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THE

FLORA OF BRITISH INDIA.

BY

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ASSISTED BY VARIOUS BOTANISTS.

VOL. V.

CHENOPODIACEÆ TO ORCHIDEÆ.

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FLORA OF BRITISH INDIA.

Order CXVII. **CHENOPODIACEÆ.**

Herbs or shrubs. *Leaves* simple, alternate, exstipulate. *Flowers* 1–2-sexual, small, usually regular, often dimorphic; bracts 1–3, or 0. *Calyx* inferior, of 3–5 free or connate sepals, imbricate in bud. *Petals* 0. *Stamens* usually 5, opposite the sepals, perigynous or hypogynous; anthers 2-celled. *Ovary* ovoid, globose or depressed, 1-celled; stigma 2–4; ovule solitary, basal or lateral, campylotropous. *Fruit* usually a utricle enclosed in the often enlarged fleshy calyx. *Seeds* horizontal or vertical, testa crustaceous, coriaceous or membranous; albumen floury fleshy or 0; embryo curved, annular or spiral.—Genera 80; species about 520, natives of all climates.

Three genera of the Tribe *Camphorosmeæ* are so characteristic of Affghan or Soongarian vegetation, that they may be expected to occur within the Indian frontier; they are *Camphorosma*, with an unequally 3–5-toothed compressed not tubercled perianth; *Panderia*, with an equally 5-lobed tubercled perianth; and *Kirilovia* with an equally 5-toothed smooth perianth.

Suborder I. Chenopodieæ. *Stem* not twining. *Bracteoles* free from the perianth. *Anthers* erect or incurved in bud.

Series 1. Cyclolobeæ. *Embryo* annular or horseshoe-like; albumen copious (0 in *Salicornia*).

Tribe I. **Euchenopodieæ.** *Stem* not jointed. *Flowers* clustered, all similar. *Leaves* flat. *Stamens* perigynous. *Embryo* usually annular.

Utricle circumciss		1. Aeroglochin.
Utricle indehiscent.	Perianth 5-partite	2. Chenopodium.
Utricle indehiscent.	Perianth 5-lobed, base thickened	3. Beta.

Tribe 2. **Atripliceæ.** *Stem* not jointed. *Flowers* dimorphic; ♂ ebracteolate, 3–5-lobed or parted; ♀ usually without perianth and enclosed in 2 free or connate bracts, except *Spinacia*. *Stamens* perigynous. *Testa* crustaceous or coriaceous; embryo annular.

Fl. ♀ ebracteolate.	Perianth 3–4-toothed	4. Spinacia.
Fl. ♀ bracteoles flat, edges united or not		5. Atriplex
Fl. ♀ bracteoles conduplicate, edges united		6. Eurotia.

Tribe 3. **Camphorosmeæ.** *Stem* not jointed. *Flowers* all similar or perianth in ♀ 0. *Stamens* hypogynous. *Utricle* naked or enclosed in the unchanged perianth. *Testa* membranous, adhering to the copious albumen; embryo horseshoe-formed.

Sepals 3–5.	Utricle crested above	7. Axyris.
Sepals 3–5, united, of ♀ 0.	Utricle crested above	8. Microgynæcium.

Tribe 4. **Corispermeæ.** *Stem* not jointed. *Flowers* 2-sexual. *Fruit* exserted from the perianth. *Seed* erect, compressed; testa membranous, adhering to the copious albumen; embryo annular.

Fruit unarmed, hidden by the large bracts . . . . . 9. CORISPERMUM.

Tribe 5. **Chenoleeæ.** *Stem* not jointed. *Flowers* all similar. *Utricle* included in the usually enlarged perianth. *Stamens* hypogynous. *Seed* usually horizontal; testa membranous or coriaceous, adhering to the scanty albumen; embryo annular.

Fruiting perianth with simple or spinescent lobes . . . 10. CHENOLEA.
Fruiting perianth with transverse wings . . . . . 11. KOCHIA.

Tribe 6. **Salicornieæ.** *Stem* fleshy, usually jointed. *Flowers* 2-sexual, immersed in cavities of the joints or between the scales of a fleshy cone. *Testa* crustaceous, fleshy or membranous.

Seed with fleshy albumen; embryo semi-annular . . . . 12. ARTHROCNEMUM.
Seed exalbuminous; embryo conduplicate . . . . . 13. SALICORNIA.

Series 2. SPIROLOBEÆ. *Embryo* spiral; albumen scanty or 0.

Tribe 7. **Suædeæ.** *Utricle* enclosed in the simply enlarged perianth. *Stem* not jointed.

Perianth 5-lobed. Leaves linear fleshy . . . . . 14. SUÆDA.

Tribe 8. **Salsoleæ.** *Utricle* enclosed in the transversely winged perianth. *Stem* jointed or not.

* *Seed horizontal. Sepals dorsally winged.*

Stem jointed . . . . . 15. HALOXYLON.
Stem not jointed . . . . . 16. SALSOLA.

** *Seed vertical. Sepals dorsally winged or not.*

Seed dorsally compressed. Stem jointed . . . . . 17. ANABASIS.
Seed laterally compressed. Sepals not winged. Anthers appendaged . . . . . 18. HALOCHARIS.
Seed laterally compressed. Sepals winged. Anthers simple 19. HALOGETON.

Suborder II. BASELLEÆ. *Stem twining. Bracteoles* 2, broad, adnate to the face of the perianth. *Filaments* straight or recurved in bud.

Filaments straight in bud. Embryo spiral . . . . . 20. BASELLA.

1. **ACROGLOCHIN,** *Schrad.*

An erect, strict, glabrous annual. *Leaves* alternate. *Flowers* minute, sessile, clustered in the axils of short axillary cymes, subtended by needle-like flowerless branches; bracts and bracteoles 0. *Sepals* 5, subacute, green. *Stamens* 1–3, filaments dilated below. *Ovary* depressed; style short, stigmas 2 subulate; ovule erect. *Utricle* disciform, depressed, circumsciss. *Seed* horizontal, testa black shining, albumen floury; embryo annular.

A. chenopodioides, *Schrad. Cat. Hort. Gött.* 1824. A. Schraderianus, *Schultes Herb.* A. persicarioides, *Moq. in DC. Prodr.* xiii. 2. 254.

Amarantus persicarioides, *Poir. Dict. Suppl.* i. 311. A. cauliflorus, *Link Enum. Hort. Berol.* ii. 389. A. diandrus, *Spreng. Neue Entd.* iii. 20. A. persicarioides and A. acroglochin, *Spreng. Syst.* i. 927. Lecanocarpus cauliflorus *Nees Pl. Hort. Bonn.* 4, t. 2. L. nepalensis, *Fisch. mss.* Blitanthus nepalensis, *Reichb. Cat. Hort. Dresd.* 1824.

WESTERN HIMALAYA; from Kashmir, alt. 8–5000 ft., to Kumaon and ? Nepal. KHASIA MTS., alt. 5–6000 ft., *J. D. H. & T. T.*—DISTRIB. Yunan.

Stem 1–2 ft.; branches 0 or short, erecto-patent, strict. *Leaves* 1–2½ in., obtuse or acute, lobulate and erose; petiole ¼–1 in. *Cymes* shorter than the leaves, ½ in. long and broad, branches rigid spreading. *Flowers* about $\frac{1}{10}$ in. diam., green.

2. CHENOPODIUM, *Linn.*

Erect or prostrate herbs. *Stem* angled. *Leaves* alternate, entire lobed or toothed. *Flowers* minute, 2-sexual, in axillary clusters or cymes. *Sepals* 3–5. *Stamens* 1–5. *Disk* 0. *Ovary* free, depressed or compressed; styles 2–3. *Utricle* membranous, included in the perianth. *Seed* horizontal or vertical, testa crustaceous, albumen floury; embryo annular.—Species about 50, all climates.

* *Scentless or fœtid herbs. Sepals* 5, *herbaceous* (not succulent in fruit). *Embryo perfectly annular.*

1. **C. album,** *Linn. Sp. Pl.* 219; erect or ascending, mealy or green, leaves rhombic deltoid or lanceolate acute or obtuse, entire toothed or irregularly lobulate, upper narrower more entire, sepals keeled covering the utricle, seed smooth keeled. *Moq. in DC. Prodr.* xiii. 2. 70; *Boiss. Fl. Orient.* iv. 901; *Wall. Cat.* 6952 (*excl.* most of C. (= *Amarantus viridis*). C. giganteum, *Don Prodr.* 74; *Moq. l. c.* C. nepalense, *Hort. Monsp.* C. album, *Linn.* C. viride, *Linn.*, and C. laciniatum, *Linn.*; *Roxb. Fl. Ind.* ii. 58, 59. C. purpurascens, *Ham., in Wall. Cat.* 6955. ? C. vulpinum, *Wall. Cat.* 6954 A.

TROPICAL and TEMPERATE HIMALAYA; from Kashmir to Sikkim, ascending to 12,000 ft. (wild and cultivated), and in WESTERN TIBET to 14,000 ft. Plains of BENGAL, the GANGETIC VALLEY and the PANJAB, KHASIA MTS., cult. DECCAN PENINSULA.—DISTRIB. Ubiquitous.

Stem 1–10 ft., rarely slender or decumbent, angled, often striped green, red or purple. *Leaves* extremely variable, in the cult. forms 4–6 in. long, with the petiole sometimes as long or longer. *Clusters* in compact or lax panicled spikes, which in cult. forms become thyrsoid. *Seeds* rarely vertical.—The cultivated forms vary from green to red.

2. **C. opulifolium,** *Schrad. in DC. Fl. Franc.* v. 372; erect or ascending, mealy, leaves broadly rhombic obtuse or acute sinuate-lobed upper similar, cymes axillary lax-fld. usually shorter than the leaves, sepals keeled partially covering the utricle, seed punctulate margin rounded. *Moq. in DC. Prodr.* xiii. 2. 67; *Boiss. Fl. Orient.* iv. 901.

CENTRAL and WESTERN HIMALAYA; Nepal, *Wallich*; Garwhal ?, *Edgeworth*; Kashmir and Lahore, alt. 6–8000 ft., *Clarke.* WESTERN TIBET, alt. 10–14,000 ft., *Thomson.*—DISTRIB. Europe, N. and W. Asia.

Very near *C. album*, and not easily distinguished in the small acute-leaved form except by the seed. In the ordinary state with broad openly sinuate obtuse leaves it is distinct enough.

3. **C. hybridum,** *Linn. Sp. Pl.* 219; erect, nearly glabrous, leaves large broadly triangular ovate long acuminate with 2–4 broad acute lobes

on each side, clusters in lax axillary and terminal almost leafless corymbose panicles, sepals obtusely keeled spreading in fruit, seed horizontal large opaque pitted hardly keeled. *Boiss. Fl. Orient.* iv. 902; *Moq. in DC. Prodr.* xiii. 2. 68; *Fl. Dan.* t. 2049.

WESTERN TIBET; Ladak, alt. 12,000 ft., *Thomson*. PESHAWUR; *Stewart*.—DISTRIB. Europe, N. Africa, N. Asia, N. America (introduced).

Stout or slender, with spreading branches, 1–3 ft. high, odour heavy. *Leaves* 3–5 in., almost shining, broadly ovate, pale green, thin, 3–5-nerved from near the usually cordate base. *Clusters* large or small.

4. **C. murale,** *Linn. Sp. Pl.* 219; nearly glabrous, leaves bright-green rhombic or deltoid-ovate acute sides lobed and sharply toothed base cuneate, clusters in lax or dense axillary divaricate cymes, sepals obtusely keeled incurved in fruit, seed horizontal dotted acutely keeled opaque. *Boiss. Fl. Orient.* iv. 902; *Moq. in DC. Prodr.* xiii. 2. 69; *Fl. Dan.* t. 2048. C. Gandhium, *Ham.* (& Chamrium, *Ham.*), *Wall. Cat.* 6953. C. Hookerianum, *Moq. in DC. Prodr.* xii. 2. 68.

UPPER GANGETIC VALLEY and the PANJAB; *Royle*, &c. KUMAON and NEPAL; *Hamilton*, &c. DECCAN PENINSULA; at Bangalore, Coimbatore and elsewhere. CEYLON; at Trincomalee, *Glenie*.—DISTRIB. Ubiquitous.

Rather fœtid. *Stem* 6–14 in., stout or slender, erect or ascending; branches decumbent. *Leaves* ¾–3 in. broad, rather shining; petiole long or short. *Spikes* sometimes very slender.

5. **C. glaucum,** *Linn. Sp. Pl.* 220; branches decumbent or prostrate, leaves oblong or ovate-oblong sinuate-lobed or -toothed very mealy beneath, clusters in short dense axillary spikes, sepals keeled nearly covering the utricle. *Boiss. Fl. Orient.* iv. 338; *Moq. in DC. Prodr.* xiii. 2. 72.

WESTERN TIBET; Ladak, alt. 12–14,000 ft., *Thomson*.—DISTRIB. Europe, N. and W. Asia, N. America, S. Chili, Australasia.

Much and widely branched, often succulent; stem 6–18 in., shining. *Leaves* ½–1 in., tip obtuse or rounded, base cuneate. *Spikes* ¼–1 in., simple or compound; lateral flowers usually 2–4-merous, with a vertical very small seed; terminal 5-merous, with a larger often horizontal seed.

** *Strongly aromatic glandular herbs. Embryo incompletely annular.*

6. **C. Botrys,** *Linn. Sp. Pl.* 219; erect, glandular-pubescent, branches and cymes spreading and recurved, lower leaves petioled ovate or oblong deeply sinuate or lobulate upper oblanceolate more entire, cymes short axillary and in long terminal racemes, sepals glandular-pubescent enclosing the utricle, seed horizontal subglobose smooth margin obtuse. *Moq. in DC. Prodr.* xiii. 2. 75; *Boiss. Fl. Orient.* iv. 903; *Sibth. Fl. Græc.* t. 253. C. ilicifolium, *Griff. Notul.* iv. 337, and *Ic. Pl. Asiat.* t. 521. C. nepalense, *Hort. Monsp.* Ambrosia Botrys, *Moq. Chenop. Enum.* 37; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 4–10,000 ft. PESHAWUR; *Stewart*. WESTERN TIBET, alt. 11–14,000 ft., a weed in fields.—DISTRIB. Europe, N. and W. Asia, N. Africa, introduced into America.

Very aromatic. *Stem* grooved and ribbed, 6–18 in. high, stout or slender. *Leaves* 1–3 in., usually oak-like, very obtuse; petiole variable. *Cymes* short, branched, flowers solitary or clustered, minute.

7. **C. ambrosioides,** *Linn. Sp. Pl.* 219; erect, puberulous and glandular, branches strict, leaves shortly petioled oblong or lanceolate obtuse

sinuate-toothed upper entire, clusters in slender axillary and terminal simple or panicled spikes, sepals enclosing the utricle, seed horizontal smooth shining margin obtuse. *Wall. Cat.* t. 6956; *Moq. in DC. Prodr.* xiii. 2. 72; *Boiss. Fl. Orient.* iv. 904; *Wight Ic.* t. 1786; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73. C. vulpinum, *Wall. Cat.* 6954 B.

BENGAL, SILHET and the DECCAN; *Wallich, Heyne,* &c.—DISTRIB. Widely spread in the Old World, introduced into America.

Usually a tall rank aromatic much-branched plant, easily distinguished by the long slender spikes of small clusters. Wight remarks that the flowers are polygamous at Coimbatore.

**** Scentless herbs. Sepals* 1–3, *succulent, baccate in fruit. Embryo imperfectly annular.*

8. **C. Blitum,** *Hook. f. in Gen. Plant.* 52; glabrous, erect or ascending, leaves petioled triangular hastate or deltoid and cordate acuminate deeply acutely unequally toothed, clusters sessile axillary and in terminal leafy spikes, perianth baccate not enclosing the utricle, seed vertical smooth margin obtuse. Blitum virgatum, *Linn. Sp. Pl.* 4; *Boiss. Fl. Orient.* iv. 905; *Moq. in DC. Prodr.* xiii. 2. 83; *Lamk. Ill.* t. 5; *Bot. Mag.* t. 276.

N.W. INDIA; Kashmir, alt. 8500 ft. WESTERN TIBET, alt. 12–14,000 ft., *Thomson,* &c.—DISTRIB. Europe, N. and W. Asia, N. Africa.

Stem 1–3 ft., rather stout, white. *Leaves* 1–3 in., bright green; petiole slender, shorter or longer than the blade. *Clusters* $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Stamen* 1. *Seed* opaque.

3. BETA, *Linn.*

Succulent herbs. *Leaves* alternate, subentire. *Flowers* 2-sexual, solitary or in axillary spiked or cymose clusters. *Perianth* urceolate, 5-lobed, cohering in fruit by their enlarged hardened bases. *Stamens* 5. *Disk* fleshy, annular. *Ovary* depressed, sunk in the disk; style short, stigmas 2–4 subulate. *Utricle* adnate to the disk and base of perianth. *Seed* horizontal, testa thin, albumen floury; embryo annular.—Species 2 (or 6–8), N. Asiatic and European.

B. vulgaris, *Linn. Sp. Pl.* 222; annual or perennial, glabrous, root-leaves ovate or oblong obtuse base cuneate or cordate cauline rhombic ovate oblong obovate or lanceolate, spikes slender panicled, flowers sessile solitary or 2–3-nate, bracts narrow acute, sepals oblong obtuse thickened at the base in fruit. *Moq. in DC. Prodr.* xiii. 2. 55; *Boiss. Fl. Orient.* iv. 898; *Lamk. Encycl.* t. 182; *Grah. Cat. Bomb. Pl.* 171; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73. B. benghalensis, *Roxb. Fl. Ind.* ii. 59; *Wall. Cat.* 6948. B. orientalis, *Roth Nov. Sp.* 181.

Cultivated in various parts of INDIA.

Stem 1–3 ft., erect, furrowed. Lower *leaves* 1–10 in., often trowel-shaped, base decurrent on the petiole, margin waved, upper short incurved. *Spikes* 6–18 in. slender; clusters remote. *Sepals* with membranous margins.—*Beet.*

4. SPINACIA, *Linn.*

Annual herbs. *Leaves* attenuate. *Flowers* dicœcious, ebracteate, males in terminal leafless spikes; females in axillary clusters. MALE fl. *Sepals* 4–5, herbaceous, simple. *Stamens* 4–5, filaments capillary. FEM. fl.

Perianth subglobose, 2–4-toothed; fruiting enclosing the utricle, coriaceous, unarmed or with 2–3 dorsal spines. *Stigmas* long, filiform, connate below. *Utricle* hard, compressed, adnate to the perianth. *Seed* vertical, testa thin, albumen floury; embryo annular.—Species 4, Oriental, 2 of them extensively cultivated.

S. oleracea, *Linn. Sp. Pl.* 1027; erect, leaves deltoid ovate acuminate acutely broadly pinnatifidly lobed, fruiting perianths free 2-spinous. *Moq. in DC. Prodr.* xiii. 2. 118; *Lamk. Encycl.* t. 814; *Grah. Cat. Bomb. Pl.* 171; *Dalz. & Gibs. Suppl.* 23. S. tetrandra, *Roxb. Fl. Ind.* iii. 771; *Wight Ic.* t. 818; *Wall. Cat.* 6949.

Cultivated throughout INDIA.—Native country unknown.

The *S. tetrandra* of Roxburgh is not the plant of Stevens, as M. de Candolle assumes it to be ("Origine des Plantes Cultivée," 79), but the common *S. oleracea*, which, as Boissier points out, is distinguished from *S. tetrandra* by the free fruiting perianths. Nevertheless De Candolle's suggestion that the cultivated *S. oleracea* is a derivative from the *S. tetrandra*, Stev., which is indigenous in the Caucasus, is a very reasonable one.—*Spinach.*

5. ATRIPLEX, *Linn.*

Herbs or shrubs, usually mealy. *Leaves* rarely opposite. *Flowers* monœ- or dicœcious. MALE fl. ebracteate. *Sepals* 3–5, oblong, obtuse. *Stamens* 3–5. FEM. fl. 2-bracteate; bracts flat, accrescent, dilated in fruit and forming a 2-valved covering to the utricle. *Perianth* 0. *Utricle* at the base of the greatly enlarged and hardened bracts; stigmas 2. *Seed* erect, or inverse and suspended from the funicle, rarely horizontal, testa various, albumen floury; embryo annular.—Species about 100, all temperate, cool and tropical regions.

* *Flowers polygamous. Seed of the female fl. vertical, of the bisexual horizontal.*

1. **A. hortensis,** *Linn. Sp. Pl.* 1053; annual, stout, erect, leaves not mealy triangular-cordate upper ovate-lanceolate, spikes axillary and in terminal panicles, fruiting bracts nearly free thin orbicular or elliptic reticulate obtuse or mucronate. *Moq. in DC. Prodr.* xiii. 2. 91; *Boiss. Fl. Orient.* iv. 907; *Grah. Cat. Bomb. Pl.* 171; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73. A. virgata, *Roth Nov. Sp.* 377; *Moq. l. c.* 97. A. bengalensis, *Lamk. Dict.* i. 276. A. heterantha, *Wight Ic.* t. 1787.

Cultivated in many parts of BENGAL, the DECCAN, N.W. INDIA and up to 12,000 ft. in the WESTERN HIMALAYA and TIBET.—DISTRIB. Cultivated in Europe and N. and W. Asia.

This, the Arroche, Orache or Mountain Spinach of the French, is of unknown origin, being found only under cultivation or in cultivated ground.—A specimen of this from Heyne, in Rottler's Herbarium, bears the name *A. virgata*, thus identifying that obscure plant, which Roth described from very young individuals.

** *Annuals, with monœcious flowers.*

2. **A. crassifolia,** *C. A. Mey. in Ledeb. Fl. Alt.* iv. 309; green and hoary, erect or ascending and diffuse, branches white, leaves petioled oblong or ovate-oblong or hastately ovate obtuse entire or sinuate-toothed upper entire often acute, male clusters in slender leafless interrupted spikes, fruiting bracts rhombic-ovate or orbicular herbaceous entire or toothed with a very thick white convex smooth disk and base. *Moq. in DC. Prodr.* xiii.

2. 93; *Boiss. Fl. Orient.* iv. 909; *Ledeb. Ic. Fl. Alt.* t. 42. A. laciniata, *Aitchison Cat. Panjab Pl.* 125, and *Herb. Ind. Or. H. f. & T.*

N.W. INDIA and the PANJAB; from the Jumna westward. KUNAWUR and WESTERN TIBET, alt. 8–12,000 ft., *Falconer, Thomson.*—DISTRIB. Affghanistan, Turkestan, Soongaria, Altai Mts.

Branched from the root; branches firm, 1–2 ft. *Leaves* usually small, 1–1½ in., pale; petiole slender. *Fruiting-bracts* very variable, from ovate with a cuneate base to orbicular, $\frac{1}{6}$–$\frac{1}{3}$ in. long.—I fear that this is only a dry country form of *A. laciniata*, L., with white stems, small leaves, and hardened disk of the bracts, which Boissier describes as smooth or tubercled (they are quite smooth in the Indian plant). The name seems a singularly inappropriate one.

3. **A. rosea,** *Linn.*? *Sp. Pl. Ed.* 2, 1493; green, mealy, branches very many diffuse slender ascending, leaves small petioled rhombic-ovate with obtuse sides and tips entire or subsinuate, male clusters in short axillary spikes, fruiting bracts small broadly triangular-hastate or flabelliform crenate thin disk coarsely reticulate or rugose. *Schkuhr Handb.* t. 350; *Fl. Dan.* 1284; *Boiss. Fl. Orient.* iv. 911. ? A. tartarica β virgata, *Boiss l. c.* 910.

WESTERN TIBET; banks of Salt Lakes, alt. 12–14,000 ft., in Sassar, Hanle, &c., *Thomson.*—DISTRIB. (of *A. rosea*) Westward to the Atlantic.

A very slender plant; branches 4–6 in., greenish-white. *Leaves* ¼–½ in., base cuneate. *Bracts* about ¼ in. broad or long, sometimes sinuate-lobed, subsessile or contracted into a hardened pedicel.—An obscure plant.

*** *Perennials, with monœcious flowers.*

4. **A. repens,** *Roth Nov. Sp.* 377; shrubby, white, stem woody prostrate rooting, leaves small petioled oblong elliptic or suborbicular obtuse, male clusters in short branched spikes, fruiting bracts united into a thick corky obovate or orbicular turgid pouch with thin free tips contracted at the base into a stout cylindric pedicel, disk smooth or rugose. *Moq. in DC. Prodr.* xiii. 2. 99. A. Kœnigii, *Wall. Cat.* 6951. A. cristata, *Kœnig mss.* A. Belangeri, *Boiss. Fl. Orient.* iv. 913. Obione Belangeri, *Moq. l. c.* 108. O. nummularia, *Moq. Enum. Chenopod.* 72. O. Kœnigii, *Moq. l. c.* 109; *Wight Ic.* t. 1790.

DECCAN PENINSULA, *Kœnig*; Tuticoreen in Tinnevelly, *Wight.* CEYLON, *Thwaites.*—DISTRIB. ? Affghanistan, Persia.

Branches woody, 1–2 ft. long, straggling or tufted and short. *Leaves* ¼–1 in. long, thick, tip rounded or retuse, base cuneate; petiole very short. *Fruiting-bracts* very variable, $\frac{1}{4}$–$\frac{1}{3}$ in. long or broad, sometimes compressed, smooth, at others almost globose with thick processes on the surface, lips very short crenate. *Radicle* pointing upwards.—The Affghan plant has smaller bracts, but of the same corky character, and with thick cylindric pedicels.

5. **A. Stocksii,** *Boiss. Diagn. Ser.* iv. 73; shrubby, white, branches woody prostrate or suberect, leaves small petioled oblong elliptic or suborbicular obtuse, male clusters axillary or in short leafy spikes, fruiting bracts cuneate at the base only orbicular or broadly ovate and suddenly contracted into a short pedicel disk small, lips broad quite entire thin reticulate. A. Griffithii, *var.* Stocksii, *Boiss. Fl. Orient.* iv. 916. A. repens, *Aitchison Cat. Pl. Panjab* 125. Obione Stocksii, *Wight Ic.* t. 1789; *Dalz. & Gibs. Bomb. Fl.* 212.

SCINDE; salt marshes at Kurrachee, *Stocks, Vicary.* GUZERAT; common, *Dalz. & Gibs.*

Habit and foliage very much like *A. repens*, but leaves often larger and fruiting-bracts very different.—Boissier has made this a variety of *A. Griffithii*, which appears

to me to differ in its much larger orbicular sinuate thin leaves, and rhombic fruiting-bracts, which are corky throughout, united to the middle, and perfectly smooth. This is Moquin's type of *Griffithii*, so named by himself. Another plant of Griffith also numbered 1751 has very large orbicular fruiting-bracts nearly $\frac{2}{3}$ in. diam., with a woody veined disk, the thin margins united all round (like an *Alyssum* fruit). As for Moquin's description, it agrees with neither of these plants, and it is difficult to account for this, and for his suggestion that *A. Griffithii* may be a var. of the Australian *A. Lindleyi*.

6. **EUROTIA,** *Adeus.*

Herbs or undershrubs, woolly or tomentose. *Leaves* small, alternate, entire. *Flowers* minute, 1-sexual. Male fl. spicate, ebracteate. *Sepals* 4, obovate, obtuse. *Stamens* 4, filaments filiform. Fem. fl. axillary, 2-bracteate; bracts conduplicate, connate with free lips, at length closing over the utricle, becoming coriaceous, veined, villous, 2-beaked, and at length splitting into 4 valves. *Perianth* 0. *Utricle* ellipsoid, compressed, membranous; stigmas 2, filiform. *Seed* sessile, free, obovoid, beaked below, testa membranous, albumen floury; embryo horseshoe-shaped.

E. ceratoides, *C. A. Meyer in Led. Fl. Alt.* iv. 239; shrubby, hoary with stellate hairs, leaves linear-oblong or lanceolate obtuse floral narrower, fruiting bracts urceolate silkily villous with long reddish hairs. *Boiss. Fl. Orient.* iv. 917; *Moq. in DC. Prodr.* xiii. 2. 120. Axyris ceratoides, *Linn. Sp. Pl.* Achyranthes papposa, *Jacq. Ic. Rar.* t. 189. A. Moorcroftiana, *Brown in Wall. Cat.* 6950; *Moq. l. c.* 117.

Western Himalaya; in the drier regions from Kunawur westward, and in Western Tibet, alt. 8–14,000 ft., *Moorcroft*, &c.—Distrib. Central Europe from Spain eastward, Affghanistan, Central Asia, Siberia, Mongolia, N.W. America.

A bush, 2–4 ft. high, stunted and dwarf at high and dry elevations; branches strict, slender, leafy, glabrous or tomentose. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., rarely ovate or elliptic, margin often recurved; petiole very short; upper sessile. *Fruiting-bracts* crowded along the upper parts of the branches conspicuous for their long silky red-brown hairs $\frac{1}{3}$ in. long.

7. **AXYRIS,** *Linn.*

Annual, stellately hairy or glabrate herbs. *Leaves* small, alternate, entire. *Flowers* minute, monœcious, ebracteate. Male fl. in terminal clusters with 3–5 hyaline sepals, often irregularly placed, and 2–5 slender stamens. Fem. fl. axillary, solitary or mixed with the males. *Sepals* 3–4, unequal, at length scarious. *Utricle* membranous, embraced by the sepals, obovoid, compressed or spherical, tip shortly winged crested or 2-auricled, stigmas capillary very long. *Seed* erect, obovoid, adhering to the utricle, testa membranous marked with concentric lines, albumen granular; embryo horseshoe-shaped.—Species 5 or 6, N. and Central Asia, N.W. America.

A. amaranthoides, *Linn. Sp. Pl.* 979; erect, branched from the base, leaves ovate or oblong obtuse or acute. *Moq. in DC. Prodr.* xiii. 2. 116; *Lamk. Encycl.* t. 753; *Schkuhr Handb.* 285^{b}. A. hybrida, *Linn.*; *Moq. l. c.*; *Schkuhr l. c.*

Western Himalaya; in the drier regions from Lahul to Kumaon, alt. 8–13,000 ft., and in Western Tibet, alt. 10–14,000 ft., *Jacquemont, Strachey & Winterbottom, Thomson,* &c.—Distrib. Turkestan, Soongaria, the Altai, Siberia, N. China.

Very variable in size, 4–10 in. high; stem stout or slender. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in.,

pale-yellowish or reddish-brown when dry; nerves faint; petiole short, slender. *A. hybrida* is, I think, only the longer branched state of *A. amaranthoides.*

Var. *humifusa*, Moq. l. c.; very small, procumbent.—Western Tibet, *Thomson, Clarke.* Topedunga (with *Microgynæcium*), *Strachey & Winterbottom.*—I suspect that the *A. prostrata* does not differ from this.

There is a fragment of an *Axyris* gathered in Lahul by the Rev. H. Jaeschke, and described as a garden weed, which has ovate obtuse leaves 1 in. long, on petioles of the same length.

8. **MICROGYNÆCIUM,** *Hook. f., Gen. Plant.* iii. 56.

A small diffuse prostrate puberulous or glabrous annual. *Leaves* alternate, petioled, ovate, entire. *Flowers* monœcious, very minute, clustered, hidden amongst the leaves. MALE fl. ebracteate. *Perianth* hyaline, 5-lobed. *Stamens* 1–4, filaments very long. FEM. fl. 2-bracteate, solitary or crowded, bracts unchanged in fruit. *Perianth* 0. *Utricle* hyaline, obliquely ovoid, turgid, compressed, covered with scattered processes, and 1–2-auricled at the top; stigmas capillary. *Seed* erect, testa coriaceous, albumen granular; embryo horseshoe-shaped.

M. tibeticum, *Hook. f. l. c.*

WESTERN TIBET; Topedunga, north of Kumaon, *Strachey & Winterbottom.* SIKKIM; at Tungu, alt. 12–14,000 ft., *J. D. H.*

Stem branched from the base, branches 1–2 in., slender. *Leaves* ¼–¾ in., green, rather fleshy, nerves indistinct; petiole half as long. *Flowers* microscopic.—A very inconspicuous plant.

9. **CORISPERMUM,** *Linn.*

Annual stiff herbs. *Leaves* alternate, rigid, 1-nerved, narrow, floral margined with white, hiding the short spikes. *Flowers* 2-sexual, ebracteolate. *Sepals* 1–3, unequal, scarious. *Stamens* 1–5, unequal. *Utricle* exserted, orbicular or oblong, compressed, hardened, margined or winged; stigmas subulate, recurved. *Seed* erect, adherent to the pericarp, testa coriaceous, albumen floury; embryo annular.—Species 8, S. Europe, N. and W. Asia, China, N.W. America.

C. hyssopifolium, *Linn.*; *Boiss. Fl. Orient.* iv. 930; glabrous or softly hairy, diffusely branched from the base, leaves linear or narrowly linear-obovate obtuse, spikes axillary and terminal dense or lax, bracts linear oblong green or margin white. *Moq. in DC. Prodr.* xiii. 2. 140; *Sibth. Fl. Græc.* t. 1.

WESTERN TIBET; alt. 10–15,000 ft., *Falconer, Thomson.*—DISTRIB. S. France, Caucasus, Soongaria to China.

Branches 6–10 in., rigid, stout or slender. *Leaves* ½–1½ in., thick, green, usually obtuse and apiculate. *Spikes* 3–6 in., continuous with the branches; bracts laxly or closely imbricate, ⅛–¼ in. long, oblong-lanceolate, acute, coriaceous. *Utricle* oblong, shining, winged all round.

10. **CHENOLEA,** *Thunb.*

Tomentose, silky or villous herbs or shrubs. *Leaves* alternate, narrow, entire. *Flowers* minute, axillary, 2-sexual and female, immersed in wool, ebracteate. *Perianth* with 5 incurved lobes, at length closing over the utricle, with the lobes usually tubercled or spinous at the back. *Stamens* 5. *Utricle* membranous, included in the crustaceous or coriaceous perianth; stigmas 2–3, capillary. *Seed* orbicular, horizontal, testa thin, albumen

scanty; embryo annular.—Species 20, S. Europe, N. Africa, Temp. Asia, Australia, with one N. American and one S. African.

1. **C. divaricata,** *Hook. f.*; annual, erect, excessively branched from the base and upwards, softly rufous villous, leaves linear obtuse, fruiting perianth with 5 acute dorsal straight spines about as long as the diameter of the disk. Echinopsilon divaricatus, *Kar. & Kiril. in Bull. Soc. Hist. Nat. Mosq.* 736. E. tibeticus, *Herb. Ind. Or. H. f. & Thoms.*

WESTERN TIBET; alt. 11–14,000 ft., *Thomson*, &c.—DISTRIB. Soongaria, W. China.

Whole plant clothed with long soft spreading hairs. *Stem* 4–15 in., stout, straight in well-developed specimens, sometimes as thick as a goose-quill, very leafy, striped green and white; branches innumerable, forming a pyramidal mass. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in. long, soft, mottled green and white (when freed of hairs). *Clusters* of flowers axillary. *Perianth* minute; sepals short, villous. *Stamens* as long as the sepals. *Utricle* depressed; styles 2, filiform.

2. **C. ? sedoides,** *Hook. f.*; annual, tall, slender, erect, hoary-tomentose or glabrate, branches ascending very slender, leaves fleshy semiterete green some filiform others oblong and minute glabrous or the upper villous, clusters 2–3-fld. in long slender spikes shorter than the floral leaves, perianth villous, fruiting with conical spines equalling the diameter of the disk or shorter often unequal. Kochia sedoides, *Schrad. Neue. Journ.* 1809, 86; *Boiss. Fl. Orient.* iv. 926. Echinopsilon sedoides, *Moq. in Ann. Sc. Nat. Ser.* 2. 127, and in *DC. Prodr.* xiii. 2. 136. Salsola sedoides, *Pall. Voy.* 280, t. 41, f. 2. S. cinerea, *Waldst. & Kit. Pl. Hung.* ii. 110, t. 106. Suæda sedifolia, *Pall. Illust.* t. 32, 33, 34.

SCINDE, *Stocks.*—DISTRIB. Siberia, Soongaria, Caucasus to Bulgaria.

The specimens are flowerless, but seem to belong to this species. *Stem* white. *Leaves* $\frac{1}{10}$–$\frac{1}{4}$ in., often gibbous at the base below, then at the tips of the branches longer and villous with tawny hairs, but for which the plant might be taken for a *Suæda.*

11. KOCHIA, *Roth.*

Villous or pubescent rarely glabrous undershrubs or herbs. *Leaves* alternate, sessile, narrow, entire. *Flowers* minute, 2-sexual and female, axillary, ebracteate. *Perianth* subglobose, lobes 5 incurved, fruiting closing over the utricle coriaceous girt by 5 free or confluent horizontal wings. *Stamens* 5; anthers large, exserted. *Utricle* depressed, membranous; style slender, stigmas 2–3 capillary. *Seed* orbicular, horizontal, testa membranous, albumen scanty; embryo annular.—Species 20, S. Europe, Temp. Asia, N. and S. Africa, Australia, N.W. America.

* *Perennials.*

1. **K. prostrata,** *Schrad. Neue. Journ.* 1809, 85; a villously pubescent low undershrub with a very stout woody rootstock, branches slender erect or spreading, leaves flat linear subacute, clusters in long leafy spikes, wings of fruiting perianth subquadrate hard and scarious strongly nerved crenate about equalling the diameter of the disk. *Boiss. Fl. Orient.* iv. 923; *Moq. in DC. Prodr.* xiii. 2. 132. Salsola prostrata, *Linn.*; *Jacq. Fl. Austr.* t. 294. Chenopodium Augustanum, *All. Fl. Pedem.* ii. 198, t. 38, f. 4.

WESTERN HIMALAYA; in the dry regions of Kunawur and Zanskar; and in WESTERN TIBET, alt. 10–14,000 ft., *Thomson*, &c.—DISTRIB. Westwards to Spain and N. Africa, Siberia, Central Asia.

Rootstock as thick as the thumb; branches very numerous, 6–10 in., as well as the leaves and flowers densely fulvous-villous. *Leaves* $\frac{1}{3}$–$\frac{1}{2}$ in., nerveless. *Spikes* slender. *Fruiting-calyx* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., margins of adjacent wings approximate.

** *Annuals* (*always ?*).

2. **K. odontoptera,** *Schrenk in Bull. Acad. Petersb.* i. 361 (1843); annual, diffusely branched from the base, densely tomentose, leaves small short flat linear acute, clusters in long or short simple or branched leafy spikes, wings of fruiting perianth cuneate or flabellate scarious strongly nerved crenate-lobed about equalling the diameter of the disk. *Boiss. Fl. Orient.* iv. 924. K. stellaris, *Belang. Voy. Or. Ic. ined.* K. odontoptera & K. stellaris, *Moq. Enum. Chenopod.* 93, and in *DC. Prodr.* xiii. 132. Panderia pilosa, *Herb. Ind. Or. H. f. & T. in part.*

WESTERN TIBET, alt. 8–12,000 ft., *Thomson.*—DISTRIB. Affghanistan, Turkestan, Persia.

Root sometimes as thick as the finger and possibly perennial; branches long or short, slender; pubescence closer and paler than in *K. prostrata;* leaves much shorter, $\frac{1}{6}$–$\frac{1}{4}$ in. long; wings of fruiting perianth narrower, contracted at the base, the margins of adjacent ones distant.—I follow Boissier in identifying this with Schrenk's *K. odontoptera.*

3. **K. scoparia,** *Schrad. Neue. Journ.* 1809, 85; annual, glabrous or pubescent, strict, erect, leaves green linear-lanceolate acute, clusters in leafy panicled spikes, wings of the fruiting perianth short semicircular scarious nerved entire shorter than the diameter of the disk. *Boiss. Fl. Orient.* iv. 925; *Moq. in DC. Prodr.* xiii. 2. 130. Chenopodium scoparia, *Linn.*

NORTH-WEST INDIA, *Royle, Jacquemont.*—DISTRIB. N. and Central Asia to Japan and westward to Spain.

A tall herb, 3–5 ft.; branches erect and stem white smooth, usually glabrous, the ultimate twigs pilose or villous. *Leaves* 1–1½ in., midrib distinct. *Fruiting-perianth* described as being very variable.—The characters given above apply to the only Indian specimen I have seen; it is Royle's, and without particular locality; others have the wings reduced to a short acute tubercle, or are quite simple.

4. **K. indica,** *Wight Ic.* t. 1791; annual? softly villous, diffusely branched from the base, branchlets divaricate long, leaves small elliptic or linear-oblong acute, wings of fruiting perianth short broadly triangular-ovate obtuse thick nerveless much shorter than the diameter of the disk. K. Griffithii, *Bunge in Boiss. Fl. Orient.* xiii. 2. 924. Panderia pilosa, *Herb. Ind. Or. H. f. & T. in part.*

NORTH-WEST INDIA, from Delhi to the Indus, common. DECCAN PENINSULA salt soils at Coimbatore, *Wight.*—DISTRIB. Affghanistan.

Branches of this closely resemble long ones of *K. prostrata* in hairiness, &c., but the habit is much more straggling, the plant is apparently annual, and the wings of the fruiting perianth are very different. Wight states that the flowers are sometimes male only, and I think it probable that fertile males are on different plants from the female or hermaphrodite. Boissier observed that Wight's plant is the same as *Griffithii,* but was unaware that Wight had published it. The Panjab plant distributed under "Herb. Ind. Or. H. f. & T." as *K. scoparia,* is, I think, rather referable to *K. indica.*

XII. ARTHROCNEMUM, *Moq.*

Fleshy leafless jointed shrubs or herbs. *Flowers* minute, 2-sexual, 2–3 together in the axils of the scales of sessile cone-like spikes, 2-bracteate.

Perianth obpyramidal, 3–4-gonous. *Stamen* 1. *Utricle* compressed, membranous; stigmas 2–3. *Seed* inverse, compressed, testa membranous, albumen fleshy; embryo dorsal, comma-shaped, radicle stout inferior.—Species 7 or 8, of temperate and tropical saline places.

1. **A. indicum,** *Moq. Chenopod. Enum.* 113, and in *DC. Prodr.* xiii. 2. 151; stem prostrate woody, branches short diffuse ascending, joints $\frac{1}{4}$–$\frac{1}{3}$ in. diam., spikes cylindric broader than the joints, floral joints very short hardly 2-lipped concealing the flowers. *Ung. Sternb. in Atti Bot. Congr. Firenz.* 1874, 282; *Dalz. & Gibs. Bomb. Fl.* 212. Salicornia indica, *Willd. in Nov. Act. Hist. Nat.* ii. 3, *ex Vahl Enum.* i. 10; *Wight Ic.* t. 737; *Roxb. Fl. Ind.* 185, and *Ed. Carey & Wall.* i. 84; *Grah. Cat. Bomb. Pl.* 171.

BENGAL; in salt marshes, *Roxburgh.* NORTHERN CERCARS, *Wight.* BOMBAY, *Graham*, &c.—DISTRIB. Trop. Africa.

Stems several feet long, branches opposite and alternate, 1–3 in. high; joints $\frac{1}{6}$–$\frac{1}{3}$ in. long, mouth slightly dilated. *Spikes* $\frac{1}{2}$–1 in. long, joints $\frac{1}{6}$ in. deep, cup-shaped, closely imbricate, fruiting very spongy with thin margins. *Fruiting-perianths* 3 together, shorter than the cup-shaped joints, closely appressed, laterally compressed, spongy, gibbous towards the axis of the spike, flat towards the cup; top broadly truncate with a minute hole for the protrusion of the stigmas. *Stamens* not seen. *Utricle* adnate to the perianth, ovoid, compressed, indurated. *Seed* free, erect, orbicular, testa membranous; embryo and albumen of the genus.

2. **A. ? glaucum**, *Ung. Sternb. in Atti Bot. Congr. Firenz.* 1874, 283; shrubby, densely branched, joints $\frac{1}{10}$–$\frac{1}{6}$ in diam., spikes hardly stouter than the branches, floral joints not closely imbricating, fruit exposed. *Boiss. Fl. Orient.* iv. 932. A fruticosum, *var.* glaucum, *Moq. in DC. Prodr.* xiii. 2. 151.

DECCAN PENINSULA, *Herb. Wight* (*Kew Distrib.* No. 2474, 2475). CEYLON, *Thwaites.*—DISTRIB. Mediterranean, W. Asia, Trop. Africa.

Apparently tall, stem below as thick as the little finger; branches many, erect or ascending, slender. *Male flowers* (in threes, consisting of 3 stamens each in a membranous perianth ?). *Female spikes* about as long as broad, obscurely 2-lipped. *Utricle* flagon-shaped, enclosed in the broadly ovoid spongy perianth, which has a minute hole for the protrusion of the stigmas. *Seeds* orbicular, testa black thinly crustaceous; embryo and albumen of the genus.—I am not quite sure as to the structure, &c., of the male flowers (No. 2474), and am doubtful as to its distinctness from *A. fruticosum.* It is, I think, monœcious.

XIII. **SALICORNIA,** *Linn.*

Herbs or shrubs with the habit of *Arthrocnemum*, but with the flowers sunk in cavities of the joints. *Perianth* obpyramidal, 3–4-toothed, fruiting spongy. *Stamens* 1–2. *Utricle* included in the spongy perianth, membranous; stigmas subulate. *Seed* erect, compressed, testa hispid with hooked hairs, albumen 0; embryo conduplicate, radicle inferior parallel to the folds of the cotyledons.—Species 8, temperate and tropical.

S. brachiata, *Roxb. Fl. Ind.* i. 84, and *Ed. Wall. & Carey*, i. 82; perennial erect with diffuse opposite rather slender branches, joints stout shortly bifid, lobes rounded, spikes slender cylindric. *Wall. Cat.* 6941; *Wight Ic.* t. 738; *Moq. in DC. Prodr.* xiii. 2. 145; *Ung. Sternb. in Atti Bot. Congr. Firenz.* 1874, 304. Arthrocnemum indicum, *Thwaites Enum.* 246.

BENGAL; in salt marshes, *Roxburgh.* TANJORE, *Wight.* CEYLON, north of the island, *Thwaites.*

Stem woody, 12–18 in., thick at the base, much branched; branches about $\frac{1}{6}$–$\frac{1}{4}$ in. diam.; lobes of joints with (when dry) membranous margins. *Flowers* 3-nate. *Stamen* 1. *Utricle* ovoid, subacute, styles distinct. *Testa* thinly coriaceous; embryo hooked, both ends pointing downwards.—Moquin erroneously cites Nepal as a habitat, and suggests its not being distinct from *S. herbacea*, which it does not resemble. Roxburgh describes the perianths as flask-like, fleshy, with a longitudinal slit for the exsertion of stamens and styles, and as adhering together firmly and to the joints till the seed is ripe.

XIV. **SUÆDA**, *Forsk.*

Herbs or shrubs. *Leaves* fleshy, terete, rarely flattish. *Flowers* minute, axillary, usually 2-sexual, bracteate and 2-bracteolate. *Perianth* short, 5-lobed or -partite; lobes or segments equal or unequal, simple or gibbous or subwinged. *Stamens* 5, short. *Utricle* included, membranous or spongy; stigmas 2–5, minute, subulate, recurved. *Seed* erect, oblique or horizontal, testa crustaceous or coriaceous, albumen scanty or 0; embryo plano-spiral. —Species about 40, in saline shores and deserts.

Many annual species have dimorphic flowers; viz. summer ones with albuminous seeds and crustaceous testa, and autumnal ones with larger almost exalbuminous seeds and a membranous testa. I am far from sure that I have correctly determined the names and synonymy of the Indian species.

* *Perennials. Styles usually* 3–5, *rarely* 2.

1. **S. fruticosa**, *Forsk. Fl. Æg. Arab.* 70; suberect or decumbent, branches erect or divaricate, leaves $\frac{1}{2}$-terete linear or ellipsoid obtuse floral very short, spikes slender leafy, flowers axillary solitary or 2–3-nate, 2-sexual, fruiting perianth subglobose segments obtuse incurved, styles 3 short, seed vertical or horizontal, testa black shining. *Boiss. Fl. Orient.* iv. 939; *Moq. in DC. Prodr.* xiii. 2. Salsola fruticosa, *Linn.*; *Grah. Cat. Bomb. Pl.* 17; *Engl. Bot.* t. 635; *Cav. Ic.* t. 285; *Sibth. Fl. Græc.* t. 255. S. indica, *Wall. Cat.* 6946 C. S. Lana, *Edgew. in Hook. Journ. Bot.* ii. (1840) 286; *Moq. l. c.* 190.

North-West India; from Delhi, and throughout the Panjab, westward to the Indus, common in the plains.—Distrib. Westward to the Atlantic, Africa and America.

Stem and branches usually slender. *Leaves* very variable, $\frac{1}{6}$–$\frac{1}{2}$ in. long.—I have seen no specimen of Edgeworth's *Salsola Lana*, which I assume from his description and locality to be *S. fruticosa*. Bunge, according to Boissier (Fl. Or. iv. 950, under *Haloxylon recurvum*) refers it to *Schoberia indica*.

2. **S. monoica**, *Forsk. Fl. Æg. Arab.* 70; shrubby, branches suberect, leaves linear flattish obtuse, spikes leafy panicled, flowers axillary 2–3-nate polygamous, bracts minute scarious entire, fruiting perianth obovate-oblong lobes obtuse incurved, styles 2–5 short, seed vertical, testa black shining. *Boiss. Fl. Orient.* iv. 940; *Moq. in DC. Prodr.* xiii. 2. 156; *Wight Ic.* t. 1792. S. nudiflora, *Thwaites Enum.* 246.

South Deccan; on the sea coast at Tinnevelly, and Tuticorin, *Wight*. Ceylon, *Moon*, &c.—Distrib. Arabia, Trop. Africa.

I am in great doubt about this Indian plant, which in a dry state is difficult to distinguish from *S. fruticosa* and *vermiculata*. Boissier, l. c. 940, says that Thwaites' *S. indica* is *S. monoica*, but Thwaites quotes *Wight Ic.* t. 1796, which has densely crowded flowers (not 2–3 together as Boissier describes). Boissier (under *S. fruticosa*) further says that all the specimens he has seen of *S. indica*, Willd., are referable to *S. fruticosa* or *monoica*. The plant I have here called *monoica* is Wight's t. 1792;

it has a longer fruiting-perianth than *S. fruticosa*, which is very shortly lobed, and the bracts are smaller and more entire; it is also more erect.

3. **S. nudiflora,** *Moq. in Ann. Sc. Nat. Ser.* xxiii. 316, and in *DC. Prodr.* xiii. 2. 155; stem woody diffusely branched, leaves semiterete obtuse ellipsoid or the lower linear or obovate-oblong, bracts hyaline toothed often forming persistent stellate tufts, flowers crowded in dense globose clusters forming leafless spikes polygamous, fruiting perianth obovoid lobes short, styles 3, seed erect, testa crustaceous black. *Dalz. & Gibs. Bomb. Fl.* 213. S. indica, *Moq. l. c.*; *Wight Ic.* t. 1796; *Thwaites Enum.* 246; *Dalz. & Gibs. l. c.*; *Wall. Cat.* 6946 A. Salsola nudiflora, *Willd. Sp. Pl.* ii. 1313; *Roxb. Fl. Ind.* ii. 60; *Grah. Cat. Bomb. Pl.* 270. S. fruticosa? *Wall. Cat.* 6944. S. elata, *Wight in Wall. Cat. l. c.* Chenopodium prostratum, *Roxb. mss.*

On the sea coast; BENGAL, BOMBAY, the DECCAN and CEYLON.

I retain this species with much hesitation, suspecting that it is a form of *S. monoica*, Forsk., or *S. vermiculata*, Forsk. It is evidently a common coast plant; and there is a good figure of it in Roxburgh's Icones, with the mss. name of *Chenopodium prostratum*, by which it is by inadvertence alluded to (under *S. indica*) in Roxburgh's Flora (ii. 62). The stellate tuft of toothed bracts left at the axils of leaves after the fruiting perianths have fallen away, is often a very marked character, as are the leafless spikes of confluent globose many-fld. clusters.

** *Annuals. Styles* 2.

4. **S. maritima,** *Dumort. Fl. Belg.* 22; erect, glaucous green, glaborous, branched usually from the base, leaves linear or filiform semiterete floral very small, clusters of flowers minute in very slender spikes, fruiting perianth depressed lobes rounded covering the utricle, styles long slender, seed usually horizontal. *Boiss. Fl. Orient.* iv. 941; *Trimen in Journ. Bot.* xxiii. (1885) 173. S. nudiflora, *Moq. in DC. Prodr.* xiii. 2. 155. Chenopodium maritimum, *Linn.; Engl. Bot.* t. 633; *Fl. Dan.* t. 489. Schoberia maritima, *C. A. Mey. in Ledeb. Fl. Alt.* i. 400. Chenopodina maritima, *Moq. l. c.* 161. C. indica, *Wight l. c.* t. 1793. Salsola salsa, *Jacq. Hort. Vind.* iii. 44, t. 83. S. indica, *Willd. Sp. Pl.* i. 1317, *ex Roxb. Fl. Ind.* ii. 62; *Wall. Cat.* 6946 F; *Grah. Cat. Bomb. Pl.* 170. S. nudiflora, *Wall. Cat.* 6945. S. sativa, *Wight in Wall. Cat. l. c.*

UPPER GANGETIC PLAINS; Delhi, *Clarke*. Sea coast of BENGAL, BOMBAY, the DECCAN and CEYLON.—DISTRIB. Siam, Europe, N. Africa, N. and W. Asia, N. America.

This appears to be the European plant, though apparently sometimes becoming woody, if not shrubby. Roxburgh indeed describes it as a perennial, but his figure is that of an annual. Graham states that it is universally eaten and an essential article of food during famines. Wallich's (not Willdenou's) *Salsola nudiflora* is a common state with the floral leaves shorter than the clusters. Trimen (l. c.) describes as an erect variety of *S. maritima*, a plant with slender ascending branches and very short leafy bracts, which is found in salt pans in Ceylon with *S. nudiflora & indica*, adding that it is not the *S. indica* of Wight Ic. t. 1793. I have no material for ascertaining what it is.

5. **S. corniculata,** *Hook. f. in Gen. Pl.* iii. 67; slender, small, diffusely branched from the base, leaves $\frac{1}{8}$–$\frac{1}{4}$ in. oblong or linear-oblong obtuse floral ovate, flowers very minute 2–3-nate axillary unisexual?, perianth turbinate fleshy lobes gibbous behind or two produced into rounded vertical wings, utricle orbicular membranous adherent to the perianth, seed vertical or horizontal not or hardly beaked some subglobose with thinly coriaceous pale testa, others lenticular with black crustaceous testa. Schoberia corniculata,

C. A. Mey. in Ledeb. Fl. Alt. i. 399, and *Ic. Fl. Ross.* t. 195; *Moq. in DC. Prodr.* xiii. 2. 166.

WESTERN TIBET; Parang Valley and Hanle Plains, alt. 14–15,000 ft., *Thomson.*—DISTRIB. Soongaria, Siberia.

Glaucous; branches 4–8 in., spreading and ascending, white. *Leaves* scattered or crowded, pale when dry. *Bracts* microscopic, jagged. *Flowers* extremely minute; perianth fleshy but thin.—The black seeds occur indiscriminately amongst the pale.

6. **S. microsperma,** *Ledeb. Fl. Ross.* iii. 785; diffusely branched from the base, leaves $\frac{1}{8}$–$\frac{1}{3}$ in. linear-oblong obtuse flattish floral oblong, flowers very minute 2–5-nate axillary 2-sexual, perianth subglobose lobes equal rounded obscurely tubercled in fruit, utricle orbicular membranous adherent to the perianth, seed vertical or horizontal orbicular with a long beak, testa thinly coriaceous pale. *Boiss. Fl. Orient.* iv. 943. Schoberia microsperma, *C. A. Mey. in Eichw. Pl. Casp. Cauc.* 14, t. 13. Chenopodina prostrata & parviflora, *Moq. in DC. Prodr.* xiii. 2. 163, 165. C. pygmæa, *Moq.? Herb. Ind. Or. H. f. & T.*

WESTERN TIBET; banks of the Indus, and of Lake Thogji Chumo, alt. 13–15,500 ft., *Thomson*; Lake Pangong, *H. Strachey.*—DISTRIB. Siberia, Lake Aral, Soongaria.

This appears to me to be very near *S. corniculata*, having the same structure and minute size of perianth seed, &c., but the perianth is globose without the gibbosities of that plant, and the seed has the radicular end produced into a long beak. *S. microsperma* is described as having a black shining testa, which I do not find in either the Tibetan or Soongarian specimens, and it is reasonable to suppose that the seeds are dimorphic in this as in *S. corniculata.*

15. HALOXYLON, *Bunge.*

Shrubs or small trees with opposite jointed branches. *Leaves* opposite, triangular and very short, or longer and terete. *Flowers* small solitary or spicate, axillary, 2-sexual, 2-bracteolate. *Sepals* 5, concave, accrescent and horizontally winged. *Stamens* 5 or fewer, on the margin or base of a cupular disk with alternating rounded or square staminodes. *Utricle* globose or depressed, enclosed in the perianth; stigma 2-lobed or stigmas 3–4 recurved. *Seed* horizontal, testa membranous, albumen 0; embryo plano-spiral.—Species 8–10, S. Europe, W. and Central Asia, Indian.

This genus might be united to *Anabasis*, differing only in the position of the seed.

* *Leaves distinct.*

1. **H. recurvum,** *Bunge in Boiss. Fl. Orient.* iv. 949; tall, glabrous, pruinose, dark brown, paniculately branched, branches divaricate, leaves $\frac{1}{8}$–$\frac{1}{3}$ in. trigonous or semiterete ovate-subulate or ellipsoid obtuse or acute, floral about equalling the axillary flowers, stigma obtuse or obscurely 2-lobed, fruiting sepals with large erect ovate obtuse lips and orbicular erose scarious wings. H. recurvum & H. Stocksii, *Hook. f. in Gen. Pl.* iii. 70. Caroxylon recurvum, *Moq. in DC. Prodr.* xiii. 2. 175. C. indicum, *Wight Ic.* t. 1794. Salsola Stocksii, *Boiss. Diagn. Ser.* 2. iv. 75. S. Lana, *Stocks mss.* S. recurva, *Wall. Cat.* 6943.

The WESTERN PANJAB PLAINS and SALT RANGE, ascending to 2500 ft., *Edgeworth, Stewart.* SCINDE, *Stocks.* SOUTH DECCAN PENINSULA; Coimbatore, *Wight.* BURMA; banks of the Irawaddi, *Wallich.*—DISTRIB. Affghanistan, Yunan.

A straggling bush, blackish when dry, several feet high with long spreading

strict or recurved branches a foot long or less, ending in strict spikes 2–6 in. long; joints of stem $\frac{1}{2}$–$\frac{3}{4}$ in. apart, of spikes $\frac{1}{4}$ in. or less. *Sepals* obtuse; fruiting perianth $\frac{1}{4}$ in. diam. *Style* elongate. *Staminodes* rounded.—The Scinde specimens have more fleshy and obtuse leaves; most of the Coimbatore and all the Panjab ones are very robust with strict branches; the Burmese ones and one of the Coimbatore are much more slender with recurved branches. In the "Genera Plantarum' I proposed the name *S. Stocksii* for the Scinde specimens, regarding them as distinct from the Burmese by their much stouter habit and thicker obtuse leaves, but more copious specimens from all the localities have convinced me that all are forms of one variable plant. Boissier gives Beluchistan as the locality for Stocks's specimens, but those in the Kew and Wight's Herbaria are from Scinde.

2. **H. Thomsoni,** *Bunge in Boiss. Fl. Orient.* iv. 950; a dwarf hoary pale puberulous much-branched shrub, leaves $\frac{1}{4}$–$\frac{1}{2}$ in. linear terete obtuse floral shorter and small rounded bracteoles villous in the axils, flowers often densely crowded, fruiting sepals with very short rounded tips and orbicular or subreniform scarious entire wings, stigmas 2 linear-oblong. H. Griffithii ?, *Herb. Ind. Or. H. f. & T.* (*not of Boissier*).

Western Tibet; alt. 10–14,000 ft., *Falconer, Thomson.* Shigar Valley, alt. 7–8000 ft., *Clarke, Bellew.*

Rootstock short, stout, woody, sending up many branches 4–10 in. high; branches woody below, rather slender, glaucous; branchlets divaricate, rather slender, joints 1 in. or less. *Flowers* 2–3-nate or in globose clusters which are broader than the floral leaves. *Perianth* $\frac{1}{10}$ in. long in flower, in fruit $\frac{1}{4}$ in., wings brown. *Ovary* laxly woolly.—Very near *C. Griffithii*, but the leaves are always developed, and there are only 2 stigmas.

Var. *gracillima*; 12–18 in. high, extremely slender, paniculately branched, flowers more distant subsolitary.—Iskardo, alt. 8000 ft., *Clarke.* In flower only.—Habit much more slender, but the flowers are identical.

** *Leaves reduced to the dilated tips of the joints.*

3. **H. salicornicum,** *Bunge in Boiss. Fl. Orient.* iv. 949; a low erect strict pale almost leafless shrub, joints produced into two very short triangular points woolly within, spikes long erect, bracteoles ovate axils woolly, fruiting sepals with very short obtuse tips and flabelliform scarious white crenate wings, stigmas subclavate. Caroxylon salicornicum, *Moq. in DC. Prodr.* xiii. 2. 174.

Scinde; *Stocks* (*in Herb. Dalzell*).—Distrib. Beluchistan, Affghanistan.

Stem woody, 1-2 ft. high; branches erect or ascending, terete; joints of stem $\frac{1}{2}$ in., of branches about $\frac{1}{4}$ in., of spikes shorter. *Fruiting-perianth* about $\frac{1}{4}$ in. diam., tips of sepals with membranous margins, wings often irregularly developed.—Possibly the specimen in Dalzell's Herbarium is from Beluchistan, though marked Scinde; it is in flower only.

4. **H. multiflorum,** *Bunge in Boiss. Fl. Orient.* ix. 949; a low erect pale much-branched almost leafless shrub, joints produced into two very short rounded tips, spikes short, bracteoles orbicular concave, sepals very short obtuse, fruiting sepals with very short obtuse tips and orbicular cordate or flabellate scarious wings, stigmas lanceolate. Anabasis multiflora, *Moq. in DC. Prodr.* xiii. 2. 212.

North-Western Panjab Plains, and the Salt Range, ascending to 2000 ft., *Stewart.*—Distrib. Affghanistan.

Closely allied to *H. salicornicum*, but much lower, 4–6 in. high, with a very stout woody stem and almost fascicled branches; the leaves and bracteoles are much broader, not woolly, the spikes shorter, and fruiting perianth larger, $\frac{1}{3}$ in. diam.

16. **SALSOLA,** *Linn.*

Herbs or shrubs; branches not jointed. *Leaves* usually alternate, sessile, often short and pungent. *Flowers* small, solitary or fascicled, axillary, 2-sexual, 2-bracteolate. *Sepals* 4–5, concave, fruiting accrescent usually horizontally and broadly winged above the middle, completely embracing the utricle. *Stamens* 5 or fewer, usually hypogynous. *Utricle* ovoid or orbicular, fleshy or membranous; stigmas 2–3, subulate or linear. *Seed* usually horizontal, testa membranous, albumen 0; embryo spiral.—Species 40, Europe, N. and S. Africa, Temp. Asia, Australia, N. America.

* *Annual spinescent herbs. Leaves ovate-subulate or linear.*

1. **S. Kali,** *Linn.*; *Boiss. Fl. Orient.* iv. 954; pubescent, scabrid or glabrous, diffusely branched from the base, branches stout rigid, leaves short subulate-lanceolate from a ½-amplexicaul base thick rigid pungent, flowers 1–3 together axillary or subspicate, bracts and sepals subequal pungent, fruiting perianth cartilaginous base rounded, wings obovate orbicular or reniform scarious sometimes obsolete. *Moq. in DC. Prodr.* xiii. 2. 187. ? S. Jacquemontii, *Moq. l. c.* 188.

North-Western Panjab; Peshawur, *Stewart.* Western Tibet, alt. 12–14,000 ft., *Thomson,* &c.—Distrib. Westward to the Atlantic, N. Asia, N. and S. Africa, Australia, N. America.

Usually glaucous; stem 6–18 in. rarely erect, and branches soft and pithy within, striped green and white. *Leaves* ½–1½ in., spreading and recurved. *Fruiting-perianth* ¼–⅓ in. diam., transparent, often rose-coloured. *Seed* adherent to the utricle.

2. **L. collina,** *C. A. Mey. in Led. Fl. Alt.* i. 393; erect or decumbent, simple or branched, protean in habit and foliage, glabrous or hispid, leaves ovate rigid or broadly subulate or linear and flaccid tip pungent base ½-amplexicaul, floral similar much longer than the bracts, flowers 1–3 axillary, perianth membranous, sepals lanceolate equal or unequal, fruiting dimorphic, either little changed and adnate below to and enclosed within the hardened and thickened bases of the floral leaf, bracts and bracteoles, or with the the bracts, &c., unchanged and the sepals becoming broadly equally or unequally winged. *Moq. in DC. Prodr.* xiii. 2. 188; *Pall. Ill. Pl.* 34, t. 26; *Ledeb. Fl. Ross.* iii. 800.

Kunawur, *Herb. Royle.* Western Tibet, alt. 12–15,000 ft., common, *Thomson, Clarke.*—Distrib. S. Russia, Siberia, Soongaria.

A most puzzling plant, usually smaller in all its parts than *L. Kali,* so variable in habit that it is difficult to believe that the various Tibetan forms are referable to one species. The originally described form, well figured by Pallas, has diffuse stiff branches uniformly clothed throughout with imbricating ovate-lanceolate appressed coriaceous green leaves ¼–⅓ in. long, with white margins and 1–2 flowers in the axils of each, with ovate erect pungent bract and bracteole; its exact counterpart occurs in Tibet. The greatest contrast to this is a strict erect simple or branched form, with scattered distant spreading cylindric or filiform flaccid leaves an inch long, and axillary flowers sunk in the hardened nut-like connate bases of the leaf bracts and bracteoles. Another form is 6–14 in. high, erect, with green striped stout stem and branches, and rigid spreading or recurved or flexuous spinescent linear or lanceolate leaves ¼–½ in. long. Another has stout branches spreading on the ground, with filiform leaves 1½ in. long. Another form has dense squarrose tufts of branches beset closely with rigid subulate recurved imbricating leaves ⅛–¼ in. long. The perianth is as variable as the habit and foliage: when the perianth becomes winged, it is rarely regularly so; when the bases of the bracts, &c., become indurated round the flower, the sepals rarely

become winged; their indurated bases vary from $\frac{1}{8}$–$\frac{1}{4}$ in. long, are pale and smooth, rounded and often gibbous, or bigibbous below; they are very thick and woody; they occur on the same plant with the normal fruiting-bracts. Ledebour notices a similar condition of *S. Kali* as lusus *nodiflora* (Fl. Ross. iii. 799). He regards *collina* as a species between *S. Kali* & *tamariscinum*, differing from *Kali* in the bracts being never rigidly spinescent, and the fruiting perianth being always membranous below, and from both in the minute perianth wings: these distinctions altogether break down in Tibetan and other examples of *S. collina*.

** *Unarmed shrubs. Leaves minute subglobose.*

3. **S. fœtida,** *Del. Fl. Ægypt.* 57; a stout hoary pale excessively branched shrub with stout stem and filiform crowded branchlets clothed with uniformly minute subglobose fleshy leaves, floral leaves imbricate rather longer, forming short spikes, bracteoles like the leaves, fruiting perianth minute ($\frac{1}{10}$ in. diam.) silvery-white, wings symmetrical rounded margins often overlapping, stigmas 2 recurved. *Boiss. Fl. Orient.* iv. 961. S. Moorcroftiana, *Wall. Cat.* 6947 (and misspelt S. Marosteum by *Moq. in DC. Prodr.* xiii. 2. 191). S. indica, *Herb. Royle.* S. spinescens, *Wight Ic.* t. 1795. Caroxylon fœtidum, *Moq. in l. c.* 178.

PANJAB PLAINS, UPPER GANGETIC PLAIN, from Delhi, *Moorcroft*, westwards, *Royle, Edgeworth*, &c. SCINDE, *Stocks.*—DISTRIB. Beluchistan, Persia, Arabia, N. Africa.

A large shrub, stinking of rotten fish (in Egypt, not hitherto observed in India), forming dense masses of filiform twigs and minute leaves, amongst which the little perianths shine like silver stars.—The branchlets often bear globose villous galls, $\frac{1}{4}$–$\frac{3}{4}$ in. diam., beset with linear leaves, and caused by insect-puncture.

4. **S. verrucosa,** *M. Bieb. in Mem. Soc. Hist. Nat. Mosq.* i. 141; a stout hoary shrub or tree with the habit and leaves of *S. fœtida*, but flowers in dense clusters and spikes, and fruiting perianth $\frac{1}{4}$–$\frac{1}{3}$ in. diam. dark brown. *Boiss. Fl. Orient.* iv. 961; *Moq. in DC. Prodr.* xiii. 2. 180. S. dendroides, *Pall. Ill. Pl.* t. 14 (*with the leaves too thick, according to Boiss.*). S. georgica, *Bunge in Ledeb. Fl. Ross.* iii. 814.

NORTH-WESTERN PANJAB; lower hills and the Peshawur Valley, *Stewart.* DISTRIB. Siberia, Persia, Armenia, the Caucasus, S. Russia.

Boissier says that this differs from *S. fœtida* in the lower leaves being filiform, 1–1½ lines long, and the others he describes as "½-terete filiform slender;" but this does not at all agree with any of the numerous specimens in Herb. Kew, except one of a var. *glabrescens* (Caucasus, *Hohenacker*). Some specimens have smaller and white fruiting-perianth, approaching those of *S. fœtida*.—This plant is (like *S. fœtida*) infested with galls.

17. ANABASIS, *Linn.*

Perennial herbs or shrubs, branches jointed. *Leaves* opposite, fleshy or obsolete. *Flowers* small, solitary or clustered, axillary, 2-sexual, female minutely 2-bracteolate. *Sepals* 5, scarious, fruiting winged or not. *Stamens* 5, on a short disk, alternating with 5 staminodes. *Utricle* included or exserted, subglobose, dorsally compressed, dry or fleshy; style short, stigmas 2 subulate. *Seed* erect, orbicular, compressed, testa membranous or coriaceous, albumen 0; embryo spiral.—Species 15, S. Europe, N. Africa, W. and Central Asia.

1. **A. phyllophora,** *Kar. & Kir. in Bull. Soc. Nat. Mosq.* 1840; a dwarf glabrous pale leafless shrub, stems many erect from a woody stock, joints long terminating in two triangular acute teeth (leaves), flowers soli-

tary in opposite axils spicate, staminodes ciliolate, fruiting perianth with 3 conniving wings the posterior largest. *Boiss. Fl. Orient.* iv. 970 (*from which the above character is taken*).

The PANJAB; by the Jhelum River, *Aitchison.*—DISTRIB. Soongaria, Turkestan, Altai.

The only specimen is not in flower; but it precisely accords with the Soongarian plant. I have refrained from quoting the synonyms that Boissier (on Bunge's authority) gives, because I suspect some confusion to exist. *Anabasis intermedia,* Moq. and *A. subulifolia,* Schrenk, must, according to the characters attributed to them, differ much from this. Nor do I see why this, all the specimens of which are as leafless as a *Salicornia,* should be called *phyllophora.*—Boissier gives Damascus as the locality for his plant, and speaks doubtfully of its identity with the Soongarian.

2. **A. setifera,** *Moq. in Chenop. Enum.* 164, and in *DC. Prodr.* xiii. 2. 214; a dwarf leafless glaucous pale shrub, stem rough when dry, leaves short oblong thick fleshy semiterete obtuse with a deciduous bristle, axils woolly, flowers crowded in the upper axils, floral leaf oblong or rounded, bracts minute linear membranous ciliate, staminodes subquadrate, fruiting perianth $\frac{1}{3}$ in. diam., wings 3–5 obovate or orbicular-cordate hyaline not nerved, stigma obscurely 2-lobed. *Boiss. Fl. Orient.* iv. 970.

The PANJAB; on the Salt Range, *Stewart.*—DISTRIB. Persia, Arabia, Egypt.

The solitary specimen precisely accords with the *A. subulifolia,* Schrenk, of Haussknecht's Iter Orientale from Persia, which differs altogether from Schrenk's character of that species and from *A. phyllophora,* with which Boissier unites *subulifolia.* It agrees with the characters of *A. setifera* in everything but having only 3 winged sepals instead of 5, and. as I find 3 and 4 in some of Bunge's specimens gathered and named by himself, this character is evidently of no value.

18. **HALOCHARIS,** *Moq.*

Hispidulous annuals, branches often whorled. *Leaves* alternate, sessile, fleshy, tipped with rigid hairs. *Flowers* axillary, solitary, 2-sexual, 2-bracteolate. *Sepals* 5, lanceolate, hyaline. *Stamens* 5, on a fleshy disk; anthers linear, cells narrow parallel separate, connective inflated; staminodes 0. *Utricle* included, ovoid or orbicular, compressed, membranous, rugulose; stigmas 2, slender. *Seed* suspended, inverse, lenticular, laterally compressed, testa membranous, albumen 0; embryo plano-spiral.—Species 5, Persia, Affghanistan and Central Asia.

1. **H. violacea,** *Bunge Anabas. Revis.* 63, t. 1, f. 3; a small sparsely hispid prostrate diffusely branched annual, hairs very long, leaves linear subtriquetrous obtuse floral oblong equalling or exceeding the bracteoles, spikes subcapitate, perianth squarrosely hispid with very long hairs, connective produced into an obovoid violet appendage longer and broader than the anther-cells. *Boiss. Fl. Orient.* iv. 975.

WESTERN PANJAB PLAINS, the SALT RANGE, alt. 2000 ft., and PESHAWUR VALLEY, common, *Stewart.*—DISTRIB. Affghanistan, Beluchistan, S.E. Persia.

Branched from the base; branches slender, 3–6 in., tips ascending. *Leaves* scattered, $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* minute, concealed by the long bristles.

2. ? **H. sulphurea,** *Moq. in DC. Prodr.* xiii. 2. 201, *in part*; erect, hispid with long bristles, leaves linear subtrigonous obtuse floral oblong about equalling the lanceolate hirsute bracteoles, flowers in capitate clusters which are spicate on terminal short branches, outer sepals villous, connective produced into a sessile elongate ellipsoid yellow appendage

much longer and broader than the anther-cells. *Bunge Anabas. Revis.* 63, t. 1, f. 2; *Boiss. Fl. Orient.* iv. 975. Halimocnemis sulphurea, *Moq. Chenop. Enum.* 152.

The PANJAB; west of the Indus, *T. W. H. Tolbert.*—DISTRIB. Assyria, Persia.

A much larger and stouter plant than *H. violacea*, with capitate clusters of leaves and flowers ½ in. diam., forming long interrupted spikes. I have seen but one specimen, which differs from the only authentic one I have seen of *H. sulphurea* in the larger more globose heads, and longer appendage of the anthers.

19. **HALOGETON,** *C. A. Meyer.*

Annuals. *Leaves* alternate, sessile, fleshy, obtuse or tipped with a long bristle. *Flowers* minute, axillary, clustered, polygamous, immersed in wool, 2-bracteolate. *Sepals* 5, 2 outermost winged or gibbous, hyaline. *Stamens* 5 or fewer, filaments linear, anthers simple; staminodes 0 or 5, lingulate. *Utricle* included, ovoid, membranous; stigmas 2, filiform. *Seed* usually inverse, laterally compressed, rostellate, testa membranous or subcoriaceous, albumen 0; embryo spiral.—Species 5, Spain, N. Africa, West and Central Asia.

This genus would perhaps be better united with *Salsola*. There are in Falconer's and Thomson's Tibetan collections flowerless specimens of what is probably another species, with more or less woolly stems, leaves cylindric ½–⅔ in. long, terminated by a very long stout pale-brown bristle.

H. glomeratus, *C. A. Mey. in Ledeb. Fl. Alt.* i. 378, and *Ic. Ross.* t. 40; a much-branched soft glaucous or hoary erect or ascending leafy green herb, leaves minute cylindrical ellipsoid or obovate often tipped with a fugacious bristle axils glabrous or woolly, floral and bracteoles similar, flowers very minute solitary or clustered, sepals 4–5 hyaline lanceolate fruiting with long claws and fan-shaped or orbicular white pink or brownish hyaline veined wings. *Boiss. Fl. Orient.* iv. 985; *Moq. in DC. Prodr.* xiii. 2. 206. Anabasis glomerata, *M. Bieb. in Act. Mosq.* i. 110, and iv. 19. H. tibeticus, *Bunge mss.*

WESTERN TIBET; alt. 12–14,000 ft., abundant, *Falconer, Thomson,* &c.—DISTRIB. Siberia, Soongaria, Turkestan, Affghanistan.

Branched from the base; primary branches 2–10 in. long, white, as thick as a goose-quill or less. *Leaves* often in clusters (arrested branches) ⅙–¼ in. long, green, the larger with membranous basal auricles. *Fruiting-perianths* densely crowded, ¼–⅓ in. diam.—Bunge (in lett.) regards the Tibetan plant as different from the Soongarian, but I can find no character; both are very variable in the size of the leaves and of the fruiting perianth. Boissier describes the flowers as clustered, the outer in each cluster female, the rest 2-sexual and diandrous.

20. **BASELLA,** *Linn.*

A much-branched twining fleshy herb. *Leaves* alternate, broad, entire. *Flowers* spicate, sessile, 2-sexual, white red or violet; bract minute, caducous; bracteoles 2, united into a 2-lipped cup and adnate to the perianth. *Perianth* fleshy, 5-fid, at length baccate, lobes short incurved. *Stamens* 5, on the mouth of the tube, filaments short, erect in bud; anthers versatile. *Utricle* globose, included, thin, adhering to the seed; stigmas 3, linear-clavate. *Seed* erect, subglobose, testa crustaceous, albumen scanty; embryo plano-spiral, cotyledons large thin involute.

B. rubra, *Linn.*; *Moq. in DC. Prodr.* xiii. 2. 223; *Lamk. Ill.*

t. 215, f. 1; *Gærtn. Carp.* t. 126. B. alba, *Linn.*; *Roxb. Fl. Ind.* ii. 104; *Wall. Cat.* 6960; *Wight Ic.* t. 896; *Grah. Cat. Bomb. Pl.* 170; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73. B. canalifolia, *Ham.*; *Wall. Cat.* 6961. B. alba, *L.*, nigra, *Lour.*, cordifolia, *Lamk.*, ramosa, *Jacq.*, japonica, *Burm.*, and lucida, *L.*, *Moq. l. c.* 223, 224. B. ramosa, *Jacq. f. Eclog.* ii. 10, t. 161; *Reichb. Hort.* t. 61. B. crassifolia, *Wight mss.*—*Rheede Hort. Mal.* vii. t. 24.

Throughout INDIA, wild or cultivated, and in CEYLON.—DISTRIB. Trop. Asia and Africa.

Glabrous. *Leaves* petioled, broadly ovate or cordate or orbicular, 2–7 in. diam., narrowed into the petioles. *Spikes* 1–6 in., axillary, peduncled, simple or branched, flowers white or red. *Fruit* size of a pea, red white or black.—Roxburgh regards two varieties of this, a red- and a green-stemmed one, as wild in India, and adds three cultivated sorts, a red- and a white-stemmed that are raised from seed, and differ only in luxuriance from the corresponding wild forms; and lastly a large sort (*B. lucida*, L., and *cordifolia*, Lamk.), which is the most cultivated, and is always increased by slips; it is the largest form, covering trellises and native houses, and is the most succulent, and more used as a pot-herb than the others.

ORDER CXVIII. **PHYTOLACCACEÆ.**

Glabrous trees shrubs or herbs. *Leaves* alternate, quite entire; stipules small or 0. *Flowers* racemed, bracteate and 2-bracteolate. *Sepals* 4–5, imbricate in bud. *Petals* 0. *Stamens* 4, alternate with the petals, or more and irregularly inserted; filaments usually persistent and anthers deciduous. *Carpels* 1 or more, superior, free or connate, 1-ovuled; stigmas usually sessile and recurved; ovules amphitropous or campylotropous. *Ripe carpels* dry or fleshy. *Seeds* erect, often arillate; albumen fleshy or floury; embryo peripheric.—Genera 20, species about 60, tropical and temperate.

Rivina Latbenia, *Ham. in Wall. Cat.* 6952, from Patna, erroneously cited by Moquin under his *Pircunia Latbenia*, is the common South American *Rivina lævis*, L. (*R. orientalis*, Moq.), or an allied plant, no doubt cultivated at Patna. Mohlana nemoralis, *Mart.*, a Brazilian and African undershrub with reticulate fruit, is naturalized in several parts of Ceylon (Trimen in Lond. Journ. Bot. xxiii. (1885) 173.

PHYTOLACCA, *Linn.*

Shrubs or herbs, rarely trees. *Leaves* exstipulate. *Flowers* 1–2-sexual. *Sepals* 4, oblong, obtuse. *Stamens* 5–25. *Carpels* 5–10, free or connate, fleshy in fruit. *Seeds* reniform, compressed, exarillate, albumen floury; embryo annular, cotyledons slender, radicle ascending.—Species 10, tropical and subtropical.

P. acinosa, *Roxb. Fl. Ind.* ii. 458; quite glabrous or puberulous, leaves elliptic-ovate or lanceolate acuminate narrowed into the stout petiole, racemes shortly peduncled. *Wall. Cat.* 1598. P. decandra, *var. β.* acinosa, *Moq. in DC. Prodr.* xiii. 2. 33. P. Kæmpferi, *A. Gray in Mem. Amer. Acad.* N. S. vi. 404. Pircunia Latbenia, *Moq. l. c.* 29, *excl. syn. Wall. Cat.*

TEMPERATE HIMALAYA, wild or cultivated, from Hazara and Kashmir to Bhotan, alt. 5–9000 ft.—DISTRIB. China, Japan.

Stems 3–5 ft., stout, herbaceous, succulent. *Leaves* 6–10 by 2½–4 in., green, thinly succulent. *Racemes* 2–6 in., erect, many-fld., rachis stout; bracts linear-lanceolate, membranous; pedicels ¼ in. *Flowers* ⅓ in. diam. *Sepals* broadly oblong,

obtuse. *Ripe carpels* about 10, nearly free, blue-black.—The Japanese specimens have broader leaves than the Himalayan. The leaves are eaten cooked.

Order CXIX. **POLYGONACEÆ.**

Herbs, rarely shrubs. *Leaves* rarely opposite, entire or serrulate; stipules (ochreæ) scarious or membranous, usually sheathing the stem. *Flowers* usually 2-sexual, jointed on the pedicel. *Perianth* of 3–6, free or connate, persistent sepals, imbricate in bud. *Stamens* 5–8, rarely more or fewer, opposite the sepals. *Disk* annular glandular or 0. *Ovary* free, 2–4-gonous; styles 1–3, stigmas various; ovule 1, basilar, orthotropous. *Nut* hard, usually enclosed in the calyx. *Seed* erect, testa membranous, albumen floury or horny; embryo various, radicle superior.—Genera 30, species about 600, chiefly temperate.

Polygonear. familiæ sedifolia, Wall. Cat. 6286, from the mountains of Nepal, is a remarkable plant, which being without flower or fruit I fail to refer to its genus, or even order. It is prostrate, hirsute, consisting of creeping interlaced stems and branches as thick as a sparrow's quill, the terminal ones bearing imbricate membranous short cup-shaped ochreæ with oblique entire ciliate mouths, and fleshy linear-oblong obtuse subsessile leaves $\frac{1}{3}$–$\frac{1}{2}$ in. long, and hirsute on both surfaces; filiform simple root fibres are given off from the stem, and these also are hirsutely fibrillose. A solitary rigid peduncle, $\frac{1}{8}$–$\frac{1}{6}$ in. long, terminates some of the branches, and this bears a small short cupular ochrea. The whole plant much resembles (superficially) a small creeping hirsute *Æschynanthus*.

Tribe 1. **Eupolygoneæ.** *Perianth* 3–5-cleft. *Stamens* 1–8, rarely more. *Stigmas* 2–3, capitellate, rarely fimbriate.

* *Shrubs.*

Stamens 12–18. Styles 4	1. Calligonum.
Stamens 8. Styles 3	2. Pteropyrum.

** *Herbs or undershrubs.*

Stamens 8 or fewer. Cotyledons flat	3. Polygonum.
Stamens 8. Cotyledons plaited	4. Fagopyrum.

Tribe 2. **Rumiceæ.** *Perianth* 4–6-cleft. *Stamens* 9, rarely 6. *Stigmas* fimbriate, peltate or horseshoe-shaped.

Sepals 6, unchanged in fruit. Nut 3-winged	5. Rheum.
Sepals 4, unchanged in fruit. Nut 2-winged	6. Oxyria.
Sepals 6, 3 inner enlarged in fruit (except *R. acetosella*)	7. Rumex.

See *Kœnigia* under *Polygonum*.

1. **CALLIGONUM,** *Linn.*

Rigid much-branched shrubs. *Leaves* alternate, linear subulate or obsolete, ochrea short. *Flowers* solitary or few, loosely clustered, ochreate, 2-sexual. *Sepals* 5, flat. *Stamens* 12–18. *Ovary* 4-angled. *Nut* exserted, 4-angled, angles variously crested winged echinate or setose. *Seed* oblong, terete or 4-angled; embryo central, straight, cotyledons narrow.—Species 20, in deserts of W. and Central Asia and Africa.

C. polygonoides, *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 29; an almost leafless shrub or small tree with terete pale flexuous branches and

very slender branchlets, leaves most minute bristles at the distant nodes, nuts oblong hard densely clothed with many series of branching intricate rigid red-brown flexuous bristles. *Boiss. Fl. Orient.* iv. 1000.

The PANJAB, *Edgeworth, Talbart*; Salt Range, alt. 2000 ft., *Stewart*. SCINDE, *Stocks*; Boogtee Hills, *Vicary*.—DISTRIB. Persia, Armenia, Syria.

Flowering branches about as thick as a crow-quill or less, internodes 1–1½ in. long; pedicels ⅛–⅙ in.; sepals about as long. *Fruit* ½–1 in. diam. including the shaggy branched bristles, nucleus about ¼ in.

2. **PTEROPYRUM,** *Jaub. & Spach.*

Rigid shrubs. *Leaves* small, alternate or fascicled, linear or spathulate; ochrea very short or obsolete. *Flowers* small, ochreate, 2-sexual. *Sepals* 5, subequal. *Stamens* 8. *Ovary* 3-angled, acuminate; styles 3. *Nut* broadly 3-winged, beaked. *Seed* beaked, base broad; embryo eccentric, cotyledons oblong, short.—Species 5–6, Western Asiatic.

P. Oliveri, *Jaub. & Spach. Ill. Plant. Orient.* ii. 9, t. 108; leaves fascicled thick glaucous obovate oblong spathulate or linear-oblong obtuse nerveless, nut broadly 6-winged in two superposed series of wings, the lower wings broadest. *Meissn. in DC. Prodr.* xiv. 1. 31; *Boiss. Fl. Orient.* iv. 1002; *Wight Ic.* t. 1809. P. Griffithii, *Meissn. l. c.* Atraphacis sp., *Aitchison Cat. Pl. Panjab.* 125.

SCINDE, *Vicary, Stocks*.—DISTRIB. Affghanistan, Persia.

An excessively branched shrub, branchlets white. *Leaves* ½–¾ in., margins often recurved. *Clusters* many-fld., sessile; flowers shortly pedicelled. *Fruit* ¼ in. diam., nearly circular in outline; each angle of the nut with 2 superposed wings brought about by the 3-gonous nucleus twisting as the wings grow, the effect of which is that each vertical wing is as it were cut in two in the middle, and the upper half of the wing of one angle alternates with the lower half of the wing of another angle.

3. **POLYGONUM,** *Linn.*

Herbs, rarely undershrubs. *Leaves* alternate, entire, rarely lobed; stipules tubular, membranous, rarely minute and 2-fid. *Flowers* 2-sexual, small or minute, clustered; clusters axillary or terminal, bracteate and bracteolate, axillary and sessile, or in spiciform capitate or panicled racemes; pedicel short usually jointed under the perianth; bracts and bracteoles membranous, ochreate. *Disk* glandular or 0. *Perianth* 4–5- rarely 3-cleft, 2 outer sepals usually smallest. *Stamens* 5–8, rarely 1-4, perigynous. *Ovary* compressed or 3-gonous; styles 2 or 3, free or combined below, stigmas usually capitellate. *Nut* included in the more or less enlarged (rarely fleshy) perianth, trigonous or biconvex. *Seed* albuminous; embryo lateral, radicle long, cotyledons small (rarely large), flat, accumbent, rarely incumbent.—Species about 150, in all latitudes.

A very troublesome genus, the Indian species of which have been much confused, and I cannot hope that I have finally settled the limits of those especially of the *Persicaria* and *Avicularia* sections. *Kœnigia* is regarded as a section of *Polygonum*.

KEY TO THE SECTIONS.

A. *Stipules minute 2-partite.*

Sect. 1. KŒNIGIA. A minute annual. Flowers in terminal clusters. Stigmas subsessile. Nut subterete.—Sp. 1.

Sect. 2. ELEUTHEROSPERMA. Slender annuals. Flowers in terminal and axillary clusters. Styles minute free. Seed loose in the triquetrous nut.

B. *Stipules tubular elongate.*—Sp. 2–3.

Sect. 3. AVICULARIA. Herbs. Leaves small; stipules hyaline, cleft or torn. Flowers axillary. Styles minute free. Albumen horny.—Sp. 4–11.

Sect. 4. AMBLYGONON. Perennial-rooted herbs. Flowers in spiciform racemes; bracts tubular, truncate. Nut orbicular; *cotyledons incumbent.*—Sp. 12–14.

Sect. 5. TOVARA. A perennial-rooted tall herb. Leaves broad. Flowers distant in very slender racemes; bracts tubular. Nut flattened with 2 rigid persistent hooked styles.—Sp. 15.

Sect. 6. BISTORTA. Erect or prostrate annual or perennial-rooted herbs. Flowers in spiciform racemes; bracts hyaline, ovate or lanceolate not tubular.—Sp. 16–23.

Sect. 7. PERSICARIA. Erect or decumbent unarmed often glandular annuals or perennials. Leaves narrow. Flowers in slender or dense spiciform racemes; bracts tubular.—Sp. 24–38.

Sect. 8. CEPHALOPHILON. Erect or prostrate unarmed annuals rarely perennials or shrubs. Leaves broad, sometimes lobed or auricled. Flowers capitate; bracts not tubular.—Sp. 39–48.

Sect. 9. ECHINOCAULON. Erect or ascending usually prickly annuals. Leaves usually broad, often hastate. Flowers capitate or racemose, bracts tubular. (Hardly distinct from *Cephalophilon.*)—Sp. 49—55.

Sect. 10. ACONOGONON. Erect shrubs, rarely herbs. Flowers in branched panicles; bracts open or very shortly tubular.—Sp. 56–67.

Sect. 11. TINIARIA. Twining herbs. Leaves broad, hastate or cordate. Flowers in axillary clusters or slender racemes; bracts not tubular.—Sp. 68–70.

Sect. I. KŒNIGIA, *Hook. f.* A minute annual. *Leaves* often opposite; stipules short 2-lobed or -partite. *Flowers* in terminal and axillary clusters or heads; bracts not tubular or sheathing. *Perianth* 3–5-cleft. *Stamens* 1–5 without interposed glands. *Stigmas* 2–3, subsessile. *Nut* subterete or compressed; cotyledons accumbent.

1. **P. islandicum,** *Hook. f.*; glabrous, leaves obovate, flowers very minute. Kœnigia islandica, *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 83; *Lamk. Ill.* t. 51; *Fl. Dan.* t. 418. K. monandra, *Dcne. in Jacq. Voy. Bot.* 142, t. 147; *Meissn. l. c.*

ALPINE WESTERN HIMALAYA; in marshy places from Kashmir to Kumaon, alt. 12,000 ft. WESTERN TIBET, alt. 11–14,000 ft.—DISTRIB. Arctic and subarctic regions and Altai Mts.

Stems very slender, succulent, forming tufts 1–6 in. high with matted roots. *Leaves* $\frac{1}{8}$–$\frac{1}{4}$ in., petioled, obtuse. *Flowers* 2-sexual or female. *Perianth-lobes* equal or unequal. *Stamen* usually solitary (rarely 2) in the Indian plant. *Nut* rather longer than the perianth.—Maximovicz (Mel. Biol. xi. 309) doubts the validity of *Kœnigia* as a genus.

Sect. II. ELEUTHEROSPERMA, *Hook. f.* Slender annuals. *Leaves* small, broad; stipules 2-partite. *Flowers* in axillary and terminal clusters. *Perianth* 5-cleft; bracts not tubular or sheathing. *Stamens* 2–4. *Styles* minute, free. *Seed* loose in the acutely triquetrous nut; cotyledons accumbent.

2. **P. delicatulum,** *Meissn. in DC. Prodr.* xiv. 1. 127; quite glabrous, stem filiform, leaves sessile or subsessile $\frac{1}{6}$—$\frac{1}{4}$ in. elliptic ovate or ovate-cordate acute, flowers minute in axillary clusters scarcely exceeding

the bracts, stamens 2–3, nut 3-quetrous usually much longer than the perianth. Kœnigia, *No.* 3 *& 4 Herb. Ind. Or. H. f. & T.*

ALPINE HIMALAYA; on wet rocks, alt. 10–16,000 ft., from Sikkim to Kashmir, *Wallich*, &c.

Annual, 4–12 in., tufted, flaccid. *Leaves* distant, nerves obscure; petiole rarely $\frac{1}{10}$ in.; stipular segments acute or obtuse, entire or crenate. *Perianth* very minute, $\frac{1}{20}$ in. long, segments obtuse or acute, 2 outer smaller. *Stamens* very short. *Nut* very variable in size, ovate-lanceolate, twice or thrice as long as the perianth, pale, coriaceous, angles very prominent, faces concave. *Seed* loose.

3. **P. filicaule,** *Wall. Cat.* 1694; sparingly strigose, stem very slender, leaves petioled $\frac{1}{3}$–$\frac{2}{3}$ in. ovate or ovate-lanceolate obtuse or acute, flowers in axillary and terminal sessile clusters pedicelled, stamens 3–4, nut trigonous slightly longer than the perianth. *Meissn. in Wall. Pl. As. Rar.* iii. 59, and in *DC. Prodr.* xiv. 1. 127; *Bab. in Trans. Linn. Soc.* xviii. 104; *Gærcke in Bot. Reis. Pr. Waldem.* 136. P. alpestre, *Wall. Cat.* 1725. P. microphyllum, *Klotzsch mss.* Kœnigia nepalensis, *Don Prodr.* 74. Kœnigia, *No.* 2 *Herb. Ind. Or. H. f. & T.*

SUBALPINE and ALPINE HIMALAYA; in woods, &c., alt. 9–16,000 ft., from Sikkim to Kashmir. WESTERN TIBET; Ladak, alt. 11–12,000 ft., *Stewart.*

Annual, 4–18 in., flaccid, tufted, rather succulent; stem with often a few reflexed hairs below the nodes. *Leaves* distant, rarely 1 in., soft, most strigose beneath; stipular lobes glabrous or hairy, acute or obtuse. *Perianth* $\frac{1}{20}$ in. long, white; segments rounded, 2 outer smaller. *Filaments* very short. *Nut* ellipsoid, pale, coriaceous, angles very prominent, faces concave. *Seed* loose.—Meissner and Babington describe 8 stamens. I find only 3–4. *P. alpestre, Wall.*, is the fully developed state; vars. *cæspitosum* and *extenuatum* of Meissner are more Alpine forms.

Sect. III. AVICULARIA, *Meissn.* Erect or prostrate herbs, rarely undershrubs. *Leaves* small; stipules tubular hyaline, cleft or torn. *Flowers* in axillary clusters; bracts tubular. *Perianth* 4–5-cleft. *Stamens* 3–8, very short. *Styles* 3, minute, free. *Nut* 3-gonous. *Albumen* horny, cotyledons incumbent.

* *Root perennial, branches herbaceous* (*shrubby in 7. P. salicornioides*). —*See also* P. plebejum.

4. **P. recumbens,** *Royle mss.*; *Bab. in Trans. Linn. Soc.* xviii. 116; puberulous or scaberulous, stems long stout woody much-branched grooved prostrate and ascending, leaves $\frac{1}{2}$–$\frac{2}{3}$ in. petioled broadly elliptic flat obtuse or acute nerves obscure, stipules ovate-lanceolate tumid with a strong excurrent nerve on each side, pedicels short jointed at the tip, fruiting perianth obvoid 5-partite. *Meissn. in DC. Prodr.* xiv. 1. 96.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4500-8000 ft., *Royle*, &c. *Rootstock* stout; branches many, 1–2 ft., as thick as a crow-quill and more, rooting at the base. *Leaves* close set; stipules $\frac{1}{6}$–$\frac{1}{2}$ in., lanceolate and acuminate or truncate and lacerate, nerves variable, longer than the pedicels. *Nuts* $\frac{1}{16}$ in., long, broadest below the middle, black, shining.

5. **P. cognatum,** *Meissn. Polyg. Prodr.* 91, and in *DC. Prodr.* xiv. 1. 96; glabrous or nearly so, stems short subsimple prostrate and ascending angled, leaves $\frac{1}{3}$–$\frac{1}{2}$ in. petioled elliptic obtuse or acute thick nerveless, stipules ovate tumid hyaline subentire nerves 2 short included, pedicels crowded short jointed at the tip, fruiting perianth very thick urceolate tube twice as long as the orbicular lobes. P. alpestre, *C. A. Meyer Enum. Pl. Cauc.* 157; *Boiss. Fl. Orient.* iv. 1037; *Jaub. & Sp. Ic. Pl. Orient.* t. 118.

P. rupestre, *Karel & Kiril. En. Plant. Alt.* 789. P. confertum, *Royle mss.*; *Bab. in Trans. Linn. Soc.* xviii. 116; *Meissn. l. c.* P. ammannioides, *Jaub. & Sp. l. c.* t. 119. P. affine, *Stephan. mss.*; *Spreng. Syst.* ii. 256, *not of Don.*

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 11,000–14,500 ft., *Royle*, &c. WESTERN TIBET; ascending to 16,500 ft., *Thomson, Stewart*, &c.—DISTRIB. Soongaria, Persia, Syria, Asia Minor, Caucasus.

Branches many, stout, flexuous, 2–6 in., from a woody stock, scaly at the base, but not rooting. *Leaves* rarely 1 in., elliptic-lanceolate, almost succulent; stipules silvery, obtuse, acute or acuminate. *Perianth* very thick, lobes with white margins. *Nut* $\frac{1}{10}$ in. long, ovate, compressed or obtusely trigonous, black, shining, usually compressed and obtuse in Indian examples.—Boissier adopts the later name of *P. alpestre* for this, because Meissner described his *cognatum* from a variety (*P. rupestre*, Kar. and Kiril.) with longer pedicels. He further refers the Himalayan plant to Meissner's var. *ammannioides*, a Persian form with shorter internodes, and smaller narrower leaves; but the majority of Indian specimens do not differ from the common form.

6. **P. paronychioides,** *C. A. Mey. En. Pl. Talysch.* 20; rootstock very stout woody, branches short tufted erect and ascending scaberulous young concealed by the stipules, internodes very short, leaves linear with a deciduous mucro margins recurved, stipules large hyaline lanceolate tumid 2-nerved tip lacerate, pedicels short jointed at the tip, fruiting perianth urceolate lobes rounded shorter than the tube 2 outer awned at the back. *Boiss. Fl. Orient.* iv. 1040; *Meissn. in DC. Prodr.* xiv. 1. 89. P. Paronychia, *C. A. Mey. Enum. Pl. Cauc.* 158 (*not of Cham. & Schl.*). P. Meyeri, *Steud. Nomencl.* P. mucronatum, *Royle mss.*; *Bab. in Trans. Linn. Soc.* xviii. 115.

WESTERN HIMALAYA, in the drier regions; Kunawur to Zanskar, alt. 8–12,000 ft., *Royle*, &c.—DISTRIB. Affghanistan, Persia.

Root or rootstock often as thick as the middle finger, tortuous, woody, with chestnut scaling back. *Stem* 1–4 in., fragile, white or red-brown, not grooved. *Leaves* $\frac{1}{2}$ in., nerveless, glabrous or scaberulous; stipules in young plants concealing both leaves and stem, lower with often two very faint included nerves, upper with two strong exserted ones. *Fruiting-perianth* as in *P. cognatum*, but shorter. *Nut* $\frac{1}{12}$ in., broadest in the middle, black, smooth.—The character of the dorsally mucronate outer sepals appears pretty constant, though not referred to by authors.

7. **P. salicornioides,** *Jaub. & Spach. Ill. Pl. Orient.* t. 123; shrubby, scaberulous, branches stout divaricate grooved at length spinescent and leafless, internodes crowded, leaves minute fleshy linear ovate or oblong rigid 1-nerved margin revolute, stipules short hyaline lacerate, perianth rosy, nut large thick opaque punctate. *Meissn. in DC. Prodr.* xiv. 1. 90; *Boiss. Fl. Orient.* iv. 1042.

SCINDE, *Vicary.*—DISTRIB. Persia.

The specimen is very imperfect, and I have taken much of the specific character from Boissier.

** *Root mostly annual* (*except some forms of* P. plebejum).

8. **P. aviculare,** *Linn.*; *Boiss. Fl. Orient.* iv. 1036; glabrous, branches procumbent or ascending grooved leafy, leaves elliptic or elliptic-oblong or -lanceolate obtuse flat nerveless, stipules shorter than the internodes hyaline lacerate many-nerved, flowers axillary, pedicel short jointed at the tip, perianth obovoid cleft to near the base, nut ovoid obtusely 3-gonous minutely rugosely striolate. *Bab. in Trans. Linn. Soc.* xviii. 114. P. aviculare γ. diffusum, *Meissn. in DC. Prodr.* xiv. 1. 97.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 6–10,000 ft., *Royle*, &c.; Rawul Pindee, *Aitchison*. WESTERN TIBET, alt. 10–12,000 ft., *Thomson*, &c.—DISTRIB. Widely dispersed, indigenous in Europe and N. Asia, probably a colonist elsewhere.

The Himalayan and Tibetan specimens are intermediate in several points between *P. aviculare* and *P. Bellardi*, as these are defined by Boissier; the leaves are not veined as he describes them in *aviculare*, nor are they acute as they should be in *P. Bellardi*; and though the branches sometimes run out into a subspicate inflorescence, this is not so slender and interrupted as in true *Bellardi*. Boissier gives "India borealis" as a habitat for the latter plant; but I have seen no specimens.

9. **P. tubulosum,** *Boiss. Diagn. Ser.* i. 83, and *Fl. Orient.* iv. 1032; glabrous, branches short prostrate or ascending leafy angular not grooved internodes very short, leaves linear acute or obtuse margins recurved, stipules hyaline subentire lacerate or fimbriate faintly 1–2-nerved, flowers axillary sessile, perianth ovoid tube much longer than the small rounded white or pink lobes, nut rhomboid triquetrous smooth shining. *Meissn. in DC. Prodr.* xiv. 1. 91. P. rottboellioides, *Jaub. & Sp. Ill. Pl. Or.* t. 122; *Meissn. l. c.* 92. ? P. Olivieri, *Meissn. l. c.* 92, *in part.*

NORTH-WESTERN HIMALAYA; Kunawur and Lahul, alt. 6–7000 ft., *Royle, Thomson, Stewart.* WESTERN TIBET, alt. 10–11,000 ft., *Thomson.*—DISTRIB. Affghanistan, Persian Alps.

A small annual, with sometimes rosy flowers, crowded leaves and hyaline stipules, $\frac{1}{6}$ in. long, very different from *P. aviculare* in the sessile perianth cleft at the top only, and in the small broad short shining nut.—Meissner has cited "Kumaon, Strachey and Winterbottom, No. 49," as a locality for *P. Olivieri*, Jaub. and Spach. I have seen no specimens, and suspect some error. The calyx-lobes of *P. Olivieri* (which is a synonym of *P. polycnemoides*) equal the tube.

Var. *tibetica*; branches very slender much longer, leaves usually acute or acuminate. —Western Tibet; Karakoram, alt. 12,000 ft., *Clarke*; Lahul, *Jaeschke*; Chamba, *Ellis.*

10. **P. molliæforme,** *Boiss. Diagn. Ser.* i. 7. 84, and *Fl. Orient.* iv. 1043; very small and slender, stems short dichotomous bearing axillary clusters of stipules and flowers, leaves spreading linear setaceous apiculate 3–5-nerved margins recurved, stipules ventricose hyaline white 1–2-nerved split to the middle into several lanceolate segments, perianth sessile concealed by the stipules cleft to below the middle, nut ovoid acute obtusely 3-gonous. *Meissn. in DC. Prodr.* xiv. 1. 91.

WESTERN TIBET; Nubra, alt. 14–16,000 ft., *Thomson.*—DISTRIB. Persia.

Root almost capillary. *Stems* spreading, 1–2 in., filiform, rigidly flexuous, red. *Leaves* very narrow, $\frac{1}{4}$–$\frac{1}{2}$ in. long; stipules large for the size of the plant. *Flowers* minute. *Perianth* hyaline.—This curious little species resembles a seedling state of *P. paronychioides*, but differs in the perianth. Boissier describes the stipules as nerveless, but I find 1 or 2 nerves, one always exserted, in both Persian and Tibetan specimens.

11. **P. plebejum,** *Br. Prodr.* 420; diffusely branched, prostrate, smooth or minutely scaberulous, branches terete grooved, internodes usually shorter than the leaves, stipules hyaline short lacerate to the middle and fimbriate nerve unilateral excurrent (rarely 2 or more or 0), flowers 1–3-nate, pedicels 0 or short, perianth $\frac{1}{10}$ in. or less cleft to near the base, nut rhomboid 3-gonous smooth and shining. *Meissn. in DC. Prodr.* xiv. 1. 94. P. Dryandri, *Spr. Syst. Veg.* ii. 255; *Wall. Cat.* 1691; *Meissn. Polyg. Prodr.* 88. P. aviculare, *Don Prodr.* 72. P. herniarioides, *Del. Fl. Ægypt.* 13; *Meissn. l. c.* 94, and in *Wall. Pl. As. Rar.* iii. 62. P. Roxburghii, *Meissn. l. c.*; *Miquel Fl. Ind. Bat.* i. 997.

Throughout TROPICAL INDIA; and (but rarely) ascending the HIMALAYA to

7000 ft., from Bhotan to Kashmir (absent in Ceylon).—DISTRIB. Affghanistan, Tropical Asia, Java, Philippines, Australia, Madagascar, Egypt, Tropical and S. Africa.

If (following Wallich's example for most of them) I am right in bringing all the following forms under one species, this is a far more protean plant than *P. aviculare*, with which it is generally compared, but from which it differs entirely in habit, in the few-nerved stipules, and rhombic smooth nut. I have spent some days in analyzing the flowers and fruit of the vast number of specimens of it at my disposal, in the vain attempt to discover constant even varietal characters amongst them. The utmost I can effect is to select eleven forms, the extremes of which differ so much from one another that I have described them as varieties, though there is not one of these that does not seem to pass insensibly into two or more others, and I regard my work as provisional only. If any one is specifically distinct, it is var. *Miqueliana*, with its larger flowers and all the sepals acute; I have, however, seen no other specimens than Hohenacker's; and the shape of the sepals is so variable with age in other species, that much importance must not be attached to them. Var. *micranthema*, with nuts sometimes only $\frac{1}{10}$ in. long, at first sight appears very distinct, but there are transitions of all its characters (nuts included) into those of the commoner forms. For the rest I must leave the further elucidation of this aggregate species to local botanists working on fresh specimens. In the matter of the citation of published works and Herbarium numbers, &c., I have been very sparing, because I cannot reconcile in several cases Meissner's descriptions and references with the specimens of Wallich, and with other authors' writings; and the diagnoses of the earlier authors are vague and incomplete. Though described as annual, the root is so often woody, that I think it must be at times biennial or even perennial.

P. plebejum proper; branches stout or slender, stipules rather short lower internodes often longer than the leaves upper shorter or very short, leaves $\frac{1}{6}$ to $\frac{1}{3}$ in. upper often much shorter oblong or linear obtuse margin often recurved, flowers sunk amongst the stipules rarely exserted, sepals short broad rounded. P. illecebroides, *Meissn. l. c.* 94. P. cliffortioides, *Meissn. l. c.*, and in *Wall. Pl. As. Rar.* iii. 62. P. herniarioides, *Herb. Strach. & Winterb.* 23. P. Roxburghii, *var.* brevifolia & pedicellaris, *Meissn. l. c.* 93.

Common from Assam to the N.W. Provinces and on the lower hills.—This is intended to include all the forms known to me that do not better agree with the diagnosis of the following ones. It is a common African and Australian plant. To it I should refer Wallich's 1691/1, 1691/3, 1691/4, the lower left-hand specimen, 1691/5, *except the Prome specimen*, and 1691 G, I, K.

Var. *effusa*; lax, slender, flaccid, internodes longer, leaves narrowly linear or dilated upwards from a very narrow base tip rounded, flowers all or most pedicelled, sepals short broad. P. effusum, *Meissn. l. c.* 93, *in part.*—Bengal to Bombay, Guzerat and N.W. India. Kumaon, *Herb. Strach. & Winterb.* 22.—Probably a native of wet places, whence its characters. Strachey and Winterbottom's specimens are characteristic, but Wallich's 1691/3 from Oude appears to me to be nothing but common *plebejum*.

Var. *indica*; branches uniformly spreading all round from the crown and leafy, internodes short, leaves $\frac{1}{4}$–$\frac{1}{3}$ in. uniformly spreading horizontally linear- or obovate-oblong flat obtuse or apiculate, stipules very short, flowers crowded in the axils, pedicels shorter than the perianth or 0, sepals broad 2 outer acute, nut $\frac{1}{14}$ in. P. indicum (& ? P. linifolium), *Heyne in Roth Nov. Sp.* 208; *Wight Ic.* t. 1808; *Dalz. & Gibs. Bomb. Fl.* 214. P. Roxburghii, *var.* α. longifolium & γ. spathulatum, *Meissn. l. c.* 93. P. Dryandri, *Wall. Cat.* 1691 H, L.—The common Mysore and Carnatic form, also occurring in Bombay. When more irregular in development of leaves and branches not distinguishable from *P. plebejum* proper. Both habit and locality point to its being *P. indicum* of Roth, who describes the occasional scabridity of the end of the leaf as serrulation, and suspects its identity with *P. plebejum*. It is a common Australian and African form.

Var. *brevifolia*; rootstock very woody, branches very stout grooved often 1–2 ft. dark brown, internodes of branchlets very short concealed by the leaves and stipules which latter show as a continuous white villous band on the underside of the branchlets, leaves $\frac{1}{8}$–$\frac{1}{4}$ in. obovate acute or apiculate flat coriaceous dark brown when dry,

flowers sessile almost concealed by the stipules, sepals narrower outer acute, nut $\frac{1}{12}$–$\frac{1}{12}$ in. P. Dryandri, *Wall. Cat.* 1691/5, *from Prome.*—From Bengal (Griffith, Kew Distrib. 4098) to Garwhal, Banda, Bombay, Scinde, Guzerat and Prome. Also in Africa.—This is a short crowded leaved form allied to *indica*, and differs from *Griffithii* in its stoutness and narrower longer leaves, which are not so covered by the stipules.

Var. *Griffithii*; branches excessively numerous from the root very slender flexuous and quite naked below, branchlets very slender with the internodes so close that they look woolly from the crowded fimbriate and crinite stipules, leaves shorter than the stipules $\frac{1}{10}$–$\frac{1}{8}$ in. orbicular or broadly obovate flat apiculate, flowers subsessile minute hidden amongst the stipules, sepals rounded 2 outer apiculate, nut not seen.—East Bengal, *Griffith* (*Kew Distrib.* 4099, 4101); plains of N.W. India, *Falconer* (*Kew Distrib.* 268).—A very singular form, probably a modification of var. *brevifolia*, with the bases of the branches buried in soil, and hence leafless and very slender.

Var. *scindica*; branches rather stout flexuous pale red brown with scattered leaves below, branchlets slender, internodes very short woolly from the crinite stipules, leaves $\frac{1}{10}$–$\frac{1}{8}$ in. elliptic-oblong pale obtuse margins strongly recurved, flowers very minute sessile sunk amongst the stipules, sepals narrow obtuse, nut half the length of the perianth $\frac{1}{24}$ in. long black.—Scinde, *Stocks.*—This has much the habit of some common forms of the species, but the branchlets are crinite as in *Griffithii*, and the nut very minute. No doubt it is only one of many forms to be found in Scinde.

Var. *elegans*; black when dry, branches stout grooved smooth or scaberulous, internodes longer or shorter than the leaves, stipules brownish fimbriate, leaves $\frac{1}{2}$–$\frac{2}{3}$ in. upper as long as the lower linear-lanceolate acute or acuminate rarely obtuse margins flat or revolute, flowers sessile or shortly pedicelled, sepals narrow 2 outer acute. P. elegans, *Roxb. Hort. Beng.* 29, and *Fl. Ind.* ii. 291. P. prostratum, *Roxb. mss.* P. ciliosum, *Meissn. l. c.* 95. P. Dryandri, *Wall. Cat.* 1691/2.—From Bengal, Assam and Bhotan to Nepal, Belgaum, Chittagong and Tenasserim.—Usually rather a large form, passing into *plebejum* proper by insensible transitions. The dark colour when dry, long narrow acuminate leaves and narrow sepals distinguish typical specimens. It is well described by Roxburgh and figured in his unpublished Icones (as *P. prostratum*). It occurs in Australia.

Var. *micranthema*; small, branches 2–8 in. very slender, stipules short, leaves $\frac{1}{4}$–$\frac{1}{3}$ in. linear or linear-oblong obtuse base narrowed flat, upper crowded as long as the often distant lower, flowers very minute pedicelled crowded in the upper axils, pedicel often as long as the perianth, sepals narrow obtuse, nut $\frac{1}{40}$–$\frac{1}{20}$ in. P. Dryandri *Wall. Cat.* 1691/4, *the upper left-hand specimen from Kumaon.* P. micranthemum, *Franchet mss.*—Birma, *Griffith*; Bengal and Silhet, *Clarke*; Soane River sands, *J. D. H.*; Kumaon.—This is only a small state of *plebejum*, into which it passes by insensible gradations. Franchet named it as above from Mongolian specimens.

Var. *Miqueliana*; branches rather stout flexuous straggling dark when dry, internodes longer than the leaves, stipules short 2-nerved, leaves $\frac{1}{4}$ in. obovate or oblong-obovate or linear-oblong obtuse flat, flowers 1–2 in the axils, pedicels slender longer than the perianth jointed towards the base, sepals narrow all acute, nut $\frac{1}{10}$ in. P. Miquelianum, *Meissn. Pl. Hohenack.*, No. 1613, and in *DC. l. c.* 92.—Canara; near Mangalor.—A very distinct variety, but more material is wanted to judge of its constancy. Meissner describes the stipules as 6-nerved, and the margins of the leaves as revolute, neither of which is the case in my specimens. Nor do I know of many-nerved stipules in any Indian form of *P. plebejum* except the following, which singularly enough comes from Mangalor, has revolute leaf-margins, and all the sepals acute.

Var. *polyneura*; branches straggling dark when dry, internodes longer or shorter than the leaves, stipules 4–6-nerved, leaves $\frac{1}{3}$ in. linear oblong acute or obtuse margins recurved, flowers 1–2 in the axils, pedicels as long as the perianth jointed at the base, sepals narrow acute, nut $\frac{1}{10}$ in. P. elegans, *Miquel in Herb. Hohenacker*, No. 19 (*not of Roxb.*). P. Roxburghii, *var.* longifolia, *Meissn. l. c.* 93.—Canara; near Mangalor.

Sect. IV. AMBLYGONON, *Meissn.* Erect or ascending herbs. *Leaves* large; stipules with often a dilated mouth. *Flowers* in cylindric spikes or

racemes; bracts tubular. *Perianth* 4–5-partite. *Stamens* 5–8, alternating with glands. *Styles* 2–3, short, stigmas capitate. *Nut* orbicular, compressed; embryo slender, cotyledons narrow incumbent.

12. **P. orientale,** *Linn.*; *Meissn. Monog. Polyg.* 53, t. 1, f. 30–35, and t. 3, and in *DC. Prodr.* xiv. 1. 123; tall, branched, softly pubescent or silkily villous, leaves long-petioled ovate or ovate-cordate acuminate, stipules short strigose and ciliate, racemes cylindric laxly panicled, bracts close 3–6-fld. *Bot. Mag.* t. 213; *Gærtn. Fruct.* ii. t. 119, f. 5; *Miquel Fl. Ind. Bat.* i. 1005; *Bab. in Trans. Linn. Soc.* xviii. 99. P. altissimum, *Mœnch. Meth.* 630. P. amœnum, *Bl. Bijd.* 531. P. pilosum, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 286; *Wall. Cat.* 1710, *excl.* C. P. cochinchinense, *Meissn. Monog. Polyg.* 55. P. torquatum, *De Bruyn in Pl. Jungh.* 303. Lagunea cochinchinensis, *Lour. Fl. Coch.* i. 271.—*Rheede Hort. Mal.* xii. t. 76.

Wet places from ASSAM and SILHET westwards to OUDE and JAMU; ascending the Himalaya to 5000 ft.—DISTRIB. Siam, Java, Borneo, China, Japan, Turkestan (often cultivated).

A branching annual, 3–10 ft.; branches hollow. *Leaves* 6–9 by 2–5 in., grey with hairs; nerves very numerous; petiole 1–4 in.; stipules short, hirsute, truncate, mouth membranous or dilated herbaceous and recurved. *Racemes* 3–5 in., on long stout strict peduncles and pedicels, erect or cernuous; bracts crowded strigosely tomentose and ciliate; flowers large, white red or green. *Stamens* 7–8, included. *Styles* connate below, stigmas capitellate. *Nuts* $\frac{1}{8}$ in. diam., orbicular, flattened with rounded margins and rather concave faces, black, shiny, pericarp very thick. *Cotyledons* incumbent.—Roxburgh remarks that the ends of the branches when moistened become thickly glutinous.

Var. *glabrata*; very sparsely pubescent or glabrate, petiole narrowly winged.—Kashmir, *Thomson*; Saharunpore Bot. Garden, *Royle, Falconer.*

Var. *parvifolia*; sparingly pubescent, leaves 2–3$\frac{1}{2}$ in. elliptic acuminate membranous, petiole winged, stipules very short, mouth herbaceous. *Wall. Cat.* 1709/2 (*under P. tomentosum*).—Silhet, *De Silva.*—I have seen no other specimen. A note on the specimen says the shoots are eaten and have a sour taste.

13. **P. tomentosum,** *Willd. Sp. Pl.* ii. 447; stem simple very stout erect pubescent or glabrous, leaves 4–8 in. shortly petioled lanceolate finely acuminate silky beneath rarely glabrate, stipules strigose truncate mouth erect with rigid bristles half their length or less, racemes stoutly peduncled panicled, bracts crowded hispid and ciliate. *Meissn. in DC. Prodr.* xiv. 1. 124, *excl. var.* β; *Roxb. Hort. Beng.* 29, and *Fl. Ind.* ii. 287; *Miquel Fl. Ind. Bat.* i. 1006; *Wall. Cat.* 1709, *excl.* B, E, G, H, *and part of* D. P. orientale, *Wall. Cat.* 1710 C. P. ochreatum, *Houtt. Pfl. Syst.* vi. 442, t. 49, f. 1. P. pulchrum, *Blume Bijd.* 530.

In ditches, &c., from BENGAL, ASSAM and CACHAR, southwards to MALACCA; and from BOMBAY to MALABAR and CEYLON.—DISTRIB. Java, Philippines, Trop. and S. Africa.

Stems one or more from a prostrate rooting annual stock, 2–4 ft., often as thick as the finger. *Leaves* 1–1$\frac{1}{2}$ in. diam., usually pubescent or subsilky above; petiole rarely $\frac{1}{2}$ in.; stipules $\frac{1}{2}$–1 in., membranous. *Racemes* 2–4 in., always erect, strict; bracts 6–8-fld.; flowers large, white. *Stamens* 7–8. *Nut* large, $\frac{1}{8}$ in. diam., orbicular flattened with rounded margin and convex faces; pericarp very thick, crustaceous, black, shining; cotyledons incumbent.—This is apt to be confounded with *P. barbatum.* Meissner quotes Wall. Cat. 1708 A, and 1708 G, I, for this, but the first and last are certainly *barbatum*, and only one piece of G appears to be *tomentosum.*

14. **P. limbatum,** *Meissn. in DC. Prodr.* xiv. 1. 123; stem simple

very stout erect, leaves 4–8 in. shortly petioled lanceolate acuminate scaberulous on both surfaces, stipules strigose truncate mouth with a spreading or recurved herbaceous scabrid ciliate limb, racemes stoutly peduncled panicled, bracts crowded hispid. *Boiss. Fl. Orient.* iv. 1031.

BENGAL; in the Jheels, *J. D. H. & T. T.*; Maldah, *Clarke*. UPPER GANGETIC PLAIN, *Thomson*. GARWHAL, *Edgeworth*. CONCAN, *Law*.—DISTRIB. Egypt, Trop. Africa.

Habit, inflorescence and nut of *P. tomentosum*, but the leaves in all the specimens are minutely scabrid on both surfaces, and the stipules have constantly a herbaceous limb. Fruit and pericarp as in *P. tomentosum*, and cotyledons incumbent.

Sect. V. TOVARA, *A. Gray*. A tall herb with perennial root. *Leaves* broad; stipules tubular. *Flowers* in a very slender raceme; bracts tubular. *Perianth* 4-partite. *Stamens* 5, alternating with glands. *Styles* 2, long, rigid, hooked, persistent, stigmas simple. *Nut* flattened; cotyledons accumbent.

15. **P. virginianum,** *Linn.*; *Meissn. Monog. Polyg.* 81, t. 1 I, f. 27–29, t. 3 N, and in *DC. Prodr.* xiv. 1. 112; sparsely hispid, leaves 4–10 in. short-petioled elliptic or elliptic-lanceolate, stipules short hispid, racemes 6–16 in., bracts distant 2-fld. P. filiforme, *Thunb. Fl. Jap.* 163; *Meissn. Monog.* 75, and in *DC. l. c.* P. muticum, *Mænch Suppl.* 266. Persicaria virginiana, *Gærtn. Fruct.* ii. t. 119, f. 3.

TEMPERATE HIMALAYA, very rare, *Falconer*; Kashmir, on the Jhelum River, alt. 2–4000 ft., and Pir Panjal, alt. 7–10,500 ft., *Stewart*; Sikkim, on the Balesun River, alt. 7–8000 ft., *King*.—DISTRIB. China, Japan, Eastern United States.

Stem 5 ft. and upwards, branches hollow. *Leaves* thin, base acute, nerves many, slender; petiole ½–1 in.; stipules ¼–½ in., mouth truncate and ciliate. *Racemes* long-peduncled, very long and slender; bracts ciliate, ¼–1 in. apart; bracteoles narrow, hyaline; pedicels ⅙ in., rigid, stout in fruit. *Perianth* eglandular, thin. *Fruit* ellipsoid, flattened, pale brown, as long as the persistent styles.—The long hooked persistent style free to the base, serving to attach the fruit to foreign bodies, is unique in the genus, and indicates that the species should form a separate section (it is singular that though provided with so obvious a means of transport the species should be so rare in India). I find no difference between the Himalayan and East American plants; the W. Asiatic and some American have shorter and blunter leaves. The Sikkim specimen has leaves sparsely strigillose on both surfaces, as in some American ones, others of both countries are nearly glabrous.

Sect. VI. BISTORTA, *Tourn.* Perennial eglandular herbs, erect with simple stems from a woody rootstock, or with branching prostrate stems and erect leafy scapes. *Leaves* broad or narrow; stipules tubular, eciliate. *Flowers* in spiciform racemes, eglandular; bracts membranous, ovate or lanceolate, open not tubular nor truncate. *Perianth* 4–5-partite, not enlarged in fruit. *Stamens* 4–10. *Styles* 2–3, long, slender, free; stigma simple. *Nut* trigonous or biconvex; cotyledons accumbent.

* *Stem solitary, simple, erect from a woody rootstock.*

16. **P. viviparum,** *Linn.*; *Boiss. Fl. Orient.* iv. 2027; root-leaves long-petioled linear or linear-oblong acute or obtuse crenulate base acute obtuse or cordate, spikes solitary erect slender, flowers suberect pink, the lower replaced by bulbils. *Meissn. in Wall. Pl. As. Rar.* iii. 53, and in *DC. Prodr.* xiv. 1. 124; *Fl. Dan.* t. 13. P. angustifolium, *Don Prodr.* 70. P. bracteatum, *Spreng. Cur. post.* 154. P. bulbiferum, *Royle mss.*; *Bab. in Trans. Linn. Soc.* xviii. 94; *Meissn. in DC. l. c.* 125. P. affine,

Wall. Cat. 1683/3, *not of Don.* P. bistorta, *Gærcke in Bot. Reis. Pr. Waldem.* 135.

ALPINE and SUBALPINE HIMALAYA, from Kashmir to Sikkim, &c. WESTERN TIBET, alt. 9–15,000 ft.—DISTRIB. Alpine North and Arctic Europe, Asia and America.

Rootstock woody, as thick as the thumb or less; stem 4–12 in., slender. *Leaves* very variable, 1–6 in., coriaceous, sometimes pubescent or even tomentose beneath; cauline sessile, erect. *Spikes* 1–4 in. long; bracts ovate, acuminate. *Perianth* very variable in size. *Stamens* included or exserted. *Styles* filiform, slender, free and included or greatly lengthened and connate below. *Nut* very small, trigonous or biconvex.—Probably an Alpine state of *P. bistorta*.

17. **P. sphærostachyum,** *Meissn. Monog. Polyg.* 53, and in *Wall. Pl. As. Rar.* iii. 52, and in *DC. Prodr.* xiv. 1. 125; root-leaves long-petioled linear or linear-oblong acute or obtuse crenulate base acute or obtuse, spikes solitary erect stout cylindric or capitate very dense-fld., flowers crimson drooping. *Bot. Mag.* t. 6847. P. macrophyllum, *Don Prodr.* 70; *Bab. in Trans. Linn. Soc.* xviii. 95. P. gracillimum, *Spreng. Cur. post.* 154. P. tenue, *Don l. c.* P. stenophyllum, *Meissn. in DC. l. c.* P. splendens, *Klotzsch in Bot. Reis. Pr. Wald.* t. 88. P. affine, *var.* angustifolium, *Wall. Cat.* 1683.

TEMPERATE and SUBALPINE HIMALAYA; from Scinde to Sikkim, alt. 11–15,000 ft. WESTERN TIBET, Heyde.

The dense spike of brilliantly coloured drooping flowers is the best character for this beautiful plant; I am very doubtful about some of the synonyms cited for it and for *P. viviparum*, especially as to Don's *angustifolium, tenue* & *gracillimum*.

18. **P. perpusillum,** *Hook. f. Ic. Pl.* t. 1490 A; very dwarf, glabrous, radical leaves subsessile narrowly linear obtuse margins recurved quite entire, scape very slender 1-leaved, flowers few capitate pendulous, sepals 4 unequal, stamens 1–3 perfect, nut trigonous or biconvex.

ALPINE HIMALAYA, alt. 12–15,000 ft.; Sikkim, *J. D. H.*; Kumaon and Garwhal, *Strachey & Winterbottom* (*Polyg. No.* 39), *Duthie*.

Subcæspitose; rootstock stout, clothed with membranous torn stipules. *Leaves* $\frac{1}{4}$–$\frac{3}{4}$ by $\frac{1}{20}$ in., spreading; stipules 2-fid. *Scape* $\frac{1}{4}$–$1\frac{1}{2}$ in., erect; head $\frac{1}{6}$–$\frac{1}{4}$ in. diam.; flowers $\frac{1}{16}$ in. long, white or pink; bracts crowded, obtuse; pedicel short, jointed at the top. *Sepals* broad, obtuse, very unequal, inner orbicular or oblong. *Styles* 2–3, nearly free, stigmas capitate. *Nut* pale, smooth.—A very singular little species, allied to *P. sphærostachyum*; variable in number of stamens, some of which are reduced to capitellate filaments, and in the form of the sepals and fruit.

19. **P. paleaceum,** *Wall. Cat.* 1684; root-leaves long-petioled linear-oblong or -lanceolate crenulate base very narrow, spike solitary erect stout cylindric, flowers crowded suberect pink. P. confusum, *Meissn. in Wall. Pl. As. Rar.* iii. 53. P. carneum, *C. Koch in Linnæa*, xxii. 197.

KHASIA MTS.; alt. 4–6000 ft., abundant.

Rootstock as thick as the thumb; stem 6–16 in., slender. *Leaves* 3–9 in., very variable in breadth, obtuse or acute, base always narrowed into the slender petiole. *Spikes* 1–2 in., flowers crowded; bracts ovate, acuminate, scarious.—Very nearly allied to *P. bistorta*, but the leaves are always very gradually narrowed to the base, not forming broad wings below the base as usual in the European plants. This species is omitted by Meissner in the Prodromus.

** *Perennial herbs with tufted or creeping branched rootstocks and erect simple rarely branched flowering stems bearing erect spikes.*

20. **P. amplexicaule,** *Don Prodr.* 70; glabrous, densely tufted,

flowering stems 2–3 ft. very slender, leaves large long-petioled ovate-cordate caudate-acuminate crenulate upper amplexicaul, racemes very long-peduncled erect, bracts ovate, styles free slender. *Meissn. in Wall. Pl. As. Rar.* iii. 54, and in *DC. Prodr.* xiv. 1. 126; *Bab. in Trans. Linn. Soc.* xviii. 96; *Bot. Reg.* 1839, t. 46; *Bot. Mag.* t. 6500. P. oxyphyllum, *Wall. Cat.* 1715; *Meissn. ll. c.* P. ambiguum, *Meissn. ll. c.*; *Wight Ic.* t. 1797. P. petiolatum, *Don l. c. fid. Bab.*

TEMPERATE HIMALAYA; from Murree, alt. 6–8000 ft., to Sikkim, alt. 9–13,000 ft. *Rootstock* stout, woody, branched. *Stems* 2–3 ft., green, sparingly leafy. *Lower leaves* 3–6 in. long, minutely papillose beneath, especially on the nerves; stipules 1–2 in., narrow, tips torn. *Racemes* 1–2, 2–6 in. long. *Flowers* red, white or greenish-white, $\frac{1}{6}$–$\frac{1}{4}$ in. diam. *Stamens* 8, anthers exserted. *Ovary* 3-gonous.

Var. *speciosa*; flowers larger, $\frac{1}{3}$ in. diam., deep purplish-red or claret-coloured. P. speciosum, *Wall. Cat.* 1716; *Meissn. ll. c.*—Occurs throughout the range of the species, and is the only form found hitherto in Sikkim, the specimens from whence are very stout. In Nepal it occurs in a large branched form.

21. **P. affine,** *Don Prodr.* 70, *excl. syn.*; glabrous, densely tufted, flowering stems 4–12 in., leaves sessile or shortly petioled linear- or elliptic-lanceolate or oblanceolate acute or obtuse crenulate glaucous beneath cauline few, racemes shortly peduncled stout erect, flowers suberect, styles free slender. *Meissn. Monog. Polyg.* 52, and in *DC. Prodr.* xiv. 1. 126; *Bab. in Trans. Linn. Soc.* xviii. 97; *Bot. Mag.* t. 6472. P. Brunonis, *Wall. Cat.* 1692; *Royle Ill.* 317, t. 80, f. 3; *Meissn. in Wall. Pl. As. Rar.* iii. 54; *Lindl. & Paxt. Fl. Gard.* ii. t. 37; *Lemaire Jard. Fleur.* t. 117. P. Donianum, *Spreng. Syst. Cur. post.* 154.

ALPINE andS UBALPINE HIMALAYA; from Kashmir, alt. 8–14,000 ft., eastward Kumaon, alt. 11–13,000 ft. WESTERN TIBET.

Rootstock woody, long, branched, often tortuous, and 4–8 in. long; crown clothed with scarious old stipules. *Leaves* chiefly radical, 2–4 in., narrowed into the petiole, finely reticulate, margins recurved; stipules $\frac{1}{2}$–1 in., entire or split, many-nerved, brown. *Peduncles* 3–8 in., usually stout. *Racemes* 2–3 in., obtuse, flowers crowded, rosy, $\frac{1}{6}$–$\frac{1}{4}$ in. diam. *Sepals* elliptic-oblong. *Nut* 3-gonous.—Iskardo and Kashmir specimens attain 16 in. in height.

22. **P. vaccinifolium,** *Wall. Cat.* 1695; tufted, glabrous, branches trailing and creeping, leaves shortly petioled small orbicular or elliptic acute at both ends or acuminate quite entire, stipules rigid laciniate with many long strong excurrent nerves, racemes subsessile, styles filiform free. *Meissn. in Wall. Pl. As. Rar.* iii. 54, and in *DC. Prodr.* xiv. 1. 126; *Royle Ill.* 317, t. 80, f. 2; *Bab. in Trans. Linn. Soc.* xviii. 96; *Lindl. & Paxt. Fl. Gard.* ii. 37; *Bot. Mag.* t. 4622.

TEMPERATE and SUBALPINE HIMALAYA; from Kashmir to Bhotan, alt. 9–14,000 ft. WESTERN TIBET; Ladak, alt. 14–16,500 ft., *Stewart.*

Rootstock sometimes as thick as the little finger and twisted, usually longer more slender and much branched; branches leafy. *Leaves* $\frac{1}{2}$–$\frac{2}{3}$ in., rather glaucous beneath; stipules $\frac{1}{3}$–$\frac{1}{2}$ in., brown, giving a crinite appearance to the tips of the young branches. *Racemes* $1\frac{1}{2}$–3 in.; bracts acuminate; flowers rose-red, $\frac{1}{3}$ in. diam. *Stamens* at length exserted.—Meissner's vars. *obtusifolium*, *medium*, and *flagelliforme*, are not sufficiently distinguishable.

23. **P. emodi,** *Meissn. in Wall. Pl. As. Rar.* iii. 51, 54, t. 287, and in *DC. Prodr.* xiv. 1. 127; glabrous, rootstock elongate, branches trailing and creeping, leaves subsessile rigid linear-lanceolate acuminate at both ends quite entire striate-nerved, stipules long membranous acuminate many-nerved, racemes peduncled, stamens included, flowers pedicelled, styles free

filiform. *Bab. in Trans. Linn. Soc.* xviii. 98. P. Meissneri, *Wall. Cat.* 1693.

TEMPERATE HIMALAYA; from Dalhousie to Bhotan, alt. 8–11,000 ft.

Rootstock as thick as a goose-quill; branches 6–10 in., internodes often 1–1½ in., with short ascending leafy branches. *Leaves* 1½–2 in., margins recurved; stipules 1 in. *Racemes* 1–1½ in., few-fld.; bracts acuminate; flowers red. *Perianth* ⅙ in. long. *Stamens* 8. *Nut* ellipsoidly rhombic, angles very obtuse.

Sect. VII. PERSICARIA, *Meissn.* Erect or decumbent annual or perennial herbs. *Leaves* usually narrow; stipules tubular, often ciliate. *Flowers* in spiciform racemes, often glandular; bracts more or less tubular, usually truncate, often ciliate. *Perianth* 4–5-partite, not enlarged in fruit. *Stamens* 4–8, often alternating with glands. *Styles* 2–3, free or connate below, stigmas usually capitate. *Nut* trigonous or biconvex, cotyledons accumbent.

* *Styles* 2, *rarely* 3; *nut biconvex.* (See also *P. Hydropiper.*)

24. **P. glabrum,** *Willd. Sp. Pl.* ii. 447; glabrous, leaves 4–8 in. petioled lanceolate or linear-lanceolate finely acuminate glandular or not, stipules membranous eciliate glabrous, racemes slender panicled, peduncles usually quite glabrous, bracts rarely ciliolate. *Meissn. in DC. Prodr.* xiv. 1. 115, and in *Mart. Fl. Bras.* v. 1, t. 14; *Roxb. Fl. Ind.* ii. 287; *Bab. in Trans. Linn. Soc.* xviii. 102; *Wight Ic.* t. 1799; *Wall. Cat.* 1711; *Grah. Cat. Bomb. Pl.* 172; *Dalz. & Gibs. Bomb. Fl.* 214. P. Poiretii, *Meissn. in Wall. Cat.* 1712, &c. P. Persicaria, *Wall. Cat.* 1720.—*Rheede Hort. Mal.* xii. t. 77.

In ditches, &c., from ASSAM, SILHET and BENGAL westward to the INDUS and SCINDE, and southward to BURMA, ascending the HIMALAYA to 6400 ft. in GARWHAL. CEYLON, common.—DISTRIB. Tropical Asia, Africa and America.

Stem 2–4 ft., sometimes as thick as the finger, rarely diffusely branched, often red. *Leaves* usually dark brown and shining when dry; stipules rarely with a few short cilia. *Racemes* 2–4 in., very slender; bracts truncate, tip oblong or rounded, few-fld. *Perianth* very variable in size, white or rosy. *Stamens* 6–8. *Nut* orbicular, biconvex, black, shining.—It is difficult to separate this from smooth forms of *P. Persicaria*, of which it is the tropical representative; it is, however, much larger, less branched, with more attenuate leaves brown when dry, and normally eciliate bracts and stipules. Meissner doubtfully cites under his var. *obscurum* (which is the common state of the plant in India) Roxburgh's *P. tenellum*, on the faith of a note of Wallich's in Herb. DC.; but the published *tenellum* of Roxburgh has filiform racemes and trigonous nuts, and is what I suppose to be *P. flaccidum.* Boissier points out (under *P. senegalense*) that the Affghan habitat attributed to this by Meissner is a mistake for Loodiana. Var. *glandulosissima*, Meissn. in Wall. Pl. As. Rar. iii. 57, and in DC. l. c., is the glandular-leaved state of the plant, and is the *P. fluviatile*, Herb. Ham. and Wall. Cat. 1711 E; the nut is trigonous in Hamilton's specimen.

Var. *scabrinervis*; peduncles often glandular above, leaves glandular, midrib beneath scabrid. P. scabrinerve, *Royle mss.*; *Meissn. l. c.* 121, *in part*; *Bab. l. c.* 101. P. quadrifidum, *Ham. in Wall. Cat.* 1711 F.—N.W. India, *Royle;* Soane River, *J. D. H.*; Bengal; Burma; Ceylon.—Hamilton's specimens have a deceased inflorescence.

Var. ? *macrantha*; leaves densely gland-dotted, midrib beneath scabrid, racemes very stout, bracts oblong, flowers nearly ¼ in. diam. rose-cold., styles 2 or 3.—Silhet station, *Clarke.*—The specimens are very indifferent, but I think referable to *P. glabrum.* It must be a handsome plant.

25. **P. amphibium,** *Linn.*; *Boiss. Fl. Orient.* iv. 1028; perennial, leaves usually floating oblong or lanceolate, stipules truncate ciliate or not, racemes solitary dense-fld., peduncles hairy, bracts eciliate, perianth

eglandular, fruit ovoid faces convex. *Meissn. in DC. Prodr.* xiv. 1. 115; *Fl. Dan.* t. 282.

WESTERN HIMALAYA, *Falconer*; Kumaon, alt. 6400 ft., *Strachey & Winterbottom*; Kashmir, *Thomson*.—DISTRIB. Westward to the Atlantic, N. Asia and America.

Rootstock creeping, woody. *Leaves* long petioled and floating, or subsessile and aerial, obtuse or acute, serrulate or ciliate, eglandular; stipules glabrous or hispid. *Racemes* very stout, 1–2 in. long; peduncle stout; bracts acute obtuse or cuspidate. *Sepals* $\frac{1}{6}$ in., not nerved, bright red, much longer than the shining nut.

26. **P. lanigerum,** *Br. Prodr.* 419; much branched, clothed with snow-white cottony tomentum, leaves petioled or sessile narrowly lanceolate acuminate rarely glabrous above, stipules short truncate eciliate, racemes 1–2 in. slender, bracts small crowded glabrous or tomentose eciliate. *Meissn. in Wall. Pl. As. Rar.* iii. 55, and in *DC. Prodr.* xiv. 1. 117; *Benth. Fl. Austral.* v. 271; *Boiss. Fl. Orient.* iv. 1030; *Wall. Cat.* 1714. P. lanatum, *Roxb. Hort. Beng.* 29, and *Fl. Ind.* ii. 285. P. arachnoideum, *Klotszch mss.*

In ditches, &c.; BENGAL, *Roxburgh*, ROHILKUND, *Wallich*, *Thomson*, and along the lower HIMALAYA from Sikkim to the Beas River; Belgaum, *Herb. Wight.*—DISTRIB. Java, Philippines, Egypt, Tropical and S. Africa and America, Australia.

Stem 2–5 ft., procumbent and creeping below, sometimes much thicker than the thumb; branches slender, much divided, divaricating, white, "deep red within, especially at the joints," *Roxb.* *Leaves* 4–8 in., finely acuminate, thickly cottony beneath; stipules membranous, mouth unequal. *Racemes* in slender divaricate cottony peduncles; bracts very small, obtuse or acute, and small red or white perianth eglandular. *Stamens* 6. *Nut* orbicular, small, flat, black, shining.—Roxburgh describes this as annual, Bossier calls it annual in his clavis and perennial in his description, others say perennial; the great size of the rooting base of the stem would indicate the latter.

Var. *glutinosa*; peduncles and perianth glandular. P. glutinosum, *Wall. Cat.* 1717; *Meissn. in Wall. Pl. As. Rar.* iii. 55, and in *DC. l. c.* 120.—Banks of the Irawaddy, *Wallich*.—This appears to me a form of *P. lanigerum* growing in dry places. The root is annual. S. Africa.

27. **P. lapathifolium,** *Linn.*; *Boiss. Fl. Orient.* iv. 1030; annual, erect, branched, leaves subsessile elliptic-ovate or lanceolate glandular beneath ciliolate, stipules sparingly ciliate, racemes dense-fld. erect or nodding, bracts eciliate, pedicels usually glandular, perianth greenish glandular nerves strong, stamens usually 6. *Meissn. in DC. Prodr.* xiv. 1. 119; *Reichb. Ic. Crit.* v. t. 495; *Engl. Bot.* t. 1382.

Plains of N. INDIA; var. *nodosa* from Lahore westwards to Kashmir, ascending the Himalaya to 7000 ft.; var. *laxa* from BENGAL to the Sutlej, ascending the Himalaya to 6000 ft. The CONCAN.—DISTRIB. W. and N. Asia, Europe, Africa, and America.

I am indebted to Mr. Baker for identifying the Indian forms of this and the following species, which present a series of varieties more or less representing the European ones described above, but none of them conforming to the typical *P. lapathifolium*. The var. *nodosa* is, he informs me, often very difficult to distinguish from *P. Persicaria*.

Var. *nodosa*; taller, more branched, spikes oblong, perianth reddish not so strongly veined, nut smaller. P. nodosum, *Pers.*; *Meissn. in DC. l. c.* 118. P. maculatum, *Dyer & Trimen*.

Var. *laxa*; spikes laxer cylindric. P. laxum, *Reichb. Ic. Crit.* v. 56, t. 492. P. nutans, *Roxb. Fl. Ind.* ii. 285. P. quadrifidum, *Herb. Strachey & Winterbottom, Polyg.* 24.

28. **P. Persicaria,** *Linn.*; *Boiss. Fl. Orient.* iv. 1030; annual, erect

or ascending, leaves subsessile elliptic-oblong or lanceolate eglandular, stipules usually hirsute and ciliate, racemes oblong dense-fld., bracts ciliate, pedicels glabrous, perianth red eglandular nerves slender, stamens usually 6. *Meissn. in DC. Prodr.* xiv. 1. 117; *Reichb. Ic. Crit.* v. 55, t. 491; *Engl. Bot.* t. 756.

WESTERN HIMALAYA; Kashmir, *Falconer*, &c. WESTERN TIBET, alt. 9–14,000 ft., *Thomson*, &c.—DISTRIB. N. and W. Asia, Europe, Africa, N. America.

Under *P. lapathifolium* I have alluded to the difficulty of distinguishing this plant from its var. *nodosa*, in India at any rate. I must leave a further study of the forms of both to Indian botanists, with living specimens to work upon.

29. **P. minus,** *Huds.*; *Meissn. in DC. Prodr.* xiv. 1. 111; slender, erect or ascending, glabrous, leaves sessile linear- or oblong-lanceolate subacute, stipules sparsely strigose truncate ciliate cilia much shorter than the tube, racemes erect filiform, bracts close rarely interrupted glabrous ciliate, perianth eglandular, nut polished. *Boiss. Fl. Orient.* iv. 1029; *Miquel Fl. Ind. Bat.* i. 1002. P. Posumbu, *Wall. Cat.* 1722 (*not of Ham.*). P. tenellum, *Blume Bijd.* 530. P. hypostictum, *Miquel in Herb. Hohen.*, No. 971. P. Banca, *Herb. Ham.* P. strictum, *Allioni*; *Wight Ic.* t. 1800.

Throughout the hotter parts of India, from ASSAM and CHITTAGONG to KASHMIR, and southward to TRAVANCORE, ascends the Himalaya to 6000 ft. CEYLON, ascending to 4000 ft.—DISTRIB. Europe, Temperate and Tropical Asia.

Stem sometimes creeping, 6–10 in. high or long, much branched or simple. *Leaves* usually under 2 in., glabrous or puberulous beneath, or minutely strigose on the midrib beneath; stipules ¼–½ in., with stiff closely appressed bristles. *Racemes* ½–1 in., erect; flowers minute. *Nut* orbicular.—The nuts are rather smaller than in European specimens, but I find no other difference. Wight describes the Nilghiri plant as 2–3-gynous and 5–6-androus. Small states of *P. serrulatum* are with difficulty distinguished from this.

30. **P. assamicum,** *Meissn. in DC. Prodr.* xiv. 1. 111; diffusely branched and creeping, and ascending, branches glabrous, leaves dark green when dry petioled elliptic-ovate or -lanceolate subacute or acuminate glabrous or with the nerves beneath setulose and margins ciliate, stipules strigose cilia as long as the tube, racemes 1–1½ in. very slender and on very slender pedicels, bracts interrupted glabrous truncate ciliate, perianth eglandular, stamens 5 or 6.

ASSAM, *Wallich*, *Masters*; CACHAR, *J. D. H. & T. T.*—DISTRIB. Burma, *Griffith.*

The prostrate habit, dark-green petioled broader leaves, longer cilia of the stipules and more slender interrupted racemes, at once distinguish this remarkable species, which has the colour of *P. tinctorium* when dry. The Burmese specimen is very much stouter than the Assam and Cachar ones, and has leaves 4 by 1½ in. The nut is like that of *P. minus.*

†† *Styles* 3, *rarely* 2. *Nut* 3-*gonous*, *rarely biconvex.*

31. **P. viscosum,** *Ham. in Don Prodr.* 71; annual, stem ascending and branches hirsute with spreading bristly hairs and glands, leaves shortly petioled lanceolate acute or acuminate strigose, stipules short hirsute, racemes 1–1½ in. erect, bracts close strigose and ciliate, perianth eglandular. *Meissn. Monog. Polyg.* 73; *in Wall. Pl. As. Rar.* iii. 55, and in *DC. Prodr.* xiv. 1. 102; *Wall. Cat.* 1713. P. strigosum & hirsutum, *Herb. Ham.*

NEPAL, *Hamilton*; KHASIA MTS., SILHET and CACHAR, *De Silva*, *Griffith*, &c.

Stem 1–3 ft., stout or slender, hollow, hairs flexuous, glandular or not. *Leaves* 2–7 in., glandular or not beneath, usually drying brown, stipules ⅓–½ in. *Racemes*

rather slender ; peduncles densely glandular ; bracts short ; flowers bright red, hardly exserted. *Stamens* 8. *Nut* broadly trigonous, black.—I find no character for Meissner's var. *verrucosum*, of which I think the varnish is due to the glue used in mounting the specimen.

Var. *minor ;* smaller, weaker, more slender and sparsely hirsute, green when dry, leaves 1–1½ in. elliptic-lanceolate obtuse. *Wall. Cat.* 1713 C.—Nepal (cult. in Hort. Bot. Calc.) ; Silhet.

32. **P. stagninum,** *Ham. mss.* ; *Meissn. in Wall. Pl. As. Rar.* iii. 56, in *DC. Prodr.* xiv. 1. 104 ; stem erect or ascending and branches glabrous below above and peduncles subsilkily strigose, leaves 3–5 in. lanceolate or linear-lanceolate acuminate strigosely pubescent on both surfaces glandular or not beneath, stipules strigose cilia shorter than the tube, racemes strict erect, bracts close glabrous or strigose ciliate, perianth eglandular. P. tomentosum, *Wall. Cat.* 1709/4 *in part,* E, G, H. P. barbatum, *Wall. Cat.* 1708 F. P. Bishiræ, *Ham. mss.* ; and P. conspersum, *Meissn. in Wall. Pl. As. Rar. l. c.*, and in *DC. l. c.* 102. P. hispidum, *Bab. in Trans. Linn. Soc.* xviii. 100 (*not of Don*). P. Hamiltonii, *Meissn. in DC. l. c.* 104, *excl. syn. P. hispidum,* (*not of Sprengel*). P. Goyalpara, *Herb. Ham.* P. Hornemanni, *Meissn. in DC. l. c.* 107.

Throughout the hotter parts of India, from CHITTAGONG, CACHAR and BENGAL to CHAMBA, ascending the Himalaya in Sikkim and Kumaon to 4000 ft. MYSORE, *Clarke.* PEGU and BURMA, *Wallich.*

Annual ? *Stem* simple or branched. *Leaves* usually grey when dry, young often silky. *Racemes* stout or slender ; peduncles usually long and stout ; bracts glabrous or more or less (sometimes densely) strigose, very many-fld. ; flowers white. *Styles* long, slender, connate below. *Nut* pitchy black.—Very near *P. barbatum,* and probably a form of it ; but the peduncles are invariably strigose, the racemes and cilia of the stipules both shorter. Meissner refers Sprengel's *Hamiltonii* (which is Hamilton's *hispidum*) to the neighbourhood of *P. barbatum,* but I am disposed to place it under *P. flaccidum,* whilst the rest of Meissner's *Hamiltonii* comes here.

33. **P. barbatum,** *Linn.* ; *Meissn. in DC. Prodr.* xiv. 1. 104 ; branches stout erect and peduncles glabrous, or nearly so, leaves 4–7 in. lanceolate or linear-lanceolate acuminate glabrous except the ciliolate margins and midrib beneath, stipules strigose cilia longer than the tube, racemes 2–4 in. slender erect, bracts close glabrous sparingly and shortly ciliate, perianth eglandular white, stamens 5–8. *Bab. in Trans. Linn. Soc.* xviii. 100 ; *Wall. Cat.* 1708, *excl. F* ; *Wight Ic.* t. 1798 ; *Miquel Fl. Ind. Bat.* i. 999. P. rivulare, *Kœn., Roxb. Fl. Ind.* iii. 290 ; *Grah. Cat. Bomb. Pl.* 172 ; *Dalz. & Gibs. Bomb. Fl.* 214. P. Hornemanni, *Meissn. in DC. l. c.* 107. P. Marmoramæ & fluviatile, *Herb. Ham.*

Throughout the hotter parts of India, from ASSAM to the INDUS, and southwards to MALACCA, PENANG and CEYLON.—DISTRIB. Tropical Asia and Africa.

The nearly or quite glabrous stems and peduncles, the long bearded stipules, long weak slender but erect racemes, and shorter weaker cilia of the bracts, best distinguish this from *P. stagninum* ; but none of these characters holds good by itself, and I look to Indian botanists for further information. I am not certain that the synonymy of these plants is quite right, there is so much confusion between the names adopted by Hamilton, Wallich and Roxburgh, which last author has different names for the same plant in his Herbarium, his Icones and his Flora. The *barbatum* of "Flora Indica" is, I think, certainly what I have retained as *flaccidum* ; that so called on his authority in Herb. Wallich is *P. Hydropiper* ; that of his Icones is undoubtedly *P. tomentosum* ; whilst in his Herbarium *P. barbatum* is labelled *P. aquaticum,* which suggests to me that it is the *rivulare* of "Flora Indica," of which there is a poor drawing in his Icones, representing a very narrow-leaved plant with short stipules and slender racemes of white flowers.

34. **P. serrulatum,** *Lagasc.*; *Boiss. Fl. Orient.* iv. 1028; stem prostrate and rooting below, branches and peduncles glabrous, leaves 2–4 in. subsessile linear- or elliptic-oblong or -lanceolate acute or acuminate, glabrous or sparsely hairy beneath, base rounded cordate or acute, stipules strigose cilia as long as the tube, racemes ½–1½ in. slender erect, bracts glabrous strongly often squarrosely ciliate, perianth eglandular, stamens 5–8, nut trigonous polished. *Meissn. in DC. Prodr.* xiv. 1. 110. P. flaccidum, *Roxb. Fl. Ind.* ii. 291 (*not of Meissn. or Boiss.*). P. mite?, *Wall. Cat.* 1721 E, G, 1721/a *in part.* P. Rapte, *Herb. Ham.*

Plains and low hills of N. INDIA, from ASSAM and BENGAL to the INDUS, ascending to 4000 ft.; in the HIMALAYA, from Kumaon westwards.—DISTRIB. W. Asia, S. Europe, all Africa, America, Australia.

Habit between small states of *P. barbatum* and *P. minus*, of which latter this is probably a form with stouter racemes and more ciliate bracts and stipules. Specimens with leaves rounded or cordate at the base are distinct enough from both. Boissier describes it as perennial with rosy flowers, but the Indian plant is an annual with white flowers. Meissner and Boissier could not have attended to Roxburgh's description of his *P. flaccidum* (leaves cordate at the base), or they would have identified that plant with this; Roxburgh's figure of this (under the name of *P. flaccidum*) represents the leaves as much broader and more cordate at the base than I have ever seen them to be. A remarkable state from Dufla in Bhotan, collected by Booth, has the under surface of the leaves studded with a yellow secretion in minute dots.

Var. *Donii*; tall, slender, leaves petioled elliptic or lanceolate acuminate at both ends sparsely hairy beneath, racemes long slender erect, bracts close imbricate with one far removed and low on the slender peduncle, cilia as long as the tube. P. Donii, *Meissn. Monog. Polyg.* 72, *excl. syn.*, and in *DC. Prodr.* xiv. 1. 105, *excl. cit. of Wight.*—Nepal, *Wallich.*

There are two sheets of this in the Hookerian Herbarium (from Wallich, 1821), one with the narrow leaves described by Meissner, the other with much broader elliptic ones. They closely resemble *P. flaccidum* var. *hispida*, but the closer bracts with long spreading cilia and eglandular perianth distinguish it. From *P. Posumbu* most of the same characters separate it, but it is in many respects intermediate between these two.

35. **P. Posumbu,** *Ham. in Don Prodr.* 71 (*not of Wallich*); flaccid, very slender, stem extensively creeping below and peduncles quite glabrous, leaves 1–3 in. petioled elliptic-lanceolate caudate-acuminate glabrous or sparsely hairy, stipules sparingly strigose, cilia stiff longer than the tube, peduncles and erect racemes filiform sometimes very long, bracts minute close or distant very shortly ciliate, perianth very small eglandular, nut perfectly smooth and polished. *Meissn. in DC. Prodr.* xiv. 1. 105, *in part*; *Miquel Fl. Ind. Bat.* i. 1000. P. Donii, *Wall. Cat.* 1723 B. P. cæspitosum, *Blume Bijd.* 532 (*of Herb. Lugd. Bat.*). P. gracile, *Herb. Ham.*

TEMPERATE and SUBTROPICAL HIMALAYA; from Sikkim to Nepal. ASSAM, SILHET, CACHAR and the KHASIA MTS., ascending to 5000 ft.—DISTRIB. Munnipore, Java, China and Japan.

Stem creeping for 1–3 ft., then ascending or decumbent for 12–18 in., simple or branched. *Leaves* very membranous, ciliolate; petiole sometimes ⅓ in. *Racemes* 1–3 in., always erect, very variable in length, sometimes almost capillary and 5 in. long with distant bracts, at others short with imbricate upper bracts and remote lower ones (these resembling small specimens of *serrulatum*). *Nut* 3-gonous, very small.—There are no Nepal specimens of this in Hamilton's or Wallich's Herbaria. Hamilton's are from Goalpara in Assam, and are not ticketed *P. Posumbu*, which name nowhere appears in his collection. Meissner's α *tenerum* is the right plant; his β *firmum* is composed of this and of *P. flaccidum*; his γ *macrophyllum* is *P. flaccidum*; his δ ? *cæspitosum* is right; his ε ? *ovatum* would appear to be *Ceratogo*

non atriplicifolium, both from the number of Wallich's, which he quotes (1719), and from the length of the petiole (6–8 lines).—Don's publication of ***Posumbu*** and Blume's of ***cæspitosum*** are contemporaneous.

36. **P. Hydropiper,** *Linn.*; *Boiss. Fl. Orient.* iv. 1029; glabrous, rather robust, stem erect or ascending branched, leaves subsessile or petioled lanceolate or oblong-lanceolate glabrous or with the costa scabrid beneath, stipules glabrous or sparsely strigose very shortly ciliate, racemes filiform decurved interrupted, bracts glabrous glandular or not mouth naked or minutely ciliate, perianth very glandular pink, nut usually trigonous opaque granulate. *Meissn. in DC. Prodr.* xiv. 1. 109; *Fl. Dan.* t. 1376; *Reichb. Ic. Crit.* v. t. 494. P. mite, *Wall. Cat.* 1721 F, H.

Plains and hills of INDIA, in wet places, from ASSAM, SILHET, CHITTAGONG and BENGAL to N.W. INDIA; ascending the KHASIA MTS. to 5000 ft., and the HIMALAYA to 7000 ft. MADRAS (coll. *G. Thomson*).—DISTRIB. Westward to Europe and N. Africa, Temperate and Subtropical Asia, Java, N. America, Australia.

Annual, roots tufted or shortly creeping; stems and branches rather stout, leafy, 12–18 in. high, always glabrous, often glandular, nodes often swollen. *Leaves* rarely more than 3 in. long, very variable in width and in the length of the apex, usually covered with impressed glands; stipules glabrous, or with scattered erect appressed hairs that are sunk in the tissue of the stipule. *Racemes* flexuous, leafy at the base; bracts variable as to ciliation, which is always short, usually broader than in *P. flaccidum*; perianth pinkish. *Nut* sometimes flat, finely granular.—I cannot distinguish this from the European *P. Hydropiper*, though the cilia of the stipules are often longer and the nut smaller. Hamilton in a note upon his specimen (under the name of *flaccidum*), says that Roxburgh desired that it should bear the name of *Pani-maricha*, i.e. water-pepper. The Eastern specimens have more commonly a scabrid costa (which, however, varies in amount to total absence), and have more often sunk hairs in the stipules. I find these latter in European specimens; in which also I find occasional cilia on the bracts, but never a scabrid costa to the leaf. It is the *P. barbatum* of Roxb., according to a specimen in Herb. Wallich, but not of the "Flora Indica." Zollinger's No. 95 from Java is identical with the Indian plant. The long cilia of the more glabrous stipules, shorter racemes and more crowded flowers distinguish this from *P. flaccidum*.

Var. ? *eglandulosa*; perianth eglandular, nut compressed.—Western Himalaya, *Edgeworth*; Kunawur, Jamu and Ladak, *Thomson*.—But for the more drooping racemes and smaller pink flowers this would be *P. mite*, L., to which I was inclined to refer it, but Mr. Baker regards it as a form of *Hydropiper*.

37. **P. flaccidum,** *Meissn. in DC. Prodr.* xiv. 1. 107, *in part, excl. syn.* (*not of Roxburgh*); glabrous or pubescent, stem erect or ascending simple or branched, leaves usually petioled lanceolate or elliptic-lanceolate acuminate, stipules strigose or hirsute, cilia half as long as the tube or longer, racemes very long filiform decurved, bracts usually very distant glabrous glandular, mouth ciliate, nut trigonous rarely compressed opaque granulate. *Boiss. Fl. Orient.* iv. 1029, *excl. syn. Donii.* P. barbatum, *Roxb. Fl. Ind.* ii. 289 (*not of Willd.*). P. Posumbu, *Thwaites Enum.* 245. ? P. tenellum, *Roxb. Fl. Ind.* ii. 289. P. Donii, *Wight Ic.* t. 1801. P. mite ?, *Wall. Cat.* 1721/2, 3, D, 1723/1 b, C. P. Rottleri, *Roth Nov. Pl. Sp.* 205. P. rivulare, *Herb. Helf.* (*ex Meissn.*). P. asperulum, *Wall. mss.* P. Bisculatium, *Herb. Ham.* P. ciliatum, *Ic. Roxb.*

Common throughout INDIA in wet places, ascending the Himalaya to 4000 ft., and extending to CEYLON and MALACCA.—DISTRIB. Malay Archipelago.

Usually a much taller, longer and larger leaved species than *P. Hydropiper*, and differing in other characters indicated under that plant.

Root perennial ?, shortly creeping; stems 2–3 ft., usually erect and slender

glabrous or strigose. *Leaves* 2–6 in., glabrous altogether or with the exception of the costa and nerves beneath, or hispidly or strigosely hairy on the surfaces or below only, brown when dry, more or less glandular. *Stipules* usually very strigose with stiff appressed hairs, cilia often as long as the tube. *Racemes* subpaniculate, sometimes 6 in. long and extremely slender; bracts glabrous, more or less ciliate, glandular or not; perianth bright pink, very thickly glandular. *Stamens* 8. *Nut* small, black, minutely granular.—The taller, longer-leaved, hairy forms of this are very distinct from *P. Hydropiper*, but amongst a large suite of specimens of both, some occur that it is difficult to refer to one rather than to the other. As pointed out under *P. serrulatum*, Roxburgh's *P. flaccidum* is that plant. This obliges me to retain the name (*flaccidum*) as Meissner's, though in so doing I am unable to take in his synonymy and his varieties, which are much confused. Boissier gives Affghanistan Griffith as a locality for this species, but I have seen no specimens, and his description quite agrees with the Indian plant. I can hardly doubt this being Roth's *P. Rottleri*, which he received from Heyne (under the name of *P. barbatum*, Rottler), but am puzzled by his description of "style quite simple and stigma capitate"—in allied species he always speaks of stigmas. I do not see how glabrous forms differ from the American *P. acre*, HBk., except, as Meissner observes (in Fl. Bras.), by the granulate (not smooth polished) nut.

Var. *hispida*; leaves elliptic ovate much smaller 1–1½ in. long, hirsute beneath or on both surfaces, glands of perianth less strong. P. hispidum, *Ham. in Don Prodr.* 71, *not of Meissn. or Bab.* P. Posumbu, *Meissn. in DC. l. c.* 105, *in part.* P. Hamiltonii, *Spreng. Syst. Veg., Cur. post.* 155 (*not of Meissn.*). P. Babingtoni, *Endl. Gen. Pl. Suppl.* iv. 47, *excl. syn. Bab.* P. mite, *Wall. Cat.* 1723, 1 a, *in part.*—Nepal, *Hamilton*; Kumaon, at Naini tal, alt. 6400 ft., *Strach. & Winterb.* (No. 17); Hawalbagh, *Thomson.*—A specimen in Wallich's Herbarium of Hamilton's *P. hispidum* shows that this plant has been misunderstood first by Babington, who described for it a variety of *P. barbatum*, or *P. Bishiræ*, followed by Meissner (in De Candolle), who did the same, adopting the name of *Hamiltonii*, which had been proposed for it by Sprengel (there being an earlier *P. hispidum*); and lastly by Endlicher, who included both Hamilton's and Babington's plants under the third name of *P. Babingtoni*. Beyond this I have been unable to unravel completely the synonymy of this obscure plant, which differs from *P. flaccidum* in its much shorter leaves and less glandular perianth. It resembles *P. serrulatum* var. *Donii*, which differs in the coarse strong cilia of the bracts.

38. **P. macranthum,** *Meissn. in DC. Prodr.* xiv. 1. 207; tall, erect, stem glabrous or sparsely strigose, leaves 3–6 in. petioled elliptic-lanceolate acuminate glabrous or sparsely hispid beneath, stipules substrigose, cilia as long as the tube, racemes long narrow erect strict, bracts closely imbricate with one or two removed far below glabrous shortly ciliate eglandular, perianth very large, nut large polished. Polygonum, No. 21, *Herb. Ind. Or. H. f. & T.*

Assam, *Wallich, Griffith*, &c. Silhet, the Jheels and Khasia Mts., ascending to 5000 ft., *J. D. H. & T. T., Clarke.*

Habit and size of *P. flaccidum*, but at once distinguished by the strict rarely flexuous (never decurved) racemes 3–6 in. long, with closely imbricating bracts and the polished nut.—I have seen but two flowering specimens, in which the perianth is nearly ¼ in. diam.; and from the small size of the buds in numerous other specimens I suspect that the perianth may vary much in size. The nut is nearly ⅛ in. long, jet-black, quite smooth, shining with obtuse angles.

Sect. VIII. Cephalophilon, *Meissn.*; erect or prostrate unarmed annuals, rarely perennial-rooted, or shrubs. *Leaves* usually broad entire or runcinately lobed or auricled; stipules short, tubular. *Flowers* in single or corymbose heads (spikes in *P. muricatum*); bracts flat, hardly tubular. *Perianth* 4–5-lobed or -partite. *Stamens* 6–8, glands 0 or obscure. *Styles* 2–3, filiform, connate below or throughout, stigmas capitate. *Nut* tri-

gonous or biconvex, enclosed in or adnate to the often enlarged and sometimes fleshy perianth-tube; cotyledons accumbent.

39. **P. humile,** *Meissn. in Wall. Pl. As. Rar.* iii. 59, and in *DC. Prodr.* xiv. 1. 128; small, sparsely glandular-hairy, stem filiform, leaves $\frac{1}{3}$ in. subsessile ovate acute or rhombic-ovate, mouth of stipules very oblique, heads long peduncled small, bracts very small ovate-lanceolate acute, stamens 5–6, nut biconvex striate and punctate. P. perforatum, *Wall. Cat.* 1700, *in part.*

TEMPERATE and ALPINE HIMALAYA; Kunawur, *Grant*; Kumaon, alt. 8500 ft., *Strachey & Winterbottom*; Nepal, *Wallich*; Sikkim, alt. 7–11,000 ft., *J. D. H., Clarke.*

Annual. *Stem* 4–6 in., simple and erect or diffusely branched from the base. *Leaves* very uniform, epunctate, sometimes narrowed into a short broad petiole. *Heads* $\frac{1}{4}$ in. diam., on long slender pedicels, without an involucral leaf; bracts longer than the flowers. *Perianth* greenish, tube closely investing but not cohering with the nut, eglandular; lobes very short, rounded. *Nut* black, coarsely punctate; styles slender, connate below, stigmas capitate.

40. **P. glaciale,** *Hook. f.*; dwarf, flaccid, glabrous, subsucculent, leaves long-petioled broadly ovate obtuse, heads small sessile or peduncled, peduncle minutely glandular at the tip, bracts broadly ovate obtuse glabrous about equalling the 3-gonous nut. P. perforatum γ. glaciale, *Meissn. in DC. Prodr.* xiv. 1. 128. P. perforatum, *Aitchison in Journ. Linn. Soc.* xviii. 90.

ALPINE and SUBALPINE HIMALAYA; Kashmir, alt. 8400–12,000 ft., *Clarke*; Kunawur and Piti, alt. 9000–11,000 ft., *Thomson*; Kumaon, alt. 13,000 ft., *Strachey & Winterbottom*, &c.—DISTRIB. Affghanistan.

Annual, 2–4 in. high, branched from the root, branches diffuse. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in., nerves indistinct, surfaces minutely granular when dry; petiole as long as the blade, winged above only; stipules short, cupular, simple or 2-lobed, glabrous. *Heads* $\frac{1}{6}$–$\frac{1}{4}$ in. diam., without an involucral leaf. *Perianth* hyaline; lobes subequal, obtuse. *Stamens* 5. *Nut* minute, closely invested by the perianth-tube, black, striolate and punctate.—The long petioles at once distinguish this from *P. alatum.*

41. **P. alatum,** *Ham. mss.*; *Spreng. Syst. Veg., Cur. post.* 154; tall, erect or low and procumbent, glabrous or sparsely hairy, leaves large or small ovate or deltoid-ovate obtuse or acute narrowed into a broadly winged often amplexicaul petiole glandular or not, stipules tubular obliquely truncate, peduncles glandular hispid at the tip, heads usually with an involucral leaf, bracts ovate-lanceolate glabrous not ciliate, perianth 1–5-fld., stamens 7–8, nut biconvex or trigonous striate and punctate. P. punctatum, *Ham. in Don Prodr.* 72; *Bab. in Trans. Linn. Soc.* xviii. 105. P. perforatum, *Meissn. Monogr. Polyg.* 83, and in *Wall. Pl. As. Rar.* iii. 59, and in *DC. Prodr.* xiv. 1. 128, *excl.* γ. *glaciale*; *Wall. Cat.* 1700. P. nepalense, *Meissn. Monog.* 84, *in Wall. Pl. As. Rar.*, and in *DC. ll. c.*; *Fresen. in Mus. Senkenb.* iii. 64; *Bab. l. c.* 106; *Wight Ic.* t. 1804.

Throughout the HIMALAYA; abundant at 4–10,000 ft. elevation, from Sikkim to Kashmir. KHASIA MTS., alt. 4–6000 ft. NILGHIRI MTS. (a weed in gardens), *Wight.* CANARA; Bababudan Hills, *Heyne.* CEYLON, abundant.—DISTRIB. Affghanistan, Java, Japan, Abyssinia.

Annual. *Stem* rarely creeping for a short distance at the base, erect and subsimple or branched from the base; branches 6-18 in. high, slender or rather stout, flaccid or stiff, erect ascending or prostrate, glabrous or sparsely grandular-hairy. *Leaves* in the largest specimens 2–3 in. long, and the smallest $\frac{1}{4}$ in., base sometimes subcordate, suddenly contracted into the broadly-winged petiole which is often

auricled at the base; stipules glabrous or hairy, sometimes glandular, rarely ciliate. *Heads* ¼–¾ in. diam.; peduncles short or long, always glandular-hairy above; involucral leaf often longer than the head, sessile, ovate-cordate, obtuse or acute. *Sepals* white or pale purple, membranous, subequal, very variable in size. *Stamens* included. *Style* long with one or two long arms and capitate stigmas. *Nut* varying in size in the same head, closely invested with and cohering with the thin perianth-tube and crowned with its lobes.—I fail to discriminate between Meissner's *P. perforatum* and *P. nepalense*, and I have taken for both Hamilton's name of *alatum* as adopted by Sprengel for his *punctatum*. The absolute character whereby these supposed species were distinguished, that of the biconvex and trigonous nut, is accompanied by no other, and I have taken typical nuts of both forms from one head of a Nilghiri specimen. Meissner himself observes that his *nepalense* has sometimes trigonous nuts. The character of glandular leaves again is most variable, and eglandular specimens are far the most abundant. Of the following forms some may prove to belong to distinct species, but I doubt it.

P. alatum proper; stems 1–2 ft., leaves large glandular or not, heads large, invol. leaf large, bracts obtuse or subacute, nut trigonous. P. alatum, *Spreng. l. c.* P. punctatum, *Ham. mss.*—Abundant.

Var. *nepalense*; stems 1–2 ft., leaves large glandular or not, heads large, invol. leaf large, bracts obtuse or subacute, nut biconvex. P. nepalense, *Meissn. Monog. l. c.* t. 7, f. 2; *Wall. Cat. l. c.* P. guttuliferum, *Miq. Pl. Hohenack.*, No. 968 (*leaves glandular*).—Abundant.

Var. *parviflora*; stem 1–2 ft. slender, leaves about 1 in.; heads small on more slender peduncles, bracts acute, lower recurved, nut trigonous. P. perforatum, *Meissn. l. c. excl. γ.*; *Wall. Cat.* 1700.—Common, also in Ceylon (nuts flat).

Var. *arenaria*; smaller, diffusely branched, stem elongate prostrate with ascending flowering branches, leaves ½–1 in. narrower eglandular, petiole shorter, heads large, invol. leaf very small, bracts obtuse, fruiting perianth with a median rib on each face, nut biconvex.—Sikkim, sands of the River Rungeet, &c., *Clarke*, *Treutler*.

Var. *Metziana*; small, diffusely branched from the base, branches very slender prostrate and ascending, leaves broad ½–1 in. long glandular or not, petiole short, heads small, peduncles very slender, invol. leaf large or small, bracts acute, nut trigonous or biconvex. P. Metzianum, *Miq. in Herb. Hohenack.*, No. 610.—Specimens with 3-gonous nuts are from Sikkim and the Khasia Mts., at 5000 ft.; Kumaon and Dalhousie, 7000 ft.; and with flat nuts from Parusnath, the Khasia Mts., Canara, the Nilghiri Mts. and Ceylon, all at above 4000 ft.

Var. *rigidula*; dwarf, nearly glabrous, stem 2–3 in. strict erect subsimple or dichotomously branched, leaves ¼–½ in. acute eglandular, petiole short, heads small (large for the size of the plant), invol. leaf large or small, bracts acute or acuminate, flowers purple-red, nut biconvex.—Kunawur, *Grant*; Sikkim, alt. 7300 ft., *Clarke*.—Very like small specimens of *P. humile*.

Var. *tenuicaulis*; very slender, diffusely branched, quite glabrous except the tips of the peduncles, leaves ½–¾ in. very narrow acuminate glandular, heads very small, peduncles capillary, bracts acuminate recurved, nut trigonous.—Khasia Mts., alt. 4–5000 ft., *J. D. H. & T. T.*, *Clarke*.

42. **P. microcephalum,** *Don Prodr.* 72; glabrous or sparsely hairy, stem rigid tall erect or decumbent below angled and grooved, leaves 3–5 in. hastately ovate-lanceolate or -oblong acuminate abruptly narrowed into the long winged petiole, stipules truncate often ciliate, heads small, peduncle filiform quite glabrous, involucral leaf 0, bracts oblong obtuse more or less ciliate, nut 3-gonous granulate. *Meissn. Monog. Polyg.* 82, in *Wall. Pl. As. Rar.* iii. 59, and in *DC. Prodr.* xiv. 1. 129. P. staticiflorum, *Wall. Cat.* 1704, *excl.* D. P. strigosum, *Herb. Ham.*; *Wall. Cat.* 1732, *under P. Wallichii.* ? P. ciliatum, *Ham. in Don Prodr.* 73.

Temperate Himalaya; Nepal, *Wallich*; Sikkim, alt. 4–5000 ft., *J. D. H.* Khasia Mts. and Silhet, alt. 0–4000 ft.

Root slender, perennial, woody; stem 2–3 ft., often decumbent and rooting below at the nodes, glabrous or subhispid above. *Leaves* membranous, eglandular, ciliolate,

with the petiole sometimes auricled at the base, uppermost sessile and deeply amplexicaul. *Peduncles* axillary and subterminal, often forked; heads $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; perianth white, 5-cleft. *Stamens* 8. *Styles* 2–3, slender, connate below, stigma capitate.—It is curious that of 60 specimens examined not one bears ripe fruit. Meissner and Clarke (mss.) describe it as 3-gonous, but I find both digynous and trigynous flowers. Meissner's var. *β. subvillosa* is a hirsute leaved state. Hamilton's *P. ciliatum* is a very doubtful plant; according to Don's description it differs from *P. microcephalum* only in the decumbent stem. Meissner describes the peduncles as sometimes hispidulous, but I never find them so.

43. **P. Wallichii,** *Meissn. Monogr. Polyg.* 83, t. 7, f. 1, *in Wall. Pl. As. Rar.* iii. 60, and in *DC. Prodr.* xiv. 1. 129; glabrous, stem slender decumbent, branches ascending, leaves 1–2 in. ovate-cordate acuminate ciliolate, petiole not winged auricled at the base, stipules ciliolate, heads small, peduncles subterminal short very slender quite glabrous, involucral leaf 0 or small, bracts broadly oblong obtuse eciliate. *Wall. Cat.* 1702, *excl. cit. of Wight.*

TEMPERATE HIMALAYA; Nepal, *Wallich, Scully*; Sikkim, alt. 4000 ft., *Clarke.*

Root perennial, creeping. *Stems* 2–3 ft., flexuous, stout, angled and grooved, prostrate but not rooting. *Leaves* 1–2 in., rather abruptly acuminate, uppermost cordate amplexicaul, auricles minute green; stipules long, loose, glabrous or hairy. *Peduncles* subterminal; heads as in *P. microcephalum*, but bracts not ciliate. *Perianth* 5-fid. *Stamens* 6–8. *Nut* trigonous.—I have seen only a few specimens. The habit, and naked petioles with minute basal auricles and eciliate bracts distinguish this from *P. microcephalum.* Meissner is in error in citing Wight's t. 1805 for this; it is clearly *P. sphærocephalum.*

44. **P. sphærocephalum,** *Wall. Cat.* 1703; rarely glabrous, stem very long slender creeping, branches short erect, leaves 1–3 in. ovate- or oblong-cordate acuminate ciliolate, petiole not winged nor auricled, stipules truncate mouth naked, peduncles glandular-hairy terminal and axillary, involucral leaf 0, bracts ovate-oblong acute eciliate. *Meissn. in Wall. Pl. As. Rar.* iii. 60; *Bab. in Trans. Linn. Soc.* xviii. 107; *Gærcke in Bot. Reise Pr. Waldem.* 136. P. Wallichii, *Wight Ic.* t. 1805. P. podocephalum, *Klotzsch in Bot. Reise Pr. Waldem.* t. 86.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Kumaon, alt. 6–8000 ft., *Royle,* &c. NILGHIRI MTS., *Wight.*

Perennial?. *Stems* 2–3 ft. long, rooting at the nodes, angular and grooved; branches erect from the nodes, 2–4 in. high, with 2–3 long-petioled leaves terminating in a solitary 1-headed peduncle. *Leaves* 1–3 in., eglandular, sparsely hairy or glabrous; petiole $\frac{1}{2}$ to 1 in., winged at the top only. *Heads* $\frac{1}{2}$ in. diam.; flowers longer than the bracts, rose-cold. *Nut* flat or 3-gonous.—A specimen in Wight's Herbarium has much larger leaves (3–$3\frac{1}{2}$ by 2 in.), with petioles winged to near the base; it is marked *P. Wallichii*? and is the only one seen of the Nilgihri plant figured by Wight. In the plate he correctly figures the peduncles as hairy, and the stipules as eciliate, but he describes the former as glabrous, and the latter as shortly ciliate. He has, I suppose, figured *sphærocephalum* from native specimens, and copied Meissner's description of *P. Wallichii.*

45. **P. runcinatum,** *Ham. in Don Prodr.* 73; stem ascending from a creeping base smooth scabrid or hairy, leaves runcinate-pinnatifid glabrous terminal lobe triangular-ovate acuminate, petiole short with amplexicaul auricles, peduncles glandular-hispid above, heads large, involucral leaf 0, bracts oblong eciliate, nut minute globosely 3-gonous. *Meissn. Monog. Polyg.* 85, *in Wall. Pl. As. Rar.* iii. 60, and in *DC. Prodr.* xiv. 1. 130; *Wall. Cat.* 1698. P. reticulatum, *De Bruyn. in Pl. Jungh.* 300.

CENTRAL and EASTERN HIMALAYA; Nepal, *Hamilton, Wallich*; Sikkim, alt.

7–10,000 ft., *J. D. H.*, &c. KHASIA MTS., alt. 4–5000 ft., *Lobb, J. D. H. & T. T.*, &c.—DISTRIB. Java.

Annual. *Stems* 10–18 in., slender, flaccid, grooved and angled, strict or flexuous, simple or branched. *Leaves* 1½–6 in., membranous, ciliolate, glabrous or sparsely hairy, uppermost simple and cordate-amplexicaul; lateral lobes 1–3 pairs horizontally spreading, rounded or oblong; auricles very variable, sometimes in mere green rings, at others nearly 1 in. diam.; stipules short, hairy and ciliate. *Peduncles* slender. *Heads* ½–¾ in. diam.; flowers white or pink. *Perianth* 5-cleft. *Stamens* 7–8. *Styles* 3, slender, connate below. *Nut* opaque.—The var. β. *javanicum* has much larger more ovate trigonous nuts.—Extensively cultivated in Sikkim.

46. **P. sinuatum,** *Royle mss.*; *Meissn. in DC. Prodr.* xiv. 1. 130; glabrous, stem creeping with short erect leafy branches, leaves runcinate-pinnatifid, terminal lobe rhomboid acute, petiole short with amplexicaul auricles, peduncles glabrous axillary, heads solitary, involucral leaf 0, bracts ovate obtuse, nut minute globosely trigonous.

WESTERN HIMALAYA; Kumaon, *Royle*, alt. 9000 ft., *Strachey & Winterbottom*; Garwhal, *Falconer*; Kulu, alt. 8–10,500 ft., *Stewart*.

Perhaps, as Meissner suggests, a variety of *P. runcinatum*, but creeping, much smaller in all its parts, and quite glabrous except occasionally the stipules, leaves ½–1 in., terminal lobe much smaller in proportion to the lateral and of a very different shape, sometimes almost transversely oblong and apiculate. The nut is the same in both.

47. **P. capitatum,** *Ham. in Don Prodr.* 73; stems or branches many stout creeping from a woody rootstock leafy, and stipules glandular-hirsute, leaves ½–1½ in. shortly petioled elliptic acute, petiole 2-auricled at the base, stipules short cupular, heads 1–3, peduncles glabrous or glandular-hispid, involucral leaf 0, bracts ovate acute eciliate. *Meissn. Monog. Polyg.* 82, and in *DC. Prodr.* xiv. 1. 129; *Bab. in Trans. Linn. Soc.* xviii. 107. P. repens, *Wall. Cat.* 1699; *Meissn. in Wall. Pl. As. Rar.* iii. 60.

SUBTROPICAL and TEMPERATE HIMALAYA; on rocks, walls, &c., alt. 4–6000 ft., from Chamba to Bhotan. KHASIA MTS., alt. 3–5000 ft.

Perennial; rootstock stout, twisted; stems or branches 6–10 in. long, trailing and rooting below, red-brown; hairs brown. *Leaves* crowded, bifarious, rather thick, brownish when dry, eglandular, base sometimes cordate; petiole ⅛–⅙ in., auricles small rounded. *Heads* ¼–¾ in. diam., dense-fld., glandular and hairy; bracts glabrous. *Perianth* pink, 5-cleft; segments obtuse. *Stamens* 8. *Nut* 3-gonous, very small, 1/14 in., much smaller in proportion to the perianth than in its allies.—Meissner's var. *macilentum* appears to have no definite character.

48. **P. chinense,** *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 130; shrubby, glabrous or sparsely pubescent or glandular-pubescent, leaves petioled 3–5 in. from linear-oblong to oblong- or deltoid-ovate or -rotundate entire or crenulate, base truncate rounded acute or subcordate uppermost cordate amplexicaul, petiole hardly winged usually 2-auricled at the base, stipules long very obliquely truncate acute, heads panicled or corymbose, peduncles usually glandular-hairy, involucral leaf 0, bracts glabrous usually acute, fruiting perianth dry or fleshy, nut trigonous. *Meissn. Monog.* 60, and in *Wall. Pl. As. Rar.* iii. 60; *Bab. in Trans. Linn. Soc.* xviii. 109; *Roxb. Fl. Ind.* ii. 289; *Wight Ic.* t. 1806; *Grah. Cat. Bomb. Pl.* 172; *Dalz. & Gibs. Bomb. Fl.* 214. P. cymosum, *Roxb. l. c.* P. auriculatum, *Meissn. Monog.* 39, t. 6, and in *Wall. Cat.* 1705. P. polycephalum, *Wall. Cat.* 1707. P. brachiatum, *Poir. Dict.* iv. 15; *Lamk. Ill.* 315, t. 4; *Wall. Cat.* 1706. P. patens, *Don Prodr.* 73; *Meissn. Monog.* 60. P. corymbosum, *Willd. Sp. Pl.* ii. 452. P. ovatum, *Heyne in Roth Nov. Sp.* 206. P. adenotrichum, *Wall.*

mss. Ampelygonum chinense, *Lindl. in Bot. Reg.* 1838; *Misc.* 63, No. 118. P. panduræforme, *Ham. mss.*; *Wall. Cat.* 1704 D. Coccoloba crispata, *Ham. in Roxb. Fl. Ind.* ii. 292.

SUBTROPICAL and TEMPERATE HIMALAYA; from Simla to Bhotan, alt. 4-8000 ft. ASSAM, the KHASIA MTS., SILHET, CACHAR, CHITTAGONG, RANGOON and BURMA to MALACCA. BEHAR, top of Parusnath, alt. 4000 ft. DECCAN PENINSULA; on the Western Ghats from the Concan southward. CEYLON, abundant.—DISTRIB. Sumatra, Java, Philippine Islands, China and Japan.

A rambling or erect shrub, reaching 5 ft.; stems and branches many from the root, stout, flexuous, angled and grooved. *Leaves* extremely variable, rarely orbicular; gland-dotted or not, rigid or membranous, flat or undulate; petiole short, winged above, auricles extremely variable, deciduous usually rounded, sometimes $\frac{1}{2}$ in. broad, at others suppressed; stipules often $\frac{3}{4}$ in. long with long waving points. *Heads* very variable in number, $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; peduncles divaricate; flowers white, pink or purplish. *Perianth* 5-cleft. *Stamens* 8. *Styles* 3, connate below. *Nuts* variable in size, enclosed in the dry or fleshy perianth.—A polymorphous plant, of which the following forms may show the extent of variation, but are not approximately constant, nor do they comprise all the departures from any assumed type that could be defined by words, which would be a very great many. I cannot conceive what other *Polygonum* than this Roth describes as *P. ovatum.*

P. chinense proper; leaves ovate-oblong or deltoid-ovate base truncate or subcordate, peduncles eglandular.—Var. Thunbergianum, *Meissn. in Wall. Pl. As. Rar.* iii. 60, and in *DC. l. c.*

Var. *ovalifolia*, Meissn. l. c.; leaves ovate or oblong-ovate acute at both ends often crenulate glabrous, peduncles glandular-hispid, heads large or small.—Himalaya, Parusnath, common in the Deccan Mts., Ceylon, &c.

Var. *subhastata*, Meissn. l. c.; leaves oblong or lanceolate base cordate or subhastate sometimes very long, peduncles eglandular, heads small.

Var. *corymbosa*, Meissn. l. c.; leaves oblong-lanceolate base acute or acuminate, peduncles eglandular, heads large.

Var. ? *parvifolia*; stem slender prostrate, leaves 1½–2 in. hastate oblong, petiole not auricled, bracts obtuse or subacute.—Silhet, *Wallich*; Assam, *Jenkins.*—This may be a different species; the habit is that of *P. Wallichii*, but the leaves are not ciliolate.

Var. *hispida*; branches leaves on both surfaces and inflorescence hispidly hairy, hairs on the branches reflexed.—Tenasserim, *Gallatly* (*in Herb. Calcutt.*).

Sect. IX. ECHINOCAULON, *Meissn.* Erect prostrate or subscandent often prickly herbs. *Leaves* usually broad, often cordate or hastate; stipules tubular. *Flowers* in simple or panicled heads or spikes; bracts usually shortly tubular, ciliate. *Perianth* 5-lobed. *Stamens* 5–8, with alternating glands. *Styles* 2–3, free, stigmas capitate. *Nut* free, trigonous or biconvex; cotyledons accumbent.

* *Nut exserted.*

49. **P. muricatum,** *Meissn. Monog. Polyg.* 74, *in Wall. Pl. As. Rar.* iii. 58, and in *DC. Prodr.* xiv. 1. 133 (*not of Wall. Cat.*); stem very long and slender flaccid smooth or angles sparsely scabrid, leaves distant lower petioled ovate or oblong-ovate acute or obtuse, base rounded truncate or cordate upper amplexicaul-cordate, stipules glabrous ciliate, heads laxly panicled, peduncles glandular-hispid or glabrous, spikes few-fld. P. asperulum, *Wall. Cat.* 1724. Polyg. pedunculare *var.* and Polyg. n. 57, *Herb. Ind. Or. H. f. & T.*

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 10–12,000ft., *J. D. H.* KHASIA MTS., alt. 4–5000 ft., *J. D. H. & T. T., Clarke.*

Perennial?. *Stems* creeping and often tufted at the base, above rambling over bushes, sometimes quite smooth even at the nodes. *Leaves* 1–2 in., membranous, sometimes sparsely hairy beneath, ciliolate or not, midrib beneath smooth or scabrid; petiole very slender, smooth or scabrid; stipules truncate, base naked or with a ring of reversed prickles. *Spikes* $\frac{1}{3}$–1 in. long, on almost capillary peduncles; flowers distant in Himalayan specimens, closer in Khasian; bracts ovate or lanceolate, hispid and ciliate or glabrate. *Perianth* white or pink. *Stamens* 5 or 6. *Styles* very slender, connate below. *Nut* ovoid, with acute angles, pale, smooth, shining.—Wallich's Nepal specimens have the spikes and bracts densely glandular-pubescent or glabrate, and partially exserted nuts. Sikkim ones have perfectly smooth and glabrous stems, stipules, spikes and bracts, eciliate stipules, and smaller flowers with subacute sepals much shorter than the nut; they may form a different species. Khasian ones have subcapitate densely glandular-pubescent spikes, and nuts closely wrapped in the perianth, the segments of which are obtuse as in the Nepal specimens.

50. **P. arifolium,** *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 134; stem very slender flaccid smooth or angles retrorsely scabrid, leaves long-petioled broadly hastate acuminate basal lobes spreading acute, stipules very short hispid and ciliolate, peduncles glandular-hispid, heads small few-fld., involucral leaves 1–2 linear, bracts small hispid, nuts broadly trigonous exserted. Polyg. n. 53, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Dikeeling, alt. 7000 ft., *Clarke.* KHASIA MTS., in woods, alt. 5000 ft., *J. D. H. & T. T.*—DISTRIB. N. America.

Stems 2–3 ft., weak. *Leaves* 2–3 in., membranous, ciliolate, glabrous, or sparsely setose on the nerves beneath and on one or both surfaces, base truncate; petiole nearly as long as the blade, very slender, smooth or scabrid; stipules $\frac{1}{4}$ in. long, lax, base naked or with a few retrorse hairs. *Heads* small, very few-fld., on strict forked peduncles, usually subtended by one or two narrow spreading ciliate invol. leaves; bracts very small, lanceolate, acute, ciliate; flowers small. *Perianth* 5-cleft. *Stamens* 5. *Styles* very slender, connate below. *Nut* ovoid, acutely 3-gonous, acute, pale, shining.—This is a slender form of the American plant quite like some Pennsylvanian specimens. Flowers and ripe fruits are formed on short stolons from the creeping base of the stem.

** *Nut included in the perianth.*

51. **P. perfoliatum,** *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 132; stem rambling or climbing, flexuous angles and petioles with stout recurved prickles, leaves very long-petioled peltate deltoid angles obtuse or subacute, stipules foliaceous orbicular amplexicaul, peduncles smooth or sparingly prickly, racemes solitary short, bracts broad rounded glabrous, nut globose obscurely 3-gonous. *Roxb. Fl. Ind.* ii. 288; *Wall. Cat.* 1696; *Lamk. Ill.* t. 315, f. 3; *Burm. Fl. Ind.* 90, t. 31, f. 2. Echinocaulos perfoliatus, *Hassk. Cat. Hort. Bogor.* 85, and *Pl. Rar. Jav.* 220. Chilocalyx perfoliatus, *Hassk. in Flor. Bot. Zeit.* 1842, *Beibl.* ii. 20; *Miquel Fl. Ind. Bat.* i. 1013.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 4–5000 ft., *J. D. H.*; Bhotan, *Booth.* KHASIA MTS., alt. 4000 ft., *J. D. H. & T. T.* BENGAL, in the Jheels, &c. SILHET, *Wallich.* CACHAR, *Keenan.*—DISTRIB. Java, China, Japan.

Stem rambling for several feet. *Leaves* 2–5 in. long and broad, membranous, midrib and nerves beneath sometimes prickly; petiole slender, as long as the blade; stipules $\frac{1}{2}$–1 in. diam. *Peduncles* very short; racemes $\frac{1}{4}$–$\frac{3}{4}$ in.; bracts membranous; flowers white or lilac, large for the genus. *Perianth-lobes* rounded. *Stamens* 8. *Styles* short, connate below. *Nut* large, black, apiculate, included in the often fleshy perianth. *Cotyledons* very large, radicle short inflexed accumbent.—Leaves acid, eaten in Cachar, *Keenan.*

52. **P. sagittatum,** *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 132; glabrous, stem suberect or prostrate angles petioles and midrib beneath covered more or less with recurved prickles, leaves petioled 1–2 in. linear-oblong obtuse or acute base sagittate, margins smooth, stipules very short glabrous, heads few small, involucral leaf 0, peduncles slender distantly muricate or smooth, bracts oblong obtuse glabrous, nut 3-gonous. P. muricatum, *Herb. Griff. Kew Distrib.* 4125. P. Sieboldii, *Meissn. l. c.* 133.

WESTERN HIMALAYA, *Falconer*; Kulu and Kumaon, alt. 7–8000 ft., *Edgeworth*; Lohoo Ghat, *Thomson*. EAST BENGAL, *Griffith*. KHASIA MTS., in marshes at Myrung, alt. 5000 ft., *J. D. H. & T. T.*—DISTRIB. Siberia, China, Japan, Eastern N. America.

Very similar to slender form of *P. strigosum*, but the leaves are shorter, more glaucous beneath, not truncate or cordate below, but with two long deflexed or incurved obtuse or acute auricles, and their margins are quite smooth.

53. **P. strigosum,** *Br. Prodr.* 420; stem 2–4 ft. suberect angles petioles and nerves of leaf beneath more or less covered with recurved prickles, leaves shortly petioled linear or linear-oblong acuminate or acute base truncate or shortly cordate, margin retrorsely prickly, racemes panicled oblong or subglobose, peduncles scabrid prickly or glandular-hispid, bracts ovate or oblong ciliate and strigose, nut globosely 3-gonous included in the perianth. *Meissn. in DC. Prodr.* xiv. 134. P. horridum, *Roxb. Cat.* 29, and *Fl. Ind.* ii. 291; *Meissn. in Wall. Pl. As. Rar.* iii. 58, and in *DC. l. c.* 133. P. muricatum, *Wall. Cat.* 1697 (*not of Meissn.*), *excl. var. glabrata*; *Miquel Fl. Ind. Bat.* i. 1011. P. sagittatum, *Don Prodr.* 73 (*not of Linn.*). P. sagittatum β. indicum, *Meissn. Monog. Polyg.* 65. P. hispidulum, *Blume Bijd.* 535. P. auriculatum, *Herb. Ind. Or. H.f. & T.*

TROPICAL HIMALAYA from Kulu to Bhotan, and the KHASIA MTS., ascending to 5000 ft., in watery places; and southward to the NILGHIRI MTS., CHITTAGONG and PENANG. CEYLON; alt. 5–6000 ft. (C. P. 3348).—DISTRIB. Ava, Malay Archipelago, China.

Stem 1–3 ft., often rather stout, very variable in amount of prickles. *Leaves* 1–5 in., rigid, glabrous or pubescent beneath, sometimes scabrid above, margin with rigid minute recurved prickles, midrib usually prickly; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. or 0; stipules 1 in., ciliate, glabrous or hairy, base with usually a pectinate ring of reversed prickles. *Peduncles* slender; racemes $\frac{1}{6}$–$\frac{1}{3}$ in., densely many- or few-fld.; flowers pink. *Perianth*-lobes obtuse. *Stamens* 6–8. *Styles* slender, connate below. *Nut* black, opaque, punctulate.—Meissner describes the nuts as sometimes biconvex; I find all the Northern Indian specimens to be trigynous, all the Peninsular digynous, which favours the view that this does not differ from *P. pedunculare*. Bentham indeed (Fl. Austral. v. 268) unites with this *P. pedunculare*, *P. glabratum*, and *P. muricatum*. For the first and second there is something to be said, but *P. muricatum* is an entirely different species. The American *P. Meissnerianum* differs from *P. strigosum* chiefly in the prickles not being recurved.

54. **P. prætermissum,** *Hook. f.*; small, glabrous, stem 6–8 in. ascending subsimple nearly or quite unarmed, leaves shortly petioled linear obtuse base sagittate with obtuse lobes, stipules glabrous eciliate with a few recurved bristles at the base, flowers very few and distant in forked or simple glabrous axillary racemes, bracts erect oblong glabrous or subciliate, nut globosely 3-gonous included in the perianth. P. strigosum, *Thwaites Enum., in part*; *Benth. Fl. Austral.* v. 268, *in part*. P. muricatum, *var.* glabrata, *Wall. Cat.* 1697/3. P. muricatum, *Herb. Ind. Or. H.f. & T.*

SILHET, *Wallich*. KHASIA MTS., in watery places, alt. 4–5500 ft., *J. D. H. & T. T., Clarke*. CEYLON, alt. 6–7000 ft., *Walker* (C. P. 2250).—DISTRIB. Tasmania.

Stem 4–18 in., creeping and rooting at the base, quite smooth except rarely a few

deflexed prickles beneath the nodes. *Leaves* 1–2 in., perfectly glabrous, margin not ciliate, basal lobes deflexed or decurved, rarely horizontal; petiole ¼–½ in., quite smooth; stipules ½ in. *Peduncles* very slender; racemes ½–1 in. long, with only 3–5 bracts, which are usually very distant. *Sepals* obtuse. *Stamens* 5. *Style-arms* slender. *Nut* pale (ripe?) punctulate.—The inflorescence of this species is very characteristic and constant, and its habit being the same wherever it has been found, I am constrained to regard it as a distinct species, though in doing so I contravene Bentham's opinion as expressed in the "Flora Australiensis." My first knowledge of the plant was from Tasmanian specimens, which (Flora Tasmanica, i. 307) I referred to Brown's *P. strigosum*, and doubtfully to Meissner's plant of that name. I had then no opportunity of consulting Brown's Herbarium, which was during his lifetime closed to botanists. This being now accessible, I find that his *strigosum* is identical with the Indian plant subsequently published by Roxburgh as *P. horridum*. *P. prætermissum* is the *P. muricatum* var. *glabrata* of Wall. Cat. 1697/3, but not the *P. glabratum* of Meissner (in Wall. Cat. 6285), which is referable to *P. pedunculare*.

55. **P. pedunculare,** *Wall. Cat.* 1718; glabrous, stem 1–2 ft. ascending unarmed or angles with recurved prickles, leaves petioled elliptic oblong or linear-oblong acute base acute sagittate cordate or truncate, margin smooth or most minutely scaberulous, racemes panicled oblong or globose, peduncles glabrous or glandular-hispid, bracts acuminate ciliate, nut orbicular biconvex included in the perianth-tube. *Meissn. in DC. Prodr.* xiv. 1. 133, *in part*; *Miquel Fl. Ind. Bat.* i. 1011. P. dichotomum, *Blume Bijd.* 529 ?. P. glabratum, *Wall. Cat.* 6285.

ASSAM, *Masters.* CACHAR, *Keenan.* The CONCAN, *Stocks*, &c. NILGHIRI and PULNEY MTS., *Wight*, &c. SINGAPORE, *Wallich.* MALACCA, *Cuming.* CEYLON, *Walker.*—DISTRIB. China, Java, Borneo, Philippine Islands, Australia.

It is difficult to define this variable plant in words. It may be a form of *P. strigosum*, but is certainly as distinct as are the species of the *Persicaria* and other sections of this perplexing genus. The following very distinct forms are united by exceptional ones.

P. pedunculare proper; glabrous, stem quite smooth except a few reversed prickles at the nodes and sometimes on the angles, leaves 1–2 in. elliptic-lanceolate or -ovate acuminate at both ends, peduncles and bracts glabrous or glandular pubescent. *Wight Ic.* t. 1802 C.—Singapore, Cachar, Pulney Mts., Ceylon.

Var. *robusta*; tall, stems stout glabrous unarmed or with reversed prickles at the angles and nodes, leaves 3–6 by ½–⅔ in. linear-lanceolate acuminate at both ends, peduncles and pedicels stout glandular-hispid, heads large. *Wight Ic.* t. 1802 B.—Nilghiri and Pulney Mts.

Var. *angustissima*; stem nearly smooth, leaves petioled or upper sessile 4–5 by ¼–⅓ in. narrowly linear-lanceolate acuminate at both ends, peduncles very slender glandular-hispid, heads small, bracts glabrous. *Wight Ic.* t. 1802 A; *Polyg.* No. 49, *Herb. Ind. Or. H. f. & T.*—The Concan, Belgaum, &c., *Ritchie*, &c.; Nilghiris.

Var. *nilagirica*; stem nearly smooth, leaves petioled 4–6 by ¾–1 in. flaccid membranous, linear-oblong or oblong-lanceolate obtuse, peduncles very slender glandular-hispid, heads rather large, bracts subciliate.—Nilghiri Mts., at Conoor, alt. 6000 ft., *Clarke.*

Var. *assamica*; small, 6–10 in. high, stem nearly smooth, leaves subsessile or shortly petioled 1–2 by ¼–⅓ in. linear-lanceolate acute with an acute base or linear-oblong and obtuse with a contracted hastate base, peduncles very slender sparsely glandular-hispid, heads very small few-fld., bracts subhispid.—Assam, *Masters*; Jynteapore, *Clarke.*—This approaches in habit *P. prætermissum.*

Var. *glabrata*; tall, 12–18 in., stem nearly smooth except a few reversed bristles at the nodes, leaves linear-oblong 2–3 by ½—¾ in., base rounded and truncate, peduncles and heads as in var. *assamica.* P. glabratum, *Meissn. in Wall. Cat.* 6285.—Silhet.

Sect. X. ACONOGON, *Meissn.* Shrubs, rarely perennial-rooted herbs. *Leaves* usually broad; stipules tubular, eciliate. *Flowers* in branched panicles, pedicelled; bracts not tubular, very open. *Perianth* 5-partite. *Stamens* 8, rarely fewer, with or without interposed glands. *Styles* 2–3, short, free or connate below, stigmas capitate. *Nut* trigonous, not tightly enclosed in the perianth; cotyledons accumbent.

* *Tall herbaceous or shrub-like species. Flowers very small* $\frac{1}{12}$–$\frac{1}{6}$ *in. diam.; perianth cleft nearly to the cuneate base, segments spreading.*

56. **P. alpinum,** *All. Fl. Pedem.* i. 206, t. 68, f. 1; stem glabrous, or young parts softly pubescent, pale reddish or white, leaves shortly petioled lanceolate or linear-lanceolate acuminate glabrous or puberulous, flowers in terminal thyrsoid dense-fld. pyramidal panicles, perianth $\frac{1}{8}$–$\frac{1}{6}$ in. diam. cleft nearly to the cuneate base, inner segments obovate-spathulate, nut broadly rhomboid-ovoid acutely 3-gonous pale rather longer than the enlarged perianth. *Meissn. Monog. Polyg.* 56, t. 3 G; *Boiss. Fl. Orient.* iv. 1031. P. sibiricum, *Linn. fil. Suppl.* 228 (*not of Pallas*). P. acidum, *Pall. Reise* ii. 25, iii. 316 (*fid. Ledeb.*). P. divaricatum, *Vill. Dauph.* iii. 322 (*not of Linn.*). P. polymorphum & alpinum, *Meissn. in DC. Prodr.* xiv. 1. 139.

NORTH-WESTERN HIMALAYA; from Kulu to Kashmir, alt. 7–12 000 ft., *Thomson*, &c.—DISTRIB. Turkestan westward to S. Spain, Siberia, N. America.

Root perennial. *Stems* 6 ft., annual, grooved, paler than in any of the following species. *Leaves* 3–5 in., glabrous or finely pubescent beneath especially, margins flat; base acute; stipules long, lax, deciduous above the base. *Inflorescence* a foot long and more, of myriads of white or pale pink flowers; pedicels much longer than the short obtuse bracts, jointed close below the perianth or lower down. *Nut* $\frac{1}{6}$ in. long, shining —This agrees well with the European and N. Asiatic plant. Boissier and Meissner give Affghanistan as a habitat, but Griffith's specimens have much larger sepals which conceal the much smaller nut, and the inflorescence is more corymbose; I refer them to *P. polystachyum.*—Eaten raw and cooked; tastes like rhubarb (*Aitchison*).

57. **P. paniculatum,** *Blume Bijd.* 533; shrubby, quite glabrous, branches terete, leaves petioled elliptic-ovate or -lanceolate acuminate or caudate-acuminate base acute or rounded, flowers in terminal large lax-fld. thyrsoid panicles, perianth $\frac{1}{12}$ in. diam., segments oblong, nut very small included in the simple or baccate perianth. *Meissn. Monog. Polyg.* 95, and in *DC. Prodr.* xiv. 1. 137; *Miquel Fl. Ind. Bat.* i. 1012.

TEMPERATE HIMALAYA, *Herb. Griffith*; Garwhal, alt. 5–6000 ft., *Duthie*; E. Nepal and Sikkim, alt. 7–8000 ft., *J. D. H.*—DISTRIB. Java.

A shrub, 4–6 ft., with flexuous branches that are not grooved. *Leaves* 5–7 by 2–3 in., firm, often black when dry. Margins ciliolate; nerves 15–30 pairs; petiole $\frac{1}{2}$–1 in.; stipules with a long limb deciduous above the base. *Panicle* effuse, quite glabrous; pedicels usually short, but here and there long; bracts minute, obtuse; flowers white. *Nut* $\frac{1}{12}$ in. long, turgidly ovoid, 3-gonous, black.—The Indian specimens are perfectly glabrous, Javan have minute pubescence on the midrid and nerves beneath. Duthie's Garwhal plant has more membranous fewer-nerved (10–14 pairs) leaves, and pedicels sometimes $\frac{1}{6}$ in. long; but the number of nerves varies remarkably in individual specimens of all the species of this section.

58. **P. rude,** *Meissn. in DC. Prodr.* xiv. 1. 137; shrubby, branches stout terete strigose with depressed hairs, leaves petioled elliptic-lanceolate acuminate softly pubescent beneath or on the nerves only, flowers in large terminal thyrsoid hirsute panicles, perianth $\frac{1}{12}$ in. diam., segments

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oblong, nut very small exceeding the simple or baccate perianth. *Wall. Cat.* 1685/2. P. molle, *in part*, *Herb. Ind. Or. H.f. & T.*

KHASIA MTS., alt. 4–5000 ft., *De Silva*, *Mack*, &c.

A robust shrub, 6–8 ft.; branches stout, not grooved. *Leaves* 4–5 by 1½–2 in., glabrous or finely pubescent above, base acute, nerves 10–30 pairs; stipules glabrous or sparsely hairy. *Inflorescence* as in *P. paniculatum*, but laxly hirsute with flexuous hairs, flowers (white) and fruit nearly the same.

? Var. *sikkimensis*; branches glabrous except a few deflexed hairs at the nodes.—Sikkim; Lachen, alt. 10,000 ft., *J. D. H.*—Of this I have only a single specimen in fruit; it is unlike either *rude* or *molle* in its all but glabrous branches. The hairs of the nodes and laxly hirsute panicle are those of *P. rude*. The fruiting perianths are not baccate.

59. **P. molle,** *Don Prodr.* 72; shrubby, branches stout terete villous with erect or spreading hairs, leaves petioled elliptic-lanceolate silkily pubescent tomentose or villous beneath, flowers in large terminal thyrsoid tomentose panicles, perianth $\frac{1}{12}$ in. diam., segments oblong, nut included in the usually baccate perianth. *Meissn. Monog. Polyg.* 56, *in Wall. Pl. As. Rar.* iii. 64 (*partly*), and in *DC. Prodr.* xiv. 1. 136 (*excl. cit. of Wight Ic.*); *Lindl. in Bot. Reg.* 1841, *Misc.* 66. Coccoloba Totnea, *Ham. in Don Prodr.* 74.

CENTRAL and EASTERN HIMALAYA; Nepal, *Hamilton*, *Wallich*; Sikkim, alt. 5–7000 ft., *J. D. H.*, *Clarke*. MISHMI HILLS, *Griffith*.

Habit and general characters of *P. rude*, but more softly tomentose, and with the hairs on the branches never deflexed, and stipules more silky. *Flowers* white.

60. **P. frondosum,** *Meissn. in DC. Prodr.* xiv. 1. 137; shrubby, quite glabrous, branches stout terete, leaves broadly ovate- or elliptic-oblong acuminate or caudate-acuminate, base rounded or cordate, flowers in short thyrsoid axillary and larger terminal dense-fld. panicles, perianth $\frac{1}{12}$ in. diam., segments oblong, fruiting long-pedicelled, nut small longer than the perianth. P. Hayii, *Herb. Strach. & Winterb. Polyg.* n. 34.

WESTERN HIMALAYA; Garwhal, *Falconer*; Kumaon, alt. 7500–9000 ft., *Edgeworth, Strachey & Winterbottom.*

A very distinct species, perfectly glabrous in all its parts, easily distinguished by its very broad leaves, 5–7 by 2½–3½ in., of firm texture, long petioles ½–1½ in., axillary panicles, and the long pedicels of the fruiting perianths $\frac{1}{6}$–$\frac{1}{4}$ in. long; the nuts are, however, so diseased that this last may be an abnormal character.

** *Tall herbaceous or shrub-like species. Flowers* $\frac{1}{4}$ *in. diam.; perianth cleft nearly to the cuneate base, segments widely spreading.*

61. **P. polystachyum,** *Wall. Cat.* 1686; shrubby, glabrous or pubescent, branches grooved, leaves subsessile or petioled oblong-lanceolate caudate-acuminate, base usually contracted and subhastately cordate or truncate, flowers in large pubescent or glabrate terminal thyrsoid spreading panicles with erect or decurved branches, pedicels very slender, perianth $\frac{1}{4}$ in. diam., 3 inner segments broadly obovate-spathulate, nut small triquetrous shorter than the unaltered perianth. *Meissn. in Wall. Pl. As. Rar.* iii. 61, and in *DC. Prodr.* xiv. 1. 137; *Bab. in Trans. Linn. Soc.* xviii. 111. P. molle, *Wight Ic.* t. 1807 (*not of Don*). Polyg. n. 69, *Herb. Ind. Or. H.f. & T.*

TEMPERATE HIMALAYA; from Mishmi to Kashmir, alt. 7000 to 12,000 ft., and to 14,000 ft. in Sikkim.—DISTRIB. Affghanistan.

Shrubby, 3–6 ft. high. *Leaves* 4–9 by 1½–3½ in., nerves very numerous, base of the uppermost usually acute, of the lower sometimes the same, but usually as described above; margins smooth or crisped; stipules ample, glabrous or sparsely hairy.

Panicle very variable in form, effuse, branches sometimes strict and erect or diverging, at others horizontal and decurved; bracts short, obtuse; pedicels sometimes $\frac{1}{6}$ in.; flowers white or pink. *Sepals*, 2 outer oblong, inner much larger and broader. *Nut* pale, not tightly enclosed in the perianth.—The Affghanistan plant of Griffith (Journ. No. 1040) referred by Boissier and Meissner to *P. alpinum*, is, I think, certainly *P. polystachyum*.

Var. *glabra*, Meissn. l. c.; quite glabrous.

Var. *pubescens*, Meissn. l. c.; puberulous pubescent or tomentose with grey or buff tomentum on the leaves beneath.

Var. *longifolia*; leaves linear-oblong 8–9 by 2–2½ in. glabrous above finely pubescent beneath, base subcordately truncate, panicle small.—Sikkim; at Yakla, alt. 12–16,000 ft., *Clarke*.

Var. *crispata*; leaves glabrous margins crisped and undulately crenulate.—Chumba, *R. Ellis*.

Var. *Griffithii*; leaves densely clothed beneath with silky tomentum, stipules silky.—Mishmi Hills, *Griffith*.

62. **P. rumicifolium,** *Royle mss.*; *Bab. in Trans. Linn. Soc.* xviii. 112; herbaceous, glabrous or sparsely puberulous or laxly pubescent, stem very robust simple, leaves petioled broadly ovate or ovate-cordate obtuse or subacute, flowers in small axillary and terminal dense-fld. panicles, nut very broadly ovate acutely 3-gonous, about as long as the perianth. *Meissn. in DC. Prodr.* xiv. 1. 138, *excl. var. oblongum*; *Garcke in Bot. Reise Pr. Waldem.* 136. P. ramoso-spicatum, *Klotzsch in Bot. Reise Pr. Waldem.* t. 87.

WESTERN HIMALAYA; from Nepal, *Wallich*, to Kashmir, alt. 10–14,000 ft., *Royle*, &c.

Root stout, perennial. *Stem* 6–18 in., as thick as a swan's quill or less, pale, grooved. *Leaves* 3–5 by 1½–3 in., succulent, green, margin even or undulate, nerves very slender; petiole ½–1 in., very stout; stipules large, lax, glabrous. *Panicles* sessile, the axillary ones usually shorter than the leaves; flowers green, $\frac{1}{6}$–$\frac{1}{4}$ in. diam. *Perianth* cleft to near the cuneate base, segments subequal, orbicular, spreading. *Nut* pale, very broad.—I think that some of Boissier's varieties of *P. alpinum* (*polymorphum*) are referable to this, which closely resembles the *P. alpinum*, var. *lapathifolium* of N.E. Asia and N.W. America, but has much larger flowers. I do not know what Babington's var. β is with retrorsely hairy stems and much smaller leaves. The young parts are acid, and eaten like rhubarb in the Western Himalaya. I find specimens of this distributed by Wallich from Nepal, under the number 1727 (*Rheum emodi*) in Herbs. Hooker and Bentham, but not in the Linnæan Society Herb., where the species is absent.

*** *Tall, herbaceous or shrubby species. Perianth campanulate, cleft two-thirds way down, base rounded; lobes oblong erecto-patent.*

63. **P. campanulatum,** *Hook. f.*; pubescent or tomentose, stem creeping and stoloniferous below slender grooved, leaves petioled elliptic ovate or lanceolate acuminate or tip caudate base acute or rounded, flowers nodding or pendulous in terminal cymes with divaricate branches, nut 3-winged rather longer than the campanulate perianth. P. rumicifolium, *var.* γ ? oblonga, *Meissn. in DC. Prodr.* xiv. 1. 138.—Polyg. n. 69 and 71, *Herb. Ind. Or. H. f. & T.*

TEMPERATE and SUBALPINE HIMALAYA; E. Nepal and Sikkim, alt. 9–12,000 ft., *J. D. H.*, *Clarke*; Kumaon, alt. 7500 ft., *Strachey & Winterbottom*.

Stem 2–3 ft. high, prostrate or ascending, dichotomously branched, glabrous or pubescent above. *Leaves* 3–6 by 1–2½ in., more or less pubescent on both surfaces with grey, or (beneath) buff tomentum, membranous or rather coriaceous; petiole $\frac{1}{4}$–½ in.; stipules ample, deciduous near the base or altogether. *Inflorescence* quite

different from those of the other species of the section, and like that of *Fagopyrum cymosum*; branches pubescent or villous, short or long and flowering towards the extremity only; flowers pale pink or red, shortly pedicelled; bracts small, usually ovate, acute. *Perianth* $\frac{1}{8}$–$\frac{1}{6}$ in. long, truly campanulate; lobes oblong, obtuse, subequal. *Stamens* 8, filaments very long. *Nut* pale, tip exserted.—A very distinct plant, which I have attempted to identify with the obscure *P. Hagei*, Royle. This, however, is described as having scabridly hairy branches and peduncles, very short petioles, and broad leafless panicles, and as a native of Nagkunda, whence various collectors have sent *P. polystachyum*, but none the *P. campanulatum*, the form of whose perianth could scarcely have escaped notice.

Var. *membranifolia*; leaves large broad membranous, bright green, pubescence inconspicuous, cymes much smaller than the leaves.—Sikkim, in woods, alt. 6–10,000 ft.

Var. *longipes*; leaves elliptic ovate sparingly pubescent, branches of cymes dichotomous long naked leafy at the base.

Var. *fulvida*; leaves clothed beneath with dense matted fulvous tomentum. P. crispatum, *Clarke in Journ. Linn. Soc.* xv. 116 (*where it is taken for Roxburgh's Coccoloba crispata, which is P. chinense*).

64. **P. tortuosum,** *Don Prodr.* 71; a low shrub, glabrous or finely pubescent, much dichotomously branched, leaves sessile coriaceous elliptic obovate or orbicular obtuse or acute, panicles short terminal dense-fld., nut trigonous included in the campanulate perianth. *Meissn. in DC. Prodr.* xiv. 1. 138. P. tataricum, *Wall. mss.*

Western Himalaya; Garwhal, at Gangotri, *Duthie*; Kunawur and Lahul, alt. 9–13,000 ft., *R. Inglis*, &c. Western Tibet, alt. 15,500 ft., *Strachey & Winterbottom*; Ladak, alt. 16,500 ft., *Stewart.*

Root woody; branches 8–16 in., divaricate, geniculate, as thick as a goose-quill below, smooth, shining, red-brown. *Leaves* 1–2 in., pale green, crimson in autumn; nerves very slender; stipules short, truncate. *Panicles* $\frac{1}{2}$–1 in. long, very dense-fld.; peduncles and very short pedicels pubescent. *Perianth* $\frac{1}{8}$ in. long; lobes oblong, erect. *Stamens* 8, short. *Nut* pale, ovate.—A remarkable species. Meissner's var. *tibetanum* is the common state of the plant, closely allied to and possibly a state of *P. sericeum*, Pall. Don's habitat of Nepal is no doubt an error, as Wallich's mss. name of *P. tataricum*, cited by Don himself, shows.

Var. *spicata*; flowers in solitary simple terminal and axillary spikes longer than the leaves.—Dras, alt. 8–9000 ft., *Thomson.*

******** *Small herbaceous species with capitate or racemose panicles.*

65. **P. sibiricum,** *Laxm. in Nov. Act. Acad. Petrop.* xviii. (1773) 531, t. 7, f. 2; dwarf, quite glabrous, coriaceously fleshy, branches many from the long perpendicular root erect or decumbent, leaves narrowly linear obtuse 2-auricled towards the base, flowers in capitate terminal panicles shorter than the leaves, nut enclosed in the perianth. *Meissn. in DC. Prodr.* xiv. 1. 139; *Ledeb. Fl. Ross.* iii. 527. P. hastatum, *Murr. Comm. Goett.* v. (1774) 37, t. 6; *Ledeb. Fl. Alt.* ii. 80, t. 361. P. crassifolium, *Murr. in Linn. Syst. Veg.* ed. 14, 378. P. rumicifolium, *Pall.* (*non Royle*).—Polyg. n. 37, *Herb. Ind. Or. H. f. & T.*

Western Himalaya; Kangra, alt. 11–12,000 ft., *Edgeworth.* Western Tibet, common; alt. 12–15,000 ft., *Strachey & Winterbottom* (Polyg. n. 48), *Thomson*, &c.

Root several inches long, simple. *Stems* or branches 1–6 in., stout (much longer in Siberian specimens). *Leaves* 1–3 by $\frac{1}{10}$–$\frac{1}{4}$ in., flat, opaque, base cuneate being narrowed below the acute or obtuse equal or unequal auricles into a thick petiole; midrib broad, nerves invisible; stipules short, membranous. *Heads* of *flowers* $\frac{1}{6}$–$\frac{1}{3}$ in. diam. (effuse in Siberian specimens); bracts minute; pedicels short or long. *Perianth* $\frac{1}{10}$ in. long, subglobose, pink, segments broadly oblong. *Stamens* 5–8,

filaments short. *Nut* oblong-ovate, 3-gonous, black, shining, about as long as the perianth.—The larger Tibetan specimens are the size of small Siberian ones; the smallest Tibetan are quite minute.—Eaten in Tibet.

66. **P. acaule,** *Hook. f. Ic. Pl.* t. 1490 B; dwarf, diœcious, hirsute, leaves all radical sessile oblong obtuse, flowers in an erect narrow terminal peduncled panicle bearing short lateral dense-fld. branches, perianth very small subglobose or campanulate, nut 3-gonous exceeding the perianth. Polyg. n. 70, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Donkia and Kangra lama passes, on the Tibetan frontier, alt. 17,000 ft., *J. D. H.*

Rootstock very stout, ending below in a thick woody tap-root, simple or divided above into two or more very short branches clothed with membranous stipules. *Leaves* many, spreading or erect, 1 in. long or less, coriaceous, hirsute on both surfaces or beneath only, nerves above impressed; stipules glabrous or hirsute. *Panicle* with its peduncle 2–4 in. high; peduncle stout, naked (rarely with a single leaf), and rachis hirsute; branches $\frac{1}{6}$–$\frac{1}{4}$ in. long, horizontal or drooping; flowers crowded, often drooping. *Perianth* $\frac{1}{12}$ in. long, segments unequal oblong or rounded. *Stamens* 8, minute and imperfect in the female flower; filaments short. *Styles* 3, short, free. *Nut* (unripe) oblong, trigonous, base contracted (as if stipitate).—A remarkable species, evidently of this section, but very unlike any other.

67. **P. nummularifolium,** *Meissn. in DC. Prodr.* xiv. 1. 127; very small, stems creeping and forming matted tufts, nodes hairy, leaves $\frac{1}{10}$–$\frac{1}{6}$ in. petioled orbicular ciliate, stipules tubular hairy, clusters many-fld., flowers pedicelled subdiœcious ?, sepals orbicular, stamens 5, nut orbicular biconvex.

ALPINE HIMALAYA; on rocks, Kumaon, *Edgeworth*, alt. 14–15,000 ft., *Strachey & Winterbottom*; Kashmir, alt. 13,400 ft., *Clarke*; Sikkim, alt. 14–17,000 ft., *J. D. H.*

Perennial. *Stems* one inch or two long, internodes short. *Leaves* rather fleshy, brown when dry; petiole as long as the blade; stipules truncate. *Flowers* numerous and large for the size of the plant, white or bright pink, males largest. *Stamens* very short; anthers purple. *Nut* included, smooth, pale; stigmas 2 minute subsessile. —The smallest species of the genus, and very unlike any other, referred by Meissner to § Cephalophilon, but the flowers are not capitate, and the minute styles are quite free.

Sect. XI. TINIARIA, *Meissn.* Twining unarmed annuals or with perennial roots. *Leaves* broad, cordate or hastate; stipules tubular, eciliate. *Flowers* axillary, or in slender racemes; bracts short, not tubular. *Perianth* 5-partite, 3 outer sepals at length enlarged and dorsally winged. *Stamens* 8 without interposed glands. *Styles* 3, very short, stigmas capitate or fimbriate. *Nut* 3-gonous; cotyledons accumbent.

68. **P. Convolvulus,** *Linn.*; *Boiss. Fl. Orient.* iv. 1032; annual, prostrate or twining, leaves sagittate-cordate, flowers in axillary clusters and terminal cymes, 3 outer sepals obtusely keeled rarely winged, pedicels short jointed above the middle. *Meissn. in DC. Prodr.* xiv. 1. 135; *Fl. Dan.* t. 744.

WESTERN HIMALAYA; Kunawur, *Royle*. WESTERN TIBET; Nubra, *Thomson*.—DISTRIB. N. and W. Asia, Europe, N. Africa.

Annual. *Stem* 1–4 ft., angles puberulous. *Leaves* 1½–4 in., gradually acuminate, angles obtuse or acute, puberulous beneath; petiole slender; stipules short. *Racemes* suberect, short, slender, pedicels recurved. *Perianth-segments* obtuse, green with white margins, $\frac{1}{8}$ in. in fruit. *Nut* black, $\frac{1}{10}$ in. long.

69. **P. dumetorum,** *Linn.*; *Boiss. Fl. Orient.* iv. 1032; stem twining or prostrate, leaves broadly ovate-cordate or subhastately cordate acuminate, fruiting perianth broadly oblong or obovate, 3 outer sepals broadly winged, pedicels very slender, not winged to the base, usually jointed below the middle, nut $\frac{1}{8}$ in. long. *Meissn. in DC. Prodr.* xiv. 1. 135; *Fl. Dan.* t. 756; *Engl. Bot.* t. 2811.

TEMPERATE HIMALAYA; from Kunawur to Kashmir, alt. 4–9000 ft.—DISTRIB. Europe, N. and W. Asia.

Habit of *P. Convolvulus*, but stem terete, flowers more racemose, pedicels capillary, and fruiting perianth very different. This last varies exceedingly in size and shape from elliptic oblong $\frac{1}{6}$ in. long, to cuneate-obovate $\frac{1}{4}$ in. long and tapering into the shortly winged pedicel. I find no difference between nuts of this and *P. Convolvulus.*

70. **P. pterocarpum,** *Wall. Cat.* 1690; stem twining, leaves broadly ovate-cordate acuminate, fruiting perianth cuneate-obovate rarely broadly oblong, 3 outer sepals broadly winged, pedicel very slender winged often to the base, nut $\frac{1}{6}$ in. long. *Meissn. in Wall. Pl. As. Rar.* iii. 62, and in *DC. Prodr.* xiv. 1. 135; *Bab. in Trans. Linn. Soc.* xvii. 113.—Polyg. n. 62, *Herb. Hook. f. & T.*

TEMPERATE HIMALAYA; from Sikkim to Simla, alt. 6–9000 ft.,—also in Kashmir, *Stewart.*

Probably only a state of *P. dumetorum*, but the fruiting perianth is usually much larger, sometimes $\frac{1}{2}$ in. long, or even $1\frac{1}{4}$ in. including the winged petiole, and the nut is always larger. In both there are obscure lines of pubescence on the stem and petioles.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

P. (Bistorta ?) GRIFFITHII, *Hook. f.*; very stout, leaves 6–7 in. long-petioled coriaceous oblong-lanceolate acuminate pubescent beneath, petiole as long as the blade, raceme incurved very stout, bracts lanceolate densely imbricate.—Bhotan Himalaya; on rocks above Sanah, alt. 9500–10,000 ft., *Griffith* (Itin. Notes, p. 410, n. 637).—A remarkable plant, and quite unlike any other, probably near to *P. Bistorta*, but much more robust. The curvature of the top of the peduncle is possibly due to this terminating a pendulous branch. The specimens are very imperfect, consisting of old, apparently radical leaves, and hollow glabrous stems or peduncles, a foot long and as thick as a goose-quill, each bearing the remains of two cauline leaves, and terminated by a stout incurved raceme $2\frac{1}{2}$ in. long. The raceme is clothed with membranous bracts enclosing each many pedicels, from which the perianths have fallen. The stipules on the stem are 1–2 in. long, quite glabrous, with free tips.

P. HAGEI, *Royle mss*; *Bab. in Trans. Linn. Soc.* xviii. 110; *Meissn. in DC. Prodr.* xiv. 1. 139, from Nagkunda, is probably *P. polystachyum*, a common plant of that locality.

P. PALUDOSUM, *Griff. Rep. Bot. Gard. Calcutt.* 1843, 39, is a mss. name and unidentifiable.

POLYGONEARUM FAMILIÆ SEDIFOLIA, *Wall. Cat.* 6286, see p. 22.

4. **FAGOPYRUM,** *Gærtn.*

Erect herbs. *Leaves* deltoid, hastately deltoid, or -cordate. *Flowers* in terminal or axillary cymes. *Perianth* 5-partite; segments subequal, not enlarged in fruit. *Stamens* 8, alternating with glandular disk-lobes. *Ovary* 3-gonous; styles 3, stigmas capitate. *Nut* much longer than the perianth, 3-gonous. *Cotyledons* very broad, twisted, or rolled round the ascending radicle.—Species 3, Europe and Temp. Asia, one cultivated.

1. **F. esculentum,** *Moench Method.* 290; annual, glabrous, leaves triangular-cordate acute, flowers in axillary and terminal peduncled subcapitate many-fld. cymes, nut ovate angles acute. *Meissn. in Wall. Pl As. Rar.* iii. 63, and in *DC. Prodr.* xiv. 1. 143; *Bab. in Trans. Linn. Soc* xviii. 117. F. emarginatum, *Meissn. in DC. l. c., excl. var. β.*; *Bab. l. c* 118. Polygonum Fagopyrum, *Linn.*; *Roxb. Fl. Ind.* ii. 292; *Wall. Cat* 1687. P. dioicum, *Ham. mss.* P. emarginatum, *Roth Catalect. Bot.* i. 48: *Don Prodr.* 73.

Cultivated in the KHASIA MTS., throughout the HIMALAYA and WESTERN TIBET at elevations of 2000 to 12,000 ft., and in the NILGHIRI HILLS.—DISTRIB. Centre of Europe and N. Asia.

Stem 1–3 ft. *Leaves* 1–4 in. diam. (5 in very large specimens). *Flowers* pink or white, in heads or compound cymes $\frac{1}{2}$–$\frac{3}{4}$ in. diam. *Nut* $\frac{1}{4}$–$\frac{1}{3}$ in. long, pale.

2. **F. cymosum,** *Meissn. in Wall. Pl. As. Rar.* iii. 63, and in *DC. Prodr.* xiv. 1. 144; puberulous, root perennial, leaves triangular, flowers secund on the long recurved branches of peduncled terminal and axillary cymes, nut ovate angles acute. *Bab. in Trans. Linn. Soc.* xviii. 119; *Lindl. Bot. Reg.* 1847, t. 26. F. triangulare, *Meissn. ll. c.* F. emarginatum, *var.* kunawarense, *Meissn. in DC. l. c.* 143. Polygonum cymosum, *Treviran. Delect. Sem. Hort. Vratisl.* 1824; *Reichb. Ic. Exot.* ii. t. 176. P. acutatum, *Lehm. Cat. Sem. Hort. Hamb.* 1820. P. triangulare, *Wall. Cat.* 1689. P. emarginatum, *Wall. Cat.* 1688 (*not of Roth*). P. dibotrys, *Don Prodr.* 73. P. volubile, *Turcz. in Bull. Soc. Imp. Nat. Mosq.* 1840, 77. P. rugosum, *Herb. Ham.*

TEMPERATE HIMALAYA; in woods, &c., from Kashmir to Sikkim, alt. 5–11,000 ft. KHASIA MTS., alt. 4–5000 ft.—DISTRIB. Yunan.

A tall branching perennial-rooted sparsely pubescent species. *Leaves* large, usually 3–4 in. diam., angles acute or obtuse, upper usually narrow and amplexicaul; petiole long, slender. *Inflorescence* very lax, branches of panicle 2–5 in. long; flowers pedicelled, white. *Nut* $\frac{1}{4}$–$\frac{1}{3}$ in., more than twice as long as the perianth.—I suspect that Meissner has described the fruit of *tataricum* under his *F. triangulare.*

3. **F. tataricum,** *Gærtn. Fruct.* ii. 182, t. 119, f. 6; annual, glabrous, leaves very broadly triangular-cordate or -hastate, flowers in axillary and terminal peduncled subcapitate cymes, nut with 3 deep grooves and rounded angles. *Meissn. in DC. Prodr.* xiv. 144. F. rotundatum, *Bab. in Trans. Linn. Soc.* xviii. 117; *Meissn. l. c.* Polygonum tataricum, *Linn.*; *Don Prodr.* 74; *Meissn. Monog. Polyg.* 62, t. 4, 8; *Dalz. & Gibs. Bomb. Fl. Suppl.* 74.

Cultivated throughout the HIMALAYA, at elevations of 3–12,000 ft.—DISTRIB. N. Europe and N. Asia.

Stem 2–3 ft., usually simple. *Leaves* 1–2 in. diam. *Flowers* white or pink. *Nut* $\frac{1}{6}$ in. long, conico-ovoid, opaque, rounded, angles keeled towards the tip.

5. RHEUM, *Linn.*

Stout herbs with woody large roots. *Leaves* large, entire toothed or lobed; stipules scarious. *Flowers* clustered in panicled racemes usually 2-sexual. *Sepals* 5. *Stamens* 6–9. *Ovary,* 2–4-angled; styles 2–4, stigmas dilated capitate or horseshoe-shaped. *Nut* 2–4-winged, very much larger than the usually unchanged sepals. *Embryo* straight, cotyledons broad.—Species 20, Central Asia and the Himalaya.

* *Stemless species. Flowers in a spike-like raceme.*

1. **R. spiciforme,** *Royle Ill.* 318, t. 78; leaves all radical thickly

coriaceous orbicular broadly ovate or cordate glabrous or stellately puberulous beneath, racemes 1–3 glabrous, fruit broadly ellipsoid or oblong, wings broader than the disk. *Meissn. in DC. Prodr.* xiv. 1. 36. R. Moorcroftianum, *Meissn. l. c. (not of Royle)*; *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA; in the drier ranges, from Kumaon, alt. 14–16,000 ft. westwards to WESTERN TIBET, alt. 9–14,000 ft., abundant.—DISTRIB. Affghanistan.

Root short or long, thicker than the thumb. *Leaves* all radical, 6–12 in. diam., very leathery, with prominent radiating nerves and reticulated nervules beneath, red-brown in age; petiole 3–6 in., very stout, glabrous or puberulous. *Racemes* 1–3, radical, 4–12 in., strict, dense-fld.; peduncle and rachis stout, glabrous; bracts minute, ovate, scarious; flowers $\frac{1}{10}$ in. diam., on capillary pedicels. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ in. long, 3–4 times as long as the oblong obtuse sepals, tip rounded or notched, wings membranous; pedicel half as long as the fruit or less.

2. **R. Moorcroftianum,** *Royle Ill.* 315, 318; leaves all radical thickly coriaceous orbicular glabrous or stellately puberulous beneath, racemes pubescent, fruit ovoid, wings narrow. *Wall. Cat.* 1727, *in part.*

WESTERN HIMALAYA; Kumaon, *Moorcroft in Herb. Wallich.*

I am uncertain about this plant, which differs from *R. spiciforme* in the very much larger pubescent peduncles and racemes, which together are two feet long, and in the form of the fruit. The only specimens are Wallich's, are very bad, and have neither locality nor collector's name. They are ticketed "large broad-leaved small-stalked Rhubarb; the root more purgative than the long-stalked." Another sheet has attached to it a ticket in the same handwriting, "narrow round-leaved long-stalked Rhubarb." *R. Moorcroftianum* is written in pencil on the sheets, I think by Royle (certainly not by Wallich). Hence they are no doubt the plants mentioned by Royle (Ill. Pl. Himal. 315) as brought by Moorcroft from Niti, alt. 12,000 feet, in Kumaon, and of which Royle says that "Major Hearsay, Moorcroft's companion, has described two kinds to me, one round-leaved and short-stalked, and the other short-stalked, but large and broad-leaved (*R. Moorcroftianum*, nob.) with the root more purgative than that of the former." From this it appears that Royle, not Wallich, as hitherto supposed, is the author of *R. Mooreroftianum*; and that Meissner is further in error in describing it as everywhere glabrous.

** *Stemless species. Flowers panicled; panicles leafless.*

3. **R. tibeticum,** *Maxim. mss.*; leaves very coriaceous orbicular-cordate and short thick petioles scaberulous, fruit nearly orbicular notched at both ends, wings very broad. Rheum, No. 6, *Herb. H. f. & T.*

WESTERN HIMALAYA; Zanskar, *Thomson*; Kashmir, Barji la, alt. 12,000 ft., *Clarke.* WESTERN TIBET; common, alt. 12–14,000 ft., *Thomson*, &c.

Root very stout. *Leaves* 6–12 in. diam., entire or crenulate, nerves 5 very stout radiating from the petiole which is 4–8 in. long and as thick as the finger. *Panicles* puberulous or quite glabrous, with the peduncle 4–10 in. high, fruiting a foot high; branches erecto-patent, simple or again branched; fruiting peduncle very thick, deeply grooved; bracts very minute; flowers $\frac{1}{12}$ in. diam., pedicels short. *Fruit* $\frac{1}{3}$ in. long and broad, four times as large as the unchanged sepals; wings much broader than the nucleus.—Resembles *R. leucorhizum*, Pall., but none of the sepals enlarge in fruit.

*** *Stem branched and panicle leafy.*

4. **R. emodi,** *Wall. Cat.* 1727; stem tall leafy, leaves long-petioled very large orbicular or broadly ovate obtuse base cordate 5–7-nerved, panicle papillosely puberulous fastigiately branched and leafy, flowers dark purple, fruit ovoid-oblong base cordate apex notched wings narrow. *Meissn. in Wall. Pl. As. Rar.* iii. 65, and in *DC. Prodr.* xiv. 1. 35 (*exclude syn. Webbianum*); *Bot. Mag.* t. 3508. R. emodium, *Wall. mss.*; *Nees & Eberm.*

Med. Pharm. Bot. i. 455. ? R. australe, *Don Prodr.* 75, *Hayne Arnz. Gewachs.* 12, t. 6; *Nees Pl. Offic. Suppl.* 5, t. 5, 6; *Sweet, Brit. Fl. Gard.* t. 269.

SUBALPINE and ALPINE HIMALAYA; Nepal, *Wallich*; Sikkim, *Ic. Cathcart*; ? Simla, on Choor, alt. 11–12,000 ft., *Edgeworth.*

Root very stout; stem very stout, 5–6 feet high, streaked green and brown. *Radical leaves* often 2 ft. diam., papillose beneath, subscaberulous above; petiole 12–18 in., very stout, scaberulous. *Panicle* 2–3 ft., with erect strict branches; flowers $\frac{1}{8}$ in. diam. *Fruit* $\frac{1}{2}$ in. long, purple, wings narrower than the disk.—I am not quite satisfied as to the synonymy of this plant, for it is difficult to distinguish it in a dried state from *R. Webbianum.* Wallich's are the only native specimens I am sure about; for the Sikkim locality I depend on an excellent drawing in the Kew collection, made by Mr. Cathcart's artists in Darjiling. Edgeworth's has the larger flowers of this, but the habit and glabrous panicle of *emodi.*

5. **R. acuminatum,** *Hook. f. & Thoms. mss. in Bot. Mag.* t.4877; stem leafy, leaves long-petioled triangular- or orbicular-ovate acuminate base cordate 5–7-nerved, panicles papillosely puberulous fastigiately branched and leafy, flowers dark red, fruit ovoid-oblong base cordate tip entire or notched, wings narrower than the nucleus.

SIKKIM HIMALAYA; alt. 10-13,000 ft., *J. D. H., Clarke.*

Probably only a small form of *R. emodi* with acuminate leaves, but the flowers are considerably larger, and though long under cultivation it does not attain half the size of that plant, or vary in its character.

6. **R. Webbianum,** *Royle Ill.* 318, t. 17 a; stem leafy, leaves long-petioled orbicular-cordate or reniform 5–7 nerved papillose or glabrous, tip rounded or subacute, panicles axillary and terminal quite glabrous, flowers pale yellowish, fruit broadly oblong or orbicular notched at both ends. R. emodi, *Wall. Cat.* 1727 C; *Herb. Strach. & Winterb.*; *Herb. H.f. & T.*

CENTRAL and WESTERN ALPINE HIMALAYA; from Nepal to Kashmir, alt. 10–14,000 ft.

Very variable in size, from 1 to 6 ft. high, with leaves 4 in.–2 ft. in diameter; flowers very much smaller than in *R. emodi*, the panicle less strict and quite glabrous, and the fruit broader ($\frac{1}{3}$ in. diam.), with broader wings more like that of *C. spiciforme.*—Royle describes the leaves as somewhat hairy above, but they are quite glabrous in most of the specimens. The habit differs a good deal from that of *R. emodi*, the inflorescence being more axillary, and its branching more diffuse after flowering. The flowers are not above $\frac{1}{12}$ in. diam., on capillary pedicels without bracts.

**** *Stem simple; panicles axillary concealed by bullate bracts.*

7. **R. nobile,** *Hook. f. & Thoms.*; *Ill. Himal. Pl.* t. 19; stem simple densely clothed with reflexed inflated imbricating (downwards) bladder-like reticulated bracts which conceal the short axillary panicles, leaves ovate-oblong or rounded base cuneate or cordate, fruit broadly ovoid 2–4-winged, disk tuberculate. *Meissn. in DC. Prodr.* xiv. 1. 36.

SIKKIM HIMALAYA; in the interior ranges, alt. 13–15,000 ft., *J. D. H., Clarke.*

Root very long, 3 in. diam. and under. *Leaves* very coriaceous, 1 foot diam. and under, usually edged with red, upper passing into the bracts; petiole 2–6 in., stout; stipules voluminous, 6–8 by 4–6 in., rose-red. *Stem* 3–4 ft., as thick as the wrist below, deeply grooved. *Bracts* orbicular, 6 in. diam., pale straw-coloured, reticulate, deciduous in age. *Panicles* 3–4 in., branched, glabrous; and flowers crowded, $\frac{1}{10}$ in. diam., green. *Fruit* $\frac{1}{4}$ in. long.—Gill, in his "River of the Golden Sands," speaks of

a plant inhabiting the lofty regions of East China bordering Tibet, which is probably this or an allied species.

6. **OXYRIA,** *Hill.*

An erect herb, with stout rootstock. *Leaves* chiefly radical, orbicular-cordate or reniform; stipules broad, lax. *Flowers* in panicled racemes, 2-sexual. *Sepals* 4, 2 outer reflexed; 2 inner larger, erect, appressed. *Stamens* 6. *Ovary* compressed; styles 2, short, stigmas fimbriate. *Nut* biconvex, 2-winged. *Embryo* lateral, nearly straight, cotyledons linear-oblong.

O. digyna, *Hill*; *Boiss. Fl. Orient.* iv. 1004; leaves cordate or reniform. O. reniformis, *Hook. Fl. Scot.* 111; *Meissn. in DC. Prodr.* xiv. 1. 37; *Engl. Bot.* t. 910. O. elatior, *Br. in Wall. Cat.* 1726; *Meissn. in Wall. Pl. As. Rar.* iii. 64, and in *DC. l. c.*; *Royle Ill. Pl. Him.* 314; *Hook. Ic. Pl.* t. 483.

ALPINE HIMALAYA; from Sikkim to Kashmir, alt. 10–14,000 ft. WESTERN TIBET, alt. 12–17-500 ft.—DISTRIB. Mts. of Europe, N. Asia and America, Arctic Regions.

Glabrous, fleshy. *Rootstock* tufted, with many erect succulent stems 4–18 in. high. *Leaves* radical, many, long-petioled, 1–4 in. diam., rarely 3-lobed or sub-hastate, cauline 1–2; petiole sometimes 8 in. *Racemes* slender, lax-fld.; pedicels jointed in the middle, tip thickened. *Outer sepals* spreading or reflexed; inner spathulate, 3–5-nerved. *Fruit* $\frac{1}{6}$–$\frac{1}{4}$ in. diam., orbicular-cordate, wing membranous veined top notched.—A most agreeable salad, raw and cooked. Except in often attaining a very large size (18 in. high), the Himalayan plant does not differ from the European.

7. **RUMEX,** *Linn.*

Perennial herbs, or annuals, rarely shrubby. *Leaves* various; stipules often disappearing with age. *Flowers* in axillary clusters or in whorls arranged in simple or panicled racemes. *Sepals* 6 (rarely 4); outer unchanged, inner enlarging entire or toothed, midrib or disk often enlarged or tubercled. *Stamens* 6. *Ovary* 3-gonous; styles 3, stigmas fimbriate. *Nut* included in the usually enlarged inner sepals (valves) angles acute. *Embryo* lateral, nearly straight; cotyledons linear or oblong.—Species described about 100 (probably greatly exaggerated), in all temperate and some tropical countries.

I think that this genus wants revision and a very great reduction of species, when most of the Indian ones will be referred to European, in the directions I have indicated under each.

Sect. I. **Lapathum,** *Meissn.* *Flowers* 2-sexual. *Styles* terminal. *Inner sepals* (valves) coriaceous much enlarged in fruit. *Leaves* not hastate.

* *Inner fruiting-sepals quite entire, disk tumid or not.*

1. **R. orientalis,** *Bernh.*; *Boiss. Fl. Orient.* iv. 1009; tall, stout, leaves elongate-oblong obtuse base cordate, racemes in an open lax or thyrsoid dense panicle, whorls crowded, pedicels about equalling the fruiting perianth, valves broadly orbicular-cordate obtuse reticulate quite entire with or without a small tubercle. *Meissn. in DC. Prodr.* xiv. 1. 51. R. Dioscoridis, *Hayne Arnzeik.* xiii. 5, t. 5.

WESTERN HIMALAYA; Kumaon to Kashmir, alt. 6–9000 ft., *Falconer*, &c.

WESTERN TIBET; alt. 11–13,000 ft., *Thomson*, &c.—DISTRIB. Westward to Asia Minor, Syria and Greece.

Stem 3–4 ft., often very stout, deeply grooved. *Lower leaves* 1–2 ft., upper narrow at the base. *Valves* $\frac{1}{4}$–$\frac{1}{6}$ in. long, quite entire in all Indian specimens, pale, flat, finely reticulate.—The Indian specimens with no tubercle resemble *R. aquaticus*, L., and those with a tubercle *R. Patientia*, and I do not see why all these should not be united.

** *Inner fruiting-sepals with very narrow margins and few or no teeth.*

2. **R. maritimus,** *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 59; annual, leaves lanceolate narrowed into the petiole, panicle leafy to the top, valves rhombic- or oblong-ovate with a lanceolate tip all with an oblong tubercle unarmed or with 2–3 long needle-like spines. *Fl. Dan.* t. 1208. R. palustris, *Sm. Fl. Brit.* i. 394; *Fl. Dan.* t. 1873; *Boiss. Fl. Orient.* iv. 1014. R. Wallichii, *Meissn. l. c.* 48. R. Wallichianus, *Meissn. in Wall. Pl. As. Rar.* iii. 64. R. acutus, *Roxb. Fl. Ind.* ii. 208. R. Roxburghianus, *Wall. Cat.* 1731, *in part.* R. comosus & setaceus, *Ham. mss.*; *Wall. Cat.* 6287, 6288. R. chinensis, *Campd. Rum.* 63, 76.

Marshes in ASSAM, SILHET, CACHAR, and BENGAL, common.—DISTRIB. Europe, Asia, N. Africa, N. and S. America.

Stem 1–4 ft., angled and deeply grooved. *Leaves* 3–10 in., petioled, base always narrowed into the petiole. *Whorls* of flowers lax or dense, many- or few-fld. *Fruiting perianths* all unarmed, or, on the same plant, some armed and some unarmed, yellow brown when ripe, tubercle smooth, with a narrow sometimes reticulate margin; spine sometimes 4 times as long as the valve, tip straight or slightly hooked.—The fruit varies greatly in size and number and length of the spines or the valves, and I am quite unable to discriminate between the various plants I have here referred to *R. maritimus*.

3. **R. nigricans,** *Hook. f.*; annual, leaves linear-oblong obtuse contracted above the cordate base, flowering branches rigid divaricate leafy or leafless, fruiting perianths densely crowded in globose distant or confluent heads, turning black in drying, pedicels short, valves with very large oblong dark tubercles and lanceolate tips, margins very narrow entire or with one or two short straight teeth or spines. R. dentatus, *Wall. Cat.* 1730 (*not of Linn.*).

BENGAL, *Clarke*. KHASIA MTS., *Griffith*. BEHAR, *J. D. H.* DECCAN PENINSULA, *Herb. Heyne* (*Wallich*).

Stem 6–18 in., angled and grooved. *Leaves* 6–8 by 1–1½ in., thin; petiole long, slender. *Fruiting perianth* much larger than in *R. maritimus*, very dark when dry, as is the whole raceme.—Closely resembles *R. conglomeratus*, but the leaf is *panduriform*, and the tips of the valves acute.

*** *Inner fruiting-sepals with broad much-toothed wings.*

4. **R. dentatus,** *Linn.*; *Boiss. Fl. Orient.* iv. 1013; annual, leaves oblong obtuse often contracted above the rounded or cordate base, often waved or crisped, whorls distinct leafy or not, fruiting perianth ovate or oblong-ovate with an oblong smooth tubercle and broad densely reticulated wings which are irregularly toothed, teeth short stout straight. *Meissn. in DC. Prodr.* xiv. 1. 56 (*excl. syn. Wall. Cat.*). R. Roxburghianus, *Wall. Cat.* 1731, *in part.* R. Klotzschianus, *Meissn. l. c.* 57. R. obtusifolius, *Herb. Ham., Wall. Cat.* 6289. Rumex, No. 3, *Herb. Strach. & Winterb.*

From ASSAM and SILHET to the INDUS, common, ascending the Himalaya to 1000 ft. SCINDE, *Stocks*. The CONCAN, *Law*, &c.

Habit of *R. Patientia*, L., to which this is closely allied. Distinguishable from

the other Indian annual species by its broad irregularly-toothed wings, the teeth of which are not hooked.—A specimen from Oude has very narrow wings, and thus shows a transition to *nigricans*. I cannot in Herbarium specimens distinguish large specimens of this with petioled floral leaves cordate at the base from states of *R. nepalensis*. Except for its shorter pedicels, this would pass for *R. obtusifolius*, L.

5. **R. nepalensis,** *Spreng. Syst.* ii. 159; perennial?, tall, branched, radical leaves large oblong ovate-oblong or triangular-ovate acute or obtuse base widely or narrowly cordate, upper sessile or petioled similar or with narrowed bases, racemes elongate, whorls distant, valves orbicular-ovate one or all with an oblong tubercle broadly winged, wing pectinately toothed strongly reticulate, teeth usually hooked at the tip. *Boiss. Fl. Orient.* iv. 1011; *Wall. Cat.* 1728; *Meissn. in Wall. Pl. As. Rar.* iii. 64, *in Linnæa* xiv. 192, and in *DC. Prodr.* xiv. 1. 55; *Wight Ic.* t. 1810. R. Roxburghianus, *Schultes fil. Syst.* vii. 1402 (*not of Wallich*). R. hamatus, *Trevir. in Nov. Act. Leopold.* xiii. 174; *Meissn. in DC. l. c.* 56. R. ramulosus, *Meissn. in DC. l. c.* R. peregrinus, *Boiss. Diagn. Ser.* 1, v. 46. R. tuberosus, *Roxb. in Herb. Willd.* (*ex Meissn.*). R. uncinatus, *Hort.*

Temperate Himalaya; from Bhotan to Kashmir, alt. 4–9000 ft. (12,000 on the Chenab, *Stewart*). Khasia Mts.? Western Peninsula; on the Ghats from the Concan to the Nilghiris.—Distrib. Westward to Asia Minor, Java, S. Africa.

Root with tuberous fibres (Boissier). *Stem* 2–4 ft., stout, erect. *Lower leaves* often 6–14 by 3–5 in., undulate or not; petiole very slender, upper petioled or sessile. —Probably not specifically different from *R. pulcher*, L.

Sect. II. **Acetosa,** *Tournef.* *Flowers* unisexual or polygamous. *Styles* arising from the angles of the ovary, inner sepals (valves) much enlarged, membranous, entire, midrib with a deflexed tubercle near its base. *Leaves* hastate.

6. **R. scutatus,** *Linn.*; *Boiss. Fl. Orient.* iv. 1015; perennial, polygamous, papillose, stem creeping below branched, leaves all long-petioled hastately cordate or sub-3-lobed lateral lobes rounded suddenly contracted into the narrower midlobe, racemes very slender, whorls 2–4-fld. distant, valves cordate at the base. *Meissn. in DC. Prodr.* xiv. 1. 69; *Campd. Rum.* 132, t. 2, f. 6. R. hastifolius, *M. Bieb. Fl. Taur. Cauc.* i. 290.

Western Himalaya; Simla, *Thomson*.—Distrib. Persia and westward to Middle and South Europe and N. Africa.

Somewhat glaucous. *Branches* slender, 1–2 ft., flexuous, dichotomously divided, ending in long lax panicles. *Leaves* 1–2 in. diam., the lobes all broad. *Flowers* small; pedicels jointed about the middle, elongating in fruit.—The specimens are not in fruit.

7. **R. hastatus,** *Don Prodr.* 74; glaucous, polygamous, branches erect from a stout shrubby base all petioled rhombic deltoid or hastately 3-lobed with the lobes all narrow, racemes very slender panicled, whorls few-fld. distant, valves orbicular notched at both ends. *Meissn. in Wall. Pl. As. Rar.* iii. 64, and in *DC. Prodr.* xiv. 1. 72; *Wall. Cat.* 1729.

Himalaya; from Kumaon to Kashmir, alt. 1–8000 ft. Bhotan, *Booth.*—Distrib. Affghanistan.

Rootstock woody, often as thick as the thumb; branches much divided, slender, 1–2 ft., obscurely angled. *Leaves* ½–1 in., coriaceous, nerveless. *Racemes* ending the branches, rachis filiform; flowers very small, pedicels lengthening in fruit. *Valves* ⅛–¼ in. diam., often pink, very delicately veined.

8. **R. acetosa,** *Linn.*; *Boiss. Fl. Orient.* iv. 1015; perennial, dicœcious,

green, stem subsimple, radical leaves petioled oblong obtuse base cordate hastate or sagittate, cauline sessile, racemes lax, whorls 6–8-fld., outer sepals reflexed, valves orbicular. *Meissn. in DC. Prodr.* xiv. 1. 64; *Fl. Dan.* t. 2534; *Engl. Bot.* t. 127.

WESTERN HIMALAYA; from Kumaon to Kashmir, alt. 8–12,000 ft.—DISTRIB. N. Asia, Europe from the Caucasus westward, N. America.

Root of slender fibres, from a short woody stock. *Stem* 1–2 ft., deeply grooved. *Leaves* 2–6 in.; petiole of lower slender; stipules ragged. *Panicle* contracted; branches strict, erect, leafless. *Sepals* of male with scarious margins. *Valves* of ripe female perianth broadly ovate-cordate, pink or crimson.

9. **R. vesicarius,** *Linn.*; *Boiss. Fl. Orient.* iv. 1017; annual, monœcious, glabrous, branched from the root, rather fleshy, leaves petioled elliptic ovate or oblong 3–5-nerved, base cuneate rarely cordate or hastate, racemes short terminal and leaf-opposed leafless, flowers pedicelled sometimes 2-nate and connate, valves large orbicular 2-lobed at each end very membranous and reticulate without a marginal nerve. *Meissn. in Wall. Pl. As. Rar.* iii. 64, and in *DC. Prodr.* xiv. 1. 70; *Roxb. Fl. Ind.* ii. 209; *Campd. Rum.* 129, t. 3, f. 1. 8; *Wall. Cat.* 1732.

WESTERN PANJAB; on the Salt range, and trans-Indus hills; cultivated and an escape in other parts of India.—DIRTRIB. Affghanistan, Persia, the Levant, and N. Africa.

Pale green, 6–12 in. high, dichotomously branched. *Leaves* 1–3 in., obtuse or acute; petiole as long as the blade. *Racemes* 1–1½ in.; pedicels slender, jointed about the middle or unjointed. *Fruit* ½ in. diam., white or pink, valves hyaline.

SECT. III. **Acetosella,** *Meissn.* *Flowers* dicœcious. *Styles* arising from the angles of the ovary. *Inner sepals* herbaceous, hardly enlarged in fruit. *Leaves* hastate.

10. **R. acetosella,** *Linn.*; *Boiss. Fl. Orient.* iv. 1018; perennial, stem slender simple or branched from the base, lower leaves petioled lanceolate or hastate, uppermost sessile, racemes leafless, flowers minute, pedicels jointed at the top. *Meissn. in DC. Prodr.* 63; *Fl. Dan.* 1161; *Engl. Bot.* t. 1674.

EASTERN HIMALAYA; Sikkim, at Darjeeling, alt. 7–8000 ft., *Clarke*; introduced ?—DISTRIB. Europe, N. Africa, N. Asia.—Introduced elsewhere.

Glabrous, often bright red in autumn; rootstock creeping, much branched. *Leaves* ½–2 in., variable in breadth and form; stipules silvery, torn. *Racemes* erect; male fl. largest. *Fruiting sepals* oblong, erect, closely appressed to the small 3-gonous fruit.—*Sheep-sorrell.*

ORDER CXX. PODOSTEMONACEÆ.

Aquatics, growing on stones in tropical streams, annual or perennial. *Stem* branched with leaves, or with these confluent into amorphous fronds. *Inflorescence* various, often of a 1- or many-flowered scape, naked or arising from a tubular sheath. *Flowers* 1-sexual, rarely dicœcious, usually enclosed in a spathe. *Perianth* 0, or membranous, lobed or partite or of a few scales. *Stamens* definite or not, free or connate, hypogynous or perigynous, filaments flat; anthers 2-lobed. *Ovary* free, sessile or stalked, smooth or ribbed, 1–3-celled; styles 2–3, or one and columnar, stigma one capitate, or 2–3, simple toothed or laciniate; ovules many, anatropous, axile or parietal. *Capsule* 1–3-celled; septicidal or septifragal, valves 2–3. *Seeds*

minute, testa mucilaginous, albumen 0; embryo straight, cotyledons 2, radicle inferior.—Genera 21; species about 120, chiefly tropical.

An Order of very doubtful affinity, some genera of which I am disposed to regard as perhaps consisting of reduced forms of *Scrophularineæ* or *Lentibularineæ*. The species are probably very numerous in India, though unknown in rivers having snow-feeders. I have followed Weddel's most careful monograph in describing the Indian species, reducing the genera in accordance with Bentham's revision of these in the Genera Plantarum. I suspect that an examination of more copious materials will modify the characters of the species, and perhaps bring some of them together as varieties or forms of dimorphic or polymorphic plants.

Tribe I. **Tristicheæ.** *Flowers* 2-sexual. *Stamens* 1–3. *Ovary* 3-celled. *Styles* 3.

Stamens 3 . . . . . 1. TERNIOLA.

Tribe II. **Eupodostemeæ.** *Perianth* of 2 rarely 3 scales. *Stamens* 1, or 2–3 with the filaments connate.

Stigmas subsessile, broad, flat, crested. Stamens 2 . . . . . 2. HYDROBRYUM.
Stigmas short, linear or ovate, entire. Stamens 2 . . . . . 3. PODOSTEMON.

1. TERNIOLA, *Tulasne.*

Stems confluent into an expanded horizontal lobed frond, or in one species long and floating. *Leaves* minute, setaceous. *Flowering-buds* adnate to the base of the stem, or scattered along the elongated branches; pedicel solitary, with a ring of scale-like leaves usually forming a short sheath round its base. *Flowers* 2-sexual. *Perianth* hyaline, 3-lobed. *Stamens* 3, filaments free. *Ovary* 3-celled; styles 3, spreading, inner, linear; placentæ thick, in the inner angles of the cells. *Capsule* ovoid, septicidally 3-valved, valves equal, septa vanishing.—Species 7, all Indian.

* *Stems frond-like horizontal.*

1. **T. zeylanica,** *Tul. Monogr. Podost.* 190, t. 13, f. 3; plant flat suborbicular or irregularly lobed, leaves some very narrow in rosettes, others connate into a short broad tubular or cup-shaped echinate sheath with a ciliate mouth. *Wedd. in DC. Prodr.* xvii. 46. T. ceylanica, *Wight Ic.* t. 1919. Tristicha zeylanica, *Gardn. in Calc. Journ. Nat. Hist.* vii. 177. Lawia zeylanica, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 112. Dalzellia zeylanica, *Wight l. c.* 34. Mnianthus zeylanicus, *Walp. Ann.* iii. 443.

CEYLON; on smooth gneiss rocks in streams at Peradenyia.

Plant frond-like, attached to stones, about 1 in. diam. *Leaves* simple, sometimes forked or lacerate, $\frac{1}{12}$ in. long, mixed with papillæ. *Sheath* bristling with rigid teeth (tips of connate leaves). *Pedicel* equalling the flower, at length elongate and $\frac{1}{3}$ in. long. *Perianth* oblong. *Stamens* included. *Capsule* ellipsoid, subsessile, 9-ribbed, crowned with 3 recurved stigmas.

2. **T. pulchella,** *Tul. Monogr. Podost.* 192, t. 13, f. 4; plant minute narrow flat lobed, leaves distichous short linear acute, sheath cylindric of slender connate leaves mouth ciliate. *Wedd. in D.C. Prodr.* xvii. 46. Lawia pulchella, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 113. Mnianthus pulchellus, *Walp. Ann.* iii. 443.

The CONCAN; near Bombay.

Plant froud-like, $\frac{1}{6}$–$\frac{1}{8}$ in. diam.; lobes very short, terminated by buds. *Leaves* $\frac{1}{5}$ in.

long, with a white mesial line, upper shorter. *Pedicel* about as long as the leaves. *Perianth* obtusely 3-lobed. *Capsule* obovoid, crowned with 3 short stigmas.

3. **T. Lawii,** *Wedd. in DC. Prodr.* xvii. 47; plant very minute flat, leaves sublanceolate crowded round the base of the sheath which is formed of connate leaves with free recurved tips, pedicel very short. Tulasnea Lawii, *Wight Ic.* t. 1919, f. 3. Dalzellia Lawii, *Wight l. c.* 35.

The CONCAN; in the Salset River, *Law.*

Plant about $\frac{1}{6}$ in. diam. *Flowering buds* crowded round the margins of the frond. *Perianth-segments* obtuse. *Capsule* ellipsoid, obscurely ribbed.

4. **T. longipes,** *Tul. Monogr. Podost.* 193, t. 13, f. 2; plant minute, narrow, lobed, leaves crowded round the base of the sheath subdistichous linear-elongate acute longer than the pedicel, sheath broad formed of connate leaves ciliate. *Wedd. in DC. Prodr.* xvii. 47. Lawia longipes, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 113. Mnianthus longipes, *Walp. Ann.* iii. 443.

The CONCAN; in streams near Bombay, *Law.*

Similar to *T. Lauii*; margins of the lobes studded with buds. *Leaves* flat, broad at the base, $\frac{1}{3}$–$\frac{1}{2}$ in. long. *Pedicel* lengthening to $\frac{2}{3}$ in.

5. **T. pedunculosa,** *Wedd. in DC. Prodr.* xvii. 47; plant flat lobed, leaves short subulate all connate into a sheath that is much shorter than the pedicel. Dalzellia pedunculosa, *Wight Ic.* 35. Tulasnea pedunculosa, *Wight l. c.* t. 1919, f. 4.

The CONCAN; Bombay, in the Salset River, *Law*; North Canara, *Talbot.*

Probably only a variety of *T. longipes*, as surmised by Weddel, but considered distinct by Wight; the capsule is the same.

6. **T. foliosa,** *Wedd. in DC. Prodr.* xvii. 47; plant broad flat lobed, leaves elongate linear crowded round the base of the pedicel and much shorter than it, none of them connate into a sheath. Dalzellia foliosa, *Wight Ic.* 35. Tulasnea foliosa, *Wight l. c.* t. 1919, f. 2.

The CONCAN; Bombay, in the Salset River, *Law.*

Plant about $\frac{1}{4}$ in. broad; margin of lobes studded with buds. *Leaves* numerous in a cluster, $\frac{1}{4}$–$\frac{1}{3}$ in. long, very narrow, flat, very acute, translucent. Pedicel $\frac{1}{12}$ in. long.

** *Stems elongate, filiform.*

7. **T. ramosissima,** *Wedd. in DC. Prodr.* xvii. 47; stem filiform very long floating much branched, branches some like the stems, others short and flowering, leaves alternate narrowly linear almost acicular, sheath very short of connate leaves much shorter than the pedicel. Dalzellia ramosissima, *Wight Ic.* 35. Tulasnea ramosissima, *Wight l. c.*

MALABAR; rivers in Cochin, *Johnson.*

A foot or more long; leafy, stems submerged; flowering branches floating, attached to the upper face of the stem and accompanied by two very slender branchlets. *Leaves* on the sterile branches almost acicular, shorter than on the flowering. *Sheath* hardly any, its outer leaves short and very acute. *Pedicel* $\frac{1}{3}$–$\frac{2}{3}$ in. long. *Perianth* 3-lobed almost to the middle. *Filaments* at length exserted; anthers oblong, base sagittate. *Capsule* oblong, narrowed at both ends, 9-ribbed; stigmas slender, suberect.

2. HYDROBRYUM, *Endl.*

Plants small, green, herbaceous, frond-like, spreading over stones, sending up buds clothed at the base with distichous scale-like leaves. *Flowers*

2-sexual, each enclosed in a sessile membranous sheath. *Perianth* 0. *Stamens* 2, filaments united below; staminodes 2, linear. *Ovary* ovoid, 2-celled; stigmas 2, subsessile, broad, flat, spreading, crested or toothed, deciduous. *Capsule* long-pedicelled, ovoid; valves equal 5-ribbed.

H. Griffithii, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 104, and *Monogr. Podost.* 141; *Wedd. in DC. Prodr.* xvii. 67. Podostemon Griffithii, *Wall. mss.*; *Griff. in As. Res.* xix. 105, t. 17, and *Ic. Pl. As.* t. 541, f. 2, & t. 544. P. Griffithii, *Gardn. in Calc. Journ. Nat. Hist.* 1850, 40, 41.

KHASIA MTS., on rocks in streams, alt. 2–3000 ft., *Griffith, J. D. H. & T. T.*

Plants consisting of small coriaceous green frond-like lobed patches about 1 in. broad adhering firmly to stones, with buds irregularly scattered over the surface; flowering buds of 6 distichously imbricating leaves about $\frac{1}{12}$ in. long, the lower of which have often filiform tips. *Spathe* about $\frac{1}{10}$ in. long. *Stamens* as long as the ovary; anthers oblong; staminodes with subspathulate tips, appressed to the ovary in bud. *Ovary* subglobose; style very short, stigmas cuneate. *Capsule* oblong-lanceolate, valves delicately ribbed.

3. PODOSTEMON, *Michaux.*

Herbs of various habits. *Pedicels* scattered and adnate to the stem or in terminal or lateral very short branches which are naked or scaly at the base. *Flower* 2-sexual sessile in a little spathe, with 2 linear staminodes at the side of the staminal column. *Stamens* 2, filaments united below. *Ovary* ovoid, 2-celled; styles short linear subulate or ovate acute. *Capsule* long-pedicelled, ovoid, or ellipsoid; valves 3–5-ribbed, persistent or one deciduous. —Species about 20, American, Madagascarian and Indian.

Sect. I. **Dicræa.** *Stems* branched, floating. *Flower-buds* few, lateral on the branches.

1. **P. dichotomus,** *Gardn. in Calc. Journ. Nat. Hist.* vii. 165; stems dichotomously branched compressed floating, flowering branches elongate flexuous, flowers distichously alternate on short leafy branches, sheath of connate leaves the lower of which are scale-like the upper subulate, capsule ellipsoid. Dicræa dichotoma, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 101, and *Monogr. Podost.* 119, t. 9, f. 1.; *Wedd. in DC. Prodr.* xvii. 69.

DECCAN PENINSULA, in streams of the Western Ghats.

P. dichotomus proper; stems slender flexuous and angled. Dicræa dichotoma, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 100, and *Monogr. Podost.* 114; *Wight Ic.* t. 1916, f. 2.—Nilghiri Mts.; in the Pycarrah River, *Wight.*

Var. *Wightii*, Wedd. l. c.; stems and branches shorter broader more flexuous, leaves subulate, flowers more numerous. P. Wightii, *Gardn. l. c.*; *Wight Ic.* t. 196, f. 3. Dicræa Wightii, *Tul. ll. c.*—Nilghiri Mts.; in the Pycarrah River, *Wight.*

Var. *longifolia*, Wedd l. c.; habit of var. *Wightii*, but leaves longer only born on the lower buds. Dicræa longifolia, *Wight l. c.* 1916, f. 4.—Malabar, *Johnson.*

Var. *rigida*, Wedd. l. c.; stems and branches stouter more rigid flowering throughout, leaves all scale-like and connate into a tubular 2-fid sheath. P. rigidus, *Gardn. l. c.* Dicræa rigida, *Tul. ll. c.*; *Wight Ic.* t. 1916, f. 5.—Nilghiri Mts.; in the Pycarrah River, *Wight.*

2. **P. stylosus,** *Benth. in Gen. Pl.* iii. 112; stems very long branched compressed margins floriferous, leaves 4 distichously imbricate inner obtuse subcuspidate sheathing the spathe, stigmas pubescent equalling or exceeding

the ovary, capsule 6-ribbed. Dicræa stylosa, *Wight Ic.* t. 1917, f. 2; *Wedd. in DC. Prodr.* xvii. 70.

MALABAR; in mountain streams, near Calicut, *Johnson*. TRAVANCORE; in streams of the Anamallay Hills, *Wight*.

The long stigmas distinguish this species.

3. **P. elongatus,** *Gardn. in Calc. Journ. Nat. Hist.* vii. 188; stems long filiform subsimple terete floating below and branches flowering, tips elongate leafy flowerless, leaves acicular, flowers distichous in spikes or racemes terminating short branches, capsule ellipsoid. Dicræa elongata, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 102, and *Monogr. Podost.* 124, t. 9, f. 2; *Wight Ic.* t. 1917, f. 1; *Wedd. in DC. Prodr.* xvii. 70.

CEYLON; in the Mahawalle Gunga River, below Peradenyia, *Gardner*.

Stems tufted, 1–2 in., clothed with distichous buds; upper buds flowerless, consisting of clusters of linear or subspathulate leaves $\frac{1}{5}$–$\frac{1}{2}$ in. long.; lower buds of boat-shaped acute keeled leaves connate at the base and enclosing the flower. *Spathe* funnel-shaped, mouth 2-fid. *Filament* stout, equalling the ovary and subulate staminodes; anthers oblong. *Capsule* sessile on the fruiting pedicels, which terminate short leafless branches, 8–12-ribbed; stigmas ovate, acute.

4. **P. algæformis,** *Benth. in Gen. Plant.* iii. 112; stems long compressed floating simply or dichotomously branched from the base, branches strap-shaped simple or forked obtuse, flowers on the margins of the stem below or branches, pedicel with minute leaves at the base, of which the inner are large and concave, capsule elliptic-oblong 8-ribbed. Dicræa algæformis, *Beddome in Trans. Linn. Soc.* xxv. 223, t. 24; *Wedd. in DC. Prodr.* xvii. 70; *Warm. in Videlsk. Selsk. Skr.* vi. 2, t. 12; *Trim. in Journ. Bot.* xxiii. (1855) 173.

TRAVANCORE; on rocks in streams of the Anamallay Mts., *Beddome*. CEYLON; near Kandy, *Trimen*.

Stems tufted, dark green, $\frac{3}{4}$ in., like a *Fucus*; branches unequal, alternate or clustered. *Spathe* with a dilated 2–3-fid mouth. *Staminodes* 2–3, subulate, as long as the ovary. *Filaments* connate below; anthers oblong. *Stigmas* subulate.—Mr. Hemsley, who has examined the Ceylon specimens, regards them as intermediate between *P. algæformis* and *Wallichii*.

5. **P. subulatus,** *Gardn. in Calc. Journ. Nat. Hist.* vii. 184; stem short simple or dichotomous, branches short leafy, leaves amplexicaul distichous elongate-subulate, pedicels short, stigmas subulate-lanceolate. *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 103, and *Monogr. Podost.* 135, t. 9, f. 4; *Wedd. in DC. Prodr.* xvii. 74; *Wight Ic.* t. 1918, f. 1; *Thwaites Enum.* 222. P. dendroides, *Thw. mss.*

CEYLON; on rocks in the Mahawalle Gunga River, near Holnicut.

Stems stout, rough, 1–1½ in., attached to stones by a small fleshy depressed rootstock. *Leaves* 1–2½ in., base very broad, with rarely a short stipule on the margin of the sheath. *Spathe* broadly tubular, 2–4-lobed unequally. *Filament* much longer than the ovary; staminodes shorter, narrowly linear. *Capsule* ellipsoid, usually long-peduncled; valves 8-ribbed, one falling before the other.

Sect. II. **Polypleurum.** *Stem* flat dilated frond-like. *Flower-buds* scattered or submarginal, with few scales.

6. **P. Hookerianus,** *Wedd. in DC. Prodr.* xvii. 74; plant an irregularly dilated thickish sinuate or lobulate frond with marginal 1-fld. buds of about 6 distichously imbricate ovate obtuse or acuminate leaves, capsule

smooth. Mniopsis Hookeriana, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 104, and *Monogr. Podost.* 147, t. 8, f. 5; *Wight Ic.* t. 1918, f. 4.

The CONCAN; near Bombay, in streams, *Law.* N. CANARA, in the Kala nuddi, *Talbot.*

Plant 1–2 in. broad, appressed to rocks, &c. *Leaves* not keeled, lower short obtuse, upper $\frac{1}{8}$ in. long. *Spathe* tubular, mouth 2-lobed. *Pedicel* about $\frac{1}{3}$ in. *Filament* flat; staminodes linear, acute, shorter than the ovary. *Ovary* sessile, globose; stigmas long, subulate-lanceolate. *Capsule* subglobose, one valve falling away before the other.—Mr. Hemsley regards the Canara specimens as intermediate between *P. stylosus* and *algæformis.*

7. **P. Johnsonii,** *Wedd. in DC. Prodr.* xvii. 75; plant an irregularly dilated membranous suborbicular or lobed frond, buds on the upper surface 1-fld. of 4–6 distichously imbricate ovate obtuse keeled leaves, capsule smooth or with 8 confluent broad ribs. Mniopsis Johnsonii, *Wight Ic.* t. 1919, f. 5.

MALABAR; in rivers, *Johnson.*

Plant 1–1$\frac{1}{4}$ in. broad, appressed to the stones, &c. *Leaves* $\frac{1}{12}$ in., spreading, rigid when dry, upper rather the longest. *Spathe* ovoid, subcompressed, split ventrally and at the tip. *Filament* longer than the ovary; anthers ovate; staminodes very narrow, incurved above, equalling the ovary. *Ovary* globose, sessile; stigmas short, linear. *Capsule* ellipsoid.

8. **P. olivaceus,** *Gardn. in Calc. Journ. Nat. Hist.* 181; plant a membranous irregularly lobed flat frond, buds crowded on its upper surface 1-fld. of 6 equitant oblong obtuse acutely keeled leaves, capsule with 8 thick ribs. *Wedd. in DC. Prodr.* xvii. 75. P. griseus, *Gardn. l. c.* Hydrobryum olivaceum & griseum, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 104 and *Monogr. Podost.* 138, 140, t. 9; *Wight Ic.* t. 1918, f. 2. ? P. Gardneri, *Harv. mss.*; *Thwaites Enum.* 223.

NILGHIRI MTS.; in the Pycarrah River, *Wight.* CEYLON; in the Mahawalle Gunga River, *Gardner*, &c.

Plant about 1 in. broad, appressed to rocks, &c., its lobes sometimes imbricating. *Leaves* $\frac{1}{12}$ in., upper larger. *Spathe* elliptic-oblong, incumbent on the frond, at length split longitudinally. *Pedicel* at length $\frac{1}{8}$ in. long. *Filament* compressed, arms short, anthers ovate; staminodes linear, shorter than the ovary. *Ovary* sessile; stigmas short, triangular-lanceolate. *Capsule* ellipsoid, ribs of the persistent valve decurrent on the pedicel.—*P. Gardneri,* which consists of a simple terete stem crowned with capillary leaves, and grows on the rootstock of *P. olivaceus,* is supposed to be an abnormal foliaceous development of that plant.

9. **P. acuminatus,** *Wedd. in DC. Prodr.* xviii. 75; plant a flat frond radiately lobed, buds in the sinus and angles between the lobes 1-fld. of 6 equitant leaves terminating in long subulate caducous points, capsule broadly 8-ribbed.

KHASIA MTS., in the Bogapane and Kalapane Rivers, *J. D. H. & T. T.*

Plant minute, membranous, subdichotomously irregularly shortly forked or lobed and toothed. *Buds* horizontal; lower leaves shorter, obtuse. *Spathe* ellipsoid, narrowed below, at length split longitudinally. *Pedicel* ascending, $\frac{1}{10}$ in. *Filament* flattened, arms short, spreading, staminodes linear, half as long as the ovary. *Stigmas* subulate-lanceolate. *Capsule* obliquely ellipsoid, ribs of the persistent valve decurrent on the pedicel.

10. **P. microcarpus,** *Wedd. in DC. Prodr.* xvii. 76; plant a dichotomous flat branching frond bearing scattered 1-fld. buds of 6–8 equitant subacute compressed keeled leaves, spathe boat-shaped, capsule obovoid

ellipsoid not ribbed. Hydrobryum lichenoides, *Kurz in Journ. As. Soc. Beng.* xlii. 2. 103.

TENASSERIM; on branches of shrubs near waterfalls at Tavoy and Moulmein, *Parish.*

Plant 1–2 in. broad, adhering to bark, irregularly or subradiately spreading. *Leaves* $\frac{1}{12}$ in. long, upper largest. *Spathe* open, rather shorter than the pedicel. *Stamens* unknown.—I have seen no specimen of Kurz's *Hydrobryum lichenoides*, of which the description is very meagre; as, however, he states it to have been received from Parish and collected in Burma, there is little room to doubt its identity. Weddel describes the plant as not ribbed, Kurz as broadly 8-ribbed.

11. **P. Wallichii,** *Br. in Wall. Cat.* 5225; plant a minute flat veined lobulate frond, buds on the edges of the lobes 1-fld. continuous with the veins, of 5–7 scale-like subdistichous fleshy at length deciduous leaves, spathe tubular, capsule 8-ribbed. *Griff. in As. Research.* xix. 103, t. 17, and *Notul.* 378, and *Ic. Pl. Asiat.* t. 541, f. 1, 542, 543; *Gardn. in Calc. Journ. Nat. Hist.* 183; *Royle Ill.* i. 331. Dicræa Wallichii, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 101, and *Monogr. Podost.* 118; *Wight Ic.* t. 1916, f. 1; *Meissn. in DC. Prodr.* xvii. 70. Lacis Wallichii, *Steud. Nomencl.* Polypleurum orientale, *Tayl. mss.* Blandovia striata, *Lehm. mss.*

KHASIA MTS., *Wallich*; at the falls near Churra, *Griffith.* AVA; at Cheppedong, *Wallich.*

Plant ascending, about 1 in. long, veins radiating. *Buds* usually from between the lobes, rarely superficial. *Leaves* irregularly disposed, more or less connate. *Pedicel* $\frac{1}{2}$–$\frac{2}{3}$ in. *Spathe* dilated at the mouth, invaginate about the middle. *Filament* subterete; anthers broadly ovate; staminodes 2 or with a third arising from the fork of the filament. *Ovary* ovoid; stigmas thick, subulate, unequal, divaricate. *Capsule* narrowed into the pedicel; valves persistent, incurved.

12. **P. pterophyllus,** *Benth. in Gen. Pl.* iii. 112; plant a very small flat-veined lobed frond, lobes entire or forked, buds arising from the veins at about the middle of the frond of 4–6 distichous leaves with winged keels, capsule ellipsoid 8–12-ribbed. Dicræa pterophylla, *Wedd. in DC. Prodr.* xvii. 71.

KHASIA MTS.; in rivulets, *J. D. H.*

Plant variable in form, appressed; veins radiating from the centre; lobes or segments short or sometimes $1\frac{1}{4}$ in. long. Upper *leaves* the longest, about $\frac{1}{14}$ in. long, keel dilated into an oblong wing. *Pedicels* $\frac{1}{4}$–$\frac{1}{2}$ in. *Stigmas* (imperfect) ovate or ovate-lanceolate. *Capsule* about $\frac{1}{16}$ in.

13. **P. minor,** *Benth. in Gen. Pl.* iii. 112; plant a minute stellately lobed flat veinless frond, lobes narrow simple or subdichotomously branched, buds on the margins and upper surface of the fronds leafless, spathe enclosed in a very obliquely funnel-shaped sheath, capsule ellipsoid 10-ribbed. Dicræa minor, *Wedd. in DC. Prodr.* xvii. 71.

KHASIA MTS.; *Griffith.*

Plant fragmentary, fragments $1\frac{1}{4}$ in. long and less, very narrow, olive-brown when dry. *Sheath* split to the base on one side, margin waved or lobed, fleshy; spathe seated in the sheath, tubular, mouth 2-lobed, longer than the pedicel. *Filament* equalling the capsule; anthers ovate; staminodes very slender, half as long as the filament. *Capsule* sessile, subacute, dorsal nerve acute; stigmas linear, acute.

Sect. III. **Selaginoides.** *Stems* of two forms, flowering densely fascicled elongate, clothed with imbricating tetrastichous thick scales; leaves of the flowerless stem with very long filiform tips.

14. **P. selaginoides,** *Benth. in Gen. Pl.* iii. 113; stems densely tufted simple erect the flowerless naked below, flowering densely clothed from the base with 4-ranked imbricating scales, flowers terminal subsessile, capsule ellipsoid smooth. Mniopsis selaginoides, *Beddome in Trans. Linn. Soc.* xxv. 223, t. 28. Dicræa selaginoides, *Wedd. in DC. Prodr.* xvii. 68.

SOUTH DECCAN; in streams of the Anamallay Hills, *Wight, Beddome.*

Rootstock small, depressed, stems 2–3 in. rather fleshy. *Leaves* of the flowerless stems $\frac{1}{3}$–$\frac{1}{2}$ in. long, semiterete below then strap-shaped, those of the flowering stems subclavate, the upper $\frac{1}{10}$ in., lower shorter, keeled at the back, channelled in front; filiform tips jointed at the base and deciduous. *Spathe* amongst the upper leaves, saccate, mouth 2-lobed. *Ovary* ellipsoid, obtuse, stigmas unequal. *Filament* equalling the ovary, anthers oblong; staminodes narrowly linear. *Capsule* $\frac{1}{8}$ in. long.

DOUBTFUL SPECIES.

DICRÆA APICATA, *Tul. Monogr. Podost.* 204; *Wedd. in DC. Prodr.* xvii. 71; stems 2–3 in. compressed simple naked crowned with a brush of filiform branchlets, flowers as in *P. dichotomus*.—Nilghiri Mts., *Wight*; in streams at Pycarrah, *Gardner*. ? Ceylon, *Thwaites* (C. P. 2989). Probably (according to Tulasne) an abnormal form of *P. dichotomus* var. *rigida*.

ORDER CXXI. NEPENTHACEÆ.

Climbing or prostrate evergreen undershrubs. *Leaves* alternate, exstipulate; midrib stout, produced into a peduncle which bears a pitcher of various forms, nerves parallel; pitcher with 2 longitudinal ribs or wings in front, at first closed by a lid which opens and becomes erect or reflected, inner surface covered below the middle with glands that secrete water; mouth with a revolute and closely ribbed margin (*peristome*). *Inflorescence* terminal or lateral; flowers racemose rarely panicled, dicœcious, small, green or brownish. *Perianth* 4-, rarely 3-partite; segments oblong, glandular within. MALE FL. *Stamens* 4–16, united in a column crowned by the usually connate anthers with extrorse dehiscence. FEMALE FL. *Ovary* superior, 4- rarely 3-gonous, 4–3-celled; stigma sessile, discoid, 4–3-lobed. *Ovules* numerous, in many series, attached to the septa, anatropous, ascending. *Capsule* coriaceous, loculicidally 4–3-valved. *Seeds* very numerous, minute, imbricate, testa membranous, produced into a thread at each end; albumen fleshy; embryo axile, straight, cotyledons linear, radicle short inferior.—Genus 1, species about 30, Tropical Asia, Malay Islands, N. Australia, New Caledonia, Madagascar and the Seychelles.

NEPENTHES, *Linn.*

Character of the Order.

* *Flowers panicled.*

1. **N. distillatoria,** *Linn.*; *Hook. f. in DC. Prodr.* xvii. 93; glabrous, leaves elliptic-lanceolate, petiole broadly winged $\frac{1}{2}$-amplexicaul, pitcher cylindric hardly inflated below, mouth subcordate, ribs not winged, peristome narrow not dilated behind, lid smooth within. *Burm. Fl. Ind.* 190; *Gærtn. Fruct.* ii. 18, t. 33; *Thwaites Enum.* 290. N. indica, *Poir. Encycl.* iv. 458; *Brongn. in Ann. Sc. Nat.* i. 43, t. 5, f. 1. Bandura zeylanica, *Burm. Thes. Zeyl.* 42, t. 17.

CEYLON; south of the island, common.

A tall climber. *Leaves* 5–12 by 1–2½ in., coriaceous, acute or acuminate. *Pitchers*

4–6 in. long; peristome very narrow; lid orbicular. *Panicle* 8–12 in., puberulous. *Flowers* ¼ in. diam.

** *Flowers in a raceme with at its base short branches with scorpioid inflorescence.*

2. **N. ampullaria,** *Jack in Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 271; stem stout rusty-pubescent, leaves elliptic- or obovate-lanceolate or obcuneate pubescent beneath narrowed into a short winged ½-amplexicaul petiole, lower pitchers fascicled globose leafless, upper saccate, wings fimbriate, peristome broad and deep, lid linear reflexed, peduncle short and inflorescence rusty-tomentose. *Hook. f. in DC. Prodr.* xvii. 93; *Lambert, Pinus II. App.* t. 8; *Korth. Verh. Nat. Gesch.* 39, t. 13; *Hook. Bot. Mag.* t. 5109. N. ampullacea, *Blume Mus. Bot.* ii. 9; *Wall. Cat.* 2243 A, *in part.*

SINGAPORE, *Jack.* MALACCA, *Cuming, Griffith.*—DISTRIB. Sumatra, Borneo.

Stem prostrate below, with a whorl of many short pitchers, above erect. *Leaves* 3–12 by 1–4 in., nerves 2–4 on each side. *Pitchers* green, purple-spotted. lower 1–2 in. diam., upper cylindric cup-shaped or hemispheric, often gibbous or inflated in front; mouth orbicular; throat glandular to the top; peristome forming a deep curtain in the pitcher; lid very much smaller than the mouth, eglandular, *Racemes* 4–10 in., dense-fld. *Flowers* ½–¾ in. diam. *Capsule* 1–1½ in.

*** *Flowers simply racemose; pedicels rarely 2-fld.*

3. **N. Rafflesiana,** *Jack in Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 270; stem stout cylindric, lower leaves lanceolate upper oblong to linear-lanceolate, petiole long ½-amplexicaul, lower pitchers ventricose below, wings fimbriate upper funnel-shaped not winged, neck elongate, peristome convex dilated and pectinate posteriorly, lid smooth within. *Wall. Cat.* 2242, 2243 A, *in part*; *Hook. f. in DC. Prodr.* xvii. 96; *Hook. Bot. Mag.* t. 4285; *Fl. des Serres*, t. 213, 214; *Korth. in Ann. de Gand.* iii. 7, t. 105; *De Vriese Tuinbow Flor.* i. 208, t. 5. N. Hookeri, *Alphand Prom. de Paris, cum Ic.*

SINGAPORE, *Jack*, &c.—DISTRIB. Sumatra, Borneo.

Stem long, stout, and young leaves thinly woolly. *Leaves* 4–18 in., lower membranous; petiole 3–8 in. *Pitchers* puberulous, peduncle stout, lower 3–4 in. diam., greenish yellow blotched with purple, mouth oblique contracted; peristome ½ in. broad; upper pitchers 6–12 in. long; wings narrow, ciliate or not; lid with large glands. *Racemes* 6–10 in., white and woolly, dense-fld.; flowers ½ in. diam. *Capsule* 1–1½ in.—Varies from glabrous to white-woolly.

4. **N. phyllamphora,** *Willd. Sp. Pl.* iv. 2. 874; stem cylindric, leaves elliptic-oblong or lanceolate young denticulate and ciliate, petiole long ½-amplexicaul, pitchers subcylindric, peristome narrow, lid oblong or orbicular, racemes pubescent, pedicels slender. *Wall. Cat.* 2244; *Brongn. in Ann. Sc. Nat.* i. 458; *Jack in Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 271; *Korthals in Verh. Nat. Gesch.* 28, t. 15; *Hook. f. in DC. Prodr.* xvii. 97. N. fimbriata & macrostachya, *Blume l. c.*; *Miquel Ill. Fl. Ins. Archip.* 3. t. 2, and 5. t. 6. Phyllamphora mirabilis, *Lour. Fl. Coch.* 606.—*Rumph. Herb. Amboin.* v. t. 121.

SINGAPORE, *Wallich*; MALACCA, on Mt. Ophir, *Lobb.*—DISTRIB. Malay Archipelago, China, New Guinea.

Stem short, creeping and climbing. *Leaves* 4–18 in., young puberulous, nerves many; petiole 1½–5 in. *Pitchers* 4–6 in. long, narrowed at the base, not winged; peristome ⅕–⅓ in. diam., lid densely glandular within. *Racemes* slender, mealy and hairy; flowers ⅓–½ in. diam. *Capsule* ½–⅔ in. long.

5. **N. sanguinea,** *Lindl. in Gard. Chron.* 1849, 580, with wood-cut; stem stout 3-gonous, leaves sessile obovate-oblong or cuneate cordately amplexicaul, pitchers large young short ventricose below narrowly 2-winged, old cylindric narrowed below, peristome broad dilated posteriorly, lid densely glandular within, racemes lax-fld., pedicels long capillary. *Hook. f. in DC. Prodr.* xvii. 100. N. sanguinea, *Griff. Posth. Papers,* iv. 348.

MALACCA; at Goonong Ledang, *Griffith*; Mt. Ophir, *Lobb.*

Often epiphytic; branches short, stout. *Leaves* with imbricating bases; nerves 2–3 hairs, obscure. *Pitchers* 12 by $2\frac{1}{2}$–$3\frac{1}{4}$ in., blood-red, scurfy; mouth broad, ovate, produced behind; peristome $\frac{1}{2}$–$\frac{3}{4}$ in. broad, inner margin inflexed; lid membranous. *Racemes* pubescent, male a foot long, female shorter; pedicels 1–$1\frac{1}{2}$ in.; flowers small, $\frac{1}{4}$–$\frac{1}{3}$ in. diam.

6. **N. khasiana,** *Hook. f. in DC. Prodr.* xvii. 102; stem cylindric, leaves sessile amplexicaul lanceolate base shortly decurrent penninerved, pitchers large subcylindric inflated below, mouth contracted, peristome broad, racemes robust puberulous, pedicels short. N. distillatoria, *Wall. Cat.* 2244, *in part*; *Grah. in Bot. Mag.* t. 2798. N. phyllamphora, *Herb. Ind. Or. H. f. & T.*

KHASIA and JYNTEA MTS., *Wallich*, &c.

Stem short, stout, elongate under cultivation, prostrate, leafy. *Leaves* 1–2 ft. by $1\frac{1}{2}$–$3\frac{1}{2}$ in., acute or acuminate, base narrowed, nerves numerous. *Pitchers* 4–7 by $1\frac{1}{2}$–3 in., membranous, glabrous, green, reddish above, young shortly winged; mouth orbicular; peristome cylindric; lid membranous. *Racemes* lateral and terminal, puberulous; pedicels $\frac{1}{3}$ in.; flowers $\frac{1}{3}$ in. diam., green. *Capsule* $\frac{3}{4}$–1 in. long.—A specimen of this in Herb. Wallich is marked as from "Courtallam, *Herb. Heyne,*" but has never been found there by any subsequent collector, and it is inconceivable that the natives should not know so remarkable a plant.

7. **N. albo-marginata,** *Lobb ex Lindl. in Gard. Chron.* 1849, 580, with wood-cut; stem subcylindric and racemes and pitchers hoary-pubescent, leaves subsessile with a shortly decurrent $\frac{1}{2}$-amplexicaul base elliptic-lanceolate acuminate, pitchers cylindric or funnel-shaped, or younger ventricose below, with a white velvety band on the neck, peristome narrow, lid orbicular glandular within, racemes long, pedicels very slender. *Hook. f. in Trans. Linn. Soc.* xxii. 422, t. 73, and in *DC. Prodr.* xvii. 102. N. tomentella, *Miquel Fl. Ind. Bat.* i. pt. 1, 1075, and *Ill. Fl. Ins. Archip.* v., t. 5. N. distillatoria, *Wall. Cat.* 2244, *in part.*

SINGAPORE, *Wallich.*—DISTRIB. Borneo.

Hoary-pubescent. *Stem* elongate, subtomentose or subsilky. *Leaves* 8–14 by $\frac{1}{3}$-$1\frac{1}{4}$ in.; nerves 1–2 on each side, slender. *Pitchers* 3–5 by $1\frac{1}{2}$ in., green purple or mottled with purple and red, stellately downy, lower ventricose below with fimbriate wings, upper narrower. *Racemes* elongate, lax-fld.; pedicels $\frac{3}{4}$–1 in.; flowers $\frac{1}{4}$–$\frac{1}{5}$ in. diam. *Capsule* $1\frac{1}{2}$–2 in.

8. **N. Reinwardtiana,** *Miquel in Plant. Jungh.* i. 168, and *Fl. Ind. Bat.* i. pt. 1, 1075, and *Illust. Pl. Ins. Archip.* 4, t. 4; stem glabrous obtusely 3-gonous, 2–3-winged above, leaves sessile $\frac{1}{2}$-amplexicaul linear-lanceolate acuminate shortly decurrent glabrous, pitchers subcylindric inflated below glabrous, mouth dilated produced posteriorly, peristome narrow smooth, lid densely glandular within, racemes downy lax-fld., pedicels slender. *Hook. f. in DC. Prodr.* xvii. 103. N. distillatoria, *Wall. Cat.* 2244, *in part.*

SINGAPORE, *Wallich.*—DISTRIB. Sumatra, Borneo.

Stem subcylindric below, winged above by the decurrent leaf bases. *Leaves* 5-10

by ¾–1 in., lower long acuminate, upper shorter often obtuse, nerves 3–4 on each side. *Pitchers* 4–8 in., violet; mouth 2–2½ in. wide; peristome very obscurely if at all striate. *Racemes* 5–7 in. long; female shorter, tomentose; pedicels ½–1 in.; flowers small, ¼–⅔ in. diam. *Capsule* ½–¾ in.—Differs from *N. gracilis* in the glandular lid and smooth peristome.

9. **N. gracilis,** *Korthals in Verh. Nat. Gesch.* xxii. t. 1 and 4, f. 1–38; stem glabrous 3–4-angled, leaves sessile linear-lanceolate decurrent, pitchers cylindric inflated below, contracted in the middle, mouth orbicular, peristome very narrow ribbed, lid orbicular with few glands within, racemes narrow downy, pedicels short. *Hook. f. in DC. Prodr.* xvii. 104; *Blume Mus. Bot.* ii. 10; *Miquel Fl. Ind. Bat.* i. pt. 1, 1071; *Spach Suites à Buffon Veg. Phan.* t. 144. N. Korthalsiana, *Miquel l. c.* 1071, and *Fl. Ins. Archip.* 7, t. 1. N. lævis, *Korth., in part.*

MALACCA and SINGAPORE; *Jack, Wallich.*—DISTRIB. Borneo.

Stem slender, angles obtuse. *Leaves* 4–7 by 1 in., glabrous, coriaceous; nerves 3–5 pairs, conspicuous. *Pitchers* 2½–4 in. long, glabrous, membranous, lower winged; mouth rather dilated; peristome very narrow or almost filiform; glands of lid very few and large. *Racemes* tomentose or glabrate, pedicels ⅕–½ in. *Flowers* ⅙–⅓ in. broad. *Capsule* slender, ¾–1½ in. long, glabrous.

ORDER CXXII. CYTINACEÆ.

Leafless brown reddish or yellowish parasites, or with leaves reduced to scales. *Flowers* solitary or in a spadix-like spike, or clustered on the root or branch of the host. *Perianth* superior, 3–10-cleft, segments or lobes imbricate or valvate. *Stamens* 8 or more, forming a fleshy ring round the style, or inserted on the perianth, 2-celled, bursting by pores or slits. *Ovary* 1-celled, or with many spurious cells formed of branching fleshy pendulous or parietal placentas; stigmas various. *Ovules* excessively numerous, orthotropous or anatropous. *Fruit* fleshy, 1-celled. *Seeds* innumerable, very minute, sometimes sunk in the placentas, nucleus homogeneous, or albumen cellular with a most minute embryo.—Genera 7, species 22, mostly tropical.

1. SAPRIA, *Griff.*

Plant dicœcious, consisting of a solitary large flower sessile in a cup formed of the bark of a vine-stem, surrounded at the base by large broad opposite imbricating bracts. MALE FL. *Perianth-tube* hemispheric and solid below, cupular above and marked with 20 radiating ridges; limb 10-partite, segments rounded or oblong imbricate in two rows, spreading; from the base of the tube rises a stout columnar style crowned with a broad cup-shaped very hairy disk. *Anthers* about 20, sessile in a ring under the disk, subglobose, 2–3-celled, opening outwards by one pore. FEM. FL. *Perianth* of the male. *Ovary* traversed by longitudinal sinuous cells the walls of which are covered with anatropous ovules; stigma, a papillose cone in the centre of the disk. *Fruit* the swollen globose ovary crowned with the perianth.

S. himalayana, *Griff. in Proc. Linn. Soc.* i. 216, and in *Trans. Linn. Soc.* xix. 314, t. 34, 35; *Hook. f. in DC. Prodr.* xvii. 112. S. Griffithii, *Brown in Trans. Linn. Soc.* xix. 244.

EASTERN ASSAM; in the Mishmi Hills, on the roots of a vine, alt. 3–5000 ft., *Griffith.*

Buds **globose; bracts white and pink.** ***Flowers*** **fœtid, 5–6 in. diam., tube blood-red within; segments fleshy, warted; ring at throat clothed with filiform processes; disk of column rosy.**

Order CXXIII. **ARISTOLOCHIACEÆ.**

Herbs or shrubs, often climbing. *Leaves* alternate, entire or 3–5-lobed, exstipulate. *Flowers* 2-sexual, often large, usually lurid, terminal axillary or lateral, solitary racemose or cymose, bracteate or not. *Perianth* superior, regular or irregular, 3-lobed or tubular and variously shaped, lobes valvate. *Stamens* 6 or more, subsessile in a ring round the base of the style, cells parallel opening by dorsal slits. *Ovary* 4–6-celled, placentas parietal, free or meeting in the axis; style columnar, stigma lobed; ovules numerous, anatropous. *Fruit* capsular or baccate. *Seeds* numerous, various, albumen copious fleshy; embryo minute.—Genera 5, species about 200, chiefly tropical.

Perianth short, regular, 3-lobed. Ovary very short	1. Asarum.
Perianth short, regular. Stamens 1-seriate. Ovary linear . .	2. Bragantia.
Perianth regular. Stamens 2-seriate. Ovary linear	3. Thottea.
Perianth tubular with an inflated base, irregular	4. Aristolochia.

1. **ASARUM,** *Linn.*

Perennial herbs; rootstock stout, woody. *Leaves* radical. *Flowers* solitary, terminal, peduncled, purple. *Perianth* shortly campanulate, regular, persistent, 3-lobed. *Stamens* 12, connective produced. *Ovary* inferior or ½-inferior, 6-celled; styles 6, tubular, grooved or 2-fid. *Fruit* coriaceous, bursting irregularly. *Seeds* boat-shaped, convex face wrinkled, opposite face winged or with a fleshy raphe.—Species 13, N. temperate hemisphere.

A. himalaicum, *Hook. f. & Thoms. mss.*; *Duchartre in DC. Prodr.* xv. 1. 424; leaves long-petioled rounded-ovate deeply cordate finely acuminate. *Klotzsch in Monatsb. Berl. Akad.* 1859, 385; *Braun Ind. Sem. Hort. Berol. App.* 1861, 12.

Sikkim Himalaya; alt. 9–11,000 ft., *J. D. H.*

Rootstock slender. *Leaves* 3–4 in. diam., membranous; petiole 4–8 in., slender. *Peduncle* 1–2 in. *Perianth* broadly campanulate, lurid purple, ¾ in. diam., puberulous, lobes triangular. *Connective* with a subulate tip.—Belongs to the section *Euasarum* with a European and N.W. American species.

2. **BRAGANTIA,** *Lour.*

Shrubs or undershrubs; hairs stellate. *Leaves* petioled, 3–5-nerved; veins closely reticulate beneath. *Flowers* axillary or subradical, cymose, bracteate. *Perianth* shortly campanulate, equally 3-lobed, deciduous. *Stamens* 6–12, 1-seriate, free or connate, connective thick. *Ovary* elongate, 4-celled; style short, stigmas 3 or more linear; ovules 2-seriate. *Capsule* elongate, 4-gonous, septicidally 4-valved, valves separating from a placentiferous column. *Seeds* oblong, 3-gonous, rugose or deeply pitted, often coated with remains of the placenta.—Species 4 or 5, Malayan and Indian.

* ***First pair of basal nerves reaching far beyond the middle of the leaf.*** ***Cymes axillary.*** ***Stamens*** 9–12.

1. **B. corymbosa,** *Griff. in Trans. Linn. Soc.* xix. 335; shrubby, branches leaves beneath and inflorescence finely puberulous, leaves distichous oblong-ovate acuminate glabrous above, flowers in cymose spikes, perianth-tube 0, segments cordate acute, anthers 8–10, stigma discoid. *Duchartre in DC. Prodr.* xv. 1. 429. B. melastomæfolia, *Duchartre l. c.* Asiphonia piperiformis, *Griff. l. c.* 333, t. 37, and *Notul.* 344, and *Ic. Pl. Asiat.* t. 528; *Ann. Sc. Nat. Ser.* 3, vii. 338. Strakæa melastomæfolia, *Presl Epimel. Bot.* 221.

MALACCA, *Griffith, Lobb, Cuming.*

Branches slender, terete. *Leaves* 5–6 by 2–2½ in., shining above; petiole very short, base rounded. *Cymes* much shorter than the leaves; spikes peduncled, divaricate. *Flowers* ¼ in. diam. *Capsule* 1 foot long, torulose. *Seeds* ⅙–½ in. long, lanceolate, 3-gonous, rugose.

2. **B. Wallichii,** *Br. in Wall. Cat.* 7415; shrubby, branches and leaves beneath finely pubescent or glabrate tips and inflorescence tomentose, leaves oblong-lanceolate glabrous above, flowers in small irregular few-fld. cymes not spicate, perianth hemispheric, segments broadly ovate. *Duchart. in DC. Prodr.* xv. 1. 430; *Wight Ic.* t. 520; *Wight & Arn. in Ed. Phil. Journ.* 1833, 181; *Dalz. & Gibs. Bomb. Fl.* 225. B. siliquosa, *Miq. Pl. Ind. Or. Hohenack.* n. 64. Apama siliquosa, *Lamk. Encycl.* i. 91, and *Ill.* t. 640. Trimeriza piperina, *Lindl. in Bot. Reg. under* t. 1543. —*Rheede Hort. Mal.* vi. t. 28.

DECCAN PENINSULA; in the western forests, from the Southern Concan southwards. CEYLON; ascending to 4000 ft.

Branches angled. *Leaves* 5–8 by 1½–2 in., base acute or rounded. *Cymes* ½–1 in. long, rarely longer. *Flowers* 1 in. diam. *Capsule* 3–4 in., straight. *Seeds* $\frac{1}{10}$ in. long, 3-gonous, deeply pitted.

Var. *brachycarpa*; leaves ovate-oblong or oblong acuminate finely puberulous beneath, flowers in cymose spikes, capsule 2½ in. B. brachycarpa, *Thwaites mss.*

Var. *latifolia*, Duchart. l. c.; leaves larger broader obovate-oblong tomentose beneath. B. hispida, *Thwaites mss.*

3. **B. Dalzellii,** *Hook. f.*; shrubby, stout, leaves very large oblong-lanceolate acuminate finely puberulous beneath, capsules 5–8 in. long torulose, seeds ⅛ in. long 3-gonous rugose and deeply pitted.

The CONCAN? *Herb. N. A. Dalzell.*

A very fine species with leaves a foot long by 3 in. broad, and very long pods and large seeds. From the remains of the inflorescence its branches do not appear to have been spicate. Seeds lemon-yellow.

** *First pair of basal nerves not reaching the middle of the leaf. Cymes from the base of the stem. Stamens* 6.

4. **B. tomentosa,** *Blume Enum. Pl. Jav.* 82; herbaceous, low, stem simple and leaves beneath densely tomentose, leaves 1–3 oblong or ovate cordate, flowers in simple spikes. *Duchart. in DC. Prodr.* xv. 1. 431; *Bennett Plant. Jav. Rar.* 43, t. 11; *Griff. in Trans. Linn. Soc.* xix. 335; *Miquel Fl. Ind. Bat.* B. khasiana, *Griff. l. c.* B. latifolia, *Lindl. in Bot. Reg. under* t. 1543. Bragantia, n. sp., *Br. in Trans. Linn. Soc.* xiii. 219. Ceramium tomentosum, *Bl. Bijd.* 1135. Cyclodiscus tomentosus & latifolius, *Klotzsch in Monatsb. Berl. Akad.* 1859, 592. Aristoloch., *Wall. Cat.* 9108.

SILHET, *De Silva*; Moulmein, *Lobb, Parish.*—DISTRIB. Java.

Stem creeping below, and rooting, then ascending, 6–12 in., simple, angular,

geniculate, tomentose. *Leaves* 4–6 by 2½–4 in., smooth but opaque above, 6–9-nerved at the base and penninerved beyond. *Flowers* ½–¾ in. diam.; bracts oblong, persistent. *Perianth-lobes* rounded-cordate, acute. *Capsule* 2 in. long, straight. *Seeds* ⅛ in. long, 3-gonous, rugose.

Var. *lanuginosa*; leaves densely woolly beneath.—South Andaman Islands, *Kurz.*

3. **THOTTEA,** *Rottb.*

Shrubs, erect or straggling. *Leaves* broad, coriaceous, 3–5-nerved. *Flowers* axillary, cymose. *Perianth* broadly campanulate or urceolate, equally 3-lobed, deciduous. *Stamens* numerous, 2-seriate; connective broad. *Ovary* elongate, 4-celled; style broad, stigmas 5–25, radiating; ovules 2-seriate. *Capsule* elongate, 4-gonous, septicidally. 4-valved, placentas usually free. *Seeds* oblong, 3-gonous, rugose, coated with remains of the placenta.—Species 5, Malayan.

1. **T. grandiflora,** *Rottb. in Dansk. Vidensk. Selks. Schrift.* ii. 530, t. 2; tomentose, leaves obovate-oblong oblong or elliptic-oblong or -lanceolate acute or acuminate, corolla very large campanulate. *Griff. in Trans. Linn. Soc.* xix. 325, t. 36, and in *Notul.* iv. 346, and *Ic. Pl. Asiat.* t. 530, 531; *Ann. Nat. Hist. Ser.* 3, vii. 328; *Bennett Pl. Jav. Rar.* i. 45; *Klotzsch in Monatsb. Berl. Akad.* 1859, 589; *Duchart. in DC. Prodr.* xv. 1. 428.

Malacca, *Ringit* (1779), *Griffith, Maingay.* Singapore, *Oxley, Lobb.*—Distrib. Borneo?

Branches stout, woody, sometimes villous with spreading hairs. *Leaves* 1–1½ ft. by 6–8 in., coriaceous, basal nerves 3–5; petiole ¼–½ in., stout. *Spikes* 1–2 in., bracts ¼–½ in. *Perianth* attaining 5 in. long and as broad, ribbed, mottled with purple, pubescent outside, arachnoid within. *Style rays* 12–15. *Capsule* 4–6 in., straight or twisted, angles acute, pubescent. *Seeds* ⅙ in. long, 3-gonous, acute at both ends, tubercled.—The doubtful Bornean plant has a rounded leaf 1 foot by 10 in.

2. **T. dependens,** *Klotzsch in Monatsb. Berl. Akad.* 1859, 589; glabrous, leaves lanceolate or elliptic-lanceolate acuminate, corolla urceolate base inflated. *Duchart. in DC. Prodr.* xv. 1. 428. Lobbia dependens, *Planch. in Hook. Lond. Journ. Bot.* vi. (1847) 144, t. 3. Piper arborescens, *Roxb. ex Wall. Cat.* 6648 B.

Singapore; *Wallich, Lobb.*

Branches slender, terete. *Leaves* 6–10 by 2½–3½ in., thinly coriaceous; petiole ⅙ in. *Spikes* simple or cymose, quite glabrous. *Flowers* 1 in. long. *Ovary* 1–1½ in., very slender. *Perianth-base* inflated; tube above it short, cylindric, lobes broader than long.

3. **T. tricornis,** *Maingay mss.*; branches and leaves beneath hoary, leaves elliptic-oblong or oblong-lanceolate or oblanceolate acute or subacute base acute or rounded, cymes short not spicate, perianth depressed acutely 3-angled in bud broadly lanceolate.

Malacca; *Maingay* (Kew Distrib. 1819).

Branches stout, terete or obtusely angled. *Leaves* 7–9 by 3–4 in., coriaceous; petiole ¼ in. *Cymes* ½–1 in., branched, and perianth densely tomentose. *Flowers* ¾ in. diam., tomentose. *Ovary* short. *Stamens* 12 in 2 rows. *Capsules* 7–8 in. long, downy with brown pubescence, straight or twisted, not torulose. *Seeds* nearly ⅛–⅙ in. long, 3-gonous, tubercled.—This has more the habit of a *Bragantia* than a *Thottea.* The two genera may well be united.

4. **ARISTOLOCHIA,** *Linn.*

Shrubs or perennial herbs, often twining. *Leaves* entire or lobed;

petiole with a dilated base, and with often the stipule-like leaf of an undeveloped bud in the axil. *Perianth* coloured, tube inflated at the base, then contracted, hairy within; limb dilated, obliquely 1–2-lipped. *Anthers* 6, rarely 5, or more; style very short, 3–6-lobed. *Capsule* septicidally 6-valved or splitting through the placentas. *Seeds* various, often covered with the remains of the placenta.—Species about 180, chiefly tropical.

Sect. I. **Diplolobus,** *Duchart.* *Column* 6-lobed. *Anthers* 6.

1. **A. bracteata,** *Retz. Obs.* v. 29; quite glabrous, stem slender decumbent, leaves reniform or broadly cordate tip obtuse or subacute margins flat or waved glaucous beneath, flowers solitary, peduncle bracteate. *Roxb. Fl. Ind.* iii. 490; *Wall. Pl. As. Rar.* ii. 3, and *Cat.* 2706; *Grah. Cat. Bomb. Pl.* 178; *Dalz. & Gibs. Bomb. Fl.* 224; *Klotzsch in Monatsb. Berl. Akad.* 1859, 598. A. bractiolata, *Lamk. Encycl.* i. 258; *Klotzsch l. c.* A. mauritiana, *Pers. Encheir.* ii. 527. A. Kotschyi, *Hochst. ex A. Rich Tent. Fl. Abyss.* ii. 237. A. maurorum and A. abyssinica, *Klotzsch l. c.* (*not of Linn.*).

DECCAN PENINSULA, northward to BUNDELKUND, *Wallich, Edgeworth,* &c. SCINDE, *Vicary.* CEYLON; north of the island, *Gardner.*—DISTRIB. Arabia, Trop. Africa.

Root slender, perennial. *Stem* or branches 12–18 in., angled and striate. *Leaves* $1\frac{1}{2}$–3 in. long and broad, widely and shallowly cordate at the base; petiole 1–$1\frac{1}{2}$ in. *Peduncle* short; bract usually orbicular, variable in position, sometimes basal. *Perianth* 1–$1\frac{3}{4}$ in., base globose, tube cylindric erect slender; lip erect, linear, as long as the tube, dark purple with revolute edges, villous with purple hairs. *Fruit* pyriform, 1 in. long, many-grooved. *Seeds* triangular-cordate.

2. **A. indica,** *Linn.*; *Duchart. in DC. Prodr.* xvi. 479; shrubby, quite glabrous, twining, leaves from linear to obovate-oblong or subpanduriform base cuneate rounded or shallowly cordate 5-nerved, flowers 1–3, bract opposite the base of the peduncles. *Roxb. Fl. Ind.* iii. 489; *Wall. Cat.* 2704; *Klotzsch in Monatsb. Berl. Akad.* 1859, 595; *Grah. Cat. Bomb. Pl.* 178; *Dalz. & Gibs. Bomb. Fl.* 224. A. lanceolata, *Wight Ic.* t. 1858; *Klotzsch l. c.* A. maysorensis, *Fisch. mss.* A. pandurata, *Wall. mss.* Aristolochia, *Griff. Notul.* iv. 348, and *Ic. Pl. Asiat.* t. 529.—*Rheede Hort. Mal.* viii. t. 25.

Throughout the low country of INDIA from NEPAL, *Hamilton,* and lower BENGAL, *Clarke,* to CHITTAGONG, *J. D. H. & T. T.*; and the DECCAN PENINSULA, from the Concan southward. CEYLON common up to 3000 ft.

Stem woody below, branches slender. *Leaves* membranous, excessively variable, in the narrowest forms 4 by $\frac{1}{2}$–$\frac{3}{4}$ in., in the broadest 4–5 by 3 in., broadest part at the base or middle or above the middle, abruptly or gradually obtusely acuminate or apiculate, often oblong and quite obtuse; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., very slender. *Perianth* straight, greenish, base globose, tube shortly funnel-shaped, mouth oblique trumpet-shaped gradually passing into the short oblong obtuse glabrous brownish lip. *Capsule* $1\frac{1}{2}$–2 in. long, oblong, grooved. *Seeds* flat, triangular, winged.—Wight's *A. lanceolata* occurs both in the Peninsula and Ceylon.

3. **A. Roxburghiana,** *Klotzsch in Monatsb. Berl. Akad.* 1859, 596; quite glabrous, shrubby, twining, leaves large cordate upper often narrow subsagittately lanceolate lower or all ovate or broadly ovate-oblong pedately 5–7-nerved, upper with the 2 principal nerves produced far beyond the middle, lower with all the nerves spreading, flowers in racemose puberulous cymes, lip of perianth villous. *Duchart. in DC. Prodr.* xv. 1. 480. A. acuminata, *Roxb. Fl. Ind.* iii. 489 (*not of Lamarck*); *Wall. Cat.* 2705; *Wight*

Ic. t. 771; *Miq. Fl. Ind. Bat.* i. 1086; *Grah. Cat. Bomb. Pl.* 178; *Dalz. & Gibs. Bomb. Fl.* 224. A. acuminata, *Duchart. l. c.*

EASTERN HIMALAYA; from Sikkim, alt. 2–5000 ft., *J. D. H.*, to Mishmi, *Griffith.* ASSÁM, SILHET, CHITTAGONG, &c., south to PENANG, *Wallich*, &c. DECCAN PENINSULA; on the Ghats from the Concan southward. CEYLON, *Gardner.*—DISTRIB. Java, Borneo.

A stout lofty climber. *Leaves* 4–8 in.; upper 2–3 in. broad, lower 3–5; broadest at the cordate base, sinus deep or shallow, basal lobes sometimes incurved. *Cymes* 1–3 in., lax-fld.; peduncle and pedicels slender; bracts small, oblong. *Perianth* 2–2½ in. long, pale green; base globose, tube curved, mouth oblique with recurved margins; lip linear, straight, obtuse, villous, as long as the tube. *Capsule* very variable, globosely pyriform or oblong, with the long stipes 1–2½ in. long, membranous. *Seeds* most variable, obtusely triangular in the smaller capsules, $\frac{1}{6}$–$\frac{1}{4}$ in. broad, with narrow wings and one face studded with tubercles; in larger capsules the seeds are larger and more broadly winged and lip tubercled; in the largest capsules the seeds are ½ in. diam., with very broad wings, and a thin disk quite smooth or sparsely tubercled on one face.—The variations in the leaves of this plant are remarkable, but not so much so as are those of the capsule and seeds. I long thought that these indicated at least two species.

4. **A. atropurpurea,** *Parish mss.*; slender, herbaceous, stem straggling and petiole and cymes pubescent, leaves ovate-lanceolate acuminate base cordate, cymes few-fld. subsessile, lip of perianth glabrous, capsule ½ in.

TENASSERIM; on limestone rocks at Moulmein, *Parish.*

Rootstock woody; stem 1–2 ft., pendulous, zigzag, angular and grooved. *Leaves* purple, 5–7 by 2½–5 in., membranous; 5 basal nerves diverging, slender; petiole 2–3 in. *Cymes* very short. *Perianth* 1–1½ in., very like in form *P. Roxburghii*, base globose, tube funnel-shaped, mouth oblique passing into the straight obtuse glabrous lip with recurved edges. *Capsules* globose, shortly stipitate.

Sect. II. **Siphisia,** *Duchart.* *Column* 3-lobed. *Anthers* 6.—(Lofty climbers; stem in all woody below; branches twining. *Leaves* large. *Flowers* axillary or chiefly in villous cymes on the old wood. *Perianth* sharply bent back upon itself, lower half on obovoid sac, upper trumpet- or cup-shaped, as long.)

5. **A. platanifolia,** *Duchart. in DC. Prodr.* xv. 1. 437; branches glabrous or pubescent, leaves very broad deeply digitately 3-lobed glabrous or tomentose beneath lobes pinnatifidly lobulate, flowers axillary and solitary also in villous cymes on the old wood, perianth tomentose or villous, mouth obtusely 6-angled lips recurved villous with purple papillose hairs.

EASTERN HIMALAYA; Mishmi Mts., *Griffith*; Sikkim and E. Nepal, alt. 3–6000 ft., *J. D. H.*, &c. KHASIA MTS., alt. 4000 ft., *J. D. H. & T. T.*

A stout lofty climber; old wood with corky rugged fissured bark. *Leaves* a foot long and as broad or broader, cleft to near the base with a rounded sinus, glabrous and shining above, glaucous glabrous pubescent tomentose or woolly beneath, base rounded-cuneate or cordate, lobes very variable, lobules few acute or acuminate; petiole 2–3 in. often stout and twining. *Cymes* shortly peduncled; pedicels 1–1½ in. *Perianth* yellowish with purple veins externally, sac 1½ in. long, tube as long golden yellow within, mouth 1 in. diam. *Capsule* 4–6 by 1–1½ in. diam., linear-oblong with 6 ribs divided by deep furrows.

6. **A. saccata,** *Wall. Pl. As. Rar.* ii. 2, t. 103, and *Cat.* 2707; branches tomentose or glabrate, leaves ovate- or linear-oblong or linear-lanceolate acuminate base deeply cordate glabrous or puberulous above,

beneath pubescent silky or densely tomentose rarely nearly glabrous and glaucous, cymes villous with long hairs, mouth of perianth nearly circular with a narrow reflexed purple papillose border. *Duchart. in Ann. Sc. Nat. Ser.* 4, ii. t. 5, 6, and in *DC. Prodr.* xv. 1. 436; *Bot. Mag.* t. 3640. Siphisia saccata, *Klotzsch in Monatsb. Berl. Akad.* 1859, 603.

EASTERN and CENTRAL HIMALAYA; Nepal, *Wallich*; Sikkim, *J. D. H.*; Bhotan, *Griffith*. ASSAM, *Griffith*. KHASIA MTS., alt. 1–4000 ft., *J. D. H. & T. T.* SILHET, *Bruce*.

Habit and stature of *A. platanifolia*, of which Duchartre suggests it may be a form, but no intermediates have occurred. *Leaves* very variable in size and pubescence, largest 12 by 6 in., longest 16 by 4 in., narrowest (var. *angustifolia*, Duchart. l. c.) 12 by 2½ in., cordate base deep or shallow, petiole 1–2 in. *Cymes* and perianth much more villous than *A. platanifolia*.

Var.? *dilatata*, lips of perianth greatly dilated ½–¾ in. diam.—Kumaon, *Blinkworth* (*Wall. Cat.* 2707 B); alt. 7–8000 ft., *Strachey & Winterbottom*.

7. **A. Cathcartii,** *Hook. f.*; branches petioles and leaves beneath densely silkily villous, leaves rounded-cordate acute or ovate-lanceolate acuminate, cymes and perianth densely villous with very long spreading hairs, perianth bearded with long hairs, mouth very wide square with very broad recurved lips fringed with long purple papillose hairs. A. saccata. *var.* villosa, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA and KHASIA MTS.?, alt. 2–3000 ft., *J. D. H. & T. T.*

Habit of *A saccata*, but leaves shorter broader with dense silky shaggy wool beneath, and a very different perianth, the tube of which is far more dilated, with a much broader square mouth. *Capsule* as in *A. saccata.*—A fine drawing of this, made by Mr. Cathcart's artists, represents so different a plant from *A. saccata*, that it can hardly be a variety.

8. **A. Griffithii,** *Hook. f. & T. in Herb. Ind. Or.*; *Duchart. in DC. Prodr.* xv. 1. 437; branches glabrous with villous tips, leaves broadly ovate- or orbicular-cordate acute densely tomentose beneath, flowers axillary, perianth densely pubescent, tube above the sac abruptly dilated into a hemispheric cup 3–4 in. diam. with erect margins. Aristolochia, *Griff. Notul.* iv. 190, No. 1015.

EASTERN HIMALAYA; Bhotan, alt. 8000 ft., *Griffith*; Sikkim, alt. 7–9000 ft., *J. D. H.*

A tall climber. *Leaves* 4–6 in. long and often as broad, woolly but not shaggy beneath; petiole 2–4 in. *Flowers* apparently all solitary and axillary (extra-axillary, *Griffith*); peduncle villous, 2–3 in., with one or two leafy bracts. *Perianth* uniformly closely pubescent; sac ribbed and veined; limb or cup "ochreous yellow with radiating lines of clavate red warts, throat blood-red; tube yellow and spotted red within," *Griffith*. *Capsules* 7 inches long, shortly stipitate, twisted at the base, with 6 strong ribs and as many deep furrows. *Seeds* orbicular, convex on one face, concave with a median ridge on the other.—A remarkable species. The extracts translated from Griffith's Notulæ must be accepted cautiously, the Latin not being very intelligible.

DOUBTFUL AND EXCLUDED SPECIES.

ARISTOLOCHIA SPECIES.—Western Himalaya; Chamba, alt. 5000 ft., *Clarke*.—A slender climber, branches puberulous, leaves shortly petioled, 4–5 by 1–1¼ in., membranous lanceolate finely acuminate from a truncate or broadly cordate base, basal nerves short.—This flowerless plant referred to Aristolochia doubtfully by Mr. Clarke, and I should think correctly, is far beyond the geographic range of any other Indian species.

A. THWAITESII, *Hook. Bot. Mag.* t. 4918, *and under* 5295, was erroneously supposed to be a Ceylon species. Its native country is unknown.

Order CXXIV. **PIPERACEÆ.**

Herbs or shrubs, rarely subarboreous, aromatic. *Leaves* alternate opposite or whorled, often pellucid-dotted, entire; stipules 0 or 2 connate, or adnate to the petiole. *Flowers* minute, 1–2-sexual, in axillary or terminal catkin-like spikes subtended by a peltate bract. *Perianth* 0. *Stamens* 2–6, rarely 7–8, hypogynous; anthers often jointed on the filaments, bursting longitudinally, or with the cells confluent. *Ovary* 1-celled, or of 3 or more carpels free or connate below; stigmas sessile, simple or penicillate. *Ovules* 1 or more, orthotropous. *Fruit* small, of the 1-celled genera indehiscent, of the pluri-carpellar forming cocci or follicles. *Seeds* globose ovoid or oblong; testa thin, albumen copious floury; embryo minute, enclosed in a sac, radicle superior.—Genera 8, species enumerated about 1000 (probably exaggerated), chiefly Tropical American.

Tribe I. **Saurureæ.** *Ovary* of 3–4 free or connate carpels.

Stamens 3–6. Ovary 1-celled . . . . . **1. Houttuynia.**

Tribe II. **Pipereæ.** *Ovary* 1-celled.

Anther-cells distinct. Fruit not minute, stigmas 3–5 confluent . **2. Piper.**
Anther-cells confluent. Fruit minute, stigma usually penicillate **3. Peperomia.**

1. **HOUTTUYNIA,** *Thunb.*

Perennial herbs? *Leaves* alternate, usually cordate; stipules broad, membranous. *Spikes* terminal and leaf-opposed, peduncled, involucrate; involucre of 4–6 white petaloid bracts. *Flowers* minute. *Perianth* 0. *Stamens* 3–6; filaments below adnate to the ovary; anthers oblong. *Ovary* of 3–4 partially connate 1-celled carpels; styles free, erect, stigmatose on the inner surface; ovules many, on parietal placentas. *Fruit* subglobose, bursting between the styles. *Seeds* globose, testa membranous.—Species 2 or 3; Eastern Asiatic and Californian.

H. cordata, *Thunb. Fl. Jap.* 234, t. 26; leaves cauline cordate, bracteoles minute. *Cas. DC. in Prodr.* xvi. 1. 238; *Poir. Encycl.* ii. t. 739; *Bot. Mag.* t. 2731; *Schnizl. Icon.* t. 82; *Roxb. Fl. Ind. Ed. Wall. & Carey,* i. 360. Polypara cochinchinensis, *Lour. Fl. Coch.* i. 78.

Tropical Himalaya; from Garwhal to Sikkim, alt. 1–5000 ft. Assam and Khasia Mts., *Griffith*, &c. Distrib.—Siam, China, Japan.

Rootstock creeping; stem 1–3 ft., herbaceous, erect, leafy, subsimple, angular, pubescent at the nodes. *Leaves* 1½–2½ in. long and broad, very broadly ovate-cordate, acuminate, 5-nerved, abruptly narrowed into the petiole, glabrous or nerves pubescent beneath, gland-dotted; petiole 1–2 in., base sheathing; stipules long, linear-oblong, obtuse. *Bracts* ⅓–½ in., rounded or oblong. *Spike* ½ in., elongating in fruit to 1–2 in., dense-fld. *Stamens* 3.

2. **PIPER,** *Linn.*

Shrubs, rarely herbs or trees, with swollen nodes, often glandular and aromatic. *Leaves* entire, often unequal-sided; stipules various. *Flowers* very minute, dicœcious, very rarely 2-sexual, spiked, each in the axil of a bract with or without lateral bracteoles; bracts peltate, or cupular and adnate to the rachis, sometimes decurrent on the rachis with or without raised margins; bracteoles if present forming low ridges on each side of the flower,

or connate in a semilunar form. *Perianth* 0. *Stamens* 1–4, rarely more, filaments short; anthers 2-celled, cells often confluent by dehiscence. *Ovary* 1-celled; style conic beaked or 0, stigmas 2–5; ovule solitary, erect. *Berry* ovoid or globose. *Seed* usually globose, testa thin, albumen hard.—Species described about 500 (probably greatly exaggerated), all tropical or subtropical.

A most difficult genus, Herbarium materials for the analysis of which have never been intelligently collected, whilst the descriptions of the published species are quite inadequate for their accurate determination. Wallich's Herbarium, and the diagnoses in Vahl's "Enumeratio" and in Roxburgh's "Flora Indica" form the basis of the works of the only two authors who have attempted the revision of the Indian species, namely Miquel and Casimir De Candolle. Of these Wallich's specimens are so mixed that in some cases three or four species are included under one name and number, and even on one sheet; whilst of Vahl's diagnoses not one is sufficient to identify the plant he means, and of Roxburgh's only one or two species are recognizable. Wallich, it is true, often attaches to his specimens names given by Roxburgh, but these are rarely the names that are taken up in the "Flora Indica;" or if they are, they do not apply to the plants described in that work. The only considerable collections of Indian *Piperaceæ* made since Wallich's were distributed, are Wight's Peninsular, Griffith's Transgangetic Indian, and Thomson's and my own from Sikkim, Bengal, the Khasia Mts., &c. Wight published good figures of several, but confined himself to such as were named by Miquel and to the reproduction of a few of Roxburgh's unpublished Icones, procured from the Calcutta Botanic Gardens. Griffith's specimens were hurriedly collected, with no attempt to match the sexes, or the flowering with the fruiting specimens, for doing which his rapid journeys precluded the possibility. Unfortunately the Ceylon peppers were not thoroughly studied by either Gardner or Thwaites, the only two botanists who had opportunities for so doing previous to Dr. Trimen's incumbency of the Botanical Gardens, and who will doubtless elucidate them. In the process of attempting (with little success, I fear) to discriminate the Indian species for this work, and to unravel their intricate synonymy, I have been much impressed by the correctness of Miquel's views as to the ordination of the species, and the skill with which he has grouped them. When he undertook to monograph the Order, the materials were very bad, were in a chaotic state of confusion, and were so scattered in the British and Continental herbaria, that he could bring no two large collections under his eye at one time. Yet he traced the outlines of a good system, gave characters to a large proportion of well-defined species, and founded genera, which though now reduced to sections of one genus are for the most part natural groups. In the discrimination and elucidation of species he was too hasty by far. For the rest I must leave the further study of the Order to local botanists in the four great centres of its Indian distribution, namely its transgangetic provinces, the South Deccan, the Malayan Peninsula, and Ceylon; in each of which the species should be examined on the spot, with a view to matching the sexes, and flowering with fruiting specimens, and to observing the transition from young to old foliage, and the effects of locality and climate on the characters of each species.

Sect. I. **Muldera.** *Spikes* solitary. *Flowers* dicœcious, the males sunk in a fleshy stipitate or sessile receptacle formed of the greatly enlarged bract (and bracteoles?). *Berries* sessile; stigmas sessile.—The female plants of this section are imperfectly known, and may possibly be confounded with others.

* *Receptacle of male fl. stipitate.*

1. **P. Schizonephros,** *Cas. DC. in Prodr.* xvi. 241; quite glabrous, leaves coriaceous elliptic-lanceolate acuminate 3-nerved at the very base, male spikes hoary, receptacles distant stipitate not recurved about 8-androus. Schizonephros glaucescens, *Griff. Notul.* iv. 383.

MALACCA; at Ching, *Griffith.*

Branches very slender, terete, stiff; nodes much thickened. *Leaves* 3–5 by 1–2 in., base unequal; petiole stout, ¼–½ in. *Spikes* 6–7 in., very slender; receptacles reniform, about $\frac{1}{10}$ in. diam., tomentose within.—Cas. DC. unites with this a Javan plant in fruit which is named by Junghuhu *P. Cubeba*, possibly rightly; but the leaves are more narrowed at the tip and the spike is not hoary. I have altered the misprint "Schizonephos" to "-nephros," as in Griffith's mss., the derivation from *νεφρὸς* a kidney being obvious.

2. **P. Maingayi,** *Hook. f.*; leaves thickly coriaceous elliptic-ovate or lanceolate acuminate 5–7-nerved quite glabrous, male spikes finely tomentose, receptacles stipitate not recurved 3–5-androus.

SINGAPORE and MALACCA, *Maingay.*

Branches stout. *Leaves* 4–5 by 2–2½ in., nerves prominent on both surfaces, nervules obsolete; petiole ¼–⅓ in. *Spikes* 1–2 in.; peduncle short. *Receptacles* of male peltate, $\frac{1}{10}$ in. diam.; of female minute, cupular. *Berry* about ⅓ in. diam.—The leaf is like *P. firmum*, but the pubescent spikes very different.

3. **P. galeatum,** *Cas. DC. in Prodr.* xvi. 242; quite glabrous, leaves thinly coriaceous elliptic-ovate or lanceolate finely acuminate 3-nerved from the very base, male spikes slender, receptacles distant stipitate recurved diandrous. Muldera galeata (in part), *Miquel in Hook. Lond. Journ. Bot.* v. 557. M. Wightiana, *Wight Ic.* t. 1943, *right-hand figure only*; *Miquel l. c.*

TRAVANCORE; at Courtallam, *Wight.*

Branches slender, nodes thickened. *Leaves* 3–5 by 1¼–2 in., nervules distinct beneath; petiole ¼–½ in. *Male spike* 6–10 in., quite glabrous; receptacles obliquely kidney-shaped, recurved, longer than the stipes, mouth very small.—Miquel describes female flowers, but I find none in Wight's Herbarium. Some authentically-named specimens in Arnott's Herbarium ticketed *M. Wightiana* are identical with *galeata*.

** *Receptacle of male spikes sessile or unknown.*

4. **P. trichostachyon,** *Cas. DC. in Prodr.* xvi. 1. 242; glabrous, leaves elliptic-lanceolate acuminate moderately coriaceous with 3 basal nerves and 2 subopposite from the midrib above them, spike stout hoary, male receptacles sessile globose diandrous. Muldera trichostachya, *Miquel in Hook. Lond. Journ. Bot.* v. 556; *Wight Ic.* t. 1944.

DECCAN PENINSULA; The Concan and Canara, *Stocks*, &c.; Kandella, *Dalzell.* NILGHERRY and SHEVAGHERRY HILLS, *Wight.*

Stem stout, woody; branches stout or slender. *Leaves* 5–6 by 1–2 in., 2nd pair of nerves often stronger than the first, nervules slender. *Spikes* stout, 3–4 in. *Receptacles* tomentose at the mouth. *Fruit* globose, ⅓ in. diam.

5. **P. pachyphyllum,** *Hook. f.*; glabrous, leaves shortly petioled very thickly coriaceous oblong or orbicular-obovate or elliptic acute or acuminate, nerves broad faint 2–3 pairs basal and one higher up, all lost above in the thick texture of the leaf, fruiting spike very stout, sunk in the fleshy rachis.

MALACCA, *Griffith.*

Leaves 4–6 by 2–4 in., probably fleshy, pale yellowish when dry, nerves obscure; petiole ¼–½ in., very stout. *Fruiting spike* 2½ in.; peduncle much longer than the petiole, very stout; rachis glabrous, bract and bracteoles forming a ring round the base of the smooth globose fruit.—I place this in *Muldera* from its resemblance to *P. Maingayi* in foliage, but which has a very different fruiting-spike. I have seen no male or female flowers.

Sect. II. **Cubeba.** *Spikes* solitary; flowers dicœcious; bracts of female spikes peltate. *Fruit* contracted at the base into a pedicel.

* *Quite glabrous* (*see also* P. caninum var. *glabra*).

6. **P. ribesioides,** *Wall. Pl. As. Rar.* i. 79, t. 9, and *Cat.* 6637; quite glabrous, very robust, leaves 8–12 in. very coriaceous linear- or ovate-oblong acuminate base deeply cordate 5–9-nerved at the very base 3-nerved higher up, petiole 1–2 in., fruiting spike short stout, pedicel glabrous as long as the globose apiculate fruit. *Cas. DC. in Prodr.* 342. Cubeba Wallichii, *Miq. Syst. Pip.* 289, and *Ill. Pip.* 47, t. 46, 47.

Tenasserim, *Helfer, Falconer.* Penang and Singapore, *Wallich, Maingay.* Burma; at Chappedong, *Wallich.*

A very stout climber; branches pale, as thick as a goose-quill, deeply furrowed when dry. *Leaves* variable, sometimes 5 in. broad, basal sinus 1–1½ in. deep, lobes rounded equal or not; nerves very strong beneath, nervules slender; petiole very stout; young leaves small, lanceolate, subsagittately cordate. *Spikes* 1–3 in.; bracts short coriaceous, rachis of spike stout rigid; bracteoles together semilunar. *Fruit* ½ in. diam.

7. **P. sumatranum,** *Cas. DC. in Prodr.* xvi. 1. 343; quite glabrous, very robust, leaves 8–12 in. very coriaceous oblong or linear-oblong acuminate 5–7-nerved at the very shortly cordate base and 3-nerved higher up, petiole 1–1½ in., fruiting spike 2–3 in. very stout, pedicel glabrous as long as the globose apiculate fruit is broad. Cubeba sumatrana, *Miq. Comm. Phyt.* 42, t. 5 a; *Syst. Pip.* 290, and in *Fl. Ind. Bat.* i. 2. 448, and *Suppl.* 186. P. pedicellosum, *Wall. Cat.* 6646 B ?.

Tenasserim and Andaman Islands, *Helfer.* Penang, *Wallich.* Singapore, *Maingay.*—Distrib. Sumatra.

Very closely allied to *P. ribesioides*, and perhaps only a state of that plant, which the fruit entirely resembles, but the leaves are narrower, more contracted at the base, with a very small short sinus. The male flowers are unknown in both. Possibly they are both large forms of *P. Cubeba*, L. fil.

8. **P. pedicellosum,** *Wall. Cat.* 6646 A; quite glabrous, robust, leaves 2–4 in. very coriaceous elliptic or ovate-cordate obtuse 5–7-nerved near the base, petiole ¼–½ in., fruiting spikes 1–1½ in. very stout, pedicel hoary as long as the subovoid obtuse fruit. *Cas. DC. in Prodr.* xvi. 1. 343. Cubeba Neesii, *Miq. Syst. Pip.* 292, and *Fl. Ind. Bat.* i. 2. 449.

Singapore, *Wallich.*

This resembles *P. Cubeba*, Linn. f., but has hoary pedicels of the fruit. The smaller leaves, short petiole, and fruit, distinguish it from *P. ribesioides* & *sumatranum.*

9. **P. Griffithii,** *Cas. DC. in Seem. Journ. Bot.* 1866, 163, and in *Prodr.* xvi. 1. 343; quite glabrous, branches slender, leaves thinly coriaceous ovate or elliptic 3–5-nerved at the base and 3-nerved higher up, fruiting spikes 6–8 in., pedicels slender longer than the very small globose fruit.

Assam, *Masters, Griffith.*

Branches terete or obscurely furrowed when dry. *Leaves* 4–6 by 2–3½ in., base rounded or subacute; nerves very slender, nervules faint; petiole ¼–½ in. *Female spikes* slender; bracts obscure in fruit, cup-shaped, adnate to the glabrous rachis, bracteoles short. *Fruits* numerous, globose, ⅙ in. diam.

** *Leaves more or less pubescent beneath* (*glabrous in vars. of* P. caninum).

10. **P. caninum,** *Blume in Verh. Batav. Genoots.* xi. 214, f. 26, and *Enum. Pl. Jav. fasc.* 1. 72; hirsute pubescent or glabrate, branches slender terete, leaves petioled membranous ovate ovate-cordate or -lanceolate acuminate rarely elliptic-lanceolate 3–5-nerved towards the base, male spikes slender, fruiting slender, fruit very small, pedicel sometimes very short. *Cas. DC. in Prodr.* xvi. 1. 341. P. Cubeba, *Vahl Enum.* i. 332; *Roxb. Fl. Ind.* i. 159; *Ed. Carey & Wall.* i. 161; *Wall. Cat.* 6645; *Nees Plant. Med.* t. 22. Cubeba canina, *Miq. Comm. Phyt.* 33, t. 3; *Syst. Pip.* 293, and *Fl. Ind. Bat.* i. 2. 449, and in *Ann. Mus. Lugd. Bat. fasc.* v. 137.

Tenasserim (or Andaman Islands?), *Helfer.* Malacca, *Griffith, Maingay.* Penang, *Wallich.*—Distrib. Malay Islands.

A rambling climber, more or less hirsute with flaccid hairs, rarely quite glabrous. *Leaves* 2–4 by 1½–2 in., usually broadest at the base which is rarely unequal-sided, nerves slender; petiole ¼–1 in., slender. *Male spikes* 2-3 in.; bracts adnate by a broad base, stamens 2, anther-cells distinct. *Fruiting spike* ½–1½ in.; peduncle slender; bracts peltate, villous. *Fruit* ⅙ in. diam., pedicel variable in length, always shorter than the fruit.

P. caninum proper; branches glabrate, except the younger, leaves glabrous above, finely pubescent beneath.

Var. *glabra;* leaves quite glabrous.—Tenasserim (or Andaman Islands), *Helfer.*

Var. *lanceolata;* leaves elliptic-lanceolate finely acuminate very sparsely hairy beneath, pedicel of fruit very short. P. Lonchites, *Wall. Cat.* 6644 B, *in part* (*the centre plant of the four on the sheet*). Penang, *Wallich.*—Wallich tickets this P. lanceolatum, *Roxb.*, but Roxburgh's plant of that name is, I think, clearly *P. miniatum.*

Var. *angustifolia,* Miq. mss.; leaves smaller linear-lanceolate 2–2½ by ½–⅔ in. nearly glabrous.—Malacca, *Maingay* (*Kew Distrib.* 1333/4).—This appears the same as Zollinger's No. 698 f. from Java, named *Cubeba canina* var. *angustifolia,* Miq. Mant. Pip.

Var. *lanata;* branches and leaves beneath hirsute. P. lanatum, *Roxb. Fl. Ind.* i. 159; *Ed. Carey & Wall.* i. 161; *Wall. Cat.* 6647; *Cas. DC. in Prodr.* xvi. 1. 341. P. Lonchites, *Wall. Cat.* 6644 A, *in part.* P. Cubeba, *Wall. Cat.* 6645 (*not of Linn. f.*). P. javanicum, *Cas. DC. l. c.* 343. Cubeba lanata, *Miq. Syst. Pip.* 298, and *Fl. Ind. Bat.* i. 2. 450. C. Lowong *var.* quintuplinervis, *Miq. l. c.* 298.—Penang, *Wallich.*

Var. ? *Thwaitesii;* branches glabrous, leaves ovate-lanceolate glabrous or sparsely pubescent beneath, fruiting spikes nearly glabrous, fruit very shortly pedicelled. P. arcuatum, *Thwaites Enum.* 293, *in part* (*not of Blume*). P. arborescens, *Thwaites l. c.* (*not of Roxb.*). P. Thwaitesii, *Cas. DC. l. c.* 357. P. bantamense, *Cas. DC. l. c.* 362 (*the Ceylon plant only*).—Ceylon, *Thwaites* (*C. P.* 35 *in part,* and 2178).

11. **P. muricatum,** *Blume in Verh. Batav. Nat. Genoots.* xi. 219, f. 1, and *Enum. Pl. Jav. fasc.* i. 68; branches stout hirsute or glabrate, leaves large membranous elliptic or elliptic-oblong acuminate 7–9-nerved sparsely hairy above tomentose beneath, female spike 5–6 in. stoutly pedicelled tomentose, rachis stout, bracts peltate, fruit sessile and pedicelled. *Miquel Syst. Pip.* 326; *Ill. Pip.* 55, t. 55, *in Hook. Lond. Journ. Bot.* iv. 438, and *Fl. Ind. Bat.* i. 2. 2454; *Cas. DC. in Prodr.* xv. 1. 341. P. birmanicum β. macrostachyum, *Cas. DC. l. c.* 338.

Malacca, *Griffith.*—Distrib. Sumatra, Java, Borneo.

Stem evidently stout and soft; branches as thick as a goose-quill, roughly hairy. *Leaves* 6–9 by 3½–6 in., base rounded or subcordate rarely subacute, equal or unequal; petiole ½–3 in. *Spike* 1–2-sexual, erect or drooping; peduncle ½ in.; bracts glabrous above, subsessile, orbicular. *Fruit* unripe on thick pedicels, many imperfect, the pedicel being truncate. "*Seed,* subglobose," *Miquel.*—The leaves are most variable in form and pubescence.

Var. *glabrata*; branches glabrous below, above hispid, as are the petioles peduncles and leaf-nerves beneath.—Mishmi Hills in Upper Assam, *Griffith.*

Sect. III. **Chavica.** *Spikes* solitary; flowers dicœcious. *Bracts* orbicular, peltate. *Fruit* very small, in dense cylindric rarely globose spikes, sessile.

* Fruiting spikes much longer than broad. Stigma sessile.

† *Leaves quite glabrous* (*see also* 23. Hapnium) *sometimes slightly pubescent in* P. sylvaticum.

12. **P. longum,** *Linn. Sp. Pl.* 29; glabrous, branches soft angular and grooved when dry, lower leaves long-petioled ovate-cordate upper narrower oblong-cordate sessile amplexicaul, fruiting spikes short suberect. *Cas. DC. in Prodr.* xvi. 1. 355; *Vahl Enum.* i. 334; *Roxb. Fl. Ind.* i. 156, and *Ed. Carey & Wall.* i. 156; *Grah. Cat. Bomb. Pl.* 199; *Dalz. & Gibs. Bomb. Fl. Suppl.* 84; *Wall. Cat.* 6640; *Nees Med. Bot.* t. 23; *Woodv. Med. Bot.* iv. t. 247; *Bentl. & Trim. Med. Pl.* iii. t. 244. P. sarmentosum, *Wall. Cat.* 6641. P. latifolium, *Hunter in As. Research.* ix. 390. Chavica Roxburghii, *Miq. Syst. Pip.* 239, *Ill. Pip.* 35, t. 30, and *Fl. Ind. Bat.* i. 2. 440; *Hayne Arnz. Gewachs.* xiv. t. 20; *Wight Ic.* t. 1928. C. sarmentosa, *Miq. in Hook. Lond. Journ. Bot.* iv. 433, v. 531 (*not of Syst. Pip.*?).—*Rheede Hort. Mal.* vii. 27, t. 14.

Hotter provinces of India, from East Nepal to Assam, the Khasia Mts. and Bengal, westward to Bombay, and southward to Travancore, Ceylon and Malacca, wild or cultivated.—Distrib. Malay Islands.

Stems creeping below; "young shoots downy, branches prostrate or creeping with broad leaves, flowering shoots erect," *Roxb.* *Lower leaves* 2–3 in., often rounded-ovate, acuminate, 7-nerved, sinus rounded but narrow, basal lobes equal; petiole 1–3 in.; upper leaves much narrower, with often unequal basal lobes. *Male spikes* 1–3 in.; female $\frac{1}{2}$–$\frac{2}{3}$ in. *Fruit* about $\frac{1}{10}$ in. diam.—The Malabar plant referred to *P. sarmentosum* by Miquel (Lond. Journ. Bot. l. c.), and a Malacca one so named by him, seem to me undistinguishable from *P. longum*, and I doubt *sarmentosum* being a distinct species. Of the Mergui *P. sarmentosum* (Fl. Ind. Bat.) I have seen no specimens. Wallich's *P. sarmentosum* (No. 6641) has broader upper leaves, and is perhaps the true plant. He is the authority for referring Hunter's *P. latifolium* to it.

13. **P. peepuloides,** *Roxb. Fl. Ind.* i. 159, and *Ed. Carey & Wall.* i. 158; glabrous, branches slender rigid terete often warted, leaves membranous shortly petioled very uniform oblong linear- or ovate-oblong caudate-acuminate, base rounded 3–5-nerved nearly to the tip, fruit minute. *Wall. Cat.* 6650 A. P. brachystachyum, *Wall. Cat.* 6656, *in part.* Chavica peepuloides, *Miq. Syst. Pip.* 237; *Cas. DC. in Prodr.* xvi. 1. 389. C. Neesiana, *Miq. l. c.*, 249.

Tropical Himalaya; from Nepal, *Wallich*, to Bhotan, *Griffith.* Assam, Silhet and the Khasia Mts., common, ascending to 3000 ft. Chittagong, *J. D. H. & T. T.*

A slender bush, climbing below with free spreading slender branches. *Leaves* 2–5 by 1–2 in., variable in breadth, sometimes narrowed to a minutely cordate base; petiole of upper leaves $\frac{1}{8}$–$\frac{1}{4}$ in., of lower rarely $\frac{1}{2}$ in. *Male spikes* slender, 2–3 in., clothed with peltate bracts; stamens 2–4; female $\frac{1}{2}$–$\frac{2}{3}$ in., cylindric, longer than their peduncle. *Fruit* $\frac{1}{12}$ in. diam.—The branches are frequently warted as in *P. brachystachyum*, to which this is most closely allied.

14. **P. Chaba,** *Hunter in As. Research.* ix. 391 (*not of Blume*); quite glabrous, stem stout climbing and rooting, leaves very short-petioled rather

coriaceous oblong-ovate or -lanceolate acuminate 3–5-nerved at the very obliquely cordate auricled base penninerved above it, fruiting spike stoutly peduncled suberect conico-cylindric. *Roxb. Fl. Ind.* i. 156, and *Ed. Carey & Wall.* i. 158. P. maritimum, *Blume Herb. Lugd. Bat.* P. longum, *Blume Verh. Bat. Genoots.* ix. 197, and *Enum. Pl. Jav.* i. 70 (*excl. various syn.*). P. callosum, *Opiz in Reliq. Hænk.* iii. 152. P. officinarum, *Cas. DC. in Prodr.* xvi. 356. P. Arnottianum, *Cas. DC. l. c. excl. syn.* P. glabrum, *Roxb. Ic. pict. ined.* P. peepuloides, *Wall. Cat.* 6650 E, F. Chavica officinarum, *Miq. Syst. Pip.* 256, *Ill. Pip.* 39, t. 34, and *Fl. Ind. Bat.* i. 2. 444; *Hayne Arnz. Gewachs.* xiv. t. 21. C. maritima, *Miq. Syst.* 262. C. peepuloides, *Wight Ic.* t. 1927 (*not of Roxb.*).—*Rumph. Herb. Amb.* v. 333, t. 116, f. 1.

Cultivated in various parts of INDIA and the Malay Islands.

Branches flexuous, terete, hard, finely striate when dry, pale. *Leaves* 5–7 by 2½–3½ in., rather shining above, pale when dry, base very variable, nerves 3–6 pair above the 3–5 basal; nervules arching; petiole ¼–½ in. *Fruiting spikes* 1–2 in. long, ½ in. diam., broadest at the base, obtuse, forming a fleshy cone of innumerable fruits ⅛ in. diam.—The alternate nerves of the main portion of the leaf, all starting from the midrib, are very characteristic of this species. I have seen no certain male fl. Rumph's figure, quoted by Hunter, is very characteristic of the venation above the base, but it omits the basal nerves.

15. **P. sylvaticum,** *Roxb. Fl. Ind.* i. 156, and *Ed. Carey & Wall.* i. 158; glabrous, stem flaccid creeping angular and furrowed when dry, leaves membranous long-petioled broadly ovate or ovate-cordate acuminate 5–7-nerved from the base or the inner pair higher inserted, upper leaves elliptic or oblong-lanceolate shorter petioled, male spikes 2–3 in. slender, fruiting female short erect ⅔–1½ in., fruit free. *Cas. DC. in Prodr.* xvi. 1. 355; *Wall. Cat.* 6653 A, B. ? P. Betle, *Wall. Cat.* 6652 C. P. Malamiri, *Roxb. ex Wall. Cat.* 6642 A (*not of Roxb.*). Chavica sylvatica, *Miq. Syst. Pip.* 248; *Wight Ic.* t. 1930.—Chavica, No. 19, *Herb. Ind. Or. Hook. f. & T.*

Upper and lower ASSAM, *Masters, Griffith,* &c. Jheels of BENGAL, *J. D. H. & T. T.* (? NEPAL) and AVA, *Wallich.* TENASSERIM; at Mergui, *Griffith.*

A low creeping species; stems succulent, several feet long, contracting much in drying; branches short, erect, or ascending, flexuous. *Leaves* rarely puberulous on the nerves beneath, lower 3 by 2½–3 in., nerves slender; upper as long but narrower; petiole of lower 2–4 in. *Spikes* shortly peduncled; males as in *P. peepuloides,* but bracts larger; stamens generally 4 (*Roxburgh,* I find 2); anthers reniform, cells confluent, dehiscing over the crown, female always erect. *Fruit* ⅙–⅛ in. diam.—A very distinct species, something like *P. attenuatum* with more the habit of *P. longum*; it is probably not uncommon in marshy districts. It may be Roxburgh's *P. Malamiris,* as Wallich's ticket says; but the original of *P. Malamiris* of Linnæus (Sp. Pl. Ed. i. p. 29) consists of a mixture of plants, for which he cites the Flora Zeylanica, Plukenet, and the Amalago of Rheede, giving as the native country both the East and West Indies.

16. **P. petiolatum,** *Hook. f.*; quite glabrous, branches stout, leaves large long-petioled thinly coriaceous rounded-ovate acuminate 7-nerved nervules arching, fruiting peduncle very short spike short cylindric. Chavica petiolata, *Cas. DC. in Prodr.* xvi. 1. 389 (*excl. the Khasian plant*).

UPPER ASSAM; Mishmi Hills, *Griffith.*

There are only 2 specimens, both in fruit; each consists of a stout branch 6 in. long and with 4 leaves, each 6 by 3½–5 in. with rounded bases, opaque above with the nerves obscure, the latter strong beneath, connected by the arching venules; fruiting spike 1–1½ in.; fruit globose, ⅛ in. diam., yellow.

17. **P. Betle,** *Linn. Sp. Pl.* 28; quite glabrous, or with the petioles puberulous, stem and branches stout climbing compressed when dry, leaves large coriaceous petioled obliquely ovate-oblong or rounded ovate-cordate 5–7-nerved, base often unequal, petiole ½–1½ in., male spikes 3–6 in., female long-peduncled, fruiting stout 1–5 in. pendulous. *Hunter in As. Res.* ix. 390; *Vahl Enum.* i. 328; *Roxb. Fl. Ind.* i. 158, and *Ed. Carey & Wall.* i. 166; *Dalz. & Gibs. Bomb. Fl. Suppl.* 89; *Wall. Cat.* 6652 A; *Bot. Mag.* t. 3132; *Cas. DC. in Prodr.* xvi. 1. 359; *Burm. Fl. Ind.* 14, and *Fl. Zeyl.* t. 82, f. 2. P. Siriboa, *Linn. Sp. Pl.* 29; *Hunter l. c.* 391; *Vahl l. c.* 332. P. Betle *var.* Siriboa, *Cas. DC. l. c.* P. peepuloides, *Wall. Cat.* 6650 C. P. Chavya, *Ham.*; *Cas. DC. l. c.* Chavica Betle, *Miq. Syst. Pip.* 224, and *Fl. Ind. Bat.* i. 2. 439; *Wight Ic.* t. 2926. C. Siriboa, *Miq. l. c.* 228, *in Hook. Lond. Journ. Bot.* iv. 433, and in *Fl. Ind. Bat.* i. 1. 438; *Thwaites Enum.* 292. C. Chuvya, *Miq. Syst. Pip.* 267, and *Ill. Pip.* 42, t. 39.—*Rheede Hort. Mal.* vii. 29, t. 15.

Cultivated in the hotter and damper parts of INDIA and CEYLON, and in the Malay Islands.

Apparently a larger and stouter plant than the other species of this section, with more coriaceous usually broadly ovate leaves, sometimes 4–5 in. diam.; spikes longer and longer-peduncled; fruit ⅙–¼ in diam., very fleshy and often confluent into a cylindric fleshy red mass. *P. Chuvya* and *Siriboa* are, I suppose, large-leaved cultivated forms; the latter is described as having pubescent young leaves, which I do not observe, though the petioles are sometimes, but not always, puberulous.

18. **P. miniatum,** *Blume in Verh. Bat. Genoots.* xi. 166, and *Enum. Pl. Jav. fasc.* i. 65; quite glabrous, branches rigid terete, nodes much swollen, leaves very shortly petioled large coriaceous elliptic-oblong or -lanceolate caudate-acuminate 5-nerved from the very base, spikes very long erect most dense-fld., fruit very minute. *Cas. DC. in Prodr.* xvi. 1. 354. P. auriculatum, *Blume ll. c.* 171 and 66. P. glandulosum, *Opiz in Presl Rel. Hænk.* 158. P. arborescens, *Wall. Cat.* 6648 A. P. lanceolatum, *Roxb. Fl. Ind.* i. 159. P. Lonchites, *Wall. Cat.* 6644 A, *the two upper specimens only.* P. moluccanum, *Spreng. Syst. Veg.* i. 112. Chavica miniata, macrostachya & ? lanceolata, *Miq. Syst. Pip.* 234 and 236, *Ill. Pip.* 32, 33, t. 28, 29, and *Fl. Ind. Bat.* i. 2. 440. ? C. lanceolata, *Miq. Syst. Pip.* 264, and *Fl. Ind. Bat.* i. 1. 445. Cubeba macrostachya, *Miq. Comm. Phyt.* 38.

MALACCA, *Griffith* (*Kew Distrib.* 1327). SINGAPORE, *Lobb.* PENANG, *Wallich.* —DISTRIB. Java, Banda, Philippines.

Branches as thick as a crow-quill, very hard and smooth. *Leaves* 3–7 by 1½–3½ in., rigid, shining above, base nearly equal, nerves stout, nervules transverse; petiole ⅙–¼ in. *Spikes* most dense-fld. of any Indian species; fruiting ⅙–¼ in. diam., tapering from the base; bracts minute, peltate, hairy; stamens 3. *Fruit* 1/20 in., ellipsoid; stigmas 3.—Miquel describes a Sumatran variety with hairy shoots and nerves beneath. His *C. lanceolata* is a very doubtful plant.

19. **P. bœhmeriæfolium,** *Wall. Cat.* 6654 A; tall, quite glabrous, branches subterete when dry, often warted, leaves membranous very shortly petioled or the upper sessile obliquely oblong or linear-oblong acuminate often narrowed at the very unequal almost auricled base 5–7-nerved, nerves distant, male and female spikes 3–6 in., peduncles slender much longer than the petioles. *Cas. DC. in Prodr.* xvi. 1. 348. Chavica bœhmeriæfolia, *Miq. Syst. Pip.* 265, and *Ill. Pip.* 41, t. 37.

TROPICAL EASTERN HIMALAYA; Sikkim, ascending to 5000 ft., *J. D. H.* Bhotan, *Griffith.* ASSAM, SILHET and the KHASIA MTS., *Wallich*, &c. PEGU, *Kurz.* TENASSERIM, *Parish.*—DISTRIB. Ava.

Branches not stout, rather soft. *Leaves* very variable, in the typical form

(Wallich's) 6–7 by 1½–2½ in., broadest above the middle with narrow unequal bases; in some Khasian specimens much broader and larger, 8–9 by 5½ in.; in Sikkim and Bhotan ones much smaller and more symmetrical, 3–3½ by 2–3 in.; petiole rarely ¼ in. *Spikes* flexuous; bracts of male pedicelled, the pedicel sometimes elongate; anthers 2 sessile 2-celled. *Fruit* ⅛ in. diam.—The long peduncles at once distinguish this from *P. peepuloides*, which is included with it under Wallich's No. 6654.

20. **P. pothiforme,** *Wall. ex Cas. DC. in Prodr.* xvi. 1. 351; tall, quite glabrous, leaves membranous petioled 7–9 by 3 in. linear-oblong acuminate base oblique cordate, nerves 5 of which 3 run to the tip, fruiting spike 3 in., rachis and fruits coalescing into a fleshy cylindric mass 1 in. diam. P. pothoides, *Wall. Cat.* 6639 B?

BURMA; at Chappedong, *Wallich.*

Habit of the large forms of *P. bœhmeriæfolium*, but the petioles are longer and the fruiting spike very different. Wallich's specimen is the only one known.

†† *Leaves more or less pubescent.* (See also 15. *sylvaticum.*)

21. **P. anisotis,** *Hook. f.*; branches densely shortly tomentose, leaves membranous subsessile obliquely oblong acuminate from a very unequal auricled base 5–7 nerved from the very base, sparsely hairy above beneath rusty tomentose on the veins especially, fruiting spikes ½ in.

UPPER ASSAM; Thaumathaya, in the Mishmi Hills, *Griffith.*

Habit of the branches of *P. longum*, but the leaves are more unequal-sided and more cordate. *Leaves* 3–5 by 1½–2 in., very thin, finely acuminate, nerves slender, nervules transverse. *Fruiting spikes* cylindric, like those of *P. peepuloides*; peduncle hispidly hairy, slender; bracts minute, peltate. *Fruit* about ⅛ in. diam.

22. **P. aurantiacum,** *Wall. Cat.* 6658 A; stems climbing and rooting glabrous, leaves all petioled coriaceous ovate elliptic- or orbicular-ovate caudate-acuminate 5-nerved hairy or glabrate beneath base rounded or acute, spikes 1½–3 in., stigmas very minute, young fruit angular ripe globose. *Cas. DC. in Prodr.* xvi. 1. 357. Chavica Wallichii, *Miq. Syst. Pip.* 254, and *Ill. Pip.* 38, t. 33, and *Fl. Ind. Bat.* i. 2. 143.

NEPAL; at Sheopore, *Wallich.* ASSAM, from Suddya and elsewhere, *Griffith.*

A rather stout climber, of a yellowish colour when dry; branches not hard or woody, glabrous. *Leaves* or young trailing shoots with petioles 2–3 in. long; leaves on the main stem and branches 3–4 in. long, with petioles ¾–1 in., upper surface almost shining; nerves very slender above, strong beneath; nervules indistinct on both surfaces. *Spikes* drooping, peduncle of both sexes about as long as the petioles; flowers densely crowded; bracts peltate, quite glabrous; stamens 2, anthers reniform, cells confluent dehiscing across the tip; fruiting spikes variable in length. *Fruit* distinctly pyramidal when young and dry, when ripe about ⅙ in. diam., not so crowded as usual in the section from many not ripening. It is curious that this very distinct species has not been collected in Sikkim or Bhotan.

23. **P. Hapnium,** *Ham. in Wall. Cat.* 6650 D; climbing, branches stout rooting warted below, leaves petioled rugose oblong or oblong-lanceolate acuminate 7-nerved above the base nerves beneath pubescent or glabrate, base very unequal auricled on one side, peduncles longer than the leaves, fem. spikes short cylindric. P. Siriboa, *Herb. Heyne in Wall. Cat.* 6651 B. P. nigrum, 6643 C, *the centre specimen only.* Chavica Arnottiana, *Miq. Syst. Pip.* 268, and *Ill. Pip.* 43, t. 40 (*not* P. Arnottianum, *Cas. DC.*).

TRAVANCORE, *Heyne;* Courtallam, *Wight.* "Phuranbari," *Hamilton.*

Branches hoary; warts minute. *Leaves* 3–4 by 1½–2 in., the older ones very

rugosely reticulated, basal auricle sometimes incurved and overlapping the petiole, at others absent, nerves impressed above; petiole $\frac{1}{2}$–$\frac{1}{3}$ in., slender. *Female spike* young, $\frac{2}{3}$ in. long; peduncle as long hoary.—An obscure but very distinct plant, of which the specimens are insufficient. Miquel unites with it Wallich's 6651 A (P. Chuvya, *Hunter* ?), which is a Siam plant collected by Finlayson and is quite different, having glabrous leaves; it is in too imperfect a state for determination. Cas. De Candolle quotes *Chavica Arnottiana*, Miquel, and Wall. Cat. 6651 A, B, under his *P. Arnottianum*, but describes from Wall. Cat. 6650 E, F, which are unquestionably *P. Chaba*. I do not know where Phuranbari, Hamilton's habitat, is.

** Fruiting spikes globose. Stigmas sessile.

24. **P. brachystachyum,** *Wall. Cat.* 6656, *in part*; quite glabrous, branches slender rigid lower warted, leaves petioled thinly coriaceous elliptic-lanceolate or -ovate obtusely caudate-acuminate 5-nerved, base acute, fruiting spike globose very shortly peduncled. P. vasculosum, *Wall. Cat.* 6660. P. Mullesua & Guigual, *Don Prodr.* 20; *Cas. DC. in Prodr.* xvi. 1. 338, 339. Chavica sphærostachya, *Miq. Syst. Pip.* 279, *Ill. Pip.* 44, t. 42, 43, *in Hook. Lond. Journ. Bot.* v. 551, and *Fl. Ind. Bat.* i. 2. 446, t. 27 B, *excl. var.* β; *Cas. DC. in Prodr.* xvi. 1. 388; *Wight Ic.* t. 1931. C. Mullesua & Guigual, *Miq. Syst. Pip.* 280.

SUBTROPICAL HIMALAYA; from Simla to Bhotan, alt. 2–5000 ft. KHASIA MTS., alt. 3–5000 ft. NILGHIRI HILLS, alt. 5000 ft., *Noton*, &c.

A much-branched twiggy shrub, 5–6 ft. high; branches terete, woody. *Leaves* membranous, rarely coriaceous, 3–7 by 1–3$\frac{1}{2}$ in., nerves strong beneath, nervules transverse; petiole slender, $\frac{1}{4}$–$\frac{1}{2}$ in.; young leaves in Kumaon specimens are rounded-cordate. *Male spikes* only seen on Nilghiri specimens, 2–3 in., slender, drooping; bracts minute, peltate; stamens 2; anthers reniform, cells confluent, dehiscing across the tip. *Female spikes* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., rachis pubescent. *Fruit* $\frac{1}{10}$ in. diam.; stigmas 3, very minute.—Only to be distinguished from *P. peepuloides* by the globose fruiting spikes, having like it the frequently warted branches. Amongst a host of specimens I have not one collected as male in the Himalaya, and suspect that the males are mixed up with those of *P. peepuloides, khasianum* and *nepalense*, which are often undistinguishable in young foliage.

Var. *rhombica*; leaves more coriaceous rhombic-ovate 7-nerved, fruiting spikes larger, $\frac{1}{2}$–$\frac{2}{3}$ in. diam.—Assam, mouth of the Now Dihong River, *Griffith*.

25. **P. Thomsoni,** *Hook. f.*; scandent, quite glabrous, branches stout herbaceous, leaves long-petioled ovate-oblong or -lanceolate acuminate 5-nerved at the rounded or cordate often oblique base, fruiting spike shorter than its peduncle subglobose. Chavica Thomsoni, *Cas. DC. in Prodr.* xvi. 1. 389. C. petiolata, *Cas. DC. l. c., the Khasian specimen.*—Chavica No. 18, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 7000 ft., *Treutler*. KHASIA MTS., alt. 3–4000 ft., *J. D. H. & T. T.* CACHAR, *Keenan*.

Branches as thick as a crow-quill and more, rooting at the nodes, not woody, black when dry. *Leaves* 4–7 by 2$\frac{1}{2}$–3$\frac{1}{2}$ in., thick, nervules indistinct; petiole 1–2$\frac{1}{2}$ in. *Male spikes* 1–2 in., bracts peltate. *Fruiting spikes* very young, $\frac{1}{4}$ in.—A very distinct-looking species, I think, but hardly in condition for description; the fruiting spikes are too young to judge of their mature form.

*** Fruiting spike long or short. Ovary produced into a distinct style. RHYNCHOLEPIS, *Miq.*

26. **P. rostratum,** *Roxb. Fl. Ind.* i. 160, and *Ed. Carey & Wall.* i. 163; stem erect, branches petioles leaves beneath and peduncles roughly tomentose, leaves large membranous shortly petioled oblong orbicular or somewhat

fiddle-shaped acuminate 7-nerved at the rounded or cordate often unequal base, peduncle short, fruiting spikes short cylindric, style elongate. *Cas. DC. in Prodr.* xvi. 1. 377; *Miq. Syst. Pip.* 284, and *Fl. Ind. Bat.* i. 2. 447. P. stylosum, *Miq. in Ann. Mus. Bot. Lugd. Bat.* i. *fasc.* 5, 139; *Cas. DC. l. c.* 344. P. birmanicum, *Cas. DC. l. c.* 338, *excl. var.* β. Rhyncholepis? Roxburghii, *Miq. Syst. Pip.* 284, and *Fl. Ind. Bat.* i. 2. 447.

MALACCA, *Griffith.* SINGAPORE, *Maingay.*—DISTRIB. Sumatra.

Stem 18 in. from a creeping stock, rusty-tomentose, suberect, dichotomously branched, lower nodes thickened. *Leaves* 5–7 by 2–4 in., base usually narrowed, glabrous or puberulous above, nerves slender; petiole stout, $\frac{1}{8}$–$\frac{1}{2}$ in. *Male spikes* not seen. *Fruiting spikes* $\frac{1}{2}$–1 in. long; peduncle very short; bracts orbicular. *Fruit* globose, $\frac{1}{8}$–$\frac{1}{6}$ in. diam.; style very variable in length, as long as the fruit or shorter.—I have not seen authentic specimens of Roxburgh's *P. rostratum*, but there seems no reason to doubt that Miquel's *P. stylosum* is the same.

27. **P. penangense,** *Cas. DC. in Prodr.* xvi. 1. 353; erect, quite glabrous, branches terete, leaves petioled membranous oblong or ovate-lanceolate caudate-acuminate 5-nerved, base acute or subacute, peduncle equalling the very short fruiting-spike, style elongate. P. Lonchites, *Wall.* Cat. 6644 B, *in Herb. Hook. only.* Chavica penangensis, *Miq. Syst. Pip.* 279, and *Ill. Pip.* 45, t. 44 (*not Miq. in Hook. Lond. Journ. Bot.*).

PENANG, *Wallich.* SINGAPORE? *Lobb.*

A shrub; branches hard, smooth. *Leaves* 3–5 by $1\frac{1}{2}$–2 in., nerves slender, alternate, bases rather distant; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Female spikes* $\frac{1}{2}$ in. or less, peduncle slender; bracts peltate. *Fruits* few $\frac{1}{10}$–$\frac{1}{8}$ in. diam. globose, styles slender equalling their diameter.—Miquel cites *Wall. Cat.* 6642 B for this, no doubt a mistake for 6644 B, which, however, he must have taken from the Hookerian Herbarium, as there is no specimen at all of this species in the Linnæan Society's, where 6642 B is *P. attenuatum.*

Sect. IV. **Pseudochavica.** *Spikes* solitary; flowers diœcious. *Fruits* forming a loose interrupted spike, usually much larger than in Sect. *Chavica;* fruits and stigmas sessile. *Bracts* peltate, orbicular, margins free all round.

28. **P. Hamiltonii,** *Cas. DC. in Prodr.* xvi. 1. 359, *in part*; quite glabrous, shrubby, branches finely striate, leaves petioled coriaceous elliptic or almost rounded obtuse or subacute 5–7-nerved from above the base, bracts orbicular ciliate, fruiting spikes slender, fruit ovoid. P. plantagineum, *Herb. Ham. in Wall. Cat.* 6659 A, B *in part.* P. Betle, *Wall. Cat.* 6652 B, *the two left-hand specimens only*; *Cas. DC. l. c.* p. 359, *in part*; *Miq. Syst. Pip.* 229, *in part.*

SIKKIM TERAI, *J. D. H.* ASSAM, *Simons.* SILHET and KHASIA MTS., *Wallich,* &c. CHITTAGONG; at Seetakoond, *J. D. H. & T. T.*

Stem stout, flexuous, scandent and rooting below; branches subterete or angular. *Leaves* remarkably uniform, 2–3 by 1–$2\frac{1}{2}$ in., pale when dry, nerves strong, nervules transverse, base nearly equal, never cordate; petiole $\frac{1}{2}$–1 in. *Male spikes* slender, $1\frac{1}{2}$–3 in.; flowers 2–3-androus. *Fruiting spikes* 4–6 in., flexuous; peduncle $\frac{1}{2}$ in., slender; rachis glabrous, except the ciliate pits.—This is one of the most constant of Indian species in the form of the leaf. The name *P. plantagineum,* Hamilton, has been overlooked by Miquel and Cas. DC., though the type of Wallich's No. 6659. Cas. DC. has described with *P. Hamiltonii* Wallich's 6659 C (misprinted G), which is a very different plant, with caudate-acuminate leaves, and is referred by Miquel (Syst. 225) to *Chavica Siriboa.* It is, I think, neither *Hamiltonii* nor *Siriboa,* and is in too young a condition of flowering to determine.

29. **P. Hookeri,** *Miq. in Hook. Lond. Journ. Bot.* iv. 437; shrubby,

branchlets petioles peduncles and leaves beneath sparsely hirsute, leaves petioled rather coriaceous ovate ovate-oblong or -lanceolate obtusely acuminate 5–7-nerved from the rounded or subcordate equal or oblique base, spikes long slender, bracts orbicular. *Cas. DC. in Prodr.* xvi. 1. 366; *Dalz. & Gibs. Bomb. Fl.* 115.

The CONCAN and CANARA; Mahableshwar and Bababoodan Hills, *Law, Cleghorn*, &c.

Branches stout, terete, angled when dry. *Leaves* 3–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., brownish when dry, glabrous above, nerves beneath slender, nervules transverse; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. *Male spikes* 3–6 in., flexuous, peduncle equalling the petiole; bracts glabrous; stamens 2. *Fruiting spikes* 3–6 in.; bracts sometimes adnate below and shortly decurrent; scar glabrous within.—A distinct species, but the fruiting spikes are immature, and the bracts being sometimes decurrent, it should perhaps be removed to Sect. *Eupiper*.

30. **P. Schmidtii,** *Hook. f.*; shrubby, quite glabrous, branches woody terete, leaves petioled very coriaceous ovate-oblong or -lanceolate acuminate 5-nerved from above the base, nerves alternate, base rounded or acute strongly reticulated on both surfaces, peduncles longer than the petioles, male spikes 4–6 in., female shorter fruiting with a very thick flexuous rachis, fruit globose or ovoid, bracts orbicular. P. arborescens, *in part, Miq. Syst. Pip.* 320; *Wight Ic.* t. 1940, *right-hand figure*; *Cas. DC. in DC. Prodr.* xvi. 1. 359, *the Nilghiri plant only.* P. nigrum, *Wall. Cat.* 6643 D, *the lower specimen only.* ? P. arcuatum, γ. quintuplinervium, *Cas. DC. l. c.* 360.

NILGHIRI MTS., *Schmidt, Wight*, &c.

A large shrub, clothing trunks of trees; branches usually drying black. *Leaves* 3–4 by 1–2 in., drying brown; nerves beneath very stout, sometimes whitish beneath, margin often recurved; petiole stout, $\frac{1}{3}$ in. *Male spikes* stout, peduncle twice as long as the petiole; female stout, very dense-fld. *Fruiting spike* variable, often tortuous, rachis usually very thick. *Fruit* in some very fleshy and described by Wight as oblong, in others less fleshy and quite globose.—I cannot imagine this to be what Roxburgh intended as the Moluccan *P. arborescens*, and of which he says the peduncles are about as long as the petioles, and which Miquel describes as having puberulous nervules beneath, and short male spikes. The Ceylon plant (C. P. 2461), referred to by Thwaites and Cas. DC. as *P. arborescens*, is *P. argyrophyllum*. Wallich's 6643 E from Penang, referred by Miquel both to *P. arborescens* (Syst. Pip. 320) and to *P. attenuatum* (p. 307), is *P. porphyrophyllum*.

31. **P. nepalense,** *Miq. Syst. Pip.* 318; shrubby, quite glabrous, leaves petioled membranous or thinly coriaceous elliptic-ovate or -oblong or -lanceolate more or less caudate-acuminate 5–7-nerved above the equal or oblique acute or rounded base, male spikes long slender, fruiting spike long or short, rachis densely tomentose, bracts orbicular, fruit ovoid sessile granulate. *Cas. DC. in Prodr.* xvi. 1. 357. P. peepuloides, *Wall. Cat.* 6650 B. —Piper Nos. 5 and 20 (*for the most part*), *Herb. Ind. Or. H. f. & T.*

SUBTROPICAL HIMALAYA, alt. 3–5000 ft., from Garwhal, *Edgeworth*, to Bhotan and Mishmi, *Griffith*. KHASIA MTS., alt. 3–5000 ft., *Griffith*, &c.

Branches slender. *Leaves* very variable, 3–5 by 1–3 in., base rarely rounded or cordate; petiole $\frac{1}{2}$–$\frac{2}{3}$ in. *Spikes* 2–7 in.; bracts sessile. *Fruiting spikes* often 6 in., puberulous, straight or flexuous. *Fruit* $\frac{1}{3}$ in. long, pointed.—The commonest Himalayan and Khasian species. No. 20 *Herb. H. f. & T.* appears to be a form with broader and more coriaceous leaves, for the flowers and fruit afford no character.

32. **P. khasianum,** *Cas. DC. in Prodr.* xvi. 349, *in part*; glabrous or peduncles and petioles sparsely pubescent, leaves petioled membranous lanceolate or oblong-lanceolate caudate-acuminate 5-nerved above the equal

acute or rounded base, peduncle longer than the petiole, fruiting spike short, rachis tomentose, bracts orbicular, fruit small globose obscurely pedicelled.

NÉPAL? *Wallich.* SIKKIM HIMALAYA, alt. 2–6000 ft., *Clarke.* UPPER ASSAM, *Griffith.* KHASIA MTS., alt. 3–5000 ft., *J. D. H. & T. T.*

It is difficult without the fruit to distinguish this from *P. nepalense*; the leaves are never so large, not exceeding 5 in., and are narrower with much longer often falcately curved points. The spikes are never more than 1½ in., and the small fruits are only ⅛–⅙ in. diam.—I find no specimen of this in Wallich's Herbarium, but good ones in Herb. Hook. received from him. I have retained the name of *khasianum*, though the description in the Prodromus is drawn up in part from *P. Hamiltonii* and from *P. nepalense*, whence the fruit is described as ovoid.

33. **P. Lonchites,** *Roem. & Sch. Syst.* i. *Mant.* 241; quite glabrous, branches woody terete, nodes much enlarged, leaves shortly petioled thinly coriaceous elliptic- or oblong-lanceolate subacute 3–5-nerved from near the base, peduncles longer than the petioles, male spikes ½–1 in., fruiting females 1–2 in. flexuous, rachis tomentose, bracts orbicular. *Miq. Syst. Pip.* 331, *Ill. Pip.* 56, t. 57, and *Fl. Ind. Bat.* i. 2. 454; *Wall. Cat.* 6644 B, *the left-hand and lower right-hand specimens.* Chavica penangensis, *Miq. in Hook. Lond. Journ. Bot.* iv. 433 (*not of Syst. Pip.*).

PENANG, *Porter, Wallich.*

Branches rigid, internodes short. *Leaves* very uniform, 2½–3 by 1–1¼ in., subacute at both ends, tip not at all caudate, nervules reticulate, uppermost oblique and subauricled at the base; petiole ¼–⅓ in. *Male spikes* uniformly short; bracts ciliate; female much longer. *Fruits* unripe, sessile, ovoid.—A very distinct species, the authorship of which is attributed in the Prodromus to Miquel, and no allusion made to Roemer and Schultes, who profess to have described from Wallich's No. 6644 B, quoting "P. lanceolatum Roxb." which is inscribed on one of Wallich's tickets. As, however, there are 3 species on the sheet of 6644 B, it is doubtful to which Roemer and Schultes refer.

Sect. V. **Eupiper.** *Spikes* solitary; flowers dicœcious, rarely polygamous. *Fruits* forming loosely interrupted spikes usually larger than in Sect. *Chavica;* fruits and stigmas sessile. *Bracts* and bracteoles either wholly adnate to the rachis or with raised membranous margins.

* *Bracts of the female spike forming (when dry) a short hemispheric cup under the ovary, margins not or very slightly raised; bracteoles forming a semilunar ridge above the ovary.*

34. **P. nigrum,** *Linn. Sp. Pl.* 28; quite glabrous, stem stout climbing and rooting terete, leaves petioled coriaceous usually broadly ovate oblong or nearly orbicular base usually rounded and oblique 5–9-nerved above the base, nerves strong alternate, peduncles longer or shorter than the petioles, flowers often polygamous, bracts of female short cupular wholly adnate without raised margins, fruit globose. *Vahl Enum.* i. 329; *Roxb. Fl. Ind.* i. 150, and *Ed. Carey & Wall.* i. 153; *Hunter in As. Research.* ix. 383; *Burm. Fl. Ind.* 13; *Blume in Verh. Bat. Genoots.* xi. 191, f. 11–17; *Wall. Cat.* 6643 A, B, C *in part*, D *in part*; *Miq. Syst. Pip.* 308, *Ill. Pip.* 50, t. 50, *in Hook. Lond. Journ. Bot.* v. 552, and *Fl. Ind. Bat.* i. 2. 451; *Cas. DC. in Prodr.* xvi. 1. 363; *Marsden Sumatr.* t. 1; *Bot. Mag.* t. 3139; *Hayne Arnz. Gewachs.* xiv. t. 6; *Nees Pl. Med.* t. 21; *Woodv. Med. Bot.* iv. t. 246; *Bentl. & Trim. Med. Pl.* t. 245; *Dict. Sc. Nat.* t. 291; *Spach Suites Buff.* t. 125. P. trioicum, *Roxb. ll. c.*; *Miquel Syst.* 310, and in *Hook. Journ.* iv. 438, v. 552; *Wight Ic.* t. 1935. P. nigrum *var.* trioicum, *Cas. DC. l. c.* P. malabarense and P. baccatum (the Indian synonyms only), *Cas.*

DC. l. c. 242. Muldera multinervis & Wightiana, *Miq. in Hook. Lond. Journ. Bot.* v. 557–8.—*Rheede Hort. Mal.* vii. 23, t. 12.

Native in the forests of the CIRCARS and ? of ASSAM and MALABAR; cultivated in hot damp parts of India, Ceylon and the tropics generally.

Branches stout, trailing and rooting at the nodes. *Leaves* 5–7 by 2–5 in., most variable in breadth, sometimes glaucous beneath; base acute rounded or cordate, equal or unequal; nerves stout, 2–3 pairs basal, with another pair higher up which run to the tip; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in., stout. *Flowers* usually dicœcious, but often the female bears 2 anthers, or the male a pistillode; anthers 2-celled. *Fruiting spikes* very variable in length and robustness, rachis glabrous. *Fruit* globose, sessile, red, pulp thin.—The distinctions, if any, between the wild and cultivated black Peppers (*P. nigrum* and *trioicum*) want careful study, from fresh specimens. Roxburgh, who first distinguished them, gives no other character than that the leaves of *P. trioicum* are glaucous beneath. Miquel, who retained both species in his Systema, observes that *P. trioicum* has less coriaceous narrower more lanceolate leaves, less white beneath, and in the Fl. Ind. Bat. he simply refers to *trioicum* as perhaps the wild form of *nigrum*. Clarke has collected in the Khasia (at Amwee, alt. 3000 ft.) a membranous-leaved pepper otherwise like *P. nigrum* with young female spikes. I have examined authentic specimens of *Muldera Wightiana* and *multinervis* in Arnott's Herbarium, and do not see how they differ from *P. nigrum*; those of *M. Wightiana* are in male flower only. The transversely dehiscing female receptacle of *M. multinervis* described by Miquel seems to me to be formed of the ordinary bracts and bracteoles of *P. nigrum*. I however advance this with hesitation, for our knowledge of the specific limits of *P. nigrum* are as vague as of its geographical.

35. **P. zeylanicum,** *Miq. in Lond. Journ. Bot.* iv. 436; quite glabrous, branches terete stout woody, nodes much thickened, leaves small long-petioled coriaceous broadly ovate or ovate-cordate acuminate 3–5-nerved from the base, nerves and nervules impressed above very prominent beneath, peduncles longer than the petioles, fruiting spikes short robust, bracts adnate tips raised in fruit, fruit globose smooth densely crowded. *Cas. DC. in Prodr.* xvi. 1. 366. P. arcuatum, *Thwaites Enum.* 293, *in part* (C. P. 2177).

CEYLON; in the higher parts of the central province, *Walker*, &c.

Dark brown when dry, much branched. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ by 1–$1\frac{1}{2}$ in., paler beneath, often bullate above, base usually equal; petiole $\frac{1}{2}$–1 in. *Male spikes* 1–$1\frac{1}{2}$ in.; bracts closely imbricate, the lowest sometimes oblong and peltate; stamens 2, filaments very broad. *Fruiting spikes* 1–$1\frac{1}{2}$ in., flexuous.—A very distinct-looking species. I do not find the filaments to be margined beneath the anthers as described by Miquel. The *forma major* of that author, from the Deccan (Mayabam, Sir F. Adam), is a very doubtful plant, in fact indeterminable.

36. **P. trineuron,** *Miq. in Hook. Lond. Journ.* v. 555; quite glabrous, branches slender rigid, leaves thin elliptic-lanceolate subacute or acuminate 3-nerved nearly to the tip, peduncles longer than the petioles, male spikes slender shorter than the leaves, male and female bracts closely adnate to the rachis, stamens 2, fruits distant globose quite smooth. *Cas. DC. in Prodr.* xvi. 362. P. insulare & ceylanicum, *Cas. DC. l. c.* 242. Muldera diandra, *Thwaites Enum.* 428 (*omitted in DC. Prodr.*).

CEYLON, in damp forests in the south of the island, *Walker, Thwaites.*

Branches slender, black, nodes much enlarged. *Leaves* 3–5 by $\frac{3}{4}$–$1\frac{1}{2}$ in., base acute; principal nerves 1–2 pair, slender; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Male spikes* 2–3 in.; bracts semicircular, rather distant. *Fruiting spike* rigid; bracts forming a thick cup; rachis black, naked between the fruits.—This is certainly not a *Muldera*, though it resembles *P. arcuatum*, Blume, of Java.

37. **P. leptonema,** *Hook. f.*; quite glabrous, branches terete firm,

nodes much enlarged, leaves petioled thinly coriaceous broadly elliptic or rounded abruptly acuminate, 5-nerved from near the rounded rarely subcordate base, peduncles slender longer than the petioles, female spikes very slender longer than the leaves, flowers very minute in separate whorls. P. Lonchites, *Wall. Cat.* 6644 B, *the right-hand upper specimen only.*

PENANG, *Wallich, Maingay.*—DISTRIB. Java (*Zollinger*, 3771/8).

Apparently shrubby. *Leaves* very symmetrical for the genus, dull brown when dry, 3–4 by 2–3 in., nerves slender, nervules distinct on both surfaces; petiole slender, $\frac{1}{2}$ in. *Female spikes* alone seen; flowers sometimes in a broken spiral, but usually in distinct whorls; bracts cupular, confluent below with the slender quite glabrous rachis. *Fruit* $\frac{1}{6}$ in. long, ellipsoid, with a very short style when dry.—A very distinct species, which Miquel appears to have overlooked in Wallich's Herbarium, where the only specimen is fastened on a sheet with two other species (*P. caninum* and *Lonchites*). In the Hookerian Herbarium he has named it "a *P. acre*, Bl., vix diversum;"—it differs from *P. acre* totally in the bracts and flowers.

** *Bracts of the female spike adnate to the rachis with decurrent raised more or less membranous margins which are confluent with the bracteoles on either side of the ovary.* (The species of this group are involved, and I have failed in the attempt to dissociate Nos. 40 to 43.)

38. **P. rhytidocarpum,** *Hook. f.*; a stout quite glabrous climber, leaves long-petioled large coriaceous elliptic ovate oblong or orbicular acuminate not glaucous beneath 3–5-nerved above the rounded acute or cordate base, spikes very long, fruiting females 8–12 in., bracts with slightly raised margins, fruit granulate (when dry). P. aurantiacum, *Wall Cat.* 6658 B. P. nigrum, *var.* macrostachyum, *Cas. DC. in Prodr.* xvi. 1. 363.

ASSAM, SILHET and the KHASIA MTS., ascending to 4000 ft., common, *Wallich, Griffith*, &c. CHITTAGONG, *J. D. H. & T. T.*

Habit and foliage of *P. nigrum*, but distinguished by the long petioles, often 2 in. long, larger leaves, attaining 7 in. in breadth, very long spikes, raised margins of the bracts and granulate fruit.—Miquel has named a specimen without fruit in Herb. Hook. as *P. trioicum*? and alludes to it in Syst. Pip. (314, parag. 3).

39. **P. attenuatum,** *Ham. in Wall. Cat.* 6642 B, C, D *in part*; branches soft compressed angled and grooved when dry, leaves long-petioled membranous orbicular-ovate or cordate abruptly acuminate upper more ovate glabrous or puberulous beneath 7-nerved from near the base, fruiting female spikes very long slender, bracts decurrent with raised membranous margins, fruit small globose. *Miq. Syst. Pip.* 306, *Ill. Pip.* 49, t. 49, and in *Fl. Ind. Bat.* i. 2. 451; *Cas. DC. in Prodr.* xvi. 1. 363; *Wight Ic.* t. 1933. ? P. Sirium, *Cas. DC. l. c.* 361. P. Malamiris, *Roxb. Fl. Ind.* i. 160, and *Ed. Carey & Wall.* i. 162.

EASTERN TROPICAL HIMALAYA;. Sikkim, *J. D. H.*, &c.; Bhotan, *Griffith.* ASSAM, SILHET and the KHASIA MTS., *Hamilton*, &c. NILGHIRI HILLS; on the Eastern slopes, *Wight*, &c.—DISTRIB.? Penang and Java.

Apparently a rambling species, not unlike *P. sylvaticum.* *Branches* stout, but evidently soft, flexuous, glabrous. *Leaves* $2\frac{1}{2}$–6 in., often as broad as long, from finely downy to glabrous beneath; base usually equal rounded truncate or cordate, of the upper usually acute; nerves slender; petiole 1–3 in., rarely shorter. *Male spikes* slender; bracts adnate, cupular; bracteoles slender; stamens 2–4. *Female spikes* very slender, lengthening in fruit to 9 in.; rachis glabrous, except in the ciliate scars left by the fruit; ovaries ovoid; stigmas minute. *Fruit* globose, $\frac{1}{6}$ in. diam.—The 7 basal nerves seem to distinguish this from the following. Cas. DC. refers the *Sirium* of Rumph (V. 119, t. 2) and Vahl's *P. diffusum* to it, but the evidence is very slight. According to Miquel, a specimen of Roxburgh's *P. Malamiris* so named by himself

in Delessert's Herbarium is this; unfortunately Roxburgh's names of *Polygonums* and *Peppers* are often at issue both with his descriptions, and these again with his Icones; he quotes Linnæus for his *Malamiris*, but Linnæus includes plants of both the old and new worlds under *Malamiris*. Rheede's figure of Linnæus' plant of that name, Amalago (vii. t. 16), cited by Roxburgh, cannot well be *P. attenuatum*.

40. **P. sylvestre,** *Lamk. Ill.* 79 ?; quite glabrous, branches subterete, leaves petioled hardly coriaceous elliptic or ovate acuminate base acute rounded or subcordate 5-nerved from near the base, spikes long very slender, bracts of male cupular adnate to the rachis, of the female with raised margins glabrous within, rachis glabrous, fruit globose. *Miq. Syst. Pip.* 314, and in *Hook. Lond. Journ. Bot.* iv. 438, and v. 552; *Thwaites Enum.* 293 (C. P. 3688); *Cas. DC. in Prodr.* xvi. 1. 361; *Wight Ic.* t. 1937.

Assam and Silhet, *Wallich, Griffith.* Deccan Peninsula, at Courtallam, *Wight.* Ceylon, *Walker*; south end of the island, *Thwaites.*

A branching climbing shrub, with apparently soft branches, much compressed and furrowed when dry in the Ceylon specimens. *Leaves* 4–5 by 2–3 in., more coriaceous than in *P. attenuatum*, with much shorter petioles, and never rounded-ovate as in that plant, base acute or rounded rarely cordate, nerves not so basal; petiole $\frac{1}{2}$–$\frac{2}{3}$ in. *Male spikes* 5–6 in., flowers rather distant; stamens 2–4; female lengthening much in fruit, rachis slender, glabrous. *Fruit* $\frac{1}{6}$ to nearly $\frac{1}{4}$ in.—I accept this as Lamarck's *P. sylvestre* with great doubt, and I find it difficult to define it by description from narrow-leaved forms of *P. attenuatum*, and from some states of *P. argyrophyllum*, but feel sure it is quite distinct from the former. A specimen in Wight's Herbarium is marked *P. trioicum*, as is another from Roxburgh's Herbarium, but the fruit seems too small for that form of *nigrum*, the rachis too is slender, and leaves too membranous. I refrain from citing any of the extra-Indian descriptions or habitats for *sylvestre*, but there is in Herb. Hook. a plant said to be from Mauritius which tallies with this, and is marked *P. sylvestre* by Miquel; it is probably a garden specimen, and is in male fl. only.

41. **P. Hymenophyllum,** *Miq. in Hook. Lond. Journ. Bot.* v. 554; petioles and leaves beneath pubescent with crisped hairs, branches terete, leaves shortly petioled very membranous ovate elliptic-ovate or -oblong or ovate-cordate acuminate base acute or rounded 2–3-nerved towards the base, nerves slender alternate, spikes very long and slender, fruiting rachis very slender glabrous or pubescent in the scars, bracts confluent with the rachis. *Cas. DC. in Prodr.* xvi. 1. 364; *Wight Ic.* t. 1942. P. Malamiris, *Wall. Cat.* 6642 G, H. P. nilghirianum, *Cas. DC. l. c.* P. lanatum, *Wight mss.*; *Miq. l. c.* 553 (*not of Roxb.*). P. Wightii, *Miq. in Hook. Lond. Journ. Bot.* v. 552 *for the most part.*

Deccan Peninsula; on the Nilghiri, Shevagherry and Travancore Mountains, *Wight*, &c.

A slender climber, with branches that do not appear to shrink in drying. *Leaves* 3–5 in., very variable in breadth, always thinly membranous, base usually equal; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Male spike* very slender; bracts with free rounded tips, peduncle longer or shorter than the petiole. *Fruiting spikes* 3–6 in., rachis very variable; bracts usually inconspicuous being entirely confluent with the rachis, but sometimes they have more or less conspicuously raised margins and are ciliated within. *Fruit* oblong when unripe, with often a distinct style, globose and $\frac{1}{6}$–$\frac{1}{4}$ in. diam. when ripe. —Wight, not having seen male plants, is disposed to regard this as the female of *P. argyrophyllum*, and though males are now known, they do not help to distinguish them. The pubescence, which is the best character for this, is far from constant in amount, and is sometimes almost evanescent. So too the development of the bracts in the fruiting rachis is very various. A Javan plant of Zollinger's (II. No. 304) closely resembles this.

42. **P. argyrophyllum,** *Miq. Syst. Pip.* 330, *Ill. Pip.* 55, t. 56, and

in *Hook. Lond. Journ. Bot.* v. 555; quite glabrous, shrubby, branches terete, leaves petioled membranous or coriaceous lanceolate or elliptic- or ovate-lanceolate acuminate sometimes silvery beneath 5-nerved above the base, nerves distant alternate, base acute often oblique, male spikes very slender, peduncles longer than the petioles, fruiting spike 3–6 in., bracts usually decurrent with raised margins, scars naked or ciliate. *Cas. DC. in Prodr.* xvi. 1. 365; *Wight Ic.* t. 1941. P. Malamiri, *Wall. Cat.* 6642 E, F, I. P. Wightii, *Miq. in Hook. Lond. Journ. l. c.* 552, *in part.*

DECCAN PENINSULA, *Heyne*; Travancore Mts., *Wight.* CEYLON; in the central province.

Some states of this appear to differ from *P. Hymenophyllum* only in being glabrous, others have the much more coriaceous foliage of other forms, and the leaves are normally more white beneath. There is so much variation in the development of the bracts that possibly there is more than one species here. The following appear to me to be probably varieties of this.

1. *P. argyrophyllum proper*; leaves long 4–6 by 1¼–2 in. whitish beneath, petiole nearly 1 in., peduncle very slender, fruiting spike ¼–2½ in., rachis very slender glabrous, bracts almost confluent with the rachis, fruit small ⅙ in. diam. *Wall. Cat.* 6642 F.—This was sent to Wallich by Wight, but I find no specimen in the Herbarium of the latter. There are, however, good ones in Arnott's Herbarium.

2. Leaves smaller shorter petioled more elliptic sometimes bullate not white beneath, fruiting spikes 5–7 in., rachis slender, bracts with raised margins, scars distant with fimbriate edges, young fruit oblong subtruncate with a distinct style globose when ripe. *Wall. Cat.* 6642 E, I.—Courtallam, *Wight.* Concan?, *Stocks.*

3. Leaves elliptic more coriaceous less acuminate not white beneath, bracts with conspicuous sinuate raised margins which embrace the bases of the young fruits, ripe fruit globose ¼ in. diam. P. nepalense, *Wight Ic.* t. 1938 (*not of Miquel*).—Courtallam, in dense forests.—This resembles *P. sylvestre* in the form of the leaf, and *P. Wightii* in their texture.

4. Leaves coriaceous 3–5 by 1½–2½ in. elliptic-lanceolate acuminate bullate above silvery beneath, nerves stronger more distant, petiole ½ in., fruiting spikes 4–6 in., bracts with raised sinuate margins, fruit large "yellow" (*Clarke*). P. argyrophyllum, *Thwaites Enum.* 293.—Nilghiri Hills, alt. 7000 ft., *Clarke.* Ceylon (C.P. 3625).—This should perhaps be referred to *P. Wightii*, but the alternate nerves are very constant.

5. Leaves much smaller 2–2½ by 1 in. elliptic-lanceolate, petiole short ¼ in., fruiting spikes 1–2 in. slender, rachis slender, bracts with hardly raised margins, scars ciliate, fruit ⅙ in. diam.—Nilghiri or Kurg Hills, *G. Thomson.*—This very small form a little resembles *P. khasianum.*

6. Leaves thinly coriaceous elliptic-lanceolate or oblong ovate silvery or not beneath, fruiting spikes 2–7 in., bracts with raised sinuate margins, rachis rather slender, fruit globose ⅛ in. diam. P. Walkeri, *Miq. in Hook. Lond. Journ. Bot.* iv. 439; *Cas. DC. l. c.* 3362. P. arborescens, *Thwaites Enum.* 293, *excl. syn.*—Ceylon, *Walker, Thwaites* (C. P. 35 in part, and 2461).—I do not find the minute hairs described by Miquel.

43. **P. Wightii,** *Miq. in Hook. Lond. Journ. Bot.* v. 552, *in part*; quite glabrous, branches stout terete, leaves petioled coriaceous broadly ovate or orbicular rarely elliptic or oblong often glaucous beneath base rounded or cordate rarely acute 5–7-nerved near the base, spikes 2–3 in. stout, bracts with prominent sinuate margins. *Wight Ic.* t. 1939 (*P. Wightiana on plate*). P. nigrum, *Wall. Cat.* 6643 D, *the upper right-hand specimen only.*

NILGHIRI and TRAVANCORE HILLS, *Wight*, &c.

The robust habit, broader leaves with stronger more basal nerves, longer petioles, and often stouter fruiting-spikes with almost winged bracts, best distinguish this

from the coriaceous-leaved plants referred to *P. argyrophyllum*. Whether, however, what I have described above should be regarded as Miquel's *P. Wightii* is perhaps doubtful, there being much confusion in both Wight's and Arnott's Herbaria, where alone authentic specimens of Miquel's plants are preserved. Miquel's description of leaves sparsely hairy on the nerves, together with specimens named by Miquel *P. Wightii* in Herb. Arnott with this character, obviously apply to *P. Hymenophyllum*; others equally authentically named *P. Wightii*, and quite glabrous, with membranous leaves, are identical with forms of *P. argyrophyllum* (perhaps *sylvestre*); whilst still a third series, with coriaceous leaves and more basal stronger nerves, also named *Wightii* by Miquel, represent that plant as here limited. Furthermore, specimens of this last in Arnott's Herbarium are named by Miquel "*P. nigrum forma sylvestre.*" In short the confusion is inextricable, and I cannot say whether *P. sylvestre*, *argyrophyllum*, *Hymenophyllum* and *Wightii* represent as many species, or fewer, or one only. Lastly, *P. Wightii* must be carefully distinguished from *P. Schmidtii* (*P. arborescens Miq. not of Roxb.*), which though not easily distinguishable by words is a very different species.

44 **P. leptostachyum,** *Wall. Cat.* 6649; quite glabrous, branches stout contracted angled and grooved when dry, leaves large coriaceous petioled obliquely ovate oblong-ovate or -lanceolate acuminate 5-nerved above the base, nervules transverse, fruiting spike 7 in., peduncle much longer than the petiole, rachis stout glabrous, bracts with obscure margins, scars glabrous. *Miq. Syst. Pip.* 315. P. indicum, *Miq. fid. Cas. DC. Prodr.* xvi. 1. 498.

BURMA; banks of the Attran River, *Wallich.*

Branches white when dry, internodes long, nodes hardly swollen. *Leaves* very pale, 5–8 by 2–4 in., base acute rounded or cordate; petiole stout, ½–1 in. *Spikes* pendulous, scars narrow. *Fruit* scattered, globose, unripe with a distinct style, ripe globose ⅙ in. diam.—A very handsome species, of which the male is unknown. Cas. DC. changes Wallich's name to *P. indicum*, citing as the authority Miquel's Systema (p. 315), where, however, the name *leptostachyum* is preserved, and I find no authority in Miquel for the name *P. indicum*. The *P. leptostachyum* of A. Richard is undescribed, and only mentioned in Grisebach's Cat. Pl. Cub. 69. Miquel's citation of Wall. Cat. 1540 for this is an error.

Sect. VI. **Heckeria.** *Spikes* subumbellate. *Flowers* 2-sexual.

45. **P. subpeltatum,** *Willd. Sp. Pl.* i. 166; shrubby, branches very stout soft, leaves very large long-petioled membranous orbicular-cordate glabrous or puberulous beneath, nerves flabellate, spikes erect. *Cas. DC. in Prodr.* xvi. 1. 333; *Vahl Enum.* i. 337, *excl. syn. Lam.*; *Wall. Cat.* 6638. Heckeria subpeltata, *Kunth in Linnæa* xiii. 171. Pothomorphe subpeltata, *Miquel Syst. Pip.* 213, *Ill. Pip.* 29, t. 26, *in Hook. Lond. Journ. Bot.* iv. 431, and *Fl. Ind. Bat.* i. 2. 437; *Wight Ic.* t. 1925.

DECCAN PENINSULA; from the Concan Hills, alt. 5000 ft., southwards, *Heyne Wight*, &c. PENANG, *Wallich.* CEYLON, ascending to 4000 ft., *Walker*, &c.—DISTRIB. Malay Islands, Tropical Africa and Madagascar.

A succulent shrub, 4–5 ft. high, with very thick stem and branches. *Leaves* a foot diam. or less, acute or tip rounded, deeply cordate with a narrow sinus; petiole 6–10 in., with a narrow deciduous wing. *Spikes* 3–7 together, 3–5 in. long, very-shortly pedicelled; bracts pedicelled, peltate, triangular or ½-lunar, ciliate; flowers very minute; stamens 2; stigmas 3. *Fruit* very minute, trigonous, cuneiform, truncate.

UNDETERMINABLE AND EXCLUDED SPECIES.

P. AMALAGO, *Linn. Fl. Zeyl.* No. 28.—Miquel (*Syst. Pip.* 258) correctly observes that Linnæus' Amalago is a mixture of various species from the old and new worlds. The *Amalago* of Rheede (vii. t. 16) with elliptic leaves and very long peduncles is not recognizable.

P. ARBORESCENS, *Roxb. Fl. Ind.* i. 159, and *Ed. Carey & Wall.* i. 161.—To this Miquel refers Wallich's No. 6643 E, a native of Penang, which is a flowerless barren state with variegated leaves of a plant called *Cissus? porphyrophyllus* by Lindley. At p. 307, however, he refers the same number to *P. attenuatum.* He also refers a Nilghiri plant of Perrottet to it; this plant I have not seen, but assume it to be *P. Schmidtii.* Lastly he figures his *P. arborescens* (Ill. Pip. 54, t. 54), but does not state where the figured specimen comes from. The only authority for Roxburgh's plant is his citation of Rumph (V. t. 28, f. 1), which is not recognizable as depicting any of the above-mentioned plants.

P. ARCUATUM, *Blume,* var. nervis remotioribus, *Miq. Syst. Pip.* 334; from the Nilghiri Mts., Perrottet.—This is, I assume, the *P. arcuatum* var. β. *quintuplinervium,* Cas. DC. in Prodr. xvi. 1. 360. It is probably *P. Schmidtii.*

P. ARANEUM, *Wall. Cat.* 6661; from Taong-dong in Ava, has neither flower nor fruit, and is indeterminable.

P. CLYPEATUM, *Wall. Cat.* 6655 (P. obtusissimum and P. manillanum, *Miq. Syst. Pip.* 337, 339)—are both species of *Ficus.*

P. CORIACEUM, *Vahl Enum.* i. 314, is doubtfully referred to *P. Cubeba* by Miquel (Syst. Pip. 289), and omitted by Cas. DC.

P. DIFFUSUM, *Vahl Enum.* i. 333, from Ceylon, is referred by Cas. DC. (Prodr. xvi. 1. 364) to *P. attenuatum,* but I have seen no specimen of this from Ceylon. Cas. DC. omits this habitat, as does Miquel (Syst. Pip. 327), who gives Java and Amboyna.

P. EXASPERATUM, *Vahl Enum.* i. 322; *Cas. DC. in DC. Prodr.* xvi. 1. 378. (Chavica? exasperata, *Miq. Syst. Pip.* 275), is indeterminable.

P. FALLAX, *Vahl Enum.* 335, is doubtfully referred by Cas. DC. to *P. nigrum* var. *trioicum,* and by Miquel to *P. longum* or *P. sarmentosum* (*Syst. Pip.* 241).

P. LÆVE, *Vahl Enum.* i. 332; *Cas. DC. in Prodr.* xvi. 1. 362; *Miq. Syst. Pip.* 335, is indeterminable.

P. MALAMIRIS, *Linn. Sp. Pl.* 29; *Vahl Enum.* i. 327 (see Nos. 15, 39, 41, 42).

P. NIGRUM?, *Wall. Cat.* 6643 E, F; from Malacca, Singapore and Penang.—These are young plants, with broadly cordate rounded leaves variegated green white and purple, of a *Piper,* species unknown, and are the Cissus? porphyrophyllus, *Lindl. in Journ. Hort. Soc.* i. 225, and *Flore des Serres Ser.* 2, iv. t. 1491. It is *P. porphyrophyllum, N. E. Brown in Gard. Chron.* (1884) xxii. 438.

P. POTHOIDES, *Wall. Cat.* 6639 A; *Cas. DC. in Prodr.* xvi. 1. 351 (Chavica pothoides, *Miq. Syst. Pip.* 266).—There are two species on this sheet, neither in flower or fruit. Of one of these there is a specimen in Herb. Kew from the Andamans, collected by Kurz, in an equally imperfect state.

P. RETROFRACTUM, *Vahl Enum.* i. 314; *Cas. DC. in Prodr.* xvi. 1. 378 (Chavica retrofracta, *Miq. Syst. Pip.* 275), is indeterminable.

P. SUIPIQUA, *Ham. in Don Prodr.* 20; *Cas. DC. in Prodr.* xvi. 1. 378 (Chavica Suipiqua, *Miq. Syst. Pip.* 275), is no doubt a common Nepal species, but I cannot guess which.

P. SYLVESTRE, *Lour.*; *Vahl Enum.* i. 326, is evidently a mixture.

P. SYRINGÆFOLIUM, *Vahl Enum.* i. 328; *Cas. DC. in Prodr.* xvi. 1. 378 (Chavica syringæfolia, *Miq. Syst. Pip.* 275), is indeterminable.

P. THERMALE, *Vahl Enum.* i. 328; *Cas. DC. in Prodr.* xvi. 1. 3378 (Chavica thermalis, *Miq. Syst.* 276), from hot springs at Tranquebar, should be obtained and determined by botanists in Madras by means of the locality.

P.? VENUSTUM, *Wall. Cat.* 6666; *Cas. DC. in Prodr.* xvi. 1. 378, from Singapore, is a *Pothos* in a very young state, not distinguishable from *P. remotiflorus,* Hook., of Ceylon.

P. ZUCCARENII, *Cas. DC. in Prodr.* xvi. 1. 365, from India, *Griffith* in Herb. Munich, is indeterminable. The petiole is described as sheathing throughout its length, which I have not observed in any Indian Piper. It is probably a *Pothos.*

3. **PEPEROMIA,** *Ruiz & Pav.*

Annual or perennial, usually succulent herbs. *Leaves* alternate opposite

or whorled, quite entire, pellucid-punctate, exstipulate. *Spikes* terminal or leaf-opposed, solitary or fascicled, rarely axillary. *Flowers* 2-sexual, minute, sessile or sunk in the rachis, often whorled, erect, bracteate. *Perianth* 0. *Stamens* 2, very short; anther-cells confluent. *Ovary* obtuse acute or beaked, 1-celled; stigma lateral or terminal, usually penicillate; ovule 1, erect. *Fruit* minute, indehiscent. *Seed* with a membranous testa.—Species 3–400, chiefly tropical and American.

* *Leaves alternate.* (See also *P. Wightiana.*)

1. **P. exigua,** *Miq. Syst. Pip.* 77, and *Fl. Ind. Bat.* i. 2. 432; quite glabrous, stem very slender decumbent, leaves alternate petioled rounded-ovate-cordate or subdeltoid 5–7-nerved, tip rounded, spikes solitary axillary and terminal, fruit sessile, stigma terminal. *Cas. DC. in Prodr.* xvi. 1. 403. Micropiper exiguum, *Miquel Comm. Phyt.* 56, t. 9 D. Piper exiguum, *Blume in Verh. Bat. Genoots.* xi. 232. P. hyalinum, *Wall. Cat.* 6662.

BURMA; hills opposite Prome, *Wallich.*—DISTRIB. Java, Philippines, ? West Africa.

Stems 3–6 in., sparingly branched. *Leaves* hyaline when dry, ½–1 in. diam., base sometimes truncate; petiole ⅙–1 in. *Spikes* ½ in., filiform. *Fruit* ovoid, beaked.

2. **P. moulmeiniana,** *Cas. DC. in Seem. Journ. Bot.* 1866, 140, and in *DC. Prodr.* xvi. 1. 415; quite glabrous, stem succulent straggling, leaves alternate shortly petioled elliptic-lanceolate obtuse 5-nerved from the base, spikes slender panicled, fruit globose, stigma minute.

TENASSERIM; at Moulmein, *Parish.*

Stems tufted, 6–8 in. high, sparingly branched; branches divaricate. *Leaves* 2–2½ in. long, succulent, nerves faint; petiole ¼–⅓ in. *Spikes* 1–1½ in. *Fruit* not so broad as the rachis.

3. **P. pseudo-rhombea,** *Cas. DC. in Prodr.* xvi. 1. 440; quite glabrous, stem stout erect succulent, leaves alternate petioled fleshy elliptic-lanceolate acute 3-nerved, spikes solitary axillary and terminal shorter than the leaves. P. courtallensis, *var.* β., *Thwaites Enum.* 292.

CEYLON; Central Province, alt. 3–5000 ft., *Thwaites.*

Stem simple, 1 foot high, as thick as a goose-quill. *Leaves* 2 in., narrowed into the short petiole, nerves obscure.—I have seen but one specimen, and in young flower only.

4. **P. Thomsoni,** *Hook. f.*; quite glabrous, erect, branched, leaves alternate petioled elliptic-ovate subacute 5-nerved, spikes slender axillary and terminal. Peperomia No. 9, *Herb. Ind. Or. H. f. & T.* Piper ovalifolium, *Wall. Cat.* 6663 B, *the lower specimen.*

DECCAN PENINSULA; Nilghiri or Kurg Mts., *G. Thomson*; Courtallam, *Wight*; Dindigul, alt. 2500 ft., *Wight in Herb. Wall.* ? CEYLON, *Thwaites.*

Stem very stout, erect or ascending at the base, naked below, as thick as a swan's quill; branches all reaching about the same height, leafy. *Leaves* all alternate, 2–3 in. long, succulent, 3 principal nerves broad; petiole ½–⅔ in. *Spikes* when flowering as long as the leaves, much longer in fruit.—A specimen of this in Herb. Arnott is mentioned by Miquel (in Hook. Lond. Journ. Bot. v. 549) as a glabrous, luxuriant, alternate-leaved var. of *P. dindigulensis,* from which it appears to me to be widely different, and to be very near *pseudo-rhombea* of Ceylon.

** *Leaves mostly opposite or whorled.*

5. **P. Wightiana,** *Miq. in Hook. Lond. Journ. Bot.* v. 548; suberect, rather slender, glabrous or with the tips of the leaves ciliolate, leaves opposite and alternate petioled obovate elliptic oblong or orbicular obtuse, 3-nerved, spikes 1–3 usually terminal. ? P. Wightiana, *Cas. DC. in Prodr.* xvi. 1. 420. P. ceylanica, *Miq. l. c.* 550; *Cas. DC. l. c.* 457.

The CONCAN, on trees, *Stocks.* MALABAR, *Wight.* NILGHIRIS, *G. Thomson.* CEYLON, *Walker*; Central Province, alt. 6000 ft., *Thwaites* (C. P. 3954).

Stems 6–10 in., straggling and rooting below, glabrous or puberulous. *Leaves* ½–1 in., very variable, rarely obovate, succulent, glabrous except at the tip; petiole ¼–½ in. *Spikes* 1–2 in., very slender, sometimes paniculate.—Cas. DC. describes the stem as pubescent, but it is glabrous in authentic specimens (in Herb. Arnott), and Miquel does not describe it as pubescent. Wight's figure is, I think, taken from *P. dindigulensis.* I suspect this is only a variety of *P. Heyneana.* Specimens from the Nilghiris have all the leaves alternate. Miquel's *P. ceylanica* has most minute pubescence on the branches; the leaves are chiefly opposite.

6. **P. dindigulensis,** *Miq. Syst. Pip.* 122, *in Hook. Journ. Bot.* v. 549, and *Ill. Pip.* 19, t. 13; stem and leaves pubescent, leaves opposite rarely alternate or 3-nately whorled petioled elliptic-ovate or rounded obtuse or acute 3–5-nerved, spikes slender axillary and terminal solitary or panicled. *Cas. DC. in Prodr.* xvi. 1. 442; ? *Wight Ic.* t. 1921. P. Heyneana, *Wight Ic.* t. 1922; *Thwaites Enum.* 292. ? P. Wightiana, *Wight Ic.* t. 1924. P. Thwaitesii, *Cas. DC. l. c.* 448. Piper ovalifolium, *Wall. Cat.* 6663 A and B (*except the lower specimen*).

DECCAN PENINSULA; from the Concan southward, in the moist ghats.

Very variable, sometimes 18 in. high, with a stem as thick as a goose-quill and suberect, at others more slender and straggling; stem simple or branched. *Leaves* 1–1½ in., succulent, narrowed into the petiole. *Spikes* 1–3 in. long.—I find nothing answering to Wight's figure of *P. Wightiana* in his or Arnott's Herbarium; its alternate leaves resemble *P. Wightiana,* but the hairiness is that of *P. dindigulensis.* His figure of *P. dindigulensis* represents a glabrous plant, unlike any species I have seen; but for its opposite leaves I should refer it to *P. Thomsoni.* I have seen no specimens of *P. Thwaitesii,* Cas DC., but the description entirely accords with *P. dindigulensis.*

7. **P. portulacoides,** *A. Dietr. Sp. Pl.* i. 172; quite glabrous, tufted, stem very stout branched and succulent, leaves opposite or the upper whorled petioled obovate or subrhomboid tip rounded 3-nerved, spikes stout longer than the leaves axillary and terminal. *Miq. Syst. Pip.* 130, and in *Hook. Lond. Journ. Bot.* v. 550; *Cas. DC. in Prodr.* xvi. 1. 443; *Wight Ic.* t. 1922. P. Candolleana, *Miq. Syst.* 146. Piper portulacoides, *Lamk. Ill.* 82; *Vahl Enum.* i. 350. P. trifolium, *Herb. Willd.*

TRAVANCORE mountains; at Courtallam, *Wight.*—DISTRIB. Mauritius, Bourbon, Madagascar, Seychelles.

Stem erect from a creeping base, sometimes as thick as a swan's quill, leafy. *Leaves* all opposite, 1–2 in. long, very variable in width and thickness, very succulent; petiole ¼–½ in. *Spikes* 1–2 in., axillary and terminal.

Var. *courtallensis*; smaller, leaves narrower. P. courtallensis, *Miq. in Hook. Lond. Journ. Bot.* v. 594; *Cas. DC. in Prodr.* xvi. 1. 463. Courtallam, *Wight.*—I see no material difference between this and *P. portulacoides*; and they inhabit the same locality.

8. **P. confusa,** *Hook. f.*; quite glabrous, stem and branches diffuse creeping and rooting, leaves subsessile succulent opposite and 3-nately whorled oblong obtuse 3-nerved narrowed at the base, spikes axillary and terminal panicled stout erect more or less thickened upwards. P. courtal-

lensis, *Thwaites Enum.* 292, and *Cas. DC. in Prodr.* xvi. 1. 463 (*not of Miquel*).

CEYLON; Central Province, alt. 3–5000 ft., *Gardner, Thwaites* (C. P. 2173).

Stems 6–10 in. long, diffusely branched, as thick as a crow-quill, naked below, rooting at the distant nodes. *Leaves* ¾–1 in., narrowed into a very short petiole. *Spikes* ½–⅔ in., stoutly pedunculed, obtuse.—This is the *P. courtallensis* of Cas. DC., who cites Miquel, but omits the Continental Indian localities where *P. courtallensis* proper alone is found, and the number (831) which he quotes is of Gardner's (not Thwaites') collection. This differs from *P. portulacoides* in habit, and the form of the subsessile leaves, and the spikes.

9. **P. Heyneana,** *Miq. Syst. Pip.* 123; quite glabrous, stem diffusely branched creeping and rooting, leaves opposite and 3–4-nately whorled petioled linear- or obovate-oblong obcuneate or obcordate rarely orbicular 3-nerved, spikes slender axillary terminal and panicled. *Cas. DC. in Prodr.* xvi. 1. 453. Piper oblongum, *Wall. Cat.* 6663 C?

SUBTROPICAL HIMALAYA; from Kumaon, alt. 3500 ft., *Strachey & Winterbottom,* to Sikkim, alt. 5–6000 ft. KHASIA MTS., alt. 4–5000 ft., *J. D. H. & T. T.* Patkoye Mts. in UPPER ASSAM, *Griffith.*

A small prostrate tufted very variable species. *Stem* 4–10 in. long, rather slender. *Leaves* ½–1½ in. long, thinly fleshy, drying green; petiole ⅙–⅓ in. *Spikes* ½–1½ in. —It is unfortunate that Miquel should have attached the name of Heyne to a species which Heyne never saw, and which grows very far from the region which that author rendered botanically classical.

10. **P. reflexa,** *A. Dietr. Sp. Pl.* i. 180; stem pubescent stout densely branched and tufted leafy, leaves sessile or shortly petioled coriaceous 4-nately whorled orbicular or nearly so 3-nerved pubescent beneath or glabrate, spikes solitary axillary and terminal stout much exceeding the leaves. *Miq. Syst. Pip.* 169, *in Hook. Lond. Journ. Bot.* iv. 426, *Fl. Ind. Bat.* i. 2. 436, and in *Mart. Fl. Bras.* iv. 17; *Wight Ic.* t. 1933. P. reflexa, *vars.* ζ. Berlandieri & η. parviflora, *Cas. DC. in Prodr.* xvi. 1. 452. Piper saxatile, *Wall. Cat.* 6664. P. pusillum, *Blume in Verh. Bat. Nat. Genoots.* xi. 382, f. 37. Micropiper pusillum, *Miq. Comm. Phyt.* t. 5.

SUBTROPICAL HIMALAYA; from Garwhal, alt. 4–6000 ft., *Edgeworth,* to Sikkim, ascending to 7000 ft., and to UPPER ASSAM, *Griffith.* KHASIA MTS., alt. 4–6000 ft. TRAVANCORE, at Courtallam, *Wight.* CEYLON, Central Province, ascending to 6000 ft.—DISTRIB. Malay Islands, China, Australia, Africa, America.

Stem or branches 3–10 in., rooting at the lower nodes, lower as thick as a goose-quill in Courtallam specimens, which are nearly glabrous, more slender in others. *Leaves* very uniform, rarely opposite or 6-nate, ⅓ in. long, rarely more, sometimes elliptic, lower shortly petioled, wrinkled and yellowish when dry. *Spikes* ½–1½ in., stoutly pedicelled, obtuse.

ORDER CXXV. CHLORANTHACEÆ.

Herbs shrubs or trees, usually aromatic. *Leaves* opposite, usually toothed, petioles often connate and forming a sheath; stipules small, subulate. *Flowers* in terminal or pseudo-axillary spikes, heads or panicles, 1-sexual (one of each sex sometimes cohering). FL. ♂. *Perianth* 0. *Stamens* 1 or 3 connate, filaments very short and thick; anthers 2-celled, or the lateral when 3 are connate 1-celled. FL. ♀. *Perianth* 0, or adnate to the ovary, with a 3-toothed limb. *Ovary* 1-celled; style very short linear or subclavate or 0; ovule 1, orthotropous, pendulous from the top of the cavity. *Drupe* small ovoid or globose. *Seed* pendulous, testa membranous, albumen copious fleshy; embryo minute, far from the hilum, cotyledons diverging,

radicle inferior.—Genera 3, species 25, tropical and subtropical (not African).

The above character does not embrace the anomalous genus *Circæaster* which is appended to the Order.

CHLORANTHUS, *Swartz.*

Perennial herbs, or shrubs. *Flowers* in terminal simple or panicled spikes, connate ♂ and ♀ in pairs. *Stamens* 1, or 3 confluent; central anther 2-celled, lateral anthers 1-celled. *Ovary* naked; stigma subsessile, truncate.—Species 8, Eastern Asiatic.

1. **C. officinalis,** *Blume Enum. Pl. Jav.* 79; *Fl. Jav.* iii. 10, t. 1; leaves subsessile elliptic or elliptic-lanceolate acuminate finely gland-serrulate, anthers 3 connate by their connective. *Solms in DC. Prodr.* xvi. 1. 474; *Miq. Fl. Ind. Bat.* i. 1. 804. C. elatior, *Br. in Bot. Mag.* t. 2190. C. erectus, *Sweet*; *Wall. Cat.* 6881. Cryphea erecta, *Ham. in Brewst. Ed. Journ.* 1825, 11, t. 2.

EASTERN HIMALAYA; Sikkim, in hot valleys, *J. D. H.* BHOTAN, *Clarke.* ASSAM, SILHET and the KHASIA MTS., ascending to 4000 ft., *Wallich*, &c., and southward to PENANG, the ANDAMAN ISLANDS, and MALACCA, *Maingay.*—DISTRIB. Yunan, Malay Archipelago, Philippine Islands.

An evergreen erect undershrub, 1–3 ft., quite glabrous and shining. *Leaves* very variable in size and breadth, subsessile, from 3 by 1 in. to 10 by 4 in.; petiole $\frac{1}{8}$–$\frac{1}{4}$ in. *Spikes* 1–2 in., in panicles 2–5 in. long; flowers minute, distant. *Berries* $\frac{1}{4}$ in. diam., white.

2. **C. brachystachyus,** *Blume Fl. Jav. fasc.* viii. 13, 14, t. 2; leaves shortly petioled elliptic or elliptic-lanceolate acuminate coarsely callously serrate, anthers solitary 4-celled. *Solms in DC. Prodr.* xvi. 1. 475; *Miq. Fl. Ind. Bat.* i. 2. 801, and *Ann. Mus. Lugd. Ind. Bat.* iii. 129. C. monander, *Br. in Bot. Mag.* t. 2190 *in note.* C. ceylanicus, *Miq. l. c.* 802. C. denticulatus, *Cord. in Adæus* iii. 296. Ascarina serrata, *Bl. En. Fl. Jav.* i. 79. Sarcandra chloranthoides, *Gardn. in Calc. Journ. Nat. Hist.* viii. 348; *Wight Ic.* t. 1946; *Cord. l. c.* 301.

KHASIA MTS., alt. 4–5000 ft., *Jenkins*, &c.—TRAVANCORE; on the Pulney Mts., *Wight.* PENANG, *Porter, Wallich, Maingay.* CEYLON; Central Province, alt. 3–5000 ft., *Walker*, &c.—DISTRIB. China, Philippine Islands, Japan.

Habit of *C. officinalis*, but taller and more woody, with deeply serrate leaves and red berries.

UNDETERMINABLE AND EXCLUDED SPECIES.

C. GRANDIFOLIUS, *Miq. Fl. Ind. Bat.* i. 1. 802; *Solms in DC. Prodr.* xvi. 1. 477; "branches warted, leaves petioled membranous 7–8 in. long, obversely oblong acuminate remotely callously mucronate-serrate base acute or subcuneate, nerves 8–10 erecto-patent, petiole $\frac{1}{2}$–$\frac{3}{4}$ in., spikes brachiate subopposite or alternate, bract ovate boat-shaped tip subcallous. *Herb. Wight*, n. 878."—I can form no guess as to what this is, having found nothing corresponding to the description in Wight's Herbarium.

C. INCONSPICUUS, *Swartz in Phil. Trans.* lxviii. 359, t. 15; *Solms l. c.* 474. C. indicus, *Wight Ic.* t. 1945.—The specimens of this from which Wight's published drawing was made are in his Herbarium, but without locality, nor is any locality given with his description in the Icones; they are no doubt from China.

ANOMALOUS GENUS.

CIRCÆASTER, *Maxim.*

A small, inconspicuous, very slender annual, with a simple filiform

erect stem, bearing at the top a whorled fascicle of leaves and many axillary few-fld. short peduncles. *Leaves* membranous, rhomboidly spathulate, cuneate and quite entire below the middle, above it semicircular and toothed. *Flowers* minute, 2-sexual or female. *Sepals* 2–3, minute, scale-like, persistent. *Petals* 0. *Stamens* 1–2, alternate with the sepals, persistent, filaments linear flattened; anther subglobose, cells rather diverging, opening laterally. *Carpels* 1–4, free, linear-oblong, 1-celled; stigma sessile, oblique; ovule pendulous from the top of the cell. *Ripe carpels* oblong, terete, pericarp membranous, narrowed at the base, sparsely clothed with hooked bristles. *Seed* oblong, testa membranous adherent to the hard fleshy albumen; embryo in the axis of the albumen terete, cotyledons linear, radicle superior.

C. agrestis, *Maxim. in Bull. Acad. St. Petersb.* xxvii. 556; *Mel. Biol.* xi. 345.

WESTERN HIMALAYA; Kumaon, alt. 8000 ft., *Strachey & Winterbottom, Duthie.*—DISTRIB. W. China.

Stem 3–5 in., ending in fibrous roots. *Leaves* very many in a solitary false whorl, formed of crowded pairs, pale green, narrowed into a broad petiole and together with it 1–1½ in. long, nerves flabellate; immediately below the whorl of leaves are two linear 1-nerved ones, which are the primordial leaves. *Pedicels* shorter than the petioles, very slender. *Sepals* $\frac{1}{20}$ in. long, ovate-oblong. *Stamens* twice as long. *Ripe carpels* cylindric, $\frac{1}{6}$ in long, green, tip acute.—A very obscure plant, of doubtful or indeed unknown affinity, but regarded by Bentham as near *Chloranthaceæ*. It occurs in fields in W. China, and in Kumaon on mossy rocks in woods, &c. The hooked bristles on the carpels are such aids to dispersion that it may be supposed to be common, though so inconspicuous as to be overlooked.

ORDER CXXVI. MYRISTICEÆ.

Evergreen trees, often stellately tomentose. *Leaves* alternate, quite entire, exstipulate, often pellucid-punctate. *Flowers* dicœcious, small, regular, fascicled umbelled or panicled; bracteoles persistent or caducous. MALE FL. *Perianth* 3-(2–4-)lobed, valvate in bud. *Anthers* 3 or more, connate in a sessile or stipitate column head ring or disk, 2-celled. FEM. FL. *Perianth* of the male. *Staminodes* 0. *Ovary* superior, free, sessile, 1-celled; style short or 0; stigma capitate discoid or lobed; ovule 1, basal, erect, anatropous. *Fruit* fleshy, at length 2- rarely 4-valved. *Seed* erect, enclosed in a thin or fleshy entire or lacerate often highly coloured aril, testa thin or crustaceous, albumen hard densely ruminate; embryo basal, small, cotyledons rounded spreading often wrinkled, radicle short inferior.—Species about 80, Tropical East Asiatic, Malayan and American; a few African, and one Australian.

Previous to the publication of the "Flora Indica" of Dr. Thomson and myself, the British Indian Nutmegs were known only through the named but undescribed specimens distributed by Wallich; for the species contained in Roxburgh's Flora are for the most part from the Archipelago, and were quite undeterminable by that author's brief descriptions. Wallich's types are therefore the foundation of our knowledge; but then there are often several species under one name, and most are in so incomplete a condition, that it is impossible to draw up satisfactory descriptions from them alone, and very difficult to identify other collections by them. Nor is their imperfection the only obstacle; more serious ones are, the excessive variability of the foliage of individual species, throughout the genus, in size, form, texture, pubescence and number of nerves; and the alterations in all these characters in leaves taken at different stages of growth of the same tree. The only other Indian collections available for the "Flora Indica" were Griffith's, and these were assiduously compared

with Wallich's in the endeavour to unravel the intricacies of the genus and limit its species. The arrival of Maingay's splendid Malay Peninsular Herbarium, and his notes on this genus, have enabled me in the present work to correct several erroneous determinations of the "Flora Indica," and to approach nearer to a satisfactory description of the species; but much still remains to be done, which can only be accomplished by a study of living specimens at different times of the year. For every species, flowers of both sexes and ripe fruit are all absolutely necessary for its exact limitation, and the knowledge of its affinities, as well as for establishing sections of the genus. Hitherto for the latter purpose most importance has been given to the structure of the staminal column, which from its minuteness (in most of the species) is difficult of analysis, in dried specimens especially; and I am inclined to think that this organ is more variable than has been supposed, and that some sections founded on it by Alph. De Candolle and others must be abandoned. In the following descriptions, that of the colour of the foliage applies only to dried specimens. This genus affords a fine field for study, but to do this effectually requires a careful comparison of the materials in the Herbaria of Holland, Florence, and Kew. Until this is done, it will be impossible to say which of many of the Indian species are natives of the Malay Archipelago.

MYRISTICA, *Linn.*

Character of the Order.

Sect. I. **Eumyristica.** *Male flowers* racemed or panicled; perianth with a persistent scale-like bracteole at its base. *Anthers* elongate, firmly connate in a shortly stipitate or sessile column.

M. fragrans, *Houtt. Hist. Nat.* ii. 3. 233; glabrous, leaves 3-3½ in. elliptic-oblong or -lanceolate acuminate glaucous beneath, nerves about 8 pair slender, flowers bracteolate males in lax slender supra-axillary racemes. *Alph. DC. in Prodr.* xiv. 1. 189; *Blume Rumph.* 180, t. 55; *Miquel Fl. Ind. Bat.* i. 2. 53; *Bentl. & Trim. Med. Pl.* iii. t. 218. M. officinalis, *Linn. f. Suppl.* 265; *Gærtn. Fruct.* i. 194, t. 41 (*excl. syn. Rumph.*); *Hook Exot. Bot.* t. 155, 156, and *Bot. Mag.* t. 2756, 2757; *Spach Suites Buff.* t. 143. M. moschata, *Thunb.*; *Wall. Cat.* 6785; *Roxb. Fl. Ind.* iii. 843; *Reichb. Ic. Exot.* t. 276, 277; *Woodv. Med. Bot.* iv. t. 238; *Hayne Arnz. Gewachs.* ix. t. 12; *Nees Pl. Med.* t. 133; *Guimp. & Schl.* t. 73, 74. M. aromatica, *Lamk. in Act. Par.* 1788, 155, t. 5–7, and *Ill. Gen.* t. 832; *Roxb. Cor. Pl.* iii. 267.—*Rumph. Herb. Amb.* ii. 14, t. 4.

Cultivated in the MALAYAN PENINSULA, PENANG and the MALAY ISLANDS; —native of the Eastern Moluccas.

A lofty tree; branches slender. *Leaves* coriaceous, sometimes oblanceolate, and tip caudate, base acute, pale yellow brown, paler with red-brown nerves beneath; petiole ¼–½ in. *Male racemes* 1–2 in.; flowers ¼ in. long, ellipsoid or urceolate, nodding; bracteole a scale under the glabrate perianth; anthers 9–12, connate in a cylindric stipitate column. *Fruit* ovoid, subglobose or pyriform, 1½–2 in. long.—*Alph. DC.* describes the perianth as strigose with appressed hairs, but I find them to be nearly or quite glabrous; Blume says very sparsely strigose.

1. **M. elliptica,** *Wall. Cat.* 6798 A; glabrous, leaves 8–10 in. linear-oblong subacute subglaucous beneath, nerves about 12 pair slender, male fl. in short axillary racemes bracteolate urceolate, fem. fl. few fascicled on short supra-axillary peduncles. *H. f. & T. Fl. Ind.* 162; *Alph. DC. in Prodr.* xiv. 1. 190; ? *Kurz For. Fl.* ii. 282.

PENANG and SINGAPORE, *Wallich.* MALACCA, *Maingay* (*Kew Distrib.* 1296). ? Andaman Islands, *Kurz.*

A tree; branches stout. *Leaves* very pale; petiole ½–1 in., stout. *Male perianth*

elongate-urceolate or ellipsoid, ⅓ in. long, 3-toothed; bracteole orbicular; connective apiculate; *fem.* urceolate; ovary stipitate strigose, stigma oblong. *Fruit* 2½ in. long, oblong, glabrous; "aril blood-red laciniate," *Maingay*.—I have seen no Andaman specimens, and Kurz's description is quite at variance with Wallich's plant in the scurfy tomentose inflorescence (see *M. andamanica*). Wallich's "6798 B? fructu maximo" is doubtful.

2. **P. laurifolia,** *Hook. f. & T. Fl. Ind.* 163; glabrous except the inflorescence, leaves 6–9 in. shortly petioled very coriaceous linear-oblong or -lanceolate obtuse or subacute glaucous beneath, nerves 12–20 pair, male fl. bracteolate tomentose densely crowded in a very short stout axillary peduncle. *Alph. DC. in Prodr.* xiv. 1. 191; ? *Beddome Fl. Sylv.* t. 267. M. diospyrifolia, *Alph. DC. l. c.* M. tomentosa, *Thwaites, fid. Alph. DC. l. c.*

DECCAN PENINSULA; on the Western Ghats from Canara to Cape Comorin, from the plains up to 5000 ft., *Beddome*, &c. CEYLON, Central Province, alt. 1500–4000 ft., *Walker*, &c.

Branches moderately stout. *Leaves* variable, shining above with impressed nerves, pale brown or whitish beneath, base acute rounded or cuneate; nerves sometimes very faint; petiole 1–1½. *Peduncle* very stout indeed, ⅙ in. long or less; flowers densely crowded, sessile or stoutly pedicelled, nearly ¼ in. long, silkily pubescent, shortly 3-lobed.—Beddome's figure represents a much more slender plant than any of the specimens I have seen, with slender petioles and pedicels, the latter loosely clustered on an almost obsolete peduncle. *Fruit* in Beddome's figure 2½ in. diam., globose, apiculate, with a deep longitudinal furrow; aril deeply cut into linear lacerate lobes, nearly enclosing the seed.—Alph. De Candolle gives *M. tomentosa*, Thwaites (not H. & T.), as a synonym of *M. diospyrifolia*, but I do not find that name of Thwaites, and as the plant is glabrous, I suspect some error of citation.

Var. *lanceolata*; leaves lanceolate 6 by 1½ in., petiole very stout, nerves very faint.—S. India, *Beddome*.

Var. *zeylanica*; leaves linear-oblong obtuse 7–8 by 2–2½ in., petiole more slender, pedicels longer. M. ceylanica, *Alph. DC. in Ann. Sc. Nat. Ser.* 4, iv. 29, and in *Prodr.* xiv. 1. 190. M. zeylanica, *Thwaites Enum.* 11 and 399.—Ceylon, *Thwaites*.—Beddome's figure more resembles this than it does the other Ceylon form of the species, which is identical with the peninsular Indian.

3. **M. andamanica,** *Hook. f.*; glabrous, leaves petioled membranous elliptic-oblong subacute not glaucous beneath, nerves 12–15 pair very slender, male flowers in sessile or peduncled clusters on the branches very shortly pedicelled, bracteole large, perianth globose 3-lobed, staminal column oblong obtuse. ? M. elliptica, *Kurz For. Fl.* ii. 282 (*not of Wall.*).

ANDAMAN ISLANDS; *Herb. Hort. Bot. Calcutta.*

Branches slender, quite glabrous, youngest shoots rustily hoary. *Leaves* almost membranous, 3–4 in. diam., pale brown when dry on both surfaces, base acute, nerves spreading; petiole ¾–1¼ in., slender. *Clusters of flowers* sessile or on a thick 3–6 fld. peduncle ¼–½ in. long; pedicel ⅛ in., stout, rather scurfy; perianth quite glabrous and smooth, ⅛–⅙ in. diam.—Apparently a very distinct species, but approaches *M. malabarica*.

4. **M. malabarica,** *Lamk. in Act. Par.* 1788, 162; nearly glabrous, flowering branches slender, leaves 4–8 by 1½–4 in. linear-oblong or elliptic-lanceolate subacute glaucous beneath, nerves 8–14 pair, male fl. in subcymose panicles bracteolate, peduncles and pedicels slender, perianth globose, anthers 10–15, fruit narrowly oblong pubescent. *Blume Rumph.* i. 185; *Hook. f. & T. Fl. Ind.* 163; *Alph. DC. in Prodr.* xiv. 1. 195; *Dalz. & Gibs. Bomb. Fl.* 4; *Beddome Fl. Sylv.* t. 269. ? M. tomentosa, *Grah. Cat. Bomb. Pl.* (*not H. f. & T.*). M. dactyloides, *Wall. Cat.* 6786 (*hardly of Gærtner*). M. notha, *Wall. Cat.* 6787.—*Rheede Hort. Mal.* iv. t. 5.

The CONCAN, CANARA and N. MALABAR, *Heyne*, &c.

A tall tree. *Leaves* thinly coriaceous on the flowering branches, thick and leathery on the fruiting, more or less shining above, nerves very slender; petiole $\frac{3}{4}$–1 in. *Male panicles* 1–1½ in., axillary and supra-axillary; peduncle naked below, subumbellately cymose above; bracteole an orbicular scale; perianth $\frac{1}{6}$ in., puberulous, 3-toothed; anthers connate in a cylindric shortly stipitate column. *Female panicles* few-fld.; flowers larger. *Fruit* 2 by 1 in., pubescent.—A fruiting specimen apparently of this species from Dalzell (marked *amygdalina*?) has oblong leaves 10 by 4 in. and rounded at the base; the detached fruit accompanying it is, however, long and pubescent as in Rheede's and Beddome's figures of *malabarica*. On the other hand, fruits that accompany Wight's Malabar specimens of *malabarica* are shorter broader and only 1½ in. long.

5. **M. malaccensis,** *Hook. f.*; quite glabrous, branches rather slender, leaves 8–10 in. linear-oblong acute or acuminate, nerves 15–20 pair slender, male fl. in subcymose fascicles bracteolate subglobose, anthers about 7.

MALACCA, *Maingay* (*Kew Distrib.* 1305).

Habit of *M. malabarica*, but leaves longer, usually rounded at the base but sometimes acute, petiole rather short $\frac{1}{3}$–$\frac{1}{2}$ in., panicle longer 3–4 in., with more numerous much smaller flowers $\frac{1}{10}$ in. long, on slender rather longer pedicels. *Perianth* 3-toothed; anthers connate in a broad sessile column, tips acute.—The probable fruiting state of this, according to Dr. Maingay's Herbarium notes (Kew Distrib. 1304) in specimens of which the leaves 6 in. long are elliptic-oblong obtuse very leathery acute at the base with a very stout petiole, "Fruit subglobose 1¼ by 1⅕ in., glabrous, pale-yellowish; pericarp thick, fleshy, $\frac{2}{10}$–$\frac{3}{10}$ in. thick; aril complete, slightly lobed at the tip, clear reddish orange, testa slightly crustaceous pale brown."

6. **M. magnifica,** *Beddome Fl. Sylv.* t. 268; young parts clothed with golden pubescence, leaves 10–24 in. thickly coriaceous linear-oblong acute or acuminate densely stellately tomentose beneath glabrate in age, nerves 20–26 pairs, male flowers tomentose dense crowded on very short stout axillary peduncles bracteolate, fruit large oblong.

SOUTH TRAVANCORE; in the plains, *Beddome*.

An immense gregarious tree, 100 feet high, described by Beddome as having buttressed trunks, most like *M. laurifolia*, but different looking, with different pubescence venation and antheriferous column, and a larger fruit. Except in the much larger size and pubescence, I see no difference between this and *laurifolia*. The specimen communicated by Beddome, and which he says was pronounced at Kew to be *M. malabarica*, consists of a single leaf 20 by 6 in., with 20 pairs of nerves, and a very stout petiole and midrib; it is perfectly glabrous, presents no definite character but size and corresponding number of nerves; both the texture, colour and nervation occur in leaves of *M. laurifolia* and *malabarica*.

7. **M. Maingayi,** *Hook. f.*; branches stout black, shoots and inflorescence rusty-tomentose, leaves 7–10 in. linear-oblong acute or acuminate glabrous, nerves 14–18 pairs, male panicles axillary and supra-axillary, peduncle and pedicels short very stout, perianth bracteolate ovoid, column of anthers slender acute.

MALACCA, *Maingay* (*Kew Distrib.* 1289).

A lofty tree. *Branches* much angled by the contraction of the bark in longitudinal ridges. *Leaves* very coriaceous, 2–2½ in. broad, pale brown, nerves slender, base acute or rounded; petiole 1 in. *Male panicles* decurved, 8–10-fld.; peduncle compressed; pedicels about ¼ in.; perianth as long, broadly ovoid; bracts caducous; bracteole broad half as long as the perianth; anthers 9, stipes very short, pubescent.—Approaches *M. hyposticta*, Miquel, of Java, but the stout branches with black bark and very coriaceous leaves not glaucous beneath appear to distinguish it.

Sect. II. **Pyrrhosa,** *Blume* (Irya, *H. f. & T.*, Horsfieldia & Gymnacranthera, *Alph. DC.*). *Male flowers* ebracteolate (bracteoles fugacious) generally minute, in many-fld. compound panicles (or paniculate heads in *M. Horsfieldii*). *Anthers* combined in a fleshy oblong turbinate spherical or 3-gonous sessile (rarely stipitate) column or cup.

* Anthers produced to the base of the column, closely combined throughout their length (not separable), *or the tips alone free.*

† *Panicles more or less tomentose.*

8. **M. superba,** *Hook. f. & Thoms. Fl. Ind.* 162; branchlets leaves beneath and panicles scurfily rusty-tomentose, leaves 12–18 in. elliptic-lanceolate or oblanceolate, nerves 25–30 pair, male panicles robust, perianth glabrous, staminal column subsessile solid ovoid obtuse, anthers 10. *Alph. DC. in Prodr.* xiv. 1. 194.

PENANG, *Phillips.*

Branches stout. *Leaves* coriaceous, 4–8 in. broad, bright red brown, and loosely stellately tomentose beneath; nerves firm, nearly straight; petiole $\frac{3}{4}$ in. *Male panicles* in the axils of fallen leaves, 4–6 in. long; perianth $\frac{1}{6}$ in. long, ellipsoid, obtuse, 3–4-toothed; pedicel as long, very stout; anthers closely confluent to their tips in a subsessile column not apiculate. *Female fl.* and *fruit* unknown.

9. **M. Murtoni,** *Hook. f.*; branchlets young leaves beneath and panicles rustily tomentose, leaves 10–12 in. oblong very coriaceous glaucous beneath, base rounded or cordate, nerves 20–30 pair slender spreading, male fl. $\frac{1}{6}$ in. long broadly ovoid in short stout dense-fld. panicles very shortly pedicelled, staminal column fusiform sessile, anthers with the tips free.

SINGAPORE, *H. J. Murton.*

Branches very stout. *Leaves* 3–5 in. broad, brown and shining above, old quite glabrous beneath; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., very stout, glabrous. *Male panicles* 1–2 in. long; flowers densely crowded, perianth lobed $\frac{1}{3}$-way down; anthers slightly twisted. *Fem. fl.* and *fruit* unknown.—This appears to be nearest to *M. superba,* differing in the much smaller flowers and fewer anthers with free tips.

10. **M. tomentosa,** *Hook. f. & Thoms. Fl. Ind.* 161; branchlets leaves beneath and panicles softly rusty-tomentose, leaves 5–12 in. elliptic-oblong lanceolate or oblanceolate at length glabrate, nerves 12–20 pair, male panicles robust, perianth $\frac{1}{14}$ in. diam. globose glabrous granulate, staminal column sessile turbinate solid top depressed. *Alph. DC. in Prodr.* xiv. 1. 204.—Myristicacea, *Wall. Cat.* 9025.

PENANG, *Porter, Phillips.* MALACCA, *Maingay* (*M. Wallichii, Kew Distrib.* 1284).—DISTRIB. Borneo?.

Branches stout, bark grey. *Leaves* 2–2½ in. broad, thinly coriaceous, dull brown above, bright red-brown beneath; base acute or cuneate; petiole ½ in. *Male panicles* like those of *M. Wallichii,* but not so long and stout; pedicels slender; perianth 3–4-cleft, glabrous; anthers about 15, quite confluent; tips incurved but not free.—A Bornean plant entirely resembles this, except in that it has a much smaller staminal column, with only about 10 anthers. I greatly doubt the constancy of the characters drawn from the number of anthers in this genus.

11. **M. Wallichii,** *Hook. f. & Thoms. Fl. Ind.* 161; shoots ashy grey, leaves 8–12 in. oblong or linear-oblong acute or acuminate glabrous or sparingly rusty-tomentose beneath, nerves 20–25 pair, male panicles very stout rusty-pubescent, perianth $\frac{1}{10}$ in. diam. subsessile glabrous, staminal column a depressed 3-gonous 3-lobed fleshy sessile cup with incurved

anther-cells. *Alph. DC. Prodr.* xiv. 1. 203. M. Horsfieldii, *Blume? Wall Cat.* 6806, *in part.*

MALACCA, *Maingay* (*Kew Distrib.* 1284). SINGAPORE, *Wallich, Lobb, Maingay* (*M. crassifolia*, Kew Distrib. 1283).

A tall tree, branches robust. *Leaves* 2–3½ in. broad, very coriaceous, dull brown above, red brown beneath, nerves spreading; petiole 1–1½ in., often stout. *Male panicles* axillary and from the axils of fallen leaves, branched from the base which is often as thick as the petiole, branches stout; flowers pedicelled, thickly coriaceous, in globose clusters of 8–10, 3–4-cleft; anthers 10–12 (24–27 cells?, *Maingay*), forming a low obconic 3-gonous fleshy column of firmly united cells. *Female panicles* short; fruit (unripe) very shortly and stoutly pedicelled.—This species, which is probably a variety of *M. tomentosa*, was founded on the young fruit and leaves of one of a mixed lot of species comprised under Wallich's No. 6806, of which he says "forsan duæ species mixtæ." There are two sheets of specimens under this number; one contains the fruiting specimens taken up as *Wallichii*, together with a panicle of male fl. of *M. crassifolia*; the other contains scraps of *M. polyspherula* and *M. crassifolia*.

12. **M. Kingii,** *Hook. f.*; leaves 8–10 in. long-petioled obovate or oblanceolate obtusely acuminate thinly coriaceous quite glabrous not glaucous beneath, nerves 15–20 pair very slender, panicles 4–6 in. sparsely rusty-tomentose flowers pedicelled, male perianth globose ⅛ in. diam. 3–4 cleft, staminal column sessile depressed-globose top concave, anthers firmly united with incurved tips.

SIKKIM HIMALAYA; near Sivoke, alt. 10,000 ft., *King*. ? ASSAM, *Masters in Herb. Calcutt.*

Branches very stout with rough bark and large scars of fallen leaves. *Leaves* 3½–5 in. broad, pale brown on both surfaces when dry, nerves spreading; petiole 1–1½ in. *Panicles* rather stout, from the axils of fallen leaves, much and loosely branched, flowers not very crowded; pedicels short stout. *Perianth* thick. *Staminal column* small; anthers about 20 ?.—This differs from *M. glabra*, to which it is perhaps too closely allied, in the pubescent panicle, longer petiole, larger leaves with more numerous veins and stouter panicles and pedicels, larger perianth and small depressed staminal column. The Assam specimens are of leaves only, 12–18 in. long by 5–7 broad.

13. **M. Horsfieldii,** *Blume Bijd.* 577, and *Rumph.* i. 192; leaves very coriaceous 8–12 in. oblong or elliptic-oblong rusty-tomentose beneath at length glabrate, nerves 16–30 pair very strong, male panicles rusty-tomentose, flowers sessile in dense globose heads, perianth ⅕ in. long clavate angled 3–4-toothed, anthers 6 confluent in a clavate sessile column depressed at the top. *Hook. f. & T. Fl. Ind.* 164; *Alph. DC. in Prodr.* xiv. 1. 200; *Bedd. For. Man.* 176. M. Iryadghedhi, *Gærtn. Fruct.* i. 196, t. 41, f. 4, *excl. syn.* M. ferruginea, *Wall. Cat.* 6803. Pyrrhosa Horsfieldii, *Wight Ic.* t. 1857. Horsfieldia odorata, *Willd. Sp. Pl.* iv. 872.

CEYLON; in the Ambagamowa and Ratnapoora districts. SINGAPORE (*cult.?*), *Wallich.*—DISTRIB. Cult. in Java.

A tall tree, branches very stout, densely woolly, at length glabrate. *Leaves* 2½–4 in. diam., pale bright-brown above, rufous at first beneath, or red brown; petiole very stout, ½–1 in. *Male panicles* 3–6 in., rachis and branches very stout; heads of flowers ¼–½ in. diam., quite globose; perianths subsessile, compacted, glabrous, hardly pedicelled; bracteoles orbicular, retained amongst the flowers but caducous, densely woolly outside; anthers quite confluent to the tips. *Female panicles* short, few-fld., ovary tomentose. *Fruit* shortly stoutly peduncled, ovoid, 1 in. long, rusty-tomentose; aril fleshy, entire.

** *Panicles glabrous.*

14. **M. amygdalina,** *Wall. Pl. As. Rar.* i. 79, t. 90, and *Cat.* 6797;

glabrous, leaves 6–8 in. elliptic-lanceolate acute at both ends, nerves 8–12 pair, male panicles much branched, perianths $\frac{1}{30}$ in. diam. globose 2–3-fid, staminal column cupular subglobose, anthers firmly united, fruit ellipsoid, aril nearly entire yellow. *Hook. f. & Thoms. Fl. Ind.* 160; *Alph. DC. in Prodr.* xiv. 1. 203; ? *Kurz For. Fl.* ii. 283. M. exaltata, *Wall. Cat* 6804 B?.

TENASSERIM; at Tavoy and Moulmein, *Wallich.*

A tall perfectly glabrous tree. *Leaves* 1½–2 in. diam., coriaceous, pale brown on both surfaces, narrowed into a petiole ½ in. long. *Male panicles*, from the axils of fallen leaves, 3–5 in. long and nearly as broad, branched from the base, quite glabrous; flowers loosely clustered, pedicels as long as the perianth, slender; staminal column globosely trigonous, fleshy, concave; anthers about 8, wholly combined. *Fruit* shortly peduncled, 1½ in. long; pericarp rather thin, glabrous; aril yellow, lacerate at the tip only.—This species again was founded on fruiting specimens of Wallich's, but I think there is no doubt that his *M. exaltata*, B?, from the same country is the same in male flowering state. In the "Flora Indica" there are united with it two very similar Malaccan plants, which have, however, quite different stamens (one is *M. polyspherula*, the other perhaps the same). I am in doubt as to Kurz's *M. amygdalina*; his description agrees with that here described except in that the leaves have 12–19 pairs of nerves and the panicles are supra-axillary. A plant of Helfer's differs only in having more anthers and rather larger flowers, tending to unite the following with this.

15. **M. glabra,** *Blume Bijd.* 575, and *Rumphia* i. 191, t. 64, fig. 1; quite glabrous, leaves 3–8 in. elliptic-lanceolate or oblong obtuse acute or acuminate, base acute, nerves 7–14 pair, male panicle much branched, perianths $\frac{1}{7}$–$\frac{1}{10}$ in. diam. ovoidly globose 2–4-cleft glabrous, staminal column oblong or turbinate, anthers firmly united tips incurved or inflexed, fruit oblong or ellipsoid, aril thin scarlet. *Hook. f. & Thoms. Fl. Ind.* 161; *Alph. DC. in Prodr.* xiv. 1. 202. M. integra and M. floribunda, *Wall. Cat.* 6799, 6805.

SILHET, *Wallich, J. D. H. & T. T.* ? TENASSERIM, *Helfer* (*Kew Distrib.* 4358). SINGAPORE, *Wallich, Murton.* MALACCA, *Maingay* (*Kew Distrib.* 1286).—DISTRIB. Java.

Leaves coriaceous, not glaucous beneath, rather pale brown, very variable in size and apex, but base always acute and petiole short, hardly exceeding ¼ in. *Male panicles* 2–6 in., quite glabrous, branched from the base; peduncles and pedicels slender. *Staminal column* variable in length, top rounded; anthers 12–15, the tips meeting in a concavity or not. *Fruit* broadly oblong or ellipsoid, 1 in. long, deeply grooved on one side towards the base; valves thick. I doubt this being different from *M. amygdalina.* Helfer's specimens have much smaller flowers than the Silhet ones, and more numerous anthers.

16. **M. bivalvis,** *Hook. f.*; quite glabrous, leaves 7–10 in. linear-oblong obtusely acuminate, nerves 15–20 pair, male panicles much branched, perianths $\frac{1}{6}$ in. diam. broader than long transversely 2-valved, staminal column a laterally compressed 2-fid fleshy cup clothed with numerous and deeply inflexed anthers.

SINGAPORE; in jungles behind the Botanical Gardens, *Murton.*

A bushy tree, 30–40 ft. high, bark grey. *Leaves* 2–2¼ in. diam., darker brown above, pale not glaucous beneath; nerves very spreading; petiole ⅓–½ in. *Male panicles* quite glabrous; perianths the largest of the group, turgid, transversely oblong; pedicel as long as the valves; anther column an obconic compressed sessile fleshy cup, or rather a cup formed of the firmly united anther-cells, which are incurved as two inflexed opposite flaps, tips of the cells not free.—A plant from Roxburgh's Herbarium resembles this closely, but the leaves are more membranous

with more oblique nerves, and the inflexed anthers are confined to the upper part of an obconic stipes, as in *Irya*. It is probably one of the species described by Roxburgh in terms too brief to be of any use in identifying the plants intended.

** Anthers produced to the base of the column or not, cells more or less free, easily separable.

17. **M. Farquhariana,** *Wall. Cat.* 6795; glabrous except the panicle, leaves 5–10 in. oblong or linear- or elliptic-oblong acute or acuminate usually very glaucous beneath, nerves 8–20 pair, male panicles spreading, perianth bell-shaped 3-fid pubescent within, staminal column sessile, anthers free above, tips erect acute. *Hook. f. & Thoms. Fl. Ind.* 162; *Alph. DC. in Prodr.* xiv. 1. 200; *Beddome Fl. Sylv.* t. 270. M. paniculata, *Alph. DC. in Ann. Sc. Nat. Ser.* 4, iv. 31, and in *Prodr. l. c.*

DECCAN PENINSULA; from the Concan to Wynaad and Tinnevelly, ascending the Ghats to 2000 ft. MALACCA, PENANG and SINGAPORE, *Wallich*, &c., *Griffith* (*Kew Distrib.* 4355), *Maingay* (*Kew Distrib.* 1290, 1293, ?1302).—DISTRIB. Philippine Islands.

A tall tree, young parts pubescent; branches stout, grey. *Leaves* extremely variable in size, form and texture, nerves faint or strong; petiole $\frac{1}{2}$-$\frac{3}{4}$ in. *Male panicles* 3–8 in., rather slender, branched from the base; flowers fascicled, perianth $\frac{1}{8}$ in.; anthers 7–11, narrow, connectives attached behind and from the base to about the middle only, so that the anthers are easily detached by dissection. *Female panicles* 6–10-fld. *Fruit* 1–1$\frac{1}{4}$ in., subglobose, glabrous, aril lacerate.—This species is founded on Wallich's Singapore fruiting specimen; the identity in foliage of those and a Malaccan plant of Griffith with small flowers suggested their union in the "Flora Indica." As stated under *M. Griffithii*, there are specimens of that plant as like Wallich's type in foliage. In the "Flora Indica" the anthers are described as having involute tips, but this is not the case. Alph. DC. separates the Malayan specimens from the Deccan ones on characters taken from the foliage, but the leaves vary greatly in both countries, and identical forms are common to both.

18. **M. crassifolia,** *Hook. f. & Thoms. Fl. Ind.* 160; nearly glabrous, leaves 8–12 in. thickly coriaceous oblong obtuse or acute, base rounded or cuneate, nerves 12–15 pair, male panicle sparsely rusty-pubescent, perianth $\frac{1}{30}$ in. glabrous usually 2-fid, anthers 3–5 in a depressed ring, cells separable. *Alph. DC. in Prodr.* xiv. 1. 204. M. Horsfieldia, *Blume ?, Wall. Cat.* 6806, *in part.* M. Irya, *var.* crassifolia, *Miquel in Herb.*

MALACCA, *Griffith* (*Kew Distrib.* 4550). SINGAPORE, *Wallich, Anderson.*—DISTRIB. Borneo.

Branches very robust. *Leaves* 3–4$\frac{1}{2}$ in. diam., grey-brown above, red-brown beneath, nerves slender; petiole $\frac{3}{4}$–1 in., very stout. *Male panicle* 3–4 in., branched from near the base; flowers clustered, globose; anther-cells 6–10, slightly cohering by their backs, sessile, tips free, hardly incurved.

19. **M. polyspherula,** *Hook. f.*; glabrous except the panicle, leaves 6–10 in. linear-oblong or lanceolate obtuse acute or acuminate, nerves 8–16 pair base rounded or acute, male panicle rusty-tomentose, perianth globose $\frac{1}{35}$ in. diam. glabrous 2–4-cleft, anthers 4–6 in a depressed column, cells separable. M. globularia, *Hook. f. & Thoms. Fl. Ind.* 160; *Alph. DC. in Prodr.* xiv. 1. 202 (*not of Blume*). M. Horsfieldia, *Blume?, Wall. Cat.* 6806, *in part.*

SINGAPORE, *Wallich.* MALACCA, *Griffith* (*Kew Distrib.* 4351 *amygdalina*, and 4352 *globularia*); *Maingay* (*Kew Distrib.* 2286, *glabra*).

Branches stout, shoots slightly scurfy, bark grey. *Leaves* rarely 2 in. broad,

coriaceous, greenish grey above, brown beneath; nerves slender, nearly horizontal; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., stout. *Male panicles* 3–3$\frac{1}{2}$ in., branching from near the base, flowers pedicelled, glabrous, yellow, black when dry; anthers in a sessile broadly obconic trigonous truncate mass, anther-cells incurved and meeting in a tricrural line.—Specimens of *M. globularia* from Amboyna show that this was erroneously referred to that plant in "Flora Indica." From *M. amygdalina*, with which it was confounded in "Flora Indica," the stamens at once distinguish it.

20. **M. Griffithii,** *Hook. f.*; glabrous except the finely pubescent panicles and flowers, leaves 5–6 in. linear-lanceolate finely acuminate shining above glaucous beneath, base acute, nerves 8–10 pair very faint, male panicles slender, perianth globose $\frac{1}{20}$ in. diam. 2–3-cleft, anthers 8 in a globose sessile mass, cells separable.

MALACCA, *Griffith* (*Kew Distrib.* 4356). SINGAPORE, *Maingay* (*Kew Distrib.* 1306).

Leaves 1$\frac{1}{2}$–1$\frac{3}{4}$ in. broad, very coriaceous (smaller in Maingay's specimens), and 2$\frac{1}{2}$–3 by 1–1$\frac{1}{4}$ in., pale brown above, very glaucous beneath with a reddish midrib; petiole $\frac{1}{2}$ in. *Male panicle* narrow, rachis and distant branches very slender, naked below; flowers clustered, pedicel slender; anthers easily separable, curved, attached by the back with free tips and sides; cells confluent. Fruit "racemed, size of a cherry, pedicel $\frac{1}{2}$ in., pericarp thick with a deep longitudinal furrow; aril white, as long as the seed," *Griffith mss.*—In Maingay's specimens fruit "elliptic or subglobose $\frac{3}{4}$ in. long dirty orange minutely scurfy, aril complete pinkish convolute lacerate at the tip," *Maingay mss.* I cannot be certain of Maingay's and Griffith's plants being conspecific; their foliage is identical, but this is all undistinguishable from states of *M. Farquhariana.*

21. **M. Irya,** *Gærtn. Fruct.* i. 195, t. 41; leaves 6–10 in. linear- or elliptic-oblong acuminate glabrous, nerves 12–20 pair slender, perianth globose $\frac{1}{20}$ in. diam. glabrous 2–3-cleft, anthers 6–8 free in a ring crowning an obconic receptacle, fruit panicled globose. *Hook. f. & T. Fl. Ind.* 159; *Alph. DC. in Prodr.* xiv. 1. 202; *Miquel Fl. Ind. Bat.* i. 2. 64; *Beddome Forest. Man.* 176. M. javanica, *Blume Bijd.* 576, and *Rumph.* i. 190, t. 62. M. sphærocarpa, *Wall. Pl. As. Rar.* i. 79, t. 89, and *Cat.* 6796. M. exaltata, *Wall. Cat.* 6804, *in part.*

TENASSERIM, *Wallich.* SOUTH ANDAMAN ISLANDS, *Kurz.* MALACCA, *Griffith* (*Kew Distrib.* 4357), *Maingay* (*Kew Distrib.* 1291, 1292). CEYLON, not uncommon.—DISTRIB. Sumatra, Java, Borneo.

A tree, buds ashy. *Leaves* 2–3 in. broad, membranous at length coriaceous, dark brown above, lighter beneath, base rounded cuneate or acute; petiole $\frac{1}{2}$ in. *Male panicles* 3–6 in., very many-fld.; fem. shorter, perianths larger. *Fruit* 1 in. diam., glabrous; pericarp coriaceous; aril thin, entire, yellow or reddish, seed globose.—With the habit inflorescence and minute flowers of Sect. *Pyrrhosa,* this has nearly the staminal column of a *Knema.*

Sect. III. **Knema.** *Male flowers* fascicled on the top of a short stout peduncle or tubercle; pedicels with a persistent bracteole about the middle (under the flower in *M. Cantleyana*). *Anthers* short, in a whorl round a peltate disk.

22. **M. Hookeriana,** *Wall. Cat.* 6802 A; branchlets very stout leaves beneath and panicle most densely flocculent and woolly, leaves 1–2 ft. at length glabrate and glaucous beneath linear-oblong or narrowed downwards obtuse or acute, petiole short thick, nerves 20–30 pair, male fl. $\frac{1}{3}$ in. diam. densely clustered on a short peduncle or tubercle 3-cleft, anthers about 20 on the margin of a long-stipitate orbicular peltate disk. *Hook. f. & Thoms. Fl. Ind.* 156; *Alph. DC. in Prodr.* xiv. 1. 204.

PENANG, *Wallich, Porter.* MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1279).

Branches as thick as the fore-finger; wool tawny, ¼ in. thick, flocculent. *Leaves* very variable in breadth, narrowest 12 by 2½ in., broadest 24 by 8 in., thickly coriaceous, pale brown and shining above, wool on under-surface deciduous in large flakes leaving the surface perfectly glabrous. *Male fl.* "crimson within," *Maingay*; pedicels ½–1 in. long, with a persistent bracteole about the middle; stamens pale rose, filaments very short, anthers deflexed; fem. fl. not seen. *Ovary* "rusty tomentose; stigma subsessile, disciform, concave, crenate-serrate," *Maingay*. *Fruit* 2½ in. long, ellipsoid, most densely woolly, perianth very thick; aril fleshy, lobed.—Wallich's 6802 B, without flower or fruit, is probably Laurineous.

23. **M. Cantleyi,** *Hook. f.*; branchlets robust and petioles and young leaves and inflorescence densely rusty-tomentose, leaves 9–12 in. oblong or linear-oblong coriaceous glaucous beneath, nerves 20–30 pair strong, male fl. clustered on a tubercle shortly stoutly pedicelled, perianth bracteolate at the base 3-fid, anthers 6–8 on the margin of a stoutly clavately stipitate small disk.

SINGAPORE, N. *Cantley.*

Branches stout with pale bark. *Leaves* 3–5 in. diam., dark brown above, young clothed with flocculent rusty fugacious wool which is more persistent on the midrib above, beneath finely pubescent (probably glabrate in age); petiole very short, stout. *Male fl.* ⅙–¼ in. diam., with the pedicels ¼–⅓ in. long; bracteole orbicular, appressed to the perianth; perianth-lobes short; staminal column small, anthers short sessile separate. *Fem. fl.* and *fruit* unknown.—This appears to be most nearly allied to *M. Hookeriana*; it differs from the other Indian species of this section in the bracteole being close under the perianth.

24. **M. longifolia,** *Wall. Cat.* 6801; branches scurfy or glabrous, leaves 1–2 ft. linear or linear-oblong or obovate-oblong obtuse glabrous glaucous beneath base rounded cordate or acute, nerves 20–40 pair stout, male fl. clavate ¼ in. diam. fascicled on a tubercle pedicelled 3-cleft, anthers 12–18 on the teeth of a long-stipitate circular disk, style long glabrous, stigma small toothed. M. longifolia, *in part, Hook. f. & Thoms. Fl. Ind.* 156; *Alph. DC. Prodr.* xiv. 1. 204; *Kurz For. Fl.* ii. 283. ? M. linifolia, *Roxb. Fl. Ind.* iii. 847.

SIKKIM HIMALAYA, in hot valleys, *Thomson.* ASSAM, SILHET and the KHASIA MTS., *Wallich*, &c. CHITTAGONG, *J. D. H. & T. T.* PEGU, MATABAN and TENASSERIM, *Kurz.*—DISTRIB. Ava.

A lofty tree, branchlets stout or slender, sometimes tomentose. *Leaves* extremely variable, usually linear, 12–18 by 2–2½ in., sometimes much broader, 18–24 by 6–7 in. and narrowed below the middle, thickly coriaceous, pale yellow-brown and shining above, nerves arched or nearly horizontal; petiole ½–1 in., stout, glabrous or tomentose. *Male fl.* very variable in size, ⅕–⅓ in. diam., densely tomentose, scarlet within; pedicel ⅙–⅔ in., bracteole obscure; anther-disk concave or plane; pedicel grooved, contained in the tubular base of the perianth; anthers short, deflexed. *Female* pedicels very short; ovary densely tomentose. *Fruit* 1–2 in. long, subglobose or ellipsoid, tomentose; aril pale, thin, lobed above the middle.—The Malayan plant referred to under this species in "Flora Indica" is *M. furfuracea.*

Var. *erratica*; leaves smaller 6–10 by 1½–2½ in. M. erratica, *Hook. f. & Thoms. Fl. Ind.* 156; *Alph. DC. in Prodr.* xiv. 1. 205. M. corticosa, *Hook. f. & Thoms. l. c.* 156, *in part.*—Khasia Mts. and Chittagong.—I fear this is only a small-leaved state of *M. longifolia*, and not even a variety; the stigma is identical, and the character taken from the top of the antheriferous disk being flat (in opposition to concave in *longifolia*), cannot be relied on. The flowers are, however, much more trigonously globose, and the stalk of the anther-disk is shorter.

25. **M. attenuata,** *Wall. Cat.* 6791; branchlets and inflorescence furfuraceously tomentose, leaves 5–9 in. elliptic-oblong or -lanceolate acute

or acuminate glaucous beneath, nerves 14–20 pair, male fl. fascicled on a short peduncle, pedicels slender, perianth subglobose 3-fid $\frac{1}{4}$ in. diam., anthers 12 on the toothed margin of a stipitate peltate disk, fruit ovoid beaked. *Hook. f. & Thoms. Fl. Ind.* 157; *Alph. DC. in Prodr.* xiv. 1. 205; *Beddome For. Man.* 176. M. corticosa, *Bedd. Fl. Sylv.* t. 271 (*not of H. f. & T.*). M. amygdalina, *Grah. Cat. Bomb. Pl.* 175; *Dalz. & Gibs. Bomb. Fl.* 4.

On the CONCAN GHATS, *Heyne, Dalzell,* &c. TRAVANCORE MTS., alt. 2–3000 ft., *Beddome.*

Branches slender, at length glabrous. *Leaves* 2–3 in. diam., thinly coriaceous, pale brown above; midrib and spreading nerves beneath stout, tomentose when young; base acute or rounded; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Male peduncle* $\frac{1}{6}$ in.; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., bracteolate above the middle. *Female* flower not seen; pedicels of fruit about as long as of the male fl. *Fruit* 1–1$\frac{1}{2}$ in. long, ellipsoid or ovoid with a short point or beak, densely furfuraceously rusty-tomentose; pericarp thin; aril entire, except towards the lobed apex.—Wallich's specimens (from Heyne) have nearly globose fruits; the Concan and Travancore ones have longer fruits with acute tips.

26. **M. glaucescens,** *Hook. f. & Thoms. Fl. Ind.* 157; branchlets and inflorescence rusty-hoary, leaves 4–6 (rarely 12) in. linear-oblong obtuse acute or acuminate glaucous beneath, nerves 12–20 pair, male and female fl. few fascicled on a very short peduncle long-pedicelled, male perianth subglobose, female turbinate, anthers about 10 on the toothed margin of a subsessile peltate disk with a flat top, stigma subsessile peltate toothed, fruit small subglobose, aril nearly complete. M. intermedia β. minor, *Miquel Fl. Ind. Bat.* i. 270. ? M. sumatrana, *Blume Rumph.* i. 187. M. corticosa, *in part, Hook. f. & T. l. c.* 158; *Alph. DC. in Prodr.* xiv. 1. 205, *in part*; *Kurz For. Fl.* 284. M. missionis ? & lanceolata, *Wall. Cat.* 6788, 6794. ? M. angustifolia, *Roxb. Fl. Ind.* iii. 847. ? Knema glaucescens, *Jack in Mal. Misc.* No. vii. 35, and in *Hook. Comp. Bot. Mag.* i. 149 (*not of Wallich*). ? K. corticosa, *Lour. Fl. Coch.* 742.

TENASSERIM, *Griffith, Helfer* (*Kew Distrib.* 4343, 4344, 4349), &c. ANDAMAN ISLANDS, *Kurz.* SINGAPORE, *Wallich.* MALACCA, *Griffith* (*Kew Distrib.* 4343), *Cumming* (No. 2315), *Maingay* (*Kew Distrib.* 1280, 1282, 1299). SINGAPORE, *Wallich, Murton.*—DISTRIB. Sumatra, Java.

I have retained the name adopted for this plant in the "Flora Indica," though there is no certainty of its being the *Knema glaucescens* of Jack; it, however, agrees with it in the important character of its very small fruit, which is ovate-oblong as described in the Flora, or nearly globose or ellipsoid (*Kurz*). It is no doubt the *M. lanceolata* and probably *missionis* of Wallich; the latter, from Heyne's Herbarium, was probably collected in the Straits and sent to that missionary. Whether it is the *M. sumatrana* of Blume and *M. angustifolia* of Roxburgh is altogether doubtful. The copious specimens received since the date of the "Flora Indica," show that the Tenasserim and Malayan plants included under *M. corticosa* in that work are not different from *M. glaucescens.* With regard to *M. glauca,* Blume, referred also in that work to *M. corticosa,* its fleshy aril divided low down should (according to his plate) separate it from *glaucescens,* but Javanese specimens named *glauca* and *corticosa* by Miquel and others only differ from the Indian plant in the larger fruit, and Kurz describes the aril of *corticosa,* H. f. & T., as "blood-red somewhat fleshy and lacerate;" and as to Loureiro's *Knema corticosa,* much more complete specimens are wanted before it can safely be identified with any Malayan species. The Andaman specimen of Kurz has leaves fully a foot long. The small leaves, subglobose male flowers $\frac{1}{4}$ in. diam., and turbinate female ones $\frac{1}{4}$ in. long, together with the subsessile or short styled peltate stigma, and small fruit $\frac{2}{3}$ in. long, with their furfuraceous pericarp and almost entire thin aril, well distinguish this species, whose proper name can only be determined when more is known of the plants quoted under it.

27. **M. laurina,** *Blume Rumph.* i. 139, t. 61; branches inflorescence and leaves beneath especially the nerves scurfily tomentose, leaves 9–12 in. oblong or linear-oblong acute or acuminate glaucous beneath, nerves 20–30 pair, base rounded or cordate, fruit 2–3 in. long subsessile on tubercles of the branch oblong-ovoid, pericarp thick densely scurfily tomentose, aril scarlet entire except at the lacerate tip, seed oblong. *Alph. DC. in Prodr.* xiv. 1. 206; *Miquel Fl. Ind. Bat.* i. 2. 70. M. tomentosa, *Blume Biid.* 577 (*not of Thunb.*).

MALACCA, *Maingay* (*Kew Distrib.* 1294).—DISTRIB. ? Java, Sumatra.

Without flower it is not possible to identify this, which may be a form of *M. furfuracea*, with any described plant. It agrees with Blume's figure and description of *M. laurina*, except in the more numerous nerves, and very much longer fruit. A plant from the Andamans, collected and named *M. laurina* by Kurz, resembles the Malacca plant except in the fruit, which is that of *glaucescens*, to which I refer it.

28. **M. intermedia,** *Blume Rumph.* i. 187; glabrous except the inflorescence and fruit, leaves 6–12 in. linear-oblong acuminate glabrous glaucous beneath, nerves 12–20 pair, male fl. $\frac{1}{6}$ in. diam. fascicled on tubercles of the branches pedicelled 3-gonously globose scurfily tomentose 3-cleft, anthers 12–18 on the toothed margin of a peltate disk with a pyramidal boss, fruit pedicelled ovoid-oblong finely pubescent base intruded. *Hook.f. & T. Fl. Ind.* 158; *Alph. DC. in Prodr.* xiv. 1. 206; *Miquel Fl. Ind. Bat.* i. 270 (*excl. var.* β.).

MALACCA, *Griffith* (*Kew Distrib.* 4359), *Maingay* (*Kew Distrib.* 1281, 1288). SINGAPORE, *Lobb.*—DISTRIB. Java.

Branchlets usually slender. *Leaves* narrow, $\frac{2}{3}$–$2\frac{1}{2}$ in. broad, rarely elliptic-oblong, very coriaceous, nerves strong, base acute obtuse or rounded, pale brown and shining with very prominent closely reticulated nerves above; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., stout, quite glabrous. *Male fl.* rufous-tomentose, pedicel $\frac{1}{3}$–$\frac{1}{2}$ in., stout, bracteolate in the middle; perianth subpyramidal; staminal disk subsessile, circular or trigonous, central boss 3-gonous; anthers short. *Fruit* $1\frac{1}{4}$ in. long, broadly oblong with a groove on one side, top rounded; aril thin, entire except at the tip.—The tubercles from which the flowers spring are often diseased and present a mass of brown floccose hairs, probably caused by insect puncture.

29. **M. gibbosa,** *Hook.f. & Thoms. Fl. Ind.* 158; glabrous except the inflorescence and fruit, leaves linear-lanceolate acuminate at both ends hardly glaucous beneath, nerves 15–30 pair, male fl. pedicelled fascicled on a peduncle urceolately campanulate 3-fid, anthers 10–12 on the margin of a long-stalked circular disk, fruit pedicelled oblong base gibbous and intruded. *Alph. DC. in Prodr.* xiv. 1. 205.

KHASIA MTS., *Griffith* (*Kew Distrib.* 4348); near Churra, *J. D. H. & T. T.* PEGU, *M'Clelland.*

Branchlets slender, glabrous. *Leaves* long and narrow, $1\frac{1}{4}$–2 in. broad, thinly coriaceous, nerves strong, pale brown, hardly shining above, sometimes a little glaucous beneath, nerves slender; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., slender, glabrous. *Male fl.* $\frac{1}{4}$ in. long, rufous-pubescent, a good deal like the female of *M. glaucescens*, constricted below the 3-fid limb; pedicel of antheriferous disk clavate. *Fruit* 1–$1\frac{1}{2}$ in. long, rather like *M. intermedia*, but gibbous at the base; aril entire, except at the top.

30. **M. furfuracea,** *Hook.f. & Thoms. Fl. Ind.* 159; branchlets petioles and inflorescence densely scurfily tomentose, leaves 6–14 in. linear-oblong obtuse acute or acuminate glaucous beneath, nerves 10–40 pair, male fl. fascicled on short peduncles or tubercles globosely 3-gonous 3-fid pedicelled, anthers about 10 on the toothed margin of a 3-gonous peltate shortly stipitate disk, fem. fl. larger sessile on tubercles, stigma sessile discoid

crenulate. *Alph. DC. in Prodr.* xxiv. 1. 206. M. longifolia, *Hook. f. & T. Fl. Ind.* 156 (*the Malayan plant*). Knema glaucescens, *Wall. Cat.* 6810 (*not of Jack*).

PENANG, *Porter*. MALACCA, *Griffith* (*Kew Distrib.* 4346, ? 4345), *Maingay* (*Kew Distrib.* 1287). SINGAPORE, *N. Cantley*.

Branchlets stout, older with black shining cracked bark. *Leaves* most variable in size, $\frac{3}{4}$–$1\frac{1}{2}$ in. diam., usually pale brown and shining above, base acute obtuse or cordate; nerves strong, arched; petiole usually very short, thick, and thickly furfuraceous, but sometimes more slender and glabrate. *Male fl.* about $\frac{1}{6}$ in. diam., pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., bracteolate about the middle; antheriferous disk orbicular or 3-gonous, flat; pedicel short but distinct. *Fem. fl.* ovoid, nearly $\frac{1}{3}$ in. long; stigma concave, many-toothed. *Fruit* $1\frac{1}{2}$ in. long, ovoid-oblong, densely scurfily tomentose; pericarp thick, aril entire except at the tip.—The black bark of the older branchlets seems a good character for this species. Griffith's No. 4345, from Malacca; has very numerous crowded flowers on a very short thick peduncle, with pedicel $\frac{1}{2}$ in. long, and 18 anthers on a less toothed disk.

DOUBTFUL, INDETERMINABLE AND EXCLUDED SPECIES.

M. FINLAYSONIANA, *Wall. Cat.* 6793, is *Melodorum fulgens* H. f. & T. (see vol. i. p. 82).

M. EUGENIÆFOLIA, *Alph. DC. in Prodr.* xxiv. 1. 190, described from leaf and fruit only, and placed in Section *Eumyristiceæ*, is indeterminable.

M. GLAUCESCENS, *Wall. Cat.* 6790, is *Tetranthera venulosa*, Meissn.

M. HEYNEANA, *Wall. Cat.* 6789; *Alph. DC. l. c.* 207, without flower or fruit, is probably Laurineous.

M. HOOKERI, *Wall. Cat.* 6802 B, is undeterminable.

M. INTEGRIFOLIA, *Steud. Nom.*, is *Myrica integrifolia*, Wall.

M. MICRANTHA, *Wall. Cat.* 6807; *A. DC. l. c.* 208, is a Siam plant, and not Indian.

M. MONTANA, *Roxb. Fl. Ind.* iii. 846; *Wall. Cat.* 6792, is referred by A. DC. (*Prodr.* xxiv. 1. 190) to *M. iners*, Blume. It has not been found in British India.

M. ? OBTUSIFOLIA, *Wall. Cat.* 6808; *H. f. & T. Fl. Ind.* 163; *A. DC. l. c.* 194, from Singapore, is indeterminable.

M. SAPIDA, *Steud. Nom.*, is *Myrica sapida*, Wall.

M. SESQUIPEDALIS, *Wall. Cat.* 6809 "an Laurin. fam.," from Penang, is *Actinodaphne sesquipedalis*, Hk. f. & T.

MYRISTICA ? *Wall. Cat.* 9017, from Silhet, *Gomez*, is not of this genus.

MYRISTICA; Malacca, *Maingay* (*Kew Distrib.* 1298), in fruit only, is a very fine probably new species, with very coriaceous large glabrous leaves rounded at the base, dark brown when dry, and oblong fruit $2\frac{1}{2}$ in. long, in large long-peduncled panicles; pericarp very thick; seed ellipsoid, 2 in. long, beautifully mottled, pale brown and white.—The following is Dr. Maingay's description of the fruit: "ovoid-elliptic, 2 by $\frac{8}{10}$ in., dark green, perfectly glabrous, dotted with black; seed 2 in., cylindric-elliptic; aril complete, fleshy, blood-red, tip lacerate."

MYRISTICA; Malacca, *Maingay* (*Kew Distrib.* 1301), has slender pale glabrous branchlets with finely tomentose fulvous tips; elliptic pale greenish leaves $2\frac{1}{2}$–3 in. long, shining above paler beneath with 6–10 pair of very slender nerves; fruit ovoid, 1–$1\frac{1}{4}$ in. long, long-peduncled, fascicled on a tubercle of the stem, keeled on one side and gibbous at the intruded base, pericarp thin, aril entire, seed small ovoid.—The following is from Dr. Maingay's notes: "Fruit elliptic-ovate, $1\frac{1}{2}$ by 1 in., suddenly narrowed into a short stalk, keeled at the suture of the valves, pale greenish-orange, rusty-puberulous; seed $\frac{9}{10}$ by $\frac{6}{10}$ in. elliptic; aril complete, blood-red, tip lobulate, testa pale membranous, tegmen crustaceous."

MYRISTICA; Singapore, *Maingay* (*Kew Distrib.* 1297), closely resembles *M. fur-*

furacea in habit and foliage; fem. flowers densely crowded forming almost globose fascicles on tubercles of the stem, clavate, with the stout pedicel ¼ in. long, densely rufous-tomentose; stigma subsessile with 3–4 radiating teeth.—Apparently the same species is sent by Murton also from Singapore, with leaves glabrous and glaucous beneath.

Order CXXVII. **MONIMIACEÆ.**

Trees or shrubs, often aromatic. *Leaves* opposite, rarely alternate, entire or serrate, usually coriaceous, exstipulate. *Flowers* 1–2-sexual, regular, usually in short cymes or racemes; bracts small or 0, or 2 valvately enclosing the bud. *Perianth* inferior, globose ovoid or depressed, rarely campanulate; limb 4-many-toothed, teeth in one or several series, equal or the outer sepaloid and inner petaloid, or various, or obsolete, when the mouth closes over the ovary. *Stamens* few or many, in one or many series on a disk adnate to the perianth-tube, included; filaments short, simple or with a basal scale; anthers erect, 2-celled, bursting by slits or valves. *Carpels* many, rarely solitary, sessile in the base or on the sides of the perianth-tube, or immersed in a disk, 1-celled; styles long or short, stigma small; ovule solitary, erect or pendulous, anatropous or orthotropous. *Fruiting carpels* free, enclosed in the perianth or exposed on a discoid receptacle, indehiscent. *Seed* erect or pendulous, testa membranous, albumen fleshy; embryo usually next the hilum and minute, cotyledons erect or diverging, radicle superior or inferior.—Genera 22; species about 150, tropical and temperate.

* Drupes on an enlarged disciform receptacle, fem. perianth circumsciss.

Anther-cells confluent	1. KIBARA.
Anther-cells parallel, distinct	2. MATTHÆA.

** Drupes on a small receptacle, perianth-lobes persistent. 3. HORTONIA.

1. **KIBARA,** *Endl.*

Aromatic trees or shrubs. *Leaves* opposite, entire or toothed. *Flowers* 1-sexual, small, in short axillary or lateral cymes or panicles; bracts minute or 0. MALE FL. *Perianth* short, teeth or lobes 4, 2-seriate; mouth contracted. *Disk* annular or tubular. *Anthers* subsessile, 5–8, 2-seriate, cells confluent above. FEM. FL. *Perianth* circumsciss above the disk. *Carpels* many, free; style very short; ovule pendulous, anatropous. *Ripe carpels* sessile or stipitate on a dilated receptacle. *Seed* pendulous; embryo small, axile, radicle superior.—Species 10, Eastern Tropical Asia, Australia.

K. coriacea, *Endl. Gen. Pl.* 314; leaves elliptic obtuse acute or acuminate subentire, cymes umbellately compound puberulous much branched exceeding the petioles. *A. DC. Prodr.* xvi. 2. 670; *Miquel Fl. Ind. Bat.* i. 2. 73. *Tulasne in Archiv. Mus.* viii. 404. K. Blumei, *Steud. Nomencl. Ed.* 2; *Blume Mus. Bot.* ii. 88, f. 9. Brongniartia coriacea, *Blume Bijd.* 436. Sciadicarpus Brongniartii, *Hassk. Plant. Jav. Rar.* 209. Sarcodiscus chloranthiformis, *Griff. Notul.* iv. 381, and *Ic. Pl. Asiat.* t. 545.

MALACCA, *Griffith, Maingay.*—DISTRIB. Java, Sumatra, Celebes.

A tree, branches stout, smooth, and leaves when dry yellowish. *Leaves* 5–10 in., coriaceous, obscurely toothed towards the tip; midrib puberulous beneath. *Cymes*

branched from the base; branches and pedicels long, slender. *Perianth* 2-bracteolate, pyriform, $\frac{1}{6}$ in. long, "closed by scales arranged in an alternating series of twos and threes," *Maingay*. *Stamens* 5–7, included; anthers dehiscing apically and transversely. *Drupes* 1–15, $\frac{1}{2}$–1 in. long, seated singly on fleshy lobes of the orange-cold. receptacle, umbelled on the thickened peduncle, subtended by the excessively thickened reflexed perianths, ellipsoid, tip rounded, purple-black.—Beccari (Malina, 186) describes a variety from the Arou Islands.

2. **MATTHÆA,** *Blume.*

A glabrous shrub. *Leaves* opposite, entire or subserrate, coriaceous. *Flowers* fascicled, axillary, pedicelled. *Perianth* depressed-turbinate, mouth central, very minute obtusely 4-toothed, at length circumsciss. *Stamens* 4–6, filaments fleshy; anthers 2-celled, dehiscence lateral. *Pistillode* of male fl. minute. *Carpels* very many, covering a broad flat receptacle; style very short, conical; ovule pendulous, anatropous. *Ripe carpels* long-stipitate, seated on the thickened receptacle, and perianth ellipsoid.

M. sancta, *Blume Mus. Bot.* ii. 89, fig. 10; *A. DC. Prodr.* xvi. 2. 669; *Miquel Fl. Ind. Bat.* i. 2. 74.

Malacca, *Maingay*.—Distrib. Sumatra, Borneo.

Branches terete, smooth. *Leaves* 6–9 by 2–3½ in., coriaceous, oblong, shortly acuminate, base acute; nerves very spreading, slender; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Peduncles* $\frac{1}{6}$–$\frac{1}{2}$ in. long, rather stout, puberulous. *Flowers* $\frac{1}{3}$ in. diam. *Ripe carpels* $\frac{3}{4}$ in. long, numerous, about as long as their slender stalks, dark purple.

3. **HORTONIA,** *Wight.*

An aromatic shrub. *Leaves* opposite, subentire, coriaceous. *Flowers* 2-sexual, in short axillary cymes; bracts small or 0. *Perianth-tube* short, campanulate; lobes many, many-seriate, outer sepaloid, inner petaloid. *Disk* hairy. *Stamens* 7–12, 1–2-seriate; filaments short, base 2-glandular; anther-cells parallel, extrorse. *Carpels* numerous, sessile, style short or 0; ovule pendulous, anatropous. *Ripe carpels* obliquely ovoid, seated on a small receptacle surrounded with the withered thickened perianth-lobes. *Seed* flattened, albumen fleshy; cotyledons erect or divergent, radicle short superior.

H. floribunda, *Wight in Jard. Mag. Zool. & Bot.* ii. 546; *Thwaites Enum.* 11; *Hook. f. & Thoms. Fl. Ind.* 166.

Ceylon; Central Province, alt. 4–7000 ft.

A glabrous aromatic bush; branches stout or slender, terete; buds puberulous. *Leaves* very variable in form, usually red-brown when dry, but sometimes green or yellowish; nerves few; petiole $\frac{1}{3}$ in. *Cymes* glabrous or puberulous, $\frac{1}{2}$–3 in. long; flowers pedicelled, alternate or subumbellate, greenish-yellow, pedicels $\frac{1}{6}$–$\frac{1}{2}$ in., stout or slender. *Perianth* $\frac{1}{3}$ in. diam. *Fruit* $\frac{1}{2}$ in. long, ellipsoid, subacute, red-black.—A very variable plant. Thwaites had doubts of the permanent distinctness of var. β I have, in making its varieties, regarded as the type the commonest form, which is that on which the genus was founded.

H. floribunda proper; leaves 3–5 by 1–2 in. ovate-lanceolate obtusely acuminate, nerves arching. H. floribunda *var.* acuminata, *Hook. f. & Thoms. Fl. Ind.* 166; *Thwaites Enum.* 12. H. floribunda & acuminata, *Wight Ic.* 1997, 1998, *right-hand figure*; *A. DC. Prodr.* xvi. 2. 272, *excl. syn. angustifolia*; *Tulasne in Arch. Mus.* viii. 427.

Var. *ovalifolia*, Hook. f. & Thoms. l. c.; leaves 2–4 by 1½–2 in. broadly elliptic or oblong obtuse or apiculate, nerves spreading. *Thwaites l. c.* H. ovalifolia, *Wight Ic.* t. 1998, *left-hand figure*; *A. DC. l. c.*; *Tulasne l. c.* 428.

Var. *angustifolia*, Thwaites l. c.; leaves 4–6½ by 1–1½ in., linear-lanceolate acuminate 3-nerved from above the base, nerves parallel to the margin, cymes very slender.—Galle.

Order CXXVIII. **LAURINEÆ.**

Aromatic, erect, trees or shrubs (except *Cassytha*). *Leaves* alternate, rarely opposite or deciduous, gland-dotted, exstipulate. *Flowers* (except *Cassytha* and *Hernandia*) 1–2-sexual, regular, in axillary cymes clusters panicles or racemes; bracts 0 or deciduous, often involucriform. *Perianth* inferior, tube sometimes enlarged in fruit; limb usually 6-cleft. *Stamens* usually a multiple of the perianth-lobes, in 2–4 series on the tube, filaments flattened; inner or some or all the filaments often 2-glandular at the base; anthers erect, 2–4-celled (1-celled in *Syndiclis*), cells opening by upcurved at length deciduous lids. *Ovary* sessile in the base of the perianth-tube, 1-celled; style terminal, stigma simple or discoid or dilated; ovule solitary, pendulous from the top of the cell, anatropous. *Fruit* on an often thickened peduncle, fleshy or dry, indehiscent, naked or (in *Cryptocarya*) enclosed in or adnate to the perianth-tube. *Seed* pendulous, testa membranous, albumen 0; cotyledons plano-convex, fleshy, radicle superior minute.—Genera 34, species about 900.

The species of this Order are very difficult of discrimination without fruits, and the genera are in some cases far from natural; the character of 2- and 4-celled authers separating generically plants otherwise very nearly related.

Tribe I. **Perseaceæ.** Shrubs or trees. Third row of *stamens*, if present, with the anther-cells opening outwards by valves. *Inflorescence* lax-fld.

* *Anthers* 2-celled. *Fruit* enclosed in the perianth-tube.

Perianth-segments 6, subequal . . . . . 1. Cryptocarya.

** *Anthers* 2- rarely 1-celled. *Fruit* not enclosed wholly in the perianth-tube.

† *Stamens* 9 *in* 3 *series*; *4th series* 0 *or of staminodes only.*

Staminodes ovate or cordate. Fruiting perianth 6-fld., enlarged . . . . . 2. Apollonias.
Staminodes ovate or cordate. Fruiting perianth not enlarged . . . . . 3. Beilschmiedia.
Staminodes 0 or imperfect. Fruiting peduncle swollen . 4. Dehaasia.

†† *Perfect stamens* 3; *anthers* 2-*celled* . . . 5. Endiandra.

††† *Perfect stamens* 4; *anthers* 1-*celled* . . . 6. Syndiclis.

*** *Anthers* 4-celled. *Perfect stamens* 9.

Fruiting perianth with deciduous lobes and persistent base wholly or in part . . . . . 7. Cinnamomum.
Fruiting perianth with persistent, reflexed lobes . . . . 8. Machilus.
Fruiting perianth with persistent, erect lobes . . . . . 9. Phœbe.
Fruiting perianth wholly deciduous; pedicel greatly thickened . . . . . 10. Alseodaphne.

Tribe II. **Litseaceæ.** All the anthers opening inwards.

* *Anthers 4-celled.*

Flowers dicœcious, enclosed in densely imbricating bracts . . 11. ACTINODAPHNE.
Flowers dicœcious, umbelled, umbels involucrate . . . . . 12. LITSEA.
Flowers 2-sexual, solitary or panicled, enclosed in imbricating bracts . . . . . 13. DODECADENIA.

** *Anthers 2-celled.*

Flowers umbelled, umbels involucrate . . . . . 14. LINDERA.

TRIBE III. **Cassytheæ.** Twining leafless herbs or shrubs. Flowers of *Perseaceæ*.

15. CASSYTHA.

TRIBE IV. **Hernandieæ.** Trees. Anther-valves opening laterally.

16. HERNANDIA.

1. CRYPTOCARYA, *Brown.*

Evergreen trees or shrubs. *Leaves* rarely subopposite, 3- or penni-nerved. *Flowers* small, 2-sexual, in axillary and subterminal panicles. *Perianth* ovoid or turbinate ; lobes 6, subequal. *Perfect stamens* 9, those of the 1st and 2nd series eglandular, anthers introrsely 2-celled; of the 3rd series 2-glandular, anthers extrorsely 2-celled; staminodes of 4th series stipitate. *Fruit* wholly included in and often adnate to the oblong or globose perianth-tube.—Species about 40, tropical and subtropical.

A. Species of North-Eastern India and the Malay Peninsula..

* *Adult leaves tomentose or pubescent, at least on the nerves and midrib beneath.*

1. **C. Griffithiana,** *Wight Ic.* t. 1830; branchlets inflorescence and leaves beneath densely rusty-villous, leaves 8–12 in. very coriaceous oblong caudate-acuminate shining above glaucous beneath, nerves very strong, panicles short and shortly peduncled, flowers subsessile crowded mixed with long bracts, fruit globosely flask-shaped. *Kurz For. Fl.* ii. 295. C. infectoria & caudata, *Meissn. in DC. Prodr.* xv. 1. 68.

TENASSERIM (South), *Kurz.* MALACCA, *Griffith, Maingay.*

A small evergreen tree ; branchlets stout. *Leaves* 2–4 in. broad, rarely rounded-ovate, margin usually recurved ; nerves 8–10 pair, sunk above ; midrib rusty-pubescent, tip sometimes 1 in. long ; petiole $\frac{1}{3}$ in., very stout. *Panicles* 1–2 in., oblong. *Flowers* about $\frac{1}{6}$ in. diam., perianth-tube very short. *Fruit* globose, narrowed into a thick neck exactly like a round-bellied flask, 2–3 in. diam., smooth, black, shining, pedicel and peduncle greatly enlarged.—Wight was the first to publish this as *Griffithiana*. Meissner, supposing it to be Blume's *Cylicodaphne infectoria* (Mus. Bot. ii. 11), has adopted (from Miquel) that specific name. I have seen no authentic specimen of Blume's plant, of which Meissner makes a variety *C. infectoria β. acuminata,* giving Borneo as the habitat ; but the Borneo plant differs from the Malaccan not only in the short apex of the leaf, but in the elliptic or oblong fruit.

2. **C. impressa,** *Miquel Fl. Ind. Bat.* i. 923; branchlets inflorescence and leaves beneath densely finely rusty-tomentose, leaves 3–6 in. very coriaceous elliptic or oblong shortly acuminate opaque above, nerves 4–6 pair very strong beneath, panicles often equalling the leaves loosely branched, flowers pedicelled, bracts deciduous. C. infectoria γ. opaca, *Meissn. in DC. Prodr.* xv. 1. 69. C. venosa, *Meissn. mss.*

MALACCA, *Griffith* (*Kew Distrib.* 4277), *Maingay* (*Kew Distrib.* 1250).—DISTRIB. Sumatra.

Referred by Meissner to a form of his *infectoria,* but abundantly distinct in the

short tomentum, much smaller leaves opaque above, with short points, petioles twice as long, long loose panicles, and smaller flowers. The fruit is undescribed.—King regards this as *C. crassinervia*, Miquel, of Sumatra, and he may be right. I have seen no authentic specimens of either *impressa* or *crassinervia*.

3. **C. andamanica,** *Hook. f.*; branchlets inflorescence and leaves beneath densely rusty-tomentose, leaves 3–5 in. coriaceous linear-oblong acute shining flat and even above subglaucous beneath, nerves 10–14 pair strong beneath, panicles peduncled compound shorter than the leaves, flowers pedicelled, fruit long-pedicelled narrowly ellipsoid. C. tomentosa, *Herb. Hort. Calc., not of Blume.*

ANDAMAN ISLANDS, *Herb. Hort. Calcutt.*

Branchlets stout. *Leaves* 1½–2½ in. broad, very pale on both surfaces when dry, margins flat, nervules beneath very fine. *Panicles* sometimes as long as the leaves; branches erecto-patent, rather dense-fld. *Flowers* pale when dry, $\frac{1}{10}$ in. long; tube of perianth shorter than the lobes. *Fruit* 1–1½ in., subacute at both ends, quite smooth; peduncle ½ in., swollen.—This differs from *C. tomentosa* in the more numerous nerves and shape of the leaves.

4. **C. rugulosa,** *Hook. f.*; branchlets and leaves beneath finely rusty-pubescent, leaves 3–5 in. linear-oblong acute or acuminate rugose and shining above, beneath with 5–8 pairs of strong nerves, panicles hoary rather slender much branched as long as the leaves, flowers pedicelled minute, fruit globosely flask-shaped.

MALACCA, *Maingay* (*Kew Distrib.* 1262).

A very distinct species, allied to *C. Griffithiana*, but much smaller in all its parts, not villous, with slender much-branched panicles of very small pedicelled flowers; the fruit is of nearly the same shape, but only ⅔ in. long.—King takes this to be Miquel's *C. impressa* of Sumatra; he may be right, but it differs from the description.

5. **R. Ferrarsi,** *King in Herb. Hort. Calcutt.*; branchlets and leaves beneath very finely rusty-pubescent, leaves 6–9 in. thinly coriaceous narrowly linear-oblong narrowed into the petiole acute or acuminate flat and smooth above subglaucous beneath, nerves 12–15 pair tomentose beneath, panicles very long-peduncled, fruit small narrowly ovoid.

ANDAMAN ISLANDS, *Herb. Hort. Bot. Calc.*

A shrub; branches elongate. *Leaves* about 2 in. broad, pale above, not shining; base very acute; petiole ½–¾ in., pubescent. *Fruiting panicle* 4–6 in. *Fruit* ½ in. long, smooth, even, obtuse; peduncle ¼ in., stout.

** *Adult leaves quite glabrous beneath.*

6. **C. amygdalina,** *Nees in Wall. Pl. As. Rar.* ii. 69, and *Syst. Laurin.* 208; branchlets and inflorescence hoary-pubescent, leaves 3–8 in. coriaceous elliptic or oblong acute or obtuse quite glabrous shining above opaque beneath with 6–10 pair of strong straight very oblique nerves, panicles as long as the leaves long-peduncled, fruit elliptic or cylindric-oblong. *Meissn. in DC. Prodr.* xv. 1. 72 and 507. C. floribunda, *Nees l. c.*; *Meissn. l. c.* 71. Laurus amygdalina, *Ham. in Wall. Cat.* 2585. L. floribunda, *Wall Cat.* 2593, *in part.*

NEPAL, *Wallich.* SIKKIM; at the foot of the hills, *King.* ASSAM, SILHET and the KHASIA MTS., *Hamilton, Wallich, Griffith.* ? ANDAMAN ISLANDS, *Herb. Hort. Bot. Calc.*

A tree; branches spreading. *Leaves* rigid, pale brown (not glaucous) beneath; base acute or obtuse; nervules faint, costa sometimes faintly hairy; petiole ½–¾ in., hoary. *Panicles* long-peduncled, often very large and much branched, pedicels

jointed. *Flowers* $\frac{1}{10}$ in.; perianth-tube as long as the lobes. *Fruit* $\frac{3}{4}$ in. long, very shortly pedicelled, obtuse, quite smooth and even.—The Andaman specimens have much longer and more coriaceous leaves, 6–7 in. long, and a more turgid fruit; they may prove specifically distinct.

7. **C. enervis,** *Hook. f.*; branchlets slender and leaves quite glabrous, leaves 4–5 in. elliptic-lanceolate caudate-acuminate base narrowed into the slender petiole subglaucous beneath, nerves 6–8 pair very faint on both surfaces, fruit globose.

MALACCA, *Griffith* (*Kew Distrib.* 4336).

Branches black when dry. *Leaves* thinly coriaceous, $1\frac{1}{4}$–2 in. diam., brownish green, smooth and even above when dry with faintly raised obliquely arching nerves, violet brown beneath, with very faint nerves and obsolete nervules; petiole $\frac{1}{3}$ in. *Panicles* apparently slender and shorter than the leaves. *Fruit* $\frac{1}{2}$ in. diam., smooth, even, not shining, with an obtuse very short tip.—A very distinct species, without flowers, remarkable for the slender branches and very faint nerves of the leaf.

8. **C. Kurzii,** *Hook. f.*; branchlets slender black and leaves glabrous, leaves shortly petioled 4–8 in. oblong or linear-oblong or -oblanceolate obtusely acuminate smooth and shining above, glaucous brown beneath, nerves about 8 pair strong beneath, panicles shorter than the leaves nearly glabrous, flowers minute hoary. C. Wightiana, δ. Griffithii, *Meissn. in DC. Prodr.* xv. 1. 70 (*excl. the Canara plant*). C. ferrea, *Kurz For. Fl.* ii. 295 (*not of Blume*).

TENASSERIM; Mergui, *Griffith* No. 1142 (*Kew Distrib.* 4274).

Branchlets black when dry. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ in. diam., thinly coriaceous, base acute; nerves oblique, finely reticulated beneath; petiole $\frac{1}{4}$ in., stout. *Flowers* pedicelled, $\frac{1}{12}$ in. long.—This may, as Kurz holds, be referable to *C. ferrea,* which it is very near; but in all the (indifferent) specimens of *ferrea* that I have seen, the branches are stouter and pale when dry, the panicle pubescent and flowers larger. Without knowing the fruit (which is linear-oblong and $\frac{3}{4}$ in. long in *C. ferrea* var. *Mentek*) it is impossible to identify this with the Javanese plant. It differs entirely from *Wightiana* in foliage and pubescence of panicle.

9. **C. ferrea,** *Blume Bijd.* 557 ?; branchlets stout pale and panicle pubescent or puberulous, leaves 4–8 in. glabrous linear- or elliptic-oblong or lanceolate obtusely acuminate smooth hardly shining above glaucous brown beneath, nerves 8–12 pair strong beneath, panicles often equalling the leaves hoary, flowers minute, fruit (in Java specimens) linear-oblong. *Meissner in DC. Prodr.* xv. 1. 69; *Nees Syst. Laurin.* 216; *Miquel Fl. Ind. Bat.* i. 921.

MALAY PENINSULA; Pomerong Johore, *Cantley* (No. 8).

Under *L. Kurzii* I have indicated the differences between that and this, which quite agrees with Javan specimens of *ferrea,* though it is impossible to identify it certainly without the fruit.

10. **C. cæsia,** *Blume Bijd.* 335 ?; whitish, branchlets petioles and panicles rusty-pubescent, leaves 5–7 in. glabrous oblong or elliptic-oblong acuminate smooth above glaucous white beneath, nerves 6–10 pair arched and strong beneath, nervules very fine, panicles often longer than the leaves, flowers hoary, fruit globose. *Meissn. in DC. Prodr.* xv. 1. 71; *Miquel Fl. Ind. Bat.* i. 925.

ANDAMAN ISLANDS; *Herb. Hort. Bot. Calc.*—DISTRIB. Java.

Branchlets rather stout. *Leaves* firmly coriaceous, 2–3 in. diam., base rounded or acute, midrib and nerves beneath sometimes slightly pubescent; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Panicles* large with spreading branches; flowers $\frac{1}{8}$ in. long, pedicelled. *Fruit* fleshy,

⅔ in. diam.—King notes this as either *cæsia* or a new species; it agrees with Blume's character of *cæsia* except in that the midrib beneath is almost quite glabrous. The fruit of the Javan plant being unknown, the identification is not sure. A similar plant, but with shorter petioles, more nerves and more pubescent flowers, occurs in Celebes. Meissner regards the Javan *cæsia* as perhaps a var. of *ferrea*, from which the Indian plant seems to be very distinct.

11. **C. ? Andersoni,** *King in Herb. Hort. Bot. Calc.*; very robust, leaves 8–12 in. long-petioled glabrous elliptic acute at both ends thickly coriaceous finely reticulated above red-brown beneath with 10 pairs of very oblique stout nerves and transverse nervules, panicle very large stout corymbose and much branched hoary-pubescent, flowers minute.

ASSAM, *Jenkins in Herb. Hort. Calc.*

I have seen only a leaf, a portion of a panicle and a drawing (lent by Dr. King) of this remarkable plant, which resembles no other of the Order in foliage or flowers. The panicle is 8 in. long, and must have been as broad at the top, the peduncle is as thick below as a goose-quill, black and shrunken when dry (as if soft when fresh); it branches repeatedly corymbosely from low down, the ultimate divisions flowering at the tips; the flowers are about $\frac{1}{16}$ in. diam., on pedicels of the same length; perianth-segments oblong, obtuse; stamens short, glabrous; ovary ovoid, style short, stigma discoid.

B. Species of Ceylon and Western India.

12. **C. Wightiana,** *Thwaites Enum.* 254; branchlets and inflorescence rusty-pubescent or puberulous, leaves 4–10 in. rigidly coriaceous elliptic or oblong acuminate glabrous smooth hardly shining above, glaucous white and glabrous or faintly puberulous beneath with 6–10 pair of strong arched nerves, panicles spreading equalling or shorter than the leaves, fruit globose. *Meissn. in DC. Prodr.* xv. 1. 70 (*excl. var.* δ.); *Beddome Forest. Fl.* t. 299. C. floribunda, *Wight Ic.* t. 1829 (*not of Nees*); *Dalz. & Gibs. Bomb. Fl.* 222.

DECCAN PENINSULA; from Canara southwards. CEYLON; ascending to 5000 ft.

A tall tree; branches rather stout, often lenticellate. *Leaves* variable in breadth, 1½–4 in., strongly reticulate beneath, base rounded or acute; petiole ½–1 in. *Panicles* very many-fld.; flowers pedicelled, ⅛ in. long. *Fruit* ½ in. diam., smooth, black, glossy. —Wight figures and describes the Ceylon plant as having oblong fruit, as does Meissner, but Thwaites correctly states it to be globose. I have seen no fruit of Peninsular specimens. Meissner's vars. *parvifolia* and *lanceolata* are not separable from the type.

13. **C. Stocksii,** *Meissn. in DC. Prodr.* xv. 1. 71; branches and panicles rusty-tomentose, leaves 2½–4 in. rigidly coriaceous oblong obtuse or rounded at the tip glabrous smooth above, glaucous beneath with 6–7 pair of stout pubescent or glabrous nerves, panicles shorter than the leaves stout dense-fld., fruit ovoid. C. neilgherriensis, *Meissn. l. c.*

DECCAN PENINSULA; Canara, *Stocks*, &c.; Nilghiri Hills, *Wight*; Anamallay Hills, *Beddome*.

A large tree, very near *C. Wightiana*, but the leaves are much smaller, shorter-petioled, and usually very obtuse; the panicles short, contracted, and dense-fld., the flowers larger, and the fruit only ⅓ in. long and ovoid, not shining.

14. **C. membranacea,** *Thwaites Enum.* 254; branchlets slender and panicles rusty-pubescent, leaves 3–5 in. glabrous membranous elliptic-oblong acute or acuminate finely reticulated on both surfaces, beneath somewhat glaucous with 5–7 pair of strong nerves, panicles very small few-fld., fruit

oblong-ovoid. *Meissn. in DC. Prodr.* xv. 1. 72; *Beddome Forest Man.* 185.

CEYLON; in the Saffragam district, alt. 2000 ft., *Sir J. Mackenzie, Thwaites.*

A tree of middle size; branches very slender. *Leaves* 1¼–2 in. diam., hardly shining but beautifully reticulated above, reddish brown, base narrowed into a slender petiole of ¼–⅓ in. *Panicles* ½–⅓ in. long, few and lax-fld.; flowers pedicelled, 1/10 in. long. *Perianth-tube* rather longer than the limb. *Fruit* (not seen) about ½ in. long, black-purple.

DOUBTFUL SPECIES.

CRYPTOCARYA sp., from the Anamallay Hills, alt. 3000 ft., *Beddome*, closely resembling *C. Griffithiana*, Wight, but in too young a state for determination.

CRYPTOCARYA sp., from Tenasserim, alt. 5000 ft., *Beddome*, a fragment in flower with very membranous leaves, resembles *C. costata*, Blume, of Java.

2. APOLLONIAS, *Nees.*

Evergreen trees. *Leaves* scattered, penninerved. *Flowers* 2-sexual, small, in axillary and subterminal panicles. *Perianth-tube* short; lobes 6, subequal. *Perfect stamens* 9; filaments filiform, 1st and 2nd series eglandular with introrse 2-celled anthers, of 3rd series 2-glandular with extrorse 2-celled anthers, staminodes of 4th series ovoid or cordate. *Berry* globose or ovoid, with the 6-cleft hardened perianth at its base.—Species 2, a Canarian and the following.

A. Arnottii, *Nees Syst. Laurin.* 670; quite glabrous or young parts sparsely hairy, leaves lanceolate acuminate, panicles few-fld. long-peduncled. *Meissn. in DC. Prodr.* xv. 1. 65; *Wight Ic.* t. 1819; *Beddome Forest. Fl.* t. 291.

DECCAN PENINSULA; Malabar, Tinnevelly and Travancore, *Wight.*

Leaves 3–5 by ¾–1½ in., thinly coriaceous, young red-brown when dry, with sparse silky hairs beneath and on the young panicles, old quite glabrous, greenish-brown when dry, both ends very acute; nerves prominent but very slender on both surfaces; petiole ¼–½ in. *Panicles* 1–2 in., slender, erect or spreading, sparingly branched; flowers pedicelled, 1/8–1/6 in. diam. *Fruit* ¼–⅓ in. long, ovoid, acute, girt at the base by the hardened perianth.—This I should regard as forming (along with the Canarian species) a section of *Phœbe* with 4-celled anthers, which would, however, upset the present artificial arrangement of the genera in the Order.

3. BEILSCHMIEDIA, *Nees.*

Evergreen trees or shrubs. *Leaves* alternate or opposite, penninerved. *Flowers* small, 2-sexual, fascicled or panicled. *Perianth-tube* short; lobes 5, subequal. *Perfect stamens* 9; filaments of 1st and 2nd series eglandular with introrse 2-celled anthers, of 3rd series 2-glandular with extrorse anthers; staminodes of 4th series ovoid or cordate. *Fruit* ovoid oblong or globose, perianth wholly deciduous.—Species about 20, all tropical.

Sect. I. *Leaves* opposite or alternate; terminal buds very small, pubescent or tomentose, not enclosed in coriaceous scales (except *B. Clarkei*). *Flowers* 1/6–⅓ in. diam., broadly campanulate or cup-shaped.

* *Perianth cleft nearly to the base into linear or oblong segments.*

1. **B. Roxburghiana,** *Nees in Wall. Pl. As. Rar.* ii. 69, and *Syst. Laurin.* 198; terminal buds and inflorescence tomentose, leaves 7–9 in. ovate or ovate-lanceolate or elliptic-oblong obtusely acuminate shining and finely reticulate on both surfaces, panicles short shortly peduncled, fruit

2 in. long cylindric-oblong. *Meissn. in DC. Prodr.* xv. 1. 63 (*excl.* β); *Wight Ic.* t. 1828; *Kurz For. Fl.* ii. 293; ? *Brandis For. Fl.* 378; *Gamble Man. Ind. Timb.* 309. Laurus bilocularis, *Roxb. Fl. Ind.* ii. 311.

ASSAM; at Negrigam, &c., *Griffith*. TIPPERA, *Roxburgh*. TENASSERIM, *Helfer* (*Kew Distrib.* 4335).

A deciduous tree, branches woody. *Leaves* 2½–3½ in. broad, firmly coriaceous; nerves 10–12 pair, slender and prominent on both surfaces; base acute, rarely rounded, sometimes unequal-sided; petiole ½–1¼ in. *Panicles* 1–1½ in., subsilkily tomentose; bracts small, broad, caducous; pedicels as long as the flowers. *Perianth* ⅙ in. diam.; segments linear-oblong obtuse, hairy on both surfaces. *Stamens* pubescent; staminodes conical, tomentose. *Ovary* glabrous, stigma simple. *Fruit* pruinose, purple.—Wight's figure, copied from Roxburgh's drawings, represents the sepals as acute. Brandis and Gamble give Sikkim, ascending to 8000 ft., as its locality, and Kurz adds the Andaman Islands; the latter is likely, but not the former; and these *Laurineæ* are so very difficult of discrimination, that I suspect all unlikely habitats, to which may be added those of the Forests of Kumaon, Oude, and Nepal, mentioned by Brandis. (See *B. sikkimensis*.)

2. **B. fagifolia,** *Nees in Wall. Pl. As. Rar.* ii. 69, and *Syst. Laur.* 200; terminal buds and inflorescence pubescent, leaves 3–4 in. elliptic or elliptic-lanceolate obtusely acuminate, panicles very short crowded subsessile, young flowers enclosed in broad silky caducous scales, fruit ¼ in. ellipsoid-oblong. *Meissn. in DC. Prodr.* xv. 1. 64. Tetranthera fagifolia, *Wall. Cat.* 2539.

SILHET, *De Silva*. ? ASSAM, *Jenkins*.—DISTRIB. ? Munnipore.

A little known tree, very closely allied to *B. Roxburghiana*, but it has smaller more elliptic leaves on shorter petioles, very small panicles, and the bracts are apparently much larger and broader. The Silhet specimens are in flower only, they have very glabrous shining leaves 2½–3 in. long; the Assam ones are in fruit only, they have leaves 3–4½ in. long, sparsely puberulous beneath; the Munnipore ones (in flower) have more lanceolate shining glabrous leaves with shorter thicker petioles. The following variety strengthens my suspicion (shared by Kurz), that *fagifolia* and *Roxburghiana* are forms of a wide-spread Indian forest tree.

Var. ? *Dalzellii*, Meissn. in DC. l. c. (*excl. the Assam plant*); leaves 4–7 in. oblong or lanceolate very coriaceous and shining, base acute or obtuse, nerves more numerous, fruit 1–1½ in. ellipsoid-oblong or globose. B. fagifolia, *Beddome, Forest. Fl.* t. 263. B. Roxburghiana, *Dalz. & Gibs. Bomb. Fl.* 222.—Deccan Peninsula, in forests of the Western Ghats from the Concan southwards.—The flowers of this are identical with those of *B. fagifolia*, but if the Assam specimens of the latter plant are true, the fruit is considerably larger and broader. Dalzell describes it as a large forest tree. The Assam plant referred here by Meissner, is, I think, typical *fagifolia*.

3. **B. Clarkei,** *Hook. f.*; terminal buds and inflorescence tomentose, leaves 5–7 in. subopposite membranous elliptic-lanceolate acuminate not shining reticulate on both surfaces, panicles 3–4 in. peduncled lax-fld.

SIKKIM HIMALAYA; Reinak, alt. 4500 ft., *Clarke*.

A tree, 80 ft.; branches slender, rough, tips tomentose; bud-scales lanceolate, ⅛ in. long. *Leaves* thinner in texture than in any other Indian species, 1½–2 in. diam., very acute at both ends, beautifully reticulated with 10–12 pairs of nerves, dull green when dry; petiole ⅓–½ in., slender, pubescent. *Panicles* 12–20-fld., suberect, not densely tomentose; peduncle short and branches rather stout; flowers pedicelled. *Perianth* cup-shaped, ¼ in. diam., cleft nearly to the base; segments oblong, obtuse. *Filaments* broad, hairy; staminodes ovate-hastate, glabrous. *Fruit* not seen.

4. **B. sikkimensis,** *King in Herb. Hort. Calc.*; terminal buds pale tomentose, leaves 3–4 in. opposite elliptic oblong obtuse or subacute base obtuse or rounded opaque above, nerves strong beneath, fruit ellipsoid.

SIKKIM HIMALAYA and EAST NEPAL; alt. 4–5000 ft., *J. D. H.*, *King*.

Possibly a form of *B. Roxburghiana*, but the branches and leaves are all opposite, and the leaves much smaller and more rounded at both ends; the fruit is 1 in. long. Dr. King's specimens are in fruit only, mine gathered in E. Nepal I noted as being exactly like a small plum.—This is probably the tree referred to *B. Roxburghiana* by Gamble and Brandis, and stated to grow at 8000 feet elevation in Sikkim.

5. **B. malaccensis,** *Hook. f.*; terminal buds and young panicles rusty-pubescent, leaves 6–9 in. thickly coriaceous glabrous elliptic-oblong obtuse or subacute, nerves very strong beneath, panicles short axillary, peduncle and divaricating branches very stout, perianth deeply cleft, segments linear-oblong sparsely pubescent. B. Roxburghiana β.? malaccensis, *Meissn. in DC. Prodr.* xv. 1. 63.

MALACCA; *Griffith*, *Maingay* (*Kew Distrib.* 1260).

Branches very stout, woody. *Leaves* 2½–5 in. broad, rather shining above, beneath red-brown with 8–10 very stout arched nerves; petiole ⅓–½ in., very stout. *Panicles* horizontal, 2–3 in. long, very stout, shortly peduncled; flowers ⅓ in. diam., broadly campanulate, stoutly pedicelled. *Filaments* hairy; staminodes stipitate. *Ovary* glabrous, style rather slender. *Fruit* not seen.—An imperfect specimen of a plant much resembling this is in Kurz's Andaman Herbarium.

6. **B. macrophylla,** *Meissn. in DC. Prodr.* xv. 1. 63; branches very stout with terminal bud and petioles rusty-pubescent, leaves 10–12 in. alternate thickly coriaceous elliptic-oblong obtusely acuminate, nerves strong beneath, panicles very short, fruit globose. *Kurz For. Fl.* ii. 294.

TENASSERIM; at Mergui, *Griffith*.

Very near *B. malaccensis*, and possibly only a large-leaved form of that plant, but without fruit of the latter they cannot be identified.

†† *Perianth-lobes short, rounded.*

7. **B. Maingayi,** *Hook. f.*; branchlets terminal buds and inflorescence densely tomentose, leaves 8–10 in. alternate thinly coriaceous elliptic-oblong brown and opaque on both surfaces, nerves beneath rather slender, panicles short stout very dense-fld., flowers mixed with short broad coriaceous tomentose deciduous bracts, perianth shortly cleft, lobes rounded densely pubescent.

MALACCA, *Maingay* (*Kew Distrib.* 1268).

Branches very stout. *Leaves* red-brown when dry, base acute; petiole stout, ¾ in. *Panicles* 1–1½ in., peduncle very short and branches stout. *Flowers* (in bud only) ¼ in. diam. *Filaments* hairy; staminodes stipitate.

8. **B. Brandisii,** *Hook. f.*; leaves alternate 6–10 in. elliptic-oblong acuminate glabrous, panicles short pubescent, perianth with 5 rounded lobes, fruit 2–2½ in. long oblong.

ASSAM; in the Naraber Forest, Golaghat, *Brandis*.

A moderate-sized tree. *Leaves* thinly coriaceous, base acute; nerves 8–10 pair, very slender; petiole 1–1½ in. *Flowers* about ⅛ in. diam., almost tomentose. *Ovary* glabrous. *Fruit* stoutly peduncled, obtuse, smooth.—Flowering state imperfect, but anthers clearly 2-celled, glabrous, otherwise it a good deal resembles *Alseodaphne petiolaris*.

9. **B.? longipes,** *Hook. f.*; terminal buds and panicle and leaves beneath ashy-pubescent, leaves 5–7 in. coriaceous elliptic-lanceolate acuminate base cuneate shining above, nerves beneath very strong, panicles 6 in. long stout, branches distant few-fld., perianth shortly cleft, lobes rounded densely tomentose.

MALACCA, *Maingay* (*Kew Distrib.* 1248).

Branches rather stout. *Leaves* 7–8 by 2½–3½ in., usually broadest above the middle, pale greyish green above, beneath pale brown, nerves oblique, 10–12 pair; petiole stout, ½–¾ in. *Panicles* axillary, 5 in. long, erect, narrow; peduncle and rachis rather stout, branches very short, few-fld.; flowers $\frac{1}{10}$ in. diam.; pedicel short, stout. *Perianth* cup-shaped, cleft to about the middle. *Filaments* pubescent, glands sessile; staminodes minute. *Ovary* glabrous, style minute. *Fruit* unknown.—In the absence of fruit the genus is doubtful.

Sect. II. *Leaves* usually opposite; terminal buds enclosed in large glabrous coriaceous concave scales. *Flowers* about $\frac{1}{10}$ in. diam., subglobose. (I suspect that this section may constitute a genus.)

10. **B. oppositifolia,** *Benth. in Gen. Pl.* iii. 152; quite glabrous, terminal buds lanceolate, leaves opposite lanceolate or oblong-lanceolate obtuse shining and reticulate on both surfaces, panicles long-peduncled slender, branches spreading, flowers minute, fruit cylindric-oblong, pedicel thickened clavate. Haasia oppositifolia, *Meissn. in DC. Prodr.* xv. 1. 61; *Beddome For. Man.* 184. Apollonias zeylanica, *Thwaites Enum.* 253.

CEYLON; Central Province, alt. 3–4000 ft., *Thwaites.*

A tree, 50–60 ft.; branches rather slender, bud-scales linear-oblong concave, very rigid. *Leaves* 5–7 by 1–2¼ in., thinly coriaceous, alike in colour &c. on both surfaces; base acute; nerves 6–8 pair, very slender and oblique; petiole ½–¾ in. *Panicles* 4–6 in. long, and flowers nearly black when dry; branches divaricate; pedicels 2–3 times as long as the subglobose flower, which is about $\frac{1}{12}$–$\frac{1}{10}$ in. diam. *Perianth* wholly deciduous; lobes rounded, obscurely pubescent. *Stamens* glabrous, glands and staminodes sessile. *Fruit* ¾–1¼ in. long, sometimes subclavate, pedicel ¼ in. long.

11. **B. Wightii,** *Benth. in Gen. Pl.* iii. 152; quite glabrous, terminal buds lanceolate, leaves opposite elliptic or elliptic-lanceolate obtusely acuminate shining and reticulate on both surfaces, panicles long-peduncled slender, branches spreading, flowers minute. Haasia Wightii, *Nees Syst. Laur.* 676; *Meissn. in DC. Prodr.* xv. 1. 61; *Beddome Forest Fl.* t. 298.

SOUTH DECCAN PENINSULA; Travancore, Tinnevelly and Anamallay Hills, *Wight, Beddome.*

Except in the form of the leaves this seems to be *B. oppositifolia,* but without seeing fruit I hesitate before uniting them.

12. **B. assamica,** *Meissn. in DC. Prodr.* xv. 1. 64; quite glabrous, terminal buds lanceolate, leaves opposite elliptic-ovate or lanceolate obtusely acuminate shining and reticulate on both surfaces, fruit 1½ in. long very shortly pedicelled elliptic- or ovoid-oblong tip rounded or subacute base shortly contracted pericarp thick.

ASSAM, *Jenkins.*—DISTRIB. Burma (*Griffith*), Munnipore.

Branches rather slender, terminal compressed; buds ½ in. long, scales very coriaceous, linear-oblong, quite glabrous. *Leaves* 5–6 in., firmly coriaceous, pale brown when dry, base cuneate; nerves about 10 pair, very slender, equally prominent on both surfaces; petiole ¾ in., slender. *Flowers* unknown.

13. **B. Gammieana,** *King in Herb. Hort. Calc.*; quite glabrous, terminal buds ovoid, leaves opposite elliptic-oblong or -ovate obtusely acuminate shining and reticulate on both surfaces, fruit ¾ in. long shortly pedicelled globosely obovoid apiculate or mammillate.

EAST NEPAL, on the north slope of Phulloot, alt. 6000 ft., *J. D. H.,* and SIKKIM at the same elevation, *King.*

A small tree; branches stout; terminal buds ⅓ in., scales glabrous very coriaceous. *Leaves* 4–6 in., firmly coriaceous, variable in breadth, colour (pale brownish yellow when dry) and reticulation the same on both surfaces; base cuneate; nerves very

slender, 12–15 pair, spreading; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Panicles* apparently (in the absence of flowers) very short, about 1 in. long in fruit, then stout and curved but not swollen.

14. **B. globularia,** *Kurz For. Fl.* ii. 294; quite glabrous, terminal buds ovoid acute, leaves opposite elliptic-oblong or lanceolate reticulate on both surfaces, fruit 1–1$\frac{1}{2}$ in. diam. globose very fleshy with a thick hard endocarp.

MARTABAN; on the hills, alt. 3–4000 ft., *Kurz*.

Buds of *B. Gammieana*, leaves narrower longer and less shining, fruiting panicle very short and stout.—The specimens are very imperfect, and Kurz's description is wholly insufficient; he regards it as possibly a hill form of *B. Roxburghiana*, but judging from the buds I should doubt its being of the same genus, and its close affinity to *B. Gammieana* is obvious.

4. DEHAASIA, *Blume.*

Evergreen trees. *Leaves* alternate, often fascicled at the ends of the branches, penninerved. *Flowers* small, 2-sexual, in axillary peduncled panicles. *Perianth-tube* very short; segments 6, 3 outer much the shortest. Perfect *stamens* 9, filaments of 1st and 2nd series eglandular, with 2-celled introrse anthers, of the 3rd series 2-glandular with 2-celled extrorse anthers; staminodes 0, or few and minute. *Berry* oblong, pedicel very much enlarged, coloured, perianth wholly deciduous.—Species 10, Malayan.

The 4-celled anthers alone distinguish this genus from *Alseodaphne*. The species require revision with ample materials.

1. **D. cuneata,** *Blume Rumph.* i. 164, t. 46; glabrous, leaves subverticillate cuneate-obovate much narrowed at the base obtuse acute or subacute glaucous or not beneath, panicles long-peduncled very slender, fruit ellipsoid-oblong. Haasia cuneata, *Nees Syst. Laurin.* 378. Cryptocarya cuneata, *Blume Bijd.* 558. Endiandra ? Candolleana, *Meissn.* (*by error*) *ex Kurz For. Flor.* ii. 295. ? Cyanodaphne cuneata, *Blume Mus. Bot.* i. 333; *Meissn. in DC. Prodr.* xv. 1. 76; *Miquel Fl. Ind. Bat.* i. 926; ? Dictyodaphne Candolleana, *Meissn. l. c.* 30. Alseodaphne grandis, *Kurz For. Fl.* ii. 293 (*not of Nees*).

PEGU, ARRACAN and TENASSERIM, *Helfer* (*Kew Distrib.* 4270), *Kurz*, &c.—DISTRIB. Java.

Old branches stout, scarred; young elongate, stout, clothed with white bark. *Leaves* at the tips of the branches only, 4–10 by 2–5 in., hard, coriaceous, dark brown when dry, often with a violet-glaucous hue beneath, base narrowed into a petiole $\frac{1}{2}$–1$\frac{1}{2}$ in. long, smooth and opaque above; nerves 8–10 pair, impressed above, strong beneath. *Panicles* 3–6 in., peduncle and pedicels black when dry, minutely puberulous, branches and pedicels divaricate, slender in flower; flowers subglobose, $\frac{1}{4}$–$\frac{1}{2}$ in. diam. *Stamens* short, densely tomentose. *Fruit* 1–1$\frac{1}{2}$ in. long, bluish black, pruinose; swollen pedicel $\frac{2}{3}$ to 1$\frac{1}{2}$ in. long, straight or curved, warted.—I have doubtfully referred to this Blume's *Cyanodaphne cuneata*, suspecting that the character ascribed to the fruit (of being, as in *Cryptocarya*, enclosed in the perianth-tube) is founded in error; Blume's Javanese flowering specimens of *Cyanodaphne cuneata* (I have seen no fruit from him) are identical with the Indian *D. cuneata*, and the fruit I have described unquestionably belongs to it. Kurz quotes Meissner's authority for *Endiandra ? Candolleana*, intending no doubt *Dictyodaphne Candolleana*, an obscure Burmese plant for which Meissner quotes the numbers 566 and 1610 of Wallich's Burma collection.

2. **D. Kurzii,** *King in Herb. Hort. Calcutt.*; glabrous, leaves subverticillate cuneate- or rhombic-obovate much narrowed at the base obtusely acuminate glaucous or not beneath, panicles long peduncled very slender, outer perianth-lobes $\frac{1}{4}$ smaller than the inner, fruit cylindric oblong.

TENASSERIM, *Helfer* (*Kew Distrib.* 4272). ANDAMAN ISLANDS, *Herb. Hort. Bot. Calc.*

Very similar to *D. cuneata*, and perhaps a variety of that plant with longer more elliptic and acuminate leaves, which in Helfer's specimens are 3–6 in. long, but in the Andaman ones 6–10 in. The fruit of the Andaman plant is 2 in. long, with a stout fleshy warted pedicel 1 in. long.

3. **D. elongata,** *Blume in Nees Syst. Laur.* 377, and in *Rumphia* i. 163, t. 47; characters of *D. cuneata*, but fruit globose on a very short pedicel. *Meissn. in DC. Prodr.* xv. 1. 60 (*Haasia*); *Miquel Fl. Ind. Bat.* i. 929 (*Haasia*).

ANDAMAN ISLANDS, *Herb. Hort. Calc.*—DISTRIB. Sumatra.

Dr. King suspects this to be a form of *D. cuneata*, and I think he is right; the leaves are 8–11 in. long, the flowers larger than in *D. cuneata*, the fruit 1–1½ in. diam. with a very fleshy sarcocarp and quite globose.

4. **D. microcarpa,** *Blume in Nees Syst. Laurin.* 373, and *Rumph.* i. 162, t. 44; glabrous, leaves shortly petioled elliptic-oblong acuminate not glaucous beneath, panicles shortly peduncled, outer perianth-lobes ¾ smaller than the inner, fruit cylindric-globose. *Meissn. in DC. Prodr.* xv. 1. 60; *Miquel Fl. Ind. Bat.* i. 928. Laurus incrassata, *Jack in Mal. Misc.* ii. 7. 33? (*ex Wall. Cat.* 2589.) Persea incrassata, *Nees Syst.* 127. Machilus incrassatus, *Nees in Wall. Pl. As. Rar.* ii. 70. ? Haasia incrassata, *Nees Syst. Laurin.* 376; *Miquel l. c.* 390.

MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1274). ? Singapore, *Prince.*—DISTRIB. Sumatra, Java, Borneo.

Branches woody, white. *Leaves* not so fascicled towards the ends of the branches as in the preceding species, 9–14 by 3½–5½ in., coriaceous, base acute, smooth, greenish or pale greenish brown on both surfaces when dry; nerves about 12 pair, very prominent beneath; petiole stout, ¾–1 in. *Panicles* 2–6 in., black when dry, branches stout, spreading; pedicels obconic in flower, ⅛–⅙ in. *Perianth* ⅙ in. diam., nearly glabrous; lobes broad, outer obtuse, inner subacute. *Stamens* longer and less villous than in the preceding species. *Fruit* "baccate, 1 in. long, blue-black, shining, subtended by the enlarged slightly thickened perianth, pedicel enlarged fleshy trigonous, bright scarlet warted," *Maingay.*—Though the fruit is large, I refer this to Blume's *D. microcarpa*, of which that author describes and figures apparently young fruit only; for after a most careful analysis I can find no difference between authentic specimens of Blume's plant and this; furthermore Blume states that both his figure and description of the fruit are taken from another source. *D. squarrosa*, Zoll., seems identical. Jack quotes *Rumph. Amb.* i. 162, t. 44, for his *L. incrassata*, but the plate is not characteristic, if taken for this plant.

DOUBTFUL SPECIES.

HAASIA NITIDA, *Meissn. in DC. Prodr.* xv. 1. 61, from Borneo, has 4-celled anthers and is an *Alseodaphne.*

HAASIA PEDUNCULARIS, *Nees, Meissn. l. c.* See *Alseodaphne peduncularis.*

5. ENDIANDRA, *Brown.*

Evergreen trees. *Leaves* alternate, penninerved. *Flowers* small, in axillary panicles. *Perianth-tube* very short; segments 6, in 2 series. Perfect *stamens* 3, all of the 3rd order, extrorsely 2-locular, filaments 2-glandular or not; staminodes 0, or 3 minute, or replaced by a fleshy ring. *Berry* oblong or subglobose, pedicel hardly thickened; perianth usually wholly deciduous.—Species about 15, Indian, Malayan, Australian and Pacific.

1. **E. firma,** *Nees in Wall. Pl. As. Rar.* ii. 68, and *Syst. Laurin.* 195;

glabrous, leaves 5–8 in. elliptic-oblong obtusely acuminate coriaceous base acute concolorous and finely reticulate on both surfaces, nerves distinct, panicles lax-fld. much shorter than the leaves. *Meissn. in DC. Prodr.* xv. 1. 79. Laurus firma, *Wall. Cat.* 2597.

SILHET, *De Silva*. CACHAR, *Keenan*.

Branches terete, woody; terminal buds small, puberulous. *Leaves* when dry red-brown on both surfaces; nerves 10–11 pair, sunk above, prominent beneath, very obliquely arched; petiole ½ in., stout. *Panicle* 1–2 in., obscurely puberulous, black when dry; branches spreading; flowers pedicelled, minutely bracteolate. *Perianth* campanulate, ¼ in. diam.; segments broadly ovate, obtuse, glabrous externally, three inner smaller, tomentose within, as is a triangular space at the base of the outer and the base of the perianth within. *Anthers* 3, sessile, subsagittately oblong, obtuse, thick, tomentose, with linear-oblong obtuse sublateral cells and oblong valves. *Fruit* (in Cachar specimen) 1¼ in. long, elliptic-ovoid, quite smooth, tip rounded.—Nees describes the leaves as sometimes opposite, and the fruit as oblong, 2 by ½ in., seated on the small orbicular base of the perianth; but Wallich's specimens, the only ones known to Nees, are in flower only (having no fruit), and all the leaves are alternate.

2. **E. Maingayi,** *Hook. f.*; leaves 3–4 in. coriaceous elliptic or elliptic-oblong obtusely subcaudate acuminate, minutely reticulated, nerves very obscure, racemes very short glabrous few-fld., perianth unequally 6-cleft, fruit 1½–2 in. oblong.

MALACCA, *Maingay* (*Kew Distrib.* 1270).

Branches rather slender. *Leaves* 1½–2 in. diam., firmly coriaceous, red-brown, shining and finely reticulated on both surfaces; nerves 8–10 pair, very slender and faintly raised on both surfaces, base acute; petiole ⅓–½ in. *Racemes* ½ in. long or less, hoary; buds globose, ⅛–⅙ in. diam. *Sepals* very coriaceous, concave. *Stamens* sessile, almost in the centre of the flower. *Ovary* sunk in the very short perianth-tube; style short, stigma minute. *Fruit* solitary, axillary, peduncles (or pedicels) not ½ in. long.

6. SYNDICLIS, *Hook. f.*

A glabrous tree. *Leaves* alternate, penninerved. *Flowers* minute, panicled, bisexual, gland-dotted. *Perianth* 4-partite, wholly deciduous; segments transversely oblong, 2-seriate, the two inner rather smaller. *Perfect stamens* 4, opposite to and as long as the perianth-lobes, broadly ovate, thick, pubescent and gland-dotted, 1-celled; cell small, opening introrsely by a single valve; staminodes 4, minute, lanceolate, hirsute. *Ovary* glabrous, tapering into an acute style.

S. paradoxa, *Hook. f. Ic. Plant.* t. 1515.

BHOTAN, *Booth*.

Branchlets slender, leafy at the tips, the very young obscurely pubescent or hoary. *Leaves* petioled, 3–5 by 2–2½ in., rather membranous, obovate-oblong, acuminate, with 10–12 pairs of slender nerves, drying pale brown, conspicuously reticulated with raised nervules on both surfaces; base acute; petiole ½ in., slender. *Panicles* shorter than the leaves, axillary, slender, with spreading few-flowered branches; flowers ⅒ in. diam.; pedicels long, thickened under the flower. *Perianth-segments* short, broader than long, subreniform, early falling away in one piece. *Stamens* (apparently sessile anthers) very large for the size of the flower, pubescent all over except the valve, hollowed in front with the small cell towards the lip in front; valve emarginate (as if of 2 confluent valves), finally recurved over the top of the anther; staminodes, I think, alternate with the anthers.—An exceedingly curious plant, the only one of the Order with 1-celled anthers; it was in a collection of plants made in Bhotan by Mr. Booth, nephew of the late Thomas Nuttall, who gave the collection to Sir W. Hooker.

7. **CINNAMOMUM,** *Blume.*

Evergreen trees or shrubs. *Leaves* opposite or alternate, usually triple-nerved. *Flowers* small, 2-sexual or polygamous, in axillary and subterminal panicles; females usually largest, with often fewer parts. *Perianth-tube* short; segments 6, subequal. *Perfect stamens* 9 or fewer, filaments of 1st and 2nd series eglandular, with introrse 4-celled anthers; of the 3rd 2-glandular with extrorse 4-(rarely 2-)celled anthers; staminodes of the 4th series cordate or sagittate. *Fruit* seated on the enlarged perianth, the segments of which are wholly or in part deciduous, or very rarely persistent and entire.—Species about 130?, tropical and subtropical Eastern Asia, Australia and the Pacific.

The following is a very imperfect account of the British Indian *Cinnamoma*, to discriminate the species of which with any approach to completeness or accuracy requires a careful study of living specimens. I am so uncertain of the limits of the described species and their synonymy, that I have sparingly quoted from such authors as Miquel and Nees, who must often have worked upon very incomplete materials; and from referring to extra-Indian species, which may or may not be identical with Indian. Meissner did much towards reforming the genus, but more remains to be done. I have retained a good many species that I suspect will not stand. In the "Genera Plantarum" it is suggested that the genus may be reduced to ten species, but I do not see my way to this. The fruiting perianth is incorrectly described in that work; it is usually greatly enlarged, and the lobes sometimes persist.

Sect. I. **Malabathrum.** *Buds* naked or with very small scales. *Leaves* opposite, triple-nerved, rarely alternate or penninerved; axils of principal nerves without pits.

* Leaves opposite or subopposite, triple-nerved.

a. Species of the Himalaya and Northern India.

1. **C. Tamala,** *Fr. Nees in Nees & Eberm. Med. Pharm. Bot.* ii. 426, and *Plant. Officin. fasc.* 4; leaves 3–10 in. ovate oblong or lanceolate usually acuminate 3-nerved, nerves not impressed above, panicles scarcely exceeding the leaves, perianth sparingly silky-pubescent, lobes deciduous in fruit, stamens and ovary villous, fruit small ellipsoid. *Meissn. in DC. Prodr.* xv. 1. 17; *Hayne, Arnz. Gew.* xii. t. 26; *Blume Rumph.* t. 14, f. 3, 4; *Nees in Wall. Pl. As. Rar.* ii. 75, and *Syst. Laurin.* 56; *Brand. For. Fl.* 374; *Gamble Man. Ind. Timb.* 306. C. albiflorum, *Nees in Wall. Pl. As. Rar.* ii. 75, and iii. 32, and in *Syst. Laurin.* 58; *Wight Ic.* t. 140; *Blume Rumph.* t. 14, f. 2?. C. Cassia, *Don Prodr.* 67 (*not of Linn.*). C. pauciflorum, *var.* ? β. Tazia, *Meissn. in DC. Prodr.* xv. 1. 17. Persea Tamala, *Spreng. Syst.* ii. 268. Laurus Cassia, *Roxb. Hort. Beng.* 30; *Wall. Cat.* 2580. L. albiflora, *Wall. Cat.* 2569. L. Tamala, Tazia, Somcaurium & Sailyana, *Ham. in Trans. Linn. Soc.* xiii. 555–558.

Tropical and Subtropical Himalaya; from near the Indus to Bhotan, alt. 3–5000 ft., ascending to 7800 in Sikkim. Silhet and Khasia Mts., alt. 3–4000 ft.

A moderate-sized tree. *Leaves* usually 4–5 in. long, very variable in breadth, rarely alternate, shining above, rarely elliptical and obtuse, venules below very obscure, more distinct in Sikkim specimens; a single specimen from the Deyra doon (Falconer) has broader (2½ in.) leaves with 5 nerves. *Flowers* ¼–⅕ in. long. *Fruit* ½ in. long; peduncle and calyx small, ½ in. long, the latter usually ¼ in. diam. with truncate lobes.—Khasian specimens from the Bor-panee River have leaves only ½–1 in. diam. Brandis is the authority for this species advancing westward to near the Indus; Garwhal is the most western locality known to me. Meissner's three varieties have no distinctive characters.

2. **C. obtusifolium,** *Nees in Wall. Pl. As. Rar.* ii. 73, and *Syst.*

Laur. 33; leaves quite glabrous 8–12 in. very coriaceous elliptic-oblong obtuse acute or acuminate 3-nerved, nerves not impressed above, panicles very large and stout subterminal and corymbiform often exceeding the leaves, perianth subsilky-pubescent, lobes persistent in fruit, stamens and ovary sparsely hairy or glabrous, fruit small ellipsoid or subglobose. *Meissn. in DC. Prodr.* xv. 1. 12; *Wight Ic.* t. 139; *Kurz For. Fl.* ii. 287; *Gamble Man. Ind. Timb.* 305. Laurus obtusifolia, *Roxb. Fl. Ind.* ii. 302; *Wall. Cat.* 2574. L. macrophylla, *Wall. Cat.* 2575. L. Bejolghota and L. Bazania, *Ham. in Trans. Linn. Soc.* xiii. 559, 560. L. Cassia, *Herb. Ham.*

Central and Eastern Himalaya; Nepal, *Hamilton*, &c.; Sikkim, ascending to 7000 ft. Assam, Silhet and the Khasia Mts., and southwards to Tenasserim and the Andaman Islands.

A large robust plant, the largest leaved of the Indian species. *Leaves* often glaucous beneath, nervules faint or distinct; petiole short, robust. *Flowers* small ($\frac{1}{4}$ in diam.), often crowded at the ends of the much-branched long-peduncled crowded panicles. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ in. long, succulent; peduncle and calyx $\frac{1}{3}$–$\frac{1}{2}$ in. long, the latter $\frac{1}{3}$ in. broad in fruit, lobes rounded in Sikkim specimens, narrower and more acute in Silhet ones.

3. **C. impressinervium,** *Meissn. in DC. Prodr.* xv. 1. 21; leaves quite glabrous 3–5 in. elliptic-lanceolate acuminate 3-nerved, nerves deeply impressed in age, panicles shorter than the leaves silkily tomentose, fruiting calyx small pyriform or cupular, enclosing the small unripe fruit, lobes wholly deciduous.

Sikkim Himalaya, alt. 4–6000 ft., *Herb. Griffith, J. D. H.*—Distrib. Yunan.

Branches slender; buds and young shoots silky. *Leaves* brown when dry, 1–2 in. diam., shining above, paler beneath, with faint reticulations; petiole very slender. *Panicles* shortly peduncled, rather few-fld. *Fruiting* calyx and pedicels $\frac{1}{4}$ in.; mouth quite entire; the fruit is too young to determine its nature.

4. **C. pauciflorum,** *Nees in Wall. Pl. As. Rar.* ii. 75, and *Syst. Laur.* 68; leaves quite glabrous 2–4 in. ovate or ovate-lanceolate acuminate 3-nerved, base acute rounded or cordate, panicles shorter than the leaves few-fld. nearly glabrous, calyx-lobes wholly deciduous in fruit. *Meissn. in DC. Prodr.* xv. 1. 17, *excl. var. β.*; *Gamble Man. Ind. Timb.* 305; *Wall. Cat.* 2579. C. recurvatum, *Wight Ic.* t. 133. Laurus recurvata, *Roxb. Fl. Ind.* ii. 301.

Khasia Mts.; alt. 4000 ft., *De Silva, J. D. H. & T. T.* Assam Valley and Silhet, *Gamble.*

A small tree, buds and young shoots glabrous. *Leaves* very much smaller than in the preceding species, firmly coriaceous, usually glaucous and finely reticulated beneath, rarely 5-nerved, tip sometimes caudate-acuminate. *Panicles* sometimes reduced to 3 flowers. *Perianth* $\frac{1}{10}$–$\frac{1}{8}$ in. long. *Stamens* hairy. *Fruiting calyx* very small, with a quite entire mouth; fruit too young to describe.—Hamilton's *C. Tazia*, referred doubtfully to this as a variety, is clearly *C. Tamala*, as the specimen in Herb. Wallich proves, and it was moreover found at the foot of the Sikkim Himalaya, where *C. pauciflorum* does not occur. Roxburgh states that his *L. recurvata* was supposed to have come from China, and if so, it may be the *C. dulce* of the Hong Kong Flora, and possibly the same species as *C. pauciflorum*. Roxburgh describes his *L. dulcis* from China as having long narrow leaves with the lateral nerves vanishing a little above the middle, and must be a very different plant. The drawing of Roxburgh which Wight has copied (Ic. t. 138) is unnamed in the original. Another drawing of Roxburgh's named *L. dulcis* equally disagrees with the description in "Flora Indica" in having strong lateral nerves produced to the tip. Wallich doubtfully refers Roxburgh's *L. recurvata* to *Daphnidium.*

b. Species of Burma and the Malay Peninsula. (See also *C. zeylanicum & obtusifolium.*)

5. **C. javanicum,** *Blume Bijd.* 570, and *Rumph.* 42, t. 19; branches petioles young leaves beneath and panicles fulvous-tomentose at length glabrate, leaves 6–12 in. elliptic or elliptic-oblong acuminate strongly 3-nerved transverse nerves very strong beneath, panicle shorter than the leaves few-fld. *Meissn. in DC. Prodr.* xv. 1. 10.

SINGAPORE, at Madang, *Cantley.* ? Penang, *Walker.*—DISTRIB. Java, Sumatra, Borneo.

Branches robust. *Leaves* firmly coriaceous, shining above; petiole stout. *Panicles* 3–4 in. long, perianth densely tomentose. *Fruit* unknown.—The Singapore specimens in late flower are certainly the Javan plant, but the Penang ones, which have neither flower nor fruit, have the leaves more narrowed into the very short thick petiole.

6. **C. Cassia,** *Blume Bijd.* 570 ?; leaves 3–4 in. glabrous oblong to oblong-lanceolate caudate-acuminate 3-nerved, petiole slender, panicles cymose silky terminal and axillary, flowers small, fruit the size of a pea with the perianth-lobes persistent or truncate.

AVA; on the Kakhyen Hills, *Kurz.*—DISTRIB. China.

I have refrained from quoting synonyms for Kurz's plant, of which I have seen no specimens; it is remarkable for the small size of the fruit, in which respect it agrees with the plant that yields the Cassia bark of China, but differs in the perianth-lobes being sometimes persistent, these being wholly deciduous in the China plant, leaving a perfectly entire mouth of the fruiting perianth. In Bentley and Trimen's Med. Pl. (iii. t. 233) they are represented as minute and persistent.

7. **C. iners,** *Reinw. in Blume Bijd.* 570; leaves glabrous 3–8 in. lanceolate oblong or linear-oblong 3-nerved, base acute or obtuse, panicles slender long-peduncled often exceeding the leaves silkily pubescent, flowers small, perianth $\frac{1}{10}$ in. long lobes persistent, fruit oblong $\frac{1}{3}$ in. long base sunk in the perianth. *Meissn. in DC. Prodr.* xv. 1. 19 (*excl. var.* γ.); *Nees in Wall. Pl. As. Rar.* ii. 73; *Wight Ic.* t. 122; ? *Kurz For. Fl.* ii. 287. C. malabathrum, *Batka in Nov. Act. Nat. Cur.* xvii. 2. 618, t. 45; *Nees Syst. Laur.* 38, 663. C. Griffithii, *Meissn. l. c.* 19. C. gracile, *Miquel Ann. Mus. Bot. Lugd. Bat.* i. 259. Laurus malabathrum, *Wall. Cat.* 2583 A *in part* (*not of Roxb.*). L. nitida, *Roxb. Fl. Ind.* iii. 300; *Wall. Cat.* 2582, *excl.* B.

TENASSERIM, *Kurz*; at Mergui, *Griffith.* MALACCA, *Griffith, Maingay.* (*Kew Distrib.* 1242, 1243). PENANG, *Wallich, Phillips.*—DISTRIB. Sumatra, Java.

A tree, branchlets nearly glabrous. *Leaves* very variable in breadth, rarely ovate and rounded at the base, shining above, nerves continued to the tip. *Panicles* very lax-fld., with spreading branches and pedicels; flowers about $\frac{1}{10}$ in. long. *Fruiting perianth* rather spreading when dry, $\frac{1}{3}$ in. diam.—Kurz describes the fruiting perianth as truncately 6-lobed, implying that the lobes are partially deciduous, and the fruit as $\frac{2}{3}$ in. long, which makes me doubt the identity of his plant with that described above. Wallich's *L. malabathrum* is, I think, this, and is not Roxburgh's, who takes the name, following Solander, for Rheede's Malabar plant. There is in the Kew Herbarium a Canara specimen of what resembles this, but it is not in fruit.

8. ? **C. nitidum,** *Blume Rumph.* i. 35, t. 13, f. 2, and t. 16, f. 1, 2; leaves 3–9 in. glabrous elliptic oblong or linear-oblong obtuse 3-nerved, panicles slender long-peduncled often longer than the leaves silkily pubescent, perianth $\frac{1}{6}$ in. long lobes rounded and persistent in fruit. C. iners, γ. subvenosum, *in part, Meissn. in DC. Prodr.* xv. 1. 21. C. eucalyptoides, *F. Nees Pl. Off. Suppl. fasc.* iv. t. 9; *Nees Syst. Laur.* 41. C. iners, *Wall. Cat.* 2583 E, and in *Wall. Pl. As. Rar.* ii. 73. ? L. Culitlaban, *Roxb. Fl. Ind.* ii. 299; *Wight Ic.* t. 137; *Wall. Cat.* 2583 C. Laurus malabathrum, *L.* ?, *Wall. Cat.* 2583 *in part* (*not of Roxb.*).

TENASSERIM; at Mergui, *Griffith*. PENANG and BURMA, *Wallich*. CANARA?, *Herb. Stocks & Dalzell*.—DISTRIB. Malay Islands and Moluccas.

Very like *C. iners*, and perhaps only a variety, but the flowers are longer and almost twice as large.—Roxburgh's *L. Culitlaban*, for which he cites Willdenow, and which he identifies with Rumph. Amb. ii. t. 14, is from Amboyna, and described as a slender Cypress-like tree with short appressed branches, and panicles stouter than the leaves; his figure (Wight Ic. t. 137) represents the leaves as much more acute than in the specimen in Herb. Wallich.

9. **C. Tavoyanum,** *Meissn. in DC. Prodr.* xv. 1. 20; branchlets young leaves beneath and panicles tomentosely pubescent, leaves 4–6 in. elliptic- or oblong-lanceolate obtusely acuminate 3-nerved, panicles slender long-peduncled few-fld., flowers long-pedicelled $\frac{1}{8}$ in. long. C. sulphuratum, *Kurz For. Fl.* ii. 288, *not of Nees*. C. sulphuratum γ merguense, *Meissn. l. c.* 18. C. lucens, *Miquel Ann. Mus. Bot. Lugd. Bat.* i. 261. C. obtusifolium, var., *Wall. Cat.* 2569 G.

TENASSERIM; at Tavoy, *Gomez*; Mergui, *Griffith* (*Kew Distrib.* 4241), *Helfer* (*Kew Distrib.* 4245, *C. iners* ?); Moulmein, *Parish*.

This again is very near *C. iners*, from which the copious fulvous tomentum, narrower leaves, usually slender and longer petiole, longer pedicels and larger flowers distinguish it. It is also very near if not identical with *C. sulphuratum*, but in the absence of fruit I do not venture to unite it.

10. **C. vimineum,** *Nees Syst. Laur.* 82, and in *Wall. Pl. As. Rar.* ii. 76; quite glabrous, branches very slender, leaves 3–4 in. subopposite lanceolate obtuse 3-nerved shining above, margins waved. *Meissn. in DC. Prodr.* xv. 1. 19. Laurus viminea, *Wall. Cat.* 2578.

PENANG; *Porter*.

The slender habit and small shining leaves with waved margins distinguish this species. There are no flowers in Wallich's specimens, and two flowers distributed with it to Herb. Hook. are detached, and perhaps do not belong to the leaf-bearing ones; they are very small and nearly glabrous.—Kurz informs me that boiled leaves smell of fennel.

11. **C. mollissimum,** *Hook. f.*; branches petioles and leaves beneath densely villous with soft white hairs, leaves elliptic acuminate 3-nerved, peduncles very slender strict few-fld. shorter than the leaves, flowers minute shortly pedicelled.

PENANG; *Curtis*.

Branches slender, but thickened by the long soft spreading hairs. *Leaves* 5–6 in., pale greyish white beneath when dry, above pale green and finely softly hairy, at length glabrate; nerves strong beneath, reaching the tip; petiole stout, $\frac{1}{3}$–$\frac{1}{2}$ in. *Peduncle* 2 in., trichotomously branched at the tip only. *Flowers* $\frac{1}{12}$ in. long, tomentose, pedicels hardly as long. *Perianth-lobes* short, rounded.—A very remarkable and singularly fragrant species.

c. *Species of the Deccan Peninsula and Ceylon.* (See *C. iners & nitidum* in b.)

12. **C. zeylanicum,** *Breyn in Ephem. Nat. Cur. dec.* i. *ann.* 4, 139; leaves 4–7 in. glabrous very coriaceous ovate or ovate-lanceolate 3–5-nerved obtuse or subacute reticulate beneath, panicle often longer than the leaves subsilkily pubescent, perianth $\frac{1}{4}$ in. long, fruiting peduncle campanulate $\frac{1}{3}$ in. diam. crowned with the rounded perianth-lobes, fruit oblong $\frac{2}{3}$ in. long apiculate dry. *Nees Syst. Laurin.* 95, and in *Wall. Pl. As. Rar.* ii. 74, and iii. 32; *Meissn. in DC. Prodr.* xv. 1. 13; *Blume Bijd.* 588; *Wight Ic.*

t. 123, 129, 134; *Wall. Cat.* 2573; *Beddome For. Fl.* t. 262, and *For. Man.* 184, and *Flor. Sylv.* t. 242; *Bentl. & Trim. Med. Pl.* iii. t. 224; *Thwaites Enum.* 252 (*excl. some vars.*); *Kurz For. Fl.* ii. 287; *Miquel Fl. Ind. Bat.* i. 898. C. aromaticum, *Grah. Cat. Bomb. Pl.* 173; *Dalz. & Gibs. Bomb. Fl. Suppl.* 71. ? C. iners, *Wight Ic.* t. 122 *bis.* Laurus cinnamomum, *Roxb. Fl. Ind.* ii. 295. L. nitida, *Wall. Cat.* 2582 ? B. L. Cassia, *Burm. Fl. Ind.* 91; *Ham. in Trans. Linn. Soc.* xiii. 555; *Spreng. Syst.* ii. 567; *Bot. Mag.* t. 1636, *copied in Wight Ic.* t. 128.

TENASSERIM, BURMA and the MALAY PENINSULA; DECCAN PENINSULA and CEYLON, indigenous or cultivated.—DISTRIB. Cultivated in the Malay Islands and elsewhere in the tropics.

I am unable to unravel the synonymy of the varieties attributed to this species by Nees and others. Thwaites suspects that it passes into *C. nitidum* and *iners*. This is possible if the fruiting calyces prove the same, though not into *C. obtusifolium*, which, besides its characters of leaf and panicle, appears to have a different range. I have also kept *C. multiflorum* and *ovalifolium* (which Thwaites unites with *zeylanicum*) as distinct, though with hesitation. Kurz (For. Fl.) describes the fruiting perianth of *zeylanicum* as truncately 5-cleft, but I find the lobes in fruit all perfect and rounded in what I take to be typical specimens. Meissner's var. *fœniculaceum* (Ceylon, Thwaites 2284) seems to have no recognizable character, and Thwaites does not distinguish it. Vars. *inodorum* and *Cassia* of Nees I suppose to be the same thing, and are the faintly aromatic wild forms, passing probably into *nitidum*, the fruiting perianth of which is unknown. Beddome's figure of *zeylanicum* is of a very coarse-leaved var. from the Nilghiris, which he calls Var. *Wightii*; his fig. 11 on the same plate representing what he supposes to be fruit of *iners* is perhaps referable to *C. macrocarpum*.

13. **C. multiflorum,** *Wight Ic.* t. 126 and 131; branches slender, branchlets and young leaves beneath clothed with fine white pubescence, leaves opposite 2–4 in. thinly coriaceous usually ovate-lanceolate acuminate 3-nerved, panicles slender much branched many-fld., flowers small subcorymbose, pedicels slender, perianth $\frac{1}{8}$ in. long. *Meissn. in DC. Prodr.* xv. 1. 15. C. zeylanicum, var. β., *Thwaites Enum.* 252. C. villosum & dubium, *Wight Ic.* t. 127, 135. C. perpetuo-florens, *Burm. Fl. Zeyl.* 63; *Wight Ic.* t. 141. C. iners, var. δ. ? dubium, *Meissn. l. c.* 20. Laurus dubia, *Wall. Cat.* 2571.

CEYLON; common in the Central Province, ascending to 3000 ft.

This, which Thwaites finds it difficult to distinguish from *zeylanicum*, is a more slender plant, with much smaller and less coriaceous leaves, and very much smaller flowers. Wallich's *L. dubia* received from Wight as *L. Cassia* seems the same thing, and probably came from Ceylon.

14. **C. sulphuratum,** *Nees in Wall. Pl. As. Rar.* ii. 74, and *Syst. Laur.* 55; branches petioles young leaves beneath or on both surfaces and panicles densely fulvous-tomentose, leaves thickly coriaceous elliptic oblong or ovate-lanceolate obtuse or acute 3–5-nerved, panicles shorter than the leaves long-peduncled, flowers few corymbose, perianth $\frac{1}{4}$ in. long lobes persistent, fruit $\frac{1}{2}$–$\frac{2}{3}$ in. ellipsoid fleshy. *Meissn. in DC. Prodr.* xv. 1. 18 (*excl. vars.* and *syn. villosum*). Laurus malabathrum, *Wall. Cat.* 2583 D.

NILGHIRI HILLS, *Heyne*, &c.

Leaves very variable in breadth, base acute, nerves very strong and often pubescent on the upper surface, old perfectly glabrous and very rigidly coriaceous, in mountain ? specimens often short broad and convex with recurved margins; petiole usually short, $\frac{1}{4}$ in., and stout. *Panicles* stout, 2–4 in. *Fruiting perianth* $\frac{1}{3}$ in. diam., lobes rounded. *Fruit* minutely apiculate.—Very closely allied to *C. Tavoyanum*, if not conspecific.

15. **C. Wightii,** *Meissn. in DC. Prodr.* xv. 1. 11; branches and

petioles very robust, terminal buds globose silky, leaves subopposite 3–4 in. thickly coriaceous elliptic broadly ovate or oblong obtuse glaucous beneath, nerves 3–5 continued to near the tip, panicles fulvous-tomentose usually longer than the leaves, peduncle branches and pedicels very stout few- or many-fld., perianth $\frac{1}{4}$ in. lobes deciduous, fruit globose seated on the very thick obconic base of the perianth. C. Bazania, *var.* parvifolia, *Nees in Wall. Pl. As. Rar.* iii. 32, and *Syst. Laurin.* 36.

NILGHIRI HILLS, *Wight, Perrottet*, &c.; Dindygul, *Wight*.

Branches as thick as a goose-quill, apparently soft, shrinking and black when dry, young nearly glabrous. *Leaves* sometimes almost rounded, finely reticulated beneath, base acute; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., often very broad. *Panicles* long-peduncled; pedicels shorter than the perianth. *Fruit* $\frac{1}{2}$ in. diam.; base of perianth about $\frac{1}{3}$ in. diam., obconic, fleshy.—Apparently a very distinct species, but I am not certain that the fruit is normal, it has a diseased look.

16. **C. ovalifolium**, *Wight Ic.* t. 125; branches and petioles very robust, terminal buds very small, leaves subopposite 3–4 in. thickly coriaceous elliptic orbicular or sublanceolate tip rounded or obtuse, nerves 3 vanishing beyond the middle, panicles hoary usually shorter than the leaves long-peduncled few-fld. *Meissn. in DC. Prodr.* xv. 1. 22. C. zeylanicum, *var.* ovalifolium, *Thwaites Enum.* 252.

CEYLON; in the Central Province, alt. 4–8000 ft.

Very young branchlets and leaves silky. *Leaves* rarely 5 in. long and elliptic-lanceolate, pale and finely reticulated beneath, with 3 faint or distinct nerves, base sometimes cordate; petiole usually short and very stout, but sometimes $\frac{1}{2}$ in. *Panicles* solitary or 2–3-nate, often only 3-fld. *Perianth* about $\frac{1}{6}$ in. long.—Thwaites, from a note on his specimens made subsequently to the publication of his Enumeratio, was disposed to regard this as distinct from *zeylanicum*. The evanescence of the three nerves beyond the middle of the leaf is a very constant but not an absolute character.

17. **C. litseæfolium,** *Thwaites Enum.* 253; glabrous or nearly so, leaves subopposite 3–5 in. thickly coriaceous ovate or oblong tip obtuse or rounded, nerves 3–5 very indistinct rarely produced to the middle, petiole slender, panicles subterminal longer than the leaves branched laxly many-fld., perianth small campanulate silky, lobes early caducous. *Meissn. in DC. Prodr.* xv. 1. 22.

CEYLON; Central Province, at Hapotelle, alt. 5000 ft., *Thwaites*.

A tree, 50–60 ft. high, branched at the top; branchlets and small terminal buds subsilky. *Leaves* hard, flat, pale brown; nerves almost immersed in the substance; base acute; petiole $\frac{1}{2}$–$\frac{2}{3}$ in. *Panicles* on long stout peduncles; flowers subcorymbose at the ends of the branches; pedicels longer than the perianth, stout. *Perianth* about $\frac{1}{10}$ in. long.

18. **C. macrocarpum,** *Hook. f.*; branches slender, leaves 5–8 in. oblong-lanceolate 3–5-nerved, petiole $\frac{3}{4}$–1 in., fruiting perianth $\frac{2}{3}$ in. diam. broadly funnel-shaped very shortly 6-toothed, fruit 1 in. long globosely oblong. C. iners, *Wight Ic.* t. 130. Carua, *Ham. in Trans. Linn. Soc.* i. 57. —*Rheede Hort. Mal.* i. t. 51.

CANARA, *Dalzell*.

Leaves 1$\frac{1}{2}$–3 in. broad, rather thinly coriaceous, very faintly reticulate beneath, lateral nerves sometimes $\frac{2}{3}$ in. above the base; petiole $\frac{3}{4}$–1 in. *Panicles* shorter than the leaves; fruiting peduncle long, slender for the size of the fruit, which is much the largest of the genus. *Fruiting perianth* apparently fleshy, together with the thickened pedicel nearly 1 in. long.

19. **C. gracile,** *Hook. f.*; quite glabrous, branches slender, leaves

opposite 3–4 in. thinly coriaceous elliptic ovate or lanceolate obtusely acuminate 3-nerved finely reticulate on both surfaces, panicles axillary very slender shorter than the leaves few-fld., pedicels very long and slender, flowers very small.

SOUTH DECCAN; Tinnevelly Hills, alt. 3–4500 ft., *Beddome*.

A shrub or tree; branches usually pale. *Leaves* ¾–1¾ in. broad, pale green, subcaudate, glaucous or not beneath, base acute, nerves not produced to the tip; petiole slender, ¼–½ in. *Panicles* 6–8-fld.; pedicels ¼–¾ in. long; flowers $\frac{1}{10}$ in., glaucous, quite glabrous, as are the stamens and ovary.—Apparently a very distinct and pretty little species, but more specimens are wanted.

** Leaves mostly alternate, triple-nerved.

20. **C. caudatum,** *Nees in Wall. Pl. As. Rar.* ii. 76, and *Syst. Laurin.* 83; leaves alternate 3–4 in. thinly coriaceous orbicular or elliptic obtusely caudate-acuminate 3–5-nerved, flowers minute in very short axillary few-fld. pubescent cymes, fruiting perianth turbinately funnel-shaped fleshy 6-lobed, fruit ellipsoid or globose fleshy. *Meissn. in DC. Prodr.* xv. 1. 23; *Kurz For. Fl.* ii. 289. Laurus caudata, *Wall. Cat.* 2603.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 1–4000 ft., *J. D. H. & T. T.*, &c. BURMA, in the Kakhyen Hills, *Kurz*.—DISTRIB. Yunan.

A large glabrous shrub with slender spreading branches. *Leaves* rarely opposite, brown when dry, sometimes oblique, base acute, nervules transverse, very slender; petiole slender, ⅓ in. *Cymes* irregular, sometimes reduced to one or two axillary flowers; flowers $\frac{1}{12}$ in. diam.; pedicels slender. *Fruiting perianth* ⅓–½ in. diam., very fleshy. *Fruit* rarely obovoid.

21. **C. Perrottetii,** *Meissn. in DC. Prodr.* xv. 1. 22; densely fulvous-tomentose on branches and both surfaces of young leaves and panicles, leaves mostly alternate long-petioled oblong or ovate-oblong 3-nerved tip obtuse or rounded, panicles shorter or longer than the leaves stout few-fld., flowers large subsessile.

NILGHIRI HILLS, *Perrottet, Wight*.

A shrub? branches stout. *Leaves* thickly coriaceous, in age glabrous on both surfaces and shining above, base acute; petiole ¾–1½ in. *Flowers* 3-nate, ¼ in. long, sessile or narrowed into a very short stout pedicel, densely tomentose. *Fruit* not seen.

*** Leaves subopposite, penninerved.

22. **C. citriodorum,** *Thwaites Enum.* 253; leaves 2–3 in. subopposite quite glabrous densely coriaceous ovate or oblong obtuse penninerved, nerves very faint, panicles longer than the leaves stout branched laxly many-fld. subsilky, flowers stoutly pedicelled. *Meissn. in DC. Prodr.* xv. 1. 22.

CEYLON; Saffragam and near Galagama, alt. 1–2000 ft., *Thwaites*.

A tree, 20–30 ft.; branches stout. *Leaves* very hard, pale brown and shining when dry, base rounded or acute, nerves spreading from the very obscure midrid; petiole ⅓–½ in. *Flowers* about ⅛ in. long, pedicels about as long.—I have seen no fruit. Meissner describes the calyx-lobes as deciduous, the fruiting calyx as truncate and quite entire, 2 lines in diameter, and the fruit as ovoid.

Sect. II. **Camphora.** *Buds* enclosed in large orbicular concave silky caducous imbricating scales. *Leaves* alternate, penninerved; axils of principal nerves often pitted. *Perianth-lobes* wholly caducous in age.

The Camphor tree, *C. camphora*, F. Nees (*Wall. Cat.* 6347), belongs to this section; it is commonly cultivated in India.

23. **C. glanduliferum,** *Meissn. in DC. Prodr.* xv. 1. 25 (*excl. var.* β.); leaves 3–5 in. alternate elliptic or lanceolate caudate-acuminate penni-nerved, panicles axillary long-peduncled few-fld. nearly glabrous, flowers sparsely pubescent without villous within. Camphora glandulifera, *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 90. Laurus glandulifera, *Wall. in Act. Ser. Med. & Phys. Calcutt.* i. 45, *with plate*, and *Cat.* 2601; *Brandis For. Flor.* 376; *Gamble Man. Ind. Timb.* 306.

CENTRAL HIMALAYA; Nepal, top of Sheopore, *Wallich*; ? Kumaon, at Petora, alt. 5000 ft., *Thomson*. KHASIA MTS.; Myrung, alt. 5–6000 ft., *J. D. H. & T. T.*

A tree; branches stout, smooth, black when dry. *Leaves* very variable in size and breadth, thickly coriaceous, often glaucous beneath, brown when dry; nerves erecto-patent; petiole ½–1 in., slender. *Panicles* 2 in. long, peduncle very slender glabrous; flowers shortly pedicelled, $\frac{1}{10}$ in. diam. *Stamens* hairy. *Ovary* glabrous.—I have described this species from Wallich's Nepal plants with nearly glabrous panicles, referring the tomentose flowered var. β. *caniflora* of Meissner to *C. cecicodaphne.* Brandis and Gamble no doubt include it under their *glanduliferum.* If the fruit which is unknown be not different, I do not see how Wallich's plant is to be distinguished from *C. Parthenoxylon.*

24. **C. cecicodaphne,** *Meissn. in DC. Prodr.* xv. 1. 25; habit and characters of *C. glanduliferum*, but panicles shorter crowded and densely tomentose as are the flowers within and without, fruit 1¼ in. long oblong. C. glanduliferum, β. caniflorum, *Meissn. l. c.* Camphora caniflora, *Meissn. mss.* Cecicodaphne glaucescens, *Nees in Wall. Pl. As. Rar.* ii. 70, and *Syst. Laurin.* 203. Tetranthera glaucescens, *Wall. Cat.* 2560. Laurus glaucescens, *Herb. Ham.*

EASTERN HIMALAYA; Sikkim, *J. D. H.*; Bhotan, *Griffith.* ASSAM, *Mann*; Patkoye Mts., *Griffith* (*Kew Distrib.* 4247). SILHET, *Hamilton*, &c.

As stated under *C. glanduliferum*, this may prove a form of that plant, as Meissner supposed; it differs from *C. Parthenoxylon* in the tomentose panicles and large oblong fruit.

25. **C. inunctum,** *Meissn. in DC. Prodr.* xv. 1. 25; leaves alternate 3–5 in. long-petioled elliptic-oblong or ovate obtusely acuminate penni-nerved, nerves very faint finely reticulate beneath, panicles solitary slender glabrous few-fld., flowers long-pedicelled glabrous. *Kurz For. Fl.* ii. 289. Camphora inuncta, *Nees in Wall. Pl. As. Rar.* iii. 32, and *Syst. Laurin.* 89; *Miquel Fl. Ind. Bat.* i. pt. 1, 905. Tetranthera camphoracea, *Wall. mss.* Phœbe micrantha, *Meissn. mss.*

TAVOY, *Gomez*, *Herb. Calcutt.* MALACCA, *Griffith* (*Kew Distrib.* 4256).

A tree with slender branches which are black when dry. *Leaves* in Wallich's specimens 3 in., in King's 5 in., thinly coriaceous, with two long sub-basal nerves; petiole ½–1 in. *Panicle* slender, 2–3 in. long, long-peduncled, subcorymbosely few-fld.; flowers $\frac{1}{10}$ in. broad, on slender pedicels ⅙–¼ in. "Fruiting perianth funnel-shaped. *Berry* ovoid the size of a pea," *Meissner.*—Wallich's specimens are very imperfect, and the fruit described by Nees is not on it. I suspect *C. inodorum*, Meissn., of Borneo, may be the same plant, and both may possibly be referable to *C. Parthenoxylon.*

26. **C. Parthenoxylon,** *Meissn. in DC. Prodr.* xv. 1. 26; leaves alternate elliptic ovate or oblong subcaudate-acuminate penninerved often glaucous beneath, panicles short nearly glabrous shorter than the leaves perianth nearly glabrous without pubescent within, fruit ⅓ in. diam. globose *Kurz For. Fl.* ii. 289; *Benth. Fl. Hongk.* 290. C. pseudo-sassafras, *Meissn. l. c.* 27. C.? malaccense, *Meissn. l. c.* 27. C. Neesianum, *Meissn. l. c.* Camphora Parthenoxylon, *Nees in Wall. Pl. As. Rar.* ii. 76. C. pseudo-sassafras, *Miquel in Zolling. Verseichn.* 113, 114 *in part.* C. chinensis

Nees in Otto Gartenzeit. 1833, 91, and *Syst. Laurin.* 92. Sassafras Parthenoxylon, *Nees Syst. Laurin.* 491; *Wight Ic.* t. 1832. Parthenoxylon porrectum and P. pseudo-sassafras, *Blume Mus. Bot. Lugd. Bat.* i. 323; *Miquel Fl. Ind. Bat.* i. 1. 917. Persea pseudo-sassafras, *Zolling. in Nat. en Geneesk. Arch.* ii. 635. Laurus Parthenoxylon, *Jack in Mal. Misc.* i. 28; *Wall. Cat.* 2602. L. porrecta, *Roxb. Hort. Calc.* 30, and *Fl. Ind.* ii. 308. Phœbe latifolia, *Champ. in Kew Journ. Bot.* v. 197.

MALAY PENINSULA; from Tenasserim, *Griffith*, &c. (*Kew Distrib.* 4248, 4249), to PENANG, *Wallich, Maingay* (*Kew Distrib.* 1514 and 1244).—DISTRIB. Sumatra, Java, China.

A large tree, branches stout, black when dry, with very smooth bark. *Leaves* extremely variable, the largest 8 by 4 in., coriaceous, others thinner almost membranous and glaucous beneath, base acute; nerves spreading, the lowest pair sometimes longest; petiole slender, 1–1½ in. *Panicles* 1–3 in. long, with the young shoots enclosed in rounded coriaceous silky caducous scales, black when dry, many-fld.; flowers $\frac{1}{12}$ in. diam., pedicelled. *Perianth-lobes* broadly oblong, obtuse, wholly deciduous. *Stamens* very short, hairy. *Ovary* glabrous. *Stigma* discoid. *Fruiting perianth* $\frac{1}{4}$–$\frac{1}{3}$ in. long, funnel-shaped, suddenly expanding into the fruit-bearing disk. *Fruit* succulent.—I find no specimen of *C. malaccense*, Meissn., said to be described from specimens in Herb. Hook.; but I cannot doubt its being *C. Parthenoxylon.*

DOUBTUL AND EXCLUDED SPECIES.

C. BURMANNI, *Blume* (Laurus dulcis, *Roxb. Hort. Beng.* 30, and *Fl. Ind.* ii. 303; *Wall. Cat.* 2581), is a Malayan Island species, not hitherto found in India. Meissner quotes Wight's Icones, t. 138, copied from a drawing of Roxburgh under the name of *dulce*, for this, but it differs in the very strong nerves produced to the very tips of the leaves.

C. CATHIA, *Don Prodr.* 67, is probably *Phœbe paniculata.*

C. HEYNEANUM, *Nees Syst. Laur.* 77 (Laurus Heyneana, *Wall. Cat.* 2576), is referred to var. *γ. subvenosum* of *C. iners*, Reinw., by Meissner (in *DC. Prodr.* xv. 1. 20). It is not very like any species described above; it is a very slender plant, the subopposite leaves are very long and narrow, 5–7 by ½–1 in., with nerves obscure above; the fruiting peduncles are very long and slender; the pedicels ¼ in., suddenly dilating into the almost rotate fruiting-perianth ⅓ in. diam. with rounded spreading lobes, and the fruit (apparently dry) is oblong ½ in. long.—It is from Heyne's Herbarium without habitat.

LAURUS MALABATHRICA, *Soland. mss. in Roxb. Fl. Ind.* ii. 297. Roxburgh quotes Rheede's Katou-Karua (*Hort. Mal.* v. t. 53) for this; and Hamilton (in *Trans. Linn. Soc.* xiii. 550) has a long article upon it and upon Rheede's Carua (*Hort. Mal.* i. t. 57), which I have referred to *C. macrocarpum.* It appears to me to be impossible to identify absolutely the plants which such figures are supposed to represent.

LAURUS RIGIDA, *Wall. Cat.* 2570, from Silhet, with rigid elliptic very coriaceous leaves 3–5 in. long, is inderminable.

C. TOMENTOSUM, *Don Prodr.* 67, is probably *Phœbe paniculata.*

LAURUS ?? SMILACIFOLIA, *Wall. Cat.* 2572, from Penang, is *Grewia laurifolia*, with leaves 10 in. long.

8. **MACHILUS,*** *Nees.*

Evergreen trees. *Leaves* alternate, penninerved. *Flowers* 2-sexual, in axillary panicles. *Perianth-tube* short or 0; segments 6, subequal or outer rather smaller, all persistent (except *M. edulis*) and spreading or reflexed in

* Further information on this genus will appear at the end of the volume, additional materials being expected from Calcutta.

fruit. *Perfect stamens* 9, filaments of the 1st and 2nd series eglandular with introrse 4-celled anthers; of the 3rd series eglandular with extrorse 4-celled anthers; staminodes of the 4th series cordate. *Berry* globose or oblong, seated on the persistent perianth.—Species about 15, Eastern Asiatic.

A. Species of Northern India, Himalaya, Assam and the Khasia Mts:

* *Flowers quite or nearly glabrous.* (See also *M. odoratissima*.)

1. **M. parviflora,** *Meissn. in DC. Prodr.* xv. 1. 505; quite glabrous, leaves linear-oblong or oblanceolate obtuse subacute or obtusely acuminate glaucous beneath minutely reticulate on both surfaces, panicles shorter than the leaves few-fld., perianth subglobose $\frac{1}{6}$ in. diam. glabrous, lobes broad short, pedicels about twice as long stout, fruit $\frac{2}{3}$–1 in. long elliptic-oblong.

Khasia Mts., alt. 4–5000 ft., *Griffith* (*Kew Distrib.* 4263), *J. D. H. & T. T.*

A small tree; bark of flowering branches whitish, rough. *Leaves* very variable in breadth, youngest faintly silky, firmly coriaceous, base acute; nerves 8–12 pair; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Panicles* narrow, long-peduncled; flowers small for the genus, obscurely puberulous within. *Filaments* nearly glabrous; anthers very short. *Ovary* glabrous.

2. **M. Gammieana,** *King in Herb. Calcutt.*; quite glabrous, leaves linear- or ob-lanceolate finely acuminate brown beneath when dry, nerves very slender oblique, panicles longer than the leaves with spreading branches, perianth $\frac{1}{6}$ in. diam., pedicels twice as long, fruit $1\frac{1}{2}$ in. diam. globose.

Sikkim Himalaya, *Herb. King*; Darjeeling, alt. 7500 ft., *J. D. H.*

Branches with pale bark. *Leaves* 5–7 in., hardly shining above, base much attenuated; petiole $\frac{3}{4}$ in.; nerves 10–20 pair, very slender. *Panicles* long-peduncled, branches spreading, corymbosely few-fld. *Perianth* short, lobes obtuse, silky within. *Filaments* very hairy. *Anthers* oblong.—King's flowering specimen has much fewer (10–12 pair) nerves than the fruiting (15–20).

3. **M. Clarkeana,** *King in Herb. Calcutt.*; quite glabrous, leaves 6–10 in. narrowly elliptic-lanceolate acuminate brown on both surfaces when dry, panicles few-fld. shorter than the leaves, peduncles and pedicels stout, perianth $\frac{1}{3}$–$\frac{1}{2}$ in. diam. nearly glabrous, fruit globose.—M. odoratissima γ., *Herb. Ind. Or. H. f. & T.* (not of Meissn.).

Sikkim Himalaya; alt. 5–8000 ft., *J. D. H., Treutler, King.*

Branches stout, black when dry. *Leaves* 1–$1\frac{1}{2}$ in. broad, young glabrous except the densely silky very young ones which resemble bud-scales; petiole very short. *Panicle* 2–$2\frac{1}{2}$ in., black and subglaucous when dry; flowers the largest of the genus. *Sepals* linear-oblong, nearly glabrous within. *Filaments* long, hairy towards the base; anthers linear-oblong. *Fruit* (detached) $\frac{2}{3}$ in. diam.—The long narrow leaves, very robust few-fld. panicles and thickly pedicelled large flowers are prominent characters of this very distinct-looking plant.

4. **M.** ? **Khasyana,** *Meissn. in DC. Prodr.* xv. 1. 42; leaves membranous glabrous lanceolate or oblanceolate or obovate acute dark brown above when dry blue-glaucous beneath reticulate on both surfaces, nerves strong arched, panicles usually long-peduncled hoary shorter than the leaves, perianth-lobes rounded.

Khasia Mts., *Griffith.*

Branches very short, rough with the scars of fallen leaves. *Leaves* 6–10 by $1\frac{1}{2}$–3 in.; nerves 10–15 pair; petiole 1–$1\frac{1}{2}$ in., stout. *Panicles* 3–6 in.; flowers corymbose, $\frac{1}{6}$ in. diam., more globose than usual in the genus. *Filaments* very short indeed; anthers broad. *Ovary* glabrous; style long, slender. *Fruit* unknown.—The subglobose buds, with broad almost rounded perianth-lobes, and very dark membranous leaves, are unlike those of any other species.

** *Panicles pubescent.* (The species all want further investigation.)

5. **M. Gamblei,** *King in Herb. Calcutt.*; leaves 3–4 in. thinly coriaceous obovate to elliptic-lanceolate obtuse acute or caudate-acuminate very pale and glabrous or subsilky beneath, petiole slender, panicles few-fld. shorter than the leaves, pedicels slender, flowers silky, fruit small globose. M. odoratissima, β. canescens, *Blume Mus. Bot.* 330; *Meissn. in DC. Prodr.* xv. 1. 41 (*the Assam plant only*).

NORTHERN BENGAL; Cooch Behar, *King.* ASSAM, *Jenkins, Griffith.*

Branches rather slender, dark. *Leaves* sometimes elliptic or lanceolate, acute at both ends, finely reticulate above; nerves 8–10 pair, very slender, oblique; petiole ½ in., glabrous or pubescent. *Perianth-lobes* linear-oblong, villous or tomentose within. *Filaments* very slender, nearly glabrous; anthers oblong. *Fruit* (quite young) ¼ in. diam. "always globose," *King.*—This looks different from *M. odoratissima* in the broad pale leaves with cuneate bases.

6. **M. Listeri,** *King in Herb. Calcutt.*; leaves 3–5 in. glabrous oblong or lanceolate rarely obovate glaucous beneath, petiole slender, panicles shortly peduncled shorter than the leaves hoary-pubescent, pedicels long slender, flowers silky, fruit globose 1 in. diam.

UPPER ASSAM; Narainpore and Dukrung Valley in the Duphla Hills, alt. 3000 ft., *Col. Lister.*

The plants sent me by King as flowering and fruiting specimens of this are considerably different; the first (from Narainpore, which resemble *M. Gamblei*) have slender branches and elliptic-lanceolate acuminate leaves with very slender nerves; the fruiting ones have much thicker obovate or oblong leaves with stouter petiole midrib and nerves. *Flowers* ¼ in. long; pedicel twice as long as the perianth, which is about ⅙ in. long and silkily tomentose without and within; lobes linear-oblong. *Filaments* short, nearly glabrous; anthers oblong. *Style* very slender.

5. **M. edulis,** *King in Herb. Calcutt.*; young leaves and panicles subvillously tomentose, leaves obovate oblong or oblanceolate substrigose beneath or glabrate with many rigid prominent nerves, tip rounded acute or acuminate, panicles stoutly peduncled appearing with the young leaves, perianth deciduous ?, fruit very large globose.

SIKKIM HIMALAYA; near Darjeeling, alt. 6000 ft., *Herb. Griffith, King, Lister.*

Branches of old wood as thick as a swan's quill, woody, with prominent large leaf-scars; bark rugged. *Leaves* 5–6 by 1½–2½ in., brown when dry, thinly coriaceous, narrowed from above the middle to the base; nerves 10–12 pair, very oblique, nearly straight; petiole ½–¾ in., rather slender. *Panicles* densely softly tomentose, 3–4 in. long including the long peduncle; branches short, stout, few-fld.; flowers about ¼ in. diam. *Perianth-lobes* broadly oblong, villous within. *Filaments* very short, broad, villous; anthers broad. *Fruit* nearly 2 in. diam., on a stout woody peduncle, with no trace of a perianth.—Young shoots smooth and very stout, terminal leaves and large terminal buds enclosed in imbricating subsilky scales, the outer of which are semicircular, and the inner oblong and ¾ in. long.

8. **M. bootanica,** *Meissn. in DC. Prodr.* xv. 1. 42; branches leaves beneath and panicles hoary-pubescent, leaves 8–10 in. long-petioled membranous obovate abruptly acuminate, nerves slender, panicles long-peduncled few-fld., flowers large.

BHOTAN; in woods near Chuka, alt. 4000 ft., *Griffith.*

"A moderate-sized tree," *Griff.* *Branches* stout, wood rugged with very large leaf-scars. *Leaves* pale brown beneath when dry; nerves 15–20 pairs, spreading, nearly straight; petiole 2–2½ in. *Panicles* 6–8 in. long, including the long stout peduncle; branches few and few-fld.; pedicels long (for the genus) often ⅓ in. long;

flowers $\frac{1}{3}$ in. diam. *Perianth-lobes* oblong, finely tomentose without and within. *Filaments* long, villous; anthers narrow. *Fruit* unknown.—A very distinct-looking plant from its large broad membranous leaves and large long-pedicelled flowers.

9. **M. sericea,** *Blume Mus. Bot.* i. 330; branches very stout and panicles hoary-pubescent, leaves long-petioled 6–8 in. coriaceous oblong-lanceolate acuminate young silky beneath, nerves very slender, panicles 4–8 in. long, branches usually short few-fld. *Meissn. in DC. Prodr.* xv. 1. 41. Phœbe sericea, *Nees Syst. Laurin.* 99 (*excl. syn. Fl. Nep.*); *Meissn. l. c.* 35. Ocotea sericea, *Nees in Wall. Pl. As. Rar.* ii. 71, and iii. 32. Laurus sericea, *Wall. Cat.* 2606.

CENTRAL HIMALAYA; Nepal and Kumaon, in the Deyra hoon, *Wallich.*

Branches as thick as a swan's quill. *Leaves* when young polymorphous, oblong to lanceolate obtuse acute or acuminate, base acute or rounded, white-silky beneath; old leaves rigidly coriaceous, brown when dry, rather glaucous beneath, finely reticulate on both surfaces; nerves 12–15 pair, arched; petiole 1–1½ in. *Panicles* sometimes very long, with few short branches; flowers shortly pedicelled, $\frac{1}{8}$–$\frac{1}{6}$ in. diam. *Filaments* short, hairy; anthers narrow. *Fruit* unknown.—Wallich's specimens of *Laurus sericea*, A, B, C, may or may not belong to one species; it is described by Nees as a *Phœbe*; but Blume afterwards separated some of the specimens as *Machilus sericea*, observing that it differs from the *Phœbe* in the absence of rings (caused by the fall of the bud-scales) at the bases of the branches. This difference is due to the age of the branches, of which the old bear scars of scales, which scales the first year's shoots do not bear. Meissner quotes Wallich's 2606 B under both. The specimens are very bad, and are all possibly referable to *M. odoratissima*, but the petioles are longer. The Nepal specimens have hairy filaments and anthers, those of the Kumaon ones are glabrous. When the Western Himalayan *Machili* are cleared up, *M. sericea* will probably be suppressed as being a composite book-species.

10. **M. odoratissima,** *Nees in Wall. Pl. As. Rar.* ii. 70, and *Syst. Laurin.* 172; glabrous except the panicle, leaves 3–9 in. long-petioled lanceolate or oblong or elliptic-lanceolate acuminate usually slightly glaucous beneath, nerves slender, panicles long- or short-peduncled hoary-tomentose or glabrous, flowers glabrous or pubescent, fruit oblong or globose. *Meissn. in DC. Prodr.* xv. 1. 40; *Brand. For. Fl.* 378; *Gamble Man. Ind. Timb.* 308; *Blume Mus. Bot.* i. 329. M. indica, *Kurz For. Fl.* ii. 291; *Miquel Fl. Ind. Bat.* i. 1. 914 (*excl. var.* β.). M. rimosa, *Blume l. c.* 330; ? *Meissn. l. c.* 42; ? *Kurz l. c.* 292. Laurus odoratissima, *Wall. Cat.* 2607. L. indica, *Lour. Fl. Coch.* i. 311 (*ex Nees*). L. Champa and L. bombycina, *Herb. Hamilt.*

SUBTROPICAL and TEMPERATE HIMALAYA, from Murree eastwards; ascending to 8000 ft. in Sikkim; ASSAM and the KHASIA MTS. TENASSERIM and MARTABAN, alt. 3–7000 ft. ? SINGAPORE, *Wallich.*—DISTRIB. Java, Sumatra, Cochin China.

A large tree, stunted at high elevations, shoots pubescent. *Leaves* very variable in breadth, coriaceous; nerves irregular, usually 15–20 pair; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., slender. *Panicles* about equalling the leaves, but very variable, loosely branched; peduncle glabrous hoary or subsilkily pubescent, as are the flowers, which are sometimes corymbose on the short branches. *Perianth* $\frac{1}{8}$–$\frac{1}{4}$ in. diam.; lobes oblong obtuse, lengthening a little after flowering. *Filaments* glabrous or slightly hairy; anthers oblong, rarely hairy. *Fruit* $\frac{1}{2}$–$\frac{2}{3}$ in. long.—I am very much puzzled with this plant, and suspect that it consists of several species, the differences being marked between the specimens with glabrous and those with silkily pubescent perianths, and those with globose and with oblong fruit. The type of the species is *Laurus odoratissimus*, Wall. Cat. 2607, from Nepal, which has copiously silkily pubescent shoots and panicles (which however are hardly developed); No. 2607 C and D (from Herb. Hamilton) with globose fruit seem the same; and other specimens with globose fruit are from Sikkim and Simla. The other form is Wallich's 2607 B from Kumaon, with glabrous

panicles, of which there are flowering specimens from Kumaon (*M. odoratissimus* and *Ocotea ligustrina*, Herb. Strach. and Winterb.) accompanied by specimens with oblong fruit. Furthermore, glabrous panicles with oblong fruit occur in Sikkim and ? Singapore, and oblong fruit in Bhotan. Of *M. rimosa*, Blume, little is known; Kurz describes it as differing from *M. odoratissimus* in the smaller flower. The Moulmein plant referred to *rimosa* by Meissner has small flowers, but the specimen is too small to judge of its identity. Wallich's Singapore locality I suspect to be erroneous.

11. **M. villosa,** *Hook. f.*; shoots and panicles densely softly ashy or rufous-tomentose, leaves 3–5 in. coriaceous elliptic or elliptic- or linear-lanceolate or oblanceolate obtuse acute or acuminate, pale above brownish beneath, nerves 6–8 pair, panicles subterminal fascicled usually longer than the leaves, branches spreading, flowers densely tomentose, fruit globose. Ocotia glaucescens, *Nees in Wall. Pl. As. Rar.* ii. 71, and iii. 32. Phœbe glaucescens, *Nees Syst. Laurin.* 100 and 671; *Meissn. in DC. Prodr.* xv. 1. 36. P. villosa, *Wight Ic.* t. 1822; *Kurz For. Fl.* ii. 290. Laurus glaucescens, *Roxb. ex Wall. Cat.* 2592 (*not of Fl. Ind.*). L. floribunda, *Wall. Cat.* 2593 B. L. villosa, *Roxb. Fl. Ind.* ii. 310. (L. villosa & glaucescens, *Ic. Roxb.*)

SIKKIM HIMALAYA; alt. 7000 ft., *Gamble*. UPPER ASSAM; Nuku Hills, *Simons*, *Griffith* (*Kew Distrib.* 4261); Patkoye Hills, *Griffith* (*Kew Distrib.* 4259). SILHET, *Wallich*. CACHAR, *Keenan*. CHITTAGONG, *Roxburgh*, *J. D. H. & T. T.*

A large tree; branchlets dark brown. *Leaves* very pale, rather shining above, base very acute; nerves strong beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Panicles* sometimes excessively numerous and umbellate, almost terminating the branches, the minute villous terminal bud not lengthening; peduncle stout, branches spreading; flowers subcorymbose, shortly pedicelled. *Perianth* hemispheric, densely tomentosé; lobes short, broad, rounded. *Filaments* and anthers short, glabrous. *Berry* globose, $\frac{1}{3}$ in. diam., seated on the reflexed calyx.—Specimens collected in fruit by Keenan, together with Roxburgh's excellent drawings (it is unquestionably his *L. villosa*), prove this to be a *Machilus*. Much confusion has attended its history from Roxburgh having figured it under two names (*glaucescens* and *villosa*), and by his having further, as pointed out by Wight, described two plants under the name of *glaucescens*. Of these names Wallich took *glaucescens* for his No. 2592, which is that which Roxburgh described as *villosa*. Roxburgh's other plant described under *L. villosus*, with alternate triplenerved leaves and flowers in lateral panicles, is no doubt an *Actinodaphne*.

12. **M. fruticosa**, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 101, and *For. Fl.* ii. 292; glabrous except the hoary panicles, leaves 4–6 in. thickly coriaceous oblong or linear- or elliptic-oblong obtuse or obtusely acuminate dark brown above glaucously brown beneath, nerves faint beneath, panicles axillary long-peduncled, flowers very small corymbose, fruit small globose.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 4262), *Helfer* (*Kew Distrib.* 4268); Martaban, alt. 4000 ft., *Brandis*.

Branches stout, black. *Leaves* rounded or acute at both ends, often shining above, margin sometimes recurved; nerves 10–12 pair; petiole $\frac{1}{2}$ in. *Panicles* 3–8 in. long, stiff, black when dry, branches spreading; flowers about $\frac{1}{8}$ in. diam., hoary; pedicels about twice as long. *Perianth* subglobose; lobes rounded, obtuse, hoary. *Filaments* glabrous, except at the base; anthers oblong. *Fruit* "the size of a pea, on a long thickened pedicel," *Kurz*.—I have seen no fruit.

13. **M. macrantha,** *Nees in Wall. Pl. As. Rar.* ii. 70, and iii. 31, and *Syst. Laurin.* 174; leaves long-petioled glabrous from oblong rounded at both ends to elliptic-lanceolate and acute at both ends rarely obovate bluish and glaucous beneath, panicles in subterminal corymbs longer or shorter than the leaves much branched more or less hoary-pubescent, perianth tomentose, filaments villous, fruit globose. *Meissn. in DC. Prodr.*

xv. 1. 40; *Wight Ic.* t. 1824; *Beddome For. Fl.* t. 264; *Thwaites Enum.* 254; *Dalz. & Gibs. Bomb. Fl.* 221. M. glaucescens, *Wight Ic.* t. 1825 (*excl. syn.*); *Dalz. & Gibs. l. c.* Cryptocarya floribunda, *Miquel Pl. Hohenack.* n. 1458 (*not of Nees*). Laurus macrantha, *Wall. Cat.* 2587.

DECCAN PENINSULA; on the Ghats from the Concan southwards, ascending to 7000 ft. CEYLON, alt. 1500–4000 ft.

A large tree; branches brown when dry. *Leaves* 3–9 by 1½–3½ in., finely reticulate on both surfaces; nerves 8–12 pair, slender, sometimes indistinct; petiole slender, 1–1½ in. *Panicles* grouped in a subterminal corymb as in *M. villosa*, sometimes 10 in. long and with very long peduncle and spreading branches; at others short and subsessile, peduncle and branches from hoary-pubescent to glabrate; flowers very variable in size, ⅛–¼ in. diam. *Perianth* tomentose without and within; lobes oblong or linear-oblong. *Anthers* pubescent. *Fruit* black, ½–¾ in. diam.—I can find no characters whereby to distinguish Wight's *glaucescens* from *macrantha*. Dalzell and Gibson describe the fruit of the former as about the size of a small gooseberry, and of the latter as of a large currant. The length of the petiole at once distinguishes it from *M. villosa*, as does the pubescence of the panicle.

9. PHŒBE, *Nees.*

Evergreen trees or shrubs. *Leaves* alternate or scattered, penninerved. *Flowers* small, 2-sexual or polygamous, in axillary and subterminal panicles. *Perianth-tube* short; segments 6, subequal, erect and enlarging and clasping the base of the fruit. *Perfect stamens* 9; filaments of 1st and 2nd series eglandular with introrse 4-celled anthers, of 3rd series 2-glandular with extrorse 4-celled anthers; staminodes of 4th series cordate or sagittate. *Fruit* ellipsoid or oblong, clasped at the base by the hardened perianth-segments.—Species about 26, Indian and Malayan.

Phœbe, which in the "Genera Plantarum" is reduced to *Persea*, must, I think, be restored; the fruiting perianth is very characteristic and habit uniform.

* *Perianth quite glabrous.*

1. **P. lanceolata,** *Nees Syst. Laurin.* 109; quite glabrous, leaves elliptic-lanceolate finely or caudate-acuminate, perianth glabrous, segments equal, fruit ½ in. *Meissn. in DC. Prodr.* xv. 1. 34 (*excl. var. γ.*); *Wight Ic.* t. 1821; *Brandis For. Flor.* 377; *Kurz For. Fl.* ii. 290; *Gamble Man. Ind. Timb.* 308; ? *Beddome For. Man.* 184. Ocotea lanceolata, *Nees in Wall. Pl. As. Rar.* ii. 71. Laurus lanceolata, *Wall. Cat.* 2599. L. lanceolaria, *Roxb. Fl. Ind.* ii. 309. L. salicifolia and L. ? camphorata, *Herb. Hamilt.*

SUBTROPICAL HIMALAYA, from Simla eastwards, ascending to 6000 ft. KHASIA MTS., common. BURMA, *Griffith.* MARTABAN and TENASSERIM, *Kurz.* SOUTH DECCAN, Nilghiri Hills and southward, alt. 3000 ft., *Beddome.*

An evergreen tree; branches slender, bark usually yellowish white. *Leaves* 5–10 by 1–2½ in., thinly coriaceous, pale when dry above and pale brown beneath, base very narrow; nerves 6–10 pair; petiole slender, ½–¾ in. *Panicles* axillary, very variable, shorter or longer than the leaves, peduncle sometimes strict and 1–2 in., at others curved and 4–6 in., branches few; flowers 1/10–⅛ in., pale yellow or white. *Perianth* cup-shaped; segments broad, obtuse, pubescent within, hardening and clasping the fruit, which is narrowly ellipsoid, black.—Nees describes the leaves as very finely pubescent beneath. I have seen no Deccan specimens. Very near *P. declinata*, Nees, of the mountains of Java. Var. *γ. ligustrina*, Meissn., is *P. declinata*, Nees.

2. **P. angustifolia,** *Meissn. in DC. Prodr.* xv. 1. 34; quite glabrous

leaves very narrowly lanceolate acuminate or caudate, perianth glabrous, segments equal, fruit ½ in.

KHASIA MTS., alt. 2–4000 ft., *Griffith, Lobb, J. D. H. & T. T.*

A small shrub, perhaps only a form of *P. lanceolata*, but the leaves are much narrower, 4–10 by ½–1 in.

3. **P. declinata,** *Nees Syst. Laur.* 114; quite glabrous, branches black when dry, leaves elliptic-lanceolate or -oblong obtuse or obtusely acuminate red brown, nerves 6–8 pair very obscure beneath, perianth glabrous, segments subequal. *Meissn. in DC. Prodr.* xv. 1. 34; *Miquel Fl. Ind. Bat.* i. 1. 906. P. ligustrina, *in part*, *Nees Syst.* 113. P. lanceolata, γ. ligustrina, *in part*, *Meissn. l. c.* Ocotea declinata, *Blume Bijd.* 572. O. ligustrina, *in part*, *Nees in Wall. Pl. As. Rar.* ii. 71, and iii. 32. Laurus declinata, *Blume Cat. Hort. Bot. Buitenz.* 66. L. ligustrina, *Wall. Cat.* 2588 A.

SINGAPORE, *Wallich.*—DISTRIB. Java.

A very distinct species, remarkable for the black shoots, brown finely reticulate leaves, 4–5 by 1–1¼ in., with slender black petioles and midrib beneath, and very faint slender nerves.—I have seen no fruit. Wallich's 2588 B from Tavoy consists of three specimens of two plants, both different from *declinata*, one is probably *P. lanceolata*; two others have elliptic acute thin reticulated leaves only 2 in. long, with numerous very slender spreading nerves; these resemble no other species except in the flowers, which are like those of *P. lanceolata*, but rather smaller.

** *Perianth silky pubescent or tomentose.*

4. **P. pallida,** *Nees Syst. Laurin.* 112; shoots very finely puberulous, leaves elliptic-lanceolate or oblanceolate finely acuminate puberulous beneath at length glabrous, nerves 8–10 pair very oblique deeply impressed above strong beneath, panicles axillary long-peduncled and flowers very finely pubescent. *Meissn. in DC. Prodr.* xv. 1. 34; *Brandis For. Fl.* 377. P. glaucescens & fuscans, *Meissn. l. c.* 37, *in part.* Laurus pubescens, *Wall. Cat.* 2595 (*excl.* B, C). Ocotea pallida, *Nees in Wall. Pl. As. Rar.* ii. 71.

SUBTROPICAL HIMALAYA; Kumaon, *Thomson, Strachey & Winterbottom*; Nepal, *Wallich.* ? Sikkim, *J. D. H.* EASTERN OUDE forests, *Brandis.*

Very closely allied to *P. lanceolata*, but the young leaves, panicles and flowers are finely tomentose, and the leaf-nerves deeply sunk above.—The Sikkim specimens doubtfully referred here are flowerless, the leaves are much larger, 6–10 by 1½–3½ in., more membranous, and the nerves less deeply sunk, as might be expected in plants from a moist climate; they are certainly not referable to *Laurus glaucescens* (*Machilus villosa*) as Meissner supposed, and have not the rusty tomentum of *P. paniculata*. *Fruit* too young for description.

5. **P. paniculata,** *Nees Syst. Laurin.* 105; shoots rusty-tomentose, leaves elliptic or elliptic-lanceolate rarely obovate acuminate pubescent and with 8–12 pair of very strong nerves beneath, panicles axillary long-peduncled and flowers pubescent or tomentose, fruit turgidly ellipsoid ⅓–½ in. *Meissn. in DC. Prodr.* xv. 1. 37 (*excl. syn. Laurus villosa and Phœbe villosa*); *Brand. For. Fl.* 377 (*excl. syn. L. villosa*); *Wight Ic.* t. 1820. P. pubescens, *Nees Syst. Laur.* 107; *Kurz For. Fl.* 290. P. Wightii, *Meissn. in DC. l. c.* 38; *Beddome Forest. Fl.* t. 292. Ocotea pubescens & paniculata, *Nees in Wall. Pl. As. Rar.* ii. 71, 72, and iii. 32. Laurus paniculata, *Wall. Cat.* 2598. L. pubescens, *Wall. Cat.* 2595 B, C. Cinnamomum tomentosum and C. Cathia, *Don Prodr.* 66 (*fide Nees*).

CENTRAL HIMALAYA; Nepal, *Wallich.* BURMA; from Chittagong and Ava to

Tenasserim, *Griffith* (*Kew Distrib.* 4271), *Kurz*, &c. NILGHIRI HILLS, alt. 5–6000 ft., *Wight*, &c.

The ferruginous tomentum of the young shoots, usually shorter and broader leaves pubescent or even tomentose beneath, with stronger nerves and nervules, best distinguish this from *P. pallida*. The fruit is quite like that of *P. lanceolata*, but rather broader.—Very near *P. multiflora*, Blume, of Java.

6. **P. attenuata,** *Nees Syst. Laurin.* 104 (*excl. syn. Blume*); branches very stout, young shoots and leaves beneath rusty-pubescent or -villous, leaves oblanceolate acute or acuminate, nerves 15–20 pair, panicles stoutly peduncled and flowers tomentose. *Meissn. in DC. Prodr.* xv. 1. 38. Ocotea attenuata, *Nees in Wall. Pl. As. Rar.* ii. 71. Laurus attenuata, *Wall. Cat.* 2600.

EASTERN HIMALAYA; Sikkim, *Gamble, King.* BHOTAN, *Griffith* (*Kew Distrib.* 4254), *King.* SILHET, *Wallich.*

Well distinguished by the very stout branches, leaves broadening upwards, 5–10 by 1½–3 in., more numerous nerves, and stout petioles, peduncles and branches of the panicle. *Flowers* ¼ in. diam., shortly stoutly pedicelled. *Fruiting perianth* ⅓ in. long, campanulate, very rigid; fruit nearly ⅔ in. long, narrowly ellipsoid.

7. **P. opaca,** *Blume Mus. Bot.* i. 327; branches very stout, leaves rigidly coriaceous obovate obovate-cuneate or oblanceolate rarely oblong abruptly obtusely acuminate subglabrous or puberulous beneath, nerves 10–12 pair, panicles and flowers rusty-pubescent. *Miquel Fl. Ind. Bat.* i. 1. 909. P. attenuata, *Miquel in Herb. Jungh.* P. malaccensis, *Meissn. in DC. Prodr.* xv. 1. 37. Alseodaphne ? grandis, *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 183; *Meissn. l. c.* 28. Laurus grandis, *Wall. Cat.* 2594 A. Persea grandis, *Nees in Wall. l. c.* iii. 32. P. lucida, *Blume.*

MALACCA, *Griffith, Maingay.* PENANG, *Porter.*—DISTRIB. Java, Sumatra, Borneo.

Young parts finely rusty-pubescent. *Leaves* very variable, 5–10 by 2–4 in., brown when dry, usually shining above and subglaucous beneath, base acute, rarely obtuse; petiole ½–1 in. *Panicles* numerous, usually shorter than the leaves; peduncles stout, finely pubescent; flowers numerous, ⅙ in. diam., pedicelled; fruiting panicle very stout indeed, a foot long, with thickened branches and pedicels. *Fruiting perianth* broadly campanulate, very rigid. *Fruit* ¾ in. long, ellipsoid. *P. lucida*, Blume, of Sumatra and Borneo, seems the same.

8. **P. Tavoyana,** *Hook. f.*; young shoots petioles and nerves beneath silky or rusty-villous, leaves membranous elongate-lanceolate caudate-acuminate pubescent or tomentose beneath, nerves 10–15 pair, panicles with very slender peduncles and flowers pubescent. Machilus Tavoyana, *Meissn. in DC. Prodr.* xv. 1. 41; *Kurz For. Fl.* ii. 292.

TENASSERIM; King's Island, Mergui Archipelago, *Helfer* (*Kew Distrib.* 4260); Tavoy, *Parish.*

Apparently a very distinct species, nearest to *P. attenuata*, but with membranous leaves 5–10 by 1–2 in., ending in very slender tails, slender petioles sometimes 2½ in., and very slender flowering panicles.—The specimens are in bud and young fruit; the perianth in the latter is ⅙ in. long, very rigid, as in the genus.

10. ALSEODAPHNE, *Nees.*

Evergreen trees. *Leaves* usually subverticillate towards the ends of the branches, penninerved, often obovate. *Flowers* bisexual, subumbellate on the branches of axillary and subterminal panicles. *Perianth-tube* short; segments 6, subequal or the three outer smaller, deciduous or not at all

enlarged after flowering, obsolete in fruit. *Stamens* and *staminodes* as in *Phœbe*. *Fruit* ellipsoid, seated on the truncate end of the long or short often much swollen and fleshy peduncle.—Species about 15, Tropical Asiatic.

Habit of *Dehaasia*, but anthers 4-celled. The species are very imperfectly known.

* *Perianth-segments subequal or the outer rather narrower.*

1. **A. semecarpifolia,** *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 182; nearly glabrous, leaves coriaceous cuneately obovate or oblong tip obtuse or rounded 6–8-nerved often glaucous beneath, panicles long-peduncled branches spreading, perianth nearly glabrous segments subequal, fruit ellipsoid acute equalling its swollen warted peduncle. *Meissn. in DC. Prodr.* xv. 1. 28; *Wall. Cat.* 2586 A; *Dalz. & Gibs. Bomb. Fl.* 222; *Wight Ic.* t. 1826, 1827; *Thwaites Enum.* 254; *Beddome For. Fl.* t. 297.

Deccan Peninsula; in dry forests from the Concan southwards. Ceylon in the drier parts of the island.

A small tree, very variable in foliage, young parts obscurely puberulous. *Leaves* 2–7 in., usually very finely reticulate above when dry and glaucous beneath, base acute; nerves faint or strong; petiole ½–1 in. *Panicles* about as long as the leaves or shorter; peduncle and branches slender, glabrous, black when dry; flowers on rather long pedicels, ⅛ in. diam., subumbellate at the tips of the branches. *Perianth-segments* usually subequal, but in one specimen from Herb. Stocks the outer are as short as in the next section.—The following seem to be forms of one species, but I am far from confident about this.

1. A. semecarpifolia proper; leaves rather thinly coriaceous glaucous beneath, panicles equalling the leaves, fruit ½–⅔ in.

Var. *angustifolia*, Meissn. l. c.; leaves 3–5 by 1–1½ in. elliptic-oblong or -lanceolate obtuse or subacute glaucous beneath, panicles as long as the leaves, fruit ⅔ in. rather narrower.—Ceylon and the Concan.

Var. *macrocarpa*; leaves 4–7 in. elliptic-oblong subacute very glaucous beneath tip rounded, fruit 1 in., peduncle much thickened.—Ceylon, *Thwaites* (C. P. 2269).

Var. *rufa*; young parts and young leaves beneath rufous-hoary, leaves broadly cuneate-obovate very coriaceous red when dry tip rounded, panicles as long as the leaves, fruit ½ in.—Concan, *Herb. Dalzell.*

Var. *parvifolia*; leaves 2–3 in. obovate very glaucous beneath tip rounded, petiole very short, panicles much shorter than the leaves. *Wight Ic.* t. 1827.—Courtallam, *Wight.*

2. **A. peduncularis,** *Hook. f.*; quite glabrous, branches slender, leaves membranous elliptic-lanceolate obtusely subcaudate-acuminate, nerves 6–10 pair, panicles very slender few-fld. much shorter than the leaves, perianth glabrous outer segments rather smaller, stamens very short. Haasia peduncularis, *Nees Syst. Laurin.* 376; *Meissn. in DC. Prodr.* xv. 1. 61. Machilus peduncularis, *Nees in Wall. Pl. As. Rar.* ii. 70. Persea peduncularis, *Nees Syst. Laurin.* 125 (*excl. syn. Rumph.*). Laurus peduncularis, *Wall. Cat.* 2596.

Penang, *Wallich.*

Branches with white bark, except the first year's, which are smooth and very slender. *Leaves* 4–6 by 1½–2 in., rather wavy from their thin texture, base very acute; nerves beneath much raised, slender, arching and meeting far within the margin; petiole ⅓–½ in., very slender. *Panicles* 1–1½ in., peduncle and branches filiform; flowers ⅒ in., pedicelled. *Perianth* subglobose, segments short, quite glabrous without (persistent, *Nees*). *Stamens* very short, hairy; staminodes? *Fruit* according to Nees immature, ovoid, in a cylindric fleshy curved pedicel two inches long and as thick as a goose-quill.—Wallich's specimens in the Linnæan Society have neither flower nor fruit, but I find one or two flowers in Herb. Hook. which were

bisexual and agree with Nees' description except in that the anthers are decidedly 4-celled. The slender habit and thin leaves are unlike its congeners.

3. **A. decipiens,** *Hook. f.*; nearly glabrous, leaves subverticillate rigidly coriaceous cuneately obovate or lanceolate very obtusely acuminate glaucous beneath, nerves 8–10 pair sunk above very strong beneath, panicles shorter than the leaves shortly peduncled, perianth minutely hoary, outer segments rather smaller.

SINGAPORE, *N. Cantley.*

Branches rather robust, bark brown. *Leaves* 4–6 by 1½–2½ in., base very acute, smooth, brown above and not reticulated, finely reticulate and bluish beneath; petiole ½–¾ in. *Panicles* rather stout, loosely branched, branches and pedicels obscurely puberulous; flowers $\frac{1}{12}$ in. diam., subglobose. *Perianth-segments* hairy within, as are the stamens and staminodes.—Very similar to *Dehaasia cuneata*, Bl.

4. **A. petiolaris,** *Hook. f.*; branches very stout subverticillate, leaves very large thickly coriaceous long-petioled oblong or oblong-obovate obtuse or subacute not narrowed into the petiole glabrous, nerves 8–10 pair very strong, panicles very stout longer or shorter than the leaves sparsely scurfy, fruit 1½ in. oblong much longer than the cylindric pedicel. Nothaphœbe ? petiolaris, *Meissn. in DC. Prodr.* xv. 1. 59.

ASSAM; on the Nuku Hills, *Simons.* CACHAR, *Keenan.*—DISTRIB. Burma; in the Hookhoom Valley, at Camein, *Griffith.*

A large tree, branchlets as thick as the little finger. *Leaves* 8–12 by 4–6 in., shining and reticulated above, brown on both surfaces, young glaucous beneath, base acute or cuneate; petiole very stout, 1½–2½ in. *Panicles* about half the length of the leaves, loosely branched often from near the base; branches stout, ascending, when fruiting as thick as a duck's quill and soft; flowers shortly pedicelled, ⅙–⅛ in. diam. *Perianth* scurfy, segments short, subequal, obtuse. *Fruit* apparently very fleshy, top rounded, pedicel ¼–½ in. long.

** *Outer segments of the perianth much smaller than the inner.* (See also *A. semecarpifolia.*) (NOTHAPHŒBE, *Blume.*)

5. **A. umbelliflora**, *Hook. f.*; nearly glabrous, leaves scattered very coriaceous elliptic-oblong or lanceolate caudate-acuminate shining above, panicles much shorter than the leaves, fruit oblong much longer than the short cylindric pedicel. Nothaphœbe umbelliflora, *Blume Mus. Bot.* i. 328; *Meissn. in DC. Prodr.* xv. 1. 58. Ocotea umbellifera, *Blume Bijd.* 573. Phœbe ? umbelliflora, *Nees Syst. Laur.* 115; *Miquel Fl. Ind. Bat.* i. 1. 911. Euphœbe umbelliflora, *Blume in Herb. Lugd. Bat.* Haasia nitida, *Meissn. l. c.* 61.

MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1247, 1247/2).—DISTRIB. Sumatra, Java, Borneo.

Branches rather stout, leafy, bark dark. *Leaves* scattered (not subverticillate at the ends of the branches), 4–6 by 1½–2 in., very dark brown above, red-brown beneath when dry, base acute; nerves strong, oblique; petiole ½–1 in. *Panicles* 1–2 in., shortly peduncled, faintly rusty-hoary; flowers globose, $\frac{1}{12}$ in. diam., glabrous, shortly pedicelled. *Perianth-lobes* nearly glabrous within, outer about half the length of the inner. *Stamens* very short, anthers broad. *Fruit* 1¼ in. long, top rounded; pedicel ⅓ in., woody.—This is the plant mentioned by Wight (under tab. 1831) as having the habit of *Haasia*, but 4-celled anthers.

6. **A. panduriformis,** *Hook. f.*; leaves large very shortly petioled glabrous thinly coriaceous panduriform obtuse base cordate, nerves 16–18 pair, panicles shorter than the leaves, branches short many-fld., perianth

rusty-pubescent, 3 outer segments much shorter, fruit 2½–3 in. long cylindric-oblong, pericarp thin 5-ribbed.

MALACCA, *Maingay.*

Branchlets rather stout, glabrous. *Leaves* 8–12 by 3–4 in., brown on both surfaces, narrowed above the cordate base and then dilating; nerves raised on both surfaces, very numerous in the basal portion; petiole ¼ in., very stout. *Panicles* 2–6 in.; peduncle and rachis rather stout and branches glabrous; flowers $\frac{1}{12}$ in diam., subglobose, bright yellow, crowded on short pedicels, rusty-pubescent. Outer *perianth-segments* broadly ovate, inner rounded. *Stamens* very short, hairy, as are the staminodes. *Fruit* very remarkable, slightly curved, dull red, somewhat narrowed towards the base, top rounded; pericarp coriaceous, ribs very narrow. *Seed* cylindric.—A distinct species.

**** Perianth unknown.*

7. **A. ? grandis,** *Nees Syst. Laurin.* 183, *in part*; glabrous, branchlets very stout, leaves subverticillate large thickly coriaceous cuneately obovate obtuse or subacute glaucous beneath, nerves 8–10 pair very strong beneath impressed above, panicles shorter than the leaves, fruit globosely ellipsoid apiculate, pedicel very short thickened. *Meissn. in DC. Prodr.* xv. 1. 28, *in part.* Persea grandis in part, *Nees in Wall. Pl. As. Rar.* iii. 32. Laurus grandis, *Wall. Cat.* 2594 C, D.

TENASSERIM; Tavoy, *Gomez.* BURMA, at Amherst, *Wallich.*

Branchlets woody, as thick as a swan's quill, bark rough. *Leaves* 6–12 in., greenish brown when dry, base very acute; petiole stout, ½–1 in. *Fruiting panicles* not very stout, bearing tuberous excrescences (insect nidi ?) on the rachis and under the fruit, the pedicel of which is often deformed. *Fruit* 1 in. long, sometimes seated on the diseased pedicel, which is then woody, rough and as large as a small nut; the healthy pedicels appear to be short, ¼ in. long and cylindric.

8. **A. ? costalis,** *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 185; glabrous, leaves 12–24 in. very coriaceous oblanceolate or cuneately obovate glaucous beneath, top rounded or subacute, nerves 12–20 pairs very strong beneath. *Meissn. in DC. Prodr.* xv. 1. 29. Laurus grandis, *Wall. Cat.* 2594 B.

SINGAPORE, *Wallich.*—DISTRIB. Burma; Nammarsa, *Griffith* (Actinodaphne, *Kew Distrib.* 4326).

Leaves pale, 5–8 in. diam., opaque, when dry midrib flat above, nerves hardly immersed, base very narrow; petiole stout, 1–3 in.—Wallich's specimens consist of leaves only, Griffith's of leaves and branches; the latter are as thick as the thumb, smooth, striate with a very thick pith, and bear axillary globose flower-buds ½–¾ in. diam., clothed with orbicular silky scales.—The genus is altogether doubtful.

9. **A. crassipes,** *Hook. f.*; branchlets and shoots rusty-tomentose, leaves coriaceous scattered long-petioled elliptic-lanceolate acuminate falcately recurved, nerves 6–8 pair capillary, fruiting peduncles very thick woody, fruit ⅓ in. ellipsoid twice as long as the very thick woody cylindric pedicel.

MALACCA, *Maingay.*

Branches stout, woody, smooth, bark ashy. *Leaves* 4–5 by 1–1½ in., very pale, nerves excessively slender and very laxly reticulate on both surfaces, base very acute; petiole slender, ½–1 in. *Fruiting peduncles* numerous, 3–4 in., very strict, often thickened upwards, as rigid and woody as the branches and thicker at the top than the pedicel is broad; pedicels $\frac{1}{4}$–$\frac{1}{6}$ in. long, cylindric, black, confluent with the thickened ends of the panicle. *Fruit* smooth, "dark blue-black, pruinose, globose, pedicel red," *Maingay.*

DOUBTFUL SPECIES.

A? LUCIDA, *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 186; branches stout lenticellate, leaves 8–12 in. scattered very coriaceous obovate-oblong acuminate base obtuse shining above paler beneath, nerves 16–20 pair spreading slender, midrib prominent above, reticulations beneath very faint, petiole 1–1½ in. terete thickened and rugose at the base. *Meissn. in DC. Prodr.* xv. 1. 29. Laurus ?? lucida, *Wall. Cat.* 2590.—Singapore, *Wallich.*—Probably not a Laurineous plant.

11. **ACTINODAPHNE,** *Nees.*

Evergreen shrubs or trees. *Leaves* subverticillate, rarely scattered or opposite penni- or triple-nerved. *Flowers* small dicœcious, in axillary or lateral dense bracteate sessile or peduncled umbels or clusters; bracts imbricating, caducous (not whorled as in *Litsæa*). *Perianth-tube* short, segments 6, subequal, rarely persistent. *Perfect stamens* 6–9, filaments of the 1st and 2nd series eglandular, of the 3rd 2-glandular; anthers all introrse and 4-locellate; staminodes of fem. 9. *Fruit* seated on the usually enlarged flat or concave perianth-tube.—Species about 50, Eastern Asiatic and Malayan.

The inflorescence is abnormal in *A. sikkimensis & leiantha.* The genus is with difficulty separable from *Litsæa.*

* Leaves more or less whorled, penninerved, or if triple-nerved with the lower pair of nerves very short (sometimes triple-nerved in *A. molochina & Hookeri*).

† Female fl. in sessile or subsessile clusters or umbels. (In *A. madraspatana* and occasionally in a few others the clusters or umbels are peduncled.) (This is an artificial subdivision, but I can suggest no better, except perhaps into glabrous and villous styles, if enough were known of these.)

a. *Species of Northern India and the Eastern Peninsula.*

1. **A. reticulata,** *Meissn. in DC. Prodr.* xv. 1. 212; leaves 5–7 in. whorled penninerved coriaceous linear- or elliptic-lanceolate acuminate young softly pubescent beneath not glaucous, nerves 12–15 pair very slender, flowers clustered, fruit broadly ellipsoid seated on the cupular quite entire long-pedicelled perianth-tube.

KHASIA MTS.; alt. 4–5000 ft., *J. D. H. & T. T., Clarke.*

A small tree; branches not robust, branchlets when young softly tomentose. *Leaves* in whorls of 4–8, 1–1½ in. diam., greenish and almost shining above, very finely impressed-reticulate on both surfaces, paler beneath, nerves very faint; petiole ⅙ in. *Flowers* ¼ in. diam., pedicels as long, both silky; bud-scales nearly glabrous. *Filaments* glabrous. *Fruit* ½ in. long, rather longer than broad, black, pedicel ¾ in., cup ⅓ in. diam.—To a specimen of this in the Hookerian Herbarium, received from Sir J. Smith about 1821, and no doubt sent by Wallich or Hamilton, the habitat, "Nepal? *Wallich*," was subsequently added by myself, because Smith gave it along with many Nepal plants to Sir W. Hooker at that date. Meissner hence gave Nepal as a habitat, but omitted the query; his var. *glabra* is the same plant with old and therefore glabrous branches.

2. **A. sikkimensis,** *Meissn. in DC. Prodr.* xv. 1. 213; leaves whorled penninerved 3–6 in. membranous lanceolate caudate-acuminate glabrous glaucous or not beneath, nerves 10–12 pair very slender, female

flowers clustered subsessile or pedicelled, fruit oblong seated on the very small quite entire base of the perianth.

SIKKIM HIMALAYA, alt. 3–6000 ft., *J. D. H., Clarke, King.*—DISTRIB. Munnipore.

Branches very slender, filaments glabrous; branchlets and young leaves beneath puberulous. *Leaves* in whorls of 4–6, very thin, greenish and almost shining above, paler beneath, not impressed-reticulate; petiole $\frac{1}{8}$–$\frac{1}{3}$ in., slender. *Flowers* very small, subsessile, each 2–4-bracteate independently of the bracts surrounding the whole cluster. *Filaments* and style glabrous. *Fruit* $\frac{2}{3}$ in. long, top rounded, pedicel about as long.—The inflorescence is very anomalous.

3. **A. concolor,** *Nees in Wall. Pl. As. Rar.* iii. 31, and *Syst. Laurin.* 593; leaves whorled penninerved 5–7 in. thinly coriaceous elliptic or subcuneate-obovate acuminate base elongate shining above glaucous beneath, nerves 5–8 pair deeply impressed above, flowers subsessile in very small clusters. *Wall. Cat.* 6346; *Kurz For. Fl.* ii. 304.

TENASSERIM; at Tavoy, *Gomez.*

Branches rather slender, young finely rusty-pubescent; scales of leaf-buds clothed with long rufous silky hairs. *Leaves* in whorls of 3, usually broadest above the middle, base much produced, quite smooth and not reticulate above, young obscurely pubescent beneath; petiole $\frac{1}{2}$ in. *Clusters* of flowers $\frac{1}{4}$–$\frac{1}{2}$ in. diam.; flower-buds silkily tomentose, very shortly pedicelled.—Described from Wallich's type specimen, which has buds only; it answers to Meissner's β. *fagifolia*, but it is clear that his *concolor* and its variety are only large and small leaves of the same plant.

4. **A. malaccensis,** *Hook. f.*; branchlets leaves beneath and petioles brown-tomentose, leaves whorled penninerved 4–8 in. coriaceous elliptic-oblong obtuse or subacute polished above, nerves 10–12 pairs strong beneath, female fl. in dense globose clusters very shortly pedicelled or subsessile, fruit globose seated on the very small cup-shaped thickened perianth-tube.

MALACCA, *Maingay.*

Branches rather stout, densely tomentose. *Leaves* dark brown when dry, $1\frac{1}{2}$–3 in. diam., smooth above, at length glabrous beneath, base acute or subacute; petiole stout, $\frac{1}{2}$–$\frac{3}{4}$ in. Clusters of *female fl.* globose, $\frac{1}{2}$ in. diam.; pedicels $\frac{1}{8}$ in. long. *Perianth* turbinate, $\frac{1}{8}$ in. diam., tube villous within, lobes short, rounded, glabrous. *Style* slender, glabrous; stigma lobulate. *Fruit* $\frac{1}{3}$ in. diam.; cup $\frac{1}{8}$ in. diam.; pedicel very short and thick.

b. *Species of the Deccan Peninsula.*

5. **A. salicina,** *Meissn. in DC. Prodr.* xv. 1. 212; leaves whorled penninerved coriaceous 4–6 in. linear-lanceolate subcaudate-acuminate glaucous beneath glabrous, nerves 10–12 pair very slender, fruit globose seated on the enlarged 6-lobed perianth-tube.

NILGHIRI HILLS, *Wight, Gardner.*

Branches slender, branchlets densely rusty-tomentose. *Leaves* 4–8 in a whorl, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, flat, hardly shining above; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. *Flowers* not seen. *Fruit* $\frac{1}{3}$ in. diam.; pedicel as long.—Very near *A. stenophylla* of Ceylon in habit, but very different in the fruiting calyx. The supposed Ceylon specimens mentioned by Meissner are not so; they have no collector's name nor locality, and are no doubt Peninsular. I have not seen var. *abbreviata*, which appears to be founded on a shorter leaved specimen.

6. **A. campanulata,** *Hook. f.*; glabrous except the tomentose subsilky inflorescence, leaves whorled penninerved 2–3 in. thinly coriaceous elliptic obtuse base acute green on both surfaces or subglaucous beneath,

nerves 6–8 pair very slender, flowers in simple fascicles, male subglobose shortly pedicelled, female campanulate shortly 6-cleft. A. salicina, *Beddome Fl. Sylv.* t. 295, and *Forest Man.* 186 (*not of Meissn.*).

DECCAN PENINSULA; Tinnevelly, *Beddome.*

Apparently a shrub, with slender whorled glabrous branches. *Leaves* $\frac{3}{4}$–$1\frac{1}{4}$ in. diam., 4–8 in a whorl, minutely impressed-reticulate on both surfaces; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers*; male $\frac{1}{8}$ in. diam., stamens nearly glabrous; female $\frac{1}{8}$ in. long, tube silky outside villous within, lobes obtuse glabrous deciduous. *Style* slender, glabrous; stigmas 3, lobulate, stipitate.—Near *M. molochina* in habit, but the slender nerves and female flowers are very different. I think this is undoubtedly what Beddome has figured as *A. salicina*, referring it (For. Man.) to Wight's var. *abbreviata*: he figures the style as hairy, stigma 4-cleft, fruiting calyx cupular with deciduous lobes, and fruit 4 lines in diameter. Female flower same form as in *Litsæa zeylanica*, Wight Ic. t. 1844.

7. **A. lanata,** *Meissn. in DC. Prodr.* xv. 1. 219; branchlets and young leaves densely softly rusty-tomentose, leaves whorled penninerved coriaceous 3–5 in. elliptic-lanceolate acuminate glaucous beneath, nerves 8–10 pair very slender, flowers in sessile clusters, fruit pisiform seated on the wholly persistent 6-lobed perianth.

NILGHIRI MTS., *Wight, Gardner.*

Leaves 4–8 in a whorl; midrib and petiole rusty-tomentose, at length glabrous; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., rather slender. *Fruit* $\frac{1}{3}$ in. diam., pedicel about as long stout.—Probably a broad-leaved state of *A. salicina.* It is not a Ceylon plant, and it is erroneously placed in the section *Notholitsæa* in the Prodromus.

8. **A. madraspatana,** *Beddome in Herb.*; branchlets and petioles pubescent, leaves whorled penninerved 6–10 in. elliptic-lanceolate obtuse glaucous beneath, nerves 8–10 pair very oblique, flowers in dense globose silkily tomentose clusters, females very shortly peduncled. A. Hookeri, *var.* longifolia, *Meissn. in DC. Prodr.* xv. 1. 219. A. Hookeri, *Beddome For. Fl.* t. 296 (*excl. locality of Sikkim*).

DECCAN PENINSULA; on the Cuddepah Hills, *Wight, Beddome.*

Branchlets very robust, minutely but closely tomentose. *Leaves* 4–8 in a whorl, pale green when dry, youngest densely clothed with long golden silky hairs (as in *A. angustifolia*); midrib and nerves strong but not stout, orange-red; nervules very faint; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., stout. *Male fl.* $\frac{1}{4}$ in. diam.; lobes oblong, membranous, silkily hairy without, glabrous within. *Ovary* 0. *Fruit* not seen.—Beddome remarks that this is the only Laurineous plant of the Cuddepah Hills (except, I suppose, *Cassytha*); it is very near *A. angustifolia*, but the leaves are more obtuse, glaucous beneath, and the male fl. are much larger. Meissner describes the leaves as triple-nerved, but the lower pair are too short to admit of this.

9. **A. Hookeri,** *Meissn. in DC. Prodr.* xv. 1. 218 (*excl. var.* γ.); branchlets and young leaves densely softly rusty-tomentose or villous, leaves whorled penninerved (rarely subtriple-nerved) 5–8 in. coriaceous ovate- or elliptic-lanceolate finely acuminate glabrous or tomentose beneath, nerves 6–8 pair very slender, male fl. clustered, fem. umbelled or subracemose on a short stout peduncle, fruit ellipsoid seated on the much-thickened subcampanulate entire perianth-tube. A. angustifolia, *Nees?*; *Herb. Ind. Or. H. f. & T.*

The CONCAN and CANARA; on the Ghats, *Stocks, Law, Dalzell.*

Young leaves and branches almost woolly; buds large, silky. *Leaves* green when dry, sometimes 3 in. diam., smooth and often polished above, hardly glaucous beneath, and even when old then often rusty villous (var. *dasypoda*, Meissn.); petiole 1–$1\frac{1}{4}$ in., always tomentose. *Flowers* silky; males very shortly pedicelled, $\frac{1}{4}$ in. diam.; fem.

fewer, longer pedicelled, umbels sessile or subracemose on a short peduncle. *Filaments* woolly. *Fruit* $\frac{1}{3}$ in. long; perianth-cup as broad, thick; pedicel very stout, $\frac{3}{4}$–1 in. long.—Habit of *A. lanata*, but distinguished from all its Peninsular allies by the broad leaves ending in long points. It may, however, be a form of *angustifolia*, in which case *madraspatana* and *lanata* may be varieties of it. It is erroneously placed in the section *Notholitsæa* in the Prodromus.

c. *Species of Ceylon.*

10. **A. molochina,** *Nees Syst. Laurin.* 603 (*excl. var.* γ.); leaves 1–3 in. whorled penninerved rigidly coriaceous elliptic obovate or cuneate-obovate obtuse shining above, beneath tomentose glabrous or glaucous, fem. fl. in simple clusters shortly pedicelled, fruit globose seated on the 6-fid perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 211; *Thwaites Enum.* 257; *Wight Ic.* t. 1843; *Beddome For. Man.* 186.

Ceylon; Central Province, alt. 6–8000 ft., *Walker*, &c.

A small tree, branches rather stout glabrous or scurfily tomentose. *Leaves* rarely orbicular, shining above, hard; nerves 4–6 pair, very prominent beneath, variable and sometimes triple-nerved on the same branch with the penninerved; petiole short, stout, rarely $\frac{1}{4}$ in. *Bracts* 9, outer smaller, 6-flowered. *Flowers* silky without, glabrous within; pedicel $\frac{1}{6}$ in., stout. *Style* glabrous. *Fruit* "about $\frac{1}{4}$ in. diam." (*Thwaites*), seated on the scarcely enlarged perianth.—Meissner has two varieties, but their characters are found on the same branch, and many more as good might be made of this most variable species, the extremes of which would but for intermediates be regarded as distinct species.

Var. *Moonii*; leaves ovate or elliptic-lanceolate obtusely acuminate. A. Moonii, *Thwaites Enum.* 256 (not of Meissner).—Ceylon, alt. 5–7000 ft., *Moon, Sir G. McKenzie.*—Meissner, misled by a misplaced ticket of Thwaites, took a glabrous leaved form of *molochina* for this. The only specimens are very bad.

11. **A. stenophylla,** *Thwaites Enum.* 256; leaves 2–5 in. whorled penninerved coriaceous linear-oblong or -lanceolate obtuse quite glabrous glaucous beneath, nerves 10–15 pair, fem. fl. in simple clusters shortly pedicelled, fruit globose seated on the entire cup-shaped perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 212; *Beddome For. Man.* 186. A. Thwaitesii, *Meissn. l. c.*

Ceylon; in the Oova and Badulla districts, ascending to 3000 ft.

A tree, 20–30 ft.; branchlets glabrous or rusty-pubescent. *Leaves* 4–8 in a whorl, $\frac{1}{3}$–$\frac{1}{2}$ in. broad, hardly shining above, midrib beneath stout, nerves usually very regular and slender; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Bracts* subsilky and ciliate. *Flowers* many, in rounded clusters $\frac{1}{8}$ in. diam., fulvous silky. *Perianth-lobes* wholly deciduous. *Style* villous. *Fruit* $\frac{1}{3}$ in. diam., black, pedicel $\frac{1}{4}$–$\frac{1}{3}$ in.—Small forms with leaves $1\frac{1}{2}$ by $\frac{1}{3}$ in. look very different, but are united by intermediates with the larger leaved.

12. **A. elegans,** *Thwaites Enum.* 256; leaves 2–4 in. whorled penninerved thinly coriaceous lanceolate or elliptic-lanceolate caudate-acuminate quite glabrous glaucous beneath, nerves 8–10 pairs very faint, fem. fl. in simple clusters very shortly pedicelled, fruit globose seated on the entire cup-shaped perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 212; *Beddome For. Man.* 186.

Ceylon; Central Province and Pasdoon Corle, ascending to 3000 ft., *Thwaites.*

A small tree; branches slender. *Leaves* 4–6 in a whorl, nerves very finely reticulated above almost evanescent, capillary beneath; petiole very slender, $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* in subsolitary clusters, rusty-tomentose, $\frac{1}{8}$ in. diam. *Perianth-lobes* wholly deciduous. *Filaments* villous. *Fruit* nearly $\frac{1}{2}$ in. diam.; pedicel $\frac{1}{4}$ in.

13. **A. glauca,** *Nees Syst. Laurin.* 599; leaves 2–4 in. whorled penni-

nerved coriaceous elliptic-oblong rounded at both ends glaucous beneath minutely impressedly reticulate, nerves 6–8 pair very slender raised on both surfaces, male fl. large in sessile clusters stoutly pedicelled. A. glauca, β. Walkeri, *Meissn. in DC. Prodr.* xv. 1. 213.

CEYLON, *Walker.*

Branchlets petioles and strong midrib beneath rusty-tomentose. *Leaves* 4–6 in a whorl; petiole ½ in., stout. *Male fl.* ⅓ in. diam., tomentose, pedicels ¼ in. slender. *Bracts* about 14, 5-fld. *Perianth* villous without and at the base within. *Filaments* woolly at the base. *Ovary* and slender style glabrous.—This is the plant (the specimen indeed) described by Nees as *A. glauca*, and which Meissner referred to a variety of the *glauca* of Thwaites, which again is a different plant (my *pisifera*). Nees describes the leaves as glaucous above (no doubt a slip), and as "scrobiculo-reticulata," alluding to the impressed minute reticulation which in a less marked degree is not uncommon in the genus.

14. **A. pisifera,** *Hook. f.*; quite glabrous, branches slender, leaves 2–3 in. whorled penninerved elliptic-oblong obtuse impressed punctate on both surfaces glaucous beneath with 6–8 pairs of nerves, unopened clusters of flowers solitary sessile pisiform quite glabrous 5-fld. bracts eciliate. A. glauca, *Thwaites Enum.* 256; *Meissn. in DC. Prodr.* xv. 1. 213, *not of Nees*; *Beddome For. Man.* 186.

CEYLON; at Pedrotatagalla, alt. 7–8000 ft., *Thwaites* (C. P. 2536).

A tree, 30–40 ft. (*Thwaites*). *Leaves* in Thwaites' indifferent specimen thinly coriaceous, with recurved margins, base acute; petiole ⅓ in., very slender. *Unexpanded clusters* of flowers ⅙ in. diam., quite globose, pale, with about 14 perfectly glabrous bracts, the outer smallest. *Sepals* 6, substrigosely hairy in bud. *Filaments, ovary* and *style* quite glabrous.—This is quite distinct from *A. glauca* in the slender glabrous branches, and in the flower-buds, which are scattered like small peas along the branches, and by the glabrous eciliate bracts. *Stamens* young, but apparently quite glabrous. Thwaites describes the fem. fl. as 1½ line long, with the 2-line long pedicels rusty-hairy; the sterile stamens as spathulate, acute, glabrous, and the fruit as subglobose, on the slightly enlarged crenulate perianth. I have described from C. P. 2536.

†† Female flowers in peduncled umbels or clusters; or mixed, some pedicelled simply, others umbelled on peduncles in the same inflorescence. (See also *A. madraspatana, lanata & Hookeri.*)

15. **A. sesquipedalis,** *Hook. f. & Thoms. in Herb. Ind. Or.*; branches very robust tomentose, leaves whorled penninerved very coriaceous 1–2 feet linear or oblanceolate acute shining above subglaucous beneath, nerves 15–20 pair strong venules 0 or faint, fem. fl. solitary and umbellate on short peduncles in the same cluster, fruit globose on a broad flat entire or 5-crenate disk. Litsæa macrophylla, *Kurz For. Fl.* ii. 305 (*not of Blume*). Myristica sesquipedalis, *Wall. Cat.* 6809.

TENASSERIM; at Mergui, *Griffith.* PENANG, *Wallich.*

Branches as thick as the fore-finger, terete, smooth, finely pubescent, young villously hirsute. *Leaves* many in a whorl, 2–7 in. diam., dark brown and glossy above, the largest more membranous, base very acute, finely pubescent beneath, at length glabrous, surfaces not reticulate, midrib impressed above, but not the nerves; petiole very stout, ½–1 in. *Flowers* not seen. *Fruit* in clusters of 2 in. diam., globose, ¾-1 in. diam., shining; peduncles and pedicels ½ in., very stout, hard, pubescent; disciform enlarged and thickened perianth hard, rugose outside, flat and smooth on the face.—Kurz has referred this to Blume's *Litsæa macrophylla*, which differs in the much smaller leaves not narrowed at the base and short petiole.

16. **A. Maingayi,** *Hook. f.*; branches very robust, leaves whorled

penninerved 1–2 feet very coriaceous oblanceolate or oblong-obovate subacute shining above rusty-tomentose beneath, nerves 15–20 pair very strong beneath with strong parallel transverse venules, fem. fl. solitary and umbellate on short peduncles in the same cluster, fruit globose on a broad flat 6-lobed perianth.

MALACCA, *Maingay* (*Kew Distrib.* 1275 and 1258, *sesquipedalis*).

Habit of *A. sesquipedalis*; leaves as large and of the same shape and texture, but tomentose beneath and barred between the nerves with strong parallel venules; the fruiting calyx is much smaller and less coriaceous and thick, the perianth-lobes persistent, and the globose black fruit is only $\frac{1}{2}$ in. diam.

17. **A. pruinosa,** *Nees in Wall. Pl. As. Rar.* ii. 68, iii. 31, and *Syst. Laurin.* 591; branches slender, leaves whorled penninerved 3–5 in. coriaceous lanceolate or elliptic-lanceolate or oblanceolate caudate-acuminate smooth and shining above glaucous beneath, nerves 8–10 pair very slender, fem. fl. very small in peduncled umbels or clusters, fruit seated on the cupular-turbinate perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 216. Laurus pruinosa, *Wall. Cat.* 2584.

PENANG, SINGAPORE and MALACCA, *Wallich, Maingay.*

Branches rather slender, branchlets densely rusty-tomentose. *Leaves* 4–6 in a whorl, dark brown glossy and quite smooth above with the nerves obscure beneath, not reticulate, midrib red on both surfaces, finely pubescent beneath when young, glabrous in age; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., slender. *Flowers* $\frac{1}{8}$ in. diam., silky, shortly pedicelled. *Style* slender, glabrous. *Fruiting perianth* $\frac{1}{4}$ in. diam., lobes deciduous; fruit not seen.

18. **A. angustifolia,** *Nees in Wall. Pl. As. Rar.* iii. 31, and *Syst. Laurin.* 594 (*excl. syn. Blume*); branches robust, leaves whorled penninerved 4–12 in. lanceolate oblanceolate or elliptic obtusely acuminate shining above young tomentose beneath, nerves 6–10 pair strong beneath very oblique, fem. fl. in peduncled umbels, fruit globose on a small cup-shaped entire perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 214; *Wight Ic.* t. 1841; *Miquel Fl. Ind. Bat.* i. 1. 967; *Beddome Fl. Sylvat.* t. 295, figs. 10, 11. ? A. heterophylla, *Blume Mus. Bot.* t. 342; *Meissn. l. c.* 214. Tetranthera angustifolia, *Wall. Cat.* 2559. T. caduca, *Herb. Ham.* Litsæa angustifolia, *Kurz For. Fl.* ii. 305. Laurus Gullawara, *Herb. Ham.*

ASSAM, *Hamilton, Jenkins.* SILHET and KHASIA MTS., alt. 1–2000 ft., *J. D. H. & T. T., Clarke.* CHITTAGONG, *Clarke.* PEGU and TENASSERIM, *Wallich,* &c.—DISTRIB. Sumatra, Java.

A tree, branches rather robust, young softly tomentose. *Leaves* 4–6 in a whorl, very variable in length and breadth, glossy with slender raised nerves above, beneath glaucous or not, quite veinless between the strong nerves, villous when young; petiole $\frac{1}{3}$–$\frac{2}{3}$ in. *Clusters* silkily villous; flowers $\frac{1}{6}$ in. diam. *Style* villous. *Fruit* $\frac{1}{3}$ in. diam. or less, cup $\frac{1}{6}$ in. diam., pedicel about as long.—Judging from the leaf only, *A. macroptera,* Miquel, of Sumatra, is this. It a good deal resembles *A. Hookeri.*

19. **A. hirsuta,** *Hook. f.*; branchlets petioles and leaves beneath hirsute and brown-tomentose, leaves whorled penninerved 4–6 in. thinly coriaceous elliptic-lanceolate acuminate smooth and shining above, nerves 8–10 pair very slender, fem. fl. long-pedicelled umbellate or subracemose on a hirsute peduncle, fruit (young) seated on the cup-shaped quite entire perianth-tube.

MALABAR; at Quillon, *Wight.*

Apparently a very distinct species, in young fruit only, allied to *A. lanata* of the Nilghiris, but with broader ($1\frac{1}{2}$–2 in.) leaves densely tomentose beneath, and hirsute branches petioles and nerves beneath; the flowers too are long-pedicelled and umbel-

late; the common peduncle is $\frac{1}{4}$–$\frac{1}{2}$ in. long, and the pedicels rather longer.—Being found at Quillon, this is probably a coast species.

** Leaves in interrupted whorls, or the lower opposite, triple-nerved at the base, the lateral nerves reaching beyond the middle of the leaf.

20. **A. speciosa,** *Nees Syst. Laurin.* 602; branchlets stout and leaves beneath densely rusty-tomentose, leaves opposite and whorled triple-nerved long-petioled very thickly coriaceous orbicular rugose above, nerves 4–6 pair very strong beneath with strong cross-venules, clusters globose small silkily tomentose. *Meissn. in DC. Prodr.* xv. 1. 219; *Wight Ic.* t. 1842; *Thwaites Enum.* 257; *Bedd. For. Fl.* 187.

CEYLON; Central Province, ascending to 8000 ft.

A small tree, 30–40 ft.; branches very stout. *Leaves* 6–10 in. diam., 3–4 in a whorl and opposite, abruptly acuminate, base rounded or subacute, shining brown above with deeply impressed nerves and nervules, the former tomentose beneath almost velvety with rusty-brown hairs; petiole 1–2 in., very stout. *Clusters* of flowers $\frac{3}{4}$–1 in. diam.; pedicels very short. *Male perianth* $\frac{1}{4}$ in. diam.; tube very short; lobes glabrous within; fem. longer pedicelled. *Filaments* villous. *Style* woolly. *Fruit* "subspherical, seated on the enlarged truncate base of the perianth," *Thwaites.*

Var. β. *Candolleana,* Thwaites l. c.; leaves less coriaceous more sparingly hairy ovate or oblong-lanceolate acuminate base acute. A. Candolleana, *Meissn. l. c.*—Central Province, at about 4000 ft., *Thwaites.*

21. **A. obovata,** *Blume Mus. Bot.* i. 342; branchlets and leaves rusty-pubescent, leaves whorled triple-nerved 10–18 in. long-petioled thinly coriaceous broadly elliptic-oblong or obovate acuminate smooth and shining above often glaucous beneath, nerves 3–4 pairs slender beneath, male fl. large clustered, fem. panicled, fruit ellipsoid seated on the thickened cupular entire perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 219. Tetranthera obovata, *Wall. Cat.* 2562. Tetradenia obovata, *Nees in Wall. Pl. As. Rar.* ii. 64. Litsæa obovata, *Nees Syst. Laurin.* 636. Laurus obovata, *Herb. Ham.*

SIKKIM HIMALAYA, alt. 1–2000 ft., *J. D. H., Clarke.* ASSAM, *Jenkins.* SILHET and KHASIA MTS., ascending to 3000 ft.—DISTRIB. Munnipore.

A small tree; branches stout. *Leaves* 4–12 in. diam., very variable in size and shape, largest often quite membranous, rarely elliptic-lanceolate; petiole 1–2 in. *Male fl.* $\frac{1}{2}$ in. diam., tube very short, lobes membranous; fem. much smaller, but longer pedicelled. *Style* glabrous. *Fruit* $\frac{2}{3}$–1 in. long; cup dilated, $\frac{1}{3}$–$\frac{1}{2}$ in. diam., turbinate; pedicel very stout, $\frac{1}{2}$ in. long.

22. **A. ambigua,** *Hook. f.*; nearly glabrous, leaves subverticillate $1\frac{1}{2}$–3 in. orbicular or broadly oblong (rarely oblong-lanceolate) obtuse or tip rounded triple-nerved glaucous beneath margins recurved, umbels 4–6-fld. sessile solitary or clustered, bracts 6–8, fruit ellipsoid subovoid or subglobose. A. molochina, γ. subtriplinervis, *Meissn. in DC. Prodr.* xv. 1. 211. Litsæa ambigua, *Meissn. l. c.* L. zeylanica, *var.* β., *Thwaites Enum.* 257, *in part.* L. orbicularis, *Thwaites Enum.* 258; *Meissn. l. c.* 222 (C. P. 2699, 3155, 2280, 72, 2278).

CEYLON; Ambagamowa district and Central Province, alt. 4–7000 ft.; *Gardner, Thwaites.*

A small tree; branchlets usually black, "brown-tomentellous," *Thwaites.* *Leaves* very rigidly coriaceous, pale brown, convex above and shining with 6–8 pair of impressed nerves, glaucous (white and pruinose, *Thwaites*) beneath with rather slender nerves, the 2 basal reaching about the middle of the leaf, base rounded or acute rarely cordate; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. (and midrib hairy at the base, *Thwaites*). *Umbels,* unopened

globose, $\frac{1}{6}$–$\frac{1}{4}$ in. diam., scattered along the branches and axillary; bracts hard, strongly ciliate, outer smaller glabrous, inner hemispheric rusty silkily hairy; flowers pedicelled, $\frac{1}{6}$ in. diam., and pedicel silkily tomentose. *Sepals* 4–6, oblong. *Stamens* 6–9, filaments short. *Fruit* about $\frac{1}{2}$ in. long.—A very distinct species, strangely mixed up with others by Thwaites and Meissner. I have adopted Meissner's specific name as the orbicular-leaved state is quite exceptional, and it is certainly not a *Litsæa*. Meissner's var. β. *lanceolata* is a narrower leaved form.

*** Leaves scattered or alternate more or less triple-nerved.

23. **A. confertiflora,** *Meissn. in DC. Prodr.* xv. 1. 219; glabrous, leaves alternate 5–7 in. coriaceous orbicular-ovate or -oblong acute or obtuse triple-nerved and with 3–4 pair of strong superior nerves, pale or subglaucous beneath and delicately reticulate, flowers very numerous long-pedicelled in dense axillary subsessile fascicled clusters, bracts not seen.

EASTERN HIMALAYA; Bhotan, near Dewangiri, alt. 2–3000 ft., *Griffith* (*Kew Distrib.* 433).

Branches stout, black when dry, smooth. *Leaves* 3–4 in. broad, pale brown and shining above, with slender raised nerves; paler beneath with very strong nerves, of which the two lower pair are penninervuled towards the margin of the leaf; base acute; petiole $\frac{3}{4}$–1 in. long. *Flowers*, unexpanded $\frac{1}{8}$ in. diam., globose, glabrous, or nearly so; pedicels $\frac{1}{3}$–$\frac{1}{2}$ in.; common peduncle $\frac{1}{10}$ in., scarred by the fallen bracts. *Sepals* rounded, concave, coriaceous. *Filaments* glabrous, anthers short. *Ovary* subglobose, with three lateral furrows, a subulate style and acute stigma. *Fruit* unknown.—The ovary is remarkable for the genus.

24. **A. leiantha,** *Hook. f.*; glabrous except the rusty-tomentose inflorescence, leaves scattered 5–9 in. coriaceous subtriple-nerved lanceolate acute or subacute, nerves 6–8 pair beneath subglaucous not reticulated, flowers in axillary and infra-axillary racemes which when young are clothed with imbricate rounded silky caducous bracts. Litsæa leiantha, *Kurz For. Fl.* ii. 305.

TENASSERIM (or Andaman Islands), *Helfer* (*Kew Distrib.* 4330).

Branches black, bark smooth. *Leaves* brown when dry, 2–2¼ in. diam., rigid, margins undulate, base acute, shining above with raised nerves, beneath glaucous when young, lowest pair of nerves longest, ¼–⅓ the length of the leaf; petiole 1–1½ in., slender. *Flowers* ¼ in. diam., clusters arranged on an erect raceme 1–2 in. long; rachis slender, nearly glabrous; pedicels short; bracts ¼ in. diam., coriaceous. *Perianth* villous within at the base; segments concave. *Filaments* and anthers short. *Ovary* and style slender glabrous, stigma discoid. *Fruit* unknown.—The foliage resembles that of *A. sphærocarpa* of Java, in which the flowers are umbelled. The racemose inflorescence is unique in the genus.

DOUBTFUL SPECIES.

ACTINODAPHNE sp., South Andaman, *Kurz in Herb. Calcutt.*; branches very stout and petiole and midrib above and beneath brown-tomentose, leaves whorled penninerved 12–18 by 4–7 in. oblong-lanceolate acuminate shining above glaucous and reticulate beneath, nerves 12–15 pair and cross nerves impressed above raised beneath, petiole stout 1–1½ in.

ACTINODAPHNE sp. Beddome in his Forest Manual (187) alludes to a new and fine species called Nattee as forming a lofty tree in the South Canara Ghats.

ACTINODAPHNE? from Seetakoond, near Chittagong, *Clarke*; a plant very like *A. leiantha*, having similar racemose inflorescence. *Branches* slender and leaves glabrous. *Leaves* scattered triple-nerved, thinly coriaceous, 3–5 in., elliptic or elliptic-lanceolate, obtusely caudate-acuminate, narrowed into a very long slender petiole ½–1½ in., impressed punctate on both surfaces, subglaucous beneath, lower pair of nerves very long, others few or 0. *Racemes* ½–1 in., solitary or 2-nate, erect, simple

or compressed, formed of globose clusters of 3-5 flowers enclosed in 6–8 subsilkily pubescent rounded concave bracts; peduncle of raceme slender, with a few small scales. *Flowers* too young to analyze.—This may be a *Lindera*, for the inflorescence somewhat resembles that of *L. caudata*; or possibly a *Litsæa* of the section *Neolitesæa*.

11. **LITSÆA,** *Lamk.* (TETRANTHERA, *Jacq.*)

Evergreen, rarely deciduous trees or shrubs. *Leaves* alternate, rarely opposite or subopposite, penninerved, rarely triple-nerved, leaf-buds naked or scaly. *Flowers* dicœcious, umbéllate; umbels 4–6- rarely more-flowered, sessile or pedicelled; pedicels clustered rarely solitary, axillary or on the leaf-scars, sometimes racemose or fascicled on a common peduncle; involucral bracts 4–6, rarely more, concave, coriaceous or membranous. *Perianth-tube* ovoid campanulate or very short; lobes or segments 6–4, rarely more or fewer, equal or unequal, or in a few wanting. *Stamens* 6, 9, 12, rarely more or fewer; filaments of 1st and 2nd series usually eglandular, of the 3rd (and 4th if present) 2-glandular; anthers all introrse, 4-celled. *Fruit* a drupe or succulent, seated on the often greatly enlarged perianth-tube.—Species about 140, Tropical and Eastern Asia, Australasia, the Pacific Islands, rare in Africa and America.

After many weeks of study I am unable to offer a satisfactory account of the Indian Litsæas, flower of one or other sex and fruit of most being wanted to determine their affinities and formulate the diagnoses of the species. The sections *Conodaphne* and *Cylicodaphne* pass into one another, and cannot be distinguished without ripe fruit, which is wanting in two-thirds of the plants referred by Meissner to the first of these sections. Blume's section *Tomingodaphne*, if confined to the deciduous leaved species, may, I think, be retained.

It is to be borne in mind that neither Nees nor Meissner cites Roxburgh's "Flora Indica;" as also that Roxburgh adopted different names for the same plant in his "Flora," in his unpublished "Icones," and in the Calcutta Bot. Garden. I have been very cautious in identifying Indian species with Malayan, for want of better specimens of the latter. I think it probable that sect. *Neolitsæa* will be restored to generic rank, as *Tetradenia*, from its habit and floral characters.

Sect. I. **Tomingodaphne**, *Blume.* *Leaves* deciduous, alternate, penninerved, terminal buds usually perulate (clothed with imbricate chartaceous scales. *Perianth-segments* 6; tube not enlarged in fruit.—Mountain species, of 5–11,000 feet elevation.

* *Terminal buds naked.*

1. **L. citrata,** *Blume Bijd.* 565; quite glabrous, branches black when dry, leaves 5–7 in. deciduous alternate long-petioled penninerved membranous greenish when dry lanceolate caudate-acuminate glaucous beneath, nerves 12–15 pair very slender, umbels solitary or corymbose on a very short peduncle 4–10-fld., pedicels very slender, fruit small globose, perianth-base not enlarged. Tetranthera citrata, *Nees Syst. Laurin.* 560; *Blume Mus. Bot.* i. 385; *Miquel Fl. Ind. Bat.* i. 958. T. polyantha, *Wall. Cat.* 2538; *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 545; *Meissn. in DC. Prodr.* xv. 1. 182 (*including* β. *citrata, but excluding China as locality*); *Kurz For. Fl.* ii. 301.

EASTERN HIMALAYA; from Sikkim to Mishmi, alt. 5–9000 ft. KHASIA MTS., alt. 5–6000 ft. AVA, *Kurz.*—DISTRIB. Java.

A deciduous bush or small tree, with a delightful fragrance of oranges; branches slender, quite smooth; terminal bud naked. *Leaves* the most membranous of the genus, bright green above, dull glaucous beneath, youngest silky; nerves variable, from

nearly horizontal or obliquely ascending, base acute; petiole ½–1 in., very slender. *Umbels* ½ in. diam.; bracts membranous, not in decussating pairs, glabrous or sparsely silky; flowers with usually villous white pedicels; males about ⅙ in. diam., with an abortive ovary; females smaller, stamens imperfect, stigma disciform. *Sepals* membranous, obovate, subequal. *Stamens* 9–10 in the male, 3 of them 2-glandular; filaments usually hairy; anthers quadrate. *Fruit* ¼–⅓ in. diam.—This is not the *L. citrata* of Hong Kong.

2. **L. Kingii,** *Hook. f.*; quite glabrous, branches black when dry, leaves 3–4 in. alternate deciduous penninerved short-petioled thinly coriaceous greenish when dry elliptic-lanceolate acute glaucous and reticulate beneath, nerves 12–18 pair very slender and spreading, umbels solitary or few and corymbose stoutly pedicelled recurved in bud 5-fld., fruit small globose, perianth-base not enlarged. L. citrata, *Herb. Calcutta, in part.* Tetranthera No. 5, *Herb. Ind. Or. H.f. & T.*

Sikkim Himalaya, alt. 6–8000 ft., *J. D. H., King, Clarke.* Khasia Mts., *Griffith.*

A deciduous bush, with a delightful spicy fragrance; branches stout, quite smooth; terminal buds with the young leaves quite glabrous and convolute (like a lanceolate or perulate bud). *Leaves* thin but firm in texture, shining and reticulate above, with pale nerves, base acute; petiole ⅓–½ in. *Umbels* ½ in. diam.; bracts 4–5, quite glabrous, not decussately opposite; flowers with short quite glabrous pedicels; males about ⅙ in. diam. *Sepals* 6, oblong, unequal. *Stamens* 8–12, 4 or 6 2-glandular; filaments glabrous. *Ovary* minute; female in smaller fewer-fld. umbels; perianth more irregular; stigma discoid. *Fruit* ¼ in. diam.—Closely allied to *L. citrata*, but quite distinct in the stouter branches, more elliptic acute leaves, short petioles, and much stouter pedicels of the umbels.

** *Terminal buds perulate.*

3. **L. sericea,** *Wall. Cat.* 2545 (Tetranthera); branches black when dry, terminal buds perulate, leaves 3–4 in. alternate deciduous penninerved subcoriaceous oblong-lanceolate base acute softly tomentose and reticulate beneath, nerves slender 10–12 pair, umbels solitary very shortly pedicelled 8–20 fld., bracts 4 caducous, fruit long-pedicelled small subglobose on the very small flat perianth-tube. Tetranthera sericea, *Wall.*; *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 565; *Blume Mus. Bot.* i. 376. T. sericea and T. sikkimensis (*excl. syn. T. elongata and hab. Khasia*), *Meissn. in DC. Prodr.* xv. 1. 181.

Temperate Himalaya, alt. 9–11,000 ft.; from Nepal, *Wallich*, to Bhotan, *Griffith.*—Distrib. Munnipore.

A small very aromatic tree, sometimes 50 ft. high; bud-scales rigid, outer short obtuse, innermost long, lanceolate, acuminate; branches robust. *Leaves* pale brown when dry, young clothed with fulvous brown silky shining tomentum, base very acute; petiole ¼ in., tomentose. *Umbels* nearly 1 in. diam., on very short tomentose peduncles; bracts glabrous; flowers pedicelled, ⅙ in. diam. *Sepals* 6, rounded, hairy at the base within. *Stamens* 12, short, filaments hairy; anthers broad, square; glands very large. *Ovary* ovoid, style stout, stigma very large. *Fruit* ¼ in. long, pedicels ¾–1 in. long.

4. **L. oreophila,** *Hook. f.*; quite glabrous, branches rather slender, leaves alternate penninerved deciduous ovate-lanceolate acuminate finely reticulate on both surfaces, nerves 8–10 pair very slender, umbels solitary pedicelled ovoid in bud and mucronate 6-fld., bracts 4 broadly ovate acute cucullate glabrous, flowers tomentose. Lindera Hookeri, *Meissn. in DC. Prodr.* xv. 1. 245.

Sikkim Himalaya; Lachoong Valley, alt. 10–11,000 ft., *J. D. H.*

A bushy tree, branches terete; buds scaly, glabrous. *Leaves* 2-3 in., rather membranous, greenish when dry, not glaucous beneath, base rounded or cuneate; petiole $\frac{1}{3}$ in., very slender. *Umbels* in bud $\frac{1}{4}$ in. long, erect on a rather stout pedicel $\frac{1}{3}$ in. long. *Flowers* very young, 9?, filaments villous; anthers 4-celled.—Meissner describes this as a *Lindera*, but I find that I many years ago made a note that the anthers are 4-celled, and on a second examination I am confirmed in this. I am not positive as to the leaves being deciduous, judging from appearance only.

Sect. II. **Eulitsæa,** *Benth.* *Leaves* persistent, alternate, penninerved. *Perianth-segments* very incomplete or 0, tube not or slightly enlarged in fruit. *Stamens* often more than 12.

5. **L. tomentosa,** *Herb. Heyne, ex Wall. Cat.* 2550; densely softly tomentose except the leaves above, leaves 3–7 in. alternate penninerved coriaceous elliptic or oblong obtuse acute or acuminate, nerves 8–10 pair, umbels large solitary many-fld., perianth incomplete or 0, fruit globose on the small thickened perianth-tube. Tetranthera tomentosa, *Roxb. ex Wall. Cat. l. c.* A, B; *Meissn. in DC. Prodr.* xv. 1. 177 (*excl. habitat of Sirmore and citat. of Nees*); *Wight Ic.* t. 1834; *Kurz For. Fl.* ii. 297 (*description only*). T. apetala, *Dalz. & Gibs. Bomb. Fl.* 222. T. japonica fem., *Herb. Wight.* Laurineæ, *Wall. Cat.* 7455.

Deccan Peninsula; on the Western Ghats, from the Concan southwards. Ceylon; Central Province, ascending to 4000 ft.

An evergreen tree; branchlets stout. *Leaves* pale when dry, finely reticulated above, laxly beneath, base acute or rounded; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Umbels* $\frac{1}{2}$-$\frac{2}{3}$ in. diam.; pedicel as long, stout; bracts 4, tomentose on both surfaces; flowers very shortly pedicelled. *Stamens* 18–20, filaments long, slender, villous; glands long-pedicelled. *Fruit* $\frac{1}{2}$ in. diam.—Griffith's Mergui plant, and Wallich's 2550 C (not A as quoted by Meissner), are flowerless specimens of *L. sebifera,* as is probably Meissner's var. *β.*? *birmanica*, which I have not seen. Kurz, who introduces the latter in his Forest Flora on Meissner's authority, never saw it. I have no idea what Gamble's *T. tomentosa* from Sikkim, alt. 6–8000 ft., is (Man. Ind. Timb. 310); his Birman *T. tomentosa* is doubtless *L. sebifera,* var. *tomentosa.* Wallich's lithographed ticket, "No. 7455, *Laurin.*," is attached to a sheet without a specimen; but another sheet, also marked 7455 in pencil, contains a specimen of *L. tomentosa.*

6. **L. sebifera,** *Pers. Syn.* ii. 4; glabrous or tomentose, leaves alternate 3–9 in. coriaceous or chartaceous elliptic ovate or oblong, tip acute obtuse or rounded, nerves 8–10 pair, umbels corymbose or racemose usually long-pedicelled few- or many-fld., perianth very incomplete or 0, fruit globose on the small thickened perianth-tube.

Throughout the hotter parts of India, from the Panjab and lower Himalaya at Garwhal, eastwards to Sikkim, Assam and the Khasia Mts., the Gangetic Plain and Bengal; and southwards to Malacca and throughout the Deccan Peninsula. Ceylon, ascending to 3000 ft.—Distrib. Malay Islands, China, Australia (introd. in Mauritius).

An evergreen tree, 20–50 ft., of protean habit foliage and inflorescence. *Leaves* subterminal on the branches, pale when dry; petiole $\frac{1}{2}$–1 in. *Umbels* few or many, $\frac{1}{3}$–$\frac{2}{3}$ in. diam.; pedicels clustered on a stout or slender common peduncle $\frac{1}{4}$–3 in. long; bracts 4, more or less tomentose. *Stamens* 9–20 or more, filaments more or less villous. *Fruit* the size of a pea, pedicel sometimes thickened.—I recognize three principal forms of this variable plant: 1, leaves usually thin, glabrous or nearly so, often small, oblong, tip rounded; 2, leaves much larger, more pubescent beneath, and more or less acute; 3, leaves large, ovate or oblong, acute, thickly tomentose beneath or on both surfaces (as in states of *L. tomentosa*, for which flowerless specimens have been taken by Nees and Meissner). The varieties proposed by Blume and Meissner may be grouped as follows. I am compelled to query Jacquin's plate of *laurifolia,*

which represents the perianth of 6 equal lobes toothed at the tips; which is totally unlike anything I have met with in the large suite of specimens examined.

Var. 1. *L. sebifera* proper; leaves 3–6 in. thin oblong glabrous above sparingly pubescent beneath. L. sebifera & tetranthera, *Pers. Synops.* ii. 4. L. multiflora, *Blume Bijd.* ii. 564. L. chinensis, *Lamk. Dict.* iii. 574. Tetranthera laurifolia, multiflora, racemoso-umbellata & Roxburghii, *Blume Mus. Bot.* ii. 373, 374, and including Var. *Jacquinii, Meissn. in DC. Prodr.* xv. 1. 178, 179. T. laurifolia (? *Jacq. Hort. Schoenb.* i. 59; t. 113); *Roxb. Fl. Ind.* iii. 823; *Bot. Reg.* t. 893; *Blume Mus. Bot.* i. 372; *Wall. Cat.* 2555 A, D; *Brand. For. Fl.* 319; *Gamblé Man. Ind. Timb.* 310. T. Roxburghii, *Nees in Wall. Pl. As. Rar.* ii. 65 and iii. 30, and *Syst. Laurin.* 515; *Thwaites Enum.* 255. T. apetala, *Roxb. Cor. Pl.* ii. 25, t. 147, and *Fl. Ind.* iii. 819; *Gærtn. f. Fruct.* iii. 226, t. 222; *Wall. Cat.* 2554 B, C. T. capitata, *Herb. Roxb.* Tomex tetranthera & sebifera, *Willd. Sp. Pl.* ii. 839, 840. Sebifera glutinosa, *Lour. Fl. Coch.* ii. 783. Laurus involucrata, *Kœnig in Retz. Obs.* vi. 27. Gaja nippeli, *Jones in Asiat. Res.* iv. 303.—Widely distributed.

Var. 2. *glabraria*; leaves usually larger more ovate and acute usually more tomentose beneath. L. glabraria & lævis, *Juss. in Ann. Mus.* vi. 212. L. geminata, *Blume Bijd.* 564. L. platyphylla, *Pers. Synops.* Tetranthera geminata, glabraria & platyphylla, *Nees Syst. Laurin.* 559, 569, 570. T. citrifolia & tersa, *Spreng. Syst. Veg.* ii. 266, 267. T. apetala, *Wall. Cat.* 2554, *in part.* T. polycephala, *Wall. mss.* T. laurifolia, *Nees in Wall. Pl. As. Rar.* ii. 66 and iii. 30, and *Syst. Laurin.* 519; *Benth. Fl. Austral.* v. 305. T. litoralis, *Blume Mus. Bot.* i. 375, and β. glabrescens, *Meissn. in DC. Prodr.* xv. 1. 180. T. laurifolia, *vars.* citrifolia, platyphylla & attenuata, *Blume l. c.* 374, and (*including var.* longifolia) *Meissn. l. c.* 179. Glabraria tersa, *Linn. Mant.* 276. G. tersa & litoralis, *Miquel Fl. Ind. Bat.* i. 941, 943.—Widely distributed.

Var. 3. *tomentosa*; leaves ovate or oblong acute and branches densely soft tomentose on both surfaces or sparingly above. Tetranthera tomentosa, *Nees in Wall. Pl. As. Rar.* ii. 65, and *Syst. Laurin.* 511 (*not of Roxb.*). T. laurifolia? *Wall. Cat.* 2550 C.—Western Himalaya; Sirmore, *Wallich*; Kumaon and Garwhal, alt. 2–3000 ft. Birma and Tenasserim, *Wallich*, &c.—Except by the compound umbels this is undistinguishable from *L. tomentosa*, and favours the view taken by Dalzell and Gibson, that *tomentosa* and *sebifera* are forms of one species.

7. **L. ligustrina,** *Nees in Wall. Pl. As. Rar.* ii. 65, and *Syst. Laurin.* 513, 677 (Tetranthera); glabrous or the shoots pubescent, leaves 3–4 in. persistent alternate penninerved shortly petioled elliptic oblong or obovate obtuse or acute shining and reticulated above, nerves 6–8 pair, umbels solitary or clustered many-fld., bracts glabrous, perianth very incomplete or 0. Tetranthera ligustrina, *Nees*; *Meissn. in DC. Prodr.* xv. 1. 180; *Wight Ic.* t. 1835; *Wall. Cat.* 2555 C, E. T. celastroides, *Miq. in Pl. Hohenack.* n. 1336.

Deccan Peninsula; on the Ghats, from the Nilghiri Hills and southward.

A bush or small tree, similar at first sight to states of *L. sebifera*, but more glabrous, leaves always small, with very fine reticulation above, shorter petioles rarely ½ in., and simple umbels, with slender pedicels and glabrous bracts. *Filaments* villous. *Fruit* not seen.—The Ceylon plant referred here by Thwaites is the following.

8. **L. undulata,** *Hook. f.*; branchlets petioles and inflorescence hoary-pubescent, leaves 3–6 in. alternate penninerved coriaceous linear-oblong obtuse glabrous except the midrib beneath, margins waved, umbels solitary and clustered stoutly pedicelled, bracts pubescent, perianth very incomplete. Tetranthera ligustrina, *Thwaites Enum.* 254, *not of Nees.*

Ceylon; in the Central Province, *Walker, Macræ.*

Branches robust. *Leaves* 1–1½ in. broad, shining and not reticulated above, pale grey-brown beneath, nerves 10–12 pair, slender; petiole ½–¾ in., at length

glabrous. *Umbels* globose, $\frac{1}{3}$–$\frac{1}{2}$ in. diam.; pedicels $\frac{1}{2}$ in. *Stamens* villous. *Fruit* not seen.—Possibly a form of *L. ligustrina*.

9. **L. membranifolia,** *Hook. f.*; branches stout, shoots petioles leaves beneath and umbels hoary-pubescent, leaves 8–12 by 4–6 in. alternate penninerved very membranous oblong-obovate obtuse or apiculate green when dry hardly glaucous beneath, nerves 10–14 pair slender, cross nervules strong beneath, umbels solitary large long-pedicelled, bracts 4 hoary, flowers numerous pedicelled, perianth incomplete.

Upper Assam; Mishmi Hills, and woods at Yen, *Griffith* (*Kew Distrib.* 4310).

A medium-sized tree; bark of branches smooth, red-brown. *Leaves* with cuneate bases, obscurely pubescent between the nerves, very thin. *Umbels* (flowering) 1 in. diam.; pedicel as long, slender; flowers and pedicels villous. *Sepals* 3 or more, unequal, small. *Filaments* very slender, $\frac{1}{4}$ in. long, sparsely villous.—Possibly an extreme form of *L. sebifera*, but most dissimilar.

Sect. III. **Conodaphne,** *Blume.* *Leaves* persistent, alternate or opposite, penninerved. *Perianth-segments* usually 6, equal or subequal, rarely unequal; tube not or slightly enlarged in fruit, except *L. Blumii.* (The fruit and fruiting perianth-tube are known in very few species referred to this section by Blume and Meissner. Some of the following are possibly referable to Sect. Cylicodaphne.)

* *Leaves opposite or subopposite* (*sometimes alternate on the same specimen*).

10. **L. lancifolia,** *Roxb. ex Wall. Cat.* 2532 (Tetranthera) (*not T. lanceæfolia of Fl. Ind.*); branches slender finely tomentose, leaves opposite and alternate 3–8 in. thin shortly petioled penninerved oblong or elliptic-oblong or -lanceolate acute or acuminate glaucous beneath, nerves 6–8 pair, umbels few small in usually very shortly pedicelled clusters villously tomentose, bracts 6 3-fld., fruit globose on the very minute flat perianth-tube. T. lancifolia, *Roxb.*; *Nees in Wall. Pl. As. Rar.* ii. 65, and *Syst. Laurin.* 509; *Meissn. in DC. Prodr.* xv. 1. 194; *Miquel Fl. Ind. Bat.* i. 944 (*excl. var.* ϵ. *and syn. Roxb. Fl. Ind.*). T. chrysantha and T. pusilla, *Blume Mus. Bot.* i. 376. T. attenuata, *Wall. Cat.* 2534, *in part.*

Tropical Eastern Himalaya; from Bhotan to Mishmi, *Griffith.* Silhet and Khasia Mts., ascending to 3000 ft., *Wallich*, &c. Tenasserim, *Griffith*, &c.—Distrib. Borneo.

A bush or small tree; pubescence grey or rusty. *Leaves* very variable in size, drying grey or red-brown, not coriaceous, young finely tomentose beneath, smooth above with impressed nerves, nervules faint beneath; petiole $\frac{1}{10}$–$\frac{1}{3}$ in. *Clusters* $\frac{1}{4}$ in. diam.; umbels very small and shortly pedicelled, in bud $\frac{1}{8}$ in. diam.; flowers $\frac{1}{10}$ in. diam. *Sepals* very unequal, villous. *Stamens* about 6, usually shorter than the sepals, but very unequal. *Fruit* $\frac{1}{2}$ in. diam., apiculate.—Meissner's vars. *glaucophylla, pusilla, borneensis* and *alternifolia* offer no constant characters; his var. ϵ. appears to be *L. oblonga*.

Var. *pedicellata;* pedicels very slender $\frac{1}{4}$ in. long, branches less tomentose.—Tenasserim or Andaman Islands, *Helfer* (*Kew Distrib.* 4306).

Var. *alternifolia*, Meissn. l. c.; leaves mostly alternate more glabrous.—Sikkim Himalaya, *J. D. H.* (*Herb. Ind. Or., Tetranthera*, No. 15).

11. **L. gracilipes,** *Hook. f.*; quite glabrous, leaves opposite and subopposite 4–5 in. penninerved thinly coriaceous pale elliptic- or oblong-lanceolate acute or subacute smooth above beneath obscurely reticulate and

when dry with close impressed points, nerves 5–7 pair very slender and oblique, umbels few in a cluster 3–4-fld. pedicel filiform.

MALACCA, *Griffith* (*Kew Distrib.* 4311).

Branchlets slender; bark brown, smooth. *Leaves* 1¼–1½ in. broad, nerves above very obscure; base very acute; petiole ¼–⅓ in. *Umbels* (male) about ¼ in. when expanded; pedicels ⅓–½ in.; bracts 4, minutely puberulous, as are the sessile flowers. *Sepals* 4–6, spathulate, membranous, ciliate. *Stamens* 10, filaments slender, glabrous; anthers short. *Ovary* 0. *Perianth-tube* after flowering (when ½ in. long) clavate, truncate, with a contracted mouth.—A very distinct plant, of which more specimens are much wanted. The leaves are attacked by a species of fungus like that of *L. chartacea.* The pedicels of the umbels do not seem to thicken after flowering, but they are too young to judge from.

12. **L. Blumii,** *Nees in Wall. Pl. As. Rar.* ii. 65; branches stout and leaves beneath and umbels rusty-tomentose, leaves opposite 6–12 in. penninerved rigidly coriaceous linear-oblong obtuse or acute smooth above obscurely reticulate beneath with 8–15 pair of very strong arched nerves, umbels many clustered very shortly pedicelled 6–8 fld., fruit ellipsoid half sunk in the large hemispheric truncate quite entire warted very shortly pedicelled perianth-tube. L. ferruginea, *Blume Bijd.* 561. Cylicodaphne ferruginea, *Meissn. in DC. Prodr.* xv. 1. 207. Actinodaphne Blumii, *Nees Syst. Laurin.* 598. Tetranthera fulva β. rigida in part, *Meissn. l. c.* 195. Lepidadenia ferruginea, *Miq. Fl. Ind. Bat.* i. pt. 1, 935.

MALACCA, *Griffith, Maingay,* &c.—DISTRIB. Java.

A tree; branches rather stout. *Leaves* very rarely subopposite, 2–3½ in. diam., above smooth, usually yellow-green with faintly-impressed nerves and recurved margins, base acute or cuneate; petiole stout, ½–1 in. *Umbels* (female) ⅓ in. diam. when expanded; bracts 4, coriaceous; flowers small, tomentose. *Sepals* oblong, densely silky-tomentose. *Stamens* (in sketch in Wight's Herb. from Griffith's specimens) 12, all imperfect, hairy, of 1st and 2nd row hairy, 2-glandular with the anthers produced into a ligula. *Ovary* with a slender erect style and lobed stigma. *Fruit* 1 in. long; cup of perianth ⅔ in. diam., edge of mouth acute.—That this is *Litsæa ferruginea* of Blume is nearly certain from comparison with a named specimen from Blume in the Hookerian Herbarium. Meissner describes the fruit as globose and the perianth-tube as flat with a torn margin, characters foreign both to Miquel's description of the fruit, and to that of the Malaccan plant. The species is omitted in Blume's revision of the Litsæas, &c., in Mus. Bot. Lugd. Bat.

13. **L. sessiliflora,** *Hook. f.*; branches stout and leaves beneath and inflorescence rusty-tomentose, leaves 8–12 in. opposite penninerved very shortly petioled oblong-lanceolate acuminate rugose above, nerves 16–20 pair very strong beneath with raised cross-nervules, umbels axillary sessile 3-fld., flowers sessile, perianth villous, fruit small globose seated on the persistent 6-lobed perianth.

PENANG; on Government Hill, *Maingay.*

A tree, 10 feet high (Maingay); branchlets as thick as a goose-quill, densely tomentose. *Leaves* bifarious, coriaceous, rusty-brown, above glabrous except the tomentose midrib with deeply sunk nerves, beneath red brown; petiole ⅙ in., very stout. *Umbels* appressed to the axils, solitary or crowded, ¼ in. diam.; bracts 4, scarious, villous. *Sepals* subequal, obtuse. *Stamens* 9, shorter than the perianth; filaments short, villous, 3 inner 2-glandular; anthers short. *Ovary* and style glabrous. *Fruit*, young size of a pea, seated on the stellate perianth.—A very remarkable species, with the habit of *L. Blumii*, but a very different fruit and with rugose leaves.

** *Leaves alternate, glabrous beneath or nearly so.*

14. **L. Wallichii,** *Hook. f.*; quite glabrous, leaves alternate 4–18 in.

penninerved thinly coriaceous elliptic-oblong-ovate or -lanceolate acuminate exquisitely reticulate on both surfaces subglaucous beneath, nerves strong 4–6 pair, umbels axillary solitary or clustered, bracts membranous glabrous 4-fld., stamens glabrous, fruit small ovoidly globose on the persistent 6-lobed perianth. Lindera nervosa, *Kurz For. Fl.* ii. 308. Tetranthera chartacea ?, *Wall. Cat.* 2531 B. T. chartacea, β. ? nervosa, *Meissn. in DC. Prodr.* xv. 1. 186 and 513. Laurin., *Wall. Cat.* 7531, *the right-hand specimen.*

EASTERN TROPICAL HIMALAYA; Bhotan, *Griffith* (*Kew Distrib.* 4290). BURMA; at Amherst, *Wallich*. ARRACAN and TENASSERIM, *Kurz*, &c.

A tree; branches quite smooth. *Leaves* coriaceous, but flexible, shining, pale brown or greenish above when dry, largest 20 by 9 in., the reticulations between the nerves extremely fine, base acute obtuse or (in Bhotan specimens) rounded; nerves beneath slender but prominent, often reddish, petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Umbels* few, $\frac{1}{3}$ in. diam., pedicel $\frac{1}{4}$–$\frac{1}{2}$ in.; bracts caducous; male flowers small, glabrous within and without, subsessile. *Sepals* oblong. *Stamens* 9, 3 inner 2-glandular, anthers oblong. *Ovary* 0 or imperfect, with a slender style and small stigma. *Fruit* $\frac{1}{3}$ in. long, pedicel $\frac{1}{10}$ in., thick.—A very handsome species.

15. **L. mishmiensis,** *Hook. f.*; branches black and leaves quite glabrous, leaves 4–6 in. alternate penninerved long-petioled thinly coriaceous oblong-lanceolate acuminate base acute smooth above pale brown beneath, nerves 12–16 pair very slender, umbels solitary axillary and on short leafy branches long-pedicelled 10–15-fld., bracts caducous and long-pedicelled flowers pubescent or tomentose.

UPPER ASSAM; Mishmi Hills at Laim-Planj-thaya, *Griffith*.

A large tree, branches smooth; buds silkily tomentose. *Leaves* 1½–2 in. diam., not rigid, faintly irregularly reticulated beneath; petiole slender, ½–⅔ in. *Umbels* ⅓–½ in. diam.; pedicel ½ in., pubescent, not stout; bracts 4–5, very concave, coriaceous; pedicels of flowers $\frac{1}{6}$–$\frac{1}{4}$ in., and base of male perianth white-tomentose. *Sepals* 6, small, oblong. *Stamens* 9, 3 inner 2-glandular; filaments short, glabrous, anthers square. *Ovary* minute; style slender, stigma small. *Fruit* unknown.—Quite unlike any other species in the long pedicels of the male flowers, whence the inflorescence resembles a *Lindera*.

16. **L. assamica,** *Hook. f.*; branches and leaves glabrous or the latter faintly puberulous beneath, leaves 4–6 in. alternate penninerved thinly coriaceous greenish when dry very shortly petioled elliptic acuminate at both ends smooth above faintly reticulate and pale beneath with 6–10 very slender nerves, umbels axillary solitary and fascicled 4-fld., bracts 4 glabrous, sepals 6, stamens 9 very villous below. Tetranthera rangoonensis, *var.* assamica, *Meissn. in DC. Prodr.* xv. 1. 188.

ASSAM plains, *Jenkins, Griffith* (*Kew Distrib.* 4309).

Branches rather slender, terete, pale, tips petioles and nerves beneath of very young leaves puberulous. *Leaves* 1–2 in. broad, very symmetrical in all the specimens, but varying greatly in size, narrowed into the very short ($\frac{1}{6}$–$\frac{1}{4}$ in.) petiole, hardly shining above. *Umbels* few and scattered (probably the specimens are not in good flower), ¼ in. diam.; pedicel about as long; bracts very concave; flowers very small, shortly pedicelled, $\frac{1}{12}$ in. diam., villous at the base without and within, as are their pedicels. *Sepals* oblong. *Stamens* exserted, filaments villous, 3 2-glandular; anthers oblong. *Fruit* unknown.

17. **L. venulosa,** *Meissn. in DC. Prodr.* xv. 1. 187 (Tetranthera); quite glabrous, branches very slender, leaves 3–4 in. alternate penninerved very membranous oblong-lanceolate obtusely caudate-acuminate glaucous beneath, nerves 6–12 pair very slender, umbels 3–5-fld. male solitary, fem. often racemed, peduncle and pedicels very slender. Myristica glaucescens, *Wall. Cat.* 6790.

SOUTH DECCAN, *Heyne, Wight.* Tinnevelly Hills, alt. 3–4000 ft., *Beddome.*

An evergreen straggling bush; bark brownish. *Leaves* greenish when dry, quite smooth above, loosely reticulate beneath, base acute; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., slender. *Umbels* $\frac{1}{4}$ in. diam.; pedicel $\frac{1}{4}$–$\frac{1}{2}$ in.; common peduncle in fem. $\frac{1}{2}$ in. or less; flowers quite glabrous. *Sepals* 5 or 6, oblong, unequal, very transparent and gland-dotted. *Stamens* in the male 10, filaments glabrous, 6 2-glandular; anthers nearly square, gland-dotted; outer stamens of fem. with small subspathulate heads, inner short with large glands. *Ovary* ovoid, tapering into the slender style; stigma large, discoid. *Fruit* unknown. —Very closely allied to *Tetr. gemelliflora*, Miquel, of Java, which has a remarkable oblong fruit nearly 2 in. long seated on the unaltered perianth-tube; it is possibly a variety of it.

18. **L. firma,** *Blume Mus. Bot.* i. 381 (Tetranthera); branches glabrous, leaves 3–7 in. alternate penninerved red-brown when dry rigidly coriaceous oblong or obovate smooth above beneath minutely pubescent with 10–12 pairs of very strong arching nerves and slender parallel cross-nervules, male umbels 5-fld., pedicels sometimes on a very short peduncle, perianth densely villous, sepals narrow unequal. *Meissn. in DC. Prodr.* xv. 1. 190; *Miquel Fl. Ind. Bat.* i. 950.

MALACCA, *Maingay* (*Kew Distrib.* 1271).—DISTRIB. Borneo, Celebes.

An evergreen tree or bush; branches woody, bark wrinkled when dry and quite glabrous. *Leaves* 3–7 in., very hard when dry, pale or dark red-brown, not reticulate above, often redder beneath; base acute or narrowed into the smooth glabrous petiole $\frac{1}{2}$–$\frac{3}{4}$ in. long. *Male umbels* very numerous, axillary and at the old leaf-scars, $\frac{1}{2}$ in. diam., pedicels $\frac{1}{6}$–$\frac{1}{4}$ in.; bracts 4, pubescent. *Stamens* 9–16, 3–6 2-glandular. *Ovary* filiform or 0. *Fruit* not seen.

**** Leaves alternate, pubescent or tomentose beneath.*

19. **L. grandis,** *Wall. Cat.* 2552 (Tetranthera); branches very stout, and leaves beneath densely brown-tomentose, leaves 8–16 in. alternate penninerved very thickly coriaceous and hard brown when dry oblong or obovate-oblong obtuse smooth above beneath with 12–16 pairs of very strong spreading nerves and strong parallel cross-nervules, petiole very stout, male umbels large 5–7-fld. in sessile fascicles or corymbose on a very stout peduncle, sepals long narrow subequal silky. Tetranthera grandis, *Meissn. in DC. Prodr.* xv. 1. 188; *Kurz For. Fl.* ii. 299. Polyadenia grandis, *Nees in Wall. Pl. As. Rar.* ii. 62, and *Syst. Laurin.* 574.

PEGU and TENASSERIM, *Kurz.* PENANG, *Porter.* MALACCA and SINGAPORE, *Maingay.*

A tree, 20–40 ft., with warted bark (*Kurz*). *Leaves* large, hard, 3–7 in. broad, nerves impressed above, tip often rounded; base obtuse or rounded; petiole very stout, 1–2 in. *Male umbels* numerous, rather silkily tomentose, $\frac{1}{2}$–$\frac{3}{4}$ in. diam., in bud as large as a pea; pedicels $\frac{1}{2}$ in.; bracts 5, coriaceous. *Sepals* linear-elongate. *Stamens* 12–14, anthers short, 3-4-glandular. *Fruit* unknown.—I do not know Meissner's β. *javanica* (*T. multiflora*, Zoll.), nor have I found amongst Wallich's plants specimens of *L. grandis* from Birma (as cited by Meissner). A Bornean plant of Beccari (Sarawak n. 2537) closely resembles this; it is in bud only.

20. **L. polyantha,** *Juss. in Ann. Mus.* vi. 211; branches and leaves beneath pubescent or tomentose, leaves 3–16 in. alternate penninerved chartaceous broadly or narrowly oblong ovate or obovate tip obtuse rounded or apiculate glabrous above strongly reticulate beneath base acute rounded or cordate, nerves 5–10 pair, umbels 5–6-fld. clustered and subcorymbose on a short peduncle, bracts 4–5, fruit globosely ellipsoid on a very small perianth-base. L. monopetala, *Pers. Synops.* ii. 4. Tetranthera monopetala, *Roxb. Cor. Pl.* ii. 26, t. 148, and *Fl. Ind.* iii. 821; *Nees in Wall. Pl. As. Rar.* ii.

66, and *Syst. Laurin.* 525; *Blume Mus. Bot.* i. 378; *Meissn. in DC. Prodr.* xv. 1. 189; *Miquel Fl. Ind. Bat.* i. 948; *Brand. For. Fl.* 380, t. 45; *Kurz For. Fl.* ii. 299; *Gamble Man. Ind. Timb.* 310. T. macrophylla, *Wall. Cat.* 2549. T. alnoides, *Miquel Pl. Jungh.* 180, and *Fl. Ind. Bat. l. c.* 948. T. fruticosa & verticillata, *Herb. Ham.* ? T. semecarpifolia, *Wall. Cat.* 6345 A. T. hexantha, *Sieb. Fl. Maurit.* 92. Tomex pubescens, *Herb. Willd.*

From PANJAB and the SALT RANGE along the foot of the HIMALAYA ascending to 3000 ft., eastwards to ASSAM and southwards to the SATPURA RANGE (*Brandis*). CO ROMANDEL (*Roxburgh*), TENASSERIM and PENANG. (*Not in Ceylon.*)—DISTRIB. Java, China (introd. in Mauritius).

An evergreen bush or small tree, 20–40 ft.; branches rather stout. *Leaves* extremely variable, the largest (Ava, *Wallich*) 16 by 9 in., usually rusty-brown when dry, rarely green, glossy above; nerves strong beneath; petiole $\frac{1}{2}$–1 in. *Umbels* (unopened $\frac{1}{6}$ in. diam.) densely tomentose, stoutly pedicelled. *Perianth* 5–6-partite. *Stamens* 9–13, filaments hairy. *Ovary* in ♂ 0, or with a slender style and small stigma. *Fruit* $\frac{1}{4}$–$\frac{1}{3}$ in.—Brandis gives South India and Ceylon as habitats, but I have seen no Peninsular specimens, and the only authority for Ceylon is an unnamed scrap of Thwaites (C. P. 326), for which he gives no locality, and was probably not of his own collecting. Wallich's *semecarpifolia* (Cat. 6345 A) is, I think, this, but the specimen is a very bad one.

21. **L. amara,** *Blume Bijd.* 563; branches and leaves beneath rusty-tomentose rarely glabrate, leaves 4–6 in. alternate penninerved shortly petioled coriaceous brown elliptic or elliptic-lanceolate acute smooth above beneath reticulate with 8–15 pair of very strong nerves, umbels tomentose males clustered or very shortly racemose, females clustered subsessile, perianth densely villous, sepals small narrow very unequal, fruit ovoid or elliptic on the very small calyx-tube. Tetranthera amara, *Nees Syst. Laurin.* 551; *Kurz For. Fl.* ii. 299; *Blume Mus. Bot.* i. 379; *Miquel Fl. Ind. Bat.* i. 949; *Meissn. in DC. Prodr.* xv. 1. 190. T. fruticosa, *Nees l. c.* 543. T. capitulata, *Miquel Pl. Jungh.* i. 182, and *Fl. Ind. Bat. l. c.*

MALAY PENINSULA; from Pegu southwards to PENANG and MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1276).—DISTRIB. Sumatra, Java, Borneo, Celebes.

An evergreen shrub or small tree, very variable in pubescence. *Leaves* rather hard when dry, usually shining above with fine impressed nerves, base acute or obtuse; petiole $\frac{1}{8}$–$\frac{1}{3}$ in. *Inflorescence* very variable; umbels $\frac{1}{4}$–$\frac{1}{3}$ in. diam., pubescent or hirtellous; males sometimes merely clustered in the axils, at others corymbose or racemose on a short stout peduncle; pedicels very variable $\frac{1}{16}$–$\frac{1}{3}$ in., stout or slender, hirtellous or tomentose, as are the bracts. *Sepals* small, narrow, very unequal, almost obscured by the long villous hairs. *Stamens* 8–10, filaments villous, at length longer than the sepals, 3 inner 2-glandular; anthers short. *Ovary* in male 0, in female with a slender style and small discoid sub-2-lobed stigma. *Fruit* $\frac{1}{3}$ in. long, very shortly stoutly pedicelled; perianth-base disciform, truncate or obscurely 6-lobed or -toothed. —A very variable plant, of which there are many forms in the Archipelago.

Var. *fusco-tomentosa*, Meissn. l. c.; branches and leaves beneath villously rusty-tomentose. (Vars. puberula & pubescens, *Herb. Maingay* (*Kew Distrib.* 1251 and 1251/2), and var. velutina, *Herb. Griff.*, *Kew Distrib.* 4293.)

Var. *angusta*, Meissn. l. c.; branches and leaves beneath very finely pubescent or almost glabrous, umbels on slender fascicled pedicels $\frac{1}{3}$–$\frac{1}{2}$ in. long. Tetranthera angusta, *Wall. Cat.* 6344; *Nees in Wall. Pl. As. Rar.* iii. 30, and *Syst. Laurin.* 641. —Pegu to Tavoy, *Helfer* (*Kew Distrib.* 4294 and 4304), *Griffith* (*Kew Distrib.* 4295).

22. **L. rangoonensis,** *Meissn. in DC. Prodr.* xv. 1. 187 (*excl. var.* β.) (Tetranthera); branches leaves beneath and inflorescence finely rusty-tomentose, leaves 4–6 in. alternate penninerved thinly coriaceous green when dry oblong-lanceolate acuminate smooth above base rounded beneath finely reticulated with 10–14 pair of strong nerves, male umbels small axillary clustered 4–5-fld., perianth densely villous, sepals small very unequal.

PEGU; at Rangoon, *M'Clelland.* TENASSERIM, *Beddome.*

Very closely allied to *L. amara*, differing in the green very acuminate leaves; the perianth is quite the same, as are the 8 stamens, 3 of which are 2-glandular. The female, however, seems distinct in resembling the male, in being pedicelled, and having a large discoid stigma. *Fruit* unknown.—Meissner's β. *assamica* is a totally distinct plant (*L. assamica*, nob.), with slender nerves and leaves puberulous beneath.

23. **L. Kurzii,** *King in Herb. Calcutt.*; branches stout leaves beneath and inflorescence shortly brown-tomentose, leaves 6–10 in. alternate penninerved pale coriaceous oblong or oblanceolate-oblong acute or acuminate smooth and minutely reticulate above beneath with 12–18 pair of very strong rather spreading nerves and strong parallel cross-nervules, male umbels axillary in clusters 5-fld., perianth densely villous, sepals large unequal.

ANDAMAN ISLANDS, *Kurz*, &c.

An evergreen tree? *Leaves* glabrous above except the midrib, with the nerves impressed, base acute or rounded; petiole ½–1 in., stout. *Umbels* ⅓ in. diam.; bracts rather thin, sparsely tomentose; flowers densely villous without and within. *Perianth-lobes* much larger than in *L. amara*, and less unequal. *Stamens* 6–10, 3 2-glandular. *Fruit* unknown.

Sect. IV. **Cylicodaphne,** *Nees* (gen.). *Leaves* persistent, alternate (rarely opposite in *L. Wightiana*), penninerved. *Perianth-segments* usually 6, tube much enlarged disciform or cupular in fruit.—See also *L. Blumei.* (The fruit is known in most of the species; but not in most of the previous section, species of which may hence prove to be referable to this.)

* Umbels solitary or fascicled, rarely corymbose; if racemose, the peduncle or rachis is very short. (Some species of the racemose section have the raceme occasionally reduced to an umbel, as *L. Stocksii, Wightiana* and others.)

† Leaves more or less pubescent or tomentose beneath.

24. **L. khasyana,** *Meissn. in DC. Prodr.* xv. 1. 185 (Tetranthera); branchlets leaves beneath and inflorescence finely pubescent, leaves 6–12 in. alternate penninerved oblong or ob long-lanceolate pale above white or glaucous beneath with 10–15 pairs of very strong nerves and slender cross-nervules, umbels 6–8-fld. fascicled or subracemose on a very stout peduncle, fruit oblate much broader than the turbinate fleshy perianth-tube. Tetranthera glauca, var.? *Herb. Ind. Or. H.f. & T.*

KHASIA MTS.; on Ladder Hill, near Churra, alt. 2–4000 ft., *J. D. H. & T. T.*

A tree; branches long, rather stout. *Leaves* 2–4 in. broad, above greenish and quite smooth with impressed nerves, beneath white or rather rusty, at length glabrous, base acute; petiole about ¾–1 in., at first tomentose. *Umbels* shortly stoutly pedicelled, flowering ⅓ in. diam.; bracts 4; peduncle ¼–½ in. *Sepals* silky without, glabrous within. *Stamens* (young) 7–9, glabrous. *Ovary* 0 in male, or very minute. *Fruit* 1 in. diam., greatly depressed, broadest above the middle, ⅓ in. diam., ½ in. long with the pedicel.

Var. *Hookeri*; umbels larger, pedicel stouter, swollen perianth-tube as broad as the fruit which is larger. L. khasyana, *Herb. Calcutt.* Tetranthera Wightiana? *Herb. Ind. Or. H.f. & T.* Cylicodaphne? Hookeri, *Meissn. l. c.* 209, *excl. var.* β.—Sikkim, alt. 6000 ft., *King, Kurz.* Assam, Mishmi Hills, *Griffith* (*Kew Distrib.* 4286, 4287). Khasia Mts., at Churra and Amwee, alt. 3–4000 ft., *J. D. H. & T. T.*

25. **L. martabanica,** *Kurz For. Fl.* ii. 301; branchlets and leaves beneath densely tomentose, leaves 4–8 in. alternate penninerved coriaceous

long-petioled pale elliptic-ovate or lanceolate acuminate, nerves 5–7 pair strong beneath with cross-nervules and conspicuous reticulations, male umbels 4–5 fld. solitary stoutly pedicelled, bracts 5–6, perianth-tube tomentose, fruit oblong seated on the thickened cupular or truncate very shortly pedicelled perianth-tube. T. calophylla, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 102.

TENASSERIM and MARTABAN; in the drier hill forests, alt. 4–6000 ft., *Kurz.*

A tree, 25–35 ft.; branches rather stout, pale. *Leaves* in the male plant 3½–4½ in., almost ovate, in the fem. 8 in. and elliptic-lanceolate and caudate-acuminate, above yellow green when dry with impressed nerves, beneath grey or pale rusty-brown and shortly tomentose; petiole ½–1 in. *Male umbel* apparently always solitary, female shortly racemose (umbels sometimes in short corymbose peduncled racemes, *Kurz*); bracts broad, concave, coriaceous; flowers sessile. *Sepals* membranous, oblong, obtuse. *Stamens* 9, glabrous, 3 inner 2-glandular. *Fruit* ½ in. long, perianth-cup ⅓ in. broad, and with the pedicel about as long.—The foliage resembles *Lindera bifaria.*

26. **L. semecarpifolia,** *Wall. Cat.* 6345 B (Tetranthera ?); branchlets petioles leaves beneath and umbels tomentose or pubescent, leaves 6–7 in. alternate penninerved rigidly coriaceous obovate or obovate- or elliptic-oblong obtuse or subacute, beneath pale brown with 6-10 pairs of strong nerves and transverse nervules, umbels 6-fld. clustered subracemosely on a short stout peduncle, flowers large ¼ in. diam., fruit depressed globose seated on the large entire puberulous turbinately cup-shaped shortly thickly pedicelled perianth-tube. Tetranthera semecarpifolia, *Wall.*; *Nees Syst. Laurin.* 559; *Kurz For. Fl.* ii. 303; *Meissn. in DC. Prodr.* xv. 1. 198.

EAST BENGAL, *Griffith* (*Kew Distrib.* 4284). BURMA, *Wallich, Griffith.* MARTABAN, *Kurz.*—DISTRIB. Munnipore.

A tree, 25–30 ft. (*Kurz*); branchlets tawny-pubescent. *Leaves* 2½–5 in. broad, above green or brown smooth with impressed nerves, beneath grey brown or purplish. *Umbels* tomentose, about ½ in. broad in flower; bracts 4 (perhaps more); male flowers about 6, sessile, ¼ in. diam. when open. *Sepals* free to the base, linear-oblong, pubescent without and within, very unequal. *Stamens* about 8, very unequal, pubescent. *Ovary* (in the male) 0, or with a stout style and decurved discoid stigma. *Fem. fl.* smaller, with a thick funnel-shaped calyx-tube and very small lobes. *Fruit* ¾ in. diam., perianth-tube as broad, very thick, quite entire, with the very stout pedicel ¾ in. long.—Under *L. polyantha* it is stated that Wallich's 6345 A is probably that plant.

27. **L. elongata,** *Wall. Cat.* 2546 (Tetranthera); branchlets and leaves beneath rusty-tomentose, leaves alternate penninerved oblong or elliptic-lanceolate obtuse acute or acuminate, nerves 5–20 pair strong beneath with strong cross-nervules and conspicuous reticulations, umbels 4–5-fld. usually solitary peduncled, bracts coriaceous very unequal strongly ciliate, fruit oblong seated on the thickened expanded usually lobed pedicelled perianth-tube. Daphnidium ? elongatum, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 620; *Meissn. in DC. Prodr.* xv. 1. 231. Tetranthera sikkimensis, *Meissn. l. c.* 181, *in part.*

TEMPERATE and SUBTROPICAL HIMALAYA; Garwhal, *King*; Nepal, *Wallich*; Sikkim alt. 6–8000 ft., *J. D. H.*, &c. Bhotan, *Griffith.* KHASIA MTS., alt. 5–6000 ft., *Griffith*, &c.

A bush or small tree, branches rather stout. *Leaves* exceedingly variable, rarely obovate or oblanceolate, longest 9 by 2 in. and caudate-acuminate, average 4–5 by 1–1½, broadest 8 by 3 in. with rounded or subacute tips, base acute, rarely obtuse or rounded; petiole stout, ⅓–½ in. *Umbels* very rarely clustered; males ½–⅔ in. diam. in flower, fem. smaller; pedicel ¼–1 in., stout or slender; flowers silkily villous. *Sepals* 4–6, membranous, oblong, obtuse. *Stamens* 8–12, filaments villous with long

hairs, sometimes ¼ in. long and very slender; anthers oblong. *Ovary* in male fl. minute; in fem. glabrous with a stout style and discoid stigma. *Fruit* ½ in. long; perianth-base about ⅓ in diam. with the thickened pedicel ⅓–½ in. long.—The leaves are so variable in shape and size, that I have difficulty in sorting the specimens into varieties thereby. A small-leaved state from Bhotan, Griffith, and Sikkim alt. 8000 ft., has rounded bases to the leaf. The only Garwhal specimen I have seen has sessile clustered umbels. In the Genera Plantarum this species is inadvertently (under *Lindera*, Sect. 3, v. iii. p. 163) referred to the section *Eulitsæa*, but the perianth is very well developed, and its tube much enlarged; it is therefore a good *Cylicodaphne*. It is very easily confounded with *Lindera assamica* and states of *L. bifaria*.

28. **L. nuculanea,** *Kurz in Journ. As. Soc. Beng.* 1873, ii. 102, and *For. Fl.* ii. 301; branchlets petioles and leaves beneath softly tomentose or sublanate, leaves 5–6 in. alternate penninerved thinly coriaceous obovate or obovate-oblong to oblong-lanceolate acute, base acute beneath glaucous reticulated and with 6–8 pair of rather slender nerves, umbels subsessile, fruit oblong mucronate pale yellow longer than the large subhemispheric truncate nearly smooth shortly peduncled cup. Cylicodaphne Hookeri, *var.* siamensis, *Meissn. in DC. Prodr.* xv. 1. 209.

Tenasserim, *Kurz;* on Molyet, alt. 6000 ft., *Gallatly* (*in Herb. Calcutt.*).—Distrib. Siam.

A shrub; branchlets slender. *Leaves* 2–3½ in. diam., very softly tomentose beneath, above green and smooth with impressed nerves; petiole ¼–½ in. *Flowers* unknown. *Fruit* about ¾ in. long, cupular perianth-tube ⅔ in. diam., warted.—The fruit of this a good deal resembles in its colour and mucronate top that of the plant named *T. læta* in Herb. Calcutt. (not the true *læta*), which has lobed cups and longer petioles.

29. **L. coriacea,** *Heyne in Wall. Cat.* 2556 (Tetranthera); branchlets leaves beneath and umbels finely pubescent, leaves 4–6 in. alternate penninerved coriaceous elliptic-ovate or lanceolate acute or acuminate at both ends greenish above beneath at length glabrous brown and reticulated, nerves 6–10 pair, umbels 4-fld. small crowded subsessile, fruit small oblong seated on the enlarged cupular shortly pedicelled truncate perianth-tube. Tetranthera coriacea, *Heyne*; *Meissn. in DC. Prodr.* xv. 1. 186. T. micrantha, *Meissn. l.* c. 183.

Deccan Peninsula, *Heyne;* Courtallam, *Wight* (*Kew Distrib.* 2532).

Branches rather slender, bark pale. *Leaves* very variable in breadth, 1–2½ in., red-brown beneath, transverse nervules obscure; petiole very short, ⅙–¼ in. *Umbels* ¼ in. diam., when flowering, appressed to the branch in a small globose head; pedicel elongating a little in fruit; bracts 4, silky. *Male fl.* funnel-shaped, silky below. *Sepals* small, glabrous. *Stamens* 12, apparently glabrous; glands of those opposite the sepals very large. *Ovary*, if present, slender, with an erect small stigma. *Fruit* (unripe) ¼ in. long, obtuse, perianth-tube ⅓ in. broad, with the thickened pedicel sometimes ½ in. long.

30. **L. Hookeriana,** *Meissn. in DC. Prodr.* xv. 1. 188 (Tetranthera); branchlets very stout and leaves beneath densely softly brown-tomentose, leaves 4–6 in. alternate penninerved thickly coriaceous elliptic or obovate obtuse beneath not reticulate, nerves 6–8 pair, petiole very stout, male umbels 8–12-fld. subsilky or nearly glabrous, pedicel slender. L. nemoralis in part, *Trimen. Syst. Cat. Ceyl. Pl.* 76.

Ceylon, *Gardner.*

Branches with pale bark, and large scars of fallen leaves (mossed in the specimens). *Leaves* remarkably coriaceous, 2–2½ in. diam., smooth and pale brown above with faintly impressed nerves and a puberulous costa which is very stout beneath, not

reticulated beneath under the pubescence; petiole ½ in. *Umbels* axillary and at the leaf-scars, in bud ⅙ in. diam., obscurely pubescent; pedicel ⅓–½ in., slender; bracts concave; flowers (very young) funnel-shaped, silky below without and within. *Sepals* oblong, glabrous, small. *Stamens* 6, apparently glabrous. *Fruit* and fem. fl. unknown.—A well-marked plant (totally distinct from *T. nemoralis*), of which only two specimens are known, both in young flower; so the above character will probably require modification. Its nearest ally is *L. longifolia*.

31. **L. longifolia,** *Nees Syst. Laurin.* 528 (Tetranthera); branchlets leaves beneath and umbels rusty-tomentose, leaves 6–12 in. alternate penninerved coriaceous elliptic elliptic-lanceolate or obovate obtuse acute or acuminate, beneath strongly reticulate, nerves 6–10 pair, umbels densely clustered shortly peduncled about 10-fld., fruit small globose seated on the expanded concave thickened perianth-tube. L. cauliflora, *Moon Cat.* Tetranthera longifolia, *Nees ex Meissn. in DC. Prodr.* xv. 1. 188 (*excl. var.* β.); *Thwaites Enum.* 255 (*excl. var.* γ.).

Ceylon; common in the Central Province, alt. 4–7000 ft.

A small sparingly branched tree (*Thwaites*). *Leaves* very variable in size, the largest 7 in. broad, brownish green when dry and often harshly pubescent above, reticulations beneath broad, base acute or rounded; petiole ⅓–½ in., stout. *Umbels* in flower ¼ in. diam.; bracts 4, subequal; flowers rusty-tomentose, villous below. *Sepals* unequal, sometimes antheriferous. *Stamens* 12, filaments slender hairy, inner anthers short sometimes 2-celled. *Fruit* about ⅓ in. diam., much broader than the entire perianth-tube.—The name *longifolia* is not appropriate. Meissner's var. β. *nitida*, from Moulmein, is unknown to me. Thwaites' var. γ. is *L. glaberrima* (*T. nervosa* β. *chartacea*, Meissner.)

32. **L. nemoralis,** *Thwaites Enum.* 255; branchlets petioles and leaves beneath densely rusty-villous or tomentose, leaves 1–2 ft. alternate penninerved linear- or elliptic-lanceolate acuminate, nerves 12–15 pair strong and spreading beneath, umbels small clustered glabrous or very sparsely hairy.

Ceylon; about 21 miles from Galle, alt. 1000 ft., under large forest trees, *Gardner, Thwaites.*

A bush, 10–12 ft.; stem erect or sparingly branched; branches robust. *Leaves* 3–4 in. broad, not thickly coriaceous, green above when dry with tomentose midrib, almost woolly, loosely reticulate and pale beneath between redder villous nerves; petiole 1–2 in., very stout. *Flowers* and *fruit* not seen.—Most of the above description is from Thwaites, who says in a note that he has never found flowers or fruits, but that the former were found by Gardner. It is a noble species, and quite unlike any other.

†† Leaves glabrous beneath or nearly so. (*See also* L. Stocksii.)

a. *Species of the Himalaya, Assam, Khasia and Silhet.*

33. **L. salicifolia,** *Roxb. ex Wall. Cat.* 2536 (Tetranthera); glabrous or branches and leaves beneath hoary, leaves 3–12 in. alternate penninerved chartaceous broadly or narrowly elliptic or oblong acute or acuminate usually glaucous beneath, nerves 8–15 pair, umbels clustered glabrous rarely hoary 4–6-fld., pedicels short, stamens villous, fruit ellipsoid, perianth-tube hardly enlarged or small and cup-shaped. T. salicifolia, *Roxb.*; *Nees in Wall. Pl. As. Rar.* ii. 66 and 30, and *Syst. Laurin.* 534. T. glauca, *Wall. Cat.* 2533; *Meissn. in DC. Prodr.* xv. 1. 185 (*excl. var.* δ.); *Nees ll. c.* 66 and 531; *Kurz For. Fl.* ii. 300. T. laurifolia, *Roxb. in Wall. Cat.* 2535 (*not of Fl. Ind.*). T. attenuata, *Wall. Cat.* 2534; *Nees in Wall. l. c.* ii. 6 and iii. 30, and *Syst. Laurin.* 533. T. lanceæfolia, *Roxb. Fl. Ind.* iii. 822; *Kurz*

For. Fl. ii. 300 (*lancifolia*). T. salicifolia & saligna, *Herb. Ind. Or. H.f. & T.*

NORTHERN and EASTERN INDIA; from Oude and Nepal to Sikkim (ascending to 6000 ft.). Assam, Bengal, Chittagong and Pegu.

An evergreen bush or small tree; branches never very stout, bark dark or black. *Leaves* very variable, pale brown or darker above when dry, smooth and usually obscurely reticulated above, nerves beneath strong with faint nervules; petiole ¼–1 in. *Umbels* ¼–⅓ in. diam., nerves corymbose, glabrous or hoary. *Stamens* 6–9, usually very short, with villous filaments. *Fruit* ⅓ in. long, purple-black; perianth-tube variable in size, but always small and narrower than the base of the ripe fruit, and rarely cupular as in *L. oblonga*, from which it is hardly distinguishable.—I have vainly endeavoured to arrange the many forms of this protean plant under the varieties proposed by Meissner, the characters of which are chiefly taken from the reticulation and hoariness of the foliage. Of Nees' var. γ. *lævigata*, which is Meissner's var. δ., from Courtallam, Wight, I know nothing. The following marked forms are united by intermediates.

Var. 1. *ellipsoidea*, Meissn.; branches hoary, leaves large 4–12 in. broadly elliptic or oblong passing into lanceolate glaucous beneath, petiole often 1 in., umbels subsessile in dense subglobose heads.—Sikkim, Assam, Khasia, Silhet.—The type of Wallich's *glauca*.

Var. 2. *elongata*, Meissn.; branches hoary or glabrous, leaves narrower, petiole often long, umbels on stout pedicels more loosely clustered.—Assam, Khasia and Silhet.—I suppose this to be Meissner's var. as named; his locality of Penins, Ind. *Hb. Wight*, founded on an Assam specimen in Herb. Wight.

Var. 3. *attenuata*, Meissn.; branches quite glabrous, leaves subdistichous about 6 by 1½ in. linear-oblong acute shining above brown beneath, petiole short, umbels in globose clusters.—Assam, Silhet, &c.—This is Wallich's *T. attenuata* (Cat. 2534 A.).

Var. 4. *laurifolia*; branches hoary, leaves subdistichous 3–5 by ⅔–1 in. linear-oblong obtuse or acute brown and glabrous or grey and hoary beneath, petiole short, umbels loosely clustered, pedicels short slender.—Common in Assam, Khasia, Silhet and Bengal, from the Sunderbunds to Chittagong.—This is *T. laurifolia*, Herb. Ham., and Wallich's *T. salicifolia*, Herb. Roxb. (Cat. 2536), and *T. angustifolia* of Gamble (Man. Ind. Timb. 311). It is very similar to *L. angustifolia*, Wall., but has fewer nerves and broader leaves.

Var. 5. *polyneura*; leaves 5–10 in. elliptic-lanceolate acuminate polished above, nerves 12–16 pair.—Sikkim and Khasia, alt. 3–4000 ft.

Var. ? 6. *reticulata*; leaves 5–9 in. elliptic-lanceolate caudate-acuminate, upper surface reticulated with pale nervules under brown, stigma in male fl. very large discoid.—A small tree from the Myrung woods, Khasia. *T. salicifolia* in part, *Herb. Ind. Or. H.f. & T.*—This is probably a different species, but in the absence of fruit I hesitate to name it as such.

34. **L. oblonga,** *Wall. Cat.* 2542 (Tetranthera); glabrous or nearly so, leaves 4–7 in. alternate penninerved elliptic- or oblong-lanceolate subacute pale brown and subglaucous beneath with 8–10 pair of slender nerves and no cross-nervules, umbels in shortly peduncled corymbs or shortly racemose 3–6-fld., bracts and pedicels glabrous or hoary, fruit oblong base immersed in the small cupular perianth-tube. Cylicodaphne oblonga, *Meissn. in DC. Prodr.* xv. 1. 205, *excl. var.* Tetranthera oblonga, *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 551. ? T. Doshia, *Don Prodr.* 65. Tomex Doshia, *Ham. mss.*

NEPAL, *Wallich.* Assam and Khasia Mts., *Jenkins, Griffith* (*Kew Distrib.* 4300).

A shrub or small tree, so similar to *L. salicifolia*, that I suspect it to be only a more glabrous state of that plant with more corymbose inflorescence, rather larger umbels, and a longer narrower fruit, ⅔ of an in. long.—Meissner's var. *Stocksii* is *L. Stocksii*, nob., and his var. *Griffithii* is *L. myristicæfolia*, Wall. This and *L.*

salicifolia are referable either to sect. *Conodaphne* or *Cylicodaphne*, according to the development of the perianth-tube.

Var. ? *albescens*; leaves shorter and broader nearly white beneath.—Outer ranges of the Sikkim Himalaya, alt. 4–6000 ft., *J. D. H.*, *Clarke*.

35. **L. angustifolia,** *Wall. Cat.* 2537 (Tetranthera); nearly or quite glabrous, leaves 3–8 in. shortly petioled alternate penninerved narrowly linear-lanceolate acute or acuminate, nerves 15–30 pair, umbels simple chiefly axillary solitary or clustered glabrous, pedicels slender. Tetranthera angustifolia, *Wall.*; *Meissn. in DC. Prodr.* xv. 1. 183, *in part.* T. saligna, *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 539.

Silhet, *De Silva.* Chittagong, *Clarke, Lister.*—Distrib. Munnipore.

Branches slender, young hoary. *Leaves* ½–⅔ in. diam., dark brown when dry above, grey brown beneath, smooth, nerves slender; petiole ¼–⅓ in. *Umbels* small, male ⅓ in. diam., about 6 fld.; flowers nearly glabrous. *Sepals* oblong. *Stamens* 6–9, filaments sparsely hairy, hardly longer than the sepals. *Fem. fl.* and *fruit* not seen.—Wallich's specimens have very slender branches and leaves only 3–4 in. Meissner, misled by wrongly named specimens, has described the young fruit of another plant for that of this. The usually much longer narrow leaves with many nerves and slender pedicels of the umbels distinguish this from *L. salicifolia*. It is perhaps nearer to *L. oblonga*.

36. **L. Meissneri,** *Hook. f.*; quite glabrous except the bracts and flowers, leaves 3–5 in. alternate penninerved coriaceous narrowly elliptic-lanceolate obtusely subcaudate-acuminate pale finely reticulated on both surfaces subglaucous beneath, nerves 10–15 pair slender and raised above, umbels 4-fld. solitary shortly pedicelled, bracts 4 silky long ciliate coriaceous very unequal outer smaller, perianth 4-lobed, stamens 9. Litsæa ? khasiana, *Meissn. in DC. Prodr.* xv. 1. 227. Dodecadenia ? *Herb. Ind. Or. H. f. & T.*

Khasia Mts.; near Churra and the Boga panee, alt. 4–5000 ft., *J. D. H. & T. T.*

Branches rather slender. *Leaves* ½–1½ in. broad, very pale yellowish brown, smooth and almost shining above when dry, base acute, nervules raised beneath, but hardly transverse; petiole ⅓–½ in., slender. *Umbels* (male) ⅓ in. diam., on stiff stout pedicels or subsessile; bracts very concave, whitish when dry, fringed with long brown hairs; flowers sessile, silky. *Sepals* membranous, broadly oblong. *Stamens* short, filaments hairy; anthers small, very short. *Ovary* imperfect, style hairy, stigma 2-lobed.—This is quite unlike any other species of either *Actinodaphne* or *Litsæa*, but is in some respects nearest *L. elongata* in the solitary umbels with unequal long ciliate bracts. I found specimens of a similar shrub at the coal-pits near Churra, in which the nerves are more numerous and spreading, and the very young umbels seem to be crowded on a very short peduncle.

37. **L. læta,** *Wall. Cat.* 2541 (Tetranthera); glabrous or nearly so, leaves 5–14 in. alternate penninerved coriaceous pale when dry elliptic- or linear-oblong or -lanceolate acute glaucous beneath finely reticulate on both surfaces, nerves 5–8 pair, umbels 3–8-fld. large in sessile clusters usually long-pedicelled glabrous or hoary, bracts 4–5, stamens 9–12, fruit large globose seated on a large pedicelled turbinate perianth-tube. Tetranthera læta, *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 548 and 677; *Meissn. in DC. Prodr.* xv. 1. 186 (*excl. var.* γ. ? *glauca*).

Tropical Eastern Himalaya; Sikkim and Bhotan. Assam, Khasia Mts. and Silhet, alt. 2–4000 ft., common.

A small tree; branches rather slender; shoots and young leaves beneath very finely pubescent. *Leaves* very variable in breadth, pale green or yellow above when dry, and white or very pale reddish beneath, base acute; petiole ⅓–½ in., stout in the larger

leaves. *Umbels* 3–10 in a cluster, in bud $\frac{1}{4}$–$\frac{1}{2}$ in. diam., usually finely hoary, sometimes tomentose or glabrous; pedicel $\frac{1}{4}$–1 in., stout; flowers subsessile, about $\frac{1}{6}$ in. diam. *Sepals* oblong, subequal, nearly glabrous. *Stamens* very unequal and irregular as to glands, at length far exserted, filaments hairy. *Ovary* with a large discoid stigma. *Fruit* 1 in. diam.; perianth-tube fleshy, as is its large turbinate pedicel. —Meissner's β. *major* is only a large-leaved specimen; his γ. *glauca*, from Ceylon, is *L. glaberrima*, Thwaites. A plant called *T. læta* in Herb. Calcutt. from the Ryang River in Sikkim, alt. 2000 ft., differs remarkably in the fruit, which is $\frac{2}{3}$ in. long, oblong, mucronate, and nearly white; its fruiting perianth-tube is subcampanulate, $\frac{1}{2}$ in. diam., with a sinuately lobed mouth.

38. **L. Thomsonii,** *Meissn. in DC. Prodr.* xv. 1. 183 (Tetranthera); quite glabrous, leaves 5–7 in. alternate penninerved firmly coriaceous linear-oblong or elliptic-lanceolate acuminate pale brown above paler beneath with 6–10 slender nerves very obscurely reticulated, umbels in short subracemose corymbs, peduncles and pedicels short stout, young fruit globose. Tetranthera læta, *Wall.* ? *Herb. Ind. Or. H. f. & T.*

SILHET; near the station, *J. D. H. & T. T.*

A large tree; branches stout. *Leaves* 2–3 in. broad, base acute, hardly shining above, not glaucous beneath; petiole $\frac{1}{2}$–1 in. long, stout. *Corymbs* axillary and in the leafless axils, rounded, about 1 in. diam.; pedicels spreading; pedicels of very young fruit clavate with the truncate perianth-tube of immature fruit $\frac{1}{4}$ in. diam., and globose; young fruit about $\frac{1}{3}$ in.—Apparently a very distinct plant, but having neither flower nor ripe fruit, it is not in a state for satisfactory description.

39. **L. chartacea,** *Wall. Cat.* 2531 (Tetranthera); quite glabrous except the inflorescence, branches slender, leaves 3–5 by $1\frac{1}{4}$–$1\frac{1}{2}$ in. alternate penninerved thinly coriaceous elliptic-lanceolate acuminate pale subglaucous and reticulated beneath, nerves 6–8 pair slender, petiole very slender, female umbels small fascicled peduncled 6–8-fld., flowers stoutly pedicelled, fruit ellipsoid on a broad cupular perianth-tube. Tetranthera chartacea, *Wall.*; *Meissn. in DC. Prodr.* xv. 1. 186 (*the Nepal plant only*); *Nees in Wall. Pl. As. Rar.* ii. 67 and iii. 30, and *Syst. Laurin.* 546.

NEPAL, *Wallich.* SIKKIM; at Rishap, alt. 5500 ft., *King.*

A moderate-sized tree (*King*). *Leaves* finely reticulate between the nerves beneath, base acute; petiole $\frac{1}{2}$ in., more slender than in its allies. *Umbels* $\frac{1}{6}$ in. diam. when expanded, pedicels about as long, both finely fulvous-pubescent; bracts 4, rounded; flowers $\frac{1}{12}$ in. diam., coriaceous, funnel-shaped. *Sepals* small, very variable in shape and length. *Ovary* ovoid; style stout, stigma simple. *Fruit* $\frac{2}{3}$ in. long, obtuse, black when dry; cupular perianth-tube $\frac{1}{3}$ in. diam., rather suddenly narrowed into the thickened clavate peduncle, together $\frac{1}{2}$–$\frac{2}{3}$ in. long.—Wallich's specimens from Nepal are males, King's from Sikkim are in fruit, but they appear conspecific; together they form very insufficient material. The small umbels and pale leaves with very slender petioles are the most prominent characters. The Sikkim plant referred to this by Meissner is *Dodecadenia paniculata*, with a very different flower and fruit. Of his Java plant (Zollinger 2853 b) I know nothing. His var. β. ? *nervosa* (Wall. Birm. Herb. 1463, from Amherst) is *L. Wallichii*, nob.

b. *Species of Pegu, the Eastern Peninsula, Penang and the Andamans.*

40. **L. leiantha,** *Kurz For. Fl.* ii. 300 (Tetranthera); quite glabrous, branches and leaves blackish when dry, leaves 4–6 in. alternate penninerved coriaceous elliptic obovate or obovate-oblong obtuse or subacute smooth above faintly reticulate beneath with 6–9 pairs of moderately stout nerves, umbels fascicled long-pedicelled glabrous 5-fld., bracts glabrous, perianth nearly glabrous.

ANDAMAN ISLANDS; Mount Harriet, in forests, *Kurz.*

Branches stout, smooth, young buds quite glabrous. *Leaves* 3–3½ in. broad; base acute or obtuse, rather unequal; petiole 1–2 in., stout, black. *Umbels* in bud as large as a small pea, pedicels ⅓ in., not very stout; bracts hardly coriaceous, 2 outer opposite, very concave, inner membranous; flowers sessile, sparsely hairy below. *Sepals* scarious, unequal, linear-oblong. *Filaments* hairy. *Ovary* of male minute, with a large stigma. *Fruit* unknown.—I have seen but one specimen, in bud, communicated by Dr. King; it much resembles (and is probably) *Tetr. elliptica*, Nees, of Java, and *T. nigricans* of Borneo, which latter has smaller cymose or subracemose umbels.

41. **L. petiolata,** *Hook.f.*; branches and leaves glabrous, leaves 4–5 in. alternate long-petioled penninerved coriaceous pale brown when dry elliptic or oblong obtuse or subacute smooth above beneath minutely reticulate with 5–6 pairs of slender nerves, umbels below the leaves clustered very shortly pedicelled 5-fld., bracts 5 outer glabrous, sepals 6 with long lax hairs, stamens 9–10, filaments long slender villous.

MALACCA, *Maingay* (*Kew Distrib.* 1265).

Branches grey brown when dry, tips and young leaves glabrous. *Leaves* much like *L. leiantha*, but the petioles rather shorter and more slender, shining above, hardly glaucous beneath. *Umbels* ⅓ in. diam.; outer bracts hardly coriaceous, inner membranous slightly pubescent, innermost small; flowers on villous pedicels laxly clothed with long rufous flexuous hairs. *Sepals* linear-oblong, membranous. *Filaments* far exserted, 2 or more 2-glandular. *Ovary* (in male) rudimentary, filiform, with a very large discoid stigma. *Fruit* and *fem. fl.* unknown.—The long petioles are characteristic.

42. **L. castanea,** *Hook.f.*; branchlets hoary, leaves 3–6 in. alternate penninerved hard coriaceous and dark brown when dry glabrous oblong or obovate-oblong obtuse very finely reticulate on both surfaces, base acute or obtuse, nerves 12–16 pair impressed above very strong beneath, umbels solitary clustered or corymbose on a very short peduncle 5–4-fld., pedicels stout, bracts 4 very coriaceous white-tomentose, stamens 10–15 villous.

MALACCA, *Maingay* (*Kew Distrib.* 1269).

Branches woody, dark grey brown, not stout. *Leaves* 1½–2½ in. diam., smooth but not shining above, paler brown beneath; petiole ¾–1 in., rather slender. *Umbels* ½ in. diam., pedicels as long; bracts very concave, persistent with involute margins when dry, glabrous within; flowers minute, sessile, ⅒ in. diam. *Sepals* 6, linear-oblong, or linear, obtuse, very unequal, villous. *Stamens* variable in number, filaments very slender, villous, 3–4 with small pedicelled glands; anthers short, broad. *Ovary* in fl. male 0. *Fruit* unknown.—This Maingay has referred to *Cylicodaphne obtusifolia*, Nees, of Java, which differs in the leaves being nerveless.

43. **L. albicans,** *Kurz in Journ. As. Soc. Beng.* 1873, ii. 102, and *For. Fl.* ii. 303 (Tetranthera); glabrous except the shoots and inflorescence, leaves 6–10 in. alternate penninerved thinly coriaceous lanceolate or oblong-lanceolate shortly acuminate base narrowed beneath glaucous and reticulate, nerves 6–10 pairs slender, umbels clustered on a short peduncle, fruit in a large fleshy waved perianth-tube narrowed into a thick pedicel.

PEGU; in tropical forests on the Eastern slopes, *Kurz*.

A tree, 20–25 ft.; branches rather slender. *Leaves* 2–2½ in. broad, obscurely reticulate above, base very acute; petiole ½–⅔ in. long. *Umbels* small.—I have seen only leaves and very young umbels. The description is almost wholly from Kurz.

44. **L. penangiana,** *Hook.f.*; glabrous or nearly so, leaves 5–8 in. alternate penninerved coriaceous pale when dry elliptic-oblong obtuse or acute finely reticulate on both surfaces, nerves 5–8 pair, umbels in sessile

clusters hoary-pubescent 6-fld., bracts 4, fruit $\frac{1}{3}$ in. ellipsoid seated on the subsessile hemispheric perianth-tube.

PENANG, *Phillips*; on Government Hill, *Maingay* (*Kew Distrib.* 1258/2).

Hardly distinguishable without the fruit from *T. læta*. It is very closely allied to *Tetranthera sessiliflora*, Meissn., *T. accedens*, Blume, *T. lucida*, Blume, and *T. diversifolia*, Blume, but the fruit is larger than in any of these. It may be the same as *T. tuberculata*, but that is described as having subglobose fruit.—In shape the cup of the fruit resembles *L. Blumii*, which differs in the opposite leaves.

45. **L. longipes,** *Meissn. in DC. Prodr.* xv. 1. 205 (Cylicodaphne); quite glabrous, leaves 6–8 in. alternate penninerved very coriaceous oblong obtuse pale above glaucous beneath with 6–10 pairs of slender nerves and very faint reticulations, umbels quite glabrous, fruiting perianth-tube 1 in. diam. hemispheric very fleshy, pedicel $1\frac{1}{2}$ in. long. Tetranthera myristicæfolia, *Wall.*; *var.* longipes, *Kurz For. Fl.* ii. 302.

TENASSERIM, *Helfer* (*Kew Distrib.* 4281); Mergui, *Griffith*.

Branches rather slender, black when dry. *Leaves* 3–$3\frac{1}{2}$ in. diam., when dry greenish above smooth and hardly shining, base acute; petiole $\frac{2}{3}$–1 in. *Umbels* very young, quite glabrous. *Fruiting umbels* axillary, peduncle much shorter than the pedicels, which are gradually thickened upwards; large perianth-tube very rugose when dry.

46. **L. myristicæfolia,** *Wall. Cat.* 2548 (Tetranthera); quite glabrous, leaves 3–9 in. alternate penninerved oblong or elliptic-oblong or lanceolate rarely obovate obtuse or acute beneath brown or glaucous with 6–10 pairs of very faint nerves, umbels numerous 4–6-fld. quite glabrous in peduncled clusters or corymbs, fruit small globose immersed in the cupular fleshy shortly pedicelled perianth-tube. Cylicodaphne myristicæfolia, *Meissn. in DC. Prodr.* xv. 1. 208; *Kurz For. Fl.* ii. 102 (*in part*). C. oblonga, *var.* γ. ? Griffithii, *Meissn. l. c.* 205. Lepidadenia Griffithii, *Wight Ic.* t. 1846. Diospyros ? acuminata, *Wall. Cat.* 4129.

PEGU, *Kurz*. TENASSERIM, at Tavoy, *Wallich*. PENANG, *Porter*. MALACCA, *Griffith, Cumming, Maingay*.

A small tree; branches woody. *Leaves* very variable in size and form, but uniform in texture, drying dark or light-coloured, above quite smooth, not shining; petiole $\frac{1}{2}$–$\frac{2}{3}$ in., rather stout. *Umbels*, flowering $\frac{1}{3}$ in. diam.; pedicels rather slender, $\frac{3}{4}$–1 in.; bracts 4–6, coriaceous, 6–fld. (4-fld., *Kurz*). *Sepals* 6, glabrous, obscurely lobed or toothed. *Stamens* 10–12, quite glabrous. *Fruit* $\frac{1}{3}$ in. diam.; perianth-tube clavate, $\frac{1}{2}$ in. diam., very fleshy, rugose when dry, narrowing into the very fleshy clavate pedicel, together $\frac{1}{3}$–$\frac{1}{2}$ in. long.—This and the preceding are almost the only species of this section with quite glabrous umbels. Kurz, who unites them as varieties describes the fruit as obovate-globular, of the size of a small cherry, and the thick fleshy entire smooth cup as $\frac{3}{4}$ in. diam. Meissner's var. β. *tavoyana* is the form with short leaves, and var. *acutata* the narrower more acute leaved one. The Canara plant referred to the latter is *L. Stocksii*, nob.

47. **T. Helferi,** *Hook. f.*; glabrous, leaves 3 in. alternate penninerved very coriaceous ovate or elliptic-ovate acuminate smooth and brown when dry above beneath pale brown with 4–6 very slender nerves and very faint reticulations, umbels solitary pedicelled 4-fld., bracts 4 glabrous outer largest, sepals 6 glabrous, stamens 12.

TENASSERIM (or Andaman Islands), *Helfer* (*Kew Distrib.* 4307).

Branches woody; bark rough, whitish. *Leaves* very finely acuminate, margins slightly recurved when dry, base acute; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., very slender. *Umbels* (male) about $\frac{1}{3}$ in. diam.; bracts black when dry; pedicel $\frac{1}{2}$ in., slender, decurved. *Sepals* subequal. *Filaments* quite glabrous except at the base; anthers short. *Ovary*

not seen. *Fruit* unknown.—A very distinct species, of which the materials are scanty.

c. *Species of Ceylon.*

48. **L. glaberrima,** *Thwaites Enum.* 255 (Tetranthera); glabrous or nearly so, branches slender, leaves 2–7 in. alternate penninerved thinly coriaceous greenish when dry oblong-lanceolate or oblanceolate acuminate smooth above very finely reticulate (rarely puberulous) beneath with 6–8 pair of very strong arched nerves that form large loops within the margin lowest pair shortest, umbels in very short racemes or fascicles 4-fld., bracts 4–5 glabrous, fruit oblong seated on the small dilated cup-shaped perianth-tube. Tetranthera nervosa, *Meissn. in DC. Prodr.* xv. 1. 187. T. longifolia *var.* γ., *Thwaites l. c.* T. læta, *var.* γ. ? glauca, *Meissn. l. c.* 187. Cylicodaphne Thwaitesii, γ. angustata, *Meissn. l. c.* 208.

Ceylon; in the Central Province, alt. 4000 ft., *Walker*, &c.

A small tree; branches glabrous or puberulous. *Leaves* variable in size, opaque above, glaucous or not beneath, base acute or obtuse; petiole ¼–½ in., glabrous or puberulous. *Umbels* few, ⅓ in. diam.; pedicel short, slender; common peduncle, if present, not ½ in. long; outer bracts very concave, membranous, innermost narrow; flowers shortly pedicelled; pedicels silkily villous, as are the perianth-tube and bases of the sepals. *Sepals* unequal, membranous, linear-oblong, sparsely hairy, villous at the base within. *Stamens* 8; filaments very slender, hairy; anthers broad, 2 or 3 2-glandular. *Ovary* in male a slender minute column with no stigma. *Fruit* ⅓ in. diam.; base of perianth as broad, on a thickened pedicel.—The remarkable nervation distinguishes this. Meissner's *T. nervosa* vars. α. and β. are individuals only.

49. **L. ovalifolia,** *Thwaites Enum.* 256 (Tetranthera); quite glabrous, branches robust, leaves 2–4 in. alternate penninerved rather long-petioled thickly coriaceous brown when dry broadly oblong orbicular or elliptic rarely ovate-lanceolate rounded at both ends or base acute, very finely reticulate beneath with 6–10 very faint free nerves, umbels clustered very shortly stoutly pedicelled 5–6-fld., bracts 4 pubescent, sepals 6 (4–8), fruit subglobose seated on the thickened cupular perianth-tube. Lepidadenia ovalifolia, *Wight Ic.* t. 1839. Cylicodaphne Thwaitesii, *Meissn. in DC. Prodr.* xv. 1. 208, *var. a. only.*

Ceylon; Central Province, alt. 2–7000 ft., *Walker*, &c.

A tree, 30–40 ft.; branches rather rough. *Leaves* very variable, rigid, flat, above smooth or shining with very obscure nerves, beneath pale or dark brown opaque or rather shining with a stout midrib, base rarely cordate; petiole stout, ¼–⅔ in. *Umbels* sometimes clustered on a short stout peduncle, ⅓ in. diam.; bracts very coriaceous; flowers on short villous pedicels. *Sepals* 6 in the flowers I have examined (4–8 according to Thwaites), oblong, glabrous. *Stamens* 9–12 (8–16 or more, Thwaites), inner 2-glandular; filaments short, sparsely hairy; anthers broad. *Fruit* ⅓–½ in. diam. in a large fleshy shortly stoutly pedicelled almost hemispheric cup.—Some specimens from Walker, doubtfully referred to *Cylicodaphne Gardneri* by Meissner, have elliptic leaves with the surface convex above between the deeply sunk nerves, and correspondingly concave beneath; others, as Thwaites' C.P. No. 10 and 351, are exactly intermediate between this and *L. iteodaphne.* I refer here Thwaites' C.P. 2487, which has longer petioles than *L. iteodaphne.*

50. **L. iteodaphne,** *Thwaites Enum.* 255 (Tetranthera); glabrous except the pubescent umbels, leaves alternate penninerved coriaceous shortly petioled oblong or linear-oblong and obtuse or linear-lanceolate and acuminate smooth above beneath finely reticulate glaucous or not, nerves 6–10 pair very slender, umbels small few or solitary clustered 4–5-fld., pedicels

very short and usually stout, sepals usually 4, fruit oblong on the small cupular swollen perianth-tube. ? Tetranthera iteodaphne, *Nees Syst. Laurin.* 542. Cylicodaphne Thwaitesii, *Meissn. in DC. Prodr.* xv. 1. 208 (*excl. var. a. ovalifolia*).

CEYLON; in the Central Province, ascending to 6000 ft., *Walker*, &c.

A very puzzling plant, of which the specimens are not sufficient for a full description. I am uncertain as to its being the *T. iteodaphne* of Nees, whose description is insufficient, and who further describes the sepals as 6, and the bracts as strigose. I find only 4 sepals, and rarely more than 8 stamens. Thwaites sends three forms.

1. Leaves 3–4 by 1–1½ in. oblong or narrowly oblong obtuse or acute dark brown above when dry, base acute obtuse or rounded.—Adams Peak (C.P. 10, 357, 729, 2605). Cylicodaphne Walkeri, *Meissn. l. c.* This approaches *L. ovalifolia*, Thw.

2. Leaves 3—5 in. oblong-lanceolate acute or acuminate pale above more so and almost glaucous beneath, petiole very short.

3. Leaves 4–6 by ¾–1 in. linear lanceolate acuminate pale on both surfaces, petiole short, male umbels solitary on slender pedicels ¼ in. long, fem. fruiting perianth smaller. Var. β., Thwaites (C.P. 360). C. iteodaphne γ. angustata, *Meissner l. c. in part.*

Another form, sent by Walker only, has leaves 5–6 by 1 in., oblong-lanceolate, grey-brown beneath with often 12–15 pairs of more conspicuous nerves.—I assume it to be *T. Walkeri*, Meissn. Thwaites' numbers are very confusing, because of the badness of most of the specimens, and because those in different herbaria are attached to dissimilar specimens. I have hence not quoted some of them, or Meissner's references to them. C.P. 729 in Herb. Hook. is quite undeterminable: probably referable to var. 2.

** Umbels racemed.

† *Leaves quite glabrous beneath* (*except* L. Stocksii). (*See also* L. Gardneri.)

51. **L. glabrata,** *Wall. Cat.* 2543 (Tetranthera); quite glabrous except the silkily hoary inflorescence, leaves 5–7 in. alternate penninerved coriaceous linear- or elliptic-oblong or -lanceolate acute or acuminate faintly reticulate beneath with 10–12 pairs of nerves, male in racemes 3–5 in. long 6-fld., pedicels long. Tetranthera ? glabrata, *Wall.*; *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 560; *Meissn. in DC. Prodr.* xv. 1. 197. Laurus salicifolia ?, *Wight mss.*

DECCAN PENINSULA; Dindygul Hills, alt. 3000 ft., *Wight.*

Very near *L. Panamonja*, and perhaps only a variety of that plant, or rather of its Tenasserim larger umbelled form; but the flowers, which are in bud only, are densely silky (not tomentose), the racemes less tomentose, the stamens more hairy; and in the absence of developed flowers and fruit I hesitate to unite them. Their foliage is very similar, but the umbels of the Deccan plant are rather larger.

52. **L. nitida,** *Roxb. ex Wall. Cat.* 2540 (Tetranthera); quite glabrous' leaves 4–10 in. alternate penninerved thinly coriaceous oblanceolate or obovate-oblong tip rounded retuse or subacute, faintly loosely reticulate beneath with 10–14 pair of very slender nerves, male umbels long-pedicelled 4–5-fld. in slender glabrous racemes 2–4 in. long, female racemes much shorter, fruit ellipsoid sunk in the enlarged subspherical shortly pedicelled perianth-tube. Tetranthera nitida, *Roxb.*; *Nees in Wall. Pl. As. Rar.* ii. 67 and iii. 31, and *Syst. Laurin.* 556; *Kurz For. Fl.* ii. 302. T. Baula, *Herb. Ham.* Cylicodaphne nitida, *Meissn. in DC. Prodr.* xv. 1. 203.

EASTERN HIMALAYA; Bhotan, *Griffith.* ASSAM, near Goalpara, *Hamilton.* SILHET, *Wallich.* PEGU, at Rangoon, *Wallich, M'Clelland.*

A timber tree; branchlets woody, angular, bark pale. *Leaves* 2–3 in. broad, much

narrowed towards the base, pale brown when dry, above smooth with slender raised nerves; petiole $\frac{1}{2}$–$\frac{2}{3}$ in., stout. *Male racemes* axillary and below the leaves, numerous, rachis and pedicels very slender, the latter often $\frac{2}{3}$ in.; umbels quite glabrous; bracts rather membranous; flowers sessile. *Perianth-tube* turbinate, silky; sepals 4 nearly glabrous, very unequal. *Stamens* about 14, filaments slender hairy. *Female racemes* 1 in. long; umbels shortly pedicelled; flower not seen. *Fruit* (unripe) apparently sunk in the globose or at length hemispheric smooth perianth-tube, which with its short pedicel is about $\frac{1}{2}$ in. long; edge of mouth thin, obscurely lobed; ripe fruit "oblong 6–7 lines long seated in the 3–5-cleft large fleshy cup," *Kurz.*—The raised nerves of the upper surface of the dried leaves is in contrast to those of the three last species.

53. **L. Maingayi,** *Hook. f.*; quite glabrous except the umbels, leaves 7–16 in. alternate very long-petioled penninerved rigidly coriaceous oblong or oblanceolate obtuse or acute, nerves 10–18 pair strong beneath with transverse nervules, male umbels in racemes 5–6 in. long hoary 6-fld. long-pedicelled.

MALACCA, *Maingay* (*Kew Distrib.* 1264, 1273).

Branches woody, bark blackish when dry. *Leaves* 2–5 in. broad, brownish and shining above with impressed nerves, paler beneath and finely reticulated between the rather distant nervules; base narrowed; petiole 2 in., slender. *Racemes* from below the leaves, numerous; rachis rather slender, arched or drooping, nearly glabrous; umbels in bud globose, $\frac{1}{3}$ in. diam., expanded $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; bracts 4, coriaceous, concave, subequal, white and hoary; pedicel $\frac{1}{6}$–$\frac{1}{3}$ in. long; flowers pedicelled. *Perianth* with a funnel-shaped tube, tomentose, sepals 6–8. *Stamens* about 12, filaments long slender glabrous; anthers linear-oblong. *Ovary* sunk in the tube of the perianth (imperfect). *Fruit* unknown.

54. **L. Panamonja,** *Ham. in Wall. Cat.* 2553 (Tetranthera); quite glabrous except the tomentose racemes, leaves 5–12 in. alternate penninerved coriaceous oblong or lanceolate acuminate reticulate beneath between the 10–12 pair of slender nerves, male umbels in racemes 5–7 in. long 6-fld. long-pedicelled, female in shorter racemes. Tetranthera Panamonja, *Ham.*; *Meissn. in DC. Prodr.* xv. 1. 197; *Kurz For. Fl.* 302. T. Panamanja, *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 561 and 677; ? *Wight Ic.* t. 1836.

ASSAM Plains, *Wallich*, &c. TENASSERIM frequent, *Griffith, Kurz.*

A large tree; young shoots puberulous. *Leaves* firmly coriaceous, 2–3½ in. broad, pale brown when dry, rarely oblanceolate, base acute or cuneate; petiole $\frac{1}{2}$–1 in. *Racemes* solitary or in pairs from below the leaves, slender, drooping; umbels in bud globose, $\frac{1}{6}$–$\frac{1}{4}$ in. diam., tawny-tomentose; pedicels $\frac{1}{6}$–$\frac{1}{2}$ in.; bracts 4, subequal, coriaceous, concave; flowers 6, sessile. *Perianth* tomentose, tube funnel-shaped; sepals 6, oblong. *Stamens* hirsute at the base. *Stigma* dilated. "*Fruit* broader than long, almost didymous, size of a pea, 2-*seeded*, seated on an entire small cup-like expansion of the perianth-base," *Kurz.*—The description of the fruit is from Kurz; that it is called 2-seeded is no doubt an oversight. The Tenasserim specimens (var. β. *longiracemosa*, Meissn. l. c.) have longer racemes and larger flowers than the Assam ones. In Herb. Wight there is a plant in very young flower, figured in his Icones (t. 1836), from Courtallam, called *T. Panamanja*, which differs much in habit from that species. The leaves are very coriaceous elliptic acute shining above, petiole $\frac{3}{4}$ in.

55. **L. oleoides,** *Meissn. in DC. Prodr.* xv. 1. 195 (Tetranthera); quite glabrous except the tomentose racemes, branches very stout, leaves 3–4 in. alternate penninerved very coriaceous elliptic tip obtuse or rounded base acute beneath not glaucous faintly reticulate with 8–10 pair of slender nerves, petiole stout, male racemes short erect, umbels shortly pedicelled, fruit globose seated on the broad turbinate subsessile perianth-tube.

NILGHIRI MTS.; at Sispara, *Wight, Gardner.*

Apparently a robust shrub, or tree, with erect leaves greenish above and hardly glaucous beneath, and branches as thick as a goose-quill. The very young racemes are axillary, erect, 1 in. long, with a stout rachis and very shortly stoutly pedicelled umbel, much too young for analysis. *Fruiting racemes* 1–2 in. long, rachis stout, pedicels of umbels short and thick; pedicel and perianth-tube together forming a broadly obconic or turbinate cup $\frac{1}{2}$–$\frac{2}{3}$ in. diam. with an entire or lobed thin margin.—Meissner describes this as having opposite or subopposite leaves, but I find them opposite only on very young shoots. Possibly an extreme form of *L. Wightiana.*

56. **L. Stocksii,** *Hook. f.*; glabrous except the silky-tomentose inflorescence, leaves 4–6 in. alternate penninerved coriaceous oblong-lanceolate or oblanceolate rarely obovoid acute or acuminate, glaucous and very finely but distinctly reticulate and sometimes puberulous beneath with 10–16 pairs of strong nerves, fem. umbels 6–8-fld. in stout suberect racemes 1–3 in. long, fruit ellipsoid seated on the entire or irregularly lobed turbinate thickly pedicelled perianth-tube. Tetranthera lanceæfolia, *Grah. Cat. Bomb. Pl.* 174. ? T. glauca, δ. ? lævigata, *Nees Syst. Laur.* 677; *Meissn. l. c.* 185. C. myristicæfolia, *var.* acutata, *Meissn. l. c.* 209 (*the Canara plant only*).

The CONCAN and CANARA; on the Ghats and Mahableshwar Hills, *Gibson, Stocks, Ritchie,* &c.

Branches stout. *Leaves* 1–2 in. broad, often of a purplish or brown glaucous hue beneath, greenish above with impressed nerves; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Female umbels* shortly pedicelled, flowering nearly $\frac{1}{2}$ in. diam.; bracts 4, and flowers silvery silky. *Perianth-tube* oblong-turbinate in flower; stamens (of female) reduced to the 2 glands and a ligule. *Fruiting umbels* sometimes solitary or corymbose; fruit (unripe) $\frac{1}{2}$ in. long; perianth-tube nearly $\frac{1}{2}$ in. diam.—It is with great hesitation that I advance this as distinct from *L. Wightiana,* and on the other hand I am not quite satisfied whether or no *L. Stocksii* may not include two species, or that the synonymy of the three following forms is absolutely correct. Meissner evidently had the same difficulty as I have experienced in respect of these Litsæas.

1. *Stocksii proper*; leaves very minutely puberulous beneath.—Along with ellipsoid-fruiting specimens of this from near Parwar Ghat, Ritchie sends detached fruits which are transversely oblong, 1 in. diam. Tetranthera oblonga, *var.* Stocksii, *Meissn. in DC. Prodr.* xv. 1. 205.

2. Var. *acutata*; leaves quite glabrous and more glaucous beneath, but reticulated as in *Stocksii proper.* Cylicodaphne myristicæfolia, *var.* acutata, *Meissn. l. c.* 209, *in part.* Tetranthera lanceæfolia, *Roxb.*?; *Grah. Cat. Bomb. Pl.* 171.

3. Var. *glabrescens*; leaves obovate-oblong rarely lanceolate very white and glaucous beneath with no or very obscure traces of reticulation.—Cylicodaphne Wightiana, *var.* glabrescens, *Meissn. l. c.* 201 (the plant of Stocks), and *var.* acutata, *Meissn. l. c.* 515.—Canara, *Stocks.* Nilghiri Hills, at Villa Cadoo, *Wight.*

†† *Leaves more or less pubescent beneath* (*sometimes glabrous in* L. Gardneri).

57. **L. Gardneri,** *Thwaites Enum.* 255 (Tetranthera); nearly glabrous, branches robust, leaves 4–6 in. alternate penninerved thickly coriaceous oblong or broadly elliptic obtuse glabrous or hoary beneath with 8–10 pair of very strong nerves and transverse nervules reticulations very obscure, racemes short tomentose with stout rachis and pedicels, bracts silky, fruit oblong seated on a broad turbinate stoutly pedicelled perianth-tube. Cylicodaphne zeylanica & rigida, *Meissn. in DC. Prodr.* xv. 1. 201.

CEYLON; Central Province, alt. 4–6000 ft., *Thwaites.*

A tree, 40–50 ft.; branches as stout as a goose-quill. *Leaves* 1½–4 in. broad, brown when dry above with impressed nerves, paler beneath but not glaucous; base acute; petiole $\frac{1}{4}$–$\frac{2}{3}$ in., stout. *Racemes* 1–3 in. long, strict; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in.; umbels

5-fld., ½ in. diam. when flowering; flowers silky. *Perianth* turbinate, glabrous within, 4–6-partite. *Stamens* usually 9. *Fruit* nearly globose, ⅓–½ in. broad (Thwaites); perianth-tube with the very thick pedicel ¾–1 in. long, and ½ in. diam.—Quite possibly a form of *L. Wightiana*. The flowers according to Thwaites are polygamous.

58. **L. Beddomei,** *Hook. f.*; branchlets midrib beneath and racemes pubescent, leaves 2–3 in. alternate penninerved coriaceous linear-oblong or -lanceolate obtuse acute or acuminate silvery glaucous beneath with 8–10 pair of very faint and slender nerves, male racemes 1–2 in., bracts silvery 4-fld.

South Deccan; Tinnevelly Hills, *Beddome.*

Apparently a small bush; branches scarred. *Leaves* ½–¾ in. broad, smooth and greenish above when dry with very faint nerves, obscurely reticulate beneath. *Racemes* 1–2 in., or less; pedicels ¼ in., male umbels ¼ in. diam. in flower; bracts coriaceous. *Perianth-tube* pubescent, lobes 6 membranous. *Stamens* 8; filaments short, glabrous.—A very distinct-looking small species, of which the specimens are insufficient for a full character.

59. **L. Wightiana,** *Wall. Cat.* 2557 (Tetranthera); branchlets leaves beneath and inflorescence more or less rusty-tomentose or villous, leaves 3–9 in. alternate penninerved coriaceous from oblong to elliptic-lanceolate obtuse acute or acuminate, brown beneath with 8–12 pair of strong nerves and reticulations, racemes stout 1–4 in., umbels stoutly pedicelled silky large 4–6-fld., fruit ½ in. seated on the turbinate or hemispheric stoutly pedicelled entire or 6-toothed perianth-tube. Cylicodaphne Wightiana, *Nees in Wall. Pl. As. Rar.* ii. 68 and iii. 31; *Meissn. in DC. Prodr.* xv. 1. 200 and 515 (*excl. var. β. and γ.*); *Dalz. & Gibs. Bomb. Fl.* 222. ? C. floribunda, *Blume Mus. Bot.* i. 387; *Meissn. l. c.* Tetranthera Wightiana, *Bedd. Fl. Sylv.* 293.

Nilghiri and Travancore Hills, alt. 6–8000 ft., *Wight*, &c. Canara, *Stocks, Dalzell.*

A rather large tree (Wight); branches robust. *Leaves* very variable in size and breadth, usually greenish above with impressed veins and light or dark brown beneath, rarely purplish and glaucescent; base acute; petiole ⅓–⅔ in., stout. *Racemes* suberect or spreading, rachis stout; pedicels ¼–⅓ in., stout; umbels ½–⅔ in. broad when flowering; bracts 4, coriaceous. *Perianth* turbinate, tube and 6 lobes silkily tomentose. *Stamens* about 12, filaments hairy. *Stigma* discoid. *Fruit* as in *L. Stocksii*, but in the Canara specimens the mouth of the perianth-cup has 6 remote erect or spreading teeth.—I have under *L. Stocksii* and *Gardneri* stated my suspicions that they are forms of this very variable plant, as may be *L. ovalifolia*. Meissner's vars. *tomentosa* and *parvifolia* have no certain characters; his locality of Assam is founded on an erroneous label, and that of Ceylon refers to *L. Gardneri*.

60. **L. cordata,** *Jack in Mal. Misc. ex Calc. Journ. Nat. Hist.* iv. 356; branchlets leaves beneath and racemes rusty-tomentose, leaves 4–6 in. alternate penninerved thinly coriaceous broadly ovate-oblong cordate acute or acuminate, nerves 10–12 pair spreading with transverse nervules beneath, racemes slender axillary and in terminal panicles drooping, umbels 6–8-fld. Tetranthera cordata, *Jack ex Meissn. in DC. Prodr.* xv. 1. 196. T. cordifolia, *Meissn. l. c.* T. Perrottetii, *Blume Mus. Bot.* 384; *Meissn. l. c.*

Malacca, *Griffith.*—Distrib. Sumatra, Philippines.

Branches black when dry. *Leaves* 3–4 in. broad, brown when dry and polished above with raised nerves and nervules, base always cordate, sometimes unequal; petiole ½–¾ in., rather slender. *Racemes* 1–4 in., slender; pedicels ¼ in.; umbels in flower ⅓ in.; bracts 4, nearly glabrous; flowers villous. *Sepals* 6. *Filaments* hirsute. *Fruit* in Philippine specimens ½–⅔ in. long, ellipsoid, seated on the turbinate

shortly thickly pedicelled perianth-tube, which is about $\frac{1}{3}$ in. diam. at the mouth.—Meissner's locality of "Penins. Ind. Or., Wight," is erroneous. Wight's specimen is from Griffith.

Sect. V. **Neolitsæa,** *Benth.* *Leaves* persistent, alternate, triple-nerved, sometimes subverticillate. *Umbels* in sessile clusters. *Perianth-segments* usually 4, deciduous, tube not or rarely enlarged in fruit. *Stamens* usually 6. *Fruit* small.—LITSÆA, *Nees*, *Meissner.* TETRADENIA, *Nees.* (I think *Tetradenia*, Nees, should be restored as a genus.)

61. **L. lanuginosa,** *Nees Syst. Laurin.* 634; leaves 5–12 in. alternate and whorled elliptic-lanceolate or oblanceolate acuminate triple-nerved softly thinly tomentose beneath soon glabrous and glaucous, bracts and flowers silkily villous, fruit oblong. *Meissn. in DC. Prodr.* xv. 1. 221; *Brand. For. Fl.* 382; *Gamble Man. Ind. Timb.* 312. Tetranthera lanuginosa, *Wall. Cat.* 2561. T. Cuipala, *Don Prodr.* 65. Tetradenia lanuginosa, *Nees in Wall. Pl. As. Rar.* ii. 64. L.? Cuipala, *Nees and Meissn.*

Outer HIMALAYA; from Kashmir, alt. 3000 ft., to Sikkim, alt. 6000 ft. (very rare in Garwhal). KHASIA MTS., *Herb. Griffith.*

A small tree, terminal buds often 1 in. long. *Leaves* variable in size, young densely clothed with long soft shining silky hairs, often 8–10 in a terminal whorl; basal nerves usually produced far beyond the middle, others 3–4 pair; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. *Umbels* in clusters nearly 1 in. diam., 4-fld., male fl. shortly pedicelled, fem. longer pedicelled. *Filaments* of inner stamen with long-pedicelled glands. *Fruit* $\frac{1}{2}$ in. long acute at both ends, pedicel thickened at the top but not swollen upwards.—I think this is certainly Don's *Tetr. Cuipala.*

62. **L. fuscata,** *Thwaites Enum.* 258; leaves 3–4 in. alternate and whorled coriaceous elliptic acuminate triple-nerved, beneath white or pale brown with appressed hairs at length glaucous, bracts and flowers villously silky or tomentose, fruit globose on the much-thickened funnel-shaped perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 221.

CEYLON; Central Province, alt. 6–8000 ft., *Walker*, &c.

A tree, 20 ft.; branchlets rusty-tomentose. *Leaves* $1\frac{1}{2}$–2 in. broad, smooth above, youngest densely clothed with silky hairs; petiole $\frac{1}{2}$–1 in. *Clusters* of male fl. $\frac{3}{4}$ in. broad; flowers shortly pedicelled. *Filaments* laxly hairy; glands of inner subsessile. *Fruit* $\frac{1}{2}$ in. diam., pedicel $\frac{3}{4}$–1 in. long.—Beddome (Forest Manual) regards this, *L. orbicularis* and *ambigua* as vars. of *L. zeylanica*, but to me they appear all very distinct.

63. **L. zeylanica,** *C. & Fr. Nees in Amœn. Bot. Bonn. Fasc.* i. 58, t. 5, *ex Nees Syst. Laurin.* 626 (ceylanica); quite glabrous or branchlets and petioles faintly puberulous, leaves alternate 3–5 in. elliptic- or oblong-lanceolate obtusely or acutely acuminate triple-nerved with 1–3 pairs of nerves above the middle glaucous or not beneath, bracts and flowers silky, fruit subglobose or oblong seated on a disciform perianth-tube with a thickened pedicel. *Meissn. in DC. Prodr.* xv. 1. 226; *Blume Mus. Bot.* i. 346; *Brand. For. Fl.* 382; *Dalz. & Gibs. Bomb. Fl.* 223; *Gamble Man. Ind. Timb.* 311; *Thwaites Enum.* 257; *Beddome Fl. Sylv.* t. 294; *Wight Ic.* t. 132 and 1844. L. oblonga, *Nees Syst. Laurin.* 678; *Wight Ic.* t. 1845. L. striolata, *Blume l. c.* 347; *Meissn. l. c.* 223. L. foliosa, *Nees l. c.* 622; *Meissn. l. c.* 222 (*excl. var.* β.); *Kurz For. Fl.* ii. 306. L. furfuracea, *Nees l. c.* 625; *Blume l. c.* 347; *Miquel Fl. Ind. Bat.* i. 975. L. scrobiculata, *Meissn. l. c.* 233. L. trinervia, *Juss. in Dict. Sc. Nat.* xxvii. 79. Tetradenia ceylanica, furfuracea & foliosa, *Nees in Wall. Pl. As. Rar.* ii. 64 and iii. 30. Tetranthera foliosa, pulcherrima (*in part*) & furfuracea, *Wall. Cat.* 2563,

2567, 2568. Laurus Cassia, *Linn. ex Wight in Hook. Journ. Bot.* ii. (1840) 336. L. involucrata, *Vahl in Herb. Juss. ex Lamk. Dict.* iii. 445; *Roxb. Cor. Pl.* ii. 46, t. 187. L. zeylanica, &c., *Herm. Mus. Zeyl.* 26.

BHOTAN and the KHASIA MTS., *Griffith.* SILHET, *Wallich.* CHITTAGONG, Pegu and Tenasserim, ascending to 7000 ft., and Martaban, *Kurz.* MALACCA, *Maingay*; on Mt. Ophir and in littoral woods at Tangong chi, *Griffith.* PENANG, *Wallich.* DECCAN PENINSULA; on the Western Ghats from the Concan southwards, and from Quilon on the coast, *Wight*, ascending to 7000 ft. on the Nilghiris. COROMANDEL, on the coast hills, *Roxburgh.* CEYLON, ascending to 6000 ft.—DISTRIB. Sumatra, Java.

A small tree, variable as to foliage. *Leaves* often caudate-acuminate, 7 by 3½ in. the largest specimens from Courtallam and Sumatra (*L. latifolia*, Blume), smooth above or beautifully reticulated with minute impressions on one or both surfaces wholly or in part; petiole ½–2 in. long. *Umbels* 4–5 fld. in all the specimens I have examined, and as figured by Roxburgh (6–12 fld., Brandis, by error I suspect). *Fruit* globose and subglobose, ¼–⅓ in. diam., or oblong and ½–⅔ in. long; pedicel much thickened, ⅓–⅔ in. long.—I am in doubt as to there being one or two species included in the above: one has globose fruit, mammillate at the top, as figured by Roxburgh, and in Wight's Icones, t. 132, from Ceylon, and his *L. oblonga*, t. 1845, from Courtallam, and which I have seen in specimens from Canara, the Nilghiris and Malacca; the other species with much larger oblong fruit, rounded at the top, as figured by Wight also as *L. zeylanica* at t. 1844, for which he gives no precise locality (beyond that it is a native of Ceylon, Martaban and the western slopes of the Nilghiris), and as figured by Beddome, t. 294, and of which I have seen specimens from the Concan? (Herb. Dalzell). Brandis describes the fruit of *zeylanica* as globose but occasionally ovoid, and they are oblong in Nees' description of *zeylanica*, *furfuracea* and *oblonga*, and Meissner's of *foliosa* var. *cæsia.* Kurz describes the Burman *foliosa* as having oblong fruit; and Meissner his *zeylanica* var. *venosa* as "ovali-globosa." Unfortunately I find no fruit amongst the many Ceylon specimens that I have examined.—With regard to the characters ascribed by authors to *furfuracea*, *oblonga*, *scrobiculata*, *foliosa* and *pulcherrima*, I find nothing in these whereby to distinguish them from *zeylanica*; nor are Meissner's five varieties of the latter at all fixed. For the distinctive characters of the too-closely allied *L. umbrosa*, I must refer to the notes under that species.

64. **L. umbrosa,** *Nees Syst. Laurin.* 623 (Tetranthera); branchlets slender pubescent, leaves 2–5 in. alternate elliptic or oblong-lanceolate caudate-acuminate triple-nerved below and with usually 2–4 pair of strong nerves above the middle glaucous or not beneath, fruit globose on a very slightly enlarged perianth-tube with a slender pedicel. *Meissn. in DC. Prodr.* xv. 1. 223. L. consimilis, *Nees Syst.* 628 (*excl. syn. Laurus involucrata*); *Meissn. l. c.* 223; *Gamble Man. Ind. Timb.* 311. Tetradenia umbrosa and T. consimilis, *Nees in Wall. Pl. As. Rar.* ii. 64 and iii. 30 (*excl. var.* β.). Tetranthera umbrosa, *Wall. Cat.* 2564, and pulcherrima? 2567 B. T. pallens, *Don Prodr.* 66.

TEMPERATE and SUBTROPICAL HIMALAYA; Kashmir and Chumba, alt. 3–5000 ft., *Clarke*; Simla and Kumaon, alt. 6–7000 ft.; Nepal, *Wallich.* Sikkim, alt. 7000 ft., KHASIA MTS., alt. 5–6000 ft.—DISTRIB. Munnipore.

Habit and characters of *L. zeylanica*, but usually more slender, with more caudate leaves, and best distinguished by the longer more slender fruiting-pedicels with a smaller dilated perianth-tube under the fruit. There are three forms which I have endeavoured to characterize below, of which the larger leaved Khasia may be the transition to *zeylanica*, with which Brandis unites both *L. umbrosa* and *consimilis*, probably rightly. Gamble, however, keeps them distinct. *L. consimilis* was founded by Nees on Wallich's flowering specimen of *pulcherrima*? (No. 2567 B), which he identified doubtfully with Roxburgh's Coromandel *Laurus involucrata*, assuming that they were from the same mountains; and in so far as that Roxburgh figures many pairs of nerves above the basal, he had some reason for his assumption; but in other respects,

as in locality, Roxburgh's *involucrata* is better referred to *zeylanica*. Leaves with transversely striolate nervules occur in all forms.

L. umbrosa proper; leaves small elliptic rarely 3 by $\frac{2}{3}$–1 in., nerves 2–3 pair above the basal, fruit globose. L. umbrosa β. khasiana, *Meissn. in part.*—Khasia Mts., alt. 5–7000 ft.

Var. *impunctata*; leaves larger broader 3–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in. L. umbrosa β. khasiana, *Meissn. in part*, and L. foliosa *var.* impunctata, *Meissn.*, with oblong fruit, from Khasia, alt. 5–7000 ft., and L. striolata, *Meissn.*, with globose fruit, from Sikkim, alt. 7000 ft.

Var. *consimilis*; leaves more membranous oblong-lanceolate 3–5 by 1–$1\frac{1}{2}$ in. often more glaucous beneath with usually many pairs of nerves above the basal, fruit globose.—Kashmir to Nepal.—There is a good specimen of this in Herb. Hooker, received from Wallich in 1821, but it is not in the Wallichian Herbarium of the Linnæan Society.

65. **L. Mannii,** *King in Herb. Calcutt.*; branches slender and petioles and pedicels pubescent, leaves scattered 2–3 in. triple-nerved elliptic-lanceolate obtusely caudate-acuminate minutely impressed punctate on both surfaces nerves beneath very slender, fruiting clusters sessile, fruit minute globose mucronate seated on the remains of the unaltered perianth.

KHASIA or JYNTEA HILLS, *G. Mann.*

The small leaves with faint nerves and small mucronate fruit about $\frac{1}{6}$ in. diam. well distinguish this species, which may be a *Litsæa* as Dr. King has named it, but without bracts and flowers it is impossible to say that it is not an *Actinodaphne* or *Lindera*.

DOUBTFUL SPECIES.

LITSÆA? species, from Upper Assam, Mishmi Hills at Choonpara, *Griffith.* Leaves only; these resemble *L. Wallichii* in form, in the bright red-brown coriaceous shining surfaces covered with fine reticulations, but differ in having 20–30 pairs of nerves; they are 12–18 by 5–9 in., oblong, subacute or acuminate, shortly petioled, and as well as the branches perfectly glabrous.

L. VELUTINA, *Blume Mus. Bot.* i. 376; *Meissn. in DC. Prodr.* xiv. 1. 181; from India, *Heyne.*—It is impossible from the meagre description to say what this may be.

LITSÆA rugosa, *Kurz in Flora* 1872, 171 (Tetranthera? ochrascens, *Miquel Fl. Ind. Bat. Suppl.* i. 146, 363. Sideroxylon? rugosum, *Wall. Cat.* 4158. S. Wallichianum, *G. Don Gen. Syst.* iv. 28; *DC. Prodr.* viii. 185), from Penang.—Wallich's specimens have neither flower nor fruit, and do not resemble any *Litsæa* known to me. Miquel's *Tetranthera? ochrascens* is a Sumatran plant described from specimens without flower or fruit. Wallich's *S. ? rugosum* was overlooked when the genus was worked up for Vol. III. of this Flora.

LEPIDADENIA Wightiana, *Nees Syst. Laurin.* 583; *Wight Ic.* t. 1837. Tetranthera Roxburghii, *Hassk. Pl. Jav.* 243, *excl. syn.* (*fid. Miquel*).—This is correctly referred by Meissner to Blume's (not Persoon's) *L. sebifera* (Cylicodaphne sebifera, *Blume in DC. Prodr.* xv. 1. 202). Wight's figure is taken from a single bad specimen without locality, and it so precisely accords with Javanese ones, that I cannot without further evidence believe it to be from the Nilghiris, where Wight supposes he once gathered it, but where neither he nor any other collector has since found it.

LAURUS umbellata, *Ham. in Don Prodr.* 64, from Nepal.—Meissner (*in DC. Prodr.* xv. 1. 258) doubtfully suggests this being *L. tomentosa* or *laurifolia* (*sebifera*, Pers.), but the description is far too meagre to admit of any identification. The authers should be 2-celled, for Don keeps it in *Laurus*.

12. **DODECADENIA,** *Nees.*

Evergreen trees. *Leaves* scattered, coriaceous, penninerved; buds

perulate. *Flowers* 2-sexual, subsolitary or 2–3 together, subsessile or panicled and pedicelled, each with 4–5 imbricating bracts. *Perianth-tube* short; segments 6–9, subequal, spreading. Perfect *stamens* 10–15; filaments slender, of 1st and 2nd series eglandular, of 3rd and 4th 2-glandular; anthers all 4-celled, introrse. *Fruit* seated on the dilated thick flattish perianth-tube, stoutly pedicelled.

1. **D. grandiflora,** *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 588; branchlets and young leaves silky-tomentose, leaves elliptic-lanceolate acuminate, flowers subsolitary, ovary hirsute. *Meissn. in DC. Prodr.* xv. 1. 210; *Brandis For. Fl.* 381; *Kurz For. Fl.* ii. 304. Tetranthera grandiflora, *Wall. Cat.* 2544. ? Laurus macrophylla, *Don Prodr.* 64.

TEMPERATE HIMALAYA; Kumaon, alt. 8000 ft., *Blinkworth*, &c. BURMA, on the Khakyen Hills, *Kurz*. Nepal, *Wallich*.

Branches rugged, shoots subsilkily tomentose. *Leaves* 3–4 in. (rarely 6–8), thinly coriaceous, minutely reticulate on both surfaces, opaque beneath; nerves 6–8 pair, very slender; petiole $\frac{1}{4}$–$\frac{3}{4}$ in., slender, young tomentose. *Flowers* $\frac{1}{2}$ in. diam.; pedicels very short, covered with the scars of bracts which are oblong silky $\frac{1}{8}$ in. long. *Perianth-segments* oblong, obtuse, hoary within. *Filaments* slender, exserted, villous. *Ovary* hirsute; stigma oblique, lobulate. *Fruit* $\frac{1}{2}$ in. long, ellipsoid; peduncle stout, $\frac{1}{4}$ in.; perianth-tube discoid, $\frac{1}{4}$ in. diam., entire.—Meissner (in DC. Prodr. xv. 1. 258) suggests this being Don's *Laurus macrophylla*, but Don's description is too meagre to admit of any identification.

2. **D. Griffithii,** *Hook. f.*; branchlets glabrous, leaves elliptic-lanceolate acuminate, flowers subsolitary, ovary glabrous, style hirsute.

BHOTAN, *Griffith* (*Kew Distrib.* 4312).

Very similar to *D. grandiflora*, but the branchlets and ovary are quite glabrous, and the leaves much more strongly reticulate between the nerves beneath. I have seen no fruit.—*Bracts* 7 to each flower. *Sepals* 6, coriaceous, oblong, obtuse, silky without, glabrous within; tube turbinate. *Stamens* 10, filaments all villous; 4 of the longer eglandular; 2 of the longer 2-glandular; 4 short ones 2-glandular.

3. **D. ? paniculata,** *Hook. f.*; quite glabrous, leaves elliptic-ovate or oblong acute or acuminate coriaceous, flowers in axillary panicles long-pedicelled, ovary glabrous. Tetranthera chartacea, *Meissn. in DC. Prodr.* xv. 1. 186 (the Sikkim plant only).

SIKKIM HIMALAYA, *J. D. H.*; at Mik, alt. 3000 ft., *Clarke*. BHOTAN; in woods at Sasee, *Griffith*.—DISTRIB. Munnipore.

A small tree, 40 ft. (Clarke); branches quite smooth and glabrous, rather slender. *Leaves* 5–9 by 2–$2\frac{1}{2}$ in., coriaceous, pale brown and rather shining above, beneath more or less glaucous or white, base acute cuneate or rounded; nerves 5–10 pairs, reddish, transverse nervules and reticulations distinct; petiole $\frac{1}{2}$–$\frac{2}{3}$ in., rather stout. *Panicles* $1\frac{1}{2}$–2 in. long, axillary, spreading; branches stiff spreading with often 3 terminal flowers; pedicels $\frac{1}{3}$ in., stiff, thickened at the tip; flowers $\frac{1}{3}$ in. diam., apparently 2-sexual. *Sepals* rounded oblong, glabrous, spreading and recurved, connate at the base and separating together early from the pedicel, hispid at the base within. *Stamens* 8–10, filaments and anthers hispidulous, alternate ones shorter, all shorter than the sepals; anthers oblong, 4-celled, introrse. *Staminodes* about 20. *Fruit* 1–$1\frac{1}{2}$ in. long, clavately obovoid, $\frac{1}{2}$–$\frac{2}{3}$ in. broad below the rounded top; pedicel thickened into the obconic truncate calyx-tube, which is about $\frac{1}{3}$ in. diam., drooping.—A very curious plant, which I hesitatingly put into *Dodecadenia*. Meissner included it under *Tetranthera*, and in Herb. Hook. has labelled it *T. chartacea*, Wall.? β. *areolata*. The bracts are evidently caducous, for all are gone. Griffith in his Itinerary Notes, p. 113 (n. 404), calls it a *Tetranthera*, and describes it as a large tree. In the

absence of bracts it is not possible to say it is not a *Tetranthera*, but it resembles no other, and the flowers are quite like those of a *Dodecadenia*.

13. **LINDERA,** *Thunb.*

Shrubs or trees, often deciduous. *Leaves* alternate or subopposite, penni- or 3–5-nerved; buds perulate or naked. *Involucres* 4–6- or more-fld., sessile or pedicelled, fascicled or racemose; bracts 2–5. *Flowers* dicœcious, pedicelled, umbellate or capitate. *Perianth-tube* very short; segments 7–9, subequal, small, petaloid. *Stamens* usually 9, 3-seriate, filaments narrow, of 1st and 2nd series eglandular, of 3rd (rarely of 2nd) 2-glandular; staminodes in fl. ♀ 9; anthers 2-celled, all introrse. *Fruit* globose or ovoid, seated on the unaltered or disciform entire or 6-toothed perianth-tube.—Species about 60, Tropical and Eastern Asia and N. America.

I follow Bentham (in Gen. Plant.) in bringing together under one genus all the Indian 1-celled *Litseaceous* plants, and have for the most part arranged them under the sections he has proposed. I expect, however, that when more complete specimens of this group are available, several of the genera now included under *Lindera* will be restored much upon the lines I here indicate as sections.

Sect. I. **Aperula.** *Leaves* persistent, penninerved. *Umbels* long-pedicelled; bracts 4, involucriform, 6–12-fld. *Stamens* 9.

1. **L. assamica,** *Kurz For. Fl.* ii. 308; branchlets and leaves beneath rusty- or tawny-hirsute and pubescent, leaves persistent 4–6 in. lanceolate or elliptic-lanceolate acuminate penninerved, umbels 6–9-fld., pedicels slender solitary or fascicled on a short common peduncle, bracts 4 glabrous, fruit subglobose. Aperula assamica, *Meissn. in DC. Prodr.* xv. 1. 240. *in part.* A. Meissneri, *Herb. Calcutt.*

Eastern Himalaya; Bhotan, *Griffith* (*Kew Distrib.* 4316); Sikkim, alt. 7–9000 ft., *J. D. H.*, &c. Martaban Hills, on the Nettoung, *Kurz.*

A small tree or shrub, 10–30 ft.; shoots finely pubescent. *Leaves* 1–2 in. diam., coriaceous, smooth above with impressed nerves, beneath with 6–10 pairs of strong nerves cross-nervules and reticulation, base very acute; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Umbels*, male about $\frac{2}{3}$ in. diam. when in flower; pedicel $\frac{1}{2}$–1 in., very slender, nearly glabrous; flowers on slender silky pedicels $\frac{1}{4}$–$\frac{1}{3}$ in.; fem. umbels smaller with shorter pedicels and shorter pedicelled flowers; bracts hemispheric. *Sepals* 6, subequal. *Stamens* 9, filaments hairy, 3-inner 2-glandular. *Fruit* nearly $\frac{1}{2}$ in. long.—Foliage a good deal like that of *Litsæa elongata*.

2. **L. Meissneri,** *King mss.*; glabrous except the silky inflorescence, leaves persistent 2–3 in. ovate or ovate-lanceolate caudate-acuminate with 5–8 pair of very slender nerves, umbels about 9-fld., pedicels very slender racemed on a slender common peduncle, bracts 4 membranous. Aperula assamica, *Meissn. in DC. Prodr.* xiii. 1. 240, *in part.*

Assam; on the Nuku Hills, *Simons.*

Closely allied to *L. Meissneriana*, but the branchlets are smooth and bark as in *L. oxyphylla*, the leaves are glabrous, much smaller, more ovate, caudate-acuminate and hardly reticulate beneath, the petioles more slender and the umbels smaller.—The specimen is a solitary one in male fl. Meissner is mistaken in uniting it with Griffith's 1171, and giving Jenkins as its collector. It is one of several curious plants found by Simons in the Nuku Hills, where no one has since collected that I know of. King (in Herb. Calcutt.) observed that Meissner has included two species under his *A. assamica*, and suggested the name of *Meissneri* for one of them.

3. **L. malaccensis,** *Hook. f.*; glabrous except the sparsely pubescent inflorescence, leaves 3–5 in. coriaceous broadly ovate or elliptic-ovate or -lanceolate shortly acuminate shining above with 4–6 pair of impressed nerves which are strong beneath with faint cross-nervules, umbels 4–9-fld. small very numerous, pedicels clustered on a short stout common peduncle, bracts 4, fruit globose. Tetranthera Griffithii, *Meissn. in DC. Prodr.* xv. 1. 191.

Malacca, *Griffith* (*Kew Distrib.* 4297), and Singapore, *Maingay* (*Kew Distrib.* 1257, 1272).—Distrib. Borneo.

Branches black, terete, smooth. *Leaves* 2–3 in. broad, dark brown, paler and opaque beneath, base acute or cuneate; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Umbels* very numerous, unexpanded $\frac{1}{8}$ in. diam., on rather stout pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. long; bracts hemispheric, coriaceous; flowers villous. *Sepals* unequal. *Stamens* 9, villous at the base. *Fruit* $\frac{1}{3}$ in. diam.—I have seen many specimens of both sexes, but none with expanded flowers.

4. **L. latifolia,** *Hook. f.*; branches leaves beneath and umbels densely grey-tomentose, leaves persistent 5–8 in. obovate oblong or broadly oblanceolate subacute or acuminate with 10–12 pair of nearly straight nerves deeply sunk above, umbels 10–12-fld. solitary clustered or fascicled on a very short peduncle, bracts 4, fruit globose small.

Khasia Mts., alt. 5–6000 ft., at Nunklow, Myrung and Pomrang, *Griffith* (*Kew Distrib.* 4321), *J. D. H. & T. T.* Nyrmai, *Clarke.*

A small tree. *Leaves* membranous, 3–5 in. diam., reticulate beneath with cross-nervules, base acute; petiole tomentose, $\frac{1}{4}$–$\frac{1}{2}$ in. *Umbels* unexpanded $\frac{1}{3}$ in. diam. on rather stout tomentose pedicels; bracts hemispheric, tomentose. *Sepals* 6, broad. *Stamens* 9, filaments hairy. *Fruit* the size of a pea.—Some large-leaved specimens have the nerves more arched.

5. **L. oxyphylla,** *Benth. in Gen. Pl.* iii. 163; glabrous except the hoary umbels, leaves 3–4 in. elliptic-lanceolate acuminate subglaucous beneath penninerved, nerves very obscure, umbels 9–14-fld. in subsessile clusters shortly pedicelled, bracts 4. Aperula oxyphylla, *Meissn. in DC. Prodr.* xv. 1. 240. Daphnidium oxyphyllum, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 618. Tetranthera oxyphylla, *Wall. Cat.* 2547.

Penang, *Porter.*

Branches stout, black when dry, smooth, quite glabrous. *Leaves* rather coriaceous, 1–1$\frac{1}{2}$ in. broad, smooth above with about 12 pair of very slender raised nerves which are with difficulty seen beneath, base acute; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Umbels*; male, unexpanded, $\frac{1}{4}$ in. diam.; bracts hemispheric. *Sepals* 4–6, unequal. *Stamens* 9. *Fruit* unknown.—Wallich's specimens are the only ones seen; it approaches *L. citriodora* of China, and very much resembles *L. Kingii.*

Sect. II. **Polyadenia.** *Leaves* persistent (except perhaps *L. venosa*), penninerved. *Umbels* sessile or subsessile. *Bracts* 4–8, involucriform or imbricate. *Stamens* 9–12. § Polyadenia & Cephalodaphne, *Blume & Gen. Plant.*

6. **L. reticulata,** *Benth. in Gen. Plant.* iii. 164; branchlets robust and leaves beneath and umbels densely rusty-tomentose, leaves persistent 7–10 in. very coriaceous obovate oblong or oblanceolate-oblong obtuse or acute, nerves 10–15 pair very strong beneath with strong close cross-nervules, umbels very small clustered sessile 4–9-fld., bracts 4, fruit oblong. Polyadenia reticulata, *Nees in Wall. Pl. As. Rar.* ii. 61, and *Syst. Laurin.* 572; *Meissn. in DC. Prodr.* xv. 1. 232. Tetranthera reticulata, *Ham. in Wall. Cat.* 2551.

Assam; at Goalpara, *Wallich, Griffith* (Polyadenia grandis, *Kew Distrib.* 4278). Silhet, *De Silva.*

Branches very stout, woody, pale, furrowed. *Leaves* brown when dry, very variable in form and breadth, 2½–4 in. diam., rather shining above with slender sunk nerves, base acute; petiole ½–⅔ in., very stout, tomentose. *Umbels* ⅛ in. diam., bracts coriaceous concave; flowers minute, shortly pedicelled, hirsute. *Sepals* 6, unequal. *Stamens* 6–12, filaments short, villous, most or all with stipitate glands. *Fruit* ellipsoid or oblong, ½ in. long, smooth, shortly pedicelled.

7. **L. venosa,** *Benth. in Gen. Plant.* iii. 164; branchlets stout and leaves glabrous, leaves 6–10 in. long-petioled narrowly elliptic-lanceolate shining above, nerves 12–15 pair rather strong beneath with distant reticulations, umbels 15-fld. very large sessile or stoutly pedicelled clustered and at first enclosed in many broad imbricate hard rounded scales, bracts 7 coriaceous pubescent. Daphnidium venosum, *Meissn. in DC. Prodr.* xv. 1. 231. Tetranthera, *Griff. Itin. Notes* 144 n. 692, and *Notul.* iv. 355, and *Ic. Pl. Asiat.* iv. t. 353.

Bhotan; near Oongar Bridge, alt. 6000 ft., *Griffith* (*Kew Distrib.* 4308).

A medium-sized tree, nearly leafless in winter, *Griffith*; branches stout, pale, furrowed. *Leaves* towards the ends of the branches, spreading and deflexed, rather membranous, brown above, with slender impressed nerves, paler beneath; base acute; petiole 1–1½ in., slender. *Buds* enclosing umbels ½–⅔ in. long, ovoid, axillary and on the branches, solitary or 2–3 together. *Umbels* nearly 1 in. diam.; bracts concave, coriaceous, pubescent; flowers villously silky, shortly pedicelled. *Sepals* 6–8, unequal. *Stamens* 9–12, filaments villous, 3 inner or more with one or two long-pedicelled cup-shaped glands; sometimes of 12 stamens 6 are eglandular, 4 2-glandular and 2 1-glandular. *Fruit* unknown.

8. **L. bifaria,** *Benth. in Gen. Plant.* iii. 164; branchlets and leaves beneath finely brown-tomentose or villous, leaves persistent 1½–6 in. pale brown coriaceous shortly petioled elliptic ovate-lanceolate acuminate, nerves 5–10 pair strong beneath with faint or strong cross-nervules, umbels small sessile 6–10-fld. solitary or clustered, bracts 6–8 imbricate, fruit small globose. Daphnidium bifarium, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 616; *Meissn. in DC. Prodr.* xv. 1. 231; *Brand. For. Fl.* 383. Tetranthera bifaria, *Wall. Cat.* 2530. Laurus Nasusua, *Don Prodr.* 64.

Subtropical Himalaya; Kumaon, alt. 5000 ft., *Blinkworth, Strachey & Winterbottom.* Nepal, *Wallich.* Upper Assam, Mishmi Hills, *Griffith.* Khasia Mts., alt. 3–4000 ft., *Wallich*, &c.—Distrib. Yunan, China, Munnipore.

A small tree with very pale-brown branches and foliage when dry; branches rather stout. *Leaves* very variable in size and amount of hairiness, nerves and cross-nervules beneath very strong and midrib often villous, above smooth and minutely impressed-punctate; base acute or cuneate, rarely obtuse; buds scaly, youngest leaves densely clothed with fulvous long shining silky wool; petiole ¼ in., very stout. *Umbels* solitary or clustered, globose, ⅛–⅙ in. diam. before opening; bracts rounded, coriaceous, concave, brown, more or less pubescent; flowers very small, axillary in the upper bracts, shortly pedicelled, pedicel and perianth-tube velvety. *Sepals* 6, membranous, subequal. *Stamens* 9, short, filaments glabrous. *Ovary* glabrous, with a stout style and discoid stigma. *Fruit* ¼ in. diam., seated on the very small shallow cup-shaped perianth-tube.—Griffith's 2464 from Bhotan referred to *bifaria* by Meissner is not that plant; it has deciduous leaves and different branches and flowers. The specific name *bisona* quoted by Nees as that of Wall. Cat. 2550 is simply a misreading of *bifaria* which is indistinctly written.

Sect. III. **Daphnidium.** *Leaves* persistent, triple-nerved.

9. **L. caudata,** *Benth. in Gen. Plant.* iii. 164; branchlets slender and

young leaves fulvous- or rusty-hairy or tomentose, leaves persistent 3–4 in. ovate- or elliptic-lanceolate caudate-acuminate triple-nerved almost to the tip, flowers minute in very short subglobose solitary or clustered spikes bracteate and 2-bracteolate, bracteoles large the pair enclosing single flowers, fruit globose seated on the 6-cleft perianth-tube. Daphnidium caudatum, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 608; *Meissn. in DC. Prodr.* xv. 1. 230; *Kurz For. Fl.* ii. 307. Tetranthera caudata, *Wall. Cat.* 2566.

KHASIA MTS., alt. 4–5000 ft., *Wallich, Griffith*, &c. MARTABAN and TENASSERIM, about 6000 ft., *Kurz.*

A small slender tree. *Leaves* brown when dry, subglaucous beneath with strong nerves and cross-nervules, thinly coriaceous, opaque above, base subacute; petiole slender, $\frac{1}{3}$ in. *Flowers* distinctly spicate on a very short tomentose rachis, each sessile in the axil of a small bract and enclosed in two concave pubescent rather thin bracteoles; flower and bracteole about $\frac{1}{12}$ in. long. *Perianth* villous within and without at the base. *Sepals* 6, membranous, subequal. *Stamens* 9, villous, 3 inner 2-glandular (in the female 6 short filaments, each with 2 very large glands). *Ovary* glabrous with a stout style and very large discoid stigma. *Fruit* $\frac{1}{4}$ in. diam.—The single flowers being bracteate recalls *Actinodaphne sikkimensis.*

10. **L. pulcherrima,** *Benth. in Gen. Plant.* iii. 164; glabrous except the silky buds, leaves persistent 4–5 in. elliptic-oblong -ovate or -lanceolate caudate-acuminate triple-nerved pale or glaucous beneath, umbels 5–6-fld. enclosed in 4–6 large concave imbricating deciduous bracts, fruit ellipsoid. Daphnidium pulcherrimum, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 610; *Meissn. in DC. Prodr.* xv. 1. 229; *Brand. For. Fl.* 383; *Kurz For. Fl.* ii. 306; *Gamble Man. Ind. Timb.* 312.

TEMPERATE HIMALAYA; from Kumaon, alt. 5–8000 ft., to Sikkim and Bhotan, alt. 4–9000 ft. KHASIA MTS., alt. 5–6000 ft. MARTABAN; on hills ascending to 6000 ft., *Kurz.*—DISTRIB. Munnipore.

A large tree; branchlets hoary. *Leaves* membranous or thinly coriaceous, greenish when dry, minutely reticulate above with 3 slender raised nerves, beneath finely reticulate, caudate tip often 1 in. long and very slender; petiole slender, $\frac{1}{3}$–$\frac{1}{2}$ in. *Clusters* quite sessile, globose; bracts pale, rather thin, concave, subsilky, outer smaller; flowers on short silky-tomentose pedicels; perianth silky. *Sepals* 6, oblong, membranous, equal or subequal. *Stamens* 9, filaments short, nearly glabrous; of female reduced to 2 glandular filaments. *Ovary* and style pubescent; stigma very large. *Fruit* $\frac{1}{3}$ in. long; perianth wholly deciduous, or rarely fragments remain; pedicel slender, $\frac{1}{3}$–$\frac{2}{3}$ in., not thickened at the tip.

11. **L. melastomacea,** *Benth. in Gen. Plant.* iii. 164; quite glabrous, leaves persistent 2–3 in. coriaceous obovate- or oblanceolate-oblong shortly obtusely acuminate triple-nerved not glaucous beneath, umbels 3–5-fld. sessile solitary or clustered, bracts 4, fruit ellipsoid. Daphnidium melastomaceum, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 607; *Meissn. in DC. Prodr.* xv. 1. 228. Laurus cuspidata, *Don Prodr.* 64.

A shrub or small tree, with stiff erect leafy branches. *Leaves* coriaceous, greenish or brown when dry, smooth above with 3 strong nerves and indistinct nervules, the latter very slender and indistinct beneath, base narrowed into the very short ($\frac{1}{6}$–$\frac{1}{3}$ in.) petiole. *Umbels* globose in bud, usually crowded and sessile in the leaf axils, sometimes very shortly stoutly pedicelled; bracts very coriaceous, hemispheric, glabrous; flowers on villously silky pedicels, villous within. *Sepals* 6, equal or unequal. *Stamens* 9, filaments hairy, 3 inner 2-glandular. *Ovary* not seen. *Fruit* $\frac{1}{3}$ in. long, seated on the persistent or broken up hardly changed perianth-tube; pedicel $\frac{1}{3}$–$\frac{1}{2}$ in.

Sect. IV. **Sassafrimorpha,** *Benth.* *Leaves* deciduous, triple- or quintuple-nerved.

12. **L. heterophylla,** *Meissn. in DC. Prodr.* xv. 1. 246; branches robust, shoots and leaves beneath rusty-tomentose, leaves deciduous 2–4 in. entire or 3-lobed at the tip, old coriaceous orbicular ovate or oblong obtuse or subacute quintuple-nerved at the rounded or cordate base, umbels subsessile many-fld., flowers in the axils of large imbricating deciduous villous membranous bracts, fruit ellipsoid. Benzoin sericeum and Lindera triloba ?, *Herb. Ind. Or. H.f. & T.* Daphnidium bifarium in part, *Meissn. in DC. l. c.* 231 (*not of Nees*). Hamamelidea, *Griff. Itin. Notes,* 147.

EASTERN TEMPERATE HIMALAYA; Sikkim, alt. 8–10,000 ft., *J. D. H.* Bhotan; at Oongar, alt. 9–10,000 ft., *Griffith.*

A shrub or small tree, with flexuous branches, flowering when leafless; buds clothed with imbricate scales. *Leaves* 2–4 in. broad, old brown when dry; above rather shining with sunk nerves and reticulations, beneath with very strong nerves; lobes if present triangular, subacute; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., stout. *Umbels* (or contracted spikes) $\frac{1}{2}$–$\frac{3}{4}$ in. diam., with 3–5 very coriaceous imbricating scales at the base; each flower in the axil of a subspathulate or obovate-oblong concave bract that is villous with long hairs at the back; pedicels short, villous, as is the base of the perianth. *Sepals* linear-oblong, subsilkily hairy. *Stamens* 9, filaments very short, glabrous; 3 or more 2-glandular. *Fruit* immature.

13. **L. Neesiana,** *Benth. in Gen. Plant.* iii. 164; quite glabrous, leaves deciduous 3–7 in. membranous ovate acute or acuminate triple-nerved at the cuneate or cordate base, umbels solitary or clustered pedicelled 5–7-fld., bracts 4 membranous glabrous, fruit small globose. *Kurz For. Fl.* ii. 309. Aperula Neesiana, *Blume Mus. Bot.* i. 366; *Meissn. in DC. Prodr.* xv. 1. 241. Benzoin Neesianum, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 498. Tetranthera Neesiana, *Wall. Cat.* 2538. T. prunifolia, *Wall. mss.* ? Laurus macrophylla, *Don Prodr.* 64; *Meissn. l. c.* 258.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 6–8000 ft., *J. D. H.*

A very spicy tree; shoots terete, smooth, usually quite black when dry, often very stout. *Leaves* $1\frac{1}{2}$–$4\frac{1}{2}$ in. diam., smooth and reticulated above when dry, more or less glaucous beneath with 4–6 pairs of nerves besides the basal which do not reach the middle of the leaf, and slender distant reticulated ones. *Umbels* unopened, globose, $\frac{1}{3}$ in. diam., on slender pedicels $\frac{1}{3}$–$\frac{1}{2}$ in.; outer bracts hemispheric, inner narrower; flowers on tomentose pedicels, $\frac{1}{4}$ in. diam., green. *Sepals* orbicular, nearly glabrous, very membranous. *Stamens* 9, filaments short, glabrous, inner 2-glandular. *Fruit* $\frac{1}{6}$ in. diam., seated on the unaltered perianth with fragments of the sepals.—This has much the habit of *L. oxyphylla* and *Litsæa polyantha.*

Var. ? *Griffithii*; bark of branchlets quite white, umbels racemose on a short slender peduncle.—Mishmi Mts., *Griffith.*

SPECIES OF UNDETERMINED SECTION.

14. **L. bootanica,** *Meissn. in DC. Prodr.* xv. 1. 245; branches stout pale grey deeply grooved (by contraction of the bark), annual shoots herbaceous black when dry, leaves (young) scattered deciduous membranous 3–5 in. penni-nerved lanceolate acuminate densely softly tomentose beneath narrowed into the $\frac{1}{2}$ in. slender petiole, buds ovoid large with very broad densely silky scales, umbels of fem. fl. on a stout glabrous $\frac{1}{2}$ in. peduncle, flowers 8–10 on stout villously silky or tomentose pedicels, perianth-tube campanulate villous, lobes 6 or more unequal oblong erect glabrous, staminodes on the top of the tube narrow spathulate exserted slightly hairy, some with pedicelled glands, ovary ovoid sunk in the perianth-tube, stigma sessile?.

BHOTAN, *Griffith* (919 a) (*Kew Distrib.* 4325).—A few very imperfect male flowers are scattered among the females. They are in a broken condition, have a very short perianth-tube, and short filaments, and 2-celled oblong anthers.

15. **L. Griffithii,** *Meissn. in DC. Prodr.* xv. 1. 245; branches slender woody glabrous, leaves much too young for description ¼–½ in. long deciduous penninerved lanceolate acute silky, female fl. white odorous in very small axillary subsessile nodding clusters very shortly pedicelled and pedicels silky tomentose, perianth ⅛ in. diam., tube very short obconic, sepals 6 broad glabrous, staminodes very short with large glands glabrous, ovary glabrous, style short, stigma discoid.

BHOTAN, above Tongsa, alt. 8500 ft., *Griffith* (*Kew Distrib.* 4334).—Griffith describes the flowers and bracts as white.

16. **L.? sikkimensis,** *Meissn. in DC. Prodr.* xv. 1. 245; a bush 15 ft. high, branchlets woody rugose, shoots inflorescence and young leaves beneath clothed with long golden red villous hairs, leaves (young) 2–2½ in. scattered deciduous penninerved membranous obovate-oblong narrowed into a short petiole, tip rounded, nerves 6–8 pair very slender, umbels subsessile few-fld., fem. fl. very shortly pedicelled, perianth-tube short, sepals 6 orbicular, staminodes very short almost reduced to glands, ovary ovoid glabrous, style short, stigma small.

SIKKIM HIMALAYA; Lachen, alt. 11–12,000 ft., *J. D. H.*—This is quite unlike any other species of *Lindera*. The adult leaves probably differ a good deal from the young here described.

17. **Daphnidium argenteum,** *Kurz For. Fl.* ii. 307; a deciduous tree, shoots silvery silky hairy, leaves 3½–6½ in. lanceolate to broad-lanceolate acuminate at both ends firmly membranous glabrous above appressed silvery-pubescent beneath penninerved laxly reticulate on both surfaces, petiole glabrescent or silvery-pubescent ¼–⅓ in., flowers on very short tomentose pedicels forming a short densely tomentose raceme involucred by pubescent concave bracts at the base, perianth appressed pubescent filaments almost glabrous, anthers 2-celled. (*Description from Kurz.*)

MARTABAN and Eastern slopes of the PEGU Yomah, *Kurz*.

18. **Daphnidium lancifolium,** *Thwaites Enum.* 257; *Meissn. in DC. Prodr.* xv. 1. 229; "a tree young parts and inflorescence fulvous silky, leaves (5–7) more or less crowded at the ends of the branches 2–3½ by ½–⅔ in. lanceolate acutely acuminate smooth or minutely rugulose above white and pruinose beneath triple-nerved, base acute, lateral nerves hardly reaching the middle of the leaf, petiole ¼–½ in., buds (umbels) 3–4-fld. with 4 scales sessile on the branches below the leaves, flowers subsessile ⅒ in. long." *Thwaites.*

CEYLON; Central Province, Hapootelle district, *Thwaites*.

Of this its author says it is apparently near *D. nielastomaceum*, but the few leaves I have seen do not bear this out; he says that he has seen only a single specimen mixed with *Actinodaphne stenophylla*, which it greatly resembles. The anthers are not described, and I suspect that if 4-celled this is a *Litsæa*, and that the 4 scales are the involucral bracts. On the specimen sent to Kew Thwaites says that he has seen neither flower nor fruit.

14. CASSYTHA, *Linn.*

Filiform twining parasites, adhering to their hosts by suckers. *Leaves* minute scales, or 0. *Flowers* minute, 2-sexual or dimorphic? spiked capitate or racemose, 3-bracteolate. *Perianth-tube* short and globose or (often in the same species) as long as the limb and turbinate; segments 6, 3 outer smaller. Perfect *stamens* 9, filaments of 1st series eglandular with 2-celled

introrse anthers, of the 2nd similar or stamens reduced to staminodes, of the 3rd 2-glandular with extrorse 2-celled anthers. *Fruit* enclosed in the succulent perianth-tube, crowned by its limb. *Cotyledons* at length confluent.—Species about 15, Australian, with a few S. African and one widely distributed.

1. **C. filiformis,** *Linn. Sp. Pl.* 35; quite glabrous, or young parts puberulous, stems slender, flowers sessile in lax or dense lateral spikes, perianth twice the length of the rounded ciliate bracteoles, outer sepals rounded ciliate, inner oblong, fruit globose smooth (not ribbed). *Nees Syst. Laurin.* 642; *Meissn. in DC. Prodr.* xv. 1. 255; *Wight Ic.* t. 1847; *Wall. Cat.* 2608 and 7534; *Roxb. Fl. Ind.* ii. 314; *Dalz. & Gibs. Bomb. Fl.* 223; *Griff. Notul.* iv. 353; *Hook. Fl. Exot.* t. 167; *Benth. Fl. Austral.* v. 311. C. americana and C. guineensis, *Meissn. in DC. l. c.* 311.—*Rheede Hort. Mal.* vii. t. 44.

From BANDA to BENGAL, SILHET? and CHITTAGONG, and southward to TRAVANCORE and CEYLON. PENANG, *Wallich.* MALACCA, *Griffith.*—DISTRIB. Arabia, Mascarene Island, Tropical E. Asia and islands, Australia, Polynesia, Tropical Africa and America.

Forming a web of leafless cords over bushes. *Spikes* ½–2 in.; flowers $\frac{1}{12}$ in., white, rather distant; bracts rounded, ciliate. *Perianth-segments*, outer small, rounded, ciliate; inner much longer, ovate. *Fruit* glabrous, the size of a pea, crowned by the perianth-lobes.

2. **C. capillaris,** *Meissn. in DC. Prodr.* xv. 1. 252; quite glabrous, stems capillary, flowers few in very small peduncled heads, bracts minute acute, sepals ovate obtuse inner rather the longest.

CEYLON, *Thwaites.*— DISTRIB. Borneo.

A much more slender plant than *C. filiformis*, forming hair-like masses of considerable length.

15. HERNANDIA, *Linn.*

Evergreen trees. *Leaves* alternate, ovate or peltate, 3–7-nerved. *Flowers* monœcious, 3-nately involucrate at the ends of the branches of a lax panicle, pedicelled, centre flower ♀ with a cupular involucel at its base, lateral ♂; bracts of involucre 4–5, subvalvate in bud. *Perianth-segments* in 2 valvate series, 3–6 in ♂ fl., 4–8 in ♀ fl. *Stamens* as many as and opposite to the outer perianth-segments, filaments 1–2- or e-glandular; anthers 2-celled, extrorse; staminodes 4–5 in fl. ♀. *Ovary* inferior; style short, stigma dilated toothed or lobed. *Fruit* enclosed in the enlarged involucel. *Seed* globose or ovoid, testa thick hard ribbed; embryo thick, lobed and ruminate. —Species 8, tropical.

H. peltata, *Meissn. in DC. Prodr.* xv. 1. 263; leaves rounded-ovate obtuse or acute peltate, flowers in hoary long-peduncled corymbs, filaments 2-glandular, fruit ovoid 8-ribbed. *Kurz For. Fl.* ii. 309; *Beddome Fl. Sylvat.* t. 300; *Benth. Fl. Austral.* v. 314; *Seem. Fl. Vit.* 205, t. 32. H. Sonora, *Linn. in part*; *Wight Ic.* t. 1855; *Thwaites Enum.* 258; *Wall. Cat.* 7811.

SINGAPORE, *Wallich.* ANDAMAN ISLANDS, *Herb. Calcutt.* CEYLON; on the seashore.—DISTRIB. Malay Archipelago, N. Australia, Pacific Islands, E. Africa, Madagascar.

A tree; branchlets stout, smooth, wood soft. *Leaves* 6–12 in., rather coriaceous, 5–9-nerved; petiole as long, stout. *Corymbs* 4–10 in. broad; flowers clustered, middle one of the three female with sometimes a few males below it. *Male fl.* ⅓ in. diam.; segments 6, hoary, 2-seriate; filaments short. *Female fl.* smaller; involucel

cupular, $\frac{1}{10}$ in. long, in fruit greatly enlarged and enclosing the drupe; perianth-tube adnate to the ovary, segments 8, narrow; glands 4, subglobose; style villous, thickened upwards, deciduous with the perianth-lobes, stigma dilated irregularly lobed. *Fruit* enclosed in the involucel, except at the apex, together $1\frac{1}{2}$ in. diam. *Seed* hard.—I suspect that this may prove to be only a variety of the American *H. Sonora*, Linn.

Whilst this sheet was passing through the press, Mr. C. Curtis has sent from Penang flowering specimens of a plant with the habit and foliage of an *Endiandra*, but having 6 very short broad thick sessile anthers, opposite to each of which is a broad but rather longer villous staminode, which is closely appressed to the ovoid glabrous ovary. The broad thick square anther has two small extrorse circular pores closed by caducous valves.—It is no doubt a new and very singular genus, allied to *Endiandra*, which may bear the name of *Hexapora Curtisii*, in allusion to the pore-like cells of the three anthers.

Order CXXIX. **PROTEACEÆ.**

Trees or shrubs, rarely herbs. *Leaves* alternate or scattered, rarely sub-opposite or whorled, mostly hard, entire toothed or pinnatisect, exstipulate. *Inflorescence* various. *Flowers* 2-sexual. *Perianth* inferior, often irregular, segments 4 at first valvately cohering in a cylindric tube gibbous at the base, with free recurved tips. *Stamens* 4, shorter than and inserted on the segments; anthers erect, adnate to the filaments, 2-celled, introrse. *Hypogynous glands* or scales 4, free or connate, alternating with the stamens, or 0. *Ovary* 1-celled, often oblique; style terminal, tip thickened, stigma terminal or lateral. *Ovules* solitary or geminate or many 2-seriate. *Fruit* various. *Seed* exalbuminous; cotyledons compressed or fleshy, often unequal; radicle short inferior or lateral.—Genera 50, species about 950, chiefly Australian and S. African, none N. American, European or N. Asiatic.

1. **HELICIA,** *Lour.*

Trees or shrubs. *Leaves* alternate, entire or toothed. *Flowers* in terminal and axillary racemes, 2-sexual. *Perianth* regular, tube slender; limb narrow, straight, segments at length revolute. *Anthers* oblong, connective produced. *Hypog. scales* free, or confluent in a cup-shaped or annular disk. *Ovary* sessile; style slender, stigma terminal; ovules 2, basal or lateral, ascending. *Nut* hard, globose. *Seeds* subglobose, or 2 hemispheric.—Species 25, Tropical Asia and Australia.

* Racemes glabrous.

† *Leaves narrowed at the base into a distinct petiole.*

1. **H. erratica,** *Hook. f.*; quite glabrous, leaves 4–7 in. cuneate-obovate or -oblong to oblanceolate or elliptic-lanceolate acute or obtuse entire or coarsely serrate narrowed into a short petiole, racemes glabrous, hypog. scales more or less connate, ovary glabrous, fruit 1–$1\frac{1}{2}$ in. diam. obliquely globose or depressed umbonate. H. cochinchinensis, *Kurz For. Fl.* ii. 311, and *Meissn. in DC. Prodr.* xiv. 442 (*the Assam plant only*). H. robusta, *Herb. Ind. Or. H.f. & T.*

Sikkim Himalaya, alt. 2–6000 ft., *J. D. H.* Khasia Mts., common. Martaban, alt. 5–7000 ft., *Kurz, Parish.*

A small tree. *Leaves* 2–4 in. broad, coriaceous, shining above, nerves 7–12 pair; petiole $\frac{1}{3}$–$\frac{3}{4}$ in. long. *Racemes* 6–9 in. *Perianth* pale yellowish, slender, $1\frac{1}{2}$ in. long when unexpanded. *Hypog. glands* obtuse. *Fruit* usually very oblique, base abruptly narrowed. *Cotyledons* turning a bright red when cut.—This is no doubt the Assam *H. cochinchinensis* of Meissner, and Kurz's plant of that name; it differs from Lourero's

H. cochinchinensis (which this author describes as having a small ovate drupe with a longitudinal furrow) in the very large broad fruit, and in being a mountain plant.—I suspect that the "Pundua Mt." (Khasia Mts.) specimens of *H. attenuata* of *Wall. Cat.* 1040/2 are this, but without fruit it is impossible to say.

2. **H. attenuata,** *Blume in Ann. Sc. Nat. Ser.* 2. i. 216; quite glabrous, leaves 3–6 in. elliptic-oblong acute at both ends narrowed into a short petiole entire or obscurely serrate, racemes quite glabrous, hypog. scales connate, ovary glabrous, fruit 2 in. long ovoid narrowed at both ends obtusely 6-angled. *Bennet Pl. Rar. Jav.* 83; *Meissn. in DC. Prodr.* xiv. 439. Rhopala attenuata, *Jack Mal. Misc.* i. No. 2. 10; *Wall. Cat.* 1040. R. racemosa, *Roxb. mss.*

PENANG, *Jack.* ? KHASIA MTS., *De Silva.*
This is not distinguishable from *H. erratica* except by the fruit.

3. **H. nilagirica,** *Beddome in Madr. Journ. Lit. and Sc.* 1864, *with figure,* and *For. Man.* 1878; quite glabrous, leaves broadly ovate elliptic or lanceolate acute base narrowed into the petiole coarsely acutely toothed submembranous, racemes shorter than the leaves, fruit spherical ½ in. diam.

NILGHIRI HILLS; on Western slopes, alt. 3–4000 ft., *Beddome.*
This again closely resembles *H. erratica* and *attenuata,* but differs in the fruit, which from Beddome's observations is spherical and very small.—It is remarkable that no specimens of this exist in the collections of Wight or any other of the numerous collectors in the Nilghiris but Beddome's, and I have seen none.

4. **H. ceylanica,** *Gardn. in Calc. Journ. Nat. Hist.* vii. 453; quite glabrous, leaves 3–4 in. obovate-oblong obtuse or tip rounded quite entire narrowed into a petiole, racemes and ovaries quite glabrous, hypog. scales distinct tips subacute, fruit ovoid narrowed at both ends about 1 in. long. *Meissn. in DC. Prodr.* xiv. 438 (zeylanica); *Thwaites Enum.* 250; *Beddome For. Man.* 178.

CEYLON; in the Central Province, alt. 2–4000 ft., *Gardner, Thwaites.*
A middling-sized tree. *Leaves* 1½–2 in. broad; petiole ½ in. *Panicle* with a purple rachis. *Perianth* pale yellow, unopened 1 in. long. *Fruit* (not seen by me) the size of a hazel-nut, black-purple.—This again is very near *H. attenuata.*

5. **H. petiolaris,** *Bennet Plant. Rar. Jav.* 84; quite glabrous, leaves 5–7 in. broadly oblong or broadly cuneately obovate obtuse or subacute quite entire, base suddenly narrowed and decurrent on the long petiole. *Meissn. in DC. Prodr.* xiv. 438. Rhopala moluccana, *Jack Mal. Misc.* i. No. 2. 10 (*not of Brown*); *Wall. Cat.* 1041.

SINGAPORE, *Wallich.* (Cult. in Penang, *Jack.*)
Leaves 5–6 by 3–3½ in., firmly coriaceous; nerves spreading; petiole 1½ in. *Racemes* longer than the leaves. *Flowers* 1 in. long.—Very distinct from any of the preceding species.

6. **H. terminalis,** *Kurz For. Fl.* ii. 312; glabrous or nearly so, leaves obversely oblong retuse with a mucro, base acuminate and tapering into a long slender petiole entire or somewhat waved, raceme at the end of the branchlets slender glabrous much longer than the leaves.

AVA; on the Kakhyen Hills, *Kurz.*
I have seen no specimens of this, which from Kurz's description must be near *H. petiolaris,* and differs from its congener in the terminal raceme; the leaves are 3–5 in. long, the petiole ¼–½ in., and the flowers about ½ in.

†† *Leaves sessil or subsessile base obtuse or retuse.*

7. **H. robusta,** *Wall. Cat.* 2702; quite glabrous, leaves obovate-oblong narrowed towards the rounded or obtuse base, obtuse or obtusely acuminate coarsely serrate, hypog. scales more or less connate, fruit obliquely globose apiculate abruptly narrowed into a short stipes. *Bennet Pl. Rar. Jav.* 83; *Meissn. in DC. Prodr.* xiv. 440; *Kurz For. Fl.* ii. 311. H. macrophylla, *Wall. Cat.* 3661. H. castaneæfolia, *Meissn. in DC. Prodr.* xiv. 441. H. javanica, *Blume in Ann. Sc. Nat. Ser.* 2. i. 217; *Bennet l. c.* 83, t. 18; *Meissn. l. c.* 440. Helittophyllum javanicum, *Blume Bijd.* 652. Rhopala robusta, *Roxb. Fl. Ind.* i. 363, and *Ed. Carey & Wall.* i. 366; *Wight Ic.* t. 191. R. glabrata, *Wall. Cat.* 1039.

ASSAM and KHASIA MTS., *Roxburgh, Wallich, Griffith.* MARTABAN and TENASSERIM, on the hills, alt. 2–4000 ft. MALACCA, *Griffith, Cumming, Maingay.*—DISTRIB. Java, Sumatra.

A small tree, branches robust. *Leaves* 8–12 in. by 3–5 in., very coriaceous, nerves strong beneath, serrated to the base or not; petiole 0 or very short and stout. *Racemes* shorter or longer than the leaves, sometimes 1 foot long. *Flowers* ¾–1 in. long in bud. *Fruit* 1 in. diam., obscurely ribbed when dry.—Meissner's *H. castaneæfolia* was founded on specimens wrongly ticketed as from the Philippines. Bennet distinguished *H. javanica* by the hypogynous scales being free, but as Kurz describes those of *robusta* as all connate or "one or a few free," this character will not hold, and I can find no other.

8. **H. travancorica,** *Beddome mss.*; quite glabrous, leaves subsessile obovate-oblong obtusely acuminate distantly serrate base obtuse, racemes shorter than the leaves, fruit globose apiculate base rounded. H. robusta, *Beddome For. Fl.* t. 301 (*excl. syn.*).

SOUTH DECCAN; hills of Travancore and Tinnevelly, at about 4000 ft. elevation, *Beddome.*

This resembles *H. robusta* in the form of the leaf, which is however smaller and more coriaceous; it differs in the short racemes 3 in. long, and notably in the quite globose perfectly smooth apiculate fruit, not at all stipitate but rounded at the base, and only ¾ in. diam.

** *Rachis of the raceme pubescent, tomentose or villous.*

9. **H. excelsa,** *Blume in Ann. Sc. Nat. Ser.* 2. i. 219; shoots rusty-tomentose, leaves oblanceolate or cuneately obovate obtusely acuminate quite entire or coarsely serrate narrowed into the rather slender petiole glabrous, racemes and flowers rusty-villous, ovary villous, fruit small, smooth. *Bennet Plant. Jav. Rar.* 84; *Meissn. in DC. Prodr.* xiv. 441; *Kurz For. Fl.* ii. 312. H. salicifolia, *Presl Epimel.* 247; *Meissn. l. c.* 439; *Kurz l. c.* Rhopala excelsa, *Roxb. Fl. Ind.* i. 363, and *Ed. Carey & Wall.* i. 365; *Wall. Cat.* 1038; *Wight Ic.* t. 190.

SILHET, *Roxburgh.* KHASIA MTS., alt. 3–5000 ft., *J. D. H. & T. T.* CHITTAGONG and TENASSERIM, *Helfer,* &c.—DISTRIB. Cambogia.

A large tree. *Leaves* 4–6 by 1½–2½ in., coriaceous, yellow green when dry; petiole ⅓–½ in. *Racemes* axillary and terminal, about equalling the leaves, more or less villous. *Flowers* 2–5-nate, yellowish green, ¼–⅓ in. long in bud. *Fruit* (in Malaccan specimens) obliquely ovoid, obtuse, smooth, ½ in. long when dry. Presl's *H. salicifolia* from Helfer (*Kew Distrib.* 4366) seems in no way different, except in the connate scales. *H. loranthoides,* Presl, from the Philippines, is possibly the same species. Malaccan specimens have nearly glabrescent flowers.

10. **H. pyrrhobotrya,** *Kurz in Journ. As. Soc. Beng.* 1873, ii. 303, and *For. Fl.* ii. 312; shoots rusty-villous, leaves oblanceolate narrowed into the very stout petiole acuminate coarsely serrate, glabrous or with the midrib beneath rusty-pubescent, racemes very long stout and flowers rusty-villous, ovary glabrous.

Martaban Hills, alt. 4000 ft., *Brandis, Kurz.*

Branches **very robust.** ***Leaves*** **12–14 by 3–3½ in.; petiole ¾ in.** ***Racemes*** **as long as the leaves, rachis very stout, flowers 1–1¼ in. long (*Kurz*) solitary or 2–3-nate; pedicels stout, villous; style 1½ in.** ***Fruit*** **unknown.—A very distinct species. Kurz describes the leaves as "narrowed towards the obtuse base;" but they are quite acute in our (solitary) specimen from Kurz.**

Order CXXX. **THYMELÆACEÆ.**

Shrubs or trees, rarely herbs, with tough fibrous inner bark. *Leaves* alternate or opposite, simple, quite entire. *Flowers* usually 2-sexual, axillary or terminal, in heads umbels clusters spikes or racemes. *Perianth* regular, tubular or campanulate, 4–5-lobed, imbricate in bud, often with 1–2 scales at the base. *Stamens* 2, or as many or twice as many as the lobes; anthers 2-celled. *Disk* annular, cupular or of scales. *Ovary* superior, 1- rarely 2-celled (4–5-celled in *Gonystylus*); style short or long, terminal or eccentric, stigma capitate; ovules solitary or one in each cell, pendulous from near the top of the cell, anatropous. *Fruit* indehiscent (capsular in *Aquilarineæ*). *Seed* pendulous or lateral, albumen fleshy or 0; embryo straight, radicle superior.—Genera nearly 40, species 360, temperate and tropical.

Tribe I. **Euthymeleæ.** *Ovary* 1-celled, 1-ovuled. *Fruit* indehiscent.

* Perianth without scales. Stamens as many and opposite the perianth-lobes or twice as many. Flowers 4-nerved.

† *Perianth not circumsciss in fruit.*

Perianth-tube cylindric. Style 0. Disk 0	1. Daphne.
Perianth urceolate. Style short. Disk 0 or minute . . .	2. Thymelæa.
Perianth-tube cylindric. Style long, stigma linear . . .	3. Edgeworthia.
Perianth-tube cylindric. Style short, stigma large . . .	4. Wikstrœmia.

†† *Perianth circumsciss after flowering.*

Shrubs, leaves flat	5. Stellera.
Annuals, leaves linear	6. Diarthron.

** Perianth with scales above the stamens. Flowers 5-nerved.

Fruiting perianth circumsciss; pericarp thin	7. Lasiosiphon.
Fruiting perianth not circumsciss; pericarp thick	8. Linostoma.

Tribe II. **Phalerieæ.** *Ovary* 2-celled; cells 1-ovuled. *Fruit* indehiscent.

Flowers sessile. Stamens exserted	9. Phaleria.

Tribe III. **Aquilarieæ.** *Ovary* 2-celled; cells 1-ovuled. *Fruit* a loculicidal capsule.

Perianth-tube cylindric. Stamens 5	10. Gyrinops.
Perianth campanulate. Stamens 10	11. Aquilaria.

Anomalous genus. Ovary 4–5-celled. **Gonystylus.**

1. **DAPHNE,** *Linn.*

Shrubs or small trees. *Leaves* alternate. *Flowers* in terminal or lateral sessile or peduncled heads or clusters. *Perianth* tubular, lobes 4, spreading; scales 0. *Stamens* 8, 2-seriate, subsessile; anthers dorsifixed. *Ovary* 1-celled; style very short or 0. *Fruit* coriaceous or fleshy. *Testa* crustaceous.—Species about 80, Europe, N. Africa, Temp. Asia.

1. **D. oleoides,** *Schreb.*; *Boiss. Fl. Orient.* iv. 1047; leaves 1–2½ in. obovate oblanceolate or linear-lanceolate obtuse acute or mucronate sparsely hairy or glabrate, flowers in terminal sessile or subsessile clusters ebracteate, perianth silky. *Meissn. in DC. Prodr.* xiv. 533; *Jaub. & Sp. Ill. Pl. Or.* t. 305. D. mucronata, *Royle Ill.* 322, t. 81, f. 2; *DC. l. c.* 536; *Brand. For. Fl.* 384; *Gamble Man. Ind. Timb.* 315. D. coriacea, *Royle l. c.* 321. D. buxifolia, *Vahl Symb.* i. 29; *Sibth. Fl. Græc.* t. 357; *Jaub. & Sp. l. c.* 306. D. acuminata, *Boiss. & Hoh. Diagn. Ser.* 1. xii. 103; *Boiss. Fl. Orient.* iv. 1048. ? D. cashemireana, *Meissn. l. c.* 535.

Western Himalaya; from Garwhal westwards to Murree and the Suliman Range, alt. 3–9000 ft.—Distrib. Affghanistan and westwards to Italy.

A small much-branched shrub; branches green brown or purple, pubescent or glabrate. *Leaves* very variable, sessile, coriaceous. *Flowers* white or tinged with pink, about ⅓ in. long; lobes ovate or lanceolate, very variable in length. *Ovary* pubescent. *Fruit* dry or rather fleshy, ¼–⅓ in. long, ellipsoid, orange or scarlet.

2. **D. cannabina,** *Wall. in Asiat. Research.* xiii. 315, t. 7, 8, and *Cat.* 1045 (not of Loureiro); leaves 2–4 in. oblanceolate or linear-lanceolate or elliptic obtuse or obtusely acuminate glabrous, flowers in terminal and lateral sessile bracteate heads, perianth-tube cylindric pubescent. *Griff. Notul.* iv. 370. D. papyracea, *Wall. ex Steud. Nomencl.* 483; *Meissn. in Denkschr. Regensb. Bot. Gesell.* iii. 282, and in *DC. Prodr.* xiv. 537; *Dene. in Jacq. Voy. Bot.* 143, t. 148; *Brand. For. Fl.* 386; *Gamble Man. Ind. Timb.* 315; *Madden in Journ. As. Soc. Beng.* xviii. 610. D. odora & Bholua, *Don Prodr.* 68. D. papyrifera, *Ham. mss.*

Temperate Himalaya; from Chamba to Bhotan, alt. 5–7000 ft. in the west, and 6–10,000 in the east. Khasia Mts., alt. 3–6000 ft.

A shrub, 7–8 ft.; branches glabrous, except the youngest, leafy at the tips. *Leaves* thinly coriaceous, nerves faint; petiole very short. *Flowers* white purple or yellowish, very sweet; bracts oblong or lanceolate. *Perianth* ½ in., tube rather slender; lobes broad or narrow, ovate, acute. *Fruit* ovoid, succulent, red or orange.—Possibly two species are included here. Small alpine states 6–8 in. high from Sikkim have broadly elliptic-ovate hard reticulated leaves ½–1 in. long, and dark brown when dry; the stems are buried in the ground with the few leaves and small greenish-white flowers exserted.—Finding no authority for Steudel having attributed the name of *D. papyracea* to Wallich, I have taken for it that of *D. cannabina* which Wallich did give it, though under the erroneous impression that it was Loureiro's plant of that name (which is *Wikstræmia indica*).

3. **D. involucrata,** *Wall. in Asiat. Research.* xiii. t. 6, and *Cat.* 1050; leaves 3–6 in. oblong-lanceolate acuminate glabrous, flowers in long-peduncled axillary involucrate heads, perianth ⅓–½ in. silkily villous. D. Wallichii, *Meissn. in DC. Prodr.* xiv. 2. 540. Eriosolena Wallichii, *Meissn. Gen.* ii. 242. Scopolia involucrata, *C. A. Mey. in Bull. Imp. Acad. Sc. St. Petersb.* 1843, 357. D. longifolia, *Meissn. in Regensb. Denkschr.* iii. 285; *DC. l. c.*—Daphne sp. *Griff. Notul.* iv. 370, and *Ic. Pl. Asiat.* t. 538.

Sikkim Himalaya, alt. 6000 ft., *J. D. H. & T. T.* Khasia Mts., alt. 4–6000 ft.,

common. Patkoye Mts. in UPPER ASSAM, *Griffith*. TENASSERIM MTS., alt. 4–5000 ft., *Parish*, &c.

A tall lax shrub, often 20 ft. high; branches glabrous, except the tips. *Leaves* narrowed at both ends, pale beneath, thin; nerves very many, slender, arching; petiole $\frac{1}{8}$ in. *Heads* few- or many-fld.; peduncles solitary or fascicled, filiform, $\frac{1}{4}$–4 in. long, glabrous or villous, bracteolate at the base; involucral bracts 2, boat-shaped, obtuse, silky; flowers white, scented, limb flesh-coloured. *Perianth* villously silky; lobes ovate, acuminate, much shorter than the tube. *Fruit* ovoid, $\frac{1}{3}$ in. long, black.

4. **D. pendula,** *Sm. Ic. Ined.* ii. 34*, t. 34; leaves 3–5 in. oblong-lanceolate acuminate glabrous, flowers in long-peduncled axillary involucrate heads, perianth $\frac{1}{4}$–$\frac{1}{3}$ in. silkily villous. *Meissn. in DC. Prodr.* xiv. 2. 540; *Miq. Fl. Ind. Bat.* i. pt. 1, 877. D. montana, *Meissn. in Regensb. Denkschr.* iii. 284. Erisolena montana, *Blume Bijd.* 651; *Meissn. in DC. l. c.*

BURMA; on the hills between Nattoung and Moulmein, *Parish*.—DISTRIB. Java, Sumatra.

Very similar to *D. involucrata*, but smaller in all its parts, and with the flower smaller in proportion to the leaves. It may be only a variety.

2. THYMELÆA, *Endl.*

Herbs shrubs or undershrubs, rarely annual. *Leaves* scattered, usually small, narrow. *Flowers* small, 2-sexual or polygamous, axillary, sessile; bracts small. *Perianth* urceolate or males rarely tubular; lobes 4, spreading; scales 0. *Disk* minute annulate. *Stamens* 8, 2-seriate; anthers subsessile. *Ovary* subsessile, 1-celled, style very short, stigma capitate. *Fruit* dry, included in the perianth or wholly naked, pericarp membranous. *Testa* crustaceous, albumen scanty or 0.—Species 20, Mediterranean region to E. Asia.

T. arvensis, *Lamk. Fl. Franc.* iii. 218, and *Ill.* t. 293; annual, very slender, glabrous or sparsely pubescent, stem strict erect leafy, leaves sessile linear-lanceolate, flowers axillary sessile minute. *Meissn. in DC. Prodr.* xiv. 1. 551. Lygia Passerina, *Fasan. in Act. Acad. Neap.* 1787, 235; *Boiss. Fl. Orient.* iv. 1052. Passerina annua, *Wikstr. in Act. Holm.* 1818, 320; *Nees Gen. Fl. Germ.* iii. t. 47. Stellera Passerina, *Linn. Sp. Pl.* 559; *Jacq. Ic. Rar.* i. t. 68; *Reichb. Ic. Fl. Germ.* xi. 12, t. 550; *Gærtn. Fruct.* i. 186, t. 39, f. 2. P. diarthronoides, *Griff. Notul.* iv. 365, and *Ic. Pl. Asiat.* t. 534.

UPPER PANJAB; plains below Jummoo, *Thomson*. KASHMIR, Ramoo, alt. 6000 ft., *Clarke*.—DISTRIB. Affghanistan and westward to France and N. Africa.

Stem 8–18 in., sparingly branched, branches erect. *Leaves* $\frac{1}{3}$–$\frac{1}{2}$ in., suberect, acuminate. *Flowers* $\frac{1}{10}$ in., hermaphrodite, in all the axils, and forming long leafy very slender spikes. *Perianth* appressed-pubescent; lobes ovate, obtuse, erect, very short. *Fruit* $\frac{1}{10}$–$\frac{1}{8}$ in. long, ovoid, narrowed upwards.

3. EDGEWORTHIA, *Meissn.*

Shrubs. *Leaves* scattered. *Flowers* capitate, 2-sexual, in sessile or peduncled axillary heads; bracts involucriform or 0. *Perianth-tube* cylindric; lobes 4, spreading; scales 0. *Stamens* 8, 2-seriate; anthers subsessile. *Disk* annular, lobulate. *Ovary* sessile, villous, 1-celled; stigma elongate, cylindric. *Fruit* included in the base of the perianth, pericarp coriaceous. *Testa* crustaceous.

E. Gardneri, *Meissn. in Denkschr. Regensb. Bot. Gesellsch.* iii. 280, t. 6, and in *DC. Prodr.* xiv. 2. 543. E. chrysantha, *Lindl. in Journ. Hort. Soc.* i. 148, and *Bot. Reg.* 1847, t. 48; *Meissn. in DC. l. c.*; *Fl. des Serres*, t. 289. E. papyrifera, *Zucc. in Abhandl. Math. Phys. Kl. Bair. Acad.* iv. 3. 199; Daphne Gardneri, *Wall. in As. Research.* xiii. 388, t. 9, and *Cat.* 1044; *Don Prodr.* 69. D. papyrifera, *Sieb. in Act. Batav.* xii. 24.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich.* Sikkim, alt. 5–7000 ft., *J. D. H.*, &c. BHOTAN, *Griffith.*—DISTRIB. China, Japan.

A large much-branched bush, with stout branches. *Leaves* 3–5 in., elliptic-lanceolate, acuminate, glabrous above, pubescent or silky beneath; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Peduncle* 0–1 in., stout, decurved, silky; heads 1–2 in. diam., naked at the base or surrounded with short linear silky bracts. *Flowers* densely crowded, golden yellow, sweet-scented. *Perianth* $\frac{1}{2}$–$\frac{3}{4}$ in. long, densely silky; lobes short, broadly ovate or rounded.—I find no character whereby to distinguish the Chinese and Japanese plant from the Himalayan.

4. WIKSTRŒMIA, *Endl.*

Trees or shrubs. *Leaves* opposite, rarely alternate. *Flowers* 2-sexual, in terminal racemes or spikes, ebracteate. *Perianth-tube* elongate; lobes 4, spreading. *Stamens* 8, 2-seriate, filaments short. *Disk* of 1–4 scales. *Ovary* villous, 1-celled; style short, stigma large globose. *Fruit* fleshy and naked, or more dry and included in the base of the perianth. *Testa* crustaceous, albumen sparing or 0.—Species about 20, Tropical and E. Asia, Australia, Pacific.

1. **W. indica,** *C. A. Mey.*, var. viridiflora; glabrous, leaves subopposite $\frac{3}{4}$–1 in. oblong or obovate-oblong tip rounded base cuneate, flowers in terminal subsessile fascicles, perianth nearly glabrous, lobes short obtuse. W. viridiflora, *Meissn. in Denkschr. Regensb. Bot. Gesellsch.* iii. 286, and in *DC. Prodr.* xiv. 2. 546; *Benth. Fl. Hongk.* 297. Daphne viridiflora, *Wall. Cat.* 1049. Diplomorpha ? viridiflora, *C. A. Mey. in Bull. Imp. Acad. Sc. St. Petersb.* 1843, 358.

CHITTAGONG, *J. D. H. & T. T.* TENASSERIM; at Mergui, *Griffith.* SINGAPORE, *Lobb.*—DISTRIB. China, Mauritius (naturalized), Philippines.

A shrub. *Leaves* 1–1½ in., thinly coriaceous, brown when dry, nerves numerous, very slender. *Flowers* few in a cluster, ebracteate. *Perianth* ½ in. long, glabrous, greenish yellow. *Disk-scales* usually united in pairs. *Fruit* ¼ in. long, ovoid, scarlet.—This appears to be nothing but a short-leaved form of the common N. and S. Pacific Island and Malayan *W. indica*, which finds its western limit in the Bay of Bengal, and with which it is united by Bentham in the Australian Flora (vi. 37).

2. **W. canescens,** *Meissn. in Denkschr. Regensb. Bot. Gesellsch.* iii. 288, and in *DC. Prodr.* xiv. 2. 547; branchlets and inflorescence silkily pubescent, leaves alternate and opposite oblong-lanceolate acute usually glabrous above and pubescent beneath, peduncles axillary and terminal few-fld., perianth-lobes short obtuse. *Dcne. in Jacquem. Voy. Bot.* 145. W. salicifolia, *Dcne. in Ann. Sc. Nat Ser.* 2. xx. 50, and in *Jacquem. Voy. Bot.* 144*, t. 149; *Meissn. in DC. l. c.* 546. W. chamædaphne and W. inamœna, *Meissn. in DC. l. c.* W. virgata, *Meissn. l. c.* 289, and in *DC. l. c.*; *Beddome For. Man.* 178, t. 25, f. 4. Daphne canescens & virgata, *Wall. Cat.* 1046, 1047. D. sericea, *Don Prodr.* 69. D. inamœna, *Gardn. in Calc. Journ. Nat. Hist.* vii. 454. D. oppositifolia, *Ham. mss.* Diplomorpha canescens & virgata, *C. A. Mey. in Bull. Imp. Acad. Sc. St. Petersb.* 1843, 358.

TEMPERATE HIMALAYA; from Kumaon to Central Nepal, alt. 5–9000 ft. KHASIA MTS., alt. 5–6000 ft. UPPER ASSAM, on the Patkoye Mts., *Griffith*

CEYLON; Central Province, alt. 6–8000 ft., *Walker*, &c.—DISTRIB. Affghanistan, N. China.

A small shrub, 1–3 ft. *Leaves* 1–3 in., thin, variable in breadth, sometimes faintly pubescent above and glabrous beneath, base cuneate; petiole $\frac{1}{8}$ in., with often a minute white bud in the axil. *Peduncle* slender, silky, rarely $\frac{1}{2}$ in.; flowers often at length spicate or even cymose. *Perianth* $\frac{1}{4}$–$\frac{1}{3}$ in. long. *Disk-scales* linear. *Fruit* $\frac{1}{4}$ in. long, narrowly ovoid, silky; pericarp black, thin. *Embryo* large, in a thin layer of albumen, cotyledons flat oblong, radicle half its length.—Most of the species included here under *W. canescens* are founded on the cohesion or freedom of the hypogynous scales, which organs vary greatly in this and other genera of the Order. It is remarkable that this genus should not occur in the Nilghiris.

5. **STELLERA,** *Linn.*

Herbs undershrubs or shrubs. *Leaves* alternate. *Flowers* 2-sexual, in terminal sessile heads or spikes. *Perianth-tube* cylindric, at length circumsciss above the ovary; lobes 4, rarely 5, spreading; scales 0. *Stamens* 8, rarely 10, 2-seriate; anthers subsessile. *Disk* produced on one side into a lanceolate or linear blade. *Ovary* subsessile, 1-celled; style short, stigma capitate. *Fruit* dry, included in the base of the perianth, pericarp membranous.—Species about 6, Central and W. Asia.

S. Chamæjasme, *Linn. Amœn. Acad.* i. 400; a glabrous herb, stems erect simple leafy, leaves sessile elliptic-lanceolate acute or acuminate, heads involucrate. *Meissn. in DC. Prodr.* xiv. 2. 549. S. hypericifolia, *Endl. Gen. Suppl.* 4. ii. 63; *Meissn. l. c.* S. concinna, *Edgew. in Trans. Linn. Soc.* xx. 88; *Meissn. l. c.* S. altaica, *Thieb. in Pers. Synops.* i. 436; *Meissn. l. c.* Passerina Stelleri, *Wikstr. in Act. Holm.* 1818, 321. P. racemosa, *Wikstr. l. c.* 320; *Ledeb. Ic. Pl. Ross.* t. 374. Wikstræmia ? hypericifolia, *Meissn. in Denksch. Regensb. Bot. Gesellsch.* iii. 287*. Septas hypericifolia, *Wall. Cat.* 1048.

WESTERN HIMALAYA; Kumaon and Garwhal, alt. 10–11,000 ft., *Wallich*, &c.—DISTRIB. Westward to the Caucasus, N. and Central Asia.

Rootstock long, woody; stems quite simple, rather stout, 6–10 in. high. *Leaves* opposite and alternate, $\frac{1}{2}$–1 in., thin, veined, base rounded or cuneate, involucral like the cauline. *Flowers* in a sessile head, sweet-scented, yellow. *Perianth* $\frac{1}{2}$–$\frac{2}{3}$ in. long, glabrous, tube slender; lobes very short, oblong.

6. **DIARTHRON,** *Turcz.*

Slender annuals. *Leaves* scattered, linear. *Flowers* minute, 2-sexual, in lax terminal racemes, ebracteate. *Perianth-tube* slender or urceolate, constricted and circumsciss above the ovary; lobes 4, spreading; scales 0. *Stamens* 8, 2-seriate; anthers subsessile. *Disk* 0. *Ovary* subsessile, glabrous, 1-celled; style short, stigma ovoid subclavate. *Fruit* dry, enclosed in the membranous base of the perianth, pericarp membranous. *Testa* crustaceous, albumen sparing or 0.—Species 2, Persia and Central Asia.

D. vesiculosum, *Fisch. & Mey. in Bull. Soc. Imp. Mosc.* 1839, 170; annual, slender, erect, leafy, leaves sessile linear obtuse or subacute, perianth-tube with 8 ridges, stamens 8. *Meissn. in DC. Prodr.* xiv. 2. 558; *Boiss. Fl. Orient.* iv. 1054. D. carinatum, *Jaub. & Sp. Ill. Pl. Or.* t. 105. Passerina costata, *Griff. Notul.* iv. 367, and *Ic. Pl. Asiat.* t. 535.

The PANJAB; Peshawur, *Vicary*. WESTERN TIBET; Iskardo, alt. 9000 ft., *Clarke*.—DISTRIB. Soongaria, Affghanistan, Persia.

A slender annual, 6–12 in., usually copiously dichotomously branched. *Leaves* ½-⅔ in., nerveless, rather glaucous. *Racemes* very slender, flowering ¼ in. long, fruiting 1 in.; flowers very shortly pedicelled. *Perianth* ⅙ in. long, tube very slender, lobes short. Lower *anthers* smaller than the upper. *Fruit* 1/12–1/10 in. long, narrowly ovoid, perianth-tube membranous (vesicular when the fruit does not ripen).

7. **LASIOSIPHON,** *Fresen.*

Silky shrubs. *Leaves* opposite or scattered. *Flowers* 2-sexual, in dense heads with broad bracts. *Perianth-tube* cylindric, circumsciss above the ovary; lobes 5, spreading; scales above the stamens 5–10. *Stamens* 10, upper or all shortly exserted; anthers oblong or linear. *Disk* 0 or short, annulate. *Ovary* sessile, 1-celled; style filiform, stigma capitate. *Fruit* small, dry, included in the base of the perianth, pericarp membranous. *Testa* crustaceous; albumen scanty or 0.—Species about 25, Trop. and S. African and Trop. Asiatic.

L. eriocephalus, *Dcne. in Jacquem. Voy. Bot.* 148; leaves subsessile from oblong to linear-oblong -lanceolate or oblanceolate acute glabrous or silky beneath, heads globose shortly peduncled, bracts hoary deciduous, perianth densely villous with long silky hairs. *Meissn. in DC. Prodr.* xiv. 2. 597; *Thwaites Enum.* 250; *Beddome For. Man.* 179, t. 25, f. 2. L. speciosus, *Dcne. l. c.* 147, t. 150; *Meissn. in DC. l. c.* 598; *Dalz. & Gibs. Bomb. Fl.* 221. L. sisparensis, Hugelii ? and insularis, *Meissn. in DC. l. c.* L. Metzianus, *Miq. Analect. Bot.* ii. 3, t. 1. Daphne eriocephala, *Wall. Cat.* 1051. Lachnæa eriocephala, *Heyne mss.* Gnidia eriocephala, *Meissn. in Regensb. Denkschr.* iii. 292; *Wight Ic.* t. 1859. G. sisparensis, *Gardn. in Calc. Journ. Nat. Hist.* 1; *Wight Ic.* t. 1860; G. insularis, *Gardn. l. c.* G. monticola, *Miq. in Flora* 1849, 557.

Deccan Peninsula; on the Ghats from the Concan southwards, ascending to 7000 ft. on the Nilghiris. Ceylon, ascending to 4000 ft.

A small tree or large much-branched bush, with much of the habit of *Edgeworthia Gardneri*; branchlets usually purplish. *Leaves* 2–3 by ¾–1 in., not coriaceous, narrowed from the middle or above it to the rounded base, nerves very slender and oblique. *Heads* 1–2 in. diam.; involucral bracts oblong, acute, silky, shorter than the flowers, which are very numerous, densely packed and thickly clothed with white or buff long silky villous hairs. *Perianth* ½-¾ in. long, yellow; tube slender; lobes 4–5, oblong, obtuse; scales at its mouth very variable, oblong obcordate or 2-fid. —I can find no valid characters whereby to distinguish the 5 species here brought together, for which Decaisne and Meissner rely chiefly on the shape of the perianth-scales, and Thwaites has united both *speciosus* and *zeylanicus* with *eriocephalus*. The scales are described as minute obovate and notched in *L. eriocephalus*; obcordate in *L. sisparensis*; linear and bifid in *L. speciosus*; linear and entire in *L. Metzianus*, and small linear and fleshy in *L. insularis*. Wight further characterizes *L. sisparensis* by the tawny brown heads. *L. Hugelii*, Meissn., said to be from the Himalaya, is probably founded on an erroneously ticketed plant, for no species of the genus is known from that region, and Hugel collected in the Nilghiris; Decaisne indeed referred Hugel's plant doubtfully to *L. eriocephalus* itself. Beddome confirms this view of the species thus brought under one.

8. **LINOSTOMA,** *Wall.*

Shrubs sometimes climbing. *Leaves* opposite or subopposite. *Flowers* 2-sexual, in small panicled cymes; bracts 2, on the peduncle, at length greatly enlarged and membranous. *Perianth-tube* cylindric, base at length turgid, lobes 5, spreading; scales above the stamens 10, free or connate in

pairs. *Stamens* 10, filaments filiform, exserted; anthers ovoid or oblong. *Disk* 0. *Ovary* sessile, 1-celled; style filiform, stigma penicillate. *Fruit* ovoid, included or not in the inflated base of the perianth, pericarp dry corky or crustaceous. *Testa* membranous, albumen 0.—Species 5 or 6, Indian and Brazilian.

1. **L. pauciflorum,** *Griff. in Calc. Journ. Nat. Hist.* iv. 234, *in note*; quite glabrous, leaves 1–1½ in. very shortly petioled elliptic or obovate apiculate, peduncle slender 1–2-fld., perianth glabrous, tube slender. *Meissn. in DC. Prodr.* xiv. 2. 600; *Kurz in Journ. As. Soc. Beng.* 1870, ii. 83, and *For. Fl.* ii. 334. Psilæa dalbergioides, *Miquel Fl. Ind. Bat. Suppl.* 355.

TENASSERIM; in the Pine forests of Martaban, alt. 3–4000 ft., *Kurz.* SINGAPORE, *Griffith, Maingay.*—DISTRIB. Sumatra.

An erect shrub, 4–6 ft.; branches long, slender, black when dry. *Leaves* thin, rather glaucous beneath; nerves very numerous, spreading, parallel, slender; petiole $\frac{1}{16}$ in. *Peduncle* filiform, 1–2 in.; bracts leaf-like, but thinner, white, translucent; flowers few, nodding, greenish-white; pedicel short, slender. *Perianth* ¾ in. long, very slender; lobes linear-oblong; scales clavate. *Fruit* ½ in. long, excluding the persistent perianth-lobes, quite glabrous, ellipsoid but narrowed above and below, perianth-tube with 10 slender ridges; pedicel swollen at the tip, pericarp coriaceous.

2. **L. decandrum,** *Wall. Cat.* 4203; quite glabrous, leaves 2–3 in. petioled oblong or oblong-lanceolate acuminate, peduncle many-fld., perianth glabrous, tube ovoid. *Meissn. in DC. Prodr.* xiv. 1. 599; *Kurz in Journ. As. Soc. Beng.* 1870, ii. 83, and *For. Fl.* ii. 334; *Griff. Notul.* iv. 372. Nectandra decandra, *Roxb. Fl. Ind.* ii. 425.

SILHET, *Roxburgh.* CHITTAGONG, at Seetakoond, *J. D. H. & T. T.* TENASSERIM, *Kurz.*

An erect evergreen shrub; branches slender, dark, speckled with white. *Leaves* coriaceous, red-brown when dry, sometimes caudate-acuminate; nerves exceedingly slender and numerous; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Peduncle* 2–3 in., rather stout, 6–10-fld.; bracts sessile, oblong, obtuse or acute, smaller than the leaves. *Flowers* umbellate, greenish-white, fragrant; pedicels ¼ in. long, jointed in the middle under the flower. *Perianth-tube* quite glabrous, ¼ in. long; lobes linear, as long as the tube; scales erect, clavate. *Fruit* ½ in. long, broadly ellipsoid, acute above and below, perianth-tube sparingly silkily villous.

3. **L. scandens,** *Kurz in Journ. As. Soc. Beng.* 1870, ii. 83, and *For. Fl.* ii. 334; finely rusty-tomentose, leaves 2–3 in. petioled broadly oblong or elliptic, tip rounded or retuse, flowers in panicled peduncled heads or umbels. Enkleia malaccensis, *Griff. in Calc. Journ. Nat. Hist.* iv. 234 *in note*, and *Notul.* iv. 363. L. siamense, *Kurz in Journ. As. Soc. Beng.* 1870, ii. 83, and *For. Fl.* ii. 334. Lasiosiphon scandens, *Endl. Gen. Pl. Suppl.* iv. pt. 2, 67; *Meissn. in DC. Prodr.* xiv. 2. 598.

PEGU and TENASSERIM, *Kurz.* MALACCA, *Griffith.* SINGAPORE, *Schomburgk, Maingay.*

A lax climbing shrub with long decurved branches. *Leaves* sometimes acute at the top and subcordate at the base, coriaceous, nearly glabrous except the midrib above, nerves arched; petiole ¼–⅓ in. *Peduncles* stout, fruiting 1–3 in. long; bracts leaf-like, but thinner. *Flowers* imbricate, rusty-pubescent, greenish-brown. *Perianth-tube* cylindric; lobes 5, ovate; scales white, petaloid. *Fruit* nearly ½ in. long, subglobose, on a short stout pedicel, ribbed, often bearing at its base the split perianth-tube, tip conical, glabrous, marked by two opposite whitish-yellow lines.—My specimens have no flowers, and the description is taken from Griffith. I have seen no Tenasserim specimens. Kurz's *L. siamense* is identical with *scandens.*

9. **PHALERIA,** *Jack.*

Trees. *Leaves* opposite. *Flowers* 2-sexual, in terminal or lateral sessile heads; bracts involucriform, leafy, deciduous. *Perianth-tube* elongate; lobes 4–6, spreading; scales 0. *Stamens* 8–12, 2-seriate, exserted, filaments filiform; anthers small. *Disk* cupular or annulate. *Ovary* 2-celled; style filiform, stigma capitate. *Drupe* naked, succulent or fleshy, endocarp coriaceous or hard, 1–2-celled. *Testa* thin; albumen 0.—Species about 8, Eastern Asiatic, Malayan and Australian.

P. cauliflora, *Benth. in Gen. Pl.* iii. 199; quite glabrous, leaves 6–9 in. shortly petioled oblong-lanceolate or oblanceolate caudate-acuminate base acute, flowers in subsessile heads on the sides of the branches, perianth glabrous, margins of lobes pubescent. *Beddome For. Man.* 180, t. 25, f. 5. Drymispermum cauliflorum, *Thwaites Enum.* 251.

Ceylon; in the Pasdoon Corle, *Thwaites.*

A small elegant tree, with long subpendulous branches. *Leaves* shining, green, rather membranous, base acute; nerves very slender, 8–10 pair, rather arched; petiole $\frac{1}{3}$ in. *Perianth* $\frac{3}{4}$ in. long, tube slender, lobes rounded. *Fruit* $\frac{3}{4}$ in. long, almost as broad, obliquely obovoid or turgid, subacute, narrowed into a short stipes, fleshy, red.

10. **GYRINOPS,** *Gærtn.*

Trees. *Leaves* alternate, shining. *Flowers* 2-sexual, in terminal subpanicled umbels, ebracteate. *Perianth-tube* slender; lobes 5, spreading; scales above the stamens connate in a ring. *Stamens* 5; anthers subsessile, connective very thick. *Disk* 0. *Ovary* long-stalked, 2-celled; style subulate, stigma ovoid. *Capsule* stipitate, compressed, loculicidally 2-valved. *Seeds* ovoid, with a long tail-like appendage, testa crustaceous, inner coat thick, albumen 0.—Species 2, a South Indian and Moluccan.

G. Walla, *Gærtn. Fruct.* ii. 276, t. 140; glabrous except the silky shoots and young foliage, leaves oblong or elliptic caudate-acuminate, nerves very slender. *Meissn. in DC. Prodr.* xiv. 602; *Hook. Ic. Pl.* t. 5; *Wight Ic.* t. 1850; *Bedd. Fl. Sylv.* t. 303.

Ceylon, common in the warmer parts.

A tree with slender branches and yellowish foliage of a light brown when dry. *Leaves* 2–3 in., very variable in breadth, base acute; nerves mere striations, transverse, very closely placed; petiole very short. *Umbels* few-fld., very shortly peduncled. *Perianth* $\frac{1}{4}$ in. long; tube slender, acute at the base; lobes very short, rounded, pubescent within.—In Gen. Plant. iii. 200, this is erroneously said to be a native of the Indian Peninsula.

11. **AQUILARIA,** *Lamk.*

Trees. *Leaves* alternate; nerves slender, parallel. *Flowers* 2-sexual, in axillary and terminal peduncled or subsessile umbellules, ebracteate. *Perianth* campanulate; lobes 5, broad, spreading; scales above the stamens 5, hairy, connate at the base. *Stamens* 10; anthers subsessile, oblong; connective broad. *Disk* 0. *Ovary* subsessile, villous, perfectly or imperfectly 2-celled; stigma large, subsessile. *Capsule* compressed, oblanceolate or obovate, loculicidal; pericarp coriaceous or hard and woody. *Seeds* of *Gyrinops.*—Species 2 or 3, E. Asiatic, Malayan and Chinese.

1. **A. Agallocha,** *Roxb. Cat.* 33, and *Fl. Ind.* ii. 422; nearly glabrous

except the silky shoots, leaves petioled linear-oblong or lanceolate or oblanceolate caudate-acuminate, fruit 1½–2 in. oblanceolate acuminate thinly coriaceous glabrous. *DC. Prodr.* ii. 59; *Meissn. in DC. l. c.* xiv. 2. 601; *Wall. Cat.* 7250; *Roxb. & Coleb. in Trans. Linn. Soc.* xxi. 199, t. 21; *Royle Ill.* 173, t. 36, f. 1; *Kurz For. Fl.* ii. 335; *Miquel Fl. Ind. Bat.* i. pt. 1, 882; ? *Griff. Notul.* iv. 358.—Gyrinopsis species Assamica, *Benth. in Gen. Pl.* iii. 200.

EASTERN HIMALAYA; Bhotan, *Griffith.* ASSAM, *Hamilton.* KHASIA MTS., SILHET and TIPPERA HILLS, *Roxburgh*, &c. MARTABAN HILLS, *Kurz.*

A large evergreen tree. *Leaves* 2–3½ in., thinly coriaceous, shining, sometimes subsilky on the nerves beneath, nerves very many and faint; petiole $\frac{1}{10}$ in. *Umbels* very many-fld., sessile or shortly peduncled, silky; flowers white, about equalling their pedicels or shorter. *Perianth* persistent in fruit, $\frac{1}{4}$–$\frac{1}{3}$ in. broad and long, silky without, densely villous within; lobes rounded, ovate, equalling the turgid turbinate tube; scales villous.—I have seen no Martaban specimens, which are described by Kurz as having obovate-cuneate densely tomentose capsules. The figure in the Linnæan Transactions represents a short broad thick capsule, quite like that of *A. malaccensis*, and very different from those of the Bhotan and Khasian *A. Agallocha.* Griffith does not describe the fruit, and I am hence in doubt whether the plant of the Notulæ is this or *malaccensis*; he gives Mergui as a habitat, whence I have seen no specimens.—Eagle or Aloe-wood; Aggur, *Beng.*

2. **A. malaccensis,** *Lamk. Dict.* i. 49, and *Ill.* t. 356; glabrous except the silky shoots, leaves oblong-lanceolate shortly obtusely caudate-acuminate, fruit 1 in. broadly obovoid very thick and woody when ripe. *DC. Prodr.* ii. 59; *Meissn. in DC. l. c.* xiv. 2. 601, *excl. citat. of Benth.*; *Dict. Sc. Nat.* t. 248; *Kurz For. Fl.* ii. 236. A. ovata, *Cav. Diss.* vii. 377, t. 224.—*Rumph. Amb.* ii. 34, t. 10.

MALACCA, *Griffith, Maingay.* TENASSERIM? *Kurz.*—DISTRIB. Malay Islands.

Very similar to *A. Agallocha* in foliage, which is however rather smaller, and it differs in the much smaller flowers and short broad woody capsule, the valves of which are ¼ inch thick at the suture.—The Honble. C. Smith sends from Perak, under the name of Kaya tang Karus, the foliage of what may be another species, the leaves being much broader, with much longer acuminate tail-like points; it produces Garu, (Taras Gharu, *Griffith*), the name given to the wood of *A. malaccensis.*

ANOMALOUS GENUS (referable to TILIACEÆ.)

GONYSTYLUS, *Teijsm. & Binnend.*

Lofty trees, inner bark not tenacious. *Leaves* alternate, rigid, many-nerved, glabrous. *Flowers* small, bisexual, in axillary and terminal peduncled spicate umbels. *Perianth* short, cup-shaped, 5-cleft, thickly coriaceous, hirsute within, persistent, with a ring of setaceous incurved processes at the base. *Stamens* very numerous, at the base of the perianth, filaments very short; anthers basifixed, elongate, 2-celled, dehiscing lengthwise. *Ovary* 4–6-celled; style filiform, deflexed, stigma clavate 2-lobed; ovules solitary in each cell, pendulous, anatropous. *Fruit* subglobose, 2–5-angled or furrowed, pericarp very thick. *Seeds* pendulous, oblong, curved, exalbuminous.—Species 3 or 4, Malayan.

G. Maingayi, *Hook. f.*; leaves 4–5 in. shortly petioled elliptic-oblong acuminate glabrous base rounded, perianth ¼ in. diam., fruit ellipsoid 1–1½ in. long obtuse, unequally 2–4-valved, 6-celled with 3 or more cells abortive.

MALACCA, *Maingay* (*Kew Distrib.* 1441).

A tree, branches woody with black wrinkled bark, the young ones and those of the inflorescence finely grey-pubescent. *Leaves* 1½–2 in. diam., quite glabrous and rather shining above, faintly pubescent on the stout midrib beneath, dark brown when dry; nerves very numerous, parallel and prominent beneath; petiole ½ in. *Inflorescence* apparently forming a narrow erect woody panicle 4–6 in. long with short stout branches. *Fruit* (unripe) smooth, seated on the perianth, the lobes of which are revolute; valves with walls ¼ in. thick, formed of transverse woody fibres; pedicel ½–¾ in. long. *Seeds* (quite unripe) ½–¾ in. long, semicircular, quite flat.—This differs from the Javan *G. Miquelianus*, Teijsm. & Binn. (in Bot. Zeit. 1862, 265, Miquel Ann. Mus. Lugd. Bat. i. 132, f. 4), in the much smaller flower and fruit. *G. bancanus* again has flowers very much smaller than in *G. Maingayi*. For the reference of this genus to *Tiliaceæ* see Baillon, Hist. Pl. vi. 122, and Adansonia, xi. 327.

ORDER CXXXI. ELÆAGNACEÆ.

Shrubs or trees, with copious silvery or brown scales. *Leaves* alternate or opposite, quite entire, exstipulate. *Flowers* small, regular, 1–2-sexual, in axillary fascicles or cymes, white or yellow. *Perianth* in the 2-sexual and female fl. tubular, 2–6-cleft, in the male of *Hippophae* of 2 membranous sepals. *Stamens* adnate to the perianth-tube, in the male fl. twice as many as the lobes, in the 2-sexual as many as the lobes and opposite them. *Ovary* free, 1-celled; style filiform, stigma lateral; ovule 1, basal, erect, anatropous. *Fruit* indehiscent, enclosed in the perianth-tube. *Seed* ascending, albumen 0 or scanty; embryo straight, axile, cotyledons thick, radicle inferior.—Genera 3, species 16, North Temp. and Tropical regions.

Perianth 4-fid	1. ELÆAGNUS.
Perianth of ♂ 2-partite, membranous, of ♀ 2-fid	2. HIPPOPHAE.

1. ELÆAGNUS, *Linn.*

Perianth-tube oblong or globose, constricted above the ovary; limb valvately 4-cleft, deciduous. *Stamens* 4, on the mouth of the corolla. *Style* linear, included, stigma lateral.—Species about 12.

1. **E. hortensis,** *M. Bieb. Fl. Taur. Cauc.* ii. 112; arboreous, branches dark brown, leaves deciduous ovate-oblong or linear-oblong silvery beneath, flowers 1–3-nate, fruit ellipsoid-oblong, endocarp thick bony. *Schlecht. in DC. Prodr.* xiv. 609; *Boiss. Fl. Orient.* iv. 1056; *Brand. For. Fl.* 389. E. angustifolia, *Linn.*; *Reichb. Ic. Fl. Germ.* xi. t. 549; *Sibth. Fl. Græc.* t. 152; *Bot. Reg.* t. 1156. E. orientalis, *Linn. Mant.* 41; *Pall. Fl. Ross.* i. 11, t. 5. E. Moorcroftii, *Wall. Cat.* 4031; *Schlecht. in DC. l. c.* 610.

WESTERN TIBET, alt. 5–10,500 ft., *Moorcroft, Thomson,* &c. WESTERN HIMALAYA, alt. 6–7000 ft., *Edgeworth.*—DISTRIB. Westwards to Spain, Western and Central Asia to China.

A tree, 12–30 ft. high, often spinous, young silvery. *Leaves* 1–3 in., obtuse, nerves faint; petiole ¼ in. *Flowers* pedicelled, yellow, fragrant. *Perianth* ⅙–¼ in. long, silvery, campanulate above, teeth triangular-ovate. *Style* glabrous. *Fruit* ¾ in. long, red, dry or fleshy.

2. **E. umbellata,** *Thunb. Fl. Jap.* 66, t. 14; shrubby, leaves deciduous oblong-lanceolate silvery beneath, flowers clustered, fruit small ellipsoid and contracted at both ends or subglobose, endocarp coriaceous ribbed woolly within. *Schlecht. in DC. Prodr.* xiv. 614; *Maximov. Diagn. Dec.* viii. 560; *Brand. For. Fl.* 391; *Gamble Man. Ind. Timb.* 318. E.

parvifolia, *Wall. Cat.* 4026; *Royle Ill.* 323, t. 81, f. 1; *Bot. Reg.* xxix. t. 51. E. reflexa, *Dcne. & Morren in Ann. de Hort. Paris*, 1841.

TEMPERATE HIMALAYA; from Kashmir to Nepal, alt. 3–10,000 ft.—DISTRIB. Affghanistan, N. China, Japan.

Branches often thorny, not so dark as *E. hortensis*. *Leaves* 1–2¼ in., obtuse, glabrous or sparsely pubescent above, nerves obscure; petiole ¼ in. *Flowers* pedicelled, appearing with the leaves, white, fragrant. *Perianth* ¼ in., silvery, tube slender, narrowly funnel-shaped, teeth broadly triangular-ovate. *Fruit* ⅓ in. long, succulent.—I follow Maximovicz in referring *E. reflexa* to this, but the only specimen so called that I have seen is from Thuret's garden (Antibes) and is *E. latifolia*.

3. **E. pyriformis,** *Hook. f.*; shrubby, leaves persistent ? oblong or elliptic subsilvery beneath, flowers clustered, fruit very small very shortly pedicelled pyriform acute at both ends, endocarp crustaceous smooth glabrous within.

UPPER ASSAM; Mishmi Hills, or the Lohits near Koondilak, *Griffith*.

Branches brown, none silvery, obscurely scaly. *Leaves* 2–3 in., obtuse or subacute, rusty-brown above when dry, young only silvery beneath, older discoloured; petiole ⅛–¼ in. *Flowers* not seen. *Fruit* ¼–⅓ in. long, turgid, clothed with appressed brown hardly shining scales, turbinately narrowed below; top mammillate or beaked.—The fruit is quite unlike that of any other species.

4. **E. latifolia,** *Linn. Sp. Pl. Ed.* 2, 177 (*excl. syn.*); shrubby, erect or scandent, leaves ovate oblong elliptic or almost rounded obtuse or acute, silvery or rusty beneath, flowers usually many in a cluster, fruit large linear-oblong, endocarp coriaceous ribbed woolly within. *Schlecht. in DC. Prodr.* xiv. 610; *Maximov. Diagn.* viii. 560; *Brand. For. Fl.* 390, t. 46; *Wight Ic.* t. 1856; *Wall. Cat.* 4028; *Gamble Man. Ind. Timb.* 317; *Beddome, Fl. Sylv.* t. 180; *Thwaites Enum.* 252 (*excl. syn. parvifolia*). E. conferta, *Roxb. Fl. Ind.* i. 440, and *Ed. Carey & Wall.* i. 460; *Kurz For. Fl.* ii. 331. E. arborea, *Roxb. l. c.* 441, and *Ed. Carey & Wall.* 461; *Schlecht. l. c.* 611; *Wall. Cat.* 4027; *Don Prodr.* 67. E. armata, *Ham. mss.* E. ferruginea, *A. Rich. Monogr. Elæagn.* 387, 404; *Schlecht. l. c.* 610; *Wall. Cat.* 4029. E. Thwaitesii & Wallichiana, *Schlecht. l. c.* 611, 612. E. Kologa, *Schlecht. l. c.*; *Dalz. & Gibs. Bomb. Fl.* 224. E. elliptica, *Herb. Heyne.* E. Simoni, *Hort.*

SUBTROPICAL and TEMPERATE HIMALAYA; from Kumaon, alt. 2–7000 ft., to Sikkim, alt. 5–8000 ft.; Bhotan and the Mishmi Hills. KHASIA MTS., alt. 0–5500 ft. BENGAL, at Comilla, *Clarke*. CHITTAGONG, *J. D. H & T. T.* TENASSERIM, *Griffith*. PENANG, *Maingay*. DECCAN PENINSULA; from the Concan southwards, ascending to 7000 ft. CEYLON, ascending to 5000 ft.—DISTRIB. Burma, Malay Islands, China.

A bush small tree or climber, very variable in habit, trunk sometimes 6 in. diam.; branches often spinescent. *Leaves* 4–5 in., very variable, thin or coriaceous, from almost rounded to elliptic-lanceolate, obtuse acute or acuminate, silvery or bright rusty-red beneath; petiole ¼–⅓ in. *Flowers* often very numerous, pedicel lengthening in fruit. *Perianth* campanulate, lobes very broad. *Fruit* ¾–1½ in. long, elliptic-oblong, fleshy, red, acid, ribs 8, strong.—Roxburgh figures the flowers as white; they are of a pale yellow, but probably vary.

2. HIPPOPHAE, *Linn.*

Dicœcious shrubs or small trees, often spinescent. *Leaves* alternate, narrow. MALE FL. in axillary clusters, bracts deciduous. *Perianth-segments* 2, opposite. *Stamens* 4. FEMALE FL. solitary. *Perianth* tubular, 2-dentate. *Fruit* a membranous utricle enclosed in the succulent perianth.

Seed oblong, testa crustaceous, shining, albumen scanty.—Species 2, Europe and N. Asia.

1. **H. rhamnoides,** *Linn.*;—*Schlecht. in DC. Prodr.* xiv. 607, and in *Linnæa* xxxii. 296; leaves from obovate to linear-oblong, not tomentose, clothed beneath with short silvery or rusty circular scales. *Boiss. Fl. Orient.* iv. 1055; *Reichb. Ic. Fl. Germ.* t. 549; *Brand. For. Fl.* 388; *Gamble Man. Ind. Timbers*, 317. H. tibetana, *Schlecht. in Linnæa l. c.*

North-Western Himalaya; in the beds of streams of the inner drier ranges, from Kumaon westwards, alt. 7000–12,000 ft. Western Tibet, ascending to 15,000 ft. —Distrib. Affghanistan and westwards to N. and Middle Europe, N. and Central Asia.

A thorny shrub or small tree, with rigid branches and silvery twigs and leaves. *Leaves* ½–2 in., narrowed into the short petiole, above sparsely scaly when young, green and glabrous in age, beneath clothed with circular toothed scales. *Flowers* on the old wood; male minute; perianth-segments oblong; filaments short. *Fruit* in. diam., oblong or globose, orange yellow or scarlet.—Excessively variable in habit, and in the density of the foliage, and the breadth and shape of the leaves.

2. **H. salicifolia,** *Don Prodr.* 68; leaves linear-lanceolate densely clothed beneath with white or rusty stellate hairs and some circular scales. *Schlecht. in DC. Prodr.* xiv. 607, and in *Linnæa* xxxii. 295; *Brand. For. Fl.* 387. H. conferta, *Wall. Cat.* 4032; *Royle Ill.* 323.

Temperate Himalaya, from Jamu to Sikkim, alt. 5–10,000 ft.

A willow-like shrub, 10–20 ft., with lateral thorns. *Leaves* 2–4 in., dull green and glabrous or pubescent above, margins usually recurved, midrib often rusty red. *Flower* as in *H. rhamnoides*, but fruit smaller (always ?).—Different as this plant looks in its ordinary condition from *H. rhamnoides*, I expect that it will prove a form of that plant due to the moister climate which it affects.

Order CXXXII. **LORANTHACEÆ.**

Parasitic evergreen shrubs. *Leaves* usually opposite, entire, exstipulate, sometimes absent. *Flowers* 1–2-sexual, racemed spicate or fascicled, usually bracteate and often 2-bracteolate. *Calyx* adnate to the ovary, limb truncate or 0, rarely toothed. *Petals* 4–8, free or connate, valvate in bud. *Stamens* equal to and opposite the corolla-lobes, usually inserted on them. *Ovary* inferior, 1-celled; style short or long, stigma simple; ovule 1, erect, adnate all round to the walls of the ovary. *Fruit* a 1-seeded berry or drupe. *Seed* adnate to the pericarp, albumen fleshy; embryo straight, radicle superior.—Genera 13, native of tropical and a few of temperate countries; species about 500.

Flowers 2-sexual	1. Loranthus.
Flower 1-sexual.	
Anthers adnate to the petals, opening by pores	2. Viscum.
Anthers on the middle of the petals, dehiscing transversely	3. Arceuthobium.
Anthers at the base of the petals, many-celled	4. Notothixos.
Anthers at the base of the petals, 2-celled	5. Ginalloa.

1. **LORANTHUS,** *Linn.*

Leaves opposite or alternate. *Flowers* 2-sexual. *Petals* free or more or less connate into a tubular corolla with spreading tips. *Stamens* inserted on the petals, anthers adnate or versatile, cells parallel.—Species about 350, mostly tropical.

SECT. I. **Euloranthus.** *Flowers* small, under ¼ in.; bract scale-like or hollow; bracteoles 0. *Petals* 4–6, free. *Anthers* ovate or oblong, base obtuse, cells unequal or one suppressed.

1. **L. odoratus,** *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 215, and *Cat.* 505; quite glabrous, leaves subopposite elliptic or lanceolate, flowers minute opposite or fascicled on axillary spikes, petals 6 free. *Don Prodr.* 143; *DC. Prodr.* iv. 294. L. hexapetalus, *Ham. mss.*

NEPAL, *Wallich*; E. Nepal and Sikkim, alt. 7000 ft., *J. D. H.* Khasia Mts. on oaks, alt. 5–6000 ft., *Griffith, J. D. H. & T. T.* (*Loranth.* 27, 28).

Bushy, bark dark. *Leaves* 3–5 in., fleshy, narrowed into a petiole, often falcate, penninerved, nerves slender. *Spikes* 1–2½ in., strict, solitary or fascicled; flowers ⅛–⅙ in., yellowish, sweet-scented. *Ovary* with the base sunk in the rachis; calyx-limb short; style very stout, stigma capitate. *Petals* spathulate, ⅛ in. long; buds clavate. *Fruit* ellipsoid, glabrous.

2. **L. Lobbii,** *Hook. f.*; leaves opposite sessile ovate-lanceolate from a rounded or acute base glabrous, flowers minute sessile fascicled in small sessile clusters, calyx rusty-tomentose, petals 4 free puberulous.

PENANG, *Lobb, Maingay* (*Kew Distrib.* 695/2), *Curtis.*

Branches terete; bark pale, obscurely puberulous. *Leaves* 2½–4 in., thickly coriaceous, almost nerveless, obtusely acuminate, minutely impressed-punctate through the contraction of the tissues on both surfaces which are similar. *Flowers* sometimes 1-sexual; clusters 6–20-fld., ¼–⅓ in. diam. *Petals* ⅙ in. long, linear, obtuse, puberulous, free; buds oblong, tip rounded. *Ovary* globose; calyx-limb shortly tubular. *Style* clavate, stigma obtuse. *Fruit* ⅙ in. long, puberulous, ellipsoid.—This is the plant referred to in *Gen. Plant.* iii. 208 as from Moulmein, and possibly *L. axanthus,* Korth. The Moulmein habitat is an error; there are 3 specimens of it in the Kew Herbarium, all from Lobb, and all bear his number 338: of these one is stated to be from Java, a second from Penang, and a third from Moulmein. As, however, Maingay's specimens are from Penang, so no doubt are all the others. It differs from the Sumatran *L. axanthus,* Korth. (Miq. Fl. Ind. Bat. i. 1. 834), in the subsessile leaves and other characters. There are very imperfect specimens of probably this species from Borneo (Beccari, 2378).

3. **L. nodiflorus,** *Thwaites Enum. Pl. Ceyl.* 134; leaves opposite petioled elliptic acute or acuminate glabrous, flowers small sessile fascicled in sessile clusters, calyx rusty-tomentose, petals 4 free glabrous.

CEYLON, *Walker*; in forests of the Ambagamowa District, *Thwaites.*

Branches terete, thickly lenticellate. *Leaves* 2½–3 in., thickly coriaceous, almost nerveless, tissue contracted as in *L. Lobbii.* *Flowers* in small clusters. *Ovary* globose. *Style* filiform, stigma hemispheric; calyx-limb short, dilated. *Petals* ⅓ in. long, linear, obtuse, quite glabrous; buds linear, tip obtuse.

SECT. II. **Phœnicanthemum.** *Flowers* small, not 1 in. long, spicate or racemose, 2-sexual; bract scale-like, bracteoles 0. *Corolla* lobes or segments 4–5, reflexed symmetrically; buds often clavate at the tip. *Anthers* oblong, erect, continuous with the filament, 2-celled. PHŒNICANTHEMUM (Gen.), *Miquel.*

* *Racemes or spikes very many-fld., quite glabrous.*

4. **L. Wallichianus,** *Schultz. Syst.* vii. 100; quite glabrous, leaves opposite and alternate petioled elliptic obtuse penninerved, racemes slender fascicled shorter than the leaves, flowers ¼ in. 4-merous, glabrous, buds straight subcylindric obtuse, ovary smooth. *DC. Prodr.* xvi. 294; *Wight*

Ic. t. 143; *Wight & Arn. Prodr.* 381; *Dalz. & Gibs. Bomb. Fl.* 109. L. polystachyus, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 217; *Wall. Cat.* 509. L. terrestris & tetrandrus, *Heyne mss.*

DECCAN PENINSULA; on the Western Ghats, from the Concan southwards.

Branches terete, bark pale, dotted. *Leaves* 2½–4 in., very coriaceous, base acute, nerves slender; petiole ½ in., stout. *Racemes* 1–3 in., suberect; pedicels ⅛–⅙ in.; bract concave, gibbous. *Flower* erect, then spreading, pale red. *Ovary* globose; calyx-limb annular. *Corolla* 4-cleft; style slender, stigma capitate. *Fruit* ⅓ in., ovoid, rugose.

5. **L. intermedius,** *Wight mss.*; quite glabrous, leaves opposite and alternate petioled elliptic or broadly ovate obtuse penninerved, racemes rather stout solitary or fascicled shorter than the leaves, flowers ⅓–⅔ in. 4-merous glabrous, buds curved subcylindric, ovary smooth. L. Blumeanus, *Wight mss. in part.*

DECCAN PENINSULA; Shevagerry Hills and Khalsa Range, alt. 3500 ft., *Wight* (*Kew Distrib.* 1234). Nilghiri and Kurg Mts., *G. Thomson* (*Loranth.* 37, *Herb. H. f. & T.*).

Very near *L. Wallichianus*, and perhaps a large state of that plant, but the leaves are larger and broader, the racemes more robust, and flowers much larger. It is intermediate between *R. Wallichianus* and *R. obtusatus.*

6. **L. obtusatus,** *Wall. Cat.* 526; glabrous, leaves subopposite long-petioled ovate or elliptic obtuse penninerved, racemes solitary stout shorter than the leaves, flowers ¾–1 in. 4-merous glabrous, buds 4-angled, ovary rugulose. *Wight & Arn. Prodr.* 381; *Dalz. & Gibs. Bomb. Fl.* 109. L. Blumeanus, *Wight mss. in part.*

DECCAN PENINSULA; on the Ghats from the Concan southwards.

Branches robust, lenticellate, bark pale. *Leaves* 3–5 in., sometimes 3½ in. diam., very coriaceous, nerves slender; petiole ¾–1 in. *Racemes* strict, erect; flowers crowded or scattered; pedicels ⅛–¼ in. *Ovary* ovoid; calyx angular. *Corolla* not swollen at the base. *Style* slender, stigma capitate. *Fruit* ovoid, closely rugulose. —The petiole is much longer in this than in *Wallichianus* and *intermedius.*

7. **L. pulcher,** *DC. Prodr.* iv. 295; quite glabrous, leaves opposite and alternate shortly petioled oblong- or ovate-lanceolate acuminate penninerved, spikes or racemes subterminal solitary or fascicled, rachis very robust, flowers ¼ in. 5-merous glabrous, buds straight constricted in the middle obtuse terete. L. speciosus, *Wall. Cat.* 518. L. coccineus, *Hook Bot. Misc.* t. 58 (*not of* p. 278). Dendrophthoe pulcher, *Miq. Fl. Ind. Bat.* i. pt. 1, 821.

PENANG, *Porter, Phillips.*

Branches robust, terete; bark pale, smooth. *Leaves* 5–7 in., very coriaceous, pale and shining above, nerves faint spreading; petiole ⅙ in., very robust. *Racemes* or spikes strict, rather dense-fld. to the base, rachis stout, terete, pedicels ⅛–⅛ in., stout; flowers erecto-patent, red; bract boat-shaped. *Ovary* short; calyx-limb annular. *Corolla-base* rather inflated, terete, tip 5-cleft. *Style* rather stout, stigma hardly capitate. —I think the figure in Bot. Misc. given as of *L. coccineus* undoubtedly is a 4-merous form of *L. pulcher.*

8. **L. Parishii,** *Hook. f.*; glabrous, leaves subopposite petioled linear-lanceolate acuminate penninerved, spikes terminal longer than the leaves strict very robust, flowers ¼ in. 4–5-merous hoary, buds terete obtuse.

TENASSERIM; on Donnatoung, alt. 2000 ft., *Parish.*

Branches very stout; bark black, smooth, shining. *Leaves* 5–7 by 1–1½ in.

very coriaceous, smooth and shining, and probably flaccid when fresh; nerves many, horizontal, very obscure; base narrowed into a stout petiole ½ in. *Spike* erect, many-fld.; rachis very stout, naked towards the base; flowers erecto-patent, scarlet, quite sessile; bract boat-shaped; calyx subglobose, limb obsolete. *Corolla* 4–5-cleft to the middle; bud more swollen at the top than the base. *Style* stout, stigma capitate. —A very distinct plant.

9. **L. ensifolius,** *Thwaites Enum.* 134; quite glabrous, leaves sub-opposite petioled narrowly falcately lanceolate acuminate 3–7-nerved, nerves parallel, racemes axillary and terminal slender equalling the leaves or shorter, pedicels slender, bracteole minute.

CEYLON; at Ratnapoora, alt. 1000 ft., *Thwaites.*

Branches black and opaque when dry. *Leaves* 3–5 by 1–1½ in., thinly coriaceous, opaque, dark brown when dry, narrowed into a petiole ¼–⅓ in. *Racemes* solitary or 2 together, erect; pedicels ⅙ in. *Ovary* ellipsoid; calyx-limb annular. *Corolla* unknown. *Style* filiform, ¾ in.; stigma capitellate.—The parallel nerves at once distinguish this species.

10. **L. pentapetalus,** *Roxb. Fl. Ind.* i. 553; ii. 211, and *Ed. Carey & Wall.* ii. 290; quite glabrous, leaves opposite and alternate petioled ovate or elliptic acute or acuminate penninerved, spikes axillary erect strict stout longer than the leaves, flowers ¼ in. 4–5-merous glabrous base suddenly inflated and 5-angled, style jointed at the middle. *DC. Prodr.* iv. 295; *Wall. Pl. As. Rar.* iii. t. 225, and *Cat.* 503; *Kurz For. Fl.* ii. 322; *Griff. Notul.* iv. 617, and *Ic. Pl. Asiat.* t. 624, 625; *Blume Fl. Jav. Loranth.* 39, t. 14, and 23 A. L. polycarpus, *Wall. Cat.* 540. L. erythrostachyus, *Wall. mss.* Phœnicanthemum pentapetalum, *Miq. Fl. Ind. Bat.* i. pt. 1, 823. Dendrophthoe pentapetala, *G. Don Gen. Syst.* iii. 419.

NEPAL, *Wallich, J. D. H.*, and from ASSAM, SILHET and CACHAR to MALACCA, PENANG and SINGAPORE, *Maingay* (*Kew Distrib.* 691, 692).—DISTRIB. Ava, Yunan, Java, Sumatra, Borneo.

Branches stout, terete; bark dark, smooth. *Leaves* 2–4 in., coriaceous, dark brown or black when dry, nerves very faint; petiole ½–⅔ in., rather slender. *Spikes* solitary and in pairs, dense- or lax-fld.; rachis very stout, naked below; flowers erect, then spreading, quite sessile; bracteole ovate, ciliolate. *Ovary* terete, shortly cylindric; calyx-limb annular, obscurely toothed. *Corolla-lobes* reflexed from the middle; bud constricted in middle, tip clavate. *Style* slender above the joint, stigma capitellate. *Fruit* ellipsoid, truncate.—The style of this species is very characteristic, the lower part where embraced by the corolla-tube being 5-angled.

** *Racemes or spikes very many-flowered, pubescent or tomentose.*

11. **L. coccineus,** *Jack in Mal. Misc.* i. 8, and in *Hook. Bot. Misc.* i. 278 (*excl.* t. 58); rusty-tomentose, leaves opposite and alternate petioled ovate or ovate-lanceolate acute or acuminate base rounded or cordate, spikes or racemes axillary strict erect, pedicels very short, corolla ⅓ in. 4-cleft straight, base rather swollen and 4-angled, fruit ovoid long-necked. *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 215; *DC. Prodr.* iv. 296; *Griff. Notul.* iv. 620, and *Ic. Pl. Asiat.* t. 626. L. racemiferus, *Wall. Cat.* 539. Phœnicanthemum coccineum & Bennetianum, *Miq. Fl. Ind. Bat.* i. pt. 1, 825, 826. Dendrophthoe coccinea, *G. Don Gen. Syst.* iii. 419.

CACHAR, *Keenan.* PEGU, *M'Clelland.* TENASSERIM, *Wallich,* &c. MALACCA, *Griffith* (*Kew Distrib.* 2718). SINGAPORE, *Jack.*—DISTRIB. Ava, Barilla, Borneo.

Branches long, terete, stout, lenticellate; bark pale. *Leaves* 3–6 in., very coriaceous, variable in size and shape, nerves very faint; petiole ¼–½ in. *Spikes or racemes* very variable in length; rachis stout; pedicels very short and stout; bracteole

gibbosely boat-shaped; flowers scarlet. *Ovary* ovoid, narrowed below the cupular 4-toothed calyx-limb. *Corolla-segments* spreading, narrow. *Style* slender, stigma capitate. *Fruit* flagon-shaped, neck crowned by the 4-toothed calyx.—It is curious that Jack does not describe the inflorescence of his *L. coccineus* as being pubescent. —Under *L. pulcher* I have referred to the figure given in the Bot. Misc. as *L. coccineus*.

12. **L. Hookerianus,** *Wight & Arn. Prodr.* 381; young leaves and inflorescence mealy or rusty-pubescent, leaves subopposite petioled oblong- or elliptic-ovate or lanceolate obtuse or subacute penninerved, spikes axillary strict erect about equalling the leaves, flowers $\frac{1}{4}$ in. puberulous 4-merous, buds subterete, ovary depressed-globose, calyx-limb 4-lobed. *Thwaites Enum.* 134.

DECCAN PENINSULA; at Courtallam, *Wight*. CEYLON; Batticaloa, *Gardner*; Central Province, *Thwaites*.

Branches terete, lenticellate, bark dark. *Leaves* 2–3 in., coriaceous, dark brown when dry, nerves very faint, base acute; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., rather slender. *Spikes* solitary or in pairs; rachis stout, pitted by the flowers; bracteole small, orbicular. *Ovary* oblate; calyx-limb dilated. *Corolla* orange-red, segments linear; buds straight, slightly swollen at the base. *Style* stout, stigma capitate. *Fruit* small, globose, crowned with the cupular calyx.

13. **L. Wightii,** *Hook. f.*; young leaves and flowers mealy or puberulous, leaves opposite and alternate small petioled elliptic obtuse, spikes rather shorter than the leaves strict erect, flowers $\frac{1}{6}$ in. 4-merous, buds terete base not swollen, calyx-limb entire, ovary globose. L. Arnottianus, *Wight mss.* (*not of Korthals*).

DECCAN PENINSULA; at Courtallam, *Wight*.

A small shrub; branches rather slender, terete, pale, bark rough. *Leaves* 1–1½ in., dark when dry, coriaceous, base acute; nerves slender, lower 2–3 pair nearly parallel to the margin; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., rather slender. *Spikes* solitary or in pairs; rachis stout; bracteole orbicular and ovary and corolla clothed with a mealy scurf. *Corolla-tube* straight, base not inflated; segments long, connate, linear-spathulate. *Style* slender, lengthening after flowering, stigma capitate.

*** *Spikes or racemes with* 1–2 *pairs of flowers.*

14. **L. ligustrinus,** *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 219, and *Cat.* 513; young parts and flowers rusty-pubescent, leaves opposite and alternate petioled lanceolate obtuse or acute penninerved, racemes axillary very short with 1–2 pairs of flowers, flowers $\frac{1}{3}$ in. 4-merous, buds subterete base swollen 4-angled, calyx-limb entire. *DC. Prodr.* iv. 294; *Don Prodr.* 143; *Brand. For. Fl.* 395.

TROPICAL HIMALAYA, from Kumaon to Sikkim, alt. 2–4000 ft. CHITTAGONG, *J. D. H. & T. T.*

Apparently terrestrial (Brandis), a root parasite? *Branches* stout, terete, closely lenticellate, bark pale. *Leaves* 1½–2½ in., brown or black when dry, very coriaceous, nerves obscure, base acute; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Racemes* single or in pairs, spreading, ½–1 in. long; rachis rigid, glabrous; flowers very shortly pedicelled; bracteole rather large, orbicular. *Ovary* urceolate; calyx-limb short. *Corolla-segments* reflexed from the middle, pink or scarlet, linear; bud straight, obtuse. *Style* slender, stigma capitate.—The parasitism of this and the following should be examined.

15. **L. terrestris,** *Hook. f.*; quite glabrous, leaves opposite and alternate petioled lanceolate obtuse or acute penninerved, racemes axillary short or long with 1–2 pairs of flowers, flowers $\frac{1}{3}$ in. 4-merous, buds sub-

terete base swollen 4-angled, calyx-limb entire. L. ligustrinus, *Herb. Ind. Or. H. f. & T. in part.*

KHASIA MTS., alt. 1–3000 ft. *J. D. H. & T. T.*

Very similar to *L. ligustrinus*, and always growing from the ground, and hence probably a root parasite, quite glabrous, leaves thinner with more distinct nerves, racemes sometimes 2 in. long.—Dr. Thomson and I gathered this plant at seven or eight places at various localities all over the Khasia Mts., and never found it attached to an aerial tree-branch. It either replaces *L. ligustrinus* or is a remarkable form of that plant. I find no traces of ferruginous pubescence on it.

SECT. III. **Heteranthus.** *Flowers* 1–1½ in., axillary, cymose or racemose; bract scale-like; bracteoles 0. *Petals* 4–6, free; buds straight or incurved, tip not clavate. *Anthers* very slender, continuous with the filament, 2-celled.

16. **L. heteranthus,** *Wall. Cat.* 537; very robust, nearly glabrous, leaves alternate shortly petioled elliptic or oblong-lanceolate or linear obtuse or subacute thickly coriaceous penninerved and striolate, racemes longer than the leaves very stout curved sparse-fld., pedicels very stout, ovary cylindric, buds 1–1½ in. curved slender acute, petals 6. *DC. Prodr.* v. 306. L. eleutheropetalus, *Kurz in Journ. As. Soc.* 1871, ii. 64, and *For. Flor.* ii. 321. Dendrophthoe macrocalyx, *Miq. Fl. Ind. Bat.* i. pt. 1, 821.

BURMA; Martaban, *Wallich, Brandis.*—DISTRIB. Java, Borneo.

Branches terete; bark smooth, dark. *Leaves* 3–5 in., very variable in breadth, pale yellow-brown when dry, nerves very obscure, base acute, narrowed into the very stout petiole ¼–½ in. *Racemes* solitary or in pairs, 3–5 in., rachis and pedicels very stout; bract orbicular, concave. *Calyx* ¼ in. narrow, limb cupular entire. *Corolla-buds* slender, linear, red; segments very slender. *Anthers* twice as long as the filament. *Style* filiform, stigma simple.—Kurz describes the flowers as at first minutely puberulous.

SECT. IV. **Cichlanthus.** *Flowers* in axillary fascicles, rarely racemose, usually scurfily or mealy-tomentose; bract scale-like; bracteoles 0. *Calyx* hardly produced above the ovary. *Corolla* long, curved, scurfy, 4- rarely 5-lobed, and deeply cleft behind. *Anthers* narrow, cells indistinct. *Fruit* clavate turbinate or pyriform, except *L. vestitus.*

* *Leaves mealy or scurfy on both surfaces, rarely glabrescent. Fruit pyriform or clavate.*

17. **L. scurrula,** *Linn.*;—*Kurz For. Fl.* ii. 319; young shoots and inflorescence covered with short soft white or rusty tomentum, leaves opposite petioled or sessile ovate elliptic oblong cordate or obovate obtuse or subacute penninerved glabrous or tomentose beneath, flowers in axillary very short subracemose fascicles pedicelled, ovary pyriform, corolla 1 in. very slender usually curved terete, tube split, lobes 4 short, bud terete, tip subclavate acute or obtuse, berry pyriform tomentose.

Throughout INDIA; from the Sikkim Himalaya and Bengal southwards to Singapore; and from Behar, Central India and the Concan, southwards to Travancore and CEYLON.

A large bush, very variable in amount of pubescence, form and size of leaves, and in inflorescence; bark smooth or lenticellate, usually pale. *Leaves* rarely exceeding 3 in., coriaceous; nerves slender; petiole rarely ¾ in. *Inflorescence* if racemose rarely ½ in. long; pedicels long or short. *Ovary* with the base often lengthening into a pedicel as the fruit ripens; calyx-limb very short, entire. *Corolla* variable in length, ½–1 in., very slender, buff or pink, lobes acute. *Filaments* short. *Style*

filiform, sometimes obscurely jointed a little way below the tip (opposite the base of the corolla-lobes), stigma minute. *Fruit* ¼ in.—I am in doubt as to whether all the following varieties are really referable to one species, and whether, if so, some others should not be included under it. Kurz, who was the first to bring *L. obtectus* and *grandiflorus* under *L. Scurrula*, confines the type plant to a form with solitary or twin flowers; but this is obviously an abnormal condition, and his *Scurrula proper* does not appear to be distinguishable from his var. *buddleioides*, which I take to be the common and typical form of the species. I have refrained from quoting any Malayan Archipelago species as synonymous, but I suspect that several of these, as *L. obovatus*, *L. sphenoideus*, and *L. repandus*, all of Blume, are referable to *L. Scurrula*.

L. Scurrula proper; leaves petioled from oblong to obovate and rounded or cordate obtuse young clothed on both surfaces and old beneath with pale appressed tomentum, flowers fascicled rusty or grey. L. Scurrula, *DC. Prodr.* iv. 301; *Roxb. Cor. Pl.* ii. t. 140; *Fl. Ind.* i. 550 and ii. 186, and *Ed. Carey & Wall.* ii. 206; *Wall. Cat.* 6867 (*specimens very bad, perhaps a mixture*). L. buddleioides, *Desrouss. in Lamk. Encycl.* iii. 600; *DC. l. c.* 302; *Wight & Arn. Prodr.* 383; *Dalz. & Gibs. Bomb. Fl.* 110. L. Heyneanus, *Wall. Cat.* 528. L. Heynii, *DC. l. c.* 300. L. pyrifolius, *Wall. Cat.* 6869. L. cinnamomeus, *Wall. Cat.* 527; *DC. l. c.* 300.—Loranth No. 19, *Herb. Ind. Or. H. f. & T.*—Sikkim Himalaya, alt. 3–6000 ft., *J. D. H.*, *Clarke*. Assam, Silhet and the Khasia Mts., alt. 3–6000 ft., *Wallich*, *Griffith* (*Kew Distrib.* 2728). Tenasserim, *Helfer* (*Kew Distrib.* 2728). Malacca, *Griffith*. Deccan Peninsula, from the Ganges to Travancore, abundant. Ceylon, ascending to 4000 ft.

Var. *bengalensis*; leaves sessile or subsessile ovate glabrous when mature, flowers fascicled rustily tomentose, corolla ½–⅔ in. curved less slender pale buff. Loranth. No. 23, *Herb. Ind. Or. H. f. & T.*—Assam, Khasia Mts. and Silhet, *Griffith* (*Kew Distrib.* 2722, 2734), *J. D. H. & T. T.* Dacca, *Clarke*. Noakoly, *J. D. H. & T. T.*

Var. *obtecta*, Kurz For. Fl. ii. 319; leaves shortly petioled glabrous when mature, petiole very short, flowers racemose scurfily and rustily tomentose ¾ in. long, corolla very slender. L. obtectus, *Wall. Cat.* 534. L. concavifolius, *Griff. Notul.* iv. 615.—Ava, *Wallich*. Malacca, *Griffith*.

Var. *lævigata*; like var. *obtecta*, but petiole longer, and flowers less scurfily tomentose. L. rufidulus & lævigatus, *Wall. Cat.* 535, 536; *DC. l. c.* 302.—Tenasserim, *Wallich*, *Helfer* (*Kew Distrib.* 2715, 2731). Malacca, *Griffith*.—Very near var. *graciliflora*.

Var. *graciliflora*, Kurz l. c. 319; leaves elliptic adult glabrous, petiole ¼ in., flowers ½–1 in. in short racemes very slender much curved hoary with pale or dark pubescence. L. graciliflorus, *Wall. Cat.* 521; *DC. l. c.* 300. L. obovatus, *Blume Bijd.* 663, and *Fl. Jav. Loranth.* t. 9. Dendrophthoe obovata, *Miquel Fl. Ind. Bat.* i. 1. 817.—Sikkim, alt. 2000 ft., *J. D. H.* Bhotan, *Griffith*. Assam and Silhet, *Wallich*, *Griffith* (*Kew Distrib.* 2714). Chittagong, *J. D. H. & T. T.* Also Timor.

18. **L. cordifolius,** *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 223, and *Cat.* 517; branches and leaves on both surfaces (except in age) clothed with white or tawny appressed tomentum, leaves opposite usually large rather long-petioled orbicular or very broadly ovate base rounded or cordate, tip obtuse or rounded, flowers ¾–1 in. fascicled on a short peduncle pedicelled densely rufous or white-tomentose, tip of bud very acute, ovary pyriform, corolla slender curved terete, tube split, lobes 4 short acute, berry pyriform tomentose. *DC. Prodr.* iv. 302; *Don Prodr.* 143; *Brand. For. Fl.* 396. L. buddleioides, *Thwaites Enum. in part*, 136.

Subtropical Himalaya, alt. 1–5000 ft.; from Kashmir, *Brandis*, and Garwhal, *Falconer*, to Nepal, *Wallich*. Central India, at Hazaribagh, *Vicary*. Nilghiri Hills, *Wight*, at Goodaloor, alt. 4000 ft., *Clarke*. Ceylon, *Thwaites*.

This is hardly more than a variety of *L. Scurrula*, differing in its greater size, more rounded and cordate leaves and the copious white tomentum, which gives it a

very different aspect from the ordinary state of *L. scurrula*, of which Wight and Arnott indeed suggest its being a variety. The Ceylon specimens are beautifully white.

19. **L. ferrugineus,** *Roxb. Fl. Ind.* i. 551, ii. 188 (*ferruginosus*), and *Ed. Carey & Wall.* ii. 207; branchlets and leaves beneath clothed with close rusty scurfy tomentum, leaves opposite shortly petioled elliptic obtuse glabrous above base rounded, flowers ½–1 in. in axillary sessile or shortly peduncled fascicles pedicelled densely rusty villous, calyx turbinate, limb entire, corolla slender terete, tube split, lobes 4, fruit pyriform villous. *DC. Prodr.* iv. 299; *Wall. Cat.* 500; *Jack in Mal. Misc.* i. 9, and in *Hook. Bot. Misc.* i. 279, t. 59. L. Schultesii, *Blume in DC. l. c.* 300, and *Fl. Jav. Loranth.* t. 2. L. Oortianus, *Korth, fid. Herb. Hort. Calcutt.* Dendrophthoe ferruginea, *G. Don Gen. Syst.* iii. 420; *Miquel Fl. Ind. Bat.* i. 1. 812. D. Oortiana, *Miquel l. c.* 813.

PENANG and SINGAPORE, *Roxburgh, Wallich, Phillips,* &c. MALACCA, *Griffith* (*Kew Distrib.* 2727), *Maingay* (*Kew Distrib.* 686).—DISTRIB. Java, Sumatra.

Branches terete; bark smooth, dark or grey, minutely lenticellate. *Leaves* 1½–4 in., very uniform in shape, coriaceous, dark brown or black above when dry, nerves faint; petiole ⅛–⅙ in., villous. *Fascicles of flowers* solitary or clustered, very variable in length, differing from all states of *L. scurrula* in the thick tomentum and less pyriform ovary. *Corolla* when fresh green within, rufous externally.

20. **L. rhopalocarpus,** *Kurz in Journ. As. Soc.* 1871, ii. 62, and *For. Fl.* ii. 319; branches slender and branchlets leaves beneath and inflorescence scurfily tomentose, leaves small opposite and alternate shortly petioled obovate or cuneate glabrate above, flowers in axillary sessile or shortly peduncled fascicles pedicelled tawny scurfily tomentose, calyx oblong, limb truncate, corolla ½ in., tube very slender terete curved split 4-lobed, fruit elongate narrowly clavate truncate, base with a thickened ring. L. cuneatus, *Wall. Cat.* 541; *DC. Prodr.* iv. 301, *excl. syn.* ? L. fuscus, *Blume Bijd.* 660, and *Fl. Jav. Loranth.* 28, t. 7. Dendrophthoe fusca, *Miquel Fl. Ind. Bat.* i. 1. 814.

PEGU and ARRACAN, *Kurz.* MARTABAN, *Wallich*; at Moulmein, *Griffith* (*Kew Distrib.* 2732).—DISTRIB. Java?

A small shrub, 1–2 ft.; branches terete; bark dark, minutely lenticellate, of shoots rufous. *Leaves* 1–2 in., young tawny on both surfaces old glabrous on both, base narrowed into the very short petiole, tip rounded, nerves few ascending. *Flowers* few, "whitish, ½–¾ in., somewhat lepidote;" bract minute. *Fruit* ½–¾ in. long, gradually narrowed from the truncate tip to the base, which has an annular thickening immediately above the bract, terete, scurfy.—The very remarkable fruit at once distinguishes this species, of which I have seen no corolla.

21. **L. malaccensis,** *Hook. f.*; branches slender, branchlets and inflorescence rusty and scurfily pubescent, leaves small opposite on slender petioles elliptic obtuse quite glabrous, flowers ½ in. in axillary fascicles of 2 or more very shortly pedicelled, calyx-tube pyriform, limb truncate contracted, corolla-tube very slender terete split in front, lobes 4 acute, fruit subcapitately clavate contracted into a very slender pedicel.

MALACCA, *Griffith.*

Apparently a small shrub; branches terete, closely lenticellate. *Leaves* 1½ in., thinly coriaceous, very dark brown when dry, almost shining above, nerves faint spreading; petiole ¼–⅓ in., very slender for the genus. *Flowers* dark rusty brown when dry; bract minute. *Corolla-lobes* very short, acute. *Fruit* as long as the corolla, consisting of a short ellipsoid head suddenly contracted into a long slender pedicel which is not thickened at the base, scurfily pubescent.—The fruit of this

also is very characteristic. The only specimens I have seen are Griffith's, and they were communicated to Dr. Gardner in Ceylon.

22. **L. thelocarpus,** *Hook. f.*; branchlets and leaves beneath clothed with very fine cinnamon or tawny scurfy stellate tomentum, leaves opposite petioled oblong or ovate-oblong obtuse glabrous above, flowers fascicled on short axillary peduncles pedicelled, fruit clavate papillose contracted into a pedicel with an annular thickened base. Loranthus No. 6, *Herb. Ind. Or. H.f. & T.*

CHITTAGONG; at Kazi ke hat, *J. D. H. & T. T.*

Branches stout, terete, sparsely lenticellate, bark grey. *Leaves* 1½–3 in., rigidly coriaceous, dark brown and opaque above, nerves most obscure, base rounded; petiole ¼–⅓ in. *Flowers* not seen; bracts very minute. *Fruit* ½ in. long, subumbellate, inserted on pedicels half their length, puberulous and bearing naked orbicular pustule-like tubercles, tip rounded.—A peculiar species, not easily distinguished by words from *L. scurrula*, except by the very different fruit, which bears papillæ something like a *Boerhavia*; the leaves also are much more rigid than *L. scurrula*.

23. **L. pulverulentus,** *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* 221, and *Cat.* 515; branchlets and young leaves clothed with flocculent white fugacious mealy tomentum, leaves often large opposite long-petioled broadly ovate or ovate-oblong glabrous acute or obtuse, nerves distinct, flowers 1 in. in solitary or fascicled racemes long-pedicelled scurfily white-tomentose, calyx-limb 0, corolla slender curved, tube terete split, lobes 4 narrow, fruit clavate mealy. *DC. Prodr.* iv. 301; *Brand. For. Fl.* 396; *Kurz For. Fl.* ii. 318. L. carnosus, *Wall. Cat.* 552. L. leptanthus, *Wall. Cat.* 553 (*excl.* B.).

SUBTROPICAL HIMALAYA, alt. 2–4000 ft., from Garwhal to Bhotan. PEGU and AVA, *Kurz*. CENTRAL PROVINCES, *Brandis*. The CONCAN, *Stocks*.

Branches robust, terete, usually closely lenticellate; bark dark grey. *Leaves* very variable in size, 2–8 in. (much smaller in var. *leptanthus*), dark brown when dry; nerves arching, much stronger than in its allies; petiole ⅓–1 in. *Racemes* ½–2½ in.; pedicels ¼–⅓ in.; bract minute; flowers green when fresh, white or cream-coloured when dry. *Ovary* pyriform, top contracted. *Style* very slender, stigma minute ovoid. *Fruit* "large, club-shaped," *Kurz*.

Var. *leptanthus*; leaves smaller 1–2 in. elliptic or orbicular very coriaceous nerves obscure, corolla 1½ in. L. leptanthus, *DC. l. c.* 299. L. leptanthus, *Wall.*, β. rotundifolia, *Cat.* 533 B.—Ava, *Wallich*.

** *Leaves glabrous or nearly so. Fruit turbinate.*

24. **L. umbellifer,** *Schultz Syst.* vii. 97; youngest parts rusty-pubescent, leaves opposite and alternate petioled oblong obtuse or acute glabrous, flowers 1–1½ in. umbelled or fascicled rarely subracemose on short axillary peduncles young hoary, corolla-tube slender curved, lobes 4 short, fruit turbinate. *DC. Prodr.* iv. 301. L. umbellatus, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 222, and *Cat.* 516; *Don Prodr.* 143.—Loranth. No. 72, *Herb. Ind. Or. H.f. & T.*

TEMPERATE and SUBTROPICAL HIMALAYA, from Nepal to Bhotan, alt. 2–5000 ft., *Wallich*, &c. KHASIA MTS., alt. 4–6000 ft., common.

Branches rather stout, grey, lenticellate. *Leaves* 3–4 in., subacute at both ends, coriaceous, nerves distinct, brownish when dry; petiole ¼–⅓ in. *Inflorescence* variable, flowers sometimes fascicled on the branches without a common peduncle, at others subracemose, but with the raceme never more than ⅓ in.; bract small. *Calyx-tube* minute, ovoid or obovoid, rusty-pubescent; limb very short, obscurely 4-toothed. *Corolla* exceedingly slender in bud, with a clavate obtuse or subacute tip;

tube slightly swollen in flower; lobes not $\frac{1}{4}$ the length of the tube. *Filaments* shorter than the anther. *Stigma* capitate. *Fruit* $\frac{1}{3}$ in., turbinately obovate with a broad subtruncate top.—Brandis says there is no bract, but small bracteoles at the base of the ovary. I think this is a mistake.

Var. *clavigera*; flowers perfectly glabrous. L. clavigerus, *Wall. Cat.* 6873. ? L. clavatus, *Roxb. Fl. Ind.* i. 553, ii. 189, and *Ed. Carey & Wall.* ii. 210. L. Corynitis, *Spreng. Cur. Post.* 140; *DC. l. c.* 317.—Silhet, *De Silva & Gomez.*—Wallich's specimens are the only ones I have seen.

25. **L. elatus,** *Edgew. in Trans. Linn. Soc.* xx. 58; youngest buds rusty-pubescent, leaves opposite and alternate large long-petioled broadly ovate base rounded or subcordate glabrous, flowers 1–1$\frac{1}{2}$ in. umbelled or fascicled on short axillary peduncles rarely subracemose young hoary, corolla-tube narrow curved split, lobes short linear-spathulate, fruit turbinate. L. umbellifer, *Brand. For. Fl.* 397.

Temperate Himalaya, alt. 5–10,000 ft.; from Simla, *Royle, Edgeworth,* &c., to Bhotan, *Griffith.*

Very near indeed to *L. umbellifer*, but the bark is almost black when dry, the leaves much larger, more coriaceous, of a very different shape and long-petioled, the calyx broader and more truncate, and the tube of the corolla is much less slender in bud; it is further remarkable for the elevation it inhabits.

*** *Leaves tomentose. Fruit ellipsoid.*

26. **L. vestitus,** *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 218, and *Cat.* 511; branchlets petioles and leaves beneath clothed with soft appressed buff or pale rufous tomentum, leaves opposite petioled oblong or ovate- or linear-oblong obtuse glabrous above base acute, flowers $\frac{1}{2}$–$\frac{3}{4}$ in. in axillary sessile or peduncled fascicles pedicelled rufous-villous, calyx-limb truncate, corolla terete, buds with rounded clavate tips, tube split, lobes 4 obtuse, fruit ellipsoid at length glabrous. *DC. Prodr.* iv. 302; *Don Prodr.* 143; *Brand. For. Fl.* 396; *Gamble Man. Ind. Timb.* 320.

Subtropical and Western Himalaya, alt. 5–7000 ft., from Garwhal to Nepal. Khasia Mts., alt. 4–6000 ft., *Griffith, J. D. H. & T. T.*

A large shrub (erect on oak trees in the Khasia Mts.); branches stout, terete; bark dark, sparsely lenticellate. *Leaves* 2$\frac{1}{2}$–4 in., very coriaceous, often bullate, and with recurved margins, pale greenish and shining above, nerves faint; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Fascicles of flowers* solitary or clustered, usually peduncled; flowers smaller than in *L. ferrugineus*. *Corolla-lobes* very short, obtuse. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ in. long.—A very distinct species, differing in its fruit from the others of this section.

Sect. V. **Dendrophthoe.** *Flowers* in axillary clusters or racemes, often mealy; bract scale-like; bracteoles 0. *Calyx* usually produced into a toothed tube above the ovary. *Corolla* long or short, tube often gibbously inflated, straight or incurved, usually split at the back, 5- rarely 4-lobed. *Anthers* narrow, cells indistinct. *Fruit* ovoid or oblong (pyriform in *L. Stocksii*).

* *Flowers pubescent tomentose or villous.*

27. **L. tomentosus,** *Heyne in Roth Nov. Sp.* 191; branches and leaves beneath rusty-tomentose, leaves all alternate petioled oblong or obovate-oblong obtuse penninerved, bract rarely exceeding the 5-toothed calyx, flowers $\frac{3}{4}$ in. in axillary sessile or shortly peduncled fascicles pedicelled densely rusty-villous with hispid hairs, corolla curved, tube terete split, lobes 5 oblong. L. bracteatus, *DC. Prodr.* iv. 306, *in part.* L. tomentosus,

var. lanuginosus, *Thwaites Enum.* 135. L. Candolleanus, *Hohenack. Pl. Ind. Or.* No. 514 a.—Loranth. No. 9, *Herb. Ind. Or. H.f. & T.*

NILGHIRI and PULNEY MTS., *Heyne, Wight, Schmidt,* &c. CEYLON, alt. 3–5000 ft., *Thwaites* (C. P. 2492).

Branches stout, dark grey, terete. *Leaves* 1–1½ in., tip rounded, rarely 3-nerved at the base, glabrous, black and opaque above when dry; petiole ⅓–½ in. *Fascicles* few-fld., solitary or clustered, peduncle rarely ⅙ in. *Ovary* short. *Corolla-tube* terete, curved, split to the middle, not inflated or gibbous. *Filaments* short, anthers oblong. *Style* filiform, stigma capitellate.—I have regarded this as Heyne's *tomentosus*, in contradistinction to his *bracteatus*, agreeing as it does with Roth's character, except in that the pubescence is rusty red and not grey. Roth describes the bract as only 2 lines long, whereas in Heyne's *bracteatus* it reaches ½ in.: this is, however, a very variable organ in both species. Thwaites' var. *normalis* (C. P. 1642) is very unlike the normal peninsular forms; it has elliptic-oblong green leaves 3–3½ in. long, with subsilky pubescence beneath, dense clusters of sessile flowers, and less villous flowers.

28. **L. bracteatus,** *Heyne in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 220; branches inflorescence and young leaves beneath clothed with thin soft grey or buff tomentum, leaves all alternate petioled orbicular or cuneate-obovate penninerved, bract (sometimes 2) much longer than the 5-toothed calyx, flowers ⅔–1 in. in axillary peduncled fascicles pedicelled, corolla curved, tube gibbously inflated in the middle, lobes 5 linear. *DC. Prodr.* iv. 306 (*excl. syn. tomentosus*); *Wall. Cat.* 510; *Wight & Arn. Prodr.* 385 (*excl. syn. Roth, &c.*). L. tomentosus, *Wight Ic.* t. 378. L. Heyneanus, *Schult. Syst.* 106.

SOUTH DECCAN PENINSULA; on the Nilghiris, &c., *Heyne,* &c.

Rootstock creeping, branches slender. *Leaves* ½–1 in., grey when dry, rarely cuneately obovate, glabrous or grey-pubescent or tomentose; petiole slender, ⅙–¼ in. *Bracts* oblong, often 3 times as long as the 5-toothed calyx. *Flowers* much longer than in *L. tomentosus*, not villous, more appressedly grey-pubescent, tube more slender though gibbously swollen in the middle; lobes very narrow. *Fruit* ½ in., elliptic-oblong, puberulous.

Var. *angustifolia*; clothed with thin ashy tomentum, leaves narrowly obovate-cuneate, bracts very narrow, flowers smaller. L. montanus, *var.* longifolius, *Wight in Wall. Herb.* (6866 in part).—Pulney Mts., *Wight.*—Though very dissimilar in foliage, I find no character whereby to distinguish this specifically.

29. **L. Stocksii,** *Hook. f.*; leaves small opposite clothed with buff mealy pubescence sessile or subsessile oblong or orbicular rounded at both ends or base cordate, flowers solitary axillary sessile, bracts as long as the calyx oblong obtuse, fruit small pyriform tomentose. Loranth. No. 15, *Herb. Ind. Or. H.f. & T.*

The CONCAN, *Stocks.*

Branches slender, bark grey, not lenticellate, young mealy like the foliage. *Leaves* ½–1 in., mealy on both surfaces; nerves few, obscure. *Fruit* (young) ¼–⅓ in. long; tip rounded; calyx-limb not produced, truncate.—Apparently a very distinct species near *L. bracteatus*, but with sessile leaves and pyriform fruit like that of a *Cyclanthus*, to which section perhaps it should be referred.

30. **L. recurvus,** *Wall. in DC. Prodr.* iv. 299, and *Cat.* 525; branchlets and young leaves clothed with buff or grey pubescence, leaves all alternate obovate-cuneate glabrous or ashy-pubescent beneath, 3-nerved at the base, bract shorter than the 5-toothed calyx, flowers ⅔ in. in numerous axillary sessile tomentose fascicles pedicelled, corolla usually strongly curved, tube split gibbously inflated below the middle, lobes 5 linear-oblong. *Wight*

& Arn. Prodr. 383. L. Candolleanus, *Wight & Arn. l. c.* 385; *Wight Ic.* t. 305.

NILGHIRI MTS., *Noton, Wight*, &c.

Branches usually very stout, sparsely lenticellate; bark black. *Leaves* $\frac{3}{4}$–2 in., usually very coriaceous, dark and opaque above, nerves few; petiole $\frac{1}{6}$–$\frac{1}{2}$ in. *Fascicles* usually many and dense-fld.; flowers very shortly pedicelled; corolla stouter than in *L. bracteatus*, often curved in a semicircle, but sometimes straight.

** *Flowers at length glabrous.*

31. **L. cuneatus,** *Heyne in Roth Nov. Sp.* 193; glabrous except the youngest buds, leaves small all alternate petioled obovate-cuneate tip rounded or retuse base 3-nerved, bract small acute much shorter than the 5-toothed calyx, flowers $\frac{3}{4}$–$1\frac{1}{4}$ in. in subsessile axillary fascicles pedicelled, corolla-tube split slightly gibbously inflated above the middle, lobes 5 linear, fruit oblong. *Wight & Arn. Prodr.* 385; *Thwaites Enum.* 135 (*excl. var.* β.). L. lobeliæflorus, *DC. Prodr.* iv. 406. L. goodeniæflorus, *DC. l. c.*; *Wight & Arn. l. c.* L. montanus, *Wight in Wall. Cat.* 6866.

DECCAN PENINSULA; from the Concan southwards. CEYLON, abundant.

Branches not robust, bark grey. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., very variable in width, narrowed into the short petiole, nerves few. *Fascicles of flowers* rarely peduncled; flowers very variable in size, shortly pedicelled. *Calyx* hoary. *Corolla* very slender, straight or curved. *Fruit* $\frac{1}{3}$ in., oblong, surmounted by the cupular toothed calyx.—I have seen no authentic specimens of *L. goodeniæflorus* and *lobeliæflorus*.

32. **L. sclerophyllus,** *Thwaites Enum.* 135; glabrous except the flower and leaf-buds, leaves all alternate very shortly petioled very coriaceous obovate or cuneate-obovate 3-nerved, bract shorter than the 5-toothed calyx, flowers 1 in. in axillary sessile or very shortly peduncled fascicles pedicelled, corolla-tube nearly straight split slightly swollen about the middle, lobes 5 linear, fruit oblong glabrous.

CEYLON; Central Province, ascending to 7000 ft., *Walker*, &c.

Very much more robust than *L. cuneatus*, with much larger broader thickly coriaceous leaves $1\frac{1}{2}$–2 in. long. *Calyx* pubescent.

33. ? **L. ligulatus,** *Thwaites Enum.* 135; leaves petioled glabrous linear or oblong base acute tip rounded nerveless, racemes glabrous few-fld. equalling or shorter than the leaves, bract minute, flowers 1 in., calyx obscurely toothed, corolla glabrous, lobes 5 linear-spathulate acute.

CEYLON; at Jaffna and Calpentyne, *Gardner*.

Branches terete. *Leaves* $\frac{3}{4}$–2 in.; petiole $\frac{1}{12}$–$\frac{1}{6}$ in.—I have nothing to add to the above meagre description taken from Thwaites, the specimens I have seen being very imperfect.

34. **L. suborbicularis,** *Thwaites Enum.* 134; young shoots and flower-buds scurfily pubescent, leaves all alternate petioled very coriaceous orbicular or orbicular-obovate 3-nerved, bract smaller than the sharply 5-toothed pubescent calyx, flowers 1 in. racemose, corolla straight or curved, tube split gibbously inflated below the middle, lobes 5 linear, fruit oblong glabrous.

CEYLON; in elevated parts of the Island, *Walker*, &c.

Habit of *L. sclerophyllus*, but leaves more rounded, petiole longer, sometimes $\frac{1}{2}$ in. long, and flowers in racemes $\frac{1}{2}$–1 in. long.

35. **L. longiflorus,** *Desrouss. in Lamk. Encycl.* iii. 498; quite glabrous

throughout (racemes rarely puberulous), leaves alternate or opposite sessile or petioled orbicular oblong elliptic or linear obtuse thickly coriaceous, flowers 1–2½ in. in axillary and supra-axillary racemes secund erect pedicelled, calyx-limb cupular truncate entire, corolla slender curved split slightly dilated above the middle, lobes 5 short linear-oblong, fruit oblong. *DC. Prodr.* iv. 304; *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 217; *Wight & Arn. Prodr.* 384; *Roxb. Cor. Pl.* t. 139; *Grah. Cat. Bomb. Pl.* 86; *Dalz. & Gibs. Bomb. Fl.* 110; *Brandis For. Fl.* 397; *Kurz For. Fl.* 321; *Thwaites Enum.* 134; *Wall. Cat.* 507; *Wight Ic.* t. 302; *Gamble Man. Ind. Timb.* 320. L. bicolor, *Roxb. Fl. Ind.* i. 548, ii. 185, and *Ed. Carey & Wall.* ii. 205, and *Cor. Pl.* t. 139; *Wall. Cat.* 499. L. Kœnigianus, *Agardh in Schult. Syst.* vii. 108; *DC. l. c.* 307. L. Wightianus, *Wall. Cat.* 6872. L. imbricatus and L. lineatus, *Edgew. in Trans. Linn Soc.* xx. 59.—*Rheede Hort. Mal.* x. t. 4.

TROPICAL and TEMPERATE HIMALAYA, alt. 3–7500 ft., from Jamu to Bhotan. GANGETIC PLAINS, from Oude eastward to ASSAM, and southward on plains and hills throughout both Peninsulas to TRAVANCORE and MALACCA. CEYLON, in the warm parts of the Island.

A large bush; branches terete, usually smooth, dark or light grey, lenticellate or not. *Leaves* 3–10 by ½–5 in., infinitely variable in shape and veining, opaque and dark brown when dry; petiole stout, ¼–½ in. *Racemes* 1–4 in., solitary or fascicled, stout or slender, usually upcurved with upcurving flowers of variable length; bract orbicular, cupular; pedicels stout or slender. *Calyx* hoary in Ceylon specimens, limb quite entire. *Corolla* pink or red, with often green lobes, lower half of tube very narrow, reflexed part of the lobes ⅙–¼ the length of the tube. *Filaments* shorter than the anthers, often glandular. *Stigma* capitate. *Fruit* ½ in., smooth, crowned with the cupular calyx.—Of the many forms of this common and variable plant the following are the most remarkable.

Var. *falcata*, Kurz For. Fl. ii. 321; leaves linear 4–6 by ¼–½ in. often falcate, flowers ¾–1 in., calyx glabrous or white and scurfy. L. falcatus, *Linn. f. Suppl.* 211; *DC. l. c.* 305; *Wall. Cat.* 519. L. Wightianus, *Wall. Cat.* 6872, in part. L. longiflorus γ., *Wight & Arn. l. c.*—Deccan Peninsula and Ceylon.—The name of this variety is much the earliest for the species, but is very inapplicable, and has hence been put aside by general consent.

Var. *amplexifolia*, Thwaites Enum. 134; leaves large sessile 4–7 in. diam. orbicular- or oblong-cordate amplexicaul. L. amplexifolius, *DC. l.c.*; *Wight & Arn. l. c.*; *Grah. Cat. Bomb. Pl.* 86. L. amplexicaulis, *Wall. Cat.* 520.—Deccan Peninsula and Ceylon.—Inflorescence often terminal.

Var. *pubescens*; peduncle pedicels calyx and corolla in bud pubescent.—Deccan Peninsula.

36. **L. lonchiphyllus,** *Thwaites Enum.* 418; very robust, quite glabrous, leaves opposite and alternate subsessile very coriaceous ovate acute or acuminate strongly penninerved bullate, bract minute, flowers 1½ in. in shortly peduncled fascicles pedicelled, calyx-limb entire, corolla-tube very slender below gibbously inflated above the middle split nearly to the base, lobes 5 linear much shorter than the tube, fruit ovoid.

CEYLON; in the Ambagamowa District, *Thwaites.*

Branches very thick, terete, bark pale smooth or lenticellate. *Leaves* 4–6 by 1½–2½ in., pale brown when dry, margin recurved, base rounded or subcordate, nerves many arching deeply sunk and anastomosing; petiole ⅙–¼ in., very stout. *Flowers* few in a fascicle. *Calyx* small, bract subacute. *Corolla* slightly curved. *Style* slender, stigma capitate. *Fruit* ½ in. long.—The strongly nerved and bullate leaves of the only specimen I have seen are marked characters.

37. **L. elegans,** *Wall. in DC. Prodr.* iv. 304, and *Cat.* 530; very robust, glabrous, leaves opposite and alternate very shortly petioled elliptic

or narrow-oblong obtuse very thickly coriaceous, flowers 1–1¾ in. in very short axillary racemes stoutly pedicelled, bract cupular, ovary oblong, calyx-limb cupular obscurely 5-toothed, corolla slender curved, tube split dilated above the middle, lobes 5 linear one-fourth the length of the tube.

BURMA; on the Irawaddy near Yenangeun, *Wallich.*

Branches terete, smooth, bark grey. *Leaves* 2½–3 in., narrowed into the petiole, dark brown and opaque when dry, with undulate margins; nerves few, faint, very oblique. *Racemes* ⅓–⅔ in., robust, 4–6-fld., peduncle pedicels and calyx hoary; corolla glabrous, scarlet?—I have seen only Wallich's insufficient specimens; it is possibly a form of *L. longiflorus.* A somewhat similar plant from Pegu (*M'Lelland*) has broader leaves, with smaller flowers and quite glabrous racemes.

38. **L. elasticus,** *Desrouss. in Lamk. Encycl.* iii. 599; quite glabrous, leaves all opposite sessile very thickly coriaceous from orbicular to elliptic or oblong obtuse 3–5-nerved, flowers 1 in. in axillary fascicles sessile, bract minute, calyx-limb cupular entire, corolla-tube funnel-shaped split, lobes 5 filiform spirally coiled much longer than the tube. *DC. Prodr.* iv. 306; *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 217; *Wall. Cat.* 508; *Dalz. & Gibs. Bomb. Fl.* 109; *Wight Ic.* t. 343. L. Euphorbiæ, *Wight Ic.* t. 1063.—*Rheede Hort. Mal.* x. t. 3.

DECCAN PENINSULA; Vingorla, &c., in the Concan, *Dalzell, Ritchie*; Malabar, the Nilghiri and Pulney Mts., *Wight.*

Branches dichotomous, stout, terete, smooth, pale brown, lenticels few. *Leaves* very variable, 1½–4 in., pale brown on both surfaces when dry, base acute. *Flowers* quite glabrous and sessile; ovary minute. *Corolla-tube* rather swollen below. *Filaments* very long, spirally coiled like the corolla-lobes; anthers long, as narrow as the filament. *Style* very long, stigma fusiform. *Fruit* ovoid, red, "the size of a small bean," *Wight.*—I do not find any difference between *L. Euphorbiæ* and *elasticus*; the corolla-tube is split in both, though Wight does not observe this in *L. Euphorbiæ*, which has smaller rounder leaves than the type. This is one of the few Indian species with flowers absolutely sessile on the branches.

39. **L. pentandrus,** *Linn. Mant.* 63; leaves rarely opposite petioled elliptic-oblong or -lanceolate rarely obovate obtuse or acute, flowers ⅔ in. in densely scurfy axillary very short racemes, bract cupular, calyx-limb 5-toothed, corolla straight, tube dilated below equally 5-cleft to the middle, lobes linear acute, fruit oblong-ovoid. *DC. Prodr.* iv. 305; *Kurz For. Fl.* ii. 320; *Wall. Cat.* 514; *Blume Fl. Jav. Loranth.* 33, t. 10. L. farinosus, *Desr. in Lamk. Encycl.* iii. 597; *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 221; *Wall. Cat.* 514; *Griff. Notul.* iv. 616, and *Ic. Pl. Asiat.* t. 620, f. 1, 2. L. rigidus, contractus, & Finlaysonianus, *Wall. Cat.* 531, 6864, 6871. Dendrophthoe pentandra & farinosa, *Miquel Fl. Ind. Bat.* i. pt. 1, 818, 819. Elytranthe farinosa, *G. Don Gen. Syst.* iv. 427.

SILHET, *Wallich.* CHITTAGONG, *J. D. H. & T. T.* PEGU, *Kurz.* TENASSERIM, *Wallich.* MALACCA, *Griffith* (L. elasticus, *Kew Distrib.* 2723), &c. SINGAPORE, *Lobb.* PENANG, *Wallich, Phillips.*—DISTRIB. Sumatra, Java, Borneo.

Branches rather stout, terete, grey. *Leaves* 2–6 in., dark brown or almost black when dry, thickly coriaceous, nerves faint; petiole ¼–½ in. *Racemes* solitary or fascicled, few- or many-fld.; flowers usually crowded; pedicels short, stout; bract rather large; buds cylindric, not clavate at the tip. *Corolla* not split, reflexed portion of lobes half the length of the tube. *Style* stout, stigma capitate. *Fruit* ⅓ in., crowned by the cupular unequally 5-lobed calyx-limb.

40. **L. neelgherrensis,** *Wight & Arn. Prodr.* 382; very robust, quite glabrous, leaves opposite and alternate thickly coriaceous oblong orbicular elliptic or oblong-lanceolate obtuse penni- or few-nerved, bract minute,

flowers 1 in. in sessile or peduncled axillary fascicles sessile or pedicelled, calyx-limb entire, corolla-tube rather inflated, lobes 5 linear much longer than the tube reflexed above the middle, fruit oblong. *Wight Ic.* t. 1020, and *Spic. Neilgherr.* t. 88; *Thwaites Enum.* 134; *Zenk. Plant. Ind.* t. 17.

NILGHIRI HILLS; ascending to 7000 ft., *Wight*, &c. CEYLON; Central Province, alt. 1–7000 ft., *Walker*, &c.

Branches very stout, terete, smooth, or minutely cracked, not lenticellate. *Leaves* 3–6 in. by 1½–4 in., narrowed into the petiole, dark brown above and beneath; nerves very few, raised on both surfaces; petiole ¼–½ in., very stout. *Flowers* fascicled on the nodes of the axils, sessile and peduncled together; bract variable; pedicels very short or 0. *Calyx* minute, ellipsoid or globose, limb cupular, margin thin hardly lobed. *Corolla-tube* very slender in bud, in flower straight, not split, lobes sometimes all free, at others one or two are combined for half their length. *Filaments* short, anthers long. *Style* filiform, stigma capitate. *Fruit* ½ in., smooth.—The nervation varies much. Thwaites suggests that this may be a variety of *L. elasticus*, but it is very different.

Var. ? *Clarkei*; flowers smaller ⅔ in. corolla-lobes equal shorter more spathulate reflexed portion about ⅙ in.—Ootamacund, alt. 7000 ft., *Clarke*.—Amongst the very numerous specimens of *L. neelgherrensis* that I have examined, none have such short and spathulate corolla-lobes as this.

41. **L. memecylifolius,** *Wight & Arn. Prodr.* 383; quite glabrous, leaves opposite and alternate petioled narrowly oblong or elliptic obtuse thickly coriaceous, flowers 1–1½ in. umbelled on short stout axillary peduncles erect pedicelled, ovary cylindric-oblong, calyx-limb cupular obtusely 5-toothed or truncate, corolla straight, tube 5-angled split slightly inflated above the middle, lobes 5 linear-lanceolate acuminate as long as the tube or longer, fruit oblong or pyriform.

NILGHIRI HILLS, alt. 8000 ft., *Wight*, *Schmidt*, &c.

Branches stout, terete, brown. *Leaves* 1–3 in., dark brown and smooth when dry, narrowed into the very short petiole, flat, nerves faint, oblique. *Umbels* solitary or fascicled; peduncle and pedicels very stout, ⅛–⅙ in.; bracts orbicular, very coriaceous. *Ovary* broad at the top, calyx-limb short. *Corolla* scarlet, strict, erect, acute in bud, lobes reflexed for about half their length. *Filaments* much shorter than the anthers. *Stigma* capitate. *Fruit* ⅓ in., smooth, crowned by the cupular calyx-limb.—Closely allied to *L. neelgherrensis*, but the leaves are smaller, flowers umbelled and fewer and larger, corolla not dilated at the base, and the calyx obtusely toothed.

42. **L. sarcophyllus,** *Wall. in Wight & Arn. Prodr.* 384, and *Cat.* 6863; very stout, quite glabrous, leaves large alternate and opposite shortly petioled, elliptic oblong or orbicular very thickly coriaceous obtuse, flowers 1–1½ in. in short many-fld. racemes, calyx-limb cupular obtusely unequally lobulate, corolla curved, tube narrow split dilated towards the base, lobes 5 linear slender much longer than the tube. L. carnosus, *Herb. Wight.*

NILGHIRI MTS.; at Cumbum on a Ficus, *Wight.*

Habit of the large-leaved states of *L. longiflorus* with oblique nerves, but leaves much thicker, calyx-limb distinctly lobulate, and corolla-tube dilated below. Wight's specimens are the only ones I have seen.

43. **L. crassus,** *Hook. f.*; very stout, leaves large alternate petioled very thickly coriaceous elliptic or oblong obtuse, flowers ¾ in. in small axillary subsessile racemes densely furfuraceous pedicelled, calyx-limb cupular quite entire, corolla straight funnel-shaped not split, equally cleft to below the middle into 5–6 lobes with long reflexed linear tips, fruit ovoid-oblong. L. retusus, *Wall. Cat.* 504, *in part.*

SINGAPORE, *Wallich.*

Branches terete, grey, densely lenticellate. *Leaves* 3–7 by 1½–4 in., dark brown and opaque when dry on both surfaces; nerves broad, distinct; petiole very stout, ¼ in. *Racemes* ½ in.; pedicels very short; bracts orbicular, cupular. *Calyx-tube* globose, limb truncate. *Corolla-lobes* linear from a cuneate base, reflexed for half their length. *Anthers* linear, longer than the filament. *Stigma* capitate. *Fruit* (young) ½ in. long, crowned with the cupular calyx-limb.—I have seen only Wallich's specimens of this very fine species which are attached to two sheets with *L. retusus*, Jack, from which they differ entirely in habit, in the texture form and colour of the leaves, and in the unibracteate and scurfy much shorter flowers. The specimens of *L. retusus* are flowerless.

Sect. VI. **Tolypanthus.** *Flowers* in involucrate fascicles, 1-bracteate, ebracteolate; bracts much broader than the flowers, free or connate into a bell-shaped involucre.

44. **L. involucratus,** *Roxb. Fl. Ind.* i. 552, ii. 188, and *Ed. Carey & Wall.* ii. 208; puberulous, leaves opposite and alternate long-petioled elliptic ovate or cordate obtuse, involucre of 4 ovate free bracts in a whorl equalling the 4 laxly villous sessile flowers, calyx-limb 4-lobed, corolla ½ in., tube straight cleft to the middle into 5 linear lobes with recurved tips. *DC. Prodr.* iv. 298; *Wall. Cat.* 501; *Griff. Notul.* iv. 632.

SIKKIM HIMALAYA, alt. 2–3000 ft., *J. D. H., Clarke.* ASSAM, CACHAR, SILHET and KHASIA MTS., *Wallich, Griffith,* &c.

Branches slender, young tomentose, old woody terete with dark-brown smooth bark and large lenticels. *Leaves* 4–7 in., thin, almost membranous, base acute, nerves very slender; petiole ½–1 in. *Clusters of flowers* solitary or fascicled, sessile or shortly peduncled; bracts leafy, ½ in. *Calyx-tube* oblong, limb cleft to the base. *Corolla-tube* rather inflated below, lobes recurved for about half their length. *Filaments* shorter than the oblong-linear anthers. *Style* very stout, stigma large, capitate, obscurely lobed. The var. *hebecladus*, Wall., has no characters that I can recognize.

45. **L. Gardneri,** *Thwaites Enum.* 133; very stout, glabrous, leaves opposite and alternate petioled ovate or oblong obtuse, involucre of 5–6 ovate free bracts in a whorl much shorter than the 5–6 glabrous sessile flowers, calyx-limb truncate, corolla ¾ in., tube straight cleft into 5 linear-oblong lobes recurved above the middle.

CEYLON; at Hantani, alt. 3000 ft., *Gardner.*

Branches very stout; bark smooth, red-brown, lenticels few. *Leaves* 3–4 in., coriaceous, greenish-brown above, red-brown beneath; midrib strong, nerves slender; petiole ¼–½ in. *Clusters of flowers* sessile on the branches; bracts ¼–⅓ in., obtuse, nerves reticulate. *Ovary* very short; calyx-limb annular, thickened. *Corolla-tube* straight, glabrous, not dilated, sometimes bilabiate, lobes ¼ the length of the tube. *Filaments* subulate, as long as the linear-oblong caducous anthers; stigma capitate. *Fruit* (young), ellipsoid.

46. **L. lageniferus,** *Wight Ic.* t. 306; glabrous, leaves opposite or alternate shortly petioled orbicular or oblong base rounded acute or cordate, involucre large bell-shaped 5-lobed of 5 connate bracts much shorter than the 5 glabrous or hoary sessile flowers, calyx-limb 5-toothed, corolla 1½–2 in., lobes 5 very short oblong-lanceolate. *Grah. Cat. Bomb. Pl.* 86; *Dalz. & Gibs. Bomb. Fl.* 110; *Hook. Ic. Pl.* t. 229, 230.

Hills of the CONCAN, *Graham, Law.* MALABAR, *Wight.*

Branches stout or slender; bark dark brown, smooth, lenticels few large. *Leaves* 3–4 in., rather thin, and shining above, with short petioles and cordate or rounded bases in Malabar specimens, more oblong and coriaceous with acute bases in Concan

ones; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Involucres* 1–1½ in., shortly peduncled; lobes short, unequal, triangular-ovate; flowers subsessile. *Ovary* very short, quite glabrous. *Calyx-limb* minute, sharply toothed. *Corolla* narrow, straight, slightly dilated in the middle, suddenly contracted at the base of the lobes, which are ⅛ the length of the tube. *Filaments* subulate; anthers linear-oblong, caducous. *Stigma* capitate.

Sect. VII. **Macrosolen.** *Flowers* large, racemose or subspicate, bracteate and 1–2-bracteolate; bract small, shorter than the ovary; bracteoles often connate in a cup. *Corolla* 5–6-cleft.

47. **L. retusus,** *Jack in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 212; quite glabrous, leaves opposite and alternate shortly petioled obovate elliptic orbicular or cuneate very thickly coriaceous obtuse or retuse, bract and bracteoles minute, flowers in very short axillary few-fld. racemes, calyx-limb obsolete, corolla straight tube slightly dilated cleft to the middle into 5 linear-lanceolate lobes. *DC. Prodr.* iv. 296; *Wall. Cat.* 504, *in part.* Macrosolen retusus, *Miq. Fl. Ind. Bat.* i. pt. 1, 828. Elytranthe retusa, *G. Don Gen. Syst.* iii. 425.

Singapore, *Jack, Wallich,* &c. Malacca, *Griffith, Cuming,* &c.—Distrib. Java, Borneo.

Branches stout, terete, brown. *Leaves* 3–4 by 1–4 in., sometimes obcordate, pale greenish above and shining a little when dry, pale brown beneath; midrib stout, nerves slender; petiole very stout, $\frac{1}{6}$–$\frac{1}{3}$ in. *Racemes* ¼ in., peduncle and pedicels $\frac{1}{8}$–$\frac{1}{6}$ in., spreading, quite glabrous. *Ovary* ovoid. *Corolla* not split dorsally, pale rose; lobes rather shorter than the tube. *Anthers* very slender, longer than the filament. *Stigma* capitate. *Fruit* globosely ovoid.

48. **L. trigonus,** *Wight & Arn. Prodr.* 386; quite glabrous, branchlets very robust triquetrous, leaves very large thickly coriaceous opposite or whorled in threes broadly elliptic obtuse, flowers in short axillary and cauline racemes or cymes, bracts connate in a small cup, calyx-limb cupular truncate, corolla-bud ⅓ in. terete clavate 5-merous.

Travancore; at Quilon, *Wight.* South Concan; Belgaum, on the highest point of the N.E. Hills, *Ritchie.* N. Canara, *Talbot.*

Branches terete, as thick as the middle finger; branchlets with the flat or concave faces ⅓ in. broad, smooth. *Leaves* 4–6 in., often as broad, brown and opaque when dry, base acute or rounded, nerves distinct; petiole very stout, ½–¾ in. *Flowers* in clustered cymes or racemes, 1–1½ in.; peduncle and pedicels very stout, angled when dry; bracts forming a shallow oblique cup. *Fruit* ½ in., ellipsoid, crowned by the cupular calyx-limb.—A very remarkable species, of which flowers are much wanted; the two localities assigned to this species are so widely apart in position and otherwise as to require confirmation; possibly two species are hence indicated.

49. **L. Brandisianus,** *Kurz in Journ. As. Soc.* 1871, ii. 63, and *For. Fl.* ii. 317; quite glabrous, leaves subopposite petioled elliptic-lanceolate caudate-acuminate, flowers 1–1¼ in. in short axillary racemes or cymes, bract and bracteoles connate below acute, calyx-limb truncate, corolla straight 6-angled in bud, tube urceolate below cleft to the middle into 6 linear reflexed lobes.

Martaban Hills, alt. 3000 ft., *Brandis.* Moulmein, *Parish.*

Branches terete, bark pale. *Leaves* 3–7 in., firmly coriaceous, base acuminate, greenish when dry and shining above, yellowish brown beneath, midrib strong, nerves very faint; petiole $\frac{1}{3}$–½ in. *Flowers* "usually in a 1–2-fld. raceme terminated by a cyme of 3–4 flowers," *Kurz*; peduncle and pedicels very stout; corolla-tube rather stout in bud, with a ridge at the base of the lobes; buds stout, glabrous, clavate above the middle, very coriaceous.

50. **L. hypoglaucus,** *Kurz in Journ. As. Soc.* 1872, ii. 309, and *For. Fl.* ii. 318; quite glabrous, leaves subopposite lanceolate or elliptic-lanceolate acuminate glaucous beneath, flowers $1\frac{1}{4}$–$1\frac{3}{4}$ in. 2–3-nate on short crowded axillary peduncles, bract and bracteoles minute connate below, calyx cylindric limb entire truncate, corolla-tube curved slightly dilated below deeply 6-cleft, lobes linear.

Drier hill forests of MARTABAN, alt. 5–6000 ft., *Kurz.*

Leaves $2\frac{1}{2}$–3 in., tapering into the short petiole, nerves obscure. *Flowers* bright crimson; bract and bracteoles triangular-ovate.—Character from Kurz; I have seen no specimens.

51. **L. formosus,** *Blume Bijd.* 660; and *Fl. Javæ, Loranth.* t. 15; glabrous, leaves subopposite ovate to elliptic-oblong acuminate or cuspidate shining on both surfaces, flowers 2–3 in. in few-fld. hoary axillary cymes, bract and bracteoles minute, calyx-limb obscurely toothed, corolla-tube very long subinflated, lobes 6 linear. *DC. Prodr.* iv. 297; *Kurz For. Fl.* ii. 317. Macrosolen formosus, *Miquel Fl. Ind. Bat.* i. pt. 1, 827. Elytranthe formosa, *Don Gen. Syst.* iii. 426.

BURMA; "in Tenasserim?" *Kurz.*—DISTRIB. Java.

Branches terete or obscurely 4-angled. *Leaves* 4–6 in., coriaceous, base obtuse or acute, nerves obscure; petiole very short, thick. *Flowers* crimson, pedicelled; bract and bracteoles 3-gonous. *Ovary* oblong. *Corolla-tube* a little curved, lobes greenish. *Anthers* linear.—I have seen no Indian specimens; the description is from Kurz.

52. **L. ampullaceus,** *Roxb. Fl. Ind.* ii. 189, and *Ed. Carey & Wall.* ii. 209; quite glabrous, leaves all opposite petioled elliptic-ovate oblong or lanceolate subacute or acuminate polished above, nerves distinct, flowers 3–7 $\frac{1}{2}$–$\frac{2}{3}$ in. in short axillary glabrous racemes, calyx-limb entire, corolla-tube oblong 6-angled inflated below, lobes 6 linear-spathulate as long as the tube, fruit ellipsoid. *DC. Prodr.* iv. 296; *Kurz For. Fl.* ii. 316; *Wall. Cat.* 502. L. pallens & carinatulus, *Wall. Cat.* 523, 529; *DC. l. c.* 296, 297. Macrosolen? pallens, *Miq. Fl. Ind. Bat.* i. pt. 1, 831.

From BENGAL, ASSAM and the KHASIA MTS. to PENANG, MALACCA and SINGAPORE.

Branches stout or slender, pale; bark smooth or lenticellate. *Leaves* 3–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., very coriaceous, base acute rarely rounded, nerves spreading; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Racemes* very variable, with 3–6 pairs of flowers and a terminal one; peduncle solitary or few in a cluster, rarely 1 in. long; pedicels 0–$\frac{1}{6}$ in.; bract sometimes half the length of the ovary; bracteoles smaller, connate. *Corolla* greenish yellow; bud straight, bottle-shaped, with prominent angular shoulders. *Fruit* "long oval smooth yellow the size of a currant," *Roxb.*—I have difficulty in distinguishing this from the following; some Mergui specimens have large leaves rounded at the base of a golden colour when dry. Some Malaccan ones have longer and very slender peduncles and pedicels. There is no named specimen of *L. carinatulus* in Wallich's Herbarium, but good ones were distributed to Hooker and Bentham; they do not differ at all from *ampullaceus.*

53. **L. globosus,** *Roxb. Fl. Ind.* i. 550, ii. 187, and *Ed. Carey & Wall.* ii. 206 (*excl. cit. Rheede*); quite glabrous, leaves all opposite (rarely alternate or 3-nately whorled) petioled elliptic-lanceolate subacute or acuminate, nerves very obscure, flowers 3–7 in axillary glabrous racemes pedicelled $\frac{1}{3}$–$\frac{1}{2}$ in., calyx-limb entire, corolla-tube oblong 5–6-angled inflated, lobes 5–6 linear-spathulate as long as the tube, fruit globose. *DC. Prodr.* iv. 297; *Kurz For. Fl.* ii. 315; *Wall. Cat.* 6870. L. subglobosus, *Wall. Cat.* 538; *DC. l. c.* 297; *Kurz l. c.* 316. L. oleoides, *DC. l. c.* L. olei-

folius, *Wall. Cat.* 524. L. viridiflorus, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 219; *Wall Cat.* 512. L. sphærocarpus, *Blume Bijd.* 661, and *Fl. Jav. Loranth.* t. 17; *DC. l. c.* 297. Macrosolen sphærocarpus & oleoides, *Miq. Fl. Ind. Bat.* i. 1. 830, 831. Elytranthe sphæroidea, *Don Gard. Dict.* iv. 127.

TROPICAL HIMALAYA; Nepal, *Wallich.* Sikkim, alt. 1–4000 ft., *J. D. H.* BENGAL, CACHAR, KHASIA MTS., PEGU, PENANG and MALACCA.—DISTRIB. Java.

I very much doubt this being anything but a form of *L. ampullaceus*, from which it differs in the narrower nerveless leaves and (according to description) in the globose fruit. Indeed Roxburgh's own specimens (in Herb. Bentham) do not agree with his drawing or description, and are certainly *L. ampullaceus*. Roxburgh describes the flowers as greenish orange, but his figure represents them with a pink corolla-tube and yellow lobes. Kurz says greenish orange with yellow tips, as does Clarke. Kurz says that the nerves become visible in a dry state. The Plate of Rheede (x. t. 5) quoted by Roxburgh and others for *L. globosus* cannot belong to that plant, which is not a native of Malabar; it is too rude for determination.

Sect. VIII. **Elytranthe.** *Flowers* few, large, crowded, decussately arranged on very short spikes which are sessile, or terminate very stout axillary peduncles. *Bracts* and *bracteoles* subequal, large, coriaceous, at length deciduous. *Calyx-limb* tubular, truncate, quite entire. *Corolla* tubular or funnel-shaped, 5–6-cleft.

* *Bracts and bracteoles orbicular, shorter than the calyx.*

54. **L. loniceroides,** *Linn. Sp. Pl. Ed.* 2. 473 (*excl. syn. Pluk.*); quite glabrous, leaves all opposite petioled oblong-ovate or -lanceolate acuminate, spikes few-fld. terminating short stout axillary peduncles, bract and bracteoles orbicular sheathing the base of the ovary, corolla 1–2 in. narrowly funnel-shaped curved, lobes 5–6 linear-oblong or -spathulate. *DC. Prodr.* iv. 299; *Roxb. Fl. Ind. Ed. Carey & Wall.* 216; *Wight & Arn. Prodr.* 382; *Wight Ic.* t. 303; *Dalz. & Gibs. Bomb. Fl.* 110; *Thwaites Enum.* 133; *Wall. Cat.* 506 A. L. umbellatus, *Heyne in Roth Nov. Sp.* 192; *DC. l. c.* 316. L. macrophyllus, *Zenk. Pl. Ind.* t. 16.

DECCAN PENINSULA; from the Concan to Travancore, ascending to 6000 ft. in the Nilghiris. CEYLON, in the Central Province, alt. 4–7000 ft.

Branches stout, terete; bark pale, warted. *Leaves* 2–5 by 1½–2 in., thickly coriaceous, nerves spreading; petiole ¼–⅓ in. *Peduncles* solitary or crowded, very robust, ⅙–⅓ in. long, 2–6 fld.; bracts shorter than the ovary, very coriaceous, obtuse or subacute, keeled. *Calyx-tube* twice as long as the ovary, truncate, cylindric, quite entire. *Corolla* red, thickly coriaceous, very variable in length, split ⅓ way down. *Anthers* slender, multilocellate. *Fruit* ellipsoid.—*L. coriaceus*, Desv. in Lam. Encycl. iii. 597 (cited under this by De Candolle and others), is quite another plant, a native of Bourbon.

55. **L. capitellatus,** *Wight & Arn. Prodr.* 382; quite glabrous, leaves all opposite petioled oblong-ovate or lanceolate acuminate, spikes subsessile or on very short stout axillary peduncles, bracts and bracteoles orbicular sheathing the base of the ovary, corolla ¼–⅔ in. usually straight funnel-shaped cleft to or below the middle into 5–6 linear or spathulate lobes. *Wight Ic.* t. 304; *Dalz. & Gibs. Bomb. Fl.* 109; *Thwaites Enum.* 133. L. ampullaceus, *Wall. Cat.* 506 B.

DECCAN PENINSULA; from the Concan southwards. CEYLON, ascending to 3000 ft.

Thwaites suspects this to be a variety of *L. loniceroides*, and he is probably

right, for except the short straight corolla and usually very short peduncle of the flower, I find little to distinguish it.

56. **L. psilanthus,** *Hook. f.*; quite glabrous, robust, leaves all opposite petioled ovate-oblong or -lanceolate acute or acuminate, spikes few-fld. terminating long stout axillary peduncles, bracts decussately opposite and bracteoles orbicular sheathing the base of the ovary, corolla 1–1½ in. very slender curved tubular, lobes 6 very slender. Loranth. No. 71, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA and Mishmi Hills; *Griffith.* KHASIA MTS., alt. 4–6000 ft., *Griffith*, &c.

Very near *L. loniceroides*, and perhaps a form of that plant, but more robust, with usually larger longer-petioled leaves, longer peduncles often 1 in. long, and very slender corollas bright red with yellow almost filiform lobes.

** *Bract and bracteoles oblong; longer than the calyx.*

57. **L. albidus,** *Blume Bijd.* 665; quite glabrous, leaves all opposite petioled ovate or oblong obtuse, spikes 2–6-fld. terminating stout axillary peduncles, bracts oblong twice as long as the calyx, corolla 1–1½ in. tubular curved, lobes 5–6 short oblong. *DC. Prodr.* iv. 299. L. leucosiphon, *Griff. Notul.* iv. 623, and *Ic. Pl. Asiat.* t. 619–623. Elytranthe albida, *Blume Fl. Jav.* t. 22; *Miquel Fl. Ind. Bat.* i. pt. 1, 832.

TENASSERIM; at Mergui, *Griffith.* MALACCA, *Griffith, Maingay.*—DISTRIB. Java, Sumatra, Borneo.

A large shrub, branches terete, bark pale. *Leaves* 2–3 by 1–1½ in., moderately coriaceous, rarely cordate, nerves many spreading; petiole ½–¾ in., rather slender. *Peduncles* ¼–½ in., solitary or fascicled; bracts ¼ in. long, very coriaceous, concave, keeled, obtuse or subacute; bracteoles as long, opposite, narrower. *Calyx-tube* short, truncate, quite entire. *Corolla* constricted above the ovary, then rather swollen, mouth constricted, white, with pale pink limb. *Filaments* subulate.

58. **L. Maingayi,** *Hook. f.*; branchlets and inflorescence rusty-pubescent, leaves opposite shortly petioled elliptic or obovate obtuse, flowers capitate decussately inserted on a short stout sessile rachis and concealed by the obtuse bracts, corolla ¼ in. quite glabrous funnel-shaped regularly cleft into 6 linear recurved lobes longer than the tube.

MALACCA, *Maingay.*

Branches terete, smooth, as thick as a duck's quill, without lenticels; nodes distant, thickened. *Leaves* 2–3 in., coriaceous, midrib strong beneath, nerves very slender, base acute; petiole ¼ in., slender. *Inflorescence* of scurfy heads sessile at the nodes, solitary or fascicled, about ⅔ in. long, formed of about 4 pairs of decussate broadly oblong obtuse caducous imbricating bracts, each at the base of a perfectly glabrous sessile flower; rachis of the inflorescence very stout, 4-sided, deeply excavated opposite the flowers. *Ovary* very short; calyx-limb cupular. *Corolla* coriaceous, lobes spreading. *Filaments* linear, anthers oblong. *Stigma* capitate.—The specimen is a solitary one; so allowances must be made for the description. It is closely allied to *L. Arnottianus*, Korth, of Sumatra, which has acute bracts.

DOUBTFUL AND EXCLUDED SPECIES.

L. BIFLORUS, *Desrouss. in Lamk. Encycl.* iii. 600; *DC. Prodr.* iv. 302; *Wight & Arn. Prodr.* 386, is probably one of the forms of *L. Scurrula.*

L. CORIACEUS, *Desrouss.*, which is cited by authors as a synonym of *L. loniceroides*, L., is a very different plant, a native of Bourbon.

L? FIRMUS, *Wall. Cat.* 6874, is *Henslovia umbellata*, Bl.

L. KANNELI, *Schult. Syst. Veg.* vii. 153; *Wight & Arn. Prodr.* 387; *Rheede Hort. Mal.* x. t. 5, is undeterminable.

L. LAMBERTIANUS, *Schult. Syst.* vii. 118; *DC. Prodr.* iv. 317, is probably *L. pentapetalus*, Roxb., if from Nepal, which is doubtful.

L. MITCHELII, *Wall. Cat.* 6865, from Madras, is an *Olax*, probably *O. Wightiana.*

L. OBOVATUS, *Griff. Notul.* iv. 622, from Malacca, is apparently near *L. globosus*, differing in the cuneate-obovate leaves.

L. PUNICEUS, *Wall. Cat.* 522, from Penang, consists of a few detached alternate lanceolate finely acuminate coriaceous leaves, and a few detached small ellipsoid fruits: it is undeterminable. Wallich says it is like his *L. erythrostachys* (*L. pentandrus*, L.) of Nepal.

L. RUGULOSUS, *Heyne in Roth Nov. Sp.* 194; *DC. Prodr.* iv. 317; *Wight & Arn. Prodr.* 386, from the Deccan, is undeterminable. It is no doubt a *Cichlanthus.*

L. SERRULATUS, *Roxb. in Steud. Nomencl.* Nothing is known of this.

L. SIAMENSIS, *Kurz For. Fl.* ii. 320, is a Siam plant allied to *L. pentandrus.*

L. TURBINATUS, *DC. Prodr.* iv. 305; *Wight & Arn. Prodr.* 386, from the Nilghiris, is altogether doubtful. Wight and Arnott say that but for the calyx being unequally 4-cleft, it would be referred to a glabrous var. of *L. buddleioides*, Desr. (*Scurrula*, L.).

L. VISCIFOLIUS? *Wight in Wall. Cat.* 6865, is in too imperfect a state for determination. It was communicated by Wight to Wallich, and is probably *L. recurvus*, Wall. I find nothing more like it amongst Wight's plants. The exact locality is Cumbum in the Nilghiris, Jany, 1827.

2. VISCUM, *Linn.*

Leaves opposite, often reduced to scales. *Flowers* unisexual, small or minute, solitary or fascicled in the axils of the leaves or at the nodes of the branches, rarely terminal. *Perianth-tube* of the male solid, of the female adnate to the ovary; limb 3–4-partite, segments usually deciduous. *Anthers* broad, sessile, adnate to the perianth-lobes, opening by many pores. *Ovary* inferior; stigma sessile or subsessile, large, pulvinate. *Fruit* succulent, pericarp full of viscid matter. *Embryo* in fleshy albumen, solitary or 2 in each seed.—Species about 30, temperate and tropical.

* *Branches dichotomous, leafy, or the lower whorled. Flowers fascicled, terminal in the forks of the branches. Perianth-lobes deciduous.*

1. **V. album,** *Linn. Sp. Pl.* 1023; branches terete, leaves obovate-cuneate tip rounded, flowers in sessile or shortly peduncled cup-shaped bracts. *Boiss. Fl. Orient.* iv. 1068; *DC. Prodr.* iv. 278; *Brand. For. Fl.* 392; *Kurz For. Fl.* ii. 323. V. stellatum, *Don Prodr.* 142; *DC. l. c.*; *Wall. Cat.* 490.

TEMPERATE HIMALAYA; from Kashmir to Nepal, alt. 3–7000 ft.—DISTRIB. Westward to the Atlantic, N. Asia to Japan.

A large green bush, branches jointed. *Leaves* sessile, very coriaceous, flat, 1–2 in. long, broad or narrow, obscurely 3–5-nerved. *Flowers* diœcious, sessile, 3–5 in a cluster, bracts concave. *Perianth-segments* 3–4, triangular, thick, acute, deciduous. *Fruit* white, ¼–⅓ in. long, ellipsoid.—*Mistletoe.*

** *Branches dichotomous leafy* (*or leaves* 0 *in* V. ramosissimum). *Flowers in axillary sessile or peduncled fascicles. Perianth-lobes deciduous.*

2. **V. monoicum,** *Roxb. Fl. Ind.* iii. 763; branches terete, leaves shortly petioled obliquely ovate or falcate acute or acuminate 3–5-nerved, flowers monœcious in axillary sessile or shortly peduncled fascicles, bracts cuspidate, fruit oblong. *DC. Prodr.* iv. 278; *Brandis For. Fl.* 393; *Kurz For. Fl.* ii. 324; *Wight & Arn. Prodr.* 379 (under *V. orientale*); *Griff. Notul.* iv. 637, and *Ic. Pl. Asiat.* t. 631. V. falcatum, *Wall. Cat.* 492; *DC. l. c.* V. benghalensis, *Roxb. mss.* ? V. confertum, *Roxb. l. c.*

SIKKIM HIMALAYA, alt. 2–4000 ft., *J. D. H.* KHASIA MTS., alt. 0–3000 ft., *Wallich*, &c. GANGES DELTA, *Roxburgh.* OUDE, *Vicary.* MARTABAN and TENASSERIM, *Kurz.* NILGHIRI or KURG HILLS, *G. Thomson.*

A large shrub. *Leaves* rather thin, 1–5 in. long, very variable in breadth, nerves often strong. *Flowers* 1–3, minute, greenish, the lateral usually female, central male or absent, sometimes appearing spicate from terminating leafless shoots. *Perianth-segments* 4, triangular-oblong. *Fruit* the size of a pea truncate smooth "yellowish," Kurz, "blackish brown," Brandis.—Much of the above description is taken from Kurz. I follow Wight and Arnott in regarding Roxburgh's *V. confertum* from Silhet as probably the same.

Var. ? *Edgeworthii*; branches more robust, leaves very thickly coriaceous sometimes $2\frac{1}{2}$ in. broad and 7-nerved.—Banda, on *Zizyphus, Edgeworth.*—This may be a different species.

3. **V. verruculosum,** *Wight & Arn. Prodr.* 379; branches terete opposite and whorled, leaves petioled obovate oblong or rounded obtuse or acute base cuneate 3–5-nerved, peduncles axillary 3-fld., flowers monœcious, fruit linear-oblong warted. V. monoicum ? *Wight in Wall. Cat.* 6875.

DECCAN PENINSULA; on the Dindygul Hills, alt. 2500 ft., *Wight.*

Branches rather slender, terete, branchlets angular. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., black when dry, not thickly coriaceous. *Flowers* as in *V. orientale*, of which it is (as suggested by Wight and Arnott) perhaps a variety, but according to Wight the fruit is very different, being long slender and warted. Thwaites unites it with *orientale*, but gives no reason.

4. **V. orientale,** *Willd. Sp. Pl.* iv. 737; branches terete or angled and grooved opposite and whorled, leaves petioled from obovate to elliptic oblong and linear oblong obtuse 3–5-nerved, base narrowed or rounded, flowers few or many in sessile or peduncled clusters monœcious, fruit globose smooth. *DC. Prodr.* iv. 278; *Wight & Arn. Prodr.* 324; *Brand. For. Fl.* 393; *Kurz For. Fl.* ii. 324; *Blume Fl. Jav. Loranth.* t. 24, 25; *Benth. Fl. Austral.* iii. 396; *Miquel Fl. Ind. Bat.* i. pt. 1, 804; *Wall. Cat.* 491. V. verticillatum, *Roxb. Fl. Ind.* iii. 764. V. Heyneanum, *DC. l. c.* V. indicum, *Rottl. mss.*

BENGAL, BEHAR, and CHITTAGONG, and thence southward to SINGAPORE and TRAVANCORE. CEYLON; Central Province, ascending to 7000 ft.—DISTRIB. Malay Islands, China, New Guinea, Australia.

A rather large much-branched shrub, black or brown when dry; branches often very slender, branchlets angular. *Leaves* rarely more than 1 in., often unequal. *Flowers* minute, rarely more than 5. *Flowers* as in *V. foliatum*, but perianth usually 3-cleft. *Fruit* the size of a pea (Kurz), "purple, copiously minutely dotted," W. & A.—I cannot distinguish between specimens with deeply grooved and angled branches, and those with terete ones, there are so many intermediates.

5. **V. orbiculatum,** *Wight Ic.* t. 1016, and *Spec. Neilgherr.* t. 86; branches and branchlets acutely angled and deeply grooved, leaves petioled elliptic oblong or rounded much waved obtuse 3–5-nerved, flowers 3–5 in sessile or peduncled axillary clusters, fruit oblong rounded at both ends.

NILGHIRI HILLS, *Wight, Herb. Hohenack.*

I doubt this being anything but a form of *V. orientale* with the main branches angled and grooved and leaves much waved.

6. **V. ovalifolium,** *Wall. Cat.* 489; branches stout terete, leaves petioled very coriaceous elliptic or oblong rarely ovate obtuse 3–5-nerved, flowers dicœcious ? crowded in axillary sometimes spicate clusters, perianth 4-lobed, fruit oblong-ovoid. *DC. Prodr.* iv. 278; *Kurz For. Fl.* ii. 325. V. obtusatum, *Wall. Cat.* 494; *DC. l. c.*

TENASSERIM, *Griffith, Lobb,* &c. ANDAMAN ISLANDS, *Kurz.* MALACCA, *Griffith* (*Kew Distrib.* 2739), *Maingay* (*Kew Distrib.* 696). PENANG, *Wallich.*—DISTRIB. China, Ava.

This resembles a very large stout form of *V. orientale* with larger very thickly coriaceous leaves 2–4½ in. long, and more numerous flowers clustered at the axils and nodes. *Perianth* 4-merous.—*V. ovalifolium* (and *V. obtusatum*) are reduced to varieties of *V. orientale* by Miquel, *Fl. Ind. Bat.* i. pt. 1, 805, perhaps correctly.

7. **V. capitellatum,** *Sm. in Rees Cycl.* xxxvii; dwarf, branches short terete very stout, leaves shortly petioled ovate obovate spathulate or orbicular concave above obscurely 3-nerved tip rounded base cuneate upper smaller linear-oblong, flowers 3–6 terminating solitary fascicled or whorled peduncles, fruit ovoid. *DC. Prodr.* iv. 279; *Wight & Arn. Prodr.* 330. V. mangiferæ, *Wight in Wall. Cat.* 6878. V. verticillatum, *Herb. Rottl.*

DECCAN PENINSULA; from Canara at Sindolé, *Ritchie,* southwards. CEYLON, common, *Thwaites.*

A small species, forming much-branched tufts 6–10 in. long and broad, often parasitic on other *Loranthaceæ.* *Leaves* ¼–1 in. long, and often as broad, apparently sometimes wanting. *Peduncles* very variable in length, ½ in. or less; bracts rounded.

8. **V. ramosissimum,** *Wall. Cat.* 6876; branches terete very long and slender, leaves 0 or very few sessile petioled obovate or linear-oblong or -cuneate tip rounded base cuneate obscurely 3-nerved, flowers 1–3 minute sessile, fruit subglobose minute. *Wight & Arn. Prodr.* 380.

DECCAN PENINSULA; on the Ghats and low grounds, from the Concan southwards. ? SINGAPORE, *Murton.* CEYLON; on Rhododendron at Maturata, *Trimen.*

Branches 10–18 in. long, striate; internodes 1–2 in. long, nodes hardly swollen, not contracted. *Leaves* 1 in., coriaceous, only one or two pairs at the bases of the main branches in a few specimens, the majority are leafless.—It is not easy to distinguish some specimens of this from *V. angulatum.* The Singapore specimens are imperfect; if not *ramosissimum,* they are probably an undescribed species.

*** *Leafless. Perianth-lobes deciduous.*

9. **V. angulatum,** *Heyne mss.*; *DC. Prodr.* iv. 283; leafless, branches angled long and slender nodes not swollen or contracted, flowers very minute sessile solitary or whorled at the nodes, perianth-lobes deciduous. *Wight & Arn. Prodr.* 380; *Dalz. & Gibs. Bomb. Fl.* 110; *Benth. Fl. Austral.* iii. 396; *Miquel Fl. Ind. Bat.* i. pt. 1, 806; *Wall. Cat.* 497. V. attenuatum, *Herb. Hohen.* n. 1478. V. ramosissimum, *Wight Ic.* t. 1017.

DECCAN PENINSULA; on the Ghats and low grounds, from the Concan southwards.—DISTRIB. Java, Australia.

Habit of *V. ramosissimum,* but never so slender as that sometimes is, and always leafless as far as is known; main stem terete, branches acutely 4-angled or (when dry) many-angled below.

10. **V. articulatum,** *Burm. Fl. Ind.* 311; leafless, branches flattened, internodes 1–2 in. striate and furrowed when dry contracted at the nodes, flowers very minute fascicled in cup-shaped bracts at the tops of the internodes, perianth-lobes deciduous. *DC. Prodr.* iv. 284; *Miquel Fl. Ind. Bat.* i. pt. 1, 806; *Kurz For. Fl.* ii. 325. V. attenuatum, *DC. l. c.*; *Wight & Arn. Prodr.* 380; *Brand. For. Fl.* 394. V. moniliforme, *Blume Bijd.* 667, and *Fl. Jav. Loranth.* t. 25 B; *DC. l. c.* V. fragile, *Wall. Cat.* 498. V. compressum, *Poir. Encycl. Suppl.* ii. 861; *DC. l. c.*; *Blume Fl. Jav. Loranth.* t. 24. V. fragile, *Wall. mss. in DC. l. c.* V. aphyllum, *Griff. Notul.* iv. 634, and *Ic. Pl. Asiat.* t. 630.

SUBTROPICAL HIMALAYA; from Chamba, ascending to 3000 ft., eastward to Sikkim. ASSAM, MISHMI and the KHASIA MTS., ascending to 6000 ft., and southward to TRAVANCORE, MALACCA and CEYLON.—DISTRIB. Malay Islands.

A pendulous much di-tri-chotomously branched green shrub, yellow or black when dry; internodes very variable in length and breadth, 1–2 by $\frac{1}{10}$–$\frac{1}{3}$ in. *Flowers* few or numerous in the cup-shaped bracts, 3–4-merous, arranged in depressed 3-fld. spikes, of which the lateral flowers are usually male; males with reflexed perianth-lobes; females bibracteolate with erect deciduous perianth-lobes. *Fruit* subglobose, yellow, smooth.—I think there can be no doubt of this common plant being Burmann's *V. articulatum* and Blume's *V. moniliforme*, which latter name is usually given to *V. japonicum*. There are two states of it.

V. ARTICULATUM *proper*; more slender, internodes rarely $\frac{1}{3}$ in. broad.

Var. *dichotoma*, Kurz For. Fl. ii. 325; much stouter, internodes thicker and broader often $\frac{1}{2}$ in. broad. V. dichotomum, *Don Prodr.* 147; *DC. Prodr.* iv. 284. V. elongatum, *Wall. Cat.* 495; *DC. l. c.* V. nepalense, *Spreng. Syst., Cur. Post.* 47. V. opuntioides, *Roxb. Fl. Ind.* iii. 764; *Wall. Cat.* 496. Viscum sp., *Griff. Notul.* iv. 636, and *Ic. Pl. Asiat.* t. 632.—Common in the Himalaya, Khasia Mts., the higher hills of Pegu, and the Deccan Peninsula.—Harvey (*Fl. Cap.* ii. 581) gives this as a native of South Africa, but describes the fruit as mostly warted, which is not the case in the Indian plant.

**** *Leafless. Perianth-lobes persistent.*

11. **V. japonicum,** *Thunb. in Trans. Linn. Soc.* ii. 329; a small tufted leafless species, branches flattened contracted at the nodes, internodes $\frac{1}{4}$–1 in. long, flowers very minute fascicled in cup-shaped bracts at the tips of the internodes, perianth-lobes persistent. *DC. Prodr.* iv. 283. V. Opuntia, *Thunb. Fl. Jap.* 64. V. articulatum, *Miquel Prol. Fl. Jap.* 297; *Frach. & Sav. Enum. Pl. Jap.* i. 406; *Maxim. Diagn.* xx. 616; *Benth. Fl. Hongk.* 141, and *Fl. Austral.* iii. 396. V. tænioides, *Comm. in Thou. Mel. Obs.* 43; *DC. l. c.* 283; *Baker Fl. Maurit.* 135. V. moniliforme, *Wight & Arn. Prodr.* 380; *Wight Ic.* t. 1018, and *Spic. Neelgherr.* t. 87; *Kurz For. Fl.* ii. 325 (*not of Blume*). V. articulatum, *Brand. For. Fl.* 393. V. Wightianum, *Wall. Cat.* 6877 (*not of Wight & Arn.*).

TEMPERATE HIMALAYA; from Murree to Kumaon, alt. 5–7000 ft. KHASIA MTS., alt. 4–5000 ft. MALACCA, on Mt. Ophir. NILGHIRI MTS., ascending to 7000 ft., *Wight*, &c. CEYLON, in the most elevated parts of the Central Province.—DISTRIB. Mauritius, China, Japan, Australia.

Much smaller than *V. articulatum*, erect, rarely 6 in. high, usually densely tufted, very variable in the breadth of the internodes. *Inflorescence* as in *V. articulatum*, but perianth-segments (3–4) persistent. *Fruit* $\frac{1}{10}$ in. long, ellipsoid.—This very distinct species is usually referred to the Javanese *V. moniliforme*, Blume. Of this last I have seen no authentic specimens, but its author describes it as abundant at Bintenzorg, where *V. japonicum* is not likely to be found. I have seen no Javanese specimens of *V. japonicum*, and it is not described in Miquel's Flora. Miquel, rightly no doubt, refers Blume's *moniliforme* to *articulatum*, which is very common in Java. Wallich's No. 6877 consists of several fragments of this, but there has been accidentally fastened on the same sheet a scrap apparently of *V. orientale*.

Var. *coraloides*, Wight Ic. t. 1019; dicecious, branchlets narrower, all female.—Nilghiri Hills, abundant, *Wight* (who states that he has never found male flowers).

DOUBTFUL AND EXCLUDED SPECIES.

V. GROSSUM, *Wight in Wight & Arn. Prodr.* 380; *Wall. Cat.* 6879.—Wight and Wallich's plants consist of nothing but fragments of branches resembling those of *V. album*. The flowers are described as fascicled at the nodes, but there are none in the specimens. It is a native of the Dindygul Hills in the Southern Carnatic.

V.? HETERANTHUM, *Wall. Cat.* 488; *DC. Prodr.* iv. 279 (V. latifolium, *Ham. in Don Prodr.* 142. V. platyphyllum, *Spreng. Cur. Post.* 47; *DC. l. c.*), is *Henslovia heterantha*, Hook. f. & Thoms.

V. WALLICHIANUM, *Wight & Arn. Prodr.* 379 (*excl. syn. V. Wightianum*); stem and branches terete, whorled opposite or dichotomously, nodes swollen leaves 2–2½ in. flat very stoutly petioled very thick and coriaceous oblong obscurely 3-nerved base cuneate, flowers unknown.—There is a scrap of this in Wight's Herbarium without locality; it a good deal resembles *V. album*, but is, I think, distinct. There are also fragments of it in Wallich's Herbarium, fastened on the sheet with *V. Wightianum*, Wight & Arn. (not Wallich), and numbered 491, which is *V. orientale*, a very different plant.

V. WIGHTIANUM, *Wight & Arn. Prodr.* 380 (*not of Wallich*); stem and branches terete whorled or dichotomous, nodes thickened, leaves 2-2½ in. very coriaceous subsessile broadly elliptic rounded at both ends tip rounded grey and opaque when dry nerves very obscure, flowers unknown.—Apparently a very distinct species, of which there are fragments in Wight's Herbarium without locality, and in Wallich's mixed with *V. Wallichianum*.

2. ARCEUTHOBIUM, *Rich.*

Minute green leafless parasites, with the leaves reduced to opposite scales in which the very minute ebracteolate dicecious? solitary flowers are sunk. *Perianth* as in *Viscum*, but 2–5-partite, and always persistent. *Anthers* globose, bursting transversely.—Species 5–6, S. Europe, W. Asia, N. America.

A. minutissimum, *Hook f.*; stem none but the inconspicuous stock that ramifies within the bark and which the minute branches perforate but scarcely rise above the surface, appearing as a 2-lipped cup, male fl. sessile in the cup 3–5-partite, fem. fl. pedicelled.

KUMAON HIMALAYA, alt. 10,700 ft., on Pinus excelsa, *Duthie*.
The most minute dicotyledonous plant that I can call to mind.

3. NOTOTHIXOS, *Oliv.*

Dichotomously branched parasitic hoary or tomentose shrubs. *Leaves* opposite, flat, coriaceous. *Flowers* minute, monœcious, in unisexual heads, or spikes, like those of *Viscum*, but the subsessile anthers are broad, erect, many-celled and lobulate? and dehisce by pores or a transverse slit at the apex.—Species 4, a Cingalese and three Australian.

N. floccosus, *Oliv. in Journ. Linn. Soc. Lond.* vii. 104; densely woolly tomentose, branched, leaves orbicular or broadly ovate obtuse, flowers spicate, anthers bursting by many pores. Viscum floccosum, *Thwaites Enum.* 418.

CEYLON; in the Ambagamowa and Ratnapoora Districts, *Thwaites*.
Much branched; branches slender, young tomentose. *Leaves* ½–¾ in. long,

petioled, ovate, 3-nerved and transversely veined, coriaceous, glabrous above with sunk nerves, beneath densely clothed with ochreous woolly tomentum; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., woolly. *Flowers* few, terminal in short spikes. *Anthers* 8-celled and lobed. *Perianth-lobes* 3–4, triangular, acute, persistent. *Style* very short, conical. *Fruit* ovoid, white, $\frac{1}{8}$ in. long.—Hardly generically separable from *Viscum*, but the habit and woolliness are those of *Notothixos*.

4. **GINALLOA,** *Korth.*

Parasitic very slender glabrous shrubs, with the habit of the leafy Viscums, but the flowers are spicate, the branches have usually a thickening at the base like a sheath, and the anthers are didymous 2-celled and open by slits lengthwise.—Species 4, Malayan.

* *Flowers in a cupular bract.*

1. **G. Helferi,** *Kurz For. Fl.* ii. 326; leaves linear-cuneate $\frac{1}{2}$–$\frac{2}{3}$ in. diam. tip rounded or emarginate 5-nerved. Viscum Helferi, *Presl Epimel. Bot.* 256.

TENASSERIM, *Helfer.*

Leaves 3–4 in., tapering to the sessile base, thinly coriaceous. *Spikes* 1–2 in., terminal or in the forks, very slender. *Flowers* minute; perianth-segments 3, triangular, acute. *Anthers* large, sessile.

2. **G. spathulifolia,** *Oliv. in Journ. Linn. Soc.* vii. 103; leaves linear or narrowly linear-spathulate $\frac{1}{8}$–$\frac{1}{3}$ in diam. nerves very obscure. Viscum spathulifolium, *Thwaites Enum.* 136.

CEYLON; on Adams Peak, *Gardner, Thwaites.*

Leaves 2–3 in., tapering to the sessile base, thinly coriaceous, tip obtuse or retuse. *Spikes* 1–2 in., terminal and in the forks, very slender. *Perianth-segments* 3, triangular, at length deciduous. *Ovary* narrowly oblong. *Fruit* ellipsoid, nearly $\frac{1}{2}$ in. long.

** *Flowers sunk in the fleshy rachis of the spike.*

3. **G. andamanica,** *Kurz in Journ. As. Soc. Beng.* 1872, ii. 309, and *For. Fl.* ii. 326; leaves thickly coriaceous petioled obovate or obovate-oblong obscurely 3–5-nerved.

SOUTH ANDAMAN ISLAND, *Kurz.*

A rather large parasite; stem terete, dichotomously branched. *Leaves* $1\frac{1}{2}$–2 in. long, tip rounded; petiole very short, stout, flat. *Spikes* 1–4 in., robust, terminal and in the forks. *Flowers* minute, clustered, dicœcious?, surrounded with a thin dilatation of the rachis; perianth-segments 3, triangular. *Fruit* (unripe) elongate.—I have seen no specimens.

ORDER CXXXIII. **SANTALACEÆ.**

Trees shrubs or herbs. *Leaves* alternate or opposite, quite entire, sometimes scale-like or 0, exstipulate, nerves inconspicuous. *Inflorescence* various; flowers inconspicuous, green, usually bracteate and bracteolate, regular, 1–2-sexual. *Perianth* superior or inferior, 3–8-toothed -lobed or -partite; lobes with often a tuft of hair behind the anthers. *Stamens* 3–6, inserted on the lobes above rarely on the base of the perianth and opposite them; anthers 2-celled. *Disk* various, epigynous or perigynous. *Ovary* inferior (superior in *Champereia*), 1-celled; style usually short, stigma entire or 3–6-lobed;

ovules 2–3, adnate to, or pendulous from, a central column (solitary and basal in *Champereia*). *Fruit* a nut or drupe. *Seed* globose or ovoid; testa thin or obsolete; albumen copious, fleshy; embryo usually terete.—Genera 28, species 220, temperate and tropical.

Tribe I. **Thesieæ.** *Perianth* ½-superior, tube adnate to the base of the ovary, and usually produced above it. *Disk* 0. *Fruit* a very small nut.

Flowers spicate	1. Thesium.

Tribe II. **Osylideæ.** *Perianth* superior, tube adnate to the ovary, not produced above it. *Fruit* a drupe.

* *Anther-cells distinct, parallel.*

Stamens with interposed processes. Leaves alternate	2. Pyrularia.
Stamens with interposed processes. Leaves opposite	3. Santalum.
Stamens without interposed processes. Leaves alternate . . .	4. Osyris.

** *Anther-cells divergent or confluent.*

Parasitic shrubs. Flowers minute, cymose or fascicled . . .	5. Henslovia.
Leaves alternate. Filaments 2-fid	6. Scleropyrum.
Small leafless parasitic shrubs	7. Phacellaria.

Tribe III. **Anthoboleæ.** Perianth inferior, 3–4-partite. *Ovary* superior or immersed in the disk. *Ovule* 1, erect.

Flowers in slender axillary panicles, very minute	8. Champereia.

1. THESIUM, *Linn.*

Slender perennial herbaceous root-parasites, rarely annual or shrubby. *Leaves* alternate, narrow, decurrent, 1–3-nerved. *Flowers* minute, greenish, solitary and axillary or in 2-chotomous cymes, 2-sexual. *Perianth* adnate to the ovary, tube produced above it; lobes 5, rarely 4, with a tuft of hair on the face. *Stamens* 5–4, inserted at the base of perianth-lobes, included. *Ovary* inferior; style short or long, stigma capitate or lobulate; ovules 2–3, pendulous from a basal free often flexuous or crumpled column. *Fruit* a sinuate drupe or nut, often ribbed. *Embryo* terete.—Species about 100, temperate and tropical; all but 2 Brazilian species are natives of the Old World.

I have no sufficient materials for discriminating the Himalayan plants of this most troublesome genus, which I provisionally include under *T. himalense*, itself probably a widely distributed W. and N. Asiatic plant, possibly also European.

1. **T. himalense,** *Royle Ill.* 322; stems procumbent or suberect very slender, leaves bracts and bracteoles linear, nut ellipsoid or globose its nerves rather faint crowned by the narrower perianth-tube with linear incurved lobes. *Edgeworth in Trans. Linn. Soc.* xx. 88; *A. DC. Prodr.* xiv. 645. T. multicaule, *Herb. Ind. Or. H. f. & T.*, ? *of Ledeb.*

Western Himalaya; from the Chenab Valley to Kumaon, alt. 5–7000 ft., *Royle*, &c.

Very closely allied to *T. multicaule*, but very much more slender, and usually procumbent. *Stem* 6–18 in. *Leaves* scattered, 1–2 by $\frac{1}{10}$–$\frac{1}{6}$ in., 1-nerved. *Perianth* glabrous; lobes bearded within, obtuse. *Style* often exserted, stigma capitate.

Nut $\frac{1}{6}$ in., with faint but distinct raised nerves and reticulations.—There appear to be several varieties of this plant, approaching *T. divaricatum*, *T. montanum*, and various other Oriental and Siberian species, which should probably all be united, for their characters are very vague.

Var.? 1; perianth-lobes much shorter broadly ovate, nut more globose.—Garwhal, on the Niti Pass, alt. 11,5000 ft., *Strachey & Winterbottom.* Tibet, *Heyde.*—A more alpine plant than *T. himalense* proper, and possibly *T. alatauicum*, Kar. & Kir.

Var.? 2; stems slender straggling and much branched, the branches divaricate, leaves very much more slender, flowers minute.—North-West Himalaya, at Vatar, *Brandis*; Garwhal, *Strachey & Winterbottom* (Thesium 2).

Var. 3? *pachyrhiza*; stems very numerous procumbent from (in the Tibetan specimens) a stout woody rootstock as thick as the little finger, leaves slender, fruit (in Sikkim specimens) ellipsoid or depressed globose crowned with linear incurved perianth-lobes.—Heights above Kibas, *Thomson.* Sikkim, at Tungu, alt. 11–12,000 ft., *J. D. H.*—I think this is nothing but a state of *T. himalense*, with a very old rootstock; the form of the nut is so variable as to afford no distinctive character, and its nervation is that of the other forms included under *himalense.*

2. **T. Wightianum,** *Wall. Cat.* 4037; stems numerous branching from the base procumbent leafy, leaves very many uniform linear-lanceolate acute tips often bleached, bract and bracteoles hardly longer than the globose reticulated 10-nerved nut which is crowned by the short incurved perianth-lobes. *A. DC. Prodr.* xiv. 647; *Wight Ic.* 1852 (*exclude fig. of anthers*). T. nilagiricum, *Miquel in Analect. Mel.* iii. 15, and in *Hohenack. Pl. Ind. Or.* No. 973.

NILGHIRI HILLS, *Wight*, &c. Conoor, alt. 7–7500 ft., *Clarke.*—DISTRIB. Abyssinia?

Branches straggling, sometimes a foot long. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ by $\frac{1}{12}$ in., almost acuminate, rather fleshy. *Flowers* axillary, solitary or 2-nate, minute, sessile. *Stamens* glabrous. *Style* short, stigma capitate. *Nut* $\frac{1}{10}$ in. diam., with prominent longitudinal nerves and impressed reticulations.

DOUBTFUL SPECIES.

THESIUM sp.? from Murgulla, in the Salt Range, *Vicary.*—Apparently a tall very slender erect species, with long branches, scattered leaves, and the inflorescence and flowers of the common forms of *P. himalense.* It is perhaps *T. multicaule*, Ledeb.

2. PYRULARIA, *Michaux.*

Trees or shrubs. *Leaves* alternate, deciduous, membranous. *Flowers* polygamous, axillary or in terminal cymes, bracteolate. *Perianth-tube* solid in the male, in the fem. adnate to the ovary; lobes 5, valvate, hairy on the face. *Stamens* 5, inserted at the bases of the perianth-lobes with the anthers adhering to the hairs. *Disk* of scales between the stamens. *Ovary* inferior; style columnar, stigma capitate; ovules 2–3, pendulous from a free short straight basal column. *Drupe* large, pyriform, obovoid or globose. *Seed* globose; embryo short, subterete, near the top of the albumen.—Species 2, a Himalayan and N. American.

P. edulis, *A. DC. Prodr.* xiv. 628; leaves ovate oblong or elliptic-oblong acuminate young with long hairs beneath, male fl. in hirsutely tomentose panicles, fem. solitary, fruit pyriform. Sphærocarya edulis, *Wall. Cat.* 4033, and in *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 371, and *Tent. Fl. Nep.* 19, t. 10, copied in *Wight Ic.* t. 255; *Gamble Man. Ind. Timb.* 320. S. vestita, *Wall. Cat.* 7207.

CENTRAL AND EASTERN TROPICAL HIMALAYA; Nepal, *Wallich.* Sikkim, alt.

4–5000 ft., *J. D. H.* Mishmi Hills, in Upper Assam, *Griffith*. KHASIA MTS., alt. 4–5000 ft., *Wallich*, &c.

A large or small thorny deciduous leaved tree; branches stout, youngest villous; buds large, of pale broad silky rounded imbricating scales. *Leaves* 3–7 in., rather fleshy, rarely obovate-oblong, quite entire; nerves few, very oblique, sunk above, very prominent beneath, petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Male racemes* 1–3 in., terminal and axillary; flowers pedicelled, about $\frac{1}{6}$ in. diam., ebracteate. *Perianth-lobes* triangular, acute. *Fl. fem. Ovary* clavate, pubescent; style short. *Drupe* $1\frac{1}{2}$–2 in. long, narrowed into the stout peduncle, crowned with the perianth-lobes; epicarp tough; sarcocarp glutinous, traversed by vessels; endocarp globose.

3. **SANTALUM,** *Linn.*

Glabrous trees or shrubs. *Leaves* opposite, rarely alternate, coriaceous. *Flowers* axillary or in terminal trichotomous paniculate cymes, 2-sexual; bracts minute. *Perianth-tube* adnate to the base of the ovary, campanulate or ovoid; lobes 4, rarely 5, valvate, with a tuft of hair on the face. *Stamens* 5–4, short, united at the bases of the lobes. *Disk* of scales between the stamens. *Ovary* at first free, at length half-inferior; style elongate, stigma 2–3-lobed; ovules 2–3, inserted below the summit of a long acuminate central free column, reflexed. *Drupe* subglobose, top annulate by the deciduous perianth. *Seed* subglobose; embryo terete, slender.—Species about 8, Indian, Malayan, Australian and Pacific.

S. album, *Linn. Sp. Pl.* 497; leaves elliptic-ovate or ovate-lanceolate acute or subacute base acute, panicles terminal and lateral, pedicels about equalling the perianth-tube. *A. DC. Prodr.* xiv. 683; *Roxb. Fl. Ind.* i. 442, and *Ed. Carey & Wall.* i. 462; *Grah. Cat. Bomb. Pl.* 177; *Dalz. & Gibs. Bomb. Fl.* 224; *Brand. For. Fl.* 398; *Kurz For. Fl.* ii. 329; *Beddome Fl. Sylv.* t. 256; *Gamble Man. Ind. Timb.* 321; *Dict. Sc. Nat.* t. 5 (*except the hairs*), copied in *Spach Hist. Veg.* t. 25; *Hayne Arnz. Gewachs.* x. t. 1; *Bentl. & Trimen Med. Pl.* iii. t. 292; *Griffith in Trans. Linn. Soc.* xviii. 59, t. 1–3; *Bot. Mag.* t. 3235. S. myrtifolium, *Roxb. Fl. Ind.* i. 444, and *Ed. Carey & Roxb.* i. 464. S. verum, *Linn. Mat. Med.* 102. Sirium myrtifolium, *Roxb. Cor. Pl.* i. t. 2; *Fleming in As. Research.* xi. 181 (Syrium). Santalum album, *Rumph. Amb.* ii. 42, t. 11.—Chandana, *Jones in As. Research.* iv. 253.

DECCAN PENINSULA; from near Poona on the west and Midnapoor on the east, southwards, on dry hills, ascending to 3000 ft.; cultivated elsewhere.

A small evergreen glabrous tree. *Leaves* opposite, $1\frac{1}{2}$–2 in. long, pale brown when dry, thin, narrowed into a slender petiole $\frac{1}{3}$–$\frac{1}{2}$ in., glaucous beneath; nerves faint. *Racemes* much shorter than the leaves, pedicels opposite; flowers $\frac{1}{6}$ in. diam., at first straw-cold., then blood-red, inodorous even when bruised. *Drupe* globose, size of a cherry, black when ripe, flesh juicy; endocarp hard, with 3 short ribs from the tip downwards.—The *S. myrtifolium* of the Concan with narrower undulate leaves and less scented wood is regarded by Roxburgh as a very distinct species, and by De Candolle as a variety. Brandis, however, unites them, and I follow him as the latest Indian authority. Roxburgh's dried specimens show no character.

4. **OSYRIS,** *Linn.*

Glabrous shrubs; branches angular. *Leaves* alternate. *Flowers* small, axillary, solitary or cymose, polygamous. *Perianth-tube* solid in the male fl., in the fem. adnate to the ovary; lobes 3–4, triangular, valvate, with a tuft of hair on the face. *Stamens* 4–5, short, inserted at the base of the lobes; anther-cells separate. *Disk* angled between the stamens. *Ovary*

inferior; style short or long, stigma 3–4-fid.; ovules 2–4, pendulous from a short stout central placenta. *Drupe* globose or ovoid. *Seed* globose; embryo terete or with cotyledons dilated.—Species 5 or 6, S. European, African and Indian.

O. arborea, *Wall. Cat.* 4035; leaves subsessile elliptic-lanceolate -oblong or -obovate mucronate acute or acuminate base acute, male cymes in axillary peduncled clusters umbels racemes or fascicles, fem. subsolitary (1–3) on long slender pedicels, drupe subglobose. *A. DC. Prodr.* xiv. 633; *Brand. For. Fl.* 399. O. Wightiana, *Wall. Cat.* 4036; *Wight Ic.* t. 1853; *Grah. Cat. Bomb. Pl.* 177; *Dalz. & Gibs. Bomb. Fl.* 223; *A. DC. l. c.*

SUBTROPICAL HIMALAYA; from Simla to Bhotan (exclusive of Sikkim), ascending to 7000 ft. DECCAN PENINSULA; on the Ghats, from the Concan southwards. CEYLON; in the Central Province, alt. 4–6000 ft.

A glabrous (except var. β) shrub or small tree, black when dry; branches acutely angled, tips puberulous. *Leaves* 1–2 rarely 3 in. long, very variable in breadth, thickly coriaceous, midrib and nerves prominent beneath, or the latter faint. *Flowers* very minute. *Drupe* yellow, ¼–⅓ in. diam.

Var. *puberula*, branchlets and leaves beneath finely puberulous.—Nilghiri Hills, *Jerdon*; at Conoor, alt. 6000 ft., *Beddome*. Central Province, *Thompson* (*Brandis*). —I have not seen specimens of this variety from the Central Province. The Sindh? plant (no doubt from Beluchistan) collected by Stocks, cited as the same by Brandis, appears to me to be a very different species.

5. HENSLOVIA, *Blume.*

Parasitic shrubs with spreading, erect or twining branches. *Leaves* alternate, thickish. *Flowers* very minute, monœcious or diœcious, axillary or the females with stamens; males subracemose or capitellate; fem. solitary or few and clustered. *Perianth-tube* of male 0, of fem. adnate to the ovary globose ovoid or oblong; lobes 5–6, valvate. *Stamens* 5 or 6, inserted at the base or middle of the lobes, short, 0, or reduced to staminodes in the female fl.; anthers didymous, with a few long soft hairs at the back. *Disk* concave or convex. *Ovary* inferior; stigma subsessile, discoid or lobed; ovules 2–3, pendulous from the top of a stout central column. *Drupe* ovoid, obovoid, ellipsoid or subglobose; inner wall of hard endocarp protruded as 5–10 hard vertical plates into deep fissures of the stellately lobed seed. *Embryo* linear.—Species about 12, Indian, Malayan and Chinese.

The characters of the 12 species described in the Prodromus, and which are chiefly taken from Blume (*Mus. Bot. Lugd. Bat.* i. 243), are utterly insufficient, and from the imperfection of specimens I am at a loss to identify the Indian satisfactorily with the Archipelagan species. *H. heterantha*, Vidal Sinops. Fam. y. Gen. Plant. Filip. t. 82, F, is *Exocarpus latifolia*, Br.

1. **H. granulata,** *Hook. f. & Thoms. Herb. Ind. Or.*; branches pustulate, flowers sessile on the top of very short clustered peduncles which are clothed with imbricating rounded bracts, the 4–5 upper of which form a spreading involucre, males numerous, females 1 or few, fruit small obovoid, pyrene 5-furrowed. *A. DC. Prodr.* xiv. 632; *Kurz For. Fl.* ii. 328.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 4–7000 ft., *Griffith* (*Kew Distrib.* 4389), *J. D. H.* KHASIA MTS., alt. 5–6000 ft., *J. D. H. & T. T.*

A small parasitic shrub, with erect and spreading stout branches. *Leaves* 1–2 in. long, from obovate to roundly spathulate, contracted into a distinct petiole, 5–9-nerved. *Clusters of peduncles* very numerous, 1/16–⅛ in. long; bracts with membranous subciliate margins, upper largest. *Flowers* quite sessile; perianth 5-lobed;

females without stamens. *Stigma* pulvinate, sessile, obscurely lobed.—I find no difference between A. De Candolle's var. *Sikkimensis* and the Khasia plant. The bracts are not more than half a line long (about $\frac{1}{24}$ in.).

2. **H. heterantha,** *Hook. f. & Thoms. in Herb. Ind. Or.*; branches smooth or sparingly pustulate, flowers sessile on the top of very short solitary or clustered peduncles which are bracteate at the base and tip only, the bracts at the tip forming a spreading involucre, males numerous, females 1 or few, fruit small elliptic-oblong, pyrene 5–6-furrowed. *A. DC. Prodr.* xiv. 632 (*excl. syn. H. frutescens*); *Kurz For. Fl.* ii. 328. ? H. umbellata, *Blume Mus. Bot.* i. 243; *A. DC. l. c.* 630. Viscum ? heteranthum, *Wall. Cat.* 488; *DC. Prodr.* iv. 279. V. latifolium, *Ham. in Don Prodr.* 142; *DC. l. c.* V. platyphyllum, *Spreng. Cur. Post.* 47.

CENTRAL and EASTERN HIMALAYA; Nepal, *Hamilton, Wallich.* SIKKIM, alt. 2–5000 ft., *J. D. H.* ? PEGU and MARTABAN, alt. 4–7000 ft., *Kurz.*—DISTRIB. ? Java.

A small parasitic shrub, with erect and spreading rough usually pale-brown branches, often minutely pustular. *Leaves* very variable, elliptic ovate or rounded, 1–4 in. long, sometimes as broad and orbicular, 5–9-nerved, narrowed into the petiole. *Flowers* about the size of *H. granulata*; females without or with very imperfect stamens; stigma very shortly 5-lobed, subsessile. *Fruit* red, tasting of *Pyrus aucuparia* in Sikkim ($\frac{1}{6}$ in. long and less); yellow in the Martaban plant, *Kurz.*—Kurz describes two varieties from Martaban, *heterantha* proper, with 5-merous sessile or subsessile flowers, and *coriacea* with 6-merous shortly pedicelled flowers. The Hong Kong *H. frutescens*, Benth., united with *heterantha* by A. DC., is, I think, different, having fewer nerves, a much larger fruit, and pedicelled male flowers: it is described as terrestrial.

Var. ? *sessiliflora*; flowers quite sessile.—Khasia Mts., on Oaks near Nowgong.

3. **H. Lobbiana,** *A. DC. Prodr.* xiv. 631; branches terete twining smooth or faintly granulate, male flowers very minute few spicate, towards the tips of short strict clustered peduncles which are bracteate only at the base and under each flower, females on short fascicled bracteate pedicels, fruit globose or shortly oblong, pyrene nearly smooth obscurely 5–7-furrowed, stigma stellately 5-lobed.

PENANG, *Lobb.*; on the top of Government Hill, *Maingay* (*Kew Distrib.* No. 1315), *Curtis.* MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1313).

A creeper according to Maingay, some of the branches of whose specimens are twining. *Leaves* from obovate-spathulate to orbicular, very coriaceous, dark brown when dry. *Peduncles* of male spikes $\frac{1}{6}$–$\frac{1}{3}$ in. long; flowers sessile or very shortly pedicelled, $\frac{1}{30}$ in. diam., subglobose. *Pedicels* of female $\frac{1}{12}$–$\frac{1}{20}$ in. long, bracts very minute in both sexes. *Perianth-tube* of female longer than the pedicel; lobes 5, each with a stamen.—I have described this from Lobb's specimens (No. 334), which are from Penang (not Singapore), as are those of Maingay and Curtis. I do not find the leaves to be punctato-verrucose beneath as described by A. De Candolle, nor the perianth-lobes as pilose.

4. **H. varians,** *Blume Mus. Bot. Lugd. Bat.* i. 244, t. 43; branches terete twining nearly smooth, male fl. racemose or clustered on stout peduncles which are bracteate at the base and under each flower, females fascicled pedicelled, fruit shortly ellipsoid, endocarp 5-furrowed and rugose. *A. DC. Prodr.* xiv. 631. ? H. philippinensis, *A. DC. l. c.* Dendrotrophe varians, *Miq. Fl. Ind. Bat.* i. 780.

TENASSERIM; Mergui. *Griffith* (*Kew Distrib.* 4390, 4392). MALACCA, *Maingay* (*Kew Distrib.* 1316/2), ? *Cuming* (No. 2255).—DISTRIB. Borneo.

Very closely allied to *H. Lobbiana*, but the leaves are much paler when dry, with

usually a more slender petiole, the male flowers are larger and more racemose, i. e. longer pedicelled, and the common peduncle is longer; the females also are longer pedicelled, and have longer bracts, the stigma is very obscurely lobed, not stellately rayed as in *Lobbiana*. The female flowers of the Tenasserim specimens have very minute imperfect anthers, those of Borneo, as figured by Blume, have perfect ones. The Malaccan plant of Cuming described by A. De Candolle as *H. philippinensis*, is from Malacca; it has very slender male racemes, and may be Blume's *H. spicata*, which according to De Candolle differs in the 6-merous perianth (a character of no value) and glandular flowers. My Bornean specimens of *varians* are very insufficient. Maingay's has leaves 4 by 2–3 in.

5. **H. buxifolia,** *Blume Mus. Bot. Lugd. Bat.* i. 244; branches smooth terete spreading and twining, flowers minute bisexual on short simple pedicels or sessile on branched few-fld. very short peduncles which are 2–4-bracteate under the flower, fruit minute globose 4–6-furrowed and rugose, stigma discoid lobed subsessile. *A. DC. Prodr.* xiv. 631. Dendrotrophe buxifolia, *Miquel Fl. Ind. Bat.* i. 781. Osyris rotundata, *Griff. Notul.* iv. 742, and *Ic. Pl. Asiat.* t. 627, f. 11.

Malacca; in littoral woods, *Griffith* (*Kew Distrib.* 4391), *Cuming* (No. 2366).—Distrib. Borneo.

Habit of *H. Lobbiana*, but the flowers are in much shorter branched peduncles, apparently all hermaphrodite, with very small lobes, the fruit is not ¼ in. diam., and the stigma more shortly lobed. Griffith describes the ovules as 5.

DOUBTFUL SPECIES.

H. erythrocarpa, *Kurz in Trimen Journ. Bot.* xiii. (1875) 329; branches striate, leaves oval or oval-oblong narrowed into a broad petiole 3-nerved very obtuse 1½–2½ in. long coriaceous opaque glabrous, veins distinct above invisible beneath, fruits 1–4 in the leaf axils subelliptic-globose size of a large pea orange yellow smooth shortly stipitate.—On trees in woods of Kamorta, Tenasserim, *Kurz*.

Henslovia sp., Tenasserim or Andamans, *Helfer* (*Kew Distrib.* 4393); leaves rounded 3–5-nerved, petiole short broad, fruit subglobose ⅓ in. long, endocarp rugose.

Henslovia sp., Mt. Ophir, Malacca, *Maingay* (*Kew Distrib.* 1314); leaves very coriaceous broadly oblong, petiole short stout, fruit globose ¼ in. long stipitate smooth or nearly so, with many locelli.

6. SCLEROPYRUM, *Arnott.*

Trees, often spiny. *Leaves* alternate, coriaceous. *Flowers* in short catkin-like spikes at the leafless nodes, polygamous. *Perianth-tube* of male solid, of fem. adnate to the ovary; lobes 5, valvate or subimbricate. *Stamens* 5, inserted at the bases of the lobes short, filaments 2-fid; anther-cells separate, dehiscing transversely. *Disk* annular. *Ovary* inferior; style short, stout, stigma large peltate; ovules 3, pendulous from the top of a central column. *Drupe* pyriform, pedicelled. *Seed* subglobose; embryo terete.—Species 2, Indian.

1. **S. Wallichianum,** *Arn. in Jard. Mag. Zool. & Bot.* ii. (1858) 550; a spinous glabrous tree except the finely tomentose inflorescence, leaves elliptic ovate or oblong obtuse, perianth-lobes imbricate. *Wight Ic.* t. 241. Sphærocarya Wallichiana, *Wight & Arn. in Ed. Phil. Journ.* xv. (1832) 180. Pyrularia Wallichiana and P. ceylanica, *A. DC. Prodr.* xiv. 629; *Beddome For. Fl.* t. 304. ? Champereia Perrottetiana, *Baill. Adans.* iii. 125.—*Rheede Hort. Mal.* iv. t. 18 (fem.), and vii. t. 30 (male).

Deccan Peninsula; on the Western Ghats, from the Concan southwards, as-

cending to 5000 ft. in Coorg. CEYLON, in the Central Province, alt. 4–6000 ft., *Walker*, &c.

Branches very stout and woody, bark pale. *Leaves* 3–6 in., penninerved, and 3-nerved at the base, which is sometimes cordate; petiole ½ in. *Racemes* 1–2 in. long, the rachis and peduncle stout, of female thickening much after flowering; bracts minute; flowers reddish. *Perianth* $\frac{1}{10}$ in. diam.; segments ovate, subacute, distinctly imbricate, with one outer, all with a tuft of hairs behind the stamens. *Fruit* 1 in. long including the very stout pedicel, crowned with the persistent perianth.—Wight figures the leaves as sometimes cordate, upon which A. De Candolle founds his var. *Bertii*, quoting under it "S. Wallichianum, *Bertie in Wight Ic.* t. 241;" but Wight quotes Arnott as the author both of the genus and species, and I do not find any reference to the name Bertie in Wight or elsewhere. I have referred with doubt Baillon's *Champereia Perrottetiana* to this plant, of which it may be an unarmed flowering specimen with an occasionally 4-merous flower.

2. **S. Maingayi,** *Hook. f.*; unarmed (always ?) glabrous, except the finely tomentose inflorescence, leaves oblong or ovate obtuse, perianth-lobes valvate. ? Pyrularia moschifera, *A. DC.*; *Benth. in Gen. Plant.* iii. 228.

MALACCA; *Maingay*.

"A medium-sized tree," *Maingay*, resembling *S. Wallichianum* in habit and foliage, but the branches are unarmed, the flowers smaller, and the perianth-segments strongly valvate. Bentham in Gen. Plant. refers this doubtfully to *Sphærocarya moschifera*, Blume Mus. Bot. i. 245 (*Pyrularia moschifera*, A. DC.), a plant I have not seen, but which is described as having leaves acuminate and pubescent beneath, and in which the stamens are not described as bifid. *P. moschifera* is more probably a true *Sphærocarya*.—I have seen no fem. fl. or fruit of Maingay's plant.

DOUBTFUL AND EXCLUDED SPECIES.

SPHÆROCARYA LEPROSA, *Dalzell*, is *Strombosia ceylanica*; see Vol. I. 579.

7. PHACELLARIA, *Benth.*

Small leafless parasitic shrubs, stems fascicled. *Flowers* minute, scattered on the branches, solitary or fascicled, sessile or sunk in the branch, ebracteate, monœcious. *Perianth-tube* of male solid, of fem. adnate to the ovary; lobes 4–8, short, valvate. *Stamens* 4 or 5, inserted on the bases of the lobes, filament short thick; anther-cells diverging below. *Disk* flat. *Ovary* inferior; style short, stout, stigma entire or 3-lobed; ovules 3, pendulous from and appressed to the top of a conical central column. *Fruit* unknown.—Species 3, Indian.

The species of this genus should be described from specimens in a living state, or preserved in spirits.

1. **P. rigidula,** *Benth. in Gen. Plant.* iii. 229; quite glabrous, stems rigid terete crowded in a tuft on a small stock simple or sparingly branched, perianth 4–5-cleft.

TENASSERIM; at Mergui, parasitic on a *Loranthus*, *Griffith* (*Kew Distrib.* 2745).

Stems 4–6 inches long, strict, rather slender; branches alternate, ascending, short. *Flowers* scattered along the branches, $\frac{1}{16}$ in. diam.; males subglobose, lobes broadly triangular; females with a longer tube.

2. **P. compressa,** *Benth. in Gen. Plant.* iii. 229; stems very stout scaberulously puberulous quite simple, perianth 5–8-cleft.

TENASSERIM; at Moulmein, *Parish*.

Stems fewer from the stock than in *P. rigidula*, and quite simple, much stouter, flowering almost from the base, when dry ⅛ in. diam., described by Bentham as com-

pressed, but fresh specimens are necessary to confirm this. *Flowers* smaller even than in *P. rigidula*, with the lobes often cleft to the base.

3. **P. Wattii,** *Hook. f.*; hoary, stems much branched, branches stout, flowers clustered, perianth 5-cleft.

MANIPUR; on the mountains, alt. 7500 ft., *Watt*, growing on *Loranthus*.

Stems 4–8 in. long, about $\frac{1}{8}$ in. diam., flexuous. *Flowers* larger than in the two former species, sometimes crowded in globose masses, hoary.

8. CHAMPEREIA, *Griff.*

Glabrous shrubs or small trees. *Leaves* alternate. *Flowers* minute, in 3–5-fld. axillary panicled cymes, 2-sexual (always?); bracts minute or 0. *Perianth* inferior; segments 5, valvate. *Stamens* 5, perigynous, filaments longer than the perianth, filiform; anther-cells parallel. *Disk* shortly 5-lobed between the stamens. *Ovary* superior, half immersed in the disk; stigma sessile, broad; ovule solitary, erect in the centre of the cell. *Drupe* ellipsoid, pedicelled. *Seed* conform to the drupe; embryo terete, radicle superior clavate.—Species 1 or 2, Malayan.

C. Griffithiana, *Planch. in Herb. Hook.*; leaves oblong or oblong-lanceolate acute or acuminate, male panicles very slender often exceeding the leaves. *Kurz For. Fl.* ii. 330 (*Griffithii*).—Champereia, *Griff. in Calc. Journ. Nat. Hist.* iv. 237.

TENASSERIM, and the ANDAMAN ISLANDS, *Griffith* (*Kew Distrib.* 4388), &c. MALACCA and PENANG, *Griffith*, *Maingay* (*Kew Distrib.* 375, 1316).

A small tree; branches slender, bark very pale. *Leaves* 3–6 in., coriaceous, ovate-oblong or lanceolate, very pale when dry, nerves slender; petiole $\frac{1}{4}$ in. *Male panicles* almost thread-like; flowers pedicelled, $\frac{1}{12}$ in. diam. *Fruiting panicles* with stout branches. *Drupe* $\frac{1}{2}$ in. long, bright red, very shortly stoutly pedicelled, quite smooth, tip rounded.—*Opilia manillana* and *Cumingiana* of Baillon (Adansonia, iii. 125), are very closely allied plants.

ORDER CXXXIV. BALANOPHOREÆ.

Low fleshy leafless or scaly brown, reddish or yellow root-parasites, without stomates. *Flowers* monœcious or diœcious, small or minute, crowded on spadix-like peduncled heads or cones; peduncles very stout, simple, annual or arising from an amorphous tuberous or a branching annual or perennial rootstock. MALE FL. *Perianth* 0, or of 3–8-valvate lobes. *Stamens* 1–2 in the naked flowers; in the flowers with a perianth as many as its lobes and opposite them or more, filaments 0, or fleshy, free or connate in a column or tube; anthers free or connate, 2-many-celled, opening by pores or valves, or bursting irregularly. FEM. FL. *Perianth* 0, or confluent with the ovary; limb 0, or minutely toothed. *Ovary* 1–3-celled; styles 1–2 or 0, stigmas simple or capitellate, rarely pulvinate and sessile; ovule 1 in each cell, usually pendulous from the top, anatropous or atropous, naked or with a single integument, or reduced to an embryo-sac. *Fruit* minute, crustaceous or coriaceous, 1-seeded. *Seed* usually adherent to the pericarp, testa very thin or 0 rarely thick, albumen densely granular and oily, rarely floury; embryo most minute, undivided.—Genera 14; species about 40, tropical or subtropical.

TRIBE. **Eubalanophoreæ.** *Perianth* of male fl. 3–6-lobed, of female 0. *Stamens* connate in a column. *Style* 1.

1. BALANOPHORA.

TRIBE. **Helosideæ.** *Perianth* of male entire or 3-lobed; of female confluent with the ovary, limb 2-lipped. *Styles* 2. 2. RHOPALOCNEMIS.

1. BALANOPHORA, *Forst.*

Glabrous fleshy herbs, with a tuberous rootstock warted with lenticels abounding in a waxy secretion. *Peduncles* bursting through the rootstock, which forms an irregularly toothed or lobed ring or short sheath at its base. *Flowers* minute, intermixed with clavate cellular bodies (bracteoles), monœcious or dicœcious. MALE FL. *Perianth* of 2–6 valvate lobes. *Stamens* 2–∞, filaments 0, or connate in a solid column; anthers free or connate. FEM. FL. *Perianth* 0. *Ovary* ellipsoid, compressed, 1-celled, narrowed into a slender style, stigma terminal; ovule 1, pendulous. *Fruit* minute, crustaceous. *Seed* globose, adhering to the pericarp, albumen oily; embryo subglobose, of 2–3-cells.—Species about 12, Eastern Asiatic, Australian and Polynesian.

* *Scales of the peduncle forming an involucre. Anthers as the perianth-lobes.*

1. **B. involucrata,** *Hook. f. in Trans. Linn. Soc.* xxii. 30 and 44, t. 4–7; involucre of 2–4 scales connate to the middle, heads ovoid or globose. *Eichler in DC. Prodr.* xvii. 144.

TEMPERATE HIMALAYA, on the roots of various trees; Simla, alt. 6000 ft., *Thomson*; Sikkim, alt. 7–10,000 ft., *J. D. H.*

Rootstock tuberous, lobed, 3–4 in. diam. *Peduncles* stout or slender, 1–6 in. long, cylindric or compressed, rarely fascicled, involucred about the middle. *Male fl.* with the tube of the perianth sunk in cavities of the heads, usually 3-merous. *Anthers* transversely oblong, bursting by transverse apical slits. *Fem. fl.* sometimes clustered round a clavate bracteole.—In Sikkim I distinguished four forms of this.

α. *rubra*; peduncles and ovoid 2-sexual heads red.
β. *flava*; peduncles and usually unisexual heads yellow.
γ. *gracilis*; peduncles long and slender, and small unisexual heads yellow.
δ. *Cathcartii*; peduncles stout and (unisexual) heads white or yellow.

** *Scales of the peduncle scattered or imbricate. Anthers as many as the perianth-lobes.*

2. **B. dioica,** *Brown in Wall. Cat.* 7246, and in *Trans. Linn. Soc.* xiii. 227, *in note*; rootstock tuberous lobed or branched, scales of peduncle imbricate, heads cylindric usually 1-sexual. *Hook. f. in Trans. Linn. Soc.* xxii. 30 and 45; *Eichler in DC. Prodr.* xvii. 145; *Royle Ill.* 330, t. 99 (78) *a.* B. elongata, *Scholt. & Endl. Melet.* xiii. *in part* (*not of Blume*); *Fawcett in Journ. Linn. Soc. ined.* B. Burmanniana, affinis, alveolata & picta, *Griff. in Trans. Linn. Soc.* xx. 93, 94, t. 3–6.

TROPICAL and SUBTROPICAL HIMALAYA; on roots of various trees, from Nepal to Mishmi, alt. 3–7000 ft., abundant. KHASIA MTS., alt. 4–6000 ft. BURMA, *Griffith.*

Rootstock a few inches to a foot in diameter. *Peduncles* 1–12 in., stout; scales laxly or densely imbricate, and heads white brown yellow or blood-red. *Heads* 1–3 in. long, cylindric ovoid or conoidal, females with sometimes a few male flowers at the base. *Perianth-lobes* 3–6. *Staminal column* short or long; anthers bursting by curved slits.—A very variable plant.

3. **B. indica,** *Wall. Cat.* 7247; rootstock tuberous lobed, scales of

peduncle scattered, heads obovoid or subglobose usually 1-sexual. *Weddel in Ann. Sc. Nat. Ser.* 3, xiv. 167, t. 9, f. 11–22; *Hook. f. in Trans. Linn. Soc.* xxii. 30 and 46; *Eichler in DC. Prodr.* xvii. 145; *Fawcett in Journ. Linn. Soc. ined.* B. picta, *Miquel, Pl. Hohen.* 1272. B. gigantea, *Wall. Cat.* 7249. B. typhina, *Wall. Cat.* 7248/3. B. elongata *in part, Hook. f. l. c.* Langsdorffia indica, *Arn. in Hook. Ic. Pl.* t. 205, 206, and in *Ann. Nat. Hist.* ii. 36.

DECCAN PENINSULA; Nilghiri Mts., *Wight.* CEYLON, *Thwaites*, &c.

Rootstock very variable in size, often very large. *Peduncles* 3–12 in. high, stout (sometimes 1 in. diam.) or slender, and heads rosy, pale red brown or purplish. *Flowers* usually dicœcious. *Perianth* 4–6-lobed.—Eichler has referred the Nilghiri specimen which I had assumed to be *B. elongata* to a var. (*β. minor*) of *B. indica*, on account of its having only as many anther-cells as perianth-lobes, whilst *B. elongata* has more (the number is not given for either species), and the anthers opening by longitudinal slits. Mr. Fawcett informs me that *B. gigantea* may differ from *B. indica* in the rootstock being tessellate rather than warted, and devoid of pustules.

4. **B. Thwaitesii,** *Eichler in DC. Prodr.* xvii. 146; rootstock small, peduncle a foot high clothed with oblong scales 1–2 in. long, scales imbricate oblong lacerate, male head ovoid. *Fawcett in Journ. Linn. Soc. ined.* B. indica, *Thwaites, mss.*

CEYLON; *Thwaites.*

Known only from a drawing in the Kew collection sent by Dr. Thwaites, and which represents either a gigantic male specimen of *B. indica* or a different species. The whole plant is of a dirty-yellow colour, the perianth nearly ½ in. diam., and the oblong head of anthers ¼ in. long.

*** *Scales of peduncle imbricate. Anther-cells* 20–60.

5. **B. polyandra,** *Griff. in Trans. Linn. Soc.* xx. 94, t. 7; rootstock tuberous lobed, male heads cylindric, female ovoid or oblong. *Hook. f. in Trans. Linn. Soc.* xxii. 30 and 47; *Fawcett in Journ. Linn. Soc. ined.* B. typhina, *Wall. Cat.* 7248 A, B.

SIKKIM HIMALAYA; on roots of trees, alt. 4–6000 ft., *J. D. H.* KHASIA MTS. *Wallich, Griffith*, &c.

General habit colour and female flowers of *B. involucrata*, differing in the many-celled head of anthers; the male flowers are the largest of the genus.

2. RHOPALOCNEMIS, *Jungh.*

A very stout glabrous dicœcious fleshy herb, with a large tuberous warted lobed rootstock. *Peduncles* many, very stout, bursting through the rootstock, which forms a warted coriaceous irregularly lobed tube round their base. *Heads* cylindric; flowers at first concealed under hexagonal connate peltate bracts, intermixed with dense masses of filiform cellular processes (bracteoles or imperfect flowers). MALE FL. *Perianth* campanulate or funnel-shaped adnate below to the base of the staminal column; mouth entire. *Stamens* 3; filaments connate in a long exserted column; anthers connate, 2–4-celled, irregularly bursting at the top. FEM. FL. *Perianth* confluent with the walls of the ovary, ellipsoid, compressed; limb very short, 2-lipped; styles 2, slender; ovule 1, pendulous. *Fruit* linear or ovate-oblong, turgid. *Seed* filling the cavity of the pericarp, consisting "of a very large horny embryo covered with a unicellular layer of endosperm," *Hoffmeister.*

R. phalloides, *Jungh. in Nov. Act. Acad. Nat. Cur.* xviii. *Suppl.* 1. 233; *Gœppert l. c.* xxii. 1. 148, t. 11–15; *Hook. f. in Trans. Linn. Soc.* xxii. 52, t. 12; *Eichler in DC. Prodr.* xvii. 138. Phæocordylis areolata, *Griff. in Trans. Linn. Soc.* xx. 100, t. 8.

EASTERN NEPALESE and SIKKIM HIMALAYA; on roots of trees, alt. 6–8000 ft., *J. D. H.* KHASIA MTS., alt. 5–6000 ft., *Griffith*, &c.—DISTRIB. Java.

Rootstock from the size of a pigeon's egg to that of a man's head, hard and rough, perennial; sheaths at the base of the peduncles short, ½–1 in. diam. *Peduncles* 1–4 in. long, 2 in. diam. or less, (and heads) pale brown, cylindric, smooth or of the male warted with scattered deformed bracts. *Heads* 3–8 in. long by 2–3 diam., the females most elongate; bracts ⅙ in. diam., formed of peltate stipitate truncate 6-sided pyramids, cohering by their edges and falling away in masses. *Male flowers* with the staminal column ⅓–½ in. long, projecting far beyond the dense velvety mass of filaments. *Female fl.* most minute; styles bent down beneath the bracts, projecting as minute hairs when released.—The germination of this genus and of *Balanophora* should be studied, for the structure of their seeds is very obscure.

ORDER CXXXV. EUPHORBIACEÆ.

Herbs shrubs or trees, often with milky juice. *Leaves* alternate or opposite, rarely divided or compound, usually stipitate. *Inflorescence* various; flowers usually small, often minute, always unisexual (in *Euphorbia* consisting of single naked stamens in a perianth-like involucre, surrounding a solitary pistil). *Perianth* simple and calycine, rarely petioled, often wanting in one or both sexes, rarely double, with the inner of 4–5 minute petals. *Stamens* various; anthers 2-celled, often didymous. *Ovary* superior, of 3, rarely more, or 2 carpels, more or less united together; styles as many as the carpels, free or united, entire or divided, stigmatic surface usually on the inner face of the styles or style-arms; ovules 1–2 in each carpel, pendulous from the inner angle of the cell, funicle often thickened. *Fruit* either a capsule of 2-valved 1–2-seeded cocci separating from a persistent axis, or a drupe with 1–3 cells, or of one or more combined nuts. *Seed* laterally attached at or above the middle of the cell, with or without an aril or thickening at the hilum. *Embryo* straight, in a fleshy albumen, with flat cotyledons and a superior radicle, very rarely exalbuminous with fleshy cotyledons.—Genera 200; species about 3000, chiefly tropical; very rare in cold countries.

Various ornamental species of this Order are frequent in Indian gardens, especially *Pedilanthus tithymaloides*, Poit. (Kurz For. Fl. ii. 418; Dalz. & Gibs. Bomb. Fl. Suppl. 76), a West Indian succulent shrub allied to Euphorbia, but with a scarlet slipper-shaped involucre, which is much cultivated in native gardens and planted in hedges; and various species of *Croton* with mottled green yellow and red leaves, and the scarlet bracted *Poinsettia pulcherrima*, which is a true *Euphorbia*. The American *E. geniculata*, Orteg. (*E. prunifolia*, Jacq., Wall. Cat. 7690), is both cultivated in gardens, and has been found apparently wild, but no doubt as an escape, in the Sutlej Valley. Others cultivated for useful purposes and occasionally found apparently wild are the castor-oil plant, *Ricinus communis*, Linn., and *Excœcaria sebifera*, Müller, both now so well naturalized in India, that I have introduced them into the Flora; as also the candle nut, *Aleurites triloba*, Forst., a tree, native of the Pacific Islands, with oily albuminous seeds, that are used both as an illuminant and in cookery. The *Manihot utilissima*, Pohl (Kurz For. Fl. ii. 402), a South American tall herbaceous plant, with a tuberous root which yields Cassava bread and Tapioca, appears to me to have no claim to be introduced into the Flora, though cultivated here and there.

TRIBE I. **Euphorbieæ.** *Flowers* monœcious; males numerous, con-

sisting of a solitary pedicelled stamen, surrounding a single female, which consists of a solitary pedicelled pistil, all enclosed in a calyx-like involucre.

1. EUPHORBIA.

TRIBE II. **Buxeæ.** *Flowers* monœcious (in the Indian genera). MALE FL. *Sepals* 4, imbricate. *Petals* 0. *Stamens* opposite the sepals or numerous. FEM. FL. *Sepals* 4 or 6. *Ovary* 2–3-celled; cells 2-ovuled. *Ovule* with a dorsal raphe.

Leaves alternate	2. SARCOCOCCA.
Leaves opposite	3. BUXUS.

TRIBE III. **Phyllantheæ.** *Flowers* unisexual. *Sepals* 1–2-seriate. *Petals* very minute or 0. *Stamens* 1–2-seriate, outer series opposite the sepals, rarely in the centre of the flower. *Ovary* 2–3-celled; cells 2-ovuled. *Cotyledons* broad.—Inflorescence axillary or lateral.

* Leaves alternate, undivided. *Petals* present.—Male fl. clustered, axillary or at the nodes; female usually solitary.

† Sepals valvate. Filaments united in a column.

Ovary 2-celled. Fruit a drupe. Venules of leaf parallel	4. BRIDELIA.
Ovary 3-celled. Fruit of 3 cocci. Venules of leaf reticulate	5. CLEISTANTHUS.

†† Calyx imbricate. Filaments free or nearly so.

Albumen scanty	6. ACTEPHILA.
Albumen copious	7. ANDRACHNE.

** Leaves alternate (rarely subopposite in *Phyllanthus*), undivided. Male fl. clustered, rarely subcymose; female usually solitary. Sepals imbricate. Stamens 1- rarely 2–3-seriate. Styles slender or dilated at the tip only.

† Capsule of 3 2-valved cocci, rarely indehiscent in *Phyllanthus*.

Sepals of male fl. thickened, with a white margin. Diffuse small-leaved herbs	8. AGYNEIA.
Sepals of male fl. thickened at the base or bearing a scale. Shrubs with distichous thin leaves	9. SAUROPUS.
Sepals of male fl. naked, not thickened. Styles usually bifid. Herbs shrubs or trees	10. PHYLLANTHUS.

†† Fruit a 3-celled berry.

Flowers diœcious. Stamens 5	11. FLUEGGEA.
Flowers monœcious. Stamens 3	12. BREYNIA.

*** Leaves alternate, undivided. Male fl. clustered at the axils or nodes. Sepals imbricate. Stamens usually numerous. Styles (or stigmas) very broad.

Stamens few. Styles short, spreading	13. PUTRANJIVA.
Stamens many. Ovary 1-celled; stigma broad, sessile	14. HEMICYCLIA.
Stamens many. Ovary 2–4-celled. Styles 3, short	15. CYCLOSTEMON.

*** Leaves opposite or whorled, undivided. Male fl. in axillary clusters or very short densely clustered racemes; females few. Sepals imbricate. Capsule of 2-valved cocci.

Leaves all opposite	16. CHORIOPHYLLUM.
Leaves chiefly whorled	17. MISCHODON.

Shrubs or trees. Calyx 4–6-lobed -toothed or -partite. Disk 0 in either sex. Styles confluent in a long or short head cone or column . . . . . 11. GLOCHIDION.
Shrubs. Calyx of 2 large and 3 minute sepals. Disk 0 in either sex. Styles 3 slender simple . . . . . 11. GLOCHIDION.
§ Glochidiopsis.

†† *Fruit a berry or of* 3–6 *cocci enclosed in a fleshy or dry indehiscent rarely* 6-*valved epicarp.*

Shrubs. Flowers dicœcious. Sepals 5. Stamens 3–5. Styles elongate. Fruit fleshy or dry, with 6 cocci . 12. FLUEGGEA.
Slender shrubs. Sepals and stamens 4–6. Fruit a berry, with 6–12 crustaceous seeds . . . . . 10. PHYLLANTHUS.
§ Kirganelia.
Trees. Sepals and stamens 4. Fruit fleshy with a bony 3–4-celled putamen . . . . . 10. PHYLLANTHUS.
§ Cicca.
Trees. Sepals 5–6. Stamens 3. Fruit fleshy with 3–4 bony hardly dehiscent cocci . . . . . 10. PHYLLANTHUS.
§ Embllica.
Shrubs or trees. Male calyx turbinate or hemispheric, lobes minute inflected. Anthers 3. Fruit dry or fleshy with 3–6 indehiscent cocci . . . . . 13. BREYNIA.
Slender shrubs. Calyx of male rotate or disciform, mouth minute 6-lobed. Stamens 3. Fruit dry or fleshy with 6 indehiscent cocci . . . . . 14. SAUROPUS.

*** Leaves alternate, undivided, entire or serrulate. Sepals imbricate. Petals 0. Stamens few or many. Styles or stigmas 2–3, dilated. Fruit a drupe.—Trees or shrubs. Male fl. in axillary fascicles or solitary.

Stamens 2–3. Ovary 2–3-celled. Drupe 1-celled . . . 15. PUTRANJIVA.
Stamens 8 or more. Ovary 1(–3)-celled. Drupe 1-celled 16. HEMICYCLIA.
Stamens 4 or more. Ovary 2–4-celled. Drupe 2–4-seeded 17. CYCLOSTEMON.

**** Leaves opposite or subwhorled, undivided, quite entire. Sepals imbricate. Petals 0. Fruit capsular, of 2-valved cocci.—Male fl. in axillary cymes or panicles.

Leaves all opposite. Sepals 4–6. Stamens 4 . . . . 18. CHORIOPHYLLUM.
Leaves whorled. Sepals 5–6. Stamens 5–10 . . . . . 19. MISCHODON.

***** Trees. Leaves alternate, trifoliolate. Sepals imbricate. Petals 0. Fruit a berry.—Flowers panicled.

Sepals 5, imbricate. Stamens 5 . . . . . 20. BISCHOFIA.

****** Trees and shrubs. Leaves alternate, quite entire. Styles or stigmas usually very minute. Fruit various.—Male fl. in axillary spikes racemes or panicles.

† *Male sepals imbricate. Fruit indehiscent or tardily dehiscent.*

Male fl. most minute in dense-fld. catkin-like spikes.
Stamens 2–5. Ovary 2-celled. Stigmas 2–4-fid. . . 21. APOROSA.
Male fl. racemose. Stamens 5–18, anthers sessile. Ovary 2-celled. Drupe 1-seeded . . . . . 22. DAPHNIPHYLLUM.
Male fl. minute, spicate or racemose. Stamens 2–5. Ovary 1–2-celled. Drupe small rugose usually compressed . 23. ANTIDESMA.
Male fl. panicled. Stamens 4–5. Fruit 1-celled, 4-valved 24. SCORTECHINIA.

Male fl. spicate or racemose. Stamens 4–8. Ovary 2–3-celled. Fruit dry or coriaceous, large, 2–3-celled. Seeds arillate . . . . . 25. BACCAUREA.

†† *Male sepals valvate. Fruit of* 2–3 *laterally flattened cocci.*

Stamens 4–5. Cocci separating from a columella . . . 26. HYMENOCARDIA.

SERIES II. Cells of ovary 1-ovuled.

Tribe IV. **Galearieæ.** *Perianth* double, of calyx and corolla. *Stamens* 4–10; filaments free. *Ovary* 1–3-celled; cells 1-ovuled. *Fruit* a small drupe.

Flowers in terminal racemes. Petals valvate. Stamens 10 . 27. GALEARIA.
Flowers in axillary panicles. Petals imbricate. Stamens 5–10 . . . . . 28. MICRODESMIS.
Flowers in axillary cymes. Petals valvate. Stamens 4–5 . 29. PLATYSTIGMA.

Tribe V. **Crotoneæ.** *Perianth* single, or of the male, or of both sexes, double. *Stamens* 1–2-seriate, outer series alternate with the sepals or central in the flower. *Ovary* 2–3-celled, cells 1-ovuled.—Inflorescence terminal or axillary.

Subtribe 1. JATROPHEÆ. Flowers in terminal 2–3-chotomous cymes; cymes unisexual, or with the central flower female, petaliferous except *Elateriospermum*.

Leaves entire, penninerved. Petals 0. Stamens 10–18 . 30. ELATERIOSPERMUM.
Leaves digitately nerved or lobed. Stamens many. Fruit capsular . . . . . 31. JATROPHA.
Leaves penninerved. Stamens many. Fruit capsular . . 32. TRITAXIS.
Leaves digitately nerved. Stamens 8–20. Fruit a drupe . 33. ALEURITES.

Subtribe 2. EUCROTONEÆ. Flowers in terminal androgynous spikes or racemes, males petaliferous, females often apetalous. Filaments inflexed in bud with the anthers reversed.

Petals usually villous. Capsule of 3 cocci . . . . . 34. CROTON.

Subtribe 3. CHROZOPHOREÆ. Flowers in axillary (rarely terminal) spikes racemes or panicles, males petaliferous, females often apetalous. Filaments straight in bud, or tips inflexed and anthers erect.

* Sepals imbricate. Petals united. Fruit a drupe.

Panicles subterminal. Leaves entire, 5–9-nerved . . . 35. GIVOTIA.

** Calyx imbricate, truncate lobed or toothed, or of free sepals. Petals free. Fruit capsular.

† *Sepals not enlarged or leafy in fruit.*

Stamens 3–5, in a column. Styles 2-fid . . . . . 36. TRIGONOSTEMON.
Stamens 12–15, in a column. Flowers in axillary clusters. 37. TRIGONOPLEURA.
Stamens 15–30, free. Styles slender, entire . . . . . *37. CODIÆUM.
Stamens 15–30, free. Styles 2-fid . . . . . 38. OSTODES.

†† *Sepals enlarged and leafy in fruit.*

Male and fem. fl. petaliferous. Sepals 4–5, free . . . . 39. BLACHIA.

Fem. fl. apetalous. Male calyx shortly toothed . . . . 40. DIMORPHOCALYX.
Fem. fl. apetalous. Sepals 4–5. Pistillode very long, filiform . . . . . 41. ERISMANTHUS.

*** Sepals valvate. Petals free. Fruit capsular.

Glabrous shrubs. Petals 4–8. Anther-cells pendulous . 42. AGROSTISTACHYS.
Stellately tomentose trees. Anther-cells connate. Styles entire . . . . . 43. SUMBAVIA.
Stellately tomentose herbs or shrubs. Anther-cells connate. Styles bifid . . . . . 44. CHROZOPHORA.

Subtribe 4. ACALYPHEÆ. Flowers in axillary rarely terminal spikes racemes or panicles, apetalous. Calyx of male closed in bud, usually membranous, oblong globose or ovoid, and splitting valvately into 3–5 concave sepals. Petals 0. Styles usually long, entire bifid multifid or papillosely fimbriate. Fruit capsular, very rarely drupaceous.

* Filaments free; anthers erect, 2-celled, cells united by their base only.

Styles undivided . . . . . 45. CLAOXYLON.
Styles very long fimbriate or lacerate. Female fl. in large bracts . . . . . 46. ACALYPHA.

** Filaments free; anthers 2-celled or 4-locellate; cells oblong or globose, laterally attached by a narrow or broad connective.

† *Stamens* 4 (or more in *Alchornea*); *anthers* 2-*celled*.

Filaments slender, anther-cells globose. Styles plumose . 47. ADENOCHLÆNA.
Filaments very short, anther-cells diverging downwards . 48. CŒLODEPAS.
Filaments slender, anther-cells oblong parallel . . . . 49. ALCHORNEA.

†† *Stamens very numerous*; *anthers* 2-*celled*.

Leaves alternate. Anther-cells pendulous. Fruit fleshy . 50. PODADENIA.
Leaves opposite. Anther-cells parallel. Fruit fleshy or capsular . . . . . 51. TREWIA.
Leaves alternate. Anther-cells parallel. Fruit of 3-angled or -horned cocci . . . . . 52. COCCOCERAS.
Leaves opposite. Stamens surrounding a naked receptacle. Anther-cells parallel contiguous . . . . . 53. CŒLODISCUS.
Leaves opposite or alternate. Stamens very many, central in the flower; anther-cells usually globose, adnate to the often broad connective . . . . . 54. MALLOTUS.

††† *Stamens one, few or many*; *anthers* 3–4-*locellate*.

Styles very long, 2-fid. Anther-cells globose. Fruit capsular . . . . . 55. CLEIDION.
Styles entire. Anther-cells subglobose. Fruit capsular . 56. MACARANGA.
Styles entire. Anther-cells oblong, superposed. Fruit very large, indehiscent . . . . . 57. PTYCHOPYXIS.

*** Filaments variously connate in bundles.

Male and fem. fl. in axillary spikes. Staminal bundles indefinite. Capsule unarmed . . . . . 58. HOMONOIA.
Male fl. in axillary racemes, fem. solitary. Staminal bundles indefinite. Capsule setose . . . . . 59. LASIOCOCCA.
Male fl. in axillary racemes. Staminal bundles definite . 60. POLYDRAGMA.

Flowers in terminal panicles. Staminal bundles indefinite. *60. RICINUS.

Subtribe 5. GELONIEÆ. Flowers in axillary or leaf-opposed clusters, rarely panicled or racemed, apetalous. Sepals of male imbricate or calyx shortly toothed. Stamens numerous, central in the flower. Fruit dehiscent or tardily dehiscent.

Male fl. racemed. Calyx 4-toothed. Styles flat. Fruit indehiscent . . . . . 61. ENDOSPERMUM.
Male fl. fascicled. Sepals 5. Fruit smooth, indehiscent . 62. GELONIUM.
Male fl. fascicled. Sepals 4–5. Capsule echinate or hispid, 3-coccous . . . . . 63. CHÆTOCARPUS.
Male fl. in panicled cymes. Sepals 4–5. Capsule of 3 2-valved cocci . . . . . 64. BALIOSPERMUM.

Subtribe 6. PLUKENETIEÆ. Flowers in axillary spikes or racemes, apetalous. Male calyx valvate. Styles connate. Fruit capsular.—Leaves alternate in all.

† *Erect shrub. Filaments inflexed in bud.*

Spikes androgynous. Fem. calyx at length foliaceous . . 65. EPIPRINUS.

†† *Twining shrubs. Filaments straight in bud.*

Racemes androgynous. Male calyx 4–5-partite. Stamens 8–30. Style-column globose or cylindric . . . . 66. PLUKENETIA.
Racemes androgynous. Male calyx 3–5-partite. Stamens 1–3. Styles spreading above . . . . . 67. TRAGIA.
Racemes androgynous. Male calyx 3-lobed. Stamens 3. Style-column fleshy . . . . . 68. CNESMONE.
Racemes unisexual. Male calyx 3-lobed. Stamens 3. Style-column globose 3-cleft . . . . . 69. MEGISTOSTIGMA.
Racemes androgynous. Male calyx 4–6-partite. Stamens 20–30. Style-column stout or slender . . . . . 70. DALECHAMPIA.

Tribe VI. **Hippomaneæ.** *Perianth* single. *Calyx* of male minute and open in bud, or obsolete.—Trees or shrubs (except *Sebastiania*).

Racemes axillary. Male calyx compressed, 2-fid. Stamens 12–15 . . . . . 71. PIMELEODENDRON.
Racemes terminal. Male calyx compressed, 2-partite. Stamens 6–50 . . . . . *71. HOMALANTHUS.
Racemes terminal. Male calyx terete, 2–3-lobed. Stamens 3 . . . . . 72. SAPIUM.
Racemes lateral or terminal. Calyx terete, 3 partite. Stamens 3 . . . . . 73. EXCŒCARIA.

Annual. Racemes axillary and terminal . . . . . 74. SEBASTIANIA.

GENERA OF DOUBTFUL AFFINITY.

75. LOPHOPYXIS. 76. BOTRYOPHORA.

1. **EUPHORBIA,** *Linn.*

Herbs or shrubs of various habit with copious milky juice. *Inflorescence* of many male and one female flower in a small 4–5-lobed turbinate or campanulate perianth-like involucre; lobes with thick glands at the sinuses; glands with often a petal-like spreading white or coloured limb. MALE fl.

a pedicelled stamen without floral envelopes of any kind; anther-cells usually globose. FEM. fl. a solitary pedicelled 3-celled 3-ovuled ovary, in the centre of the involucre, also without envelopes; styles 3, free or combined, simple or 2-fid. *Capsule* of 3 2-valved cocci separating elastically from a columella and dehiscing ventrally or both ventrally and dorsally. *Cotyledons* broad, flat.—Species about 600, in all climates but the very cold.

The species of the *Anisophyllum* section of this genus have been indefinitely multiplied, and require revision with the view of testing the constancy of the characters by which so many of the New World species which to the eye are undistinguishable from Old World ones are distinguished. Important differences do occur in the sculpturing of their seeds and in the size and form of the limb of the involucral glands, but I suspect that these have been much exaggerated, for in so far as the Indian species show, they are variable. Several species founded by Boissier on solitary unnamed specimens of Heyne's seen in the Herbaria of Vienna, St. Petersburg, &c., and not compared with those of other Herbaria, are little likely to be good. Various specific names usually attributed to Roth, because the species which bear them were described by him in his "Novæ Plantarum Species," are really to be attributed to Heyne, as stated by Roth himself under each. Heyne was not a mere collector, but an excellent botanist.

The section *Euphorbium* again must be carefully revised with living specimens; it is impossible to frame specific characters of succulent plants from dried ones, or even to determine what are species and what varieties.

It is unfortunate that Boissier omitted to consult the Wallichian Herbarium at the Linnæan Society when monographing the genus for De Candolle's Prodromus; and still more so that several species of the *Anisophyllum* section have been so mixed in that fine Herbarium that it is difficult to quote their numbers with accuracy.

There are very few Euphorbiaceæ in Wight's own Herbarium which he presented to Kew. They were probably lent elsewhere for description and never returned.

SECT. I. ANISOPHYLLUM. Herbs, rarely shrubby below, prostrate or ascending. *Leaves* all opposite, oblique or unequal at the base, stipulate or connected by a stipular line. *Involucres* solitary or cymose; glands 4–5, usually furnished with a membranous petaloid limb.

1. ELEGANTES. Usually erect dichotomously branching herbs, with leaves ½ to 2 in. long. Involucres axillary, solitary, or 2–3 together; limb of gland conspicuous, often large.—Sp. 1–8.

2. HYPERICIFOLIÆ. Erect or decumbent branching herbs or shrubs, with leaves ⅓–⅔ in. long or thereabouts. Involucres in axillary and subterminal cymes or crowded in the uppermost leaves, rarely of only 2–3 flowers; limb of gland usually conspicuous though small.—Sp. 9–16.

3. CHAMÆSYCEÆ. Prostrate, rarely erect plants, with leaves ⅙–⅓ in. long, rarely more. Involucres solitary, or in very short subsessile cymes, usually crowded along one side of the stem, or of short lateral branches; limb of gland of involucre obscure or 0, except *E. burmanica.*—Sp. 17–21.

SECT. II. EUPHORBIUM. Shrubs or trees (except 6. *Rhizanthium*) with fleshy terete ribbed angled or flattened stems and branches. *Leaves* 0, or alternate, or the upper opposite; stipules 0, or glandular or of prickles. *Involucres* axillary or terminal; or in the forks, often sessile, rarely cymose, glands without a petaloid limb.

4. TIRUCALLI. Erect shrubs or trees, with unarmed angled compressed or terete branches, leafless or with opposite alternate or fascicled leaves.—Sp. 22–23.

5. DIACANTHIUM. Erect shrubs or trees, with stout angled ribbed or winged branches that are crenate or nodose at the angles or wings, and there provided with 2 or 3 stipular prickles.—Sp. 24–29.

6. RHIZANTHIUM. Stem reduced to a fleshy tuber with short unarmed branches, and cymose rarely solitary involucres.—Sp. 30-31.

SECT. III. TITHYMALUS. Herbs, rarely shrubby below, usually erect, branches terete, not fleshy. *Leaves* alternate, upper (rarely all) opposite, exstipulate. *Involucres* in terminal or axillary cymose umbels radiating in threes; glands without a petaloid limb.

7. GALARHÆUS. Involucral glands transversely oblong with rounded margins.—Sp.—32–48.

8. ESULA. Involucral glands truncate retuse or 2-cornute.—Sp. 49–54.

1. ELEGANTES (see p. 245).

* *Floral leaves distichous, secund, imbricating and concealing the involucres.*

1. **E. pycnostegia,** *Boiss. Cent. Euph.* 9, and in *DC. Prodr.* xv. ii. 18; annual, erect, glabrous, leaves opposite oblong obtuse or cuspidate subserrulate, floral distichously imbricating broadly ovate-cordate or orbicular, involucres subsolitary glabrous, lobes toothed, limb of glands large obliquely obovate entire, cocci obtusely keeled glabrous or puberulous, seeds with sinuous furrows or flattened tubercles.

WESTERN GHATS; from the Concan to the Nilghiris, *Perrottet, Law,* &c.

A rather slender dichotomously branched herb, 1–2 feet high. *Leaves* 1–1½ in. long, thin, glabrous, except a few scattered long hairs at the axils and near them, nerves very obscure; floral collected in an oblong head; stipules minute, fimbriate. *Involucres* turbinate, hairy within. *Styles* short, 2-lobed. *Seeds* obtusely 4-angled, greenish, powdery, sometimes very obscurely furrowed.—Boissier's var. *laxa*, named by him *E. oligantha* in Hook. Herb, I think is certainly his *E. erythroclada*, under which I have described it.

2. **E. zornioides,** *Boiss. in DC. Prodr.* xv. ii. 19; annual, erect, glabrous, leaves opposite cordately linear-oblong obtuse or mucronate serrulate, floral distichously imbricating broadly ovate cordate, involucres subsolitary glabrous, lobes fimbriate, limb of glands large entire rosy, cocci obtusely angled glabrous, seeds smooth or papillose.

The CONCAN, *Law, Stocks,* &c.

Habit and general character of *E. pycnostegia*, of which it is probably a variety with narrower cauline and smaller floral leaves; the seeds are of the same form, powdery surface and colour, but without traces of sinuous furrows.

3. **E. elegans,** *Spreng. Syst.* iii. 794; annual, erect, clothed with long soft spreading hairs, leaves opposite broadly obliquely oblong elliptic or ovate-cordate obtuse serrulate towards the tips, floral broader distichously imbricating reticulate, involucres few hirsute, limb of glands large sinuate rosy, cocci globose pubescent, seeds grooved cross-wise and granulate. *Boiss. in DC. Prodr.* xv. ii. 19. E. variegata, *Heyne in Roth Nov. Sp.* 225. E platylepis, *Dene. in Jacquem. Voy. Bot.* 156, t. 157. E. strobilifera, *Dalz. in Hook. Kew Journ. Bot.* iii. (1851) 229; *Dalz. & Gibs. Bomb. Fl.* 226. ? E. dichotoma, *Roxb. Fl. Ind.* ii. 471.

DECCAN PENINSULA, *Heyne.* MALWA, *Edgeworth.* WESTERN BERAR, a weed of cultivation. The CONCAN; on naked rocks, *Law, Stocks,* &c.

Stem 1–2 ft., dichotomously branched. *Leaves* crowded or in distant pairs, ¾–1 in. long, subsessile; floral variable, often obovate, reticulate; stipules minute, setaceous. *Involucres* turbinate, pubescent without and within; lobes obovate; limb of glands very conspicuous. *Styles* elongate, 2-fid.—Boissier's var. *laxa*, with the upper leaves not imbricate, is probably a form growing in shade.

4. **E. cristata,** *Heyne in Roth Nov. Sp.* 226; annual, prostrate or ascending clothed with long flexuous hairs, leaves opposite obliquely ovate-cordate obtuse serrulate, floral distichously imbricate in a rounded head, involucres subsolitary pubescent, limb of glands pectinately laciniate and fimbriate, cocci globose, seeds with 3 or 4 parallel furrows. *Boiss. in DC. Prodr.* xv. ii. 19. E. fimbriata, *Heyne in Roth l. c.* 227; *Boiss. l. c.*, and *Euphorb. Ic.* t. 8; *Thwaites Enum.* 269; *Wall. Cat.* 7693. E. capitata, *Ham. in Wall. Cat.* 7708 A.—*Wall. Cat.* 7707 A.

DECCAN PENINSULA, *Heyne*; Madras, *Shuter*; Vellore, *Griffith*; Palamcottah, *Wight*. CENTRAL INDIA; Mandoo, alt. 4000 ft., *Edgeworth*. AVA, *Wallich*. CEYLON; Batticaloa district, *Thwaites*.

Stems slender, 6–10 in., often dichotomously branched. *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ in., subsessile, membranous; stipules short, subulate. *Involucres* subsessile, $\frac{1}{6}$ in. diam., hairy, throat ciliate, lobes linear-lanceolate.—I find no characters whereby to separate *E. fimbriata* from *E. cristata*. Boissier, who says that they are very closely allied, distinguishes *cristata* by its slender prostrate stems, heads of floral leaves only half the size, and seeds smooth between the furrows. He regards Roth's *cristata β. major* as the type of his *fimbriata*, and refers Roth's *fimbriata* to a variety (*laxa*), distinguished by its upper leaves not being imbricate.

** *Floral leaves not distichously imbricating.*

5. **E. longistyla,** *Boiss. Cent. Euphorb.* 9, and in *DC. Prodr.* xv. ii. 20; annual, glabrous, erect, much branched, leaves opposite elliptic or oblong obtuse distantly serrulate, floral gradually smaller, invols. pedicelled, limb of glands cleft to the base into 7–9 bristles, cocci glabrous keeled, seeds with 3 or 4 parallel furrows. E. elegans, *Heyne in Wall. Cat.* 7713.

DECCAN PENINSULA, *Heyne in Herb. Petrop. & Wallich.*

Stems a foot high, flexuous, dichotomously much branched; branches capillary. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in. long, membranous, apiculate; stipules lanceolate, toothed. *Involucres* as long as their pedicels, glabrous below, velvety under the glands; lobes deeply fimbriate. *Styles* (not seen by me) very long, undivided. *Capsule* long-stalked.—I have seen only very imperfect specimens of this plant in Wallich's Herbarium, and have taken its characters chiefly from Boissier, who says that it probably assumes a form with imbricate floral leaves.

6. **E. notoptera,** *Boiss. in DC. Prodr.* xv. ii. 26; annual, erect or ascending, glabrous, leaves often deflexed in very distant opposite pairs coriaceous linear-oblong obtuse mucronate margin often recurved serrulate involucres 1–3 terminal between a pair of linear acute floral leaves pedicelled campanulate lobes fimbriate, limb of glands rather large repand, cocci with two distant dorsal narrow wings, seeds rugulose.

The CONCAN and CANARA, *Law, Stocks*, &c., in cultivated fields.

Habit of *E. erythroclada*, 12–15 in. high; stems 8–12 in. *Leaves* $\frac{3}{4}$–$1\frac{1}{4}$ in. long, narrow, nerveless; stipules very short and broad. *Involucres* rather large, $\frac{1}{8}$ in. long; glands transversely oblong. *Capsule* depressed-globose, rather rough, about $\frac{1}{10}$ in. diam.—A very distinct species, easily recognized by the 2-winged cocci.

7. **E. erythroclada,** *Boiss. in DC. Prodr.* xv. ii. 25; quite glabrous, stem tall erect dichotomously branched firm red-brown, leaves $\frac{1}{2}$–$\frac{3}{4}$ in. in distant opposite pairs obliquely oblong or obovate- or elliptic-oblong serrulate tip rounded, involucres axillary solitary turbinate red, lobes short, limb of glands small narrow rosy, capsule depressed, cocci acutely keeled, seeds with 2–3 obsolete transverse ridges. ? E. pycnostegia, *var.* laxa, *Boiss. l. c.* 18.

The CONCAN? *Hugel, Stocks.*

Stem 1–2 ft., terete, polished; branches ascending. *Leaves* rather membranous very shortly petioled; base not cordate, very unequal but hardly auricled on one side. —My specimens are very imperfect, and without fruit, from the immense collections of Stocks made by himself, Law, and others in the Concan, Canara, and Malabar, but without precise locality. They are labelled by Boissier E. n. sp., *oliganthæ* affinis? and are, I think, clearly his *E. erythroclada*, as is also his *E. pycnostegia* var. *laxa*.

8. **E. coccinea,** *Roth Nov. Gen. & Sp.* 228; more or less clothed with soft white villous hairs, stems slender purple, leaves in scattered opposite pairs obliquely broadly elliptic or obovate-oblong quite entire tip rounded base broadly auricled on one side, involucres 1 or few in the axils of the crowded small orbicular terminal leaves, lobes long ciliate, limb of 2 glands large pink, cocci compressed keeled woolly membranous. *Boiss. in DC. Prodr.* xv. ii. 37.

The DECCAN PENINSULA; Ahmedanuggur, *Hugel.* The CONCAN, *Stocks.*

Root woody, apparently perennial. *Stems* 4–8 in., rigid, slender, angularly flexuous, very brittle. *Leaves* subsessile, rather coriaceous, very oblique, sometimes retuse; stipules linear-lanceolate, villous. *Involucres* in villous leafy subglobose heads, $\frac{1}{6}$ in. diam., with very conspicuous crenate rosy-purple limbs to two of the glands, and very small ones to the other two glands. *Styles* slender but not long. *Capsule* $\frac{1}{10}$ in. long.—Probably this should be placed next to *E. cristata*.

2. HYPERICIFOLIÆ (see p. 245).

9. **E. Wightiana,** *Hook. f.*; perennial, shrubby?, branches spreading slender, leaves 2–4 in. opposite in distant pairs petioled linear oblong or obovate-oblong entire or serrulate, involucral linear or obovate, involucres solitary axillary or in very short axillary cymes minute puberulous, lobes minute ciliate, capsules oblong puberulous, seeds oblong bluish smooth with a furrow on one side.—Euphorb., *Wall. Cat.* 7692.

DECCAN PENINSULA; Madras, *Wight in Herb. Wall.*, and *Ic. in Herb. Kew.*

Branches woody, terete, as thick as a crow-quill. *Leaves* very variable, some 2–2$\frac{1}{2}$ by $\frac{1}{2}$ in., quite linear and serrulate, others oblong 2$\frac{1}{2}$ by $\frac{1}{2}$–$\frac{3}{4}$ in., others 1$\frac{1}{2}$ by $\frac{3}{4}$ in., rounded at the tip and narrowed at the base into a distinct slender petiole; involucral, some 1 in. and linear, others $\frac{1}{2}$ in. and broadly obovate. *Involucre* almost hemispherical, sessile; glands transversely oblong, unwinged; lobes very small. *Styles* short, free, 2-fid, erect. *Capsule* very shortly pedicelled, $\frac{1}{6}$ in. long, not deeply lobed, top rounded, pale, quite smooth. *Seeds* rather mottled.—My only materials for this very curious species are bad specimens in *Herb. Wallich*, and a drawing marked "Madras R. W. 446." The latter represents all the leaves serrulate and all the upper linear and acute. It is evidently near *E. Atoto*.

10. **E. Atoto,** *Forst. Prodr.* n. 207; glabrous, stem stout swollen at the nodes erect ascending or decumbent, leaves opposite oblong or linear-oblong obtuse quite entire, base unequally rounded or cordate, involucres axillary or in leafy terminal corymbose cymes, glands oblong margined, capsule glabrous, seeds smooth. *Boiss. in DC. Prodr.* xv. ii. 12; *Baill. Adans.* vi. 282; *Benth. Fl. Austral.* vi. 46. E. halophila, *Miquel Anal. Bot.* iii. 16; *Boiss. l. c.* 13. E. pallens. *Dillw. Rev. Hort. Mal.* 55. E. articulata, *Dennst. Schlüss. Hort. Mal.* 37. E. lævis, *Poir. Suppl.* ii. 612; *Boiss. l. c.* 13. E. lævigata, *Vahl Symb.* ii. 54. E. lævigata? *Wall. Cat.* 7705. E. bifida, *Thwaites Enum.* 269 (*not of Hook. & Arn.*).—Euphorb., *Wall. Cat.* 7697.—*Rheede Hort. Mal.* t. 58.

MALABAR COAST, from Canara southwards, *Wight*, &c. PERAK; *Scortechini.*

ANDAMAN ISLANDS, *Kurz.* MALACCA, *Griffith, Maingay.* CEYLON, *Walker, Thwaites.*—DISTRIB. Malay Archipelago, China, Australia, Pacific Islands.

A dwarf seaside shrub (sometimes climbing?); root stout, long; stems rigid, polished, erect inclined or prostrate, branching upwards, rarely as thick as a goose-quill. *Leaves* subsessile, $\frac{3}{4}$–$1\frac{1}{2}$ in., coriaceous, longer or shorter than the internodes; stipules minute, fimbriate. *Involucres* turbinate, glabrous; lobes triangular; glands with a very minute limb or margin. *Styles* short, 2-fid. *Capsule* glabrous; cocci hardly keeled. *Seeds* nearly globose.

11. **E. linearifolia,** *Roth Nov. Sp.* 224; quite glabrous, glaucous, stems decumbent, leaves 1 in. opposite and secund subimbricate very coriaceous obliquely linear obtuse or acute quite entire lower in distant pairs ovate, involucres few subcorymbose towards the tips of the branches or solitary and axillary, lobes triangular-ovate hairy, limb of glands large obovate white, styles short, capsule glabrous. *Boiss. in DC. Prodr.* xv. ii. 33. E. linearis, *Heyne in Wall. Cat.* 7712.

DECCAN PENINSULA, *Heyne.*

A very remarkable species, quite unlike any other, of which I have seen only fragments in Wallich's Herbarium, and can add little to the descriptions of Roth and Boissier. The branches appear to be stout, curved, and swollen at the nodes as in *E. Atoto*; the leaves are almost fleshy, with a stout midrib; their arrangement resembles that of the leaflets of a pinnate leaf.

12. **E. hypericifolia,** *Linn. Hort. Cliff.* 198; annual, glabrous or sparsely pubescent, erect ascending or decumbent, leaves opposite obliquely broadly or narrowly oblong obtuse serrulate, nerves distinct, base rounded or cordate, involucres minute in axillary and terminal usually peduncled and many-fld. cymes with many subulate bracts often subtended by 2 flora leaves rarely solitary entire glabrous, lobes lanceolate ciliate, limb smaller or larger than the gland usually rounded and white, styles very short, cocci hardly keeled glabrous or hispid, seeds smooth or with broad shallow transverse pits. *Boiss. in DC. Prodr.* xv. ii. 23; *Hook. Exot. Fl.* i. t. 36; *Thwaites Enum.* 268; *Benth. Fl. Hongk.* 301. E. indica, *Lamk. Dict.* ii. 423; *Boiss. l. c.*, and *Fl. Orient.* iv. 1086; *Wall. Cat.* 7711, *excl.* C. E. cassioides, *Presl Bot. Bemerk.* 119. E. decumbens, *Willd. Suppl.* 27. E. androsæmoides, *Dennst. Schlüss. Hort. Mal.* 36. E. parviflora, *Linn. Syst. Ed.* x. 1047; *Roxb. Fl. Ind.* ii. 472; *Boiss. in DC. l. c.* 22; *Grah. Cat. Bomb. Pl.* 179; *Dalz. & Gibs. Bomb. Fl.* 227. E. papilligera, *Boiss. Cent. Euph.* 8. ? E. bracteolaris, *Boiss. in DC. l. c.* 22.—*Burm. Thes. Zeyl.* 224, t. 105, f. 2.—Euphorb., *Wall. Cat.* 7686.—*Rheede Hort. Mal.* x. t. 51.

Common throughout the hotter parts of INDIA, from the Panjab, ascending to 4000 ft. in the Himalaya, to the Southern Deccan, Malacca and CEYLON.—DISTRIB. Tropics of both hemispheres, except Australia and the Pacific Islands.

A rather slender, rarely stout, annual, 6–12 in. high, of various habit. *Leaves*, $\frac{1}{2}$–1 in., rarely more or less, not coriaceous, more or less serrulate on all the margins except towards the base; stipules minute, setaceous, lacerate, or 0. *Involucres* very minute, turbinate, glabrous, with quite entire minute bracts at the base of the pedicel; glands very shortly stipitate, lobes usually projecting above the glands; limb of the latter white or pale pink, always small, but very variable in size, sometimes 0. *Capsule* subglobose; cocci more or less pubescent or glabrous. *Seeds* with a thin mucous coat, bluish when dry, very variable as to the amount and depth of the shallow depressions on the faces which are often obsolete.—After a very careful examination of numerous specimens, I cannot separate *E. indica* from *E. hypericifolia*, as indeed was the opinion of Bentham, Engelmann and Thwaites. The latter author quite correctly identifies with it Burmann's t. 105 f. 2, which is the authority for Linnæus' *E. parviflora*, and of which Roxburgh's excellent figure differs in no respect from *hypericifolia* and *indica*. Wallich's No. 7686, from Nepal, is a very

tall and stout form 16 in. high, of which there are specimens gathered on the banks of the Chenab by Thomson. As I am not so convinced of Linnæus' *parviflora* being the same species as *hypericifolia* or *indica*, I shall give Boissier's diagnostic character of all the species that I have here brought together, leaving it to Indian botanists to test their value.

1. E. HYPERICIFOLIA; glabrous, erect, leaves oblong or oblong-lanceolate from a subcordate or rounded base, stipules lanceolate fimbriolate, involucral lobes lanceolate, mouth hirtulous, glands rounded much smaller than their rounded white limb, capsule glabrous, seeds unequally scrobiculate and rugose.—Not Asiatic according to Boissier.

2. E. INDICA; sparsely puberulous, stem ascending or decumbent, leaves obovate obtuse from a rounded base, stipules setaceous ciliate from a broad base, involucres glabrous within and without, lobes triangular fimbriolate, glands ovate as broad or broader than their ovate-rounded limb, capsule appressedly hairy, seed with 5–6 transverse broken furrows.—Asiatic and African.

3. E. PARVIFLORA; stem ascending minutely crispulously hairy, leaves elliptic-oblong obtuse from an unequal base, cymes subsessile, involucre campanulate, throat ciliate, lobes triangular or lanceolate, limb of rounded glands large orbicular obovate, capsule appressed-hairy, cocci keeled, seed papillose.—Ceylon, Java, Pegu, Burma.

4. E. BRACTEOLARIS; stems slenderly filiform dichotomous with spreading hairs, leaves ovate obtuse from a rounded base, tip repand pale and appressedly hairy beneath, stipules very short triangular-lanceolate, floral leaves (bracts) numerous minute, involucres hairy within, lobes lanceolate hairy, glands minute orbicular as broad or narrower than the white roundish limb, cocci rounded hairy, seeds smooth except the outer faces which have 1 or 2 subtransverse and obsolete furrows.—India, *Jacquemont*; Nilghiris, *Perrottet*.—Differs from *parviflora* in the inconspicuous furrows of the seed and slenderness of the branches.

13. **E. Emodi,** *Hook. f.*; annual, quite glabrous or sparsely hairy, stems straggling from the root, branches divaricate, leaves in rather distant pairs opposite coriaceous obliquely oblong or linear-oblong obtuse serrate or subserrate, involucres subsolitary subsessile chiefly in the axils of crowded terminal leaves glabrous lobes lanceolate, limb of all 4 glands conspicuous broad white or rosy sinuate, styles slender, capsule glabrous obtusely keeled, seeds obtusely angled rough with faint tubercles. E. indica, *Aitch. & Hemsl. in Journ. Linn. Soc.* xix. 185.

WESTERN HIMALAYA; Simla, Kulu, Chamba and Lahul, alt. 4000–4500 ft., *Edgeworth, Clarke, Ellis, Jaeschke*; Iskardo, alt. 6–7000 ft., *C. B. Clarke.*—DISTRIB. Affghanistan.

Stems rather stout, 4–10 in. long, rather sparsely leafy, often purplish, hairs if present long flexuous. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in., pale green, sometimes with a broad purple blotch on the upper surface, glabrous or sparsely hairy beneath; base almost auricled on one side; nerves obscure; stipules fimbriate. *Involucres* about $\frac{1}{16}$ in. long, campanulate, glabrous, shortly pedicelled; gland purplish, contrasting with its pale rose or white limb. *Styles* half the length of the capsule or more, flexuous. *Capsule* about $\frac{1}{16}$ in. diam., shortly pedicelled. *Seed* mucose.—Similar to states of *E. hypericifolia*, but very different in the subsolitary much larger involucres with much larger limbs, long slender styles, and much larger capsule. Possibly *E. hispida*, Boiss. (see end of genus).

14. **E. pilulifera,** *Linn. Amœn. Acad.* iii. 114; annual, erect or ascending, hispid with copious crisped hairs, leaves opposite elliptic-oblong obovate or oblong-lanceolate acute toothed or serrulate, nerves distinct, floral minute, involucres numerous in axillary and terminal dense-fld. sessile or peduncled cymes minute pubescent, limb of glands very narrow or obsolete, cocci compressed keeled pubescent, seeds pale brown acutely angled transversely shallowly rugulose. *Boiss. in DC. Prodr.* xv. ii. 21; *Jacq. Icon.*

t. 478. E. hirta, *Linn. l. c.*; *Roxb. Fl. Ind.* ii. 472; *Jacq. Collect.* v. t. 11, f. 1; *Grah. Cat. Bomb. Pl.* 179; *Dalz. & Gibs. Bomb. Fl.* 227; *Benth. Fl. Austral.* vi. 51, and *Fl. Hongk.* 302. E. capitata, *Wall. Cat.* 7708, B to F.—*Burm. Thes. Zeyl.* t. 104 and 105, f. 1.—*Wall. Cat.* 7707 B.

Throughout the hotter parts of INDIA from the Panjab eastwards and southwards to CEYLON and SINGAPORE.—DISTRIB. All tropical and subtropical countries.

Stem and branches 1–2 ft. *Leaves* very shortly petioled, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, base usually narrow and obliquely cordate; stipules minute, linear; petiole distinct. *Involucres* about $\frac{1}{30}$ in.; glands small, globose, without a perceptible limb. *Capsule* $\frac{1}{24}$ in. diam., appressedly or patently hairy. *Seeds* ovoid.—The acute leaves, hispid hairiness, and small fruit render this species easily recognizable.

15. **E. rosea,** *Retz. Obs.* iv. 26; perennial, glabrous or sparsely hairy, stems prostrate flexuous, leaves opposite coriaceous obliquely obovate or linear-spathulate tip rounded crenulate, involucres solitary or few in small leafy axillary and terminal sessile cymes towards the ends of the branches, lobes 3–5-fid, limb of 2 upper glands large obliquely oblong or rounded, of 2 lower very narrow, styles very slender, cocci obtusely keeled, seed rugose. *Boiss. Euphorb. Ic.* t. 21, and in *DC. Prodr.* xv. ii. 50; *Thwaites Enum.* 269. E. thymifolia, *Wall. Cat.* 7710 D. E. indica, *Wall. Cat.* 7711 C. E. parviflora & satureioides, *Lamk. Dict.* ii. 424. ? E. auricularia, *Boiss. Cent. Euphorb.* 17, and in *DC. l. c.* 50.

DECCAN PENINSULA, from the Carnatic to Tranquebar, on the coast, *Rottler*, &c. CEYLON; common near the sea.—DISTRIB. Affghanistan.

Root long and stout; stems brittle, 4–8 in. long; branches straggling, firm, loosely leafy. *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ in. long, lower distant, upper more crowded often subsquarrose, rarely truncate; stipules minute, triangular, fimbriate. *Involucre* $\frac{1}{10}$–$\frac{1}{8}$ in. diam., subcampanulate; lobes triangular ovate, acute; glands suborbicular, often deep purple, limb rosy very conspicuous; styles deeply bifid. *Cocci* very minutely rough.—Boissier's figure of this is very unsatisfactory as regards habit. I can find no character whereby to distinguish his *E. auricularia*, which he says differs from *E. rosea* in being glabrous, with the floral leaves not imbricate, nor narrowed, in the smooth capsule and involucre, and in the styles spathulate at the tip. It is described from a specimen of Heyne's in the St. Petersburg Herbarium.

16. **E. corrigioloides,** *Boiss. Cent. Euphorb.* 11, and in *DC. Prodr.* xv. ii. 32; perennial, glabrous or papillosely pubescent, stems stout prostrate and ascending leafy, leaves opposite $\frac{1}{4}$ to $\frac{1}{2}$ in. coriaceous orbicular to obliquely oblong serrulate tip rounded, involucres turbinate crowded in small subsessile axillary and terminal often capitate cymes or leafy heads, limb of gland (when present) white lobed, styles usually slender, cocci obtusely keeled, seed smooth. ? E. disticha, *Enjelm. in Herb. Vind. ex Boiss. in DC. l. c.*

DECCAN PENINSULA, *Heyne*; Maisor and the Carnatic, *Wight*, &c.

Root stout, crowned with a short stock; branches long and flexuous, 4–10 in., pale, usually much stouter than in other species of this section. *Leaves* distichously spreading, thickly coriaceous, base rounded or obliquely cordate; petiole short, thick; stipules short, triangular, lacerate. *Cymes* leafy at the base. *Involucres* turbinate, $\frac{1}{14}$ in. diam., shortly pedicelled; lobes broad and cleft to the base into many bristles; limb when present often broader than the gland and very conspicuous. *Styles* more slender than in others of the section, but this character seems variable. *Capsule* $\frac{1}{12}$ in. diam.—Except by its stout habit, perennial root and longer styles, it is not easy to distinguish some states of this from some of *E. hypericifolia*. Between *E. disticha* and *corrigioloides*, as distinguished by Boissier, I can find no good diagnosis. Of the former he says, "Very closely allied to *E. corrigioloides*, but appearing to differ in the very short internodes, short styles, &c.," characters which I find applicable to specimens of the latter.

3. CHAMÆSYCEÆ (see p. 245).

17. **E. thymifolia,** *Burm. Fl. Ind.* 2, and *Thes. Zeylan.* t. 105, f. 2; annual, more or less hispidly pubescent, branches prostrate, leaves opposite $\frac{1}{6}$–$\frac{1}{3}$ in. petioled obliquely oblong obtuse crenulate glabrous or pubescent beneath, stipules elongate, involucres subsolitary very minute axillary especially in the crowded terminal branchlets, lobes short ciliate, glands very minute stipitate with a minute limb or 0, capsules erect obtusely keeled pubescent, seeds with 5–6 shallow transverse furrows. *Boiss. in DC. Prodr.* xv. ii. 47, and *Fl. Orient.* iv. 1089; *Lamk. Dict.* ii. 423; *Roxb. Fl. Ind.* ii. 473; *Dalz. & Gibs. Bomb. Fl.* 227; *Benth. Fl. Hongk.* 302; *Wall. Cat.* 7710, *in part.* E. Burmanniana, *J. Gay in Webb. Phyt. Canar.* iii. 239; *Thwaites Enum.* 269. E. prostrata, *Grah. Cat. Bomb. Pl.* 179 (*not of Aiton*). E. rubicunda, *Blume Cat. Hort. Bogor.* 73. E. foliata, *Hamilt. ex Dillw. Rev. Hort. Malab.* 52. E. maculata, *Aubl. Pl. Guian.* i. 479. ? E. prostrata, *Grah. Cat. Bomb. Pl.* 179. Anisophyllum thymifolium & Burmannianum, *Klotzsch & Garcke in Bot. Reise Pr. Wald.* 25.—*Rheede Hort. Mal.* x. t. 33.

Throughout INDIA and CEYLON in the plains and lower hills, ascending in Kashmir to 5500 ft.—DISTRIB. All hot countries except Australia.

Usually a much-branched prostrate plant, with many short leafy stems spreading from the root. *Leaves* distichously spreading, rather thick, base obliquely truncate; stipules fimbriate with a long point. *Involucres* $\frac{1}{30}$ in. long, turbinate, pubescent; glands stipitate, limb obscurely lobed. *Capsule* $\frac{1}{30}$ in. broad, shortly stipitate, erect from an early stage.

18. **E. granulata,** *Forsk. Fl. Æg. Arab.* 94; perennial?, hispidly villous, stems many prostrate from the root leafy, leaves opposite $\frac{1}{10}$–$\frac{1}{8}$ in. obliquely obovate oblong-obovate or rounded quite entire tip rounded or retuse, involucres axillary subsolitary hairy, limb of gland 0 or minute, styles minute, cocci hirsute not keeled, seeds faintly pitted. *Vahl Symb.* ii. 54; *Boiss. in DC. Prodr.* xv. ii. 33, and *Fl. Orient.* iv. 1087. E. Forskalii, *var.* β and γ, *J. Gay in Webb. Phyt. Canar.* iii. 242. E. fragilis, *Dcne. in Ann. Sc. Nat. Ser.* 2 (1834), 241. E. arillata, *Edgew. in Journ. As. Soc. Beng.* xvi. 1218; *T. Anders. Flor. Aden. in Journ. Linn. Soc.* 34. E. villosa, *Herb. Royle.* ? E. ægyptiaca, *var.* indica, *Boiss. in DC. l. c.* 35. E. thymifolia, *Wall. Cat.* 7710 E. Anisophyllum Forskalii, *Klotzsch & Garcke in Bot. Reise Pr. Wald. Bot.* 25.

The PANJAB PLAINS and ROHILKUND, *Royle,* &c. MALWA, *Edgeworth.* SCIND, *Stocks, Perry.*—DISTRIB. Affghanistan, Arabia, Egypt, Canaries.

Root in old plants crowned by a short rootstock; branches spreading and straggling from the root, 3–6 in., very brittle. *Leaves* spreading distichously, villous on both surfaces, the largest $\frac{1}{6}$ in. long, opaque, coriaceous, base narrow or cordate; stipules minute, ciliolate. *Involucres* very minute, axillary and on short leafy branchlets, subsessile, turbinate; lobes short, obtuse, ciliate; glands usually without a limb. *Capsule* $\frac{1}{20}$ in. diam., cocci rounded at the back. *Seed* with a thickly mucous testa. —The Scind specimens are less hirsute than the Panjab ones. Boissier describes this as annual, but I think it is certainly a perennial. I find no specimen of Boissier's *E. ægyptiaca* var. *indica* in Herb. Kew, where its author states there is a specimen from Bombay, but I suspect that the plant alluded to is *E. granulata.*

19. **E. microphylla,** *Heyne in Roth Nov. Sp.* 229; annual, quite glabrous or sparsely hairy, stems very many prostrate and spreading from the root leafy, leaves opposite $\frac{1}{6}$–$\frac{1}{4}$ in. very short obliquely oblong rounded-oblong or subquadrate tip rounded truncate or retuse and more or less

toothed, involucres subsolitary axillary glabrous, glands with a very small sinuately-lobed limb, styles very short, cocci obtusely keeled glabrous, seeds smooth. E. serpens, δ., *Engelm. mss.*; *Boiss. in DC. Prodr.* xv. ii. 30. E. Heyneana, *Spreng. Syst.* iii. 791. ? E. Heyneana, *Boiss. in DC. l. c.* 35, *in part.* E. orbiculata, *Miquel Fl. Ind. Bat.* i. 421. E. Wallichiana, *Boiss. mss.* E. thymifolia, *Wall. Cat.* 7710, *in part.* E. uniflora, *Dalz. & Gibs. Bomb. Fl.* 227. ? E. Chamæsyce, *Roxb. Fl. Ind.* ii. 473.

BENGAL and BEHAR, *J. D. H. & T. T.*, &c.; at Benares, *Madden.* BANDA, *Edgeworth.* The CONCAN, *Law, Stocks.* MADRAS, near the city, *G. Thomson.* TENASSERIM, *Helfer.*—DISTRIB. Java.

Stems very slender and much distichously branched, spreading in a whorl from the root, 4–10 in. long, whitish, brittle. *Leaves* always small, coriaceous and opaque, sometimes as broad as long, spreading at right angles, if toothed only at the broad end, nerveless; stipules minute, triangular, 2-partite or laciniately toothed. *Involucres* very numerous from the base to the tips of the stems and branches, minute, campanulate, very shortly pedicelled; bracts at the base of the pedicels subulate; lobes triangular, acute, nearly entire; glands very shortly stipitate. *Capsule* shortly pedicelled, $\frac{1}{16}$ in. diam. *Seeds* bluish, when wet mucose.—Very similar to *E. Chamæsyceæ*, but with perfectly smooth seeds. It is certainly very near indeed to the *E. serpens*, Kunth, of N. America and the West Indies, but differs in the minute stipules and the more entire leaves. Roth describes the larger leaves as being only 1–1½ line long, but the average in our specimen is 2–3 lines.—As stated under the following species, I suspect that Boissier's *E. Heyneana* is made up of Heyne's specimen of this species and the North-West Indian ones of Thomson, &c., which I have described as *E. Clarkeana.*

Var. *galioides*; more straggling, leaves ¼ in. diam. E. galioides, *Boiss. l. c.* 36. E. thymifolia, *Wall. Cat.* 7710 H, in part.—Banks of the Irawaddy at Segain, *Wallich.*—This is, I think, certainly referable to *microphylla*, and is hardly even a variety of it.

20. **E. Clarkeana,** *Hook. f.*; glabrous, stems filiform many prostrate and spreading from an annual root rarely subsimple and erect, leaves opposite $\frac{1}{6}$–$\frac{1}{4}$ in. obliquely linear-oblong entire or toothed at the rounded tip, involucres axillary chiefly towards the tips of lateral branches minute glabrous, lobes lanceolate toothed longer than the glands which are wholly or almost without a limb, cocci quite glabrous keeled, seeds obscurely transversely rugose. E. granulata, *Herb. Royle.* E. Heyneana, *Boiss. in DC. Prodr.* xv. ii. 35, *in part.*

NORTH-WEST INDIA, *Royle*; from Delhi, *Clarke,* westwards to Lahore, *Edgeworth, Thomson*, &c. SCIND, *Stocks.*

Stems very slender, crowded from the root, a span long and under; branches divaricating, pale, rather leafy, often with a few scattered hairs towards the tips. *Leaves* coriaceous, in typical specimens crowded towards the ends of short branchlets, distichously spreading, base almost auricled on one side; petiole very short; stipules rather large, setaceous from a broad toothed base. *Involucres* $\frac{1}{30}$ in. long, campanulate. *Styles* very short. *Capsule* $\frac{1}{18}$ in. broad. *Seeds* acutely 4-angled.

I advance this as an undescribed species with great hesitation. It is undoubtedly the "Panjab, Lahore and Ferozepore" plant included under his *E. Heyneana* by Boissier (who has named some of the specimens *E. sanguinea*, others *E. Heyneana*), but I have seen no Deccan specimens, and I doubt its being the plant of Heyne seen by Boissier in the St. Petersburg Herbarium, and which I suppose is *E. microphylla.* Nor do I find the white sub-3-lobed limb of the gland described by Boissier. It is very near *E. microphylla*, differing in the long narrow leaves and locality, and more closely resembles *E. sanguinea*, Hochst. and Steud., of Abyssinia, but that plant has a distinct limb to the glands and large reflexed styles cleft nearly to the base. It is no doubt the Indian plant alluded to by Engelmann under *E. prostrata* (Torrey Bot. Mex. Bound. Exped. 187) as identical with that species, which, however, differs

in the broad rounded fimbriate lobes of the involucre and distinct limb of the gland. Of Boissier's var. *scindica* the specimens are wretched. I have seen no Mauritian specimens of this.

Var. *erecta*; stem simple or branched from the base erect, leaves longer sometimes $\frac{1}{2}$ in. long, involucres sometimes in distant axils. E. uniflora, *Roxb.* (*Edgew. mss.*)—Probably a state drawn up in long grass.

21. **E. burmanica,** *Hook f. in Ic. Plant.* t. 1548; annual, quite glabrous, stems many very slender spreading from the root prostrate, leaves $\frac{1}{6}$–$\frac{1}{4}$ in. opposite in rather distant pairs petioled obliquely linear subacute subspinulosely serrate, involucres minute axillary subsolitary, lobes fimbriate, glands narrower than the rounded limb, capsules minute glabrous, cocci acutely keeled, seeds acutely 3-gonous faces obscurely undulate. E. thymifolia, *Wall. Cat.* 7710 H, *in part.*

Burma; banks of the Irawaddy at Segain, *Wallich.*

Root slender, giving off numerous rather rigid dichotomously branching filiform stems 4–6 in. long. *Leaves* very uniform, coriaceous, base obliquely rounded; margins recurved when dry, more spinulosely serrate than in any species of the section; stipules setaceous and lacerate. *Involucres* about $\frac{1}{20}$ in. long, pedicelled, campanulate, quite glabrous; lobes narrow, often longer than the glands, serrate or lacerate; glands transversely oblong with a semilunar or almost semicircular limb that is broader than itself. *Styles* short, 2-fid. *Capsule* about $\frac{1}{18}$ in. diam., quite glabrous, nodding; pedicel very long, slender.—A very distinct species, easily known by the minute narrow coriaceous sharply serrate leaves. The limb of the gland is, though small, larger in proportion than in its allies.

4. Tirucalli (see p. 245).

E. Tirucalli, *Linn. Hort. Cliff.* 197; an erect unarmed shrub or tree, branches spreading cylindric scattered whorled or clustered, leaves 0 or few small linear-oblong, involucres shortly pedicelled clustered in the forks of the smaller branches, glands peltate, cocci compressed velvety, seeds ovoid smooth. *Boiss. in DC. Prodr.* xv. ii. 96; *Roxb. Fl. Ind.* ii. 470; *Brand. For. Fl.* 439; *Kurz For. Fl.* ii. 417; *Grah. Cat. Bomb. Pl.* 179; *Dalz. & Gibs. Bomb. Fl. Suppl.* 76; *Thwaites Enum.* 268; *Benth. Fl. Hongk.* 301; *Wall. Cat.* 7687. E. viminalis, *Mill. Dict. Ed.* i. 15. E. rhipsaloides, *Lemaire Ill. Hortic.* 1857, *Misc.* 72.—Tiru-calli, *Ham. in Trans. Linn. Soc.* xiv. 286.—*Rheede Hort. Mal.* ii. t. 44.

Naturalized in Bengal, the Deccan Peninsula and Ceylon. Cultivated in N.-W. India, Burma and the Eastern Peninsula.—Distrib. A native of Africa.

A small tree, 12–20 ft., trunk 6–10 in. diam., green, cylindric, densely branched above; bark brown, cracked; branches slender like stout rushes, becoming as thick as the little finger. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in. caducous, obtuse, flaccid, pubescent at length glabrous. *Involucres* chiefly female, small, $\frac{1}{12}$ in. long, turbinate, subsessile with 2 small leaves at the base of the pedicel; lobes short hairy, glands transversely ovate, punctate; bracteoles very numerous lacerate. *Styles* short, recurved, 2-lobed, stigmas capitate. *Capsule* $\frac{1}{4}$ in., dark brown.—Hamilton (Trans. Linn. Soc. l. c.) regards this plant as a comparatively recent introduction into India from Africa.

22. **E. epiphylloides,** *Kurz For. Flor.* ii. 416; an erect unarmed fleshy small tree, branches jointed flattened with thick crenate wings, leaves subsessile obovate glabrous tip rounded or retuse, involucres in shortly peduncled dichotomous glabrous cymes in the crenatures of the branches, capsules glabrous.

South Andaman Island; on the rocky coast of Escape Bay, *Kurz.*

A tree, 12–15 ft. ; branches 2–3 in. diam. *Leaves* deciduous, very shortly petioled, glossy, base obtuse ; lateral nerves obsolete. *Cymes* of involucres inserted at the scars of fallen leaves. *Capsules* deeply 3-lobed, of the size and shape of those of *E. nereifolia*.—Description from Kurz. The habit is that of the following section. I have seen only dried flowerless branches.

5. DIACANTHIUM (see p. 245).

23. **E. neriifolia,** *Linn. Hort. Cliff.* 196 *in part*; a small erect fleshy glabrous tree, branches jointed cylindric or obscurely 5-angled with short sharp stipular thorns arising from thick tubercles, leaves subterminal fleshy obovate oblong or subspathulately obovate acute, involucres in small stout dichotomous short-peduncled cymes from the sinuses, hemispheric smooth, styles connate high up undivided, cocci compressed glabrous. *DC. Plant. Grasses* ii. t. 46; *Boiss. in DC. Prodr.* xv. ii. 79, and *Fl. Orient.* iv. 1090; *Grah. Cat. Bomb. Pl.* 178; *Dalz. & Gibs. Bomb. Fl.* 226; *Brand. For. Fl.* 439; *Kurz For. Fl.* ii. 416; *Beddome Forester's Man.* 216; *Wall. Cat.* 7689. E. ligularia, *Roxb. Fl. Ind.* ii. 465; *Ham. in Trans. Linn. Soc.* xiv. 285.—*Burm. Thes. Zeyl.* 96.—*Rumph. Herb. Amb.* iv. t. 40.

DECCAN PENINSULA ; common in rocky places ; cultivated in BENGAL and elsewhere in native villages. Cultivated and probably wild also in BURMA, *Kurz*. Cultivated only in Ceylon.—DISTRIB. Beluchistan, Malay Islands.

A shrub or small tree, 15–20 ft. *Branches* ¾ in. diam. and upwards, with the subconfluent tubercles in 5 irregular rows. *Leaves* deciduous, 6–12 in. long, terminal on the branches, waved, narrowed into a very short petiole ; stipular thorns solitary or in pairs, ⅓–½ in. long. *Involucres* yellowish, the lateral ones of the cymes shortly thickly pedicelled, central sessile ; lobes large, erect, roundish, cordate, fimbriate ; glands transversely oblong ; bracteoles most abundant, fimbriate. *Stigmas* capitate. *Capsule* about ½ in. broad, deeply 3-lobed.—Kurz describes the involucres that are in the forks of the cymes as sessile, and usually entirely male. I follow Boissier in referring Roxburgh's *E. ligularia* to *E. nereifolia*, and his *nereifolia* to *Nivulia*.

24. **E. Nivulia,** *Ham. in Trans. Linn. Soc.* xiv. 286 ; an erect fleshy glabrous tree, branches subcylindric with pairs of sharp stipular spines arising from low tubercles, leaves alternate linear- or obovate-oblong fleshy glabrous tip rounded, involucres 3-nate forming small short-peduncled cymes from above the leaf scars on the tubercles hemispheric smooth, styles connate to the middle undivided, cocci compressed glabrous. *Boiss. in DC. Prodr.* xv. ii. 79 ; *Wight Ic.* t. 1862 ; *Dalz. & Gibs. Bomb. Fl.* 225 ; *Brand For. Fl.* 439 ; *Kurz For. Fl.* ii. 417 ; *Beddome Forester's Man.* 216 ; *Wawra, Bot. It. Pr. S. Cob.* 45. E. nereifolia, *Roxb. Fl. Ind.* ii. 467 ; E. varians, *Haw. Succ. Pl.* 130 ; *Grah. Cat. Bomb. Pl.* 179. ? E. antiquorum, *Wall. Cat.* 7688.—*Rheede Hort. Mal.* ii. t. 43.

NORTH-WEST HIMALAYA ; on dry rocky hills. GUZERAT, the DECCAN PENINSULA and SCIND, *Wight*, &c. PEGU and BURMA, in dry forests, *Kurz*.—DISTRIB. Madagascar ?

A large shrub or tree, 20–25 ft. ; branches whorled ; tubercles arranged in a spiral, distant, conical, truncate. *Leaves* 6–12 in., deciduous, nerveless, midrib stout beneath. *Involucres* 3 together in a short cyme with a minute serrulate bract at their base, lateral peduncled 2-sexual, central sessile, male ; lobes large, erect, ovate, fimbriate ; glands transversely oblong ; bracteoles most abundant, fimbriate. *Stigmas* capitate. *Capsule* about ¼ in. broad. *Seeds* smooth.

25. **E. antiquorum,** *Linn. Hort. Cliff.* 196 ; an erect fleshy glabrous

tree, branches terete or obscurely 3–6-angled, branchlets with 3–5 thick sinuate wings and a pair of sharp stipular thorns in the sinuses, leaves few small from the sides of the wings fleshy obovate-oblong tip rounded, involucres 3-nate forming short-peduncled cymes in the sinuses, styles free 2-lobed, cocci compressed glabrous. *Boiss. in DC. Prodr.* xv. ii. 81; *Roxb. Fl. Ind.* ii. 468; *Grah. Cat. Bomb. Pl.* 179; *Dalz. & Gibs. Bomb. Fl.* 226; *Brand. For. Fl.* 438; *Kurz For. Fl.* ii. 416; *Beddome Forester's Man.* 217; *Wight Ic.* t. 897. ? E. arborescens, *Roxb. l. c.*—*Rheede Hort. Mal.* ii. t. 42.—Euphorb., *Wall. Cat.* 7704 A, C.

Throughout the hotter parts of INDIA and CEYLON, in dry places, ascending to 2000 ft.; also cultivated for hedges.

A polymorphous plant, *Wight*; attaining 25 ft., *Kurz.*; branches 5–6 in. broad, wings repand-sinuate. *Leaves* few, small, deciduous, almost nerveless, shortly petioled. *Cymes* rarely compound; bracts opposite, "obovate" (Kurz). *Involucres* hemispherical, nearly $\frac{1}{2}$ in. broad, yellow, the lateral ones on the cyme shortly thickly pedicelled, the central sessile, female; bracteoles abundant, fimbriate. *Fruit* $\frac{1}{2}$ in. diam.—Wight refers the plant he figures of this species to a var. *polygona*, and represents the bracts as triangular ovate and acute, and the cymes as lax with long peduncles and pedicels.

26. **E. tortilis,** *Rottler, ex Wight Ic.* t. 898; an erect fleshy glabrous shrub, branches broad jointed 3–4-angled and spirally twisted, angles compressed lobulate with a pair of stout stipular spines on the lobes, leaves ?, involucres 3-nate very shortly stoutly peduncled forming small clusters in the sinuses campanulate lobes glabrous, styles very short connate at the base, cocci not compressed. *Boiss. in DC. Prodr.* xv. ii. 81; *Brand. For Fl.* 439.—Euphorb. *Wall. Cat.* 7704 B.

DECCAN PENINSULA; Madras and the Coromandel coast. CEYLON, *Thwaites.*

A shrub; branches 2–3 in. broad; spines $\frac{1}{3}$ in. long. *Leaves* not described. *Cymes* of 3 subsessile green involucres each about $\frac{1}{4}$ in. diam.; bracts minute ovate, acute. *Involucre* green with fimbriate lobes and large glands; bracteoles very abundant, fimbriate. *Styles* subspathulate, emarginate. *Fruit* $\frac{1}{2}$ in. diam.; cocci keeled.—Wight's figure of this differs from that of *E. antiquorum* in the short crowded cymes, glabrous involucral lobes, rounded cocci, and stouter 2-lobed styles. As with all the other species of this section, careful comparison of these characters is much wanted. Thwaites suggests its being a var. of *E. antiquorum*.

27. **E. trigona,** *Haworth Succ. Pl.* 127; an erect glabrous fleshy shrub, branches 3–5-winged, sinus between the wings acute, wings lobulate with one or two pairs of stout stipular spines on the lobes, leaves from the sides of the wings petioled obovate-spathulate fleshy, tips rounded or mucronate, cymes solitary in the sinuses very shortly peduncled, involucres 3 hemispheric, lobes cuneiform fimbriate, styles connate below undivided, cocci compressed glabrous. *Boiss. in DC. Prodr.* xv. ii. 82; *Brand. For. Fl.* 438; *Roxb. Fl. Ind.* ii. 468; *Wight Ic.* t. 1863. E. antiquorum, *var.* β, *Linn. Sp. Pl.* 646. E. Cattimandoo, *W. Elliot in Wight Ic.* t. 1993; *Boiss. l. c.* 83; *Brandis*, l. c.

Dry rocky hills in the DECCAN, and probably other parts of India. ANDAMAN ISLANDS, *Kurz.*—DISTRIB. Moluccas.

The following description is from Roxburgh of specimens brought from the Moluccas:—*Stem* 6–7 ft., branches ascending, usually 3-gonous. *Leaves* 1–2 by $\frac{1}{3}$–$\frac{3}{4}$ in., solitary from between the spines, deep green above, paler beneath. *Cymes* from the sinuses generally of 3 involucres, the central sessile with 5 fascicles of male fl. only; lateral pedicelled with one female and five male fl. *Involucral lobes* rounded, jagged; scales (bracteoles) numerous, multifid. *Styles* combined to the middle.

Wight remarks of his *E. Cattimandco*, that it is so like *E. trigona* that he would

not have introduced it into his Icones, but for the gum it yields. His description of it differs from *trigona* only in the branches being 5-angled; but the figure further differs in the more remote protuberance of the branches, in the much smaller involucres, in the few stamens, and in the involucral lobes though fimbriate not being further cleft into lobes; he further figures the ovary of *trigona* as furnished with a cleft calyculus, which is noteworthy. The number of stamens no doubt varies, for Wight observes that in Cattimandoo sometimes the outer involucres of the cyme are male, sometimes the inner, and that *trigona* occasionally produces branches with solitary male involucres.

28. **E. Royleana,** *Boiss. in DC. Prodr.* xv. ii. 83; an erect glabrous fleshy shrub, branches with 5–7 broad flat faces and as many short thick obtuse undulate not lobulate wings with a pair of stipular thorns on their margins, leaves not described, involucres 3–4 in a contracted sessile cyme hemispheric, lobes cuneate fimbriate, styles free to the base?, cocci compressed glabrous. *Brand. For. Fl.* 438; *Gamble Man. Ind. Timb.* 368. E. pentagona, *Royle Ill.* 329, t. 82, f. 1 (*not of Haworth*).

OUTER HIMALAYA, in dry hilly tracts from Kumaon to the Jhelum, *Royle, Brandis,* ascending to 6000 ft. SALT RANGE, *Aitchison.*

Attains 16 ft. in height and a girth of 6 ft. *Branches* in Royle's figure 3 inches in diameter, with flat spaces between the wings. *Involucres* ½ in. diam., yellow-green, hemispheric. *Capsules* ¾ in. diam.—Royle's figure is unsatisfactory as to the styles. Brandis says it is probably the species of the dry hills near Jeypur which furnishes a great part of the fuel of that city. Boissier, who has never seen this, points out that the only character whereby Royle's figure enables him to distinguish it from Wight's plate of Cattimandoo, which species also he has not seen, are the broad flat spaces between the wings.

6. RHIZANTHIUM (see p. 245).

29. **E. sessiliflora,** *Roxb. Fl. Ind.* ii. 471; a dwarf glabrous fleshy shrub or herb, root large tuberous, stem erect terete, leaves terminal deciduous subsessile oblong or ovate- or obovate-oblong obtuse quite entire, involucres 1–3 sessile at the scars of fallen leaves minute campanulate, lobes fimbriate, styles short almost free undivided. *Boiss. in DC. Prodr.* xv. ii. 76; *Kurz For. Fl.* ii. 415.

PEGU, *Carey, Kurz.*

Root an irregular tuber, as large as a large potato; stem 1 ft., simple. *Leaves* 1–3 in., smooth, fleshy, nearly nerveless; stipular glands minute. *Involucres* reddish, solitary or the two lateral rudimentary; lobes rounded-ovate, pectinate; glands transversely oblong. *Ovary* glabrous; styles crimson.

30. **E. fusiformis,** *Ham. in Don Prodr.* 62; a dwarf glabrous herb with a long stout cylindric rootstock, leaves all radical 6–8 in. subsessile obovate or oblanceolate, cymes from the crown of the rootstock after the leaves very variable in length dichotomous, bracts ovate or the upper or all truncate and 3-fid, involucres subsessile or in long or short peduncles hemispheric, styles combined to the middle, cocci compressed. *Boiss. in DC. Prodr.* xv. ii. 93. E. acaulis, *Roxb. Fl. Ind.* ii. 472; *Boiss. l. c.*; *Grah. Cat. Bomb. Pl.* 179; *Dalz. & Gibs. Bomb. Fl.* 226. E. nana, *Royle Ill.* 329, t. 82, f. 2; *Boiss. l. c.* 94; *Wall. Cat.* 7703.

TROPICAL HIMALAYA; Kumaon, *Royle*; Nepal, *Hamilton*; Oudh, *Thomson* BENGAL, *Roxburgh.* The CONCAN, on the Bababoodan Hills, *Graham,* &c.

Rootstock 6–10 in. long, buried in the ground, 1½ in. or less in diam., brown, smooth except at the scarred apex. *Leaves* acute or obtuse, fleshy, nerveless. *Cymes* 6 in. long and less, with long peduncled involucres or very short in *nana*, with short peduncles of the involucres. *Involucres* about ¼ in. diam., greenish; lobes spathulate

fimbriate. *Capsule* $\frac{1}{3}$ in. diam., pedicel $\frac{1}{2}$ in. long or less, sometimes very short. *Seeds* broadly obliquely ovoid, subacute, smooth.—Unlike as Royle's *nana* is to Roxburgh's figure of *acaulis*, I am convinced that these are merely forms of one, the length of the cyme probably depending on the moisture of the soil, and whether produced in open ground or amongst herbage. The Concan specimens are intermediate.

7. GALARRHÆUS (p. 246).

* *Perennial herbs. Capsules smooth* (*see also* E. pilosa *and* khasyana).

31. **E. himalayensis,** *Boiss. in DC. Prodr.* xv. ii. 113 (? *of Klotzsch*); erect, glabrous or pubescent above, leaves 1–2 in. alternate sessile elliptic- or linear-oblong obtuse, nerves obscure spreading, involucral 4 orbicular or rhombic-ovate, rays few short, involucres campanulate hairy within, lobes rounded tomentose, styles stout united below the middle, capsule $\frac{1}{4}$ in. diam. and seeds quite smooth. ? E. himalayensis, *Klotzsch in Bot. Reise Pr. Wald.* 115. Tithymalus himalayensis, *Kl. l. c.* t. 20.

TEMPERATE HIMALAYA (*Hoffmeister* ?); Sikkim, alt. 10–13,000 ft., *J. D. H.*, &c. *Stems* 6–10 in. from a perennial stock, rather succulent, simple or sparingly branched, base scaly. *Leaves* rather coriaceous. *Involucres* $\frac{1}{6}$ in. diam., hidden by the involucral leaves; glands large, transversely oblong. *Capsule* shortly stipitate; cocci rounded. *Seeds* $\frac{1}{6}$ in. long, short broadly oblong, and very smooth; caruncle peltate.—The stout styles distinguish this from the smooth-fruited forms of *E. pilosa* and *sikkimensis*. Klotzsch's figure of *E. himalayensis* represents a miserable specimen of a *Euphorbia* without fruit, which it is impossible to identify; it has minute involucres with obscurely ciliate lobes.

32. **E. Wallichii,** *Hook. f.*; tall, erect, stem pubescent above, leaves 3–5 in. alternate sessile linear- or elliptic-oblong or -obovate acute, nerves many spreading, involucral 3–4 large rounded or rhombic-ovate acute, rays few short, involucres hemispheric hispid lobes broad margins woolly, styles slender united to the middle 2-fid, capsule $\frac{1}{2}$ in. diam. and seeds smooth. E. involucrata, *Wall. Cat.* 7696 A, B (*excl. loc. Silhet*), (*not of E. Meyer.*) —Euphorbia, No. 330, *Aitchison in Journ. Linn. Soc.* xviii. 93.

WESTERN and CENTRAL HIMALAYA; Nepal, *Wallich*; Kashmir, Chamba and Jamu, *Aitchison, Thomson*, &c.—DISTRIB. Kurrum Valley, Affghanistan, alt. 10–12,000 ft. *Stems* 1–2 ft. from a perennial stock, simple or sparingly divided above. *Leaves* membranous, sparsely hairy especially on the broad midrib above and beneath; involucral $1\frac{1}{2}$ in. diam. *Involucres* $\frac{1}{6}$ in. diam.; lobes very broad, rounded; glands large reniform. *Capsule* depressed globose; cocci woody; pedicel very short. *Seeds* $\frac{1}{6}$ in. long, globosely oblong very smooth, grey-blue; caruncle minute.—A large species distinguished from all other Indian ones by the large involucres, capsules and seeds. There are two sheets of it in Herb. Wallich, one, A, from Gossainthan (indicating that it was procured by Wallich's native collectors at some elevation in Nepal towards the snowy ranges); the other, B, is stated in the lithographed catalogue to be from Silhet, but this in the original ticket is queried, and is doubtless an error, for the specimens are identical with those under A. The Western Himalayan specimens seem the same species, but it has not been collected between central Nepa and Jamu. Aitchison describes it as a very handsome species growing in large tufts.

33. **E. Jacquemontii,** *Boiss. in DC. Prodr.* xv. ii. 113; stem simple or crisply puberulous, leaves 2–$2\frac{1}{2}$ in. subpetiolate lanceolate subacute glabrous, floral 3 ovate obtuse, umbel-rays 5 very short, involucre campanulate hirsute without velvety within, lobes elongate ciliate, styles rather long, capsule small and seeds smooth.

WESTERN HIMALAYA, *Jacquemont.*

Rootstock as thick as the thumb, cylindric, rather fleshy; stems 1½ ft. *Leaves* often reddish, base narrowed, beautifully nerved. *Involucral glands* stipitate, margins crisply undulate. *Styles* shortly 2-fid, connate ⅓ of their length. *Capsule* microscopically granulate.—Of this and its variety I have seen no specimen; there is nothing in the description to distinguish it from a smooth-fruited *E. pilosa.*

VAR. β. *lasiocarpa*; young capsule hirtellous.—N.W. Himalaya, *Jacquemont.* Kashmir (Pir Panjab) and Western Tibet; Iskardo, *Hugel.*

34. **E. sikkimensis,** *Boiss. in DC. Prodr.* xv. ii. 113; quite glabrous, leaves 2½–4 in. petioled linear-oblong or -lanceolate acute, nerves ascending obscure, floral whorled and 3–4 involucral ovate-oblong obtuse, involucres hemispheric glabrous without hirsute within, lobes ovate ciliate, styles very slender connate to the middle, capsule ⅙ in. diam. smooth, seeds smooth.—Euphorb., *Griff. Itin. Notes*, p. 148, No. 713.

SIKKIM HIMALAYA; in the inner valleys, alt. 8–10,000 ft., *J. D. H.* BHOTAN, at Lammoo, *Griffith.*

Stems 3 to 4 ft. from a woody rootstock, stout, but not woody, branched above. *Leaves* ½–⅔ in. broad, thinly coriaceous, narrowed into a distinct but short petiole. *Rays* several, often compound; invol. leaves ¼–⅓ in. broad, yellow. *Involucres* ⅛ in. diam.; glands transversely oblong. *Styles* very shortly 2-fid. *Capsule* ¼ in. diam.; pedicel about as long; cocci globose. *Seeds* ⅒ in. diam., nearly globose; caruncle small.—The leaves narrowed into a slender petiole and short involucres distinguish this from *E. longifolia.*

35. **E. Griffithii,** *Hook. f.*; tall, quite glabrous, stem branched above, leaves 2–3 in. sessile linear acute or apiculate, nerves many obscure, floral similar, involucral 3–4 small ovate red, base acute, involucres small campanulate glabrous without villous within, lobes small orbicular villous, styles stout united above the middle, capsule small and seeds smooth. E. sikkimensis, *Boiss. in DC. Prodr.* xv. ii. 113 (*the Bhotan plant, Griffith* 963, *only*).

BHOTAN HIMALAYA; at Woolooka, alt. 7–8500 ft., *Griffith.*

Stems from a perennial stock, stout, but not woody, 2–3 ft.; branches slender. *Leaves* rather membranous, ¼–½ in. diam., narrowed into a very short petiole, nearly black when dry; involucral scarlet or orange-red, ¼–½ in. *Rays* 8–12, slender, about equalling the floral leaves or longer. *Involucres* much smaller than in *sikkimensis*; glands large, reniform. *Capsule* rather woody. *Seeds* not seen.—Boissier (quoting Griffith's No. 963) confounded this very distinct species with *E. sikkimensis.* The scarlet colour of the involucral leaves is evident in the dried specimens.

36. **E. Stracheyi,** *Boiss. in DC. Prodr.* xv. ii. 114; stems many straggling from the rootstock branching prostrate or ascending pubescent, leaves ¼–¾ in. sessile obovate obtuse, involucral 2–4 broadly obovate, umbels solitary peduncled terminating the flowering branches, involucres hemispheric, lobes ciliate, styles short nearly free, capsule globose pubescent or minutely granulate, seeds smooth mottled.—Euphorb. *Wall. Cat.* 7685 and 7695 (*the 4 small specimens*).

ALPINE HIMALAYA; Nepal, *Wallich*; Kumaon, alt. 12–15,000 ft., *Strachey & Winterbottom* (Euphorb. n. 5, 17, 19, 20); Garwhal, alt. 10–12,000 ft., *Duthie*; Sikkim, alt. 12–16,000 ft., *J. D. H.*; Bhotan, *Griffith.*

Rootstock often long, stout, woody. *Involucres* ⅒–⅛ in. diam., hairy within; lobes often large; glands reniform. *Styles* rather long, nearly free (connate to beyond the middle, *Boissier*). *Capsule* ⅙ in. diam., not deeply lobed; pedicel very short. *Seeds* oblong, caruncle minute.—This varies excessively in size according to soil and exposure. The umbels are almost invariably solitary, but there are indications of

several rays being sometimes formed. Wallich's specimens have very slender much-branched stems, a foot long, with rather membranous black leaves; Strachey's have stout branches, 1–4 in., and coriaceous leaves sometimes secund on prostrate flowerless branches; Sikkim ones are intermediate between the above, and have often ciliate leaves; Griffith's are very small indeed, with stout simple stems less than an inch high, and leaves $\frac{1}{8}$–$\frac{1}{6}$ in. long.

Var.? *radiata*; leafing stems very many, 3 in. erect pubescent, flowering longer simple nearly leafless with 3–5 long-peduncled umbels, leaves $\frac{1}{2}$ in. elliptic-oblong glabrous.—Garwhal, at Ramni, *Strach. & Wint.* (*Euphorb.* n. 16).—A solitary specimen without fruit.

37. **E. tibetica,** *Boiss. in DC. Prodr.* xv. ii. 114; quite glabrous, stems many suberect or straggling from the woody rootstock, cauline leaves $\frac{1}{2}$–$\frac{3}{4}$ in. alternate sessile linear- or subcuneate- or spathulate-oblong tip rounded or truncate retuse or toothed, floral opposite and involucral similar, involucres axillary and in the forks very short turbinate glabrous within, lobes small ovate, styles short stout, capsule and seeds quite smooth.

WESTERN TIBET; Laptal (North of Kumaon), alt. 15,000 ft., *Strachey & Winterbottom* (No. 6); Piti, alt. 13,000 ft., *Thomson*; Karakoram, alt. 10,700 ft., *Clarke.* —DISTRIB. Kashgar.

Rootstock sometimes as long and thick as the middle finger. *Stems* 6–12 in., dichotomously branched, and foliage pale rather succulent. *Leaves* $\frac{1}{4}$ in. diam. or less, sometimes with the sides quite parallel, toothing of tips very variable. *Involucres* $\frac{1}{12}$ in. broad; glands large, transversely oblong; lobes entire, lobulate or toothed (ciliate, *Boissier*). *Capsule* shortly stipitate (pedicel long, *Boissier*), $\frac{1}{8}$–$\frac{1}{6}$ in. diam., pale green, furrows not deep between the oblong cocci. *Seeds* oblong-obovoid, caruncle rather large conic.

38. **E. Thomsoniana,** *Boiss. in DC. Prodr.* xv. ii. 113; quite glabrous, stem simple sparingly leafy, leaves $\frac{3}{4}$–$1\frac{1}{2}$ in. sessile elliptic or ovate obtuse or subacute, nerves few obscure ascending, floral broader, involucral 2 sub-orbicular, involucres campanulate glabrous without, with 4 hairy lines within, lobes short fimbriate, styles long slender, capsules large oblong and seeds smooth.

WESTERN TIBET; Leh, alt. 10–12,000 ft., *Thomson*; Gilgit, *Gill.*

Stems a foot high from a stout perennial stock, unbranched, scaly at the base. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in. broad, coriaceous, dull yellow when dry, upper and under surfaces alike. *Rays* 3–6, longer than the floral leaves. *Involucres* $\frac{1}{8}$ in. broad; lobes small; glands substipitate, transversely oblong. *Capsule* shortly stipitate, $\frac{1}{3}$ in. long, $\frac{1}{4}$ in. diam.; cocci not separate by a deep sulcus, oblong. *Seed* pale oblong, $\frac{1}{6}$ in. long, quite smooth; caruncle small, peltate.—A very distinct species.

** *Perennial herbs. Capsules usually warted. Seeds smooth.* (Capsule often smooth in *E. pilosa* and *khasiana.*)

39. **E. pilosa,** *Linn. Sp. Pl.* 460; tall, glabrous or pubescent, stems erect branched above, leaves alternate sessile or subsessile membranous from linear to oblong acute or obtuse, nerves slender spreading, involucral rounded or broadly ovate and acute, rays long or short, involucres campanulate villous within, styles long slender connate below the middle, capsule small smooth or warted glabrous or puberulous, seeds smooth. *Boiss. in DC. Prodr.* xv. ii. 116, and *Fl. Orient.* iv. 1096; *Reichb. Ic. Fl. Germ.* v. t. 138, 139, and *Ic. Crit.* ii. t. 145. E. procera, *M. Bieb. Fl. Taur. Cauc.* 378; *Reichb. Cent.* ii. t. 270.—Euphorb. No. 7, 9, 10, *Herb. Strachey & Winterbottom.*

WESTERN HIMALAYA; from Garwhal westward to Murree.—DISTRIB. Soongaria, Eastern Sibe ia and westward to the Atlantic.

Stems many from the rootstock, 1–3 ft., leafy. *Leaves* rarely more than ½ in. broad, sometimes minutely serrulate towards the tip or along the whole margin; nerves numerous but obscure; involucral bright yellow, always orbicular but sometimes pointed at the tip and with an acute base. *Rays* 5–9, long or short. *Involucres* about ⅛ in. diam., often hairy without; glands reniform; pedicel short. *Styles* often nearly as long as the capsule, but variable in length. *Capsule* ¼ in. diam., subglobose. *Seeds* 1/10 in. long, broadly oblong-ovoid; caruncle small, flat.—After a very carefu examination I am unable to regard *E. cognata* as anything but a form of *E. pilosa*, with the warts of the capsule usually, but not always, more developed. Boissier describes that of *pilosa* as smooth or sparsely and minutely tubercled. *E. cornigera*, which he separates from *cognata* by the serrulate leaves, in this respect differs from that plant as his own var. *trigonocarpa* of *pilosa* does from true *pilosa*. As to Royle's *E. cashmeriana*, it is impossible to refer so wretched a figure with certainty to any one species, but I have little doubt about its being this. Boissier's locality for *cognata* of "Nubra (Edgeworth)" is a misreading; it is not a Tibetan plant.

E. pilosa proper; capsule smooth or minutely warted.—I find specimens with this character mixed with the following.

Var. *cognata*; rays often numerous, capsule with few or many small depressed or larger conical warts. E. cognata, *Boiss. in DC. Prodr.* xv. ii. 120. E. consanguinea, *Klotzsch in Bot. Reis. Pr. Wald.* t. 19. Tithymalus cognatus, *Klotzsch l. c.* p. 66. ? E. cashmeriana, *Royle Ill.* 329, t. 82, f. 4; *Boiss. l. c.*

Var. *cornigera*; leaves finely serrulate, capsule with conical warts. E. cornigera, *Boiss. l. c.* 122.—Kashmir, alt. 6500–8500, *Jacquemont*, &c.; Murree, *Fleming*, &c.; Kulu, *Edgeworth.*

Var. *myrtifolia*; stems short decumbent or ascending, leaves ½–1 in. elliptic acute faintly serrulate. E. myrtifolia, *Edgew. mss.*—Kulu, *Edgeworth.*

40. **E. Edgeworthii,** *Boiss. in DC. Prodr.* xv. ii. 120; tall, robust, quite glabrous, leaves 2–3 in. sessile membranous oblong obtuse or acute base rounded, floral broadly ovate, involucral 3–4 orbicular, involucres small campanulate villous within, lobes ovate ciliate, capsule ¼ in. diam. warted, seeds rugose.

Western Himalaya; Kumaon, above Leetee, *Edgeworth.*

I suspect that this is only a state of *E. pilosa* with broader leaves rounded at the base. The specimen is a solitary one in fruit, having only one capsule, of the form and size of *E. pilosa.* The only ripe seed is rugose, but it may be in a diseased condition; the caruncle is minute and peltate.

41. **E. micractina,** *Boiss. in DC. Prodr.* xv. ii. 127; perennial, shortly sparsely hairy, stems short erect, leaves minute alternate sessile uppermost largest ½ in. elliptic-oblong obtuse remotely crenulate floral equalling the rays, involucral 3 ovate obtuse, involucre campanulate lobes ovate subciliate, capsule depressed warted, seeds obsoletely granulate.

Kashmir, on Pir Panjal; *Jacquemont*, in birch woods.

Root vertical, cylindric. *Stems* 6–8 in. *Leaves* gradually larger upwards, largest ¼ in. broad; involucral 1½ lines long. *Rays* ½–¾ in. *Styles* connate at the base, 2-fid. *Capsule* depressed-globose, warts conical. *Seed* 1½ line diam., ovoid, caruncle depressed.—I have seen no specimens. Boissier, who likens it to a very diminutive form of *E. Apios* or *dulcis*, does not describe the glands of the involucre, but puts it in the same section as *cognata* (*pilosa*).

42. **E. longifolia**, *Don Prodr.* 62; tall, glabrous or sparsely hairy, leaves 1–4 in. coriaceous sessile linear-oblong obtuse or acute nerves obsolete, involucral 3–4 orbicular or broadly ovate and apiculate, rays few short, involucres campanulate villous within, lobes rounded villous, styles long slender deeply 2-fid connate below the middle, capsule ¼ in. diam. covered obscurely and sparsely with conical warts, seeds smooth. *Boiss. in DC.*

Prodr. xv. ii. 120.—Euphorb. *Wall. Cat.* 7694 A and 7695 (*the central specimen*).

NEPAL, *Hamilton*, at Thoukote, *Wallich*.

I fear that this is only another form of *E. pilosa*, with more coriaceous leaves. *Capsule* rather broader than long, shortly stipitate, sulci deep between the globose cocci. *Seeds* $\frac{1}{10}$ in. long, broadly obovoid, pale; caruncle small.—Strachey and Winterbottom's No. 10, referred here by Boissier, is, I think, clearly *E. pilosa*, var. *cognata*.

43. **E. khasyana,** *Boiss. in DC. Prodr.* xv. ii. 120 and 1266; erect, quite glabrous, stems stout sparingly branched above, leaves 1–2 in. subsessile coriaceous elliptic-lanceolate obtuse nerves very obscure, involucral 2–3 orbicular or broadly ovate and apiculate, rays few stout, involucres hemispheric villous within, styles stout united to the middle obscurely 2-fid, capsule $\frac{1}{4}$ in. diam. smooth or warted, seeds smooth.

KHASIA MTS.; alt. 5–6000 ft., *Griffith* (*Kew Distrib.* 4693, *by error named* E. fimbriata, *Wall.*), *J. D. H. & T. T.*, &c.

This again I suspect may prove a variety of *E. pilosa*. It differs from *E. longifolia*, which it is very near, in the shorter stems, stouter habit, shorter broader rather more acute leaves, and obscurely 2-fid styles. The capsule and seeds are exactly as in *sikkimensis*.—The name *fimbriata*, Wall., applied to specimens of this distributed from Herb. Griffith, was inadvertently attached by Boissier to specimens of this plant in the Kew Herbarium, and cited as such in the Prodromus (p. 1266).

*** *Annuals. Capsule smooth. Seeds pitted* (unknown in *E. peltata*).

44. **E. helioscopia,** *Linn. Sp. Pl.* 459; annual, erect, dichotomously branched above, leaves alternate shortly petioled obovate or spathulate serrulate, floral similar, involucral orbicular or oblong rays about 5, involucres turbinate lobes oblong glands fimbriate, capsule smooth globose, seeds deeply reticulately pitted. *Fl. Dan.* t. 725; *Reichb. Ic. Fl. Germ.* v. t. 132 and 4754; *Boiss. in DC. Prodr.* xv. ii. 136, and *Fl. Orient.* iv. 1107.

The PANJAB and WESTERN HIMALAYA, in fields; introduced into the Nilghiris.—DISTRIB. Affghanistan and westward to the Atlantic, Japan; introduced elsewhere.

Stem often very stout and copiously umbellately or dichotomously branched above with divaricate branches. *Leaves* 2 in. long and under, membranous; floral large; involucral 2–4, small. *Involucres* $\frac{1}{10}$ in. diam., glabrous; lobes small; glands reniform. *Capsule* $\frac{1}{8}$ in. diam.; cocci rounded at the back. *Seed* turgidly oblong, or subglobose.—Boissier describes the seed as acute and compressed, which I cannot confirm.

45. **E. peltata,** *Roxb. Fl. Ind.* ii. 474; annual, erect, quite glabrous branched from below, leaves alternate sessile subspathulately oblanceolate acute serrate upper larger, floral 5 oblanceolate, involucral 3–4 elliptic acute at both ends, involucres minute campanulate with 3 villous lines within, glands peltate reniform, stamens few, styles free shortly 2-fid, capsule smooth. *Boiss. in DC. Prodr.* xv. ii. 137.

Interior of the COROMANDEL coast, *Roxburgh*.

A foot high; branches curved upwards. *Leaves*, lower $\frac{3}{4}$, upper and floral $1\frac{1}{2}$ in., all strongly nerved; involucral "oblong to cordate," *Roxb.* *Rays* very slender, 3–4 in. *Involucres* greenish yellow with purple glands; lobes narrow, ciliate. *Capsule* globose, scarcely any angle to be seen.—The above description is from Roxburgh's Flora Indica, and his unpublished drawing at Kew. It is described from plants grown in the Calcutta Gardens raised from seeds sent from Coromandel.

8. ESULA (see p. 247).

* *Annuals.*

46. **E. dracunculoides,** *Lamk. Encycl.* ii. 428; annual, glabrous,

stems erect many from the root leafy, leaves sessile linear-lanceolate subacute base acute rarely rounded or subcordate, involucral 2 broader at the base, involucres turbinate, lobes ovate ciliate, glands semilunate, styles short free, capsule smooth, seeds oblong leprous. *Boiss. in DC. Prodr.* xv. ii. 139, and *Ic. Euphorb.* t. 91; *Roxb. Fl. Ind.* ii. 474. E. lanceolata, *Heyne in Roth Nov. Sp.* 230; *Spreng. Syst.* iii. 791. E. uniflora, *Wall. Cat.* 7700, and *Herb. Royle* (*not of Fl. Ind.*).

From the PANJAB to BEHAR in the plains and low hills, and southward to CANARA and COROMANDEL.—DISTRIB. Westwards to Arabia and Trop. Africa.

Stems 12–18 in. high, often excessively branched dichotomously, branches divaricate. *Leaves* 1–1½ in. long; involucral shorter. *Involucres* solitary, hairy within. *Capsule* ⅛–⅙ in. diam., hardly depressed. *Seeds* oblong, with a white tuberculate testa.—Roth describes the margins of the leaves as scabrous.

47. **E. Maddeni,** *Boiss. in DC. Prodr.* xv. ii. 141; annual, quite glabrous, branched from the base, leaves ½–1 in. alternate sessile obovate-spathulate tip rounded base acute, floral longer opposite, involucral ovate oblong obtuse, involucres subsessile turbinate, lobes triangular 2-fid, glands semilunate 2-cornute, styles nearly free 2-fid, capsule smooth, seeds oblong obscurely ribbed smooth.—Euphorb. No. 15, *Herb. Strachey & Winterbottom.*

WESTERN HIMALAYA; from Kumaon to Murree, alt. 5–9000 ft., *Madden*, &c.

Whole plant 4–10 in. high, very variable in amount of branching, pale green, branches sometimes dichotomously divaricate. *Leaves* membranous, always narrowed at the base, sometimes retuse at the apex, nerves very slender. *Involucres* solitary in the forks of the flowering branches, or the axils of their opposite leaves, sometimes in rayed umbels; 1/10 in. diam., glabrous. *Capsule* thin, longer than broad, sulci deep between the oblong cocci, pale, ⅛ in. diam.; pedicel very short. *Seeds* 1/12 in. long, oblong, top rounded, caruncle orbicular.

48. **E. falcata,** *Linn. Sp. Pl.* 456; annual, dwarf, glabrous, stems erect dichotomously divaricatingly branched, leaves sessile oblong-obovate or linear cuspidately acuminate, floral 2–4 and involucral broader oblong or the involucral cordate cuspidately caudately acuminate, involucres minute turbinate lobes fimbriate glands semilunate, styles free, capsule small ovoid, cocci keeled, seeds transversely furrowed. *Boiss. in DC. Prodr.* xv. ii. 140, and *Fl. Orient.* iv. 1111; *Jacq. Fl. Austr.* ii. t. 121; *Reichb. Ic. Fl. Germ.* v. t. 141.

The PANJAB, at Rawul Pindee, *Aitchison*. GILGIT, *Giles*.—DISTRIB. Affghanistan and westward to Arabia, Mid. and South Europe and N. Africa.

A small annual, 6–12 in. high, with pale rigid stems and branches. *Leaves* 1 in. and less, floral and involucral sometimes serrulate. *Involucres* glabrous, hidden by the floral leaves, glands minute. *Capsule* 1/10 in. long, thin. *Seeds* pale, compressed and obscurely 3-sided, ecarunculate.—I have seen only a single Indian specimen from the Panjab in a young state, and another from Gilgit, but the characteristic cuspidate leaves of the species are unmistakable. Dr. Aitchison's note says that it is common.

49. **E. Rothiana,** *Spreng. Syst.* iii. 796; annual or perennial, erect, glabrous, glaucous, stem copiously branched above, leaves alternate linear-lanceolate or oblanceolate base acute, floral sessile ovate or oblong-lanceolate acute, involucral 2–3 triangular-ovate or ovate-cordate mucronate, involucres shortly campanulate lobes toothed and mouth villous glands semilunate 2-horned, styles free 2-fid, capsule smooth, seeds oblong bluish. *Boiss. in DC. Prodr.* xv. ii. 156; *Wight Ic.* t. 1864; *Dalz. & Gibs. Bomb. Fl.* 226;

Wawra Bot. It. Pr. S. Cob. 44. E. glauca, *Roxb. Fl. Ind.* ii. 473. ? E. segetalis, *Grah. Cat. Bomb. Pl.* 179 (*not of Willd.*). E. oreophila, *Miquel Analect. Bot.* iii. 17; *Boiss l. c.* E. Wightiana, *Boiss. Cent. Euphorb.* 37. E. graminea, *Kœnig in Herb. Vind.* E. divergens, *Klotzsch in Reise Pr. Wald. Bot.* t. 18. E. læta, *Heyne in Roth Nov. Sp.* 230. E. lanceolaria, *Herb. Heyne*, and E. linifolia, *Herb. Russell, in Wall. Cat.* 7691. Tithymalus divergens, *Klotzsch l. c.* 114.

Hills of CENTRAL INDIA and the DECCAN PENINSULA, from Banda, *Edgeworth*, southwards, alt. 4–6000 ft. CEYLON; common up to 7000 ft., *Thwaites.*

Stems usually stout, sometimes profusely dichotomously branched above, the branches bearing pairs of involucral leaves. *Leaves* 2–5 by $\frac{1}{4}$–$\frac{3}{4}$ in., coriaceous or membranous, sometimes acuminate, nerves diverging, very obscure, floral and involucral shorter, very variable. *Rays* few or many. *Involucres* $\frac{1}{10}$ in. diam., glabrous or hairy without, villous within; lobes variable, short; bracteoles very few. *Filaments* hairy. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., glabrous or hairy, quite smooth; pedicels long or short, deeply lobed. *Seeds* subglobose pale and imperfect, or broadly oblong or obovoid, brown-black or bluish, quite smooth; caruncle very small.—Boissier distinguishes *E. oreophila* from *Rothiana* by being taller, with leaves narrower at the base, umbels with more rays, involucral lobes truncate, and glabrous capsules, none of which characters appear to me to hold good, the organs to which they refer being extremely variable. The infertile seeds which occur in most of the specimens are larger than the fertile, and more globose, with no perceptible caruncle. This species is described as annual, and so are many specimens, but others appear as if from a perennial stock. Klotzsch's *E. divergens* is stated to be a native of the Himalaya, where *E. Rothiana* has not been found by others. I follow Boissier in referring it to the latter species.

Var. β, *pubescens*, Boiss. l. c.; branchlets and leaves more or less pubescent.—Canara, near Mercara, *Hohenacker, Pl. Ind. Or.* No. 807.

** *Perennials* (*see also* 49. E. Rothiana).

50. **E. kanaorica,** *Boiss. in DC. Prodr.* xv. ii. 154; perennial, quite glabrous, stems very many from the rootstock decumbent much branched naked below, leaves $\frac{1}{4}$–$\frac{1}{3}$ in. alternate coriaceous obovate-spathulate, floral opposite similar, involucres in the axils of 2 opposite orbicular leaves shortly pedicelled campanulate glabrous within, lobes triangular small, glands large 2-cornute, styles quite free 2-fid at the very tips only, capsule smooth, seeds oblong smooth.

WESTERN HIMALAYA; Kunawar on the ascent to the Runang Pass, alt. 15,000 ft.? *Thomson.*

Rootstock slender? *Stems* 6–10 in., flaccid, flexuous. *Leaves* yellowish when dry, always narrowed at the base except the upper involucral; costa and nerves invisible. *Involucres* $\frac{1}{12}$ in. diam. *Capsules* $\frac{1}{8}$ in. diam., pale. *Seeds* exactly as in *E. Maddeni.*—This a good deal resembles a very small *E. Maddeni*, but it has certainly a perennial stock, the leaves are coriaceous or fleshy, the styles short quite free and hardly 2-fid.

51. **E. prolifera,** *Ham. in Don Prodr.* 62; quite glabrous, stems many from a stout rootstock, erect subsimple, leaves 1–3 in. very coriaceous narrow linear to linear-oblong or -spathulate obtuse or acute, floral 4 elliptic obtuse, involucral 2–4 rounded, involucres shortly campanulate lobes triangular fimbriate glands peltate very variable, styles short stout revolute deeply 2-fid, capsule broad smooth, seeds globose smooth. E. nepalensis, *Boiss. in DC. Prodr.* xv. ii. 157. E. cuneifolia, *Roxb. Fl. Ind.* ii. 471; *Wall. Cat.* 7701.—Euphorb., *Wall. Cat.* 7698, 7699.

CENTRAL and WESTERN HIMALAYA; from Nepal to Kashmir, ascending to

6000 ft.; also in the plains or rocky hills from Oudh to the Panjab.—DISTRIB. Yunan.

Stems 6–12 in., stout, often with proliferous shoots of very narrow acute leaves; stock as thick as the thumb. *Leaves* $\frac{1}{6}$–$\frac{1}{3}$ in. broad, base acute or rounded, quite entire, upper or floral rarely oblong or ovate, nerves 3 very slender. *Involucres* $\frac{1}{8}$ in. diam., glabrous without and within; lobes acute; glands stipitate, peltate reniform or semilunate and 2-horned, or transversely oblong, entire or irregularly toothed; bracteoles numerous. *Styles* connate below the middle. *Capsule* $\frac{1}{6}$–$\frac{1}{4}$ in. diam., long pedicelled, rather depressed. *Seed* mottled or not, ecarunculate.

52. **E. thyrsoidea,** *Boiss. in DC. Prodr.* xv. ii. 164; glabrous, tall, stem grooved with many short branches from the axils upper with 6–10 twin 2-fid rays forming a thyrse, leaves rhombic-oblong from a narrow base subacute remotely denticulate much veined beneath, of the sterile branches narrowly linear, floral orbicular-ovate obtuse, involucres short lobes large ciliate, styles rather long connate to the middle.

NORTH-WEST HIMALAYA, *Jacquemont.*

Stem 3 ft. *Leaves* 3 by 1 in., upper smaller, membranous. *Thyrse* terminal, 6–8 in. long, reddish in flower. *Involucres* turbinately hemispheric, lobes truncate or retuse; glands with converging horns. *Styles* 2-lobed, tips thickened. *Capsule* unknown.—I have seen no specimens. Boissier, who places it in the same section as *E. Rothiana*, describes it as allied to *E. agraria*, M. Bieb., of Asia Minor, and *E. iberica*, Boiss., of Persia, &c., and as being remarkable for the distinctly veined leaves. It seems to have the denticulate leaves of *E. pilosa* var. *cornigera*, and the shcots with very narrow leaves of *E. prolifera*.

DOUBTFUL SPECIES.

E. ANGUSTIFOLIA, *Ham. in Don Prodr.* 62; perennial, stem 1 foot erect branched subvillous, umbels trifid, leaves scattered linear obtuse glabrous, involucres subsessile, glands bicornute.—Nepal, at Norcotera, *Hamilton.* Boissier (in DC. p. 177) suggests this being *E. Rothiana*, which is not a Nepal species and is usually glabrous.

E. (Chamæsyceæ) HISPIDA, *Boiss. Cent. Euphorb.* 8, and in *DC. Prodr.* xv. ii. 27; annual, softly hispid, stems decumbent or prostrate, leaves subsessile elliptic obtuse tip sharply serrulate base rounded, the larger $\frac{1}{2}$ in., involucres solitary forming short leafy axillary racemes turbinate glabrous, throat with a white beard, lobes ovate, glands transversely ovate as broad as their white or rosy obtusely 2–3-lobed limb, styles short 2-fid, cocci sparsely hairy acutely keeled, seed white, transversely tuberculately rugose. E. calliadena, *Engelm. mss.*—India, *Wallich.* n. 325, and 207 in *Herb. Kew.* Himalaya, *Jacquemont*; Kashmir, at Pir Pundjal, *Hugel.*—I find no plant answering to these numbers in Kew Herbarium, nor do I find them cited in Wallich's Herbarium. Boissier places it next to *E. coccinea.* Can it be *E. Emodi*, p. 250 ?

E. (Chamæsyceæ) NILAGHIRICA, *Miquel Analect. Bot.* iii. 17, and in *Hohenack. Herb. Ind. Or.* No. 1128; perennial ?, much branched from the base, branches 8–12 in. red-brown stout angled when dry leafy, leaves $\frac{1}{6}$–$\frac{1}{4}$ in. sessile coriaceous broadly obliquely oblong obscurely crenulate tip rounded minutely toothed or not, nerves very obscure, stipules subulate glabrous, involucres sessile and shortly pedicelled $\frac{1}{20}$ in. diam. glabrous lobes subulate longer than the oblong glands which have no limb, capsule shortly pedicelled trigonously 3-lobed, cocci sharply keeled, styles very short, seeds smooth bare. E. sanguinea, γ nilaghirica, *Boiss. in DC. Prodr.* xv. ii. 35.—Nilghiri Mts., *Metz.*

A doubtful plant, resembling some varieties of *E. corrigioloides*, but differing from that in the less thick leaves, solitary involucres, larger capsules and shorter styles. Boissier refers it to *E. sanguinea*, Hochst, as var. *nilagirica*, but it is quite unlike that plant. Engelmann (in Torrey, Bot. Mex. Bound. Survey, 187) refers it to *E. inæquilatera*, Sonder (in Linnæa xxiii. 105), a Natal plant, referred as a variety (*natalensis*) to *sanguinea* by Boissier.

E. PEPLUS, *Linn.*; *Wall. Cat.* 7706, from Roxburgh, is a specimen of the true plant, no doubt introduced into India.

E. PROSTRATA, *Ait. Hort. Kew*, ii. 139.—Engelmann (in Torrey, Bot. Mex. Bound. Exped.) says of this American species, that it is found in India; but I have seen no specimen, nor does Boissier, who figures it well (Euphorb. Ic. t. 17), mention it as Indian. It is a native of W. Africa and the Mauritius. It closely resembles *E. microphylla*, differing in the ciliate keel of the cocci.

E. PRUNIFOLIA, *Jacq. Hort. Schœnb.* iii. t. 277; *Wall. Cat.* 7690, from the Calcutta Bot. Garden, is an American plant (E. geniculata, *Ortega*; *Boiss. in DC. Prodr.* xv. ii. 72).

E. PYRIFOLIA, *Lamk. Dict.* ii. 419; *Wail. Cat.* 7084, from the Calcutta Bot. Garden, is a native of Mauritius.

E. (Anisophyllum) TENUIS, *Ham. in Don Prodr.* 62; annual, stems decumbent much dichotomously branched pubescent, leaves opposite petioled entire ovate-oblong obtuse pubescent beneath, floral lanceolate acute, limb of the glands entire rounded, capsule trigonous pubescent.—Nepal, at Bassaria, *Hamilton.*

E. (Anisophyllum) UNIFLORA, *Roxb. Fl. Ind.* ii. 473; annual, stems diffuse, dichotomous, filiform, leaves sublinear, base obliquely cordate tip serrulate, involucres solitary, capsule glabrous.—Frequent in fields, *Roxburgh.* Dalzell's plant of this name (Bomb. Fl. 227) is E. microphylla, *Heyne.*

2. **SARCOCOCCA,** *Lindl.*

Evergreen glabrous shrubs. *Leaves* alternate, coriaceous, quite entire, penni- or triple-nerved. *Flowers* in short axillary racemes, monœcious, apetalous, bracteate. *Disk* 0. MALE FL. *Sepals* 4, 2-seriate, imbricate. *Stamens* as many and opposite them; free; anthers dorsifixed, oblong, at length recurved. FEM. FL. *Sepals* 4 or 6, as in the male. *Ovary* 2–3-celled; styles short, erect, entire, at length recurved; ovules 2 in each cell, raphe dorsal. *Fruit* indehiscent, coriaceous or fleshy, endocarp hard. *Seeds* 1–2, testa membranous, albumen fleshy; cotyledons broad.—Species 2–3, Indian and Malayan.

S. pruniformis, *Lindl. Bot. Reg.* t. 1012; leaves from broadly elliptic to ovate-lanceolate acuminate, fruit ellipsoid or globose. S. saligna, *Muell. Arg. in DC. Prodr.* xvi. 1. 11; *Beddome Forester's Man.* 217; *Gamble Man. Ind. Timb.* 371. S. trinervia, *Wight Ic.* t. 1877. S. sumatrana, *Blume Mus. Bot.* ii. 191. S. salicifolia, *Baill. Monogr. Bux.* 49. Buxus saligna, *Don Prodr.* 63. B. coriaceus, *Spreng. Syst.* iv. 314. Pachysandra? coriacea, *Hook. Exot. Fl.* t. 148. Tricera nepalensis, *Wall. Cat.* 7979 A, B, C, D. Lepidopelma podocarpifolia, *Klotzsch in Reise Pr. Wald. Bot.* 118, t. 22. Myrica canarensis, *Miquel in Herb. Hohenack.* M. triplinervis, *Miq. l. c.* No. 484.

TEMPERATE HIMALAYA; from Murree to Bhotan, alt. 5–9000 ft., *Wallich*, &c. KHASIA MTS. and MUNNIPORE, alt. 4–6000 ft. DECCAN PENINSULA; on the Western Ghats from Canara southwards. CEYLON, alt. 5–8000 ft.—DISTRIB. Affghanistan, Sumatra.

A handsome shrub; branches green, terete. *Leaves* and their nervation very variable, 1–5 in. long, sometimes caudate-acuminate, base acute or rounded; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Racemes* lax- or dense-fld., $\frac{1}{3}$–$\frac{2}{3}$ in. long, female fl. below the males; pedicels of the male bracteate and usually 2-bracteolate; bracts very variable in number, of the fem. fl. more numerous, decussate. *Flowers* yellow, $\frac{1}{3}$ in. long. *Sepals* oblong, obtuse. *Stamens* twice as long. *Fruit* very variable in size and shape, rarely $\frac{1}{2}$ in. long, purple.—After a long study I am obliged (following Herb. Wallich) to unite all the Indian forms under one species. I recognize the following principal varieties.

S. PRUNIFORMIS PROPER; leaves lanceolate caudate-acuminate triple-nerved, fruit ellipsoid.—Himalaya and Western Ghats.

VAR. *brevifolia*; leaves smaller ovate obtusely acuminate usually triple-nerved, racemes short, male pedicels ebracteolate. S. saligna & brevifolia, *Mueller Arg. l. c.* 12.—Ceylon.

VAR. *zeylanica*; leaves usually triple-nerved, male pedicels 4-bracteolate, styles sharply recurved, fruit shortly ellipsoid. S. pruniformis, *Thwaites Enum.* 290 *in part.* S. zeylanica, *Baill. Monog. Bux.* 52; *Muell. Arg. l. c.*—Ceylon.

VAR. *Hookeriana*; leaves narrower lanceolate or linear-lanceolate usually penni-nerved, fruit globose. S. Hookeriana, *Baill. Monogr. Bux.* 53; *Muell. l. c.* 13. Tricera nepalensis, *Wall. Cat.* 7979 A (*in part*).—Himalaya (attaining 9000 ft. in Sikkim), Affghanistan.—Klotzsch's *Lepidopelma*, and Mueller's *saligna* β, are intermediate between *pruniformis proper* and *Hookeriana*.

3. **BUXUS,** Linn.

Evergreen glabrous shrubs or trees. *Leaves* opposite, coriaceous, penni-nerved, quite entire. *Flowers* in dense very short erect axillary racemes, monœcious, bracteate, apetalous. *Disk* 0. MALE FL. *Sepals* 4 in 2 series, imbricate. *Stamens* as many and opposite them, free; anthers dorsifixed, oblong, at length recurved. FEM. FL. *Sepals* 6, 2 outer much smaller, imbricate. *Ovary* 3-celled; styles 3, short, thick, often distant; ovules 2 in each cell, raphe dorsal. *Capsule* ovoid, crowned by the persistent styles, loculicidally 3-valved, valves bearing the split styles, endocarp splitting away from the coriaceous exocarp. *Seeds* oblong, testa black shining, albumen fleshy; cotyledons narrow, oblong.—Species about 20, temperate and tropical.

B. sempervirens, *Linn.*; *Boiss. Fl. Orient.* iv. 144; leaves oblong linear-oblong or lanceolate tip obtuse rounded or retuse, flowers sessile, capsule 3-horned. *Reichb. Ic. Fl. Germ.* t. 153; *Benth. Fl. Hongk.* 315; *Ledeb. Fl. Ross.* iii. 583; *Gamble Man. Ind. Timb.* 369. B. Wallichiana, *Baill. Monogr. Bux.* 63; *Muell. Arg. in DC. Prodr.* xvi. 1. 18. B. emarginata, *Herb. Royle.* B. sempervirens, *var.* arborea, *Wall. mss.* B. longifolia, *Jacquem. Journ.*—Buxus, *Wall. Cat.* 7978.

TEMPERATE HIMALAYA; from Kumaon to Simla, alt. 5–9000 ft.; Bhotan, alt. 5–9000 ft., *Griffith.* PANJAB, on the Salt range, &c., *Aitchison, Fleming.*—DISTRIB. Westwards to N. Africa and Britain, and northwards in W. Siberia, Turkestan, China and Japan.

A small much-branched bush or tree; buds and edges of young leaves puberulous. *Leaves* very variable in form and size, about 1–2 in. long in the Himalayan form; petiole very short. *Racemes* few-fld., fascicled, terminal flowers female. *Sepals* obtuse. *Stamens* far exserted, filaments very stout; anthers 3 times as long as broad. *Styles* equalling the ovary. *Capsule* ½ in. long, ovoid, wrinkled. *Seeds* black.—The distribution is curious, not extending to Nepal or Sikkim, though found in Kumaon and Bhotan; and being absent in N. Asia between W. Siberia and China.

VAR. *microphylla*; dwarf, leaves ¼–⅓ in. elliptic or subspathulate. B. japonica, *var.* microphylla, *Muell. Arg. in DC. Prodr.* xvi. 1. 20.—Kumaon, on dry rocks, alt. 11,000–12,000 ft., *Duthie.*

4. **BRIDELIA,** *Willd.*

Shrubs or trees. *Leaves* alternate, quite entire, sometimes with strong straight nerves and cross-nervules. *Flowers* small or minute, in axillary or spicate clusters, monœcious or dicœcious, bracteate, sessile or very shortly pedicelled. *Calyx* 5(4–6)-cleft; lobes valvate. *Petals* much smaller than the calyx-lobes. *Disk* broad, of the male pulvinate or adnate to the calyx-

tube; of the female with the centre conical, membranous, truncate, often enclosing the young ovary. *Stamens* 5; filaments united below in a column which bears a terminal pistillode, free above and spreading; anther-cells parallel. *Ovary* 2- rarely 3-celled, glabrous; styles 2, forked; ovules 2 in each cell. *Drupe* small, with 1–2 usually 1-seeded cocci or pyrenes. *Albumen* fleshy or membranous; cotyledons thin or fleshy.—Species about 30, Tropical African, Asiatic and Australian.

* Nerves 8–20 (rarely fewer than 12) pair.

1. **B. retusa,** *Spreng. Syst. Veg.* iii. 48; shoots and leaves beneath glabrous or tomentose, leaves rigidly coriaceous elliptic oblong ovate or obovate tip acute obtuse or rounded, base acute obtuse or cordate, nerves 15–20 pairs strong straight parallel, flowers diœcious in axillary or spicate clusters sessile or pedicelled glabrous or pubescent, calyx-lobes ovate acute, petals of male orbicular crenate, of fem. subspathulate, fruit globose seated on the hardly enlarged calyx. *Muell. Arg. in DC. Prodr.* xv. 1. 493; *Baill. Etudes Gen. Euphorb.* t. 25, fig. 25–34; *Thwaites Enum.* 279; *Brand. For. Fl.* 449, t. 55; *Kurz For. Fl.* ii. 368; *Gamble Man. Ind. Timb.* 356; *Beddome Fl. Sylvat.* t. 260. B. amœna, *Wall. ex Baill. l. c.* (*fid. Muell.*). B. montana, *Wall. Cat.* 7879 (*in part*); *Baill. l. c.* 583; *Grah. Cat. Bomb. Pl.* 184; *Dalz. & Gibs. Bomb. Fl.* 233. B. spinosa, *Roxb. Fl. Ind.* iii. 735; *Wall. Cat.* 7883 B *in part*; *Grah. l. c.* 184. Cluytia retusa, *Linn. Sp. Pl.* 1042. C. spinosa, *Willd. in Roxb. Cor. Pl.* ii. 38, t. 172. Andrachne Doonkyboisca, *Herb. Heyne*; *Wall. Cat. sub* 7879.—*Rheede Hort. Mal.* ii. t. 16.

Throughout the hotter parts of INDIA, along the foot of the Himalaya from Kashmir to Mishmi, ascending to 3500 ft., and thence southward to BURMA, MALACCA, TRAVANCOR and CEYLON.

A deciduous-leaved large shrub, or a tree 50–60 ft.; young spinous. *Leaves* 3–5 in., base rarely acute, glabrous above, glabrous and glaucous beneath, or finely pubescent; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Bracts* small, obtuse, villous. *Flowers* in clusters of about $\frac{1}{4}$ in. diam., both axillary and in long spikes, pubescent or glabrous, of which the males are very slender. *Calyx* $\frac{1}{6}$ in. diam., tube pubescent, lobes usually glabrous. *Disk* of male pulvinate, of fem. enclosing the young ovary. *Fruit* size of a pea, purple-black, cocci dehiscing.—Mueller makes three varieties, of which the third is the most distinct. I add a fourth. Of Wallich's *B. amœna* I have seen no specimens; Baillion took it up from a plant so named on Wallich's authority in Gaudichaud's herbarium, and presumably procured in Calcutta; he says it is very near *B. retusa*, and Mueller, who, I assume, examined it, united it with that plant. Kurz's *amœna* is *B. birmanica*.

B. RETUSA PROPER; spikes sometimes a foot long, slightly pubescent.

VAR. *squamosa*; flowers axillary or in short tomentose spikes.

VAR. *Roxburghiana*; branchlets and leaves beneath densely tomentose, leaves smaller oblong tip rounded pale when dry. B. crenulata, *Roxb. Fl. Ind.* iii. 734; *Wall. Cat.* 7880.—Chiefly in the Deccan Peninsula.

VAR. *glauca*; quite glabrous, leaves as in var. *Roxburghiana*, but quite glabrous and very glaucous beneath.—Deccan Peninsula.

2. **B. Moonii,** *Thwaites Enum.* 279; branchlets glabrous or pubescent, leaves large coriaceous elliptic-oblong or obovate tip acute obtuse or rounded, reticulate above puberulous beneath, nerves 12–14 pair strong slightly arched with strong cross-nervules, flowers monœcious? minute in small axillary clusters sessile glabrous, calyx-lobes ovate-lanceolate, petals of male orbicular irregularly lobed, of fem. oblong, fruit ellipsoid acute at both ends seated on the unaltered calyx. *Mueller Arg. in DC. Prodr.* xv. ii. 497;

Beddome Forest. Man. 201. B. retusa, *Baill. Etudes Gen. Euphorb.* 584. Cluytia retusa, *Moon Cat.* 71.

CEYLON; common up to 2000 ft., *Thwaites.*

Branches stout. *Leaves* 5–10 by 2–4 in., not glaucous beneath; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., stout. *Bracts* and *flowers* as in *B. retusa*, from which it differs in the fewer arched nerves, monœcious smaller flowers and ellipsoid fruit acute at both ends.

3. **B. montana,** *Willd. Sp. Pl.* iv. 978; nearly glabrous, leaves membranous obovate-oblong or broadly obovate obtuse acute or abruptly mucronate shining above, nerves 8–15 pair slightly arched, flowers monœcious in small dense axillary clusters sessile or shortly pedicelled glabrous, calyx-lobes triangular-ovate, petals broadly ovate entire, fruit globose seated on the unaltered calyx. *Muell. Arg. in DC. Prodr.* xv. 1. 500; *Roxb. Fl. Ind.* iii. 735; *Wall. Cat.* 7879 (*in part*); *Beddome Forester's Man.* 202; *Brand. For. Fl.* 450; *Gamble Man. Ind. Timb.* 357. Cluytia montana, *Roxb. Cor. Pl.* ii. 38, t. 171.

Along the foot-hills of the HIMALAYA, ascending to 3000 ft. and to 6000 ft. in Sikkim, from the Panjab to Bhotan. KHASIA MTS., alt. 2–4000 ft. BEHAR, on Parusnath, *J. D. H.* COROMANDEL (*Roxburgh*).

A low tree; trunk short; branchlets often pustulate. *Leaves* 4–7 by 2–4 in., usually broadly obovate, rarely elliptic and acute, shining above, paler beneath, margin undulate, base almost always acute; nerves and cross-nervules rather strong; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Bracts* many, very short, pubescent. *Calyx* $\frac{1}{8}$–$\frac{1}{6}$ in. diam. *Ovary* enclosed in the disk; styles 2, 2-fid. *Fruit* the size of a pea.—There are two forms, one with leaves very shining above and narrowed base, nerves 8–12 pair slender; the other has leaves more like *retusa*, more oblong, nerves 10–15 pair stronger.

4. **B. burmanica,** *Hook. f.*; quite glabrous, branches slender, leaves membranous broadly elliptic or obovate-oblong obtuse margins undulate base obtuse or rounded shining and finely reticulate above paler beneath, nerves 12–20 pair slender nearly straight, flowers monœcious in small axillary clusters shortly pedicelled glabrous, calyx-lobes ovate-lanceolate, petals of male obovate retuse, of fem. larger oblong, fruit globose. B. amœna, *Kurz For. Fl.* ii. 368 (*not of Wallich*). Cluytia, *Wall. Cat.* 7888.

BURMA (*Hort. Bot. Calc.*), *Wallich*; Ava, *Kurz.*

Branches smooth. *Leaves* 4–7 by 2–4 in., hardly glaucous beneath; petiole very short, $\frac{1}{6}$ in., glabrous. *Bracts* short, membranous. *Calyx* $\frac{1}{8}$ in. diam. *Fruit* not seen.—This is the plant referred by Kurz to Wallich's *B. amœna* (see under *B. retusa*); he describes the male fl. as greenish, the fem. crimson, the petals rosy, and fruit globose as large as a pea, sappy, purplish black.

5. **B. assamica,** *Hook. f.*; branches sparsely tomentose, leaves large membranous oblong obovate or elliptic-lanceolate acuminate finely reticulate and glabrous except the midrib above, minutely puberulous beneath, nerves 15–20 pairs slightly arched and cross-nervules slender, flowers monœcious in minute axillary clusters sessile pubescent or glabrate, calyx-lobes ovate-lanceolate, petals of male rounded crenate of fem. larger elliptic entire, fruit ovoid acuminate seated on the unaltered calyx. B. chartacea, *Kurz in Herb. Calcutt.* (*not of Wallich*). Cleistanthus oblongifolius, *Muell. Arg. in DC. Prodr.* xv. 1. 506 (*Griffith's plant only*).

ASSAM, *Griffith, Masters*; Mishmi Hills, *Griffith* (*Kew Distrib.* 4890); Nowgong, *Simons.* SILHET (*Roxburgh*).

Branches rather slender, pale, sparsely tomentose. *Leaves* 6–12 by 3–4 in., green on both surfaces, paler beneath, beautifully reticulated; hairs beneath microscopic, base subacute or rounded, margin subundulate; petiole $\frac{1}{3}$ in.; stipules on

terminal buds only, subulate. *Clusters of flowers* ¼ in. diam.; bracts minute, densely imbricate, pubescent, shorter than the flowers. *Perianth* ⅛ in. diam., lobes subacute. *Disk* of male flat, of fem. flat raised in the middle into a truncate cone embracing the ovary. *Styles* 2, 2-fid. *Fruit* nearly 1 in. long, smooth, pericarp thin.

** Nerves 5–12 pair, rarely more, more or less arched, rarely straight.

† *Leaves more or less pubescent or tomentose beneath.*

6. **B. stipularis,** *Blume Bijd.* 597; subscandent, shoots pubescent or tomentose, leaves subcoriaceous elliptic obovate or orbicular-oblong obtuse or acute base rounded or cordate shortly tomentose beneath, nerves 6–9 pair spreading slender slightly arched, flowers monœcious in small axillary clusters or long spikes often subtended by long stipular bracts males sessile fem. pedicelled pubescent or glabrate, petals orbicular, fruit oblong seated on the enlarged calyx. *Muell. Arg. in DC. Prodr.* xv ii. 499; *Brand. For. Fl.* ii. 449; *Kurz For. Fl.* ii. 369; *Beddome Forester's Man.* 201; *Miquel Fl. Ind. Bat.* i. ii. 364, and *Suppl.* 445. B. scandens, *Willd. Sp. Pl.* iv. 979; *Roxb. Fl. Ind.* iii. 736; *Grah. Cat. Bomb. Pl.* 184; *Dalz. & Gibs. Bomb. Fl.* 233; *Wall. Cat.* 7878 (*excl.* E). B. retusa, *A. Juss. Tent. Euphorb.* 27, t. 7, f. 22. B. Zollingeri, *Miquel l. c.* 364. Cluytia scandens, *Roxb. Cor. Pl.* ii. 39, t. 173. C. stipularis, *Linn. Mant.* 127. Zizyphus racemosus, *Wall. Cat.* 7878 D.—*Rheede Hort. Mal.* ii. t. 16.

Throughout the hotter parts of INDIA, along the foot-hills of the Himalaya from Kashmir to Bhotan, and southward to Travancor, Malacca and Penang. CEYLON; below Alagale, *Ferguson.*—DISTRIB. Malay Islands, Philippines, Tropical Africa.

A large more or less scandent evergreen shrub, branches straight or flexuous, usually fulvous-tomentose. *Leaves* 2–8 by ½–5 in., margins sometimes undulate or repand, glabrous or puberulous above, rarely acuminate; petiole ¼–⅓ in., stout, tomentose. *Clusters of flowers* green in often very long and panicled spikes; bracts tomentose; the stipular leaves are ovate-lanceolate, sometimes much longer than the flowers. *Calyx* ⅙ in. diam.; lobes lanceolate, acuminate. *Petals* alike in both sexes. *Disk* of male pulvinate, of fem. urceolate, with a ring of bristles at the base within. *Styles* with long slender arms. *Fruit* nearly ½ in. long, obtuse, bluish-black, smooth; calyx ⅓ in. diam.—I find no specimens of Wallich's Q from Nepal in his herbarium. The only Ceylon specimen that I have seen has very small flowers, it is not in fruit. Maingay describes the albumen of the immature fruit as fleshy, and adds that in the mature it probably becomes absorbed; the calyx as olive-yellow spotted with red. Wallich's n. 7878 E, from Herb. Madras, is a different species, which I fail to identify in its imperfect state.

7. **B. pubescens,** *Kurz For. Fl.* ii. 367; an erect tree, branchlets and leaves beneath tawny pubescent, leaves membranous elliptic-obovate or -oblong acute or acuminate base acute or rounded, nerves 10–12 pair arched slender, flowers monœcious in small axillary and spicate clusters sessile and shortly pedicelled pubescent, calyx-lobes lanceolate, petals of male broadly flabelliform 3-lobed, of fem. obovate fleshy, fruit oblong obtuse seated on the unaltered calyx. Cleistanthus oblongifolius, *var. a* scaber, *Muell. Arg. in DC. Prodr.* xv. ii. 506 (*the Sikkim plant*).

TROPICAL EASTERN NEPAL and SIKKIM; in hot valleys from the Terai to alt. 5000 ft., *J. D. H.*, &c. PEGU; on the Eastern slopes, *Kurz.*

An evergreen tree, 20–50 ft. *Leaves* 3–8 by ½–4½ in., midrib and nerves very slender; petiole ⅛ in., slender. *Clusters of flowers* ⅓ in. diam.; bracts short; flowers white with a deep yellow disk. *Calyx* ⅛ in. diam. *Disk* of male pulvinate, of fem. conical enclosing the ovary, mouth laciniate. *Fruit* ⅓–½ in. long, blue-black, apiculate.

8. **B. tomentosa,** *Blume Bijd.* 597; branches slender rusty-pubescent or glabrate, leaves small thin lanceolate or linear-lanceolate acute or obtuse beneath glaucous and finely pubescent, nerves 7–12 pairs nearly straight, flowers monœcious in very small axillary and spicate clusters sessile or fem. stoutly pedicelled glabrous, calyx-lobes ovate, petals of male retuse, of fem. rounded or crenate, fruit small globose seated on the unaltered calyx. *Muell. Arg. in DC. Prodr.* xv. ii. 501; *Kurz For. Fl.* ii. 367; *Gamble Man. Ind. Timb.* 357; *Wall. Cat.* 7874; *Miquel Fl. Ind. Bat.* i. ii. 364, and *Suppl.* 445; *Benth. Fl. Hongk.* 309, and *Fl. Austral.* vi. 120. B. Loureirii, *Hook. & Arn. Bot. Beech. Voy.* 211 (*excl. syn. Lour.*). B. rhamnoides, *Griff. Notul.* iv. 480. ? B. lanceæfolia, *Roxb. Fl. Ind.* iii. 737. B. lancifolia, *Ham. in Wall. Cat.* 7884. Amanoa tomentosa, *Baill. Adans.* vi. 336.—*Wall. Cat.* 7944.

TROPICAL SIKKIM HIMALAYA, *J. D. H.*; ASSAM, KHASIA MTS., SILHET, and southwards to the ANDAMAN ISLANDS, PERAK, PENANG and MALACCA.—DISTRIB. Malay Islands, China, Philippines, N. Australia.

A shrub or small evergreen tree. *Leaves* 1–3 rarely 4 in., undulate, above glabrous or obscurely pubescent, sometimes reddish-glaucous beneath and soon glabrous; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Clusters* of 5–6-fid flowers very small in very slender leafy or leafless spikes; bracts minute, villous, stipular if present subulate. *Calyx* $\frac{1}{12}$–$\frac{1}{10}$ in. diam.; lobes acute, bearded below the tip within. *Petals* variable. *Disk* of male pulvinate, of fem. short annular. *Styles* 2, 5-fid to the middle, short, arms recurved. *Disk* with a conical centre embracing the ovary. *Fruit* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., blue-black.—Mueller has a var. *trichadenia* from the Australian plant, with the fem. disk hairy within; Bentham does not notice this character. According to Roxburgh this species is diœcious; Clarke says monœcious.

9. **B. pustulata,** *Hook. f.*; branches very stout pustulate, leaves thinly coriaceous elliptic or oblong acute glabrous above sparsely pubescent beneath base usually rounded or cordate, nerves 6–9 pair strong with strong rather distant cross-nervules, flowers very many in dense globose axillary clusters monœcious glabrous, calyx-lobes triangular-ovate, petals of fem very minute, fruit globose stipitate on the unaltered calyx.

MALACCA, *Griffith* (*Kew Distrib.* 4883) and *Maingay* (1371). PERAK; at Goping, *King's Collector.*

Branches woody, bark brown. *Leaves* 4–7 by 2–4½ in., rather abruptly acute or acuminate, dark brown on both surfaces, more sooty beneath when dry, base rarely acute; petiole $\frac{1}{2}$–$\frac{1}{3}$ in., shrivelled, glabrous, black. *Clusters* $\frac{1}{2}$ in. diam.; bracts minute, rather scarious, short, obtuse or truncate, brown, sparingly hairy. *Calyx* $\frac{1}{10}$ in. diam., rigid, not much exceeding the bracts. *Ovary* ovoid; styles 2, forked at the tip.—I find no male fl. Maingay describes these as having scale-like emarginate petals, a disk lining the calyx-tube, and a conical pistillode.

10. **B. dasycalyx,** *Kurz For. Fl.* ii. 369; branches rusty-tomentose, leaves obovate or oblong subacute or acuminate pubescent beneath, base obtuse or rounded, nerves 6–10 pair, cross-nervules strong, petiole stout, flowers minute numerous in globose axillary clusters, calyx of fem. tomentose unaltered in fruit glabrous within, disk with a ring of bristles round the base of the ovary, petals linear-obovate, fruit ellipsoid.

PEGU and BURMA; in dry forests, *Kurz.*

Branches rather stout, and leaves above dark when dry. *Leaves* rather thin in *dasycalyx* proper, 5–7 in. long, acuminate, contracted at the rounded base and rather glaucous beneath; in var *aridicola*, Kurz, 3–4 in. long, oblong, obtuse or subacute, thicker; nerves nearly straight; petiole $\frac{1}{10}$–$\frac{1}{8}$ in. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ in. long.—Kurz describes *dasycalyx* proper as a climber, and var. *aridicola* as more or less erect.

†† *Leaves glabrous.*

11. **B. Hamiltoniana,** *Wall. Cat.* 7882; nearly glabrous, leaves

coriaceous small rhombic-obovate or -oblong or lanceolate obtuse repand or repandly toothed glabrous or obscurely pubescent beneath, nerves 6–9 pair nearly straight, flowers in minute axillary and spicate clusters glabrous, calyx-lobes ovate-lanceolate, petals of male rounded angled, of fem. ovate, fruit subglobose seated on the unaltered calyx. *Muell. Arg. in Linnæa* xxxiv. 77, and in *DC. Prodr.* xv. ii. 500; *Beddome Forester's Man.* 202.

BEHAR, at Monghir, *Wallich*; Kymaor Hills, *J. D. H.* The CONCAN GHATS, *Law, Stocks*, &c.

A straggling shrub. *Leaves* 1½–2½ in., finely reticulated on both surfaces, pale yellowish when dry, base cuneate, tip often suddenly narrowed into an obtuse point; nerves distant, strong; petiole ⅛ in. *Clusters of flowers* ⅛–⅙ in. diam.; bracts minute, villous except the stipular. *Calyx* ⅛ in. diam. *Fruit* ¼ in. diam.

12. **B. Kurzii,** *Hook. f.*; glabrous, leaves 4–5 in. oblong obtuse base rounded glabrous and glaucous beneath, nerves 10–12 pair slender nearly straight, fem. fl. minute sessile, calyx not accrescent, petals obovate, fruit small globose.

NICOBAR ISLANDS; Kamorta, *Kurz.*

Branches rather slender, black when dry. *Leaves* rather thin, blackish brown above when dry, margin obscurely sinuate, cross-nervules slender; petiole ⅙ in. *Calyx* of fruit ⅛ in. diam.; lobes triangular, acute. *Fruit* ¼–⅓ in. diam.—I am indebted to Dr. King for a specimen of this very distinct species, which is named *B. glauca*, Blume, by Kurz; but that species is described as having rusty-pubescent branches and elliptic-lanceolate acuminate leaves with pubescent nerves beneath.

13. **B. penangiana,** *Hook. f.*; quite glabrous, branches slender pustular, leaves membranous broadly elliptic abruptly acuminate reticulated pale beneath, nerves 6–9 pair slender spreading arched, petiole slender, flowers minute in small axillary clusters sessile and pedicelled monœcious pubescent, calyx-lobes ovate, petals broad crenate or lobulate, disk of male fl. saucer-shaped, of fem. annular, fruit small ellipsoid apiculate.

PENANG; on Government Hill, *Curtis.*

Branches pale. *Leaves* 3–5 by 1½–2½ in., green above when dry, prominently but not closely reticulate, pubescent on the midrib beneath; petiole ¼–⅓ in. *Clusters of flowers* ⅙–¼ in. diam.; bracts very small, ovate, subacute, pubescent; male fl. first appearing, pedicelled. *Calyx* ⅒ in. diam., densely pubescent. *Petals* scale-like, variable. *Pistillode* notched at the tip. *Styles* 2, 2-fid. *Fruit* ¼ in. long.—Leaves a good deal like *B. burmanica*, but with much fewer nerves.

14. **B. Griffithii,** *Hook. f.*; nearly glabrous, scandent, leaves 3–4 in. elliptic-oblong acuminate base rounded brown when dry minutely puberulous beneath, nerves 5–7 pair arched, transverse veins faint, bracts minute tomentose, fem. flowers in small globose axillary clusters sessile, calyx-lobes ovate acuminate glabrous tube villous, petals minute entire, ovary ovoid, styles 2–4 clavellate, fruit globose seated on the unaltered calyx. B. ovata, *Kurz For. Fl.* ii. 368 (*not of Dcne.*).

SOUTH ANDAMANS, *Kurz*; MALACCA, *Griffith* (*Kew Distrib.* 4883).

A scandent shrub with long brachiate branches (*Griffith*), branchlets puberulous. *Leaves* 1–2 in. broad, thinly coriaceous, dark brown when dry, rather shining above, opaque beneath, nerves very slender, cross-nervules faint; petiole ¼–⅓ in. *Clusters of flowers* ¼–⅓ in. diam.; bracts mere rings round the bases of the flowers. *Calyx* of fem. ⅙ in. diam. *Petals* elliptic. *Disk* conical with a torn mouth. *Styles* quite free.—This, which is referred by Kurz to Decaisne's Timor *B. ovata*, differs entirely from that plant in the few nerves of the leaf.

15. **B. minutiflora,** *Hook. f.*; nearly glabrous, branches pustulate, leaves membranous 2–3 in. elliptic or elliptic-oblong acuminate base acute, nerves 7–9 pair very slender arched, petiole slender, flowers monœcious in small dense axillary and spicate heads very minute pubescent, calyx-lobes ovate obtuse, petals oblong entire, disk of fem. depressed, ovary rhombic with one long bifid style, fruit ellipsoid seated on the unaltered calyx.

TENASSERIM, at Mergui, *Griffith.*—DISTRIB. Celebes, *Riedel*; Borneo (*Beccari* No. 2837, *Motley, Barber*).

Branches divaricate, bark pale, flowering shoots black when dry, quite smooth. *Leaves* brown when dry, paler beneath, cross-nervules very faint; petiole $\frac{1}{4}$ in. *Clusters of flowers* $\frac{1}{6}$ in. diam.; bracts minute, villous. *Calyx* $\frac{1}{12}$ in. diam., finely tomentose. *Disk* of fem. flower pulvinate. *Ovary* quite included in the disk, narrowed suddenly into the very stout style which is bifid for half-way, stigmas capitellate. *Fruit* (in Bornean specimens) $\frac{1}{3}$ in. long, apiculate.—A very remarkable species on account of the solitary style. The specimens were mixed with those of *B. Maingayi* under Griffith No. 867, the leaves being similar in colour and form. The male fl. are too young for description. The fruit is described from Bornean specimens, in which the leaves are sometimes rounded at the base with 12 pairs of nerves.

SPECIES OF WHICH THE MALE FLOWERS ALONE ARE KNOWN.
(Possibly *Cleistanthi.*)

16. **B. rufa,** *Hook. f.*; branches rather stout densely rusty-tomentose or villous, leaves 5–7 in. oblong or obovate-oblong cuspidately acuminate base rounded rusty-pubescent beneath, nerves 6–10 pair strong arched, cross-nervules numerous straight, petiole short stout, male fl. sessile in dense small globose axillary heads of bracts, calyx glabrous lobes ovate-lanceolate, petals obcuneate or quadrate crenate.

PENANG, *King's Collector.*

A shrub, 8–12 ft. *Leaves* thin but hardly membranous, dull green and opaque above, young floccosely rusty tomentose above; petiole $\frac{1}{10}$ in.

17. **B. cinnamomea,** *Hook. f.*; branchlets petioles and leaves beneath cinnamomeously tomentose, leaves 2–6 in. elliptic-oblong or lanceolate cuspidate or caudate-acuminate base acute or cuneate, nerves 5–7 pair rather strong beneath, cross-nervules numerous slender, male fl. small sessile and pedicelled in axillary clusters or on short lateral branchlets, calyx quite glabrous lobes ovate or ovate-lanceolate, petals obovate, disk thick.

PERAK, *Scortechini*; Kinla, *King's Collector.*

A thorny shrubby creeper, 10–15 ft.; branches woody, bark pale. *Leaves* membranous or thinly coriaceous; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., rather slender. *Bracts* woolly; calyx $\frac{1}{12}$ in. diam., pedicel sometimes as long as the calyx; disk very broad, margin subentire; pistillode glabrous.—Near *B. rufa*, but leaves membranous cuspidate or acuminate with the base acute, and nerves hardly arched. There are very small thorns on the larger branches.

18. **B. Curtisii,** *Hook. f.*; quite glabrous, leaves 2–3 in. oblong rounded at both ends glaucous beneath, nerves 6–10 pair very slender, male flowers minute sessile in small axillary clusters, bracts very small ciliolate, calyx glabrous lobes triangular-ovate, petals spathulate notched or emarginate, pistillode glabrous.

PENANG; at Tulloh Bahang, *Curtis.*

Branches rigid, divaricate, slender, blackish when dry. *Leaves* rigid, grey-brown when dry; cross-nervules beneath reticulate more or less; petiole $\frac{1}{8}$ in., slender. *Male fl.* $\frac{1}{10}$ in. diam.

DOUBTFUL AND EXCLUDED SPECIES.

B. ALNIFOLIA, *Griff. Notul.* iv. 481; *Muell. Arg. in DC. Prodr.* xv. ii. 502; branches rusty pubescent, leaves oblong obovate obtuse base subcordate pubescent, flowers monœcious in the same clusters, calyx green with blood-red spots, petals repand-sinuate.—Tenasserim, at Mergui, in wet places, *Griffith.*—Possibly *B. stipularis* (which the spotted flowers resemble), but Griffith does not say whether the calyx of *alnifolia* is glabrous or pubescent.

B. OVATA, *Dcne. in Nouv. Ann. Mus.* iii. 484; shoots and all parts glabrous, leaves petioled coriaceous oblong or elliptic-oblong obtuse mucronate or apiculate base acute or obtuse pale beneath, nerves 10–20 pairs, flowers minute in dense axillary clusters glabrous, males shortly pedicelled, fem. sessile, disk cup-shaped, fruit globose seated on the unaltered calyx. *Miquel Fl. Ind. Bat.* i. ii. 364. B. ovata, β. acutifolia, and γ. genuina, *Muell. Arg. in DC. Prodr.* xv. ii. 495.—Burma, at Melloon, *Wallich.* Malacca, *Herb. DC.* Tenasserim and Andaman Islands, *Helfer* (No 4884), all according to Mueller.—I fail to identify this amongst Helfer's or Wallich's plants. Kurz's *B. ovata* is a different plant (*B. Griffithii*, p. 272). Dr. King has sent me a specimen of *B. ovata*, Dcne., procured by Kurz from the Bintenzorg Botanical Gardens, which agrees with the above description, except in having only 6–9 pair of nerves. Dr. King further informs me that there is no Andaman specimen of it in the Calcutta herbarium, where Kurz has given that name (*B. ovata*, Dcne.) to Griffith's and Maingay's specimens of *B. pustulata.*

B. SINICA, *Grah. Cat. Bomb. Pl.* 179, described as capsular, is probably *Cleistanthus malabaricus.*

B. URTICOIDES, *Griff. Notul.* iv. 481; *Muell. Arg. l. c.*; branches warted, leaves lanceolate acuminate subentire dark green and shining above subglaucous and very shortly pubescent beneath, stipules linear membranous brown caducous, clusters axillary, or inflorescence naked, flowers numerous minute monœcious in the same cluster odour of Heliotrope, calyx pubescent outside, petals ovate entire or toothed.—Tenasserim; shores of Madama Island, *Griffith.*—Probably *B. tomentosa.*

5. CLEISTANTHUS, *Hook. f.*

Trees or shrubs. *Leaves* alternate, bifarious, quite entire. *Flowers* small or minute, in axillary clusters and spikes, monœcious, sessile or the females pedicelled. *Calyx* 5(4–6)-cleft; lobes valvate. *Petals* as many, minute. *Disk* of the male flat or pulvinate; of the female conical or turbinate, more or less enclosing the young ovary. *Stamens* 5, filaments united in a column in the centre of the disk, and bearing a pyramidal or 3-lobed pistillode, free above and spreading; anther-cells parallel. *Ovary* 3-celled, usually clothed with long hairs; styles 3, free, bifid; ovules 2 in each cell. *Capsule* sessile or stipitate, subglobose or depressed, of 3 2-valved cocci. *Seeds* without aril or caruncle; albumen copious or scanty; cotyledons thin or fleshy, often folded.—Species about 30, Tropical Indian, Malayan and African.

* *Ovary quite glabrous.*

1. **C. collinus,** *Benth. in Gen. Plant.* iii. 268; leaves coriaceous orbicular broadly obovate or elliptic tip rounded or retuse glaucous beneath, nerves 5–8 pair spreading very slender, flowers in small axillary and shortly spicate clusters silkily villous, calyx-lobes ovate-lanceolate, petals narrow, ovary glabrous, styles free clavellate, capsule large obscurely 3-lobed. Bridelia collina, *Hook. & Arn. Bot. Beech. Voy.* 211; *Wall. Cat.* 7877. Amanoa collina, *Baill. Etudes Gen. Euphorb.* 582; *Thwaites Enum.* 280. Lebidieropsis collina, *Muell. Arg. in Linnæa* xxxii. 80. L. orbicularis,

Muell. Arg. in DC. Prodr. xv. ii. 509; *Brand. For. Fl.* 450; *Gamble Man. Ind. Timb.* 358; *Beddome Forester's Man.* 203, t. 23, fig. 5. Cluytia collina, *Roxb. Cor. Pl.* ii. 37, t. 169, and *Fl. Ind.* iii. 732; *Wall. Cat.* 7890. C. retusa & patula, *Herb. Wight.* Andrachne orbiculata, *Roth Nov. Sp.* 364. A. Cadishan, *Roxb. mss.* Emblica Palasis, *Herb. Ham.*

Dry hills in various parts of INDIA from SIMLA to BEHAR, and southward to Central India, and the DECCAN PENINSULA. CEYLON; at Colonna Corle, rare, *Thwaites.*

A small tree with very hard wood and spreading rigid twiggy smooth or pustulate branches. *Leaves* 1½–4 by 1½–3 in., pale when dry, loosely reticulate, young membranous and faintly pubescent beneath, old hard, base rounded or cordate; petiole ⅙ in., slender. *Clusters* 3–6-fld.; bracts minute, villous. *Calyx* ¼ in. diam. *Petals* fleshy, always narrow, incurved. *Disk* of male pulvinate, of fem. conical with a thick margin. *Ovary* globose; styles thick, quite free; stigmas fleshy, lobed. *Capsule* ⅔ in. diam., sessile, woody, rounded-3-gonous, top not lobed, dark brown shining and wrinkled when dry. *Seeds* ⅙ in. diam., globose, chestnut-brown; albumen scanty.—The genus *Lebidieropsis* should probably be restored; the globose seeds differ wholly from those of any other *Cleistanthus.* The fruit in Roxburgh's figure is much too oblong.

2. **C. chartaceus,** *Muell. Arg. in DC. Prodr.* xv. ii. 507; shoots and flowering branches rusty-tomentose, leaves 5–8 in. coriaceous elliptic-lanceolate obtusely acuminate subsilvery beneath base acute, nerves 8–10 pair slender, flowers few in small axillary and short spicate clusters sessile glabrous, calyx-lobes ovate acute, petals cuneate lobed, ovary glabrous, capsule stipitate. C. oblongifolius, *Brand. For. Fl.* 451; *Muell. Arg. l. c.* (*in part*). Amanoa chartacea, *Baill. Etudes Gen. Euphorb.* 582. Bridelia chartacea, *Wall. Cat.* 7881. B. oblongifolia, *Hook. & Arn. Bot. Beech. Voy.* 202. Cluytia oblongifolia, *Roxb. Fl. Ind.* iii. 730; *Wall. Cat.* 7887.

SILHET, *Roxburgh, Griffith,* &c. ? Andaman Islands, *Kurz.*—DISTRIB. ? Java.

A small spreading tree, branches pale, glabrous except the shoots. *Leaves* 1½–3 in. broad, reticulated above by the cross-nervules, beneath appressedly hairy, at length glabrous, base narrowed into a short stout petiole ¼-⅓ in. long. *Clusters* 3–6 fld., often in short decurved stout rusty-tomentose spikes; bracts short, obtuse, rusty villous. *Calyx* 1/10 in. diam. *Capsule* ½ in. long and broad, stipitate, woody, laterally 3-lobed, lobes somewhat compressed; stipes ⅙ in. long, clothed with the disk, expanding under the cocci into the woody acutely 5-angled base of the columella ⅙ in. diam. *Seeds* oblong, 3-gonous, faces undulate.—The Javan and the Andaman Island specimens resemble the Indian in foliage, but want flower and fruit.

3. **C. stenophyllus,** *Kurz For. Fl.* ii. 370; quite glabrous, leaves chartaceous 3–4 in. linear-lanceolate long and thinly acuminate paler beneath, base acute, petiole ⅙ in., flowers minute few sessile in small axillary clusters, bracts ciliate, calyx slightly appressed hairy, ovary sessile glabrous.

TENASSERIM or ANDAMAN ISLANDS (*Kurz*).

I know of this only by the above description taken from Kurz. It is probably a plant of Helfer's, whose Andaman and Tenasserim collections were not separated; but for the hirsute ovary I should have referred my *C. lanceolatus* to this.

4. **C. myrianthus,** *Kurz For. Fl.* ii. 370; branches stout and leaves beneath finely fulvous-tomentose, leaves 6–9 in. coriaceous narrowly linear-lanceolate acuminate base acute, nerves 16–20 pairs arched, flowers many in dense axillary clusters glabrous sessile, calyx-lobes ovate acute, petals broadly flabellate crenate, ovary glabrous, capsule stipitate. *Gamble Man. Ind. Timb.* 357.

MALAY PENINSULA; from Pegu to Tenasserim and the Andamans, frequent *Kurz.*—DISTRIB. Java, Borneo, Philippines.

An evergreen tree, 40–50 ft. *Leaves* sometimes 1 ft. long, 1½–2½ in. broad, smooth and shining above, cross-venules faint; petiole ⅙–¼ in., stout. *Clusters* ¼-⅓ in. diam.; bracts obtuse, short, densely villous. *Calyx* ⅛ in. diam. *Petals* fan-shaped, broader than long, with flabellate nerves. *Disk* of fem. membranous, at length 5-lobed. *Ovary* globose; styles very short. *Capsule* immature, distinctly stipitate.—In the Malay Island this species varies greatly in the form of the leaves and in the amount of pubescence beneath.

** Ovary villous, hirsute, or clothed with rigid hairs.

† *Flowers glabrous* (*except fem. of* C. membranaceus).

5. **C. malabaricus,** *Muell. Arg. in DC. Prodr.* xv. ii. 508; branchlets densely villous, leaves oblanceolate acuminate or caudate glaucous and sparsely villous beneath, nerves 8–10 pair arched, stipules long setaceous-lanceolate, flowers few in axillary clusters subsessile glabrous, calyx-lobes narrowly lanceolate, petals obovate-spathulate, ovary hirsute with erect stiff hairs, capsule sparsely hairy. *Beddome Forester's Man.* 203. Lebidiera malabarica, *Muell. Arg. in Linnæa* xxxii. 81.

The CONCAN; on the banks of the Shirawah, *Law, Stocks,* &c.

Branches slender. *Leaves* 3–6 by 1–1½ in., very pale when dry, whitish beneath, sparsely hairy above, base acute; petiole ⅛ in., tomentose. *Calyx* of fem. ⅙ in. diam., very shortly pedicelled. *Disk* lobed. *Capsule* ⅓ in. diam., sessile, deeply 3-lobed at the top and sides, sparsely hairy. *Seeds* oblong, 3-gonous, rugose.—Closely allied to *C. Maingayi*, but the flowers are quite glabrous.

6. **C. acuminatus,** *Muell. Arg. in DC. Prodr.* xv. ii. 508; quite glabrous, leaves membranous ovate or elliptic long-caudate acuminate reticulate, nerves 5–10 pair very slender arched, flowers in very small axillary clusters glabrous, calyx-lobes triangular-ovate, petals obovate crenate or lobed, ovary hirsute with erect hairs, capsule small sessile glabrous. Amanoa acuminata, *Beddome Forester's Man.* iv. 203; *Thwaites Enum. Addend.* 428.

CEYLON; Colombo and the Galle district, *Walker, Thwaites.*

Branches very slender. *Leaves* 3–5 by 1–2½ in., pale green, very thin and undulate when dry, shining on both surfaces, base rounded or acute; petiole very short, ⅛–⅙ in. *Clusters* ⅙ in. diam.; bracts minute, puberulous. *Calyx* ⅟₁₂–⅟₁₀ in. diam. *Petals* variable. *Disk* of male lining the calyx-tube, of fem. urceolate. *Ovary* globose; styles 3, slender, bifid, stigmas small. *Capsule* ¼ in. broad, not so long, deeply 3-lobed at top and sides, crustaceous. *Seeds* unripe.—Perhaps a variety of *C. patulus*.

7. **C. heterophyllus,** *Hook. f.*; quite glabrous, leaves coriaceous of two forms, larger on the branches 4–6 in. elliptic or elliptic-lanceolate caudate-acuminate, nerves 4–5 pair slender, smaller on the spikes ¼–⅓ in. lanceolate, flowers minute in very small clusters in very slender axillary and terminal panicled flexuous rigid spikes glabrous sessile, calyx-lobes of male ovate of fem. obtuse, petals narrow, ovary hirsute with long erect hairs.

MALACCA, *Maingay* (*Kew Distrib.* 1372).

Branches rather slender, quite smooth. *Leaves* greyish green when dry, smooth on both surfaces, base acute, reticulations faint; petiole ¼ in. *Clusters* ⅟₁₀–⅛ in. diam. in spikes 4–8 in. long, with or without a small leaf at their base; bracts minute, ovate, acute, slightly hairy. *Calyx* about ⅟₁₀ in. diam. *Petals* narrow but enlarged upwards, truncate or retuse. *Disk* of male pulvinate, of fem. urceolate. *Pistillode* 3-toothed. *Styles* 3, 2-fid.

8. **C. lævis,** *Hook. f.*; quite glabrous, leaves 3–5 in. coriaceous ovate or ovate- or elliptic-lanceolate base acute or rounded faintly reticulate beneath, nerves 6–10 pair very slender, flowers solitary or few together axillary or in slender axillary spikes quite glabrous, calyx-lobes ovate-lanceolate, petals obovate truncately retuse, disk of male cupular lining the calyx-tube, fruit (young) sessile hairy.

SINGAPORE; jungle behind the Botanical Gardens, *Murton.*

A small tree, 15–20 ft.; branches smooth, woody, but slender, terete. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ in. diam., pale grey above when dry, pale brown beneath, quite smooth; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Flowers* very few seen; bracts very small, ovate or rounded, slightly ciliate. *Calyx* of male $\frac{1}{8}$ in. diam. *Disk* with a raised obscurely crenate border. *Staminal column* slender; pistillode short, stout, cylindric, truncate. *Young fruit* deeply 3-lobed at the top, sparsely hairy.—Better specimens of this very distinct species are much wanted.

9. **C. malaccensis,** *Hook. f.*; quite glabrous except the flowering shoots, leaves 3–6 in. coriaceous elliptic-oblong or lanceolate obtusely subcaudate acuminate, base acute, nerves 4–6 pair slender, flowers minute in small villous axillary and paniculately spiked clusters glabrous, calyx-lobes of male ovate of fem. lanceolate, petals of male spathulate of fem. rounded, ovary with a few long erect caducous hairs, styles simple.

MALACCA, *Maingay* (*Kew Distrib.* 1373).

Habit of *C. chartaceus;* branches stout; bark pale. *Leaves* dark brown when dry, paler beneath, very smooth on both surfaces, cross-nervules very faint, base suddenly narrowed and shortly produced on the very short petiole. *Clusters* $\frac{1}{8}$–$\frac{1}{6}$ in. diam.; spikes stout, often recurved, forming terminal panicles a foot long and less with a leaf here and there; bracts rusty-villous. *Calyx* $\frac{1}{12}$ in. diam., fem. rather the largest, with much narrower apparently deciduous lobes (they easily break away from the flowers). *Disk* of male pulvinate, of fem. tubular. *Filaments* very short. *Pistillode* conical. *Ovary* elongate ovoid; styles apparently not 2-fid.

10. **C. lancifolius,** *Hook. f.*; branches and leaves glabrous, leaves 4–5 in. elliptic-lanceolate very finely acuminate base acute, nerves 12–15 pair very slender, fem. fl. solitary or few together axillary clothed at the base with pubescent bracts, calyx glabrous lobes lanceolate acuminate, petals spathulate entire claw rather long, ovary hirsute.

TENASSERIM, *Helfer* (*Kew Distrib.* 4875).

Branches slender, terete; tips pubescent. *Leaves* spreading, $\frac{3}{4}$-$1\frac{1}{4}$ in. diam., thinly coriaceous, nerves slender, tapering point nearly 1 in. long; petiole $\frac{1}{4}$ in. *Flowers* (unexpanded) $\frac{1}{6}$ in. long. *Petals* nearly half as long as the calyx. *Ovary* subglobose, enclosed in the disk; styles 2-lobed at the tip.—Can this be Kurz's *C. stenophyilus?* if so, the ovary of that plant is erroneously described as glabrous.

11. **C. gracilis,** *Hook. f.*; quite glabrous, branches very slender, leaves $1\frac{1}{2}$–2 in. elliptic-ovate obtusely caudate base acute, nerves 5–7 pair very faint, flowers few in axillary clusters and spikes glabrous, calyx-lobes lanceolate, petals of male very minute linear of fem. elliptic, ovary hirsute enclosed in the membranous elongate 5-partite disk, capsule sessile quite glabrous.

PERAK, *Scortechini.* QUEDAH; *King's Collector.*

A much-branched tree, 18–25 ft.; branchlets divaricate, ultimate almost filiform. *Leaves* rather coriaceous, pale when dry, sometimes a little glaucous beneath, nerves very obscure; petiole $\frac{1}{5}$ in., very slender; stipules short ovate. *Flowers* $\frac{1}{10}$ in. diam., male and fem. together; bracts minute, ciliate. *Pistillode* tomentose. *Disk-lobes* of fem. with truncate tips, together forming a membranous cone. *Capsule* about $\frac{1}{2}$ in. long.—A very distinct species, allied to *C. heterophyllus* and *patulus.*

12. **C. decurrens,** *Hook. f.*: glabrous except the tomentose flowering branchlets and bracts, leaves 3–7 in. rather thin elliptic-oblong-obovate obtuse or obtusely acuminate quite glabrous base decurrent on the petiole, nerves 5–7 pair very slender, flowers few sessile in axillary clusters or in short lateral naked or small-leaved branchlets, fem. calyx quite glabrous lobes lanceolate, disk very short shortly lobed, petals elliptic, ovary hirsute with erect hairs.

PERAK, *Scortechini*; Goping, *King's Collector.*

A small tree, 10–12 ft. (at Goping), branches rather slender, pale, glabrous, branchlets rusty-tomentose. *Leaves* variable in size and shape, sometimes $2\frac{3}{4}$ in. broad, greenish above, reddish beneath, base always very acute and narrowed into or decurrent on the petiole which is $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules minute; small leaves on the flowering branchlets obtuse or acute, pubescent beneath. *Flowering* branchlets $\frac{1}{2}$–2 in., spreading and decurved; bracts rusty woolly almost concealing the flowers. *Calyx* about $\frac{1}{12}$ in. diam., fem. alone seen. *Styles* 3, shortly 2-fid. *Fruit* not seen.

13. **C. macrophyllus,** *Hook. f.*; quite glabrous, leaves 8–12 in. thinly coriaceous oblong-ovate obtusely cuspidate base narrowed into the short petiole, fem. fl. sessile in axillary clusters, bracts very minute ciliate, calyx glabrous lobes ovate, petals subquadrate crenate, disk crenulate with an erect truncate tube enclosing the strigosely hispid ovary.

PERAK, *Scortechini.*

Branches rather stout. *Leaves* 3–5 in. diam., narrowed from above the middle to the acuminate base, smooth and rather shining on both surfaces, midrib raised above; nerves 7–8 pair, arched, cross-nervules reticulate; petiole $\frac{1}{4}$ in., rather stout. *Flowers* exserted, buds subglobose; calyx $\frac{1}{8}$ in. diam., thickly coriaceous; lobes broad, tubular sheath of ovary truncate, toothed, at length 5-cleft. *Styles* 3, 2-fid, arms flabelliform.

14. **C. membranaceus,** *Hook. f.*; branches slender flowering pubescent, leaves 2–4 in. very membranous glabrous elliptic or oblong or oblong-lanceolate obtusely acuminate or caudate glaucous beneath, nerves 10–15 pairs very slender, stipules long acicular persistent, flowers subsessile minute, calyx-lobes ovate male nearly glabrous fem. hirsute, capsule small sessile deeply 3-lobed hirsute.

PERAK; Larut, *King's Collector.*

A tree, 15–20 ft. *Leaves* very pale when dry, sometimes narrowed to the base, which is rounded or subacute, petiole $\frac{1}{12}$ in., young tomentose; stipules rigid, sometimes $\frac{1}{4}$ in. long. *Calyx* $\frac{1}{12}$ in. diam., of fem. with a villous ring at the base of the capsule. *Petals* of male obcuneate, of fem. rhomboid. *Disk* of fem. a crenulate cup at the base of the ovary. *Capsule* $\frac{1}{3}$ in. long; cocci oblong.

†† *Flowers more or less pubescent* (*see also* C. membranaceus).

15. **C. hirsutulus,** *Hook. f.*; branches slender hirsutely tomentose with spreading hairs, leaves 4–7 in. membranous obovate-oblong obtusely caudate base rounded pubescent beneath and glaucous, nerves 11–15 pair, flowers in axillary clusters subsessile minute, calyx of both sexes villous lobes ovate, petals of male flabellate 2-partite crenate, capsule sessile deeply 3-lobed pubescent.

PERAK, *Scortechini, King's Collector.*

A tree, 30–40 ft. *Leaves* greenish when dry, nerves strong beneath, petiole very short, stout, and midrib beneath tomentose; stipules $\frac{1}{6}$ in. *Calyx* $\frac{1}{12}$ in. diam., of fem. glabrous within under the capsule. *Disk* of male crenulate. *Capsule* $\frac{1}{3}$ in. long, "waxy, red."—Allied to *C. membranaceus*, but a much larger species.

16. **C. patulus,** *Muell. Arg. in DC. Prodr.* xv. ii. 505; glabrous, leaves 1–3 in. thinly coriaceous ovate to lanceolate obtusely acuminate or caudate finely reticulate base acute or rounded, nerves 5–8 pair very slender, clusters minute axillary and in slender axillary or terminal simple spikes, calyx sparsely appressedly hairy, lobes ovate acute, petals orbicular clawed crenulate, ovary hirsute with long erect hairs, capsule small sessile. *Beddome Forester's Man.* 203, t. xxiii. f. iv. 1–11 and 21. Amanoa indica, *Wight Ic.* t. 1911. A. patula, *Thwaites Enum.* 280 (acuminata *in part*), and A. indica f. minor, *Thwaites l. c.* 428. Bridelia patula, *Hook. & Arn. Bot. Beech. Voy.* 212. Lebidiera patula, *Muell. Arg. in Linnæa* xxxii. 21. Cluytia patula, *Roxb. Cor. Pl.* ii. 37, t. 170, and *Fl. Ind.* iii. 783.

DECCAN PENINSULA; Courtallam, in mountain jungles, *Wight.* CEYLON; common in the warmer parts of the island.

A tree with long horizontal dense branches; branchlets very slender, quite smooth, the tips only sometimes puberulous. *Leaves* 2–3½ in., variable in width, flatter, more rigid and usually narrower than in *C. acuminatus*, dull grey or brownish when dry, alike on both surfaces, the caudate end sometimes short and obtuse. *Flowers* yellow, as in *C. acuminatus*. *Styles* 2-fid to the middle. *Capsule* (in Peninsular specimens) ⅓ in. broad and long, deeply 3-lobed, dark brown, quite smooth, slightly hairy, subtended by the disk. *Seeds* (in Ceylon specimens) ⅙ in. long, broadly obovoid, plano-convex, smooth with rounded sides and top and a ventral hilum.—This should perhaps include *C. acuminatus*, which has axillary quite glabrous flowers. Mueller describes the capsule as at length rough with tubercles, but I do not find it so. The Peninsular specimens have less caudate leaves than the Cingalese. Roxburgh figures the petals of the male as orbicular and crenate.

17. **C. pallidus,** *Muell. Arg. in DC. Prodr.* xv. ii. 508; branches slender and young leaves and petioles and midrib beneath pubescent, leaves small elliptic or oblong-lanceolate acute acuminate or caudate base acute, nerves 6–10 pairs spreading, flowers in small axillary clusters which are rarely spicate sessile and pedicelled tomentose, calyx-lobes ovate-lanceolate, petals obovate, ovary densely villous, styles subentire, capsule small sessile. *Beddome Forester's Man.* 20. Amanoa pallida, *Thwaites Enum.* 280. Lebidiera pallida, *Muell. Arg. in Linnæa* xxxii. 80.

CEYLON; near Kandy, *Thwaites.*

Branches very leafy, bark pale. *Leaves* 1–2½ in. (rarely 5–6½ in.), pale when dry, rather membranous, midrib beneath strong, nerves slender, nervules reticulated; petiole $\frac{1}{10}$–$\frac{1}{8}$ in.; stipules small, subulate. *Clusters* 2–5 fld.; bracts very minute, except the stipular; flowers 5–6-merous. *Calyx* ⅛ in. diam., thickly tomentose externally. *Disk* of male cupular, crenate, of fem. membranous. *Ovary* globose; styles very shortly 2-fid. *Pistillode* large, 3-notched. *Capsule* ⅓ in. diam., not deeply 3-lobed, sparsely hairy. *Seeds* not ripe.

VAR. *subglauca*, Trimen, Syst. Cat. Pl. Ceyl. 78; leaves subglaucous beneath. C. subglaucus, *Thw. mss.*

18. **C. robustus,** *Muell. Arg. in DC. Prodr.* xv. ii. 504; glabrous, leaves 3–5 in. coriaceous elliptic-oblong or lanceolate acuminate faintly reticulate base acute, nerves 5–6 pair very slender, stipules minute, flowers few sessile in small axillary and spicate clusters sparsely pubescent with appressed hairs, calyx-lobes of male ovate-oblong, petals minute oblong hairy. *Beddome Forester's Man.* 202. Amanoa indica, *Thwaites Enum. Addend.* 428 (*excl. syn. Wight*).

CEYLON, in the hotter parts of the island.

Habit of *C. malaccanus*; branches and flowering spikes quite black when dry. *Leaves* dark brown, shining and faintly reticulate on both surfaces, young quite

glabrous. *Spikes* axillary, more or less recurved, rather shorter than the leaves; clusters 2–3 fld.; bracts very short, nearly glabrous, large rounded concave, smaller oblong; flowers 4–5-merous. *Calyx* $\frac{1}{8}$ in. diam.; lobes obtuse. *Disk* cupular. *Staminal column* short with a large obtuse hairy pistillode. *Fem. fl.* and *fruit* wanting.

19. **C. ferrugineus,** *Muell. Arg. in DC. Prodr.* xv. ii. 507; glabrous except the inflorescence, leaves 4–6 in. coriaceous elliptic or oblong-lanceolate caudate-acuminate base acute or obtuse, nerves 3–5 pair very strong beneath, flowers solitary or few in a cluster or axillary and in very short axillary spikes pedicelled rusty-tomentose, calyx-lobes oblong-ovate subacute, petals deeply irregularly acutely lobed, ovary densely tomentose, capsule shortly stipitate rusty-tomentose. *Beddome Forester's Man.* 203. Amanoa ferruginea, *Thwaites Enum.* 280; *Baill. Etudes Gen. Euphorb.* 50, t. 27, f. 1–4.

CEYLON; in the Central Province, ascending to 3000 ft., *Thwaites.*

Branches quite glabrous except the tips. *Leaves* greyish green when dry, pale beneath, lower nerves very long, cross-nervules faint; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., glabrous. *Flowers* 2–5 in a cluster or solitary; pedicels sometimes as long as the calyx; bracts very minute, rusty tomentose. *Calyx* $\frac{1}{10}$ in. diam., lobes obtuse. *Petals* very irregular. *Staminal column* short; pistillode prismatic with pubescent angles, truncate. *Disk* of male pulvinate. *Capsule* $\frac{1}{3}$ in. long, deeply 4-lobed; pedicel stout.

20. **C. nitidus,** *Hook. f.*; branches and petioles finely tomentose, leaves membranous glabrous oblong-lanceolate or oblanceolate caudate-acuminate margins undulate base rounded or caudate shiny above paler or glaucous beneath, nerves 8–12 pair very slender, flowers few in small axillary clusters sessile densely tomentose, calyx-lobes ovate acute, petals of male flabelliform crenate of fem. obovate, ovary densely hirsute with erect hairs, styles 3 slender bifid to the middle.

MALAY PENINSULA; Singapore, *Lobb.* PENANG, *Curtis.*

Branches very slender. *Leaves* 3–4 by 1–1½ in., greyish green when dry, and polished above, faintly reticulated beneath; petiole very short, $\frac{1}{12}$ in. *Clusters* 2–4-fld.; bracts very short, villous. *Calyx* of fem. cleft half-way down. *Disk* of male broad plane, of fem. cupular at length 5-lobed. *Ovary* globose; styles 2-fid to the middle.—The Singapore specimen is a female, the Penang a male.

21. **C. Helferi,** *Hook. f.*; branches and leaves beneath fulvous-tomentose, leaves linear-oblong acute or subacute sparsely pubescent above strongly reticulate beneath, nerves 6–10 pair spreading and arched, stipular bracts setaceous longer or shorter than the flowers, flowers few in axillary clusters tomentose sessile, calyx-lobes ovate-lanceolate, petals of male broadly ovate sessile of female rhombic-ovate obscurely toothed, ovary densely hispid with long stiff hairs.

TENASSERIM, *Helfer* (*Kew Distrib.* 4886); Mergui, *Griffith.*

Branches fulvous-tomentose. *Leaves* thinly coriaceous, 2–5 by ½–1½ in., pale grey-brown when dry, base subacute or rounded; petiole $\frac{1}{8}$ in., tomentose. *Male* and *fem. flowers* similar, nearly $\frac{1}{6}$ in. diam., glabrous within, fulvous-tomentose without. *Disk* of male adnate to the perianth-tube, of the fem. erect, 5-lobed, thin. *Staminal column* with a 3-lobed top. *Styles* 3, long, 2-fid. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in. long, sessile, shortly oblong, hairy.

22. **C. Maingayi,** *Hook. f.*; branches and young leaves softly rusty-tomentose, leaves pale elliptic- or obovate-oblong caudate-acuminate reticulate and finely pubescent beneath, nerves 6–8 pair arching, flowers few in axillary clusters sessile hirsute, calyx-lobes lanceolate finely acuminate, petals obovate subentire, ovary densely hirsute with long erect hairs, styles 3 2-fid.

MALACCA, *Maingay* (*Kew Distrib.* 1374).

Branches slender, smooth. *Leaves* 3–5 by 1–2 in., glabrous above, subglaucous beneath, with raised reticulating venules between the nerves, tip often suddenly acuminate to a point ½ in. long, base rounded or subcordate; petiole very short indeed. *Calyx* about ¼ in. diam., longer than the lanceolate bracts; lobes with long points. *Disk* of male lining the calyx-tube, of fem. membranous, urceolate. *Staminal column* long. *Fruit* not seen.—This much resembles *C. malabaricus*, differing in the tomentose flowers.

23. **C. podocarpus,** *Hook. f.*; a tree 50–70 ft., branchlets and petioles rusty-tomentose, leaves 5–10 in. subglaucous thinly coriaceous oblong or linear-oblong acuminate base cordate, midrib sunk above, nerves 8–10 pair very strong and arched beneath, petiole ⅙ in. stout, fem. calyx villously tomentose, lobes triangular, petals cuneate, disk with a broad membranous crenulate margin, capsule stoutly stipitate ⅓–½ in. diam. broader than long deeply 3-lobed densely rusty-villous.

PERAK; at Larut, *King's Collector.*

A very distinct species, with the base of the leaf cordate.

SPECIES OF WHICH THE CAPSULE IS GLABROUS, BUT THE OVARY IS UNKNOWN.

24. **C. stipulatus,** *Hook. f.*; a tree 20–30 ft.; branchlets pubescent, leaves membranous 3–5 in. glabrous oblanceolate-oblong subcaudately acuminate glaucous beneath base rounded, midrib raised above, nerves 10–12 pair very slender, petiole $\frac{1}{10}$ in., stipules rigid acicular ¼–⅓ in., capsule ½ in. diam. sessile subglobosely 3-lobed quite smooth glabrous.

PERAK; at Larut, *King's Collector.*

25. **C. ellipticus,** *Hook. f.*; a tree 30–40 ft., shoots and young petioles rusty or black-tomentose, leaves 3–4 in. coriaceous glabrous elliptic obtusely or acutely acuminate base acute above finely reticulate, midrib strong beneath slender above, nerves 7–8 pairs slender arched, cross-nervules very slender, petiole ⅛–⅙ in. stout, fem. fl. sessile in rather large tufts of rusty-villous bracts, capsule stoutly stipitate ½ in. diam. subglobose deeply 3-lobed quite glabrous minutely wrinkled.

PERAK; usually near water at Larut, *King's Collector.*

This resembles closely *C. chartaceus*, Muell.

26. **C. parvifolius,** *Hook. f.*; a small tree 30–40 ft., quite glabrous, branchlets short, leaves 2–3 in. rather membranous elliptic-lanceolate obtusely subacuminate pale when dry with undulate margins base rounded, midrib sunk above, nerves 10–12 very obscure widely spreading, fem. fl. sessile solitary ?, bracts very minute, calyx-lobes ovate lanceolate, capsule sessile ¼–⅓ in. diam. subglobose 3-lobed quite glabrous.

PERAK; on the tops of limestone hills, alt. 300–1000 ft., *King's Collector.*

27. **C. pedicellatus,** *Hook. f.*; quite glabrous, leaves 1½–4 in. coriaceous broadly elliptic or elliptic-oblong obtusely caudate base acute shining above, nerves 3–4 pair very faint, flowers in axillary panicles on long stout pedicels much longer than the calyx perfectly glabrous, calyx-lobes ovate, petals of male cuneate toothed, capsule quite glabrous.

PENANG, *Curtis, Hullett.*

Branches woody, bark pale, smooth. *Leaves* very finely reticulate on both surfaces, otherwise very smooth, margins recurved when dry, petiole $\frac{1}{10}$–⅛ in. *Pedicels* ¼–½ in., buds of male ellipsoid ⅛ in. long, bracts very minute glabrous; calyx ⅛ in.

diam.; lobes 4–5, very thick; pistillode glabrous. *Capsule* about ⅓ in. long, on a stout pedicel ½-⅔ in. long.

IMPERFECTLY KNOWN AND EXCLUDED SPECIES.

C. OBLONGIFOLIUS, *Muell. Arg. in DC. Prodr.* xv. ii. 506, is a mixture. Of its two varieties, *α. scaber* consists of *Bridelia pubescens*, Kurz (the Sikkim plant), and *B. assamica*, H. f. (Griffith's 4890). *β. genuina* is *Cleistanthus chartaceus*, Muell.

C. STIPULARIS, *Muell. Arg. in DC. Prodr.* xv. ii. 508; shoots pubescent, leaves ovate or ovate-oblong base obtuse or subcordate glabrous above grey-tomentose beneath, stipules long lanceolate acuminate, male fl. pedicelled in small axillary clusters, calyx-lobes ovate pubescent, petals clawed obovate plaited puberulous, disk low crenate, male fl. and fruit unknown. *Beddome Forester's Man.* 203. Lebidiera stipularis, *Muell. Arg. in Linnæa* xxxii. 81. Bridelia stipularis, *Hook. & Arn. Bot. Beech. Voy.* 211 (not of Linn.).—Nilghiri Mts., *Hohenacker* (n. 1551).—I know nothing of this plant, and I do not understand how it is identified with the *B. stipularis* of Hook. and Arn.

WALL. CAT. 8006, from Penang, in leaf only is probably a *Cleistanthus*; it has slender tomentose branches, and short broadly elliptic leaves 3–4 by ½–2 in., with cuspidate tips.

6. **ACTEPHILA,** *Blume.*

Trees or shrubs. *Leaves* alternate, usually large, quite entire; stipules deciduous. *Flowers* in axillary clusters, mono- or di-œcious, petaliferous or not. MALE FL. *Sepals* 5–6, subequal or the inner larger, imbricate. *Petals* as many, much smaller, inserted under the 5-lobed disk, or 0. *Stamens* 3–6, on the disk, filaments free or nearly so; anther-cells parallel. *Pistillode* 3-cleft. FEM. FL. *Perianth* of the male. *Ovary* sessile on the 5-lobed disk, 3-celled; styles short, free or connate at the base, entire or 2-fid; ovules 2 in each cell. *Capsule* hard, loculicidal or of 3 2-valved cocci. *Seeds* usually solitary in the cocci, large, 3-gonous, aril or caruncle 0, testa brittle, very thin, albumen scanty or 0; cotyledons fleshy, folded or crumpled together.—Reputed species about 10, Malayan and Australian.

Mueller's sections "Monœcious" and "Dicœcious" are annulled by Kurz's observation, that *puberula* is either; and the distinctions drawn from the form of the sepals and petals are not reliable. The glands at the base of the fem. sepals are probably present in all the species.

1. **A. excelsa,** *Muell. Arg. in Linnæa* xxxii. 78, and in *DC. Prodr.* xv. ii. 222; glabrous or with the shoots and young leaves beneath minutely puberulous, leaves 3–8 in. long- or short-petioled linear-oblong to elliptic-lanceolate or -obovate acute acuminate or cuspidate, base acute, sepals oblong, petals narrow. *Beddome Forester's Man.* 189, t. 23, f. 3. A. neilgherrensis, *Wight Ic.* t. 1910. Anomospermum excelsum, *Dalz. in Hook. Kew Journ. Bot.* iii. (1851) 228; *Dalz. & Gibs. Bomb. Fl.* 233. Croton lævigatum, *Wall. Cat.* 7749 (*not* 7735).

UPPER ASSAM; Mishmi Hills, *Griffith* (*Kew Distrib.* 4892). SILHET, the KHASIA MTS. and CHITTAGONG. ANDAMAN ISLANDS, *Kurz.* DECCAN PENINSULA; on the Western Ghats, from the Concan to Travancore, ascending to 5500 ft. CEYLON, ascending to 2000 ft.—DISTRIB. Java.

A small evergreen shrub, 4–8 feet, or a tree. *Leaves* hardly coriaceous, greenish or yellowish when dry, nerves 6–12 pairs arched, surfaces subsimilar, petiole ½–1½ in. *Flowers* male and fem. in the same cluster or not; males several, shortly pedicelled;

fem. clustered or solitary; pedicel slender, ½–2 in. long. *Sepals* variable in length, obtuse, apiculate or truncate. *Petals* very variable. *Ovary* globose, 3-lobed; styles 3, 2-fid, lobes recurved. *Capsule* ¾ to 1½ in. diam., broader than long, 3-lobed, minutely wrinkled when dry; cocci woody, dorsally rounded. *Seeds* ½ in. long, obtusely trigonous, dorsally rounded, broader than long; testa very thin, fragile, brown.—The Indian species retained by Mueller are the following. Having no-flowering specimens, I am unable to distinguish them, and suspect they are all forms of one.

A. ZEYLANICA, *Muell. Arg. in Linnæa* xxxii. 77, and in *DC. l. c.* 221; diœcious, petals of male broadly rhombic-obovate base cuneate, of fem. short cuneate-obovate flabellately dilated truncate emarginate, filaments free. A. neilgherrensis, *Thwaites Enum.* 280 (*excl. syn.*). Savia zeylanica, *Baill. Etudes Gen. Euphorb.* 571.—Ceylon.

A. THOMSONI, *Muell. Arg. in Linnæa* xxxiv. 65, and in *DC. l. c.* 222; diœcious, sepals of fem. linear-lanceolate acute with a series of basal glands, petals linear-lanceolate rigid entire about 3 times shorter than the sepals.—Mysore and the Carnatic, *G. Thomson.*

A. JAVANICA, *Miquel Fl. Ind. Bat.* i. ii. 356; monœcious, sepals coriaceous, petals of male broadly rhombic-obovate cuneately narrowed at the base, of fem. short cuneate-obovate truncate emarginate, filaments connate at the base, capsules large. *Muell. Arg. in DC. l. c.* 222; *Kurz For. Fl.* ii. 340. A. bantamensis, *Miq. l. c.* Savia Actephila, *Hassk. Cat. Hort. Bogor.* 243.—Singapore, *Wallich* (Cat. 8016), Andaman Islands, Java.

A. EXCELSA, *Muell. Arg. ll. c.*; monœcious, leaves from linear-oblong to elliptic or lanceolate; sepals submembranous suborbicular tip rounded with brown edges, petals oblong-obovate subentire, capsule large, testa membranous. (See citations under the species.)—Assam, the Khasia Mts. and Silhet.

2. **A. puberula,** *Kurz For. Fl.* ii. 341; shoots and nerves of leaves beneath minutely pubescent or glabrescent, leaves long-petioled obovate or oblong obtuse or obtusely acuminate base rounded or cordate.

ANDAMAN ISLANDS, *Kurz.*

An evergreen shrub, 4–8 ft. (*Kurz*). *Leaves* 4–7 in., hardly coriaceous, glabrous above, nerves beneath puberulous. *Flowers* monœcious or diœcious, orange-cold. *Calyx* coriaceous. *Capsules*, as in *A. excelsa*, wrinkled.—The base of the leaf and long petioles at once distinguish this species from all the forms of *A. excelsa.* I have seen no flowers.

7. **ANDRACHNE**, *Linn.*

(& 8. **HEXAKISTRA**, *Hook. f.*)

Herbs, undershrubs, or slender shrubs. *Leaves* usually small, alternate, membranous, quite entire. *Flowers* small, monœcious, pedicelled; males clustered in the axils, females solitary. MALE FL. *Calyx* 5–6-lobed or -partite. *Petals* 5–6, small or 0. *Disk-glands* as many, or twice as many. *Stamens* 5–6, alternate with the petals; anthers erect, cells parallel. *Pistillode* small. FEM. FL. *Calyx* larger. *Petals* minute or 0. *Ovary* 3-celled; styles short 2-fid or -partite; ovules 2 in each cell. *Capsule* of 3 2-valved cocci. *Seeds* curved, rugose, estrophiolate, albumen fleshy; embryo curved, cotyledons broad flat.—Species about 10, variously dispersed.

When the clavis of the Indian genera of Euphorbiaceæ was prepared, I had determined to propose for the last two species of this genus a separate one under the name of *Hexakistra* (in allusion to the needle-like style), but on reconsideration I have considered it best to postpone the dismemberment of *Andrachne*, which contains different types of structure, till all the species now included under it could be studied in detail.

1. **A. cordifolia,** *Muell. Arg. in DC. Prodr.* xv. ii. 234; shrubby,

leaves petioled ovate or oblong obtuse or mucronate softly hairy beneath, sepals connate below obovate, petals spathulate keeled, disk-glands membranous 2-partite. *Brand. For. Fl.* 456; *Gamble Man. Ind. Timb.* 349. A. Decaisneana, *Baill. Etudes Gen. Euphorb.* 577. Leptopus cordifolius, *Dcsne. in Jacquem. Voy. Bot.* 155, t. 156. Phyllanthus cordifolius, *Wall. Cat.* 7913, and 7930 *in part.* P. Hoffmeisteri, *Klotzsch in Bot. Reise Pr. Waldem.* 117, t. 24. P. glauca, *Wall. Cat.* 7927 B, *in part.*—*Wall. Cat.* 7929.

CENTRAL and WESTERN TEMPERATE HIMALAYA, alt. 5–8000 ft., from Nepal *Wallich*, westwards to Murree, *Fleming*.—DISTRIB. Affghanistan.

A small shrub; branches slender. *Leaves* 1–2 in., pale when dry, nerves very slender; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. *Flowers* $\frac{1}{8}$ in. diam.; pedicels capillary, $\frac{1}{2}$–$1\frac{1}{2}$ in. *Calyx* enlarged in fruit, acute. *Fruit* $\frac{1}{4}$ in. diam., depressed globose. *Seeds* broadly trigonous, dorsally rounded.—The leaves are very variable, rarely cordate, and I suspect that it may prove a form of *A. chinensis*, Bunge.—There is no No. 7929 in Wallich's printed List. In his Herbarium in the Linn. Soc. Rooms, that number is written in pencil on a sheet of this plant, which has also the misplaced ticket of 7930 (*Phyllanthus tetrandrus*).

2. **A. telephioides,** *Linn. Sp. Pl.* 1014; prostrate, glabrous, glaucous, leaves sessile elliptic or obovate subacute, sepals free rounded or rhombic, petals lanceolate, disk-glands membranous 2-lobed. *Muell. Arg. in DC. Prodr.* xv. ii. 235; *Boiss. Fl. Orient.* iv. 1138; *Sibthorp Fl. Græc.* x. t. 953; *Reichb. Ic. Fl. Germ.* v. t. 153. A. rotundifolia, *C. A. Meyer in Eichw. Pl. Carp.* 18, t. 20.

The PANJAB; on the Salt Range, *Fleming*; near the Jhelum, *Aitchison*.—DISTRIB. Affghanistan and westwards to Spain and the Cape de Verd Islands.

Root woody; stems very many, 8–12 in., slender, leafy, flowering throughout their length. *Leaves* $\frac{1}{6}$–$\frac{1}{3}$ in., coriaceous, nerves obscure. *Flowers* $\frac{1}{10}$ in. diam., pedicels usually shorter than the leaves. *Capsules* depressed globose, $\frac{1}{10}$–$\frac{1}{8}$ in. diam.

3. **A. aspera,** *Spreng. Syst. Veg.* iii. 884; prostrate, glaucous and papillosely pubescent, leaves orbicular-cordate or broadly reniform rounded or retuse, sepals free lanceolate obtuse ciliolate, petals rhombic subentire, disk-glands fleshy, of the male peltate incised. *Muell. Arg. in DC. Prodr.* xv. ii. 236; *Boiss. Fl. Orient.* iv. 1138.

SCIND, *Stocks*.—DISTRIB., Persia, Arabia, Trop. Africa.

A small undershrub, with woody root, short rootstock, and very many filiform prostrate stems 6–10 in. long, rarely nearly glabrous, pale green when dry. *Leaves* $\frac{1}{3}$–$\frac{1}{2}$ in. broad, rather membranous, upper sessile; petiole of lower very slender, as long as the blade. *Flowers* $\frac{1}{10}$ in. diam.; pedicel as long as the petiole. *Fruit* $\frac{1}{6}$ in. diam., membranous.

4. **A. fruticosa,** *Dcne. in Nouv. Ann. Mus.* iii. 484; sparsely hairy, branches terete, leaves elliptic-lanceolate acuminate at both ends, ovary hispid. *Muell. Arg. in DC. Prodr.* xv. ii. 235.

PERAK; at Larut, *King's Collector*.—DISTRIB. Timor-Laut, Java.

A small erect shrub, 1–2 ft., everywhere except the leaves above sparsely pubescent with long appressed hairs; branches slender, divaricate. *Leaves* 2–3 in., very thin, pale green; nerves 3–5 pair, extremely slender, ascending; stipules small, lanceolate, deciduous. *Male fl.* $\frac{1}{10}$ in. diam.; pedicel a little longer, hairy; bracts at the axils minute; sepals membranous, obtuse, hairy at the back, sometimes subspathulate; petals spathulately obovate, 1-nerved; disk-glands rather fleshy, linear, in pairs opposite the sepals; filaments narrowed from the base upwards; pistillode not half their length. *Fem. fl.* $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; sepals unequal, hairy on both surfaces. *Capsule* $\frac{1}{6}$ in. diam.;

epicarp separating; seeds transversely wrinkled.—The Timor Laut specimen so closely resembles this, that I think they must be co-specific, though I find no petals in their few flowers.

5. **A. Clarkei,** *Hook. f.*; sparsely hairy, branches acutely angled, leaves ovate-lanceolate acuminate base rounded, ovary glabrous.

MUNNIPORE; on Kohima, alt. 4700 ft., *Clarke.*

A slender erect shrub, 18 in. high; branches green with slender ribs at the angles. *Leaves* 2–2½ in., pale green, laxly hairy beneath; petiole ¼–½ in., pubescent. *Male fl.* ⅛ in. diam.; pedicel capillary, ¼–⅓ in.; sepals oblong, obtuse, rather fleshy, hairy externally; petals ⅓ as long as the sepals; disk-scales linear, in pairs opposite the sepals with a gland between the bases of each pair, about as long as the petals. *Stamens* erect; pistillode 0? *Fem. fl.* ⅓ in. diam.; pedicel ¾–1 in.; sepals ovate-lanceolate, acute, 3-nerved, green; disk-scales as in the male; ovary quite glabrous. *Capsule* 3-lobed, depressed, smooth, glabrous, about ⅓ in. diam.; seeds turgidly trigonous, smooth.

9. **AGYNEIA,** *Vent.*

Annual or perennial glabrous herbs; stems diffuse, often angled or compressed. *Leaves* small, alternate, quite entire. *Flowers* minute, monœcious, apetalous; males in axillary clusters; females solitary, largest; bracts often numerous, stipule-like. MALE FL. *Sepals* 6, gland-dotted, thickened all but the white margins. *Disk* 6-lobed. *Stamens* 3, central; anthers subsessile on the connate filaments; cells parallel, extrorse. *Pistillode* 0. FEM. FL. *Disk* 0. *Sepals* acute, not margined. *Ovary* ovoid, 3-celled, truncate; styles very short, 2-fid, sunk in the top of the ovary. *Ovules* 2 in each cell. *Capsule* splitting into 3 2-valved cocci. *Seeds* slender, curved, hilum long, albumen fleshy; embryo curved, cotyledons broad flat.—Species 2, Indian, Malayan, and Mascarene.

A. bacciformis, *A. Juss. Tent. Euphorb.* 24; leaves fleshy sessile oblong obovate or rounded to linear-lanceolate acute or acuminate obtuse glaucous. *Muell. Arg. in DC. Prodr.* xv. ii. 238; *Wight Ic.* t. 1893; *Miquel Fl. Ind. Bat.* i. 2. 367. A. impubes, *Vent. Hort. Cels.* 23, t. 23; *A. Juss. l. c.* 109, t. 6, f. 19; *Baill. Etudes Gen. Euphorb.* t. 24, f. 10–14. A. phyllanthoides, *Spreng. Syst.* iii. 19. Phyllanthus bacciformis, *Linn. Syst. Ed.* 13, 707; *Roxb. Fl. Ind.* iii. 661; *Wall. Cat.* 7896. P. racemosus, *Linn. Suppl.* 415. P. anceps & rotundifolius, *Herb. Madr.* Diplomorpha herbacea, *Griff. Notul.* iv. 479. Emblica racemosa, *Spreng. Syst.* iii. 20.

BENGAL, *Griffith, Clarke.* COROMANDEL COAST, in grassy pastures, *Roxburgh,* &c. CEYLON, near the sea.—DISTRIB. Java, Mauritius.

Annual or biennial. *Stems* 6–18 in., laxly branched, angular, green. *Leaves* rarely ¾ in. long, nerveless; stipules minute, ovate or lanceolate, acute. *Flowers* shortly pedicelled, males $\frac{1}{16}$ in., fem. ⅛–⅙ in. diam. *Sepals* broadly ovate, acuminate, studded with immersed glands, persistent. *Ovary* broadly ovoid, obtuse; style with 2 recurved arms, stigmas acute. *Capsule* ⅛ in. long, globosely ovoid, obtuse, nearly terete.—I have seen no specimen of the Javanese *A. affinis,* Kurz (DC. l. c. 239); the only Javanese species known to me is *bacciformis,* collected by Horsfield. Roxburgh describes the male sepals as laciniate.

10. **PHYLLANTHUS,** *Linn.*

(See also 11. GLOCHIDION.)

Herbs, trees or shrubs. *Leaves* bifarious or distichous, alternate, quite

entire. *Flowers* small, monœcious, usually in axillary clusters, apetalous. *Disk* various, rarely 0. MALE FL. *Sepals* 4–6, imbricate in 2 series. *Disk-glands* various (0 in ♂ of *Emblica*). *Stamens* 3–5 in the centre of the flower, filaments free or connate; anthers 2-celled, oblong or didymous, rarely reniform, cells parallel or diverging, slits extrorse vertical or transverse by the confluence of the cells. *Pistillode* 0 (or minute in Sect. *Reidia*). FEM. FL. *Sepals* of the male (or more in *Reidia*). *Ovary* 3- or more-celled; styles free or connate, usually 2-fid with slender arms, rarely dilated; ovules 2 in each cell. *Fruit* of 3 or more crustaceous or coriaceous rarely bony 2-valved cocci, with or without a separable coriaceous rarely fleshy epicarp (in Sect. *Kirganelia* a berry, in Sect. *Cicca* a drupe). *Seeds* 3-gonous, estrophiolate, testa crustaceous, albumen fleshy; cotyledons flat or flexuous. —Species about 350, of all warm countries.

Under 11. GLOCHIDION I have given my reasons for retaining the genus of that name, which is regarded by many botanists as a section of *Phyllanthus*. I think that *Kirganelia* may possibly constitute a distinct genus, characterized by the baccate fruit with superposed seeds and a crustaceous testa; and perhaps *Flueggeopsis* another.

KEY TO THE SECTIONS.

Sect. I. PELTANDRA. Herbs or undershrubs. *Leaves* membranous. *Flowers* long-(fem. very long-)pedicelled. *Sepals* 5 or 6 in both sexes. *Stamens* 5, filaments connate in a slender column; anthers erect, slits vertical, connective not produced. *Ovary* 3-celled; styles 3, minute, 2-partite. *Capsule* of 3 coriaceous or crustaceous cocci.

Sect. II. KIRGANELIA. Shrubs. *Leaves* distichous, usually petioled. *Sepals* 4–6 in both sexes. *Stamens* 5, in 2 series, filaments free, or of the outer series free, of the inner connate; anthers erect, slits vertical, connective not produced. *Styles* very minute, 2-fid. *Fruit* a 4–8-celled berry. *Seeds* 2 in each cell superposed, the upper pendulous from the top of the cavity, the lower from the middle; testa ? hard often rugose.

Sect. III. FLUEGGEOPSIS. A shrub. *Leaves* distichous, shortly petioled. *Sepals* 5–6 in both sexes. *Stamens* 5, filaments free; anthers erect, slits vertical, connective not produced. *Styles* 3, long, slender, quite entire, united at the base. *Fruit* a 3-celled, 3-seeded berry; testa crustaceous.

Sect. IV. EMBLICA. Trees. *Leaves* very small, closely pinnately set on the slender branchlets. *Male flowers* with no disk. *Sepals* 5–6 in both sexes. *Stamens* 3, filaments united in a column; anthers erect, slits vertical, connective produced. *Styles* 3, united below, each twice 2-fid. *Fruit* large, fleshy, with 3 bony 2-valved cocci.

Sect. V. PARAPHYLLANTHUS. Herbs or shrubs. *Leaves* various. *Sepals* 5–6 in both sexes. *Stamens* 3, filaments united in a short or long column; anthers erect, slits vertical, connective usually produced. *Styles* 3, free or connate below, 2-fid. *Capsule* of 3 crustaceous 2-valved cocci.

Sect. VI. EUPHYLLANTHUS. Herbs or shrubs. *Leaves* various. *Sepals* 5–6 in both sexes. *Stamens* 3, filaments more or less united, rarely free and recurved; anthers didymous or reniform, cells subglobose, slits very short, cells sometimes confluent when the dehiscence appears transverse. *Styles* 3, free or connate below, 2-fid. *Capsule* of 3 crustaceous or thin 2-valved cocci.

Sect. VII. REIDIA. Herbs or shrubs. *Leaves* various. *Sepals* often

toothed or lacerate, of male fl. 4, of fem. 4 or 6. *Stamens* 2–4; anthers didymous or reniform, sessile around a minute pistillode on the top of a slender or short column, horizontal, cells often confluent, slits transverse. *Styles* 3, 2-fid or 2-partite. *Capsule* of 3 thinly crustaceous 2-valved cocci.

Sect. VIII. CICCA. A tree. *Sepals* 4 (rarely 5–6) in both sexes. *Stamens* 4, filaments free; anthers oblong, erect, slits vertical. *Styles* 4, free. *Fruit* fleshy, with a 3–4-celled bony endocarp.

Sect. IX. PROSORUS. Dicœcious trees. *Leaves* deciduous. *Sepals* 4 in both sexes. *Stamens* 4, filaments free; anthers erect, slits vertical. *Styles* 3, free, 2-fid. *Fruit* large, epicarp thin, dry, bursting irregularly, enclosing 3 thin walled 2-valved cocci.

Sect. I. PELTANDRA (see p. 286).

1. **P. longipes,** *Muell. Arg. in Linnæa* xxxii. 10, and in *DC. Prodr.* xv. ii. 341; quite glabrous, leaves shortly petioled 3–5 in. very membranous ovate-lanceolate finely acuminate, fem. pedicels very long axillary, capsule small dry. Peltandra longipes, *Wight Ic.* t. 1891. Croton pedunculatus, *Wall. Cat.* 7767.

MALABAR; Mont. Mamettori, *Herb. Madr.*; at Quilon, *Wight.*

Shrubby?; bark white; branches long, terete, slender. *Leaves* undulate, base acute or rounded, subglaucous beneath; nerves 6–8 pair, very slender; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., slender; stipules ovate, ciliate, caducous. *Peduncles* of fem. fl. $\frac{1}{12}$–$\frac{1}{6}$ in., clothed with tetrastichously imbricating ovate fimbriate bracts; male pedicels $\frac{1}{2}$, fem. 2–3 in. *Male calyx* $\frac{1}{12}$, fem. $\frac{1}{6}$ in. diam.; sepals 5, rounded. *Disk* of both sexes orbicular. *Capsule* $\frac{1}{6}$ in. diam., globose; cocci thinly crustaceous. *Seeds* (in Wight's figure) pyriform.

2. **P. macropus,** *Hook. f.*; quite glabrous, leaves long petioled 3–5 in. very membranous ovate- or oblong-lanceolate finely acuminate, fem. pedicels very long axillary, capsule small dry.

UPPER ASSAM; in the Mishmee Hills, *Griffith* (*Kew Distrib.* 4811).

Habit of *P. longipes*, but at once distinguished by the petiole 1–3 in. long.—The specimens are in fruit only, which appears to be like that of *P. longipes*. The leaf margins are crisply undulate, as if crenate.

3. **P. suberosus,** *Wight in Wall. Cat.* 7910; branches very slender and petioles crisply puberulous, leaves 1–2 in. very membranous elliptic acute at both ends, fem. pedicels long capillary, capsule minute. *Muell. Arg. in Linnæa* xxxii. 10, and in *DC. Prodr.* xv. ii. 341. Andrachne fruticosa & Tragia glabrata, *Heyne in Herb. Rottler.*

The DECCAN PENINSULA, *Wight*; Samulcotta, *Heyne.*

Stem very slender, woody, terete; bark at the base corky; branches flexuous, with a leaf at each flexure. *Leaves* almost hyaline, green; nerves 4–6 pair, extremely slender; petiole $\frac{1}{12}$–$\frac{1}{10}$ in.; stipules ovate-subulate. *Pedicels* axillary solitary or from a very short peduncle clothed with subulate bracts, male $\frac{1}{10}$ in., fem. $\frac{3}{4}$–1 in. *Male fl.* $\frac{1}{20}$ in. diam., fem. larger; sepals rounded. *Filaments* united nearly to the top. *Capsule* $\frac{1}{10}$ in. diam., cocci thinly crustaceous.

4. **P. Thwaitesianus,** *Muell. Arg. in DC. Prodr.* xv. ii. 341; quite glabrous, leaves 1–2 in. very shortly petioled membranous elliptic subacute base acute, fem. pedicels capillary, capsule minute. P. Peltandra, *Muell. Arg. l. c.* Peltandra flexuosa, *Thwaites Enum.* 281. P. parvifolia, *Wight Ic.* t. 1892.

CEYLON; at Minnery, not common, *Thwaites*.

Stem shrubby below, much branched above, branches slender angular. *Leaves* bright glaucous-green often marbled with white, very thin; nerves 4–5 pair, extremely slender; petiole $\frac{1}{10}$–$\frac{1}{8}$ in.; stipules subulate. *Pedicels* axillary or from a very short peduncle clothed with ovate fimbriate bracts, male $\frac{1}{8}$ in., fem. $\frac{1}{2}$–$\frac{3}{4}$ in. *Male fl.* $\frac{1}{20}$ in. diam., fem. larger; sepals rounded. *Filaments* united to the middle. *Style-arms* capitellate. *Capsule* $\frac{1}{8}$ in. diam.—I have little doubt but that Wight's *Peltandra parvifolia*, of which he had lost the locality, is from Ceylon, and is the *Phyll. Thwaitesianus*, Muell., in which I find the filaments free from the middle upwards.

Sect. II. KIRGANELIA (see p. 286).

5. **P. reticulatus,** *Poir. Encycl.* v. 298; glabrous pubescent or tomentose, branches smooth or tuberculate, leaves 1–2 in. oblong or elliptic tip rounded obtuse or acute, flowers axillary and subracemose on slender branches, 3 inner filaments connate, ovary globose 5–8-celled, stigmas 3 distant very minute 2-lobed, fruit coriaceous or fleshy 8–16-seeded. *Muell. Arg. in DC. Prodr.* xv. ii. 344; *Brand. For. Fl.* 453; *Beddome Forester's Man.* 190; *Gamble Man. Ind. Timb.* 353. P. microcarpus, *Muell. Arg. in Linnæa* xxxii. 51, and in *DC. l. c.* 343. P. multiflorus, *Willd. Sp. Pl.* iv. 581; *Roxb. Fl. Ind.* iii. 664 (*not of Roxb. Icon.*); *Grah. Cat. Bomb. Pl.* 180; *Wall. Cat.* 7921. P. Kirganelia, *Herb. Ham.* and *Roxb.* P. dalbergioides & myrtifolius, *Wall. Cat.* 7934 and 7940. P. Wightianus, *Wall. Cat.* 7919. P. griseus, *Wall. Cat.* 7918 A (*in part*). P. Prieurianus, *Muell. Arg. in Linnæa* xxxii. 12. P. Chamissonis, *Klotzsch in Nov. Acad. Nat. Cur.* xix. *Suppl.* i. 420. P. sinensis, *Muell. Arg. in Linnæa l. c.* 12. P. puberulus, *Miquel in Herb. Hohenack.* No. 728. P. pentandrus, *Herb. Roxb.* P. virosus, *Wall. Cat.* 7928 D. P. spinescens, *Wall. mss.* Anisonema reticulatum, *A. Juss. Tent. Euphorb.* 19 t. 4, f. 1. A. multiflorum, *Wight Ic.* t. 1899; *Dalz. & Gibs. Bomb. Fl.* 234. A. Zollingeri, *Miquel Fl. Ind. Bat.* i. ii. 375, and *Suppl.* 449. A. dubium, *Blume Bijd.* 589; *Dcne. in Nouv. Ann. Mus.* iii. 481; *Miquel l. c.* 375. A. intermedium & eglandulosum, *Dcne. l. c.* 482; *Miquel l. c.* Kirganelia reticulata, multiflora, intermedia, Wightiana, puberula, dubia, sinensis & eglandulosa, *Baill. Etudes Gen. Euphorb.* 613, 614. K. Prieuriana, *Baill. Rec. Obs.* i. 82. K. multiflora, *Thwaites Enum.* 282. Cicca reticulata, *Kurz For. Fl.* ii. 354. C. decandra, *Blanco Fl. Filipp.* 487. C. microcarpa, *Benth. Fl. Hongk.* 312; *Kurz For. Fl.* ii. 355. Rhamnus zeylanicus, *Burm. Thes. Zeyl.* 198, t. 88.

Throughout TROPICAL INDIA; in the plains from Scind, Behar, Rohilkund, Sikkim and Assam, to Travancore, Malacca, Perak, the Andaman Islands, Burma and CEYLON. —DISTRIB. Tropical Africa, China, and the Malay Islands.

A large often scandent shrub; branchlets slender. *Leaves* thin, sometimes rather stiff, variable in size and form, base rounded acute or subcordate; nerves 6–8 pair, slender; petiole $\frac{1}{12}$–$\frac{1}{8}$ in.; stipules ovate-subulate, entire. *Flowers* male and fem. subequal, about $\frac{1}{16}$ in. diam.; pedicels about $\frac{1}{4}$ in. *Sepals* 5–6, rounded. *Disk-glands* variable. *Ovary* usually much exserted. *Fruit* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., subgranulate. *Fruit* often racemose on the slender leafless branches. *Seeds* irregularly trigonous, testa crustaceous granulate punctulate.—The pubescent state, though the less common one, occurs throughout the range of the species. I can find no characters whereby to distinguish *P. microcarpus* from *reticulatus*; the lenticellate branches occur in both, those with globose and depressed-globose fruits.

Sect. III. FLUEGGEOPSIS (see p. 286).

6. **P. glaucus,** *Wall. Cat.* 7927 A; quite glabrous, leaves 1–1½ in.

shortly petioled membranous elliptic or oblong acute obtuse or apiculate, flowers diœcious axillary pedicelled, pedicel clavate at the tip, sepals of both sexes broadly oblong, berry small globose. *Muell. Arg. in Linnæa* xxxii. 14. P. flueggeiformis, *Muell. Arg. in DC. Prodr.* xv. ii. 349. P. griseus, *Wall. Cat.* 7918 A *in part.*

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich.* Sikkim, *J. D. H., Kurz,* &c. BHOTAN, *Griffith.* KHASIA HILLS, on Shillong, alt. 4–5000 ft., *J. D. H. & T. T., Clarke.*—DISTRIB. China.

A shrub with terete divaricate branches and very slender branchlets. *Leaves* blackish when dry, very thin, subglaucous beneath, base acute; nerves 8–10 pair, very slender; petiole $\frac{1}{12}$–$\frac{1}{10}$ in., very slender; stipules narrow, membranous. *Flowers* $\frac{1}{12}$–$\frac{1}{10}$ in. diam., solitary or fascicled; pedicels $\frac{1}{8}$–$\frac{1}{4}$ in. *Disk* of male 6 globose glands; of fem. a very inconspicuous ring. *Ovary* ovoid; styles exserted, more or less connate at the base. *Fruit* $\frac{1}{4}$–$\frac{1}{2}$ in. diam., usually purple, styles persistent.—This closely resembles *P. reticulatus* in habit, but is easily distinguished by the long simple styles, free stamens, and clavate tip of the fem. pedicel. The Chinese specimens are from the Province of Kiu Kiang (Maries); they have rather longer styles.

Sect. IV. EMBLICA (see p. 286).

7. **P. Emblica,** *Linn. Sp. Pl.* 982; a large tree, branchlets glabrous or finely pubescent, leaves $\frac{1}{3}$–$\frac{1}{2}$ in. distichously close-set subsessile linear-oblong obtuse, flowers densely fascicled along the branchlets males pedicelled, fem. few subsessile, anthers free, stigmas very large twice 2-fid, fruit depressed-globose $\frac{1}{2}$ in. fleshy. *Muell. Arg. in DC. Prodr.* xv. ii. 352; *Roxb. Fl. Ind.* iii. 671; *Wall. Cat.* 7903; *Brand. For. Fl.* 454, t. 52; *Grah. Cat. Bomb. Pl.* 180; *Gamble Man. Ind. Timb.* 351; *Beddome Flor. Sylvat.* t. 258; *Benth. Fl. Hongk.* 312; *Baill. Etudes Gen. Euphorb.* 627, t. 24, f. 20–24; *Lodd. Bot. Cab.* t. 548. ? P. taxifolius, *Don Prodr.* 63. P. glomeratus, *Herb. Roxb.* Emblica officinalis, *Gærtn. Fruct.* ii. 122, t. 108; *Wight Ic.* t. 1896; *Dalz. & Gibs. Bomb. Fl.* 235; *A. Juss. Tent. Euphorb.* 108, t. 5, f. 15. Cicca Emblica, *Kurz For. Fl.* ii. 352. Dichelastina nodicaulis, *Hance in Walp. Ann.* iii. 367.—*Rheede Hort. Mal.* i. t. 38.

Throughout TROPICAL INDIA, wild or planted, from the base of the Himalaya, from Jummoo eastwards, and southwards to CEYLON and MALACCA.—DISTRIB. Malay Islands, China.

A deciduous tree; bark flaking conchoidally; branchlets slender, pubescent. *Leaves* equal and symmetrically set, like the leaflets of a pinnate leaf, glabrous or puberulous beneath; stipules scarious, lacerate. *Flowers* yellow, racemed on the branches. *Sepals* 5–6, obovate-oblong. *Staminal column* short. *Disk* of male obsolete, of fem. a lacerate cup. *Ovary* globose; styles connate at the base; arms recurved, very large, dilated and twice branched. *Fruit* obscurely 6-lobed.

8. **P. albizzioides,** *Hook. f.*; a tree, branchlets puberulous, leaves 1 by $\frac{1}{2}$ in. distichously close-set subsessile oblong or elliptic rarely orbicular glabrous glaucous beneath, flowers minute subracemose, males pedicelled, fem. subsessile, styles 2-cleft lobes broad entire, fruit globose 1 in. diam. fleshy. P. pubescens, *Wall. mss.* Cicca albizzioides, *Kurz For. Fl.* ii. 352.

BURMA; at Prome, *Wallich.* PEGU; up to 2000 ft., *Kurz, Brandis.*

Branches very slender, pubescent. *Leaves* 1 by $\frac{1}{2}$ in. or smaller, rounded at both ends; nerves 7–10 pair, very slender. *Cocci* bony, with a long pungent apex.

9. **P. pomiferus,** *Hook. f.*; a shrub or tree, branchlets pubescent, leaves $\frac{1}{2}$–$\frac{3}{4}$ in. long distichously close-set subsessile narrowly linear coriaceous acute or obtuse glabrous margins subreflexed, flowers subracemose, rachis pubescent,

staminal column slender, styles robust 2-lobed lobes short broad 3-crenulate, fruit 1 in. diam. globose fleshy. Cicca macrocarpa, *Kurz For. Fl.* ii. 352.

Pegu and Prome districts of BURMA, *Kurz*.

I have seen no specimens of this, which with the leaves of *P. Emblica* differs, according to Kurz, in the wrinkled fissured bark, the styles, and large fruit.

10. **P. pectinatus,** *Hook. f.*; branchlets scurfily tomentose, leaves $\frac{1}{3}$ in. distichously close-set linear-oblong obtuse coriaceous incurved when dry with recurved margins nerveless, fruit turbinate $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{3}$–$\frac{1}{2}$ in. P. Emblica, *Wall. Cat.* 7903 G.

PERAK, *King's Collector*; SINGAPORE, *Wallich*; MALACCA, *Griffith* (*Kew Distrib.* 4799), *Maingay* (*Kew Distrib.* 1352).

Very similar to *P. Emblica*, but differing in the scurfy rusty branchlets and form of the fruit.

Sect. V. PARAPHYLLANTHUS (see p. 286).

* *Shrubs or trees.*

11. **P. polyphyllus,** *Willd. Sp. Pl.* xiv. 586; shrubby, quite glabrous, leaves $\frac{1}{2}$–$\frac{2}{3}$ in. sessile linear-oblong obtuse or apiculate, nerves very distinct, flowers pedicelled subsolitary, anthers subsessile on a very short column free, style stout with 3 2-fid arms, fruit small 3-lobed epicarp thin, cocci subglobose crustaceous, seeds remotely foveolate. *Muell. Arg. in DC. Prodr.* xv. ii. 352; *Beddome Forester's Man.* 190 (*excl. some syns.*); *Wight Ic.* t. 1895. P. racemosus & polyphyllus, *Herb. Heyne in Wall. Cat.* 7902. P. emblicoides, *Muell. Arg. in Linnæa* xxxii. 15, and in *DC. l. c.* 353.

DECCAN PENINSULA, *Klein, Heyne*; in subalpine jungles, common towards the eastern slopes of the Nilghiris, *Wight*. CEYLON; common in the north part of the island.

Branches terete, strict. *Leaves* $\frac{1}{8}$–$\frac{1}{6}$ in. broad, base rounded or subcordate, nerves 6–8 pair; stipules ovate-lanceolate, entire. *Male fl.* $\frac{1}{10}$ in. diam; sepals 6, oblong; disk-glands fleshy; anthers not apiculate. *Fem. fl.* twice as large, disk annular. *Fruit* $\frac{1}{5}$ in. diam., depressed. *Seeds* flat on the opposed faces, convex on the other.—There is some confusion about this plant. Wight figures the styles as free and sessile, and the anthers as cohering and crowned with a prolonged connective, none of which characters do I find. Mueller describes the stylar column as slender, with 3 long slender 2-fid arms, and the anthers as shortly apiculate. I find the stylar column long and stout, and the anthers hardly apiculate and quite free. Mueller further cites Nepal as a habitat, and Don's *P. taxifolius* as a synonym, which plant has pubescent branches, and is, I should think, *P. Emblica*. I find no difference between Mueller's *P. emblicoides* and *polyphyllus*. Dalzell's *P. polyphyllus* is no doubt Mueller's *P. Lawii*. Beddome erroneously unites *P. Lawii* with *polyphyllus*.

12. **P. Lawii,** *Grah. Cat. Bomb. Pl.* 181; shrubby, quite glabrous, leaves $\frac{1}{5}$–$\frac{1}{4}$ in. very shortly petioled linear-oblong obtuse or apiculate, nerves very obscure, flowers subsessile, anthers free stipitate, styles 3 very short 2-lobed, fruit small 3-lobed, cocci subglobose crustaceous. *Muell. Arg. in DC. Prodr.* xv. ii. 353. P. spinulosus, *Herb. Heyne, Wall. Cat.* 7897 A. ? P. polyphyllus, *Dalz. & Gibs. Bomb. Fl.* 234. P. juniperinoides, *Muell. Arg. in Linnæa* xxxii. 18, and in *DC. l. c.* 358.

BEHAR; on the banks of the Soane, *J. D. H.* DECCAN PENINSULA, from the Concan and Belgaum to the Wynaad, *Law, Stocks*, &c.

A shrub; branches usually grooved, branchlets sometimes faintly puberulous. *Leaves* half as broad as long or narrower, base rounded or cordate; stipules minute, setaceous. *Male and fem. fl.* $\frac{1}{10}$–$\frac{1}{8}$ in. diam.; sepals 6, oblong, obtuse or subacute.

Seeds not seen.—Mueller describes the styles of *P. Lawii* as connate for nearly ⅓ their length, but they are free, very short, with very short thick lobes, as he has correctly described them under *P. juniperinoides*.

13. **P. hakgalensis,** *Thwaites mss. in Trimen Syst. Cat. Plant. Ceyl.* 80; shrubby, quite glabrous, leaves ½–¾ in. sessile oblanceolate or linear-oblong acute coriaceous nerves very obscure, pedicels capillary longer than the leaves, flowers axillary solitary males ¼ fem. ½ in. diam., anthers free broadly oblong obtuse column slender, styles spreading cleft to the middle, capsule globose smooth enclosed in the enlarged sepals.

CEYLON; at Hakgalle, *Thwaites*.

Branches terete, woody, scarred. *Leaves* scattered round the branches, close set. *Sepals* of both sexes broadly oblong, membranous. *Disk* of male of 6 rounded glands, of fem. a thick cushion. *Capsule* ¼–⅓ in. diam.—I have seen only one small specimen.

14. **P. nemorum,** *Russell in Wall. Cat.* 7897 B; shrubby, quite glabrous, leaves ¼ in. sessile linear-oblong apiculate nerves distinct, flowers axillary solitary shortly pedicelled, staminal column equalling the connate obtuse anthers, styles long slender connate at the base with capitate notched tips. *Muell. Arg. in Linnæa* xxxiv. 70, and in *DC. Prodr.* xv. ii. 358.

The DECCAN? *Kœnig, in Herb. Russell.*

Branches terete, leafy branchlets 2 in., very slender, horizontal. *Leaves* ⅛ in. broad, coriaceous, brown when dry, nerves 5–6 pair; stipules subulate. *Male fl.* 1/12 in. diam.; pedicels capillary, about equalling the sepals; sepals oblong; fem. fl. ⅛ in. diam., pedicel stouter, shorter than the narrower sepals; disk annular. *Ovary* globose, glabrous, shorter than the erect recurved styles.—The styles are very peculiar. Wallich's specimen is a solitary one, without fruit. On the back of the sheet is written, "Phyllanthus nemorum, fruticosus foliis bifariis simpliciter pinnatis, pinnis linearibus, fructu baccato exsucco tricocco parvo, ex spec. Kœn."

15. **P. bœobotryoides,** *Wall. Cat.* 7942; shrubby, quite glabrous, leaves 2–4 in. sessile ovate- or oblong-lanceolate acute acuminate or caudate, flowers in slender axillary spikes or racemes, sepals of male 5–6 orbicular of fem. oblong-lanceolate obtuse, anthers erect large acute free terminating the staminal column, stylar column long straight. *Muell. Arg. in Linnæa* xxxii. 15, and in *DC. Prodr.* xv. ii. 354; *Kurz For. Fl.* ii. 348.

SILHET, *Wallich, Griffith.* TENASSERIM, *Helfer.*

Branches woody, terete; branchlets long, slender, compressed and angled. *Leaves* thinly coriaceous, brown when dry, shining above; nerves 6–8 pairs, slender; petiole minute or 0; stipules minute. *Racemes* or spikes solitary or 2-nate, very slender, shorter than the leaves; bracts minute; flowers solitary or clustered; males shortly pedicelled, 1/16 in. diam., with spreading sepals, and disk of 5–6 glands; fem. larger, with erect narrower sepals and an obscure disk. *Anthers* as long as or longer than the column of filaments, lanceolate; connective produced, acute. *Stylar column* as long as the ovary, longer than the 2-partite recurved lobes which are linear-clavellate. *Fruit* not seen, but described by Kurz as a more or less woody capsule.

16. **P. columnaris,** *Muell. Arg. in Linnæa* xxxii. 15, and in *DC. Prodr.* xv. ii. 334; a tree, branchlets finely tomentose, leaves 1–2 in. elliptic or oblong obtuse or apiculate, flowers densely clustered in leafless terminal racemes, sepals of male oblong glabrous of fem. ovate tomentose, anthers minute obtuse terminating a very long slender column, stylar column short. *Kurz For. Fl.* ii. 347. P. tetrandrus, *Roxb.* ?, *Wall. Cat.* 7930.

PEGU to TENASSERIM, *Wallich, Griffith, Helfer.*

A deciduous tree, 20–25 ft.; branchlets long, slender, terete. *Leaves* thin, dull brown when dry, glaucous and puberulous beneath and rarely above, base rounded; nerves 5–7 pairs, slender; petiole $\frac{1}{12}$ in.; stipules minute. *Racemes* (leafless tips of branches) 6–8 in., erect; male fl. $\frac{1}{24}$ in. diam. on capillary pedicels, with spreading sepals and minute disk-glands; fem. larger, shortly stoutly pedicelled, with short broad erect sepals, and an urceolate disk. *Staminal column* far exserted; anther-cells short, separate, closely adnate to the top of the column, surrounding a minute 3-lobed pistillode. *Ovary* glabrous. *Capsule* $\frac{1}{4}$ in. diam., depressed, black.

17. **P. frondosus,** *Wall. Cat.* 7932; shrubby, glabrous or branchlets puberulous, leaves $1\frac{1}{2}$–2 in. subsessile oblong or ovate-oblong acute or acuminate, flowers in minute axillary clusters very shortly pedicelled glabrous, anthers erect acute free terminating a very short column, styles free sessile 2-partite segments linear. *Muell. Arg. in Linnæa* xxxii. 17. Glochidion frondosus, *Baill. Etudes Gen. Euphorb.* 637. ? P. oxyphyllus, *Miquel Fl. Ind. Bat. Suppl.* 448; *Muell. Arg. in DC. Prodr.* xv. ii. 356. P. acutus, *Wall. Cat.* 7931, 7945.

PENANG, *Wallich, Curtis.* PERAK, *King's Collector.*—DISTRIB. ? Sumatra.

A shrub, 4–6 ft. in Perak; branches woody, with pale bark; branchlets long, slender, erect, tips angular. *Leaves* membranous, variable in size, dark brown above when dry, paler beneath, base cuneate rounded or subcordate; nerves 5–9 pairs; stipules minute. *Flowers* $\frac{1}{20}$ in. diam.; pedicel not longer than the perianth. *Sepals* of both sexes broadly oblong. *Connectives* produced, acute. *Disk* of male of minute glands. *Ovary* globose, glabrous, styles reflexed on its crown. *Fruit* not seen.—In the absence of flowering specimens of *P. oxyphyllus*, Miq., I hesitate to unite it with this. The leaves of *oxyphyllus* are larger, 2–3 in. long, with more nerves, but this alone would not separate it specifically.

18. **P. Kunstleri,** *Hook. f.*; branchlets very slender angular puberulous, leaves 2–$2\frac{1}{2}$ in. subsessile ovate-lanceolate acuminate, flowers sessile in minute axillary clusters glabrous, anthers erect subsessile, ovary tomentose, styles 3 cleft to the middle arms diverging.

PENANG; alt. 800–1000 ft., *King's Collector* (*Kunstler*).

A bushy tree, 20 ft. *Leaves* membranous, base rounded, nerves 8–10 pairs very faint; stipules minute. *Flowers* $\frac{1}{30}$ in. diam. *Sepals* of both sexes oblong. *Connectives* not produced. *Disk-glands* of male 2-lobed. *Styles* erect and spreading.

19. **P. coriaceus,** *Wall. Cat.* 7946; quite glabrous, leaves 3 in. subsessile elliptic-oblong acute coriaceous, male flowers minute in axillary clusters glabrous, anthers erect subsessile, stylar column elongate, 3 arms reflexed. P. pachyphyllus, *Muell. Arg. in DC. Prodr.* xv. ii. 353.

SINGAPORE, *Wallich.*

Shrubby. *Leaves* unequal-sided with broadly rounded often decurved points, base contracted and very narrowly cordate, dark brown when dry and opaque, nerves 6–8 pairs, slender, cross-nervules indistinct; petiole $\frac{1}{10}$ in. *Sepals* ovate, obtuse. *Flowers* $\frac{1}{6}$ in. diam.; outer sepals oblong, inner more ovate. *Stamens* lanceolate, filaments very short. *Disk-glands* of male 2, crenate. *Ovary* globose; style columnar.—The specimens are very insufficient.

** *Herbs.*

20. **P. maderaspatensis,** *Linn. Sp. Pl.* 982; quite glabrous, leaves scattered $\frac{1}{4}$–1 in. subsessile narrowly or broadly cuneately obovate glaucous beneath, stipules peltate, flowers axillary males very minute subsessile fem. very shortly pedicelled, sepals broad green with white margins, styles free minute 2-lobed, seeds striated in rough lines. *Muell. Arg. in Linnæa* xxxii. 19, and in *DC. Prodr.* xv. ii. 362; *Roxb. Fl. Ind.* iii.

654; *Wight Ic.* t. 1895, f. 3; *Grah. Cat. Bomb. Pl.* 180; *Dalz. & Gibs. Bomb. Fl.* 233; *Benth. Fl. Hongk.* 311, and *Fl. Austral.* vi. 103. P. andrachnoides, *Willd. Sp. Pl.* iv. 575. P. obcordatus, *Willd. Enum. Hort. Berol. Suppl.* 65; *Roxb. Fl. Ind.* iii. 656; *Wall. Cat.* 7906. P. javanicus, *Poir.*; *Spreng. Syst.* iii. 21. P. anceps, *Herb. Heyne.* P. linearis, *Herb. Madr.* P. malabaricus, *Herb. Wight.* P. Niruri, *Wall. Cat.* 7894.

Drier parts of INDIA; from BANDA, *Edgeworth*, throughout the DECCAN PENINSULA to CEYLON.—DISTRIB. Trop. Africa, Arabia, Java, China, Australia.

Very variable in habit, erect or decumbent below; stems low and herbaceous or erect, slender, woody with spreading branches and sometimes? a woody perennial stock. *Leaves* from $\frac{1}{2}$ in. and cuneate or almost obcordate to $1\frac{1}{2}$ in., and narrowly oblong-cuneate; nerves few, slanting; petiole minute; stipules lanceolate membranous. *Male fl.* $\frac{1}{20}$ in. diam., usually fascicled with one much larger fem.; *fem.* $\frac{1}{10}$ in. diam. in fruit. *Sepals* rounded or obcuneate. *Disk* of glands in both sexes. *Anthers* almost sessile on the column, erect, apiculate. *Fruit* dry, $\frac{1}{6}$ in. diam., globose.—Mueller distinguishes four varieties by the size and form of the leaves, but they pass into one another. Roxburgh describes his *obcordatus* as suffruticose; it is a tall slender form with woody stems and long branches.

21. **P. Rheedii,** *Wight Ic.* t. 1895, f. 1; annual, quite glabrous, leaves 1–$1\frac{1}{4}$ in. subsessile elliptic or subovate apiculate, stipules not peltate, flowers axillary males very minute fem. larger longer pedicelled, sepals oblong green with narrow white margins, filaments free above, styles short 2-partite, seeds remotely striated. *Muell. Arg. in DC. Prodr.* xv. ii. 363. P. flaccidus, *Thwaites Enum.* 283.

NILGHIRI HILLS, *Wight*; alt. 6000 ft., *Clarke.* CEYLON; in the Central Province, alt. 4–7000 ft.

Diffusely branched from the base and above, $\frac{1}{2}$–3 ft. high; branches terete. *Leaves* membranous, dark brown when dry, not glaucous beneath, nerves very faint; petiole $\frac{1}{16}$ in.; stipules lanceolate. *Flowers* a few males on short capillary pedicels, and one fem. on a longer stouter pedicel, the latter in fruit $\frac{1}{3}$ in. diam. *Sepals* oblong. *Disk-glands* of male large, lobulate; of fem. linear, quite distinct. *Filaments* free above and spreading; anthers globose, not apiculate. *Styles* slender. *Capsule* $\frac{1}{8}$ in. diam., globose, hardly 3-lobed, almost membranous. *Seeds* with rather distant longitudinal very slender ridges and minute cross-lines.—Wight's figure is not accurate, nor does it accord with his specimens; the filaments are quite free, and diverge above; the fem. disk is not cupular, as figured by him and described by Mueller, but of linear glands; and the fem. pedicel is much too long. Wight suggests this being Rheede's *Niruri*, which Mueller rightly doubts. Rheede is not likely to have had a Nilghiri or Ceylon plant.

22. **P. urinaria,** *Linn. Sp. Pl.* 982; annual, rarely perennial, glabrous or nearly so, stem and branches angled, leaves $\frac{1}{6}$–$\frac{2}{3}$ in. sessile distichously imbricate oblong or linear-oblong tip rounded or apiculate, stipules peltate, flowers very minute axillary subsessile, sepals ciliolate, filaments very short free, ovary densely granulate, styles short free 2-fid, fruit echinate, seeds transversely furrowed. *Muell. Arg. in Linnæa* xxxii. 19, and in *DC. Prodr.* xv. ii. 364; *Roxb. Fl. Ind.* iii. 660; *Wall. Cat.* 7893; *Grah. Cat. Bomb. Pl.* 180; *Benth. Fl. Hongk.* 310, and *Fl. Austral.* vi. 102. P. leprocarpus, *Wight Ic.* t. 1895, f. 4. P. alatus, *Blume Bijd.* 594. P. cantoniensis, *Hornem. Hort. Haffn.* 910. P. mucronatus & racemosus, *Herb. Heyne.* P. muricatus & P. polyphyllus, *Herb. Madr.* P. echinatus, *Herb. Ham.*—*Rheede Hort. Mal.* x. 16.

Throughout INDIA; from the PANJAB to ASSAM, BURMA, MALACCA, PENANG. and CEYLON.—DISTRIB. Tropics generally.

A low or tall diffusely branched erect or decumbent herb (becoming perennial in some soils, *Roxb.*) ; branches at the angles and often the margins of the leaves and sepals minutely hispid. *Leaves* very variable in size, glaucous beneath; stipular lanceolate. *Flowers* $\frac{1}{20}$ in. diam., or the males smaller, very shortly pedicelled; fem. perianth in fruit $\frac{1}{12}$ in. diam. *Sepals* green, of the males orbicular; fem. oblong. *Disk* of male of glands; of female narrow, entire, lobed. *Filaments* very shortly united, anthers erect, didymous not apiculate. *Styles* with hooked arms. *Fruit* $\frac{1}{10}$ in. diam., echinate.—Wight represents the filaments as wholly connate and the anthers as erect, apiculate, which I do not find to be so.

Var. *Hookeri;* taller and larger in all its parts, 1–1½ ft. high, stem terete with simple long erect angled branches, filaments wholly connate. P. Hookeri, *Muell. Arg. in Linnæa l. c.*, and in *DC. l. c.* 366.—Khasia Mts., alt. 2–4000 ft., *Griffith* (*Kew Distrib.* 4805), *J. D. H. & T. T.*

Sect. VI. EUPHYLLANTHUS (see p. 286).

* Stipules semisagittate or peltate.

23. **P. Griffithii,** *Muell. Arg. in Linnæa* xxxii. 27, and in *DC. Prodr.* xv. ii. 384; shrubby, quite glabrous, leaves scattered $\frac{3}{4}$–$\frac{1}{2}$ in. subsessile elliptic or oblong acute or obtuse glaucous beneath, stipules peltate lacerate, flowers long pedicelled axillary, filaments free or united in a long or short column, anthers globose, styles very long connate to the middle arms long very slender recurved, seeds smooth.

KHASIA HILLS; at Mamloo, *Griffith, Clarke,* &c. (*Kew Distrib.* 4822). MUNNIPORE, *Watt.*

Much branched, branches woody angled. *Leaves* hardly distichously imbricating towards the tops of the branches, rather coriaceous, base acute, nerves 6–8 pair, distinct beneath. *Male fl.* $\frac{1}{16}$ in. diam., pedicels capillary, sepals rounded; fem. larger, pedicels ½ in., sepals oblong reflexed in fruit. *Disk* of male of small glands, of fem. annular lobed. *Stamens* recurved; anthers globose. *Ovary* globose; styles 3 times as long, arms capillary recurved. *Capsule* $\frac{1}{8}$ in. diam., depressed globose, obscurely lobed, smooth.—There is some error in Mueller's description. The plant is not dicœcious, and the fem. pedicels are shorter than the leaves. The anthers when upon a very elongate staminal column are, I think, imperfect.

24. **P. parvifolius,** *Ham. in Don Prodr.* 63; shrubby, nearly glabrous, branches very slender, leaves $\frac{1}{4}$–$\frac{1}{3}$ in. distichously imbricate sessile elliptic or subcuneately obovate tip rounded glaucous beneath, stipules hastate, flowers minute subsolitary axillary very shortly pedicelled, filaments free, styles sessile short 2-partite arms slender, seeds smooth. *Muell. Arg. in DC. Prodr.* xv. ii. 385. P. juniperinus, *Wall. Cat.* 7901; *Muell. in Linnæa* xxxii. 28. P. prætervisus, *Muell. Arg. in Linnæa,* and in *DC. ll. c.*

TEMPERATE HIMALAYA; from Jamu and Kumaon, alt. 5–6000 ft., to Bhotan. KHASIA MTS., alt. 4–5000 ft., *Griffith,* &c.

A shrub, 6–8 ft., bark pale; ultimate branchlets capillary, short. *Leaves* membranous; nerves 3–4 pair, very faint; stipules very minute, subulate. *Male fl.* $\frac{1}{30}$ in. diam., pedicels rather longer; sepals rounded; fem. twice as large, subsessile or longer pedicelled, sepals oblong. *Disk* of male of glands; of fem. annular, crenate. *Filaments* short, spreading; anthers didymous. *Ovary* globose, styles variable in length. *Capsule* $\frac{1}{8}$ in. diam., globose, obscurely lobed, crustaceous, smooth. *Seeds* minutely mottled with brown.—Wallich's 7901 A is from the Calcutta Garden, and accords with those from the habitats cited above, but his B from Nepal has longer acicular stipules on the branchlets.

25. **P. Roeperianus,** *Wall. Cat.* 7904; a rigid shrub, branches

ribbed erect, leaves $\frac{1}{4}$–$\frac{2}{3}$ in. shortly petioled coriaceous elliptic linear- or obovate-oblong obtuse or acute margins recurved, stipules broad peltate, male fl. shortly fem. longer-pedicelled, filaments connate to the middle, anthers didymous, disk of fem. broad 6-lobed, styles reflexed 2-partite, capsule minute, seeds rugulose. *Muell. Arg. in Linnæa* xxxii. 28, and in *DC. Prodr.* xv. ii. 385.

KHASIA MTS., alt. 5–6000 ft., *Wallich*, &c. MUNNIPORE, *Watt.*

A small shrub, with erect leafy densely fascicled rigid woody branches, and slender grooved branchlets. *Leaves* dense, suberect, glaucous beneath, pale greenish when dry; base cordate or rounded; nerves 5–6 pair, faint beneath; petiole $\frac{1}{16}$ in., stout; stipules membranous. *Flowers* from tufts of fimbriate bracts, males $\frac{1}{40}$ in. diam., on very short pedicels; fem. $\frac{1}{20}$ in., fruiting $\frac{1}{12}$ in. diam., spreading. *Sepals* 5 or 6, broadly oblong. *Disk* of male of glands; of fem. broad, expanded, lobes broad emarginate. *Style-arms* slender, straight. *Capsule* $\frac{1}{12}$–$\frac{1}{8}$ in. diam., depressed globose, crustaceous, faintly 3-lobed. *Seeds* transversely rugulose on the back, striated in a radiating manner on the sides.—I find no means of distinguishing Mueller's var. *genuinus* and *parvifolius*.

26. **P. simplex,** *Retz. Obs.* v. 29; annual or suffruticose, quite glabrous, branches compressed, leaves distichous $\frac{1}{3}$–1 in. subsessile from linear to oblong-obovate elliptic and rounded obtuse acute or apiculate, stipules peltate subsagittate, fem. flowers on short or long pedicels, filaments free, anthers didymous, ovary smooth or pubescent granular, styles short free reflexed arms recurved, capsule minute smooth or sparsely echinate, seeds minutely tubercled. *Muell. Arg. in DC. Prodr.* xv. ii. 391.

Throughout INDIA, in the plains and low hills from Kumaon to Assam and southward to TRAVANCOR, MALACCA and CEYLON, ascending the hills to 6000 ft.—DISTRIB. Malay Islands, China, Mongolia, Pacific Islands.

Stem either woody below with strict erect slender flattened leafy branches, or erect with spreading branches, and 3 ft. high; or a low dwarf bush with fascicled terete branches and compressed branchlets. *Leaves* sometimes distichously imbricating towards the ends of the branchlets, rather coriaceous and glaucous beneath; petiole minute or 0; stipules very variable, entire or toothed or fimbriate. *Flowers* often 3-nate 2 males and 1 female, or more frequently the females solitary in the upper axils; males very minute, $\frac{1}{30}$ in. diam., pedicel capillary $\frac{1}{12}$–$\frac{1}{10}$ in.; fem. on much longer stouter pedicels shorter or longer than the leaves. *Sepals* broadly oblong, fem. slightly enlarged in fruit. *Disk* of male of large rounded glands, of fem. annular. *Styles* variable in length. *Capsule* $\frac{1}{12}$–$\frac{1}{10}$ in. diam.; depressed globose, smooth, crustaceous. *Seeds* $\frac{1}{24}$ in. long, covered loosely with minute tubercles in irregular lines.—A most variable plant, of which Mueller has established four Indian varieties, differing greatly in their extreme forms, but connected by innumerable intermediates. To these I add, as a fifth, his *P. Miquelianus*.

P. SIMPLEX PROPER; stems many from a woody stock erect or ascending curved or strict flattened, leaves usually narrow and long sometimes 1¼ in., fem. pedicels shorter than the leaves. P. simplex, *Roxb. Fl. Ind.* iii. 654; *Wall. Cat.* 7898 (*excl. part of* D); *Dalz. & Gibs. Bomb. Fl.* 234. P. anceps, *Heyne in Vahl Symb.* ii. 95. P. virgatus, *Herb. Madr.* P. depressus, *Herb. Russell.* P. simplex, *var.* genuinus, *Muell. l. c.*

VAR. *oblongifolia, Muell. Arg. in Linnæa* xxxii. 32, and in *DC. l.c.*; stem erect diffusely branched, leaves $\frac{1}{2}$–$\frac{3}{4}$ in. long elliptic-oblong subacute, fem. pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. Macraea oblongifolia, *Wight Ic.* t. 1902, f. 1. ? Melanthesa rupestris, *Miquel Fl. Ind. Bat.* i. ii. 371.—Deccan Peninsula and Ceylon.—I can hardly distinguish this from var. *Gardneriana*. I have seen no specimens of Miquel's *Melanthesa rupestris*.

Var. *Gardneriana, Muell. Arg. in Linnæa l. c.*, and in *DC. l. c.* 392; usually glabrous, branches very long and slender from a short stock, branchlets angular hardly compressed, leaves from linear to broadly oblong, male fl. often fascicled, styles slender, capsule smooth. P. Gardneri, *Thwaites Enum.* 282. P. Gardnerianus, *Baill. Etudes*

Gen. Euphorb. 628. P. Miquelianus, *Muell. Arg. ll. c.* P. fruticosus, *Herb. Heyne, Wall. Cat.* 7899 A. P. debilis, *Wight mss.* P. marginatus, *Herb. Heyne.* P. depressus, *Herb. Russell.* P. patens, *Miquel in Herb. Hohenack.* No. 1130. Macraea Gardneriana & ovalifolia, *Wight Ic.* t. 1902, f. 3 and 4.—The Deccan Peninsula and Ceylon, on the hills, alt. 3–6000 ft.—This is perhaps a different species; it is a taller, larger, more branched plant with longer hardly compressed branches, usually fascicled flowers and longer fem. pedicels and style-arms. It seems to be a hill plant.

Var. *pubescens*; characters of var. *Gardneriana*, but whole plant more or less pubescent.—Ceylon, on the hills.

27. **P. Macraei,** *Muell. Arg. in Linnæa* xxxii. 29, and in *DC. Prodr.* xv. ii. 393; shrubby, quite glabrous, leaves 1–1½ in. subsessile broadly elliptic or oblong apiculate rounded at both ends, stipules subsagittate peltate, male fl. clustered shortly pedicelled, fem. pedicels equalling the leaves, filaments free, anthers didymous, ovary pubescent, styles free reflexed, seeds minutely tubercled on the back. Macraea Rheedii, *Wight Ic.* t. 1901.

Travancore; Pulney Mts., *Wight.*

I have seen no specimens of this, which may be a large-leaved form of *P. simplex.*

** Stipules simple, not peltately attached or semisagittate.

† *Shrubs.*

28. **P. myrtifolius,** *Moon Cat. Ceyl. Pl.* 65; a rigid shrub, branchlets suberect tips puberulous, leaves ⅓–½ in. shortly petioled coriaceous linear-oblong or oblanceolate-oblong obtuse or acute base narrowed cordate, stipules minute broad, pedicels slender fem. often equalling the leaves, filaments connate to the middle, anthers didymous, styles short reflexed arms recurved, capsule small, seeds minutely reticulate on the back. *Muell. Arg. in DC. Prodr.* xv. ii. 396; *Baill. Etudes Gen. Euphorb.* 628; *Thwaites Enum.* 283. Macraea myrtifolia, *Wight Ic.* t. 1902, f. 2.

Ceylon; on banks of rivers up to 1800 ft.

A small shrub, with the habit of *P. Roeperianus*, but the branchlets are puberulous and terete, the leaves narrower, not glaucous beneath, with the margins not or hardly recurved, the very faint nerves are nearly horizontal, and the stipules minute. *Flowers* 1/10–1/12 in. diam., often clustered; pedicels capillary, of both sexes very unequal in length, sometimes equalling the leaves. *Sepals* broadly oblong, thick; of fem. slightly enlarged in fruit and spreading. *Disk* of male of very large tubercled glands; of fem. an almost entire cup. *Capsule* depressed-globose, slightly 3-lobed, crustaceous. *Seeds* beautifully reticulated.

29. **P. Leschenaultii,** *Muell. Arg. in Linnæa* xxxii. 37, and in *DC. Prodr.* xv. ii. 398; shrubby, very slender, quite glabrous, leaves 1 in. petioled membranous elliptic-oblong obtuse base acute, nerves 6–8 pair distinct, pedicels much shorter than the leaves, filaments free, anthers didymous, styles short reflexed arms recurved, capsule minute, seeds ribbed.

Khasia Mts.; at Kullung Rock, alt. 5000 ft., *J. D. H. & T. T.* (*Phyllanth.* 22, *Herb. I. O., Hf. & T.*). Nilghiri Hills, *Perrottet, Foulkes.*

A shrub, 6–8 ft. *Leaves* very thin, dull green above when dry, glaucous beneath, nerves distinct on both surfaces; petiole 1/12–1/10 in., very slender; stipules lanceolate. *Male fl.* often 3-nate, very shortly pedicelled, 1/40 in. diam.; sepals oblong; disk-glands large. *Fem. fl.* 1/10 in.; pedicel ¼ in.; sepals slightly enlarged but not reflexed in fruit; styles short, reflexed, arms recurved. *Capsule* 1/12 in. globose, smooth, coriaceous. *Seeds* with distant very slender ribs.—Mueller describes the filaments as

connate for ½ to ⅔ their length; I find them free, but in dried flowers of such excessive minuteness it is impossible to be precise. Mueller gives Khasia, 2–5000 ft., as the habitat of my specimens, but I suspect some mistake as to the 2000, for I found it only at Kullung Rock; it was perhaps confounded with the following in the distribution.

30. **P. missionis,** *Hook. f.*; shrubby, quite glabrous, branches very slender, leaves ¼–½ in. petioled very membranous elliptic acute at both ends or obovate obtuse or apiculate, stipules ovate oblong obtuse, flowers clustered or the fem. solitary pedicelled, sepals broad with broad white margins, filaments united ¾ way up recurved, anthers reniform, styles erect and recurved arms slender, capsule very small. P. tenellus, *Wall. Cat.* 7892 A and B *in part.*

DECCAN PENINSULA, *Heyne in Herb. Wallich.*

Stem strict, erect, terete, slender, stiff, leafy, branches ascending. *Leaves* ¼ in. broad, very thin, hardly glaucous beneath; nerves 4–5 pair, spreading; petiole slender, 1/20–1/16 in.; stipules brown when dry, inserted by a broad base. *Flowers* 1/20–1/12 in. diam., males on unequal pedicels 1/16–⅛ in., of fem. ¼ in., fruiting ⅛ in. diam., spreading; sepals thin, obtuse. *Disk* of male of large entire peltate glands, of fem. broadly lobed; anthers dehiscing across the top. *Styles* connate at the very base. *Capsule* ⅛ in. diam., smooth, depressed globose, obscurely lobed. *Seeds* not seen.—A very distinct species in the obtuse stipules, clustered flowers and longer styles not reflexed on the ovary, but rising up.

31. **P. Clarkei,** *Hook. f.*; shrubby, branches woody, branchlets scaberulous, leaves ⅓–⅔ in. petioled firm cuneate obovate or obcordate tip rounded or retuse, nerves distinct, stipules membranous fimbriate, flowers subsolitary, pedicels of male short of fem. almost equalling the leaves, filaments very short recurved, anthers didymous cells separate, styles free reflexed, arms incurved.

SIKKIM HIMALAYA, *J. D. H.*; at Catsuperri, alt. 6000 ft., *Clarke.* UPPER ASSAM, *Griffith* (*Kew Distrib.* 4801).

A rigid shrub; branches spreading; branchlets grooved, stiff, angles rough. *Leaves* green when dry, paler beneath; nerves 3–4 pair, slender; petiole slender, 1/16 in. *Flowers* arising from minute clusters of bracts, 1/16 in. diam.; pedicels of male 1/10 in. and upwards, of fem. ¼–⅓ in. *Sepals* broadly oblong, rather thick. *Disk* of male of peltate entire glands, of fem. cupular obscurely lobed. *Ovary* globose; styles rather large, arms cylindric long but not slender.—Very distinct from all others. I found a similar species in Sikkim, but with sessile exactly elliptic leaves, but out of flower and fruit; Griffith has also, in bad state, what I take to be my Sikkim plant from Upper Assam and the Khasia Mts.

32. **P. brevipes,** *Hook. f.*; shrubby, quite glabrous, branches rigid leaves ⅓–⅔ in. petioled elliptic or obovate-oblong subacute or obtuse, nerves distinct, stipules membranous fimbriate, flowers very shortly pedicelled from tufts of fimbriate bracts, filaments connate at the base, anthers didymous, styles minute reflexed 2-lobed, capsule minute, seeds striated.

UPPER ASSAM; Mishmi Hills, *Griffith* (*Anisonema, Kew Distrib.* 4821).

A scraggy shrub, *Griff.*; branches spreading, bark brown, rather densely leafy. *Leaves* pale grey green when dry, hardly paler beneath, thinly coriaceous, base acute, nerves distinct on both surfaces; petiole 1/10 in.; stipules broadly ovate. *Flowers* in all the axils, usually solitary or a male and female together, 1/16 in. diam.; pedicels of male about as long, of fem. rather longer. *Sepals* of male broadly obovate, of fem. narrower, not enlarged, nor reflexed in fruit. *Disk* of male of orbicular glands, of fem. deeply broadly 6-lobed. *Capsule* 1/14 in. diam., depressed-globose, 3-lobed, quite smooth. *Seeds* with 5 dorsal striæ, each of a series of hardly raised minute transverse dots.

†† *Herbs.*

33. **P. pendulus,** *Roxb. Fl. Ind.* iii. 663; biennial, suffruticose, erect, quite glabrous, branchlets filiform very long drooping, leaves ⅓ in. distichous subsessile narrowly elliptic-lanceolate acute, flowers axillary very shortly pedicelled springing from short peduncles clothed with decussately imbricating entire bracts, anthers 3, filaments united above the middle, styles reflexed arms recurved.

BENGAL; very rare, *Roxburgh.*

Stem 2–3 ft., branches twiggy. *Leaves* with red margins. Bracteate *peduncles* when fully grown half as long as the leaves; bracts white, acute, membranous. *Sepals* broadly ovate, acute, of female hardly enlarged and not reflexed in fruit. *Disk* of male broad, 6-lobed, of fem. crenate. *Capsule* $\frac{1}{10}$ in. depressed globose.—A remarkable plant, described from Roxburgh's Flora and his drawing at Kew. He states that the flowers are altogether like those of *P. Niruri,* but his figure of the sepals is very different, as are the anthers. Mueller, probably by an oversight, says he has seen specimens.

34. **P. Niruri,** *Linn. Sp. Pl.* 981; annual, quite glabrous, leaves $\frac{1}{4}$–$\frac{3}{4}$ in. membranous subsessile elliptic-obovate oblong or linear tip rounded obtuse or acute, nerves few obscure, flowers minute shortly pedicelled, sepals 5–6, of male orbicular, anthers 3 sessile on a short column didymous, styles minute very short free 2-lobed, capsule minute, seeds with equal slender ribs and transverse striæ. *Muell. Arg. in Linnæa* xxxii. 43, and in *DC. Prodr.* xv. ii. 406; *Roxb. Fl. Ind.* iii. 659; *Grah. Cat. Bomb. Pl.* 180; *Dalz. & Gibs. Bomb. Fl.* 234; *Thwaites Enum.* 282; *Wall. Cat.* 7895 (*excl. part of* A); *Wight Ic.* t. 1894. P. urinaria, *Herb. Russ.* P. Lonphali, *Herb. Madr.* P. polyphyllus, *Herb. Wight.* Nymphanthus Niruri, *Lour. Fl. Coch.* 545.—*Burm. Fl. Zeyl.* t. 93.—*Rheede Hort. Mal.* x. t. 15.

Throughout the hotter parts of India; from the PANJAB to ASSAM, and southward to TRAVANCOR, MALACCA and CEYLON, ascending the hills to 3000 ft.—DISTRIB. Tropics generally, except Australia.

A weed, 6–18 in. high, branched from the base, with an erect stem naked below, and slender leafy angular branches above. *Leaves* variable, pale green, often distichously imbricating, glaucous beneath; petiole minute; stipules subulate. *Flowers* very numerous, males solitary and 2-nate $\frac{1}{40}$ in. diam., almost sessile; fem. $\frac{1}{18}$ in. diam. *Sepals* of male orbicular, of fem. narrowly obovate-oblong with broad white margins, not enlarged in fruit, spreading, not reflexed. *Disk* of male of minute glands; of fem. annular, lobed. *Capsule* $\frac{1}{16}$–$\frac{1}{12}$ in. diam., depressed-globose, smooth, hardly lobed, thinly crustaceous. *Seeds* with equal parallel slender ribs and faint cross striæ. —As Mueller observes, Thomson's specimens (from Moradabad) have hirtellous tips of the branchlets; this is just as in *P. urinaria* and *scabrifolius.*

35. **P. nanus,** *Hook. f.*; annual, quite glabrous, stems rigid short prostrate or ascending, leaves $\frac{1}{8}$ in. petioled oblong obtuse, nerves obscure, flowers very minute shortly pedicelled, sepals ovate-oblong outer acute, anthers sessile on a short column didymous, styles minute free reflexed very short, capsules minute, seeds with strong parallel and transverse ribs.

BURMA; at Tsegau, *Griffith.*

Root stout, tortuous, woody. *Stem* or branches 4–8 in., with spreading and recurved leafy slender branchlets. *Leaves* the smallest of Indian species, rather coriaceous, base rounded; nerves 3–4 pair, obscure; petiole minute; stipules minute, subulate. *Flowers* very minute; males $\frac{1}{80}$ in. diam., fem. $\frac{1}{60}$ with a thickened pedicel about as long, in fruit $\frac{1}{24}$ in. diam., and not reflexed. *Sepals* 5–6, coriaceous, with pale margins. *Disk* in both sexes of glands; glands of male pedicelled; of fem. larger, erect. *Styles* thick, 2-lobed. *Capsule* $\frac{1}{16}$ in. diam., globose, smooth, crustaceous.

Seeds much more strongly ribbed than in its allies.—This resembles a minute rigid branched *Niruri*, and has similar styles, but is smaller in all its parts with differently ribbed seeds.

36. **P. debilis,** *Herb. Ham.*; annual, quite glabrous, leaves $\frac{1}{2}$–$\frac{3}{4}$ in. very membranous elliptic or obovate obtuse or acute, nerves 4–5 pair very obscure, pedicels much shorter than the leaves, sepals with broad membranous margins, filaments very short free, anthers didymous, styles short reflexed arms recurved, capsule minute, seeds ribbed. P. tenellus, *Wall. Cat.* 7892 G.

NORTH-WEST INDIA, *Royle.* SIKKIM and BHOTAN HIMALAYA, alt. 1–3000 *ft.*, *Griffith*, &c. BEHAR and Hazaribagh, *Hamilton, Clarke.* ASSAM and KHASIA MTS., *Jenkins*, &c., alt. 2–4000 ft., *J. D. H. & T. T.* DECCAN PENINSULA, *Herb. G. Thomson.*—DISTRIB. Trop. Africa.

An erect very slender herb, 1–3 ft. high; stem terete, naked below, branched above, branches slender. *Leaves* pale green when dry, glaucous beneath, base usually acute; petiole $\frac{1}{12}$ in. and less; stipules membranous, lanceolate. *Male fl.* $\frac{1}{40}$ in. diam., very shortly pedicelled; sepals obovate-oblong; disk-glands stellately lobed; filaments recurved. *Fem. fl.* $\frac{1}{12}$ in. diam., fruiting $\frac{1}{8}$ in. diam.; sepals as in the male, but much larger, spreading in fruit. *Capsule* $\frac{1}{10}$ in. diam., coriaceous. *Seeds* with irregular slender ribs.—Near *P. Leschenaultii,* but a much more slender and annual plant with smaller leaves, few faint nerves and much larger fem. flowers. Much nearer *P. Niruri,* but the leaves, fruit and flowers are much larger, the ribs of the seed irregular, the style-arms longer and recurved, and the disk-glands of the male lobulate.—The true *P. tenellus* is a Mauritian plant, cultivated in Calcutta, and is Wallich's 7892 A, the left-hand specimen only, and is pentandrous. It is figured in Hook. Ic. Plant. t. 1569.

37. **P. rotundifolius,** *Klein in Willd. Sp. Pl.* iv. 584; annual, quite glabrous, stems many rigid ascending from the woody root branched, leaves $\frac{1}{4}$–$\frac{1}{3}$ in. subsessile coriaceous orbicular or broadly obovate tip rounded or apiculate nerves obsolete, flowers minute males sessile fem. very shortly pedicelled, anthers subsessile reniform, styles minute free 2-lobed, seeds with equal slender ribs and cross striæ. *Muell. Arg. in Linnæa* xxxii. 43, and in *DC. Prodr.* xv. ii. 405. P. bacciformis & rotundifolius, *Herb. Madr.*; *Wall. Cat.* 7896 B. P. Niruri, *Wall. Cat.* 7895 A (*in part*). P. tenellus, *Wall. Cat.* 7892 A (*in part*), C.

DECCAN PENINSULA, *Klein*; Coromandel coast, *Roxburgh, Wight,* &c. CEYLON, at Ballicaloa, *Gardner.*—DISTRIB. Arabia, Trop. Africa.

Stems many, 6–24 ft., stiff, terete; branchlets compressed or angular, angles sometimes minutely hirtellous. *Leaves* pale when dry, glaucous beneath; petiole minute; stipules minute, subulate. *Male fl.* $\frac{1}{30}$ in. diam., very shortly pedicelled; fem. $\frac{1}{12}$ in.; fruiting $\frac{1}{6}$ in. diam., spreading; pedicel stout, not half as long as the leaf. *Sepals* oblong-obovate, with a broad white margin. *Disk* of male of minute glands, of fem. annular. *Capsule* $\frac{1}{16}$—$\frac{1}{12}$ in. diam., depressed-globose, smooth, scarcely lobed.—Mueller gives *Assam* as a locality, but the specimen so marked from Col. Jenkins is probably from the Calcutta Gardens.

38. **P. scabrifolius,** *Hook. f.*; annual, erect, stem and branches angular and leaves beneath scaberulous, leaves $\frac{1}{3}$–$\frac{1}{2}$ in. subsessile broadly elliptic or obovate tip rounded nerves distinct, flowers very shortly pedicelled, stipules lanceolate serrate, filaments short united to the middle tips recurved, anthers reniform, styles free short reflexed arms recurved, capsule smooth, seeds with 7–9 dorsal ribs and faint transverse striæ.

The CONCAN, *Stocks.*

A leafy herb, 6–10 in., copiously branched from the base and upwards; stem

and primary branches stout, ultimate short, all angled; the angles as well as the leaves beneath hispidulous with white hairs. *Leaves* pale when dry, rather thick, nerves 4–5 pair distinct on both surfaces; petiole minute; stipules white, membranous, lanceolate. *Male fl.* $\frac{1}{16}$ in. diam., fem. rather larger, pedicels of both $\frac{1}{16}$–$\frac{1}{12}$ in. *Sepals* oblong obtuse with broad white margins; fem. a little enlarged and reflexed after fruiting. *Disk* of male of rounded glands; of fem. a low crenate cup; anther-cells at length confluent. *Capsule* $\frac{1}{8}$ in., depressed globose, 3-lobed, minutely granulate. *Seeds* very broad, sides with concentric ribs.—A very distinct plant, near *P. Niruri*, but with scaberulous branches and leaves, much larger flower and fruit, reflexed sepals after fruiting, and very different seeds.

Sect. VII. Reidia (see p. 286).

* *Leaves* 2–5 in. *Sepals* entire or lacerate. *Ovary* glabrous, smooth.

39. **P. elegans,** *Wall. Cat.* 7926; shrubby, quite glabrous, leaves 3–4 in. ovate- or oblong-lanceolate finely acuminate, male fl. shortly pedicelled in clusters on the branches, fem. in terminal racemes, sepals of male 4 of fem. 6 all lacerate, fruit smooth. *Muell. Arg. in Linnæa* xxxii. 46, and in *DC. Prodr.* xv. ii. 420.

Tenasserim; at Moolmayne, Mergui and Amherst, *Wallich*, &c.

Branches terete. *Leaves* coriaceous, glaucous or brown beneath, base acute or rounded, margins recurved; nerves 5–6 pair, very faint; petiole $\frac{1}{12}$ in.; stipules subulate. *Male fl.* $\frac{1}{20}$ in. diam., densely clustered; pedicels $\frac{1}{10}$–$\frac{1}{8}$ in., capillary; sepals 4, fimbriate; glands cup-shaped; anthers 2, didymous. *Fem. fl.* solitary in the axils of lanceolate bracts forming a terminal distichous raceme; flowering pedicels $\frac{1}{4}$ in., fruiting 1–1$\frac{1}{2}$ in.; sepals 6, unequal, lacerate, equalling the male in flower, fruiting much enlarged. *Fruit* $\frac{1}{2}$ in. diam. or more; cocci coriaceous. *Seeds* $\frac{1}{4}$ in. long, finely transversely striolate.

40. **P. Baillonianus,** *Muell. Arg. in Linnæa* xxxii. 47, and in *DC. Prodr.* xv. ii. 422; shrubby, quite glabrous, leaves 1$\frac{1}{2}$–2 in. ovate acuminate pale beneath, male fl. axillary long-pedicelled solitary or few together, fem. axillary and in terminal racemes, sepals entire, fruit smooth. Epistylium cordifolium, *Baill. Etudes Gen. Euphorb.* 648. E. latifolium, *Thwaites Enum.* 283 (*excl. syn.*).

Ceylon; Central Province, alt. 2–4000 ft., *Gardner, Thwaites.*

A bush, 3–4 ft., branches terete. *Leaves* membranous, green when dry, base unequal rounded rarely subcordate, often marbled with broad white or brown beneath; nerves 10–12 pair, very spreading; petiole $\frac{1}{12}$ in.; stipules minute, subulate. *Male fl.* $\frac{1}{5}$ in. diam.; pedicels capillary, $\frac{1}{3}$–$\frac{2}{3}$ in.; sepals 4, orbicular, entire; disk of 2 very large dilated reniform fleshy tuberculate lobes; anthers forming 2-lipped ends of a fleshy cross. *Fem. fl.* much smaller, axillary or from an axillary short bracteate peduncle; sepals concave, entire, much enlarged in fruit; disk large, dilated, fleshy, convex, tubercled, 6-lobed; styles short, cleft to the base into slender segments. *Fruit* $\frac{1}{4}$ in. long. *Seeds* $\frac{1}{8}$ in. long.—The disk is very remarkable. This is certainly not the Travancore plant figured by Wight (Ic. t. 1904, f. 3 (2 in text) as *Reidia latifolia.*

41. **P. Roxburghii,** *Muell. Arg. in Linnæa* xxxii. 47, and in *DC. Prodr.* xv. ii. 420; shrubby, branches crisply puberulous, leaves glabrous 1$\frac{1}{2}$–3$\frac{1}{2}$ in. lanceolate subacute or acuminate, male and fem. fl. densely fascicled in the axils or on the branchlets, pedicels of both capillary, sepals of male pectinately fimbriate of fem. serrate, ovary smooth. P. tetrandrus, *Roxb. Fl. Ind.* iii. 674; *Wall. Cat.* 7936. Epistylium Roxburghii, *Baill. Etudes Gen. Euphorb.* 648.

SILHET, *Roxburgh, Wallich.*

Branches slender, terete, rusty-puberulous. *Leaves* thinly coriaceous, green when dry above, pale beneath, base rounded or cuneate; nerves 7–10 pair, very faint; petiole $\frac{1}{12}$ in.; stipules subulate, caducous. *Flowers* very numerous in the clusters, red, males $\frac{1}{16}$ in. diam., with pedicels $\frac{1}{4}$ in., females towards the ends of the branchlets, $\frac{1}{10}$ in. diam., pedicels stouter. *Disk-glands* of male reniform, of fem. larger 2-lobed. *Fruit* $\frac{1}{4}$ in. diam., depressed, deeply 3-lobed, cocci thinly crustaceous.

42. **P. acutus,** *Wall. Cat.* 7931; shrubby, quite glabrous, leaves $1\frac{1}{2}$–2 in. obliquely ovate acute unequal-sided, male fl. from short bracteate peduncles solitary axillary, fem. in terminal racemes, sepals of male 4 of fem. 6 of both ovate obtuse entire, disk of both sexes orbicular deeply lobed, ovary glabrous. *Muell. Arg. in Linnæa* xxxii. 75, and in *DC. Prodr.* xv. ii. 423.

PENANG? *Finlayson.*

Branches smooth, terete; branchlets very slender, long, ascending. *Leaves* thinly coriaceous when dry, dark greenish-brown above, pale brown beneath; nerves 6–8 pair, very faint; petiole and stipules minute. *Male fl.* $\frac{1}{6}$ in. diam.; pedicel capillary, $\frac{1}{3}$ in., bracteate, peduncle $\frac{1}{10}$ in.; sepals membranous, fruiting about $\frac{1}{6}$ in. long. *Fem. fl.* and fruit not seen.—Wallich's solitary specimen is in a very imperfect state. Mueller gives Penang as the locality, but Wallich's ticket gives only "Herb. Finlayson."

43. **P. macrocalyx,** *Muell. Arg. in Linnæa* xxxii. 48, and in *DC. Prodr.* xv. ii. 423; shrubby, quite glabrous, leaves $1\frac{1}{2}$–3 in. elliptic or oblong acute, flowers very large axillary solitary, sepals entire of fem. greatly enlarged in fruit, ovary glabrous. ? Reidia latifolia, *Wight Ic.* t. 1904, f. 2 (*by error* 3, *see text*).

DECCAN PENINSULA; Shevagherry Hills, *Wight*; Bababoodan Hills, *Law.*

Much branched, branches terete. *Leaves* spreading, thinly coriaceous, more or less glaucous beneath, base rounded; nerves 6–8 pair, very slender; petiole $\frac{1}{12}$ in.; stipules lanceolate, caducous. *Male fl.* in the lower axils, $\frac{1}{4}$ in. diam.; pedicels $\frac{1}{2}$ in., slender; sepals broadly oblong; disk greatly dilated, 4-lobed, fleshy, tuberculate. *Fem. fl.* $\frac{1}{2}$ in. diam., pedicels $\frac{3}{4}$ in., thickened upwards; sepals orbicular-oblong; disk broadly saucer-shaped, fleshy, granular; styles reflexed, 2-fid to the middle. *Fruiting sepals* $\frac{3}{4}$ by $\frac{1}{2}$ in. *Fruit* not seen ripe. The disk is of the same character as *P. Baillonianus.*

44. **P. gomphocarpus,** *Hook. f.*; shrubby, branchlets and petioles scurfily rusty-pubescent, leaves 1–4 in. obliquely ovate or ovate-lanceolate acuminate base acute or cuneate sides very unequal, male fl. minute panicled pedicels short capillary sepals ovate fimbriate, fem. large solitary very long pedicelled, sepals denticulate, capsule 1 in. long subglobose 3-lobed lobes inflated.

PERAK, *Scortechini, King's Collector.*

A shrub, 6 ft.; branchlets long, slender. *Leaves* membranous, quite glabrous; nerves 6–8 pair, very slender; petiole $\frac{1}{12}$ in. *Male fl.* $\frac{1}{10}$ –$\frac{1}{8}$ in. diam.; pedicel $\frac{1}{10}$–$\frac{1}{4}$ in. *Fem. fl.* $\frac{1}{3}$ in. diam.; pedicel $1\frac{1}{2}$–2 in.; stigmas minute. *Seeds* small for the size of the capsule, $\frac{1}{4}$ in. long, curved, trigonous; testa pale brown, transversely rugose.—Nearly allied to the Sumatran *P. gracilipes*, Muell., but the leaves, pedicels and ovary are glabrous.

** Leaves $\frac{1}{4}$–$1\frac{1}{2}$ in., pinnately arranged.

† *Ovary and fruit glabrous, smooth. Sepals toothed or laciniate, except in P. longiflorus.*

45. **P. pulcher,** *Wall. Cat.* 7908; leafing branches pubescent on one

side, leaves ½ in. glaucous erect imbricating obliquely obovate-oblong acute or apiculate, flowers solitary, male and fem. subequal, pedicels capillary, sepals laciniate, ovary smooth. *Muell. Arg. in Linnæa* xxxii. 49, and in *DC. Prodr.* xv. ii. 421. P. pallidifolius, *Muell. Arg. in DC. l. c.* 424. P. Zollingeri, *Muell. Arg. in Linnæa l. c.* 47. P. pallidus, *Muell. Arg. in DC. l. c.* 283 (*under Zollingeri*). Epistylium pulchrum & glaucescens, *Baill. Etudes Gen. Euphorb.* 648. Reidia glaucescens, *Miquel Fl. Ind. Bat.* i. ii. 374; *Hook. Bot. Mag.* t. 5437. Eriococcus glaucescens, *Morr. & Zoll. mss.*

MALACCA, *Griffith, Maingay.* SINGAPORE, *Murton*, &c. PENANG, *Wallich, Curtis.*—DISTRIB. Siam, Java.

Branches very stout, strict, terete, branchlets slender. *Leaves* subsecund, margins somewhat thickened, nerves very obscure; stipules ovate-lanceolate, some with long flexuous points. *Pedicels* ½–1 in., males in the lower axils. *Flowers* ⅓ in. diam., white with a purple eye; sepals deeply lacerate. *Disk* of male of 4 reniform glands, of fem. thick annular crenate; styles cleft to the base into 2 filiform segments. *Fruit* not seen.

46. **P. longiflorus,** *Heyne in Wall. Cat.* 7905; shrubby, quite glabrous, leaves ½–¾ in. obliquely oblong or obovate-oblong subacute or apiculate, flowers subsolitary, pedicels slender, sepals entire of male ovate-oblong of fem. lanceolate obtuse, staminal column long slender, ovary smooth. P. Heyneanus, *Muell. Arg. in Linnæa* xxxii. 49. P. nephradenius, *Muell. Arg. in DC. Prodr.* xv. ii. 423. P. tenellus, *Wall. Cat.* 7892 B. Epistylium phyllanthoides, *Baill. Etudes Gen. Euphorb.* 648. ? Reidia ovalifolia, *Wight Ic.* 1904, f. 3 (*by error* 2 *in text*).

DECCAN PENINSULA, *Heyne.* Travancore, at Courtallam, *Wight.*

Branchlets slender, spreading. *Leaves* spreading, unequal-sided, pale brown when dry, glaucous beneath; nerves very faint; petiole minute; stipules very minute. *Male fl.* ⅛ in. diam.; pedicel rather longer, capillary; sepals membranous. *Fem. fl.* ⅕ in. diam.; pedicels stouter, ½ in.; disk small; styles divided to the base into slender arms. *Fruit* ⅙ in. long, smooth.—Heyne's name of *longiflorus*, in allusion to the narrow fem. sepals, which are conspicuously elongate when reflexed from the fruit, is unobjectionable. Mueller has referred Wight's *Reidia ovalifolia* to this, but the leaves on the branch figured are not only (as Wight observes) too small, but far too narrow; the separate leaf at fig. 8 is more acuminate, but the petiole is much too long; the ovary does not taper into the styles, and the male disk is annular and 4-lobed, not of separate glands removed from the staminal column as in its allies. More specimens are required to clear up this point.

47. **P. anabaptizatus,** *Muell. Arg. in DC. Prodr.* xv. ii. 421; leafing branches obscurely puberulous, leaves ½ in. sessile erect imbricating obliquely oblong obtuse or apiculate, flowers axillary solitary, males on short fem. on long pedicels, sepals of male orbicular subentire of fem. broadly ovate irregularly toothed, anthers with transverse dehiscence, ovary smooth. P. zeylanicus, *Muell. in Linnæa* xxxii. 49. Reidia polyphylla, *Wight Ic.* t. 1904, f. 4. Epistylium polyphyllum, *Thwaites Enum.* 283. E. zeylanicum, *Baill. Etudes Gen. Euphorb.* 648.

CEYLON; Adams Peak, alt. 5000 ft.; *Thwaites.*

A low shrub. *Branches* stout, strict, terete; branchlets slender, jointed on the branch. *Leaves* sometimes somewhat falcate, nerves obscure; stipules entire, minute, ovate-lanceolate. *Male fl.* $\frac{1}{16}$ in. diam., pedicels ⅛ in., disk of 4 glands; fem. ⅙ in. diam., pedicels ½ in., disk annular, crenate. *Styles* cleft to the base into 2 slender segments. *Fruit* ⅙ in. diam., quite smooth.

48. **P. fimbriatus,** *Muell. Arg. in Linnæa* xxxii. 47, and in *DC.*

Prodr. xv. ii. 422; quite glabrous, leaves spreading 1–1½ in. ovate acuminate, flowers all in axillary clusters male and female together, sepals lacerately toothed, anthers with transverse dehiscence, ovary smooth. Reidia fimbriata, *Wight Ic.* t. 1904, f. 1.

NILGHIRI HILLS; on the western slopes, *Wight.*

Quite glabrous. *Leaves* 1½–2 by ⅓–⅔ in., base obtuse, minutely pellucid-punctate, reticulately veined; stipules of the branches triangular ovate scarious brown, of the branchlets triangular-lanceolate longer acuminate. *Pedicels* of the male fl. half as long as the leaves. Outer sepals of the female not entire as in Wight's figure, but hardly less lacerately toothed than the outer. *Male disk* of orbicular glands; fem. an entire cup. *Styles* erect.—I do not recognize this plant in Wight's Herbarium (in Herb. Hook.), where Mueller states that he saw it; he says the habit is that of *P. Baillonianus*, but that the leaves are hardly inæquilateral, and the sepals are not entire.

49. **P. oreophilus,** *Muell. Arg. in Linnæa* xxxii. 49, and in *DC. Prodr.* xv. ii. 421; shrubby, quite glabrous, leaves ¼–½ in. broadly unequally oblong very unequal-sided subacute or apiculate, flowers axillary subsolitary, males minute pedicels equalling the leaves, anthers with transverse slits, fem. larger pedicels much exceeding the leaves, sepals of males 4 of fem. 6 all broad irregularly toothed, disk of male of 4 glands, of fem. urceolate, ovary and fruit smooth. Epistylium montanum, *Thwaites Enum.* 283.

CEYLON; Central Province, Horton Plains, alt. 6–7000 ft., *Gardner, Thwaites.*

Branches long, slender, terete, smooth; branchlets very slender. *Leaves* very membranous, dark brown when dry, base acute or rounded; nerves 5–6 pair, very faint; petiole and subulate stipules minute. *Male fl.* 1/16 in. diam., of fem. larger. *Fruit* ⅛ in. diam.; cocci thinly crustaceous.—Closely resembles *P. affinis*, differing in the smooth fruit. The specimens are very indifferent.

†† *Fruit hirsute tubercled or scabrid.*

50. **P. Wightianus,** *Muell. Arg. in Linnæa* xxxii. 47, and in *DC. Prodr.* xv. ii. 425; shrubby, branchlets and leaves beneath tomentose, leaves ½–1 in. close-set drooping obliquely oblong acute or apiculate, flowers solitary axillary pubescent, males minute shortly pedicelled fem. long-pedicelled, sepals entire ciliate, disk of separate glands in both sexes, anthers ovary and fruit scurfily scabrid. P. obliquus, *Wall. Cat.* 7947. Reidia floribunda, *Wight Ic.* t. 1903. Bradleia obliqua, *Herb. Wight.*

NILGHIRI and PULNEY HILLS, *Wight, Perrottet.*

Branches terete, scarred; branchlets long, spreading and upcurved. *Leaves* membranous, unequal-sided, pale green when dry, paler or glaucous beneath, puberulous above, base rounded or cuneate, rarely subcordate; nerves 5–6 pair, very obscure; petiole and stipules minute. *Male fl.* 1/10 in. diam., pedicel ¼ in., capillary; sepals 4, lanceolate, ciliate; disk-glands truncate. *Fem. fl.* ⅕ in. diam.; pedicels ¾ in., slender; sepals lanceolate, obtuse; disk-glands cuneate, 2-lobed; ovary pubescent; styles cleft to the base in two slender arms. *Capsule* ⅙ in. diam., subsquamosely hirsute with rusty short unequal bristles, cocci crustaceous. *Seeds* smooth.—Wight describes the flowers as fascicled, but figures them, as I find them, solitary.

51. **P. cinereus,** *Muell. Arg. in Linnæa* xxxii. 48, and in *DC. Prodr.* xv. ii. 425; shrubby, branchlets tomentose, leaves ½–⅔ in. broadly obliquely oblong unequal-sided or orbicular acute or apiculate pubescent beneath sparsely above, flowers solitary axillary, pedicels of male shorter of fem. longer than the leaves, sepals ovate entire, ovary hairy, capsule rough with minute tubercles. Epistylium floribundum, *Thwaites Enum.* 283 (*in part, excl. syns.*).

CEYLON; Central Province, alt. 3–5000 ft., *Thwaites* (C.P. 2531).

Branches slender, smooth, terete; branchlets upcurved, finely tomentose. *Leaves* as in *P. Wightianus*, but less pubescent beneath, almost black above when dry and glaucous beneath; nerves 5–6 pair, very faint; petiole minute; stipules ovate-lanceolate. *Male fl.* $\frac{1}{10}$ in. diam.; pedicel $\frac{1}{2}$ in., capillary; sepals membranous, ovate-oblong, ciliate; disk-glands very large concave stipitate. *Fem. fl.* larger; sepals glabrous. *Fruit* about $\frac{1}{4}$ in. long; cocci thinly crustaceous. *Seeds* quite smooth.

52. **P. affinis,** *Muell. Arg. in Linnæa* xxxii. 48, and in *DC. Prodr.* xv. ii. 425; shrubby, quite glabrous, leaves $\frac{3}{4}$–1 in. obliquely oblong acute or apiculate, flowers solitary axillary glabrous, males minute shortly pedicelled, sepals rounded obscurely toothed, disk-glands of male large lobulate, ovary and fruit densely hirsute with rough hairs. Epistylium floribundum, *Thwaites Enum.* 283 (*in part*).

CEYLON; Central Province, alt. 3–5000 ft.

Very similar in habit, foliage and flowers to *P. Wightianus*, but the fruit is densely clothed with much longer rough hairs.

53. **P. Hamiltonianus,** *Muell. Arg. in Linnæa* xxxiv. 75, and in *DC. Prodr.* xv. ii. 424; shrubby, slender, branchlets and leaves beneath puberulous, leaves 1–1½ in. elliptic or broadly ovate obtuse or acute membranous glaucous beneath, male fl. small long-pedicelled in axillary fascicles. fem. on longer pedicels axillary and in terminal racemes, sepals pubescent at the back male 4 fem. 6 all fimbriate, fruit scabridly hispid. P. sikkimensis, *Muell. Arg. in Linnæa* xxxii. 48, and in *DC. l. c.* 425. Agyneia tetrandra, *Ham. in Trans. Linn. Soc.* xv. 125; *Wall. Cat.* 7951.

ASSAM, *Hamilton.* SIKKIM HIMALAYA, alt. 1–2000 ft., *J. D. H., Clarke.*

A small bush, branches terete. *Leaves* very membranous, pale green when dry, paler beneath, base cuneate or rounded, nerves 5–7 pair very faint; petiole $\frac{1}{12}$ in.; stipules ovate and subulate, caducous. *Male fl.* $\frac{1}{10}$ in. diam.; pedicels capillary $\frac{1}{10}$–$\frac{1}{6}$ in., springing from minute clusters of bracts; sepals rounded, deeply toothed; disk dilated, deeply 4-lobed; staminal column very short. *Fem. fl.* $\frac{1}{6}$ in. diam.; pedicel very slender, longer than the leaves, curved. *Sepals* less deeply toothed than in the male, hardly enlarged in fruit; disk saucer-shaped; ovary 4-celled; styles 4, subulate, erect. *Fruit* $\frac{1}{6}$ in. diam., globose, rufous with rough hairs; cocci crustaceous.—Mueller describes the sepals of the fem. as entire, but I find them strongly toothed.

Sect. VIII. CICCA (see p. 287).

54. **P. distichus,** *Muell. Arg. in DC. Prodr.* xv. ii. 413; a tree, quite glabrous, with very robust branches and slender leafy branchlets, leaves pinnately distichous 2–3 in. petioled obliquely ovate acute, flowers minute densely clustered, clusters axillary or in slender racemes from the thick branches shortly pedicelled. *Beddome Forester's Man.* 191. P. Cheremila, *Roxb. Hort. Beng.* 114. P. longifolius, *Jacq. Hort. Schœnbr.* ii. 36, t. 194; *Roxb. Fl. Ind.* iii. 672. P. Cicca, *Muell. Arg. in Linnæa* xxxii. 50. P. tetrandrus, *Wall. Cat.* 7930. Cicca disticha, *Linn. Mant.* 124; *Lamk. Ill.* ii. t. 757, f. 1; *Grah. Cat. Bomb. Pl.* 180; *Dalz. & Gibs. Bomb. Fl. Suppl.* 78; *Kurz For. Fl.* ii. 353.—*Rheede Hort. Mal.* iii. t. 47, 48.

In Gardens throughout INDIA.—DISTRIB. Malay Islands, Madagascar.

A deciduous tree, 20–30 ft.; branches as thick as the finger; bark very rough, grey; leafy branchlets 1–2 ft., terete below, angular above. *Leaves* rather membranous; pale beneath, base usually rounded; nerves 5–8 pair, arched; petiole $\frac{1}{12}$ in.; stipules toothed. *Flowers* most densely clustered, $\frac{1}{16}$ in. diam., occasionally 2-sexual, sometimes 3–4-merous; pedicels capillary, $\frac{1}{4}$–$\frac{1}{2}$ in. *Sepals* orbicular. *Disk* of male

of large glands; of fem. annular, crenate. *Stamens* recurved; anthers shortly oblong, slits lateral. *Ovary* ovoid, styles reflexed from the contracted top 2-partite, arms subulate, acute. *Fruit* globose, fleshy, acid, "3–4-lobed, generally 6–8-grooved, nut 3–4-parted, parts 1-celled, 1-seeded," *Roxb.*—I have not seen the fruit. Mueller describes it as at length a 4-coccous capsule, Kurz as sappy with a 3–4-celled putamen.

Sect. IX. PROSORUS (see p. 287).

55. **P. indicus,** *Muell. Arg. in Linnæa* xxxii. 52, and in *DC. Prodr.* xv. ii. 417; quite glabrous, leaves oblong or elliptic obtuse or acute at both ends or broadly oblong and obtuse, male fl. $\frac{1}{10}$ in. diam., stamens short broad, fruit $\frac{1}{3}$ in. diam. *Beddome Forester's Man.* 191. Prosorus indica, *Dalz. in Hook. Journ. Bot.* iv. (1852) 346; *Dalz. & Gibs. Bomb. Fl.* 236; *Thwaites in Hook. Journ. Bot.* vi. (1854) 299, t. 10 C, fig. 3–6, and viii. (1856) 272, and *Enum.* 281. P. Stocksii, *Muell. Arg. in Linnæa l. c.* 51, and in *DC. l. c* P. anomalus, *Muell. Arg. in Linnæa* xxxii. 52, and in *DC. l. c.* 418. P. hysteranthus, *Muell. Arg. in Linnæa* xxxii. 52. Cicca anomala, *Baill. Etudes Gen. Euphorb.* 619. Flueggea major, *Baill. l. c.* 593, and *Rec. Obs. Bot.* ii. 42. Securinega hysterantha, *Boj. Hort. Maurit.* 278. Bridelia Berryana, *Wall. Cat.* 7876, 7960.

DECCAN PENINSULA; Courtallam, *Berry*; on the Ghats of Concan and Canara *Stocks*, &c. CEYLON, common in the central and southern forests, *Thwaites.*

A deciduous tree, 30–40 ft.; branches terete, with white spots. *Leaves* membranous, $2\frac{1}{2}$–6 by $1\frac{1}{2}$–3 in., distichous, very variable in shape, sometimes acuminate, glaucous, nerves 6–10 pair; petiole $\frac{1}{4}$ in.; stipules lanceolate, subserrate. *Male fl.* fascicled in the axils and on the branches, green; pedicels $\frac{1}{8}$-$\frac{1}{4}$ in., capillary; fem. larger, solitary or fascicled, pedicel $\frac{1}{2}$–1 in., stout. *Sepals* 4, rarely 5; 2 outer largest. *Disk* of male large, of fem. very narrow. *Anthers* subsessile on exserted filaments. *Fruit* depressed spherical, obtusely trigonous, epicarp brown; cocci white, thin. *Seeds* blue.—I do not know what authority Mueller has for implying that Wallich's specimens are from Madagascar; his No. 7876 is introduced into the Calcutta Garden from Courtallam by Dr. Berry, and his No. 7960 is simply marked as from the Calcutta Garden. The plant no doubt extends from Canara to Ceylon. Mueller cites Wallich's *Bridelia Berryana* under both *P. anomalus* and *cyanospermus.* Possibly *P. discoideus* of Tropical Africa is a form with smaller fruit.

56. **P. cyanospermus,** *Muell. Arg. in Linnæa* xxxii. 51, and in *DC. Prodr.* xv. ii. 416 (*excl. citations of Wallich*), quite glabrous, leaves elliptic-lanceolate acute at both ends, male fl. $\frac{1}{4}$ in. diam., stamens long linear, fruit $\frac{1}{2}$ in. diam. *Beddome Forester's Man.* 191. Prosorus cyanosperma, *Thwaites Enum.* 281. P. Gærtneri, *Thwaites in Hook. Journ. Bot.* viii. (1856) 272. P. indicus, *Thwaites l. c.* (1854) t. 10 C, figs. 1, 2, 7–10. Cicca Gærtneriana, *Thwaites in Baill. Etudes Gen. Euphorb.* 619. Zygospermum zeylanicum, *Thwaites ex Baill. l. c.* 620, t. 27, f. 11. Croton ? cyanospermus, *Gærtn. Fruct.* ii. 120, t. 107.

CEYLON; in the Ambagamowa and Ratnapoor districts, *Thwaites.*

Very like *P. indicus*, but with larger flowers and fruit. The seeds are of a brilliant metallic blue.—Mueller has repeated under this species the citations of Wallich which are introduced under his *P. anomalus*; he probably (rightly) intended to refer Wallich's *Bridelia Berryana* to *P. indicus*, but accidentally introduced it under *P. cyanospermus.*

11. GLOCHIDION, *Forst.*

Evergreen trees or shrubs. *Leaves* alternate, bifarious, shortly petioled, quite entire. *Flowers* small, in axillary clusters, monœcious or diœcious,

apetalous, eglandular (without disk-scales or glands). MALE FL. *Sepals* 6, rarely 5, spreading in 2 series, imbricate. *Anthers* 3–8, connate in an ellipsoid or oblong sessile column with linear cells, dehiscence extrorse, connective produced into separate points or connate in an umbonate head. *Pistillode* 0, or very rarely minute and hidden between the anthers. FEM. FL. *Calyx* usually of 6 short imbricate sepals, or shortly tubular and unequally toothed or cleft. *Ovary* 3–15-celled; styles connate in a globose columnar conical or subclavate column lobed or toothed at the tip, or 3 slender free in § *Glochidiopsis*, sometimes obscure or confluent with the top of the ovary, usually lengthening during or after the flowering; ovules 2 in each cell. *Capsule* of 3 or more 2-valved cocci, often with twice as many lobes as cells, globose or orbicular and depressed or intruded at the base and top, crowned by the often enlarged style; cocci coriaceous or crustaceous, epicarp separable or not. *Seeds* hemispherical or laterally compressed, testa crustaceous with often a succulent coat, albumen fleshy; cotyledons flat.—Species about 120, tropical and chiefly Asiatic.

I find it is inexpedient to follow Mueller (in DC. Prodr. xv. ii. 278) and Bentham (Gen. Plant. iii. 272) in reducing *Glochidion* to a section of *Phyllanthus*, from which it differs in the total absence of a disk, in habit, and in the singular modification of its styles and stigmas. Further, by keeping it distinct I comply with the wishes of Indian Botanists, whose opinion it is of importance to consult in regard to the nomenclature of so very large and universally distributed an Indian genus. The only deviation in any Indian species from the stylar characters of *Glochidion* as here limited occurs in the small section *Glochidiopsis* of Mueller, on which Blume founded the genus *Glochidionopsis*, and in which the styles are filiform and nearly free.

I add with regret, that my long and laborious study of the Indian species has resulted in their very unsatisfactory limitation and disposition. Mueller's primary division of *Glochidion* proper, based on the number of anthers, whether 3 or more, is a purely artificial one, and followed here only because I have detected no other so generally recognizable. The form of the style offers a far better character, but is very difficult of application, because of its minuteness and deceptive nature, owing to the great changes which it undergoes during its rapid development after flowering. I would urge on Indian botanists a study of this organ in living specimens, and the making careful drawings of it in all stages of growth, particularly observing the period of impregnation. Lastly, I have to acknowledge my frequent inability to identify the Indian species with the described Malayan Archipelago ones, from want of good materials of the latter and the vagueness of their descriptions. The form of the capsule, globose, or orbicular with depressed base or crown, is a guide to affinities, though often an obscure one. The female calyx, toothed or partite into sepals, is also, I think, a good character, but it is not, when minute, easily observed in dried specimens. I have to acknowledge gratefully the loan of specimens from the Directors of the Botanical Gardens of Calcutta and Ceylon, which have helped me much.

KEY TO THE INDIAN SPECIES.

Sect. 1. GLOCHIDION PROPER. *Styles* confluent into a cone or column which is lobed toothed or notched at the tip.

A. *Anthers* 4 or more. See also 28. *obscurum*, 38. *assamicum*, and 55. *villicaule* (sometimes 3 in 16. *fagifolium* and 17. *brachylobum*).

* *Female calyx* of 5–6 distinct sepals.

† Capsule depressed-globose, distinctly lobed, base and apex intruded.

§ Ovary 8–12-celled; style a very broad shallow cone, with a hollowed vertex.—Sp. 1–3.

§§ Ovary 4–8-celled: style conical from a very broad base, as long as or longer than the ovary.—Sp. 4–7.

§§§ Ovary 3–8-celled; style cylindric linear or subclavate.—Sp. 8–10.

†† Capsule globose or depressed, terete or very obscurely lobed or angled, not deeply intruded at the base and apex.—Sp. 11–15.

** *Female calyx* 4–6-lobed or -toothed, usually unequally. *Style* globose, small.—Sp. 16–19.

B. *Anthers* 3, rarely 4 or 5 in 28. *obscurum*, and 38. *assamicum*, and 55. *villicaule* (see also 16. *fagifolium* and 17. *brachylobum*).

* *Female calyx* unequally 4–6-lobed or toothed. Capsule in all depressed-globose, lobed, and intruded at the crown.

† Style in the flower globose.—Sp. 20-24.

†† Style cylindric conical or clavate.—Sp. 25–27.

** *Female calyx* of 6 free sepals.

† Capsule globose or depressed-globose, faintly angled or lobed, not deeply intruded at base and apex.—Sp. 28, 29.

†† Capsule depressed globose, deeply lobed, intruded at the base and apex.

§ Style in flower globose or broadly conic, broader than the ovary (doubtful in 32. *desmocarpum*).—Sp. 30–33.

§§ Style in flower very minute.—Sp. 34–36.

§§§ Style in flower short, columnar or clavate, not much exceeding the sepals.

¶ Leaves usually quite glabrous.—Sp. 37–43.

¶¶ Leaves usually pubescent or tomentose beneath.—Sp. 44–47.

§§§§ Style in flower greatly exceeding the sepals.—Sp. 48–55.

Sect. II. GLOCHIDIOPSIS. *Styles* 3, filiform. *Female sepals* very unequal, 2 very much the largest.—Sp. 56–58.

1. **G. multiloculare,** *Muell. Arg. in Linnæa* xxxii. 59; glabrous or puberulous, leaves 3–5 in. oblong linear-oblong or obovate glaucously purplish beneath, nerves strong, male fl. small shortly pedicelled, anthers 4–12, fem. fl. large stoutly pedicelled, sepals 8–12 broad spreading and revolute, style a flattened glabrous cone with a hollowed top crowning the depressed 10–15-celled glabrous or villous ovary, capsule very large depressed 10–15-lobed. *Kurz For. Fl.* ii. 343. Phyllanthus multilocularis, *Muell. Arg. in Flora* (1865) 370, and in *DC. Prodr.* xv. ii. 279. Bradleia multilocularis, *Spreng. Syst.* iii. 19; *Roxb. Fl. Ind.* iii. 696; *Wall. Cat.* 7864. B. pubera, *Roxb., Wall. Cat.* 7870. B. nitida, *Wall. Cat.* 7867. B. philippinensis, *Ham., Wall. Cat.* 7871 *in part.* Agyneia multilocularis, *Willd. in Neue Schrift. Gesselch. Naturf. Freund.* iv. (1803) 206, and *Sp. Pl.* iv. 509. A. pubera, *Herb. Madr.*

The GANGETIC PLAIN from OUDH, N. Behar, and the Sikkim Terai, eastwards to ASSAM, SILHET and UPPER BURMA, and southwards to the CIRCARS.

An evergreen tree, with usually drooping branches and angular branchlets. *Leaves* thinly coriaceous, obtuse or subacute, apiculate, often green or yellow above when dry, beneath brown purplish or glaucous; nerves 5–8 pair, and numerous straight, cross-nervules raised beneath, and usually distinct also in the upper surface; petiole $\frac{1}{10}$ in., stout; stipules triangular-ovate, cuspidate. *Male fl.*; pedicels stout, $\frac{1}{4}$ in.; perianth $\frac{1}{8}$ in. diam.; sepals oblong; anthers adnate to the middle, connectives very short. *Fem. fl.* stoutly pedicelled, $\frac{1}{4}$ in. diam.; style low, broad, rayed with slight furrows. *Capsules* orbicular, stoutly pedicelled, $\frac{3}{4}$–1 in. diam., the sunk apex occupied by a concave rayed adnate disk which is the remains of the style; epicarp thin reddish separating from the coriaceous cocci, which again usually fall away from the compressed seeds that persist on the axis, and have a fleshy orange-red coat.

2. **G. littorale,** *Blume Bijd.* 585; quite glabrous, leaves 2–3 in. coriaceous orbicular or broadly obovate tip rounded, male fl. shortly pedicelled, sepals elliptic, anthers 5–6, fem. fl. larger subsessile stoutly pedicelled, sepals very broad, ovary 10–12-celled subglobose glabrous or pubescent gradually narrowed into the broad short conical truncate crenulate style, capsule large orbicular depressed 10–14-lobed with the minute conical style on the flat or depressed apex. *Beddome Forester's Man.* 191; *Miquel Fl. Ind. Bat.* i. ii. 377, and *Suppl.* 449. Phyllanthus littoralis, *Muell. Arg. in Flora* xlviii (1865) 370, and in *DC. Prodr.* xv. ii. 280. Bradleia littorea, *Steud. Nomencl.* 222. B. obtusa, *Wall. Cat.* 7869. Agyneia impubes, *Herb. Madr.*? —*Wall. Cat.* 7990 *in part.*

MALABAR; near the coast, *Beddome.* CEYLON, *Wight.*—DISTRIB. Sumatra, Java, Borneo.

A small tree (*Beddome*). *Leaves* 2–3 by 2–2½ in., very pale above when dry and brown beneath, base acute or rounded; nerves 6–8 pairs, very spreading, not very strong, cross-nervules few reticulating; petiole ⅛–⅙ in., very stout; stipules triangular. *Male peduncles* ¼ in.; anthers narrow, connectives long, acute, free. *Fem. fl.* ⅛ in. diam.; pedicels as long or longer; sepals recurved. *Capsule* ⅓–¾ in. diam., base not intruded.

3. **G. coccineum,** *Muell. Arg. in Linnæa* xxxii. 60; branchlets angular puberulous or tomentose, leaves 5–7 in. coriaceous ovate oblong or elliptic-oblong or -lanceolate brown beneath, nerves strong, male fl. long-pedicelled, sepals obovate-oblong erect, anthers 5–6, fem. densely clustered sessile, sepals broadly ovate, style globosely conical with a crenulate hollowed tip broader than the short villous 8–12-celled ovary, capsule large sessile orbicular much depressed 16–20-lobed, style minute in the deeply sunk top. Phyllanthus coccineus, *Muell. Arg. in Flora* xlviii. (1865) 370, and in *DC. Prodr.* xxv. ii. 280; *Kurz For. Fl.* ii. 342. Bradleia coccinea, *Wall. Cat.* 7868. Agyneia coccinea, *Ham. in Symes' Embassy*, 479, with figure.—*Wall. Cat.* 7865.

BURMA, and from Pegu to Tenasserim, *Wallich, Griffith* (*Kew Distrib.* 4880), *Helfer* (*Kew Distrib.* 4859, 4881, 4863), &c.

An evergreen shrub or tree, 25–30 ft. *Leaves* variable in shape, and colour when dry, sometimes very pale almost white above, and faintly rusty or bluish beneath, young pubescent beneath, base acute or rounded; nerves 6–8 pair; petiole ⅒ in.; stipules subulate. *Flowers* more or less pubescent, males ⅙ in. diam., pedicels capillary, connectives very short; fem. minute. *Capsule* ½–1 in. diam., pale reddish, coriaceous, glabrous or puberulous, pericarp, &c., as in *G. multiloculare.* *Seeds* compressed, with a scarlet-fleshy coat.

4. **G. lanceolarium,** *Dalz. in Bomb. Fl.* 235; glabrous, branchlets angular, leaves 3–6 in. coriaceous elliptic-oblong or lanceolate acuminate base acute, male fl. large long-pedicelled, anthers 4–6, fem. fl. few sessile or shortly pedicelled, sepals broad, style broadly conic truncate tomentose 5–6-cleft gradually dilated into the 6–8-celled villous ovary, capsule large orbicular depressed 6–8-lobed hoary. *Muell. Arg. in Linnæa* xxxii. 60; *Kurz For. Fl.* ii. 343; *Beddome Forester's Man.* 192. Phyllanthus lanceolarius, *Muell. Arg. in Flora* xlviii. (1865), and in *DC. Prodr.* xv. ii. 282; *Brand. For. Fl.* 453. Glochisandra acuminata, *Wight Ic.* t. 1905. Bradleia lanceolaria, *Roxb. Fl. Ind.* iii. 697; *Wall. Cat.* 7855 (*excl.* C).—*Wall. Cat.* 7993.

NORTH-WEST INDIA, *Royle*, and from NEPAL eastwards to ASSAM?, SILHET and CHITTAGONG.

A tree, 25–30 ft. *Leares* usually glossy and pale or greenish above when dry, with the nerves distinct, beneath also pale with 6–10 pairs of slender raised nerves and

obscure nervules, base decurrent on the stout petiole which is ¼–¾ in. long; stipules triangular, acuminate. *Male fl.* ⅓ in. diam. and less; pedicels ¾ in. and under; sepals linear-oblong; connectives long, acute. *Fem. fl.* much smaller; sepals unequal, rigid, lanceolate, acute; style shortly exserted. *Capsules* ⅔–¾ in. diam., pale. *Seeds* often persistent on the axis.—The monstrous flowers mentioned by Mueller are males on long stout pedicels thickened upwards into a solid turbinate body crowned with six obtuse hardened perianth-lobes, within this is a conical styliform body to the face of which abortive anthers are adnate. Similar monstrous flowers occur in *P. sphærogynum* and others.

5. **G. calocarpum,** *Kurz For. Fl.* ii. 343; quite glabrous, branchlets stout, leaves 4–7 in. subcoriaceous from broadly obliquely ovate or oblong to lanceolate acute or acuminate, base very unequal, flowers all pedicelled, male sepals linear-oblong recurved, anthers 4–6, fem. sepals 5 ovate acute, ovary 4–5-celled glabrous narrowed into the conical shortly exserted 5-toothed style, capsule orbicular much depressed 8–10-lobed glabrous, with a long strong style in the smaller top.

ANDAMAN ISLANDS, in the beach forests, and NICOBAR ISLANDS, *Kurz.*

A small evergreen tree, 20–25 ft. *Leaves* very broad, dark brown when dry, base acute or rounded; nerves 6–8 pair; petiole ¼ in., very stout; stipules triangular, cuspidate. *Male fl.* on stout sometimes very short pedicels, ¼ in., ⅛ in. diam. *Fem. fl.* few in a cluster, on rather shorter stouter pedicels. *Capsules* about ¼ in. diam., purple.—I have seen only Nicobar specimens.

6. **G. goniocarpum,** *Hook f.*; glabrous except the flowers and fruit, leaves 4–5 in. coriaceous elliptic-oblong acuminate or acute base unequal acute, flowers sometimes clustered on a short peduncle all (male shortly) pedicelled, outer sepals hispid inner smaller glabrous, anthers 5, fem. fl. stoutly pedicelled, sepals broadly ovate obtuse hispid, style stout short conico-columnar pubescent 3–6 cleft base narrower than the globose villous 5–6-celled ovary, capsule subglobose pubescent 5-lobed, lobes keeled, style columnar on the flat or depressed apex.

SINGAPORE; *King's Collector.*

A tree, 20–30 ft.; branchlets rather stout, slightly angled. *Leaves* rigid when dry, pale greenish above with the nerves distinct, brown beneath with raised slender nerves and faint cross-nervules; petiole ¼–⅓ in.; stipules triangular-ovate. *Male fl.* ⅛ in diam.; outer sepals broadly oblong, inner more spathulate, connectives short. *Fem. fl.* in stout pubescent pedicels, ⅙–¼ in.; perianth coriaceous, nearly ¼ in. diam. *Capsules* ¼ in. diam. and less, base not intruded.

7. **G. tomentosum,** *Dalzell in Hook. Journ. Bot.* iii. (1853) 38; branches leaves beneath and flowers finely white tomentose, leaves 3–6 in. elliptic- or ovate-oblong pale bluish grey beneath, base acute rounded or cordate, flowers all on short stout decurved pedicels, sepals of both sexes unequal broad tomentose or the inner glabrous, anthers 5–7, style stout conical tip 4–5-cleft dilated into the 4–5-celled tomentose or glabrate ovary, capsule much depressed obscurely 10–12-lobed pubescent, style minute conical. *Beddome Forester's Man.* 192. Phyllanthus tomentosus, *Muell. Arg. in Flora* xlviii. (1865) 371, and in *DC. Prodr.* xv. ii. 283.

NORTH CANARA, *Metz, Stocks, &c.*

Dalzell describes this as a small strict shrub 3–4 ft. high with flexuous branches, leaves 2–4 by 1–1½ in., and 4 irregular female sepals toothed or lacerate at the tip; he gives no description of the fruit. This latter I appear to have in specimens sent to Kew both by Dr. Stocks and Mr. W. A. Talbot, but as these specimens differ somewhat from Mr. Dalzell's, I shall give their individual characters.

G. TOMENTOSUM PROPER; a shrub 3–4 ft., leaves 3–4 in. elliptic-oblong base rounded or acute, sepals of fem. fl. $\frac{1}{8}$–$\frac{1}{6}$ in. rather narrowly oblong, ovary and style sparingly pubescent, capsule unknown.—Canara, *Dalzell.*

Var. G. TALBOTI; a small tree, branches much more robust, leaves more coriaceous and more pubescent beneath 5–7 in. elliptic-ovate or -oblong base rounded or cordate, fem. fl. larger, sepals broader, ovary and style densely tomentose, capsule $\frac{1}{2}$ in. diam. (&c. as in specific character).—North Canara, *Stocks*; Yellapore, *Talbot.*

8. **G. desmogyne,** *Hook. f.*; branchlets leaves beneath and inflorescence tomentose, leaves 3–5 in. oblong or oblong-lanceolate acuminate, nerves very slender, male fl. very small shortly pedicelled, sepals elliptic, anthers 4–5, fem. sessile in dense globose tomentose clusters, style exserted obconico-clavate 6-toothed villous twice as long as the lanceolate acute sepals base narrower than the globose villous 6-celled ovary.

TENASSERIM, *Helfer* (*Kew Distrib.* 4867 and 4878)? on Moolyet, at 6000 ft., *Gallatly* (*in Herb. Hort. Calcut.*).

Branchlets rather stout. *Leaves* firm, hardly coriaceous, brown when dry, base acute, pubescence rather fulvous; nerves 8–10 pair, raised beneath, cross-nervules slender; petiole $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules subulate. *Male pedicel* $\frac{1}{8}$ in., perianth $\frac{1}{10}$ in. diam., sparsely tomentose, connectives very short. *Fem fl.* with style $\frac{1}{8}$ in. long. (*Capsules*, in the Moolyet specimens, rather deeply 6-lobed, $\frac{1}{3}$ in. diam., hoary, style in the deeply sunk top minute. *Seeds* with hemispheric backs and small flat sides).—This in foliage, &c, closely resembles *G. Wallichianum*, but the fem. fl. are very different.

9. **G. Gamblei,** *Hook. f.*; quite glabrous except the ovary, leaves 4–6 in. lanceolate acuminate base acute, male fl. clustered, anthers 4–5, fem. sessile in dense clusters, sepals oblong inner much smaller, style twice as long as the sepals stout clavate truncate top 4–5-lobed glabrous suddenly contracted above the depressed tomentose ovary, capsule large sessile depressed 4–5-lobed glabrous, style very short sunk in the depressed vertex. Phyllanthus Jussieuianus *in part*, *Muell. Arg. in DC. Prodr.* xv. ii. 304 (*the Sikkim plant*).

Lower hills and Terai of the SIKKIM HIMALAYA, *J. D. H., Gamble.*

Branches rather slender, terete, branchlets angled. *Leaves* 4–5 in., chartaceous, greenish and rather shining above, brownish beneath, base unequal-sided acute; nerves very slender indeed, nervules inconspicuous; petiole very short. *Male fl.* $\frac{1}{10}$ in. diam.; sepals oblong, obtuse; connectives short, acute. *Fem. fl.* sepals obtuse or subacute, erect; inner smaller; style at first globose, soon lengthening. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., pericarp very thin; style globose or oblong, not exserted, 4–5-lobed. *Seeds* obtusely trigonous.

10. **G. insulare,** *Hook. f.*; branchlets very slender tomentose, leaves 2–3 in. thin elliptic-lanceolate acuminate glabrous except the midrib beneath glaucous beneath, nerves very slender, male fl. pedicelled, sepals linear-oblong nearly glabrous, anthers 4–6, fem. minute shortly pedicelled, sepals very short tomentose on both surfaces, style exserted short columnar 3-fid glabrous narrower than the globose villous 3-celled ovary. Bridelia glauca, *Blume? Wall. Cat.* 7875.

PENANG, *Wallich.*

Branchlets long, pubescence rufous. *Leaves* dark brown above when dry, base acute or rounded, nerves 6–8 pair, cross-nervules faint; petiole $\frac{1}{10}$–$\frac{1}{8}$ in., slender; stipules subulate. *Male pedicels* capillary, $\frac{1}{3}$–$\frac{1}{2}$ in.; perianth $\frac{1}{8}$–$\frac{1}{6}$ in. diam.; outer sepals sparsely pubescent, inner smaller glabrous; connectives obtuse. *Fem. fl.* much smaller, in very small tomentose clusters. *Capsules* not seen.—A very distinct species, not taken up by Mueller.

11. **G. zeylanicum,** *A. Juss. Tent. Euphorb.* 107, t. 3; glabrous or

more or less pubescent or tomentose, leaves 4–8 in. coriaceous elliptic-oblong or oblong-lanceolate obtuse or obtusely cuspidate base rounded or cordate, male and fem. fl. in the same subsessile or peduncled clusters, sepals of both sexes short, anthers 5–6, style very short stout conical 6–8-toothed dilated into the globose 4–7-celled ovary, capsule shortly peduncled depressed rarely quite spherical globose terete or obscurely 8–14-angled or -lobed tipped with the short conic style. *Thwaites Enum.* 285; *Beddome Forester's Man.* 192. G. obliquum, *Dcne. Herb. Timor.* 481; *Miquel. l. c.* i. ii. 377. Bradleia zeylanica, *Gærtn. Fruct.* ii. 128, t. 109. B. obliqua, *Spreng. Syst.* iii. 19; *Wall. Cat.* 7863 A to E. B. mollis, *Wall. Cat.* 7858 (*not* 7859). Phyllanthus zeylanicus & obliquus, *Muell. Arg. in DC. Prodr.* xv. ii. 281 and 284. Agyneia obliqua, *Willd. Sp. Pl.* iv. 696; *Wall. Cat.* 7863 C, D. A. flexuosa, *Herb. Heyne.*—*Wall. Cat.* 7856.

The DECCAN PENINSULA from the Concan and the Circars southwards. ASSAM, SILHET and the MALAY PENINSULA, southwards to Malacca and Singapore, *Maingay*, &c. (*Kew Distrib.* 1357). CEYLON; in the central and southern parts of the island.—DISTRIB. Malay Islands.

A small tree; branchlets rather stout. *Leaves* drying green or brown, sometimes shining above, base often very unequal-sided; nerves 9–14 pairs, strong beneath; petiole stout, $\frac{1}{8}$–$\frac{1}{6}$ in.; stipules subulate or falcately-lanceolate. *Flowers* in axillary clusters or on short stout axillary or supra-axillary peduncles, females often most numerous in the clusters. *Capsule* $\frac{1}{3}$–$\frac{2}{3}$ in. diam. or rather more, glabrous or pubescent; epicarp often deciduous in narrow elliptic-lanceolate valves.—A very variable plant, to which I think the following are referable.

G. BAACANUM, *Miquel Fl. Ind. Bat. Suppl.* 449 (*Kurz For. Fl.* ii. 347); branches and leaves beneath densely rusty tomentose, ovary and style tomentose.—Malacca, Andaman Islands, &c.

G. NITIDUM, *Dalz. & Gibs. Bomb. Fl.* 235; *Muell. Arg. in Linnæa* xxxii. (1862) 60; *Beddome Forester's Man.* 192; quite glabrous, leaves shining above, flower-clusters usually in supra-axillary peduncles. G. canaranum, *Miquel Plant. Hohenack.* No. 743 *a*. G. canarum, *Beddome Forester's Man.* 192. Phyllanthus nitidus, *Muell. Arg. in Flora* xlviii. 371, and in *DC. l. c.* 282. P. canaranus, *Muell. Arg. l. c.* 371, and in *DC. l. c.* 284. Bradleia nitida, *Roxb. Fl. Ind.* iii. 699.—The Concan, Canara, Mysore and the Circars.—I think this is only a perfectly glabrous state of *zeylanicum*. Wallich's *Bradleia*, No. 7856, from Silhet, without fruit, is probably only a very large glabrous form of this; the flower peduncles arise from above the leaf axils.

12. **G. hirsutum,** *Muell. Arg. in Linnæa* xxxii. 61; branches petioles and leaves beneath densely softly white- or rusty-tomentose, flower clusters usually in supra-axillary peduncles. Bradleia hirsuta, *Roxb. Fl. Ind.* iii. 699; *Wall. Cat.* 7861 B; *Baill. Etudes Gen. Euphorb.* 638. B. mollis, *Wall. Cat.* 7859. Phyllanthus hirsutus, *Muell. Arg. in Flora* xlviii. 371, and in *DC. Prodr.* xv. ii. 283.

The SIKKIM TERAI and ASSAM to CHITTAGONG and PENANG, *Roxburgh*.

First described by Roxburgh from Calcutta Garden specimens said to have been from Penang, but Wallich says it is from China. Mueller must have seen imperfect specimens, for the male pedicels are very slender and far longer than the petioles, and the branches are far from "obscurely" puberulous. Following Roxburgh, he describes the capsule as six-seeded, which is, I suspect, a lapsus for 6-celled. Baillon describes the ovary as many-celled. Wallich has two plants called *B. mollis*, namely 7858, which has leaves glabrous beneath, and is, I think, *G. zeylanicum*, and 7859, which has narrower leaves pubescent beneath, and is *G. hirsutum*.

13. **G. Helferi,** *Hook. f.*; quite glabrous except the flowers, leaves 4–6 in. ovate or oblong-lanceolate obtuse apiculate, nerves slender, male fl. shortly pedicelled small, sepals broadly ovate, anthers 5, fem. numerous

clustered all pedicelled ovate, style twice as long as the sepals rather slender clavate tip 5–6-lobed, glabrous base narrower than the globose 5-celled glabrous ovary, capsule small globose terete. G. subscandens, *Kurz For. Fl.* ii. 344 (*not of Zollinger*). Phyllanthus Helferi, *Muell. Arg. in Flora* lxviii. 372, and in *DC. Prodr.* xv. ii. 286.

TENASSERIM, *Helfer* (*Kew Distrib.* 4874, 4879).

Branchlets black when dry, obscurely angled. *Leaves* brown when dry, rather thin; nerves 6–10 pair, raised beneath, cross-nervules distinct, often reticulate; petiole rather long, $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules triangular, cuspidate. *Male pedicels* $\frac{1}{8}$–$\frac{1}{6}$ in.; perianth $\frac{1}{8}$ in. diam.; connectives short, acute. *Fem. pedicels* $\frac{1}{8}$ in.; sepals ovate-lanceolate, acute, erect. *Capsule* $\frac{1}{3}$ in. diam., obscurely ribbed, style minute. *Seeds* ovoidly trigonous.

14. **G. brunneum,** *Hook. f.*; glabrous, branchlets stout angular, leaves (for the genus) long-petioled 4–6 in. thinly coriaceous oblong and cuspidate or oblong-lanceolate and acuminate, nerves slender, flowers minute crowded on the bracteolate ends of a stout peduncle, males shortly pedicelled, sepals unequal thick oblong obtuse, anthers 5–6, fem. subsessile, style stout cylindric-clavate glabrous 5-toothed twice as long as the ovate-oblong sepals base narrower than the villous 4–6-celled ovary, capsule globose or slightly depressed obscurely 4–6-lobed tipped with stiff cylindric style.

MALACCA, *Maingay* (*Kew Distrib.* 1358). SINGAPORE, *T. Anderson* (*Herb. Hort. Bot. Calc*).

Branchlets rigid. *Leaves* of a fine light red-brown when dry, base obtuse or subacute; nerves 6–10 pair, very slender, but raised beneath, cross-nervules distant, faint; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules triangular, coriaceous. *Peduncles* $\frac{1}{3}$ in., stiff; bracteoles minute; pedicels $\frac{1}{4}$ in. *Male perianth* $\frac{1}{10}$ in. diam.; connectives small, obtuse. *Fem. perianth* petaloid, about as large; pedicel lengthening in fruit. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., pericarp thick, valves 2-partite.—Habit of *G. zeylanicum*, from which the longer petioles distinguish it.

15. **G. oblatum,** *Hook. f.*; branches finely tomentose, leaves oblong or oblong-lanceolate obtuse or acute glaucous and glabrous or sparsely pubescent beneath, male pubescent, sepals obovate or subspathulate, anthers 4–6, fem. fl. subsessile minute, sepals short tomentose on both surfaces, style short stout conic and 4–5-celled ovary densely tomentose, capsule shortly pedicelled orbicular very depressed obscurely-lobed pubescent crown not intruded tipped by the minute style.

SIKKIM HIMALAYA, *Herb. Griffith* (*Kew Distrib.* 4853). TERAI, *J. D. H.* CACHAR, *Keenan.*

A low leafy tree; branches long, slender. *Leaves* 2–4 in., bases equal or subequal, rounded or subacute, brown when dry, quite glabrous in Cachar specimens; nerves very slender, nervules obscure; petiole short, pubescent; stipules slender. *Male fl.*; outer sepals obovate, inner narrower more spathulate; connectives free. *Fem. fl.* inconspicuous, minute; sepals obtuse. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., nearly terete, twice as broad as long.—A very distinct species.

16. **G. fagifolium,** *Miquel Plant. Hohenack.* No. 1465; quite glabrous, branchlets angular, leaves 2–3 in. thin obliquely ovate-lanceolate acuminate rather shining on both surfaces, nerves and reticulations strong, male fl. numerous in a cluster long-pedicelled, sepals broad, anthers 3–4, fem. fl. subsessile in dense capitate clusters, calyx shortly 6-lobed, style globosely 4–6-lobed much larger and broader than the very short glabrous 4–6-celled ovary, capsule orbicular depressed smooth. *Beddome Forester's Man.* 193. Phyllanthus fagifolius, *var.* concolor, *Muell. Arg. in Flora* xlviii. 373, and in *DC. Prodr.* xv. ii. 288.

NILGHIRI HILLS, *Metz.* (CHITTAGONG ?), PEGU and TENASSERIM, *Kurz, Helfer* (*Kew Distrib.* 4862).

Branchlets very smooth, angular and grooved. *Leaves* greenish or brown when dry, polished, base very acute and decurrent on the petiole; nerves 6–8 pair, distinct on the upper surface, raised on the lower; petiole $\frac{1}{10}$–$\frac{1}{8}$ in.; stipules triangular. *Male fl.* $\frac{1}{6}$ in. diam., pedicels $\frac{1}{2}$ in. or less, glabrous or puberulous; sepals obovate; connectives acute. *Fem. fl.* very much smaller, shortly stoutly pedicelled; sepals minute, very broadly ovate, acute or obtuse, margins translucent; style exserted, larger than all the rest of the flower, glabrous, tumid, ovarian cells hidden under the style.—I have seen no capsule, which Kurz describes (from Tenasserim specimens) as smooth and 3–4-coccous. I have described this, which is Mueller's var. *concolor*, from Metz and Hohenacker's specimens. I cannot identify any of my Chittagong plants with it, as Mueller does; nor have I seen his var. *cæsius* from the Nilgherries, for which he gives no further distinctive character than that the branchlets are "superne intense cæsiis," and leaves paler above.

17. **G. brachylobum,** *Muell. Arg. in Linnæa* xxxii. 62; robust, quite glabrous, leaves 4–6 in. thickly coriaceous oblong or ovate-oblong obtuse or obtusely acuminate, nerves few faint, flowers all shortly pedicelled, anthers 3–4, fem. fl. very shortly pedicelled, calyx cupular unequally 4–6-lobed, ovary obovoidly globose 4–8-lobed with 4–8 basal cells quite glabrous, capsule depressed-globose obscurely 3–5-lobed with a very large globose style. *Beddome Forester's Man.* 192. G. coriaceum, *Thwaites Enum.* 285 *in part.* Phyllanthus brachylobus, *Muell. Arg. in DC. Prodr.* xv. ii. 288.

CEYLON; in the Central Province, alt. 3–4000 ft., *Thwaites* (C.P. 3016).

Branchlets woody, bark very pale. *Leaves* the thickest of any Indian species, green or brown above, brown beneath, base acute or rounded; nerves 3–5 pair, very faint, nervules 0; petiole long for the genus, $\frac{1}{4}$–$\frac{1}{3}$ in., very stout; stipules triangular-lanceolate. *Flowers* few in a cluster, very coriaceous, male and fem. together. *Male pedicel* not much longer than the perianth (perhaps not evolute); sepals oblong, very coriaceous; connectives as long as the cells. *Fem. fl.* with spreading rounded calyx-lobes. *Capsule* $\frac{1}{3}$ in. diam., pericarp thick, red-brown when dry.

18. **G. macrostigma,** *Hook. f.*; glabrous, branches slender, leaves elliptic-oblong subacute thin very glaucous beneath, male fl. shortly pedicelled, sepals quite glabrous oblong, anthers 5, fem. fl. shortly pedicelled minute, calyx 6-lobed pubescent, style very large globose 5–6-cleft suddenly contracted into a very short pubescent base which is narrower than the 5–6-celled globose nearly glabrous ovary.

PENANG; at Penara Bukit, *Curtis.*

Branches elongate, terete, black when dry. *Leaves* 3–4 in., membranous, almost black above when dry, beneath white, base usually very unequal, one side rounded the other acute; nerves 5–6 pairs, very slender, nervules hardly any; petiole short, slender; stipules minute, triangular. *Male fl.* generally fewer than the fem., $\frac{1}{6}$ in. diam.; sepals subequal. *Fem. pedicels* short, slender, erect; calyx-lobes triangular-ovate, sparsely pubescent; stigma exserted, much larger than the perianth, lobes erect obtuse. *Fruit* unknown.—A very remarkable species with a peculiar stigma, not unlike that of the genus *Megististigma* (of this Order). The habit and foliage are those of *P. glaucifolius*, Wall.

19. **G. sclerophyllum,** *Hook. f.*; branchlets robust and leaves beneath and inflorescence rusty-tomentose or pubescent, leaves 3–6 in. stiffly coriaceous broadly ovate or oblong acute or cuspidately acuminate base broadly rounded or cordate, nerves very strong, flowers minute all hispid and pedicelled, male sepals oblong, anthers 5, style subcylindric 3–4-toothed hispid twice as long as the tubular obtusely irregularly toothed calyx base narrower than the hispid or glabrous ovary, capsule pedicelled

small depressed obscurely 4–5-lobed, style short conical. *Wall. Cat.* 7878 *in part*, and 7877 *in part* (*in Herbs. Benth. & Hook.*).

MALACCA, *Griffith* (*Kew Distrib.* 4845).

Leaves 2–3 in., broad, rigid and pale above when dry, grey-brown beneath, glabrous above with pubescent midrib; nerves 8–12 pair, spreading, much raised beneath, cross-nervules rather distant; petiole very short and stout; stipules oblong, hard. *Male fl.* $\frac{1}{8}$ in. diam., pedicel $\frac{1}{6}$–$\frac{1}{3}$ in., connectives acute. *Fem. fl.* on stouter pedicels, $\frac{1}{10}$ in. long including the style, very hispid as are the pedicels; calyx-teeth very short. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., nearly terete.—The specimens are not very good, and I find none in Wallich's Herbarium in the Linnæan Society's Rooms: I have seen too few fem. fl. to be confident as to their description. None of the other species are at all like it. The flowers are sometimes inserted on a very short peduncle. Near *G. zeylanicum* in many respects, but the stipules differ and the capsule is much intruded at the base and apex.

20. **G. Hohenackeri,** *Beddome Forester's Man.* 193; everywhere glabrous, leaves 2–4 in. thin elliptic- or ovate-lanceolate acutely or obtusely acuminate base acute, male fl. long-pedicelled, anthers 3, fem. sessile in capitate clusters, fem. calyx unequally 4–6-toothed, style broadly tumidly conical, concealing the glabrous 8-lobed ovary, capsule subsessile much depressed 6–8-lobed with a large globose smooth minutely 3–4-toothed style in the sunk top. Phyllanthus Hohenackeri, *Muell. Arg. in Flora* xlviii. 373, and in *DC. Prodr.* xv. ii. 288. Bradleia lanceolaria, *Wall. Cat.* 7855 C.

The CONCAN and CANARA; on the Bababoodan Hills and in woods at Mercara, &c., *Heyne*, &c. The CONCAN, very common, *Gibson* (*Herb. Ind. Or., Hf. & T.*, Nos. 33 & 41).

A tree, 12 ft. high; branches slender. *Leaves* usually dark brown when dry; nerves very slender, usually not raised, cross-nervules faint; petiole $\frac{1}{10}$–$\frac{1}{8}$ in.; stipules broadly triangular. *Male fl.* $\frac{1}{6}$–$\frac{1}{4}$ in. diam.; sepals linear-oblong; connectives half the length of the anther-cells, acute. *Fem. fl.* minute; calyx cup-shaped, lobes or teeth if few broad, rounded or subacute. *Capsule* $\frac{1}{4}$–$\frac{1}{2}$ in. diam., quite smooth, black, rather thinly crustaceous, style with rather raised margins, about $\frac{1}{6}$ the diameter of the capsule.—Near *G. fagifolium*, but the calyx differs.

21. **G. Ralphii,** *Hook. f.*; quite glabrous, branches slender, leaves 2–3 in. elliptic-lanceolate acuminate base acute, male fl. on slender pedicels, sepals linear-oblong, anthers 3, fem. fl. few minute sessile, calyx cupular unequally obtusely toothed glabrous, style subglobose or obovoid 4–5-lobed at the top broader than the very short villous 3–6-celled ovary, capsule subsessile depressed smooth faintly 3–6-lobed, style slightly sunk globose or shortly clavate.

The CONCAN; Mahableshwar Hills, *Ralph.* N. CANARA, near the Falls of Gair soppa, *Talbot.* TINNEVELLY, *Beddome.*

Branches and *leaves* pale brown when dry. *Leaves* not shining, thinly coriaceous, base usually unequal-sided and narrowed into the rather long (for the genus) petiole; nerves 8–12 pair, very slender, nervules indistinct; petiole $\frac{1}{8}$–$\frac{1}{6}$ in.; stipules triangular. *Male fl.* $\frac{1}{6}$ in. diam.; connectives obtuse. *Fem. fl.* very inconspicuous; style very much larger than the ovary. *Capsules* $\frac{1}{3}$ in. diam., crustaceous, crown very slightly sunk. *Seeds* hemispheric, red.—I assume the fruiting specimens collected by Mr. Talbot to be conspecific with *Ralphii*, which bear only male and fem. flowers. The plant much resembles in foliage and colour var. *Wightiana* of *G. ellipticum*, but the fem. calyx and ovary are altogether different.

22. **G. Johnstonei,** *Hook. f.*; branchlets tomentose, leaves 4–5 in. thin oblong or linear-oblong obtuse or obtusely acuminate glabrous or sparsely pubescent beneath, male fl. pedicelled, sepals nearly glabrous,

anthers 3, fem. minute sessile densely clustered, calyx turbinate pubescent irregularly 4–6-lobed or -toothed, style subglobose obscurely 4–5-lobed glabrous or puberulous broader than the pubescent or glabrous turbinate 4–5-celled ovary.

The DECCAN PENINSULA; Cochin, *Johnstone*. ? CANARA, *Herb. Stocks*.

Branches slender, terete, from densely ashy-tomentose to pubescent. *Leaves* dark brown when dry, very uniform in shape; base subequal, cuneate or obtuse; nerves 6–8 pair, very slender, cross-nervules mere lines; petiole $\frac{1}{10}$–$\frac{1}{8}$ in., slender, pubescent; stipules subulate-lanceolate from a broad base. *Male fl.* $\frac{1}{4}$ in. diam., nearly glabrous, outer sepals obovate-oblong, inner narrower more spathulate; connectives short. *Fem. fl.* in clusters, $\frac{1}{4}$ in. diam.; calyx-lobes variable in length; style rather depressed-globose, not narrowed into the ovary. *Capsule* unknown.

23. **G. nubigenum,** *Hook. f.*; branches and petioles pubescent, leaves 4–5 in. thin ovate or oblong acuminate glabrous above sparsely shortly hairy beneath with very strong nerves, male fl. shortly pedicelled sparsely pubescent, sepals oblong, anthers 3, fem. fl. subsessile in minute clusters, sepals very short acute spreading, ovary a very broad depressed 5–6-angled glabrous cone 10–12-celled at the very base, capsule shortly stoutly pedicelled depressed pubescent 10–12-lobed top deeply sunk with a large flattened orbicular 6–10-lobulate style.

SIKKIM HIMALAYA, alt. 5–7000 ft.; at Darjeeling, &c., *J. D. H., Clarke*.

A tree, 60 ft.; branchlets slender, pubescence pale; tips tomentose. *Leaves* greenish when dry, especially beneath, with 6–8 pair of arched nerves conspicuous above and raised beneath, cross-nervules irregularly anastomosing; base subequal, rounded acute or subcordate; petiole $\frac{1}{6}$ in., slender; stipules triangular. *Male fl.*; outer sepals and pedicels puberulous, inner glabrous; connective free, short. *Fem. fl.* very minute, pedicels short stout; ovary so broad that the hispidulous sepals are very spreading, cells in its narrowed concave base. *Capsule* $\frac{1}{3}$ in. diam., pericarp thinly crustaceous. *Seeds* ovoidly globose, pointed, red.—A very distinct species, inhabiting a higher elevation than any other of the genus.

24. **G. Wallichianum,** *Muell. Arg. in Linnæa* xxxii. 67; branchlets slender and flowers hoary-pubescent, leaves 2–3 in. thin elliptic-oblong obtuse or acute sparsely pubescent beneath, flowers small, anthers 3, fem. very numerous and minute sessile in globose or extended clusters, calyx-lobes very short triangular, style turgidly columnar or clavate cleft into 3–4 broad apiculate lobes, ovary 3–4-celled. Phyllanthus Wallichianus, *Muell. Arg. in DC. Prodr.* xv. ii. 309. Bridelia heterantha, *Wall. Cat.* 7873; *Baill. Etudes Gen. Euphorb.* 638 (*heteranthera*).

PENANG, *Wallich*.

Branchlets terete. *Leaves* brown when dry, base subequal, acute; nerves 6–8 pair, raised, slender; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., slender; stipules subulate. *Male fl.* from the clusters of fem., pedicel $\frac{1}{4}$–$\frac{1}{3}$ in. very slender hoary; sepals linear-oblong, connectives rather long. *Fem. fl.* $\frac{1}{20}$ in.; calyx-lobes not half the length of the stout short glabrous or hoary style, which is somewhat contracted over the ovary. *Capsule* unknown.—The fem. fl. are extremely minute.

25. **G. pycnocarpum,** *Beddome Forester's Man.* 194; everywhere glabrous, leaves 2–3 in. coriaceous elliptic oblong or oblong-lanceolate acute or acuminate base rounded and often very unequal-sided, male fl. shortly stoutly pedicelled, anthers 3, fem. sessile few in a cluster, calyx turbinate unequally 5–6-toothed or -lobed, style very stout columnar or subacute contracted at the base 3–5-cleft glabrous twice as long as the calyx, ovary glabrous 3–5-celled, capsule small glabrous depressed 3–6-lobed, style very

stout. G. coriaceum, *Thwaites Enum.* 285 (*in part*). Phyllanthus pycnocarpus, *Muell. Arg. in DC. Prodr.* xv. ii. 304.

Ceylon; Central Province, *Gardner*, *Thwaites* (No. 2560).

A small tree; branchlets rather stout, angular. *Leaves* dark brown when dry, often falcate, rarely greenish above; nerves 8–10 pair, slender, spreading, and hardly raised beneath; petiole $\frac{1}{10}$ in.; stipules small, triangular. *Male pedicel* $\frac{1}{10}$ in. (perhaps not fully lengthened); sepals oblong; connectives half as long as the cells. *Fem. fl.* coriaceous; ovary not very distinct from the style-base. *Capsules* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., quite smooth.—Mueller distinguishes this from *G. coriaceum* by the much smaller less coriaceous and unequal-based leaves, as well as by the fem. calyx, which is cleft to the middle but not below it into ovate acute lobes. It is very closely indeed allied to *G. Candolleanum*, and may prove to be a var. of that plant.

Var. *elliptica*; leaves elliptic obtuse base narrowed into the petiole, capsule $\frac{1}{3}$–$\frac{1}{2}$ in. diam.—Ceylon, Thwaites (No. 2560).—This is the supposed abnormal state of *G. Jussieuianum* alluded to by Thwaites (Enum. 286).

26. **G. arboreum,** *Wight Ic.* t. 1907; branchlets and petioles finely pubescent, leaves 4–6 in. ovate-oblong or -lanceolate acuminate reticulately nerved beneath, male and fem. flowers very shortly pedicelled, male sepals oblong, anthers 3, connectives long subulate, fem. calyx tubular unequally 6-toothed, style very stout columnar glabrous with the 4–6 ovarian cells at its very base, lobes 4–6 stout spreading obtuse, capsule large obscurely 4–6-lobed crowned with the stout long 4–6-lobed style. *Beddome Forester's Man.* 193. Phyllanthus arboreus, *Muell. Arg. in DC. Prodr.* xv. ii. 303.

Nilgherry and Shevagherry Hills; at Chispauray and Nadorputta, *Wight* (*Kew Distrib.* 2579, 2580), *Gardner*.

Branchlets rather slender, fuscously pubescent. *Leaves* rather thin, glabrous on both surfaces, base rounded or acute, pale or brown when dry; nerves slender, raised, nervules strongly reticulated; petiole $\frac{1}{10}$–$\frac{1}{8}$ in.; stipules triangular. *Male fl.* $\frac{1}{4}$ in. diam., pedicel about as long; connectives $\frac{1}{3}$ as long as the anther-cells. *Fem. fl.* larger, together with the exserted top of the style $\frac{1}{4}$ in. long; calyx rather swollen at the base, very coriaceous; ovary quite merged in the contracted base of the great style. *Capsule* $\frac{2}{3}$ in. diam., not much depressed, quite glabrous. *Seeds* large, $\frac{1}{3}$ in. long, trigonous, red.

27. **G. neilgherrense,** *Wight Ic.* v. ii. 29; glabrous or minutely hoary, leaves 3–5 in. coriaceous often falcately elliptic- or ovate-lanceolate obtuse or obtusely acuminate, male fl. stoutly pedicelled, sepals linear-oblong, anthers 3, connectives long, fem. fl. few large subsessile, calyx turbinate unequally 3–4-toothed, style very stout shortly clavate truncate with 4–6 large lobes and the 4–6 minute ovarian cells in its base, capsule sessile much depressed 4–6-lobed crowned with the large short lobulate style. G. Perottetianum, *Beddome Forester's Man.* 194. Lobocarpus Candolleanus, *Wight & Arn. Prodr.* 7; *Muell. Arg. in DC. Prodr.* xv. ii. 1254. Phyllanthus neilgherrensis, *Muell. Arg. in DC. l. c.* 303. P. Perotettianus, *Muell. Arg. in Linnæa* xxxiv. 69, and in *DC. l. c.* 307.—*Wight Cat.* 944.

Nilghiri Hills; at Nadorputtah, &c., *Wight* (*Kew Distrib.* 2662); Conoor, &c., alt. 7000 ft., *Clarke*.

A small tree, 12 ft. *Leaves* black when dry, or greenish above in fruit, 1–$1\frac{1}{2}$ rarely 2 in. broad, base usually acute; nerves 6–10 pair, slender, cross-nervules faint or strong; petiole $\frac{1}{8}$–$\frac{1}{4}$ in., quite glabrous; stipules triangular-lanceolate. *Flowers* of both sexes large for the genus; male fl. $\frac{1}{4}$–$\frac{1}{3}$ in. diam., on pedicels as long; sepals linear-oblong, rather thick; connectives as long as the anthers. *Fem. fl.* $\frac{1}{6}$ in. long; calyx very coriaceous, puberulous, teeth obtuse very unequal; style half exserted, lobes rather spreading into a 4–6 rayed crown. *Capsules* often as it were spicate on

short lateral and terminal leafless branchlets, $\frac{1}{3}$–$\frac{1}{2}$ in. diam., puberulous, pericarp thick, cocci thin; style very large, half exserted. *Seeds* rather large and broad.—Mueller's description of *Phyllanthus Perotettianus* agrees so well with this, that, coming as it does from the same locality, I do not hesitate to include it as a synonym.

28. **G. obscurum,** *Blume Bijd.* 585; finely tomentose, branchlets long slender, leaves bifarious 2–3 in. oblong obtuse or subacute ashy beneath, male fl. clustered shortly pedicelled, anthers 3 rarely 4–5, fem. subsolitary pedicels lengthening much in fruit, fem. sepals tomentose, ovary globose 6–7-celled and as well as the columnar truncate 5–6-toothed style densely tomentose, capsule globose terete not lobed tip contracted, style truncate. *Miquel Fl. Ind. Bat.* i. ii. 377. G. Roxburghianum, *Muell. Arg. in Linnæa* xxxii. 61. G. distichum, *Hance in Ann. Sc. Nat. Ser.* 4, xviii. 228. Phyllanthus obscurus, *Willd. Sp. Pl.* iv. 581; *Muell. Arg. in DC. Prodr.* xv. ii. 287. Bradleia pinnata, *Roxb. Fl. Ind.* iii. 700; *Wall. Cat.* 7866. Agyneia ? pinnata, *Miquel l. c.* 368.

PENANG, *Wallich*. PERAK, *King's Collector*.—DISTRIB. Sumatra, Java, China.

A shrub, 15 ft., or (in Perak) tree, 30–40 ft. *Leaves* of uniform size and at equal distances along the branches which are 12–18 in. long, rather coriaceous, pale opaque and puberulous above, upper base rounded, lower narrow acute; nerves slender; petiole $\frac{1}{10}$ in. *Sepals* of male oblong, obtuse, outer tomentose; anthers in a globose small column. *Fem. fl.* solitary amongst the males; sepals short, recurved. *Capsule* $\frac{1}{2}$ in. diam., finely tomentose, obscurely 12–14-angled or ribbed, tipped by the lobed style; pedicel slender, pubescent, $\frac{1}{2}$–$\frac{3}{4}$ in.; pericarp thick, almost woody. *Seeds* much compressed laterally.

29. **G. perakense,** *Hook. f.*; nearly glabrous, leaves 3–4 in. oblong-lanceolate acute quite glabrous, nerves very faint ascending, petiole slender, male fl. clustered shortly pedicelled, sepals broadly oblong glabrous, anthers 3, fem. fl. few shortly pedicelled, sepals of the male, ovary and short columnar round-topped, style densely tomentose, capsule pedicelled depressed globose 3-celled nearly glabrous very obscurely 6-lobed, style minute.

PERAK; at South Balang, *King's Collector*.

Branches very sparsely puberulous or glabrous, slender. *Leaves* thinly coriaceous, greenish above, brown beneath, hardly shining; base acute, unequal; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Male fl.* about $\frac{1}{10}$ in. diam.; pedicels $\frac{1}{6}$–$\frac{1}{3}$ in. *Fem. fl.* solitary amongst the males; style villous to the tip. *Capsule* $\frac{1}{2}$ in. diam. when ripe, almost terete, pericarp thick, with obscure raised lines at the sutures.

30. **G. sphærogynum,** *Kurz For. Fl.* ii. 346; everywhere glabrous, leaves 4–12 in. coriaceous lanceolate or ovate-lanceolate acuminate base acute, male fl. small pedicelled, sepals elliptic, anthers 3, connectives short, fem. densely clustered subsessile, sepals orbicular, ovary turbinate glabrous 4–6-celled, crowned by the subglobose entire style, capsule subsessile much depressed deeply 8–12-lobed with the large globose style in the depressed apex. Phyllanthus sphærogynus, *Muell. Arg. in Flora* xlviii. (1865) 375, and in *DC. Prodr.* xv. ii. 293. P. fagifolius *a*, *Muell. in DC. l. c.* 288 (*the Chittagong plant*). Bradleia lanceolaria, *Wall. Cat.* 7855 D.

EASTERN TROPICAL HIMALAYA; Sikkim, *Clarke*; Bhotan, *Griffith* (*Kew Distrib.* 4832/1). CHITTAGONG, *J. D. H. & T. T.* BURMA; from Pegu to Tenasserim, *Wallich*, &c.

A small tree with weeping branches, bark pale. *Leaves* very long and narrow, attaining 14 by 2 in., but sometimes only 4 by $1\frac{1}{2}$ in., smooth and often green when dry above, nerves slender; petiole stout, $\frac{1}{6}$–$\frac{1}{3}$ in.; stipules short, triangular. *Capsule* $\frac{1}{2}$ in. diam., shortly stoutly pedicelled, smooth, furrows extending to the large globose style.—Diseased flowers occur as enlarged woody turbinate bodies surmounted by 6

incurved rigid calyx-lobes, surrounding a central cone to which 3 imperfect anthers are adnate throughout their length. Similar malformed flowers occur in other species.

31. **G. nanogynum,** *Hook. f.*; quite glabrous, leaves 2–3 in. elliptic-oblong or -lanceolate obtusely acuminate shining, flowers minute, males shortly pedicelled, anthers 3, fem. sessile in dense axillary clusters, sepals oblong obtuse, ovary minute villous 3-celled covered by the depressed turbinate obscurely 3-gonous style, capsule very small globose 3–6-lobed 3-celled rusty-pubescent, style globose. Phyllanthus nanogynus, *Muell. Arg. in Flora* xlviii. (1865) 376, and in *DC. Prodr.* xv. ii. 293. Bradleia lanceolaria, *Wall. Cat.* 7855 K; *Baill. Etudes Gen. Euphorb.* 638.—*Wall. Cat.* 8003 D.

PENANG, *Wallich.* PERAK, *Wray*; at Goping, *King's Collector.* MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1359).

A large tree (*Wray*), branches terete and angular, glabrous to the tips. *Leaves* thin, dark red-brown on both surfaces when dry, base acute or cuneate; nerves very slender, suberect; petiole $\frac{1}{10}$–$\frac{1}{8}$ in.; stipules subulate from a triangular base. *Flowers* very small in axillary clusters; connectives short, obtuse. *Fem. fl.* depressed; sepals very minute, leaving the broad style exposed. *Capsule* $\frac{1}{6}$–$\frac{1}{4}$ in. diam., lobes rounded, not ribbed.—The bark is used for tanning (*Wray*).

32. **G. desmocarpum,** *Hook. f.*; branchlets pubescent, leaves 3–6 in. elliptic-oblong obtuse or subacute sparsely pubescent on the nerves beneath, male fl. minute in axillary clusters, anthers 3, fem. fl. sessile, sepals unequal tomentose, style hemispheric 3-lobed glabrous as broad as the pubescent ovary, capsules very small in dense clusters pedicelled much depressed deeply 6-lobed hoary, style very short erect lobulate.

PENANG, *Herb. Hook.* PERAK, in dense jungles, *Wray, King's Collector.*

A tree, 50–70 ft. (in Perak). *Leaves* rather coriaceous, dark brown when dry, somewhat shining above, base subacute; nerves slender, raised, ascending; petiole $\frac{1}{6}$ in.; stipules not seen. *Flowers* pubescent. *Capsules* 8–10 in a cluster, subsessile, $\frac{1}{4}$ in. diam. or less.—I am doubtful about the affinities of this species.

33. **G. Thomsoni,** *Hook. f.*; everywhere glabrous, leaves 2–4 in. elliptic or oblong acute or obtuse very glaucous beneath, male fl. few minute, anthers 3, fem. fl. numerous fascicled all very long pedicelled, sepals very minute, style a depressed fleshy 3-grooved cone capping and nearly as broad as the low 3-lobed ovary, capsules on rigid slender pedicels small depressed 3–4-celled and lobed or obscurely 6–8-lobed, sunken top with a globose rugose style or a very depressed smooth cone. Phyllanthus Thomsoni, *Muell. Arg. in Flora* xlviii. (1865) 375, and in *DC. Prodr.* xv. ii. 293; *Gamble Man. Ind. Timb.* 352.

KHASIA MTS., alt. 3–4000 ft., *Griffith* (*Kew Distrib.* 4846), *J. D. H. & T. T.*, &c.

A small tree, branches slender. *Leaves* very uniform, green above and bluish beneath when dry; nerves 6–8 pair, capillary, nervules very faint reticulate; petiole $\frac{1}{6}$ in. *Male fl.* rare, scattered amongst the fem., pedicel very short; sepals elliptic; connectives short. *Fem. fl.* very numerous, $\frac{1}{16}$ in. diam.; pedicels slender but rigid, of uniform length; sepals very minute, acute; style fleshy, obscurely trigonous with a tricrural furrow at the apex. *Capsules* $\frac{1}{3}$ in. diam., very smooth, black when dry, impressed at the top and base, thinly crustaceous; lobes rounded with a mesial furrow; style sometimes persistent as a globose fleshy body, at others altogether disappearing, when the disk of the capsule is occupied by a low smooth cone with 3 minute points. —The variable nature of the fruiting style throws doubt on the value of this organ as a guide to other species: this is a very distinct one and easily recognized by the clusters of long-pedicelled fem. fl. and the styles.

34. **G. lævigatum,** *Hook. f.*; quite glabrous, branchlets very slender angled, leaves 1–1½ in. obliquely elliptic- or ovate-oblong obtusely or acutely acuminate subglaucous beneath, nerves very faint, flowers all fascicled very minute, anthers 3. ovary glabrous globose 5-celled, style of 4–6 minute points, capsule small shortly pedicelled orbicular depressed 10-lobed crown deeply sunk, style very minute. Bradleia lævigata, *Wall. Cat.* 7853. Phyllanthus lævigatus, *Muell. Arg. in Flora* xlviii. (1865) 374, and in *DC. Prodr.* xv. ii. 289.

Tenasserim, *Helfer* (*Kew Distrib.* 4844). Perak, *King's Collector.* Penang, *Wallich, Curtis,* &c. Malacca, *Griffith* (*Kew Distrib.* 4844, 4860, 4855). Singapore, *Schomburgk, Hullett.*

Branches smooth, terete, branchlets filiform, glabrous to the tips. *Leaves* greenish above, shining, base equal or one side rounded the other acute; petiole slender; stipules minute, triangular. *Male fl.* $\frac{1}{16}$–$\frac{1}{12}$ in. diam., pedicels slender; sepals linear oblong. *Sepals* of fem. oblong, obtuse. *Capsules* $\frac{1}{3}$ in. diam., minutely dotted.

35. **G. microbotrys,** *Hook. f.*; perfectly glabrous, leaves 2–3 in. elliptic- or ovate-oblong subacute or obtusely cuspidate nerves very slender, flowers in peduncled cymes very shortly pedicelled, males very minute, anthers 3, ovary globose glabrous 3-celled, style obscure with 4–6 points, capsule very small depressed turbinately globose faintly 3- or 6-lobed glabrous, style of 4–5 minute projections.

Malay Peninsula; Perak, Singapore, &c., *King's Collector.*

A tree, 30–50 ft. (Perak); branches spreading and pendulous; branchlets slender, angular; whole plant black when dry. *Leaves* thinly coriaceous, rather shining on both surfaces, nerves 6–8 pair; petiole slender, $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules minute, broad. *Flowers* on slender axillary peduncles $\frac{1}{2}$–$\frac{3}{4}$ in. long and branched at the top; male and fem. mixed and all pedicelled, males most shortly. *Male fl.* $\frac{1}{20}$ in. long; outer sepals broadly ovate, inner almost rounded; anther-column rather broad, connectives obtuse. *Fem. calyx* as in the male; ovary with a very inconspicuous style. *Capsule* $\frac{1}{6}$–$\frac{1}{4}$ in. diam., 6-ribbed, black, top slightly depressed.

36. **G. malabaricum,** *Beddome Forester's Man.* 194; nearly glabrous except the flowers, leaves 3–4 in. elliptic-oblong or lanceolate acuminate, male fl. long pedicelled, sepals sublinear, anthers 3, fem. minute sessile in dense clusters. sepals 6 linear-oblong obtuse pubescent or glabrous, style between columnar and conic gradually swelling into the globose 3–5-celled ovary both tomentose tip truncate 4–7-toothed, capsules shortly pedicelled depressed obscurely 3–5-lobed puberulous, style very minute conical. Phyllanthus malabaricus, *Muell. Arg. in Linnæa* xxxiv. 69, and in *DC. Prodr.* xv. ii. 305.

Western Ghats; from the Concan to the Nilghiri Hills (*Herb. Ind. Or., H.f. & T.*. No. 40, 42, 43).

Branches slender, sometimes slightly pubescent. *Leaves* rather coriaceous when the plant is in fruit, greenish when dry with rather strong nerves, thinner and brown when in flower, base acute or obtuse; petiole $\frac{1}{10}$ in.; stipules subulate. *Male fl.* from the tufts of female, $\frac{1}{10}$ to $\frac{1}{6}$ in. diam.; pedicel very slender; anthers free, connectives rather long, subulate. *Fem. fl.* minute; sepals erect or tips recurved. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., not deeply sunk at the top, lobes broad, with a faint mesial furrow, crustaceous.—Very near *G. ellipticum.*

37. **G. assamicum,** *Hook. f.*; branches and leaves quite glabrous, leaves 4–6 in. elliptic-ovate -oblong or lanceolate subcaudate-acuminate brownish purple beneath base usually acute nerves firm, male fl. long-pedicelled glabrous, sepals narrow, anthers 3(–5), fem. densely clustered

subsessile, sepals linear-oblong, style very short columnar, ovary globose glabrous or pubescent, capsules small densely clustered sessile depressed faintly 4-lobed, tipped with the minute style glabrous or puberulous. Phyllanthus assamicus, *Muell. in Flora* xlviii. (1865) 378, and in *DC. Prodr.* xv. ii. 297. P. Andersonii, *Muell. Arg. in Flora* lv. (1872) 3 (*fide King*).

WESTERN HIMALAYA; Kumaon, *Edgeworth.* BENGAL; at Dacca, *Clarke.* Foot hills and low valleys of the HIMALAYA from Sikkim eastwards to UPPER ASSAM, CACHAR and CHITTAGONG. *Jenkins, Griffith* (*Kew Distrib.* 4848, 4871, 4873, 4882), &c. UPPER BURMA, *Griffith.*

An umbrageous small tree, youngest shoots glabrous. *Leaves* rather coriaceous, always discoloured, smooth above, nerves and cross-nervules raised beneath; petiole $\frac{1}{10}$ in., stout; stipules subulate from a triangular-lanceolate base. *Male fl.* $\frac{1}{6}$ in. diam., clustered; pedicels capillary, $\frac{1}{2}$–$\frac{3}{4}$ in.; sepals somewhat dilated upwards; connectives large, acute. *Fem. fl.* minute, very many in a cluster; pedicels very short and sepals and ovary glabrous or puberulous. *Capsules* often forming clusters along all the axils of the branchlets, sessile or on short slender pedicels, $\frac{1}{3}$ in. diam., quite smooth and usually glabrous, obtusely 4- rarely 3- or 5-angled and celled; pericarp thin, crustaceous. *Seeds* hemispheric, red.—A common N.E. Indian species, easily recognized amongst the glabrous ones by the small usually obscurely 4-lobed thin walled capsules with a minute style in their hardly depressed top. Leaves rarely 7 by 4 in. in Daccan specimens.—Specimens of *Andersonii* from the Calcutta Herbarium are identical with *assamicum.* Mueller describes the anthers as 3–5, but I find only 3.

38. **G. Daltoni,** *Kurz For. Fl.* ii. 344; quite glabrous, branches slender, leaves coriaceous 2–4 in. lanceolate or oblong-lanceolate acuminate shining above purplish brown beneath, base acute, male fl. sessile, sepals ovate-oblong silky within, anthers 3, fem. clustered sessile, ovary globose 4–6-celled pubescent soon glabrous, style exserted stout slightly clavate tip with 4–6 rounded lobes, capsules subsessile depressed 8–10-lobed, style stout clavate lobed deciduous. *Beddome Forester's Man.* 195. Phyllanthus Daltoni, *Muell. Arg. in Flora*, and in *DC. Prodr.* xv. ii. 310.

SIKKIM HIMALAYA, at the foot hills, *J. D. H., King.* BURMA, *Wallich.* TENASSERIM, at Mergui, and PEGU, *Griffith, Kurz.*—DISTRIB. Yunan, *J. Anderson.*

A deciduous small tree or shrub (*Kurz*). *Leaves* brown on both surfaces when dry, or green above, smooth; nerves very slender, raised; petiole $\frac{1}{10}$ in.; stipules ovate, acute. *Fem. sepals* quite glabrous without, a little pubescent within; inner smaller, subspathulate. *Style* glabrous or tomentose below. *Capsules* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., reddish brown, lobes smooth; pericarp very thin.—Mueller gives the Nilghiri Mountains as a locality for this, but I have seen no specimens.

39. **G. rigidum,** *Muell. Arg. in Linnæa* xxxii. 67; quite glabrous, leaves 3–4 in. coriaceous elliptic-oblong or lanceolate base acute, male fl. small, sepals glabrous, anthers 3, fem. all pedicelled few in a cluster, sepals oblong pubescent within below the middle, style a little longer than the sepals shortly columnar or fusiform 3–4-cleft constricted above the globose glabrous 3–4-celled ovary, capsule depressed-globose smooth 6–8-lobed crowned by the short stout exserted style. G. Jussieuianum, *Thwaites Enum.* 285 (*excl. C.P.* 2560); *Muell. Arg. l. c.* 67; *Beddome Forester's Man.* 194. G. Thwaitesi, *Muell. Arg. l. c.* 66. Gynoon rigidum, *A. Juss. Tent. Euphorb.* 107, t. 3, f. 9. G. triandrum, *Wight & Arn. in Wight Ic.* t. 1908. G. Jussieuianum, *Wight in text*, v. ii. 29. ? Phyllanthus stellatus, *Retz Obs.* v. 29; *Muell. Arg. in DC. Prodr.* xv. ii. 305. P. Jussieuianus, *Muell. Arg. in DC. l. c.* 304.

CEYLON; ascending to 4000 ft., *Kœnig*, &c.

Branchlets rather slender, not flexuous, angled. *Leaves* rarely 2 in. broad, dark brown or black when dry; nerves 6–8 pairs, very slender, cross-nervules faint reticulate; petiole $\frac{1}{10}$–$\frac{1}{6}$ in., stipules triangular. *Male pedicels* slender, $\frac{1}{4}$–$\frac{1}{2}$ in.; sepals linear-oblong; connectives rather long. *Fem. pedicel* $\frac{1}{10}$–$\frac{1}{8}$ in., about as long as the flower, thickened upwards; style about twice as long as the perianth, tip contracted till the lobes spread. *Capsule* very variable in size, $\frac{1}{3}$–$\frac{1}{2}$ in. diam., rather deeply lobed.—I doubt this being the plant which Retz called *P. stellatus*, a name in no way applicable to this, but very much so to some other Ceylon species, in which the long styles spreading from the axils of the leaves have a stellate appearance. As Thwaites truly observes, Retz's description is far too imperfect for even the approximate identification of his *stellatus*. Mueller unites a Sikkim plant of mine with this, but I do not recognize it.

40. **G. coriaceum,** *Thwaites Enum.* 285; quite glabrous, leaves 2–4 in. coriaceous elliptic-oblong or almost orbicular obtuse nerves raised and reticulate beneath, male fl. shortly pedicelled, anthers 3 connectives long, fem. sessile densely clustered, style cylindric stout glabrous top 3-lobed about twice as long as the oblong free sepals, base narrower than the globose glabrous 3-celled ovary, capsule depressed 6-lobed glabrous with the cylindric style in its sunken top. *Beddome Forester's Flor.* 194.

CEYLON; alt. 3–4000 ft., *Walker, Thwaites.*

Branchlets flexuous, rather stout, angled. *Leaves* usually of a rich red brown beneath when dry; nerves 4–5 pair, cross-nervules reticulated; petiole very short; stipules triangular. *Male* and *fem. fl.* generally in separate clusters; male pedicels $\frac{1}{6}$–$\frac{1}{4}$ in.; sepals coriaceous; connectives nearly as long as the cells. *Fem. fl.* sepals free to the base, coriaceous; style often slightly curved. *Capsule* $\frac{1}{3}$ in. diam., black when dry; lobes 3, rounded, each slightly again lobed.

41. **G. ellipticum,** *Wight Ic.* t. 1906; everywhere quite glabrous or fem. fl. and fruit sparsely pubescent, leaves 3–5 in. coriaceous elliptic-oblong or lanceolate acute or acuminate often unequal-sided base acute, male pedicels rather short, sepals linear-oblong, anthers 3, fem. fl. sessile capitately clustered. sepals oblong obtuse or subacute, style short stout conical glabrous 6-toothed narrower than the globose tomentose 4–6-celled ovary, capsule very shortly pedicelled depressed obscurely 4–6-lobed glabrous or puberulous. G. diversifolium, *Beddome Forester's Man.* 193. Phyllanthus diversifolius, *var.* β. longifolia, *Muell. Arg. in Flora* xlviii. (1865) 378, and in *DC. Prodr.* xv. ii. 298.

SOUTH CONCAN, *Law.* MALABAR, *Wight* (*Kew Distrib.* 2576 and 2663).

A shrub; branchlets slender, angled. *Leaves* variable, sometimes very unequal-sided, narrowed into the short glabrous petiole; nerves slender, raised beneath, cross-nervules very obscure; stipules triangular-hastate, often falcate. *Male pedicels* very slender, always glabrous, as are the flowers. *Male fl.* minute, black when dry. *Capsule* $\frac{1}{2}$ in. diam., pubescent in Wight's figure.—Very near *G. malabaricum*, if not a variety of that plant. I find no difference in the styles. *G. ellipticum* has broader stipules, shorter fem. sepals, longer connectives, and larger fruit.

VAR. *Wightiana*; leaves smaller 3 by $\frac{3}{4}$ in. caudate-acuminate, stipules subulate. P. diversifolia, *var.*, and Wightiana, *Muell. Arg. l. c.* G. diversifolium, β. Wightiana, *Beddome Forester's Man.* 193. Bradleia Wightiana, *Wall. Cat.* 7862.

42. **G. glaucifolium,** *Muell. Arg. in Linnæa* xxxiv. 65; branchlets very slender and leaves quite glabrous, leaves $2\frac{1}{2}$–$3\frac{1}{2}$ in. elliptic or elliptic-ovate or -oblong acuminate base very unequal, petiole slender, flower very minute, male shortly pedicelled glabrous, anthers 3, fem. subsessile, sepals hispid, style conical obtuse glabrous longer than the puberulous ovary, capsule depressed turbinate 3–4-angled glabrous crown flat. *Kurz For. Fl.*

ii. 345. Phyllanthus glaucifolius, *Wall. Cat.* 7923; *Muell. Arg. in Flora* xlviii. (1865) 378, and in *DC. Prodr.* xv. ii. 298.

TENASSERIM; at Martaban, *Wallich*; Mergui, *Griffith.*

Branches terete, smooth; branchlets long, glabrous to the tips. *Leaves* thin, dark above when dry, dirty white beneath, upper base rounded, lower acute; nerves 8–10 pair, exceedingly slender, cross-nervules faint; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules triangular. *Flowers* in minute axillary clusters; male $\frac{1}{8}$ in. diam., pedicels as long; sepals of both sexes oblong, obtuse; fem. fl. $\frac{1}{10}$ in. long, including the exserted style.—I have seen no capsules, and there is neither flower nor fruit in Wallich's specimens, which are the only ones mentioned by Mueller, who, however, describes the capsules as above; as does Kurz, who adds that they are $\frac{1}{3}$–$\frac{1}{4}$ in. diam., and sometimes pruinose. Kurz further describes the sepals of both sexes as smooth, but they are hispid in Griffith's specimens (a character of no moment in the genus). The style at length becomes twice the length of the sepals. In Wallich's specimens the branches are very glaucous. It resembles 18. *G. megastigma.*

43. **G. andamanicum,** *Kurz For. Fl.* ii. 346; glabrous except the puberulous flowers, branchlets angular and compressed, leaves 3–4 in. thin orbicular ovate or broadly elliptic-oblong glaucous beneath, male fl. small on short slender pedicels, sepals oblong obtuse puberulous, anthers 3, fem. fl. minute clustered sessile, style thick conical truncate nearly as broad as the tomentose 4–6-celled ovary tip 5–6-lobed, capsule large much depressed strongly 8–12-lobed hispidly pubescent, style very small conical sunk in the intruded crown.

SOUTH ANDAMAN ISLANDS; rare, *Kurz.*

An evergreen tree; branchlets long, stout, and leaves grey-black when dry. *Leaves* very glaucous beneath, base rounded or suddenly acute; nerves 5–7 pair, very slender, arched, nervules few distant; petiole $\frac{1}{3}$ in., rather slender; stipules subulate. *Male pedicels* $\frac{1}{4}$ in; perianth $\frac{1}{10}$ in. diam.; connectives acute. *Capsules* sessile, $\frac{1}{2}$–$\frac{3}{4}$ in. diam., thinly crustaceous, crown sunk. *Seeds* large, red, irregularly trigonously ovoid.

44. **G. velutinum,** *Wight Ic.* t. 1907/2; branches petioles leaves beneath and inflorescence more or less (sometimes densely) pubescent or tomentose, leaves 2–5 in. from orbicular to ovate elliptic or oblong obtuse or subacute rarely narrower and acuminate, male fl. shortly pedicelled, sepals sparsely hairy, anthers 3, fem. subsessile or very shortly pedicelled, sepals oblong, style stout enlarged at the truncate toothed tip and 4–7-celled ovary tomentose, capsule depressed globose 4–7-celled and lobed pubescent, style short in the depressed top. *Beddome Forester's Man.* 195. Phyllanthus velutinus, *Muell. Arg. in DC. Prodr.* xvi. ii. 309. P. nepalensis, *Muell. Arg. in Flora* xlviii. (1865) 375, and in *DC. l.c.* 291; *Brandis For. Fl.* 453. *Kurz For. Fl.* ii. 344. Bradleia ovata, *Wall. Cat.* 7852; *Baill. Etudes Gen. Euphorb.* 638.

Hot valleys of the HIMALAYA; from Kashmir, *Clarke*, eastwards to BURMA and the KHASIA MTS., alt. 3000 ft., *Griffith*, &c. DECCAN PENINSULA from the Concan to the Nilghiri Hills.

A small tree, 20–30 ft., very variable as to the pubescence of the branches and leaves. Those in western and southern examples are clothed with white or tawny tomentum, in eastern ones they are much more glabrous. *Leaves* rather coriaceous or thin, puberulous or glabrate above; nerves rather strong beneath, as are often the cross-nervules; petiole $\frac{1}{10}$–$\frac{1}{8}$ in., stout; stipules triangular. *Male fl.* $\frac{1}{10}$–$\frac{1}{6}$ in. diam.; sepals oblong; connectives short. *Fem. fl.* usually densely clustered; sepals of the male; style variously toothed, tip glabrous. *Capsule* variable, $\frac{1}{3}$–$\frac{2}{3}$ in. diam.—The eastern form might be regarded as a variety with more glabrous leaves and smaller flowers, approaching closely to *G. Heyneanum* in habit and foliage, and specimens may be found to unite these species. Wallich's examples of *B. ovata* are in a very

young state, in which I think that the styles are either undeveloped or arrested in development, whence Mueller's reference of it to a section with depressed or deplanate styles.

45. **G. Heyneanum,** *Wight Ic.* v. ii. 29 and t. 1908 (*right-hand figure*); branchlets slender tomentose, leaves 2–5 in. thin elliptic or oblong obtuse acute or cuspidate sparsely pubescent beneath, male fl. small shortly pedicelled, anthers 3, fem. longer pedicelled clustered, sepals narrow subacute, style slender exserted clavate truncate pubescent narrower than the pubescent 4–5-celled ovary, capsules pedicelled depressed 8–12-lobed 4–5-celled glabrous or puberulous, style very short. *Beddome Forester's Man.* 195. Gynoon Heyneanum, *Wight & Arn. in Dietr. Synops.* v. 388. Phyllanthus Heyneanus, *Muell. Arg. in DC. Prodr.* xv. ii. 311.

Lower Bengal, from the foot of the Sikkim and Bhotan Himalaya southwards to the Circars.

A tree, 30–40 ft. *Leaves* almost membranous, brown when dry, base acute, above glabrous except the midrib; nerves slender, tomentose beneath, nervules distinct; petiole $\frac{1}{10}$ in., tomentose; stipules triangular. *Male pedicels* $\frac{1}{10}$–$\frac{1}{3}$ in., and linear-oblong sepals hoary-pubescent. *Fem. pedicels* slender, as long as the flower or longer; style when fully developed twice the length of the perianth, base hardly contracted. *Capsules* $\frac{1}{3}$ in. diam., at length glabrous.—Very near to states of *G. velutinum*, but more slender, with less tomentose leaves, much more slender styles, and smaller flowers and seeds. The leaves of both seem to be caducous in drying.

46. **G. acuminatum,** *Muell. Arg. in Linnæa* xxxii. 68; branches long slender and leaves beneath hoary-pubescent, leaves 4–6 in. lanceolate acuminate glaucous beneath, flowers all pedicelled, fem. densely fascicled, sepals very unequal, anthers 3, style clavate truncate 4–6-lobed puberulous twice as long as the sepals, capsule very small long-pedicelled depressed deeply 4–6-lobed hoary, style minute in the deeply sunk top. Briedelia acuminata, *Wall. Cat.* 7885. Phyllanthus bicolor, *Muell. Arg. in DC. Prodr.* xv. ii. 311; *Brandis For. Fl.* 453; *Gamble Man. Ind. Timb.* 353.

Nepal, *Wallich*; Sikkim, alt. 5–7000 ft., *J. D. H.*, &c. Khasia Mts., alt. 4–6000 ft., *Griffith*, &c.

An evergreen tree; branchlets often 2 ft. long, drooping, tips tomentose. *Leaves* glabrous above except the midrib and greenish when dry, grey-white beneath with strong slanting nerves, nervules few faint; petiole very short, pubescent; stipules triangular-ovate, acuminate. *Male fl.* small, nearly glabrous; sepals obovate; connectives umbonate. *Capsules* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., lobes subglobose.—A very well marked species.

47. **G. superbum,** *Baill. Etudes Gen. Euphorb.* 638; branchlets very stout and leaves beneath and inflorescence densely tomentose, leaves 3–10 in. thickly coriaceous orbicular elliptic or ovate-oblong tip rounded or cuspidate and obtuse base broadly rounded or cordate, nerves very strong, flowers small very densely clustered on stout peduncles, male on long capillary pedicels, sepals linear-oblong, anthers 3, fem. sessile or shortly pedicelled, sepals oblong hispid, ovary 3-celled and style together forming a short hispid cone 3-cleft at the top about twice as long as the sepals, capsules pedicelled very small obtusely 3-lobed pubescent. *Muell. Arg. in Linnæa* xxxii. 64. Phyllanthus superbus, *Muell. Arg. in Flora* xlviii. (1865) 375, and in *DC. Prodr.* xv. ii. 292. G. dasyphyllum, *Miquel Fl. Ind. Bat. Suppl.* 451. Bradleia Finlaysoniana, *Wall. Cat.* 7860.

PENANG, *Wallich, Maingay* (*Kew Distrib.* 1349, 2521). PERAK, *Scortechini, King's Collector.* MALACCA, *Hervey.* SINGAPORE, *Schomburgk*, &c.—DISTRIB. Borneo, Java.

A tree, 30–40 ft.; branchlets as thick as a swan's quill. *Leaves* on Singapore specimens rounded, 2½–3½ by 2½–3 in., in others longer and 3–4 in. diam., dull greenish brown or grey when dry and very rigid, scaberulous above with imperfect nerves, beneath thickly softly tomentose with 6–12 pairs of very strong arched spreading nerves and reticulate cross-nervules; petiole very short and thick; stipules long, slender, subulate from a triangular base. *Peduncles* ⅓ in., stout. *Male pedicels* ½–¾ in., very many, capillary; perianth ⅙ in. diam.; connectives acute. *Fem. fl.* minute. *Capsules* ⅙–⅓ in., pericarp and cocci very thin.

48. **G. leiostylum,** *Kurz For. Fl.* ii. 345; branchlets slender and glabrous or hispidulous, leaves 2–3 in. thin ovate elliptic oblong or oblong-lanceolate rather abruptly narrowed to an obtuse or acuminate point glabrous, male fl. long pedicelled, anthers 3, fem. fl. solitary or few and clustered minute sessile, sepals oblong obtuse, ovary 3-celled villous, style exserted glabrous narrowly conical tip acutely 3-cleft, capsule small sessile or shortly pedicelled depressed 6-lobed hoary, style very minute. Bradleia coronata, *Wall. Cat.* 7854 (the Singapore plant).

PEGU to TENASSERIM, ascending to 4000 ft., *Helfer* (*Kew Distrib.* 4861), *Griffith* (*Kew Distrib.* 4854), *M'Lelland, Kurz*, &c. MALACCA, *Griffith* (*Kew Distrib.* 4844, 4877). SINGAPORE, *Wallich.*

An evergreen shrub or small tree. *Leaves* dark brown when dry, shining above and sometimes on both surfaces, base rounded or very unequal-sided, one side acute the other rounded; petiole slender, ⅒–⅙ in.; stipules subulate from a triangular base. *Male pedicels* glabrous or pubescent, ¼–⅓ in.; sepals linear-oblong; connectives rather long, acute, glabrous or hispidulous. *Fem. sepals* lanceolate, acute, glabrous or puberulous. *Capsule* ¼ in. diam., crustaceous. *Seeds* hemispheric.—Kurz describes the leaves beneath petioles and midrib as pubescent. This is not so in a specimen named by himself, in which the leaves are very like those of *G. lævigatum.*

49. **G. khasicum,** *Hook. f.*; everywhere quite glabrous, leaves 3–4 in. rigid elliptic acuminate, male fl. few, sepals lanceolate obtuse, anthers 3, fem. few clustered subsessile, sepals ovate-oblong subacute very unequal, style 2–3 times as long as the sepals subcylindric 3-grooved acutely unequally 2–3-toothed gradually dilated into the glabrous ovary, capsule very shortly pedicelled depressed 3–6-lobed quite glabrous, style as long stout deciduous. Phyllanthus khasicus, *Muell. Arg. in DC. Prodr.* xv. ii. 311.

SIKKIM HIMALAYA, alt. 4000 ft., *J. D. H.*, &c. KHASIA HILLS, *Griffith* (*Kew Distrib.* 4357, 4851), &c.

An umbrageous dark green tree, 50 ft., branches woody, branchlets angled. *Leaves* when dry pale above, grey brown beneath, base acute and decurrent on the short stout petiole; nerves 5–6 pair, slender, arched; stipules triangular-ovate. *Male fl.* shortly pedicelled; connectives umbonate. *Fem. sepals* erect, coriaceous. *Capsule* ⅓ in. diam., lobes rounded. *Seeds* hemispheric.—The style is hardly ever clavate.

50. **G. nemorale,** *Thwaites Enum.* 286; usually quite glabrous or nearly so, leaves 4–7 in. very coriaceous lanceolate or oblong-lanceolate acuminate base acute or rounded, nerves 3-4 pairs very obliquely ascending, male fl. shortly pedicelled, anthers 3, connectives very long, fem. fl. densely clustered subsessile or pedicelled glabrous or pubescent, sepals narrowly oblong, style stout columnar slightly curved 3-fid glabrous 3–4 times longer than the narrowly oblong sepals, base contracted above the globose 3–4-celled glabrous ovary. *Beddome Forester's Man.* 195. Phyllanthus nemoralis, *Muell. Arg. in DC. Prodr.* xv. ii. 312.

CEYLON, *Walker*; Pasdun Corle, *Thwaites*.

Branchlets stout, not flexuous, terete, smooth, sometimes shortly hairy. *Leaves* very smooth, greenish brown when dry; nerves 4–5 pair, very slender, ascending, lower almost parallel to the margin, nervules indistinct; petiole very short and stout; stipules triangular. *Flowers male* and *fem.* together in rather dense clusters, from which the long stout styles spread stellately. *Male pedicel* $\frac{1}{8}$–$\frac{1}{4}$ in.; sepals broad; connectives lanceolate, as long as the cells. *Fem. sepals* free to the base; style $\frac{1}{2}$ in. long, sometimes slightly thickened upwards. *Capsule* unknown.—The glabrous long acuminate leaves with very slanting nerves seem characteristic of this species.

51. **G. Moonii,** *Thwaites Enum.* 286 (*excl. syn.*); branchlets leaves beneath and inflorescence tomentose or villous, leaves 4–8 in. coriaceous elliptic-lanceolate or oblong acuminate or caudate base rounded or acute, nerves 6–8 pairs, male fl. shortly pedicelled, anthers 3, connectives long, fem. very numerous sessile or pedicelled densely clustered hispid, style clavate twice or thrice as long as the linear sepals pubescent 3-cleft rather narrower than the globose pubescent or glabrate 3-celled ovary, capsule globose slightly depressed and 6-lobed tipped with short hirsute pubescent or glabrate style. G. glaucogynum, *Beddome Forester's Man.* 195. Phyllanthus Moonii, *Muell. Arg. in DC. Prodr.* xv. ii. 312. P. pubescens, *Moon Cat.* 65. P. glaucogynus, *Muell. Arg. in DC. Prodr.* xv. ii. 312.

CEYLON, *Walker, Gardner, Thwaites* (n. 2150).

A shrub or small tree; branchlets rather stout, flexuous. *Leaves* 2–3$\frac{1}{2}$ in. broad, not black or brown when dry, puberulous or glabrate above, rarely so beneath; nerves 8–10 pair, usually strong beneath; petiole $\frac{1}{6}$ in., very stout; stipules oblong-lanceolate. *Male fl.* few in the clusters of fem.; connectives as long as the cells. *Fem. fl.* with the styles $\frac{1}{4}$ in. long; sepals free nearly to the base, hispid. *Capsule* $\frac{1}{3}$–$\frac{3}{4}$ in. diam.—This is clearly Mueller's *P. glaucogynus*, both according to the number he quotes (C.P. 2150) and his description of foliage and style, which latter is clavate also in Thwaites' description.

52. **G. montanum,** *Thwaites Enum.* 286; branches and inflorescence hispidly tomentose, leaves 1$\frac{1}{2}$–3 in. ovate broadly oblong or oblong-lanceolate obtuse or cuspidate beneath more or less tomentose or glabrate, base oblique rounded or subacute, male fl. pedicelled, stamens 3, connectives very long, fem. fl. sessile, style long, cylindric or subclavate more or less hairy, 3-toothed, capsule depressed globose 3-celled 6-lobed glabrous. Phyllanthus symplocoides, *Muell. Arg. in DC. Prodr.* xv. ii. 311. G. symplocoides, *Beddome Forester's Flor.* 195.

CEYLON; in the Central Province, alt. 4–6000 ft., *Thwaites*.

A tree, 15–20 ft. *Leaves* very coriaceous, nerves few strong beneath, stipules triangular lanceolate. *Fem. sepals* narrow; style straight slender, 3–4 times as long as the sepals, narrower at the base than the globose pubescent ovary. *Capsule* rather deeply lobed.—Thwaites describes this as closely allied to *G. Moonii*, but more arboreous with the leaves not acuminate and capsule glabrous.

53. **G. Gardneri,** *Thwaites Enum.* 286; branches glabrous or with the inflorescence hispidly tomentose, leaves 2–3 in. orbicular oblong elliptic acute or cuspidately acuminate base acute, male fl. shortly pedicelled, anthers 3, fem. sessile few in a cluster, style very slender glabrous 3-toothed thrice as long as the narrow sepals and narrower than the globose 3-celled ovary, capsule glabrous depressed 3-lobed. G. leptogynum, *Beddome Forester's Man.* 195. Phyllanthus leptogynus, *Muell. Arg. in DC. Prodr.* xv. ii. 312.

CEYLON; Central Province, *Walker, Gardner*.

A small tree; branchlets slender, flexuous, angled. *Leaves* dark brown when dry, hardly coriaceous; nerves 4–5 pair, hardly raised beneath; petiole $\frac{1}{10}$–$\frac{1}{8}$ in.; stipules small, ciliate. *Male pedicels* $\frac{1}{4}$ in., and linear sepals hispid; connectives nearly as long as the anthers. *Fem. calyx* tubular at the base.

Var. β., *Thwaites l. c.*; leaves narrower and longer elliptic-lanceolate finely acuminate very pale brown when dry, nerves 6–8 pair, fem. fl. sometimes pedicelled sparsely hispid or glabrous.—Reigam Corle, *Thwaites*.—This looks very different, but I expect Thwaites is right in regarding it as a variety.

54. **G. coronatum,** *Hook. f.*; branches hirsutely tomentose, leaves 3–5 in. subsessile membranous elliptic-oblong acuminate sparsely hirsute beneath, male fl. minute pedicelled hispid, stamens 3, connectives umbonate, fem. fl. few sessile in dense axillary clusters, ovary villous, style slender cylindric 2–3 times as long as the lanceolate acute tomentose sepals acutely 3-cleft glabrous above, capsule subsessile 3–6-lobed hoary-tomentose. Bradleia coronata, *Wall. Cat.* 7857 (*not* B. coronata, No. 7854, *from Singapore*). Phyllanthus penangensis, *Muell. Arg. in DC. Prodr.* xv. ii. 310.

Tenasserim; at Mergui, *Griffith* (*Kew Distrib.* 4854). Penang, *Wallich, Curtis,* &c. Perak; in rocky places, *King's Collector.*

A shrub (in Perak 8–12 ft.); branches slender. *Leaves* equal or unequal at the base, dull grey on both surfaces, nerves slender; petiole not $\frac{1}{10}$ in. *Capsule* $\frac{1}{3}$ in. diam., depressed, top sunk, style deciduous.

55. **G. villicaule,** *Hook. f.*; branchlets hirsutely tomentose with spreading rusty hairs, leaves 3–5 in. thin ovate elliptic or oblong obtuse acute or acuminate softly hairy and strongly reticulately nerved beneath, male fl. few, pedicels and lanceolate sepals hispid, anthers 3–5 large, fem. fl. minute sessile, ovary pubescent 3–4-celled, style much longer than the perianth subcylindric hispid subacutely 2–3-toothed, capsule subsessile depressed 6–8-lobed densely hirsute, style as long columnar acutely toothed deciduous.

Upper Burma; towards the silver mines, *Griffith* (*Kew Distrib.* 4842). Perak, *Scortechini.*—Distrib. Yunan.

Branchlets flexuous, hairs rufous. *Leaves* very variable in size and shape, brown when dry, sometimes only 1 in. and very broadly elliptic, base subequal, acute, rounded or subcordate; nerves 6–10 pair, strong, as are the cross-nervules; petiole very short, villous; stipules subulate. *Male fl.* shortly hispidly pedicelled; anthers half as long as the sepals, connectives large free. *Fem. fl.* inconspicuous; sepals narrow; style rather slender, a little swollen above the middle and narrowed to the top. *Capsule* $\frac{1}{2}$ in. diam., not deeply lobed, top hardly depressed, style usually leaving a minute rustily hairy base.—The specimens are not very good.

Sect. II. Glochidiopsis (see p. 307).

56. **G. sericeum,** *Hook. f.*; branchlets leaves beneath and flowers pubescent, leaves 2–3 in. linear-oblong obtuse base rounded or cordate puberulous above glaucous beneath, flowers all pedicelled, male sepals 6 outer spreading, anthers 3, fem. sepals 2–3, ovary globose villous 3-celled, styles 3 slender villous tips 2-fid, capsule depressed 3-lobed densely villous. Phyllanthus sericeus, *Muell. Arg. in DC. Prodr.* xv. ii. 314. Glochidiopsis sericea, *Blume Bijd.* 588; *Miquel Fl. Ind. Bat.* i. ii. 375; *Baill. Etudes Gen. Euphorb.* 639, t. 27, f. 16, 17.

Perak, *Scortechini, Wray,* &c. Malacca, *Griffith* (*Kew Distrib.* 4866). Singapore, *Hullett.*

A bush or small tree; branches pendulous. *Leaves* bifariously rather close-set and uniform, dull greyish green above when dry, pale beneath; nerves 10–12 pair and cross-nervules raised beneath; petiole $\frac{1}{8}$ in.; stipules ovate. *Male pedicels* $\frac{1}{8}$ in., perianth $\frac{1}{1\frac{1}{2}}$ in. diam., connectives short obtuse. *Fem. fl.* minute, sepals obtuse. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Seeds* nearly hemispheric.—Griffith in a note describes the fem. perianth as of 3 outer minute sepals and 3 inner larger.

57. **G. dasystylum,** *Kurz For. Fl.* ii. 344; branchlets and leaves beneath softly tomentose, leaves 2–3 in. thin ovate acuminate base obtuse or rounded, fem. fl. long pedicelled subumbellately fascicled, styles 3 filiform hairy, capsules fascicled pedicels slender depressed 3–4-celled 6–8-lobed tomentose with spreading hairs.

MARTABAN; in forests east of Tounghoo, ascending to 3500 ft., *Kurz.*

An evergreen tree, 15–20 ft.; branchlets slender, terete, almost hirsute with rusty hairs. *Leaves* pubescent or glabrate; nerves 5–7 pair, very slender, arched, cross-nervules distant; petiole $\frac{1}{10}$ in., tomentose; stipules minute, subulate. *Flowers* unknown. *Capsules* $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; styles inconspicuous, united at the base only.

IMPERFECTLY KNOWN AND DOUBTFUL SPECIES.

58. **G. mishmiense,** *Hook. f.*; branches stout and leaves beneath and inflorescence densely brown-tomentose, leaves 6–8 in. coriaceous oblong obtuse or subacute base acute glabrous above except the costa, nerves and cross-nervules strong beneath, capsules clustered pedicelled much depressed 4–8-celled 8–10-lobed densely hoary-tomentose, stigma subglobose or very shortly conic sunk in an apical depression, seeds hemispheric red.

UPPER ASSAM; on the Mishmi Hills, *Griffith* (*Kew Distrib.* 4843).

This has the habit of *G. zeylanicum*, from the tomentose varieties of which it differs by the greatly depressed capsules clothed with white tomentum and the small obtuse stigma in its small apex. The capsules are nearly $\frac{1}{2}$ in. diam., and the seeds $\frac{1}{8}$ in.

59. **G. Curtisii,** *Hook. f.*; branchlets petioles and leaves beneath pubescent, leaves 5–7 by $1\frac{1}{2}$–2 in. linear-oblong base very unequal-sided, nerves 8–10 pair pubescent above very strong beneath, male fl. small clustered pedicels very slender, anthers 3, connectives very short.

PENANG; Cooley Lines on Government Hill, *Curtis* (No. 670).

This appears very distinct from all the preceding species.

PHYLLANTHUS ASPERUS, *Muell. Arg. in Flora* xlviii. (1865) 377, and in *DC. Prodr.* xv. ii. 297; branchlets hispidulous and obscurely fulvous tomentose, leaves $2\frac{1}{2}$–$3\frac{1}{2}$ by $1\frac{1}{2}$ in. elliptic ovate or obovate tip rounded mucronulate pubescent on both surfaces and rough with subtuberculate white hairs, midrib and nerves prominent paler than the interspaces and beautifully reticulated, pedicels of both sexes short, of male pubescent of fem. very short tomentose, fem. sepals oblong-obovate subacute pubescent on both surfaces, ovary globose 4-celled subtomentose, style subcylindric pubescent twice or thrice as long as and about as broad as the ovary. *Beddome Forester's Man.* 193.—Malabar and Concan, *Stocks, Law in "Herb. Ind. Or., H. f. & T."* (*Mueller Arg.*).—I fail to recognize this.

PHYLLANTHUS SILHETICUS, *Muell. Arg. in Flora l. c.* 378, and in *DC l. c.*; branchlets rather stout tomentose with black yellow or rufous hairs, leaves $3\frac{1}{2}$–$4\frac{3}{4}$ by 2–$2\frac{1}{2}$ in. elliptic oblong shortly acute margined with a yellowish line base obtuse or subcordate, nerves above and beneath softly yellowish pubescent, pedicels all very short globose 4-celled obscurely tomentose, style conical scarcely longer than the ovary, capsule $\frac{3}{10}$ in. diam. depressed small pubescent deeply 6-grooved.—Silhet, *J. D. Hooker* (*Mueller Arg.*).—I do not recognize this. Mueller says that the yellow marginal line of the leaves resembles that of *G. zeylanicum*.

12. **FLUEGGIA,** *Willd.*

Unarmed or spinescent shrubs. *Leaves* small, alternate, distichous, quite entire. *Flowers* minute, axillary, pedicelled, dicœcious, apetalous; males numerous, clustered; females subsolitary. MALE FL. *Sepals* 5, subpetaloid, imbricate. *Stamens* 5, or fewer, alternating with as many disk-glands; filaments free; anthers erect, cells parallel. *Pistillode* large, 2–3-fid. FEM. FL. *Calyx* of the male. *Disk* annular, toothed. *Ovary* 1–3-celled; styles recurved, united below, elongate, entire, notched or 2-fid, ovules 2 in each cell. *Fruit* globose, coriaceous, or with a fleshy epicarp, bursting irregularly or into distinct 2-valved cocci. *Seeds* triquetrous, dorsally convex, ventrally acute, testa crustaceous, albumen scanty; embryo curved, cotyledons broad flat.—Species about 6 in the tropics of the Old World.

The large pistillode of the male fl., and the usually long recurved styles united below into an erect column of the female, are the best characters for this genus.

1. **F. microcarpa,** *Blume Bijd.* 580; glabrous, unarmed, branchlets slender angled and compressed, leaves elliptic ovate obovate or orbicular loosely reticulated beneath. F. melanthesoides, *F. Muell. in Trans. Bot. Soc. Edinb.* vii. 490. F. Leucopyrus, *Dalz. & Gibs. Bomb. Fl.* 236 (*not of Willd.*). F. virosa, *Baill. Etudes Gen. Euphorb.* 593, t. 26, f. 39–43 (*not of DC.*); *Wall. Cat.* 7928. F. leucophylla, *Wall. Cat.* 7916. F. angulata, *Baill. Rec. Obs.* i. 80. F. obovata, *Herb. Ham.* F. elliptica, *Herb. Ham.* Securinega obovata, *Muell. Arg. in DC. Prodr.* xv. ii. 449; *Brand. For. Fl.* 455; *Gamble Man. Ind. Timb.* 354; *Beddome Forester's Man.* 197; *Benth. Fl. Austral.* vi. 115. S. Leucopyrus, *Brand. For. Fl.* 456, t. 54 *in part.* Phyllanthus obtusus, *Schrank in Flora Ratisb. Syllog.* ii. 65; *Wall. Cat.* 7941. P. Wightianus, *Muell. Arg. in Linnæa* xxxii. 6 (*not* 47), and in *DC. l. c.* 334 (*not* 425); *Grah. Cat. Bomb. Pl.* 180. P. lucidus, *Hort. ex Steud. Nomencl.* P. virosus, *Roxb. in Willd. Sp. Pl.* iv. 578, and in *Fl. Ind.* iii. 659; *Wall. Cat.* 7928 A, B (C *in part*), E. P. griseus, *Wall. Cat.* 7918 A *in part.* P. leucophyllus, *Herb. Strachey & Winterb.* P. retusus, *Roxb. l. c.* 657. P. glaucus, *Wall. Cat.* 7927 B. P. rotundatus, *Herb. Wight.* Leptonema melanthesioides, *F. Muell. in Hook. Journ. Bot.* ix. (1857) 17. Cicca obovata, *Kurz For. Fl.* ii. 354. C. pentandra, *Blanco Fl. Filipp.* 486. Chorizandra pinnata, *Wight Ic.* t. 1994. Xylophylla obovata, *Willd. Enum. Hort. Berol.* 229. Bessera inermis, *Spreng. Pugill.* ii. 90. Drypetes bengalensis, *Spreng. Syst.* iii. 902. Bradleia dioica, *Vahl mss.*—*Wall. Cat.* 7948.

Throughout INDIA; from Kashmir ascending the Himalaya to 5000 ft., to Bhotan, and Assam and southwards to Malacca and Travancore. SCIND, *Stocks.* CEYLON, *Kelaart.*—DISTRIB. China, Malay Islands, Australia, Trop. Africa.

A deciduous-leaved large shrub or small tree (*Kurz*). *Leaves* very variable, thin, 1–3 in. long, subglaucous beneath, tip rounded, obtuse, acute or rarely retuse; nerves 5–7 pairs, very slender; petiole $\frac{1}{8}$–$\frac{1}{4}$ in., slender. *Flowers* usually in very dense fascicles from a crowd of minute bracts, $\frac{1}{12}$–$\frac{1}{10}$ in. diam.; pedicels $\frac{1}{6}$–$\frac{1}{2}$ in., capillary, females the longest. *Sepals* rounded or oblong, concave. *Stamens* 3–5 alternately with glands usually far exserted, filaments sometimes very long, all free to the base. *Pistillodes* 3, united at the base, slender, erect, with recurved simple or lobulate tips, rarely 2 or 0. *Ovary* ovoid, on an annular disk; styles 3, bifid. *Fruit* globose, of two sizes, mostly minute $\frac{1}{6}$–$\frac{1}{8}$ in. diam. with a dry pericarp, a few $\frac{1}{3}$ in. diam. white with a fleshy pericarp. *Seeds* 3–6, minutely punctate.

2. **F. Leucopyrus,** *Willd. Sp. Pl.* iv. 757; a glabrous woody tortuous bush, branchlets stout ending in spines, leaves obovate obcordate or orbicu-

lar. *A. Juss. Tent. Euphorb.* 106, t. 2, f. 7 A; *Wight Ic.* t. 1875; *Thwaites Enum.* 281. F. xerocarpa, *A. Juss. l. c.* t. 2, f. 7 B. F. virosa, *Dalz. & Gibs. Bomb. Fl.* 236. F. Wallichiana, *Baill. Etudes Gen. Euphorb.* 592. Securinega Leucopyrus, *Muell. Arg. in DC. Prodr.* xv. ii. 451; *Brand. For. Fl.* 456. t. 54 (*in part*); *Beddome Forester's Man.* 197. t. 24, f. 4 and 1–6; *Gamble Man. Ind. Timb.* 354. S. virosa, *Baill. Adans.* vi. 334. Cicca Leucopyrus, *Kurz For. Fl.* ii. 353. Phyllanthus albicans, *Wall. Cat.* 7937. P. Leucopyrus, *Kœn. mss. in Roxb. Fl. Ind.* iii. 658; *Wall. Cat.* 7938. P. Lucena, *Heyne mss.* Xylophylla Lucena, *Roth Nov. Sp.* 185.

The PANJAB PLAIN, *Duthie.* DECCAN PENINSULA, from Canara southwards. BURMA, *Griffith.* CEYLON, abundant.

This differs from *F. microcarpa* more in habit and foliage than in flowers or fruit; the leaves are smaller, broader, and more rigid, rarely 1 in. long, with longer petioles, the nerves less distinct, the flowers even smaller, the fruit identical. Mueller describes the styles as entire, and they are so represented by Wight, but they are usually 2-fid, as in Brandis' figure.

DOUBTFUL SPECIES.

F. PHYLLANTHOIDES, *Baill. Etudes Gen. Euphorb.* 592; *Muell. Arg. in DC. Prodr.* xv. ii. 452; an altogether doubtful plant, said by Baillon to differ from the Dahurian (*Securinega ramiflora*, Muell. Arg. l. c. 449) in the leaves not being entire, and to have been collected in the Himalaya by Strachey and Winterbottom, and to exist in the Paris Museum; where, however, Mueller searched for it fruitlessly.

13. **BREYNIA,** *Forst.*

Shrubs or small trees. *Leaves* small, alternate, petioled, quite entire, often distichous. *Flowers* minute, axillary, monœcious. *Petals* and *Disk* 0. MALE FL. *Calyx* turbinate or hemispheric, truncate, rim of the tube often much thickened and lobulate opposite the minute lobes which are inflected and rounded. *Stamens* 3, filaments united into a column; anthers adnate to the whole length of the column very slender, cells linear parallel distinct. *Pistillode* 0. FEM. FL. *Calyx* coriaceous, hemispheric turbinate campanulate or rotate, broadly shortly 6-lobed, fruiting often greatly enlarged and disciform. *Staminodes* 0. *Ovary* globose or truncate or depressed at the top, fleshy above, 3-celled; styles 3, sessile or united in a short column, 2-fid or 2-lobed; or stigmas 3, minute simple immersed in a cavity at the top of the ovary; ovules 2 in each cell. *Fruit* more or less succulent, globose or depressed, indehiscent or with a 6-valved pericarp, and 3–6 trigonous imperforate indehiscent cocci. *Seeds* with a membranous testa and fleshy albumen, ecarunculate; cotyledons broad, radicle long.—Species about 12, Tropical Asia, Africa and Pacific Islands.

* *Calyx of female greatly enlarged in fruit.*

1. **B. patens,** *Benth. in Gen. Plant.* iii. 277; quite glabrous, leaves membranous elliptic oblong or ovate obtuse or subacute, style exserted with 3 2-fid arms, fruit depressed 6–12-seeded seated on the greatly enlarged calyx. Melanthesopsis patens, *Muell. Arg. in DC. Prodr.* xv. ii. 437; *Kurz For. Fl.* ii. 348; *Beddome Forester's Man.* 196. M. variabilis, *Muell. Arg. in Linnæa* xxxii. 75. Melanthesa obliqua, *Wight Ic.* t. 1898. M. turbinata, *Wight Ic.* t. 1897; *Dalz. & Gibs. Bomb. Fl.* 234. Phyllanthus patens, *Roxb. Fl. Ind.* iii. 667; *Wall. Cat.* 7911. P. turbinatus, *Kœn. mss. in Roxb. l. c.* 666; *Grah. Cat. Bomb. Pl.* 180. P. suffultus, *Wall. Cat.* 7939. P. retusus, *Dennst. in Dillw. Rev. Hort. Mal.* 24. P. Naviruli, *Miquel Plant. Hohenack.*, No. 1556. P. pomaceus, *Moon Cat. Ceyl. Pl.* 65.

P. glaucifolius, *Wall. mss.* P. rhamnifolius, *Herb. Heyne.* P. virosus, *Herb. Wight.* P. cernuus, *Herb. Ham.*—*Rheede Hort. Mal.* v. t. 43.

TROPICAL HIMALAYA; from Nepal to Mishmi, ASSAM, the KHASIA MTS., SILHET, CHITTAGONG, MUNNIPORE and BURMA. The DECCAN PENINSULA, from the Concan and Orissa southwards. CEYLON; ascending to 3000 ft.

An erect tree (*Roxb.*); a shrub 3–6 ft. (*Kurz*) with spreading branches. *Leaves* distichous, $\frac{1}{2}$–1 in. long, rather glaucous beneath, brown when dry; nerves 3–5 pair, raised, nervules lax; petiole $\frac{1}{10}$–$\frac{1}{8}$ in.; stipules minute, acute. *Male fl.* $\frac{1}{12}$–$\frac{1}{16}$ in., drooping, pedicels capillary. *Calyx* turbinate or campanulate, thickened rim of tube crenate. *Staminal column* produced beyond the anthers. *Fem. fl.* $\frac{1}{10}$–$\frac{1}{6}$ in. diam., shorter pedicelled. *Calyx* broadly funnel-shaped, often exceeding the fruit; lobes reniform, apiculate. *Ovary* truncate; style very stout, with 3 short forked arms. *Fruit* $\frac{1}{2}$–$\frac{2}{3}$ in. broad. *Seeds* with the ventral edge entire.

2. **B. angustifolia,** *Hook. f.*; quite glabrous, leaves oblong or linear-oblong tip rounded base unequal, flowers shortly pedicelled, male calyx campanulate, outer margin of tube raised 6-lobed lobes usually retuse or emarginate, fem. broadly funnel-shaped with 6 broad rounded apiculate lobes, fruit small depressed globose seated on the much enlarged calyx.

PEGU; at Rangoon, *M'Lelland.* TENASSERIM, at Mergui, *Griffith*; Moulmein, *Parish.* PERAK, *King's Collector.*

A shrub; branches and branchlets terete. *Leaves* $\frac{3}{4}$–1 by $\frac{1}{4}$–$\frac{1}{3}$ in., rather membranous, close set distichously on the branchlets, paler or glaucous beneath; petiole $\frac{1}{12}$–$\frac{1}{10}$ in.; stipules very minute. *Flowers* solitary or clustered, very minute, pedicels usually rather longer than the calyx, slender. *Male calyx* $\frac{1}{16}$–$\frac{1}{12}$ in.; fem. $\frac{1}{10}$–$\frac{1}{8}$. *Staminal column* truncate. *Ovary* turbinate, sides grooved; style very stout, with 3 short recurved 2-lobed arms. *Fruit* $\frac{1}{4}$ in. diam. *Seeds* with the ventral edge acute entire.

3. **B. coronata,** *Hook. f.*; quite glabrous, leaves ovate obtuse glaucous beneath, flowers solitary very shortly pedicelled, male calyx hemispheric outer margin of tube obtusely toothed, fem. broadly infundibular, ovary included broadly cuneiform truncate top concave with 3 minute central stigmas very globose crowned with a raised ring seated on the enlarged patelliform calyx.

PERAK, *King's Collector.*

A small tree, 10–20 ft.; branchlets compressed and leaves above black when dry. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ in., membranous, nerves 5–6 pair, very slender; petiole $\frac{1}{8}$ in., slender, stipules minute subulate. *Male fl.* $\frac{1}{16}$ in. diam.; mouth very minute; pedicel slender; fem. fl. $\frac{1}{8}$ in. long, pedicel stouter. *Fruit* globose, $\frac{1}{3}$ in. diam., red, epicarp thin, endocarp coriaceous 6-valved; cocci 6, trigonous; enlarged calyx $\frac{1}{4}$ in. diam.

** *Calyx of female slightly enlarged in fruit.*

4. **B. rhamnoides,** *Muell. Arg. in DC. Prodr.* xv. ii. 440 (*excl. vars. α., γ.*); shrubby, quite glabrous, leaves shortly petioled membranous elliptic ovate or rounded obtuse or subacute, flowers on short pedicels, calyx of male turbinate or subcampanulate mouth of tube entire or obscurely lobed, of fem. hemispheric shortly 6-lobed, ovary truncate, fruit small globose seated on the small slightly enlarged calyx. *Brand. For. Fl.* 455; *Kurz For. Fl.* ii. 350; *Beddome Forester's Man.* 196 (t. xxiv. f. 2, *by error named* Melanthesopsis petens). B. oblongifolia, *Muell. Arg. l. c.* 400 (*the Penang plant only*). Melanthesa rhamnoides, *Wight Ic.* t. 1898; *Miquel Fl. Ind. Bat.* i. ii. 370; *Thwaites Enum.* 285. Phyllanthus rhamnoides, *Willd. Sp. Pl.* iv. 580 (*not of Roxb.*). P. Vitis-idæa, *Roxb. Fl. Ind.* iii. 665. P. tristis, *A. Juss. Tent. Euphorb.* 108, t. 5, f. 16. P. sepiarius, *Roxb. mss.*; *Wall. Cat.*

7914. P. cinerascens, *Wall. Cat.* 7915 C. P. virosus, *Herb. Wight in Wall. Cat.* 7939 C. P. oblongifolius, *Dennst. in Dillw. Rev. Hort. Mal.* 24. P. tinctorius, *Vahl mss.* (*ex Baill.*).

Throughout TROPICAL INDIA; from OUDH, *Hamilton*, and BANDA, *Edgeworth*, eastwards to UPPER ASSAM and BURMA, and southwards to TRAVANCORE, MALACCA, SINGAPORE and CEYLON.—DISTRIB. China, Malay Islands, Philippines.

A shrub or small tree; branches horizontal, flexuous, bifarious. *Leaves* $\frac{3}{4}$–1 in., dark brown or black when dry, pale beneath; petiole $\frac{1}{10}$ in.; stipules minute. *Flowers* often diœcious ?, $\frac{1}{16}$—$\frac{1}{12}$ in. long; pedicels usually decurved, variable in length. *Staminal column* truncate. *Ovary* exserted; styles very obscure. *Fruit* $\frac{1}{4}$ in. diam., red, succulent. *Seeds* $\frac{1}{8}$ in. long; testa imperforate except at the very base.—Very near *B. cernua* of the Malay Archipelago, but the fem. calyx is much smaller. Edgeworth's Banda specimens have not blackened in drying. Mueller and others describe the male fl. as springing from minute branchlets densely clothed with bracts, but this is only occasionally the case.

5. **B. discigera,** *Muell. Arg. in DC. Prodr.* xv. ii. 440; finely tomentose, leaves shortly petioled elliptic rounded or ovate acute or subacute, flowers solitary very shortly pedicelled, male calyx turbinate or hemispheric outer margin of tube entire, fem. rotate shortly 6-lobed pubescent all over, ovary turbinate stigmas minute, fruit seated on the slightly enlarged pubescent calyx crowned with a raised ring. B. rhamnoides, γ. pubescens, *Muell. Arg. l. c.* 441. Phyllanthus pubescens, *Wall. Cat.* 7917 A, B.

PENANG, *Wallich, Curtis.* SINGAPORE, *Jaeger, Cantley.*—DISTRIB. Siam.

Branches and *branchlets* terete. *Leaves* $\frac{2}{3}$–$1\frac{3}{4}$ in., thinly coriaceous, black above when dry, beneath paler or glaucous, sparsely pubescent above, shortly tomentose beneath; nerves 4–6 pair; petiole $\frac{1}{12}$–$\frac{1}{10}$ in. *Flowers* subsolitary, minute; males, $\frac{1}{16}$ in. long, about as long as their pedicels; tube pubescent, teeth inflexed glabrous; fem. subsessile, $\frac{1}{8}$ in. diam., lobes very shallow, apiculate. *Staminal column* fusiform, truncate. *Ovary* with a convex top. *Fruit* globose, $\frac{1}{4}$–$\frac{1}{3}$ in. diam., coriaceous; cocci with a small basal hole. *Seeds* $\frac{1}{6}$ in. long.—Wallich's 7917 C is a very different plant, with rounded subcordate leaves, from Burma (Kayouk Talong); it is neither in flower nor fruit.

6. **B. reclinata,** *Hook. f.*; quite glabrous, branches long divaricate, leaves shortly petioled coriaceous elliptic ovate subacute very glaucous beneath, flowers shortly pedicelled, calyx of male hemispheric thickened mouth of tube 6-crenate, of fem. turbinate shortly 6-lobed, ovary truncate, fruit small seated on the small calyx. B. rhamnoides, *var.* hypoglauca, *Muell. Arg. in Linnæa* xxxii. 73, and in *DC. Prodr.* xv. ii. 440. B. racemosa, *Muell. Arg. in DC. l. c.* 441 *in part.* Melanthesa reclinata, *Muell. Arg. in Linnæa l. c.* 74. Phyllanthus reclinatus, *Roxb. Fl. Ind.* iii. 669.

SINGAPORE and MALACCA, *Griffith* (*Kew Distrib.* 4813, *Maingay* 1356), &c.—DISTRIB. Sumatra, Java.

A subscandent shrub, black when dry, branches and long branchlets terete, decurved. *Leaves* 1–$1\frac{1}{2}$ in.; nerves 4–6 pairs; petiole $\frac{1}{12}$—$\frac{1}{10}$ in.; stipules minute. *Flowers* yellow, on short usually decurved pedicels; males $\frac{1}{16}$ in. long, mouth contracted; fem. rather larger, broadly funnel-shaped. *Staminal column* truncate. *Ovary* exserted, truncate, stigmas minute. *Fruit* $\frac{1}{4}$ in. diam., globose, depressed, red. *Seeds* $\frac{1}{10}$ in. long, with a triangular basal ventral cavity.—Mueller's *B. racemosa* is a mixture; it contains Zollinger's No. 177 from Java, which is undoubtedly *B. reclinata*, and I hence assume that the Singapore plant referred to *racemosa* is also *reclinata*; but Zollinger's No. 176, with a much smaller fruit and a much enlarged calyx, is quite a different species, possibly *B. virgata.* Mueller has, in DC. Prodr., erroneously referred Roxburgh's *P. reclinatus* to the Chinese *Breynia* (*Melanthesopsis*) *fruticosa* (*Melanthesa chinensis*, Blume), together with Wallich's No. 7925, which is a third plant from Siam.

DOUBTFUL SPECIES.

B. PANICULATA, *Spreng. Pugill.* ii. 93; *Muell. Arg. in DC. Prodr.* xv. ii. 442, a plant with 5 glandular-crisped stigmas, cannot be of this genus. The only locality given is Mountains of India.

Melanthesopsis fruticosa, Kurz For. Fl. ii. 349, cannot well be Mueller's plant of this name, which has terete branches, and has not been found elsewhere in India. Kurz's plant grows in dry hill forests of Martaban at 2500–4000 ft. elevation.

Breynia sp. ? from Bamo in Burma, *Griffith* (*Kew Distrib.* 4818), a fragment of a plant resembling a *B. reclinata* with 6 erect conical styles ? surrounding the truncate top of the ovary. A somewhat similar plant from the Calcutta Bot. Garden has 3 erect bifid styles from the truncate top of the ovary; it is a mere fragment. The leaves resemble those of *B. coronata*.

14. SAUROPUS, *Blume.*

Small shrubs or undershrubs. *Leaves* alternate, distichous, membranous, quite entire; stipules minute. *Flowers* minute, axillary, monœcious, apetalous, solitary or clustered. MALE FL. *Calyx* disciform, urceolate or turbinate, 6-lobed or -cleft, mouth very small, with superficial thickenings that meet around the stamens. *Stamens* 3, filaments combined in a very short truncate 3-gonous column, anthers sessile on the angles of the column; cells linear or subglobose, parallel, extrorse. *Pistillode* 0. FEM. FL. *Calyx* 6-cleft, persistent, accrescent. *Ovary* ovoid or globose, top rounded or concave, 3-celled; styles 3, sessile, depressed, spreading, with 3 recurved or incurved arms; ovules 2 in each cell. *Fruit* globose or depressed, epicarp fleshy or coriaceous, 6-valved or rupturing irregularly, containing 6 indehiscent 3-gonous crustaceous or bony cocci. *Albumen* fleshy; cotyledons broad, flat.—Species about 20, Indian and Malayan.

Sect. I. EUSAUROPUS, *Muell. Arg.* *Styles* apical or subapical. *Leaves* $1\frac{1}{2}$–4 in. long.

* *Leaves penninerved.*

1. **S. albicans,** *Blume Bijd.* 596; quite glabrous, branchlets angular, leaves very shortly petioled ovate-oblong obtuse or acute penninerved, male calyx disciform 6-lobed, lobes broad, fruit sessile white $\frac{3}{4}$ in. diam., epicarp fleshy bursting irregularly, cocci with a broad ventral hollow. *Muell. Arg. in DC. Prodr.* xv. ii. 240; *Baill. Etudes Gen. Euphorb.* 635, t. 27, f. 19, 20; *Kurz For. Fl.* ii. 349; *Miquel Fl. Ind. Bat.* i. ii. 366; *Hassk. Hort. Bogor.* ed. 2, 49. S. indicus, *Wight Ic.* t. 1952; *Miquel l. c.*; *Hassk. l. c.* 51. S. Gardnerianus, *Wight Ic.* t. 1951; *Thwaites Enum.* 284. S. zeylanicus, *Wight Ic.* t. 1952. Agyneia ovata, *Miquel l. c.* 367. Phyllanthus strictus, *Roxb. Fl. Ind.* iii. 670; *Wall. Cat.* 7933. Cluytia androgyna, *Linn. Mantiss.* 128.

SIKKIM HIMALAYA; hot valleys, *J. D. H.* SILHET and the KHASIA HILLS and Burma, *Wallich*, &c., to TENASSERIM, MALACCA and PENANG. TRAVANCORE, *Wight*. CEYLON; Central Province, ascending to 4000 ft.—DISTRIB. Java, Philippines.

An erect undershrub, with often a slender simple stem umbellately branched at the top; stem and branches terete, green. *Leaves* $1\frac{1}{2}$–3 in., glaucous beneath; petiole $\frac{1}{10}$ in., slender; stipules persistent. *Flowers* small, males $\frac{1}{6}$–$\frac{1}{3}$ in. diam., greenish red; pedicels capillary. *Calyx-lobes* of fem. broad, obtuse, emarginate or 2-lobed, rather enlarged in fruit. *Fruit* with a fleshy epicarp; cocci $\frac{1}{4}$ in. long.—Odour of the whole dried plant like celery. Mueller describes the fruit as stipitate, but it is quite sessile; possibly he took *S. stipitatus* for the same species. I can hardly recognize Mueller's two varieties (*Linnæa* xxii. 72, and *DC. l. c.*), *Gardneriana*

and *zeylanica*; none of Thwaites' or Gardner's specimens have "acutely acuminate leaves," and I find nothing answering to the acute calyx-lobes of *zeylanicus* figured by Wight. The fleshy aril of some authors is the remains of the septa between the seeds.

2. **S. retroversus,** *Wight Ic.* t. 1951; leaves of *S. albicans*, male calyx reflected on the pedicel in an urceolate form mouth 6-toothed, fem. discoid with 3 outer rounded lobes and 3 inner smaller subacute ones, fruit 1 in. white pyriform. *Thwaites Enum.* 284; *Muell. Arg. in DC. Prodr.* xv. ii. 241.

CEYLON; Central Province, alt. 4000 ft., *Walker, Thwaites*, &c.
The specimens do not enable me to add anything to the above description; they are in male fl. only, and appear abnormal. The fruit differs wholly from that of *albicans*.

3. **S. assimilis,** *Thwaites Enum.* 284; leaves of *S. albicans*, male calyx of 6 narrow cylindric incurved obtuse segments. *Muell. Arg. in DC. Prodr.* xv. 1. 242.

CEYLON; Central Province, alt. 3000 ft., *Thwaites*.
Male flowers alone are known of this curious species.

4. **S. stipitatus,** *Hook. f.*; quite glabrous, branches terete, leaves very shortly petioled ovate-lanceolate acuminate penninerved, fem. calyx 6-partite, lobes narrow, fruit globose stipitate, epicarp crustaceous splitting stellately into 6 valves, cocci closed with a very small basal ventral notch.

SIKKIM HIMALAYA; Darjeeling (*Herb. Griffith*).
Leaves 2–3½ by ⅔–1 in., base rounded or cuneate; petiole $\frac{1}{10}$ in. *Calyx* not or but little enlarged in fruit, 5-partite, segments linear-oblong, obtuse. *Fruit* ⅓ in. diam., globose; peduncle ½ in.—Distinguished from *S. albicans* by the longer differently-shaped leaves, calyx and fruit. I have seen no male flowers. The female flower is unlike that of the genus.

5. **S. oblongifolius,** *Hook. f.*; quite glabrous, branchlets terete, leaves very shortly petioled oblong or linear-oblong obtuse penninerved, calyx disciform 6-lobed, lobes rounded or reniform, fruit depressed globose sessile, epicarp thin crustaceous subvalvular, cocci with a broad ventral hollow.

UPPER ASSAM, *Masters*; Dailoon in the Mishmi Hills, *Griffith* (*Kew Distrib.* 4824).

Branchlets slender. *Leaves* 2½–3 in., dark green, very membranous, base acute; petiole $\frac{1}{10}$ in. *Fruit* obscurely 6-lobed; peduncle ½ in. *Seeds* ¼–⅓ in. long, as in *S. albicans*.—Near *S. albicans*, but the branchlets are terete, the leaves have parallel sides and are not narrowed towards the tip, and the fruit is smaller, ⅓–½ in. diam., depressed and 6-furrowed, not fleshy, the cocci $\frac{3}{10}$ in. long.

6. **S. lanceolatus,** *Hook. f.*; quite glabrous, branches terete, leaves very shortly petioled lanceolate acuminate penninerved, calyx 6-partite, segments oblong, fruit globose sessile, epicarp thin bursting irregularly, cocci with a very small basal ventral perforation.

UPPER ASSAM; Mishmi Hills, *Griffith* (*Kew Distrib.* 4825).
Leaves 3–4½ by 1 in., base rounded or cuneate. *Calyx* not much enlarged in fruit, segments oblong-obovate, revolute. *Fruit* ⅓ in. diam., smooth, not lobed; epicarp thinly crustaceous; cocci ¼ in. long.

7. **S. macrophyllus,** *Hook. f.*; quite glabrous, shrubby, branches terete, leaves very shortly petioled 4–8 in. ovate-lanceolate acuminate penninerved, fem. calyx deeply 5–lobed, lobes obovate-spathulate, fruit large

depressed-globose sessile, epicarp thinly crustaceous stellately 6-valved, cocci with a large ventral hollow.

UPPER ASSAM; Mishmi Hills at Laee pane and Yen, *Griffith* (*Kew Distrib.* 4834).

A shrub, 10 ft. *Leaves* 1–4½ in. broad; petiole ⅛ in. *Calyx-lobes* in fruit a little enlarged, thick, with rounded thickened and apparently carunculated tips. *Fruit* ¾ in. diam., white or flesh-coloured (*Griffith*); peduncle 1–2 in.; cocci ½ in. long.

8. **S. forcipatus,** *Hook. f.*; quite glabrous, leaves 3–5 in. membranous penninerved elliptic or oblong lanceolate acuminate base acute, male fl. disciform, lobes minute in the centre of the disk, fem. fl. much larger sepals 6 oblong spreading and recurved, ovary oblong, styles or stigmas 3 terminal depressed divided into 2 incurved arms like forceps.

PERAK, *Scortechini.*

Branchlets stout, compressed, black when dry. *Leaves* very thin, 1½–2 in. diam., base acute, nerves 7–8 pairs very slender, cross-nervules obscure, petiole $\frac{1}{10}$ in. slender. *Male fl.* in the axils of minute imbricating bracteoles shortly pedicelled, ¼–⅓ in. diam., concave or nearly flat, very obscurely 6-lobed; anthers oblong. *Fem. fl.* ½ in. diam., in the same axil with the male; pedicel short, very stout; sepals coriaceous, tip rounded.

** *Leaves triple-nerved.*

9. **S. trinervius,** *Muell. Arg. in Linnæa* xxxii. 72, and in *DC. Prodr.* xv. ii. 242; shrubby, quite glabrous, branches angled, leaves very shortly petioled ovate or lanceolate acuminate triple-nerved, lobes of male calyx narrow of fem. broad, fruit globose sessile, epicarp thinly crustaceous stellately 6-valved, cocci with a large ventral hollow. Phyllanthus trinervius, *Wall. Cat.* 7922.

SIKKIM HIMALAYA; in the Teesta Valley, *Clarke.* SILHET, CACHAR and the KHASIA MTS., ascending to 4000 ft., *Griffith*, &c.

A shrub or bushy tree, 12 ft. *Leaves* 3–5 in., base cuneate or rounded, nerves very slender; petiole $\frac{1}{10}$ in.: stipules ⅛ in., subulate. *Male fl.* usually racemed on short axillary peduncles, clothed with minute bracts, pedicel capillary, fem. solitary, both varying from ⅛ to ⅙ in. diam. *Calyx* enlarging but not equalling the fruit in breadth, sepals obovate-oblong. *Fruit* 1 in. diam.; cocci ½ in. long.—Clarke describes the male calyx as imbricate, incurved, and the fem. as of 3 broad sepals and 3 narrower, and 6 yellow glands.

10. **S. repandus,** *Muell. Arg. in Flora* lv. (1872) 2; glabrous, branches compressed and angular, leaves 3-nerved ovate-lanceolate, flowers in bracteate racemes, male calyx orbicular convex obsoletely 6-lobed, 3 outer fem. sepals triangular ovate obtuse base contracted inner half as long elliptic obtuse, ovary truncate, styles margined.

SIKKIM HIMALAYA; Nohore, alt. 2400–4000 ft., *T. Anderson in Herb. Berol.*

Branchlets and fem. pedicels shortly papillosely hirtellous. *Leaves* 2–4 in., firmly membranous, base acute, rufescent beneath; nerves slender, basal about half the length of the leaf; petiole $\frac{1}{12}$–$\frac{1}{10}$ in., stipules ¼–⅕ in. *Fruit* unknown.—Mueller observes that the habit is entirely that of *S. trinervius*, but that the leaves are more shortly 3-nerved, and male flower altogether different. I have seen no specimens. Can it be a form of *S. albicans*? which has occasionally the lowest pair of nerves rather longer than the others.

Sect. II. CERATOGYNUM. *Styles* at the circumference of broad concave top of the low truncate ovary. *Leaves* ½–1 in.

11. **S. quadrangularis,** *Muell. Arg. in Linnæa* xxxii. 72, and in *DC. Prodr.* xv. ii. 242; a dwarf glabrous shrub, branchlets angled, leaves very shortly petioled elliptic or broadly ovate or obovate obtuse or subacute penninerved, sepals of male tongue-shaped obtuse, of fem. rounded or broader than long, fruit globose, epicarp thin bursting more or less stellately, cocci with a basal ventral depression on each side of which is a tooth. ? *Kurz For. Fl.* ii. 530. S. Ceratogynum, *Baill. Etudes Gen. Euphorb.* 635 (*excl. citation of Wight & Thwaites*); *Muell. Arg. in DC. l. c.* 243 (*excl. many citations*). Phyllanthus rhamnoides, *Roxb. Fl. Ind.* iii. 663 (*not of Willd.*). P. quadrangularis, *Willd. Sp. Pl.* iv. 585. P. Myrtillus, *Ham. mss.* P. tenellus, *Wall. Cat.* 7892 A (*the large specimen only*). P. Leschenaultii, *β.* tenella, *Muell. Arg. in Linnæa* xxxii. 37. ? Ceratogynum rhamnoides, *Wight Ic.* t. 1900; *Dalz. & Gibs. Bomb. Fl.* 234.

Northern Behar; at Monghyr, *Hamilton.* Coromandel Coast, in cultivated fields, *Roxburgh.* The Concan and Mysore, *Klein, Dalzell,* &c. ? Burma; common, *Kurz.*

Plant about a foot high, with many slender leafy terete branches, the shoots alone being angled. *Leaves* $\frac{1}{2}$ by $\frac{1}{3}$ in., or broader, thin, nerves 4 or 5 pair, margins and those of the fem. sepals most minutely rough; petiole $\frac{1}{12}$–$\frac{1}{10}$ in., very slender; stipules minute, ovate-lanceolate. *Flowers* shortly pedicelled, solitary or male and female from the same axil (or the males long-pedicelled and in racemes from the lower axils, *Roxburgh*), male very minute, $\frac{1}{16}$ in. diam., fem. $\frac{1}{6}$ in. *Styles* very short, on the margin of a crenulate ridge that bounds the broad very concave top of the ovary; arms subulate, recurved, eventually immersed in the top of the fruit. *Fruit* $\frac{1}{3}$ in. diam., depressed-globose, narrower than the enlarged calyx. *Seeds* $\frac{1}{10}$ in. long; albumen scanty.—There has been confusion in respect of this plant, which is undoubtedly Roxburgh's *Phyll. rhamnoides* and the *Ceratogynum rhamnoides* of Dalzell and Gibson. Wight's figure of *Ceratogynum* is so unsatisfactory, and differs so much in the broadly ovate acute leaves, the large male flowers with lanceolate acuminate sepals, and fem. with acute ciliolate sepals, that I have queried its identity. *S. quadrangularis* is apparently a very rare plant. Mueller states that specimens are in Herb. Hook. from Wight, but I find none. The only ones I have seen are Wallich's single specimen on sheet 7092 A, from Herb. Hamilton; another in Hamilton's Herbarium (in Edinburgh Botanical Gardens), both from Monghyr, and Dalzell's from the Concan. Of the synonyms, &c., cited by Mueller under *S. Ceratogynum,* Wallich's 7892 B, cited as *P. Leschenaultii, β. tenella,* is a mixture of several species of *Phyllanthus*; *P. rotundifolius,* No. 7892 D of Wallich, is, I think, a barren specimen of *Breynia patens*; and *P. bacciformis,* No. 7909, is *Sauropus pubescens.* Baillon erroneously cites Wight as authority for referring *Ceratogynum* to *Sauropus.* I have seen no Burmese specimens; Kurz has a variety *pubescens* which may be the following, and probably his Burmese *S. quadrangularis* (*S. rhamnoides*) is *S. brevipes.*

12. **S. pubescens,** *Hook. f.*; branches compressed and leaves on both surfaces finely tomentose, leaves small very shortly petioled elliptic subacute, calyx-lobes externally tomentose, of the male cuneately quadrate retuse, of fem. rounded. Phyllanthus bacciformis, *Herb. Ham. in Wall. Cat.* 7909.

Eastern Himalaya, and along its base; the Morung, *Hamilton*; Siligoree, at the foot of the Sikkim Hills, *Clarke.*

Branches slender, strict, obscurely 2-winged here and there. *Leaves* $\frac{1}{2}$–$\frac{2}{3}$ in., membranous, nerves 3 pairs; petiole $\frac{1}{12}$ in.; stipules minute. *Flowers* $\frac{1}{12}$–$\frac{1}{10}$ in. diam., solitary red; pedicels $\frac{1}{8}$ in., very slender.—Hamilton, in a ticket attached to the specimen in Wallich's Herbarium, queries this being *P. bacciformis,* which mark of doubt is omitted in Wall. Cat.

13. **S. brevipes,** *Muell. Arg. in Linnæa* xxxii. 73, and in *DC. Prodr.* xv. ii. 242; quite glabrous, branchlets filiform angular, leaves shortly

petioled broadly elliptic glaucous beneath, flowers racemed on a densely bracteate peduncle, male calyx shortly 6-lobed, lobes retuse, glands large, fem. sepals obovate.—*Wall. Cat.* 7918 B.

BURMA; at Prome, *Wallich.*

Habit and leaves of *S. quadrangularis*, but the latter glaucous beneath, branchlets much more slender, and male calyx very different.

14. **S. compressus,** *Muell. Arg. in Linnæa* xxxii. 73, and in *DC. Prodr.* xv. ii. 243; shrubby, much branched, quite glabrous, branchlets angled and compressed, leaves very shortly petioled elliptic or broadly oblong obtuse or apiculate penninerved, flowers very minute, calyx of both sexes with 6 short broad retuse or obreniform lobes, fruit pisiform sessile, epicarp thin bursting irregularly, cocci with a minute basal ventral perforation. *Kurz For. Fl.* ii. 350.

CENTRAL and EASTERN HIMALAYA; Nepal, *Hamilton*: Sikkim, on the lower hills, *J. D. H.*, &c.; Bhotan, *Griffith.* MARTABAN; in the Eng forests, *Kurz.*

A deciduous-leaved tree or large shrub; branches flattened, branchlets very slender. *Leaves* 1 in. and under, brown when dry, nerves 2–3 pair; petiole $\frac{1}{12}$ in.; stipules minute. *Flowers* dark red, solitary or few together, males $\frac{1}{20}$–$\frac{1}{10}$ in. diam.; fem. much larger, hardly enlarged in fruit; lobes of male very variable, sometimes with the truncate ends terminating at each angle in a recurved horn. *Styles* distant as in *S. quadrangularis*. *Fruit* $\frac{1}{6}$–$\frac{1}{4}$ in. diam.; cocci $\frac{1}{8}$ in. long.—I have seen no Martaban specimens of this.

15. **S. rigidus,** *Thwaites Enum.* 284; shrubby, quite glabrous, branchlets acutely angled, leaves $\frac{1}{2}$–$\frac{3}{4}$ in. very shortly petioled elliptic rounded or subobovate obtuse or apiculate, flowers minute, male racemed on a bracteate peduncle, calyx discoid papillose within with short retuse lobes, fem. of obovoid obtuse sepals, styles erect sunk in the concave top of the ovary, fruit very small ovoid. *Muell. Arg. in DC. Prodr.* xv. ii. 243.

CEYLON; common in the hot drier parts of the island, *Thwaites.*

A small shrub, 1–2 ft. *Leaves* black-green above when fresh, with white in the middle, dark brown when dry. *Male flowers* solitary (or appearing one at a time), from a short axillary peduncle that is densely clothed with sinuate bracts, yellow-green, $\frac{1}{12}$ in. diam.; *fem.* $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Capsule* $\frac{1}{4}$ in. long.—I have very indifferent specimens, in male fl. only. Thwaites remarks that the ovary resembles that of *Agyneia*. I have no doubt as to its being a *Ceratogynum*, and very near to *S. quadrangularis.*

15. PUTRANJIVA, *Wall.*

Trees. *Leaves* alternate, evergreen, quite entire or serrulate, penninerved and reticulate. *Flowers* axillary, pedicelled, mono- or di-œcious, apetalous; males clustered, fem. subsolitary; disk 0. MALE FL. *Calyx* unequally 3–6-lobed or -partite, imbricate. *Stamens* 2–4 in the centre of the flower, filaments free or subconnate; anthers erect, cells parallel. *Pistillode* 0. FEM. FL. *Calyx* of the male. *Ovary* ovoid, 2–3-celled; styles short, spreading, dilated into broad fleshy arms; ovules 2 in each cell. *Drupe* ovoid or globose; endocarp hard, 1-celled, 1-seeded. *Seed* ovoid, testa crustaceous, albumen fleshy, cotyledons broad flat.—Species 2, Indian.

1. **P. Roxburghii,** *Wall. Tent. Fl. Nep.* 61, and *Cat.* 6814; nearly glabrous, leaves obliquely ovate or ovate-lanceolate serrulate, sepals of male 3–5, of fem. 5–6, stamens 1–3. *Muell. Arg. in DC. Prodr.* xv. ii. 443; *Royle Ill.* 347, t. 83 *bis*: *Wight Ic.* t. 1876: *Brand. For. Fl.* 451, t. 53; *Kurz For. Fl.* ii. 366; *Gamble Man. Ind. Timb.* 353; *Beddome Flor. Sylvat.* t. 275;

Dalz. & Gibs. Bomb. Fl. 236; *Endl. Ic. Gen.* t. 19. P. sphærocarpa & amblyocarpa, *Muell. Arg. l. c.* 443, 444. Nageia Putranjiva, *Roxb. Fl. Ind.* iii. 766.—*Wall. Cat.* 7889.—*Rheede Hort. Mal.* vii. t. 59.

Throughout TROPICAL INDIA, wild and cultivated, from the lower Himalaya in Kumaon, eastwards and southwards to Pegu and CEYLON.

A moderate-sized evergreen tree, shoots pubescent. *Leaves* 2–3 in., obtuse, acute or acuminate. *Flowers* small, yellow; males in dense axillary clusters, shortly pedicelled; fem. solitary or in pairs, sepals minute, pedicels $\frac{1}{2}$–1 in. pubescent. *Filaments* more or less connate *Ovary* tomentose, stigmas 3, cuneately semi-lunar. *Fruit* from globose to ovoid, size of a cherry or smaller, white-tomentose; putamen hard, wrinkled.

2. **P. zeylanica,** *Muell. Arg. in DC. Prodr.* xv. ii. 444; quite glabrous, leaves lanceolate acuminate gland-dotted beneath, sepals of male 2 of fem. 4, stamens 2. *Beddome Forester's Man.* 197, and *Fl. Sylvat.* t. 275 (*the lower left-hand compartment*). Palenga zeylanica, *Thwaites in Hook. Journ. Bot.* viii. (1856) 271, t. 7 C, and *Enum.* 287; *Baill. Etudes Gen. Euphorb.* 649.

CEYLON; at Ambagamowa, alt. 2000 ft., *Thwaites.*

A glabrous tree, 20–40 ft.; branches terete. *Leaves* 3–5 by 1–1$\frac{3}{4}$ in., oblique, shining; petiole $\frac{1}{6}$ in., rugulose; stipules minute. *Flowers* white, $\frac{1}{12}$ in. long; pedicels about as long. *Fruit* $\frac{3}{4}$ in. long, tomentose.

16. HEMICYCLIA, *Wight & Arn.*

Trees or shrubs. *Leaves* evergreen, alternate, petioled, quite entire, base usually very unequal. *Flowers* small, pedicelled, diœcious, apetalous; males clustered at the axils or nodes; females subsolitary. MALE FL. *Sepals* 4–5, imbricate, inner usually larger and subpetaloid. *Stamens* 4–23, inserted round an orbicular disk, filaments free; anthers erect, cells parallel. *Pistillode* 0. FEM. FL. *Calyx* of the male. *Disk* flat, annular. *Ovary* obliquely ovoid, 1-(rarely 2-)celled; stigmas 1, rarely 2, sessile, or on a short style, broadly reniform, flabelliform, orbicular; ovules 2 in each cell. *Fruit* ovoid, oblong, pyriform or globose, endocarp hard. *Seeds* oblong, grooved on one face, arilled; albumen fleshy; cotyledons broad, flat.—Species 9, Indian, Malayan and Australian.

* *Fruit globose, terete; endocarp bony.*

1. **H. sepiaria,** *Wight & Arn. in Edinb. New Phil. Journ.* xiv. 297; nearly glabrous, leaves very coriaceous broadly elliptic or oblong tip rounded obtuse or retuse entire or repand-toothed, base rounded or cordate, stamens 8–10, fruit small pisiform. *Muell. Arg. in DC. Prodr.* xv. ii. 487; *Wight Ic.* t. 1872; *Dalz. & Gibs. Bomb. Fl.* 229; *Beddome Forester's Man.* 198; *Thwaites in Hook. Journ. Bot.* (1855) 271, and *Enum.* 287; *Baill. Etudes Gen. Euphorb.* t. 27, f. 7, 8. Periplexis, *Wall. Cat.* 8022. P. rigida, *Wall. mss.*

DECCAN PENINSULA; from the Concan southwards, ascending to 3000 ft CEYLON; from the sea coast to 1500 ft.

A rigid, much-branched shrub, 6–9 ft.; shoots puberulous. *Leaves* 1$\frac{1}{2}$–3$\frac{1}{2}$ in., hard and almost shining when old, pale brown when dry, nerves very faint; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Flowers* villous; male $\frac{1}{6}$ in. diam., in axillary bracteolate clusters, or lengthening into short racemes, pedicels $\frac{1}{6}$–$\frac{1}{4}$ in., filiform; fem. subsessile, with the pubescent pedicels elongating in fruit. *Sepals* 4, broad. *Stamens* 6–8, inserted round a cupular disk with a waved margin; filaments slender, exserted. *Ovary* 1–2-celled; stigma peltate, orbicular, or semicircular. *Fruit* $\frac{1}{3}$ in. diam., one-seeded,

endocarp bony.—The Australian plant referred to this by Bentham (of which that author had not seen fruiting specimens) differs wholly in the much smaller flower, smaller ellipsoid fruit, and other characters.

** *Fruit ellipsoid or obovoid.*

2. **H. lanceolata,** *Thwaites Enum.* 287; branchlets tomentose, leaves ovate or lanceolate very obtusely subcaudately acuminate glabrous or the midrib pubescent beneath, flowers puberulous, pedicels very short, stamens 10–16, ovary glabrous, stigma flabelliform, fruit narrowly ellipsoid. *Muell. Arg. in DC. Prodr.* xv. ii. 487; *Beddome Forester's Man.* 199.

CEYLON; at Caltura, *Thwaites.*

A tree; branches slender. *Leaves* 1–3 in., distichous, thinly coriaceous, green when dry, both surfaces alike reticulated, margin sometimes faintly repand, midrib strong, nerves very slender; petiole $\frac{1}{10}$–$\frac{1}{6}$ in., pubescent. *Flower* $\frac{1}{8}$ in. diam., male pedicels $\frac{1}{12}$ in., fem. rather longer. *Sepals* broadly oblong. *Stigma* flabelliform, sessile or on a short stout style. *Fruit* $\frac{2}{3}$ in. long, red; tip oblique, sometimes incurved with a lateral stigma; endocarp coriaceous, crested and reticulate.

3. **H. Gardneri,** *Thwaites in Hook. Journ. Bot.* viii. (1855) 271, and *Enum.* 287; branchlets tomentose, leaves lanceolate or oblong tip rounded obtuse or subacute entire or obscurely repand-toothed glabrous or sparsely pubescent on the midrib beneath, flowers tomentose, pedicels short, stamens 20–25, ovary obovoid gibbous, fruit broadly ellipsoid. *Muell. Arg. in DC. Prodr.* xv. ii. 488; *Baill. Gen. Euphorb.* t. 27, f. 8; *Beddome Forester's Man.* 199.

CEYLON; from the sea coast to 1500 ft. common.

Very near *H. lanceolata,* but the leaves are smaller, more coriaceous, not suddenly narrowed to the tip, more crenate, the pedicels longer, flowers rather larger more tomentose, stamens more numerous, and the fruit very different, $\frac{1}{3}$ in. long, apparently flattened, sometimes obovoid. *Male fl.* $\frac{1}{4}$ in. diam.; sepals orbicular, concave, pubescent on both surfaces; central disk small, pubescent. *Stigma* reniform on a short style.

4. **H. sumatrana,** *Muell. Arg. in DC. Prodr.* xv. ii. 488; quite glabrous, leaves oblong or oblong-lanceolate obtusely acuminate entire or repand crenate glossy reticulately veined, flowers 1–3 puberulous, stigma flabelliform, fruit small 1-seeded broadly ellipsoid rounded at both ends or base truncate smooth keeled on one side. *Kurz For. Fl.* ii. 365. Anaua sumatrana, *Miq. Fl. Ind. Bat. Suppl.* 410.

BURMA; in tropical swamp forests of Martaban and the Irawaddi, and ANDAMAN ISLANDS, *Kurz.*—DISTRIB. Java, Sumatra.

An evergreen tree, 30–50 ft. *Leaves* 3–4 in., rigid, but thinly coriaceous; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Flowers* small, yellow green, and pedicels puberulous. *Sepals* $\frac{1}{10}$ in. long. *Ovary* glabrous. *Fruit* $\frac{1}{2}$ in. long.—I have seen no Burmese specimens, nor flowers or fruit of Andaman or others.

5. **H. andamanica,** *Kurz For. Fl.* ii. 365; nearly glabrous, leaves oblong-ovate to -lanceolate caudate acuminate entire or repand-crenate minutely reticulate, flowers 1–2 puberulous, stamens many, fruit ellipsoid or obovoid shortly peduncled terete, putamen semiterete coriaceous.

ANDAMAN ISLANDS; marshy places near the coast, *Kurz.*

An evergreen tree, 40–50 ft.; bark white. *Leaves* 3–3$\frac{1}{2}$ in., thinly coriaceous, rather rigid, puberulous when young, base unequal; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Flowers* rather large, puberulous; pedicels $\frac{1}{12}$–$\frac{1}{10}$ in., hairy. *Sepals* rounded, concave, 2 inner

thinner. *Drupe* over $\frac{1}{2}$ in.; peduncle $\frac{1}{6}$–$\frac{1}{4}$ in., usually deflexed.—I have seen only an indifferent specimen, the leaves of which are almost entire.

6. **H. venusta,** *Thwaites in Hook. Journ. Bot.* viii. (1855) 272; branchlets glabrous, leaves elliptic or oblong obtuse or acuminate quite glabrous base often oblique, flowers finely tomentose, males clustered, fem. long-pedicelled, stamens 5–8, stigma disciform, fruit obovoid pericarp very thick. *Muell. Arg. in DC. Prodr.* xv. ii. 488; *Dalz. & Gibs. Bomb. Fl.* 229; *Beddome Forester's Man.* 198. Astylis venusta, *Wight Ic.* t. 1922.—*Wall. Cat.* 8007.

DECCAN PENINSULA; from Canara to the Nilghiris and S. Tinnevelly, ascending to 4000 ft., *Heyne, Wight, Stocks,* &c.

A tree; branches rather stout. *Leaves* 3–5 in., very coriaceous, shining above, quite entire, base acute or cuneate, coarsely reticulated beneath, nerves many and slender; petiole $\frac{1}{6}$ in. *Flowers* $\frac{1}{4}$ in. diam.; male pedicels $\frac{1}{4}$ in., fem. 1–2$\frac{1}{2}$ in. *Fruit* $\frac{3}{4}$–1 in., sometimes gibbous, at the top crowned with the pulvinate stigma; pericarp thick and hard when dry.—Dalzell (in a letter) observes that the ovary is 1- or 2-celled, that when 1-celled the stigma is an entire disk, and not unilateral, when 2-celled the stigma is double; also that the 2 ovules in each cell are so closely packed as to appear like one.

7. **H. elata,** *Beddome Fl. Sylvat.* t. 279; glabrous, leaves lanceolate acuminate, male flowers in few-fld. axillary fascicles, pedicels slender, sepals oblong pubescent on both surfaces, stamens 8–12, ovary 1-celled, stigmas sessile disciform, fruit long pedicelled pyriform pericarp very thick.

DECCAN PENINSULA; in the Wynaad, Anamalay and Tinnevelly forests, alt. 3000 ft., *Beddome.*

A large tree, 90–100 ft. *Leaves* 4–5 by 1$\frac{1}{2}$–2 in., quite entire, shining on both surfaces; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Male fl.* 4–5 in a cluster; pedicels $\frac{1}{2}$–1 in.; flowers $\frac{1}{3}$ in. diam. *Fem. fl.* solitary, rather larger than the male; pedicel elongating in fruit. *Disk* annular. *Fruit* $\frac{3}{4}$–1 in. long.—Beddome distinguishes this from *H. venusta* by its being a very large tree with less coriaceous leaves. My specimens do not enable me to distinguish it from that plant.

8. **H. Wightii,** *Hook. f.*; nearly glabrous, leaves elliptic- or oblong-lanceolate obtusely taper-pointed many-nerved and finely reticulate entire or obscurely crenate, base acute unequal-sided, flowers axillary shortly pedicelled solitary or 2–3 together, sepals 4–7 oblong and pedicels fulvous-tomentose, disk orbicular pubescent, stamens 6–10, fruit on a short stout pedicel ovoid puberulous, pericarp thick, stigma reniform.

DECCAN PENINSULA; Nilghiri Hills, *Wight.*

Habit of *H. venusta,* but the leaves are uniformly narrower, thinner, more finely reticulate, and the pedicels are shorter than the fruit, which is $\frac{3}{4}$ in. long and subacute.

17. CYCLOSTEMON, *Blume.*

Trees. *Leaves* alternate, quite entire or crenulate, base often unequal-sided. *Flowers* axillary, dicœcious, apetalous, all racemed or clustered and pedicelled. MALE FL. *Sepals* 4–6, broad, imbricate (buds globose). *Stamens* few or many, inserted round a flattened or depressed disk; filaments short free; anthers erect, cells parallel. *Pistillode* 0 or minute. FEM. FL. *Calyx* of the male. *Disk* annular or 0. *Ovary* 2–4-celled, styles elongate or 0, stigmas dilated fleshy or connate into a peltate disk; ovules 2 in each cell. *Fruit* subglobose or ovoid, indehiscent; pericarp thick, hardened, 2-celled. *Seeds* solitary in the cells, albumen fleshy; cotyledons broad, flat.—Species about 18, Tropical Indian, Malayan and African.

Sect. 1. STENOGYNIUM, *Muell. Arg.* *Flowers* axillary. *Sepals* 4. *Stamens* 6–8. *Disk* of male fl. flat or tumid. *Ovary* 2-celled; styles elongate, slender; stigma peltate.

1. **C. indicus,** *Muell. Arg. in Linnæa* xxxii. 81, and in *DC. Prodr.* xv. ii. 481 (*excl. Malabar and Concan*); leaves obliquely ovate- or oblong-lanceolate obtusely caudate-acuminate base very unequal, nerves very faint, flowers axillary small males subsolitary and slender pedicels quite glabrous, stamens 4–6 around a flat disk.

KHASIA MTS., *Griffith* (*Kew Distrib.* 4736); below Churra, *J. D. H. & T.*

A tree. *Leaves* 3–5 in., almost membranous, green when dry, nerves 10–12 pair, very slender; petiole $\frac{1}{10}$ in. *Male fl.* $\frac{1}{10}$ in. diam., yellow, laterally compressed. *Sepals* 4, almost orbicular, concave, ciliate. *Disk* 2-lobed. *Stamens* included; anther-slits introrse. "Ovary silky; styles slender, tips dilated," *Muell.*—Griffith's specimens have leaves 3 by 1 in.; mine are much broader, 5 by 2 in. I have seen no fem. fl. or fruit. Mueller gives Malabar and Concan, Hook. and Thoms., as localities, but there must be some error here.

2. **C. lancifolius,** *Hook. f.*; leaves lanceolate caudate-acuminate base very unequal with thickened margins, nerves strong, flowers of both sexes in axillary pubescent racemes, stamens 7 or 8 round a fleshy disk, styles 2 slender.

SIKKIM HIMALAYA, alt. 4–5000 ft., *J. D. H. & T. T.* Khasia Mts., alt. 3–5000 ft., *Griffith* (*Kew Distrib.* 4738), *J. D. H. & T. T.*

A tree; branches long, slender. *Leaves* 4–6 in., coriaceous, pale green when dry, the thickened cartilaginous margin extending $\frac{1}{2}$–1 in. upwards from the petiole (sometimes obscure), base very acute; nerves 6–8 pair, slender but very distinct and raised on both surfaces; petiole $\frac{1}{3}$ in. *Flowering branchlets* in a young state enclosed in imbricating rigidly coriaceous distichous ciliate scales, forming lance-shaped buds $\frac{1}{2}$ in. long. *Racemes* few-fld., more or less pubescent. *Flowers*, male $\frac{1}{6}$–$\frac{1}{4}$ in. diam., fem. $\frac{1}{3}$ in. *Sepals* oblong, pubescent and ciliate. *Disk* of male hemispheric, entire, pubescent. *Stamens* equalling the sepals, slits introrse. *Ovary* globose, 2-celled, densely tomentose; styles 2, slender, spreading, sigmoid, stigma entire peltate cordate. *Fruit* 1 in., ellipsoid, pericarp thick, endocarp papery.

3. **C. Griffithii,** *Hook. f.*; leaves membranous elliptic-lanceolate acuminate base quite equal, nerves very slender, young fruit long pedicelled ellipsoid abruptly beaked scurfy, styles 2 slender.

UPPER ASSAM; Mishmi Hills, *Griffith* (*Kew Distrib.* 4738).

Branches very slender. *Leaves* 6 by 2 in., green when dry, nerves 6–7 pair; petiole $\frac{1}{4}$ in. *Young fruit* $\frac{1}{2}$ in.; styles slender, crowning the beak, stigma peltate; peduncle $1\frac{1}{2}$ in., glabrous.—Apparently a very distinct species, of which I have specimens in young fruit only.

Sect. 2. EUCYCLOSTEMON, *Muell. Arg.* *Stamens* numerous. *Stigmas* 2, sessile, large, broad, 2-lobed.

* *Flowers all or mostly from the old wood.*

4. **C. macrophyllus,** *Blume Bijd.* 598; leaves 5–9 in. oblong to elliptic-lanceolate obtusely acuminate base usually very unequal, nerves 6–8 pair, flowers large pubescent or tomentose, disk villous, stamens very many. *Muell. Arg. in DC. Prodr.* xv. ii. 482.

MALACCA, *Maingay* (*Kew Distrib.* 1435). ANDAMAN ISLANDS, *Kurz.* COORG, *Beddome.* CEYLON; Central Province, alt. 3000 ft.—DISTRIB. Java.

An evergreen tree, 30–40 ft., with rigid branches, *Kurz.* *Leaves* coriaceous, quite entire, pale brown when dry, smooth above, highly reticulated beneath, base cuneate

rounded or subcordate; nerves 6–8 pair, strong beneath; petiole $\frac{1}{4}$ in., very stout. *Flowers* $\frac{1}{3}$–$\frac{2}{3}$ in. diam., sessile or pedicelled. *Sepals* 4 or 5, rounded, concave, more or less pubescent or glabrate. *Disk* concave. *Filaments* free or connate. *Stigmas* reniform. *Fruit* subglobose, $\frac{3}{4}$–1 in. diam., pubescent, yellow, tomentose or strigose. —There are three varieties, or possibly species, namely—

1. *zeylanica*; male and fem. fl. peduncled, $\frac{2}{3}$ in. diam. C. zeylanicus, *Baill. Etudes Gen. Euphorb.* 562; *Thwaites Enum.* 286. Sphragidia zeylanica, *Thwaites in Hook Journ. Bot.* vii. (1855) 270, t. 10.—Ceylon.

2. *malaccensis*, male and fem. fl. peduncled, $\frac{1}{3}$–$\frac{1}{2}$ in. diam. ? C. macrophyllus, *Kurz For. Fl.* ii. 364.—Malacca, *Maingay* (*Kew Distrib.* 1430, 1435, 3349), Andaman Islands.

3. *peninsularis*; male and fem. fl. sessile, $\frac{2}{3}$ in. diam. C. macrophyllus, *Beddome Fl. Sylvat.* t. 278.—Coorg, Western Circars, *Brandis.*

5. **C. longifolius,** *Blume Bijd.* 598; leaves 1–2 ft. linear-oblong obtuse very unequal-sided base unequally cordate, nerves 20–30 pairs, flowers large glabrous, stamens very many, disk glabrous flat. *Muell. Arg. in DC. Prodr.* xv. 1. 482; *Baill. Etudes Gen. Euphorb.* 562, t. 23, f. 22–25.

PERAK; in rocky places, *King's Collector.* PENANG and MALACCA, *Maingay* (*Kew Distrib.* 1453).—DISTRIB. Java.

A tree, 60–80 ft. in Perak. *Leaves* 4–10 in. broad, very coriaceous, brown when dry, loosely reticulate on both surfaces, nerves spreading; petiole very short, immensely thick *Male fl.* very numerous in a cluster, very shortly pedicelled, $\frac{1}{2}$ in. diam. *Sepals* 5, glabrous within and without. *Stamens* numerous round a flat disk. *Stigmas* 3, cuneate 2-fid. *Fruit* 2–$2\frac{1}{2}$ in. diam., globose, obscurely trigonous, bright orange, slightly tomentose, 3-celled.

6. **C. malabaricus,** *Beddome Forester's Man.* 199; branchlets and pedicels golden tomentose, leaves 8–9 by $2\frac{1}{2}$ in. oblong membranous quite entire subcuspidate tomentose on both surfaces when young at length glabrous except the hairy costa, base unequal, nerves 7–10 pairs, petiole $\frac{1}{4}$ in., male fl. fascicled on the old branches, sepals 4 golden tomentose, stamens very many, disk cupular, fruit on the older branches solitary 1 by $\frac{3}{4}$ in. tomentose, pedicel $\frac{1}{2}$ in., stigmas 2 reniform.

SOUTH DECCAN; Tinnevelly Ghats, alt. 3–4000 ft., *Beddome.*

A large tree.—I have not seen this species; the characters are taken from Beddome's description.

7. **C. confertiflorus,** *Hook. f.*; quite glabrous, leaves coriaceous oblong obtusely acuminate reticulate on both surfaces, nerves 5–8 pairs very slender, male fl. $\frac{1}{4}$–$\frac{1}{3}$ in. diam. in dense clusters on the old wood, stamens many, disk depressed-funnel-shaped glabrous radiately ribbed and with a membranous lobed border.

NORTH CANARA; in evergreen forests at Katgal, *W. A. Talbot.*

A large tree; branches stout, woody, with pale bark. *Leaves* 4–9 in., dull greenish on both surfaces when dry, rather shiny above, base equal or unequal, margins undulate; petiole stout, $\frac{1}{6}$–$\frac{1}{4}$ in. *Male fl.* in globose clusters $\frac{1}{3}$ in. diam., sessile or shortly pedicelled, quite glabrous. *Sepals* 5, orbicular, concave, coriaceous. *Stamens* about 20, outside the disk, filaments stout; anthers large, not apiculate. *Pistillode* minute, conical. *Fem. fl.* and *fruit* not seen.—The depressed ribbed disk lining the calyx-tube and its subpetaloid border are very remarkable characters.

** *Flowers axillary* (*see also* C. ellipticus).

8. **C. eglandulosus,** *Kurz For. Fl.* ii. 364; glabrous except the fem. flowers, leaves broadly elliptic or ovate-oblong abruptly obtusely cau date-

acuminate, fem. flowers 1–3 together long-pedicelled axillary tomentose, ovary tomentose 2-celled, stigmas dilated triangular. Hopea eglandulosa, *Roxb. Fl. Ind.* ii. 611. Sarcostigma eglandulosum, *Wall. mss.*—*Wall. Cat.* 7994.

TIPPERA, *Roxburgh.* ARRACAN; in forests rare, *Kurz.* CHITTAGONG; at Seetakoond, *J. D. H. & T. T.*

An evergreen tree, 40–50 ft., *Kurz*; branches pendulous, slender. *Leaves* 2–3 by 1–1½ in., thinly coriaceous, pale when dry, reticulate on both surfaces, base unequal, nerves 5–6 pair; petiole slender, ¼–⅓ in. *Flowers*, male glabrous; fem. ¼ in. diam., solitary or few, axillary, pedicels puberulous. *Ovary* velvety-pubescent; stigmas cuneate, crenate.—I have seen neither fem. flower nor fruit, nor any Burmese specimens, and I am hence uncertain as to Kurz's plant being Wallich's, which are all from the Calcutta Gardens; his description differs from it in the much smaller leaves 1½–2 in. long.

9. **C. subsessilis,** *Kurz For. Fl.* ii. 364; glabrous except the pubescent inflorescence, leaves oblong to elliptic-oblong or oblong-lanceolate subacute or acuminate, flowers small very shortly pedicelled, ovary pubescent 2-celled, fruit ellipsoid slightly 4-lobed puberulous, stigmas minute.

CHITTAGONG, ARRACAN and MARTABAN, *Kurz.*

An evergreen tree, 25–30 ft.; branches slender. *Leaves* 4–6 in., chartaceous; nerves 10–12 pair, very slender, laxly reticulate, margins waved or subcrenate; petiole ¼ in. *Flowers* clustered, ⅙ in. diam., subsessile, axillary and at the scars of fallen leaves. *Sepals* orbicular, concave. *Stigmas* 2 or 3, triangular. *Fruit* ⅔–¾ in. long, obscurely 4-lobed, shortly beaked, orange-coloured; peduncle thickened, 1/10 in. —I have seen only one authentic specimen, and that in fruit, sent by Dr. King, which differs from Kurz's description in the more lanceolate acuminate leaves.

10. **C. assamicus,** *Hook. f.*; glabrous except the inflorescence, leaves elliptic oblong or linear-oblong tip rounded obtuse or subacute, fruits very shortly pedicelled small axillary clustered rusty-tomentose tip rounded, stigmas minute.

SIKKIM TERAI, *Gamble.* ASSAM, *Simons, Griffith.* KHASIA HILLS; at Nowgong, *Clarke.*

Leaves 3–5 in., shining and reticulate on both surfaces, base acute equal or unequal, margin undulate or repand; nerves 10–12 pair, very slender; petiole ¼ in. *Fruit* immature, ⅓ in diam., globose or very broadly ellipsoid, apparently terete; stigmas very obscure.

11. **C. ellipticus,** *Hook. f.*; glabrous except the hoary flowers, leaves membranous elliptic obtusely acuminate base subacute unequal, nerves 8–10 pair very slender, male flowers ⅓ in. diam. axillary and on the branches solitary or few together shortly pedicelled, sepals broadly oblong, stamens about 20 surrounding a small orbicular disk.

TENASSERIM or ANDAMAN ISLANDS, *Helfer* (*Kew Distrib.* 4962).

Branches slender. *Leaves* 4–5 in., dull brown above, lighter beneath, midrib slender, nerves filiform; petiole ⅙–¼ in., slender. *Male fl.* globose; pedicels shorter than the calyx, slender. *Sepals* broadly oblong, concave. *Stamens* with large oblong obtuse anthers as long as the filament. *Fem. fl.* and *fruit* unknown.

12. **C. nervosus,** *Hook. f.*; branchlets tomentose, leaves oblong-lanceolate caudate-acuminate entire glabrous except the midrib beneath, nerves very strong beneath deeply sunk above, flowers in sessile axillary clusters, sepals 4 fulvous tomentose, stamens very many disk deeply sunk villous, ovary fulvous tomentose, stigmas semicircular.

PERAK, *Scortechini.*

Branches with pale bark. *Leaves* 8–12 in., thinly coriaceous, base rounded on one

side acute on the other; nerves 12–15 pairs, cross-nervules few, raised; petiole $\frac{1}{4}$ in., stout. *Flowers* $\frac{1}{4}$–$\frac{1}{6}$ in. diam. *Sepals* orbicular.

13. **C. Helferi,** *Hook. f.*; quite glabrous except the inflorescence, leaves coriaceous elliptic-lanceolate acuminate or caudate entire or repand serrate base equal acute or rounded, male fl. few sessile on a short stout axillary peduncle, fruit unripe long-peduncled obovoid finely pubescent, stigmas very large dilated.

TENASSERIM or ANDAMAN ISLANDS, *Helfer* (*Kew Distrib.* 214).

Branches rather slender. *Leaves* 3–5 by $1\frac{1}{2}$–2 in., pale brown when dry, shining above, nerves many pair, very slender, hardly distinguishable above from the prominent lax reticulations; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* very immature, peduncle $\frac{1}{4}$ in., stout, pubescent. *Sepals* 4, orbicular. *Stamens* many; anthers extrorse. *Fruit* (young) $\frac{1}{3}$ in. long.—The large stigma at once distinguishes this from *C. subsessilis* and *assamicus*. Male flowers not seen.

14. **C. Curtisii,** *Hook. f.*; quite glabrous, leaves elliptic-lanceolate acuminate very shortly peticled base acute, midrib and nerves prominent above, nerves 8–10 pair very prominent beneath, cross-nervules finely reticulate, fem. fl. solitary axillary very shortly pedicelled, calyx patelliform glabrous fringed with coarse hairs, young fruit glabrous pericarp thin, stigmas 2 small hemispheric.

PENANG; alt. 2500 ft., *Curtis*.

A small tree, branches slender, bark nearly white. *Leaves* 6–10 by $1\frac{1}{2}$–2 in., thinly coriaceous dark green when dry on both surfaces, nerves arched, lower ascending; petiole $\frac{1}{10}$ in., stout. *Young fruit* $\frac{1}{2}$ in. diam., 2-celled; cells 2-ovuled; pedicel $\frac{1}{12}$ in., bracteate at the base.

IMPERFECTLY KNOWN SPECIES.

15. **C. leiocarpus,** *Kurz in Trimen Journ. Bot. N. S.* iv. (1875) 330; a tree 30–40 ft., leaves 4–6 in. subsessile glabrous chartaceous elliptic or linear-oblong subacute or obtusely acuminate, base subequal, dark green when dry, nerves 6–10 pairs hardly distinguishable from the reticulations, petiole $\frac{1}{10}$ in., fruit axillary solitary ellipsoid or subglobose $\frac{3}{4}$ in. diam. glabrous obscurely 2–3-lobed 2-celled 2-seeded top rounded, stigmas minute.

NICOBAR ISLANDS; Kamorta, *Kurz*.

16. **C. calocarpus,** *Hook. f.*; glabrous, leaves oblong-lanceolate acuminate base usually very unequal-sided, fruit from the old wood large globose hoary, stigmas 2 cuneate. Aporosa calocarpa, *Kurz mss.*

SOUTH ANDAMAN ISLANDS, *Kurz*.

Branches (in fruiting specimen) very stout, woody. *Leaves* 6–9 by 2–4 in., coriaceous, dull green above when dry, paler beneath, base on one side rounded, on the other very acute; nerves 6–8 pair, very slender; petiole stout, $\frac{1}{4}$-$\frac{1}{3}$ in.—Received from the Calcutta Gardens in 1867 under the above name of *Aporosa calocarpa*, but not described in Kurz's Forest Flora published in 1877. I have seen no flowers; the fruits are inserted on tubercles of the very stout branches far below the leaves.

18. CHORIOPHYLLUM, *Benth.*

A glabrous tree. *Leaves* opposite, coriaceous, quite entire. *Flowers* small, axillary, dicœcious, apetalous; males in racemose cymes; fem. few, in sessile spikes; disk 0. MALE FL. *Sepals* 4–6 membranous, broadly oblong, imbricate. *Stamens* 4, opposite the sepals, inserted round a conical disk on

rudimentary ovary, filaments free, exserted; anthers stout, dorsifixed; cells extrorse, parallel. FEM. FL. *Sepals* 4, broad, fleshy, embracing the ovary, imbricate. *Ovary* 3-celled; styles free, erect, thick, obtuse, undivided; ovules 2 in each cell. *Capsule* of 3 2-valved cocci leaving a central column. *Seeds* oblong; testa crustaceous shining, albumen fleshy; cotyledons broad, flat.

C. malayanum, *Benth. in Hook. Ic. Pl.* t. 1280.—*Wall. Cat.* 7975.

MALAYA PENINSULA; Penang, *Maingay*; Singapore, *Wallich*; Malacca, *Griffith, Maingay* (*Kew Distrib.* 1404).

A tall tree; branchlets stout, woody, terminal buds pubescent. *Leaves* subterminal, 4–6 in., from oblong to linear-oblong or nearly obovate, obtuse, narrowed at the base into the stout petiole, subglaucous beneath; midrib stout beneath; nerves many, slender, reticulate; petiole $\frac{1}{3}$ in. *Male cymes* clustered, with the stout peduncle 1–1$\frac{1}{2}$ in. long; branches short, flowers $\frac{1}{10}$ in. diam., clustered, sessile or pedicels $\frac{1}{4}$–$\frac{1}{2}$ in.; buds globose, glabrous. *Stamens* as long as the sepals. *Fem. sepals* acute. *Capsule* about $\frac{3}{4}$ in. diam., epicarp separating from the thickly crustaceous cocci.

19. **MISCHODON,** *Thwaites.*

A tree. *Leaves* whorled, long, coriaceous, quite entire, penninerved. *Flowers* in short axillary panicles, dicœcious, apetalous. MALE FL. in panicled heads. *Sepals* 5–8, often unequal, imbricate. *Disk* 0. *Stamens* 5–10, opposite the sepals, exserted, filaments free, filiform, rough; anthers ovate, dorsifixed, cells parallel, slits extrorse. *Pistillode* 3-lobed. FEM. FL. *Disk* annular. *Ovary* 3–4-celled; styles short, spreading, flat, obovate; ovules 2 in each cell. *Capsule* deeply lobed, of 3 2-valved cocci. *Seeds* 1–2 in each coccus, testa crustaceous shining; albumen fleshy; cotyledons broad, flat.

M. zeylanicus, *Thwaites in Hook. Kew Journ.* vi. (1854) 300, t. 10 B, and *Enum.* 275; *Muell. Arg. in DC. Prodr.* xv. ii. 1124; *Beddome Fl. Sylv.* t. 290.

CEYLON; near Galle and Kandy, *Walker, Gardner, Thwaites.* DECCAN PENINSULA; on the Tinnevelly Hills, *Beddome.*

A very handsome evergreen tree, 30–40 ft.; branches terete, branchlets subtetragonous, hoary-pubescent. *Leaves* coriaceous, rigid, 3–4 in a whorl, 4–14 by 1–5 in., oblong or linear-oblong, minutely strongly reticulate, base narrowed obtuse or subcordate; petiole $\frac{1}{2}$–3 in., stout; stipules 2, minute. *Male fl.* numerous, in axillary bracteate pubescent panicles shorter than the leaves, reddish-yellow, $\frac{1}{12}$–$\frac{1}{6}$ in. long; sepals lanceolate, acuminate. *Capsule* $\frac{1}{2}$ in. broad, smooth, glabrous, cocci obtusely keeled on the back. *Seeds* smooth, brown, $\frac{1}{3}$ in. long.—Beddome's specimens are not in flower or fruit.

20. **BISCHOFIA,** *Blume.*

A glabrous tree. *Leaves* alternate, 3-foliolate; leaflets often crenate. *Flowers* in axillary or lateral panicled racemes, minute, dicœcious, apetalous; males scattered or clustered, females longer pedicelled. MALE FL. *Sepals* 5, concave, obtuse, imbricate, concealing the anthers. *Disk* 0. *Stamens* 5, filaments short; anthers large, cells parallel. *Pistillode* short, broad. FEM. FL. *Sepals* ovate, caducous. *Staminodes* 5, small, or 0. *Ovary* exserted, 3–4-celled; styles long, linear, stout, entire; ovules 2 in each cell. *Fruit* globose, fleshy, with 3–4 cells lined with a parchment-like 2-valved endocarp. *Seeds* turgidly oblong, testa fibro-crustaceous, albumen fleshy; cotyledons broad flat, radicle straight elongate.

B. javanica, *Blume Bijd.* 1168; *Muell. Arg. in DC. Prodr.* xv. ii. 478; *Brand. For. Fl.* 446; *Kurz For. Fl.* ii. 355; *Beddome Sylv. Madr.* t. 259; *Gamble Man. Ind. Timb.* 355; *Miquel Fl. Ind. Bat.* i. ii. 363, and *Suppl.* 444. B. trifoliata, *Hook. Ic. Pl.* t. 844. B. Roeperiana, *Dcne. in Jacquem. Voy. Bot.* 153; *Baill. Gen. Euphorb.* t. 26, f. 25–52. B. Cumingiana & B. Toui, *Dcne. l. c.* B. oblongifolia, *Dcne. l. c.* t. 154. Stylodiscus trifoliatus, *Bennet Plant. Jav. Rar.* 133, t. 29; *Dalz. & Gibs. Bomb. Fl.* 235. Micrœlus Roeperianus, *Wight & Arn. in Edinb. New Phil. Journ.* xiv. 298; *Wight Ic.* t. 1880. Andrachne trifoliata, *Roxb. Fl. Ind.* iii. 728. A. apetala, *Roxb. mss.*; *Wall. Cat.* 7956. Phyllanthus ? gymnanthus, *Baill. Rec. Obs. Bot.* ii. 240 (fid. Muell).

TROPICAL HIMALAYA, from Kumaon eastwards, and from ASSAM southwards, to TENASSERIM. DECCAN PENINSULA; on the Western Ghats from Canara southwards to the Nilgiri Hills. (Absent from Ceylon.)—DISTRIB. Malay and Pacific Islands.

A round-headed more or less deciduous-leaved quite glabrous tree, 30-40 ft.; bark smooth. *Leaves* very variable; petiole 1–6 in.; leaflets 3–5 in., from ovate to oblong-lanceolate, acuminate, repand-toothed, petiolules $\frac{1}{2}$–$\frac{3}{4}$ in. *Panicles* very slender, flowers green, males minute on short slender pedicels, fem. $\frac{1}{6}$ in. diam. on stout pedicels. *Fruit* fleshy, on long thickened pedicels, smooth, size of a pea, blue black. *Seeds* smooth, shining, testa splitting longitudinally, dark brown.—Kurz describes the fleshy fruit as almost indehiscent and containing a crustaceous 3–4-coccous capsule (implying a dehiscence within). Wight, and Hook. Ic. Pl., figure a 3-celled fleshy fruit and 3 seeds with thick testas. Mueller describes a 3-coccous parchment-like endocarp, and says nothing of the testa.

21. APOROSA, *Blume.*

Trees. *Leaves* alternate, quite entire, rarely sinuate-toothed, penninerved. *Flowers* minute, diœcious, rarely monœcious, apetalous; males most minute in axillary catkin-like spikes; fem. sessile or shortly pedicelled in very short bracteate spikes. MALE FL. *Sepals* 4 (3–6), membranous, imbricate. *Stamens* 1–5 in the centre of the flower, filaments capillary; anthers didymous. *Pistillode* minute or 0. FEM. FL. *Sepals* of the male, but larger. *Ovary* 2-(rarely 3-)celled; stigmas small, plumose, short, spreading or recurved, simple or 2–4-cleft, rarely elongate and 2-partite; ovules 2 in each cell. *Fruit* globose, ellipsoid or ovoid, bursting irregularly, or partially 2–4-valved from the base upwards, epicarp thin or thick and spongy or fleshy, endocarp thin, often separable; cells glabrous or hairy within, especially on the septum. *Seeds* oblong or suborbicular, usually plano-convex, albumen fleshy; cotyledons broad, flat.—Species 30–40, Tropical Asiatic and Malayan.

Series I. STIPULES SMALL, DECIDUOUS.

* *Ovary* pubescent or tomentose (unknown in *A. petiolata*).

† *Leaves more or less tomentose beneath (or glabrous in* A. microcalyx). *Female flowers and fruit sessile.*

1. **A. villosa,** *Baill. Gen. Euphorb.* 645; branchlets petioles and leaves beneath softly tomentose, leaves large from broadly oblong to elliptic-obovate obtuse quite entire, bracts of male spikes broadly ovate acute hirsute, fem. fl. sessile, ovary villous, stigmas long 2-partite plumose, fruit ovoid apiculate tawny-tomentose. *Muell. Arg. in DC. Prodr.* xv. ii. 471; *Kurz For. Fl.* ii. 361. Scepa villosa, *Lindl. Nat. Syst. Bot. Ed.* 2, 441 (*male*

and fem. fl. transposed), and *Veg. Kingd.* 283, *with woodcut.* Lepidostachys ? villosa, *Wall. Cat.* 7298.

PEGU and TENASSERIM, in open forests, *Wallich, M'Lelland, Helfer* (*Kew Distrib.* 4953, 4954).—DISTRIB. Cochin China.

A deciduous-leaved tree, 20–30 ft.; branchlets stout. *Leaves* 4–10 in., coriaceous, glabrous above except the nerves, base subcordate, rounded or acute; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., stout. *Male spikes* clustered, $\frac{1}{2}$–$\frac{3}{4}$ in. long; fem. subsolitary sessile, very short, oblong; bracts concave, ciliate. *Sepals* of male 3–5, oblanceolate, acuminate, pubescent. *Stamens* 2–5, exserted. *Ovary* rusty villous. *Fruit* size of a large pea, orange-coloured, usually 1-celled and 1-seeded.—The description of the fruit is from Kurz.

2. **A. ficifolia,** *Baill. Adans.* xi. 177; branches stout and leaves beneath rusty villous, leaves 6–9 by 3–4 in. thickly coriaceous elliptic or oblong acute or acuminate obscurely sinuate-toothed pale when dry, fem. fl. sessile, stigmas depressed broad 2-partite plumose, fruit globose, pericarp not very thick, cells glabrous within.—*Wall. Cat.* 8017.

PENANG, *Wallich, Maingay* (*Kew Distrib.* 1498). PERAK, *King's Collector.*—DISTRIB. Cambogia.

Branches as thick as a goose-quill. *Leaves* rather rugose above, hardly shining, midrib above tomentose; nerves 10–12 pair, strong beneath with reticulating nervules; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., stout. *Ovary* globose, villous; stigmas 4, very large and broad, 2-partite. *Fruit* globose, $\frac{3}{4}$–1 in. diam., 2-celled, crowned with the radiating sessile stigmatic lobes. *Seeds* suborbicular, plano-convex.

3. **A. microcalyx,** *Hassk. in Bull. Bot. Soc. France* vi. (1859) 714; branchlets pubescent or tomentose, leaves coriaceous 3–6 in. elliptic ovate or oblong obtuse or obtusely acuminate base acute or cuneate entire or sinuate-toothed glabrous or pubescent beneath, nerves 6–8 pairs strong arched and meeting in large loops, fem. flowers sessile on very short spikes, ovary hirsute, stigmas short recurved 2-partite, fruit ellipsoid or broadly fusiform pubescent, top rounded base contracted, cells sparsely hairy within. A. microcalyx, *a.* genuina, *Muell. Arg. in DC. Prodr.* xv. ii. 471. A. aurita, *Miquel Fl. Ind. Bat.* i. ii. 431 (*excl. syn. Tul.*). A. Cumingiana, *Baill. Rev. Gen. Euphorb.* 645. Leiocarpus serratus, *Hassk. Cat. Hort. Bogor.* 196. Tetractinostigma microcalyx, *Hassk. Cat. Hort. Bogor. Ed. nov.* 55; *Miquel l. c.* 362.

PERAK; at Goping, *King's Collector.* MALACCA, *Griffith* (*Kew Distrib.* 4958) and *Maingay* (*Kew Distrib.* 1417).—DISTRIB. Malay Islands, China.

A small tree. *Leaves* rather shining on both surfaces, yellow when dry; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., often pubescent and minutely stipellate at the top. *Male sepals* 3–4, very irregular, glabrous. *Stamens* 1 or more. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ in. long; pericarp rather thin.

†† Leaves glabrous or nearly so (see also 3. *A. microcalyx*). Female flowers sessile.

§ *Fruit globose or nearly so* (sometimes ovoid in *A. villosula*).

4. **A. macrophylla,** *Muell. Arg. in DC. Prodr.* xv. ii. 470; quite glabrous except the spikes, leaves very large long-petioled ovate or ovate-oblong base deeply cordate, bracts of male and fem. fl. very broad glabrous ciliate, fem. fl. sessile, ovary villous, fruit subglobose velvety. *Kurz For. Fl.* ii. 361. Lepidostachys macrophylla, *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 253.

BURMA, *Wallich.* PEGU to TENASSERIM, *Kurz, M'Lelland.*

A deciduous-leaved tree, 20–25 ft.; branches very stout. *Leaves* 1–2 by $\frac{1}{2}$–1 ft., thinly coriaceous, obtuse or subacute, with vesicular dots beneath; nerves 10–12 pair;

petiole stout, 2–4 in. *Male catkins* 1–2 in.; *fem.* very short, with smaller narrower tomentose bracts. *Sepals* of male narrowly spathulate, of fem. oblong. *Stamens* 2. *Ovary* obovoid-oblong, rusty-tomentose. *Fruit* the size of a large pea, yellow, 2-celled, 2-seeded.—The fruit is described from Kurz; the stigmas are undescribed.

5. **A. nigricans,** *Hook. f.*; nearly glabrous except the tips of the shoots, bark pale, leaves coriaceous oblong or elliptic-oblong acuminate base obtuse rounded or cordate brown when dry above, beneath blackish olive-green with a few hairs when young on the midrib, petiole $\frac{1}{2}$ in. stout, fruit globose $\frac{1}{2}$ in. diam. nearly glabrous yellow black when dry, epicarp very thick with 2 or 4 lines of dehiscence, stigmas 2 short depressed 2-partite, septum hairy.

PERAK; at Larut, *King's Collector.*

A small tree, 20–30 ft. *Leaves* 6–12 in., nerves 8–10 pair, very strong beneath, cross-nervules strong or slender.

6. **A. globifera,** *Hook. f.*; branches slender and petioles and midrib above rusty-tomentose, leaves 3–4 in. thinly coriaceous elliptic-oblong or -oblanceolate obtusely acuminate base acute or rounded laxly tomentose beneath, nerves 6–8 pair very strong meeting in large loops, petiole $\frac{1}{6}$–$\frac{1}{4}$ in., fem. fl. sessile axillary, fruit globose pubescent, stigmas small depressed 4-lobed?, cells glabrous within.

PERAK, *Scortechini, King's Collector.*

A small tree, 20–30 ft., crown spreading. *Leaves* green when dry, pale beneath. *Fruit* $\frac{3}{4}$ in. diam., yellow and red (red brown when dry), epicarp rather thick, endocarp thin. *Seed* orbicular, plano-convex.

7. **A. villosula,** *Kurz For. Fl.* ii. 362; glabrous except the shoots and spikes, leaves long-petioled oblong to obovate-oblong or -lanceolate obtuse acute or subacuminate base obtuse or acute, fem. fl. sessile, ovary globose densely villous, stigmas short shortly 2-fid., fruit globose or turgidly ovoid hirsute or glabrate apiculate, pericarp thin, cells hairy within.

PEGU to TENASSERIM and the ANDAMAN ISLANDS, *Griffith, Helfer* (*Kew Distrib.* 4951), &c.

An evergreen tree, 25–30 ft.; shoots appressed-pubescent, soon glabrous. *Leaves* 3–6 in., shining, membranous; nerves 5–8 pairs, slender; petiole $\frac{3}{4}$–$1\frac{1}{4}$ in., thickened at the tip. *Fem. spikes* with crowded glabrous ciliate bracts. *Fruit* sometimes ellipsoid.—Near *A. Roxburghii,* but the ovary is densely clothed, and the fruit globose.

8. **A. latifolia,** *Thwaites Enum.* 288; glabrous, leaves thickly coriaceous obovate or broadly elliptic obtuse base rounded or subcordate, bracts ciliate, fem. fl. sessile, ovary hairy stigmas reflexed 2-fid, fruit large broadly ovoid subacute glabrous, pericarp very thick fleshy, cells villous within, stigmas depressed recurved 3-partite lobes 2-fid. *Muell. Arg. in DC. Prodr.* xv. ii. 470; *Beddome Forester's Man.* 199. Agyneia latifolia, *Moon Cat. Ceyl. Pl.* 65.

CEYLON; south part of the island, *Thwaites.*

A medium-sized tree; branches stout. *Leaves* 5-6 by 3-4 in., shining above, midrib stout; nerves 5–8 pairs, slender; petiole $\frac{3}{4}$–1 in., very stout. *Fruit* $\frac{3}{4}$–1 in. long, pericarp as thick as the cavity, at length 4-valved at the base.—I have seen no flowers.

§§ *Fruit ovoid or ellipsoid* (*see also* A. villosula).

9. **A. Roxburghii,** *Baill. Etudes Gen. Euphorb.* 645; nearly glabrous except the inflorescence, leaves oblong or oblong-lanceolate acuminate

entire or obscurely sinuate-toothed, bracts of male and fem. fl. broad glabrous ciliate, fem. fl. sessile, ovary thinly hirsute, stigmas very short 2-fid, fruit ovoid-oblong nearly glabrous, pericarp thin, septum hairy. *Kurz For. Fl.* ii. 362. A. dioica, *Muell. Arg. in DC. Prodr.* xv. ii. 472. Lepidostachys Roxburghii, *Wall. Cat.* 6816. Alnus dioica, *Roxb. Fl. Ind.* iii. 580. A. integrifolia, *Roxb. mss.*—*Wall. Cat.* 7991.

SIKKIM HIMALAYA; in tropical valleys, *J. D. H.* ASSAM, *Jenkins.* The KHASIA HILLS, SILHET, CACHAR, and southwards to TENASSERIM, *Wallich*, *Kurz*, &c.

An evergreen tree, 20–30 ft.; tips of branches glabrous or pubescent. *Leaves* 3–5 in., thinly coriaceous, sometimes caudate-acuminate, base acuminate cuneate or rounded; nerves 5–7 pairs, slender, sometimes puberulous beneath; petiole $\frac{1}{4}$–$\frac{2}{3}$ in., sometimes minutely 2-stipellate. *Male spikes* 1 in., solitary or clustered; bracts rather longer; fem. shorter. *Sepals* pubescent. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ in. long.—The Chittagoug plant referred to *A. Roxburghii* by Mueller has glabrous ovaries and is *A. aurea.*

10. **A. oblonga,** *Muell. Arg. in Linnæa* xxxii. 78, and in *DC. Prodr.* xv. ii. 472; glabrous, leaves elliptic-oblong obtuse or subacute entire base acute or rounded, bracts of male and fem. fl. glabrous ciliate, fem. fl. sessile, ovary silky, stigmas cleft to the middle arms long reflexed, fruit small ellipsoid contracted into a short beak with 2 recurved plumose stigmas, base hairy, pericarp thin, septum hairy. Lepidostachys ? oblonga, *Wall. Cat.* 7299.

BURMA; at Amherst, *Wallich* (a solitary specimen).

Shoots glabrous. *Leaves* 3–5 in., thinly coriaceous, nerves 6–7 pair slender, base sometimes almost cordate; petiole $\frac{1}{2}$–$\frac{2}{3}$ in., slender. *Fem. spikes* $\frac{1}{4}$–$\frac{1}{2}$ in., rusty-tomentose, bracts sparsely pubescent. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ in. long, nearly black when dry.—Possibly referable to *A. Roxburghii.*

11. **A. Clellandii,** *Hook. f.*; glabrous, leaves lanceolate acuminate base cuneate, petiole $\frac{1}{4}$–$\frac{1}{3}$ in., fruit sessile ovoidly globose shortly beaked puberulous, pericarp very thin fragile, cells sparsely hairy, stigmas 2 very short recurved.

PEGU; at Rangoon, *M'Lelland.*

Branches rather slender, glabrous. *Leaves* 5–6 in., thinly coriaceous, pale when dry, rather shining above; nerves 8–10 pairs, very slender, arched and spreading, cross-nervules reticulate; petiole slender. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ in. long, pericarp very thin and endocarp papery.

12. **A. Maingayi,** *Hook.f.*; branches slender, leaves small glabrous elliptic-oblong or obovate caudate-acuminate base acute, midrib beneath hairy or glabrate, bracts tomentose, fem. fl. sessile, ovary densely villous, stigmas very short 2-cleft fimbriate, fruit ellipsoid or subfusiform, pericarp thin, cells glabrous within.

MALACCA, *Maingay* (*Kew Distrib.* 1418). SINGAPORE, *Cantley.*

Branches dark when dry, branchlets pubescent. *Leaves* 2–3 in., membranous, dull green when dry; nerves 5–7 pairs, rather strong; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Male spikes* $\frac{1}{2}$ in.; fem. so short that the flowers appear to be capitate. *Sepals* 4, hirsute. *Stamens* 2. *Fruit* $\frac{1}{2}$ in. long, subacute at both ends; at length 4-valved at the base.—The leaves of this and of *A. Planchoniana* are the smallest of the Indian species. Maingay remarks that the seed is imbedded in yellow pulp, and the testa osseous.

13. **A. acuminata,** *Thwaites Enum.* 288; glabrous, leaves elliptic-lanceolate caudate-acuminate base acuminate, male spikes stout, bracts villous, sepals ciliate, fem. fl. sessile, ovary hirsute, stigmas 3 large recurved 2-fid, fruit turgidly ovoid acute hairy, pericarp very fleshy, cells glabrous

within. *Muell. Arg. in DC. Prodr.* xv. ii. 473; *Beddome Forester's Man.* 199.

TINNEVELLY, *Beddome.* CEYLON; alt. 2–3000 ft., *Thwaites.*

A small sparingly-branched tree, branches very slender and all parts but the bracts quite glabrous. *Leaves* 1½–5 in., membranous, pale when dry, tip obtuse or acute, base tapering into the slender petiole ¼–⅓ in. long, margin obscurely undulate; nerves 6–7 pair, arched, cross-nervules loosely reticulate. *Male spikes* ⅓ in.; bracts ciliate; sepals 3; stamens 2. *Fem. spikes* usually 1-fld. *Ovary* 3-celled, silkily hairy, and fruit ⅔ in. long, usually 3-seeded.—In Beddome's specimens the pericarp is much thinner than in the Ceylon ones.

14. **A. microstachya,** *Muell. Arg. in DC. Prodr.* xv. ii. 474; branches slender, shoots and young petioles pubescent, leaves shortly petioled ovate or lanceolate obtusely caudate-acuminate base acute, fem. fl. sessile subcapitate. ovary densely rusty-villous, stigmas short broad plumose, fruit very small globosely ovoid glabrous, pericarp very thin, cells glabrous. A. Tulasneana. *Baill. Etudes Gen. Euphorb.* 645. Scepa microstachya, *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 255. ? S. stipulacea, *Lindl. Nat. Syst. Bot. Ed.* 2, 441. Lepidostachys Griffithiana, *Planch. mss.*—*Wall. Cat.* 7985.

BURMA; at Amherst, *Wallich.* TENASSERIM; at Mergui, *Griffith.*

Branches smooth, black when dry. *Leaves* 5–7 in., membranous, dull green when dry; margin entire or subrepand; nerves 8–10 pairs slender, nervules very faint; petiole ¼–⅓ in. *Fem. spikes* in small clusters. *Fruit* ¼–⅓ in. long, smooth.—Closely allied to *A. Maingayi*, but the leaves are much broader and longer, nerves fewer and fainter, and the fruit is black when dry and much smaller. Kurz's *A. microstachys* is *A. aunea*, having a glabrous ovary.

15. **A. glabrifolia,** *Kurz in Trimen's Journ. Bot. N. S.* iv. (1873) 330; branches very robust, shoots tomentose, leaves 3–5 in. coriaceous elliptic-ovate obtuse or subacute base acute smooth above sparsely hairy beneath and with minute hairy tufts at the base on each side, nerves 7–8 pairs, petiole ⅓ in., fem. fl. sessile, fruit ⅔ in. long ellipsoid subacute finely pubescent 4-valved at the base, stigmas 2 short stout recurved, pericarp thin, septum hairy.

NICOBAR ISLANDS; Kamorta, common in dry grassy places, *Kurz.*

Kurz (possibly by misprint) gives the size of the fruit as 1½ in. The only specimen of this which I have seen has stout woody branches, from which it appears as if the habit of the plant was scraggy, with short leafing shoots. *Leaves* greenish and reticulate above, glabrous and pale brown beneath; petiole ¾ in., pubescent.

††† *Leaves* glabrous or nearly so. *Fem. fl.* pedicelled.

16. **A. Lindleyana,** *Baill. Etudes Gen. Euphorb.* 645: glabrous, leaves oblong ovate or ovate-lanceolate acute, base acute rounded or subcordate, stipules large hairy, bracts glabrous ciliate, fem. fl. shortly pedicelled, ovary silky-pubescent, stigmas short 2–3-partite arms hardly plumose, fruit pedicelled globose cuspidate or very broadly ellipsoid, pericarp thin, septum villous. *Muell. Arg. in DC. Prodr.* xv. ii. 473; *Thwaites Enum.* 288; *Beddome Flor. Sylvat.* t. 286. A. affinis, *Baill. l. c.* A. sphærocarpa, *Muell. Arg. in Flora* xlvii. (1864) 529, and in *DC. l. c.* Scepa Lindleyana, *Wight Ic.* t. 361; *Dalz. & Gibs. Bomb. Fl.* 236.

The DECCAN PENINSULA; from the Concan southwards. CEYLON, abundant.

A much-branched evergreen tree. *Leaves* 4–6 in., thin or coriaceous, smooth above; nerves 8–10 pairs; petiole ¼–⅓ in., rather stout. *Male spikes* 1 in. or less, rather stout; sepals 4–6, ciliate; stamens 2–3. *Ovary* fusiform, distinctly pedicelled,

2–3-celled. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., quite globose, smooth, abruptly tipped by a very short style; pedicel half its diameter in length, tomentose.

17. **A. nervosa,** *Hook. f.*; quite glabrous, leaves 4–7 in. coriaceous oblong obtuse or obtusely acuminate base rounded or cuneate with 6–8 pair of very strong nerves and strong reticulating cross-nervules, petiole $\frac{3}{4}$–1 in. stout, male spikes $\frac{1}{2}$–$\frac{3}{4}$ in. clustered, fruit shortly pedicelled globose puberulous, stigmas depressed each 4-partite, pericarp thick, cells glabrous within.

MALACCA, *Maingay* (*Kew Distrib.* 1365).

Branches rather stout, black when dry. *Leaves* variable, 2–4 in. in breadth, pale greenish when dry and smooth above, pale brown beneath. *Sepals of male* 4, ovate, tomentose; filaments short. *Fruit* $\frac{1}{2}$ in. diam.

** *Ovary* glabrous. *Fruit* sessile on the spike.

† *Fruit globose.*

18. **A. microsphæra,** *Hook. f.*; glabrous, leaves coriaceous lanceolate caudate-acuminate shining above with the midrib raised, reticulate beneath with 6–8 pairs of very slender arched nerves, fem. fl. sessile, ovary glabrous, fruit $\frac{1}{4}$–$\frac{1}{3}$ in. diam. spherical smooth glabrous, stigmas 2 very short 2-cleft, pericarp thick, septum hairy.

PERAK, *Scortechini, King's Collector.*

A shrub 10–15 ft. or tree 30–40 ft.; branches rather slender, bark pale. *Leaves* 4–6 in., greenish or yellowish when dry, grey beneath; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Fem. spikes* often clustered, very short, $\frac{1}{12}$–$\frac{1}{6}$ in.; rachis tomentose, bracts crowded. *Fruit* yellow (black when dry), indehiscent. *Seed* orbicular, compressed, plano-convex, "with a thin fleshy pale-red coat" (*Kunstler*).

†† *Fruit ellipsoid or ovoid.*

19. **A. Planchoniana,** *Baill. Etudes Gen. Euphorb.* 645 (*Planchiana*); glabrous, or the shoots puberulous, leaves small shortly petioled lanceolate caudate-acuminate base rounded or acute, nerves very obscure, bracts and sepals glabrous, fem. fl. sessile, ovary fusiform glabrous, fruit small ellipsoid beaked by the 2-fid styles glabrous, pericarp very thin, septum hairy. *Muell. Arg. in DC. Prodr.* xv. ii. 475. A. lanceolata, *Kurz For. Fl.* ii. 363 (*not of Thwaites*). Lepidostachys parviflora, *Planch. mss.*

TENASSERIM; at Mergui, *Griffith, Helfer* (*Kew Distrib.* 4956). PERAK, *King's Collector.*

A small evergreen tree. *Leaves* 2–3 in., hardly coriaceous, pale yellowish green when dry on both surfaces; nerves 6–8 pairs, extremely slender; petiole $\frac{1}{8}$–$\frac{1}{6}$ in., very slender. *Male spikes* 1 in. and less; sepals orbicular; stamens 2. *Fem. spike* very short indeed. *Fruit* $\frac{1}{4}$–$\frac{1}{3}$ in. long.

20. **A. Wallichii,** *Hook. f.*; quite glabrous, leaves oblong lanceolate or linear-lanceolate obtusely acuminate base acute or rounded, male bracts and sepals tomentose, fem. fl. sessile, ovary fusiform glabrous, fruit ellipsoid beaked by the base of the rather long plumose 2-partite stigmas, pericarp thick, cells very hairy within. Lepidostachys Roxburghii, *Herb. Ind. Or., H. f. & T.—Wall. Cat.* 8019.

SILHET and the KHASIA HILLS, *Wallich*, &c. CHITTAGONG; at Seetakoond, *J. D. H. & T. T.* MOULMEIN, on Thyong Guyung, *Lobb.*

A large tree; branches rather stout. *Leaves* 3–8 in., rather coriaceous, pale green and rather shining when dry, base rarely cordate; nerves 5–7 pair, very

slender, petiole ½–1 in. *Male spikes* 1–1½ in., rather stout; sepals 4; stamens 2. *Ovary* slender, narrowed at both ends; styles rather slender. *Fruit* ½ in. long.

21. **A. aurea,** *Hook. f.*; quite glabrous, leaves long-petioled coriaceous elliptic-oblong or -lanceolate obtusely acuminate, base acute or obtuse golden-green or -yellow when dry, male spikes clustered. bracts glabrous, fem. fl. sessile, ovary flask-shaped glabrous, styles long 2-fid fringed, fruit globose glabrous, pericarp thick, cells glabrous within. A. microstachya, *Kurz For. Fl.* ii. 363 (*not of Mueller*).

CHITTAGONG and AVA to TENASSERIM, ascending to 4000 ft., *Kurz*. PERAK, *Herb. Hort. Calcutt.* MALACCA, *Griffith* (*Kew Distrib.* 4959).

An evergreen tree, 20–30 ft.; branches pale. *Leaves* 3–6 in., shining above, paler beneath; nerves 5–6 pair, very slender; petiole ½–1 in., rather slender. *Male spikes* ½–1½ in.; bracts membranous, glabrous; sepals rounded, glandular. *Fruit* ½ in. diam., yellowish, crowned by the rather large thickly fringed stigmas, 2-valved at the base, 2-celled, 2-seeded. *Seeds* orbicular, plano-convex, grooved on the ventral face, as if formed of 2-connate seeds.—The fine golden hue of the dried leaves is characteristic of this species, which approaches *A. Wallichii*, and is well likened by Kurz to the colour of a *Symplocos*. I have seen no fem. flowers, the characters of which are taken from Kurz's description of his *A. microstachya*, which is certainly this, and not that plant of Mueller; nor have I seen any Tenasserim, Avan or Chittagong specimens, and hence my identification of the Perak and Malaccan plant with that of Kurz may be erroneous.

22. **A. lanceolata,** *Thwaites Enum.* 288; glabrous, leaves lanceolate or linear-lanceolate caudate-acuminate base acute, male bracts glabrous ciliate, fem. fl. sessile, ovary glabrous, stigmas 2 very minute entire together forming a 2-lobed disk, fruit small ovoid obtuse or subspherical. *Muell. Arg. in DC. Prodr.* xv. ii. 475 *in part; Beddome Forester's Man.* 199. Lepidostachys lanceolata, *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. 253.

CEYLON; very common.

A small evergreen tree, everywhere except the ciliate bracts glabrous. *Leaves* 3–4 in., membranous, caudate tip very long, green or yellowish when dry, base acute; nerves 5–6 pair, arched, cross-nervules reticulate; petiole ⅓–½ in., slender. *Male spikes* ¼–½ in.; bracts, clawed; sepals 4–5; stamens 4. *Fem. spikes* very short. *Ovary* ovoid. *Fruit* (from Thwaites' description) the size of a pea. *Seeds* with a fleshy outer coat.—Mueller describes the ovary as scabrid, the stamens as 2, and leaves as sometimes repand-denticulate, which makes me suspect that these characters are taken from a Bornean plant which he refers to this species. The plant of Helfer's referred here is *A. Planchoniana* (as is Kurz's *A. lanceolata*), the Malaccan (Griffith's 4959) is *A. aurea*. I have seen no ripe fruit of this.

23. **A. fusiformis,** *Thwaites Enum.* 288; glabrous, leaves oblong or obovate-oblong or orbicular acute obtuse or retuse rarely acuminate, base cuneate or rounded, bracts glabrous ciliate, fem. fl. sessile, ovary glabrous, stigma 2–3-partite short recurved, fruit fusiform glabrous, pericarp thin, cells hairy within. *Muell. Arg. in DC. Prodr.* xv. ii. 471; *Beddome Forester's Man.* 199. A. Thwaitesii, *Baill. Etudes Gen. Euphorb.* 645. Lepidostachys grandifolia, *Planch. mss.*

CEYLON; in the Central Province, alt. 5000 ft., *Walker, Thwaites.*

A tree, branches stout. *Leaves* 4–8 in., very coriaceous, shining above, base sometimes cordate; nerves 5–7 pair, slender; petiole ¼–⅓ in., usually stout, but sometimes much lengthened. *Male spikes* 1–1½ in., very stout. *Fem. fl.* crowded. *Fruit* ½–¾ in. long, beaked, base acute. *Seed* oblong, plano-convex.—Mueller has overlooked Thwaites' description of the ovary, and placed this species in a section in which that organ is clothed. Thwaites says that it resembles *A. latifolia* generally, differing in the form of the much less fleshy fruit.

Series II. *Stipules* large, persistent, lunate or falcate.

24. **A. lunata**, *Benth. in Gen. Plant.* iii. 282; branches robust pubescent, leaves 8–12 in. linear-oblong base cordate shining above with deeply impressed nerves, tomentose beneath especially on the midrib and very strong nerves, stipules large lunate, fem. spikes densely tomentose, stigmas 3–4 very stout 2-fid. Antidesma lunatum, *Miquel Fl. Ind. Bat. Suppl.* 467; *Muell. Arg. in DC. Prodr.* xv. ii. 251. ? A. coriaceum, *Blume, ex Hasskarl in Herb.*

PENANG, (*Ic. in Herb. Kew.*) PERAK; on low hills, *King's Collector.*—DISTRIB. Sumatra, ? Java.

A tree, 50 ft. *Leaves* 3 in. broad, very coriaceous; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., very stout; stipules $\frac{1}{2}$–$\frac{2}{3}$ in. long. *Fem. spikes* short; flowers sessile; sepals 5–6, linear-oblong, obtuse, tomentose.—The Perak specimens are imperfect, and in fem. fl. only. It may not be Miquel's plant, which is described as having leaves with a few marginal glands near the base and subentire stigmas. A closely allied Bornean species (Beccari No. 1213) has shorter broader tomentose styles; its fruit is ovoid, $\frac{3}{4}$ in. long, 3-celled with 3 apical beaks. Bentham no doubt rightly refers Miquel's *Antidesma lunatum* to *Aporosa*, but is mistaken in uniting with it Maingay's plant, which is the following. In a drawing of this species (in Kew Library) the fruit is represented as of the size of a small pea, globose, yellow and red, and the styles as long and rounded.

25. **A. Benthamiana,** *Hook. f. in Ic. Plant.* t. 1583; quite glabrous, leaves 8–18 by 3–5 in. subsessile linear-oblong acuminate or caudate base narrowed cordate, stipules large lunate, fruiting spikes 1 in. long, fruit ellipsoid 3-celled, cells glabrous within.

? SINGAPORE, *Cantley.*

Branches stout. *Leaves* coriaceous; nerves 12–16 pairs, very strong beneath; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., stout; stipules coriaceous. *Male spikes* cylindric, obtuse; rachis very stout; sepals 4, ovate; stamens 2, anther-cells pendulous. *Fruit* $\frac{1}{2}$–$\frac{2}{3}$ in. long.—Very different from *A. lunatum*, being perfectly glabrous, and in the much shorter petioles. The anthers are nearly as in *Antidesma*. The Singapore plant has longer petioles and more membranous leaves broader upwards.

26. **A. falcifera,** *Hook. f.*; branchlets petioles and stipules tomentose, leaves coriaceous elliptic- or linear-oblong acuminate sparsely hairy beneath, base rounded or subcordate, nerves 7–9 pair strong, stipules persistent sickle-shaped coriaceous, male spikes $\frac{1}{2}$–$\frac{3}{4}$ in. sessile clustered.

PERAK, *King's Collector.*

A tree, 40–60 ft. *Leaves* 3–5 by $1\frac{1}{2}$–$1\frac{3}{4}$ in., above almost shining reticulate and with the nerves distinct, beneath brownish, cross-nervules slender; petiole $\frac{1}{8}$–$\frac{1}{6}$ in., stout; stipules about as long, margins recurved.

SPECIES OF WHICH THE FRUIT IS UNKNOWN.

27. **A. stellifera,** *Hook. f.*; quite glabrous, leaves 8–10 in. thinly coriaceous oblong cuspidately acuminate base rounded or acute smooth above with raised midrib, nerves 10–13 pairs arched, cross-nervules reticulate, petiole $\frac{1}{2}$–$\frac{3}{4}$ in., male spikes slender sessile and peduncled, fem. spikes glabrous, flowers pedicelled, ovary glabrous 3-celled, stigmas connate in a 6-rayed disk.

PENANG, alt. 1500–1800 ft., and PERAK, at Larut, *King's Collector.*

A tree 10–15 ft. in Penang, 25–30 in Perak; branchlets very smooth with large stipular scars. *Leaves* 3–4 in. diam., sometimes polished above. *Male fl.* pubescent; sepals 4; stamens 2, short. *Rachis* of fem. spikes $\frac{1}{12}$–$\frac{1}{6}$ in. long, few-fld.; bracts

few; pedicel $\frac{1}{12}$ in., glabrous. *Ovary* oblong, crowned with a stigma as broad as itself, cells 2-ovuled.—I have seen no ripe fruit.

28. **A. Griffithii,** *Hook. f.*; glabrous, leaves oblong or obovate-oblong acuminate base rounded or acute, male and fem. spikes clustered, bracts tomentose, fem. fl. sessile, ovary ovoid glabrous, stigmas minute recurved.

MALACCA, *Griffith* (*Kew Distrib.* 4955).

Branches rather stout, pale. *Leaves* 3–5 in., thickly coriaceous, shining on both surfaces; nerves 6–8 pairs, very slender; petiole $\frac{1}{6}$–$\frac{1}{3}$ in., stout. *Spikes* of both sexes $\frac{1}{2}$ in., simple or racemose, rusty-tomentose. *Ovary* minute, style very short, 2-fid; stigmas smooth, grooved on the faces. *Fruit* unknown.—The leaves are those of *A. Roxburghii* and *villosula*, from which the tomentose bracts distinguish it.

APOROSA sp.? A species in Griffith's collection from his journey to Burma resembles *A. acuminata*, and no other, but is too imperfect for description.

22. DAPHNIPHYLLUM, *Blume.*

Small glabrous evergreen trees with robust branches leafy at the tips. *Leaves* alternate, long-petioled, quite entire, penninerved, usually glaucous beneath. *Flowers* in axillary racemes, diœcious, apetalous. MALE FL. *Sepals* 3–8, small, or calyx 4-toothed or discoid. *Stamens* 5–18, filaments short free or 0; anthers large, erect, often apiculate; cells parallel, dehiscing laterally. *Pistillode* 0. FEM. FL. *Calyx* of the male. *Disk* 0, or of 4–6 scales or glands. *Ovary* imperfectly 2-celled; styles or stigmas short, distinct, thick, recurved, entire; ovules 2 in each cell. *Drupe* oblong, usually 1-seeded. *Seed* with a membranous testa, albumen thick fleshy; embryo small, cotyledons narrow ovate or oblong.—Species 11, Tropical Asiatic and Malayan.

1. **D. majus,** *Muell. Arg. in Linnæa* xxxiv. 76, and in *DC. Prodr.* xvi. i. 2; leaves long-petioled elliptic acute or acuminate, flowers subcorymbose, stamens 8, anthers laterally compressed not apiculate. Ricinus furfuraceus, *Wall. Cat.* 7805 (*in part*).

BURMA; near Amherst, *Wallich.*

Leaves 8–12 by 4–6 in., very glaucous beneath; petiole 3–6 in. *Male corymbs* many-fld., flowers long-pedicelled. *Sepals* of male triangular-ovate, acute. Fem. flower and fruit unknown.—Very nearly allied to *D. laurinum*, but the male calyx is deeply divided and the inflorescence corymbose. This being under *Ricinus furfuraceus* in Herb. Wallich is due to an accidental misplacement of tickets.

2. **D. laurinum**, *Baill. Gen. Euphorb.* 565, t. 21, f. 25–27; leaves long-petioled linear-oblong or -lanceolate acuminate or acute, calyx of fem. unequally 4-lobed or -toothed persistent, stamens 7–10, anthers laterally compressed not apiculate. *Muell. Arg. in DC. Prodr.* xvi. i. 4. Gyrandra laurina, *Wall. Cat.* 8020. Goughia laurina, *Benth. in Hook. Kew Journ.* vi. (1854) 9. G. Griffithiana, *Wight Ic.* v. p. 22.

PERAK, *Scortechini.* MALACCA, *Griffith* (*Kew Distrib.* 4915, 4916), *Maingay* (*Kew Distrib.* 1419). SINGAPORE, *Wallich.*—DISTRIB. Sumatra, Java.

A shrub (*Griffith*); branches robust. *Leaves* 6–10 in.; base rounded or broadly cordate, more rarely acute, glaucous or not beneath; petiole 2–5 in. *Racemes* 2–3 in. *Calyx* of male disciform; lobes triangular, acute. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ in., subacute, smaller in Singapore specimens.

3. **D. glaucescens,** *Blume Bijd.* 1153; leaves elliptic- or oblong-obovate tip rounded or obtuse rarely acute, flowers racemose, sepals of fem.

minute deciduous, stamens 7–10, anthers dorsally compressed, apiculate. *Muell. Arg. in DC. Prodr.* xvi. i. 3; *Beddome Fl. Sylvat.* t. 88; *Miquel Fl. Ind. Bat.* i. ii. 431, and *Suppl.* 472. D. Roxburghii, *Baill. Gen. Euphorb.* 565 (*excl. syn. Roxb.*); *Benth. Fl. Hongk.* 316. Goughia neilgherrensis, *Wight Ic.* t. 1878–9.

NILGHIRI and PULNEY MTS., common, *Wight*, &c. CEYLON; Central Province, alt. 4–6000 ft.—DISTRIB. Corea, Java.

A small tree. *Leaves* 2–4 in.; base acute, under-surface glaucous or not; petiole ½–2 in. *Racemes* 1–1½ in. *Fruit* ellipsoid about ⅓ in. long, subrugose when dry, tip rounded.—The var. *concolor* of Mueller is not tenable; the under-surface of the leaf is sometimes glaucous in the Ceylon specimens, and sometimes not in the continental.

4. **D. himalayense,** *Muell. Arg. in DC. Prodr.* xvi. i. 4; leaves elliptic linear-oblong oblong-lanceolate or oblanceolate acute or acuminate, flowers racemed, sepals of fem. deciduous, stamens 5, anthers dorsally compressed apiculate. D. Benthami, *Baill. Gen. Euphorb.* 565. Goughia himalensis, *Benth. in Hook. Kew Journ.* vi. (1854) 9.—*Wall. Cat.* 8020.

TEMPERATE HIMALAYA from Kumaon to Mishmi, alt. 4–6000 ft., and Sikkim, alt. 4–9000 ft., *Griffith*, &c. KHASIA MTS., alt. 4–6000 ft. ? TENASSERIM, on Moolyat, alt. 6500 ft., *Beddome.*

A small tree, branches robust. *Leaves* 4–10 in., base acute, very rarely rounded or cordate, glaucous beneath; petiole 1–2½ in. *Racemes* 1–3 in. *Fruit* ½–⅔ in., ellipsoid, slightly tubercled when dry, tip rounded.—The Tenasserim specimen is a female in imperfect condition; the leaves are very dark-coloured on both surfaces and not glaucous beneath; the ovaries are quite like those of *D. himalayense.*—Wallich's 8001, from the Snowy Mts., is stated to be from Herb. Heyne, which is probably an error (for Herb. Hamilton).

SPECIES OF WHICH THE FLOWERS ARE UNKNOWN.

5. **D. Kingii,** *Hook. f.*; a tree 30–40 ft., leaves 8–10 in. rather membranous elliptic-oblong obtusely cuspidate subglaucous beneath, base acute, nerves about 10 pair with slender cross-nervules which are not reticulate, petiole 1–1½ in., fruiting raceme 1–1½ in., fruit ⅓–½ in. long ellipsoid smooth top rounded, pedicel ¼–⅓ in.

PERAK; *Scortechini*, and *King's Collector*, in low grounds.

6. **D. lancifolium,** *Hook f.*; a tree 40–60 ft, leaves 4–6 in. coriaceous lanceolate or elliptic-lanceolate acuminate at both ends hardly glaucous beneath, nerves reticulate on both surfaces, petiole 1–1½ in., fruiting racemes 1–4 in., fruit ⅓ in. long ellipsoid rounded at both ends rugose, pedicel ¼–⅓ in.

PERAK; alt. 4500–4600 ft., *King's Collector.*

7. **D. Scortechinii,** *Hook. f.*; a tree 10–15 ft., leaves 3–4 in. coriaceous oblong or obovate-oblong obtuse or subacute base acute glaucous beneath, nerves reticulate on both surfaces, petiole ¼–½ in., fruiting racemes 2–3 in., fruit ⅓–½ in. gibbously ovoid subacute smooth, pedicel ¼–½ in.

PERAK; alt. 3000–4000 ft., *Scortechini, King's Collector.*

23. ANTIDESMA, *Linn.*

Trees or shrubs. *Leaves* alternate, quite entire, stipulate. *Flowers* small or minute, in slender axillary or terminal simple or panicled spikes or racemes, dicœcious, apetalous. MALE FL. *Calyx* 3–5- rarely 6–8-toothed

-lobed or -partite. *Disk* entire or lobed. *Stamens* 2–5, rarely more, inserted on or around the disk, often irregularly, inflexed in bud; anthers lunate or didymous, connective thickened; cells globose, approximate or distant. *Pistillode* minute, clavate or globose or 0, rarely 2-fid, glabrous or hairy. FEM. FL. *Calyx* of the male. *Disk* usually annular or pulvinate. *Ovary* 1-(rarely more-)celled; stigmas 2–4, usually short, 2-fid or 2-partite; ovules 2, pendulous. *Fruit* a small more or less compressed drupe, crowned with the sublateral or terminal stigmas. *Seed* small, albumen fleshy; cotyledons broad, flat.—Species about 60, Tropical Asia, Africa, Australia and the Pacific.

Owing to the minuteness of the flowers, and the frequent impossibility of matching the sexes of Herbarium specimens, I am unable to limit and define the forms of this most difficult genus with much confidence. Comparatively few of Wallich's specimens were examined by Tulasne or Mueller, who are the chief authorities for the Indian species. I expect several of these which are not hitherto identified with previously (often imperfectly) described Malay Island ones, will prove to be the same with them. The stipules, the length of the pedicels of the male flowers, the size and form of the bracts, and the depth of the calyx-lobes are all variable. In De Candolle's Prodromus too much importance is attached to the number of stamens and the division of the calyx, whether as to depth or number of lobes, as affording sectional characters; and I am not satisfied with the more restricted use I have made of the same modifications of the calyx. The fruit may probably prove to afford the best sectional characters.

Series I. *Leaves* very large, 10–18 in. long. *Fruit* large, $\frac{1}{2}$–1 in. long. See also 23. *acuminatum*, and 24. *martabanicum*).

1. **A. longipes,** *Hook. f.*; branches slender and leaves puberulous beneath, leaves 10–12 in. oblong-obovate base rounded or cordate, nerves 15–20 pairs, fem. racemes very long slender simple pubescent flowering erect fruiting pendulous, fem. fl. minute pedicels very short greatly lengthened in fruit, ovary tomentose, fruit $\frac{1}{2}$ in. obliquely ovoid flat rugose, stigmas very minute subterminal.

PERAK, *King's Collector.*

A shrub or tree with a simple stem; branches whitish and petioles and pedicels midrid above and nerves beneath finely pubescent. *Leaves* membranous, 3–6 in. broad, nerves 15–20 pairs; petiole stout, $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules not seen. *Racemes* peduncled; pedicels filiform, $\frac{1}{3}$–$\frac{1}{2}$ in.; bracts very minute. *Fem. fl.* $\frac{1}{6}$ in.; sepals 4, ovate, acute; stigmas acute, spreading; disk glabrous. *Fruit* bright red, margins very acute, faces puberulous deeply impressed, pericarp thin.—I assume the flowering and fruiting specimens to be conspecific, and that the pedicels lengthen as described, but I have seen only flowering and fruiting individuals (apparently of the same species).

2. **A. pachystachys,** *Hook. f.*; glabrous, or nearly so, branches stout, leaves 12–18 in. obovate- or linear-lanceolate cuspidately acuminate base narrowed acute or rounded, nerves 17–20 pairs slender, petiole very stout, stipules large foliaceous, spikes solitary simple, male filiform, flowers sessile pubescent, fruiting female erect very stout, fruit $\frac{3}{4}$ in. very shortly pedicelled obliquely ovoid compressed reticulate, stigmas very minute subterminal.—Antidesma ? *Wall. Cat.* 8569.

PENANG, *Wallich.* PERAK; at Larut, *King's Collector.*

A shrub, 6–8 ft.; branches as thick as a swan's quill, bark white. *Leaves* membranous, 4–6 in. diam., quite glabrous on both surfaces; petiole $\frac{1}{2}$–1 in.; stipules $1\frac{1}{2}$–$2\frac{1}{2}$ in., obliquely lanceolate, acuminate, many-nerved. *Male spikes* 10–12 in., pendulous, glabrous; bracts very small; flowers $\frac{1}{12}$ in. broad; calyx cupular obtusely 4–6-lobed to the middle; stamens 4–5, short; disk hirsute; pistillode clavate.

Fruiting racemes as long as the leaves, strict, as thick as a crow-quill; fruits spreading, pedicel $\frac{1}{10}$ in.; calyx small, acutely 6-lobed, nearly glabrous; disk glabrous.

3. **A. pendulum,** *Hook. f.*; glabrous, branches stout, leaves 10–14 in. membranous oblong-lanceolate or oblanceolate cuspidately acuminate or caudate base acute, nerves 10–14 pairs very slender, petiole very stout, spikes solitary simple very slender, fruiting pendulous equalling the leaves, flowers of both sexes sessile, sepals 4–6 orbicular hairy, disk glabrous 5-lobed, ovary gibbously decurved glabrous, stigmas very short, fruit $\frac{1}{2}$ in. shortly pedicelled broadly ovoid compressed rugose tip rounded stigmas terminal.

PERAK, *Scortechini.*

A shrub, 6–12 ft.; branches as thick as a swan's quill, bark whitish. *Leaves* brown beneath when dry; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. *Male fl.* rather scattered; stamens 5, stout; pistillode clavate, lobulate at the top. *Fem. fl.* $\frac{1}{12}$ in.; sepals very short; disk glabrous. *Fruiting racemes* as long as the leaves; pedicels slender, $\frac{1}{10}$ in.; calyx obtusely 6-lobed. *Fruit* with acute margins, quite glabrous.—Closely allied to a Bornean species (Beccari No. 1300), which has a glabrous shortly lobed fem. calyx, and a few bristles on the fem. disk.

4. **A. Kingii,** *Hook. f.*; branchlets petioles nerves beneath and spikes densely rusty-tomentose, leaves 10–12 in. subsessile oblong or broadly obovate-oblong cuspidately acuminate base rounded or cordate, nerves 16–20 pair strong beneath, male spikes subpanicled, peduncle bracteate, flowers sessile, fem. spikes short stout erect, flowers subsessile, ovary densely tomentose, fruiting spikes very stout, fruit $\frac{1}{2}$ in. subsessile falcately ovoid deeply reticulate pubescent styles terminal.

PERAK; at Goping and Larut, *King's Collector.*

A stout shrub or small tree, 25 ft.; branches very stout. *Leaves* rather coriaceous, 3–6 in. broad, more or less rusty-pubescent all over beneath; nerves spreading, close-set; petiole very stout, $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules $\frac{1}{2}$–1 in., rigid, lanceolate. *Male spikes* erect, 4–6 in., with lanceolate stipular bracts at the base of the common peduncle; floral bracts very minute; sepals 5, free, hairy; stamens 5, rather short; disk tumid, glabrous; pistillode short. *Fem. spikes* 4–6 in., erect in flower, decurved in fruit; bracts obscure; sepals about 4, ovate, acute; disk with a few bristles.

Series II. *Leaves* 2–10 in. long, rarely more. *Fruit* $\frac{1}{4}$–$\frac{1}{2}$ in. long.

* Ovary tomentose or pubescent (sometimes glabrate in *A. alatum & leucocladon*).

5. **A. velutinosum,** *Blume Bijd.* 1125; densely tomentose, leaves 5–8 in. oblong or oblong-lanceolate acuminate, petiole very short, male fl. sessile or very shortly pedicelled, bracts linear or lanceolate, calyx villous 5–8-partite, stamens 5–8, ovary obliquely globose tomentose, style sublateral stigmas long recurved forked, fruit pedicelled obliquely globose $\frac{1}{3}$ in. diam. *Muell. Arg. in DC. Prodr.* xv. ii. 248; *Kurz For. Fl.* ii. 359; *Miquel Fl. Ind. Bat.* i. ii. 428. A. tomentosum, *Blume ex Miquel l. c.* 427, t. 26. A. attenuatum, *Wall. Cat.* 7286; *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 235. A. molle, *Wall. Cat.* 7287; *Muell. Arg. l. c.*—Antidesmea, *Wall. Cat.* 8582, 8577 *in part.*

PEGU to TENASSERIM, and BURMA, *Wallich, Griffith, Helfer* (*Kew Distrib.* 4946, 4947), &c. PENANG, *Porter, Curtis.* SINGAPORE, *Hullett.*—DISTRIB. Java.

An evergreen tree, 25–30 ft. *Leaves* hardly coriaceous, variable in amount of pubescence, base narrowed or obtuse, rarely cordate, nerves 10–15 pairs; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules from ovate to linear-lanceolate. *Spikes* or racemes subsolitary,

stout for the genus, peduncle bracteate; lower floral bracts frequently exserted and recurved. *Sepals* lanceolate, villous, very unequal. *Disk* of male minute, tumid, lobed; pistillode clavate, hairy; of fem. cupular, slightly hairy. *Style* distinct.—Wallich's *A. attenuatum* and *A. molle* are the two sexes of this species; his Penang specimens (Porter's) are more densely tomentose, beneath especially, than the others.

VAR. *lancifolia*; leaves elliptic-lanceolate acuminate.—Penang, *Curtis*.

VAR. *orthogyne*; ovary ellipsoid quite straight, stigmas terminal.—Malacca, *Griffith* (*Kew Distrib.* 4928).

6. **A. Helferi,** *Hook. f.*; branches and leaves glabrous, leaves 4–7 in. elliptic or elliptic-oblong obtuse base acute nerves slender, fem. spike stout pubescent, flowers sessile, bracts subulate, calyx 5-partite, ovary obliquely globose tomentose, stigmas 2 stout 2-lobed or partite terminal.

TENASSERIM (or Andaman Islands), *Helfer* (*Kew Distrib.* 4942).

Leaves coriaceous, perfectly glabrous on both surfaces; nerves 8–10 pair, arching; petiole $\frac{1}{4}$ in., very stout, and the linear stipules glabrous. *Spike* terminal, $1\frac{1}{2}$ in.; rachis stout. *Sepals* linear-oblong, obtuse. *Disk* of fem. cupular, hairy.—I have seen only one specimen of this very distinct-looking species. The leaves may hence be found to vary a good deal from the above diagnosis. A Perak species (Herb. Calcutt., No. 4056) in fruit only may be the same; its spike is 2–3 in., rather stout, quite simple, the fruit shortly pedicelled $\frac{1}{3}$ in. long broadly ellipsoid turgid top rounded with very minute subterminal stigmas.

7. **A. Ghaesembilla,** *Gærtn. Fruct.* i. 189, t. 39; tomentose or glabrous, leaves orbicular obovate or oblong obtuse, spikes panicled, flowers sessile, calyx 5–7-partite, disk 5-partite pubescent, stamens 4–7, ovary pubescent, fruit $\frac{1}{6}$ in. subglobose, stigmas terminal minute recurved. *Muell. Arg. in DC. Prodr.* xv. ii. 251; *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 238; *Brand. For. Fl.* 446; *Kurz For. Fl.* 358; *Grah. Cat. Bomb. Pl.* 186; *Dalz. & Gibs. Bomb. Fl.* 236; *Gamble Man. Ind. Timb.* 349; *Beddome Forester's Man.* 200. A. paniculatum, *Roxb. Fl. Ind.* iii. 770; *Ham. in Trans. Linn. Soc.* xvii. 246; *Wight Ic.* t. 820; *Dalz. & Gibs. Bomb. Fl.* 237; *Tulasne l. c.* 228; *Wall. Cat.* 7280. A. pubescens, *Roxb. Cor. Pl.* ii. 35, t. 167, and *Fl. Ind.* iii. 770; *Wight Ic.* t. 821; *Grah. Cat. Bomb. Pl.* 186; *Dalz. & Gibs. l. c.*; *Wall. Cat.* 8567; *Blume Bijd.* 1123; *Miquel Fl. Ind. Bat.* i. i. 426. A. acidum, *Retz Obs.* v. 30 (*ex Herb. Rottler*). A. sylvestre, *Lamk. Dict.* i. 207 (*ex Willd. mss. in Herb. Rottler*).—Antidesma, *Wall. Cat.* 8580.

TROPICAL HIMALAYA; from Simla to Bhotan and southward to CEYLON, SINGAPORE, PERAK and PENANG.—DISTRIB. Malay Islands, China, Australia ?, Africa.

A small tree; branches, spikes, petioles, and often the leaves beneath rusty-tomentose. *Leaves* 2–3 in., rarely more or less, base rounded or cordate, tip rounded, rarely subacute or retuse, nerves 5–6 pairs; petiole $\frac{1}{6}$–$\frac{1}{2}$ in. *Spikes* rather slender; bracts minute; male fl. clustered. *Fruit* subglobose (when fresh).

8. **A. Roxburghii,** *Wall. Cat.* 7283; villously tomentose, leaves 6–10 in. subsessile obovate-oblong caudate-acuminate, spikes very long and stout subsimple, bracts minute, flowers of both sexes sessile, calyx 3–4-partite, stamens 3–4, fem. disk hairy, ovary straight tomentose, stigmas very short terminal, fruit $\frac{1}{4}$ in. long subsessile ovoid or ellipsoid subcompressed, stigmas minute sublateral. *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 234; *Muell. Arg. in DC. Prodr.* xv. ii. 261. Stilago tomentosa, *Roxb. Fl. Ind.* iii. 757; *Wight Ic.* t. 767, 768.

SILHET, *Wallich*. ASSAM, *Griffith*.

Young branches and leaves densely rusty villous. *Leaves* 3–4 in. broad, often unequal at the rounded base, flat or bullate above; nerves 8–10 pair, spreading; petiole $\frac{1}{6}$ in. or less; stipules linear. *Spikes* 4–6 in., sometimes subpanicled, peduncle bracteate; rachis stout, densely tomentose. *Calyx-lobes* rounded, villous. *Disk* of male glabrous. *Pistillode* subglobose.

9. **A. alatum,** *Hook. f.*; glabrous, branches white, tips puberulous, leaves 3–5 in. shortly petioled elliptic-oblong or -oblanceolate abruptly cuspidate or subcaudate base acute, stipules large orbicular-ovate acute persistent, spikes short, male fl. sessile, sepals 5 hirsute, disk pulvinate glabrous, stamens 5, fem. fl. subsessile, ovary pubescent or glabrate, disk very large pulvinate glabrous, fruit $\frac{1}{3}$ in. shortly pedicelled turgidly ovoid shortly beaked, stigmas subterminal minute conic.—Antidesmea, *Wall. Cat.* 8583.

PERAK; Larut, alt. 1–3000 ft., *King's Collector*; Waterfall Hill, *Wray*. SINGAPORE, *Wallich*. MALACCA, *Griffith* (*Kew Distrib.*, No. 4941).

A small tree, shoots puberulous. *Leaves* thin or subcoriaceous, midrib glabrous or puberulous beneath; nerves 8–10 pairs, very faint; petiole $\frac{1}{12}$–$\frac{1}{8}$ in.; stipules $\frac{1}{3}$–$\frac{1}{2}$ in., coriaceous. *Spikes* $\frac{1}{2}$–$\frac{3}{4}$ in., males panicled; flowers very minute, rachis puberulous; stamens short; pistillode minute, sunk in the disk. *Disk* of fem. fl. often exceeding the calyx in width.—The remarkable stipules and very large fem. disk are conspicuous characters. The stipules a good deal resemble those of the Sumatran *A. neurocarpum*, which has tomentose branches and strong nerves.

10. **A. leucocladon,** *Hook. f.*; glabrous, branchlets slender white, leaves 5–7 in. membranous oblanceolate or oblong caudate-acuminate base acute or obtuse, petiole short, stipules filiform, male spikes panicled very slender tomentose, flowers sessile very minute, calyx 4-lobed, disk tomentose, fem. fl. subsessile, ovary tomentose or glabrate, stigmas long recurved, disk glabrous or ciliolate, fruit $\frac{1}{2}$ in. very shortly pedicelled broadly gibbously ovoid compressed beaked, stigmas large. A. Bunius, *Wall. Cat.* 7282 A (*the right-hand specimen*).

PENANG, *Wallich*. PERAK, *Scortechini*; at Sunga Ryah, *King's Collector*.

A small tree; shoots puberulous. *Leaves* membranous, drying brown; midrib glabrous or puberulous beneath; nerves 10–12 pairs, very slender; petiole $\frac{1}{12}$–$\frac{1}{8}$ in. *Male spikes* seen only in Penang specimens; bracts minute; calyx obtusely lobed below the middle; disk small, 4-lobed; pistillode columnar.—A very similar species in fem. flower only, from Perak (Calcutta Herbarium, No. 3845), has longer female peduncles and shorter stigmas.

** Ovary glabrous (see also *A. alatum* & *leucocladon*).

† *Male flowers sessile or nearly so. Calyx not deeply lobed.*

11. **A. Bunius,** *Spreng. Syst. Veg.* i. 826; shoots tomentose, leaves elliptic-oblong lanceolate obovate or oblanceolate glabrous shining above, petiole short, spikes simple or panicled stout pubescent villous or tomentose, bracts minute ovate, male fl. sessile or subsessile, calyx cupular shortly 4-lobed, disk glabrous, stamens 3, fruit shortly pedicelled $\frac{1}{6}$–$\frac{1}{4}$ in. elliptic, stigmas 3–4 very short terminal. *Muell. Arg. in DC. Prodr.* xv. i. 262; *Blume Bijd.* 1122; *Presl Epimel.* 234; *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 186; *Miquel Fl. Ind. Bat.* i. ii. 423; *Wight Ic.* t. 819; *Kurz For. Fl.* ii. 358; *Beddome Forester's Man.* 200, t. 24, f. 3; *Wall. Cat.* 7282 (*except* A *and part of* B); *Thwaites Enum.* 289. A. Thwaitesianum, *Muell. Arg. l. c.* 263. A. glabrum & floribundum, *Tulasne l. c.* 188, 189. A. sylvestre, *Lamk. Dict.* i. 207. A. ciliatum, *Presl l. c.* 235 Stilago Bunius, *Linn. Mant.*

122; *Roxb. Fl. Ind.* iii. 758.—*Rheede Hort. Mal.* v. t. 26.—Antidesma, *Wall. Cat.* 8570 A, 8574.

Throughout the hotter parts of INDIA, from the Nepal and Sikkim Terai and Assam, southwards to Singapore and Penang; and from Parusnath in Behar to CEYLON. *Griffith* (*Kew Distrib.* 4933, 4934).—DISTRIB. Malay Islands.

A small evergreen tree. *Leaves* very variable, 3–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., obtuse, acute or acuminate; base acute; nerves 10–12 pairs, arched; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules ovate-cordate (Kurz), deciduous. *Spikes* often 4–5 in. long, slightly rusty-tomentose; flowers rather large for the genus; fem. shortly pedicelled. *Calyx* of male very short, lobing very various in depth; of fem. shortly tubular, truncate. *Disk* of male lobed, of fem. cupular.—Of Thwaites' var. β., from Caltura, which he distinguishes by the firmer leaves and more delicate less pubescent inflorescence, I have only seen fruiting specimens, which I cannot distinguish from *A. Bunius*. Mueller, who regards it as a different species (*A. Thwaitesianum*), relies on the minute bracts, deeper-lobed calyx and rusty-hairy disk; but as there are no male flowers on Thwaites' specimens, I cannot verify these characters.

12. **A. Alexiteria,** *Linn. Sp. Pl.* 1027; nearly glabrous, leaves 1–3 in. subsessile from oblong or lanceolate to orbicular-ovate or -obovate obtuse acute or acuminate shining above, spikes simple or panicled slender pubescent, bracts minute, male fl. quite sessile, calyx very minute 3–4-lobed, disk glabrous, stamens 3, fruit $\frac{1}{4}$ in. diam. gibbously orbicular turgid, stigmas very short sublateral. A. zeylanicum, *Lamk. Encycl.* i. 207; *Muell. Arg. in DC. Prodr.* xv. ii. 256; *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 209.—Antidesma, *Wall. Cat.* 8568.—*Burm. Thes. Zeyl.* 22, t. 10.

SOUTHERN DECCAN PENINSULA, *Heyne*, &c. CEYLON, common.

Much branched, rather slender. *Leaves* very variable in form, the smallest of the Indian species, brown when dry, reticulate and shining on both surfaces, coriaceous, nerves usually very slender and obscure; petiole rarely $\frac{1}{12}$ in. *Spikes* 1–$1\frac{1}{2}$ in.; bracts short, broad; fem. fl. very shortly pedicelled; calyx 4-lobed.

13. **A. brunneum,** *Hook. f.*; nearly glabrous, leaves $2\frac{1}{2}$–$3\frac{1}{3}$ in. long-petioled coriaceous dark brown and opaque when dry elliptic obtuse or obtusely acuminate base acute, male spikes short branched pubescent, bracts oblong, flowers quite sessile, calyx shortly cup-shaped lobed to the middle, stamens 5 seated on the tumid glabrous disk, pistillode large often with two recurved stigmas.

CEYLON, *Thwaites* (C.P. 2208 and 2535 *in part*).

Branches stout, shoots finely pubescent. *Leaves* very dark brown, hardly shining above, quite glabrous; nerves 4–6 pair, very slender; petiole slender, $\frac{1}{2}$–$\frac{2}{3}$ in.; stipules small. *Spikes* $\frac{1}{2}$–$\frac{3}{4}$ in., rather stout. *Calyx-lobes* rounded, hairy and ciliate. *Pistillode* a small well-developed ovary, and stigmas, quite glabrous. Fem. fl. and fruit unknown.—This differs from *A. pyrifolium* in the larger broader more coriaceous brown leaves, with fewer nerves, and longer petioles; also in the more pubescent stouter spikes, quite sessile flowers, deeper-cleft calyx, and remarkably developed pistillode. *Fruit* not seen.

†† *Male flowers sessile or very shortly pedicelled. Calyx deeply* 4-*lobed or* -*partite.*

14. **A. fallax,** *Muell. Arg. in Linnæa* xxxiv. 68, and in *DC. Prodr.* xv. ii. 253; glabrous, leaves 4–7 in. petioled coriaceous oblong or ovate-oblong acute or acuminate shining above, spikes simple and panicled rusty-tomentose, flowers sessile, male calyx 4–5-lobed or -partite, stamens 3–4, disk cupular lobed and subglobose, ovary glabrous, fruit very shortly pedicelled ¼ in. diam. orbicular compressed, stigmas subterminal. A. coriaceum,

Tulasne in Ann. Sc. Nat. Ser. 3, XV. (1851) 204.—Antidesma, *Wall. Cat.* 8584, 9101.

PENANG, *Porter*, &c. MALACCA, *Maingay*. PERAK, *Wray*, *King's Collector*. SINGAPORE, at Johore, *Cantley*.

A tree?, 30–70 ft. in Perak; branches pale, tips alone rusty-pubescent. *Leaves* rarely ovate, base acute or rounded, nerves 8–10 pair; petiole $\frac{1}{2}$–$\frac{2}{3}$ in., quite glabrous in age. *Spikes* 1–$2\frac{1}{2}$ in., bracts minute, oblong. *Sepals* rounded or oblong, villous. *Filaments* rather short. *Pistillode* clavate. *Ovary* and *Disk* glabrous or very minutely puberulous; stigmas very short, thick, suberect. *Fruiting racemes* stout. —Very near *A. Bunius*, if not a form of it. Under *A. Moritzii* I have indicated Mueller's erroneous citations of Wallich's numbers cited under his *A. coriaceum*.

15. **A. nigricans,** *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 224; branches petioles and spikes densely tomentose, leaves shortly petioled 4–7 in. elliptic oblong or oblong-lanceolate acuminate glabrous except on the midrib above and beneath, spikes or racemes short simple or panicled, flowers sessile or shortly pedicelled, calyx 4-partite, stamens 4 inserted on the large hemispheric glabrous disk, ovary glabrous on a large glabrous disk, stigmas rather long recurved terminal. *Muell. Arg. in DC. Prodr.* xvi. ii. 258. A. flexuosum, *Tulasne l. c.*; *Muell. Arg. l. c.* 263. A. Bunius, *Wall. Cat.* 7282 A (*the upper specimen*).—Antidesma, *Wall. Cat.* 8575.

ASSAM, *Jenkins*. SILHET, *Wallich*, *J. D. H. & T. T.*

Leaves greyish brown when dry, sometimes caudate-acuminate, base acute or obtuse; nerves 6–12 pair, strong beneath and forming strong intra-marginal arches; petiole $\frac{1}{8}$–$\frac{1}{6}$ in., shorter than the stipules. *Bracts* minute. *Sepals* glabrous or sparsely villous, broadly ovate, spreading. *Stamens* inserted on the rounded sides of the disk. *Pistillode* conical, glabrous, but sometimes large and 2-fid like a minute ovary.—Tulasne's *A. nigricans* and *flexuosum* are the same, and Wallich's No. 8575 is quoted for both; the large hemispheric male disk is very characteristic. My own Silhet specimens have longer leaves than Wallich's; Mueller refers Willdenow's *A. Alexiteria* to this. See No. 27, p. 365.

16. **A. cuspidatum,** *Muell. Arg. in Linnæa* xxxiv. 67, and in *DC. Prodr.* xv. ii. 252; shoots petioles and spikes finely pubescent, leaves long-petioled 5–7 in. oblong-lanceolate caudate-acuminate glabrous shining on both surfaces, petiole $\frac{1}{3}$–$\frac{1}{2}$ in., spikes racemose, male fl. sessile, bracts as long as the flowers, calyx 4–5-partite, disk pubescent, stamens 3, fem. fl. subsessile, disk villous, ovary glabrous, stigmas conical erect, fruit $\frac{1}{4}$ in. obliquely orbicular compressed, stigmas minute sublateral. ? A. rotatum, *Muell. in DC. l. c.* 256.

MALACCA; at Ching, *Griffith* (A. pubescens, *Kew Distrib.*, No. 4823), *Maingay* (*Kew Distrib.*, No. 1341). SINGAPORE, *Cantley*, *King's Collector*. ? TENASSERIM, *Griffith* (*Kew Distrib.* 4927), *Helfer*.

A tree, branches glabrous. *Leaves* thinly coriaceous, dark above when dry; base rounded or acute; nerves 8–10 pairs, prominent beneath, arched; stipules ovate-lanceolate, caducous. *Spikes* slender, $1\frac{1}{2}$–3 in., with stipular bracts at their base and on the pedicels, bracts narrow. *Sepals* villous, of males rounded, of fem. ovate acute. *Disk* of male lobed, pistillode subglobose, of fem. cupular. *Fruiting racemes* very slender, pedicels $\frac{1}{8}$ in., slender.—The long petioles and villous fem. disk are good characters for separating this species from its allies. From Mueller's description and locality of *A. rotatum*, I think his plant must be conspecific with *A. cuspidatum*. There are in the Calcutta Herbarium from Perak (Scortechini and King's Collector, Nos. 2314 and 3464) male specimens of a species precisely resembling this in habit, long petiole, leaves and panicled spikes, but the flowers are smaller and the disk glabrous.

17. **A. fruticulosum,** *Kurz For. Fl.* ii. 359; branchlets leaves

beneath and spikes villously tomentose, leaves 1–1½ in. subsessile obovate-oblong or -lanceolate obtuse acuminate or obtusely mucronate, spikes short solitary or panicled, male fl. sessile, sepals 4 rounded subacute tomentose, stamens 2–3 inserted at the base of the hemispheric glabrous disk, ovary glabrous, fruit ⅙–⅛ in. long, obliquely ovoid, stigmas terminal simple.

PEGU; in the sandy soil of tidal forests near the station, *Kurz.*

A small branched shrub, 2–4 ft. *Leaves* small, yellow brown when dry, sometimes retuse; base acute; petiole $\frac{1}{12}$ in.; stipules subulate. *Flowers* minute; bracts minute, ovate-lanceolate. *Pistillode* globose, glabrous.—I have seen only young specimens with male flower.

18. **A. velutinum,** *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 223 (*in part*); branches very short petioles leaves beneath and spikes tomentose, leaves 3–5 in. elliptic oblong or oblong-lanceolate acuminate, spikes solitary or panicled, male fl. sessile, sepals 3–4 orbicular villous, stamens 3–4 inserted within the glabrous lobed disk, ovary glabrous, stigmas short terminal. *Muell. Arg. in DC. Prodr.* xv. ii. 258; *Kurz For. Fl.* ii. 359. Antidesma, *Wall. Cat.* 8577 *in part.*

PEGU, TENASSERIM and BURMA, *Wallich, Griffith* (*Kew Distrib.* 4927), *Helfer* (*Kew Distrib.* 6945), &c.

An evergreen tree, 25–30 ft. *Leaves* more or less pubescent on both surfaces or glabrous above, dark brown when dry; stipules lanceolate. *Disk* of male sometimes stipitate; pistillode columnar, hairy. Very young *fruits,* which are shortly pedicelled, only seen.—Tulasne's *A. velutinum* is a mixture of this and *velutinosum,* which occur on the same sheet of Wallich's herbarium. The character which Kurz gives of ovary pubescent is, I think, an error. The number of Wallich 1701, cited by Tulasne, is not that of Wallich's Catalogue, where 1701 is a *Polygonum.*

††† *Male flowers pedicelled. Calyx* 3–4-*lobed above the middle or toothed.*

19. **A. diandrum,** *Roth Nov. Sp.* 369; glabrous or the shoots pubescent, leaves obovate-oblong -elliptic or -lanceolate very shortly petioled not polished, racemes very slender usually branched quite glabrous, flowers all pedicelled, calyx spreading obtusely 4-lobed or -toothed, stamens 2 rarely 3 at the base of the small glabrous lobed disk, fruit ⅛–⅙ in. long ovoid acute, stigmas minute terminal. *Muell. Arg. in DC. Prodr.* xv. ii. 266; *Brand. For. Fl.* 447; *Kurz For. Fl.* 360; *Gamble Man. Ind. Timb.* 350; *Dalz. & Gibs. Bomb. Fl.* 237; *Beddome Forester's Man.* 200. A. sylvestre, *Wall. Cat.* 7281. A. lanceolarium, *Wall. Cat.* 7284; *Wight Ic.* t. 766; *Thwaites Enum.* 289. A. lanceolatum, *a.* Walkeri, *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 195; *Muell. Arg. l. c.* 266; *Beddome Forester's Man.* 201. A. Wallichianum, *Presl Epimel.* 235. A. parviflorum, *Herb. Ham.* Stilago diandra, *Roxb. Cor. Pl.* ii. t. 166, and *Fl. Ind.* iii. 759. S. lanceolaria, *Roxb. Fl. Ind.* iii. 760.—Antidesma, *Wall. Cat.* 7285, 8579.

TROPICAL HIMALAYA, from Garwhal eastwards, and southwards to TRAVANCORE and TENASSERIM. CEYLON, ascending to 1500 ft.

A bush or small tree, shoots glabrous or rusty-pubescent. *Leaves* very variable, obtuse acute or acuminate, the longest 5 by 1 in., the largest 5 by 2 in., the smallest 1 by ⅔ in., thin in texture, rarely slightly pubescent beneath, yellowish green when dry, base always acute, nerves faint; petiole $\frac{1}{10}$–⅛ in.; stipules slender. *Racemes* always quite glabrous; bracts short, oblong, obtuse, glabrous, lowest often the longest. *Flowers* minute, a few here and there sessile. *Disk* lobed and quite glabrous (described as appressed pubescent by authors).—The varieties proposed by Tulasne and retained by Mueller (*ovata, genuina, lanceolata* and *parvifolia*) are untenable with any approach to definiteness. Thwaites mentions a Cingalese form with leaves at

times only $\frac{1}{6}$ in. broad. The only male Ceylon specimen of *diandrum* that I have seen is uniformly triandrous. Walker's specimens of this in Herb. Hook. are accompanied with detached fruits of a much larger size than those of *A. diandrum*, and which I suspect belong to *A. Alexiteria*.

20. **A. pyrifolium,** *Muell. Arg. in Linnæa* xxxiv. 68, and in *DC. Prodr.* xv. ii. 265; nearly glabrous, leaves 2–4 in. long-petioled elliptic-oblong or -lanceolate caudate-acuminate shining above base acute, racemes slender simple or branched puberulous, male fl. shortly pedicelled scattered, bracts short broad, calyx cup-shaped 4–5-lobed, stamens 3–5 seated on the tumid glabrous disk, fruit subspherical, stigmas minute terminal. *Beddome Forester's Man.* 200. A. montanum, *Thwaites Enum.* 288.

CEYLON; Central Province, alt. 3–6000 ft., *Walker*, &c.

Habit of *A. Alexiteria*, but larger, and at once distinguishable by the longer rather slender petioles, $\frac{1}{4}$–$\frac{1}{2}$ in. long, and larger fruit. The flowers are always pedicelled enough to place it in this group. The tumid disk of the male fl. often rises high above the calyx, and the pistillode is minute and glabrous.

21. **A. Moritzii,** *Muell. Arg. in Linnæa* xxxiv. 67, and in *DC. Prodr.* xv. ii. 252; branchlets petioles midrib above and spikes finely tomentose, leaves 5–10 in. oblong elliptic- or obovate-lanceolate acuminate base acute or rounded, spikes very slender panicled glabrous, male fl. minute pedicelled, calyx 4–5-lobed, stamens 4–5, disk pubescent, fem. fl. pedicelled, ovary glabrous, fruit $\frac{1}{6}$–$\frac{1}{4}$ in. pedicelled subglobose acute, stigmas very short terminal. A. pubescens, *Moritzi in Zoll. Verzeichn.* 73; *Miquel Fl. Ind. Bat.* i. ii. 426, *not of Roxb.* A. pubescens, *var.* Moritzii, *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 215. A. minus, *Blume?*, *Wall. Cat.* 7288. A. leptocladum, β. genuinum, *Muell. Arg. l. c.* 253. A. leptocladum, *Tulasne l. c.* 199. A. Alexiteria, *Presl Epimel.* 234 (*not of Gœrtn.*).

TENASSERIM; at Mergui, *Griffith* and *Helfer* (*Kew Distrib.* 4926). PENANG, *Porter.* PERAK, *Scortechini*, *King's Collector.* MALACCA, *Griffith* (*Kew Distrib.* 4935).—DISTRIB. Sumatra, Java, Borneo, Philippine Islands.

A tree, 12–20 ft., bark of branches grey, lenticellate. *Leaves* very variable, usually broadest above the middle, largest 8 by 4 in., smaller 5 by 2 in., membranous, pale green, beneath rather shining and glabrous or faintly pubescent on the 8–10 pairs of raised nerves; petiole $\frac{1}{8}$–$\frac{1}{6}$ in.; stipules small, subulate or lanceolate. *Male spikes* 3–6 in., forming effuse panicles; rachis very slender; flowers nearly glabrous, scattered; bracts very minute; pistillode globose. *Fem. racemes* fewer, shorter; fruiting very slender; pedicels $\frac{1}{12}$–$\frac{1}{8}$ in. *Fruiting panicles* widely spreading.—I am very much puzzled with this plant, which is, I suspect, one of the commonest Malayan Antidesmas, and is variously named in Herbaria. Tulasne and Mueller refer Wallich's "7288 A" (there is no A in Herb. Wallich) to *A. coriaceum*, which from the description and the other number cited, 8584 (misprinted 8548), is *A. fallax.* In habit, foliage, and small fruit *A. Moritzii* resembles *A. cuspidatum*, from which its short petioles at once distinguish it, and *A. oblongifolium*, which differs in the tomentose panicle, and *acuminatum*, which has longer pedicelled male fl. and the midrib tomentose above, and *A. Menasu*, which has much larger flowers, a deeply lobed calyx and acute fem. sepals.

22. **A. khasianum,** *Hook.* .; nearly glabrous, leaves subsessile 3–6 in. from elliptic lanceolate to narrowly oblong-lanceolate acuminate or caudate midrib above glabrous, male racemes short slender solitary or panicled, male fl. pedicelled, calyx cupular shortly 3–4-lobed, stamens 2–4 inserted on the tumid glabrous entire or lobed disk, ovary glabrous, fruit $\frac{1}{3}$ in. long gibbously orbicular or elliptic acute, stigmas terminal or subterminal. A. lanceolatum, *Herb. H. f. & T.*—Antidesma, *Wall. Cat.* 8570? B and 8573.

ASSAM, *Hamilton*, &c.; on the Duphla Hills, *Booth*. KHASIA MTS., *Wallich*, &c., *Griffith* (*Kew Distrib.* 4929); common at 3–4000 ft., *J. D. H. & T. T.*

Branches with whitish bark; branchlets sparingly pubescent. *Leaves* very variable, smaller 2–3 in. and elliptic, larger 5–7 in. and lanceolate or linear oblong, greenish when dry, base acute; nerves arched, slender; petiole $\frac{1}{8}$–$\frac{1}{6}$ in.; stipules narrow, lanceolate. *Racemes* much shorter and with shorter pedicels than in *A. acuminatum*; peduncle with lanceolate stipular bracts; floral bracts ovate. *Male fl.* glabrous. *Disk* sometimes exserted, and hardly lobed; pistillode small. *Fruit* large, tipped by the 2–3 rigid bases of the stigmas.—The glabrous midrib of the upper surface of the leaf, short racemes and pedicels, and cupular shortly lobed calyx distinguish this from *A. acuminatum*, and the narrow leaves and not tomentose branches and terminal stigmas from *A. assamicum*, of which it has the simple female racemes and large oblique fruit. Can this be Mueller's *A. oblongatum*? (see p. 365,) which he describes from a specimen in the Berlin Herbarium as having the fruit ellipsoid obtuse at both ends with a stigmatiferous notch half-way between the base and apex.

†††† *Male fl. pedicelled. Calyx* 3–4-*partite.*

23. **A. acuminatum,** *Wall. mss. in Wight Ic.* t. 1991; branchlets finely pubescent, leaves 3–12 in. shortly petioled obovate-oblong or -elliptic or lanceolate caudate or acuminate above shining with the midrib tomentose, male racemes long and very slender in branched pubescent panicles, flowers minute long-pedicelled, sepals 4 broadly ovate, stamens 3–4 inserted between the lobes of the glabrous disk, ovary glabrous, fruit in large wide spreading panicles $\frac{1}{6}$ in. long ellipsoid acuminate with a distinct terminal style. *Muell. Arg. in DC. Prodr.* xv. ii. 268; *Beddome Forester's Man.* 201. A. refractum and A. Menasu (*in part*), *Muell. Arg. l. c.* 257. A. simile, *Muell. Arg. l. c.* 259. A. pubescens, *Tul.*?, *Herb. Ind. Or. H.f. & T.* A. Bunius, *Wall. Cat.* 7282 B (the right-hand specimen). A. zeylanicum *Ham. in Wall. Cat.* 8572. ? A. Menasu, *Gamble Man. Ind. Timb.* 350. A. macrophyllum, *Wall. mss.*

SIKKIM HIMALAYA, ascending to 2000 ft., common, *Griffith* (*Kew Distrib.* 4931), &c. ASSAM, *Masters.* KHASIA MTS., and SILHET, ascending to 4000 ft., *Wallich*, &c.

A large shrub. *Leaves* rather thin, often very large and 4 in. broad; base acute or rounded; nerves 8–15 pair, very slender; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules much longer, linear or lanceolate. *Racemes* often several inches long, with wide spreading branches; bracts lanceolate; pedicels many times longer than the calyx. *Disk* variable, usually lobed, but sometimes hemispheric; pistillode columnar or short and 2–3 lobed, or developed into an imperfect ovary. *Fruit* tipped with a very short slender style and minute stigmas.—Habit and foliage of *A. Menasu*, and possibly not specifically different, but the racemes are much more slender, the branches not so tomentose, and the pedicels much longer. The fruit is similar but smaller, with a more distinct style. I have restored Wallich's name as authority for this, a specimen in the Kew Herbarium from the Calcutta Garden being labelled *acuminatum*. Wight's figure is taken from cultivated specimens in which the flowers appear to be occasionally hermaphrodite. A Sikkim fruiting specimen of this or an allied species from Clarke has densely tomentose branches and racemes.

24. **A. martabanicum,** *Presl Epimel.* 232; branches petioles nerves of leaves beneath and panicles tomentose, leaves 4–11 in. shortly petioled linear-oblong acuminate, stipules large oblong-lanceolate, racemes panicled, male fl. pedicelled, calyx 3–4-partite, stamens 3–4, disk glabrous, ovary glabrous, fruiting racemes in open panicles, fruit $\frac{1}{8}$–$\frac{1}{6}$ in. long globose or ellipsoid top rounded, stigmas minute sessile terminal. *Muell. Arg. in DC. Prodr.* xv. ii. 261; *Kurz For. Fl.* ii. 358. A. oblongifolium, *var.* Wallichii, *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 221; *Muell. Arg. l. c.* 264. A.

Menasu, *Kurz For. Fl.* ii. 360 (*not of Miquel*). A. oblongum, *Wall. mss.*—Antidesma, *Wall. Cat.* 8578.

PEGU to TENASSERIM, and the ANDAMAN ISLANDS, *Wallich, Griffith, Helfer* (*Kew Distrib.* 4947).—DISTRIB. Java?

Branches velvety-tomentose. *Leaves* thin, glabrous above except the midrib, beneath between the 10–16 pair of pubescent nerves glabrous or puberulous; petiole stout, $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules on young shoots $\frac{1}{4}$–$\frac{1}{2}$ in. from subulate to broadly oblong or ovate, acuminate. *Male sepals* rounded. *Pistillode* short, columnar, glabrous. *Fruiting pedicels* $\frac{1}{6}$ in. or shorter.—Wallich's No. 1982 cited by Tulasne is not that of his Catalogue, but an MSS. one on a ticket inscribed *A. oblongum.* I have no doubt as to this being Kurz's *A. Menasu*, from which *martabanicum* differs in the tomentose branches and panicle, &c.

25. **A. Menasu,** *Miquel Plant. Exsicc. Hohenack.*, No. 104; branchlets and petioles tomentose or pubescent, leaves 4–6 in. glabrous shortly petioled elliptic oblong or lanceolate acuminate or caudate shining beneath, spikes or racemes pubescent solitary or sparingly panicled, male and fem. fl. sessile or very shortly pedicelled, calyx 3–4-partite, stamens 3–4 inserted between the lobes of the small glabrous disk, ovary glabrous, fruit $\frac{1}{6}$–$\frac{1}{4}$ in. long ovoid or ellipsoid acute, stigmas short terminal. *Muell. Arg. in DC. Prodr.* xv. ii. 257 (*the Canara plant only*). A. Bunius, *Miquel l. c.* No. 459 *a*, and *Wall. Cat.* 7282 F. A. pubescens, *Roxb.*, β. Menasu, *Tuslasne in Ann. Sc. Nat. Ser.* 3, xv. (1852) 215. A. lanceolatum, *Dalz. & Gibs. Bomb. Fl.* 237. A. pubescens, *Herb. Ind. Or. H. f. & T.* (from Madras). ? A. Alexiteria, *Gærtn. Fruct.* i. 188, t. 39. ? A. acidum, *Retz Obs.* v. 30.—Antidesma, *Wall. Cat.* 8571.

DECCAN PENINSULA, from the Concan and Circars southwards, *Heyne*, &c., *Wight* (*Kew Distrib.* 2654).

Habit of *A. Moritzii*, and very like it in foliage. *Leaves* sometimes narrow and 8 by 3 in., base rounded or acute; midrib sometimes puberulous beneath; nerves 6–10 pairs, arched; petiole $\frac{1}{8}$–$\frac{1}{4}$ in., glabrous or puberulous; stipules lanceolate. *Spikes* or *racemes* usually long; bracts very small, acute; flowers larger than in *A. Moritzii*, rachis much stouter. *Calyx-lobes* rounded, of the fem. often very acute. *Pistillode* columnar, glabrous. *Disk* of female sometimes bearing staminodes.—The common plant of the Deccan Peninsula. The Khasian and Sikkim plant brought under this by Mueller is *A. acuminatum*, differing in the more glabrous branches, and very slender racemes with longer pedicels. Probably *A. acidum*, Retz, belongs to this; it is a plant of Kœnig's described as having obovate leaves, solitary spikes, and a 5-toothed calyx. *A. Menasu* is no doubt the species alluded to by Wight under *A. acuminatum* as occurring in Malabar, and may be a form of that plant. What Gærtner's *A. Alexiteria* is cannot be determined from his figure or description, and he gives no locality for it; the fruit exactly accords with this species.

Var. *linearifolia*; leaves 3–5 by $\frac{1}{2}$–$1\frac{1}{2}$ in. linear-oblong shining on both surfaces.—Canara, *Dalzell, Talbot.*

IMPERFECTLY KNOWN SPECIES.

26. **A. andamanicum,** *Hook. f.*; branches woody glabrous, leaves 3–5 in. quite glabrous membranous shortly petioled cuspidately acuminate base acute, petiole slender, male spikes solitary very slender pubescent, male fl. quite sessile, sepals 4 rounded hirsute on both surfaces, stamens 3, disk villous, pistillode clavate 3-fid.

SOUTH ANDAMAN ISLANDS, *Kurz.*

Apparently a scraggy shrub much branched. *Leaves* uniformly brown on both surfaces when dry, very thin, nerves 6–8 pair extremely slender; petiole $\frac{1}{12}$ in., glabrous.

Male spikes 3–4 in.; flowers minute, scattered.—This resembles no other Indian species.

27. **A. nigricans ?** (p. 360); branches densely tomentose, leaves 4–6 in. shortly petioled oblong obovate-oblong or -lanceolate or narrowly linear oblong abruptly acuminate or caudate midrib above pubescent, male fl. pedicelled, calyx 4-partite, disk glabrous tumid, fem. racemes terminal and axillary subsimple short stout, rachis pubescent, calyx deeply 4-lobed, fruit large gibbously suborbicular turgid top rounded, stigma sublateral. A. nigricans, *in part, Herb. Ind. Or. H. f. & T.*

ASSAM, *Masters, Herb. Griffith* (*Kew Distrib.*, Nos. 4930, 4937, 4943). SILHET and KHASIA MTS., alt. 0–3000 ft., *J. D. H. & T. T.* CACHAR, at Shapore, *Keenan.*

A shrub. *Leaves* most variable, thin, the extreme forms are 3–4 by $1\frac{1}{2}$–2 in., broadly obovate-oblong, abruptly obtusely acuminate, and 6–8 by 1–$1\frac{1}{4}$ in., with finely cordate tips, narrowly linear oblong (I have gathered both in Khasia); nerves 8–10 pair, very slender; petiole $\frac{1}{10}$–$\frac{1}{6}$ in., tomentose; stipules not seen. *Fruiting racemes* 1–$1\frac{1}{2}$ in. long. *Fruit* about $\frac{1}{3}$ in. diam.—This has the large oblique fruit of *A. khasianum*, from which it differs in the tomentose branches, foliage, and midrib tomentose above; it is probably the fruiting state of *A. nigricans.*

28. **A. comptum,** *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 190; shoots puberulous, leaves 2–3 in. lanceolate long-acuminate base narrowed shining above, spikes short simple or branched, flowers sessile or very shortly pedicelled, bracts minute ovate acute, calyx 3-toothed rusty-tomentose, disk glabrous entire, ovary glabrous above below fulvous pubescent, drupe globose, stigmas terminal. *Muell. Arg. in DC. Prodr.* xv. ii. 263.

DECCAN PENINSULA, on the Cottalam (Courtallam ?) Mts., *Leschenault.*

The above description is taken from Tulasne, who says of it that it is a shrub 6–12 ft. high, with small narrow fulvous pubescent stipules not longer than the petioles, and a very minute calyx, and that Thwaites (Enum. 289) has wrongly united it with *A. Bunius.* I have seen no Indian species with the lower part of the ovary pubescent. The habitat is that of a flowerless specimen of Heyne in Herb. Rottler, and which I suppose is *A. Menasu.*

29. **A. oblongatum,** *Muell. Arg. in DC. Prodr.* xv. ii. 254; branches obscurely pubescent, leaves $4\frac{1}{2}$–7 by 1–2 in. shortly petioled linear-lanceolate cuspidately acuminate rigidly membranous glabrous, petiole $\frac{1}{5}$ in. rather shining, stipules lanceolate-subulate equalling the petioles, racemes very slender panicled with stipular bracts at their bases, bracts linear-lanceolate, male fl. minute long-pedicelled, calyx 3–4-lobed below the middle lobes orbicular-ovate, disk thick glabrous, stamens 4–5, pistillode subcylindric glabrous, fruit $\frac{1}{5}$ by $\frac{1}{7}$ in. ellipsoid obtuse at both ends with a lateral stigmatiferous notch half-way between the middle and tip.

KHASIA MTS., *J. D. H. & T. T.*

I cannot find any plant answering to this description amongst Thomson's and my Indian collections. In most characters it agrees with *A. acuminatum*, but that of the stigma being placed in a notch of the fruit half-way between the base and apex is one I have not met with in any species of *Antidesma.* See also 22. *A. khasianum.*

30. **A. perserrula,** *Kurz in Trimen's Journ. Bot.* iv. (1875), 330; branchlets rusty-hirsute, leaves 6–10 in. from oblong-lanceolate to obovate-oblong acuminate or mucronate, nerves beneath hirsute, spikes simple, male fl. minute sessile, sepals 3–5 acute, stamens 3–5, ovary yellow tomentose, stigma terminal.

NICOBAR ISLANDS; forests of Kamorta, *Kurz.*

A tree, 25 30 ft. *Leaves* chartaceous; petiole stout, minute, $\frac{1}{4}$–$\frac{1}{3}$ in. *Fruit* falcately ovate, $\frac{1}{2}$ in. long, compressed.—Description from Kurz, who likens the plant to *A. puncticulatum*, Miquel; I have seen no specimens.

31. **A. salicifolium,** *Miquel Fl. Ind. Bat. Suppl.* 467? (*not of Presl*); branchlets slender finely pubescent, leaves 3–5 by $\frac{1}{2}$–$\frac{3}{4}$ in. shortly petioled linear-lanceolate acuminate quite glabrous, fruiting racemes slender axillary and in short terminal branches, bracts minute subulate, fruit $\frac{1}{6}$ in. long ellipsoid hardly compressed rugose, style distinct short terminal, stigmas minute.

PERAK; on the Pluss river, *Wray*.—DISTRIB. Sumatra.

A small tree. *Leaves* thin, greenish when dry, base very acute, midrib pubescent above, nerves very slender; petiole $\frac{1}{6}$ in.; stipules narrowly lanceolate. *Fruiting spikes* erect, 1–3 in.; bracts very minute, subulate; calyx very minute, lobes 5 membranous; disk thick, glabrous. *Fruit* shortly pedicelled.—The Perak and Sumatran specimens are flowerless. This differs from the description of *A. salicifolium* in the Prodromus in the fruit being ellipsoid and straight, not subobliquely ovoid, and in the perfectly glabrous petioles and midribs.

32. **A. Wattii,** *Hook. f.*; nearly glabrous, leaves subsessile 2–3 by $\frac{1}{4}$–$\frac{1}{3}$ in. coriaceous narrowly linear-lanceolate acuminate glossy above margins recurved, racemes small slender axillary and in terminal panicles, male fl. minute pedicelled, calyx cupular unequally 4-lobed, stamens 3–4 at the base of the small glabrous deeply lobed disk.

MUNIPUR, *Watt*.

Branches very stout, woody, densely leafy, bark dark; branchlets and young parts pubescent. *Leaves* dull brown when dry, remarkably stiff, paler beneath, with very slender ascending distant nerves; petiole hardly any; stipules small, subulate. *Racemes* $\frac{1}{2}$–1 in., numerous; bracts ovate or lanceolate, as long as the pedicels. *Disk* lobed to nearly the base; pistillode minute, glabrous.—Quite unlike any other species. In foliage it is almost identical with a Bornean species (Beccari No. 3831), which however differs in the flowers being quite sessile and their structure.

24. SCORTECHINIA, *Hook. f.*

Trees. *Leaves* alternate, coriaceous, entire or subserrate, penninerved, petiole thickened at the apex. *Flowers* minute, dicœcious, in lax axillary and subterminal panicles, shortly pedicelled, apetalous. MALE FL. *Sepals* 4–5, rounded, imbricate. *Stamens* 4–5, alternating with as many minute hairy disk-glands; filaments stout, free; anthers broad, cells diverging a little, adnate to the connective, dehiscence introrse. *Pistillode* short, 3-lobed, hairy. FEM. FL. *Sepals* 4, imbricate. *Ovary* 2–3-celled?; stigmas 4, very minute; ovules (? 1 or 2), pendulous from the top of the cells. *Fruit* a 1-celled elliptic-oblong thinly crustaceous hoary-white capsule, dehiscing by 4 free deciduous elliptic-lanceolate valves. *Seed* solitary, elliptic-oblong, compressed, pendulous, testa thin crustaceous, albumen rather scanty firm; cotyledons amygdaloid, oblong, rounded at both ends, compressed; radicle minute, superior.—Species 3 or 4, Malayan and a Papuan.

1. **S. Kingii,** *Hook. f.*; leaves eglandular at the base.

PERAK, *King's Collector*. MALACCA, *Griffith* (*Kew Distrib.* 5030), *Maingay* (*Kew Distrib.* 1434).—DISTRIB. Borneo (*Beccari* 1164).

A tree 40–60 ft. high in Perak. *Branchlets* woody; tips and leaf-buds puberulous. *Leaves* 4–7 in., dark chestnut-brown when dry, elliptic or cuneate-obovate, obtuse acute or cuspidately acuminate, base very acute, serratures obtuse glandular, rather

shiny above; nerves 6–8 pair, arched, anastomosing, slightly raised above, more so beneath; petiole ½–1 in.; stipules small, lanceolate. *Panicles* shortly peduncled, hoary, 2–6 in. long, branches spreading. *Male fl.* $\frac{1}{12}$ in. diam.; sepals tumid on the back. *Stamens* included; anthers basifixed. *Fruit* erect, 1–1½ in. long, stoutly very shortly pedicelled, clothed with an appressed white tomentum. *Seed* rounded at both ends, pendulous from a spermaphore that is longitudinally attached to the walls of the cavity from its apex for ⅓ way down, eventually free below; albumen forming a dense covering of the embryo.—The spermaphore consists of the remains of the axis and septa, and bears at the top opposite to the insertion of the seed (that next to the wall of the capsule) a minute ovule. The position of the undeveloped ovule may indicate its having been solitary in a normally 2-(or 3-)celled ovary, of which the remains of the septa and axis form the column from which the seed is suspended.

2. **S. nicobarica,** *Hook. f.*; leaves with 2 prominent glands above at the insertion of the petiole.

NICOBAR ISLANDS; *Novara Expedition* (*in Herb. Hort. Bot. Calcutt.*).

Leaf elliptic, 6 by 3 in., sinuate serrate, nerves about 8 pair; petiole 1½ in., slender. *Capsule* 1 in., as in *S. Kingii.*—I am indebted to Dr. King for a fruit and leaf of this very distinct species.

25. BACCAUREA, *Lour.*

Evergreen trees. *Leaves* alternate, entire, rarely crenate-serrate, penni-nerved. *Flowers* in simple or compound spiciform racemes or racemiform panicles, dicœcious, rarely moncœcious, apetalous; males usually very minute, hoary or tomentose. *Disk* 0, or of obscure glands in the male fl. MALE FL. *Sepals* 4–5, usually unequal, imbricate. *Stamens* 4–8, filaments short free; anthers small, didymous. *Pistillode* pubescent, orbicular, sessile or stipitate, rarely an irregular cleft column. FEM. FL. *Sepals* 4–6, linear or oblong, much larger than in the male. *Ovary* 2–5-celled, ovoid or globose; stigmas 2–5, small, sessile, free or connate into a short style, 2-lobed or -cleft, arms broad or subulate, papillose, rarely united into one peltate stigma; ovules 2 in each cell. *Fruit* ovoid globose obovoid or fusiform, 2–4-celled; pericarp thick or thin, coriaceous crustaceous or woody, tardily loculicidally dehiscent. *Seeds* broad, usually dorsally compressed or flattened, testa with a thick fleshy coat (aril?); albumen fleshy or hard; cotyledons broad, flat.—Species about 30, Tropical Asiatic, African and Polynesian.

The species of this genus are most difficult of discrimination, owing to the necessity of having for this purpose flowers of both sexes and also ripe fruit, and because in foliage very different species resemble one another. The male inflorescence appears to me to afford the best sectional characters, but it may have to yield to carpological ones, when the fruits are better known. The male flowers of individual species are very inconstant as to number and form of sepals, and number of stamens. The disk-glands, when present, are too minute and, I think, variable as to presence or absence, to afford aid in the Indian species; nor do I find the anthers truly extrorse in any, the slits being more or less lateral when not truly introrse. In this as in so many other genera, I am rarely able to identify the Indian species with the Malayan, from want of good specimens of the latter. I am greatly indebted to Dr. King for the loan of the extensive collection of *Baccaureæ* of the Calcutta Herbarium, without which I could not have completed even this imperfect sketch of the Indian species.

Series I. *Male racemes* simple or nearly so; bracts very minute at the base of the simple clusters of flowers.

1. **B. courtallensis,** *Muell. Arg. in DC. Prodr.* xv. ii. 459; gla-

brous, leaves oblanceolate or obovate obtusely acuminate base acute, male racemes tufted strict quite simple, bracts very minute ovate acute, flowers $\frac{1}{15}$ in. diam. very sparsely hoary, sepals 4 subequal rounded, stamens 4–6, fem. spikes 6–8 in., flowers $\frac{1}{8}$ in. diam. sessile, sepals 5 nearly glabrous small broadly ovate, ovary subglobose hirsute, stigmas 3 very small sessile. B. sapida, *Beddome Fl. Sylvat.* t. 280. Pierardia courtallensis, *Wight Ic.* t. 1912.—Pierardia, *Wall. Cat.* 8077.

TRAVANCORE, *Heyne*; Anamallay Hills, *Wight, Beddome.*

A middling-sized tree; shoots and young petioles sparsely pubescent. *Leaves* 5–7 by 2–3 in., thin; nerves 5–7 pairs; petiole 1–1½ in. *Male racemes* in large clusters from the trunk and subsolitary on the branches.—An imperfectly known plant, considered by Beddome as the same with *B. sapida*, but differing altogether in the male racemes; and in the small sessile fem. flowers, if I am right in referring to this a specimen from the Anamallay Hills collected by Beddome, and named by him *B. macrostachys* (and which was lent to me from the Calcutta Herbarium). The male flowers described above are from Heyne (in Herb. Wallich) and from Wight. Beddome says that this species is most abundant in all moist forests of the Western Ghats from Canara to South Travancore; but it is curious that except the Anamallay specimens of this, neither the Wallichian, Kew or Calcutta Herbaria have a specimen of any *Baccaurea* from the Deccan Peninsula.

2. **B. lanceolata,** *Muell. Arg. in DC. Prodr.* xv. ii. 457; glabrous, leaves oblong or oblong-lanceolate obtusely acuminate base obtuse acute or cordate finely reticulate on both surfaces, nerves 10–12 pairs, male racemes simple in cauline tufts 6–8 in. slender flexuous glabrous, bracts very minute, flowers $\frac{1}{8}$ in. diam., sepals subequal glabrous without tomentose on the margins and within, stamens 4 with interposed glands. Hedycarpus lanceolatus, *Miquel Fl. Ind. Bat.* i. ii. 359. H. cauliflora, *Hassk. ex Miquel in Herb. Kew.* Adenocrepis lanceolata, *Muell. Arg. in Linnæa* xxxii. 82.

PERAK, *King's Collector.*—DISTRIB. Sumatra, Java, Borneo.

A tree, 20 ft.; bark pale. *Leaves* 8–12 by 3½–6 in., thinly leathery, very pale green when dry and rather shining; petiole 1½–5 in., very stout; stipules silkily pubescent. *Male racemes* pale; bracts broadly ovate; flowers rather long-pedicelled. *Fem. racemes* in Borneo specimens 6–10 in. long; flowers shortly pedicelled; sepals oblong-spathulate, nearly glabrous; ovary (4–5-celled, *Mueller*) subglobose, strigose; stigmas sessile, peltate. *Fruit* in Borneo specimens about 2 in. long, ellipsoid, glabrous. *Seeds* dorsally sulcate.

3. **B. Scortechinii,** *Hook. f.*; branchlets hirsute, leaves shortly petioled membranous subrhombic-obovate cuspidate base very acute, nerves 7–8 pairs very slender, racemes from the branches, male very slender simple white tomentose, bracts minute at the base of the flower clusters, fem. racemes slender, pedicels slender, sepals long very narrow hoary, ovary ovoid silky contracted into a stout style with 3 recurved 2-fid stigmas.

PERAK, *Scortechini.*

Leaves terminating short branches, 5–6 in., very thin; petiole ½–1 in., and midrib sometimes sparsely hairy. *Male fl.* $\frac{1}{30}$ in. diam., very shortly pedicelled; sepals 4–5; stamens as many; pistillode small. *Fem. racemes* 4–6 in.; pedicels minutely bracteate at the base, jointed about the middle; sepals ⅓ in. long; ovary 6-ribbed or grooved when dry.

4. **B. parviflora,** *Muell. Arg. in DC. Prodr.* xv. ii. 462 (*in part*); glabrous, leaves elliptic-lanceolate or oblanceolate obtusely acuminate or caudate base acute, nerves 4–5 pairs, male racemes very slender hoary bracts very minute, fem. racemes tufted, pedicels very short, sepals linear-oblong nearly glabrous, ovary ovoid silky contracted into a short neck or style with

3 large recurved stigmas, fruit small fusiform, pericarp thick. *Kurz For. Fl.* ii. 357. B. affinis, *Muell. l. c.* Pierardia parviflora, *Muell. Arg. in Linnæa* xxxii. 82.—*Wall. Cat.* 7759 B.

TENASSERIM, *Wallich, Helfer.* PENANG, *Curtis.* PERAK, *King's Collector.* MALACCA, *Hervey, Maingay* (*Kew Distrib.* 1364, 1368). SINGAPORE, *Hullett.*—DISTRIB. Sumatra (*Beccari* No. 896).

A small tree, 15–25 ft. (in Perak); branches slender. *Leaves* variable in form, 2–5 by 2–3½ in., rather thin; petiole ½–1½ in.; stipules lanceolate, ciliate and usually pubescent on the back. *Male racemes* from both the old wood and young branches, 2–4 in.; flowers $\frac{1}{20}$ in. diam.; sepals 4–5, broad; stamens 4–8; pistillode orbicular. *Fem. racemes* in tufts from the old wood (near the root in Perak specimens), 3–6 in.; pedicels bracteate at the base, jointed above the middle; sepals ⅛ in. long, obtuse, hoary and white within. *Fruit* ⅔–¾ in. long, fusiform or narrowly ellipsoid, narrowed at both ends, 3-celled, pericarp thick corky rugose and obscurely angled when dry, endocarp not separable nor thickened, smooth within. *Seed* ⅓ in., oblong-lanceolate, acute, with a shallow dorsal groove.—This is Mueller's *Pierardia parviflora*, described from Wallich's male specimen. In the Prodromus a Bornean plant (Motley No. 757) with broken remains of fem. fl. is united with it, and may or may not be conspecific.—Motley's and Barber's No. 80 from Borneo (in Herb. Hook.) may be the same. I trust I am right in referring the fusiform fruited species to this, but I have no authority for so doing beyond the fact that both sexes are common and found at most of the same localities, and that the foliage of the two is uniformly alike.

Series II. *Male racemes* with short few-fld. lateral branches to which the bract is adnate and produced beyond the sessile flowers as a short claw with 2 lateral bracteoles. *Fem. racemes* ebracteate, except at the joint of the pedicel.

5. **B. polyneura,** *Hook. f.*; shoots petioles and leaves beneath pubescent, leaves oblong obtuse or subacute base cordate, nerves 10–14 pairs, male racemes on the branches very short, flowers sessile on the bracteate tips of the short side branches hoary-tomentose, fem. racemes very long ebracteate, ovary globose, stigmas subulate recurved, fruit ellipsoid, pericarp rather thin, seeds orbicular.

MALACCA, *Griffith* (*Kew Distrib.* 4910), *Maingay* (*Kew Distrib.* 1421). PERAK, *King's Collector.*

A tree, 60–80 ft. (in Perak). *Leaves* 2–6 in., yellowish when dry, coriaceous, sometimes subfalcate, nerves and numerous cross-nervules very strong beneath; petiole rather slender, ⅔–1½ in. *Male racemes* 1–2 in., clustered; flowers $\frac{1}{20}$ in. diam.; sepals 4–5, very unequal; stamens 4–5; pistillode orbicular. *Fem. racemes* 8–12 in.; pedicels ¼ in., jointed beneath the flower; sepals ⅛ in. long, ovate or oblong, very unequal; stigmas not like those of any other Indian species I have seen. *Fruit* about 1 in. long, erect on the spreading pedicel. *Seed* obtuse at both ends.

6. **B. macrophylla,** *Muell. Arg. in DC. Prodr.* xv. ii. 460; glabrous except the pubescent racemes, leaves 6–12 in. long-petioled very coriaceous elliptic- or obovate-oblong cuspidate or acuminate, nerves 10–12 pairs very strong beneath, stipules large broad coriaceous, male racemes 2–3 in. catkin-like, flowers sessile on the bracteate tips of the branchlets, fem. stout, sepals small, ovary globose hoary-tomentose, stigmas 3 small broad 2-lobed depressed, fruit small ellipsoid or globose glabrous 2-celled, seeds flat sub-orbicular testa wrinkled. Pierardia macrophylla, *Muell. Arg. in Flora* xlvii. (1864) 516.

PENANG, *Phillips.* PERAK, *King's Collector.*—DISTRIB. Borneo.

A tree, 60–80 ft. (in Perak), (a climber, *Phillips.*) *Leaves* very variable in size, smooth dark brown and shining above, rich red-brown beneath when dry, cross-

nervules faint, base acute cuneate or rounded; petiole 2–3 in., stout; stipules (as in *B. Griffithii*) oblong, base obliquely auricled, often persistent and recurved. *Male racemes* subsessile or peduncled; side branchlets incurved, bracteate and 2-bracteolate at the tip. flower $\frac{1}{20}$ in. diam.; sepals subequal, rounded; stamens 4; pistillode very small. *Fem. fl.* $\frac{1}{10}$ in. long; sepals oblong, obtuse. *Fruit* $\frac{1}{2}$–$\frac{2}{3}$ in. long or broad, bluish green speckled with white.—The confluence of the bract of the male fl. with the branchlet of the raceme is as described in *B. sumatrana*, where however the flowers are solitary. In the fem. raceme the bract is suppressed.

7. **B. minor,** *Hook. f.*; branches slender, leaves 2–3 in. ovate or ovate-lanceolate caudate-acuminate glabrous base acuminate, nerves 4–5 pairs forming strong intra-marginal loops, petiole slender $\frac{1}{4}$–$\frac{1}{6}$ as long as the blade, racemes on the branches, males $\frac{1}{2}$–1 in. yellow tomentose, male fl. ternately sessile on the bracteate tips of the branchlets, fruiting racemes slender, rachis ebracteate, fruit globose pubescent smooth, pericarp thin.

PERAK, *King's Collector, Scortechini.*

A tree, 20–30 ft.; shoots finely pubescent. *Leaves* thinly coriaceous, yellow when dry, greener beneath, strongly reticulate between the nerves. *Male racemes* peduncled, dense-fld.; flowers $\frac{1}{20}$ in., sessile on very short side branches with a persistent bract produced beyond these and 2 bracteoles. *Fem. racemes* 6–10 in., slender, brown-tomentose, ebracteate; pedicels very short, jointed and obscurely dilated in the middle, as if with a suppressed bract; sepals $\frac{1}{8}$ in., oblong, obtuse, tomentose; ovary globose, densely tomentose; stigmas sessile, spreading, 2-fid with recurved hardly papillose subulate arms which are tomentose at the back. *Fruiting racemes* on the older wood, 6–10 in.; pedicels $\frac{1}{4}$ in., jointed about the middle. *Fruit* $\frac{2}{3}$–$\frac{3}{4}$ in. diam., tipped with 3 minute broad 2-lobed stigmas, pericarp thin with a thin smooth endocarp. *Seed* orbicular, flat.

8. **B. Maingayi,** *Hook. f.*; branchlets hoary-pubescent or glabrous, leaves quite glabrous coriaceous long-petioled broadly ovate or oblong obtusely cuspidate or acuminate base usually broadly rounded or subcordate, nerves 7–10 pairs with slender cross-nervules, male racemes from the young branches rusty-tomentose, bracts small broad adnate to the short branchlets that bear the flower clusters, fruiting racemes from the older wood rather slender, pedicels bracteate above the middle, fruit globose very finely rusty-tomentose 3-celled obscurely 3-ridged, styles minute 2-lobed depressed, pericarp very thin, cells hairy within, seeds flat, orbicular-ovate.

MALACCA, *Maingay* (*Kew Distrib.* 1415). PERAK, (*King's Collector.*)

A tree, 25–30 ft. (in Perak), branches woody. *Leaves* 7–10 by 3–5 in., yellowish when dry, above smooth often shining, greenish or red-brown beneath, nerves slender; petiole $\frac{1}{3}$–$\frac{1}{2}$ the length of the blade. *Male racemes* 2–3 in.; flowers subsessile, $\frac{1}{30}$ in. diam.; sepals 4–6, very unequal; stamens 5–6; pistillode obscure. *Fruit* $\frac{3}{4}$ in. diam., like that of *B. minor*; epicarp separating from a very thin coriaceous endocarp, the walls of which within, and the membranous septa, are clothed with long lax hairs. —This is the only species in which I have observed the cells of the fruit to be (as in so many *Aporosæ*) hairy within; but it probably is so in others.

Series III. *Male racemes* with short branched many-fld. lateral branches; bracts if present on the rachis, or if on the branches caducous.

* *Bracts on the rachis* 0, *or small ovate or lanceolate much shorter than the flower clusters.*

9. **B. flaccida,** *Muell. Arg. in DC. Prodr.* xv. ii. 459; shoots sparsely hairy, leaves glabrous 6–8 in. elliptic-lanceolate oblanceolate or obovate acute caudate or acuminate base acute, nerves 6–7 pairs, male racemes 1–2 in. tomentose, bracts ovate shorter than the clusters of flowers, flowers sub-

sessile, stamens 6–8, fruiting racemes slender, pedicels bracteate in the middle, young fruit ovoid puberulous and hairy contracted into a short style with 3 broad 2-lobed depressed stigmas. Pierardia flaccida, *Wall. Cat.* 8074.

BURMA, *Wallich.* TENASSERIM, *Helfer* (*Kew Distrib.* 4907), *Beddome.*

Habit and foliage of *B. sapida*, differing in the shorter very deciduous male bracts, and in the bracts of the female not being at the base of the pedicel, but upon it.—An imperfectly known species.

10. **B. Griffithii,** *Hook. f.*; shoots sparsely stellate pubescent or glabrous, leaves long-petioled elliptic-oblong or -lanceolate cuspidately acuminate base acute, nerves 6–8 pairs, stipules large oblong, male panicles 3–4 in., bracts small obtuse much shorter than the peduncles of the many-fld. lateral branchlets, fem. racemes short, bracts broadly ovate acute at the jointed base of the tomentose pedicels, sepals small, fruit 1–1½ in. diam. long pedicelled depressed globose rugose, pericarp very thick.

MALACCA, *Griffith.* PERAK, *King's Collector.*

A tree, 50–60 ft. (in Perak); branches petioles and often leaves above black when dry. *Leaves* 8–12 in., thinly coriaceous, not shining, red-brown or pale beneath; nerves strong, cross-nervules slender, reticulations large; petiole rather slender, equalling ¼–⅓ of the blade; stipules ⅓ in. black, obtuse, like those of *B. macrophylla*. *Male racemes* much more compound than usual, rachis slender; lateral branches much divided; bracts often on the branchlets, caducous. *Fem. racemes* 2–3 in., rachis stout; pedicels ⅛ in., stout; sepals ⅒ in., obtuse; ovary ovoid, densely tomentose, narrowed into a very short style with 3 recurved plumose stigmas. *Pedicel* of fruit ½–¾ in., woody, very stout. *Fruit* sparsely pubescent or glabrate, pericarp ¼ in. thick. *Seeds* not in a state for description.—The male flowers are described from a Malaccan specimen of Griffith.

11. **B. Motleyana,** *Muell. Arg. in DC. Prodr.* xv. ii. 461; branches robust, shoots petioles and leaves beneath finely tomentose, leaves large thinly coriaceous elliptic-oblong subacute, base narrow subcordate, nerves 12–16 pairs, male racemes on the branches tomentose very slender, bracts on the rachis minute lanceolate, lateral branches many-fld. Pierardia Motleyana, *Muell. Arg. in Flora* xlvii. (1864) 516.

PERAK, *King's Collector.*—DISTRIB. Borneo.

A tree, 60–80 ft. (in Perak); branchlets as thick as the little finger. *Leaves* 8–12 in., smooth above, greenish beneath with rusty pubescence on the nerves; petiole 2–3 in., stout.—Motley describes the fruit as having a thin yellow skin, and the seeds, which are much esteemed, as surrounded by a juicy pulp, pleasant and sweet, but containing also an intense acid. This species much resembles in foliage and fruit the plate (t. iv.) of a *Baccaurea* in "Marsden's Sumatra," alluded to under the description of the Lanseh (Ed. 3, p. 101) as the Rambe.

** *Bracts on the rachis lanceolate, all or the lowest in the racemes longer than the clusters of flowers.*

12. **B. sapida,** *Muell. Arg. in DC. Prodr.* xv. ii. 459; leaves glabrous elliptic-lanceolate oblanceolate or obovate acuminate base narrowed into the petiole, nerves 5–6 pairs, male panicles 2–3 in., bracts lanceolate usually much longer than the flowering-clusters hirsute, fem. racemes very long, fem. pedicel bracteate at the base, sepals linear-oblong ½ in. long, ovary 3-celled strigosely tomentose, stigmas sessile broad depressed 2-lobed, fruit subglobose or ellipsoid and contracted at the apex, pericarp coriaceous fleshy, seeds flat with a smooth testa and thick fleshy covering. *Kurz For. Fl.* ii. 356. B. macrostachya, *Wight Ic.* t. 1913. B. propinqua, *Muell. Arg. l. c.*

463. Pierardia sapida, *Roxb. Fl. Ind.* ii. 254; *Wall. Cat.* 8072.—*Wall. Cat.* 7758, 7761, 8071.

Base of the EASTERN HIMALAYA, *J. D. H., Clarke.* ASSAM, Hamilton. SILHET, BURMA, the MALAY PENINSULA and ANDAMAN ISLANDS, wild or cultivated.—DISTRIB. Malay Archipelago.

An evergreen tree, 40–50 ft., shoots substrigosely pubescent. *Leaves* 4–8 in., rather membranous; petiole 1–1½ in. *Male racemes* usually on the branches or trunk, fem. lower down, or on the trunk, both tomentose. *Male fl.* about ⅛ in. diam., on very short lateral branches; sepals 4–5, unequal; stamens 4–8. *Fem.* sepals ⅓–½ in. long. *Fruit* ¾–1 in. diam., yellow, puberulous; endocarp not separable, smooth within. *Seeds* orbicular, fleshy coat rose-coloured.—I find no characters whereby to distinguish *B. propinqua* from *sapida*, which appears to be a commonly cultivated tree in India, but to be also truly wild in the Sikkim Terai (Clarke) and Khasia Hills. The detached pyriform fruits distributed by Wallich with his No. 8071 do not, I think, belong to this species.

13. **B. brevipes,** *Hook. f.*; branchlets robust and leaves beneath pubescent or tomentose, leaves large thinly coriaceous obovate-oblong narrowed into the petiole subacute or acuminate, nerves about 12 pairs very strong beneath ascending and slightly arched, male racemes on the branches very long and slender hoary-pubescent, bracts linear-lanceolate lower longer than the clusters of flowers, fem. spikes from the trunk and branches stout tomentose, flowers sessile, sepals ⅓ in., ovary ovoid villously strigose, stigmas short broad depressed 2-lobed, fruit subglobose 3-celled, seed compressed beaked smooth.

PERAK, *King's Collector, Wray, Scortechini.* MALACCA, *Griffith* (*Kew Distrib.* 4908, 4909), *Maingay* (*Kew Distrib.* 1366, 1367, 1405).—DISTRIB. Borneo.

A small tree (in Perak); branchlets as thick as the little finger. *Leaves* 8–14 by 4–6 in., from sparsely pilose with scattered hairs to tomentose beneath; base acute obtuse or cordate; petiole 1–3 in., very stout. *Male racemes* with short lateral 2–3-fld. branches; flowers $\frac{1}{10}$ in. diam; sepals 4–5, unequal; stamens 4–8. *Fem. spikes* 6–10 in., stout. *Fruit* ½–1 in. diam., pubescent, cream-coloured, or waxy white. *Seeds* ¼–⅓ in. long, contracted rather suddenly into a beak; aril light blue.

**** Bracts large, broad, concave, enclosing the clusters of flowers, deciduous.*

14. **B. bracteata,** *Muell. Arg. in DC. Prodr.* xv. ii. 466; shoots petioles nerves beneath and spikes rusty-pubescent or tomentose, leaves long-petioled coriaceous elliptic-oblong -ovate or -lanceolate acuminate or acute, with 5–7 pairs of strong nerves and black dots beneath, inflorescence of both sexes on the young branches 1–3 in., bracts of male panicle broadly ovate concave exceeding the clusters of flowers, ovary villous ovoid contracted into a short style with 3 suberect 2-fid stigmas, fruit globose, pericarp very thick 3-valved. Pierardia dulcis, *Wall. Cat.* 8075 (*not of Jack*). Sapium sterculiacum, *Wall. Cat.* 7974.—*Wall. Cat.* 7834.

PERAK, *Scortechini, King's Collector,* &c. MALACCA and SINGAPORE, *Griffith* (*Kew Distrib.* 4900, 4899), *Maingay* (*Kew Distrib.* 1362, 1390).—DISTRIB. Borneo.

A tree, 30-60 ft. in Perak; branches terete, smooth, red brown. *Leaves* from 3 by 1–1½ in. to 7 by 4 in., base rounded or acute, dark brown above when dry, usually reddish beneath with black glands, and strong nerves; petiole equalling ¼–¾ the length of the blade. *Male panicles* 2–3 in.; branches rather long and distant, at first sheathed in the often opposite imbricating bracts, which are ⅛–¼ in. long obtuse and tomentose. *Male flowers* $\frac{1}{10}$–⅙ in. diam.; sepals 3–5, oblong, very unequal; stamens 4–6; pistillode columnar. *Fem. racemes* lax-fld.; sepals ⅓ in. long, linear-

oblong, obtuse. *Fruit* $\frac{2}{3}$–1 in. diam., obscurely 3-gonous, loculicidal, pericarp very thick; endocarp not separating, walls smooth within.—This cannot be Jack's *B. dulcis*.

15. **B. reticulata,** *Hook. f.*; shoots petioles and nerves beneath finely yellow-tomentose or hoary, leaves long-petioled coriaceous elliptic-oblong or elliptic acuminate or cuspidate not dotted beneath base acute pale beneath with 8–12 pairs of strong nerves, nervules strongly reticulated, male racemes on the branches stout finely tomentose, bracts broadly ovate cucullate longer thon the short lateral branches and flower-clusters.

PERAK, *Scortechini, King's Collector.* MALACCA, *Griffith* (*Kew Distrib.* 4899), *Maingay* (*Kew Distrib.* 1360, 1360/2, 1365), *Hervey.*—DISTRIB. Sumatra.

Habit of *B. bracteata*, but leaves much paler, often yellow beneath, with very strong reticulations and no black dots. In the Calcutta Herbarium this bears three names, *B. costulata* (from Malacca), *B. pubera* (from Banca), and *B. bracteata* (without locality). *B. costulata* (of which I have seen authentic specimens) has few nerves and leaves nearly smooth beneath between them. *B. pubera* is a doubtful *Baccaurea* with stellate tomentose parts; and *B. bracteata* is described above.

16. **B. latifolia,** *King in Herb. Calcutt.*; branches and petioles substellately puberulous, leaves long-petioled coriaceous elliptic or elliptic-oblong cuspidate or acute tomentose with soft hairs beneath and 10–12 pairs of very strong nerves, male panicles hoary-pubescent, bracts broadly ovate acuminate longer or equalling the flower clusters, fruiting racemes from the old wood stout, pedicels bracteate above the base jointed at the top, fruit globose smooth finely pubescent tipped with a short style 3-celled, pericarp very thick spongy.

PERAK, *King's Collector.*

A tree, 50–60 ft.; branches stout. *Leaves* 6–8 by 3–5 in., or more oblong and 6–7 by 3–3½ in., dark red brown above when dry, paler beneath, base acute or obtuse, petiole rather stout, $\frac{1}{3}$ or $\frac{1}{2}$ the length of the blade. *Male panicles* from the youngest branches, 2–4 in.; bracts $\frac{1}{6}$ in. long, concave, hoary, caducous; flowers $\frac{1}{20}$ in. diam.; sepals 4–5, broad; stamens as many; pistillode low, tumid. *Fruiting racemes* 6–8 in.; rachis hoary-pubescent, as thick as a duck's quill; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. long, woody, with 2–3 broad short bracteoles, distinctly jointed below the calyx. *Fruit* $\frac{2}{3}$–$\frac{3}{4}$ in. diam., with the short obtuse calyx-lobes at the base.

SPECIES OF WHICH THE MALE FLOWERS ALONE ARE KNOWN.

17. **Baccaurea** sp. A; branches slender black when dry glabrous to the tips, leaves 3–5 in. membranous elliptic subcaudately acuminate base very acute, nerves 4–6 pairs very slender, nervules obscure, petiole 1–2 in. very slender, male racemes on the branches very short $\frac{3}{4}$–1 in. decurved densely tomentose, bracts obtuse small adnate to the very short 2–3-fld. side branches, sepals and stamens 4, pistillode depressed orbicular.

PENANG, *King's Collector* (No. 1589).

18. **Baccaurea** sp. B; leaves glabrous 6–9 in. elliptic oblong or lanceolate acuminate base acute, nerves 5–6 pairs, petiole 2–2½ in., male racemes from the branches 4–6 in. long by $\frac{2}{3}$ in. broad finely tomentose, bracts on the slender rachis $\frac{1}{6}$ in. oblong acute or obtuse caducous shorter than the side branches, which bear many cymes of minute flowers $\frac{1}{20}$ in. diam., bracteoles on the branchlets minute persistent, sepals 5–6 unequal, anthers 5–7 sessile round the subclavate truncate pistillode.

PERAK, *King's Collector* (No. 3266).

19. **Baccaurea** sp. C; a tree 40–60 ft., leaves glabrous 8–12 in. coriaceous elliptic obtusely acuminate base acute, nerves 9–10 pairs strong beneath, petiole $1\frac{1}{2}$–3 in. stout, male racemes on the branches $1\frac{1}{2}$–2 in. finely tomentose, rachis stout, bracts $\frac{1}{6}$–$\frac{1}{4}$ in. longer than the clusters of flowers ovate-oblong obtuse concave glabrous caducous, flowers $\frac{1}{8}$–$\frac{1}{10}$ in. diam. in very short branched lateral cymes, sepals 4–5 very unequal, anthers minute filaments slender, pistillode lobed unequally.

PERAK, alt. 2500–3000 ft., *King's Collector* (No. 7368).

20. **Baccaurea** sp. D; branches petioles and leaves beneath and racemes brown tomentose, leaves coriaceous 5–8 in. oblong obtusely cuspidate base rounded or cordate, nerves 10–12 pairs strong beneath with close-set cross-nervules, petiole stout $\frac{1}{2}$–$\frac{1}{4}$ in., stipules broad tomentose, male racemes on the branches 4–6 in., bracts on the rachis lanceolate shorter than the short 3–4-fld. lateral branches.

MALACCA, *Griffith* (*Kew Distrib.* 4905, 4909 ?); "Rambehootan," *Griffith.*

SPECIES OF WHICH THE FEM. FLOWER OR FRUIT ALONE IS KNOWN.

21. **B. Wrayi,** *King in Herb. Calcutt.*; a tree 60–80 ft., young branches and petioles hirsute, leaves 5–7 in. membranous elliptic-lanceolate or oblanceolate acuminate base very acute, beneath glabrous or with sparsely hairy midrib and 7–9 pairs of slender nerves and reticulate cross-nervules, petiole 1–2 in., stipules broadly ovate villous, fem. flowering racemes villously tomentose rather stout, pedicels very short bracteate at the base, sepals $\frac{1}{6}$ in. linear-oblong obtuse tomentose caducous, ovary ovoid hirsute, stigmas 3 depressed sessile 2-lobed, fruiting racemes 6–12 in. stout tomentose, pedicel $\frac{1}{10}$–$\frac{1}{4}$ in. jointed in the middle, fruit 1–$1\frac{1}{2}$ in. long ellipsoid or subovoid granulate bright red glabrous or puberulous 3-celled, pericarp thick, endocarp not separating smooth within, seeds $1\frac{1}{2}$ in. long ovate acute compressed.

PERAK, *Wray, King's Collector.*

22. **B. malayana,** *King in Herb. Calcutt.*; a tree 60–80 ft., branches very stout, leaves 6–10 in. coriaceous glabrous pale broadly elliptic-oblong or lanceolate obtuse entire or crenate-serrate base acute or rounded, nerves 7–10 pairs arched slender, petiole 1–2 in., fruiting racemes short woody, pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. stout woody jointed about the middle or inarticulate, fruit very large 2 in. long ellipsoid or subglobosely obovoid softly appressedly white tomentose 2–3-celled, tip rounded with a minute style and 3 recurved 2-fid stigmas, pericarp very thick $\frac{1}{4}$–$\frac{1}{3}$ in., endocarp hard and coriaceous smooth within sometimes separating, seeds large 1 in. long orbicular in the 2-celled fruit subtrigonously oblong in the 3-celled thick compressed smooth not furrowed. Hedycarpus malayanus, *Jack. in Trans. Linn. Soc.* xix. 118.

PERAK, *King's Collector.* MALACCA, *Maingay* (*Kew Distrib.* 1363).—DISTRIB. Sumatra.

The Malaccan specimens have much narrower leaves, with acute bases and slanting nerves, than the Perak ones, which are broad and agree well with Jack's description of the Sumatran plant. Jack's character of the flowers is imperfect; he does not describe the bracts nor distinguish the sexes; he says the perianth is 4 or 5-partite, stamens 4 or 5, ovary 3- or 4-celled, stigmas 3 or 4. The bracts he describes as small broad and on the pedicel below its subdivision; this presumably applies to the fem. flower. It is the only species with distinctly serrate leaves, though this is not constant.

23. **B. Wallichii,** *Hook. f.*; a tree 30–40 ft., glabrous, leaves 5–6 in. thinly coriaceous pale elliptic-lanceolate or oblanceolate obtusely often caudately acuminate, base very acute, nerves 5–7 pairs and cross-nervules slender, petiole slender usually $\frac{1}{3}$–$\frac{1}{4}$ of the length of the blade, fruiting racemes from the old and young branches pubescent, bracts obscure or 0, pedicels $\frac{1}{8}$ in. rather slender jointed about the middle, sepals caducous, fruit $\frac{2}{3}$–1 in. diam. trigonously globose scarlet puberulous 3-celled, top rounded with a short style and 3 minute stigmas, pericarp thick corky, endocarp not separating pale red-brown within, seeds oblong or obovate acute compressed but turgid. Pierardia? *Wall. Cat.* 8073.

PENANG, *Wallich.* PERAK, *Scortechini, King's Collector.*

B. WALLICHII, *var.* ?, leaves of *B. Wallichii*, flowering fem. racemes 1–2 in. very slender pubescent, pedicels very short bracteate at the base bracts very broad short, sepals $\frac{1}{4}$ in. linear-oblong obtuse very finely pubescent, ovary ellipsoid densely tomentose 3-celled, stigma sessile peltate obscurely 3-lobed densely papillose, fruit as in *B. Wallichii*, but pale yellowish brown when dry minutely granulate and stigma sessile.

MALACCA, Maingay (*Kew Distrib.* 1365, *flower*, and 1368, *fruit*).

24. **B. macrocarpa,** *Muell. Arg. in DC. Prodr.* xv. ii. 459? quite glabrous, bark of branches white, leaves 5–7 in. coriaceous oblong or obovate-oblong abruptly obtusely caudately cuspidate grey brown and shining above, dark red-brown beneath with 6–8 pairs of strong nerves and cross-nervules, base narrow obtuse or subcordate, petiole 1–1$\frac{1}{2}$ in. black when dry, fem. flowering racemes from the branches 3–6 in. nearly glabrous stout black when dry, pedicels $\frac{1}{8}$ in. stout recurved jointed about the middle, very obscurely bracteate at the base and short rounded sepals glabrous, ovary broadly ovoid laterally 3-lobed contracted into a stout style with 3 large recurved plumose stigmas quite glabrous.

MALACCA, *Griffith* (*Kew Distrib.* 4903).—Closely resembles a Sumatran specimen marked *B. macrocarpa*, Miquel, in the Calcutta Herbarium, but which differs from Mueller's description of that plant in the glabrous branches petioles and leaf-nerves beneath, and in the fruit being globose and not at all ellipsoid.

25. **Baccaurea** sp. E; a tree 30–60 ft., glabrous, leaves 4–6 in. coriaceous elliptic- or obovate-oblong obtuse or subacute, base rounded or acute yellowish above when dry and greenish beneath, nerves 10–12 pairs very strong beneath, nervules strongly reticulate, petiole $\frac{1}{4}$–$\frac{1}{3}$ the length of the blade, fruiting racemes from the old branches 4–8 in. slender pubescent, pedicels $\frac{1}{8}$ in. jointed about the middle ebracteate or with a very minute bract at the joint tomentose as well as the short obtuse sepals, fruit $\frac{1}{2}$–$\frac{2}{3}$ in. turgidly ellipsoid or globose contracted into a very short beak with 3 very minute recurved 2-fid stigmas obscurely 3-ridged puberulous and obscurely wrinkled, pericarp very thin, endocarp not separable pale brown within, seeds $\frac{1}{3}$ in. long orbicular-ovate smooth compressed slightly pointed.

PERAK, *King's Collector* (No. 6240 and 6860).

26. **Baccaurea** sp. F; branchlets and petioles scurfily tomentose, leaves 4–6 in. coriaceous oblong acute or acuminate base subacute smooth above, softly tomentose beneath, nerves 6–7 pairs very strong beneath and forming intra-marginal arches red brown when dry, young with minute marginal tufts of hairs, fem. sepals very short ovate, stigmas minute sessile 2-fid, fruit 1 in. diam. very shortly pedicelled on a very short stout peduncle

depressed-globose 3-celled obscurely 3-lobed smooth rusty-puberulous, pericarp rather thick, seeds $\frac{1}{2}$ in. long broadly ellipsoid compressed smooth.

PERAK, *Scortechini*.—This in Herb. Calcutta is named *B. macrocarpa*, Muell., but it does not agree with the description of that species.

27. **Baccaurea** sp. G; branchlets petioles and leaves beneath tomentose, leaves 5–6 in. coriaceous elliptic acute or acuminate base acute or obtuse shining above, nerves 6–8 pairs very strong beneath, petiole equalling $\frac{1}{6}$–$\frac{1}{7}$ of the blade, fruiting racemes 1–3 in. very stout tomentose, fruit subsessile $\frac{3}{4}$–1 in. long obovoidly pyriform terete 3-celled smooth finely puberulous, pedicel bracteate at the base, top rounded, stigmas 3 short depressed 2-fid, arms short recurved, pericarp thick glabrous within, seed as in sp. 26.

MALACCA, *Griffith* (*Kew Distrib.* 4901), *Maingay* (*Kew Distrib.* 1361).—Perhaps a variety of 26.

28. **Baccaurea** sp. H; a small shrub or tree 10–15 ft., branches slender with pure white bark, leaves 3–5 in. rather membranous elliptic-lanceolate obtuse, base very acute, nerves 5–6 pairs very slender and nervules faintly reticulate, petiole $\frac{1}{4}$–$\frac{3}{4}$ in., fruiting racemes very short from the branches 1–2 in. slender glabrous, pedicels $\frac{1}{10}$ in. ebracteate tomentose jointed about the middle, sepals caducous, fruit $\frac{1}{3}$ in. turgidly ellipsoid rarely globose obscurely puberulous and wrinkled 2-celled base rather contracted top rounded with a very short style and 3 minute stigmas, pericarp very thin, endocarp not separable pale red-brown within, seeds $\frac{1}{4}$ in. obovoidly orbicular compressed smooth, umbonate at the lower end.

PERAK, *King's Collector* (No. 7213).—Closely resembles a fruiting Javanese specimen of *B. javanica*, Muell., from Teysmann, which differs in not having white bark, and in there being minute subulate bracts at the base of the pedicels. Also resembles a plant named *B. acuminata*, Muell., from the Nicobar Islands in the Calcutta Herbarium, but neither has that white bark. The Bornean plant, Motley n. 579, referred by Mueller to *B. javanica* is, I think, quite different from all the above.

29. **Baccaurea? symplocoides,** *Hook. f.*; quite glabrous, branches slender, leaves 4–5 in. membranous ovate-lanceolate caudate-acuminate penninerved, nerves 6–7 pairs slender, petiole slender, fem. racemes axillary on the young branches rather longer than the petioles, rachis and peduncle puberulous, bracts minute broad membranous, sepals 4–5 minute broad, ovary ovoid oblong compressed truncate, stigmas 2 very short, fruit $\frac{1}{2}$ in. long ellipsoid or ovoid smooth, epicarp thin, endocarp papery.

PERAK, *Scortechini*; Larut and Goping, *King's Collector*.

A tree, 30–40 ft.; branchlets smooth, often dark purple. *Leaves* greenish when dry and margins undulate, base cuneate or acute; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Fem. racemes* 1–1$\frac{1}{2}$ in.; pedicels $\frac{1}{10}$ in., of fruit $\frac{1}{4}$–$\frac{1}{3}$ in. *Calyx* very minute, not enlarged in fruit. *Fruit* yellow, endocarp and septum glabrous within. *Seeds* oblong with a thin fleshy coat.

PIERARDIA, *Wall. Cat.* 7906, from Singapore, is not of this genus, and is undeterminable.

HYMENOCARDIA, *Wall.*

Shrubs or trees. *Leaves* alternate, quite entire, and triple-nerved at the base or penninerved. *Flowers* dicœcious, apetalous; males solitary in the bracts of a catkin-like lateral spike, females in short axillary or lateral racemes; bracts often foliaceous in fruit. *Disk* 0. MALE FL. *Calyx* membranous,

irregularly 4–6-lobed or -partite. *Stamens* 4–6, filaments included, free or united below in a column; anthers large, at first reflexed, then horizontal, cells parallel. *Pistillode* small or equalling the filaments. FEM. FL. *Sepals* narrow, free, caducous. *Ovary* 2-celled, flattened at right angles to the plane of the septum; styles long, subterete, entire, papillose all over; ovules 2 in each cell. *Capsule* flat, of 2 compressed very broad wing-like cocci, separating from a central axis; pericarp crustaceous; endocarp membranous. *Seeds* usually solitary in the cocci, flat, testa thin, albumen not copious; cotyledons very thin, broad, flat; radicle long.—Species 5, Tropical Indian, Malayan and African.

H. punctata, *Wall. Cat.* 3549; shoots and leaves beneath pubescent and lepidote, leaves ovate or oblong obtuse or acute, male spikes lepidote. H. Wallichii, *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 256; *Muell. Arg. in DC. Prodr.* xv. ii. 476; *Kurz For. Fl.* ii. 394. Samaropyxis elliptica, *Miquel Fl. Ind. Bat. Suppl.* 465.

TENASSERIM, and BURMA, *Wallich, &c.* ? UPPER ASSAM; Mishmi, *Griffith.*

A deciduous shrub or small tree; branches woody, terete. *Leaves* 1–3 in., coriaceous, elliptic, obtuse acute or acuminate, polished above, pubescent and densely glandular beneath, costa with 3–5 pairs of straight nerves; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Male spikes* $\frac{1}{2}$ in., 1–3 together, yellow, puberulous and clothed with large glands, flowers very minute; bracts peltate, pedicelled. *Ovary* ellipsoid, compressed. *Capsule* very broadly obcordate, or transversely oblong, broader than long, $\frac{2}{3}$ in. diam., reticulately veined and with an intra-marginal vein; epicarp thin, endocarp papery shining within. *Seed* rounded, quite flat.—The fruit is not winged, as described, the cavity corresponding with the superficies. The Mishmi ticket may be an error for Burma.

27. GALEARIA, *Zoll. & Moritz.*

Glabrous or pubescent slender small trees or shrubs. *Leaves* alternate, shortly petioled, quite entire, penninerved, base usually unequal-sided. *Flowers* small or minute, in very long slender terminal racemes, diœcious; bracts minute or 0, rarely long and very slender; males fascicled, fem. usually solitary. *Disk* 0, or obscure in the male. MALE FL. *Calyx* 5-toothed or -partite. *Petals* 5, short, very concave, with inflexed margins and tips, induplicate-valvate, keeled down the middle within. *Stamens* 10, filaments very short, the antipetalous shortest; anthers didymous, glabrous or hispid. *Pistillode* usually hirsute. FEM. FL. *Calyx* and *petals* of the male. *Ovary* 2–3-celled; styles short, slender, 2-partite; ovules 1 in each cell. *Fruit* small, transversely oblong or very broadly obcuneate cuneate or subreniform, rarely large and globose, endocarp hard 1–2-celled. *Seeds* conform to the cells, compressed, testa membranous, albumen fleshy; cotyledons broad, flat.—Species 12 to 15, Malayan.

The Herbarium materials for this genus are very incomplete indeed. The foliage is uniform throughout, or nearly so. The sections founded by Mueller on the petals being hooded only at the apex and on these being hooded throughout their length are not tenable. The pistillode is, I think, a very variable organ. *G. Maingayi* differs much from the other species in the fruit, and may prove generically distinct.

* *Anther-cells glabrous, filaments and tip of connectives tomentose.*

1. **G. Maingayi,** *Hook. f.*; leaves oblong obtuse, racemes stout, pedicels longer than the male flowers, calyx cupular 5-toothed, petals puberulous margins and midrib within tomentose, fruit subglobose 1 in. diam.

MALACCA, *Maingay* (*Kew Distrib.* 1412 and 1412/2).

Glabrous; branchlets rather stout. *Leaves* 6–8 in., coriaceous, dark brown when dry, base rounded or broadly cuneate; nerves 10–14 pairs, very spreading, slender; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Racemes* 6–8 in.; bracts 0; pedicels $\frac{1}{12}$–$\frac{1}{8}$ in.; flowers longer than in the other species. *Pistillode* columnar, truncate, tomentose. *Fruit* immature, "fleshy, capsular, rugose, pale green with 3 longitudinal alæ extending from the apex to the base, 2–3-locular," *Maingay mss.*—Possibly generically distinct from *Galearia.*

** *Anther-cells hispid, filaments glabrous or pubescent.*

2. **G. fulva,** *Muell. Arg. in Linnæa* xxxiv. 205, and in *DC. Prodr.* xv. ii. 1037 (*Bennettia*); branchlets and racemes rusty-tomentose, leaves elliptic-lanceolate acuminate sparsely pubescent at length glabrous beneath, male flowers shortly pedicelled, margins of petals ciliate, anthers hispid, filaments glabrous. Cremostachys fulva, *Tulasne in Ann. Sc. Nat. Ser.* 3, xv. (1851) 262.—Bennettia, *Wall. Cat.* 8585 C (*in part*).

PENANG, *Wallich, Phillips,* &c.

Shoots densely rusty tomentose. *Leaves* 4–8 in., yellowish especially beneath when dry, base acute, rarely elliptic with a rounded base, nerves 7–10 pairs; petiole $\frac{1}{12}$ in., pubescent. *Racemes* a foot long and less, slender; bracts minute, or the lowest subulate; male fl. subglobose, $\frac{1}{12}$ in. diam.; pedicels rather longer. *Petals* orbicular. *Pistillode* short, subclavate, with a rounded hispid top. *Ovary* densely fulvous tomentose. *Young fruit* transversely oblong, velvety with pale tomentum.

3. **G. pedicellata,** *Br. in Bennett Fl. Jav.* 251 (*Bennettia*); branchlets and racemes puberulous, leaves elliptic or obovate-oblong or narrowly oblong or lanceolate acuminate glabrous or puberulous beneath, male pedicels much longer than the flowers, petals very broad glabrous margins ciliate, filaments and anthers hispid. Bennettia pedicellata, *Muell. Arg. in DC. Prodr.* xv. ii. 1039.—Bennettia, *Wall. Cat.* 8585 (*in part*).

PENANG, *Wallich, Phillips.*

A small tree, 10 ft. *Leaves* 6–12 in., and petioles very much as in *G. fulva. Male racemes* 12–16 in., slender; bracts minute, subulate; pedicels $\frac{1}{10}$–$\frac{1}{4}$ in.; flowers $\frac{1}{10}$–$\frac{1}{8}$ in. diam., depressed.

4. **G. Helferi,** *Hook. f.*; branchlets and racemes finely tomentose, leaves narrowly oblong or elliptic or oblanceolate acuminate glabrous beneath, flowers subsessile minute, petals wholly glabrous, anther-cells hispidly ciliate filaments glabrous. G. Wallichii, *Kurz For. Fl.* ii. 407.

TENASSERIM, *Helfer* (*Kew Distrib.* 4968), *Kurz.*

Branchlets and racemes, when dry, almost black with very fine pubescence. *Leaves* 8–12 by $2\frac{1}{2}$–$3\frac{1}{2}$ in., rather membranous, narrower than in other Indian species, with fewer (6–8 pairs) nerves for their length; petiole longer, $\frac{1}{3}$ in., and costa beneath dark and pubescent. *Male racemes* 12 in.; bracts 0 or obscure; flowers $\frac{1}{24}$ in., subglobose. *Filaments* very short, glabrous. *Pistillode* conical, glabrous.—This from his description is evidently Kurz's *Wallichii*; he describes the fruit as (according to Brandis) "the size of a prune, blue and pruinous, broader than long, the stone unequally wrinkled."

5. **G. Jackiana,** *Br. in Bennett Fl. Jav.* 251 (*Bennettia*); branchlets and racemes finely pubescent, leaves elliptic-lanceolate or oblanceolate acuminate glabrous or puberulous beneath, flowers subsessile very minute, margins of petals ciliate, anthers hispid.—Bennettia, *Wall. Cat.* 8585 A. Limonia leptostachya, *Jack mss.*

PENANG, *Jack.*

This has the foliage of *G. fulva,* and the minute flowers of *G. Helferi.*

6. **G. subulata,** *Muell. Arg. in DC. Prodr.* xv. ii. 1039 (*Bennettia*); branchlets petioles and rachis of racemes rusty-pubescent, leaves elliptic or oblong-obovate cuspidately acuminate yellow-green puberulous on the costa and nerves beneath, bracts erect subulate, flowers subsessile, sepals rounded, margins of petals ciliate, filaments and anthers hispid.

PENANG (in *Herb. Sonder* from *Herb. Lindley*). ? PERAK (*Herb. Hort. Calcutt.*, No. 840 and 2684).

I have seen no Penang specimens of this, which must be very near *G. Jackiana*, differing in the long bracts. The Perak specimens, which I doubtfully refer to it, have green leaves, 7–12 by 2½–5 in., with acute or rounded bases and 5–6 pairs of very strong nerves beneath; they are not in flower, but one (No. 2684) has fruit ½ in. broad by ⅓ long, very broadly wedge-shaped with rounded angles and a truncate broad base, densely clothed with a pale tomentum. The bracts seem early deciduous.

*** *Anthers and filaments quite glabrous.*

7. **G. Lindleyana,** *Muell. Arg. in Linnæa* xxxiv. 205, and in *DC. Prodr.* xv. ii. 1037; branchlets and leaf-nerves beneath and racemes finely fulvous tomentose, leaves ovate elliptic or oblong acuminate, male racemes strict, flowers small very shortly pedicelled, petals and stamens quite glabrous, pistillode with a truncate hispid dilated top.—Bennettia, *Wall. Cat.* 8585 C (*in part*).

PENANG, *Wallich, Porter*; on West Hill, alt. 2500 ft., *Curtis*.

Leaves 6–7 in., rather coriaceous, base acute or rounded; nerves 6–8 pairs, rather strong beneath; petiole ¼ in. *Racemes* apparently erect, 6–10 in.; bracts 0 or obscure, pedicels shorter than the flowers which are not $\frac{1}{12}$ in. diam.; petals rounded with a few cilia on the tips.

8. **G. affinis,** *Br. in Bennett Fl. Jav.* 251 (*Bennettia*); branchlets leaves beneath and racemes finely pubescent, leaves elliptic oblong or lanceolate acuminate puberulous beneath, male racemes erect, flowers very shortly pedicelled, petals and stamens quite glabrous. Bennettia affinis, *Muell. Arg. in DC. Prodr.* xv. ii. 1037.—Bennettia, *Wall. Cat.* 8585 B.

SINGAPORE, *Cantley*. MALACCA, Mt. Ophir, *Griffith* (*Kew Distrib.* 4966). *Maingay* (*Kew Distrib.* 1411).—DISTRIB. ? Siam, *Finlayson*.

Leaves rather coriaceous, 5–8 by 1½–3 in.; nerves 6–8 pair, strong beneath; petiole very short, $\frac{1}{10}$ in., stout. *Male racemes* 4–5 in. (2 ft. in the Singapore specimens), rachis faintly pubescent or tomentose; flowers $\frac{1}{12}$ in. diam., almost sessile. *Fruit* transversely oblong, pubescent, ½ in. diam. when dry.—I am doubtful as to all the specimens from the above localities being referable to one species; they present the following differences:—

1. Wallich's No. 8585 B, in part, which is from Herb. Finlayson and is probably Siamese (not Penang as stated by Mueller), has oblong-lanceolate leaves 5–8 by 1½–2 in., with acute bases, male racemes 4 in. long, and a short columnar hairy pistillode.

2. Cantley's Singapore plant has leaves as in No. 1, racemes 2 ft. long, and a pistillode with few hairs below and a dilated glabrous top.—A fruiting specimen from Malacca, Maingay, has a similarly elongate raceme, but the leaves are more like those of No. 1.

3. Griffith's from Mt. Ophir and a Malaccan fruiting specimen from Maingay have leaves 5–7 by 2½–3 in. with rounded or even subcordate bases, racemes of No. 1, and a stout columnar villous pistillode.

9. **G. Wallichii,** *Br. in Bennett Fl. Jav.* 251 (*Bennettia*); branchlets leaves and racemes glabrous, leaves oblong elliptic or elliptic-lanceolate

acuminate, petiole short but slender, pedicels of male fl. shorter or longer than the flowers, petals and stamens glabrous. Bennettia Wallichii, *Muell. Arg. in DC. Prodr.* xv. ii. 1038.—Bennettia, *Wall. Cat.* 8585 E.

TENASSERIM; at Tavoy, *Gomez, Helfer, Lobb.*—SINGAPORE, *Hallett.*

A tree. *Leaves* 5–7 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., base usually acute (in our species $4\frac{1}{2}$ by $2\frac{1}{2}$ with rounded base), nerves 6–7 pairs; petiole $\frac{1}{10}$–$\frac{1}{8}$ in., much more slender than in the other species. *Male racemes* 6–12 in.; bracts 0 or minute, subulate; flowers $\frac{1}{12}$–$\frac{1}{10}$ in. diam. *Petals* quite naked at the margin and tips. *Pistillode* short, tomentose, conic or with a dilated top.—Mueller describes the fruit as $\frac{1}{2}$ in. broad and $\frac{1}{10}$ long and rugose, but as there are no fruits in Wallich's specimens and he does not allude to any others, those he described may belong to another species. Kurz's *Wallichii* is *G. Helferi*, having tomentose branches, petioles and racemes.

10. **G. phlebocarpa,** *Br. in Bennett Fl. Jav.* 251 (*Bennettia*); leaves elliptic- or oblong-lanceolate acuminate quite glabrous, male flowers very minute subsessile, petals narrow glabrous except the ciliate tips, filaments and anthers quite glabrous, fruit transversely oblong tessellately rugose. Bennettia phlebocarpa, *Muell. Arg. in DC. Prodr.* xv. ii. 1038.—Bennettia, *Wall. Cat.* 8585 D.

SINGAPORE, *Wallich.* ? TENASSERIM, *Helfer.*

Branchlets glabrous, or with puberulous tips. *Leaves* 6–12 in., acute or obtuse; nerves 8–10 pairs, strong beneath; petiole $\frac{1}{10}$ in., glabrous or puberulous. *Male racemes* 6–12 in., pubescent or tomentose; bracts very minute, crowded, villous; flowers $\frac{1}{24}$ in. diam. *Petals* narrower than usual in the genus, tips hispid with deciduous hairs. *Stamens* very short. *Pistillode* obconic, glabrous, with a truncate villous top. *Fruit* $\frac{1}{2}$ in. diam., broadly wedge-shaped.—The Tenasserim specimen, a solitary one in flower only, has shorter broader leaves $4\frac{1}{2}$ by $2\frac{1}{2}$ in. with only 4 pairs of nerves, and a more tomentose rachis of the raceme and calyx; without fruit it cannot be identified.—I refrain from citing (after Mueller) the Sumatran *G. sumatrana, elliptica* and *angustifolia*, Miquel.

IMPERFECTLY KNOWN SPECIES.

BENNETTIA Finlaysoniana, *Br. in Bennett Fl. Jav.* 251; *Muell. Arg. in DC. Prodr.* xv. ii. 1039). Wallich's specimens (No. 8585 B) have neither flower nor fruit, nor have they any locality assigned to them in Wallich's printed Catalogue. In the Flora Javæ they are said to have been collected in Penang by Finlayson. It is described as having pubescent branchlets and glabrous petals and stamens. Mueller suggests its being the Sumatran *G. splendens.*

28. MICRODESMIS, *Planch.*

Slender shrubs. *Leaves* alternate, entire or toothed, penninerved. *Flowers* minute, in axillary clusters, diœcious; males numerous, fem. few. MALE FL. *Sepals* 5 (4–6 ?), imbricate. *Petals* small, twisted and imbricate. *Stamens* 5, or 10 and 2-seriate, inserted on a fleshy receptacle, filaments free; anthers erect, cells subparallel. *Pistillode* columnar, ovoid or 3-fid. FEM. FL. *Perianth* of the male. *Ovary* fleshy, minutely 2–3-celled at the base; styles short, 2-partite or lacerate; ovules 1 in each cell. *Drupe* fleshy; putamen bony, rugged. *Seeds* broadly ovoid, testa membranous, albumen fleshy; cotyledons ovate, flat.—Species 2, tropical, an Asiatic and an African.

M. casearifolia, *Planch. in Hook. Ic. Pl. under* t. 758; leaves elliptic-lanceolate caudate-acuminate entire or obscurely toothed, stamens 10 in 2 series, ovary 2-celled. *Muell. Arg. in DC. Prodr.* xv. ii. 1041; *Kurz For. Fl.* ii. 408.—*Wall. Cat.* 7987, 9077.

TENASSERIM, *Helfer*, &c. PERAK, *King's Collector*. PENANG, *Wallich*, &c. MALACCA, *Griffith*, *Maingay* (*Kew Distrib.* 1424, 1454).—DISTRIB. Borneo, South China.

A small evergreen tree; branchlets and youngest leaves puberulous. *Leaves* 2–6 in., often subfalcate, glabrous, glossy, base very acute, minutely pellucid-punctate; petiole $\frac{1}{6}$ in. *Flowers* very shortly pedicelled, puberulous. *Sepals* elliptic-ovate. *Petals* orbicular, concave. *Stamens* alternately shorter, connective apiculate. *Styles* reflexed. *Fruit* $\frac{1}{6}$–$\frac{1}{4}$ in. diam., globose, 2-celled, bright red.—Wallich's No. 7987 is stated to be from Silhet, but this is no doubt an error.

29. **PLATYSTIGMA,** *Brown.*

A tree? with rusty-pubescent shoots and inflorescence. *Leaves* alternate, coriaceous, quite entire, penninerved; stipules? *Flowers* in short axillary panicles, sessile or very shortly pedicelled, dicœcious. *Disk* 0. MALE FL. bracteate and 2-bracteolate. *Sepals* 4–5, unequal, imbricate. *Petals* 4–5, ovate, acute, valvate. *Stamens* 4–5, filaments very short; anthers large, cells oblong parallel, slits subextrorse. *Pistillode* 0. FEM. FL. 1-bracteate. *Sepals* 5, broadly ovate, imbricate, 2 interior. *Ovary* cylindric, pubescent, 1-celled; stigma very broad, sessile, disciform, quite entire; ovule 1, pendulous from the top of the cell, linear, without an obturator.

P. myristiceum, *Brown in Wall. Cat.* 7523 (*fem. plant*); *Hook. Ic. Pl.* t. 1707.—Myristicea, *Wall. Cat.* 9017 (*male plant*).

SILHET, *W. Gomez.*

Branches woody, terete, black when dry, hoary. *Leaves* 5–7 by 2–3½ in., elliptic or elliptic oblong, acute or acuminate, base acute or obtuse, glabrous above, beneath hoary pale brown; nerves 10–12 pairs, slender, nervules obscure; petiole $\frac{3}{4}$–1 in. *Male panicles* 1–3 in., sessile, rachis and branches stout; buds globose; flowers $\frac{1}{8}$ in. diam., crowded on the tomentose branches; sepals hispidly pubescent, much shorter than the corolla; petals glabrous or with a few very minute stellate hairs; anthers opposite the petals and nearly as large. *Fem. panicles* much shorter and fewer-fld. than the male; flowers on very stout pedicels, which are 1-bracteate at the base; sepals $\frac{1}{6}$ in. long; ovary rusty-tomentose with very thick walls and a narrow central cell; stigma broader than the body of the ovary, black when dry; ovule linear.—I am not certain that this is an Euphorbiaceous plant. Bentham, who has noted that it has 2 ovules but one sometimes abortive (I find but one in the many specimens examined), has suggested (Gen. Plant. iii. 283) that it may be a *Baccaurea*, from which the 1-celled ovary, linear ovule, stigma, and absence of a thickening or joint at the apex of the petiole at once distinguish it. I find no trace of stipules.

30. **ELATERIOSPERMUM**, *Blume.*

A handsome glabrous tree. *Leaves* alternate, jointed on to the 2-glandular long petiole, quite entire, penninerved, reticulate. *Flowers* in di-trichotomous panicled cymes, monœcious, apetalous, central of each cyme a sessile female. MALE FL. *Sepals* 4–6, broad, imbricate. *Stamens* 10–20 or more, on a villous receptacle, filaments very short, free; anthers linear-oblong, erect, cells adnate, parallel, connective gland-tipped. *Pistillode* minute or 0. FEM. FL. *Sepals* 6, imbricate, caducous. *Disk* elevated, pubescent. *Staminodes* many, within the disk. *Ovary* ovoid, tapering into a short thick style, 2–4-celled; stigmas 3, dilated, crescent-shaped; ovules 1 in each cell, obturator large. *Capsule* large, of 2 2-valved cocci with a thin fleshy exocarp, and bony endocarp. *Seeds* large, oblong, testa crustaceous shining, albumen? thin papery; cotyledons plano-convex, fleshy, radicle very short.

E. Tapos, *Blume Bijd.* ii. 621; *Muell. Arg. in DC. Prodr.* xv. ii. 1131; *Miquel Fl. Ind. Bat.* i. ii. 412, and *Suppl.* 460; *Hook. Ic. Pl.* t. 1294.

PERAK, *Scortechini.* MALACCA, *Gaudichaud, Griffith* (*Kew Distrib.* 4960), *Maingay* (*Kew Distrib.* 1440), &c.—DISTRIB. Sumatra, Java.

A lofty evergreen ? tree, 60–80 ft.; branchlets robust. *Leaves* 4–8 in., coriaceous, oblong or linear-oblong, obtusely acuminate, base acute, nerves 12–16 pairs; petiole 1½–2 in., slender. *Panicles* in the uppermost axils, peduncle stout, 1½–3 in., branches and pedicels short. *Male fl.* ⅙ in. diam.; fem ⅓ in. *Sepals* oblong. *Ovary* ovoid, pubescent. *Capsule* 2 in. long, oblong, smooth. *Seeds* 1¼ in. long, oblong, chestnut-brown, subtrigonous with rounded top base and sides, and an obscure dorsal and ventral ridge; testa white and veined within.

31. **JATROPHA,** *Linn.*

Herbs shrubs or trees, often glandular and prickly. *Leaves* alternate, entire or digitately lobed or partite; stipules often ciliate. *Flowers* in terminal cymes, monœcious, the central in the cyme or its forks usually female, often petaliferous. MALE FL. *Sepals* 5, imbricate, often petaloid. *Petals* 5, contorted, free or connate. *Disk* entire or of 5 glands. *Stamens* many, filaments of all or the interior only, connate; anthers erect. *Pistillode* 0. FEM. FL. *Perianth* of the male. *Ovary* 2–4-celled; styles connate below, 2-fid, lobes entire or 2-lobed; ovules 1 in each cell. *Capsule* of 2–4 2-valved cocci, endocarp crustaceous or bony. *Seeds* ovoid or oblong, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 70, chiefly American.

* *Petals free or nearly so.*

1. **J. glandulifera,** *Roxb. Fl. Ind.* iii. 688; glabrous, leaves simple and ovate or 3–5-lobed below the middle base cordate, lobes ciliate with long-stipitate glands, stipules long capillary laciniate, and cymes glandular, bracts setose and glandular, sepals entire, stamens 8. *Muell. Arg. in DC. Prodr.* xv. ii. 1084; *Wall. Cat.* 7802; *Kurz For. Fl.* ii. 403; *Dalz. & Gibs. Bomb. Fl.* 229. J. glauca, *Vahl Symb.* i. 78; *Thwaites Enum.* 277.

DECCAN PENINSULA from the Concan southwards. CEYLON; at Damboul, *Gardner.*—DISTRIB. Tropical Africa.

A small evergreen tree, 4–8 ft., trunk stout. *Leaves* 3–5 in. long and broad, subpeltate; lobes acute, sometimes toothed; petiole 2–3 in., smooth or with simple or branched capillary glandular hairs. *Flowers* greenish yellow, in glandular corymbose cymes. *Sepals* glabrous or glandular-ciliate, male obtuse, fem. acuminate. *Petals* united at the base only. *Ovary* glabrous. *Capsule* size of a cherry, slightly 6-lobed. —I have seen only Deccan specimens.

2. **J. nana,** *Dalz. & Gibs. Bomb. Fl.* 229; dwarf, glabrous, leaves entire or 3-lobed base cuneate, lobes entire, petiole very short stout, bracts and flowers glabrous, sepals entire. *Muell. Arg. in DC. Prodr.* xv. ii. 1083.

The CONCAN; stony places near Poona, Bombay, &c., *Dalzell, &c.*

A small sparingly branched shrub, 1–2 ft. *Leaves* broadly cuneate, 3–5 in. diam., lobes broad, acute; petiole ⅛–⅙ in.; stipules not seen. *Styles* slender, stigmas capitellate.—The specimens are not in a very good state. This and the following are dwarfs of African type.

3. **J. heterophylla,** *Heyne mss.*; dwarf, glabrous, eglandular, stems simple, leaves petioled simple and cordate or 3–5-lobed below the middle,

lobes quite entire, stipules capillary, bracts and sepals entire.—*Wall. Cat.* 7803 (*the upper specimen*).

DECCAN PENINSULA; Hyderabad, *Heyne*; Madras, *Shuter*; Northern Circars, in cultivated ground, *Wight.*

Stems 4–6 in. from a tuberous rootstock, stout, subsimple, terete. *Leaves* 1–3 in. diam., rather thick, very variable in form, glaucous beneath, base cuneate, petiole $\frac{1}{2}$–$\frac{3}{4}$ in., stout. *Flowers* very small. *Capsule* $\frac{3}{4}$ in. long.—Wallich's solitary specimen, received from Wight, has quite simple ovate or oblong-ovate cordate acuminate leaves; those of Heyne, &c., are lobed.

J. GOSSYPIFOLIA, *Linn. Sp. Pl.* 1006; shrubby, leaves 3–5-lobed or -partite, lobes glandular-serrulate, petiole with branched glandular paleæ or hairs, stipules capillary multifid glandular, bracts and entire sepals glandular-ciliate, stamens 10–12 monadelphous. *Muell. Arg. in DC. Prodr.* xv. ii. 1086; *Bot. Reg.* t. 746; *Jacq. Ic.* t. 633.

BENGAL, *Clarke.* SINGAPORE, *Maingay* (cultivated or an escape).—DISTRIB. Native of Brazil.

A shrub or herb, glabrous or with the inflorescence and leaves pubescent. *Leaves* 2–4 in. diam., lobes broadest in the middle; petiole 2–4 in. *Male sepals* ovate, acute; petals purple or red. *Capsule* ovoid, 3-lobed.

J. MULTIFIDA, *Linn. Sp. Pl.* 1006; glabrous, leaves long-petioled orbicular palmately cut into many narrow entire or lobulate caudate-acuminate segments, stipules capillary multifid eglandular, bracts and entire sepals glabrous, disk of fem. fl. urceolate. *Muell. Arg. in DC. Prodr.* xv. ii. 1089; *Wall. Cat.* 7801; *Salisb. Hort. Paradis.* t. 91.

Cultivated and naturalized in various parts of INDIA.—DISTRIB. Native of South America.

A large shrub or small tree. *Leaves* 3–5 in. diam., glaucous beneath; petiole about as long. *Cymes* long-peduncled; flowers scarlet; anthers linear.

** *Petals cohering to the middle or above it.*

4. **J. Wightiana,** *Muell. Arg. in DC. Prodr.* xv. ii. 1080; pubescent, eglandular, leaves peltate orbicular or ovate entire or roundly 5–7-lobed lobes obtuse entire, bracts and sepals entire, corolla-tube of male villous within, ovary and styles pubescent. J. peltata, *Wight Ic.* t. 1169 (J. villosa *in text*). J. Curcas, *Wall. Cat.* 7799 D (*in part*).

The DECCAN PENINSULA; in dry stony jungles near Coimbatore, *Wight.*

A low branching shrub, shoots rusty-villous. *Leaves* 4–6 in. diam., tomentose beneath; petiole as long; stipules unknown. *Cymes* corymbose; peduncle stout; flowers pale yellow. *Calyx-lobes* lanceolate. *Corolla* salver-shaped, $\frac{1}{4}$ in. diam., lobes ovate-oblong. *Styles* united in a slender column; stigmas 2-partite. *Capsule* 1 in. long, globosely oblong.—I have seen leaves only.

J. CURCAS, *Linn. Sp. Pl.* 1006; glabrous except the shoots, leaves long-petioled not peltate orbicular-cordate entire or 3–5-lobed or -angled, cymes glabrous or pubescent, corolla-tube of male villous within, ovary and styles glabrous. *Muell. Arg. in DC. Prodr.* xv. ii. 1080; *Roxb. Fl. Ind.* iii. 686; *Brand. For. Fl.* 442; *Kurz For. Fl.* ii. 403; *Gamble Man. Ind. Timb.* 365; *Grah. Cat. Bomb. Pl.* 183; *Dalz. & Gibs. Bomb. Fl.* 77; *Jacq. Hort. Vind.* iii. 36, t. 63; *A. Juss. Tent. Euphorb.* t. 11, p. 34 A; *Wall. Cat.* 7803 (*in part*) and 7799 (*except part of* D). J. moluccana, *Herb. Russ.*

Throughout INDIA and CEYLON, common near villages, cultivated and naturalized.—DISTRIB. Throughout the tropics.

A large shrub or small evergreen tree. *Leaves* 4–6 in. diam.; lobes obtuse or acute, quite entire; petiole as long as the blade. *Flowers* yellow. *Capsule* 1–1½ in. —Poison, physic or purging-nut.

32. **TRITAXIS,** *Baill.*

Trees or shrubs. *Leaves* alternate, entire or toothed, penninerved. *Flowers* in terminal dichotomous cymes, monœcious, with the central one of each cyme female subsessile, surrounded by many pedicelled males, or diœcious? MALE FL. *Calyx* 5-fid. *Petals* 5, longer than the calyx. *Disk* of 5 glands. *Stamens* in 2–3 whorls, the inner or all forming a central column; anthers of the outer whorl erect, of the inner horizontal, cells parallel, slits introrse. *Pistillode* 0. FEM. FL. *Calyx* of the male. *Ovary* 3-celled; styles 2-fid. *Capsule* of 3 2-valved cocci.—Species 3 or 4, Indian and Malayan.

In Genera Plantarum, iii. 392, the calyx is, by misprint, described as 3-fid, and for *Antitaxis* read *Anisotaxis*.

T. ? Beddomei, *Benth. in Journ. Linn. Soc.* xvii. 221; quite glabrous, leaves ovate or ovate-oblong entire or subsinuately toothed, cymes peduncled all male, stamens 8, filaments of the 2 or 3 inner combined in a slender column, of the outer free forming a whorl at the base of the column.

TRAVANCORE; at the foot of the Tinnevelly Ghats, *Beddome.*

Branchlets slender, terete. *Leaves* 3–4 in., thinly coriaceous, obtuse or acute, base rounded, pale beneath; nerves 10–12 pair, very slender, hardly stronger beneath than the nervules; petiole ¼–½ in. *Cymes* terminal, branched, peduncles and pedicels slender. *Flowers* ⅛ in. diam. *Calyx* obtusely 4-lobed. *Petals* much longer, oblong. *Disk-glands* large. *Filaments* slender; anthers broadly oblong, slits lateral.—A very obscure plant, unlike in habit to *T. Cumingii*, and with no fem. flowers in the male cymes, hence perhaps not a *Tritaxis*. The Andaman Island (Port Mouat) plant referred doubtfully to *Tritaxis* by Bentham (l. c.) has quite entire leaves with three strong basal nerves, and 5 to 6 pair of pinnate ones, and an exceedingly slender panicle; it is referred to *Trigonostemon* by Kurz.

33. **ALEURITES,** *Forst.*

Trees with simple or stellate pubescence. *Leaves* alternate, long-petioled, broad, entire or 3–7-lobed, 3–7-nerved from the base, petiole 2-glandular at the top. *Flowers* in lax terminal panicled cymes, mono- diœcious. MALE FL. *Calyx* subglobose, bursting into 2–3-valvate lobes. *Petals* 5, longer. *Stamens* 8–20, on a conical receptacle, 5 outer opposite the petals, alternating with small glands, filaments free; anthers erect, adnate, cells parallel. *Pistillode* 0. FEM. FL. *Perianth* of the male. *Disk* obscure or of glands alternating with the petals. *Ovary* 2–5-celled; styles with 2 linear stout arms; ovules 1 in each cell. *Drupe* large; putamen hard, 1–5-celled. *Seeds* with a thick woody testa, albumen thick hard; embryo straight, cotyledons broad flat.—Species 3, Asiatic and Pacific.

A. cordata, Muell. (Dryandra oleifera, *Wall. Cat.* 7958), a native of China and Japan, with broadly ovate-cordate acuminate leaves, and with anthers reflexed after flowering, is cultivated at Singapore, and elsewhere in India, but very rarely.

A. moluccana, *Willd. Sp. Pl.* iv. 590; shoots and young leaves stellately puberulous or tomentose, leaves long-petioled polymorphous ovate to lanceolate or broadly rhomboid and obtusely or acutely 3–7-lobed base obtuse or truncate, calyx velvety, petals obovate-oblong bearded within,

anthers erect, ovary 2-celled hispid. *Muell. Arg. in DC. Prodr.* xv. ii. 723; *Kurz For. Fl.* 377; *Bedd. Sylv. Madr.* t. 276; *Benth. Fl. Hongk.* vi. 128. A. triloba, *Forst. Char. Gen.* 112, t. 56; *Lamk. Ill.* t. 791; *Willd. l. c.*; *Roxb. Fl. Ind.* iii. 629; *Grah. Cat. Bomb. Pl.* 181; *Dalz. & Gibs. Bomb. Fl. Suppl.* 76; *Miquel Fl. Ind. Bat.* i. ii. 385; *Wall. Cat.* 7850. A. ambinux, *Pers. Syn.* 587; *A. Juss. Tent. Euphorb.* t. 12. A. cordifolia, *Steud. Nomenc.* 49. Camirium cordifolium, *Gærtn. Fruct.* ii. 195. Jatropha moluccana, *Linn. Sp. Pl.* 1006.—Camirium, *Rumph. Amb.* ii. 180, t. 58.

Occurs in various parts of INDIA, especially the Malayan Peninsula, *Griffith* (*Kew Distrib.* 4795), *Maingay* (*Kew Distrib.* 1384). Wild in the Wynaad, but probably escaped from cultivation, *Beddome*.—DISTRIB. Native of the Malay? and Pacific Islands.

An evergreen tree, 40–60 ft. *Leaves* crowded at the ends of the branches, 4–12 in. long; petiole 2–2½ in., pubescent. *Cymes* tomentose; flowers white, shortly pedicelled. *Calyx* usually splitting into three lobes or segments, $\frac{1}{10}$ in. long. *Petals* $\frac{1}{4}$ in. *Stamens* 15–20, on hairy receptacle, filaments hairy, short. *Fruit* 2–2½ in. diam., subglobose, fleshy, smooth, olive-coloured, containing 1 or 2 large, hard seeds with a furrowed testa.

34. CROTON, *Linn.*

Trees or shrubs, rarely herbs. *Leaves* alternate, rarely opposite or whorled, 2-glandular at the base. *Flowers* solitary or clustered on the rachis of a terminal raceme with small bracts, monœcious, rarely dicœcious. MALE FL. *Calyx* 5-(4–6-)partite, imbricate or subvalvate. *Petals* as many as and equalling or shorter than the sepals. *Disk-glands* as many, opposite the sepals. *Stamens* indefinite, inserted on a hairy receptacle, filaments free inflexed in bud then erect; anthers adnate, cells parallel. *Pistillode* 0. FEM. FL. *Sepals* usually more ovate than in male, rarely accrescent in fruit. *Petals* smaller or 0. *Disk* annular or of glands. *Ovary* 3-(2–4-)celled; styles usually long and slender, 2–4-cleft; ovules 1 in each cell. *Capsule* subequally 6-valved or of 3 deciduous 2-valved cocci. *Seeds* smooth, caruncle small, testa crustaceous, albumen copious; cotyledons broad.—Species uncertain (500 described), in all hot countries.

The Indian species are all referable to Mueller's section *Eucroton*, described as having the sepals equal (though often unequal in both sexes), the receptacle of the male fl. villous, and the petals distinct in the male fl. but minute or wanting in the female.

A. *Ovary* lepidote or stellately tomentose.

* *Inflorescence* lepidote. (See also *C. lævifolius* and *Griffithii*.)

† *Leaves densely lepidote beneath, or on both surfaces.*

1. **C. argyratus,** *Blume Bijd.* 602; leaves elliptic- or ovate-lanceolate acuminate silvery or rufous-lepidote beneath penninerved, racemes long lepidote, stamens 10–12, ovary lepidote, styles slender 2-partite, capsule globose rusty-pubescent. *Muell. Arg. in DC. Prodr.* xv. ii. 526; *Miquel Fl. Ind. Bat.* i. ii. 380; *Kurz For. Fl.* ii. 372; *Gamble Man. Ind. Timb.* 359. C. bicolor, *Roxb. Fl. Ind.* iii. 680.

MARTABAN to TENASSERIM, *Kurz*. PERAK, *Scortechini, King's Collector*. MALACCA, *Griffith, Maingay*. PENANG, *Curtis*.—DISTRIB. Sumatra, Java, Borneo.

An evergreen tree; branchlets lepidote. *Leaves* 4–7 in., thinly coriaceous, base minutely cordate; petiole $\frac{1}{2}$–1½ in. *Racemes* 4–6 in.; male fl. shortly pedicelled; fem. larger, stouter pedicelled. *Sepals* of fem. linear-oblong, lepidote, glabrous within. *Petals* and stamens villous. *Capsule* $\frac{1}{3}$ in. diam., hardly lobed. *Seed*

broadly obtusely 3-gonous, with a broad convex nearly smooth polished back.—I have seen no Tenasserim specimens.

2. **C. reticulatus,** *Heyne in Wall. Cat.* 7724 B *in part*; branchlets leaves beneath and inflorescence silvery lepidote, leaves ovate or elliptic-lanceolate acuminate quite entire shortly 3-nerved at the base, racemes few-fld., sepals of fem. linear-oblong accrescent, stamens 15–18, ovary stellately lepidote, style-arms divided, capsule $\frac{1}{2}$ in. long broadly oblong. *Muell. Arg. in DC. Prodr.* xv. ii. 580. C. hypoleucus, *Dalz. in Hook. Kew Journ.* iii. (1851) 123; *Dalz. & Gibs. Bomb. Fl.* 231; *Thwaites Enum.* 276. C. zeylanicus, *Muell. Arg. in Linnæa* xxxiv. 107, and in *DC. l. c.* 581.

DECCAN PENINSULA, from the Concan southwards, *Heyne*, &c. CEYLON; Central Province, *Thwaites*.

A shrub; branches slender, terete. *Leaves* opposite and alternate, 4–10 in., smooth and glabrous above, base acute or rounded; petiole $\frac{1}{2}$-$1\frac{1}{2}$ in., rusty lepidote. *Racemes* shorter than the leaves. *Sepals* of male oblong, margins woolly, twice as large as the woolly oblong petals. *Stamens* glabrous except at the villous base. *Sepals* of fem. sometimes $\frac{1}{2}$ in. long in fruit. *Ovary* globose; scales stellate, red-brown; styles very variable, usually 2-partite with long slender unequally 2-fid arms, in Wallich's specimen very large and flabellately multipartite from a cuneate base. *Capsule* stellately lepidote.—I find no character whereby to separate Mueller's *C. zeylanicus*; the fem. sepals enlarge in all the forms, and though largest in the Ceylon specimen are not otherwise different; the styles are too variable to found a character upon, and I find no difference in the capsule.

3. **C. malabaricus,** *Beddome Icones*, t. 171, and *Forester's Man.* 204; branchlets leaves beneath and inflorescence silvery lepidote, leaves ovate or rhombic-ovate acuminate quite entire sub-3-plinerved sparsely stellately lepidote above, racemes few-fld., sepals of fem. ovate-oblong villous at the base within, stamens 10–12 villous below with long silky hairs, ovary stellately lepidote, style-arms long slender, tips 2-lobed, capsule obovoid lepidote.

MALABAR; common in western forests, ascending to 4000 ft., *Beddome*.

A tree, 20–30 ft. *Leaves* 2–6 in. long; petiole 1–2 in. *Racemes* solitary or clustered, 1–2 in. *Petals* of male woolly, much smaller than the sepals; of fem. 0. *Capsule* about 1 in. long.—Closely allied to *C. reticulatus*, but the leaves are much broader, female calyx less deeply divided and lobes much shorter; male calyx with long silky hairs at the base, as also have the filaments and petals.

4. **C. scabiosus,** *Beddome Fl. Sylvat.* t. 283; branchlets leaves on both surfaces and inflorescence clothed with subsilvery lepidote scales, leaves ovate- or orbicular-cordate obtuse or acute crenate-serrate 3–5-plinerved at the base, raceme short stout, stamens 10–12 quite glabrous, ovary densely lepidote, styles 2-partite arms very long and slender, capsule subglobose 3-lobed.

TRAVANCORE; on the Nullay Mallay Hills, Kurnoul, alt. 2–3000 ft., *Beddome*.

A small tree; branches brown when dry; branchlets stout, much shrunk when dry, greenish or silvery lepidote as are the leaves. *Leaves* 2–$4\frac{1}{2}$ by $1\frac{1}{4}$–3 in., coriaceous, alike on both surfaces, nerves 1 or 2 pair above the basal; petiole rather shorter than the blade, stout. *Racemes* 1–4 in.; rachis and pedicels very stout. *Sepals* of male short; petals narrowly spathulate, deeply fringed. *Ovary* globose. *Capsule* $\frac{1}{2}$ in. long, rather longer than broad.

†† *Leaves glabrous when old.*

5. **C. oblongifolius,** *Roxb. Fl. Ind.* iii. 685; shoots and young

leaves and inflorescence lepidote, leaves oblong elliptic-oblong or -ovate or -lanceolate acute more or less repand-toothed or serrate penninerved old quite glabrous, base acute or obtuse, racemes elongate, sepals lepidote, stamens 10–12 woolly below, styles 2-partite slender, capsules globose $\frac{1}{3}$ in. diam. lepidote. *Muell. Arg. in DC. Prodr.* xv. ii. 573; *Brand. For. Fl.* 440; *Kurz For. Fl.* ii. 373; *Dalz. & Gibs. Bomb. Fl.* 231; *Beddome Forester's Man.* 204; *Thwaites Enum.* 276. E. elæocarpifolius & lævigatus, *Wall. Cat.* 7734, 7735. C. Boragatch, *Roxb. mss.* C. Dudia, *Herb. Ham.* C. Jouffra, *Miquel Plant. Hohenack.*, No. 832.—*Wall. Cat.* 7739 (*in part*).

Bengal, Silhet, Behar, Central India, the Deccan Peninsula, Martaban and Burma. Ceylon; in hot dry places.

A small deciduous tree; branches rather stout. *Leaves* 6–12 in., rather coriaceous, sometimes 4 in. broad, very pale green when dry; nerves 12–16 pairs, slender; petiole very variable, $\frac{1}{2}$–$2\frac{1}{2}$ in., rather slender. *Racemes* often fascicled, erect; pedicels long or short. *Sepals* of male broadly oblong; petals as long as the sepals, woolly; disk-glands 5, rounded; stamens 12, glabrous. *Sepals* of fem. oblong; petals small, linear, ciliate; disk depressed. *Ovary* oblong, 3-gonous, lepidote. *Capsule* $\frac{1}{3}$ in. diam., globosely 3-lobed, scaberulously lepidote, top depressed.—*C. Wallichianus*, which resembles this, differs in not being lepidote.

6. **C. Joufra,** *Roxb. Fl. Ind.* iii. 685; inflorescence lepidote, leaves elliptic- or linear- or obovate-lanceolate acuminate quite entire or remotely repand-serrate penninerved old quite glabrous, base very acute, racemes elongate, sepals stellately lepidote, stamens 12 filaments villous, styles 2-partite slender, capsules 1–$1\frac{1}{2}$ in. ovoid lepidote. *Muell. Arg. in DC. Prodr.* xv. ii. 519; *Kurz For. Fl.* ii. 373. C. persimilis, *Muell. l. c.* 619 (*Wallich's, plant only*). C. oblongifolius *Ham. in Wall. Cat.* 7718 D.

Silhet, *Roxburgh*; at Terrya Ghat, *J. D. H. & T. T., Clarke.* Seebsagur, *Clarke.* Pegu and Martaban, *Kurz.* Upper Burma, near the Silver Mines *Griffith.*

A shrub very similar to *C. oblongifolius*, but the leaves are shorter petioled, narrower, more acuminate and less serrate or toothed, and the capsule is very different.—I have seen only Silhet and Clarke's and Griffith's Burmese specimens; the capsules in the latter are terete, very obscurely 3-lobed, and the seeds oblong, as described by Kurz.—Mueller's *C. persimilis*, α. *genuina*, is a mixture of this with *C. oblongifolius* from Khasia, Assam, and Ceylon. His β. *glabrata*, from Rawak, is probably something very different.

7. **C. robustus,** *Kurz For. Fl.* ii. 372; leaves coriaceous elliptic or elliptic-oblong obtuse or subacute sparsely lepidote beneath penninerved, fem. spikes robust and subsessile flowers lepidote, styles slender 2-fid. Croton, *Wall. Cat.* 7737. ? C. oblongifolius, *Wall. Cat.* 7736.

Pegu to Tenasserim, *Kurz.* Moolmayin, *Wallich.*

A small tree; branchlets very robust, rusty-scaly. *Leaves* $1\frac{1}{2}$–8 in., dull greenish grey or brown when dry, pale but not shining beneath; nerves very slender; petiole $\frac{1}{4}$–2 in., robust. *Male fl.* much larger than in *C. argyratus*; petals very small, linear, ciliate. *Sepals* of fem. fl. broadly ovate, obtuse; disk obscure. *Ovary* coppery-lepidote. *Capsule* ovoid-globose, 3-coccous, 6-grooved, size of a large pea, obscurely scaly and tubercled.—The specimens are very indifferent, and the description is chiefly from Kurz. I take Wallich's 7736, from Tavoy, to be a male specimen of this with very slender spikes and pedicelled flowers; it differs from *C. oblongifolius* in the entire obtuse leaves.

** Inflorescence stellately tomentose or glabrous (not lepidote except sparsely in *C. lævifolius* and *Griffithii*).

† Leaves 3–5-plinerved at the base, more or less stellately pubescent or tomentose on both surfaces.

8. **C. aromaticus,** *Linn. Sp. Pl.* 1005; branches and leaves scaberulous or tomentose with stellate hairs, leaves long-petioled ovate- or orbicular-cordate acute or acuminate denticulate 3-plinerved, racemes elongate softly tomentose, stamens about 20, ovary stellately hispid, styles short 2–5-partite, capsule $\frac{1}{3}$ in. subglobose stellately scabrid. *Vahl Symb.* ii. 98; *Geisel Monogr. Croton.* 21; *Wall. Cat.* 7773 B, C; *Beddome Forester's Man.* 204. C. aromaticus & lacciferus, *Muell. Arg. in DC. Prodr.* xv. 1, 588. C. lacciferus, *Linn. l. c.*; *Wight Ic.* t. 1915; *Gærtn. Fruct.* ii. t. 107. C. tiliæfolius, β. aromatica, *Lamk. Encycl.* ii. 206. Aleurites laccifera, *Willd. Sp. Pl.* iv. 590.—*Burm. Thes. Zeyl.* 201, t. 91.

The Deccan Peninsula; from the Concan southwards. Ceylon, common.

An aromatic shrub or small tree, usually grey when dry. *Leaves* 2–4 by 1–3 in., usually scabrid above and softer pubescent beneath; nerves 2–6 pair above the basal; glands subsessile; petiole $\frac{1}{2}$–1 in., stout, pubescent. *Racemes* 4–6 in. *Male fl.* with woolly petals as long as the sepals; stamens short; receptacle densely villous; disk-glands small. *Fem. fl.* remote, stoutly pedicelled, thickly tomentose; sepals short, broad; disk hairy; petals minute, filiform, ciliate. *Capsule* obscurely lobed. *Seeds* broadly oblong, dorsally rugose, opaque.—Near *C. caudatus*, but the leaves are less toothed, the racemes more woolly, the styles much shorter, usually many-lobed and hardly exserted, and the capsule much smaller. I find no difference between *C. lacciferus* and *aromaticus*, nor does Beddome, who would include under this *C. caudatus*, *Moonii* and *nigro-viridis*. Thwaites distinguishes *aromaticus* from *lacciferus* by the longer weaker branches, less hairy leaves often more openly cordate, and the larger longer capsules with scattered stellate hairs.—*C. Moonii* appears to differ in the penninerved leaves.

9. **C. caudatus,** *Geisel Croton. Monogr.* 73; branches and racemes scurfily stellately hairy, leaves from ovate- to orbicular-cordate acute or acuminate irregularly toothed scaberulous above scabrid or softly pubescent with stellate hairs beneath 3–5-plinerved, racemes very long slender, stamens 18–30 filaments silkily hairy below, ovary stellately woolly, styles 2-partite arms very long slender hairy below, capsule large globose or broadly oblong terete woody. *Muell. Arg. in DC. Prodr.* xv. ii. 599; (*excl.* γ.); *Kurz For. Fl.* ii. 375; *Gamble Man. Ind. Timb.* 359. C. denticulatus, *Blume Bijd.* ii. 603. C. drupaceus, *Roxb. Fl. Ind.* iii. 683; *Wall. Cat.* 7720 A, C, 7721. Tiglium hispidum, *Klotzsch.*—*Wall. Cat.* 7726, ? 7769, 7826 E.

Eastern Himalaya; Sikkim, *J. D. H.*, and Bhotan, *Griffith.* Assam, Bengal and Silhet to the Deccan and Malacca. Ceylon; north part of the island.—Distrib. Java, Philippines.

A more or less scandent shrub, branches stout or slender, scurfily scabrid. *Leaves* very variable, smaller 1–3 in. ovate-cordate, larger 4–7 in. orbicular-cordate, margin denticulate or rather coarsely toothed, often with a gland at the sinus, or the teeth glandular, upper surface smooth or scaberulous, lower scabrid or tomentose, nerves 2–3 pair above the basal, pubescent above; glands minute (long-pedicelled in some Ceylon specimens); petiole 1–2 in., scabrid. *Racemes* solitary, terminal, 4–10 in.; bracts subulate or 0; pedicels long or short. *Male fl.* tomentose; petals as long as the sepals, woolly; disk-glands minute; receptacle villous with white hairs; stamens often far exserted. *Fem. fl.*; sepals ovate, subacute, scabrid; petals very minute, subulate, long-ciliate; disk low, hirsute. *Capsules* $\frac{2}{3}$–1 in. long or broad, terete or with 6 slender ridges, densely rusty scabridly pubescent, 6-valved from the top downwards. *Seed* very variable, dorsally compressed, slightly rugose.—The variable fruit is a remarkable character of this plant. I recognize the following

forms, to which may be added Kurz's *genuina*, with capsules the size of a bullet or larger and glabrous seeds; and var. *minor* with capsules the size of a large pea or small cherry and unripe seeds sprinkled with stellate hairs.

Wallich's No. 7762 from Singapore is referred to *C. caudatus* by Mueller, but if the unattached capsule belongs to it, its thin crustaceous texture is very different, the leaves too are much larger and more coriaceous; it is in a very bad state.—Roxburgh in describing the fruit alludes to two varieties, of which the larger has 3-nerved cotyledons.

Var. 1. *hispida*; leaves large rounded cordate, capsule globose $\frac{2}{3}$ in. diam. stellately hispid, seeds $\frac{1}{3}$ in.

Var. 2. *ruminata*; leaves large rounded cordate, capsule globose or broadly oblong $\frac{2}{3}$–1 in. long or broad, seeds broadly oblong, finely rusty scaberulous, endocarp woody recurved, seeds $\frac{1}{2}$ in. long longitudinally obscurely furrowed covered with scattered stellate hairs.—Sikkim and Khasia Mts.

Var. 3. *globosa*; leaves as in 2, fruit globose endocarp quite smooth, seeds $\frac{1}{4}$ in. long.

Var. 4. *tomentosa*; leaves ovate softly tomentose beneath acutely toothed with often a cup-shaped gland at every tooth on the under surface.—Silhet (Wall. Cat. 7838), Assam, *Griffith*.

Var. 5. *malaccana*; leaves smaller usually ovate-cordate base rounded acuminate sharply toothed, capsule $\frac{3}{4}$–1 in. globose or broadly oblong with 6 low ribs finely rusty-pubescent, endocarp woody smooth, seeds very broad $\frac{1}{2}$ in. long, retuse at both ends, and with a dorsal shallow furrow.—Mergui and Malacca, *Griffith* (Kew Distrib. 4775); *Maingay* (1376).

10. **C. tomentosus,** *Muell. Arg. in Linnæa* xxxiv. 107, and in *DC. Prodr.* xv. ii. 588; all parts thickly clothed with stellate tomentum, leaves coriaceous ovate or oblong acute entire or denticulate 3-plinerved, racemes short few-fld., bracts long glandular, stamens about 25 glabrous, styles 2-partite arms slender 2-fid, ovary densely stellately hispid. C. chinensis, *Benth. Fl. Hongk.* 309. C. chrozophoroides, *Kurz mss.* C. crassifolius, *Geisel Croton. Monogr.* 19. Tridesmis tomentosa, *Lour. Fl. Coch.* ii. 707.

Pegu, *Kurz*.—Distrib. South China.

Stems or branches 6–10 in. high, apparently erect from a prostrate woody rootstock, stiff, terete. *Leaves* few, 2–3 in., rigid; nerves 4–5 pair above the basal, strong beneath; petiole $\frac{1}{2}$–1 in., very stout. *Racemes* 2–4 in.; glands of bracts long-stipitate. *Sepals* ovate, nearly glabrous within. *Petals* of male as long, oblong, margins woolly. Young *capsule* $\frac{1}{3}$ in., terete? densely stellately hispid.

11. **C. cœlococcus,** *Kurz For. Fl.* ii. 377; shrubby, all parts scaberulous with stellate hairs, leaves broadly ovate or elliptic-ovate acute entire or denticulate 3-plinerved at the rounded base, racemes slender, bracts minute, sepals hispid, ovary stellately hispid, styles 2-partite slender hairy, capsule small deeply 3-lobed tuberculate and stellately hispid.

Pegu, *M'Clelland*; at Rangoon, *Kurz*.

A rigid shrub, branches terete. *Leaves* 2–3 in., basal nerves extending beyond the middle; glands stipitate; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Racemes* 1–2 in.; male fl. not seen. *Sepals* not accrescent. *Capsules* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., broader than long, 3-lobed at top and sides, lobes spreading. *Seeds* broadly ovoid, arillate, smooth, brown.—The specimens are indifferent.

12. **C. birmanicus,** *Muell. Arg. in Linnæa* xxxiv. 112, and in *DC. Prodr.* xv. ii. 601; branches scabrid with stellate hairs, leaves coriaceous orbicularly ovate-cordate acuminate finely gland-toothed minutely stellately pubescent on both surfaces strongly 3–5-plinerved at the base, racemes solitary stout terminal, fem. sepals ovate-lanceolate acuminate, stamens

about 15 glabrous, ovary densely stellate-tomentose, styles 2-partite slender. C. drupaceus ?, *Wall. Cat.* 7744, and C. aromaticus, 7773 A.

BURMA; on the Irawaddy at Taong-dong, *Wallich.* PEGU, *M'Clelland.*

Branches woody, bark pale. *Leaves* 3–5 in., yellow-brown when dry, base very broadly cordate; nerves 5–6 pair above the basal, strong beneath; glands cup-shaped, sessile; petiole 1–1½ in., stout. *Capsules* "large, depressed-globose, inflated, rigidly chartaceous. *Seeds* smooth," *Mueller.*—There are no capsules in Wallich's Herbarium, and I have seen none.

†† Leaves penninerved, not or obscurely 3-nerved at the base; mature usually quite glabrous above (or scaberulous in *C. Moonii*).

§ *Inflorescence tomentose or stellately pubescent.*

13. **C. Wallichii,** *Muell. Arg. in Linnæa* xxxiv. 118, and in *DC. Prodr.* xv. ii. 623; shoots and young leaves softly stellate-pubescent, leaves obovate oblanceolate or elliptic acuminate subserrate glabrous or softly puberulous beneath base narrowed acute or narrowly cordate nerves 6–12 pair, racemes fascicled finely tomentose, stamens 10–12 hairy below, ovary stellately pubescent, styles slender 2-partite, capsule small 3-lobed puberulous. *Kurz For. Fl.* ii. 373.—Croton sp., *Wall. Cat.* 7729, 7730, 7733, 7739 (*in part*).

BURMA, *Wallich.* PEGU, to TENASSERIM, *Griffith, Kurz.*

A small deciduous tree. *Leaves* 3–10 by 1½–3 in., yellow when dry, quite glabrous above, base often produced, glands depressed; petiole 1–1½ in., scaberulous. *Racemes* 4–8 in., slender. *Sepals* tomentose. *Disk* of fem. fl. obscure. *Styles* shorter than in many species. *Capsule* the size of a pea. *Seeds* $\frac{1}{12}$ in. long.—I have seen no fruit, and described it from Kurz and Mueller. The latter describes the habit and inflorescence as of *C. caudatus*, but this must be a lapsus, possibly for *oblongifolius*. The fem. fl. have petals which it greatly resembles, but differs in the inflorescence not being lepidote.

14. **C. sublyratus,** *Kurz For. Fl.* ii. 374; shoots rusty-scurfy, leaves very shortly petioled obovate to almost lyrate oblong obtuse or acuminate repand-serrulate beneath glabrous or with scabrous nerves, racemes stellate-tomentose, stamens 15–20 glabrous, ovary densely stellate-tomentose, styles short 2-partite, capsules small 3-lobed crustaceous sparsely pubescent.

Maritime forests of the ANDAMAN ISLANDS, *Kurz.* ? MOULMEIN, *Falconer.*

A deciduous shrub.—The only authentically named specimen I have seen of this is in a very young state; the branches are stout; the leaves 6–8 in. long, dark brown, acuminate, subentire, glabrous on both surfaces, cordate at the narrowed base; the petiole stout, $\frac{1}{4}$–$\frac{1}{3}$ in. long, and the inflorescence too young for examination. Others also collected by Kurz in the Andamans, but unnamed, have membranous serrulate pale-brown leaves, and scaberulous old fruiting racemes; the foliar glands are either sessile or shortly stipitate, capsules $\frac{1}{3}$ in. diam., and seeds subglobose smooth and mottled. A very similar plant from Moulmein in bad state, collected by Falconer, has decandrous male flowers with filaments villous below, and a shortly villous receptacle. The narrowing of the leaves above the base is characteristic of this species.

15. **C. Moonii,** *Thwaites Enum.* 276; branches and leaves beneath stellately scabrid, leaves oblong or linear-oblong acuminate subserrulate smooth or scaberulous above penninerved base rounded or unequally cordate, racemes tomentose, stamens 10–16, ovary stellately hispid, styles 2–5-partite, capsule $\frac{1}{4}$–$\frac{1}{3}$ in. diam. depressed-globose scurfy and tubercled. *Muell. Arg. in DC. Prodr.* xv. ii. 590. C. punctatus, *Moon Cat.*

CEYLON; at Caltura, *Moon, Thwaites.*

A small tree; branchlets woody. *Leaves* 3–6 in., rather coriaceous, very dark above when dry, greyish beneath; nerves 7–12 pairs, slender, spreading; glands minute; petiole $\frac{1}{2}$–$\frac{2}{3}$ in., scabrid. *Sepals* obtuse, stellate-tomentose. *Disk* of male obscure, of fem. small annular.—The specimens are in a young state, and I have seen no fruit. Beddome regards it as a var. of *C. aromaticus*, from which Thwaites' specimens differ in the longer narrower penninerved leaves. The styles are as in *aromaticus*.

16. **C. erythrostachys,** *Hook. f.*; branches young leaves petioles and racemes rusty stellately scabrid, leaves ovate oblong or linear-oblong acuminate subserrulate penninerved smooth and shining above scabrid beneath, racemes short stout, stamens about 12 glabrous, ovary depressed stellate hispid, styles very slender 2-partite, capsule $\frac{1}{3}$–$\frac{1}{2}$ in. diam. globose scabrid.

MALACCA, *Cuming* (No. 2393), *Griffith* (*Kew. Distrib.* 4777), *Lobb.*

Leaves coriaceous, 3–8 by 1–$2\frac{1}{2}$ in., base subacute rounded or subcordate; nerves 8–12 pair, slender, spreading; glands sessile; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in., stout, rusty. *Racemes* 1–$2\frac{1}{2}$ in.; flowers rather large; males tomentose, fem. more hispid; sepals glabrous within. *Petals* of male oblong, of fem. subulate. *Capsule* crustaceous.

17. **C. rhodostachyus,** *Muell. Arg. in Linnæa* xxxiv. 108, and in *DC. Prodr.* xv. ii. 590; shoots and young leaves beneath stellately puberulous, leaves long-petioled elliptic or elliptic-oblong obtuse or subacute crenulate penninerved base acute, young racemes fascicled rusty-tomentose, stamens 10–12. C. denticulatus, *Wall. Cat.* 7731.—*Wall. Cat.* 7739 *in part.*

BURMA; at Taong-dong and Sejavi, *Wallich.*

Branches woody, stout, bark grey. *Leaves* coriaceous, 4–7 in., variable in width, dull greenish when dry, base contracted and sometimes very narrowly cordate; nerves 8–10 pair, very slender; glands minute; petiole 1–$2\frac{1}{2}$ in., terete, puberulous. *Racemes* too young for description.—A very imperfectly known plant.

§§ *Inflorescence glabrous or nearly so.*

18. **C. lævifolius,** *Blume Bijd.* 603; glabrous, leaves elliptic or elliptic-lanceolate or oblong acuminate subserrate penninerved base usually acute, racemes rather short, flowers small males filled with silvery wool, stamens about 10, disk of fem. of 5 large glands, ovary globose stellately hispid and with lepidote scales, styles 2-partite, capsule $\frac{1}{4}$ in. diam. depressed globose smooth and shining. *Muell. Arg. in DC. Prodr.* xv. ii. 619. C. diadenus, *Miquel Fl. Ind. Bat. Suppl.* 451.—*Wall. Cat.* 7719.

KHASIA MTS., alt. 3–4000 ft., *Wallich,* &c.—DISTRIB. Mts. of Java, Sumatra.

A small tree, very young shoots and leaves sparsely stellately lepidote. *Leaves* 2–4 in., membranous, green when dry, nerves 8–12 pair; glands small, at length stipitate; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in., very slender. *Racemes* 2–4 in., sometimes with a few scattered stellate scales; bracts lanceolate; flowers often 2–3 together seated on small pulvini of the rachis, males appearing as if stuffed with the stellately woolly hairs of the receptacle. *Sepals* of male bearded at the tip; of fem. ovate, acute, recurved, quite glabrous. *Filaments* glabrous. *Styles* rather short. *Capsule* crustaceous, with no stellate hairs or scales.—I have seen no Javanese or Sumatran specimens, and take the identifications from Mueller. The similarity of this to *C. Klotzchianus* has led to these species being indiscriminately numbered in the distribution of Wallich's plants. *C. argutus,* cited under *lævifolius* by Mueller, is *C. Klotzschianus.* The Philippine Island *C. leiophyllus,* Muell. (*Tiglium Cumingii,* Klotzsch), is very near *C. lævifolius,* but the ovary is lepidote and the fruit is wanting.

19. **C. Griffithii,** *Hook. f.*; quite glabrous, leaves elliptic or oblong obtuse or acuminate entire or obscurely subsinuate-serrate penninerved shining above, racemes elongate glabrous or sparsely lepidote, flowers small solitary, males filled with silvery wool, stamens 8–15, disk of fem. of 5 large glands, ovary depressed 3-lobed stellately tomentose and white with lepidote scales, styles 2-partite, capsule $\frac{1}{3}$ in. diam. depressed 3-lobed sparsely lepidote smooth.—*Wall. Cat.* 7754, 7967.

MALACCA, *Griffith* (*Kew Distrib.* 4778, 4781), *Maingay* (*Kew Distrib.* 1406). SINGAPORE, *Wallich*, &c. PERAK, *Scortechini*, *King's Collector*.

Branchlets with pale bark. *Leaves* 4–8 in., rather coriaceous, very smooth, yellow brown when dry, base rounded or acute; nerves 8–12 pair, spreading, very slender; glands minute, sessile; petiole 1–$2\frac{1}{2}$ in., terete. *Racemes* 4–8 in., rachis thickening in age; sepals of fem. ovate, subacute, tips bearded. *Capsule* not shining, with globose lobes. *Seeds* subglobose.—Griffith's and some of the Perak specimens have obtuse leaves with rounded bases; in Maingay's they are more acute, and the racemes more slender; in the Singapore ones the racemes are much shorter and sparsely lepidote; hence there may be more than one species under the above description. A solitary specimen of Griffith's from Malacca (Kew Distrib. 4779) has the very slender racemes of *C. lævifolius* and lepidote ovaries.—It is possible that this is the true *lævifolius* of Blume; and if so, the Khasian plant so called should bear the name of *khasianus*.

20. **C. Gibsonianus,** *Nimmo in Grah. Cat. Bomb. Pl.* 251; quite glabrous, leaves membranous elliptic oblong or linear-oblong caudate-acuminate penninerved and 3-nerved at the obtuse or rounded base, racemes very long and slender, sepals membranous, disk of male of 5 large glands, stamens 10, ovary stellate-tomentose, styles very long 2-partite, capsule $\frac{1}{2}$ in. diam. 3-lobed stellately hairy. *Muell. Arg. in DC. Prodr.* xv. ii. 692; *Dalz. & Gibs. Bomb. Fl.* 232.

CANARA, *Gibson*, *Law*; common in moist forests on the Ghats to the south, *Talbot*.

A shrub; branches slender, smooth, young shoots and leaves sparing stellate pubescent. *Leaves* 3–8 by 1–4 in., green or yellowish when dry; nerves 8–10 pairs, very slender; glands minute, stipitate; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., terete. *Racemes* 6–10 in.; flowers distant, solitary or fascicled, bracts small. *Receptacle* of male very small, woolly. *Disk* of fem. saucer-shaped. *Styles* very long, recurved. *Capsule* crustaceous. *Seeds* broadly oblong, smooth, shining.

21. **C. Klotzschianus,** *Wight Ic.* t. 1914; glabrous except the stellately lepidote youngest shoots, leaves small membranous elliptic-oblong acute entire or serrulate penninerved and 3-nerved at the base, racemes short very slender, sepals membranous, disk of male and fem. of 5 large glands, petals of fem. subulate, stamens about 10–12, ovary stellate-tomentose, styles long 2-partite, capsule depressed 3-lobed. *Thwaites Enum.* 276; *Beddome Forester's Man.* 204. C. Thwaitesianus, *Muell. Arg. in Linnæa* xxxiv. 116, and in *DC. Prodr.* xv. ii. 621. C. caudatus, γ., *Muell. l. c.* C. argutus, *Heyne*, & umbellatus, *Heyne in Wall. Cat.* 7768. Tiglium punctulatum, *Klotzsch in Hayne Arzneik-Gewachs. ined.*—*Wall. Cat.* 7750 (*one specimen*).

DECCAN PENINSULA; Nilghiri Hills, *Foulkes*; Travancore, *Heyne*, *Wight*. CEYLON, not uncommon.

A small tree or bush; branches slender, pale. *Leaves* 1–2 in., small and membranous for the genus, pellucid-punctate, base acute; nerves 6–8 pair, very slender; glands minute, sessile; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., very slender. *Racemes* 1–3 in.; bracts subulate; male fl. long-pedicelled; sepals and petals translucidly gland-dotted; disk-glands very large; receptacle very small; stamens hairy below. *Disk* 5-lobed in

both sexes. *Sepals* of fem. ovate, acute; petals subulate, hairy; styles very long, divided $\frac{2}{3}$ way down. *Capsule* "at length glabrous," *Thwaites*.—This is undoubtedly, as Beddome has pointed out, Wight's *Klotzschianus*, and is well figured by him. Wight compares it with *C. Tiglium*, from which it differs widely in the elliptic leaves and nerves. I have seen no ripe fruit.

22. **C. ardisioides,** *Hook. f.*; robust, quite glabrous, leaves oblong or linear- or obovate-oblong obtuse crenate penninerved base acute, racemes very slender, flowers small scattered, disk of male obscure of fem. 5-lobed, stamens about 12, ovary depressed stellate-tomentose, styles 2-partite, capsule very small globose smooth.

MALACCA, *Griffith* (*Kew Distrib.* 4783).—DISTRIB. Borneo.

Branches stout. *Leaves* 2–4 in., rather coriaceous, tawny yellow when dry; nerves 6–10 pairs, very slender; glands petiolar, small; petiole $\frac{1}{4}$–$1\frac{1}{2}$ in., stout, terete. *Racemes* 3–5 in., flexuous; bracts minute; flowers scattered. *Sepals* glabrous, of male with bearded tips; of fem. ovate, obtuse. *Capsule* (one only seen) $\frac{1}{6}$ in. diam., terete.

††† *Leaves strongly triple-nerved, glabrous or nearly so.*

23. **C. Tiglium,** *Linn. Sp. Pl.* p. 1004; youngest shoots sparsely stellately hairy, leaves long-petioled membranous glabrous ovate acuminate serrate 3–5-plinerved, rachis of racemes and small flowers glabrous, fem. stellately hairy, stamens 15–20, ovary stellately hispid, styles slender 2-partite, capsule large oblong 3-lobed, pericarp thin glabrous or slightly hispid. *Muell. Arg. in DC. Prodr.* xv. ii. 600; *Roxb. Fl. Ind.* 682; *Kurz For. Fl.* ii. 374; *Grah. Cat. Bomb. Pl.* 181; *Wall. Cat.* 7722; *Blume Bijd.* ii. 602; *Klotzsch in Hayne Arzneigew.* xiv. t. 3; *Marchand in Baill. Rec. Obs. Bot.* i. 232–245, t. 9, 10; *Bentl. & Trimen Med. Pl.* iii. t. 239. C. Jamalgota, *Ham. in Trans. Linn. Soc.* xiv. 258. C. Parana (Parona *in Wall. Cat. l. c.*), *Ham. l. c.* 259; *Muell. Arg. l. c.* 623 (*Paranae*). Tiglium officinale, *Klotzsch in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. 418.—*Burm. Fl. Zeyl.* t. 90.—*Rheede Hort. Mal.* ii. t. 33.

BENGAL, ASSAM, and southward to MALACCA, BURMA, and CEYLON, naturalized or cultivated.—DISTRIB. China, Malay Islands.

A small evergreen tree. *Leaves* 2–4 in., yellowish when dry, rarely elliptic or oblong, sometimes glandular beneath; nerves 2–3 pair above the basal; glands minute, sessile; petiole 1–2 in., slender. *Racemes* 2–3 in.; bracts subulate. *Male fl.*; pedicels stellately hairy; sepals nearly glabrous, tips bearded; petals narrow, woolly-edged; stamens glabrous, receptacle villous; disk-glands 5, small. *Fem. fl.*; sepals villous at the base within; petals 0; disk obscure, annular; ovary oblong. *Capsule* $\frac{3}{4}$–1 in. long, white, turbinately obovoid, obtusely trigonous. *Seed* $\frac{1}{2}$–$\frac{2}{3}$ in., oblong, obtusely trigonous, pale.—I find no characters whereby to distinguish Hamilton's *C. Parana* from *Tiglium*; Mueller is mistaken in supposing that Wallich's 7722 B is not Hamilton's plant; the specimen is Hamilton's own from Goyalpara in Kamrup (Assam), and is so named by himself.

24. **C. nigro-viridis,** *Thwaites Enum.* 276; shoots racemes and young leaves beneath sparsely stellately pubescent, leaves coriaceous broadly ovate or ovate-lanceolate acuminate serrulate base strongly 3-nerved, racemes short stout, ovary stellately hispid, styles long 2-partite, fruit small subglobose 3-lobed woody scabrid and sparsely stellate. *Muell. Arg. in DC. Prodr.* xv. ii. 601; *Wawra Bot. It. Pr. Sax. Cob.* 37.

CEYLON; Central Province, alt. 5000 ft., *Thwaites*.

A small tree; branches very stout, smooth. *Leaves* 3–5 in., leathery, greenish when dry, quite smooth on both surfaces, base rounded; nerves 1–3 pair above the

basal; glands rather large, subsessile; petiole 1–2 in., stout, terete. *Racemes* 2–3 in.; pedicels very short, stout; bracts minute. *Sepals* of fem. stellate externally, glabrous within except the villous base; disk annular, 5-lobed; petals minute, subulate, with long hairs; styles rather stout. *Capsule* $\frac{1}{2}$ in. long, rather longer than broad, top depressed. *Seeds* unripe.—I have seen no male flowers, nor the lanceolate leaves described by Thwaites. Beddome is disposed to regard this as a form of *C. aromaticus*, but it appears to me entirely different, with the leaves of *C. Tiglium*, but very thick.

25. **C. flocculosus,** *Kurz For. Fl.* ii. 375; shoots and leaves beneath with soft woolly tomentum, leaves broadly ovate-cordate acute crenate strongly 3–5-plinerved, capsules in terminal racemes subglobose softly tomentose, seeds elliptic-oblong.—*Wall. Cat.* 7743.

PEGU and BURMA; in the swamp forests of the Irrawaddi, *Kurz*; hills opposite Paghamew, *Wallich*.

A tree; branches stout, woody; bark pale. *Leaves* 2–3 in. long and broad, pale when dry, smooth above, at length glabrous beneath; nerves 3–4 pair above the basal, glands minute; petiole $\frac{1}{2}$–1 in., rather slender. *Capsule* obscurely lobed. *Seeds* $\frac{1}{4}$ in., smooth, subterete or plano-convex.—A very distinct species, but in an incomplete state.

B. *Ovary* glabrous, styles united in a short column. *Sepals* greatly enlarged and foliaceous in fruit.

26. **C. Lawianus,** *Nimmo in Grah. Cat. Bomb. Pl.* 251; young leaves finely softly stellately hairy, leaves shortly petioled broadly ovate caudate-acuminate quite entire strongly 3-nerved, racemes short few-fld., male fl. large membranous, stamens about 20, sepals of fem. large oblong glabrous, ovary oblong glabrous 3-lobed, styles 3 united below very stout recurved, capsule large rugose glabrous. *Dalz. & Gibs. Bomb. Fl.* 232. Trigonostemon Lawianus, *Muell. Arg. in Linnæa* xxxiv. 212, and in *DC. Prodr.* xv. ii. 1105 (*in part*).

CANARA; on the Bababoodan Hills, *Gibson, Law, Dalzell.*

Branches slender, terete, smooth. *Leaves* 3–5 in., thinly coriaceous, base rounded, greenish when dry; nerves 2–3 pair above the basal; glands minute; petiole $\frac{1}{6}$ in., terete. *Racemes* very slender; bracts 0. *Male fl.* 3–5, $\frac{1}{3}$ in. diam.; pedicels capillary; sepals ovate, obtuse, gland-dotted, sparsely stellately hairy; petals larger, oblong, fimbriate; stamens short; disk of 5 large glands. *Fem. fl.* few, $\frac{1}{2}$ in. long; pedicel as long, very stout, erect; disk annular; styles recurved 2-lobed, lobes 2-fid. *Capsule* $\frac{2}{3}$ in. diam., shorter than the leafy green sepals, thickly crustaceous. *Seeds* $\frac{1}{3}$–$\frac{1}{2}$ in. long, oblong, striately mottled brown and white.—The female calyx resembles that of a *Trigonostemon*, whence Mueller's reference of this to his *T. Lawianus* (*Dimorphocalyx glabellus*, Thw.).

27. **C. chlorocalyx,** *Wall. Cat.* 8001; quite glabrous, leaves linear-lanceolate caudate-acuminate subserrulate penninerved, racemes cymose very slender, male fl. membranous, stamens 12–15 fem. subsolitary, sepals oblong foliaceous, ovary oblong glabrous 3-lobed, styles 3 united below very stout recurved 2-lobed. *Muell. Arg. in DC. Prodr.* xv. ii. 590.

SILHET, *Wallich.*

Branches stout, woody, bark pale. *Leaves* 5–9 in., ochreous yellow when dry, pale beneath, base narrowed into the petiole; nerves 10–15 pair, very slender; glands minute; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Racemes* shorter than the leaves. *Male fl.* $\frac{1}{6}$ in. diam.; sepals and petals obtuse, undulate, tipped with hairs; disk-glands 0; receptacle small, villous. *Fem. fl.* shortly pedicelled; sepals oblong, $\frac{1}{4}$ in. long, green, tip rounded; petals subulate; disk 0; ovary shortly stipitate; styles very stout, recurved, once or twice 2-fid.—Habit of *C. oblongifolius.*

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

C. CARDIOSPERMUS, *Gærtn. Fruct.* ii. 120, t. 107; *Geisel Croton. Monog.* 77; *Muell. Arg. in DC. Prodr.* xv. ii. 695.—Ceylon.—Mueller remarks that the absence of a caruncle excludes this from *Croton*. It is impossible to say what it is; possibly a *Phyllanthus*.

C. RAMIFLORUS, *Grah. Cat. Bomb. Pl.* 182; *Muell. Arg. l. c.* 693; "a small tree, leaves alternate petioled oblong-ovate subglaucous beneath, flowers small white growing on the naked branches, capsules size of a large pea half hid in the scarious 5-winged calyx, sparsely hairy."—The Concan; near K
Gibson.—I have not recognized this plant.

C. RHEEDEI, *Grah. Cat. Bomb. Pl.* 182; *Muell. Arg. l. c.* 693; "an erect suffruticose plant 2–3 feet high, flowers in terminal spikes." Croton Gibsonii, *Grah. l. c.*—*Rheede Hort. Mal.* x. 83.—It is impossible to say what *C. Rheedei* is; Mueller unites with it Graham's *C. Gibsonii*, which Graham says much resembles Rheede's t. x. f. 83, and should probably be referred to it. It is also a suffruticose species, and has petioled cordate serrate leaves. *C. Rheedei* is a native of Tull Ghat, Salsette and Jowaur, *C. Gibsonii* of the northern peaks of the Deccan, *D. Gibson.* Local botanists must rediscover both.

C. TABACIFOLIUS, *Geisel Croton. Monog.* 26; *Muell. Arg. l. c.* 696, is undeterminable by the description. Mueller observes that from its simple hairs it cannot be a *Croton*, and that it may be *Claoxylon indicus*.

35. **GIVOTIA,** *Griff.*

A small stellately tomentose tree. *Leaves* alternate, rounded, and cordate, sinuate-toothed, base 5–9-nerved. *Flowers* in axillary and subterminal racemed or panicled cymes, diœcious. *Disk* entire or lobed. MALE FL. *Sepals* 5, broad, unequal, imbricate. *Petals* 5, longer, cohering in a globose 5-lobed corolla. *Disk* of orbicular glands. *Stamens* 13–25, crowded on a woolly receptacle, filaments connate below, erect; anthers ovate, dorsifixed, cells parallel. *Pistillode* 0. FEM. FL. *Perianth* of the male. *Disk* cupular. *Ovary* 2–3-celled; styles short, spreading, 2-fid; ovules 1 in each cell. *Drupe* subglobose; putamen crustaceous, 1-celled, 1-seeded. *Seed* globose or ellipsoid, testa bony, albumen fleshy; cotyledons broad, flat.

G. rottleriformis, *Griff. in Calc. Journ. Nat. Hist.* iv. 388; *Muell. Arg. in DC. Prodr.* xv. ii. 1112; *Baill. Etudes Gen. Euphorb.* 389; *Wight Ic.* t. 1889; *Brand. For. Fl.* 442; *Gamble Man. Ind. Timb.* 365; *Dalz. & Gibs. Bomb. Fl.* 228; *Beddome Fl. Sylvat.* t. 285. Govania nivea, *Wall. Cat.* 7851.—*Wall. Cat.* 7819 A, C.

DECCAN PENINSULA; common in the central ranges of the Ghats from Dharwar and Bellary southwards, *Wight*, &c. CEYLON; in the drier parts of the island.

A small tree; branches stout, wood soft. *Leaves* attaining 10 in. long and broad, coriaceous, hoary above, beneath white with dense appressed wool; nerves 5–7, basal, with several pairs above them; petiole stout, 4–6 in., woolly, with sometimes a few glands. *Panicles* 4–8 in. long; cymes dense or lax-fld.; bracts filiform; pedicels jointed. *Male fl.* $\frac{1}{6}$ in. diam., fem. $\frac{1}{4}$ in.; sepals stellately tomentose, shorter than or equalling the oblong glabrous petals; filaments hairy below. *Fem. fl.*; ovary globose, stellately hairy. *Drupe* $\frac{3}{4}$–1 in. diam., hoary. *Seed* smooth.

36. **TRIGONOSTEMON,** *Blume.*

Evergreen trees or shrubs. *Leaves* alternate, penninerved. *Flowers* in axillary or terminal spikes racemes or cymes, monœcious. MALE FL. *Sepals* 5, imbricate. *Petals* 5. *Disk* of 5 glands, often united in a lobed cup.

Stamens 3 or 5; anthers sessile, or filaments united in a column with free spreading tips; anthers erect or horizontal, cells united by their bases, each cell with an often thick crested connective, extrorse. *Pistillode* 0. FEM. FL. *Perianth* of the male, or petals 0. *Disk* usually entire. *Ovary* 3-celled; styles 2-fid or twice 2-fid, rarely entire; ovules 1 in each cell. *Capsule* of 3 2-valved cocci. *Seeds* ovoid or globose, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 15 or more, Indian and Malayan.

The following sections are those proposed in Genera Plantarum, iii. 298. They are not natural, the species with long petioles thickened at the tip differing in habit from the rest, and resembling *Ostodes*. Sect. *Pycnanthera* appears generically distinct, but I should hesitate to separate it before having studied the whole genus thoroughly. (Under *Trigonostemon* in Gen. Plant. l. c. for *Cheilosiopsis* read *Cheilosopsis*, and for *Antitaxis* read *Anisotaxis*.)—Wall. Cat. 8018, from Penang, is possibly a *Trigonostemon*, but is in too imperfect a state for determination.

Sect. I. EUTRIGONOSTEMON. *Racemes* axillary. *Anthers* 3, on a column, erect or horizontal, 2-partite; cells connected at the base only.

1. **T. longifolius,** *Baill. Etudes Gen. Euphorb.* 341, t. 11, f. 12; leaves subsessile 8–18 in. oblanceolate acuminate, panicles or racemes axillary long spiciform hispid and pubescent, capsule hispid, styles shortly 2-lobed. *Muell. Arg. in DC. Prodr.* xv. ii. 1108; *Kurz For. Fl.* ii. 406. Croton longifolius, *Wall. Cat.* 7717. ? Athroisma dentatum, *Griff. Notul.* iv. 478, and *Ic. Plant. Asiat.* t. 585, f. 4.

From TENASSERIM and PENANG to SINGAPORE, *Wallich,* &c.

A small tree or shrub; shoots with golden hairs. *Leaves* 2–4 in. broad, narrowed into the very short petiole; nerves 15–20 pair, very slender, margin entire or with few distant glandular teeth. *Racemes* rigid, rachis angled; bracts subulate. *Male fl.* about $\frac{1}{4}$ in. diam.; sepals broad, hispid, one much the largest; petals obovate-oblong, red; anther-cells acute, connective hardly thickened. *Capsule* $\frac{1}{3}$ in. diam., equalling the stout pedicel, tridymous, densely hispid. *Seeds* minute.—The Tenasserim specimens have the broadest leaves, and those of one of Wallich's specimens are rounded at the narrow base, with a short distinct petiole.

2. **T. heteranthus,** *Wight Ic.* t. 1890; glabrous, leaves very long-petioled 5–10 in. elliptic-lanceolate caudate-acuminate entire or serrate, panicles axillary very slender, pedicels capillary, styles shortly 2-lobed, capsule glabrous. *Muell. Arg. in DC. Prodr.* xv. ii. 1109; *Kurz For. Fl.* ii. 406. ? Athroisma serratum, *Griff. Notul.* iv. 477, and *Ic. Plant. Asiat.* t. 585, f. 9.

TENASSERIM; at Mergui, *Griffith.*

Shrubby or arboreous (a tree 28 ft., *Griffith*); shoots tawny-pubescent. *Leaves* 2–3$\frac{1}{2}$ in. broad, membranous, base acute 2-glandular, teeth gland-tipped; nerves 10–15 pair, slender, arched; petiole 1–5 in., very slender, tip swollen. *Panicles* 5–6 in.; bracts minute; pedicels simple and branched. *Male fl.* $\frac{1}{3}$ in. diam.; sepals rounded, unequal, membranous, ciliate; petals twice as long, rounded; disk-glands large, ascending; staminal column stout; anthers 3, forming a star of 6 obtuse points, each being horseshoe-shaped with a cell on each arm opening downwards. *Sepals* of fem. fl. ovate, gland-ciliate; petals as long; disk of the male; ovary glabrous. *Capsule* $\frac{1}{2}$ in. diam., tridymous, crustaceous, glabrous. *Seeds* subglobose, pale.

3. **T. malaccanus,** *Muell. Arg. in Flora* (1864) 482, and in *DC. Prodr.* xv. ii. 1110; glabrous, leaves long-petioled 3–12 in. lanceolate long-acuminate entire or crenate-serrate, racemes or spikes axillary very long slender puberulous, ovary silky, styles 2-partite.

MALACCA, *Griffith* (*Kew Distrib.* 4782).

Branches stout, woody. *Leaves* 1–2½ in. broad, base obtuse or rounded; nerves 15–20 pairs, arched; petiole 1–4 in., thickened at the tip. *Male spikes* and fem. racemes rigid, angular, glabrous or puberulous; bracts minute. *Male fl.* minute, $\frac{1}{12}$ in long, clustered; fem. larger, $\frac{1}{8}$ in long, subsolitary, stoutly pedicelled; sepals of male coriaceous, pubescent, of fem. oblong, erect; petals of male broadly obovate, of fem. minute or 0; connective of anthers papillose, cells parallel, united at the base only. *Capsule* unknown.

4. **T. lætus,** *Baill. Etudes Gen. Euphorb.* 341 (*excl. syn.*); glabrous, le aves long-petioled 4–6 in. oblong to oblong-lanceolate obtusely repand-to othed base obtuse, racemes axillary elongate spiciform, pedicels very sh ort, ovary silky, styles 2-fid to the middle, capsule glabrous. *Muell. Arg. in DC. Prodr.* xv. ii. 1109 (*excl. syn. Croton lætus*); *Kurz For. Fl.* ii. 406.—*Wall. Cat.* 7740 B.

BURMA, at Amherst, *Wallich*; UPPER TENASSERIM, *Kurz.*

A shrub; buds tawny-pubescent. *Leaves* 2–3 in. broad, nerves 10–12 pairs; petiole 1–1½ in., thickened at the tip. *Racemes* rather robust, bracts minute. *Sepals* appressed-pubescent, of the fem. ovate-lanceolate ciliolate; petals puberulous. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., depressed, tridymous. *Seeds* subglobose, marbled.—I have not seen a good flowering specimen, and have taken the description partly from Kurz. Baillon erred in citing for this plant Wallich's *Croton lætus*, which is his No. 7738, and a *Mallotus*. Of Wallich's 7740 there are three sheets in his Herbarium, of which two, both marked A, consist of *Claoxylon Wallichii* and scraps of what I think is *Trigonostemon indicus*; the third, marked B, is *T. lætus* of Baillon; it bears the mss. name of *Acalypha atropurpurea*, Wall., which was evidently intended for the *Claoxylon*, some leaves of which have retained a red-purple hue.

5. **T. semperflorens,** *Muell. Arg. in DC. Prodr.* xv. ii. 1110; branches hispid, leaves very shortly petioled 5–10 in. oblanceolate from a narrow cordate base pubescent beneath, racemes very short subsessile, pedicels short stout, ovary hispid, styles 2-fid to the middle, capsules sub-sessile hispid. T. Hookerianus, *Muell. l. c.* 1109. Sylvæa Hookeriana, *Baill. Etudes Gen. Euphorb.* 342. S. semperflorens, *Hook. & Arn. Bot. Beech. Voy.* 211. Cluytia semperflorens, *Roxb. Fl. Ind.* iii. 740. Agyneia ciliata, *Wall. Cat.* 7952.—*Wall. Cat.* 8004.

ASSAM, SILHET and CACHAR, *Hamilton*, &c.

A small shrub; branches rather stout. *Leaves* 1–3 in. broad, very dark when dry, membranous, panduriformly constricted above the base, obscurely serrulate and ciliate; nerves 15–25 pair; slender, spreading, and midrib tomentose; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., very stout, tomentose. *Racemes* inconspicuous, axillary and from the branches. *Male fl.* many, purple; fem. fewer, larger, $\frac{1}{10}$ in. diam., green; sepals unequal, oblong, hispid; petals orbicular; disk and anthers as in *T. heteranthus*. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., 3-lobed, thinly crustaceous.—Roxburgh describes the fem. fl. as apetalous in *semper-florens*, and Mueller as obovate in *Hookerianus*.

6. **T. villosus,** *Hook. f.*; branchlets leaves beneath and inflorescence villously rusty-tomentose, leaves thin oblanceolate from a narrow rounded or subcordate base finely acuminate, racemes long-peduncled, anthers 3, ovary villously hispid, styles divided to the base.

PERAK, *King's Collector.*

Leaves 4–7 by 1½–2 in., brown when dry, membranous, sometimes a little con-tracted above the base and subpanduriform, pubescent above, at length glabrate, entire or very obscurely toothed; nerves 9–14 pairs, slender, spreading; petiole $\frac{1}{4}$–1 in. *Peduncles* slender, nearly as long as the leaves; bracts leafy, lanceolate, $\frac{1}{4}$–$\frac{1}{3}$ in. long; pedicels as long or longer. *Male fl.* ¼ in. diam.; sepals oblong, villous;

petals obovate-oblong; disk-glands erect; anthers discrete, cells with crested connectives. *Fem. fl.* ½ in. diam.; sepals lanceolate, villous; ovary globose; style-arms filiform.

Sect. II. TELOGYNE. Characters of *Eutrigonostemon*, but anthers 5.

7. **T. indicus,** *Muell. Arg. in DC. Prodr.* xv. ii. 1107 (*excl. syn. Croton lævigatus*); quite glabrous, leaves long-petioled elliptic lanceolate or oblanceolate acuminate glaucous or not beneath, racemes lax-fld., anthers 5, ovary tomentose, styles 2-partite. Telogyne indica, *Baill. Etudes Gen. Euphorb.* 328. Enchidium verticillatum, *Jack in Mal. Misc.* ii. vii. 89.—*Wall. Cat.* 7740 A *in part*, 7849, 7997.

PENANG, *Wallich*, &c. PERAK, *Herb. Hort. Bot. Calc.*—DISTRIB. Sumatra.

Branches slender, bark pale. *Leaves* subverticillate at the ends of the branches, 1½–2 in. broad, usually pale ochreous beneath, margin rarely with a few minute distant gland-tipped teeth, base usually acute; nerves 15–20 pairs, very slender; petiole 2–4 in., sometimes as long as the blade, very slender. *Racemes* 2–3 in., slender, quite glabrous, the uppermost flower female about ¼ in. diam., males much smaller; sepals nearly orbicular, glabrous; petiole larger. *Capsule* (immature) hoary.—Baillon, followed by Mueller, erroneously cites as a synonym Wallich's *Croton lævigatus*, which is a different plant.

Sect. III. PYCNANTHERA. *Racemes* or spikes terminal. *Anthers* 3 sessile on a short column, cells adnate to the greatly thickened connective.

8. **T. diplopetalus,** *Thwaites Enum.* 277; nearly glabrous, leaves 6–9 in. shortly petioled elliptic lanceolate or oblanceolate obtusely acuminate remotely denticulate, racemes terminal sessile elongate puberulous, male fl. minute clustered shortly pedicelled, anthers 3, fem. solitary longer pedicelled, ovary pubescent, styles short twice bifid, capsule pubescent. *Muell. Arg. in DC. Prodr.* xv. ii. 1108; *Beddome Forester's Man.* 212.

CEYLON; in the Reigam Corle, *Thwaites.*

A shrub or small tree, young parts puberulous. *Leaves* 1½–2½ in. broad, dark brown and opaque when dry, toothlets glandular, base very acute; nerves 20–30 pair, slender, nearly horizontal; petiole ⅓–½ in., channelled above. *Male spike* with a stout rachis; flowers ⅒ in. diam.; bracts very short; fem. fl. on pedicels ⅓ in. long; sepals oblong; petals larger, 2-fid, lobes rounded sinuously laciniate; anthers sessile, cells diverging from the top of an almost globose connective. *Capsule* 3-lobed, globose, smooth, ½ in. diam.—Thwaites describes the capsule as 2 in. diam., possibly a typographical error for ½–⅔. I have seen but one specimen and no fem. flowers.

9. **T. nemoralis,** *Thwaites Enum.* 277; nearly glabrous, leaves 3–7 in. very shortly petioled elliptic-oblong or -lanceolate obtuse sinuate-toothed, racemes terminal stout shorter or longer than the leaves silkily pubescent, male fl. clustered shortly pedicelled, fem. solitary longer pedicelled, ovary hispid, styles very short and broad, capsule muricate and hairy. *Muell. Arg. in DC. Prodr.* xv. ii. 1108; *Beddome Ic. Plant.* t. 183, and *Forester's Man.* 213.

TRAVANCORE; on the Tinnevelly Hills, alt. 2400 ft., *Beddome.* CEYLON; Central Province, alt. 2000 ft., *Thwaites.*

A shrub or small tree; young parts silkily hairy. *Leaves* 1–2 in. broad, crowded at the ends of the branches, green when dry, rather coriaceous; nerves 10–12 pairs, slender, arched; base narrowed into the short stout channelled petiole which is often 2-glandular at the top. *Racemes* with a stout rachis, bracts subulate, lower ⅒ in. long and more. *Flowers* red, males ¼ in. diam., fem. ½ in.; sepals very unequal, with pubescent backs and slender tips, the three largest nearly orbicular; petals larger,

oblong; anthers sessile, cells subparallel on a globose connective. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., deeply 3-lobed at the top, less so at the sides, thickly crustaceous. *Seeds* globose.

37. **TRIGONOPLEURA,** *Hook. f.*

A shrub or tree. *Leaves* alternate, shortly petioled, oblong, quite entire, glabrous, penninerved. *Flowers* dicœcious ?, small, in clusters in the leaf axils or on the branches, apetalous. MALE FL. *Sepals* 5, broadly oblong, coriaceous, broadly imbricate. *Petals* rather longer, obovate, villous on both surfaces. *Disk* of 5 large glands, round the base of the staminal column. *Stamens* about 8, filaments united in a column, tips free; anthers oblong, extrorse, cells adnate to the villous connective. *Pistillode* of 3 subulate processes terminating the column. FEM. FL. unknown. *Capsule* small, 3-lobed, hoary; epicarp separable, wrinkled; cocci bony, separating from a columella with 3 hyaline wings. *Seeds* solitary in the cells, broadly oblong, dorsally compressed, testa black, polished; aril large, pale.

T. malayana, *Hook. f.*

PERAK, *Scortechini* (*Herb. Perak.* 738, 2056). MALACCA, *Maingay* (*Kew Distrib.* 1452).

Branches woody, stout or slender, branchlets puberulous, tips tomentose. *Leaves* 4–6 in. by $1\frac{1}{2}$–$2\frac{1}{2}$ in., sometimes linear-oblong, coriaceous or thin, brown when dry, obtusely cuspidate or subcaudate, base acute obtuse or rounded; nerves 8–10 pair, rather strong beneath, cross-nervules faint; midrib sometimes puberulous; petiole $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules minute, ovate-oblong, pubescent. *Flowers* in numerous clusters of 3 or more along the branches, hoary; males about $\frac{1}{4}$ in. diam. when spread open; pedicels short, stout, tomentose; bracts 0; sepals obtuse, unequal; petals small, when dry clothed with rufous hairs, sometimes notched at the tip or side, coriaceous. *Staminal column* included, rusty villous. *Ovules* (undeveloped seeds) solitary in the cells, with a broad fleshy ? obturator. *Capsule* about $\frac{1}{2}$ in. diam. *Seeds* attached to a thickened placenta.—This genus differs from *Trigonostemon* in the anthers being seated on a central column terminating in a 3-cleft pistillode, and entirely in habit and inflorescence.

37*. **CODIÆUM,** *Juss.*

Glabrous shrubs or trees. *Leaves* alternate, quite entire, penninerved. *Flowers* monœcious, in usually unisexual racemes, rarely a female at the base of the male racemes; males small, fascicled, fem. solitary. MALE FL. *Sepals* or calyx-lobes 3–6, membranous, imbricate. *Petals* small, alternating with disk-glands. *Stamens* 15–30, free, crowded on a low receptacle; anthers erect, cells on the margins of a large connective, tips at length confluent. *Pistillode* 0. FEM. FL. *Calyx* 5-lobed. *Petals* 0. *Disk* subentire. *Ovary* 3-celled; styles entire, elongate, slender, recurved; ovules 1 in each cell. *Capsule* globose, of 3 2-valved parchment-like cocci. *Seeds* shining, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 4, Malayan, Australian and Pacific.

C. variegatum, *Blume Bijd.* 606; leaves very variable from oblong to narrowly linear often variegated green and yellow, racemes long axillary. *Muell. Arg. in DC. Prodr.* xv. ii. 1119; *Kurz For. Fl.* ii. 405. C. pictum, *Hook. Bot. Mag.* t. 3051. Croton bractiferus, *Roxb. Fl. Ind.* iii. 680. C. variegatus, *Linn. Sp. Pl. Ed.* 3, 1424. C. pictus, *Wall. Cat.* 7714.—*Rheede Hort. Mal.* vi. t. 61.

In gardens, &c., throughout INDIA, especially in the Eastern Provinces; native of the Molucca Islands.

An evergreen shrub. *Leaves* 2–10 in. long, often waved and infinitely variable in form and colouring.

38. **OSTODES,** *Blume.*

Trees or shrubs. *Leaves* alternate, broad, toothed or entire, penninerved, rarely triple-nerved at the base, which is 2-glandular or not. *Flowers* in lax terminal and lateral panicled racemes, rarely in axillary fascicles, mono- or di-œcious; males fascicled or cymose, fem. in separate racemes or solitary in the male cymes. MALE FL. *Sepals* 5, broad, unequal, imbricate. *Petals* 5–6, longer. *Disk* of 5 glands or 0. *Stamens* 8–30, inserted on a convex or columnar receptacle; anthers dorsifixed, of the inner series often horizontal, cells introrsely adnate to the broad connective, rarely extrorse, parallel or divergent. *Pistillode* 0. FEM. FL. *Perianth* of the male. *Ovary* 3-celled; styles short, 2-cleft, ovules 1 in each cell. *Capsule* subglobose, 6-ribbed, endocarp almost bony, at length breaking up into 3 2-valved cocci. *Seeds* ovoid, testa crustaceous (? pulpy when fresh), albumen fleshy; cotyledons broad, flat.—Species 6–8, Indian and Malayan.

As above defined, *Ostodes* is a heterogeneous assemblage of trees and shrubs with simple leaves, unisexual flowers, a double perianth of 5–6 imbricate sepals, as many petals, and 8 or more free stamens on a central receptacle.

1. **O. zeylanica,** *Muell. Arg. in Linnæa* xxxiv. 214, and in *DC. Prodr.* xv. ii. 1114; leaves elliptic-oblong or -lanceolate obtuse acute or acuminate crenate-serrate all penninerved longer than the petiole, flowers in large branched finely scurfily tomentose panicles, petals elliptic. *Beddome Fl. Sylvat.* t. 274. Desmostemon zeylanicus, *Thwaites Enum.* 278; *Beddome in Trans. Linn. Soc.* xxv. 225, t. 27.

TRAVANCORE; on the Anamallay Hills, alt. 2–3000 ft., *Beddome.* CEYLON; common in the drier parts of the island; ascending to 4000 ft.

A tree, young parts scurfily pubescent; branchlets robust. *Leaves* 6–12 by 2–4 in., coriaceous, brown when dry, serratures glandular; petiole stout, 1–5 in., terete. *Panicles* 6–12 in., pendulous; branches spiciform, strict; bracts short; flowers fascicled, sessile or very shortly pedicelled, $\frac{1}{3}$ in. diam. *Male fl.*; sepals rounded; petals longer, erect and recurved; stamens about 15, 5 free, 10 with filaments united below. *Fem. fl.*; disk annular, strigose within; ovary subglobose, strigose; styles cuneate, 2-fid. *Capsule* $1\frac{1}{4}$ in. diam. or less, hoary.—Thwaites describes this as a very variable plant. Some branches bear, instead of flowers, short $\frac{1}{10}$–1 in. long spikelets clothed with subconfluent bracts.

VAR. *minor, Thwaites l. c.*; subarboreus or shrubby, smaller in all its parts, leaves sometimes narrowly lanceolate, branches of panicles very slender, flowers $\frac{1}{8}$ in diam., capsule $1\frac{1}{2}$ in. diam. O. minor, *Muell. Arg. in Linnæa* and *DC. ll. c.* Trigonostemon zeylanicus, *Muell. Arg. in Linnæa l. c.* 213, and in *DC. l. c.* 1106; *Beddome Forester's Man.* 212. Tritaxis zeylanica, *Muell. Arg. in Flora* 47 (1864) 482.

2. **O. paniculata,** *Blume Bijd.* 620; leaves ovate acuminate or caudate serrate equalling or longer than the petiole, base triple-nerved, flowers in short or long branched glabrous panicles, petals broad glabrous within. *Miquel Fl. Ind. Bat.* i. ii. 384; *Muell. Arg. in DC. Prodr.* xv. ii. 1115; *Kurz For. Fl.* ii. 404.

SIKKIM HIMALAYA, in tropical valleys, and ascending to 5000 ft., *J. D. H. & T. T.*, &c. BHOTAN, *Griffith.* SILHET, at Terrya Ghat, *J. D. H. & T. T.* MARTABAN, *Kurz.* —DISTRIB. Java.

A tree, shoots pubescent; branches very stout, bark white. *Leaves* 8–12 by 4–7 in., thickly coriaceous, 2-glandular at the base; petiole 2–10 in. *Panicles*

8–12 in.; bracts minute; flowers ½ in. diam., pedicelled. *Sepals* unequal, concave. *Petals* unequal, very shortly clawed. *Disk-glands* of male large; receptacle convex, villous. *Stamens* about 20, filaments villous at the base; anthers erect, introrse. *Capsule* 1¼ in. long, subglobose, 3-lobed, rather rough, valves thickly crustaceous or woody. *Seeds* globose, 1 in. diam., brown and mottled, smooth.—The leaves are distinctly triple-nerved at the base; the other nerves are very rarely hairy at the axils; the petals are not hairy at the base.

3. **O. appendiculata,** *Hook. f.*; leaves subsessile 1–2 ft. linear-oblong all penninerved glabrous quite entire, racemes from the lower part of the stem tomentose stout; petals broad villous at the back and furnished towards the base within with 2 waved transverse appendages.

PERAK; at Larut, alt. 500–1000 ft., *King's Collector.*

A leafy tree, 40-60 ft. *Leaves* coriaceous, 6 in. broad, green when dry, shining above, base acute; nerves 12–15 pair, arched, strong beneath; petiole ¼ in., very stout. *Racemes* white-tomentose, branches stout, 6–8 in.; male fl. in short 3–5-fld. branches; bracts short, pedicels equalling the calyx or shorter. *Male calyx* of 5 broad rounded very coriaceous imbricate hoary sepals, glabrous within. *Petals* longer than the sepals, erect with recurved tips, thick; the long white hairs on the back occupy a broad round area below the middle; villous in front below the appendages. *Disk* 0. *Stamens* 8, in the centre of the flower; filaments free, clothed with long silky hairs; anthers broad, introrse. *Fem. fl.* and *fruit* unknown.—This may form a distinct genus when the fem. fl. and fruit are known.

4. **O. Helferi,** *Muell. Arg. in Linnæa* xxxiv. 215, and in *DC. Prodr.* xv. ii. 1115; leaves bifarious 8–9 in. glabrous oblong or obovate-lanceolate cuspidately acuminate quite entire, petiole very short, flowers very small fascicled in the axils. *Kurz For. Fl.* 404.

TENASSERIM; at Moulmein, *Helfer.*

Branches densely lenticellate. *Leaves* 3–4 in. broad, thin, base rounded, eglandular, midrib rough beneath; nerves 10–14 pair, arched, rather slender; petiole ⅛ in., very stout. *Male fl.* on short stout pedicels shorter than the petiole and with many bracts at the base. *Sepals* and *petals* 5–6 each, externally finely pubescent, both concave and very coriaceous, 1/16 in. long. *Stamens* in a hemispheric mass, very numerous and densely packed; anthers short, adnate to the broad filament, 2-celled, extrorse.—The habit of this is entirely different from any of the preceding, and is likened by Mueller to a *Gelonium*, but the leaves are much larger. The specimens seen by him are probably more advanced than the Kew ones, for he describes the receptacle as hairy, and the bracts as distichous.

5. **O. muricata,** *Hook. f.*; quite glabrous, leaves long-petioled, elliptic-oblong or -lanceolate acuminate entire or serrate penninerved base acute, male fl. long-pedicelled in short cymes, calyx obtusely 5-lobed, petals oblong smooth within, stamens 20–30, fem. solitary, capsule trigonously globose on a stout woody peduncle echinate.

PERAK; at Larut, *King's Collector.*

A small tree, 10–20 ft.; branchlets woody, bark pale. *Leaves* 6–10 by 3–4 in., coriaceous; nerves 10–12 pair, basal pair inconspicuous, cross-nervules very faint; petiole 1½–2½ in., rather slender, 2-grooved above. *Male cymes* axillary and on the old wood, about 1 in. long; pedicels ¼–1 in., slender, irregularly fascicled on the short rachis; bracts small, ovate; flowers white, black when dry; calyx-lobes rounded; petals oblong; stamens short, subequal, anthers introrse. *Capsule* about ¾ in. diam.; peduncle ½–1 in. long; pericarp of valves black, echinate, thin; cocci rather thick, grey. *Seeds* upwards of ⅓ in. long, ellipsoid, smooth, brown.

VAR.? *minor*; leaves smaller 4–7 in. thinner more ovate-lanceolate with much

fainter nerves pale glaucous brown when dry, petiole shorter ½–1 in. long slender, rachis of cymes shorter, fem. fl. and capsule unknown.—Penang, *King's Collector*, *Curtis* (No. 811). Singapore, *Lobb* (No. 304).

39. **BLACHIA,** *Baill.*

Glabrous shrubs. *Leaves* alternate, or opposite or the upper subopposite, membranous, quite entire, eglandular, penninerved. *Flowers* monœcious or subdiœcious; males terminal subumbellate or racemose with filiform peduncle and pedicels, fem. solitary or fascicled, pedicels thickened above. MALE FL. *Sepals* 4–5, concave, membranous, imbricate. *Petals* 4–5, small, rounded, hyaline. *Disk-glands* scale-like, alternating with the petals. *Stamens* 10–20, on a convex receptacle, filaments free; anthers ovate, cells on the margin of the connective, tips at length confluent. *Pistillode* 0. FEM. FL. *Sepals* accrescent. *Petals* 0. *Disk* obscure or annular. *Ovary* 3–4-celled; styles filiform, 2-partite, recurved or revolute; ovules 1 in each cell. *Capsule* of 3 2-valved cocci. *Seeds* oblong, estrophiolate, testa crustaceous shining, albumen fleshy; cotyledons broad, flat.—Species 5 or 6, South Indian, Ceylon and one Chinese.

1. **B. umbellata,** *Baill. Etudes Gen. Euphorb.* 387, t. 19, f. 18–20; leaves very shortly petioled elliptic-subrhombic or oblong, male flowers umbelled, fruiting sepals slightly enlarged spreading obtuse persistent. *Benth. in Journ. Linn. Soc.* xvii. 226; *Thwaites Enum.* 277. Croton umbellatus, *Willd. Sp. Pl.* iv. 545; *Wall. Cat.* 7765. Codiæum umbellatum, *Muell. Arg. in DC. Prodr.* xv. ii. 1118; *Beddome Forester's Man.* 213, t. 23, f. 6.

TRAVANCORE, *Klein, Wight.* CEYLON; common in the south of the island, especially near the sea.

A shrub. *Leaves* 4–7 in. by 1½–3 in., broadest at or above the middle, cuspidately acuminate, much narrowed at the base; nerves 8–10 pair, very slender, nearly straight; petiole $\frac{1}{10}$–¼ in. *Male fl.* 8–10, on a capillary peduncle 1–3 in.; pedicels ⅙–⅓ in.; buds globose; perianth ¼ in. diam. *Fem. fl.* 1–4, on a rigid erect slender peduncle 1–2 in. long; pedicels ⅛–½ in., thickened upwards; perianth ⅓ in. diam., in fruit ½ in. *Capsule* ⅔ in. diam., smooth, deeply 3-lobed. *Seeds* ⅓ in. long, oblong, shining, mottled.—There is a tendency to an enlargement of the female sepals.

2. **B. reflexa,** *Benth. in Journ. Linn. Soc.* xvii. 226; leaves petioled subrhombic or elliptic obtuse cuspidate or obtusely acuminate, male flowers umbelled, fruiting sepals slightly enlarged acute spreading or reflexed persistent.

NILGHIRI MTS., *Herb. G. Thomson.*

Very closely allied to *B. umbellata*, but the leaves are usually much smaller, 2–3 by 1–1½ in., the petioles longer, ¼–½ in., and the fruiting sepals more acute. The fruiting sepals are spreading as in *umbellata* or reflexed. *Seeds* ⅓ in. long, oblong, smooth, polished, mottled with brown.

3. **B. calycina,** *Benth. in Journ. Linn. Soc.* xvii. 226; leaves subsessile elliptic-rhombic or -lanceolate obtuse or obtusely acuminate, male fl. racemose, fruiting sepals much enlarged oblong obtuse or lanceolate acuminate persistent. Croton umbellatus, *Wight Ic.* t. 1874; *Wall. Cat.* 7770, 7776, 8013.

The DECCAN PENINSULA, *Klein, Heyne* (*Herb. Rottler*). TRAVANCORE, at Courtallam, *Wight*. NILGHIRI MTS. (*Herb. G. Thomson*).

This has the subsessile leaves of *B. umbellata*, and even smaller leaves than *B. reflexa*; it differs from both in the enlarged fruiting sepals, which are $\frac{1}{3}$–$\frac{2}{3}$ in. long.—The specimens in Rottler's Herbarium (from Heyne) are marked from Ceylon.

4. **B. denudata,** *Benth. in Journ. Linn. Soc.* xvii. 226; leaves petioled elliptic oblong lanceolate or ovate obtuse acute or acuminate, male fl. racemose, fem. shortly peduncled, calyx deciduous after flowering. Croton umbellatum, *Dalz. & Gibs. Bomb. Fl.* 231 (*excl. syn.*).

The CONCAN and N. CANARA, *Ritchie, Stocks, Dalzell, Talbot,* &c.

A shrub or small tree. *Leaves* very variable, 3–5 by 1–2$\frac{1}{2}$ in.; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Fem. fl.* at the base of the racemes. *Fruit* variable in size, $\frac{1}{3}$–$\frac{1}{2}$ in. long, peduncles $\frac{1}{3}$–$\frac{1}{2}$ in.

5. **B. andamanica,** *Hook. f.*; leaves elliptic or obovate obtusely acuminate, male fl. subumbellately corymbose, fem. corymbs subsessile, flowers very shortly pedicelled. Codiæum andamanicum, *Kurz For. Fl.* ii. 405. Dimorphocalyx andamanicus, *Benth. in Gen. Pl.* iii. 302.

ANDAMAN ISLANDS, in tropical forests common, *Kurz.*

A large evergreen shrub, everywhere glabrous. *Leaves* 3–6 in., base acute or obtuse, chartaceous, entire or subsinuate; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. *Male fl.* as in *B. umbellata*, fem. rather larger, both terminating young often axillary shoots. *Sepals* glabrous, of male rounded, of fem. ovate acute. *Petals* of male small; glands large, trigonous, truncate, fleshy. *Stamens* in several series. *Ovary* appressed hirsute; styles very long, 2-cleft. *Capsule* size of a small cherry, globose, 3-coccous, woody-coriaceous, roughish; peduncle nodding, thickened upwards. *Seeds* ovoid-elliptic, silky grey, variegated.—Description chiefly from Kurz.

40. DIMORPHOCALYX, *Thw.*

Glabrous trees. *Leaves* alternate, quite entire, coriaceous, penninerved. *Flowers* in axillary or terminal peduncled few-fld. racemes, or the fem. subsolitary, dicœcious. MALE FL. *Calyx* cupular, or 5-partite, 5-toothed or lobed, open in bud. *Petals* 5, longer and broader. *Disk-glands* 5, alternate with the petals. *Stamens* 10–20, on a short columnar receptacle, filaments stout, free or the inner connate; anthers dorsifixed or innate; cells adnate to thick connective, parallel or divergent. *Pistillode* 0. FEM. FL. *Sepals* 5, imbricate, enlarging greatly in fruit. *Petals* 5. *Ovary* 3-celled; styles erect, 2-fid; ovules 1 in each cell. *Capsule* of 3 2-valved crustaceous cocci. *Seeds* ovoid, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 3–4, South Indian and Malayan.

1. **D. glabellus,** *Thwaites Enum.* 278; leaves 2–3 in. elliptic-ovate -oblong or -lanceolate obtuse or subacute, stamens about 10, ovary strigose, fruiting perianth $\frac{1}{2}$–1$\frac{1}{4}$ in. diam., segments broadly oblong or obovate. Trigonostemon Lawianus, *Muell. Arg. in DC. Prodr.* xv. ii. 1105 (*the Ceylon plant only*). Croton glabellus, *Heyne in Wall. Cat.* 8012.—*Wall. Cat.* 8010 and 7750 *in part.*

DECCAN PENINSULA, *Heyne, Wight.* CEYLON; common in the drier parts of the island, *Thwaites.*

A small tree. *Leaves* red brown beneath when dry, base acute obtuse or rounded; nerves many, very slender; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Male cymes* erect; flowers $\frac{1}{4}$ in. diam., shortly pedicelled; central stamens united in a slender column with 5 free ones at its base. *Fem. flowers* long pedicelled; pedicels with few small obtuse bracts. *Petals*

of both sexes oblong, of the males longer than the sepals, of the fem. shorter. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., slightly hairy. *Seeds* $\frac{1}{3}$ in. long, oblong, mottled.—I have examined many female plants of this species from both Ceylon and the Peninsula, but have seen no males. *Croton Lawianus*, Nimmo, referred here by Mueller, is a true *Croton*. I do not know what "Falconer 1255," cited by Mueller, refers to.

2. **D. Lawianus,** *Hook. f.*; leaves 4–8 in. elliptic-ovate -oblong or -lanceolate obtuse or obtusely acuminate, stamens about 15, ovary strigose, fruiting perianth 1–2 in. diam., segments oblong or lanceolate very unequal. D. glabellus, *Beddome in Trans. Linn. Soc.* xxv. 225, t. 26 (*except figs.* 10–12). Trigonostemon Lawianus, *Muell. Arg. in Linnæa* xxxiv. 212, and in *DC. Prodr.* xv. ii. 1106 (*the Concan plant only*); *Beddome Fl. Sylvat.* t. 273 (*excl. syn.*).

The Concan, *Law, Stocks,* &c. Travancore; on the Anamallay Hills, alt. 3–4000 ft., *Beddome*.

I advance this as a species distinct from *D. glabellus* with hesitation; it differs from that plant in the much larger more membranous leaves with longer petioles, the more numerous stamens, the usually much narrower and longer very unequal fruiting sepals, and the fruit and seeds which are almost double the size. The plate of the Anamallay plant given by Beddome in the Linnæan Transactions agrees with *Lawianus* except in the fruiting sepals being in every instance equal, which they rarely are; and in the figures 10, 11, 12 of the male flower, which, if correct, indicate a widely different species, for the sepals are represented as free almost to the base, oblong with a rounded dorsal gibbosity, and the corolla as having a broad entire tube and 5 small recurved lobes; the male disk also is represented as glabrous. Figs. 14 and 15, which are stated to be abnormal male flowers of Concan specimens, precisely accord with normal ones of *D. Lawianus*, except that the receptacle is glabrous. I suspect that the calyx of figs. 10 and 12 is taken from a fem. flower, that fig. 12 is erroneous, and that the hairs on the receptacles of figs. 12 and 15 were overlooked. Beddome's male and female specimens of the Anamallay plant in all respects agree with Concan ones.

3. **D. malayanus,** *Hook. f.*; leaves 3–5 in. elliptic or elliptic-oblong obtusely acuminate, stamens about 10, ovary glabrous, fruiting perianth about 1 in. diam., sepals broadly oblong subequal.

Malacca, *Griffith* (*Kew Distrib.* 4785). Penang, *Curtis, King's Collector.*—Distrib. Borneo.

A shrub, 10–15 ft. *Branchlets* slender, bark white. *Leaves* rather membranous, base acute or obtuse, nerves many pairs very slender; petiole $\frac{1}{4}$ in. *Male fl.* in slender branched cymes; calyx with 5 short obtuse teeth; central stamens united in a slender column with 5 free ones at their base; disk of large glands; receptacle glabrous. *Capsule* $\frac{1}{2}$ in. diam., deeply 3-lobed, quite glabrous. *Seeds* subglobose, dark, mottled.—Kurz's *Codiæum andamanicum*, which Bentham by oversight (Gen. Plant. iii. 302) referred to this species, is a *Blachia*.

4. **D. capillipes,** *Hook. f.*; leaves 6–10 in. oblanceolate from a contracted obtuse base acuminate obscurely serrate, petiole short, fruiting racemes elongate capillary naked few-fld., bracts foliaceous, fruiting perianth $1\frac{1}{2}$ in. diam., sepals lanceolate acuminate very unequal.

Singapore, *Lobb*.

Quite glabrous; branches slender; tips and stipules strigose with yellow hairs. *Leaves* 2–3 in. broad, membranous, brown when dry; base minutely cordate; nerves 10–12 pair, very slender, flexuous, cross-nervules very faint reticulate; petiole $\frac{1}{3}$–$\frac{1}{2}$ in.; stipules subulate-lanceolate. *Fruiting racemes* axillary, 4–6 in.; bracts oblong, $\frac{1}{3}$–$\frac{2}{3}$ in.

long; pedicels as long, thickened and angular above. *Fruiting sepals* 1-nerved, larger oblong-lanceolate. *Capsule* $\frac{1}{2}$ in. diam., hoary, cocci globose smooth thinly crustaceous. *Seeds* subglobose, polished, mottled.

5. **D. Kunstleri,** *King mss.*; leaves 2–3 in. elliptic-oblong obtuse quite entire whitish beneath base acute, male cymes subterminal short, stamens about 13.

PENANG, *King's Collector.*

A shrub, 10–15 ft., quite glabrous, much branched, branches slender. *Leaves* $\frac{1}{2}$–1 in. broad, thin, brown above when dry, nerves many very slender; petiole $\frac{1}{4}$ in.; stipules triangular-ovate. *Cymes* of male fl. 1 in., 6–8-fld., quite glabrous, leafy towards the base; bracts minute; pedicels $\frac{1}{10}$–$\frac{1}{6}$ in. *Flowers* campanulate, white, $\frac{1}{3}$ in. broad; calyx cupular, broadly 5-toothed; petals oblong; glands large; stamens 5 at the base of the column, and 8 at the top.

41. ERISMANTHUS, *Wall.*

Subscandent shrubs. *Leaves* subsessile, opposite, bifarious, oblong, base on one side cordate, penninerved; stipules rigid. *Flowers* axillary, monœcious, males on long capillary pedicels arising from the bracts of a short subsessile axillary cone, petaliferous, females solitary in separate axils long pedicelled, apetalous. *Disk* 0. MALE FL. *Sepals* 4–5, oblong, reflexed, imbricate? *Petals* half the size, narrower. *Stamens* about 12, inserted on a conical hairy receptacle, that terminates in a very long capillary *pistillode;* filaments very short; anthers large, broadly didymous, compressed; cells dehiscing along the top and margins. FEM. FL. *Sepals* 5, elliptic-oblong, large, unequal, foliaceous, enlarging in fruit. *Ovary* 3-lobed, 3-celled, hispid; styles very long, united below, 2-partite, arms filiform hispid; ovule 1 in each cell. *Capsule* of 3 crustaceous subglobose hispid cocci. *Seeds* globose.—Species 2, the following and a Chinese one.

E. obliqua, *Wall. Cat.* 8011; *Muell. Arg. in DC. Prodr.* xv. ii. 1138; *Baill. Etudes Gen. Euphorb.* 669.

PENANG, *Wallich.* PERAK, *King's Collector.*—DISTRIB. Borneo (*Beccari* No. 769 and 632).

A sparsely hairy shrub; branches slender, terete, woody. *Leaves* 5–7 in., thinly coriaceous, green when dry, obtuse or obtusely acuminate, 10–12-nerved, obscurely crenate, lower base rounded, upper very narrow; petiole $\frac{1}{10}$ in., often bright red; stipules $\frac{1}{3}$ in., lanceolate, green, persistent. *Cones* of bracts of male fl. $\frac{1}{3}$–$\frac{1}{2}$ in., usually reflexed, and concealed under the leaf-bases; bracts subulate, most densely imbricate, hispid; male fl. $\frac{1}{6}$ in. diam., very numerous, forming a tangled mass of hairy capillary pedicels $\frac{3}{4}$ in. long; sepals and petals membranous; pistillode $\frac{1}{2}$ in., as slender as the pedicels, sparsely hairy, terminated by two narrow lamellæ. *Fem. pedicel* 2–6 in., stiff, strigose, with a few minute bracts; perianth $\frac{1}{2}$–1 in. diam.; sepals rigid, 1-nerved, mucronate, obscurely serrate. *Ovary* minute, styles $\frac{3}{4}$ in. long; ovule with a 2-fid obturator. *Capsule* about $\frac{1}{2}$ in. diam., epicarp not separating. *Seed* mottled.—I am indebted to Dr. King for notes and materials enabling me to complete the description of this curious genus, of which a Chinese species is figured in the "Icones Plantarum" (t. 1578).

42. AGROSTISTACHYS, *Dalz.*

Glabrous shrubs. *Leaves* alternate, coriaceous, usually very long, often subsessile, entire, serrate or sinuate. *Flowers* in axillary or supra-axillary

bracteate racemes or spikes, dicœcious; males few or many within each bract; fem. solitary, longer pedicelled. MALE FL. *Calyx* globose, splitting into 2–5-valvate lobes. *Petals* 8, shorter. *Disk-glands* very large, alternate with the petals. *Stamens* 8–13, on a convex receptacle, filaments nearly free, tips subulate; anthers versatile, cells pendulous from the thickened connective. *Pistillode* 2–3-fid or 0. FEM. FL. *Calyx* 5–6-fid. *Petals* longer, caducous. *Ovary* 3-celled; styles short, thick, spreading, entire or 2-fid; ovules 1 in each cell. *Capsule* of 3 2-valved crustaceous cocci, or subfleshy. *Seeds* globose, testa crustaceous shining, albumen fleshy; cotyledons broad, flat.—Species 6 or 8, Tropical Indian and African.

Sect. I. EUAGROSTISTACHYS. *Bracts* of male 1–3-fld., glumaceous, densely imbricate, on short small axillary or supra-axillary spikes.

1. **A. indica,** *Dalz. in Hook. Kew Journ. Bot.* ii. (1850) 41; leaves petioled elliptic-oblong or -lanceolate acute acutely serrate, base very acute, spikes supra-axillary very short subdistichous, bracts 1-fld., ovary glabrous. *Muell. Arg. in DC. Prodr.* xv. ii. 726 (*excl. var.* β.); *Dalz. & Gibs. Bomb. Fl.* 232; *Thwaites Enum.* 279; *Beddome For. Man.* 205.—*Wall. Cat.* 7452.

The DECCAN PENINSULA, on the Western Ghats, from the Concan southward. CEYLON; in the Central Province, alt. 1–2000 ft., *Walker*, &c.

A shrub, 5–6 ft.; branches stout, leafy. *Leaves* 4–12 by 1½–4 in., coriaceous, reticulate on both surfaces; teeth incurved, spinulose; nerves 10–15 pair; petiole ½–1½ in. *Male spikes* usually shorter than the petioles; bracts broadly ovate, ciliate; bracteoles 2, linear; pedicels very short; sepals membranous, ovate, sparsely hairy; petals 5–8, rounded or subquadrate, white; disk-glands very large; stamens 5–13, with sometimes a few fleshy filaments intermixed. *Capsule* ⅔ in. diam., tridymous; cocci woody, globose.

2. **A. Gaudichaudi,** *Muell. Arg. in Linnœa* xxxiv. 144 and in *DC. Prodr.* xv. ii. 725; leaves petioled oblanceolate acuminate obtusely sinuate-serrate base very acute, spikes infra-axillary very short terete, bracts 1-fld. Sarcoclinium Gaudichaudi, *Baill. Etudes Gen. Euphorb.* 320. A. indica, *var.* longifolia, *Muell. Arg. in DC. l. c.* 726. A. longifolia, *Kurz For. Fl.* ii. 377.

PENANG, *Gaudichaud*, &c. TENASSERIM (or Andaman Islands), *Helfer* (*Kew Distrib.* 4921).

Very like *A. indica*, but the leaves in Helfer's plant are longer, narrower, more acuminate, with shorter petioles and with fewer very shallow obtuse teeth.—I have seen no Penang specimens, and the flowers of Helfer's are too young for examination.

3. **A. Maingayi,** *Hook. f.*; leaves sessile oblanceolate acuminate quite entire, spikes supra-axillary, bracts pubescent.

MALACCA, *Maingay.*

Branches as thick as the little finger. *Leaves* 12–14 by 3–3½ in., thinly coriaceous, tapering down to their insertion, nerves about 12 pair. *Capsule* about ¾ in. diam.; cocci crustaceous, hoary. *Seeds* ⅓ in. diam.—I have seen only leaves, very young spikes and fruits of this species.

Sect. II. SARCOCLINIUM. *Bracts* remote on a long rachis. *Male fl.* many under each bract.

4. **A. Hookeri,** *Benth. Gen. Pl.* iii. 303; leaves very large subsessile

oblanceolate acuminate many-nerved entire or denticulate, stipules very long, fem. racemes 1–2 ft., pedicels solitary long, fruit subbaccate. Sarcoclinium Hookeri, *Thwaites Enum.* 279; *Baill. Etudes Gen. Euphorb.* 310, t. 11, f. 17, 18; *Muell. Arg. in DC. Prodr.* xv. ii. 727; *Beddome Forester's Man.* 206.

CEYLON; in the Ratnapoora district, *Thwaites.*

A moderate-sized tree; branchlets as thick as the middle finger. *Leaves* thinly coriaceous, 2–3 ft. by 5–8 in.; base narrowed almost to the insertion; nerves 40–50 pair, spreading, nearly straight; petiole very stout, $\frac{1}{4}$–$\frac{3}{4}$ in.; stipules 1–$3\frac{1}{2}$ in., subulate from a base $\frac{3}{4}$ in. broad, rigid, striate, brown. *Fem. racemes* slender, quite glabrous, flowers distant; pedicels $\frac{1}{2}$–1 in., jointed about the middle; sepals minute, triangular; petals ?; ovary obtusely 3-gonous, minutely tomentose; style short, thick, 3-fid from the middle, branches emarginate. *Capsule* 1 in. diam., glabrous; cocci rounded. *Seeds* $\frac{1}{2}$ in. diam.—Male fl. unknown.

5. **A. longifolia,** *Benth. in Gen. Pl.* iii. 303; leaves very coriaceous subsessile from cuneate-obovate to narrowly oblanceolate obtuse or obtusely acuminate quite entire, racemes much shorter than the leaves and flowers quite glabrous, bracts many-fld., pedicels of fem. fl. very short, ovary pubescent. Sarcoclinium longifolium, *Wight Ic.* t. 1887–8; *Muell. Arg. in DC. Prodr.* xv. ii. 727; *Thwaites Enum.* 279; *Beddome Forester's Man.* 205, t. 23, f. 1.

CANARA, NILGHIRI and TRAVANCORE HILLS; in mountain woods facing the west, *Wight,* &c. CEYLON; in the Central Province, alt. 4–6000 ft., *Macrae,* &c.

A large shrub; branchlets very stout. *Leaves,* smaller 3–7 by 1–$3\frac{1}{2}$ in., larger 12–16 by 2–3 in., nerves 10–18 pair, not reticulate; stipules $\frac{1}{2}$–$\frac{3}{4}$ in., subulate from a broad base. *Male racemes* stout; fem. slender, rarely minutely puberulous; bracts broadly ovate, minutely gland-toothed. *Sepals* of male 2–3, membranous, glabrous; of fem. 5, ovate, acute. *Petals* 5, rounded. *Disk-glands* very large. *Stamens* 5–10. *Pistillode* 2–3-cleft. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., very shortly pedicelled, tridymous; cocci globose, smooth, crustaceous.

VAR. *malayana*; racemes as long as the leaves, rachis and flowers puberulous.—Malacca, *Griffith* (*Kew Distrib.* 4739), *Maingay* (*Kew Distrib.* 1407). Singapore and Penang, *Wallich* (No. 7717 in Herb. Benth.), &c.—A Bornean plant (Beccari No. 3117) is, I think, the same as this; it has, however, broader leaves and straighter nerves.

VAR. *latifolia*; leaves 12–18 by 3–6 in., nerves fewer more horizontal, racemes much shorter than the leaves quite glabrous.—Perak, *Scortechini* and *King's Collector.*

6. **A. filipendula,** *Hook. f.*; leaves petioled membranous oblanceolate acuminate quite entire, male racemes filiform, bracts distant 5–6-fld. fem. fl. long-pedicelled, ovary glabrous.

PERAK; at Larut, *King's Collector.* SINGAPORE, *Hullett.*

A tree, 40–60 ft. (in Perak), branches stout. *Leaves* 12–20 by $3\frac{1}{2}$–5 in., bright green and glossy on both surfaces; nerves 15–20 pair, arched; petiole 1–2 in., narrowly winged. *Male racemes* 6–10 in., quite glabrous; bracts $\frac{1}{6}$ in. long, almost rounded when spread out, smooth; pedicels exceeding the bracts, capillary; flowers minute; sepals obovate-oblong; petals hyaline; disk-glands 4–5, orange-cold.; stamens 8–9, filaments very long and slender, the alternate ones dilated at the base; pistillode 0. *Fem. racemes* numerous, often fascicled above the leaf-axils, 4–6 in. long, very slender; bracts oblong, obtuse, 1-fld.; pedicels $\frac{1}{2}$–1 in.; sepals 4, membranous; disk orange, thick, crenulate; staminodes filiform. *Ovary* 3-lobed; styles entire.—Though the male specimens are from Perak and the fem. from Singapore, I

find no reason to doubt their belonging to one species, and that a very elegant one.

43. **SUMBAVIA,** *Baill.*

Trees with stellate pubescence. *Leaves* alternate, broad, 3-nerved, quite or subentire. *Flowers* in axillary spiciform racemes, monœcious; males clustered, subsessile; fem. solitary amongst the males, pedicelled. MALE FL. *Calyx* globose, membranous, splitting into valvate lobes. *Petals* 4–5, short. *Stamens* many, on a convex eglandular receptacle, filaments free; anthers oblong, erect, dorsifixed, cells parallel. *Pistillode* 0. FEM. FL. *Calyx* 5-fid, lobes narrow, imbricate. *Petals* minute or 0. *Ovary* 3-celled; styles recurved, entire; ovules 1 in each cell. *Capsule* of 2 2-valved cocci. —Species 3, Malayan.

Differs from *Mallotus* only in having petals.

S. macrophylla, *Muell. Arg. in Flora,* 1864, 482, and in *DC. Prodr.* xv. ii. 727; leaves narrowly peltate ovate-oblong or -lanceolate acuminate sides rounded or angled base contracted or rounded 2-glandular. *Kurz For. Fl.* 376.

UPPER BURMA; near the Serpentine Mines, *Griffith.* PEGU to TENASSERIM, in forests, *Kurz.*

An evergreen tree, 25–35 ft.; shoots, petioles, leaves beneath and racemes whitish with scurfy tomentum. *Leaves* 6–12 in., thinly coriaceous, glabrous above, nerves 6–8 pairs above the basal, transverse nervules distant; petiole 2–3½ in., tip rather thickened. *Racemes* shorter than the leaves, pendulous; flowers ⅙–¼ in. diam. in bud. *Sepals* 4, unequal, larger orbicular, concave, tawny, stellate-tomentose. *Petals* of the male rounded, shorter than the stamens, hyaline. *Disk* of fem. urceolate. *Stamens* about 70 on a sparingly pubescent receptacle; filaments very short, slender; anthers longer, linear-oblong. *Ovary* ovoid-oblong, acuminate, densely stellately tomentose; styles erect, spreading.—I have seen Griffith's specimens, which are in male fl. (bud); the description of the female is from Kurz. The anthers are dorsifixed though far down, not basifixed as described by Kurz in his plant.

44. **CHROZOPHORA,** *Neck.*

Diffuse, densely hispid or stellately tomentose herbs or undershrubs. *Leaves* alternate, sinuate-toothed or lobed, wavy or plaited, 2-glandular at the base. *Flowers* in sessile axillary bracteate racemes, monœcious; bracts 1-fld.; males crowded in the upper part of the raceme; fem. solitary, pedicelled. MALE FL. *Calyx* globose or ovoid, splitting into 5 valvate segments. *Petals* 5, short. *Disk* obscure. *Stamens* 5–15, filaments connate below in one or more whorls; anthers oblong, cells contiguous, parallel. *Pistillode* 0. FEM. FL. *Sepals* narrow. *Petals* narrow or 0. *Disk-glands* short, broad. *Ovary* 3-celled; styles erect or spreading, 2-fid; ovules 1 in each cell. *Capsule* of 3 hispid tomentose or scaly subfleshy 2-valved cocci. *Seeds* estrophiolate, testa shining, albumen fleshy; cotyledons broad, flat.—Species 4–6, Mediterranean, Asiatic and African.

1. **C. tinctoria,** *A. Juss. Tent. Euphorb.* 28, t. 7, f. 25; annual, prostrate, leaves 1½–2½ in. long petioled from ovate and sinuate-toothed or entire to rounded and obtusely lobed, ovaries and capsules stellately tomentose and clothed with silvery scales. *Muell. Arg. in DC. Prodr.* xv. ii. 748;

Boiss. Fl. Orient. iv. 1140; *Reichb. Ic. Fl. Germ.* t. 152; *Sibth. Fl. Græc.* t. 950.

The PANJAB, *Thomson, Edgeworth*; Salt Range, *Aitchison.* SCINDE and the DECCAN, *Stocks.*—DISTRIB. Affghanistan and eastward to the Mediterranean region.

Whole plant softly clothed with stellate tomentum. *Root* stout; branches 6–10 in. *Leaves* thick, softly tomentose on both surfaces; petiole often 3 in. *Racemes* short, lengthening in fruit; male fl. numerous; pedicels of fem. at length decurved and sometimes 3 in. long in fruit. *Stamens* 5–20. *Capsules* $\frac{1}{3}$ in. diam.—Boissier refers Griffith's Affghan plant to *C. verbascifolia*, which hardly differs, and is regarded as a variety by Mueller; it has thicker tomentum.

2. **C. obliqua,** *A. Juss. Tent. Euphorb.* 28; shrubby, erect or suberect, thickly stellate-tomentose, leaves usually about equalling the petioles or longer ovate sinuate-toothed, ovaries and capsules stellately tomentose and with silvery scales. C. tinctoria, *Muell. Arg. in DC. Prodr.* xv. ii. 749; *Boiss. Fl. Orient.* iv. 1141. C. oblongifolia, *A. Juss. l. c.* Croton obliquus, *Vahl Symb.* i. 78; *Geisel. Monogr. Crot.* 71. C. oblongifolius, *Del. Fl. Egypt.* 139, t. 51, f. 1. C. argenteus, *Forsk. Cat. Pl. Egypt.* 75. C. tinctorium, *Wall. Cat.* 7716 G.

HINDOSTAN, *Wallich.* KASHMIR, *Thomson,* &c.; the PANJAB, at Ferozepore, *Thomson.* SCINDE, *Stocks.*—DISTRIB. Arabia, N. Africa.

A taller more bushy plant than *C. tinctoria,* described as perennial by Mueller and Boissier, but the Panjab specimens are annual, as are others from Egypt, &c. The stamens are 5 in the Ferozepore plant. In Wallich's the lower petioles are twice as long as the leaf-blade and stamens 3–4. Schweinfurth's *C. obliqua* (Plant. Nilot. 10, t. 3), quoted under *obliqua* by Boissier, is not the true plant, being represented without stellate scales on the capsule.

3. **C. plicata,** *A. Juss. Tent. Euphorb.* 28; annual, prostrate or ascending, leaves 2–5 in. broad subscabridly tomentose above, petiole equalling or exceeding the blade, from ovate and sinuate-toothed or entire to broadly rounded and lobed, ovary and capsule densely stellate-tomentose without silvery scales. *Muell. Arg. in DC. Prodr.* xv. ii. 747; *Boiss. Fl. Orient.* iv. 1140; *Dalz. & Gibs. Bomb. Fl.* 232. C. Rottleri, *A. Juss. l. c.*; *Spreng. Syst.* iii. 850; *Thwaites Enum.* 443. Croton plicatus, *Vahl Symb.* i. 75; *Geisel. Crot. Monogr.* 70; *Roxb. Fl. Ind.* iii. 681. C. Rottleri, *Geisel. l. c.* 54. C. asper, *Kœn. mss.* C. tinctorius, *Wall. Cat.* 7716 (*except* G). C. moluccanus, *Willd. Sp. Pl.* iv. 551. C. Burmanni, *Spreng. l. c.* 851. C. tinctorius & C. hastatus, *Burm. Fl. Ind.* 304 t. 62, f. 1 and 305, t. 63, f. 1. C. polycarpus, *Hort. Calcutt.*

Throughout INDIA, from the PANJAB to TRAVANCORE, and from BENGAL to PEGU and BURMA. CEYLON; near Trincomalee, *Glenie.*—DISTRIB. Westward to Spain and N. Africa.

The larger states of this are to be distinguished from *C. tinctoria* by the rather scabrid upper surface of the leaves, and especially the absence of fringed scales on the ovary and capsule; in other respects it simulates the varieties of that plant. The smallest states again look exceedingly different in habit, size of leaf, colour, and especially in the shorter fewer-flowered racemes and small capsules. I am quite unable to follow Mueller in respect of his reference of the older figures and descriptions to the three varieties he has established. Burmann's, Vahl's and Geisler's descriptions are far too vague, and the figures of the former too inexact for determination. The following are the three prevalent Indian forms. I have seen no specimens from the Moluccas or Malay Islands, or from any country S. or E. from Burma. The Malaccan habitat attributed by Mueller to Klein is probably an error for Malabar.

1. Leaves large 2–4 in., leathery, rounded with a rather truncate base slightly lobed often rugose or plaited, petiole long, racemes many-fld., fruiting peduncle often 2–3 in., capsule ⅓ in. diam. C. plicata, *Dalz.*, *Boissier*. Croton plicatus, *Roxb.* C. Rottleri, *Thwaites*.

2. Leaves less thick and less tomentose ovate entire or repand toothed, petioles shorter.

3. Leaves ½–1 in., rounded deeply bullate together with the branches often densely tomentose or woolly sometimes deep green, racemes shorter fewer-fld., capsules smaller their pedicel never greatly lengthened. *C. prostrata*, Dalz., in *Dalz. & Gibs. Bomb. Fl.* 233.—This, which often grows completely appressed to the ground, is regarded by Dalzell as a very distinct species, occurring commonly in dried up water holes.

45. **CLAOXYLON,** *A. Juss.*

Evergreen trees or shrubs, rarely herbs. *Leaves* alternate, usually long-petioled, and oblong, entire or sinuate-toothed, penninerved (3-plinerved in one Indian species). *Flowers* small or minute, in axillary or lateral spikes or racemes, usually dicœcious. MALE FL. *Calyx* subglobose, of 3–4 valvate segments. *Petals* 0. *Disk* 0. *Stamens* many, rarely few, inserted on or around a central receptacle often intermixed with glands or long linear ciliate scales; filaments free; anthers erect; cells distinct, connate at the base only, quite free above and erect, dehiscence extrorse. *Pistillode* 0. FEM. FL. *Calyx* of the male. *Disk* 0 or of 3 petal-like hypogynous scales alternate with the carpels. *Ovary* 3-celled; styles short, rarely long, entire, spreading, fringed; ovules 1 in each cell. *Capsule* of 3 2-valved cocci, or coriaceous and indehiscent. *Seeds* subglobose, arillate or not, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 40, native of the tropics of the Old World.

The discovery of frutescent species of *Claoxylon* with the hypogynous male scales (petals ?) of *Micrococca* requires the suppression of the latter genus, the only other character for which is its being an annual. Mueller describes the seeds of *Claoxylon* as enclosed in an often coloured lax epidermis, Kurz as having a pure white or scarlet axil. The genus will require revision when fuller and better materials than those here described from are forthcoming.

Sect. I. *Fem. fl.* without hypogynous scales. *Stamens* central in the male fl. (See *C. hirsutum* in Sect. III.)

* *Filaments intermixed with ciliate filiform scales.*

1. **C. indicum,** *Hassk. Hort. Bogor.* 235; robust, leaves long-petioled from elliptic to broadly orbicular-ovate sinuate-toothed tomentose pubescent hoary or subglabrous, racemes 4–6 in., flowers shortly pedicelled, stamens 20–30, mixed with copious filiform villous scales, capsules small ⅓ in. diam. trigonously 3-lobed, seeds ⅛ in. diam. *Muell. in DC. Prodr.* xv. ii. 782; *Miquel Fl. Ind. Bat.* i. ii. 386. C. macrophyllum, *Hassk. Pl. Jav. Rar.* 249. C. spiciflorum, *Baill. Rec. Obs. Bot.* i. 285 (*excl. syn.*). C. parviflorum, *Hook. & Arn. Bot. Beech. Voy.* 212 (*excl. syn.*); *Benth. Fl. Hongk.* 305 (*not of Juss.*). Erythrochilus indicus, *Reinwdt. in Blume Bijd.* 615. E. mollis, *Blume l. c.*—*Wall. Cat.* 7842.

MADRAS PENINSULA, *Wight in Herb. Wall.* TENASSERIM; at Mergui, *Griffith.* BURMA and PENANG, *Wallich.* SINGAPORE, *Schomburgk.*—DISTRIB. Malay Islands, China.

A large shrub or small tree; branches stout, soft, pubescent or softly tomentose. *Leaves* in the broad form 6–10 by 4–6 in., in the narrower 6–8 by 3–4 in., base

acute obtuse rounded or subcordate, eglandular; petiole 3–5 in. *Racemes* hoary-tomentose; males longest with scattered clusters of subsessile flowers; female with solitary pedicelled flowers. *Capsules* tomentose, depressed; cocci keeled. *Seeds* (ripe ?) rugose.—The more glabrous narrower-leaved forms look very different from the very broad tomentose ones (Mueller's var. *β.*), but in the Malay Islands both accompany the same very marked capsule, which is quite unlike that of any other species.

2. **C. longifolium,** *Muell. Arg. in DC. Prodr.* xv. ii. 781 (*in part*); leaves long-petioled elliptic-oblong or lanceolate quite glabrous base acute sinuate-toothed or entire, racemes 4–6 in., flowers pedicelled, stamens 40–50, receptacle with long villous scales, fruit $\frac{2}{3}$ in. diam. with 3 globose rugose cocci, seeds $\frac{1}{4}$ in. diam. smooth. Erythrochilus longifolius, *Blume Bijd.* 616.—*Wall. Cat.* 7715 B.

PENANG, *Wallich, Curtis, Maingay* (*Kew Distrib.* 1408). SINGAPORE, *Hallett.* —DISTRIB. Java. Sumatra (Beccari No. 540).

An evergreen shrub or small tree, 4–10 ft. (*Kurz*); stem hollow; shoots pubescent. *Leaves* 3–6 in., green when dry, puberulous beneath; petiole 2–5 in. *Racemes* hoary, 2–3 in.; flowers $\frac{1}{8}$ in. diam. *Fruit* apparently bursting irregularly tridymous, hoary without, silky within.—The Calcutta Garden plant is, I think, rightly referred to this by Mueller, but is, I suspect, from Penang, and not from the Khasia Mts. On the other hand, the Khasia plant of Thomson's and my collection, also referred here by Mueller, is *C. khasiana*, differing in the very short scales amongst the stamens. I have seen no Javan specimens of *C. longifolium*. The Indian plant differs from *C. indicum* in the fruit and seed. The following varieties may be distinct species.

C. LONGIFOLIUM *proper*; racemes 4–8 in., flowers sessile or shortly pedicelled.—Penang (*Wall. Cat.* 7715 B).

Var. *brachystachys*; more glabrous, racemes 2–3 in., pedicels longer more slender $\frac{1}{4}$ in. long.—Penang, *Curtis*; Singapore, *Hallett.*

** *Filaments mixed with very small scales, or scales* 0.

3. **C. khasianum,** *Hook. f.*; leaves long-petioled elliptic- or oblong-lanceolate acuminate obscurely sinuate-toothed glabrous, racemes 1–3 in. hoary, flowers minute sessile, stamens about 50, receptacle with minute scales or glands, fruit of 1–3 globose membranous hoary carpels $\frac{1}{2}$ in. diam., seed $\frac{1}{4}$ in. diam. C. longifolium, β. glabrum, *Muell. in DC. Prodr.* xv. ii. 781 (*the Khasian plant only*).

ASSAM, SILHET, CACHAR and the KHASIA MTS., *Griffith, Wallich, J. D. H. & T. T.*

Habit and foliage of *C. indicum* and *longifolium*, but differing from the former in the fruit and seed, and from both in the small male flowers, $\frac{1}{10}$ in. diam., and the minute scales and glands of the receptacle.

Var. ? *serrulata*; leaves serrulate, racemes 6–10 in.—Garrow Hills, *Simons.*

4. **C. Wallichianum,** *Muell. Arg. in DC. Prodr.* xv. ii. 781; leaves shortly petioled oblanceolate or subcuneately obovate acuminate base very narrow sinuate serrulate, racemes 1–2 in. slender few-fld., stamens about 30, scales of receptacle few minute, fruit $\frac{2}{3}$ in. diam. 3-lobed, seed $\frac{1}{3}$ in. diam. —*Wall. Cat.* 7740 A.

MALAGA PENINSULA; Penang, *Porter, Curtis*; PERAK, ascending to 4000 ft., *King's Collector.*

Branches rather slender, terete, and petioles pubescent. *Leaves* 6–10 by $1\frac{1}{2}$–3 in., membranous, pubescent beneath; petiole $\frac{1}{2}$–1 in., slender. *Racemes* pubescent, flowers minute fascicled. *Fruit* pedicelled, nearly glabrous, pericarp thinly crustaceous glabrous within. *Seeds* $\frac{1}{3}$ in. diam., subglobose, pointed, rugose.

Sect. II. *Fem. fl.* without hypogynous scales. *Anthers* sessile in several series around the margin of a flat naked receptacle.

5. **C. anomalum,** *Hook. f.*; leaves long-petioled oblong-lanceolate acuminate subserrate glabrous base very acute 2-glandular, racemes very short dense-fld.

TRAVANCORE; at Courtallam, *Wight.*

Branches slender, terete, glabrous. *Leaves* 4–6 in., membranous; petiole ½–2 in., very slender. *Male* and *fem. racemes* ½–¾ in., very shortly peduncled; flowers ⅛ in. diam., subtomentose. *Anthers* very numerous, quite sessile, imbricating; cells short, diverging, truncate when dehisced. *Ovary* tomentose.—I have only one male and one fem. specimen of this singular species.

Sect. III. *Fem. fl.* with 3 ligulate or oblong hypogynous scales alternating with the carpels. *Racemes* very slender in all. MICROCOCCA, *Benth*

6. **C. Mercurialis,** *Thwaites Enum.* 271; annual, herbaceous, nearly glabrous, leaves ovate obtuse crenate, racemes numerous capillary glabrous, stamens few or many, ovary hirsute with 3 linear scales. *Muell. Arg. in DC. Prodr.* xv. ii. 790. Mercurialis alternifolia, *Desv. in Lamk. Encycl.* iv. 120; *Baill. Etudes Gen. Euphorb.* 490, and *Rec. Obs. Bot.* i. 76; *Grah. Cat. Bomb. Pl.* 186. Microstachys Mercurialis, *Benth. in Hook. Niger Flora* 503; *Dalz. & Gibs. Bomb. Fl.* 227. Tragia Mercurialis, *Linn. Sp. Pl. Ed.* 3, 1391 (*excl. var.* β. *and syns.*); *Roxb. Fl. Ind.* iii. 576; *Wall. Cat.* 7790.—*Plukenet Iconogr.* t. 205, f. 4.

BEHAR; at Monghir, *Wallich.* The DECCAN PENINSULA, in cultivated ground' common. BURMA, *Wallich.* CEYLON; very common.—DISTRIB. Arabia and Tropical Africa.

Stem 6–24 in., stout or slender, soft, pale, often much branched, minutely pubescent with soft long hairs. *Leaves* 1–1½ in.; base acute or obtuse, rarely cordate; nerves 4–5 pair, slender; petiole ⅓–½ in., very slender. *Racemes* equalling or exceeding the leaves; bracts very remote; flowers short- or long-pedicelled, fem. usually solitary with several males. *Sepals* glabrous. *Stamens* very variable in number, rarely only 3, often 5–10, sometimes very numerous in a globose mass in a nearly naked receptacle; anthers nearly sessile, cells short, dehiscence extrorse. *Fem. fl.* about 1/12 in. diam. *Capsule* ⅙ in. diam., glabrous or sparsely hairy, tridymous, depressed; stigmas very short, fimbriate; cocci globose, thinly crustaceous. *Seeds* pale brown, deeply foveolate.

7. **C. oligandrum,** *Muell. Arg. in Linnæa* xxxiv. 104, and in *DC. Prodr.* xv. ii. 784; shrubby, nearly glabrous, leaves long-petioled from ovate- to linear-lanceolate entire or serrate acuminate, racemes filiform longer than the leaves, flowers minute males arising from distant minute spikelets of imbricating bracteoles, stamens 5–18, ovary silky with 3 linear hypogynous scales. C. longifolium, *Baill. Etudes Gen. Euphorb.* 493 (*in part*); *Thwaites Enum.* 271 (*excl. syn. Blume*).

CEYLON; in the Central Province, ascending to 5000 ft.

A branching shrub, branches and petioles rarely pubescent. *Leaves* 3–8 by ¾–1½ in., rather membranous, very rarely puberulous beneath; base obscurely 2-glandular, acute, rarely obtuse; nerves suberect; petiole 1–2½ in. *Racemes* solitary, curved or flexuous; spikelets very distant, 1/12–1/10 in. long; pedicels about as long or less. *Filaments* short, mixed with stipitate radiating glands. *Capsule* very small; cocci globose. —Mueller distinguishes as a variety a form with leaves obtuse at the base and few (5–8) stamens, but acute and obtuse based leaves occur on the same specimen, and the number of stamens varies excessively.

8. **C. Wightii,** *Hook. f.*; shrubby, sparsely softly hispid, leaves ovate- or oblong-lanceolate obtuse subentire or crenate, racemes numerous filiform flexuous hairy, stamens 6–9 subsessile, ovary hispid with 3 ligulate and very short fimbriate styles.—*Wall. Cat.* 7747.

TRAVANCORE; at Courtallam, *Wight*; Tinnevelly Hills, *Beddome*.

Branches terete, slender, woody, younger together with the petioles and racemes laxly clothed with soft tawny hairs. *Leaves* 2–3 in., membranous, base acute; nerves 4–6 pair, very slender, midrib often fulvous-hairy beneath; petiole $\frac{1}{2}$–1 in., slender. *Racemes* numerous, 1–2 in. long; bracts minute, lanceolate, villous; male fl. with globose hairy buds $\frac{1}{20}$–$\frac{1}{16}$ in. diam., on capillary pedicels as long. *Stamens* mixed with a few unequal hyaline scales. *Capsule* about $\frac{1}{5}$ in. diam., 3-lobed, hispid, cocci thinly crustaceous. *Seeds* globose, smooth, dotted with shallow white pits.

9. **C. Beddomei,** *Hook. f.*; quite glabrous, leaves elliptic-lanceolate acuminate entire or coarsely serrate, racemes filiform strict, males with very distant bracts each containing a short spikelet of densely imbricating bracteoles from the axils of which the pedicelled male fl. arise, stamens 15–20, anther-cells linear, ovary glabrous with 3 ligulate scales and long fimbriate styles.

TRAVANCORE; on the Anamallay Hills, *Beddome*.

Branches terete, slender, woody, youngest shoots hispid. *Leaves* 4–6 in., membranous, base acute; nerves 8–10 pairs, very slender; petiole $\frac{1}{3}$–$1\frac{1}{3}$ in., slender. *Racemes* long-peduncled; bracts minute, lanceolate; spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. long; bracteoles lanceolate, green, ciliolate. *Stamens* without scales or glands; anthers subsessile, cells much longer than in the other species, quite free except at the very base. *Capsule* $\frac{1}{3}$ in. diam., glabrous, cocci thinly crustaceous. *Seeds* foveolate.

10. **C. hirsutum,** *Hook. f.*; shrubby, villously hirsute with tawny hairs, leaves lanceolate acuminate subcrenate villous on both surfaces, stamens about 8, anthers short.

TRAVANCORE; on the Tinnevelly Hills, *Beddome*.

Branches rather stout, terete, woody. *Leaves* 3–5 in., villous on both surfaces, with dense softer longer hairs beneath; nerves 4–6 pair; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in. *Racemes* 2–3 in. long, filiform, clothed with soft spreading hairs; bracts distant, with clusters of minute shortly pedicelled male flowers. *Calyx* 3–4 lobed, filaments longer than the anthers.—I have seen but one specimen, a male.

IMPERFECTLY KNOWN SPECIES.

11. **C. longipetiolatum,** *Kurz For. Fl.* ii. 396; leaves 4–8 in. long-petioled elliptic- to ovate-oblong shortly finely acuminate subcrenate or toothed base acute obtuse or subcordate slightly pubescent beneath, petiole 3–5 in., racemes hispid, capsules deeply 3-lobed hirsute with soft prickles, cocci the size of a pea.

PEGU, MARTABAN and the ANDAMAN ISLANDS, *Kurz*.

A shrub or small tree, 8–15 ft.; stem fistulose; shoots appressed-pubescent.—I have seen only imperfect specimens in young flower; they resemble *C. longifolium* except in the fruit.

12. **C. leucocarpum,** *Kurz For. Fl.* ii. 396; leaves broadly ovate obtusely acuminate a foot long and almost as broad 3–5-nerved at the rounded or subcordate base repand-toothed scabrid above stellate-pubescent beneath, petiole 3–8 in., racemes stellate-tomentose, capsules the size of a cherry 2–4-lobed fleshy-coriaceous softly stellately hispid, seeds ovoid-globose smooth $\frac{1}{3}$ in. diam. enveloped in a white aril.

Forests of PEGU, *Kurz.*

An evergreen meagre low shrub, 3–4 ft.; stem very stout, fistular; shoots stellate-pubescent. *Leaves* eglandular at the base.—The only specimen I have seen is in fruit; the three strong long spreading basal nerves are quite unlike any Indian species of the genus. The fruiting raceme is very short, the fruit pedicelled, and the seeds remain attached to the axis of the fruit after the fall of the crustaceous stellately woolly valves.

13. **Claoxylon** sp.; leaves long and stoutly petioled 10–12 by 2–4 in. oblong acuminate subentire glabrous above sparsely pubescent beneath base acute eglandular, petiole 2–3 in., young racemes very short, stamens 60–70 filaments short, anthers long for the genus, receptacle glabrous.

PERAK, on Larut Peak, alt. 2–2500 ft., *Herb. Hort. Bot. Calc.* (No. 2177).

A shrub, 3-6 ft.—Possibly a variety of *C. longipetiolatum*, but the flowers are much larger.

14. **Claoxylon** sp.; leaves 5–6 by 2–2½ in. membranous oblong acuminate scaberulous on both surfaces subserrate base acute 2-glandular, petiole ½–1 in., fruit about ½ in. diam. 3-lobed hoary crustaceous.

Tinnevelly Hills, *Beddome.*

15. **Claoxylon** sp.; stem very stout, shoots hoary, leaves very large 12–16 by 5–7 in. oblong acute or obtuse quite entire or sinuate-serrate base broad rounded or subcordate eglandular, nerves very spreading scaberulous above nearly glabrous beneath, petiole 6–10 in. stout, racemes peduncled, hoary, flowers (very young) minute.

CACHAR, *Keenan.* PEGU, *Kurz.*

A very large robust species, possibly a form of *C. khasianum*.

46. ACALYPHA, *Linn.*

Herbs, shrubs or trees. *Leaves* alternate, toothed or crenate, rarely entire, penninerved or 3–5-plinerved. *Flowers* minute, in axillary or terminal racemes, or females 1–2 in a peduncled solitary bract, monœcious, rarely dicœcious, apetalous; males very minute, ebracteate; fem. at the base of the male spike, or in separate spikes, often at the base of large accrescent leafy bracts. MALE FL. *Disk* 0. *Calyx* membranous, splitting into 4 valvate sepals. *Stamens* many, often 8, on a convex receptacle, filaments free; anther-cells divaricate, often twisted or flexuous. *Pistillode* 0. FEM. FL. *Sepals* 3–4, imbricate, often minute. *Ovary* 3-celled; styles filiform, often very long and laciniate or fimbriate; ovules 1 in each cell. *Capsule* of 3 minute 2-valved crustaceous cocci. *Seeds* subglobose, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species upwards of 220, tropical and subtropical.

* *Fem. bracts solitary, very large, 2-flowered.*

1. **A. Dalzellii,** *Hook. f.*; shrubby, glabrous, leaves long-petioled ovate obtuse base cuneate obscurely crenate, bract very large orbicular-reniform 2-fld., peduncle capillary.

The CONCAN ?, *Dalzell.*

Much branched, branches terete, bark brown. *Leaves* 2–3 in., membranous, 3–5-plinerved, nerves very slender; petiole ½–1 in., very slender. *Bracts* (female flowering) ¼–½ in. diam., quite entire; peduncles ½–1 in.; sepals lanceolate, ciliate; ovary glabrous, 3–4-celled; styles pectinately laciniate, ⅓ in. long.—A very remarkable

species, of which there are fem. specimens and a good drawing in Dalzell's Herbarium, but without locality. In the drawing two specimens are represented, one with androgynous spikes, each consisting of one female bract, and a very slender rachis with minute male flowers; the other is wholly female, and bears solitary axillary long-peduncled fem. bracts.

** *Fem. spikes* with many bracts.

2. **A. paniculata,** *Miquel Fl. Ind. Bat.* i. ii. 406; leaves long-petioled ovate acuminate, male fl. in axillary filiform long spikes, fem. fl. in axillary and terminal racemes or panicles, bracts minute not enlarged in fruit. *Muell. Arg. in DC. Prodr.* xv. ii. 802. A. racemosa, *Heyne in Wall. Cat.* 7784; *Baill. Etudes Gen. Euphorb.* 443. A. Wallichiana, *Thwaites Enum.* 271. A. filiformis, *Heyne mss.*—*Rheede Hort. Mal.* x. t. 83.

Deccan Peninsula; from Malabar southward. Ceylon; ascending to 3000 ft. —Distrib. Java, Trop. Africa.

An undershrub or herb, finely pubescent. *Leaves* 2–6 in., coarsely unequally crenate-serrate; petiole 1–4 in. *Male spikes* solitary, 2–6 in., dense-fld.; fem. racemes or panicles capillary; bracts scattered, 3-fld., ovate, obtuse, shorter than the pedicels. *Sepals* of fem. gland-ciliate, ovate-lanceolate, at length reflexed. *Capsule* $\frac{1}{12}$ in. diam., 3-lobed, glandular; styles 3–7-partite. *Seeds* reticulately pitted.—Mueller points out that Heyne's unpublished name of *racemosa*, as taken up by Baillon, is the oldest, but not applicable.—Mueller has described as forma *depauperata* (Linnæa xxxiv. 8) a starved state from the Nilghiries with weak reduced axillary male and female inflorescence.

3. **A. fruticosa,** *Forsk. Fl. Æg. Arab.* 161; shrubby, stem glabrous, leaves ovate acute or subacute crenate glabrous and glandular beneath, spikes axillary short, bracts of fem. few lax 1-fld. many-toothed, enlarged in fruit. *Muell. Arg. in DC. Prodr.* xv. ii. 822; *Kurz For. Fl.* ii. 397. A. betulina, *Retz. Obs.* v. 30; *Thwaites Enum.* 271. A. amentacea, *Roxb. Fl. Ind.* iii. 676. A. capitata, *Wall. Cat.* 7783 B.

Deccan Peninsula, *Heyne*, &c. Pegu, Martaban and Ava, *Kurz.* Ceylon, *Thwaites*, &c.—Distrib. Arabia, Trop. Africa.

A strong-smelling shrub, more or less covered with yellow waxy glands; shoots and spikes pubescent. *Leaves* 1–3 in., crenate, obtuse or subacute, base usually acute; petiole much shorter than the limb. *Spikes* $\frac{1}{2}$–1 in., solitary, bracteate and 2-bracteolate, usually male with a few fem. fl. at the base. *Sepals* of male pubescent. *Ovary* hairy and glandular; styles with filiform arms. *Capsules* tomentose. *Seeds* smooth.—Habit of *A. alnifolia*, but the stems and leaves beneath are glabrous, and the latter more or less glandular. I have seen no Burmese specimens. Large specimens apparently of this species in male flower only, from the sea coast, Tinnevelly, Wight (Kew Distrib. 2619), have leaves 3 in. long, deeply crenate, the young only glandular beneath.

4. **A. alnifolia,** *Klein mss.*; *Willd. Sp. Pl.* iv. 525; shrubby, stems pubescent and often ciliate with long deciduous hairs, leaves ovate acute serrate pubescent above and usually tomentose beneath, male spikes axillary slender dense-fld., fem. terminal sessile capitate, bracts 1-fld. 6–9-toothed longer than the flowers, styles very long fimbriate or plumose with short capillary branches. *Muell. Arg. in DC. Prodr.* xv. ii. 843; *Baill. Etudes Gen. Euphorb.* 442; *Wall. Cat.* 7782; *Wight in Hook. Comp. Bot. Mag.* ii. t. 29. A. capitata, *Willd. & Muell. ll. c. Wall. Cat.* 7783 A.

The Deccan Peninsula; common, *Heyne*, &c.

A small shrub, eglandular. *Leaves* 1–2 in., sometimes almost orbicular, base rounded or subcordate variable in hairiness; petiole rarely half the length of the blade. *Male spikes* 1–3 in.; fem. of few obtusely lobed imbricating bracts. *Sepals*

of male pubescent. *Capsule* hispid. *Seeds* subglobose.—I can find no good characters whereby to separate *capitata* from *alnifolia*. Mueller distinguishes the latter by the longer petioles and deeper lobed bracts.

5. **A. indica,** *Linn. Sp. Pl.* 1003; herbaceous, pubescent, leaves long-petioled ovate or rhombic-ovate crenate-serrate, spikes all axillary androgynous elongate, male fl. few minute terminal, bracts many distant large broad 3–5-fld. truncate crenate much larger than the capsules. *Muell. Arg. in DC. Prodr.* xv. ii. 868; *Roxb. Fl. Ind.* iii. 675; *Wight Ic.* t. 877; *Grah. Cat. Bomb. Pl.* 186; *Dalz. & Gibs. Bomb. Fl.* 228. A. spicata, *Forsk. Fl. Æg. Arab.* 160. A. ciliata & A. canescens, *Wall. Cat.* 7779 and 7785.

Hotter parts of INDIA from Behar eastwards to Assam and southwards to Singapore and Burma; and from the Concan to Travancore. CEYLON, common in fields. —DISTRIB. westwards to Tropical Africa, and eastwards to Timor and the Philippines.

Annual, 1–3 ft. *Leaves* 1–2 in., acute or obtuse, base cuneate entire; petiole slender, often longer than the blade. *Spikes* 1–3 in., slender, erect; bracts $\frac{1}{4}$–$\frac{1}{3}$ in. diam., cuneiform, many-nerved. *Ovary* hispid. *Capsules* quite concealed by the bract, often only 1-seeded, hispid. *Seed* ovoid, acute, smooth.

6. **A. brachystachya,** *Hornem. Hort. Hafn.* 909; herbaceous, flaccid, nearly glabrous, leaves long-petioled ovate or ovate-cordate subacute crenate-serrate, spikes all axillary sessile very short androgynous, male fl. very few terminal minute, fem. bracts few 2–3-fld. crowded at the base of the spike very large cut into 3 linear spreading 1-nerved obtuse lobes, styles pectinately laciniate. *Muell. Arg. in DC. Prodr.* xv. ii. 870. A. conferta, *Roxb. Fl. Ind.* iii. 677. A. calyciformis, *Herb. Wight*, and A. fissa, *Herb. Madr.*, *Wall. Cat.* 7786. Tragia tenuis, *Herb. Madr.*; *Wall. Cat.* 7787.

TEMPERATE HIMALAYA, alt. 4–8000 ft.; from Kashmir to Nepal, *Wallich*, &c. The KHASIA MTS., alt. 4000 ft., *J. D. H. & T. T.* DECCAN PENINSULA, from Canara southwards. CEYLON, *Walker*.—DISTRIB. Java, Trop. Africa.

A flaccid annual, 6–12 in. *Leaves* 1–3 in., membranous, acute obtuse or acuminate; petiole often longer than the blade. *Bracts* forming axillary clusters, each $\frac{1}{4}$–$\frac{1}{2}$ in. long; lateral segments shorter, all spreading. *Male flowers* in minute clusters on the very short filiform apex of the spike. *Capsules* hispid, quite concealed in the large green bracts. *Seeds* subglobose, nearly smooth.

7. **A. malabarica,** *Muell. Arg. in Linnæa* xxxiv. 42, and in *DC. Prodr.* xv. ii. 871; herbaceous, flaccid, stem pubescent, leaves long-petioled ovate subacute subserrate, spikes all axillary sessile short androgynous, male fl. very few terminal minute, bracts 3–7 alternate 2–5-fld. glabrous many-toothed and bordered with slender gland-tipped hairs rather longer than the capsules. A. hispida, *Heyne in Herb. Rottler.*

DECCAN PENINSULA, *Heyne, Law.*

A rather stout leafy annual, 4–6 in.; stem stout. *Leaves* $1\frac{1}{2}$–2 in., base cuneate, glabrous; petiole longer than the blade. *Spikes* $\frac{1}{2}$ in., male portion with few minute glabrous flowers. *Bracts* $\frac{1}{8}$ in. broad, separated by short intervals. *Seeds* globosely ovoid, obscurely granulate.—The more entire leaves, shorter sessile spikes, and deeper glabrous 2–3-fld. bracts distinguish this from *A. lanceolata.*

8. **A. fallax,** *Muell. Arg. in Linnæa* xxxiv. 43, and in *DC. Prodr.* xv. ii. 872; herbaceous, leaves long or short-petioled from rhombic- or orbicular-ovate to ovate-lanceolate obtuse or acute crenate-serrate, spikes all

axillary sessile or peduncled androgynous, male fl. few terminal minute, bracts many dense or remote 1-fld. hispid many-toothed often bordered with gland-tipped hairs rather shorter than the capsules. **A. lanceolata,** *Willd. Sp. Pl.* iv. 524. A. Wightiana, *Muell. Arg. ll. c.* A. hispida, *Herb. Wight* and *Thwaites Enum.* 271. A. ciliata & lanceolata, *Herb. Heyne in Wall. Cat.* 7780. A. flexuosa, *Herb. Wight.* A. virginiana, *Herb. Russell in Wall. Cat.* 7779 G. A. corchorifolia, *Vahl mss. in Baill. Etudes Gen. Euphorb.* 443. A. boehmerioides, *Miquel Fl. Ind. Bat. Suppl.* 459. A. albicans, floribunda, villosa & collina, *Heyne mss. in Herb. Rottler.*—*Wall. Cat.* 7778.

The DECCAN PENINSULA; from Mysore and the Circars southward, common, *Klein, Heyne,* &c. BURMA, at Melloon, *Wallich.* CEYLON, common. DISTRIB. Sumatra, Java, &c.

Annual, 6–18 in. high, usually branched from the base, flaccid or rather rigid, more or less pubescent and with sometimes long deciduous hairs on the stem as in *A. alnifolia.* *Leaves* very variable, 1–4 in., membranous; petiole shorter or longer than the limb. *Spikes* 1–5 in.; male fl. in a minute head concealed by the uppermost bracts, or produced into a minute spike; bracts $\frac{1}{8}$–$\frac{1}{6}$ in. diam., always 1-fld., 9–12-toothed. *Capsule* hispid, styles rather short, laciniate. *Seeds* globosely ovoid, nearly smooth.—I am very doubtful as to the name this species should bear; it is a most variable plant, and I am sure that all the synonyms quoted above belong to it. The three extreme forms are (1) a short robust state, with small elliptic leaves not above 1 in. long with the blade longer than the petiole; (2) a common form with broad leaves and elongate long-peduncled lax-fld. spikes, and (3) an often more lanceolate-leaved form with shorter sessile dense-fld. spikes. The flowers and fruit are the same in all.

9. **A. ciliata,** *Forsk. Fl. Æg. Arab.* 162; herbaceous, leaves long-petioled ovate or ovate-lanceolate acuminate serrate, spikes all axillary sessile short androgynous, male fl. few minute terminal, bracts crowded 1–2-fld. longer than the capsules with many nerves ending in long subulate hispid teeth. *Muell. Arg. in Linnæa* xxxiv. 44, and in *DC. Prodr.* xv. ii. 873; *Roxb. Fl. Ind.* iii. 676; *Wight & Arn. in Ann. Nat. Hist.* ii. (1839) 111, t. 5; *Dalz. & Gibs. Bomb. Fl.* 228; *Thwaites Enum.* 271 (*excl. syn.*). A. fimbriata, *Schum. Beskr.* 409; *Baill. Rec. Obs. Bot.* i. 272. A. ciliata, *Herb. Heyne,* and A. rubra, *Herb. Wight, in Wall. Cat.* 7781.

WESTERN HIMALAYA, alt. 3–6000 ft., from Kashmir to Garwhal. BANDA, *Edgeworth.* The DECCAN PENINSULA, from the Concan southwards. CEYLON, not uncommon.—DISTRIB. Arabia, Tropical Africa.

Annual, 1–2 ft., rather stout, glabrous or pubescent. *Leaves* 2–3 in., sometimes caudate-acuminate, base cuneate or rounded; petiole usually longer than the blade. *Spikes* rarely 1 in. long; bracts (like the calyx of a Labiate plant) hispid or glabrous, pale, teeth as long as the limb. *Ovary* sparsely hispid. *Capsule* glabrous; cocci very thin, white, glabrous, twisted after dehiscence. *Seeds* globosely ovoid, nearly smooth.

DOUBTFUL AND EXCLUDED SPECIES.

A. HISPIDA, *Burm. Fl. Ind.* 303, t. 61, f. 1; *Muell. in DC. Prodr.* xv. ii. 815 (Caturus spiciflorus, *Roxb. Fl. Ind.* iii. 760), with very long spikes, minute bracts, and very long styles, is a garden plant only in India.

A. CYLINDRICA, *Roxb. Fl. Ind.* iii. 628, is doubtfully referred by Mueller (in DC. l. c. 880) to the Brazilian *A. Poiretii,* Spr.

47. ADENOCHLÆNA, *Baill.*

Trees or shrubs, glabrous or stellately tomentose. *Leaves* alternate,

penni- or tripli-nerved, quite entire. *Flowers* in terminal or axillary spiciform racemes, or capitate, monœcious, males many clustered, females few, at the base of the spike. *Disk* 0. MALE FL. globose in bud. *Sepals* 4–6, valvate. *Stamens* 4–6, filaments free, exserted; anthers dorsifixed, versatile; cells adnate to the thick connective, parallel. *Pistillode* columnar. FEM. FL. *Sepals* 5–8, narrow, very unequal, sometimes accrescent and pinnatisect. *Ovary* 3-celled; styles long, connate below, spreading and bifid above with recurved plumosely papillose multifid arms; ovules 1 in each cell. *Capsule* of 3 2-valved cocci. *Seeds* estrophiolate, subglobose, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 4 or 5, Indian and Malayan.

SECT. I. *Leaves* penninerved. *Fruiting calyx* unaltered. SYMPHYLLIA, *Baill.*

1. **A. silhetiana,** *Benth. in Gen. Pl.* iii. 308; leaves crowded at the ends of the branches, subpanduriformly oblanceolate acuminate from a contracted cordate base, spikes terminal interrupted, flowers densely clustered sessile on short lateral thickened branchlets glabrous. Symphyllia silhetiana, *Baill. Etudes Gen. Euphorb.* 474, t. 11, f. 6, 7; *Muell. Arg. in DC. Prodr.* xv. ii. 764. Cluytia semperflorens, *Wall. mss.* (*not Roxb.*).—*Wall. Cat.* 9095.

KHASIA MTS., *Wallich, Griffith.*

Branches stout, woody, finely stellate tomentose, as are the petioles and rachis of the racemes. *Leaves* 6–10 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., thinly coriaceous, contracted above the 2-auricled base; midrib and 12–15 pairs of arched anastomosing nerves very prominent beneath; petiole $\frac{1}{10}$–$\frac{1}{6}$ in., very stout. *Racemes* stout, erect, 2–6 in. long; rachis quite naked between the clusters of flowers; bracteoles minute, pubescent; flowers $\frac{1}{10}$ in. diam; sepals 4, ovate; disk with a few hairs; pistillode small. *Ovary* stellately tomentose; styles united below in a column, arms pubescent. *Capsule* unknown.

Var. *trichantha*, Muell. l. c.; flowers smaller stellately tomentose. *Kurz For. Fl.* ii. 378.—Tenasserim, *Helfer.*—Possibly a different species, but the specimen is too imperfect.

2. **A. indica,** *Beddome mss.*; leaves short- or long-petioled elliptic or oblong obtuse, spikes lateral and terminal interrupted, flowers densely clustered scurfily puberulous. Cephalocroton indicum, *Beddome Fl. Sylvat.* t. 261. Symphyllia mallotiformis, *Muell. Arg. in Linnæa* xxxiv. 156, and in *DC. Prodr.* xv. ii. 764.

DECCAN PENINSULA; on the Ghats from Canara to Travancore.

A large tree, branchlets puberulous. *Leaves* 3–7 in., greenish or pale brown when dry, rather shining above, tip often narrowed but obtuse, base rounded or narrowly cordate at the petiole; nerves 8 pair, strong beneath; petiole very variable in length, $\frac{1}{2}$–4 in., rather thickened at the top. *Spikes* 2–6 in.; bracts minute; male buds globose, $\frac{1}{10}$ in. diam.; stamens 4–5, large, exserted. *Fem. fl.* very rare, at the base of the spikes; sepals lanceolate, unequal, tomentose; ovary and style tomentose, the latter stout and often much longer than the sepals; stigmas twice-forked, fimbriately papillose. *Capsule* subglobose, slightly scabrous, $\frac{3}{4}$ in. diam.—Some specimens of this were distributed under "*Herb. Ind. Or.*, Claoxylon, 14," and its resemblance to *Mallotus* is singular. It is also singular that no specimens occur in Wight's Herbarium, and that it has not been found in the Nilghiri Hills; the "Herb. Ind. Or. H. f. & T." specimens, obtained by G. Thomson's collectors in the Nilghiri and Kurg, are hence no doubt from the latter country.

SECT. II. *Fruiting calyx* accrescent, pectinately laciniate. CENTROSTYLIS, *Baill.*

3. **A. zeylanica,** *Thwaites Enum.* 270; branches leaves beneath and racemes finely stellate-tomentose, leaves subdeltoidly ovate or lanceolate acuminate from a truncate or subcordate 3-plinerved base, male fl. in peduncled heads. Cephalocroton zeylanicus, *Baill. Rec. Obs. Bot.* 5, 148; *Muell. Arg. in DC. Prodr.* xv. ii. 763. *Beddome Forester's Man.* 206. Centrostylis zeylanica, *Baill. Etudes Gen. Euphorb.* 470, t. 2, f. 28, 29.

CEYLON; Central Province, alt. 4–5000 ft., *Thwaites.*

A suberect shrub; branches slender. *Leaves* membranous, 3–7 by 1–3 in., brown when dry, pale beneath; nerves 5–8 pairs above the basal, slender; petiole $\frac{1}{4}$–1 in., slender; stipules minute, subreniform. *Male fl.* $\frac{1}{10}$ in. diam., tomentose; sepals 4–5, rarely 2, obtuse; filaments very stout; anthers large; pistillode pubescent below. *Fem. fl.* larger than the males; sepals 5–6, flowering lobulate at the base, fruiting nearly 1 in. long with filiform purple gland-tipped segments; ovary tomentose, 3-lobed; styles very large, much branched, branches clothed with long papillæ. *Capsule* depressed, cocci rounded. *Seeds* subspheric, $\frac{1}{6}$ in. diam., brown marbled with black. —I should be disposed to keep up Baillon's genus *Centrostylis* in a revision of the Order.

EXCLUDED SPECIES.

A. LEUCOCEPHALA, *Baill. Etudes Gen. Euphorb.* 473. Cephalocroton leucocephalus, *Muell. Arg. in DC.* xv. ii. 762; *Beddome Forester's Man.* 206, is a Madagascar plant, erroneously also ascribed to Ceylon.

48. CŒLODEPAS, *Hassk.*

Trees. *Leaves* alternate, oblong, entire or toothed, penninerved. *Flowers* in axillary spicate clusters, monœcious or diœcious, apetalous; fem. few at the base of the spike. *Disk* 0. MALE FL. *Calyx* globose, splitting into 3–4 valvate segments. *Stamens* 4–8, filaments cuneately dilated from the base upwards, free or connate at the very base; anthers terminal, didymous, cells pendulous or spreading from the connective, introrse. *Pistillode* minute, protruded. FEM. FL. *Calyx* cupular, embracing the ovary, often enlarged in fruit; lobes 4–10, imbricate. *Ovary* 3-celled; styles spreading, flattened, 2–multifid, lobes toothed or lacerate; ovules 1 in each cell. *Capsule* of 3 2-valved stellately-pubescent cocci. *Seeds* subglobose, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 3, South Indian and Malayan.

1. **C. Wallichianum,** *Benth. in Hook. Ic. Pl.* t. 1288; branchlets glabrous, leaves subsessile broadly oblong-lanceolate quite entire or subentire glabrous base cordate, spikes interrupted tomentose upper androgynous lower short female, anther-cells pendulous introrse, styles dilated. —*Wall. Cat.* 9098.

PENANG, *Porter.*

A tree; branches glabrous, tips of shoots and petioles puberulous. *Leaves* 6–10 in., coriaceous, shining, red-brown when dry, sometimes obscurely crenate near the apex, nerves 12–14 pairs arched, reticulate; petiole very short and thick or 0; stipules small, subulate. *Spikes* short, white-tomentose; male fl. minute, globose, clustered; fem. few, solitary in small bracts. *Filaments* united at the base, dilated upwards and suddenly contracted at the tip; anther-cells small, diverging. *Pistillode* thick, truncate. *Fem. calyx* tomentose, lobes short; styles thick, much larger than the ovary, multifid, lobes papillosely fringed.

2. **C. calycinum,** *Beddome Fl. Sylvat.* t. 320, and *Forester's Man.* 207; branchlets furfuraceously pubescent, leaves subsessile elliptic or linear-oblong acuminate crenate-serrate, spikes scurfily pubescent, fem. calyx much enlarged in fruit, styles 2-fid lacerate.

TINNEVELLY HILLS; in forests, alt. 2000 ft., *Beddome.*

A tree. *Leaves* 5–7 in., thinly coriaceous, greenish when dry, base acute or contracted and subcordate; petiole rarely $\frac{1}{8}$ in., scurfy; stipules subulate, lacerate. *Male spikes* 4–5 in. long, slender. *Sepals* 4. *Stamens* 4–5; filaments dilated upwards with angular shoulders, connate below and aduate to the pistillode; anther-cells divaricate. *Fem. racemes* short, few-fld. *Sepals* 5, concave, tomentose. *Ovary* pubescent. *Capsule* $\frac{1}{2}$ in. diam., 3-lobed, stellately pubescent, fruiting broadly ovate.

3. **C. ferrugineum;** branches petioles and capsules rusty-tomentose, leaves petioled linear-oblong obtusely acuminate quite entire base rounded fem. calyx closely embracing the young globose fruit.

MALACCA, *Griffith* (*Kew Distrib.* 5017).

Leaves 3–4 by 1–$1\frac{1}{2}$ in., thin but stiff, dark brown and almost shining above when dry, with the nerves all raised, beneath a little pubescent, red-brown with 10–12 pairs of raised nerves and parallel cross-nervules; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Racemes* very short. *Male fl.* very minute; sepals 5, broad, villous; stamens with very short stout filaments greatly thickened in the middle; anther-cells ovoid, pendulous, diverging; pistillode broadly conical. *Fem. calyx* very thick, globose, densely stellate tomentose, valvately 3-lobed, crowned with the large densely branched corolliform stigmas.

4. **C.? longifolium,** *Hook. f.*; branchlets petioles and spikes tomentose, leaves very shortly petioled linear-lanceolate acuminate subserrate strongly reticulate beneath, male fl. in small clusters on axillary peduncles, calyx stellately pubescent cup-shaped valvately 3–5-lobed, stamens 4–5, filaments connate below in a fleshy cup, free part triangular, anthers didymous horizontal.

PERAK; at Larut, *King's Collector.*

A tree, 20–30 ft. *Leaves* 6–10 by 1–$1\frac{1}{2}$ in., thinly coriaceous, base rounded; nerves 12–16 pairs, raised on both surfaces, strong beneath with strong cross-nervules; petiole stout, $\frac{1}{6}$–$\frac{1}{4}$ in.; stipules very slender. *Spikes* 1–3 in., rachis stout; flowers very minute, ebracteate.

49. **ALCHORNEA**, *Swartz.*

Trees or shrubs, more or less pubescent. *Leaves* alternate, entire or toothed, 3–5-pli- or penni-nerved, sometimes stipellate and usually glandular at the base above. *Flowers* small, clustered on simple or panicled terminal spikes or racemes, dicœcious or monœcious, apetalous; bracts minute. *Disk* usually 0. MALE FL. *Calyx* globose, splitting into 2–4 valvate segments. *Stamens* 6–8 or indefinite, filaments free or connate at the base; anthers dorsifixed, cells parallel or diverging. *Pistillode* 0. FEM. FL. *Sepals* 3–6, imbricate. *Ovary* 2–3- rarely 4-celled; styles distinct, often very long, linear, entire, 2-fid or sparingly lobed; ovules 1 in each cell. *Capsule* of 2–3 2-valved crustaceous cocci. *Seeds* subglobose, estrophiolate, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 30, tropical.

Sect. I. STIPELLARIA. *Leaves* triple-nerved, stipellate. *Female sepals* 5–8. *Disk* 0. *Stamens* 7–8. *Styles* filiform.

1. **A. mollis,** *Muell. Arg. in Linnæa* xxxiv. 168, and in *DC. Prodr.* xv. ii. 902; pubescent or tomentose, leaves long-petioled orbicular or broadly ovate cuspidate dentate or serrate pellucidly dotted, base rounded or cordate, ovary tomentose, capsules globose faintly 3-lobed smooth densely pubescent, seeds as broad as long dorsally compressed rugose. Stipellaria mollis,

Benth. in Hook. Journ. Bot. vi. (1854) 3. Rottlera mollissima, *Wall. Cat.* 7825. Sapium cordifolium, *Roxb. Fl. Ind.* iii. 693.

CENTRAL and EASTERN HIMALAYA, in hot valleys; Nipal, *Wallich*; Sikkim, *Clarke*. Assam, *Masters*. The CIRCARS, *Roxburgh*.

A small tree; branches woody; branchlets petioles leaves beneath and racemes finely pubescent or tomentose. *Leaves* 4–6 in. diam., with usually large glands at the base above; petioles stout, 2–6 in., terete; stipules small, subulate; stipellæ $\frac{1}{4}$ in. *Male racemes* 4–6 in., very slender, pubescent; buds $\frac{1}{12}$ in. diam., globose, glabrous, grooved between the anthers; calyx membranous, glabrous, usually bursting irregularly. *Fem. racemes* 4–6 in., bracts small; base of calyx eglandular; sepals $\frac{1}{6}$ in., lanceolate, pubescent; ovary tomentose, styles free nearly to the base. *Capsules* $\frac{1}{2}$ in. diam.—I have seen no specimens from the Circars, and have no means of verifying the citation of Roxburgh's *Sapium cordifolium*.

2. **A. villosa,** *Muell. Arg. in Linnæa* xxxiv. 168, and in *DC. Prodr.* xv. ii. 902; pubescent or tomentose, leaves short-petioled ovate acuminate serrulate pellucidly dotted, base rounded cuneate or cordate, bracts and sepals narrowly lanceolate hispidly hairy all over, styles twice as long or more than the pubescent ovary, capsules globose faintly 3-lobed rather rough or smooth glabrous or puberulous, seeds nearly as broad as long dorsally compressed tubercled. A. Zollingeri, *Hassk. Hort. Bogor. Ed.* ii. 37. Stipellaria villosa, *Benth. in Hook. Journ. Bot.* vi. (1854) 4. Aparisthmium sumatranum, *Reichb. f. et Zoll. in Retzia* 37. Bleekeria Zollingeri, *Miquel Fl. Ind. Bat.* i. ii. 407.

MALACCA, *Cuming, Griffith*, &c. (*Kew Distrib.* 4749), *Maingay* (*Kew Distrib.* 1379). PERAK, *Scortechini, Wray*, &c.—DISTRIB. Sumatra, Java.

Branchlets and racemes pubescent, tomentose, or villous with spreading hairs. *Leaves* 4–6 in. broad, with or without basal glands; petiole 1–2 in.; stipellæ $\frac{1}{4}$ in. *Male racemes* slender, pubescent; buds $\frac{1}{16}$ in. diam., subglobose, hispid; flowers very minute; sepals 2–3, stamens 8. *Fem. fl.* including the capillary styles $\frac{1}{2}$–$\frac{3}{4}$ in.; sepals and bracts together about 12, very unequal; ovary glabrous. *Capsule* size of a pea.

Var. *glabrata*; leaves glabrous beneath.—Penang, *Curtis*.

Var. ? *latisepala*; leaves pubescent on the nerves beneath only, sepals and bracts ovate obtuse or acute coarsely ciliate closely imbricate, styles shorter stouter.—Tenasserim, *Helfer* (*Kew Distrib.* 4752).—Probably a different species.

3. **A. discolor,** *Hook. f.*; branchlets petioles and racemes finely pubescent, leaves elliptic-lanceolate acuminate serrate nearly glabrous not pellucidly dotted red-purple beneath, ovary sparsely pubescent, styles united form $\frac{1}{3}$ their length.—*Wall. Cat.* 7777.

PENANG, *Wallich, Walker*; on Gool Hill, *Curtis*.

Branches woody. *Leaves* 4–6 in., base narrowed, green and glabrous above with usually basal glands, beneath a fine vinous purple; nerves 6–7 pairs above the basal, slender, pubescent, cross-nervules raised; petiole 2–5 in., very slender; stipules filiform; stipellæ narrow. *Male racemes* 2–4 in., slender; buds $\frac{1}{20}$ in. diam., hispid. *Fem. racemes* slender; bracts subulate; calyx-base glandular; sepals $\frac{1}{6}$ in. long, subulate, unequal; ovary glabrous with the style $\frac{1}{2}$ in. long.—Wallich's specimens have thicker opaque leaves, in which I do not see the pellucid glands.

4. **A. tiliæfolia,** *Muell. Arg. in Linnæa* xxxiv. 168, and in *DC. Prodr.* xv. ii. 903; branches petioles and racemes finely pubescent, leaves long petioled from broadly ovate to orbicular cuspidately acuminate or caudate dentate or serrate most minutely pellucidly dotted, ovary pubescent, styles equalling the oblong or subglobose tubercled capsules, seeds obovoid-oblong nearly smooth. *Kurz For. Fl.* ii. 386. Stipellaria tiliæfolia, *Benth*

in Hook. Journ. Bot. vi. (1854) 4. Croton Chiamala, *Wall. Cat.* 7775.—*Wall. Cat.* 7829, 7995.

SIKKIM HIMALAYA; at the foot of the hills, *J. D. H., Clarke.* BHOTAN, *Griffith.* ASSAM, the KHASIA MTS. and SILHET, *Wallich*, &c. TENASSERIM and ANDAMAN ISLANDS, *Kurz.*

An evergreen shrub; branches rather slender, terete, woody; branchlets sometimes tomentose. *Leaves* 6–10 in. broad, thin, base cuneate, rounded or cordate, pellucid glands very minute; base glandular or not; nerves pubescent; petiole slender, 2–4 in.; stipules filiform; stipellæ subulate or 0. *Male racemes* very slender, 4–6 in., sparsely pubescent; buds globose, $\frac{1}{12}$ in. diam., glabrous; calyx membranous, often bursting irregularly. *Fem. fl.* shortly pedicelled; calyx-base eglandular; sepals subulate-lanceolate, $\frac{1}{6}$ in. long; ovary minutely tubercled; styles free to the base. *Capsules* $\frac{1}{2}$–$\frac{2}{3}$ in. long, very shortly pedicelled, 3-lobed, puberulous, green with purple tubercles.

Sect. II. CLADODES, *Muell. Arg. Leaves* penninerved, estipellate. *Female sepals* 4–6. *Stamens* 3–8. *Styles* shorter, flattened and lobed.

5. **A. rugosa,** *Muell. Arg. in Linnæa* xxxiv. 170, and in *DC. Prodr.* xv. ii. 905; glabrous, leaves petioled or sessile oblong-lanceolate or oblanceolate acuminate gland-serrate, male racemes panicled rigid slender, stamens 5–8 few stout, styles very stout united in a short column at the base, tips dilated entire or cleft, capsules tridymous glabrous. *Kurz For. Fl.* ii. 385. A. javensis, *Muell. Arg. ll. c.* Aparisthmium javense, *Hassk. Hort. Bogor.* 235. Conceveibum javanense, *Blume Bijd.* 614. C. latifolium, *Zipp. in Linnæa* xv. 349. Adelia glandulosa, *Blanco Fl. Filip.* 814.—*Wall. Cat.* 7732, 7792.

BURMA; at Amherst, *Wallich.* ANDAMAN ISLANDS, *Kurz.* MALACCA, *Griffith* (*Kew Distrib.* 4730, 4780), *Maingay* (1409).—DISTRIB. Eastward to China, the Malay Archipelago and Bouton Straits.

An undershrub (Maingay). *Branches* woody, terete, tips sparsely pubescent. *Leaves* 6–10 by 2–3 in., thinly coriaceous, puberulous on the midrib beneath, very obscurely and minutely pellucidly dotted; base contracted, sometimes subcordate; nerves 8–10 pair, slender, as are the cross-nervules beneath; petiole 0–1 in.; stipules subulate. *Male spikes* 4–8 in., strict; flowers minute, in distant clusters; sepals 3–4. *Fem. spikes* shorter, stouter; flowers very shortly pedicelled; bracts minute, 2-glandular; sepals 6, broad, base subcordate; disk thick; ovary 3-lobed, puberulous; style short, stout, arms twice as long as the rest of the ovary, thick, flattened and sparingly cleft. *Capsule* the size of a pea.—Maingay describes the style-arms as either entire or cleft.

DOUBTFUL SPECIES.

6. **Alchornea** sp. ?; densely white-tomentose, leaves estipellate 2–3 in. oblong obtuse or subacute penninerved denticulate not pellucid-dotted base triple-nerved, petiole 1–1$\frac{1}{2}$ in. slender, spikes terminal as long as the leaves, bracts minute, sepals $\frac{1}{4}$ in. narrowly oblong closely imbricate, ovary pubescent 3-celled, style stout, stigmas 3 long revolute.—Perak, *Scortechini.*

The fem. spikes resemble the catkin of a willow, the flowers resembling willow pistils. The specimens are in a very young state, and in fem. fl. only. The plant is very unlike anything I know, and I hope it may be recognized by the above diagnosis.

50. PODADENIA, *Thwaites.*

A large villous tree. *Leaves* alternate, broad, quite entire, penninerved. *Flowers* in terminal tomentose bracteate glandular paniculate racemes, diœcious, apetalous; males clustered; fem. subsolitary. *Disk* 0. MALE FL.

Calyx glandular, ovoid or globose, acuminate, splitting into 3–4-valvate segments. *Stamens* many, in a convex receptacle, filaments free, mixed with glands; anther-cells distinct, pendulous from a projecting acuminate connective. *Pistillode* 0. FEM. FL. *Sepals* 4–5, imbricate. *Staminodes* subulate. *Ovary* 3-celled; styles very large, long, recurved, entire, papillose on the inner surface; ovules 1 in each cell. *Fruit* subglobose, fleshy, indehiscent, covered with sessile or stipitate glands. *Seeds* large, oblong, testa bony, aril large white fleshy, albumen copious; cotyledons flat.

P. sapida, *Thwaites Enum.* 274. P. Thwaitesii, *Muell. Arg. in DC. Prodr.* xv. ii. 791. Rottlera Thwaitesii, *Baill. Etudes Gen. Euphorb.* 426; *Beddome Fl. Sylvat.* t. 282.

CEYLON; at Ambagamowa and near Ratnapoora, *Thwaites.*

A tall tree; shoots and panicles tawny villously tomentose. *Leaves* 5–10 by 2½–5 in., coriaceous, dark brown when dry (as is the whole plant), obovate, abruptly acuminate, hairy beneath, midrib above tomentose, base narrowed; nerves 10–12 pair, spreading; petiole ¾–2 in., terete, tomentose. *Panicles* large, spreading, tomentose, and with many red long-stipitate glands. *Flowers* red, males ¼ in. diam. *Ovary* globose, tomentose; styles long, stout, twisted. *Fruit* reddish, subspherical, 1½ in. diam., clothed with long fleshy projections terminating in peltate discoid glands. *Seeds* ¾ in. long, brown.

51. **TREWIA,** *Linn.*

Trees, soft-wooded. *Leaves* opposite, broadly ovate- or orbicular-cordate, quite entire, 3–5-plinerved. *Flowers* rather large, developed before the leaves, dicœcious, apetalous; males in lax lateral bracteate racemes, one in each bract; fem. solitary on a long peduncle, or racemose. *Disk* 0. MALE FL. *Calyx* globose, splitting into 3–4 broad concave often reflexed segments. *Stamens* numerous, on a convex receptacle, filaments free; anthers dorsifixed, oblong, cells contiguous parallel. *Pistillode* 0. FEM FL. *Sepals* 3–5, broad, imbricate, caducous. *Ovary* 2–4-celled; styles connate below, very long, terete, entire, papiliose all over; ovules 1 in each cell. *Fruit* 2–4-celled, fleshy, indehiscent or loculicidal, endocarp crustaceous. *Seeds* ovoid, testa hard, albumen fleshy; cotyledons broad, flat.—Species 2, Indian.

1. **T. nudiflora,** *Linn. Sp. Pl. Ed.* 3, *Append.* 1661; fem. fl. solitary or few long-peduncled, fruit globose 1–1½ in. diam., pericarp very thick. *Muell. Arg. in DC. Prodr.* xv. ii. 953; *Roxb. Fl. Ind.* iii. 837; *Wight Ic.* t. 1870–1 (*excl. fem. fl.*); *Baill. Etudes Gen. Euphorb.* t. 18, f. 18–23; *Brand. For. Fl.* 443; *Kurz For. Fl.* ii. 379; *Gamble Man. Ind. Timb.* 359; *Grah. Cat. Bomb. Pl.* 185; *Dalz. & Gibs. Bomb. Fl.* 231; *Wall. Cat.* 7816, 7817. T. macrophylla, *Roth Nov. Sp.* 373. T. macrostachya, *Klotzsch in Bot. Reise Pr. Wald.* 117, t. 23. Rottlera indica, *Willd. in Götting. Diar. Hist. Nat.* i. 8, t. 3; *A. Juss. Tent. Euphorb.* t. 9, f. 29 C; *Wall. Cat.* 7837. Tetragastris ossea, *Gærtn. Fruct.* ii. 130, t. 109, f. 5.—*Rheede Hort. Mal.* i. t. 42.

Common in the hotter parts of India from Kumaon southward, and eastward to ASSAM, MALACCA and CEYLON.—DISTRIB. Sumatra, Java.

A large deciduous tree, more or less tomentose or woolly, shoots and sometimes leaves beneath and inflorescence clothed with flocculent cottony wool, at others nearly glabrous. *Leaves* 4–6 in. long and often as broad, variable in proportion of length to breadth, membranous, base rounded or cordate; petiole 1–3 in. *Male racemes* 3–8 in.; flowers ⅓–½ in. diam.; pedicels slender, as long or longer. *Fem. fl.* usually solitary, peduncle sometimes 4 in. long; ovary densely lanate; styles ½–¾ in. long. *Fruit* almost woody.—There are, I think, two varieties of this, both common,

one much more densely cottony than the other. There is also a small leaved state.

2. **T. polycarpa,** *Benth. in Gen. Plant.* iii. 319; fem. fl. in short racemes, fruit ovoid or subglobose ¼ in. diam., pericarp thin. T. nudiflora, *Wight Ic.* t. 1871 (*the fem. fl. only*); *Beddome Fl. Sylvat.* t. 281.

The CONCAN, *Law, Stocks*, &c.

Leaves subopposite, of the form of *T. nudiflora*, but faintly puberulous beneath, sometimes 8 in. diam.; petiole very slender. *Fem. racemes* many-fld. *Ovary* 2-celled; styles ¼–⅓ in. long. *Fruiting racemes* 2–3 in.; pedicels about ¼ in. *Fruit* ⅓ in. diam., densely finely tomentose; pericarp crustaceous, loculicidal.

THE FOLLOWING SPECIES ARE ALTOGETHER DOUBTFUL.

T. DISCOLOR, *Smith in Rees Cyclop.* xxvi.; leaves ovate entire minutely densely tomentose, minutely punctate above white beneath, panicles terminal, male calyx villous. *Muell. Arg. in DC. Prodr.* xv. ii. 954.—E. Indies ?—Mueller suggests this being *Mallotus Apelta* or *M. paniculatus*.

T. HERNANDIFOLIA, *Roth Nov. Sp.* 374, is probably *Macaranga indica*, Wight.

T. RUSCIFLORA, *Heyne in Roth Nov. Sp.* 374. This is undeterminable generically by the description. Mueller, Arg. (in *DC. Prodr.* xv. ii. 954), suggests it being a *Mallotus*.

52. COCCOCERAS, *Miquel.*

Trees. *Leaves* alternate, entire or toothed, 3-plinerved. *Flowers* in axillary and terminal racemes, diœcious, apetalous; males clustered, subsessile; fem. lax, pedicelled. *Disk* 0. MALE FL. *Calyx* globose, splitting into 3–6 valvate sepals. *Stamens* 15–20, on a convex receptacle, filaments free; anthers dorsifixed, cells distinct parallel. *Pistillode* 0. FEM. FL. *Sepals* 5, lanceolate, imbricate. *Ovary* 3-celled; styles spreading, hispid; ovules 1 in each cell. *Capsule* hard, depressed, the ribbed angles sometimes horned or produced horizontally, at length loculicidally 3-valved. *Seeds* subglobose or compressed, estrophiolate, testa smooth crustaceous.—Species 3, Malayan.

In a Bornean species apparently of this genus (Beccari 2502) the leaves are not triple-nerved.

1. **C. muticum,** *Muell. Arg. in Flora* 1864, 470, and in *DC. Prodr.* xv. ii. 950; quite glabrous, leaves long-petioled elliptic- or cuneate-oblong obtusely acuminate quite entire, nerves 5–7 pairs above the basal, fruiting racemes short, fruit shortly pedicelled triquetrous.

MALACCA, *Griffith* (*Kew Distrib.* 4770).

Branches woody. *Leaves* 5–6 in., pale grey when dry, most minutely gland-dotted beneath, base minutely cordate; petiole 2–2½ in. *Fruiting racemes* (in the solitary specimen) 1½ in., pedicels ¼ in. *Fruit* (immature) 1 in. long, lobes compressed, acutely keeled, broader than long; top broadly rounded or truncate with a very short style.—Griffith in a note says the sepals are 6 reflexed.

Var. ? *pedicellata*; leaves with 3–4 nerves above the basal, fruiting racemes 8–12 in., pedicels 1 in.—Malacca, *Griffith* (*Kew Distrib.* 4789).—The leaves are almost identical with those of *C. muticum*, but the racemes so very different that I expect this will prove a distinct species, which may be called *C. pedicellatum*. It is in very young fruit only.

2. **C. plicatum,** *Muell. Arg. in Flora* 1864, 539, and in *DC. Prodr.* xv. ii. 950; shoots racemes and young leaves beneath finely tomentose, leaves shortly petioled elliptic or oblong obtusely acuminate crenate,

racemes equalling or longer than the leaves, flowers shortly pedicelled. *Benth. in Journ. Linn. Soc.* xvii. 217. Hymenocardia plicata, *Kurz For. Fl.* ii. 395.

From PEGU to TENASSERIM; in swamp-forests, *M'Clelland*, &c.

A tree. *Leaves* 4–6 in., dark brown when dry, most minutely gland-dotted beneath, base rounded or subcordate, nerves 4–6 pair above the basal. *Racemes* slender. *Male fl.* $\frac{1}{4}$ in. diam., clustered, shortly pedicelled; sepals membranous, concave, glabrous; stamens very numerous in a globose mass, filaments very short. *Fem fl.* larger, pedicelled; sepals minute, subulate, ciliate; ovary 3-gonous; styles 2–3 fimbriate. *Fruit* not seen.

53. **CŒLODISCUS,** *Baill.*

Shrubs or small trees with stellate pubescence. *Leaves* opposite, or alternate by the suppression of one, broadly ovate or orbicular, often long-petioled, 3–7-plinerved. *Flowers* bracteate in axillary spikes or racemes, small, diœcious, apetalous; males clustered in the bracts, fem. solitary. *Disk* 0. MALE FL. *Sepals* 3, valvate. *Stamens* 20 or more, surrounding a naked central receptacle. filaments free; anthers small, oblong, erect, cells parallel, introrse. *Pistillode* 0. FEM. FL. *Sepals* 3, narrow. *Ovary* 2–5-celled; styles stout, erect, entire; ovules 1 in each cell. *Capsule* of 3 tomentose or spinous 2-valved cocci, separating from a central axil. *Seeds* subglobose; testa crustaceous, albumen fleshy, cotyledons broad flat.—Species 5 or 6, Indian and Malayan.

Differs from *Mallotus* in the stamens surrounding a naked disk and the usually oblong anthers with the cells contiguous.

1. **C. montanus,** *Muell. Arg. in DC. Prodr.* xv. ii. 759; softly tomentose, leaves opposite or subopposite long-petioled 3–7-plinerved ovate-cordate or oblong-lanceolate acuminate sinuate-toothed minutely glandular beneath, male spikes and fem. racemes short stout, stamens in one series, filaments long villous, capsule smooth tridymous densely stellate-tomentose. Croton montanus, *Wall. Cat.* 7723 B. Ricinus dioicus, *Wall. Cat.* 7828; *Baill. Etudes Gen. Euphorb.* 294.

PENANG, *Wallich, Porter*, &c.

A shrub or small tree, 18–25 ft.; branches terete. *Leaves* in rather remote unequal pairs, or with one of the pairs replaced by a branch or raceme, rather thin, dull greenish when dry; the broadest ovate-cordate, 7 by 4 in., narrowest 8 by $2\frac{1}{2}$ in., base rounded cuneate or cordate, upper surface scaberulously tomentose; petiole stout, 1–3 in. *Racemes* axillary or supra-axillary or nearly leaf-opposed; males 3–5 in.; bracts minute; flowers in remote clusters of 2–3, subsessile, ovoid in bud, about $\frac{1}{8}$ in. long; sepals 3, unequal, ovate lanceolate; stamens about 25, filaments slender, quite free to the base, anthers didymous, connective inconspicuous in fruit globose at the back of the anther; central receptacle orbicular, nearly flat. *Fem. racemes* more robust; sepals 3, tomentose. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., depressed, cocci globose. *Seeds* globose, smooth.—Thwaites, while referring this to his *Rottlera eriocarpa*, remarks of it that it differs in the hairy filaments.

2. **C. lappaceus,** *Kurz For. Fl.* ii. 393; densely furfuraceously tomentose, leaves opposite 4–8 in. ovate or broadly oblong entire or obscurely lobed and denticulate, racemes short axillary, bracts linear, ovary 3–4-celled, stamens crowded on the receptacle, filaments glabrous short, capsules sessile clothed with long soft villous filaments. Mallotus lappaceus, *Muell. Arg. in DC. Prodr.* xv. ii. 957. Croton lætus, *Wall. Cat.* 7738. Rottlera lappacea, *Wall. Cat.* 7845.

BURMA; at Segain and Yenanghur, *Wallich, Griffith.*—DISTRIB. Yunan.

A shrub; branches very stout, herbaceous. *Leaves* obtuse or acute, base obtuse or rounded, above pubescent, at length scaberulous; nerves 4–6 pair above the basal, nearly straight and reticulated, cross-nervules all very strong; petiole 2–3 in., stout; stipules linear. *Male racemes* 3–4 in., peduncled; bracts subulate; flowers 1–3 in. diam.,.stellately villous, sepals acute; stamens very numerous, mixed with long hairs; anthers orbicular, connectives broad, cells touching above and below. *Fem. spikes* short, dense-fld. *Capsule* about ¾ in. diam, cocci thin. *Seeds* small, smooth.—Kurz describes the leaves as having occasionally an acute lobe on each side.

3. **C. hirsutulus,** *Kurz For. Fl.* ii. 393; branchlets hispid, leaves very long petioled orbicular-cordate entire or repand-toothed 5–7-plinerved sparingly hispid on both surfaces with long white scattered hairs, male spikes short sessile dense-fld., flowers tawny tomentose, stamens surrounding a central area. Mallotus longipes, *Muell. Arg. in Linnæa* xxxiv. 193, and in *DC. Prodr.* xv. ii. 969.

PEGU; from Prome, *Wallich*, to Irawaddi, *Kurz.*

A low simple-stemmed deciduous-leaved shrub or undershrub, branchlets compressed. *Leaves* 5–7 in. diam., thinly coriaceous, sparingly and obscurely gland-dotted beneath; nerves 3–4 pair above the basal, very strong beneath with strong cross-nervules and reticulations; petiole 1 foot, stout, hispid. *Male spikes* ½ in.; buds globose; stamens very many.—Description chiefly from Kurz.

4. **C. glabriusculus,** *Kurz For. Fl.* ii. 393; branchlets slender puberulous, leaves glabrous broadly elliptic rarely ovate subentire 3-plinerved base rounded or cordate eglandular, male spikes very short oblong or globose, flowers tawny-tomentose, stamens surrounding a central area.

PEGU and MARTABAN, *Kurz.*

A small deciduous-leaved shrub; branchlets compressed. *Leaves* 3–6 by 2–5 in., thinly coriaceous, rarely ovate-lanceolate, glabrous on both surfaces except the midrib above when young (sparingly hirsute beneath, *Kurz*); nerves slender; petiole 1–4 in., stellately pubescent, at length glabrous; stipules setaceous. *Sepals* glabrous within and orange-coloured. *Stamens* very numerous.—Description chiefly from Kurz.

5. **C. longipes,** *Kurz For. Fl.* ii. 393; branchlets pubescent, leaves very long-petioled from orbicular to elliptic-obovate cordate 5–9-plinerved entire or sinuate crenate glabrous above and beneath except the stellately pubescent at length glabrous nerves eglandular, petiole tomentose, racemes pubescent, flowers long pedicelled tawny-tomentose, ovary 2–3-celled, capsules very long pedicelled tridymous shortly muricate.

PEGU to MARTABAN and AVA, *Kurz.*

A low deciduous-leaved shrub, 1–2 ft., rootstock stout strong, shoots densely pubescent, branchlets compressed. *Leaves* 3–4 in. long and often as broad, membranous, young stellately pubescent, nerves slender; petiole ½–3 in. *Racemes* axillary or from the base of the stem, or supra-axillary; flowers orange-yellow; pedicels 1–3 in., pubescent; stamens very numerous, glabrous; ovary muricate and stellately hispid; stigmas sessile, crimson, papillose. *Capsules* ½ in. diam., peduncle stout 2–4 in.; cocci thickly crustaceous, densely stellately hispid. *Seeds* subspherical, brown, opaque, aril white fleshy.—Description chiefly from Kurz. The short petioles, and absence of long hairs on the leaf and inflorescence distinguish this at once from *hirsutulus*, which is Mueller's *Mallotus longipes.*

DOUBTFUL SPECIES.

C. SPECIOSUS, *Muell. Arg. in Linnæa* xxxiv. 154, and in *DC. Prodr.* xv. ii. 758; branches and petioles flocculently tomentose, leaves alternate 4½–7½ in. membranous

peltate orbicular-ovate cuspidate entire or 3-lobed denticulate softly appressed-tomentose and ashy-white beneath, petiole as long as the limb, racemes elongate bisexual white-tomentose, bracts sublinear, pedicels very short, fem. calyx thrice as large as the male very unequally 3–5-fid, stamens about 60, filaments long, connectives thick papillose, central receptacle broad naked, ovary ellipsoid pubescent, styles papillose within.—East Indies (*Herb. Lenormand*).—Description from Mueller. From the peltate limb this may be sought amongst *Malloti*. Mueller says it is something like *M. barbatus*, but that it wants a fem. disk, that the male has an intrastaminal disk, and that the ovary is not softly echinate.

C. THUNBERGIANUS, *Muell. Arg. in DC. l. c.* 758; *Beddome Forester's Man.* 206; branchlets glabrous, young compressed angled and rusty-pubescent, leaves opposite not peltate in very unequally petioled pairs ovate cuspidate or acuminate base rounded contracted or subcordate entire crenulate or repand-toothed glabrous above beneath glandular-dotted and with the nerves roughly puberulous, stipules small subulate, petiole 6–10 times shorter than the limb, racemes slender long-peduncled rusty puberulous shorter than the leaves, bracts short few-fld., male fl. subellipsoid $\frac{1}{8}$ in. long, stamens about 100 polyadelphous, connective apiculate glandular, central naked area broad.—Ceylon, *Herb. Thunberg*.—Habit of *Mallotus eriocarpus*, but more robust and polyandrous. *Mueller l. c.* It is unknown to Thwaites.

53. **MALLOTUS,** *Lour.*

Trees or shrubs. *Leaves* opposite or alternate, entire toothed or 3-lobed penninerved or 3–7-plinerved, peltate or not, often glandular-dotted beneath, and sometimes with glandular areas at the base above. *Flowers* small or minute, dicœcious or monœcious, in axillary or terminal simple or panicled spikes or racemes, apetalous; males clustered, fem. solitary in the bracts. *Disk* usually 0. MALE FL. *Calyx* globose or ovoid, valvately 3–5-partite. *Stamens* 20–30 or more, crowded on a central flat or convex receptacle, filaments free; anthers small, dorsifixed, cells globose or shortly oblong parallel adnate to and often widely separated by the thickened connective. *Pistillode* 0 or very minute. FEM. FL. *Calyx* spathaceous or valvately 3–6-lobed or -partite. *Ovary* 2–4-celled; styles free or connate below, spreading or recurved, entire plumose or papillose; ovules 1 in each cell. *Capsule* of 2–3, rarely 4, 2-valved smooth tubercled echinate spinous or paleaceous cocci. *Seeds* ovoid oblong or globose, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 70 in the tropics of the Old World.

It is very difficult to arrange the species of this genus in a natural manner, and the following attempt will require modification when the species are better known.

Sect. I. BLUMEODENDRON. *Disk* glandular in both sexes. *Seeds* with a thick fleshy coat.

1. **M. Kurzii,** *Hook. f.*; quite glabrous, leaves very coriaceous ternately whorled triple-nerved elliptic or subcordate obtusely cuspidate, male cymes very short fascicled not viscid, buds globose. Blumeodendron Tokbrai, *Kurz For. Fl.* ii. 391 (*not of Mueller*).

ANDAMAN ISLANDS, *Helfer* (*Kew Distrib.* 5010), *Kurz*. ? PERAK, *King's Collector*.

An evergreen tree, 40–60 ft. *Leaves* 6–10 by 3–6 in., pale brown when dry and very rigid, base rounded or subacute; nerves 4–6 pair above the basal, very strong beneath, diverging in the Perak specimens, nearly straight in the Andaman ones, cross-nervules very faint; petiole $1\frac{1}{2}$–2 in., very stout, swollen at the base and top. *Male cymes* $\frac{1}{2}$–$\frac{3}{4}$ in., with a very short stout peduncle; pedicels as long. *Perianth* $\frac{1}{6}$ in. diam., 2–3-valved; receptacle convex, covered with tumid glands between the filaments. *Stamens* 20–30; anthers nearly orbicular, connective rather broad, slits

nearly lateral.—I have seen no fem. fl. or fruit of this apparently very distinct species, which differs from *M. Tokbrai* in the much larger thickly coriaceous leaves, short not viscid male cymes, very much larger male flowers and globose perianth. Kurz describes the capsule as almost globose, 2–3-coccous, about 1–1½ in. diam., brown, glossy, fibrous-woody; and seeds as purple, covered with a thick spurious aril. The Perak plant has shorter petioles, larger leaves with 6 pairs of nerves above the basal, and larger flowers than the Tenasserim ones, and may be a different species.

Sect. II. EUMALLOTUS. *Disk* 0, or if present annular or cupular. *Seeds* without a fleshy coat.

A. *Capsules* echinate, tubercled, or clothed with soft spines or bristles. (Capsule unknown in 20. *leptostachyus*, 21. *Clellandii*, 22. *filiformis*, 23. *puberulus*, 24. *bracteatus*, and 34. *Kingii*.)

* *Leaves* 4–14 *in. broad, broadly triangular-ovate orbicular or -rhombic, 3–5-plinerved, tomentose beneath. Racemes or panicles much longer than the leaves.*

2. **M. barbatus,** *Muell. Arg. in Linnæa* xxxiv. 184, and in *DC. Prodr.* xv. ii. 957; branches petioles and racemes softly flocculently woolly, leaves alternate very large peltate suborbicular palmatinerved shortly 3-lobed densely white stellate-tomentose, racemes terminal elongate, male calyx unequally 4–5-toothed, fem. 4-cleft, capsule globose densely clothed with layers of stellate hairs. *Kurz For. Fl.* ii. 381; *Beddome Forester's Man.* 208. Rottlera barbata, *Wall. Cat.* 7822; *Baill. Gen. Euphorb.* 423.—*Wall. Cat.* 7820.

UPPER TENASSERIM, *Kurz*; Amherst, *Wallich.* PERAK, *King's Collector, Wray* SINGAPORE, *Lobb.* PENANG, *Wallich.* NILGHIRI MTS.?, *Noton.* The CONCAN, *Stocks.*—DISTRIB. Java.

A low shrub (Kurz); branchlets very robust. *Leaves* 8–14 in. diam., dark brown or green above when dry and tomentose or flocculent when young, beneath nearly white, with 9–11 basal, and several pairs of lateral much raised nerves and many nervules; lobes acute. *Racemes* 6–10 in.; peduncle and rachis stout; bracts thick, obtuse; male fl. ¼ in. broad; fem. as long; calyx short 4-cleft. *Capsules* ⅔ in. diam. *Seeds* ⅕ in. long, broadly oblong, black, opaque.

3. **M. Roxburghianus,** *Muell. Arg. in Linnæa* xxxiv. 186, and in *DC. Prodr.* xv. ii. 962; stellately pubescent or tomentose, leaves large alternate long-petioled 7–9-nerved peltate orbicular or triangular-ovate acuminate or caudate subentire or toothed, racemes stout longer than the leaves, capsules 3-lobed hairy and prickly. *Kurz For. Fl.* ii. 383; *Gamble Man. Ind. Timb.* 361. Rottlera peltata, *Roxb. Fl. Ind.* iii. 828; *Wight Ic.* t. 1873; *Wall. Cat.* 7823.

SIKKIM HIMALAYA; alt. 2000 ft., *Clarke.* ASSAM, the KHASIA MTS., SILHET, SILLHOR, MUNNIPORE, CHITTAGONG and MARTABAN, *Roxburgh*, &c.

An evergreen tree or shrub; branchlets rather stout. *Leaves* rather thin, 4–7 in. diam., simply pubescent above, glandular and softly stellate-pubescent beneath; nerves 4-5 pairs above the basal; basal glands minute; petiole as long as the blade; stipules linear lanceolate. *Racemes* as long or longer than the leaves, terminal, erect; bracts lanceolate; male fl. ⅛ in. diam., buds globose, pubescent. *Fem. calyx* irregularly split, segments lanceolate. *Capsule* ½ in. diam.; cocci thickly crustaceous, shortly aculeate. *Seeds* subglobose, smooth.

4. **M. nepalensis,** *Muell. Arg. in Linnæa* xxxiv. 188; branches robust, leaves beneath and inflorescence shortly white- or rusty-tomentose,

leaves opposite or alternate long-petioled broadly or orbicular ovate finely acuminate, base 3-nerved, male racemes elongate very stout, flowers large, fem. racemes shorter, capsules thin tomentose and shaggy with long soft flexuous stellately tomentose spines. M. oreophilus, *Muell. Arg. in Linnæa* xxxiv. 188, and in *DC. Prodr.* xv. ii. 964; *Gamble Man. Ind. Timb.* 362.—*Wall. Cat.* 7824.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 5–7000 ft., *J. D. H.*, &c. KHASIA MTS., alt. 4–5000 ft., *J. D. H. & T. T.*

A small tree. *Leaves* 3–8 in. diam., thinly coriaceous, glabrous above except when young, quite entire; base truncate, rarely subcordate, or acute in young leaves; colour of pubescence very variable, nerves and nervules strong. *Male racemes* 6–12 in.; bracts lanceolate; flowers $\frac{1}{4}$ in. diam., globose in bud; stamens very numerous. *Fem. racemes* very stout, especially in fruit; pedicels short, stout; sepals narrow; ovary shaggy with short tomentose processes. *Capsules* densely crowded, $\frac{1}{2}$ in. diam., crinite; cocci very thin. *Seeds* $\frac{1}{6}$ in. long, subhemispheric, black, opaque.

5. **M. albus,** *Muell. Arg. in Linnœa* xxxiv. 188, and in *DC. Prodr.* xv. ii. 965; branches leaves beneath and inflorescence appressedly stellately or scurfily white or rusty-tomentose, leaves alternate broadly ovate or orbicular or triangular-ovate acuminate entire or with shallow lobes rarely sinuate-toothed, base 3–5-nerved rounded and narrowly peltate or truncate rarely acute, flowers in axillary and terminal pyramidal panicles, males globose, fem. calyx 4–5-lobed, capsule 3–4-coccous muricate and with short soft white tomentose processes. *Brandis For. Fl.* 444; *Gamble Man. Ind. Timb.* 361; *Beddome Forester's Man.* 208. M. tetracoccus, *Kurz For. Fl.* ii. 383. Rottlera alba & tetracocca, *Roxb. Fl. Ind.* iii. 829, 826. R. mappoides, *Dalz. in Hook. Journ. Bot.* iii. (1851) 122; *Dalz. & Gibs. Bomb. Fl.* 230. R. peltata, *Wight Ic.* t. 1873. R. paniculata, *Wall. Cat.* 7812.—*Wall. Cat.* 7818 B, C, E.

SIKKIM HIMALAYA; ascending to 3000 ft., *J. D. H.*, &c. BENGAL, ASSAM and southward to CHITTAGONG.

A small evergreen tree, 30–40 ft.; branchlets rather stout. *Leaves* 4–6, rarely 12 in. diam., young densely rusty-tomentose, sometimes coriaceous, base with 2 glands; petiole 3–8 in.; stipules minute. *Male panicles* with long rather slender branches, fem. shorter stouter. *Flowers* dicœcious; male buds globose $\frac{1}{8}$–$\frac{1}{6}$ in. diam., calyx 4–5 partite, fem. calyx hemispheric. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., globose, white, usually 4- rarely 5-coccous. *Seed* black, shining.—I have not given the Penang locality to this plant, and I suspect that Roxburgh is in error in doing so.

VAR. *occidentalis*; fem. panicles larger and more effuse, capsules with longer and denser processes.—Deccan Peninsula, on the Ghats from the Concan southwards. Ceylon, common.

6. **M. macrostachyus,** *Muell. Arg. in DC. Prodr.* xv. ii. 963; branches petioles leaves beneath and inflorescence shortly whitish or rusty-tomentose, leaves large usually alternate long-petioled orbicular- or triangular-cordate acuminate entire or remotely sinuate-toothed, base rounded or transverse 5-nerved sometimes slightly peltate, racemes spiciform very long, male branched at the base, male fl. small globose, fem. larger subcylindric cleft and 5-fid, capsules subglobose densely spinous, spines concealed by a thick soft stellate wool. Rottlera macrostachya, *Miquel Fl. Ind. Bat. Suppl.* 454.

PERAK; *King's Collector.* MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1381).—DISTRIB. Java, Sumatra, Borneo.

A small tree; branches stout. *Leaves* rather coriaceous, 3–6 in. diam., eglandu lar, young clothed on both surfaces thickly with rusty pubescence; nerves very strong beneath; petiole 4–8 in., stout. *Spikes* axillary; male 8–16 in., rather slender; flowers subsessile, $\frac{1}{8}$ in. diam.; stamens very numerous; fem. with occasionally a few male flowers, calyx $\frac{1}{6}$ in. long, shortly tubular. *Fruiting raceme* sometimes 18 in. long. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., obscurely trigonous. *Seeds* in Bornean specimens subglobose, $\frac{1}{6}$ in. long, smooth; in Malaccan (immature) smaller, black, opaque, as in *M. barbatus*.

7. **M. ricinoides,** *Muell. Arg. in Linnæa* xxxiv. 189, and in *DC. Prodr.* xv. ii. 963; young parts clothed with floccose fugacious tomentum, leaves alternate long-petioled ovate to orbicular-ovate cordate or peltate entire or remotely denticulate, glabrous above tomentose beneath, flowers small tomentose in simple or compound axillary and terminal spikes, bracts minute, fem. calyx 4–5-cleft, ovary villous echinate, capsule 3–4-coccous size of a cherry densely clothed with stellately scurfy long soft subulate bristles, seeds globose black slightly tubercled. *Kurz For. Fl.* ii. 382. Rottlera ricinoides, *A. Juss. Tent. Euphorb.* 33, t. 9, f. 29 A. R. Zippelii, *Hassk. Hort. Bogor.* 238. Adisca Zippelii, *Blume Bijd.* 611. R. peltata, *Miquel Fl. Ind. Bat.* i. ii. 395 (*not Roxb.*). Mappa Zippelii, *Zoll. & Morr. Verz.* 17. Adelia barbata, *Blanco Fl. Filip. Ed.* 2, 561. A. Bernardia, *Ed.* 1, 814. Croton ricinoides, *Pers. Encheir.* ii. 586. C. mollissima, *Geisel. Monog. Crot.* 73. Crozophora mollissima, *Spreng. Syst.* iii. 851.

Upper Tenasserim, *Kurz.*—Distrib. China, Philippines.

An evergreen shrub. *Leaves* 5–6 in. long and broad, thickly membranous, base 5-nerved; petiole 2–4 in., scurfily tomentose.—I have seen no Tenasserim specimens of this species, which is readily distinguished by the dense clothing of soft spines on the capsule.

8. **M. cochinchinensis,** *Lour. Fl. Coch.* 635; branches leaves beneath and inflorescence appressedly white- or rusty-tomentose, leaves alternate orbicular or deltoidly ovate caudate-acuminate entire or 3-lobed, base usually cuneate 5-nerved, nerves peltate, flowers in effuse slender panicles, males globose, fem. calyx 3–4-partite, capsule 3-coccous clothed densely with long white squarrose tomentose processes. M. paniculatus, *Muell. Arg. in Linnæa* xxxiv. 189, and in *DC. Prodr.* xv. ii. 965; *Kurz For. Fl.* ii. 383. Rottlera paniculata, *A. Juss. Tent. Euphorb.* 33; *Benth. Fl. Hongk.* 307; *Wall. Cat.* 7818. Croton paniculatus, *Lamk. Encycl.* ii. 207. Echinus trisulcus, *Lour. l. c.* 633 (*excl. syn.*). Mappa cochinchinensis, *Spreng. Syst. Veg.* iii. 878. Trewia tricuspidata, *Willd. Sp. Pl.* iv. 834.—*Wall. Cat.* 7821.

Pegu and Tenasserim, *Wallich*, *Helfer*, &c. Penang, Perak, Singapore and Malacca, *Wallich*, &c.—Distrib. Malay Islands, China.

A tree much resembling in habit *M. albus*, but branches more slender, leaves smaller, nerves peltate, more membranous with longer points and usually a cuneate base, panicles much more slender, flower and fruit smaller, fem. calyx 3–4-partite, and capsule squarrose with long processes.—I maintain Loureiro's name of *cochinchinensis* for this species, which is the monotype of his genus, and should never have been superseded. From Loureiro's description I doubt his *Echinus sulcatus* being the same plant; but I assume that Mueller, whom I follow, had good reasons for so disposing of it.

** *Leaves elliptic, oblong, or obovate-oblong, tripli- or penni-nerved. Spikes or racemes usually simple and shorter than the leaves* (*longer in* M. leptostachyus *and a few others*).

† Female calyx spathaceous.

9. **M. acuminatus,** *Muell. Arg. in Linnæa* xxxiv. 187, and in *DC. Prodr.* xv. ii. 966; branchlets hoary or glabrous, leaves opposite and alternate long petioled peltate oblong caudate-acuminate entire or repand-toothed obscurely glandular beneath, base peltate 5–7-nerved rounded or cordate, male racemes slender, buds ovoid, fem. calyx spathaceous pubescent, ovary strigose and echinate, style very long stout, capsule tridymous glandular hispid and clothed with short pubescent spines. ? M. acuminatus, *Kurz For. Fl.* ii. 383.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 4758). ANDAMAN ISLANDS, *Kurz.* PERAK, *King's Collector.* MALACCA, *Maingay* (*Kew Distrib.* 1446).—DISTRIB. Sumatra.

An evergreen tree, variable in pubescence; branchlets terete. *Leaves* 3–8 in. rather thin, almost membranous, midrib and 8–10 pair of nerves beneath hairy, cross-nervules faint or strong; petiole 1–3 in. *Male racemes* (in Andaman specimens) 2–3 in.; flowers minute, glabrous, in crowded clusters; buds ovoid, acute, $\frac{1}{12}$ in. long; stamens about 30, filaments free or connate, anther-cells separated by a truncate thick warted connective. *Fem. racemes* larger than the males, stouter; bracts lanceolate, caducous; calyx obliquely urceolate, entire or 2–3-cleft, deciduous; style very stout, puberulous or glabrate, stigmas rather short. *Capsule* (in Perak specimens) $\frac{3}{4}$ in. diam.; cocci globose.—The Perak specimens have more hoary branchlets, petioles and fem. racemes than the Malaccan. I refer this to *M. acuminatus*, of which Mueller says stamens 60, rather than to the Sumatran *M. longifolius*, in which he states them to be (as they are in this) about 27–30; he further adds under *longifolius* that it is extremely like *acuminatus*, but that besides the number of stamens it differs in the rather longer and slender spines of the capsule, and in the shorter style. Kurz says of his *acuminatus* that it is frequent in the Andamans, and that the leaves are either peltate or cordate, but I have seen no. specimens from thence. I have not cited the synonyms of *M. acuminatus* given by Mueller, feeling doubtful about the species.

10. **? M. Helferi,** *Muell. Arg. in Linnæa* xxxiv. 190, and in *DC. Prodr.* xv. ii. 968; branchlets young petioles and racemes sparsely stellate-pubescent, leaves nearly glabrous alternate long-petioled ovate- or linear-oblong caudate-acuminate sinuate-toothed obscurely glandular beneath base rounded or subcordate not peltate 3–5-plinerved, male racemes slender, buds minute obovoid nearly glabrous, fem. racemes elongate, calyx spathaceous, ovary clothed with short stout soft spines, style twice as long as the stigmas. ? *Kurz For. Fl.* ii. 384.

TENASSERIM; Koloukhin Island in the Saluen River, *Helfer* (*in Herb. DC.*); Mergui, *Helfer* (*Kew Distrib.* 4731). MALACCA, *Maingay* (*Kew Distrib.* 1446).

Branches slender, but woody, tips and racemes sparsely glandular. *Leaves* 3–6 in., rather membranous, greenish when dry; nerves very slender, 6–8 pair above the short basal, often pubescent beneath; basal glands 0; petiole 1–1½ in. *Male racemes* filiform; bracts minute, 2–4-fld.; flowers $\frac{1}{10}$ in. diam.; sepals 3–5, lanceolate; stamens about 20; anther-cells separated by the truncate tubercled connective, which sometimes is produced above them. *Fem. racemes* 6–8 in., many-fld.; calyx spathaceous; ovary pubescent and clothed with soft turgid nearly glabrous spines; style stout, twice as long as the short recurved papillose stigmas.—The male flowers are described from Mergui and the fem. from Malaccan specimens. It is possible that they may not be conspecific. Kurz says of *Helferi* that it is very common all over Burma from Pegu to Tenasserim and the Andamans, but I have seen only Helfer's male specimens, and as he described the style as short, I doubtfully quote him. It differs from *acuminatus* chiefly in the not peltate leaves and ovary not being densely hispid.

11. **M. Porterianus,** *Muell. Arg. in Linnæa* xxxiv. 185, and in *DC. Prodr.* xv. ii. 960; branchlets petioles and racemes puberulous, leaves alternate long-petioled not peltate oblong-lanceolate caudate-acuminate penninerved sinuate-crenate or entire, racemes slender, males shorter than the fem., fem. calyx spathaceous, ovary and capsule echinate, style elongate with long recurved stigmas.—Euphorb., *Wall. Cat.* 8000, 9093, 9094.

PENANG, *Porter, Curtis.*

Leaves 4–7 in., membranous or thinly coriaceous, base contracted subcordate, glabrous above, minutely glandular, glabrous or slightly hairy beneath; nerves 6–10 pair, slender, basal very short; petiole 1–2 in., very slender, sometimes hairy. *Racemes* shorter than the leaves, strict; male fl. in distant clusters, $\frac{1}{16}$ in. diam., ovoid; calyx membranous, nearly glabrous, stamens about 30, anther-cells parallel, rather distant. *Fem. fl.* shortly pedicelled; bracts concave; perianth minute; styles very large, recurved, united below. *Capsule* about $\frac{1}{2}$ in. diam.; cocci thickly crustaceous, shortly aculeate. *Seeds* broadly oblong, smooth.—Wallich's No. 8000 is said to be from Silhet, but this is an obvious mistake; the specimens evidently are a portion of the Penang collection.

12. **M. floribundus,** *Muell. Arg. in Linnæa* xxxiv. 187, and in *DC. Prodr.* xv. ii. 962; leaves long-petioled alternate peltate orbicular or orbicular-ovate acute glaucous beneath base 7–9-nerved, racemes axillary slender, calyx spathaceous, ovary clothed with long soft white tomentose spines, capsule 3-dymous glandular and covered with long scattered flexuous slender prickles. M. amentiformis, *Muell. Arg. in Flora* xlvii. (1864), 468, and in *DC. l. c.* Rottlera floribunda, *Hassk. Hort. Bogor.* 238; *Baill. Etudes Gen. Euphorb.* 426; *Miquel Fl. Ind. Bat.* i. ii. 393. Adisca floribunda, *Blume Bijd.* 610. Mappa floribunda, *Zoll. & Morr. Verz.* 17. Ricinus Tanarius, *Lour. Fl. Coch.* 580.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 476?). PERAK, *King's Collector.* MALACCA, *Griffith.*—DISTRIB. Cochin China, Java, Borneo, Celebes, Samoa.

A tree, 20–30 ft.; branches slender, nearly glabrous. *Leaves* membranous, quite entire, base with tomentose glands in the axils; nerves all slender, cross-nervules distinct, glands beneath scattered; petiole 2–3½ in., very slender. *Male spikes* 3–4 in.; flowers crowded, $\frac{1}{8}$ in. diam; stamens 40-50, puberulous. *Fem. racemes* elongate. *Capsules* $\frac{3}{4}$ in. diam.; cocci globose, thickly crustaceous, pubescent; styles shortly united.

†† Female calyx 3–6-partite (unknown in several species).

a. *Leaves* 3- *rarely* 7–9-*plinerved at the base.*

13. **M. eriocarpus,** *Muell. Arg. in Linnæa* xxxiv. 185, and in *DC. Prodr.* xv. ii. 959; branchlets and racemes rusty-tomentose, leaves opposite elliptic oblong or ovate obtuse base 3-plinerved rounded or subcordate stellately puberulous above more so and minutely glandular beneath, spikes slender, flowers small clustered, capsule globose 3-coccous clothed with soft hairy filaments. *Beddome Forester's Man.* 208. Rottlera eriocarpa, *Thwaites Enum.* 273 (*excl. syn. Wight*).

CEYLON; in the hot drier parts of the island, *Walker, Thwaites.*

A shrub; branchlets rather slender. *Leaves* 3–4 in., hardly coriaceous; nerves 3–4 pair above the basal, cross-nervules and reticulations copious; petiole $\frac{1}{2}$–2 in., slender. *Male fl.* conic in bud, $\frac{1}{8}$ in. long; stamens very numerous, filaments smooth scabrid or hairy. *Fem. fl. Ovary* surrounded with numerous staminodes; styles 3, very plumose.—I have seen no fem. fl. or fruit.

14. **M. subpeltatus,** *Muell. Arg. in Linnæa* xxxiv. 189, and in *DC. Prodr.* xv. ii. 968; nearly glabrous, leaves alternate long petioled with very long caudate tips puberulous beneath, base rounded or minutely cordate 3-plinerved, male fl. in sessile fascicles on the branches, fem. sessile axillary, calyx 5-partite, styles very long and slender, capsule clothed with very long squarrose tomentose processes. Adisca subpeltata, *Blume Bijd.* 610. Rottlera subpeltata, *Baill. Etudes Gen. Euphorb.* 433; *Miquel Fl. Ind. Bat.* i. ii. 394. R. rhynchophylla, *Miquel l. c. Suppl.* 454. Mappa acuminatissima, *Zipp. ex Spanoghe in Linnæa* xv. 349.—*Wall. Cat.* 7755.

Penang, *Porter.* Perak, *King's Collector, Scortechini.* Malacca, *Griffith* (*Kew Distrib.* 4759), *Maingay* (*Kew Distrib.* 1410).—Distrib. Sumatra, Java.

Branches terete, very smooth, tips puberulous. *Leaves* 6–12 by 2–4 in., thin, greenish when dry, nerves 3–5 pair above the basal and cross-nervules strong and puberulous beneath; petiole 3–5 in., slender; stipules lanceolate. *Male fl.* shortly pedicelled, globose, $\frac{1}{6}$ in. diam.; sepals 4, broad, densely pubescent; stamens very numerous, connective rather broad, not produced. *Fem. fl.* subsessile, $\frac{1}{2}$ in. diam.; sepals 6, lanceolate pubescent on both surfaces, ovary clothed with hispid spines, styles $\frac{1}{2}$ in. long, flexuous. *Capsule* depressed, 1 in. diam., 3-lobed; spinous processes rather rigid, $\frac{1}{3}$ in. long. *Seeds* $\frac{1}{3}$ in. diam., globose, smooth.—Mueller describes the leaves as *subpeltate*, but I should not so call them.

15. **M. Griffithianus,** *Hook. f.*; glabrous except the hispidulous viscidly glandular inflorescence, leaves opposite and alternate long-petioled subtriplinerved oblong or elliptic-oblong cuspidately acuminate quite entire eglandular beneath, racemes leaf-opposed, males of panicled spikes, fem. simple, fem. sepals 6–9 very irregular lanceolate, ovary hispid and clothed with stipitate capitate glands, styles 3 sessile long slender, capsule hispid clothed with long glandular viscid and hirtellous spines. Diplochlamys Griffithianus, *Muell. Arg. in Flora* xlvii. (1864) 539, and in *DC. Prodr.* xv. ii. 1024.

Perak; at Larut, *King's Collector.* Malacca, *Griffith* (*Kew Distrib.* 4961) and *Maingay* (*Kew Distrib.* 1432 and 1450).

A shrub (in Perak) 6–8 ft.; branches woody, terete, smooth or viscidly glandular; nodes swollen. *Leaves* 6–10 by $2\frac{1}{2}$–$4\frac{1}{2}$ in., coriaceous, greenish when dry, quite glabrous, or with a few bristles on the midrib beneath, base broad and rounded or narrowed and obtuse 2-glandular and minutely peltate; nerves 10–12 pair, basal opposite often obscure, short and intramarginal, cross-nervules rather distant; petiole $1\frac{1}{2}$–3 in., rigid, terete, swollen at the top. *Male panicles* 4–5 in., flowers $\frac{1}{4}$ in. diam.; bracts acute, buds globose, pubescent; sepals 3, receptacle conoid; stamens very many, anthers didymous, connective swollen at the back, inconspicuous in front. *Fem. fl.* pedicelled; pedicel hispid with very long bristles; perianth $\frac{1}{2}$ in. diam.; sepals lanceolate, very unequal and unequally inserted, hispidulous; ovary with a ring of spreading hairs at its base on the receptacle; styles subulate, hispid and rugulose; stipitate globose glands? of ovary quite smooth. *Capsule* 3-coccous, about $\frac{3}{4}$ in. diam., cocci woody.

16. **M. Wrayi,** *King mss.*; quite glabrous, leaves opposite very long-petioled triple-nerved coriaceous elliptic- or oblong-lanceolate cuspidately caudate quite entire obscurely glandular beneath base acute 2-glandular, style short stout, capsule tridymous appressedly tomentose and echinate with short tomentose spines.

Perak; at Larut, *Wray, King's Collector.*

A tree, 60–80 ft.; branches woody, terete, smooth. *Leaves* in distant pairs, 6–10 by 2–$2\frac{1}{2}$ in., thinly coriaceous, drying green, paler beneath; nerves 5–6 pair above the submarginal basal, cross-nervules rather distant strong; petiole 2–5 in., slender, firm, swollen at the base and top. *Fem.* fruiting racemes axillary, shorter

than the petiole, hoary with deciduous stellate pubescence. *Capsule* 1 in. diam., yellow, carpels hemispheric, spines $\frac{1}{8}$ in. long. *Seeds* $\frac{1}{3}$ in. diam., globose, smooth, mottled.

17. **M. lancifolius,** *Hook. f.*; glabrous except the stellately tomentose buds and racemes, leaves thinly coriaceous alternate long-petioled triplinerved lanceolate acuminate quite entire eglandular beneath, racemes very slender shorter than the leaves, male clusters few-fld., bracts longer than the globosely ovoid rusty-tomentose buds, style very short, capsule tridymous hoary glandular and with a few short slender spikes.

PENANG; on Government Hill, *Maingay* (*Kew Distrib.* 1451), *Curtis.*

A tree, about 20 ft.; branches slender, woody; tips of branchlets and racemes stellately tomentose. *Leaves* 5–9 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., brown beneath when dry, base eglandular acute or rounded; nerves 3–5 pair above the basal which do not reach the middle, very slanting, strong beneath, $\frac{1}{8}$ cross-nervules few; petiole 1–$2\frac{1}{2}$ in., slender, stiff; stipules ovate-lanceolate. *Racemes* 1–$1\frac{1}{2}$ in., axillary, fem. with male fl. below, bracts lanceolate; buds of male $\frac{1}{10}$ in.; sepals 3, ovate; stamens 50–60, anther-cells subglobose, connective rather narrow. *Capsule* $\frac{2}{3}$ in. diam.; cocci globose, thinly crustaceous, epicarp not separating. *Seeds* globose, smooth.

18. **M. decipiens,** *Muell. Arg. in Linnæa* xxxiv. 194, and in *DC. Prodr.* xv. ii. 977; branchlets racemes and often leaves beneath softly tomentose rarely glabrate, leaves opposite shortly petioled tripli- and penni-nerved subrhombic-ovate oblong or obovate obtusely caudate repand-toothed minutely glandular beneath, racemes elongate, stamens surrounding a minute pistillode, capsule small 3-dymous pubescent glandular and sparsely tubercled. *Kurz For. Fl.* ii. 381. Cœlodiscus eriocarpoides, *Kurz l. c.* 392. —*Wall. Cat.* 7725 and 8009.

BURMA; at Attran, *Wallich*; Moulmein, *Parish.*

A shrub; branches woody, branchlets and petioles often velvety. *Leaves* in unequal pairs, larger 5–10 by 2–5 in., smaller not half that size, rather coriaceous, greenish when dry, base rounded broad or narrow, often 2-glandular, glabrous above, velvety pubescent beneath or glabrate or quite glabrous; nerves 6–8 pair above the basal which are intramarginal; petiole $\frac{1}{4}$–$\frac{3}{4}$ in., stout; stipules oblong, pubescent, caducous. *Male racemes* 3–6 in.; bracts minute; flowers subsessile, $\frac{1}{8}$ in. diam.; sepals 3, broadly lanceolate, membranous; stamens 20–40, connective small; pistillode minute, columnar. *Fem. racemes* much stouter; pedicels very short, hirsute; sepals 3–4, like the males; ovary hirsute and tubercled; style very short; stigmas plumose, short. *Capsule* $\frac{1}{3}$ in. diam.—A specimen in Griffith's Herbarium from the Calcutta Bot. Garden, marked "*Croton urophyllum*," has leaves glabrous beneath. Kurz had no specimens of *M. decipiens*, the description of which he takes from Mueller. Of his *Cœlodiscus eriocarpoides* he had seen no fem. flower or fruit, but as he has attached this name to Parish's specimen of *M. decipiens* in the Calcutta Herbarium, I regard it as a synonym of the latter plant.

19. **M. Wallichianus,** *Muell. Arg. in Linnæa* xxxiv. 196, and in *DC. Prodr.* xv. ii. 980; branchlets and racemes scurfily pubescent, leaves long-petioled alternate and opposite elliptic-oblong obtuse or acuminate crenate-serrate mature glabrous triple-nerved, racemes spiciform slender longer than the leaves, male fl. globose apiculate. M. eriocarpoides, *Muell. Arg. in DC. Prodr. l. c.* 959. Croton castaneifolium, *Wall. Cat.* 7760.—Croton, *Wall. Cat.* 7728.

PEGU; at Rangoon, *M'Clelland.* Attran River, *Wallich.* TENASSERIM, *Helfer* (*Kew Distrib.* 4963). MERGUI, *Griffith.*

Branches woody, branchlets slender. *Leaves* 4–6 in., old coriaceous and brown when dry, and quite glabrous, densely most minutely glandular beneath, tip some-

times rounded, base rounded; nerves 4–7 pair above the basal, cross-nervules distinct reticulations obscure; petiole 1½–2 in., slender. *Racemes* longer than the leaves; bracts ovate; male fl. $\frac{1}{10}$ in. diam.; calyx membranous, nearly glabrous; stamens about 30.—*Fem. fl.* and *fruit* unknown.—Mueller's *M. eriocarpoides* is founded on young leaves of *Wallichianus*.

20. **M. leptostachyus,** *Hook. f.*; branches very slender and petioles leaves beneath and inflorescence softly tomentose, leaves alternate or uppermost pair opposite thin triplinerved elliptic- or oblong-lanceolate acuminate glandular beneath, base acute, male spikes terminal very long interrupted, flowers globose capitellate.

TENASSERIM, King's Island in the Mergui Archipelago, *Helfer* (*Kew Distrib.* 4729).

Branchlets terete, scurfily tomentose with long hairs intermixed. *Leaves* 4–10 by 2–3½ in., almost membranous, pale greenish brown when dry, glabrous above except on the midrib, nerves 4–6 pair above the basal, slender and as well as the cross-nervules raised and hairy; glands minute, scattered, yellow; petiole of upper leaves short, of lower 1–2½ in.; stipules lanceolate, tomentose. *Spike* 6–12 in., slender; bracts shorter than the globose flowers, which are sessile and $\frac{1}{10}$ in. diam. *Calyx* unequally 3-partite, segments broad glabrous within. *Stamens* about 80, anther-cells subglobose, separated widely by the truncate connective.—*Fem. fl.* and *fruit* unknown.

21. **M. Clellandii,** *Hook. f.*; branchlets petioles leaves beneath and inflorescence stellately tomentose, leaves opposite long-petioled triple-nerved linear-oblong from a cordate base obtuse strongly nerved and reticulated but eglandular beneath, male spikes short axillary, bracts subulate, flowers globose, calyx splitting irregularly, stamens very numerous, anther-cells oblong adnate to the truncate connective.

PEGU; at Rangoon, *M'Clelland*.

Branches terete, smooth. *Leaves* 3–5 in., firm but not coriaceous, dark brown when dry, paler and sparsely pubescent beneath, glabrous except when young and on the midrib above, nerves 3–4 pair above the basal, cross-nervules and reticulations much raised beneath; petiole $\frac{1}{2}$–2 in.; stipules subulate, tomentose. *Male spikes* $\frac{1}{2}$–1½ in.; flowers globose, $\frac{1}{8}$ in. diam., densely tomentose.

22. **M. filiformis,** *Hook. f.*; branchlets slender and petioles stellately pubescent or glabrate, leaves opposite and subopposite rather membranous penninerved elliptic or elliptic-oblong obtusely caudate base rounded or cuneate usually 2-glandular above, beneath eglandular but minutely pellucid-punctate, male racemes very long and slender pubescent, bracts minute setaceous much shorter than the globose pubescent buds.

TENASSERIM, *Helfer* (*Kew Distrib.* 4732), *Griffith*.

Branches slender, woody; branchlets compressed. *Leaves* 4–7 in., dull brownish green when dry, thin, nerves 7–10 pair very prominent beneath and forming intramarginal strong arches, base above eglandular; petiole $\frac{1}{2}$–1½ in., rather slender. *Male racemes* axillary and subterminal, 4–6 in.; flowers in rather distant small clusters; buds about $\frac{1}{10}$ in. diam.; stamens sparsely pubescent and glandular; sepals very broadly ovate; stamens very numerous, small; anther-cells globose with a thick connective.—This closely resembles *M. bracteatus* in habit and foliage, but the bracts and flowers are quite different.

23. **M. puberulus,** *Hook. f.*; branches petioles leaf-nerves beneath and racemes puberulous, leaves membranous alternate long-petioled caudate-acuminate sinuate-toothed minutely glandular beneath, base contracted deeply cordate 7–9-plinerved, male racemes slender, clusters many-fld., buds ovoid nearly glabrous.

PERAK, *Scortechini.*

Youngest shoots fulvous-tomentose. *Leaves* 5–7 in., with long slender tips, greenish when dry, glabrous above, base eglandular; nerves 8–10 pair above the basal, substellately puberulous, strong beneath, cross-nervules distant; petiole 2–3 in., terete. *Racemes* axillary, shorter than the leaves; bracts minute; flowers 10–20 in a cluster; buds $\frac{1}{10}$ in. long; sepals usually 3, membranous, very sparsely stellately hairy and glandular; stamens 60–70; anther-cells globose, separated by the connective which is not produced.—Differs from *M. Helferi* in the much larger leaves and flowers and very numerous stamens.

24. **M. bracteatus,** *Hook. f.*; shoots and racemes stellately pubescent, leaves opposite and subopposite membranous triple-nerved elliptic-oblong obtusely subcaudate acuminate sinuately subserrate obscurely glandular beneath base subacute, male racemes slender stellately pubescent shorter than the leaves, clusters few-fld., bracts lanceolate longer than the ovoid buds both densely subsilkily tomentose.

PERAK, *Scortechini.*

Branchlets compressed when dry. *Leaves* 5–7 by 2–3 in., very thin in texture, glabrous on both surfaces, with no pellucid glands, dull greenish when dry, base narrow with obscure glandular areas; nerves 6–9 pairs above the basal, slender but strong beneath, cross-nervules distinct distant; petiole 1–1½ in.; stipules ovate lanceolate, pubescent. *Male racemes* 2–3 in.; bracts lanceolate, buds fulvous tomentose $\frac{1}{12}$ in. long; sepals 3, ovate; stamens 30–40, anther-cells globose separated by a broad sometimes produced connective.

b. *Leaves penninerved, not or very obscurely* 3*-plinerved.*

25. **M. anisophyllus,** *Hook. f.*; sparsely pubescent, leaves subsessile opposite in very unequal pairs penninerved eglandular beneath, larger of each pair 6–8 in. elliptic lanceolate or oblanceolate acuminate smaller orbicular-ovate or -cordate, racemes very short few-fld., sepals of both sexes 3 lanceolate, ovary spinescent, styles elongate subplumose, capsule muricate.

MALACCA, *Maingay* (*Kew Distrib.* 1413).—DISTRIB. Borneo (*Motley*).

Branches terete woody, branchlets compressed simply hairy. *Leaves* rather thin, red brown and rather shining when dry, sometimes subfalcate, entire or subsinuate-toothed, glabrous or sparsely hairy on the midrib beneath, base very contracted but rounded; nerves 10–15 pair, cross-nervules very slender; petiole very short, stout, densely velvety-tomentose; stipules ½ in., subulate-lanceolate, rigid, persistent. *Male racemes* ½–1 in., filiform, bracts minute, flowers ½ in. diam., on slender pedicels; sepals membranous, glabrous; stamens 15–20, connective broad fleshy carunculate. *Fem. fl.* few, on very short racemes; sepals pubescent; ovary clothed with appressed erect hispidulous spines; style 0; stigmas very long, slender, almost feathery nearly all over.—Maingay describes the male perianth as unequally 2-cleft.

26. **M. muricatus,** *Beddome Forester's Man.* 208 (*not of Muell. Arg.*); quite glabrous, leaves opposite shortly petioled penninerved rhombic-lanceolate obtuse or obtusely narrowed at both ends entire or sinuate-toothed minutely glandular beneath nerves 6–8 pairs, male racemes and buds glabrous slightly glandular, males short, fem. elongate, ovary with a few conical glabrous tubercles, capsule tridymous, cocci with two rows of tubercles. Claoxylon muricatum, *Wight Ic.* 1886. Croton muricatum, *Heyne in Wall. Cat.* 7751. ? Axenfeldia intermedia, *Baill. Etudes Gen. Euphorb.* 419.

MYSORE, *Heyne.* TRAVANCORE, at Courtallam, *Wight* (*Kew Distrib.* 2672).

A tree, branches terete, branchlets compressed. *Leaves* 2–5 in., coriaceous, shining above; base with often two spots; petiole $\frac{1}{6}$–½ in.; stipules oblong, glabrous.

Male spikes **1–2 in., slender; flowers few in the very short rounded bracts; buds ovoid, $\frac{1}{12}$ in. long; sepals 4; stamens 30–40, anther-cells oblong not separated at the top by a truncate connective (as in *Lawii*). *Fem. racemes* 4–6 in., slender; bracts as in the male; flowers remote; sepals 6, lanceolate, glabrous; ovary glandular; style very short or 0.—I have not seen the capsule, which Wight describes and figures. The quite glabrous branchlets and 2-seriate tubercles of the cocci distinguish this species. Heyne's authentically named specimens in Rottler's and Wallich's Herbaria prove that this, and not *M. stenanthus*, is the *Croton muricatus* of Heyne. *M. muricatus* of Mueller (in DC. l. c. 972) is a mixture of the Ceylon *M. Walkeræ*, the *Claoxylon muricatum* of Wight, the Philippine Cuming 1170 δ., the Javan Zolling. 3804, and a plant cited from the Hookerian Herbarium as Falconer n. 1352 (of which latter I find no specimen in Herb. Hook.). Of all these Wight's figure alone represents Heyne's *Croton muricatum*. Beddome erroneously gives Wight as the author for *Croton muricatum* being put into *Mallotus*, for Wight refers it to *Claoxylon*. Beddome, following Mueller, refers to his *M. muricatus* (which, as stated above, includes this and others) Baillon's *Axenfeldia intermedia*, which may be *M. Walkeræ* or *stenanthus*.**

27. **M. Walkeræ,** *Hook. f.*; branchlets and spikes tomentose or pubescent and glandular, leaves opposite long- or short-petioled penninerved rhombic-ovate -obovate or -lanceolate obtusely acuminate or caudate sinuate-toothed minutely glandular beneath, base acute, nerves 6–10 pair, male racemes short, bracts large, flowers glandular, fem. racemes elongate, capsule tridymous glandular and clothed with long soft spines. M. muricatus, *Muell. Arg. in DC. Prodr.* xv. ii. 972 (*the Ceylon plant only*). Rottlera muricata, *Thwaites Enum.* 273 (*excl. syn.*).

CEYLON, *Walker*, &c.; Central Province, ascending to 4000 ft., *Thwaites* (C.P. 2108).

A small tree, branches terete, branchlets compressed. *Leaves* 3–8 by 2–3½ in., hardly coriaceous, pale greenish when dry, tip often broadly and obtusely caudate, base very acute or cuneate, quite glabrous; petiole ¼–1 in.; stipules ovate-oblong or -lanceolate, pubescent. *Male racemes* stout or slender, 1–2 in.; bracts broad, concave, often as long as the flowers; buds $\frac{1}{10}$–$\frac{1}{8}$ in., ovoidly globose; sepals 3–4, tomentose; stamens about 30, anther-cells oblong not separated by a truncate connective. *Fem. racemes* slender, pubescent or pilose; flowers few, distant; sepals 3, lanceolate, and pedicels tomentose; ovary densely echinate; style very short. *Capsule* ½ in. diam., yellowish from the copious glands; cocci puberulous, as are the spines.

Var. *laxiflora*; male racemes with capillary pedicels $\frac{1}{10}$ in. long.—Ceylon, *Walker*.

28. **M. stenanthus,** *Muell. Arg. in Linnæa* xxxiv. 191, and in *DC. Prodr.* xv. ii. 972; nearly glabrous except the resinous and puberulous branchlets and inflorescence, leaves opposite very shortly petioled elliptic- or ovate-lanceolate obtusely acuminate or caudate entire or sinuate-toothed minutely glandular beneath penninerved, nerves 5–6 pair, racemes short, male buds ovoid, fem. narrowly oblong, capsule tridymous glandular and with scattered short conical tubercles.

CANARA; at Tulliwally, *Ritchie*; Jellapore, *Talbot*.

A small tree, branches red-brown, branchlets compressed. *Leaves* 3–6 in., rather coriaceous, tapering from the middle to both ends, pale greenish-yellow when dry, and shining, with 3–4 black spots above the acute base; nerves raised beneath, as are the cross-nervules and reticulations; petiole $\frac{1}{8}$–to ¼ in., of young leaves resinous. *Racemes* ½–¼ in., axillary and terminal, very slender; bracts acute; flowers clustered, subsessile; buds $\frac{1}{10}$ in. long; sepals 3; stamens 18–20; anther-cells oblong, tips separated by a broad connective. *Fem.* solitary in the bracts; sepals 3, lanceolate. *Capsule* ⅓ in. diam., yellow from the glands, cocci rounded.

Seeds globose, smooth, polished.—Very near *M. muricatus*, but the shoots and spikes are pubescent and far more glandular, and the male buds narrower.

29. **M. Lawii,** *Muell. Arg. in Linnæa* xxxiv. 192, and in *DC. Prodr.* xv. ii. 975; branchlets petioles and inflorescence pubescent, leaves opposite shortly petioled elliptic-lanceolate or oblanceolate obtusely acuminate penninerved nerves 5–6 pair entire or repand-toothed minutely glandular beneath, racemes very slender few-fld., fem. 1–3 fld., capsules tomentose glandular and densely clothed with long villous filaments; styles sessile. *Beddome Forester's Man.* 209. M. aureo-punctatus, *Muell. Arg. in DC. l. c.* 973; *Beddome Forester's Man.* 209. Rottlera aureo-punctata, *Dalz. in Hook. Journ. Bot.* iii. (1851) 122; *Dalz. & Gibs. Bomb. Fl.* 230.

The CONCAN and CANARA, *Law, Stocks,* &c. COCHIN, *Johnstone.*

Branches terete, branchlets much compressed, finely pubescent. *Leaves* 4–8 by $1\frac{1}{2}$–$3\frac{1}{2}$ in., rather coriaceous, pale when dry, young thin shining above and glabrous, midrib and rather slender nerves puberulous beneath, base acute obtuse or rounded; petiole $\frac{1}{4}$–$\frac{2}{3}$ in.; stipules lanceolate, villous. *Male racemes* shorter than the leaves; bracts small; flowers few, solitary or in distant clusters, sessile or pedicelled, $\frac{1}{4}$ in. diam. when expanded, buds globose; sepals 3–4, broad, villous; stamens about 50, anther-cells short, separated throughout by the broad truncate connective. *Fem.* subspathaceous, splitting into 4–6 lanceolate, unequal, villous segments. *Capsule* $\frac{3}{4}$ in. diam., 3–4-coccous; styles 3–4, appressed to the fruit, plumose. *Seeds* subglobose, smooth, polished.

30. **M. Beddomei,** *Hook. f.*; glabrous except the branchlets and inflorescence, leaves opposite short- or long-petioled penninerved ovate or oblong obtusely caudate-acuminate entire or subentire minutely glandular beneath, nerves 6–8-pair, racemes very slender, male pedicels as long as the ellipsoid acute buds, fem. buds linear-oblong, ovary echinate, style distinct, capsule tridymous glandular stellately pubescent and clothed with long soft spines. M. muricatus, *Beddome Forester's Man.* 209 *in part.*

TRAVANCORE, at Courtallam, *Wight*; Anamallay Hills, alt. 4000 ft., *Beddome.*

Branches smooth, terete, branchlets compressed. *Leaves* 5–7 in., thinly coriaceous, not at all rhombic, base rounded or obtuse; nerves arched and cross-nervules strong beneath; petiole $\frac{1}{2}$–2 in.; stipules ovate-lanceolate, pubescent. *Male racemes* 2–5 in., lax-flowered; bracts very short, obtuse; buds $\frac{1}{10}$ in.; sepals 3, membranous, glabrous or puberulous; stamens about 25, anthers large, cells separated by a very narrow connective. *Fem. racemes* few- and distant-flowered; sepals 6, free or some connate, $\frac{1}{3}$ in. long, lanceolate, membranous. *Capsule* $\frac{3}{4}$ in. diam. —Differs from *Walkeræ* in the oblong or ovate leaves with no trace of being rhombic, small bracts, and stellately tomentose larger fruit. Beddome no doubt includes this under his *muricatus.*

31. **M. khasianus,** *Hook. f.*; glabrous except the tomentose inflorescence, leaves opposite shortly petioled penninerved elliptic-ovate-oblong or -lanceolate entire or sinuate-toothed caudate-acuminate eglandular beneath, base rounded or broadly cuneate, male racemes many-fld. buds globose, fem. long slender, capsules long-pedicelled tridymous pubescent and clothed with slender prickles. Claoxylon No. 10, *Herb. Ind. Or. H.f. & T.*

KHASIA MTS., *Griffith*; near Churra, alt. 3–4000 ft., *J. D. H. & T. T.*

A small tree; branchlets woody, tips and young petioles stellately pubescent. *Leaves* 4–10 by 2–$3\frac{1}{2}$ in., thinly coriaceous, pale when dry and alike on both surfaces, base with 2–3 glands above; nerves 6–9 pair, slender, cross-nervules distant faint; petiole $\frac{1}{4}$–$\frac{3}{4}$ in., rarely more; stipules triangular-lanceolate. *Male racemes* 3–6 in., sessile, scurfily stellately-tomentose; bracts very short and broad; flowers clustered, sessile and shortly pedicelled, $\frac{1}{6}$ in diam.; calyx tomentose, unequally 3-cleft; stamens

40–50, filaments free, anther-cells reniform free above and below. *Fruiting racemes* slender, 6–8 in., pedicels $\frac{3}{4}$ in. *Capsule* $\frac{3}{4}$ in. diam., cocci rather thick and woody, epicarp not separating. *Seeds* $\frac{1}{3}$ in. long, subglobose, rather longer than broad, smooth, brown.

32. **M. polyneurus,** *Hook. f.*; nearly glabrous, branchlets slender leaves alternate petioled penninerved very membranous elliptic oblong or oblong-lanceolate cuspidately caudate-acuminate sinuate-toothed pellucid-punctate but eglandular and shining beneath, nerves 10–12 pair, fem. racemes very slender 1–2-fld., fem. sepals 6, ovary tomentose and clothed with hispid spines, style very short, stigmas 2 plumose recurved.

TENASSERIM, *Helfer* (*Kew Distrib.* 4764).

Branchlets smooth, tips faintly hoary, as are the young petioles and midrib beneath. *Leaves* 5–8 by $2\frac{1}{2}$–4 in., very thin, greenish above when dry, brown beneath, with a few basal glands on the short lowest nerves; base acute or subacute, with no superficial glands above; nerves and distant cross-nervules very slender; petiole 1–$1\frac{1}{2}$ in., slender. *Fem. racemes* 2–3 in., 1–2 fld.; flowers pedicelled; sepals lanceolate.—The specimens are scanty, in very young fruit only, which is $\frac{1}{4}$ in. diam. They resemble no other species. The leaves, though pellucid-punctate, have no superficial glands beneath.

33. **M. andamanicus,** *Hook. f.*; nearly glabrous, branchlets flattened, leaves opposite very shortly petioled penninerved elliptic-oblong obtusely acuminate entire or sinuate-toothed base acute minutely glandular beneath, nerves 12–14 pair, male spikes very short terminal and axillary glandular, bracts broadly ovate, flowers globose. M. muricatus, *Kurz For. Fl.* ii. 384 (*excl. syn.*); *Gamble Man. Ind. Timb.* 362.

S. ANDAMAN ISLANDS, *Kurz.*

Branches stout, terete, smooth, branchlets strongly compressed, tips and very young leaves covered with golden glands. *Leaves* $3\frac{1}{2}$–7 by 2–4 in., firm, greenish brown when dry, base eglandular; nerves 12–14 pair, and cross-nervules slender, arched; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., rather stout; stipules broadly ovate, glabrous. *Spikes* $\frac{1}{2}$–1 in., sessile, dense-fld. *Male fl.* globose, $\frac{1}{10}$ in. diam.; calyx 3-partite, glandular; stamens about 30, anther-cells separated by a rather narrow connective, shortly oblong or rounded, sometimes divaricate below.—A female specimen bears what I take to be the very slender terminal peduncle, 1 in. long, of a capsule that has fallen away. This differs remarkably from the Deccan *M. muricatus* in its much larger size, large broad leaves with no tendency to the rhombic form, and especially in the numerous pairs of nerves. Kurz describes the ovary as densely golden glandular and muricate; the capsule as golden glandular shortly sparingly muricate, and the cocci the size of a pea.

34. **M. Kingii,** *Hook. f.*; branchlets petioles leaves beneath and panicles softly white-tomentose, leaves alternate penninerved narrowly elliptic-oblong caudate-acuminate entire eglandular beneath, male flowers subsessile in long slender sparingly branched leaf-opposed panicles, sepals 3 tomentose, stamens very numerous.

PERAK, alt. 2000–2500 ft., *King's Collector.*

A tree, 40–50 ft., branches terete smooth. *Leaves* distant, 8–10 by $2\frac{1}{2}$–$3\frac{1}{2}$ in., rather thin, pale green when dry and glabrous above, whiter beneath, base broadly cuneate eglandular; nerves 12–16 pair, strong beneath, with rather distant regular cross-nervules; petiole 1–$1\frac{1}{2}$ in., stout, terete, swollen at base and top; stipules oblong-lanceolate, tomentose. *Male panicles* 6–8 in., peduncled, one opposite each of the upper leaves; branches very slender, flowers $\frac{1}{4}$ in. diam., in the axils of minute broad bracts, pedicels $\frac{1}{16}$ in.; sepals unequal; stamens very numerous, anther-cells separated by the broad truncate connective which is often produced beyond them.

B. Capsules smooth. Leaves triple-nerved in all. (See also the species mentioned under A.)

35. **M. penangensis,** *Muell. Arg. in Linnæa* xxxiv. 186, and in *DC. Prodr.* xv. ii. 961; quite glabrous, leaves opposite coriaceous penninerved jointed at the petiole oblong-lanceolate polished cuspidate quite entire eglandular beneath base acute, male spikes short puberulous, fem. laxly clothed with long spreading hairs, styles free slender, capsules 3-dymous villous and bristly. Antidesm. ?, *Wall. Cat.* 8576.—Euphorb., *Wall. Cat.* 9092.

PENANG, *Porter, Curtis.* MALACCA, *Maingay* (*Kew Distrib.* 1444). PERAK, *King's Collector.*

Branches woody. *Leaves* 4–6 by 1½–2½ in., brown when dry and usually polished above, base acute, obscurely glandular beneath with 6–10 pairs of strong nerves besides a very obscure basal pair that are very short and close to the margin, cross-nervules obscure; petiole 1–1½ in., slender. *Male racemes* 1–2 in., rather stout; bracts short, triangular, acute; buds globose, $\frac{1}{10}$ in. diam., puberulous; stamens about 50, connective broad glandular. *Fem. racemes* remarkable for the white hairs $\frac{1}{8}$ in. long on the slender rachis and on the rigid bristle-like spines of the fruit. *Sepals* 6, lanceolate. *Capsule* $\frac{1}{3}$ in. diam., 3-lobed, villous between the spines; styles connate at the base.—The Malaccan specimens have more nerves than the Penang.

36. **M. rhamnifolius,** *Muell. Arg. in Linnæa* xxxiv. 196, and in *DC. Prodr.* xv. ii. 979; branchlets petioles and inflorescence finely pubescent or tomentose, leaves opposite and alternate oblong or oblong-lanceolate acuminate beneath minutely glandular strongly triple-nerved and reticulate, base 2-glandular rounded or subacute, male spikes equalling or exceeding the leaves, flowers clustered globose, capsules small tridymous unarmed stellately tomentose. Croton rhamnifolius, *Willd. in Nov. Act. Nat Cur.* M. micranthus, *Muell. Arg. in Linnæa l. c.* 191, and in *DC. l. c.* 971; *Beddome Forester's Man.* 209. M. zeylanicus, *Muell. Arg. in Linnæa l. c.* 195, and in *DC. l. c.* 977; *Beddome l. c.* 210. Rottlera oppositifolia, *Thwaites Enum.* 273 (*excl. syn.*). A. nervosus, *Rottl. & Willd. in Neue Schrift. Gesellsch. Naturf. Freund. Berl.* (1803) iv. 190. C. reticulatus, *Willd. Sp. Pl.* iv. 545; *Wall. Cat.* 7724 A.

DECCAN PENINSULA; Trincomalee, *Heyne*; Courtallam, *Wight.* CEYLON; common up to 2000 ft., *Moon, Gardner*, &c.

A tree; branches terete, smooth. *Leaves* 3–6 in., firm, but not coriaceous, entire or obscurely toothed, red brown when dry, subglaucous and puberulous beneath, glands very minute, two basal often obscure; nerves 4–5 pair above the basal and cross-nervules all strong and raised beneath; petiole $\frac{1}{2}$–3 in. *Male spikes* slender; bracts minute; flowers globose, $\frac{1}{8}$ in. diam.; calyx 4-partite; stamens 40–50, anther-cells subglobose, separated by a thick truncate connective. *Fem. spikes* long, many-fld., twice or thrice as long as the leaves; calyx 2–3-partite; stigmas short, thick.—I have seen no fem. fl. or fruit. Wight's specimens are in male fl., and have leaves rather glaucous and puberulous beneath; the Trincomalee one is so named by Heyne in Rottler's Herb. In Wall. Cat., Herb. Heyne is cited both under this and *M. atrovirens.* The citation of "Nov. Act." for *Crot. rhamnifolius* is from the Neue Schrift., and is not verifiable.

Var. ? *ovatifolia*; leaves much smaller ovate acuminate base broad rounded, nerves 2–3 pairs above the basal.—Ceylon; at Balangoda, *Thwaites* (C.P. 196).

37. **M. atrovirens,** *Muell. Arg. in Linnæa* xxxiv. 195, and in *DC. Prodr.* xv. ii. 978; glabrous except the sparsely pubescent racemes, leaves rather shortly petioled alternate triple-nerved at the acute base elliptic or

obovate obtuse or acute entire minutely glandular beneath, racemes slender shorter or longer than the leaves, ovary 2-celled rusty-pubescent and scaly, styles sessile. *Beddome Forester's Man.* 210. Croton atrovirens, *Herb. Madr.*, and C. coccineus, *Wall. Cat.* 7771.

DECCAN PENINSULA; from Cochin, *Johnstone*, to Travancore, *Heyne, Beddome.*

Branchlets glabrous, except the rusty-pubescent tips. *Leaves* 3–5 in., brown when dry, especially beneath, nerves 5–7 pair above the rather short basal, cross-nervules faint; petiole $\frac{1}{6}$–1 in. *Racemes* 3–6 in., simple; flowers rather long-pedicelled; bracts minute; male fl. about $\frac{1}{16}$ in. diam., buds globose; sepals membranous, sparsely glandular. *Fem. racemes* shorter; pedicels as long as the 4–5 ovate unequal acute scurfy sepals. *Fruit* unknown.

38. **M. fuscescens,** *Muell. Arg. in Linnæa* xxxiv. 195, and in *DC. Prodr.* xv. ii. 978; glabrous except the glandular rusty-pubescent inflorescence, leaves opposite petioled elliptic elliptic-oblong or obovate acute or obtusely acuminate very minutely glandular beneath pennii- and obscurely triple-nerved, base subacute, racemes shorter than the leaves, ovary 3-celled glabrous glandular, style very short, capsule tridymous unarmed glandular. *Beddome Forester's Man.* 210. Rottlera fuscescens, *Thwaites Enum.* 273.

CEYLON; not uncommon up to 2000 ft., *Walker*, &c.

A small tree; branches smooth, terete; branchlets slender, compressed, glabrous. *Leaves* 3–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., thinly coriaceous, sometimes shining on the upper or both surfaces, brown when dry, paler beneath, base obscurely 2-glandular, rarely rounded; nerves 5–6 pair, arched; petiole $\frac{1}{2}$–1 in. *Male racemes* 2–3 in., subsessile, flowers $\frac{1}{8}$ in. diam.; buds ovoid, acute; pedicels as long as the calyx; sepals 4, unequal; stamens 20–40, anther-cells not separated at the top by a truncate connective. *Fem. racemes* stout, about as long as the males; flowers $\frac{1}{8}$ in. diam.; calyx 3–5-cleft, acute. *Ovary* densely glandular, styles 3–4 short. *Capsule* about $\frac{1}{3}$ in. diam.; cocci subglobose.

39. **M. leucodermis,** *Hook. f.*; glabrous except the racemes, branches woody bark white, leaves alternate long-petioled triple-nerved elliptic or obovate entire minutely glandular beneath, racemes elongate, capsule tridymous unarmed smooth.

MALACCA, *Maingay* (*Kew Distrib.* 1433).

Upper branches sometimes as thick as a swan's quill, very white. *Leaves* 6–10 in. by 3–5 in., more or less coriaceous, brown beneath, base rounded 2–3-glandular, nerves 5–6 pair above the basal, which extend beyond the middle, cross-nervules strong beneath; petiole 1–3 in. *Racemes* axillary and from the naked branches, stellately pubescent, males 4–6 in. slender, fem. longer in fruit; bracts minute. *Male fl.* nearly $\frac{1}{4}$ in. diam., clustered; pedicels slender; buds large, $\frac{1}{6}$ in. diam., globose; sepals 4, broad, membranous, glandular, glabrous; stamens 40–50, anther-cells oblong, globose, almost connate with a very narrow connective or separated by a broader one. *Capsules* on stout pedicels 1–$1\frac{1}{4}$ in. long, about 1 in. diam., cocci rounded, rather woody, epicarp not separating. *Seeds* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., subglobose, smooth, polished, brownish.

40. **M. distans,** *Muell. Arg. in Linnæa* xxxiv. 194, and in *DC. Prodr.* xv. ii. 976; branches petioles leaves beneath and inflorescence scurfily stellate-tomentose, leaves opposite long-petioled triplinerved ovate orbicular-ovate or oblong acuminate entire or obscurely sinuate eglandular beneath, racemes few-fld., males short, fem. elongate in fruit, ovary tomentose, styles 5, capsule tridymous unarmed densely stellate-tomentose. *Beddome Forester's Man.* 209.

SOUTHERN DECCAN, *Heyne*; Travancore, *Wight*; Tinnevelly Hills, *Beddome* CEYLON, *Heyne.*

Branches terete, pubescent, yellowish. *Leaves* in distant pairs, 6–10 by 3–5 in., very variable in form, thin or the older coriaceous, glabrous above, brown-tomentose beneath, with 3–4 pairs of nerves above the long basal and strong distant cross-nervules, base minutely peltate cuneate rounded or cordate with 2 or more variously disposed minute basal glands above; petiole 2–3 in. *Racemes* axillary; male 2–3 in.; expanded flowers ¼ in. diam., buds globose; sepals 3; stamens very numerous, filaments free, anther-cells oblong, connective obscure. *Fem. racemes* 4–5 in., slender, fruiting pedicels ½–1 in.; sepals 3; styles (or stigmas) rather short. *Capsule* ⅓ in. diam., yellow; cocci globose. *Seeds* globose, smooth.—Good specimens of this are in Rottler's herbarium from Heyne with his ticket written "Croton distans sub., Trinconom., Zeylon, 1796." Mueller Arg. refers Wallich's 7772 A to it, but not B; they are, however, clearly the same species.

41. **M. repandus,** *Muell. Arg. in Linnæa* xxxiv. 197, and in *DC. Prodr.* xv. ii. 981; tawnily stellately pubescent or tomentose, leaves alternate long-petioled triplinerved broadly rhombic-ovate acuminate entire or repand-toothed glandular on both surfaces, male racemes often panicled flowers large, fem. axillary, capsules didymous stellately tomentose, seeds black. *Brand. For. Fl.* 444; *Kurz For. Fl.* ii. 380; *Gamble Man. Ind. Timb.* 361; *Beddome Forester's Man.* 210. Rottlera tricocca, *Roxb. Fl. Ind.* iii. 829; *Dalz. & Gibs. Bomb. Fl.* 230. R. rhombifolia, *Thwaites Enum.* 272. R. dioica, *Baill. Etudes Gen. Euphorb.* 423; *Wall. Cat.* 7826 C/2, D/2, E, F. R. viscida, *Blume Bijd.* 608. R. scabrifolia, *A. Juss. Tent. Euphorb.* iii. t. 9, f. 29 B; *Reichb. f. & Zoll. in Linnæa* xxviii. 319. R. trinervis, *Zipp. in Linnæa* xv. 348. R. ? cordifolia, *Benth. Fl. Hongk.* 307. R. paniculata, *Wall. Cat.* 7818 D *in part.* Croton repandus, *Willd. in Neue Schrift. Naturf. Freund. Berlin* iv. 206. C. rhombifolius, *Willd. Sp. Pl.* iv. 555. C. lacciferus & bacciferus, *Wall. Cat.* 7774, 7826 A, B, C, D.

Throughout India, from the Tropical Himalaya in Bhotan to Assam and southwards to Travancore and Ceylon in the west, and to Penang and Perak in the east.—Distrib. China, Malay Islands, New Caledonia.

A large scandent shrub or tree, trunk sometimes 60–80 ft. long; branchlets woody, scurfily tomentose. *Leaves* 2–3 in., rarely with 2–3 lateral lobes, smooth or scaberulously stellate above, often softly tomentose beneath, base cuneate, nerves 3 pair above the long basal; petiole 1–2 in. *Male panicles* sometimes 5–6 in. long; flowers rather long pedicelled, ¼–⅓ in. diam.; sepals ovate, glandular; stamens 50–60, anther-cells oblong, connective inconspicuous. *Fem. racemes* simple or branched; sepals as in the male; ovary tomentose, always 2-celled; style 0; stigmas plumose. *Capsule* ½ in. across the two globose glandular carpels; cocci crustaceous thin, epicarp not separating. *Seeds* opaque, subglobose.

42. **M. philippinensis,** *Muell. Arg. in Linnæa* xxxiv. 196, and in *DC. Prodr.* xv. ii. 981; branchlets and young leaves and inflorescence rusty or tawny pubescent, leaves alternate petioled triple-nerved ovate to ovate- or obovate-oblong or -lanceolate acuminate entire or sinuate-toothed, glabrous above, beneath subglaucous puberulous and covered with scarlet glands, spikes terminal solitary or panicled, ovary with crimson glands, stigmas 3 sessile, capsules tridymous unarmed pulverulent, seeds black. *Brand. For. Fl.* 444; *Kurz For. Fl.* ii. 381; *Gamble Man. Ind. Timb.* 361; *Beddome Fl. Sylvat.* t. 289; *Bentl. & Trim. Med. Pl.* iv. t. 236. Rottlera tinctoria, *Roxb. Cor. Pl.* ii. 36, t. 168, and *Fl. Ind.* iii. 827; *Wall. Cat.* 7832; *Grah. Cat. Bomb. Pl.* 184; *Dalz. & Gibs. Bomb. Fl.* 230; *A. Juss. Tent. Euphorb.* 83; *Benth. Fl. Hongk.* 307; *Miquel Fl. Ind. Bat. Suppl.* 454. R. aurantiaca, *Hook. & Arn. Bot. Beech. Voy.* 270. R. affinis, *Hassk. in Flora* 1844, *Beibl.* ii. 41. R. montana & mollis, *Wall. Cat.* 7833 and 7839. Croton philippensis, *Lamk. Encycl.* ii. 206. C. punctatus, *Retz. Obs.* v. 30. C. coc-

cineus, *Vahl Symb.* ii. 97. C. montanus, *Willd. Sp. Pl.* iv. 545; *Wall. Cat.* 7723 A. C. distans, *Wall. Cat.* 7792 A *in part*, and B. C. cascarilloides, *Rauesch. ex Steud. Nomencl.* i. 446.—*Wall. Cat.* 7844.—*Rheede Hort. Mal.* v. t. 21, 24.

Throughout TROPICAL INDIA, along the foot of the Himalaya from Kashmir eastwards, all over Bengal and Burma, Singapore and the Andaman Islands, and from Scind southwards to CEYLON. —DISTRIB. China, Malay Islands, Australia.

A small evergreen tree, 25–30 ft.; branches rather slender. *Leaves* 3–5 in., variable in form, glabrous or nearly so above, base narrowed, acute or obtuse; nerves 4–7 pairs above the basal; petiole 1–2 in. *Flowers* in stiff spikes, small, sessile or subsessile, males clustered, fem. solitary. *Capsules* about $\frac{1}{3}$–$\frac{1}{2}$ in. diam., covered with crimson powder. *Seeds* globose, smooth, black.

DOUBTFUL AND EXCLUDED SPECIES.

43. **M. ? Caput-Medusæ,** *Hook. f.*; a large tree (in Perak), branches petioles leaves beneath and racemes densely rusty-tomentose or villous, leaves 6–18 in. coriaceous oblong or elongate obovate-oblong obtuse base obtuse or subacute 2-glandular above penninerved, nerves 10–12 pairs strong beneath with strong cross-nervules and reticulate interspaces, petiole $\frac{1}{2}$–1 in. stout, fem. racemes 1–$1\frac{1}{2}$ in. very stout, flowers very shortly stoutly pedicelled, sepals 5 ovate subacute, disk annular villous, ovary ovoid contracted into a short stout style with 3 recurved entire stigmas 3–4-celled densely clothed with close-set long rigid hairs, fruit $1\frac{1}{2}$–2 in. diam. globose indehiscent densely clothed with long soft villous spines, pericarp thin crustaceous, seeds broad $\frac{3}{4}$ in. long dorsally compressed suborbicular, testa smooth crustaceous.

PERAK, *King's Collector.* MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1426, 1443, 1445).

I am doubtful as to the genus of this fine plant. Maingay describes the tree as small, and hairs of the fruit as stinging, and the seeds as arillate.

44. **M. ? Kunstleri,** *King in Herb. Calcutt.*; quite glabrous except the inflorescence, leaves 8–12 in. alternate long petioled coriaceous penninerved elliptic-lanceolate acute or acuminate subserrate or serrate eglandular base decurrent, male fl. in sessile bracteate clusters on the divaricating rigid branches of a large spreading sessile panicle, buds lanceolate, sepals glumaceous and broadly ovate coriaceous, bracts more or less subsilkily pubescent, margins ciliate.

PERAK, *Scortechini, Kunstler* (*King's Collector*).

A tree, 40–60 ft.; branchlets woody, pale. *Leaves* smooth, very pale green or yellowish above when dry, with a very strong midrib, yellowish green beneath; nerves 15–20 pairs, spreading, strong but slender, nervules faint reticulate; petiole 1–3 in., strong but not thick. *Panicles* axillary, 6–10 in. long and as broad; rachis and branches slender but very stiff, finely but not stellately pubescent, at length glabrate; clusters of flowers rather distant, $\frac{1}{4}$ in. diam., 4–6 fld.; buds $\frac{1}{10}$ in. long, twice as long as the bracts, rigid, acute, pale brown; stamens 20–30, filaments slender, anthers didymous, cells usually separated by the thick connective.—A very distinct and handsome plant, of a totally different habit from any *Mallotus*, and which I can hardly doubt is generically distinct; and if so, Dr. King proposes the name *Kunstlera glumacea*, after his collector who has procured so many new and interesting plants in Perak.

45. **M. ? vernicosus,** *Hook. f.*; quite glabrous, leaves alternate long petioled rigidly coriaceous elliptic-ovate obtusely acuminate highly polished above eglandular beneath, penni- and obscurely tripli-nerved, male racemes or panicles axillary solitary and in pairs ebracteate, flowers long pedicelled, buds globose, sepals 4, stamens 30–40, connective narrow.

SINGAPORE, Botanical Garden, *Cantley*.

Branches stout, woody, terete, quite smooth, brown. *Leaves* 3–4½ in., dull olive-green when dry above and brilliantly polished as if varnished, margin thin with a broad yellow border, base acute or rounded, nerves 6–8 pair including the intramarginal basal pair, strong beneath, cross-nervules slender; petiole 1–1½ in., slender, terete, rigid. *Male racemes* stout, about as long as the leaves or longer, sometimes paniculately branched; pedicels ⅙–⅓ in. long, stout; buds ⅛ in. diam.; sepals coriaceous.—A remarkable plant, quite unlike any species of *Mallotus* known to me. The specimen bears a ticket inscribed Kaya Karangi, but it does not appear whether this is the name of a place or of the plant.

M. MOLUCCANUS, *Linn.*; *Muell. Arg. in DC. Prodr.* xvii. 958, is an Amboyna species (*Wall. Cat.* 7827 B *in part*), cultivated in the Calcutta Bot. Garden. Beddome (*Forester's Man.*) gives S. Arcot as a locality for it, but without authority.

55. **CLEIDION,** *Blume.*

Glabrous trees. *Leaves* alternate, usually sinuate-toothed, penninerved. *Flowers* small, monœcious or dicœcious; males in long axillary racemes; fem. 1–2 on a long axillary peduncle. MALE FL. *Calyx* globose, splitting into 3–4 valvate segments. *Stamens* over 20, in a globose mass on a conical receptacle; filaments free; anthers dorsifixed, 4-celled, or the 2 cells transversely didymous on the margins of a broad connective. *Pistillode* 0. FEM. FL. *Sepals* 3–5, imbricate. *Ovary* 2–3-celled; styles 2–3-fid, united below, arms long filiform; cells 1-ovuled. *Capsule* of 1–3 2-valved cocci. *Seeds* subglobose, testa coriaceous, albumen fleshy; cotyledons broad, flat.—Species about 13, tropical.

1. **C. javanicum,** *Blume Bijd.* 613; leaves long-petioled elliptic to oblong or elliptic-lanceolate acute or acuminate sinuate-toothed or entire, male fl. racemose on slender pedicels, fruit tridymous cocci globose smooth. *Muell. Arg. in DC. Prodr.* xv. ii. 987; *Thwaites Enum.* 272; *Kurz For. Fl.* 390; *Beddome Sylv. Madr.* t. 272; *Baill. Etudes Gen. Euphorb.* t. 9, f. 3–5. Lasiostyles salicifolia, *Presl Bot. Bemerk.* 149. Rottlera urandra, *Dalz. in Hook. Journ. Bot.* iii. (1851) 229; *Dalz. & Gibs. Bomb. Fl.* 230.—*Wall. Cat.* 7718, A, B, C, 7742, 7753, 7759 A.

SIKKIM HIMALAYA, alt. 2–4000 ft., and KHASIA MTS. to MUNNIPORE, BURMA, TENASSERIM, PENANG and the ANDAMAN ISLANDS; and from the CONCAN to TRAVANCORE. CEYLON; Central Province.—DISTRIB. Java.

An evergreen tree. *Leaves* 4–8 by 1½–4½ in., coriaceous, green when dry, base acute, nerves 6–10 pair; petiole 1–3 in., slender. *Racemes* 3–8 in., pubescent or almost glabrous; bracts minute; male fl. ⅛ in. diam., sessile and pedicelled; fem. solitary on long thickened pedicels; sepals minute; ovary 3-lobed, style and stigmas ¾ in. long. *Capsule* 1–1½ in. diam., on a peduncle 2–4 in. long. *Seeds* ⅓–½ in. diam., globose, smooth, mottled or not.

2. **C. nitidum,** *Thw. ex Kurz For. Fl.* ii. 391; leaves very shortly petioled broadly to elliptically lanceolate acuminate at both ends sinuate-toothed above the middle, male fl. sessile in small clusters on a long slender spike. Mallotus nitidus, *Muell. Arg. in DC. Prodr.* xv. ii. 979.

SOUTH ANDAMAN ISLANDS, rare, *Kurz*. CEYLON, *Gardner, Walker,* &c.

A small evergreen tree. *Leaves* 2–3½ in., thinly coriaceous, brownish when dry, glossy; petiole ⅙–¼ in. *Spike* equalling or exceeding the leaves. *Calyx* glabrous, globose in bud.—An imperfectly known plant, of which I have seen no Andaman Island specimens, and of which the description is taken from Kurz. I have, however, a Ceylon *Cleidion* collected by Gardner, in female flower, that agrees with Kurz's description; the leaves are elliptic or obovate-oblong, dark brown above, paler

beneath, polished on both surfaces; the female pedicel is about 1 in., the ovary tomentose, and the styles free nearly to the base.

56. **MACARANGA,** *Thouars.*

Trees or shrubs. *Leaves* alternate, often large and peltate, entire or lobed, more or less glandular beneath, 3–5-plinerved. *Flowers* in axillary racemes or branched panicles, usually dicœcious, apetalous; males many, clustered; fem. one or few under each bract; bracts often large, entire or toothed. MALE FL. minute. *Calyx* globose or obovoid; sepals 3–4, valvate. *Stamens* one or more, central; filaments flexuous; anthers 3–4-locellate, cells more or less 2-valved. *Pistillode* 0. FEM. FL. *Calyx* 2–4-lobed or toothed. *Ovary* 1–6-celled; styles entire, long or short; cells 1-ovuled. *Capsules* small, of 1–5 2-valved naked or armed cocci, often glandular or with a waxy coat. *Seeds* globose, testa crustaceous or osseous, albumen fleshy; cotyledons broad, flat.—Species about 80, in the tropics of the Old World.

Series I. *Male* and *fem. fl.* in branched panicles (except the fem. of *M. trichocarpa*). *Ovary* 1–3-celled; styles free, short, recurved or reflexed.

* Floral bracts of male panicles very small, not concealing the clusters of flowers.

† *Leaves not peltate.*

1. **M. pustulata,** *King in Herb. Calcutt.*; leaves orbicular ovate or subdeltoid acuminate nearly glabrous not or hardly peltate triple-nerved, panicles short hoary, stamens 20, styles very short, capsules 2-lobed tomentose, cocci with two large dorsal viscidly glandular patches.

TROPICAL HIMALAYA; Kumaon, alt. 4–5000 ft., *Duthie.* SIKKIM; alt. 2–4500 ft., *King, Clarke.*

Branches rather glaucous, tips rusty-pubescent. *Leaves* 3–6 in. broad, base truncate or subcordate, yellowish beneath, 2-glandular above at the petiole; basal nerves 5, lowest pair very short, lateral nerves 6–8 pair; petiole 3–4 in., hoary; stipules large, ovate-lanceolate, upper recurved or revolute. *Male panicles* 2–3 in.; bracts very minute; flowers $\frac{1}{20}$ in. diam., pubescent and glandular. *Fruiting panicles* 2–3 in.; calyx 4-lobed, circumsciss; stigmas lingulate, recurved. *Capsules* $\frac{1}{3}$ in. diam., 2-valved across the cocci, which do not separate, pericarp thin. *Seeds* globose, nearly black, hilum large.

2. **M. gmelinæfolia,** *King in Herb. Calcutt.*; leaves membranous subrhombic-ovate acuminate glabrous not peltate subglaucous beneath triple-nerved, base cuneate, male panicles hoary, stamens about 20.

SIKKIM HIMALAYA; at Kursiong, alt. 4500 ft., *Kurz.*

Branchlets and petioles glaucous, tips of branches rusty-pubescent. *Leaves* 4–5 in. broad and rather longer, grey-brown beneath, triple-nerved at base with sometimes a short intramarginal pair, lateral nerves 6–8 pair, very slender, glands inconspicuous, basal 0; petiole 3–5 in.; stipules large, ovate-lanceolate, revolute. *Male panicles* 2–3 in.; bracts very minute; flowers $\frac{1}{20}$ in. diam., pubescent and glandular. —I have seen but one specimen of this, kindly communicated by Dr. King, which appears to be distinct from *M. pustulata* in the less broad very membranous leaves, with broadly cuneate bases, faint nerves, and glaucous petioles.

3. **M. Gamblei,** *Hook. f.*; leaves oblong-lanceolate acuminate glabrous penninerved, male panicles slender pubescent, stamens 15–20, stipules minute subulate.

SIKKIM TERAI; at Dalkathar, *Gamble.*

A small tree, branchlets not very stout, woody, glabrous. *Leaves* 3–5 by 1½–2 in., very obscurely sinuate-crenate, thinly coriaceous, base rounded shortly and obscurely triple-nerved with 2 glands above the base, glands of under surface very obscure and sunk in the tissue of the leaf, but on some leaves there are very conspicuous large circular black glands; nerves 10–12 pair, very slender; petiole ½–1 in., very slender; stipules at the tips of the branches, minute. *Male panicles* subtomentosely pubescent; flowers $\frac{1}{20}$ in. diam., pubescent and glandular.—I have seen only male flowers of this very distinct plant, which differs in habit and altogether in stipules from the two preceding. In stipules it resembles the group with *M. javanica.*

†† *Leaves deltoid-ovate, peltate, entire.*

4. **M. denticulata,** *Muell. Arg. in DC. Prodr.* xv. ii. 1000; leaves deltoid-ovate acuminate or obtuse base rounded or truncate peltate or cordate 9–13-nerved glabrous or puberulous beneath, male panicles slender, bracts minute, stamens 6–30, styles very short, capsule small didymous more or less clothed with waxy glands. *Kurz For. Fl.* ii. 287; *Gamble Man. Ind. Timb.* 363. M. gummiflora, *Muell. Arg. in DC. l. c.* Mappa denticulata, *Blume Bijd.* 625; *Miquel Fl. Ind. Bat.* i. ii. 403. M. gummiflora, *Miquel l. c., Suppl.* 458. M. truncata, *Muell. Arg. in Linnæa* xxxiv. 198. M. Wallichii, *Baill. Etudes Gen. Euphorb.* 430. M. paniculata, *Wall. Cat.* 7810 H, I.

Sikkim Himalaya, alt. 3–5000 ft., *J. D. H.*, &c. Assam and the Khasia Mts., ascending to 3000 ft., *Wallich*, &c. From Chittagong to Tenasserim, common. Perak; at Goping, *King's Collector.*—Distrib. Sumatra, Java.

A small evergreen tree; young parts rusty-tomentose; branches and petioles at length hoary and rather glaucous. *Leaves* 4–12 in. diam., thinly coriaceous, rather longer than broad, base truncate with 2 glands above, glands beneath dense; nerves 6 or more pairs above the basal, strong beneath; petiole 2–4 in.; stipules small, ovate-lanceolate, tomentose, fugacious. *Male panicles* 4–6 in., hoary, with very slender rachis, horizontal branches, and minute clusters of globose glandular and pubescent flowers; bracts small, sometimes expanding into an elliptic tomentose lamina; sepals 2–3, hemispheric. *Fem. panicles* smaller than the males; calyx 3–4 lobed; stigmas very short, linguiform, recurved. *Capsules* ¼ in. diam., didymous, black, with yellow glands. *Seeds* globose, black.—Mueller describes the leaves as eglandular, probably through inadvertence. I find no difference between the Indian plants named *denticulata* and *gummiflora*, or their distribution, but I have seen no typical specimen of the former, which was described from a Javan plant, or of the latter which is a Sumatran one. Gamble gives Darjeeling alt. 5000 ft. as a locality for both.

5. **M. indica,** *Wight Ic.* t. 1883 and 1949, f. 2; leaves orbicular-ovate cuspidately acuminate or acute entire or toothed broadly peltate palmati-nerved, male panicle large broad, branches zigzag, bracts minute or with a large elliptic glandular appendage, stamens 3–8, ovary 1-(rarely 2-)celled, styles subulate, capsule small globose or didymous glandular. *Muell. Arg. in DC. Prodr.* xv. ii. 1009; *Kurz For. Flor.* ii. 387; *Gamble Man. Ind. Timb.* 363; *Beddome Flor. Sylvat.* t. 287 *right-hand figure*, and *Forester's Man.* 211. M. flexuosa, *Wight Ic.* t. 1909, f. iii. ? Trewia hernandifolia, *Roth Nov. Sp.* 374.

Eastern Himalaya; Sikkim, alt. 3000 ft., *King.* Mishmi Hills, *Griffith* Khasia Mts., alt. 2–4000 ft., *J. D. H. & T. T.*, &c. Deccan Peninsula; from the Concan southwards, on the Western Ghats. Andaman Islands, *Kurz.* Ceylon, abundant up to 4000 ft., *Thwaites.*

A tree, 50–60 ft.; branchlets very robust, glaucous, tips and young leaves rusty-tomentose or flocculent. *Leaves* 6–8 in. diam., membranous or coriaceous, above smooth and glabrous except the pubescent nerves; base rounded, 2-glandular above,

beneath puberulous or softly tomentose and gland-dotted, with 6–8 pairs of nerves above the basal, and cross-nervules; petiole 6–12 in., glabrous, glaucous; stipules broadly ovate, acuminate, recurved. *Male panicles* with a glaucous peduncle and rusty-tomentose branches; clusters of flowers remote; floral bracts very broad, concave, or broader and flat, not concealing the flowers; glandular appendages $\frac{1}{8}$–$\frac{1}{6}$ in. long; flowers $\frac{1}{60}$ in. diam.; sepals obovate, membranous, pubescent. *Fem. panicles* smaller, bracts glandular; flowers pedicelled; calyx 4-cleft; styles equalling the globose glabrous waxy ovary. *Capsule* very small, rarely didymous.—Ceylon specimens have normally didymous very small capsules, with the central axis often persistent as an elliptic disk. Wight's *M. flexuosa*, of which no specimen exists, is, I think, only *M. indica* with larger bracts of the male fl. than usual.

6. **M. perakensis,** *Hook. f.*; leaves 3–4 in. diam. deltoid-ovate cuspidate base rounded peltate palmately 7–9-nerved minutely hoary beneath, male panicles very slender subtomentose, stamens 10–12, styles short recurved, capsules small didymous clothed with waxy glands.

PERAK, *Scortechini.*

Branchlets woody, puberulous, not glaucous, tips and young leaves rusty-tomentose. *Leaves* much smaller than in *M. indica*, membranous, glabrous and brown above with 2–3 glands at the base above, pale beneath, with 8–10 pair of nerves above the basal; petiole 2–3 in. hoary; stipules small, subulate, rusty-tomentose. *Male panicles* like those of *M. denticulata*, but smaller; bracts at the base of the branches lanceolate, floral very minute, rounded; flowers $\frac{1}{30}$ in. diam.; sepals 3–4, pubescent, hardly glandular. *Fruiting racemes* 1–1½ in. *Capsule* $\frac{1}{6}$ in. diam.

** Floral bracts of male large, often toothed, concealing clusters of flowers.

† *Leaves peltate entire.* (See also *M. megalophylla.*)

7. **M. Tanarius,** *Muell. Arg. in DC. Prodr.* xv. ii. 997; leaves broadly peltate ovate or deltoid or orbicular-ovate acuminate or cuspidate sinuate-toothed, base rounded or cordate palmately nerved glabrous pubescent or tomentose beneath, bracts small toothed or pectinate, stamens 5–6, fem. fl. loosely panicled or racemed, styles slender subulate, capsules 2–3-lobed sparingly softly prickly. *Kurz For. Fl.* ii. 388. M. molliuscula, *Kurz mss.* Mappa Tanarius & tomentosa, *Blume Bijd.* 624; *Zolling. in Linnæa* xxviii. 307. M. Tanaria, *Spreng. Syst.* iii. 878; *Miquel Fl. Ind. Bat.* i. ii. 401; *Benth. Fl. Hongk.* 304. M. glabra, *A. Juss. Tent. Euphorb.* t. 14, f. 44. M moluccana, *Wight Ic.* t. 816 (*excl. syn.*); *Benth. in Hook. Journ. Bot.* ii. (1843) 233; *Miquel Fl. Ind. Bat. Suppl.* 456. Rottlera Tanaria & tomentosa, *Hassk. Cat. Hort. Bogor.* 238. R. integrifolia, *Herb. Ham.* Ricinus Tanarius, *Linn. Sp. Pl. Ed.* ii. 1430. R. Mappa, *Roxb. Fl. Ind.* iii. 690. Croton lacciferus, *Blanco Flor. Filip. Ed.* ii. 517 (*not of Linn.*).—*Wall. Cat.* 7810, E, F.

ANDAMAN ISLANDS, *Kurz.* PERAK, *Wray.* MALACCA, *Maingay.*—DISTRIB. Malay Archipelago.

A small tree; branchlets stout, glaucous, tips and young leaves softly pubescent. *Leaves* 6–24 in. long, sometimes as broad, membranous, glabrous or puberulous above or on both surfaces, glandular or not above at the insertion of the petiole; nerves 6–8 pair above the basal, strong beneath; petiole 4–8 in., glaucous; stipules ½ in. long, broadly ovate-lanceolate, acuminate, scarious, back pubescent. *Male panicles* long-peduncled, slender, branched; bracts $\frac{1}{6}$–$\frac{1}{3}$ in., acute, eglandular, rarely entire; flowers $\frac{1}{20}$ in. diam.; sepals 3–4, membranous, glabrous. *Fem. fl.* in usually simply panicled spikes or racemes. *Ovary* hispid; styles larger than the carpels. *Capsule* size of a large pea, clothed with waxy glands. *Seeds* globose, rough.—Roxburgh

describes 2 or 3 glands as present in the smallest superior nerves of his *R. Mappa*, the stipules as acute cordate and reniform, and the male sepals as 2.

8. **M. Roxburghii,** *Wight Ic.* t. 1949, f. 4, and v. ii. 23; leaves deltoid- or rhombic-ovate or orbicular broadly pelaire cuspidate palmatinerved entire or minutely toothed, bracts broad tomined, stamens 2–5, ovary 1-celled, style lateral large sessile peltate pilamate, capsule globose glandular with the persistent stigma on one side. *Wight & Gibs. Bomb. Fl.* 228. M. Wightiana, *Baill. Etudes Gen. Euphorb.* 432. M. tomentosa, *Wight l. c.* t. 1949, f. 1, and v. ii. 23; *Beddome F. Sylvat.* t. 287. Mappa ? peltata, *Wight Ic.* t. 817; *Beddome Forester's Man.* 211. Osyris ? peltata, *Roxb. Fl. Ind.* iii. 755.—*Wall. Cat.* 7810 A—D, G, K.

The Deccan Peninsula; in the Circars and on the Ghats, from the Concan to Travancore. Ceylon, abundant up to 3000 ft.

A small resinous tree; branchlets very stout, glaucous, tips rusty-tomentose. *Leaves* 5–8 in. diam., coriaceous or thin, glabrous above except the pubescent nerves, and eglandular at the rounded base, beneath finely pubescent or glabrate and gland-dotted with 6–8 pairs of strong nerves above the basal, and strong cross-nervules; petiole 3–6 in., glabrous or puberulous; stipules ovate- or oblong-lanceolate, not broad, tomentose. *Panicles* densely rusty-tomentose, or the branches nearly glabrous; bracts at the axils and bases of the terminal branches very broad and often veined, floral hemispheric; flowers $\frac{1}{60}$ in. diam. *Fem. panicles* simpler, branches racemose with larger bracts; calyx-limb obsolete; ovary densely glandular, glabrous or puberulous; stigma sessile often embracing one side of the ovary, thickly papillose. *Capsule* globose, $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Seed* globose; testa brown, crustaceous, rough.—Wight's figure of *M. Roxburghii*, t. 1949, f. iv., is a reproduction of the right-hand figure of his t. 817, which is itself a copy of Roxburgh's drawing of *Osyris ? peltata*. Of this the figure in question is intended to represent a portion of a male panicle; it is very badly done.

9. **M. Curtisii,** *Hook. f.*; branchlets petioles leaves beneath and panicles densely rusty-tomentose, leaves broadly peltate orbicular-ovate acuminate sinuate-toothed palmatinerved, male panicles long laxly branched, bracts cymbiform acuminate entire, flowers very glandular, stamens 2–3.

Penang; on the West Hill, alt. 2000 ft., *Curtis*.

A tree of medium size, branchlets woody. *Leaves* 6–10 in. long and nearly as broad, thinly coriaceous, glabrous above and eglandular at the insertion of the petiole; nerves 4–5 pair above the basal, strong beneath; petiole 5–7 in., stout. *Male panicles* as long as the petioles or longer; bracts $\frac{1}{4}$ in. and less; flowers $\frac{1}{40}$ in., covered with large glands.

†† *Leaves peltate, lobed.*

10. **M. hypoleuca,** *Muell. Arg. in DC. Prodr.* xv. ii. 992; branches petioles leaves beneath and branches of inflorescence milkily glaucous, leaves peltate palmatinerved broader than long deeply 3-lobed, lobes divergent ovate-oblong acuminate, male panicles long and long-peduncled, bracts toothed, stamen 1. styles very short, capsule 3-lobed, cocci each with two glandular lines. Mappa ? hypoleuca, *Reichb. f. & Zoll. Rottler.* 30; *Zolling. in Linnæa* xxviii. 309; *Miquel Fl. Ind. Bat.* i. ii. 404, and *Suppl.* 458. Ricinus inermis, *Wall. Cat.* 7806.

Penang, *Wallich*. Malacca, *Griffith*.—Distrib. Sumatra, Borneo.

Branches stout. *Leaves* 8–10 in. across the lateral lobes, coriaceous, clothed beneath with a white waxy secretion obscuring the glands, base rounded or sub-cordate, 2–3-glandular above, lobes entire or with shallow teeth, each with 6–8 pairs

of stout nerves; petiole 4–7 in.; stipules broad. *Male panicles* longer than the leaves; bracts $\frac{1}{8}$–$\frac{1}{4}$ in. long, broadly ovate, finely rusty-tomentose; flowers $\frac{1}{60}$ in. diam.; sepals 3, membranous, papiliose; filament stout; anther 4-locellate. *Fem. panicles* shorter; calyx cupular, toothed; ovary glabrous; styles subulate. *Capsule* $\frac{1}{3}$ in. diam., rather depressed. *Seeds* impressed-punctate.—Mueller describes the fem. fl. as sometimes dianarous, no doubt an oversight for the male. I have not seen the stipules, which are deciduous in my specimens.

11. **M. megalophylla,** *Muell. Arg. in DC. Prodr.* xv. ii. 995; branches petioles leaves beneath and panicles densely rusty pubescent or tomentose, leaves very large and coriaceous broadly peltate orbicular-ovate obtusely 3-lobed rugose and reticulately nerved beneath, lobes short rounded or obsolete, male and fem. panicles much branched peduncled, floral bracts of male broad pectinately toothed, stamens 1–3, ovary 2-celled, styles very short united at the base, capsules didymous glandular. M. rugosa, *Muell. l. c.* Mappa megalophylla & rugosa, *Muell. Arg. in Flora* 1864, 467. Tragia rugosa, *Wall. Cat.* 7807.

MALACCA, *Griffith.* PERAK, at Goping, *King's Collector.*—DISTRIB. Borneo.

A tree, 40 ft. in Goping; branches woody but with large pith, puberulous. *Leaves* 12–18 in. long, above pubescent when young, when old glabrous except the nerves, truncate or cordate at the eglandular base above, beneath dark brown with 5–6 pairs of strong nerves cross-nervules and close deep reticulations concealing the glands; lobes entire, toothed or sinuately lobulate; petiole 1–2 ft., hoary, very stout; stipules very large, oblong, erect. *Male panicles* 6–10 in., branches rather slender; floral bracts $\frac{1}{6}$–$\frac{1}{4}$ in., rhomboid, eglandular; flowers $\frac{1}{60}$ in. diam., tomentose; sepals 3, ovate; stamens short; anthers 4-locellate. *Fem. panicles* broad; sepals 4. *Capsules* $\frac{1}{3}$ in. diam.; cocci globose, crustaceous, puberulous, and glandular. *Seeds* subcompressed globose, testa uneven thick.—Probably this does not differ from the *M. gigantea*, Muell., of Sumatra.

12. **M. Maingayi,** *Hook. f.*; branches glaucous and petioles and main branches of panicles glabrous, leaves broadly peltate very coriaceous rounded or broader than long in outline 3-lobed to or above the middle beneath rusty-tomentose and closely deeply reticulate, lobes short divergent acuminate, male panicles subsessile much branched, floral bracts brown-tomentose broadly ovate acuminate deeply serrate, sepals 2–4 concave densely tomentose, stamens 2.

MALACCA, *Maingay* (*Kew Distrib.* 1391). PERAK, *King's Collector.*

A tree, 30–40 ft. in Perak; branches glabrous to the tips. *Leaves* 5–7 in. diam., dark brown when dry and glabrous, when young rustily hoary above and eglandular at the rounded concave base; lobes broad, entire or obscurely toothed, beneath finely densely tomentose on the nerves and nervules which are so close that the glands are obliterated; petiole 3–4 in.; stipules very broad, membranous, spreading, not recurved, deciduous. *Male panicles* 6 in. long and almost as broad, branches spreading and rachis slender; floral bracts $\frac{1}{10}$–$\frac{1}{8}$ in. long, 5–6-fld., those at the axils longer more acute entire; flowers $\frac{1}{60}$ in. diam.; sepals rounded, glandular and tomentose.

13. **M. Hosei,** *King in Herb. Calcutt.*; branches glaucous and petioles and branches of panicle glabrous, leaves peltate or deeply cordate at the base coriaceous broader than long 3-lobed to or below the middle puberulous beneath and hairy on the nerves, lobes broad divergent cuspidate, male panicle very long-peduncled, bracts tomentose pectinately-toothed, fem. panicle much shorter, bracts entire, ovary 1–2-celled waxy glabrous, styles very short.

MALACCA, *Griffith.* PERAK, *King's Collector, Scortechini.*

A tree, 30–40 ft.; branches stout, glabrous to the tips. *Leaves* 8–12 in. across the lateral lobes, dark brown above, eglandular at the concave cordate base, beneath paler with strong nerves and slender cross-nervules which bear long spreading straight hairs, glands invisible; lobes very broad, distantly minutely toothed; petiole 3–5 in.; stipules very large, reniform, glabrous, reflexed but not revolute. *Male panicle* 12–14 in.; bracts at the axils glabrous, floral $\frac{1}{6}$ in. long, 5–6-fld.; flowers $\frac{1}{60}$ in.; sepals membranous, pubescent, eglandular. *Fem panicle* much shorter, with shorter stouter branches; flowers shortly pedicelled; calyx 3–4-lobed; ovary clothed with yellow waxy glands.

††† *Leaves not peltate, triple-nerved, deltoid-ovate, not lobed.*

14. **M. minutiflora,** *Muell. Arg. in Flora* (1864) 466, and in *DC. Prodr.* xv. ii. 1012; branchlets leaves beneath and panicles finely tomentose, leaves deltoid-ovate from a broadly cuneate base caudate-acuminate denticulate, male panicles sessile shorter than the petioles, bracts ovate pectinately toothed villous eglandular, flowers villous, stamens 2. *Kurz For. Fl.* ii. 388. M. Helferi, *Muell. Arg. in DC. l. c.* 1004.

TENASSERIM, *Helfer.*

A shrub (*Kurz*); branches slender, terete; pubescence fulvous. *Leaves* 4–6 by 3–4 in.. rather membranous, above greyish and minutely stellately pubescent, with pubescent nerves and eglandular base; beneath glandular, with 4–5 pair of slender nerves above the basal and slender cross-nervules and reticulations; petiole $1\frac{1}{2}$–2 in.; stipules lanceolate, tomentose. *Male panicles* with very slender rachis and branches; floral bracts $\frac{1}{6}$–$\frac{1}{4}$ in., eglandular; flowers $\frac{1}{60}$ in.; sepals villous, cuneate.—The leaves of Mueller's *M. Helferi* are rather more tomentose beneath than of *M. minutiflora,* but I find no other difference. Perhaps this is only a state of the following; the fruit is unknown.

15. **M. trichocarpa,** *Muell. Arg. in DC. Prodr.* xv. ii. 1003; branchlets leaves beneath and panicles finely tomentose, leaves ovate or deltoid-ovate acuminate denticulate scaberulous above, panicles very short, bracts large ovate pectinately toothed glandular and villous within, fem. panicles few-fld., capsule 2-lobed clothed with soft bristly white prickles. Mappa trichocarpa, *Reichb. & Zoll. Rottler.* 8; *Zolling. in Linnæa* xxviii. 307; *Miquel Fl. Ind. Bat.* i. ii. 402. M. Zollingeri, *Miquel l. c. Suppl.* 457. M. borneensis, *Muell. Arg. in DC. l. c.*—*Wall. Cat.* 7831.

PERAK, *Scortechini.* SINGAPORE, *Wallich, Hullett, King's Collector.* MALACCA, *Seemann.*– DISTRIB. Sumatra, Malay Islands, Cochin China.

Branches rather slender, terete; tips and young leaves villous. *Leaves* 4–6 by 2–$3\frac{1}{2}$ in., rather rigid, above greyish, puberulous on the nerves and stellately scaberulous between them and sometimes 2-glandular at the petiole, beneath yellowish or brown, glandular and simply pubescent; petiole velvety, 1–$2\frac{1}{2}$ in.; stipules lanceolate, villous. *Male panicles* 1–$1\frac{1}{2}$ in., subsessile, rachis and short branches sessile; floral bracts $\frac{1}{4}$ in. long, membranous, veined, gland-dotted, with a villous pad at the base within in my specimen. *Fem. fl.* 2–3, subsessile at the top of a short peduncle; calyx elongate urceolate, acutely 4–5-fid; styles small. *Capsule* $\frac{1}{2}$ in. across the cocci, which are thinly crustaceous. *Seeds* globose, black, rugose.—I have seen no flowers. Mueller describes the stipules as broad and obtuse. The simple fem. inflorescence is that of the following section.

†††† *Leaves not peltate, ovate or oblong.*

16. **M. populifolia,** *Muell. Arg. in DC. Prodr.* xv. ii. 1006; nearly glabrous, leaves long-petioled ovate or ovate-oblong acuminate quite entire brown and glaucous beneath, male panicles very short and shortly pedunculed, bracts small very broad toothed acuminate glandular, flowers glabrous,

stamens 1–2, styles very short, capsules small didymous covered with waxy glands. *Kurz For. Fl.* ii. 389. Mappa populifolia, *Muell. Arg. in Linnæa* xxxiv. 198. Pachystemon populifolius, *Miquel Fl. Ind. Bat. Suppl.* 462.—*Wall. Cat.* 7813.

PENANG, *Wallich.* MALACCA, *Griffith, Maingay.* ANDAMAN ISLANDS, *Kurz.*—DISTRIB. Sumatra, Borneo.

A small evergreen tree; branches rather slender, terete, tips quite glabrous or puberulous. *Leaves* 3–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., membranous, brown above when dry, base eglandular rounded, beneath of a dark yellow-brown colour, triple-nerved and with 6–8 pair of slender nerves above the basal, cross-nervules very faint; petiole 1–3 in., very slender; stipules lanceolate. *Male panicles* shorter than the petioles; branches short; bracts at the axils obtuse, hoary, floral concave glabrous; flowers $\frac{1}{80}$ in. diam.; sepals broad; anthers 4-locellate. *Capsule* $\frac{1}{3}$ in. diam., yellow from the glands. *Seeds* globose, rough.—Kurz describes the cocci as sparingly and minutely tubercled.

17. **M. javanica,** *Muell. Arg. in DC. Prodr.* xv. ii. 1004; shoots and panicles rusty-tomentose, leaves long-petioled ovate-lanceolate from a broadly cuneate base acuminate entire strongly tripli- and penni-nerved, panicles elongate subsessile, bracts of male broadly ovate pectinately serrate and glandular, sepals 2–3 very broad glabrous, stamens 2–3, stigmas large reflexed lobed, capsule minute 2-lobed densely glandular. *Wawra It. Pr. Sax. Cob. Bot.* 48. Mappa javanica, *Blume Bijd.* 625; *Zolling. in Linnæa* xxviii. 308. M. bancana, *Miquel Fl. Ind. Bat. Suppl.* 458. Rottlera javanica, *Hassk. in Cat. Hort. Bogor.* 238; *Miquel l. c.* i. ii. 403. R. montana, *Heyne mss.*—*Wall. Cat.* 7835.

PENANG? and SINGAPORE, *Wallich.* MALACCA, *Griffith* (*Kew Distrib.* 4725), *Hervey.*—DISTRIB. Java.

Branches stout, woody, terete, black, sparsely pubescent towards the tips which and the youngest leaves are red with scurfy stellate pubescence. *Leaves* 5–7 by $1\frac{1}{2}$–3 in., coriaceous, above smooth biglandular and minutely cordate with incurved margins at the very base, beneath red-brown with 6-7 pair of very strong nerves above the bases, and close strong cross-nerves, glands pitted; petiole 1–$2\frac{1}{2}$ in.; stipules variable, linear or lanceolate from a broad base. *Male panicles* 6–8 in., rachis and branches slender; floral bracts very broad, $\frac{1}{3}$ in. long; flowers $\frac{1}{60}$ in. diam.; sepals orbicular, concave. *Fem. panicles* as long but less branched than the male; bracts shorter; calyx 4-lobed; styles fleshy. *Capsule* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., black when dry. *Seeds* $\frac{1}{10}$ in. diam., globose, nearly smooth, black.—Mueller describes the capsule of the Javan plant as covered with soft green prickles. The bracts of the Peninsular specimen are larger than in the Javan.

Series II. *Male fl.* in branched panicles, fem. subcapitate on a stout short peduncle. *Ovary* 3–5-celled, styles united below into a short often thickened crown to the ovary. *Leaves* peltate and often lobed.—The species are all very imperfectly known. (See also *M. trichocarpa.*)

18. **M. Kingii,** *Hook. f.*; quite glabrous, leaves very large rather membranous broadly peltate palmatinerved 5-lobed eglandular beneath, base rounded and sinuately angled, lobes ovate-lanceolate acuminate sinuate-toothed midlobe much the longest, fruiting racemes very short shortly and very stoutly peduncled, capsules large depressed slightly 4–5-lobed hoary, stigmas 4–5 slender erect combined at the base.

MALAY PENINSULA; Jaffaria at Johore, *King's Collector.*

A small tree; branches glaucous, smooth, fistular. *Leaf* 20 in. long by 24 across the lateral lobes, above smooth, eglandular on both surfaces, greenish when dry, longer lateral lobes 10 by 3 in., midlobe 12 by 5 in., 9-nerved from the base, with 12-15 pair

of nerves on the midlobe, cross-nervules slender; petiole 12 in., stout, soft, terete, swollen at the fleshy base which is much contracted when dry; stipules on the stem free, 1 in. long, lanceolate, acuminate, reflexed, and with the margins recurved. *Capsules* shortly pedicelled, forming a head 1½ in. diam., at the end of a very stout smooth axillary peduncle 1–1½ in. long; each capsule ½ in. diam., very obscurely tubercled and with 2 glandular patches on each carpel; styles persistent, ¼ in. long, pericarp very thin. *Seeds* subglobose, compressed laterally towards the hilum, pale brown, opaque, nearly smooth; testa thin, crustaceous.—A very remarkable species.

19. **M. Griffithiana,** *Muell. Arg. in DC. Prodr.* xv. ii. 993; quite glabrous except the panicles, leaves broadly peltate palmatinerved orbicular or obovate from a rounded base quite glabrous subglaucous beneath shortly 3-lobed above the middle, lobes triangular acute, male panicles long-peduncled, floral bracts short concave cuspidate entire or obscurely toothed rusty tomentose, sepals tomentose and glandular, stamens 3–4, fem. panicles shorter flowers 3-nate, styles short stout connate into a short tumid crown. Mappa triloba, *Muell. Arg. in Flora* 1864, 466.

Malacca, *Griffith.* Perak, *Scortechini*; Goping, *King's Collector.*

A medium-sized tree in Perak; branches smooth, terete, fistular, glaucous, glabrous to the tips. *Leaves* 6–10 by 5–9 in., usually narrowed at the rounded eglandular base, thinly coriaceous, yellowish when dry, smooth on both surfaces, above obscurely glandular, beneath with 6–7 pairs of nerves above the basal and faint cross-nervules, lobes suberect, entire or remotely denticulate, sinus rounded. *Male panicles* 6–10 in.; peduncle and branches glabrous or tomentose; bracts at the axils ½ in., lanceolate, caducous; floral bracts closely imbricating, forming ovoid heads ¼ in. long; flowers $\frac{1}{80}$ in. diam.; sepals orbicular, glandular. *Fem. panicles* much stouter, more tomentose, with the flowers usually at the ends of the branches and sessile; calyx cupular 3-lobed, ovary 3–5 celled, carpels glandular towards the base; styles thick, subulate, erect or recurved, forming a tumid crown to the ovary.

20. **M. triloba,** *Muell. Arg. in DC. Prodr.* xv. ii. 989; leaves large deeply peltate palmatinerved 3-lobed from a broad rounded base glandular toothed, lobes oblong-ovate acuminate lateral ascending midlobe longest, reticulate above beneath obscurely glandular and puberulous on the nerves, male panicles subsessile, bracts small concave, fem. fl. few capitate on a short axillary very stout peduncle, ovary 5-celled, styles 5 short erect acute combined below into a tumid crown, capsule depressed, cocci produced at the back into blunt cones. Pachystemon trilobus, *Blume Bijd.* 626; *Wight Ic.* t. 1949, f. 5; *Baill. Etudes Gen. Euphorb.* t. 20, f. 38–41; *Muell. Arg. in Mem. Soc. Phys. Hist. Nat. Genev.* xvii. ii. 454 *with analysis.* Ricinus trilobus, *Reinw. in Blume Cat.* 108.—*Wall. Cat.* 7809.

Penang, *Wallich.* Perak and Goenong, *Scortechini, King's Collector.* Singapore, *Cantley.*—Distrib. Sumatra, Java, Borneo.

Branches as thick as the little finger, terete, smooth. *Leaves* 8–12 in. either way, or narrower than broad, margin rather waved, glands large terminating the short teeth, above opaque not smooth, beneath brownish, nearly glabrous; midlobe with often 16–20 pairs of nerves; petiole 6 in., stout, terete, puberulous; stipules much broader than long, recurved or revolute. *Male panicles* stoutly peduncled, branches tomentose; flowering bracts ⅛ in. long; flowers $\frac{1}{60}$ in. diam.; sepals obcuneate, papillose. *Fem. peduncle* 1½ in., with the scar of a bract at the middle; flowers 6–10, quite sessile (bracts all fallen away); calyx 4-lobed, tomentose; ovary tomentose at the base, above it covered with yellow waxy glands. *Capsule* (unripe) ⅓ in. diam., crown nearly flat.—I have seen only two leaves and young fruit of this fine species.

21. **M. Hullettii,** *King in Herb. Calcutt.*; glabrous, leaves oblong- or

ovate-lanceolate from a rounded peltate base entire caudate-acuminate sinuate-dentate minutely glandular beneath, fem. fl. few capitate on an axillary short very stout peduncle, ovary 4–5-celled, styles 5 short acute connate into a subglobose base, capsule depressed, cocci produced into conical horns.

PERAK, *King's Collector.*

A small tree; branchlets as thick as a goose-quill, terete, hollow, glabrous or with a few scattered hairs. *Leaves* 5–7 by 2–3 in., broadest opposite the insertion of the petiole, thinly coriaceous, above rather shining and reticulate, eglandular at the 7-nerved base, beneath opaque, paler, with 8–10 pairs of slender nerves above the basal and slender cross-nervules; petiole 3–4 in., very slender; stipules not seen. *Peduncle* of fem. fl. 1 in., very stout; calyx 4-lobed. *Capsules* bluish, $\frac{1}{2}$–$\frac{2}{3}$ in. diam., hemispheric below, horns glandular.

Series III. *Male* and *fem. fl.* racemose, or fem. subsolitary. *Styles* very long and slender. Leaves narrow, not peltate.

22. **M. digyna,** *Muell. Arg. in DC. Prodr.* xv. ii. 1007; nearly glabrous, leaves long-petioled elliptic- or oblong-lanceolate from a rounded base caudate-acuminate obscurely crenulate copiously glandular beneath, racemes very slender, bracts of male very minute, stamens 10–12, capsules racemose compressed didymous. *Beddome Forester's Man.* 211. Rottlera digyna, *Thwaites Enum.* 273. Mappa digyna, *Muell. Arg. in Linnæa* xxxiv. 198. Claoxylon digynum, *Wight Ic.* t. 1884.

CEYLON; at Caltura, &c., *Moon, Walker,* &c.

A small tree; branchlets slender, terete, smooth, tips glandular. *Leaves* 5–8 by $1\frac{1}{2}$–2 in., thinly coriaceous, shortly triple-nerved and 2-glandular at the very base above; nerves 8-15 pair above the basal, very slender; petiole 1–3 in., very slender; stipules on the terminal buds only $\frac{1}{4}$ in., needle-shaped. *Male racemes* 3–4 in., quite simple; bracts subulate or 0; male fl. $\frac{1}{20}$ in. diam., buds globose; sepals 3, orbicular, glandular. *Fem. racemes* longer; sepals 4, very unequal; stigmas filiform, $\frac{1}{3}$ in. long. *Capsules* $\frac{1}{3}$ in. diam.; cocci quite smooth, thinly crustaceous. *Seeds* globose, brown, shining.

23. **M. Lowii,** *King in Herb. Calcutt.*; glabrous except the inflorescence, leaves long-petioled elliptic-oblong or -lanceolate acuminate (sometimes obtusely) coriaceous penninerved minutely glandular beneath, male racemes sessile slender pubescent, bracts small concave, stamens 15–20, capsules 1–3 terminating a long peduncle with a foliaceous bract didymous spinous.—*Wall. Cat.* 7996 (*flowers monstrous*) and 9100.

PENANG, *Wallich*; on Goot Hill, *Curtis.* PERAK, *King's Collector.* SINGAPORE, *Cantley.*

A small tree; branches woody, terete, glabrous or nearly so to the tips. *Leaves* 4–7 by 1–2 in., pale when dry, and rather shining above, margins with obscure distant glands, tips long or short, cordate at the very narrow 2-glandular base; nerves 12–14 pair, very slender, cross-nervules faint; petiole 1–3 in., very slender; stipules rigid, subulate, $\frac{1}{4}$ in. long. *Male racemes* sometimes as long as the leaves; bracts tomentose, shorter than the flowers, concave, acute; flowers $\frac{1}{10}$–$\frac{1}{8}$ in. diam., glandular and hispidulous; sepals orbicular. *Peduncle* of fem. fl. 2–3 in., stout, stiff, erect, pubescent; flowers 1–9 near the end of the peduncle; bract $\frac{1}{4}$ in. long and broad, orbicular, toothed, acute; sepals 6, lanceolate; ovary spinous; styles long, filiform. *Capsules* $\frac{1}{2}$–$\frac{2}{3}$ in diam., puberulous; cocci globose, thickly crustaceous. *Seeds* globose, brown, polished.—The Singapore plant is not in a good state, the stipules are extremely slender.

24. **M. Brandisii,** *King in Herb. Calcutt.*; glabrous, leaves shortly

petioled elliptic-lanceolate acuminate or caudate penninerved with scattered black glands beneath, fem. bracts large leafy, capsules didymous glandular smooth or with a few soft prickles.

TENASSERIM, on Moolyet, alt. 2–6000 ft., *Beddome, Gallatly.*

A tree, 20 ft.; branchlets slender, woody, terete, tips glandular. *Leaves* thinly coriaceous, 4–6 by 1–2 in., margins eglandular, base acute or rounded minutely cordate eglandular; nerves 8–10 pairs, very slender; petiole ½–1 in., slender, often viscid; stipules minute, setaceous. *Peduncles* of fem. fl. 2–4 in., very slender, 1–2-fld., erect, leafy; bracts ½–1½ in., broadly ovate to lanceolate; sepals 4; styles filiform, about as long as the cocci. *Capsule* ½–⅔ in. diam.; cocci globose, rather compressed, crustaceous. *Seeds* globose, smooth, brown.

IMPERFECTLY KNOWN, DOUBTFUL AND EXCLUDED SPECIES.

M. DEPRESSA, *Muell. Arg. in DC. Prodr.* xv. ii. 989, is a Javan and Bornean plant; Ceylon is given as a locality to a specimen in Thunberg's Herbarium at Upsala, but there is no confirmation of it.

M. INVOLUCRATA, *Muell. Arg. l. c.* 1011, from Bengal (Leschenhault), is no doubt a garden plant, and is Wallich's No. 4621 from the Calcutta Garden. I believe it to be a native of the Moluccas.

M. SP.? Chittagong (*Hook. f. & T., Clarke*); a small tree, branches slender glaucous quite glabrous, leaves narrowly peltate ovate acuminate glaucous beneath base rounded eglandular, nerves 8–10 pair very slender, petiole as long as the blade.

M. MEMBRANACEA, *Kurz For. Fl.* ii. 389; an erect subsimple shrub, leaves long-petioled membranous hardly peltate entire and ovate lanceolate caudate acuminate or broadly ovate and entire or with 2–3 caudate lobes minutely gland-dotted, margins minutely toothed above minutely scaberulous beneath pubescent, base cuneate or truncate, nerves very slender, petiole 2–3 in. very slender, male fl. unknown, fem. 1–3, sepals at the top of a slender peduncle with a lacerate puberulous leafy bract, calyx urceolate embracing the style base, ovary hirsute and glandular, styles ½ in. filiform glabrous, capsule 2-coccous 2-lobed, cocci size of a small pea powdered with red glands and loosely covered with filiform flexuous smooth bristles, seeds spherical brown smooth glabrous.—Pegu, Ava and Martaban, alt. 4–6000 ft., *Kurz.* Yunan, *J. Anderson.*—I am indebted to Dr. King for specimens.

M. JAVANICA, *var.* montana, *Wawra, Bot. It. Pr. Sax. Cob.* 48.—I am unable to identify this.

57. **PTYCHOPYXIS,** *Miquel.*

A tree with densely tomentose very stout branchlets petioles and inflorescence; hairs simple. *Leaves* crowded at the ends of the branchlets, alternate, very coriaceous, oblanceolate, acuminate, entire, penninerved; petiole very short. *Flowers* axillary, dioecious ?, crowded and surrounded with densely tomentose thick lanceolate bracts; males spicate, fem. capitate. MALE FL. *Sepals* 4–5, subequal, thick, valvate. *Disk* 0. *Stamens* very numerous, in a globose head on a convex hairy receptacle; filaments flexuous, filiform, with subulate tips; anthers broadly oblong, flat, cells 4 in superposed pairs on each side of the broad connective, which is produced beyond them into a broad acute triangular point, two upper cells oblong, two lower much smaller, testicular, slits of all introrse longitudinally; pollen very minute. *Pistillode* 0. FEM. FL. *Sepals* 6, lanceolate, thick, unequal or subequal, persistent. *Ovary* 3-celled, and elongate style villously tomentose; stigmas or style-arms 3; short, recurved, entire, hispidly

papillose on the inner surface; cells 1-ovuled. *Fruit* large, broadly ovoid, densely velvety, suddenly tapering into a long stout velvety beak or style; pericarp with 6 thick raised ribs, wrinkled transversely.

P. costata, *Miquel Fl. Ind. Bat. Suppl.* 402; *Hook. Ic. Pl.* t. 1703.

PERAK, *Scortechini, King's Collector.* MALACCA, *Griffith* (*Kew Distrib.* 5031). MAINGAY (*K. D.* 1442).—DISTRIB. Sumatra.

A tree, 30–70 ft., branchlets woody. *Leaves* 6–12 in., base contracted rounded or subcordate, above glabrous except sometimes the midrib, beneath more or less rusty-tomentose; nerves 15–20 pair, cross-nervules impressed above, much raised beneath; petiole $\frac{1}{8}$ to $\frac{1}{4}$ in.; stipules subulate. *Male spikes* 3–5 in., very stout and as well as the flowers densely brown velvety; flowers shorter than the bracts, solitary or clustered, sessile or shortly stoutly pedicelled, globose in bud, expanded about $\frac{1}{3}$ in. diam.; sepals broadly elliptic or oblong, leathery, glabrous within; stamens 100 or more, contorted in bud, glabrous. *Clusters* of *fem. fl.* $\frac{1}{2}$ in. diam., covered with lanceolate velvety bracts like those of the male; sepals about $\frac{1}{4}$ in. long. *Fruit* 1–$1\frac{1}{2}$ in. diam.; pericarp thin except at the thick wavy close-set ridges; endocarp thin. *Seeds* immature.—I refer this with little hesitation to Miquel's *Ptychopyxis*, of which its author had very imperfect specimens. It agrees in the foliage with his description and with a slight sketch made by Professor Oliver from the type specimen lent to Kew from Leyden, when the *Tiliaceæ* (to which the genus was doubtfully referred by Miquel) were being examined for the "Genera Plantarum."

58. **HOMONOIA,** *Lour.*

Rigid shrubs. *Leaves* alternate, narrow, or short and toothed, glandular-lepidote. *Flowers* in many- or few-fld. axillary spikes, or from the old wood, usually dicœcious, apetalous. *Disk* 0. MALE FL. *Calyx* globose, splitting into 3 valvate segments. *Stamens* numerous, in a dense globose head of branched filaments and anthers; anther-cells subglobose, divaricate, sessile on the filament, connective obscure. *Pistillode* 0. FEM FL. *Sepals* 5–8, narrow, unequal, imbricate, caducous. *Ovary* 3-celled; styles spreading, entire, papillose; cells 1-ovuled. *Capsule* small, of 3 smooth 2-valved cocci. *Seeds* ovoid, testa crustaceous, hard, with a thin fleshy coat, albumen fleshy; cotyledons broad, flat.—Species 3 or 4, Malayan.

1. **H. riparia,** *Lour. Fl. Coch.* 637; leaves linear-oblong or -lanceolate quite entire or serrulate towards the tip densely glandular beneath, spikes long slender. *Muell. Arg. in Linnæa* xxxiv. 200, and in *DC. Prodr.* xv. ii. 1023; *Brand. For. Fl.* 401; *Kurz For. Fl.* ii. 401; *Gamble Man. Ind. Timb.* 364; *Beddome Fl. Sylv.* t 212. Adelia neriifolia, *Roth Nov. Sp.* 375; *Roxb. Fl. Ind.* iii. 849; *Wight Ic.* t. 1808; *Grah. Cat. Bomb. Pl.* 185; *Dalz. & Gibs. Bomb. Fl.* 231. Ricinus salicinus, *Hassk. Pl. Jav. Rar.* 264. Spathiostemon salicinus, *Hassk. Hort. Bogor. Ed. Nov.* 41. S. javense, *Blume Bijd.* 622; *Thwaites Enum.* 273 (*not of Bl.*). Hematospermum salicinum, *Baill. Etudes Gen. Euphorb.* 293. H. neriifolium & riparium, *Wall. Cat.* 7953, 7955. Croton salicifolius, *Geisel. Croton. Monogr.* 6.

Rocky river banks. SIKKIM HIMALAYA, alt. 1-2000 ft., *J. D. H.* ASSAM and the KHASIA HILLS and southward to BURMA, TENASSERIM and the ANDAMAN ISLANDS, and BUNDELKUND, *Edgeworth.* DECCAN PENINSULA, from the Concan southward. CEYLON, common.—DISTRIB. Java.

A rigid evergreen shrub; branches terete and leaves beneath glabrous or pubescent. *Leaves* erect, $2\frac{1}{2}$–7 in., hard when dry and red-brown beneath, obtuse acute or acumi-

nate, base acute or rounded; nerves 10–30 pairs; petiole $\frac{1}{10}$–$\frac{1}{4}$ in. *Spikes* 2–5 in.; flowers quite sessile, males $\frac{1}{6}$ in. diam.; rachis pubescent; bracts acuminate. *Sepals* of male oblong, glabrous, of fem. ovate-lanceolate, pubescent. *Ovary* pubescent. *Capsule* $\frac{1}{3}$ in. diam., globose, tomentose, smooth or sparingly tubercled.

2. **H. retusa,** *Muell. Arg. in Linnæa* xxxiv. 200, and in *DC. Prodr.* xv. ii. 1022; leaves obovate or cuneate-obovate or oblanceolate entire or toothed towards the tip sparsely glandular beneath, spikes short stout. *Brandis For. Fl.* 445; *Grah. Cat. Bomb. Pl.* 185; *Dalz. & Gibs. Bomb. Fl.* 231; *Beddome Forester's Man.* 212. Adelia retusa, *Wight Ic.* t. 1869. A. cuneata, and Hæmatospermum cuneatum, *Wall. Cat.* 7954.

In river beds, DECCAN PENINSULA, from the Concan to the Nilghiris.

A small rigid glabrous shrub, with stout woody branches. *Leaves* 1–2 in., rigidly coriaceous, narrowed from above the middle to the acute base, tip rounded or retuse often mucronate; nerves 6–10 pairs; petiole very short. *Spikes* $\frac{1}{6}$–1 in., bracts subulate, rachis glabrous; flowers minute. *Sepals* of male glabrous, of fem. pubescent. *Capsules* $\frac{1}{10}$–$\frac{1}{6}$ in. diam., hoary.

59. **LASIOCOCCA,** *Hook. f.*

A small tree. *Leaves* alternate or subternately whorled, shortly petioled, narrow, quite entire, penninerved, eglandular. *Flowers* monœcious, apetalous; males in axillary racemes; fem. solitary, in the upper axils pedicelled. MALE FL. *Calyx* globose, splitting into 3 valvate concave segments. *Disk* 0. *Stamens* very many, in a dense globose head of branched filaments bearing many anthers; anther-cells globose, divaricate, connective arching over the top and sides of the cells. *Pistillode* 0. FEM. FL. *Sepals* 5–7, unequal, imbricate, glandular and pubescent, persistent and enlarged in fruit. *Ovary* 3-celled; styles 3, filiform, combined in a column below; cells 1-ovuled. *Capsule* of 3 cocci, densely clothed with rigid hispidly setose paleæ.

A remarkable genus, differing from *Homonoia* in the inflorescence, persistent fem. sepals enlarged in fruit, and the capsule densely clothed with rigid setose paleæ.

L. symphilliæfolia, *Hook. f. Ic. Plant.* t. 1587. Homonoya symphilliæfolia, *Kurz in Gamble Man. Ind. Timb.* 364.

SIKKIM TERAI, *Gamble* (and cult. in Calcutta Bot. Garden).

A moderate tree (*Gamble*). *Branchlets* terete with white bark; shoots pubescent. *Leaves* 3–6 by 1–1½ in., panduriformly lanceolate, acuminate, contracted above the narrow cordate base, smooth, glabrous, green when dry; nerves 8–10 pair, slender, arched; petiole $\frac{1}{10}$–$\frac{1}{4}$ in., pubescent. *Male racemes* pendulous, many-fld.; rachis pubescent; bracts rounded, concave, pubescent; flowers shortly pedicelled, $\frac{1}{4}$ in. diam., or smaller. *Sepals* orbicular, membranous, finely pubescent. *Stamens* effuse, anthers minute. *Fem. flowers* erect, on hispid glandular bracteolate pedicels $\frac{1}{3}$ in. long. *Sepals* irregularly placed, 2–3 inner much smaller than the others, outermost broadly ovate, the others ovate-lanceolate, all glandular on the back and with the margins with long simple and shorter gland-tipped hairs. *Disk* obscure or 0. *Ovary* subglobose, 3-lobed, pubescent; styles long, erect, connate below in a stout column, with three slender erect arms. *Capsule* (immature) ½ in. diam., depressed, seated on the enlarged spreading linear-oblong acuminate glandular sepals.—The native specimens are male, with flowers as described; the Calcutta Garden ones have much smaller male flowers.

60. **POLYDRAGMA,** *Hook. f.*

A shrub or small tree? *Leaves* alternate, elliptic-oblong or -oborate

cuspidately caudate or acuminate, penninerved, eglandular. *Flowers* small in axillary racemes, dicœcious, apetalous. *Disk* 0. MALE FL. globose in bud. *Sepals* 3, broad, concave, valvate. *Stamens* very many, filaments combined below in 6 bundles, each bundle branching out at the top into a globose mass of stipitate didymous anthers, connective arching over the top of both cells. *Pistillode* 0. FEM. FL. *Sepals* 5, unequal, lanceolate, erect. *Ovary* globose, granulate and hispid; styles 3, elongate, subulate, erect, papillose on the inner surface, ovules 1 in each cell. *Fruit*?

P. mallotiformis, *Hook. f.*

MALAY PENINSULA; Perak, *Scortechini.*

Branches slender, terete, woody, branchlets and racemes finely pubescent. *Leaves* 6–9 in., membranous, green when dry, base acute or cuneate; nerves 5–6 pairs, with a very short basal marginal pair, all and the midrib very slender, cross-nervules distant; petiole 1½–2 in., slender, hoary; stipules small, subulate. *Male racemes* spiciform, solitary but numerous, 1–3 in., erect; pedicels short, 3-bracteate; bracts minute, ovate, acute; buds ⅛ in. diam.; sepals membranous, nearly glabrous, obtuse, 3-nerved; filaments in 6 (rarely more) bundles, branching irregularly from below the middle; anthers innumerable, cells connate, connective forking at the top and arching over each cell but quite inconspicuous between them. *Fem. racemes* 3–4 in., slender, erect, lax-fld. to the base; pedicels ⅙–¼ in., 3-bracteolate at the base; sepals $\frac{1}{10}$ in., pubescent and ciliate; ovary covered with minute rounded tubercles and also sparsely hairy; styles about twice as long as the sepals.

60*. RICINUS, *Linn.*

A tall glabrous annual, sometimes shrubby or subarboreous. *Leaves* alternate, broad, palmately 7–many-lobed, serrate. *Flowers* large, in terminal subpanicled racemes, monœcious, apetalous, upper male crowded, lower female. *Disk* 0. MALE FL. *Calyx* membranous, splitting into 3–5 valvate segments. *Stamens* very many, filaments crowded variously connate or in branching clusters; anther-cells distinct, distant, subglobose, divergent. *Pistillode* 0. FEM. FL. *Calyx* spathaceous, caducous. *Ovary* 3-celled; styles short or long, spreading, often very large, entire 2-fid or 2-partite, feathery or papillose; cells 1-ovuled. *Capsule* of 3 2-valved cocci. *Seeds* oblong, testa crustaceous, albumen fleshy; cotyledons broad, flat.

R. communis, *Linn. Sp. Pl.* 1007; *Muell. Arg. in DC. Prodr.* xv. ii. 1017; *Roxb. Fl. Ind.* iii. 689; *Brand. For. Fl.* 445; *Kurz For. Fl.* ii. 400; *Grah. Cat. Bomb. Pl.* 183; *Dalz. & Gibs. Bomb. Fl. Suppl.* 78; *Gamble Man. Ind. Timb.* 363; *Sibth. Flor. Græc.* x. t. 952; *Hayne Arzneigew.* x. t. 48; *Schkuhr Handb.* t. 312; *Benth. & Trim. Med. Pl.* iv. t. 237; *Gærtn. Fruct.* t. 107; *Baill. Etudes Gen. Euphorb.* t. 10, 11; *Bot. Mag.* t. 2209. R. inermis, *Jacq. Ic. Rar.* i. t. 195. R. lividus, *Jacq. Ic. Rar.* i. t. 196; *Schkuhr Handb.* t. 312; *Reichb. Hort. Bot.* t. 153. R. speciosus, *Burm. Fl. Ind.* 307, t. 63, f. 2. R. spectabilis, *Blume Bijd.* 623. R. viridis, *Willd. Hort. Berol.* t. 49. Croton spinosus, *Linn. Sp. Pl.* 1005.—*Wall. Cat.* 7804.—*Rheede Hort. Mal.* ii. t. 32.

Cultivated throughout INDIA and naturalized near habitations.—DISTRIB. Tropics generally, probably indigenous in Africa.

An evergreen bush or small tree; shoots and panicles glaucous. *Leaves* green or reddish, 1–2 ft. diam., membranous, lobes from oblong to linear acute or acuminate, gland-serrated; petiole 4–12 in. *Racemes* stout, erect. *Male fl.* ½ in. diam.; fem.

calyx nearly as long; styles often highly coloured. *Capsule* ½–1 in. long, globosely oblong, smooth or echinate. *Seeds* oblong, smooth, mottled.

61. **ENDOSPERMUM,** *Benth.*

Trees. *Leaves* alternate, coriaceous, rounded, ovate-cordate, often subpeltate, entire, 3–5-plinerved. *Flowers* small, in axillary long simple spikes or racemes, dicœcious, apetalous; males clustered, subsessile on the rachis; fem. solitary in the bracts. MALE FL. *Calyx* globose, shortly unequally subvalvately 4-toothed. *Stamens* 6–10, on a convex or conic receptacle, filaments short; anthers didymous, equally 4-locellate and -valved. *Pistillode* 0, or minute. FEM. FL. *Calyx* 5-toothed. *Ovary* 2–3-celled; styles connate, forming a flat spreading entire or 3-lobed disk; cells 1-ovuled. *Fruit* globose or indehiscent 2–3-lobed, endocarp crustaceous, columella 0. *Seeds* globose, testa reticulately rugose; embryo ?—Species 3–4, Malayan and Chinese.

1. **E. malaccense,** *Muell. Arg. in Flora* xlvii. (1864), 469, and in *DC. Prodr.* xv. ii. 1132; leaves orbicular-ovate, obtuse or acute, above glabrous or puberulous, beneath hoary and studded with minute glands, base rounded or subcordate eglandular, fruit stellately hoary.

PENANG, PERAK, SINGAPORE and MALACCA, *Griffith*, &c.

A tree; branchlets stout, pubescent or furfuraceous. *Leaves* 4–6 in., coriaceous, pale grey when dry above, yellowish or pale brown beneath, base cuneate rounded or subcordate; nerves 3–4 pair above the basal strong as are the cross-nervules and reticulations; petiole 3–5 in. *Racemes* 3–4 in., slender, hoary, flower-clusters scattered; male fl. $\frac{1}{12}$ in., sessile; fem. pedicelled. *Fruit* ⅓ in. diam., globose or didymous, pericarp thin, wrinkled when dry, yellow, densely minutely glandular.

2. **E. perakense,** *King in Herb. Calcutt.*; nearly glabrous, leaves broadly ovate-cordate glabrous above, base eglandular, fruit viscid.

PERAK; at Larut, *King's Collector.*

A tree, 80 ft., resembling *E. malaccense*, but the branchlets are much more slender and quite glabrous, leaves smaller (3–5 in. long), peticle more slender, fruiting racemes shorter (3 in. long), quite glabrous, and fruit clothed with a viscid secretion.

3. **E. chinense ?** *Benth. Fl. Hongk.* 304; leaves broadly ovate obtuse base truncate with 2 large glands beneath at the insertion of the petiole.—*Wall. Cat.* 7846.

PERAK, *Scortechini.* SINGAPORE, *Wallich.*

The specimens are very imperfect, but agree with the Chinese plant in form and the large tumid yellow glands at the base of the leaf.—A similar plant is in the Kew Herbarium, from Palembang in Java. Wallich's specimens are in leaf only.

62. **GELONIUM,** *Roxb.*

Evergreen glabrous shrubs or small trees; branches with stipular lines at the nodes. *Leaves* alternate, rarely opposite, pellucid-punctate, entire or serrate; stipules connate, sheathing, caducous. *Flowers* small, in sessile or shortly pedicelled axillary clusters, dicœcious, apetalous. MALE FL. *Sepals* 5, orbicular, concave, imbricate. *Disk* obsolete. *Stamens* 10–60, crowded on a convex receptacle, filaments filiform; anthers oblong, dorsifixed; cells

parallel, introrse. *Pistillode* 0. FEM. FL. *Sepals* 5–6, narrower than in the males, imbricate. *Disk* cupular; rarely enlarged and bearing staminodes. *Ovary* 2–4-celled; styles minute, reniform, semi-lunate or 2-fid, depressed; cells 1-ovuled. *Fruit* globose, 3–4-gonous or 2–4-lobed, fleshy coriaceous or crustaceous, tardily dehiscent. *Seeds* subglobose, arillate, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 15, Tropical Asian and African.

1. **G. multiflorum,** *A. Juss. Tent. Euphorb.* iii. t. 10. f. 31 A; leaves 3–7 in. oblong or oblong-lanceolate obtuse acute or acuminate, male fl. $\frac{1}{3}$ in. diam., stamens 40–60, fruit $\frac{1}{2}$–$\frac{3}{4}$ in. diam. globose obscurely 3-lobed, pericarp very thick fleshy. *Muell. Arg. in DC. Prodr.* xv. ii. 1127; *Kurz For. Fl.* ii. 409. G. fasciculatum, *Roxb. Fl. Ind.* iii. 832; *Hook. Bot. Mag.* t. 3231. Suregada glabra, *Roxb. mss.* S. multiflora, *Baill. Etudes Gen. Euphorb.* 396. S. bilocularis, *Wall. Cat.* 7981 B (*in part*), C. Rottlera fasciculata & congesta, *Herb. Ham.*—*Wall. Cat.* 7980 B (*one sheet*) and 7982.

BENGAL and the CIRCARS, *Roxburgh*, and northward to the foot of SIKKIM HIMALAYA. *J. D. H.* From CHITTAGONG to TENASSERIM and MALACCA, UPPER and LOWER BURMA.—DISTRIB. Siam, China, Malay Islands.

A tree, 30–40 ft., quite glabrous. *Leaves* bright green, coriaceous, narrowed at the acute base; petiole very short. *Flowers* sometimes subracemose, yellow, odorous, males in clusters or peduncled cymes; receptacle glandular. *Styles* short, papillose, obcordate or 2-cleft with the arms 2-fid. *Fruit* rough, with a very thick pericarp enclosing 3 crustaceous 2-valved cocci. *Seeds* $\frac{1}{3}$ in. diam., subglobose, testa with broad shallow pits.—The minute styles are very variable, usually obcordate, but sometimes with short subulate papillose arms. In a cultivated specimen (Hort. Liverpool) the fem. disk is greatly enlarged and pitted and bearing a few slender filaments. This and the two following species are mixed in Wallich's Herbarium, where his 7981 A is *G. bifarium*; B consists of *multiflorum* (*Rottlera fasciculata* and *congesta*, Herb. Ham.), together with *G. lanceolatum* and *bifarium* (*Rottlera lanceolata* and *bifaria*, Herb. Ham.); C is *multiflorum*.

2. **G. lanceolatum,** *Willd. Sp. Pl.* iv. 832; leaves 3–5 in. from obovate-oblong to elliptic elliptic-lanceolate or oblanceolate obtuse acute or acuminate entire or more or less acutely serrate, male fl. $\frac{1}{6}$–$\frac{1}{4}$ in. diam., stamens 20–40, capsule $\frac{1}{3}$–$\frac{1}{2}$ in. diam. 3-lobed, cocci keeled. *Muell. Arg. in DC. Prodr.* xv. ii. 1127; *Roxb. Fl. Ind.* iii. 831; *Wight Ic.* t. 1867; *Wall. Cat.* 7983; *Beddome Forester's Man.* 214 (*excl. syn.*); *Gamble Man. Ind. Timb.* xxix.; *Thwaites Enum.* 274 (*excl. syn.*). G. bifarium, *Herb. Wight.* G. angustifolium, *Muell. l. c.* 1128. Suregada angustifolia, *Baill. Etudes Gen. Euphorb.* 396.

The DECCAN PENINSULA, *Heyne*; Naggur Hills, *Wight*; Cochin, *Johnson*. CEYLON; common, ascending to 4000 ft.

A small evergreen tree. *Leaves* extremely variable, usually much smaller than in *G. multiflorum*, and more often serrated, sometimes spinulosely so. *Flowers* smaller, sometimes in short racemes of which the rachis is covered with imbricating bracteoles. *Capsules* rough; cocci crustaceous. *Seeds* globose, $\frac{1}{6}$–$\frac{1}{8}$ in. diam., testa with large shallow pits.—Roxburgh, I think, describes under this the fruit of *G. multiflorum*. The varieties proposed by Mueller (*elliptica*, *lanceolata* and *spathulata*) all run into one another. The specific name is not very appropriate, truly lanceolate leaves being exceptional. Thwaites, under this species, says that he is disposed to refer all the Indian species to varieties of one.

3. **G. bifarium,** *Roxb. Fl. Ind.* iii. 830; leaves 5–6 in. elliptic-oblong or -lanceolate acute or acuminate, male fl. $\frac{1}{8}$–$\frac{1}{6}$ in. diam. in sessile fascicles,

stamens 12–20, capsule $\frac{1}{3}$ in. diam. deeply 2- rarely 3-lobed. *Muell. Arg. in DC. Prodr.* xv. ii. 1128; *Kurz For. Fl.* ii. 410. Suregada bilocularis, *Roxb., Wall. Cat.* 7981 A, B (*in part*). S. dicocca, *Roxb. mss.*—*Wall. Cat.* 7980 (*in part*).

Penang, *Wallich*, &c. Andaman Islands, *Kurz*. Perak, *Herb. Hort. Bot. Calc.*—Distrib. Malay Islands.

Habit and foliage of *G. multiflorum*, but the flowers are much smaller, always in sessile fascicles, longer pedicelled, and the capsule is like that of *G. lanceolatum*.—Specimens of this in the Kew Herbarium are named by Roxburgh *G. bifarium* and *Sarugada dicocca*, but whether it is the *G. bifarium* of that botanist's Flora Indica is rather doubtful; for he describes the latter (from garden specimens the locality of which he did not know) as having a fleshy yellow always 2-lobed capsule, of which fleshiness there is no sign in his specimens. Kurz describes the fruit as fleshy-coriaceous, the size of a large pea, rarely 3-coccous.

4. **G. glomerulatum,** *Hassk. Hort. Bogor.* 237; leaves 2–3 in. elliptic-oblong or -obovate shining tip rounded nerves faint, male flowers $\frac{1}{6}$ in. diam. very shortly pedicelled, stamens 20–40, capsule $\frac{1}{3}$ in. diam. globose 3-celled smooth. *Muell. Arg. in DC. Prodr.* xv. ii. 1128. G. obtusum, *Miquel Fl. Ind. Bat. Suppl.* 452. Erythrocarpus glomerulatus, *Blume Bijd.* 605. Suregada glomerulata, *Baill. Etudes Gen. Euphorb.* 396.

Malacca, *Griffith, Hervey*. Penang, *Curtis*. Perak, *Herb. Hort. Bot. Calc.*—Distrib. Malay and Philippine Islands.

A small robust much-branched species, distinguished by its small flowers, always round-topped very shining yellow leaves, very faint nerves, and globose capsules, which show no sign of dehiscence.—The Penang specimens are not in fruit, but I think they belong to this species.

63. CHÆTOCARPUS, *Thwaites.*

Shrubs or trees with the habit of *Glochidion*. *Leaves* alternate, quite entire, penninerved, coriaceous. *Flowers* small, in axillary clusters, dicœcious, apetalous. *Disk* entire or 4–10-lobed. Male fl. *Sepals* 4–5, imbricate. *Stamens* 5–20, filaments combined below in a slender column, spreading above; anthers oblong, dorsifixed, cells parallel. *Pistillode* crowning the staminal column, 3-fid, villous. Fem. fl. *Calyx* of the male. *Ovary* 3-celled; styles distinct, incurved, 2-partite; cells 1-ovuled. *Capsule* subglobose, of 3 echinate or tubercled 2-valved cocci, endocarp hard. *Seeds* ovoid or subglobose, caruncle large coloured 2-lobed, testa crustaceous black shining, albumen fleshy; cotyledons flat, broad.—Species about 8, Indian, Malayan and American.

1. **C. castanocarpus,** *Thwaites Enum.* 275; glabrous, leaves ovate or elliptic- or ovate-oblong acuminate polished, capsules subglobose or oblong densely clothed with long rigid bristles. *Muell. Arg. in DC. Prodr.* xv. ii. 1122 (*castaneæcarpus*); *Kurz For. Fl.* 409; *Gamble Man. Ind. Timb.* 366; *Beddome Fl. Sylvat.* t. 284, f. 1–10. C. pungens, *Thwaites in Hook. Journ. Bot.* vi. (1854) 301 (*in part*), t. 10 A, f. 2–4. Adelia castanicarpa, *Roxb. Fl. Ind.* iii. 848; *Wall. Cat.* 7984. Bradleia ? coriacea, *Wall. Cat.* 7872. Regnaldia myrtioides, *Baill. Adans.* i. 187. Casearia ? coriacea, *Wall. Cat.* 7196.—*Wall. Cat.* 7891, 7988.

From Silhet and Chittagong to Malacca, Penang and the Andaman Islands, *Roxburgh, Wallich*, &c. Ceylon, in the Ratnapoora and Ambagamowa districts.

An evergreen tree; branches and leaves quite glabrous. *Leaves* 2–8 in., coria-

ceous, dark brown when dry, base acute; nerves 8–12 pairs, arched, very slender; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., stout or rather slender; stipules obliquely oblong-lanceolate. *Flowers* $\frac{1}{8}$ in. diam., in globose clusters. *Sepals* rounded, concave. *Stamens* 8. *Capsule* $\frac{3}{4}$–1 in. long; bristles tawny yellow. *Seeds* black shining, caruncle 2-lobed fleshy crimson. Thwaites (Enum. l. c.) cites fig. 1 of the plate in the Journal of Botany as representing the male fl. of *C. castanocarpus*, but it appears to me to belong to *coriaceus*.

2. **C. pubescens,** *Hook. f.*; branches petioles and leaves beneath hirsutely tomentose, leaves very coriaceous oblong or linear-oblong acuminate opaque, capsules subglobose densely clothed with long rigid bristles. C. castanocarpus, *var.* pubescens, *Thwaites Enum.* 275.

CEYLON; at Pasdun Corle, *Thwaites.*

This, which is placed under *C. castanocarpus* by Thwaites, seems to me entirely different, in the much stouter and very hirsute branches and leaves beneath, the much larger very coriaceous leaves 8–10 by 3–4 in., and more minute sessile tomentose flowers, narrower sepals, and shorter tomentose staminal column.

3. **C. coriaceus,** *Thwaites Enum.* 275; glabrous, leaves very coriaceous elliptic acuminate at both ends, capsule ellipsoid tubercled. *Muell. Arg. in DC. Prodr.* xv. ii. 1122; *Beddome Forester's Man.* 214, and *Fl. Sylvat.* t. 284, f. 11–14. C. pungens, *Thwaites in Hook. Journ. Bot.* vi. (1854) 301 (*in part*), t. 10 A, f. 6–9.

CEYLON; with *C. castanocarpus.*

A moderate-sized tree. *Leaves* 3–6 in., base acute and produced on the very short stout petiole; nerves 5–7 pair, slender. *Flowers* tomentose. *Sepals* oblong. *Filaments* hairy. *Capsule* obscurely 6-angled, $\frac{3}{4}$ in. long, woody.

64. **BALIOSPERMUM,** *Blume.*

Erect shrubs. *Leaves* alternate, sinuate-toothed or lobed, penninerved or 3–5-plinerved at the 2-glandular base. *Flowers* small, monœcious or diœcious, panicled or racemed, apetalous. MALE FL. globose. *Sepals* 4-6, membranous, orbicular, concave, imbricate. *Disk* of 4–6 glands. *Stamens* 10–30, on a small receptacle, filaments free or a few connate; anthers terminal, cells adnate for their whole length to the broad connective (nearly free in *B. malayanum*), slits lateral, at first introrse. *Pistillode* 0 (or 3 in *B. malayanum*). FEM. FL. *Sepals* 5–6, lanceolate, entire or toothed, sometimes accrescent in fruit. *Disk* entire. *Ovary* 3-celled, styles rather long, stout, 2-fid or 2-partite, stigmatic surfaces smooth (not fimbriate); cells 1-ovuled. *Capsule* of 3 2-valved crustaceous cocci. *Seeds* ovoid, testa crustaceous, albumen fleshy; cotyledons flat, broad.—Species 6, Indian, one of them Malayan.

The smaller species a good deal resemble *Claoxylon*, but the anthers at once distinguish them. Kurz's *B. reidioides* (For. Fl. ii. 411), from Siam, belongs to a very different genus; it has 5 petals and 3 anthers crowning a column, which is seated in a cupular disk.

1. **B. axillare,** *Blume Bijd.* 604; monœcious, stem stout, leaves sinuate-toothed upper small lanceolate lower large oblong ovate or rounded entire or palmately 3–5-lobed 3–5-plinerved, flowers in numerous axillary racemes, fruiting calyx not accrescent, ovary densely strigose, capsule large, seeds oblong. B. polyandrum, *Wight Ic.* t. 1885; *Dalz. & Gibs. Bomb. Fl.* 232. B. indicum, *Dcne. in Jacquem. Voy. Bot.* 154, t. 155. B. Moritzianum, *Baill. Etudes Gen. Euphorb.* 395. B. angulare, *Dcne. mss.* (*fid. Baill.*).

B. montanum, *Muell. Arg. in DC. Prodr.* ii. 1125; *Kurz For. Fl.* ii. 410. Jatropha montana, *Willd. Sp. Pl.* iv. 563. Rottlera suffruticosa, *Wall. Cat.* 7743. Ricinus montanus, *Wall. Cat.* 7727. Croton polyandrus, *Roxb. Fl. Ind.* iii. 682. C. solanifolius, *Geisel. Monogr. Croton.* 74.—*Wall. Cat.* 7763.

TROPICAL and SUBTROPICAL HIMALAYA; from Kashmir, alt. 2–3000 ft., *Thomson*, to Bhotan, *Griffith*. From ASSAM and the KHASIA MTS. to CHITTAGONG, PEGU, TENASSERIM, BURMA and PENANG. DECCAN PENINSULA; from Behar and the Concan to Travancore (not recorded from Ceylon).—DISTRIB. Java, Siam.

A stout subherbaceous leafy shrub, 3–6 ft., branching from the root, nearly glabrous except the shoots and sometimes the leaves beneath. *Leaves*, upper 2–3 in., lower 6–12 in., and sometimes as broad, biglandular at the base, rigid, strongly veined, base acute obtuse or cordate; petiole stout, of upper leaves short, of lower sometimes as long as the blade; stipules of 2 glands. *Racemes* $\frac{1}{6}$ in., interrupted, all male or with a few fem. below; bracts small. *Male fl.* $\frac{1}{6}$ in. diam.; sepals 4–5, membranous, orbicular, concave. *Disk-glands* soft, lobulate; stamens 15–20; anthers broad, subreniform, cells subconfluent at the tips. *Fem. fl.* subsessile; sepals 5. ovate, acute, toothed; disk short, cupular, crenate; ovary 2–3-lobed; styles stout, smooth, deeply bifid, arms recurved. *Capsule* $\frac{1}{3}$–$\frac{1}{2}$ in. long, obovoidly 3-dymous; cocci oblong, crustaceous, sparsely strigose or glabrous. *Seeds* $\frac{1}{3}$ in. long, oblong, smooth, mottled.

2. **B. sinuatum,** *Muell. Arg. in Flora* xlvii. (1864) 470, and in *DC. Prodr.* xv. ii. 1125; dicœcious, stem stout, leaves shortly petioled linear or obovate-oblong sinuate-toothed acuminate often subpinnatifid lobed above the middle with spreading or recurved triangular acuminate lobes, male racemes narrow longer than the leaves, fruiting calyx accrescent, ovary glabrous.

UPPER ASSAM; Mishmi and Patkoye Hills, alt. 4000 ft., *Griffith* (*Kew Distrib.* 4740).

A shrub, 6 ft. *Leaves* 6–8 by $1\frac{1}{2}$–3 in., glabrous, base narrowed acute or rounded, 2-glandular, upper sessile, lower with petioles 1–2 in. *Racemes* interrupted; male fl. $\frac{1}{8}$ in. diam.; sepals and glands as in *B. axillare*; stamens 20; fem. sepals 5, ovate-lanceolate, unequal, glabrous; ovary smooth. *Fruit* not seen.

3. **B. calycinum,** *Muell. Arg. in Flora* xlvii. (1864) 470, and in *DC. Prodr.* xv. ii. 1126; dicœcious, branches petioles and panicles finely pubescent, leaves long-petioled oblong acuminate sinuate-toothed or serrate, male panicles longer than the leaves copiously branched, fruiting calyx accrescent, ovary strigose.

UPPER ASSAM; in the Mishmi Hills, *Griffith* (*Kew Distrib.* 4744).

Habit of *B. sinuatum*, branches reddish yellow when dry. *Leaves* 6–10 by $2\frac{1}{2}$–$3\frac{1}{2}$ in., glabrous except the finely pubescent nerves beneath; base acute or rounded, 2-glandular or 2-auriculate; petiole 2–4 in. *Male panicles* erect, long-peduncled, with slender erect alternate and fascicled branches; bracts minute or 0; male fl. $\frac{1}{6}$ in. diam.; sepals orbicular, concave, membranous; disk-glands fleshy; stamens 20, filaments sometimes connate. *Fem. panicles* shorter, corymbiform, with short fewer-fld. branches and leafy bracts; flowers $\frac{1}{4}$ in. diam., stoutly pedicelled; sepals 5, linear-lanceolate, $\frac{1}{2}$ in. long in fruit. *Capsule* 1–3 in diam., of 3 globose cocci.

4. **B. micranthum,** *Muell. Arg. in Linnæa* xxxiv. 215, and in *DC. Prodr.* xv. ii. 1126; dicœcious, branches slender and petioles and racemes finely pubescent, leaves long-petioled membranous oblong or lanceolate acuminate sinuate-toothed, male panicles contracted very slender equalling or exceeding the leaves, fruiting calyx small, ovary glabrous.—*Wall. Cat.* 7715 A.

KHASIA MTS., alt. 3–4000 ft., *Wallich, Griffith, &c.*

A slender bush. *Leaves* 4–8 by 1–2½ in., pale green when dry, base acute or rounded, 2-glandular; nerves 15–20 pairs, very slender; petiole 1–3 in. *Male panicles* sometimes 1 ft., and glabrous; flowers $\frac{1}{10}$ in. diam., on capillary pedicels; sepals orbicular, hyaline; disk-glands fleshy; stamens about 16. *Fem. panicles* shorter, simpler, much fewer-fld.; flowers $\frac{1}{6}$ in. diam., longer and stouter pedicelled; fruiting pedicels often 1–1½ in.; sepals 5, ovate-lanceolate. *Capsule* subglobose, $\frac{1}{3}$ in. diam., 3-dymous, smooth.

5. **B. corymbiferum,** *Hook. f.*; dicœcious, branches finely pubescent, leaves long-petioled membranous elliptic-oblong acuminate sinuate-serrate or subentire, male panicles very long peduncled, flowers in short corymbiform clusters.

EASTERN NEPAL and SIKKIM; alt. 4–5000 ft., *J. D. H., Clarke, King.*

Stem 6–8 ft., slender, naked, simple or sparingly branched. *Leaves* 6–8 by 2½–3½ in.; base rounded, 2-glandular; costa pubescent; nerves 8–10 pairs; petiole 1–3 in., slender. *Male panicles* much longer than the leaves; peduncle very long, naked; corymbose clusters ½–¾ in., 6–10-fld.; flowers $\frac{1}{6}$ in. diam., pedicelled; sepals 5–6, membranous; disk-glands fleshy; stamens about 20, filaments sometimes connate. *Fruit* unknown.

6. **B. malayanum,** *Hook. f.*; dicœcious, leaves long-petioled elliptic-oblong rounded at both ends entire or sinuate-toothed penninerved, male flowers monœcious minute in pubescent axillary and terminal panicles, sepals 5 rounded toothed, stamens 10, anthers hispid, pistillodes 3.

MALACCA, *Maingay* (*Kew Distrib.* 1455).—DISTRIB. Borneo.

Branches woody, black when dry. *Leaves* 3–5 by 2–2½ in., coriaceous, brown when dry; nerves 6–8 pair, sometimes obtuse, often glandular; petiole 1–1½ in.; stipules of large glands. *Panicles* much shorter than the leaves, contracted; bracts minute, subulate; male flowers $\frac{1}{16}$ in. diam., very shortly pedicelled. *Sepals* rounded. *Disk-glands* rounded, villous. *Stamens* on a convex villous receptacle; filaments short, subulate; anther-cells oblong, free except at the top where they meet on the connective. *Pistillodes* subulate, villous.—Perhaps a distinct genus, differing from the other described species of *Baliospermum* in the fewer stamens, convex receptacle, discrete anther-cells, and pistillodes. The female fl. and fruit are unknown.

EXCLUDED SPECIES.

BALIOSPERMUM, *Griffith*, Mishmi Mts., alt. 5–5500 ft. (*Kew Distrib.* 4741); a small tree, leaves 6–8 by 2½–3½ in., thin, elliptic-oblong, cuspidately acuminate, quite entire, base triple-nerved, petiole 2–3 in.; male fl. minute, on slender axillary pubescent panicles, shortly pedicelled; calyx subturbinate with 4 short rounded ciliolate lobes; petiole 0; anthers 4 half exserted subsessile round a clavate pistillode, cells oblong, erect, united at the base only.—No doubt an undescribed genus, but without fem. fl. or fruit I hesitate to name it. The habit is somewhat that of a *Baliospermum*, but the male fl. are widely different.

65. EPIPRINUS, *Griff.*

A small tree or shrub. *Leaves* alternate, large, long-petioled, entire, penninerved; floral crowded, subsessile. *Flowers* in stout axillary spiciform androgynous racemes, apetalous; males crowded, subsessile; fem. in the lower part, scattered. MALE FL. *Calyx* globose, membranous, valvately 2–4-lobed. *Stamens* 5–15, filaments free, tips slender abruptly inflexed; anthers large, oblong, dorsifixed, erect in bud, cells parallel. *Pistillode* thick, 3-lobed. FEM. FL. on pedicels greatly thickening and lengthening after flowering. *Sepals* 5–6, enlarged in fruit, lanceolate, alternating with

as many minute naked or 2-glandular thick scales (or involucral bracts). *Ovary* short, 3-celled; styles 3, connate in a long stout column, tips spreading 2-fid. and subpalmately lobed; ovules 1 in each cell. *Capsule* large, of 2–3-subglobose 2-valved cocci. *Seeds* subglobose, testa crustaceous.

E. malayanus, *Griff. Notul.* iv. 487; *Muell. Arg. in DC. Prodr.* xv. ii. 1024.

MALACCA, *Griffith* (*Kew Distrib.* 4787), *Maingay* (*K. D.* 1393). PERAK, *Scortechini, King's Collector.*

A shrub or tree, sometimes 30 ft.; branchlets very stout, puberulous. *Leaves* 8–14 by 4–6 in., thinly coriaceous, smooth, greenish or brownish when dry, oblong-ovate, long-acuminate, base obtuse or cordate; nerves 9–12 pair, slender but much raised, as are the nervules; petiole 3–5 in., terete, tip swollen; stipules not seen. *Racemes* 2–6 in., simple or branched below, hoary-tomentose; rachis very stout; bracts small. *Male* sepals rounded, glabrous within. *Ovary* deeply 3-lobed and stout style densely stellate-tomentose. *Capsule* 1 in. diam., hoary, valves woody; pedicel stout, 1–1½ in. long; fruiting sepals 1½–2 in. long, pubescent on both surfaces, midrib and nerves strong. *Seeds* ⅔ in. diam.

66. **PLUKENETIA,** *Linn.*

Twining shrubs or undershrubs. *Leaves* alternate, often cordate, 3–5-plinerved, entire or toothed. *Flowers* in axillary lateral or leaf-opposed androgynous racemes, apetalous; males usually minute, fascicled; females lower on the raceme. *Disk* 0. MALE FL. *Sepals* 4–5, valvate. *Stamens* 8–30, on a prominent receptacle, filaments short free; anthers erect, cells globose or didymous, parallel or diverging. *Pistillode* 0, or filiform, capitellate. FEM. FL. *Sepals* imbricate. *Ovary* 3–4-celled; styles connate in a fleshy globose mass or cylindric toothed or lobed column; cells 1-ovuled. *Capsule* subglobose or depressed, dry or fleshy, of 3–4 2-valved cocci. *Seeds* globose, sometimes 3-ribbed on one side, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 12, tropical, chiefly American.

P. corniculata, *Smith in Nov. Act. Upsal.* vi. 4; nearly glabrous, leaves oblong from a truncately cordate base caudate-acuminate toothed, sepals 5, stamens 8, ovary 4-celled, style column obovoid, capsule greatly depressed of 4 stellately spreading granulate cocci, each produced outwards into a vertical green linear obtuse wing. *Muell. Arg. in DC. Prodr.* xv. ii. 773. Pterococcus glaberrimus, *Hassk. in Flora* 1842, *Beibl.* ii. 41. Hedraiostylus corniculatus, *Hassk. Cat. Hort. Bogor.* 234. Sajorium corniculatum, *Baill. Etudes Gen. Euphorb.* 484.

SIKKIM HIMALAYA, alt. 2000 ft., *Clarke.* UPPER ASSAM, *Jenkins, Griffith.* TENASSERIM and MALACCA, *Griffith* (*Kew Distrib.* 4716).—DISTRIB. Java.

Stem slender, tips of shoots and often the petioles appressed puberulous. *Leaves* 3–8 in., membranous; petiole 1–3 in., 2-glandular at the apex. *Male* racemes 1–1½ in., very slender, glabrous; bracts lanceolate, 3-fld., shorter than the pedicels; calyx globose, $\frac{1}{60}$ in. diam. *Fem. fl.* ⅛ in. diam.; sepals lanceolate. *Capsule* 1½ in. diam., crown nearly flat, wings nearly as long as the nucleus. *Seeds* ⅓–½ in. diam., turgidly lenticular with a sharp keel all round; testa crustaceous, pale, mottled with brown.

67. **TRAGIA,** *Linn.*

Perennial, usually climbing or twining herbs, hispid with stinging hairs. *Leaves* alternate, simple or palmately 3-lobed, serrate, base often cordate, 3–5-plinerved. *Flowers* monœcious in terminal axillary and leaf-opposed

androgynous racemes, apetalous; males superior in the raceme; fem. few, inferior. MALE FL. *Calyx* globose or obovoid, valvately 3–5-partite. *Disk* 0, or obscure. *Stamens* 1–3, rarely many, filaments free or connate; anthers ovate or oblong, cells contiguous parallel. *Pistillode* 0, or minute. FEM. FL. *Sepals* 6 (rarely more or fewer), imbricate, entire or pinnatifid, often enlarged hardening and stellately spreading in fruit. *Ovary* 3-celled; styles united below in a column, then free spreading and entire; cells 1-ovuled. *Capsule* of 3 2-valved cocci, endocarp crustaceous. *Seeds* globose, estrophiolate, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 50, chiefly tropical.

1. **T. involucrata,** *Linn. Sp. Pl.* 980; more or less pubescent hispid or tomentose and with scattered stinging bristles, rarely almost glabrous, leaves from linear-oblong to broadly ovate-cordate acuminate serrate, and from entire to deeply 3-fid or tripartite with irregularly serrate or subpinnatifid lobes, racemes hispid or glabrous, fruiting sepals rigid stellately spreading oblong pinnatifid rarely subentire, ovary hispid, seeds mottled with a broad tumid chalaza. *Muell. Arg. in DC. Prodr.* xv. ii. 943. *Kurz For. Fl.* ii. 398; *Grah. Cat. Bomb. Pl.* 186; *Dalz. & Gibs. Bomb. Fl.* 228.

Throughout INDIA, from the Panjab and lower Himalaya of Kumaon, eastward to Assam and southward to BURMA, TRAVANCORE and CEYLON.—DISTRIB. China.

An evergreen twiner. *Leaves* 1–4 in., membranous, protean in form and indumentum; petiole long or short. *Racemes* 1–2 in., slender; bracts small or minute. *Male fl.* minute, shortly pedicelled; sepals and stamens 3; pistillode 3-fid. *Fem. fl.* strigosely hispid, fruiting $\frac{3}{4}$ in. diam. *Style-column* very variable in length. *Capsule* $\frac{1}{3}$ in. diam., hispid or strigosely tomentose or nearly glabrous. *Seeds* obscurely hoary. —It is impossible to define the varieties of this most variable plant. The following are the principal forms.

T. INVOLUCRATA PROPER; coarsely strigosely hispid, leaves ovate or lanceolate acuminate coarsely toothed or serrate. *Var.* α. Rheediana, δ. genuina, and γ. hispida, *Muell. l. c.* T. hispida, *Willd. Sp. Pl.* iv. 323.—*Burm. Fl. Zeyl.* 202, t. 92; *Rheede Hort. Mal.* ii. t. 39; *Wall. Cat.* 7791 B, C, D.

Var. *cordata*, Muell. l. c.; leaves (often broadly) ovate-cordate coarsely serrate cuspidately acuminate. T. cordata, *Heyne in Wall. Cat.* 7791 A. *Var.* montana, *Thwaites Enum.* 270. T. montana, *Muell. Arg. l. c.* 904.

Var. *angustifolia*; leaves narrowly linear- or oblong-lanceolate base contracted cordate.

Var. *cannabina*; leaves all palmately 3-partite with narrow toothed or pinnatifid lobes. *Var.* ε. intermedia and ζ. cannabina, *Muell. Arg. l. c.* T. cannabina, *Linn. Suppl.* 415; *A. Juss. Tent. Euphorb.* t. 15, 49 B; *Wall. Cat.* 7715. T. hispida, *Herb. Russell.* Croton hastatus & urens, *Linn. Syst. Ed.* 13, 722.

2. **T. bicolor,** *Miquel in Linnæa* (1853) 22, and *Plant. Hohenack.* No. 1552; branches villously hirsute, leaves shortly petioled ovate-cordate acuminate serrate tomentose on both surfaces, racemes rather stout, bracts very long lanceolate, fem. sepals strigose entire, capsule tomentose and setose. T. Miqueliana, *var.* bicolor, *Muell. Arg. in DC. Prodr.* xv. ii. 943 (*excl. Metz.* No. 755).

NILGHIRI HILLS, *Wight*, &c.; at Conoor, alt. 5000 ft., *Clarke*.

Resembles some tomentose forms of *T. involucrata*, but the bracts of the racemes are fully $\frac{1}{8}$ in. long, the flowers larger, the fruiting calyx much smaller, $\frac{1}{2}$ in. diam., the sepals entire, hirsute within, and wanting the rigid woody midrib. It is a mountain plant, often but not always pulverously or rustily villous when dry.—Mueller's *T. Miqueliana* var. *bicolor* consists of this, and of Hohenacker's No. 755, which is a native of Canara (not as Mueller supposes, the Nilghiris), and which is *T. involucrata*.

3. **T. burmanica,** *Kurz For. Fl.* ii. 399; nearly glabrous, leaves broadly ovate abruptly acuminate subserrate base sinuate-cordate, fruiting sepals broadly ovate acute, stigma appressed to the hirsute woody capsules.

MARTABAN; east of Tounghoo, in forests, *Kurz.*

A large twining shrub, young parts appressed puberulous. *Leaves* 2–5 in., sparsely setose above; petiole 1–3 in. *Racemes* 2–6 in., puberulous. *Fruiting sepals* nearly 1 in. long, leafy. *Capsule* of 3 cocci each as large as a pea. *Seeds* velvety, mottled.

68. **CNESMONE,** *Blume.*

A climbing villous shrub. *Leaves* alternate, oblong from a broadly cordate base, toothed, 3–5-nerved and penninerved; stipules broad, persistent. *Flowers* monœcious, in terminal or leaf-opposed androgynous racemes, apetalous; upper male, lower fem. 2-bracteolate. *Disk* 0. MALE FL. *Calyx* globose, valvately splitting in 3 broad lobes. *Stamens* 3, alternate with the lobes, hardly exserted, filaments stout free; anthers dorsifixed, connective thick produced into a reflexed lamina, cells separate subparallel. *Pistillode* obscure or 0. FEM. FL. *Sepals* 3, enlarging in fruit. *Ovary* short, 3-celled, strigose; styles or stigmatic lobes 3, fleshy, united at the base in a fleshy mass, incurved, fimbriate within; cells 1-ovuled. *Seeds* globose, testa crustaceous with a fleshy coat, albumen fleshy; cotyledons broad, flat.

C. javanica, *Blume Bijd.* 630 (*by misprint* CNESMOSA); *Muell. in DC. Prodr.* xv. ii. 926; *Kurz For. Fl.* ii. 399; *Baill. Etudes Gen. Euphorb.* 458, t. 4, f. 14–17. Tragia hastata, *Reinwdt. in Hassk. Pl. Rar.* 245. T. rugosa, *Wall. Cat.* 7794. T. macrophylla, *Wall. Cat.* 7793.—*Wall. Cat.* 7788.

SILHET, *Wallich.* KHASIA MTS., *J. D. H. & T. T.* MISHMI HILLS, in UPPER ASSAM, *Griffith.* BENGAL; at Dacca, *Clarke.* MALAY PENINSULA and BURMA, from Pegu to Malacca and Penang, *Wallich,* &c.—DISTRIB. Java, Sumatra.

Evergreen, densely villously tomentose; branches stout. *Leaves* 3–5 in., oblong or obovate-cordate, acuminate, tomentose on both surfaces; nerves 4–5 pair above the basal, nervules reticulate; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in., stout; stipules broadly ovate, acute. *Racemes* pubescent or tomentose, 1 in. long; bracts deciduous; male fl. $\frac{1}{4}$ in. diam., pedicelled; fem. larger, subsessile; sepals velvety, broad, $\frac{1}{3}$–$\frac{1}{2}$ in. long, fruiting as long as the capsule, rhomboid-ovate, entire or crenate. *Capsule* hispid, of 3 cocci each as large as a small pea. *Cocci* velvety. *Seeds* with a mottled testa.

69. **MEGISTOSTIGMA,** *Hook. f.*

A nearly glabrous twiner. *Leaves* alternate, petioled, elliptic, cuspidately acuminate, quite entire, triple-nerved. *Flowers* monœcious, in small axillary unisexual racemes, apetalous; males minute, fem. small. MALE FL. *Calyx* ovoid, 3-lobed to below the middle; tube obconic, lined with a thickened disk; lobes ovate, obtuse, valvate. *Stamens* 3, erect in the centre of the flower, filaments short thick; anthers triangular-ovate, obtuse, base introduced; cells narrow, adnate to the face of the thick connective, slits introrse. *Pistillode* 0. FEM. FL. *Calyx* of 5 linear-lanceolate sepals, rather enlarged in fruit. *Disk* 0. *Ovary* tridymous, depressed, densely hirsute, 3-celled; style column very large, globose, contracted at the base, fleshy, smooth, 3-lobed to the middle, lobes rounded connivent; cells 1-ovuled. *Capsule* depressed, tridymous, appressed-pubescent, of 3 2-valved woody cocci. *Seeds* globose, testa mottled.

M. malaccense, *Hook. f. Ic. Plant.* t. 1592.

MALACCA, *Maingay* (*Kew Distrib.* 1423). SINGAPORE, *Lobb.*

Stem about as thick as a crow-quill, terete, smooth, pubescent, as are the petioles young leaves and racemes. *Leaves* 4–6 by 2–2½ in., thinly coriaceous, base subacute or rounded, pale greenish when dry, nerves 2–3 pair above the basal, transverse nervules slender; petiole ½–1 in., slender. *Racemes*, male 1–3 in., very slender, fem. shorter stouter; bracts minute; male fl. $\frac{1}{30}$ in. long, fem. $\frac{1}{6}$ in. *Calyx* of male sparsely hairy, of the female more hairy; anthers broadly trigonous in section, with the angle on the inner face, so that all three anthers meet by their adjacent faces. *Styles* united in a globose 3-fid mass much larger than the body of the ovary, on which it is sessile; lobes smooth within, not papillose. *Capsule* ½–¾ in. diam.—Allied to *Sphærostylis*, Baill., of Madagascar, which differs in the stamens.

70. DALECHAMPIA, *Linn.*

Shrubs or undershrubs, often twining. *Leaves* alternate, entire or 3–5-lobed or -foliolate, usually 3–7-plinerved. *Flowers* monœcious, apetalous, in axillary androgynous sessile or peduncled racemes or heads, often mixed with sterile deformed flowers, involucrate; involucre of two often large and coloured entire or 3-fid bracts, with a whorl of small outer ones at their base; upper or inner floral bracts male, 3- or more-fld., lower or outer female. *Disk* 0. MALE FL. *Sepals* 4–6, membranous, valvate. *Stamens* 20–30, on a convex receptacle, filaments free or connate; anthers erect, often didymous, cells contiguous, parallel. *Pistillode* 0. FEM. FL. *Sepals* 5–12, usually pinnatifidly fimbriate or lacerate, imbricate. *Ovary* 3–4-celled; styles connate in a fleshy slender or stout column, with an obtuse dilated or lobed stigma; cells 1-ovuled. *Capsule* deeply lobed, splitting into 3–4 2-valved cocci, endocarp hardened. *Seeds* globose or ellipsoid, estrophiolate, albumen fleshy; cotyledons broad, flat.—Species about 60, all tropical, chiefly American.

1. **D. indica,** *Wight Ic.* t. 1882; leaves 3-foliolate, leaflets serrate, bracts acutely 3-lobed, toothed, floral bracts 3-lobed, fem. sepals pinnatifidly laciniate segments subulate tips glandular. *Muell. Arg. in DC. Prodr.* xv. ii. 1241. D. coromandeliana, *Heyne in Wall. Cat.* 7798. D. bidentata, *Thwaites Enum.* 270 (*excl. syn.*). D. ternata, *a.* zeylanica, *Muell. Arg. l. c.*

DECCAN PENINSULA; Coromandel, *Heyne*; Dindygul Hills, *Wight.* CEYLON, at Gonagama, *Thwaites.*

A slender twiner, finely pubescent except on the leaves above. *Leaflets* 2–3 in., membranous, very shortly petiolulate, acuminate, terminal elliptic ovate, lateral with the outer base enlarged rounded and sometimes lobulate; petiole ½–3 in., very slender; stipules and stipellæ lanceolate. *Involucral bracts* 1 in. and less, yellow. *Flowers* surrounded by many broad fleshy scales (deformed flowers). *Sepals* of fem. 8–12, slender, rigid, ciliate. *Ovary* pubescent; style slender, stigma subcupular. *Capsule* ⅓ in. diam. *Seeds* globose, mottled.—I can find no difference between the Ceylon and Deccan plant. Mueller puts *indica* into a section with petiolulate leaflets, and *ternata* into another with sessile ones, but the Ceylon specimens have the longest petiolules.

2. **D. velutina,** *Wight Ic.* t. 1881; leaves deeply 3-lobed tomentose beneath, lobes ovate-oblong serrate, the lateral spreading, peduncle shorter than the leaves, involucral bracts 3-fid ovate-cordate serrulate, fem. bracts entire, sepals of fem. 8–10 pinnatifid hirsute. D. scandens, *var.* ζ. velutina, *Muell. Arg. in DC. Prodr.* xv. ii. 1245.

NILGHIRI HILLS, *Wight, Gardner*; at Conoor, alt. 5000 ft., *Clarke.*

An evergreen twiner; shoots pubescent. *Leaves* 2–4 in., base cordate 3–5-plinerved, segments lanceolate; petiole 1–2 in. *Peduncle* spuriously axillary, 2–3 in., puberulous.—I do not venture to follow Mueller in regarding this plant, which is confined to considerable elevations in the Nilghiri Hills, as the same with the *D. scandens*, which is found nowhere out of South America. Specimens in fruit are wanted to confirm such an identification.

3. **D. Kurzii,** *Hook. f.*; leaves 3-lobed to or below the middle sparsely pubescent beneath, lobes lanceolate subserrate lateral erect, peduncles equalling the leaves, involucral bracts 3-lobed entire, sepals of fem. 8–10 filiform hispid pinnatifid segments filiform. D. scandens, *Kurz For. Fl.* 400 (*not of Linn.*).

RANGOON; at Pegu, *M'Clelland, Kurz.* TENASSERIM; at Moulmain, *Lobb.*

Stems and *petioles* sparsely softly hairy. *Leaves* 4–5 in., base cordate, lobes acuminate; petiole shorter than the blade; stipules oblong-lanceolate. *Peduncles* 3–5 in.; involucral bracts like the leaves, with narrow or broad lobes. *Male sepals* 4; fem. 5–8. *Ovary* scabrid, style ½ in. long. *Fruiting calyx* 1 in. diam. *Capsule* of 4 globose cocci. *Seeds* globose, mottled.

71. PIMELEODENDRON, *Hassk.*

Glabrous trees or shrubs. *Leaves* alternate, crowded at the ends of the branches, quite entire, coriaceous, penninerved; petioles very unequal, tumid at the top. *Flowers* in simple or branched lateral and very short axillary racemes, dicœcious ?, apetalous; pedicels rigid; bracts caducous. MALE FL. *Calyx* saucer-shaped, of 2 very short broad coriaceous compressed and appressed imbricating lobes. *Disk* 0. *Stamens* 12–15, in one series within the margin of the perianth, filaments short, fleshy; anthers terminal, broad, truncate; cells adnate, widely diverging, extrorse. *Pistillode* 0. FEM. FL. and fruit unknown.—Species 2 or 3, Malayan.

P. Griffithianus, *Benth. in Gen. Plant.* iii. 331; glabrous, leaves long-petioled elliptic-ovate .caudate-acuminate sinuate-serrate, base acute. Stomatocalyx Griffithianus, *Muell. Arg. in DC. Prodr.* xv. ii. 1142 *in part.*

MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1400).

Branches robust, woody. *Leaves* 3–5 in., dark brown when dry, nerves 4–5 pairs arched; petiole ½–2 in., very slender, terete, swollen at the top. *Racemes* solitary or crowded, black when dry, ½–¾ in., rachis and pedicels very stout; bracts, small, broad, obtuse. *Perianth* ¼ in. diam., coriaceous or fleshy, lips very short. *Stamens* shorter than the calyx-lobes.—Bentham rightly points out that the Bornean plant of Barber (also Beccari, No. 293) is a different species; it has more obovate and more obtuse entire leaves with more nerves.

71*. HOMALANTHUS, *A. Juss.*

Glabrous trees or shrubs. *Leaves* alternate, broad, entire, often glaucous or hoary beneath, penninerved; stipules deciduous. *Flowers* small, monœcious, in terminal androgynous racemes, apetalous; males many in each bract; fem. at the base of the raceme, few or solitary in each bract, or solitary at the ends of the branches. *Disk* 0. MALE FL. *Calyx* short, compressed, of two flat appressed sepals. *Stamens* 6–50, rarely fewer, filaments very short; anthers exserted, cells short divaricate 2-valved at the top. *Pistillode* 0. FEM. FL. *Calyx* terete, 2–3-fid. *Ovary* 2–3-celled;

styles linear, divergent, entire; ovules 1 in each cell. *Capsule* didymous, fleshy, indehiscent or tardily splitting into 2 2-valved cocci. *Seeds* ovoid, with a fleshy aril, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 7–8, Malayan, Pacific and Australian.

H. POPULIFOLIUS, *Graĥ. in New Edinb. Journ. Sc.* 1827, and in *Bot. Mag.* t. 2780 (Omalanthus); leaves broadly rhombic- or triangular-ovate acuminate, bracts 3–6-fld. very short broadly toothed, male sepals subequal base dilated 2-glandular, stamens 6–10. Carumbium populneum, *Muell. Arg. in DC. Prodr.* xv. ii. 1144. C. populifolium, *Reinw. in Blume Cat. Hort. Bogor.* 105, *ex Miquel Fl. Ind. Bat.* i. ii. 414; *Benth. Fl. Austral.* vi. 150. Omalanthus Leschenaultianus, *A. Juss. Tent. Euph.* 50, t. 16, f. 53.—*Wall. Cat.* 7972 G.

PENANG, *Wallich.* CEYLON, *Dahl* (*Muell. Arg. l. c.*).—DISTRIB. Malay and Pacific Islands, Australia.

A small tree. *Leaves* 2–4 in., membranous, penninerved, more or less glaucous and often reddish beneath; petiole as long, very slender; stipules ½–1 in., lanceolate. *Racemes* 1–4 in. *Flowers* $\frac{1}{12}$ in. diam. *Calyx-lobes* unequal. *Stamens* 6, or fewer. *Capsule* ¼–3 in. diam., glaucous, didymous, tardily dehiscing. *Seeds* half enveloped in the aril.—The only Indian specimen that I have seen is one sheet (♀) of Wallich's Herbarium from Penang, under *Stillingia sebifera*. It may be introduced into that island; and yet so common a Malayan plant may be expected to occur in British India. The Ceylon habitat is probably an erroneous one.

72. **SAPIUM,** *P. Br.*

Trees and shrubs. *Leaves* alternate, entire, serrate or toothed, penninerved; petiole often 2-glandular at the top. *Flowers* in terminal simple or panicled spikes or racemes, monœcious (always?), apetalous; males several in each bract; females in the lower part of the spike, or in separate spikes, solitary in the bracts. *Disk* 0. MALE FL. *Calyx* membranous, shortly 2–3-lobed or toothed, or split to the base into 2–3 valvate sepals. *Stamens* 2–3, filaments free; anther-cells ovoid, distinct, contiguous, parallel. *Pistillode* 0. FEM. FL. *Calyx* 3-fid or -partite. *Ovary* 2–3-celled; styles free or connate at the base, spreading and recurved, undivided, cells 1-ovuled. *Capsule* crustaceous, fleshy or pulpy, rarely woody, at length loculicidally (not elastically) 3-valved. *Seeds* globose, estrophiolate, usually long-persistent on the columella, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species 25, all tropical.

Sect. I. TRIADICA. *Spikes* androgynous. *Fruit* baccate or cocci deciduous from a broadly 3-winged persistent columella.

1. **S. discolor,** *Muell. Arg. in Linnæa* xxxii. 121; branchlets and leaves beneath glaucous, leaves long-petioled elliptic acute or acuminate quite entire glaucous beneath, racemes simple terminal solitary, fruit globose capsular. Stillingia discolor, *Champ. in Hook. Kew Journ. Bot.* vi. (1854) 1; *Benth. Fl. Hongk.* 303. Excœcaria discolor. *Muell. in DC. Prodr.* xv. ii. 1210.

MALACCA, *Griffith.* SINGAPORE, *Maingay.*—DISTRIB. China.

A glabrous glaucous shrub or small tree. *Leaves* 2–2½ in., base acute; nerves 10–12 pair, very faint, nearly transverse; petiole ½–1 in., very slender, 1–2-glandular at the tip. *Spikes* 1–2½ in., dense-fld. as in *S. sebiferum*. *Styles* very short, pointed on the top of the ovary. *Capsule* ½ in., globose.

2. **S. eugeniæfolium,** *Ham. in Wall. Cat.* 7970; branchlets glaucous, leaves long-petioled ovate or elliptic acute or subacute quite entire not glaucous beneath, racemes simple terminal solitary, fruit capsular obtuse. S. Hookeri, *Herb. Hort. Bot. Calcutt.*

TROPICAL HIMALAYA; from Kumaon, alt. 3–4000 ft., *Duthie,* to Sikkim, *King.* ASSAM; at Goyalpara, *Hamilton.* KHASIA MTS., alt. 4000 ft., *J. D. H. & T. T.*

A glabrous glaucous tree. *Leaves* 3–4 in., base acute; nerves 6–10 pairs, very slender, arched; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ in., very slender, 2-glandular at or below the tip (the glands are rarely on the blade itself). *Spikes* 3–4 in., dense-fld. *Styles* jointed on to the top of the ovary. *Capsules* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., globose, wings of columella thick, horned at the outer angle; cocci very thick, woody. *Seeds* globose.—Perhaps not distinct from *S. discolor.* The ticket attached to Wallich's 7965 D, from "Sirmore, ?? W. S. Webb, ?" is probably intended for this plant, though represented by a fruiting specimen of *S. baccatum* which has never been found so far west as Sirmore.

3. **S. baccatum,** *Roxb. Fl. Ind.* iii. 694; branches glaucous, leaves long-petioled ovate or ovate-lanceolate acuminate quite entire glaucous beneath, petiole glandular or not, racemes spiciform in terminal panicles with conglobate glands on the rachis between the flowers, male fl. very minute, calyx irregularly toothed, fem. 3-fid, fruit baccate. *Wight Ic.* t. 1950, f. 2 (S. populifolium *on plate*). S. populifolium, *Wall. Cat.* 7966. S. Daidece & S. hexandrum, *Ham. in Wall. Cat.* 7965 (*excl.* D). Excœcaria baccata, *Muell. Arg. in DC. Prodr.* xv. ii. 1211; *Brand. For. Fl.* 441; *Gamble Man. Ind. Timb.* 367. E. affinis, *Griff. Notul.* iv. 486; *Muell. Arg. l. c.* 1223. Carumbium baccatum, *Kurz For. Fl.* ii. 412. Stillingia paniculata, *Miquel Fl. Ind. Bat.* i. i. 461.

SIKKIM HIMALAYA, *Clarke, Gamble.* ASSAM, SILHET and the KHASIA MTS., *Roxburgh, Wallich,* &c. CHITTAGONG, *J. D. H. & T. T.* BURMA, *Wallich.* PENANG, *Curtis.* MALACCA, *Griffith.*—DISTRIB. Sumatra.

A glabrous evergreen tree. *Leaves* 3–8 in., tips very slender; nerves 6–10 pair, very slender; petiole 1–3 in. *Racemes* 3–4 in., in a spreading panicle, very slender; bracts very short. *Male fl.* $\frac{1}{60}$ in. diam., pedicels capillary $\frac{1}{16}$ in.; stamens 2, included. *Fem. fl.* subsessile; style very short; stigmas revolute. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., globose.—Wallich's No. 7973 from Singapore with leaves linear oblong and petioles 2–3 in. may be this, but it is a mere shoot.—I have no doubt as to this being Griffith's *Excœcaria affinis,* in the description of which *inferius* should be *inferne.*

S. SEBIFERUM, *Roxb. Fl. Ind.* iii. 693; leaves long-petioled ovate orbicular-ovate or subrhombic quite entire finely acuminate glaucous beneath, racemes simple terminal solitary, fruit capsular subacute. *Muell. Arg. in Linnæa* xxxii. 121; *Grah. Cat. Bomb. Pl.* 181; *Dalz. & Gibs. Bomb. Fl. Suppl.* 77. Excœcaria sebifera, *Muell. Arg. in DC. Prodr.* xv. ii. 1210; *Brand. For. Fl.* 44; *Gamble Man. Ind. Timb.* 366; *Wall. Cat.* 7972 (*excl.* G). Stillingia sebifera, *Michaux Fl. Bor. Am.* ii. 213; *Miquel Fl. Ind. Bat.* i. ii. 64; *Benth Fl. Hongk.* 302. S. sinensis, *Baill. Etudes Gen. Euphorb.* 512, t. 7, f. 26–30. Stillingfleetia sebifera, *Bojer Hort. Maurit.* 284. Carumbium sebiferum, *Kurz For. Fl.* ii. 412. Croton sebiferus, *Linn. Sp. Pl. Ed.* 3, 1425.

Cultivated in various parts of INDIA; and elsewhere in warm countries.—A native of China.

A small glabrous tree. *Leaves* $1\frac{1}{2}$–2 in., sometimes broader than long; nerves 6–10 pair, very slender, almost transverse; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in., 2-glandular, slender. *Racemes* 2–4 in.; the earliest in the year all male; bracts short, acute. *Male fl.* clustered, $\frac{1}{20}$ in. diam., pedicelled; calyx cupular, truncate; anthers large, exserted. *Fem. fl.* longer and more stoutly pedicelled; sepals ovate, acute. *Ovary* glabrous

narrowed into a stout style with recurved stigmas. *Capsule* coriaceous, the size of a pea, subglobose, shortly pointed. *Seeds* globose, with a coating of wax under the epidermis.

Sect. II. PARASAPIUM. *Spikes* simple, androgynous. *Fruit* large, woody, globose; cocci at length deciduous, not leaving a columella.

4. **S. indicum,** *Wi ld. Sp. Pl.* iv. 572; leaves shortly petioled elliptic-lanceolate obtusely acuminate serrate or subserrate not glaucous beneath, petiole eglandular, racemes spiciform terminal solitary, male fl. subsessile, fem. pedicelled elongate, capsule large woody. *Roxb. Fl. Ind.* iii. 692; *Wight Ic.* t. 1950; *Grah. Cat. Bomb. Pl.* 181. S. Hurmais, *Ham. in Trans. Linn. Soc.* xvii. 229. S. Bingirium, *Roxb. in Wall. Cat.* 7963. Stillingia indica & Bingyrica, *Baill. Etudes Gen. Euphorb.* 513, t. 6, f. 11, 12. S. himalayensis, *Klotzsch Bot. Reise Pr. Wald.* 116, t. 21. Excœcaria indica, *Muell. Arg. in DC. Prodr.* xv. ii. 1216; *Kurz For. Fl.* 413; *Brandis For. Flor.* 441; *Gamble Man. Ind. Timb.* 367; *Beddome Forester's Man.* 215.—? *Rheede Hort. Mal.* iv. t. 51.

BAY of BENGAL, from the Sunderbunds to Tenasserim. ? SOUTH CONCAN, *Graham.*

An evergreen glabrous tree. *Leaves* 3–5 in., rather coriaceous, dark green, brown when dry, base acute, nerves many pairs; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Racemes* 2–4 in., chiefly on lateral short branches, sparsely pubescent; bracts broad, obtuse, ciliate; male fl. crowded in clusters, pedicel very short; calyx-lobes acute, ciliate; fem. larger, with long style and stigma; sepals acute, ciliate. *Fruit* 1 in. diam., old woody, young succulent, obscurely 3-lobed, walls of cocci very thick and hard. *Seeds* $\frac{1}{2}$ in. long, ellipsoid, slightly compressed; testa pale, polished.—Bentham (Gen. Plant.) rightly remarks that the African plant referred to this species by Mueller is quite distinct from it.

5. **S. virgatum,** *Benth. in Gen. Pl.* iii. 335; leaves moderately petioled subcoriaceous base 2-glandular, bracts broadly ovate acuminate, their glands small rugulose, styles rigid connate beyond the middle three times or more longer than the ovary, capsules large woody acuminate. Stillingia virgata, *Baill. Etudes Gen. Euphorb.* 508. Excœcaria virgata, *Zoll. & Moritz. in Miquel Fl. Ind. Bat.* i. ii. 416; *Muell. Arg. in DC. Prodr.* xv. ii. 1216.

MOULMAINE, *Wallich* in Herb. DC.—DISTRIB. Java.

Leaves lanceolate, acuminate, base acute crenate or subrepand-serrate, shining above; bracts many-fld., powdery-puberulous. *Fem. pedicels* 2–3 times as long as the calyx. *Male fl.* subsessile; calyx segments lanceolate, laciniately toothed. *Fem. calyx* multiglandular within. *Stamens* 3, styles sharply revolute above. *Capsules* 2 cm. broad. *Seeds* smooth, shining.—Differs from *E. indica* in the larger longer more coarsely serrate lucid leaves, larger flowers, strong connate styles and form of the capsule.—The above description is copied from Mueller. I find in the Wallichian Herb. no *Sapium* or *Excœcaria* from Moulmein.

Sect. III. FALCONERIA. *Spikes* unisexual. *Male fl.* sessile in orbicular clusters under each bract; fem. solitary. *Calyx* of male 2-lipped, of fem. of 2–3 ovate acuminate sepals. *Fruit* coriaceous or drupaceous, with tardily dehiscing or indehiscent cocci.

6. **S. insigne,** *Benth. in Gen. Pl.* iii. 335; leaves elliptic or oblong-lanceolate acuminate crenate-serrate, spikes solitary terminal, rachis very robust. Falconeria insignis, *Royle Ill.* 354, t. 84 (*or* t. 98). F. Wallichiana, *Royle l. c.* f. 3; *Brand. For. Fl.* 442. Carumbium insigne, *Kurz For. Fl.* ii. 412.—*Wall. Cat.* 8021.

SUBTROPICAL HIMALAYA, from Simla and Kumaon, alt. 5300 ft., to Bhotan (except ? Sikkim). CHITTAGONG, *J. D. H. & T. T.* PEGU, *Kurz.*

A very robust deciduous-leaved tree, with thick soft branchlets leafy at the tips, shrinking when dry. *Leaves* 6-12 in., greenish when dry, nerves 12–20 pairs spreading slender; petiole 1–2 in., glandular below the tip. *Spikes* 3–10 in., fem. greatly thickened in fruit. *Male fl.* in circular clusters $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; bracts very small, central flowers opening first and leaving short persistent pedicels, outer fl. sessile; calyx membranous, lobes rounded concave; stamens 2, very short. *Fem. fl.* shortly pedicelled; sepals ovate, acuminate; ovary globose; stigmas very short, pulvinate. *Fruit* $\frac{1}{3}$ in. diam., 1–3-celled, ovoid or globose, obscurely lobed.—Kurz describes the cocci as 2-valved. Except in the form of the fruit, I know of no difference between the two following forms.

S. INSIGNE PROPER; fruiting racemes very stout, fruit ovoid.

Var. *malabarica*; fruiting racemes more slender, fruit globose. Excœcaria insignis, *Beddome Forester's Man.* 214, t. 22, f. 5. Falconeria malabarica, *Wight Ic.* t. 1866; *Dalz. & Gibs. Bomb. Fl.* 227; *Grah. Cat. Bomb. Pl.* 367.—*Wall. Cat.* 8014.

73. **EXCŒCARIA,** *Linn.*

Glabrous trees or shrubs, with acrid milky sap. *Leaves* alternate or opposite, entire or subserrate. *Flowers* minute in lateral axillary or terminal spiciform unisexual or androgynous racemes or spikes, dicœcious or moncœcious, apetalous; males 1–3 in each bract, 2-bracteolate; fem. at the base of the raceme, or on separate racemes; rachis with large glands beneath or at the sides of the bracts. *Disk* 0. MALE FL. *Sepals* 3 (rarely 2), small, subequal. *Stamens* 3, filaments free; anthers didymous; cells globose, distinct, contiguous, parallel. *Pistillode* 0. FEM. FL. *Calyx* 3-fid or -partite. *Ovary* 3-celled; styles shortly connate, stout, spreading and recurved, entire; cells 1-ovuled. *Capsule* of 3 cocci separating from a columella, valves crustaceous twisting elastically. *Seeds* globose or subglobose, estrophiolate, testa crustaceous, albumen fleshy; cotyledons broad, flat.—Species about 30, Tropical Asia, Africa and Australia.

This genus had better be reunited with *Sapium*.

* *Leaves alternate.*

1. **E. Agallocha,** *Linn. Sp. Pl.* 1451; leaves alternate long-petioled elliptic ovate or orbicular acute or obtuse quite entire or sinuate-crenate, male spikes axillary dense-fld., bracts rounded fleshy 1-fld., male fl. sessile, sepals minute unequal, fem. spikes short few-fld., flowers pedicelled, sepals broadly ovate acute subserrulate with a basal gland within, capsule $\frac{1}{4}$–$\frac{1}{2}$ in. diam. tridymous smooth. *Muell. Arg. in DC. Prodr.* xv. ii. 1220; *Wall. Cat.* 7962 and 7964; *Brand. For. Fl.* 442; *Kurz For. Fl.* 414; *Gamble Man. Ind. Timb.* 368; *Grah. Cat. Bomb. Pl.* 185; *Dalz. & Gibs. Bomb. Fl.* 227; *Beddome Forester's Man.* 255; *Wight Ic.* t. 1865 B, and in *Hook. Comp. Bot. Mag.* ii. 306, t. 30. E. Camettia, *Willd. Sp. Pl.* iv. 864; *Lamk. Ill.* t. 805. E. affinis, *Endl. Prodr. Fl. Norf.*, 83. Stillingia Agallocha, *Baill. Etudes Gen. Euphorb.* 518, t. 7, f. 31–34.—*Rheede Hort. Mal.* v. t. 45.

Tidal forests on all the coasts of INDIA and CEYLON.—DISTRIB. Eastwards to Australia and the Friendly Islands.

A small evergreen tree. *Leaves* between fleshy and coriaceous, 2–4 in., pale brown when dry, base acute or rounded; nerves many, very faint, subhorizontal; petiole $\frac{1}{2}$–1 in., slender, tip sometimes 2-glandular. *Male spikes* numerous, 1–2 in.; fem. racemes few, $\frac{1}{2}$–1 in.; flowers fragrant, upper fem. usually imperfect. *Bracts* of male spike with 1 flower and several minute bracteoles. *Filaments* much lengthening

after flowering. *Styles* free nearly to the base. *Seeds* subglobose, smooth.—The variations in the size of the fruit and seeds are remarkable.

2. **E. acerifolia,** *F. Didrichs. Plant. Nonnull. Mus. Univ. Hafn.* 7; leaves alternate short-petioled elliptic oblong-lanceolate or oblanceolate acuminate serrulate or crenulate, nerves strong beneath arched, spikes terminal and axillary bisexual, bracts broadly ovate acute entire 2–3-fld., male sepals lanceolate acuminate entire, fem. broadly ovate acute glandular at the base within. *Muell. Arg. in DC. Prodr.* xv. ii. 1222; *Brand. For. Fl.* 441. E. himalayensis, *Muell. Arg. in Linnæa* xxxii. 122. Stillingia himalayensis, *Klotzsch in Bot. Reise Pr. Waldem.* 116, t. 21.—*Wall. Cat.* 7969.

Western and Central Himalaya, from Nepal, *Wallich*, to Kumaon, alt. 5–6000 ft., *Edgeworth, Strachey & Winterbottom.* Khasia Mts.; at Nunklow, alt. 4000 ft., *J. D. H. & T. T.*

A small evergreen tree. *Leaves* 3–6 by 1–2 in., rather membranous, green when dry; nerves 8–10 pairs; base acute or subacute; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., stout, eglandular. *Spikes* 1–2 in., slender; bracts rounded or acuminate; male fl. sessile; fem. pedicelled. *Style* short, very stout. *Capsule* about $\frac{2}{3}$ in. diam., tridymous, smooth. *Seeds* globosely ovoid, mottled.—The Khasian specimens have much narrower leaves than the Himalayan, and are referred by Mueller to a variety (*E. himalayensis*, var. *β. cuspidata*, Muell. Arg. in Linnæa xxxii. 122, and in DC. l. c.).

3. **E. holophylla,** *Kurz For. Fl.* ii. 414; leaves alternate oblong to broadly lanceolate or oblanceolate obtusely acuminate quite entire, nerves arched very slender, spikes terminal slender, bracts short broad 1–3-fld. female at the base, bracteoles 0, sepals of male very minute subulate.

Forests of Martaban and Upper Tenasserim, *Kurz*; on Thoungun, *Brandis.*

An evergreen tree. *Leaves* 3–6 in., thin, quite glabrous rather polished; petiole $\frac{1}{3}$–$\frac{1}{4}$ in., eglandular. *Spike* 2 in.; male flowers in scattered clusters, sessile; bracts rounded.—I have seen only a small flowering specimen collected by Brandis and named by Kurz, in which the male flowers are as described.

4. **E. rectinervis,** *Kurz in Herb. Hort. Calcutt.*; branchlets very stout, leaves 5–7 in. coriaceous obovate-oblong abruptly narrowed to an obtuse point, nerves numerous nearly horizontal, petiole stout 1–1$\frac{1}{2}$ in. eglandular. Actephila rectinervis, *Kurz in Trimen's Journ. Bot.* xv. (1875) 329.

Nicobar Islands; Katchall, *Kurz.*

Branchlets as thick as a goose-quill. *Leaves* 3–4 in. broad, very smooth, dull green and leathery when dry; base acute; nerves 12–15 pair, distinct beneath but slender. *Fruiting raceme* axillary, young fruit $\frac{1}{2}$ in. diam. on a stout pedicel $\frac{1}{3}$ in. long.

** *Leaves opposite.*

5. **E. crenulata,** *Wight Ic.* t. 1865; leaves shortly petioled from elliptic to lanceolate serrate or crenulate acuminate, spikes axillary and terminal unisexual, bracts 1-fld., male fl. sessile, fem. pedicelled short few-fld., bracteoles subulate as long as the flower, male sepals oblong irregularly toothed, fem. broadly ovate erose. E. cochinchinensis, *Muell. Arg. in DC. Prodr.* xv. ii. 1215; *Beddome Forester's Man.* 215. E. oppositifolia, *Muell. Arg. in DC. Prodr.* xv. ii. 1219 (*excl. syn.*) (*not of Jack*); *Beddome l. c.* Salix glabrata, *Herb. Heyne.* Microstachys, *Wall. Cat.* 7977 A.

The Deccan Peninsula; in woods on the Western Ghats from Coorg south-

wards, ascending to 7000 ft. CEYLON, common in the Central Province, alt. 4–6000 ft.

A small evergreen tree or shrub, branchlets slender, sometimes 4-gonous. *Leaves* 2–6 in., rather coriaceous, rarely somewhat obovate, base very acute, nerves 10–16 pairs, faint, spreading or subhorizontal; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Spikes* usually terminal, males 1–2 in.; fem. very short, always axillary, sometimes 1-fld.; bracts erose; bracteoles subulate, erose, conspicuous beyond the bracts. *Sepals* 3, of male quite free, inserted by a narrow base; of fem. fl. ovate, acute, with a large gland at the base within. *Styles* very short, and stigmas persistent. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., deeply 3-lobed, especially at the top; cocci thinly crustaceous, twisted after dehiscence. *Seeds* broadly ovoid, mottled.—In the absence of authentic specimens of *E. cochinchinensis*, Lour., to which this is referred by Mueller, I hesitate to follow him, for the subulate bracteoles distinguish it from all the more eastern species that I have examined. Some specimens with shorter more coriaceous highly reticulated leaves with fewer very prominent nerves look different, but I find no floral characters whereby to distinguish them. Mueller describes this under the name of E. oppositifolia, *Jack in Calc. Journ. Nat. Hist.*, by error for *Griffith, l. c.* (Jack has no species of that name), and he omits Griffith's Silhet habitat. In fact Griffith's plant is very different from the Deccan one (see No. 8).

6. **E. robusta,** *Hook. f.*; branches very stout, leaves opposite linear-oblong acuminate coriaceous entire or sinuate-subserrate, spikes axillary unisexual very robust, bracts 1-fld., bracteoles broadly ovate erose, sepals of male orbicular irregularly toothed. E. oppositifolia, *Muell. Arg. in DC. Prodr.* xv. ii. 1219 (*not of Lour.*).—*Wall. Cat.* 7968.

The CONCAN, *Stocks*; Mts. of Kurg, *Herb. G. Thomson, Wight* (*in Herb. Wall.*).

Branches as thick as a goose-quill. *Leaves* 5–8 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., base acute; nerves 15–20 pair, very spreading, slender; petiole $\frac{1}{2}$–$\frac{2}{3}$ in., very stout, eglandular. *Male spikes* solitary, sessile, 4–5 in.; rachis very stout; bracts small, broad, fleshy; bracteoles large, embracing the unexpanded flower. *Male sepals* 3, membranous, base broad cordate, point of insertion small. *Fem. fl.* not seen. *Fruit* immature, $\frac{2}{3}$ in. diam., on a very short axillary raceme, shortly stoutly pedicelled, 3-lobed, top truncate, style short persistent.—The robust habit, stout long male spikes and form of the bracteoles and sepals distinguish this at once from *E. crenulata*.

7. **E. quadrangularis,** *Muell. Arg. in DC. Prodr.* xv. ii. 1219; branchlets slender 4-gonous, leaves opposite elliptic-lanceolate or oblanceolate acuminate, spikes axillary slender bisexual, bracts 1-fld. serrulate, bracteoles lanceolate erose, sepals of male oblong irregularly spinulose-toothed, of fem. ovate acute spinulose-serrate with many subulate processes at the base within.—Microstachys, *Wall. Cat.* 7977 B.

PENANG and SINGAPORE, *Wallich.*

A shrub or tree with the habit and lanceolate leaves of *E. crenulata*, but the branchlets are more distinctly 4-angled, the leaves more membranous, with only 8–10 pair of more arched nerves, the bracteoles and male sepals are spinously toothed, and the fem. sepals have a row of fleshy setæ at the base within, as in some species of *Sapium*.

8. **E. oppositifolia,** *Griffith in Calcutt. Journ. Nat. Hist.* iv. 386; branchlets terete, leaves opposite linear-oblong acuminate entire or subserrate, spikes unisexual ? males terminal very slender 1-fld., bracts entire 1-fld., bracteoles 0, sepals broadly oblong toothed. ? E. oppositifolia, *Kurz For. Fl.* ii. 414 (*excl. syn. Bedd.*).—*Wall. Cat.* 8028, *Gnetum.*

SILHET, *Wallich*, and *Hort. Bot. Calc.* (*Kew Distrib.* 4707). ? UPPER TENASSERIM, *Kurz.*—DISTRIB. ?

Leaves 6–8 by 2–2½ in., thinly coriaceous, glossy above, base more or less acute, nerves 16–20 pair slender, slightly arched; petiole ½ in., eglandular. *Male spikes* 4–5 in., pedicelled, rachis very slender, flowers scattered, sessile; sepals of male free, base auricled, insertion very small. *Fem. fl.* solitary, terminal, pedicelled, with a large basal gland on each side. *Ovary* 3-celled, ovoid, narrowed into a short robust style with 3 subulate recurved stigmas. *Fruit* pedicelled, berried, subumbilicate, 6-grooved, of 3 cocci, size of a small apple. *Seed* subglobose.—This is named *E. oppositifolia*, Griffith, by himself in his herbarium. I have seen no specimens but his and Wallich's. In Kurz's *E. oppositifolia* the flowers are shortly pedicelled, males several in each bract; male spikes robust and fruit the size of a cherry. See under *crenulata* for the erroneous quotation of Jack as the authority for this species.

IMPERFECTLY KNOWN SPECIES.

EXCŒCARIA? Larut, Perak, alt. 2–3500 ft. (*Herb. Hort. Bot. Calcutt.*, No. 2344); a shrub 8–12 ft. quite glabrous, branches terete, leaves membranous 4–6 in. ovate-lanceolate acuminate margin slightly waved, base acute or rounded, nerves very many slightly arched, petiole ¼–½ in. slender, capsules sessile clustered in the leaf-axils ⅓ in. diam. 2–3-dymous, cocci globose quite smooth.

74. **SEBASTIANIA,** *Spreng.*

Shrubs, rarely (the Indian species) a herb. *Leaves* alternate, penni-nerved. *Flowers* monœcious, in terminal axillary and lateral slender racemes, apetalous; males minute, 1–3 in each bract; females solitary or at the base of the raceme. *Disk* 0. MALE FL. *Calyx* minute, membranous, unequally 5-lobed or -partite. *Stamens* 2–4, filaments short free or nearly so; anther-cells distinct, contiguous, parallel. *Pistillode* 0. FEM. FL. *Calyx* 3-lobed or -partite. *Ovary* exserted, 3-celled; styles free or connate at the base, entire, revolute or spreading; cells 1-ovuled. *Capsule* globose, of 3 cocci separating from a columella, endocarp crustaceous. *Seeds* oblong or subglobose, strophiolate, testa smooth, albumen fleshy; cotyledons broad, flat.—Species 40, all American but the following, and another which is American and African.

S. Chamælea, *Muell. Arg. in DC. Prodr.* xv. ii. 1175; annual, glabrous, leaves linear obtuse finely serrulate, racemes very short, cocci with two dorsal rows of spinules. *Benth. Fl. Austral.* v. 151. Microstachys Chamælea, *A. Juss. Tent. Euphorb.* 49; *Dalz. & Gibs. Bomb. Fl.* 228. Cnemidostachys Chamælea, *Spreng. Syst. Veg.* iii. 835. Stillingia Chamælea & asperococca, *Baill. Etudes Gen. Euphorb.* 516, 517. Excœcaria Chamælea, *Baill. Adans.* vi. 323. Cnemidostachys linearifolia, *Miquel Fl. Ind. Bat. Suppl.* 460. Elachocroton asperococcus, *Ferd. Muell. in Hook. Journ. Bot.* ix. (1857) 17. Tragia Chamælea, *Linn. Sp. Pl.* 1391; *Grah. Cat. Bomb. Pl.* 186; *Wall. Cat.* 7797.

BEHAR; at Dunwah, *J. D. H.*; Hazaribagh, &c., *Clarke*. DECCAN PENINSULA, from Bombay southwards. BURMA, MALACCA and SINGAPORE, *Wallich, Griffith, Maingay*. CEYLON, common.—DISTRIB. China, Malay Islands, Tropical Australia and Africa.

Stems usually many from the root, ascending 1–2 ft., slender, grooved ribbed or terete, dichotomously branched. *Leaves* 1–3 in. by ¼–½ in., base acute; petiole ⅒–⅛ in., very slender. *Male spikes* axillary or leaf-opposed; bracts minute, acute with a large often stipitate gland on each side, 1–2-fld. *Fem. fl.* usually solitary at the base of the male, or lateral on the branches. *Sepals* minute, of the male ovate, acute, ciliate; of the fem. the larger, obovate, acute, lacerate and ciliate, 2-glandular within. *Capsule* subglobosely oblong, thinly crustaceous, ¼–⅓ in. diam. *Seed*

oblong, mottled.—I can find no character whereby to separate the specimens with terete, and those with grooved ribbed stems.

GENERA OF DOUBTFUL AFFINITY.

75. **LOPHOPYXIS,** *Hook. f.*

A glabrous climbing shrub. *Leaves* alternate, shortly petioled, quite entire, 3-nerved at the base. *Flowers* small, monœcious, cymose, cymes in lax elongate branched axillary and terminal panicles, females towards the base of the branches. MALE FL. *Calyx* 5-partite, persistent; lobes ovate, spreading, valvate, tomentose. *Petals* minute, oblong, tomentose, inserted under the obcordate lobes of a thick disk. *Stamens* 5, alternate with the disk-lobes, filaments short pubescent; anthers short; cells oblong, dehiscence extrorse, connective minutely produced. *Pistillode* small, villous. FEM. FL. *Perianth* of the male. *Disk* annular, crenate. *Ovary* tomentose, 5-celled; stigmas 5, sessile, subulate, recurved; ovules 2, linear, collaterally pendulous in each cell, obturator 0. *Young fruit* cylindric-oblong, finely tomentose, deeply 5-grooved and ribbed.

L. Maingayi, *Hook. f. in Ic. Plant.* t. 1714.

MALACCA, *Maingay* (*Kew Distrib.* 1429).

Branchlets brown, grooved, puberulous. *Leaves* 4–6 in., coriaceous, ovate from a broad subcordate base, subcaudately acuminate, shining and minutely reticulate above, purplish brown beneath; nerves 4–5 pair above the short basal, cross-nervules reticulate; petiole $\frac{1}{6}$ in.; stipules not seen. *Panicles* a foot long, drooping, rachis puberulous, branchlets hoary-tomentose; flowers $\frac{1}{10}$ in. diam., very shortly pedicelled; buds globose, bracts very minute. *Sepals* tomentose on both surfaces. *Young fruit* $\frac{1}{3}$ in. long, crowned with the subulate styles, grooves extending almost to the axis, ridges obtuse.—I am very uncertain as to the affinities of this curious plant, which resembles no Euphorbiaceous one known to me.

76. **BOTRYOPHORA,** *Hook. f.*

A glabrous tree. *Leaves* alternate, long-petioled, coriaceous, elliptic- or oblong-lanceolate, caudate, quite entire, penninerved. MALE FL. sessile on the simple horizontal branches of an erect terminal? puberulous pyramidal brachiate panicle; buds pisiform, globose, glabrous. *Perianth* membranous, bursting irregularly. *Stamens* very numerous in a globose mass; anthers peltately attached to a central receptacle, imbricating; connective broad, disciform with 4 minute oblong free cells in two pairs pendulous from its outer margin.

B. Kingii, *Hook. f.*

PERAK, in open sandy soil near the coast, *King's Collector.*

A tree, 40–50 ft.; branchlets woody, knotted; bark red brown, smooth. *Leaves* 8–10 by 3–4 in., pale yellowish brown when dry, base acute; nerves 10–12 pairs, very strong, raised on both surfaces, cross-nervules finely and strongly reticulate; petiole $2\frac{1}{2}$–4 in., strict, geniculate at the base of the leaf, terete; stipules not seen. *Panicles* 6–10 in. long, 4 in. diam. at the base, terminal and axillary, shortly peduncled, rachis and branches rigid; bracts minute. *Male fl.* $\frac{1}{6}$ in. diam., half yellow half red, waxy. *Stamens* yellow.—This may be allied to *Mallotus* or *Macaranga*, but I know nothing at all like it, and it is too remarkable a plant to be passed over. The anthers, which are in a young state, recall on a minute scale those of a *Cycas*; the connective is very large in proportion to the cells, which are distant from one another.

77. SPHYRANTHERA, *Hook. f.*

An evergreen bush; branches slender, puberulous. *Leaves* alternate, petioled, elliptic-lanceolate, obtusely acuminate, entire, penninerved. *Flowers* minute, dicœcious; males subumbellately crowded on the top of a slender solitary axillary peduncle, emerging from a capitate cluster of very minute pubescent imbricating bracts; buds globosely ovoid. *Sepals* 4, broadly ovate, acute, concave, pubescent without, valvate. *Petals*? much smaller than the sepals, membranous, variable, entire or cleft to the base into two lanceolate segments. *Stamens* about 20, in the centre of the flower, filaments filiform, free; anther-cells globose, distant, divaricate, one at each end of the rather dilated connective. *Fem. fl.* and *fruit* unknown.

S. capitellata, *Hook. f. Ic. Plant.* t. 1702; Codiæum? lutescens, *Kurz For. Fl.* ii. 405.

MIDDLE ANDAMAN ISLAND; in bamboo jungles along the Middle Straits, *Kurz*.

A bush, 10–12 ft., of a yellowish green. *Leaves* 3–5 in., rather membranous, straight or subfalcate, narrowed into a petiole $\frac{3}{4}$ in. long; nerves 10–15 pairs, slender. *Peduncles* $\frac{1}{2}$ in., slender, pubescent, pedicels $\frac{1}{10}$ in., decurved. *Petals* or *disk-glands* sometimes subspathulate.—I am quite uncertain as to the affinities of this curious plant. I had named, figured, and described it before recognizing it as Kurz's *Codiæum? lutescens*, or I should have adopted his specific name.

ORDER CXXXVI. URTICACEÆ.

Herbs, shrubs or trees. *Leaves* rarely opposite, often oblique. *Stipules* various. *Inflorescence* cymose or clustered; flowers usually minute, mono- or di-œcious, rarely unisexual, often crowded on the surface of a fleshy flat concave or globose involucre, or on (in *Ficus*) the inner walls of a closed receptacle. *Perianth* equally or unequally toothed, lobed or partite. *Stamens* as many as and opposite the perianth divisions, or fewer; anthers 2-celled. *Pistillode* small or 0. *Ovary* superior, 1-celled, style often excentric, simple or 2-fid with stigmatose arms, or stigma sessile plumose or penicillate; ovule solitary. *Fruit* simple, a drupe or samara or of small indehiscent free achenes, or compound as a confluent mass of perianths and pericarps. *Seed* erect or pendulous, testa membranous; albumen copious, scanty or 0; embryo various.—Genera 108; species 1500, chiefly tropical.

The seven tribes of *Urticeæ* here adopted (following Gen. Plant.) are by many considered as 2 or more Orders.

Phenax Sonneratii, Wedd. (*DC. Prod.* xvi. i. 235[37]), a S. American herb, differing from *Maoutia* in the filiform stigma, is, according to Sonnerat, an Indian plant; if so, no doubt introduced.

TRIBE I. **Ulmeæ.** Trees, sap watery. *Flowers* usually 2-sexual or polygamous, appearing before the leaves. *Anthers* erect in bud. *Style* 2-fid. *Ovule* pendulous, anatropous. *Fruit* dry.

Leaves serrate. Cotyledons flat	1. ULMUS.
Leaves entire (serrate in young plants). Cotyledons folded	2. HOLOPTELEA.

TRIBE II. **Celtideæ.** Character of *Ulmeæ*, but fruit a drupe.

Male sepals imbricate. Stipules free. Cotyledons broad	3. CELTIS.

Male sepals induplicate-valvate. Stipules free. Cotyledons narrow . . . . . 4. TREMA.
Male sepals imbricate. Stipules connate, convolute . . 5. GIRONNIERA.

TRIBE III. **Cannabineæ.** Herbs, sap watery. *Flowers* dicœcious. *Anthers* erect in bud. *Style* 2-fid. *Ovule* pendulous. *Fruit* an achene.

A climbing hispid perennial. Leaves opposite. Embryo spiral . . . . . 5*. HUMULUS.
An erect annual. Leaves alternate. Embryo curved . . 6. CANNABIS.

TRIBE IV. **Moreæ.** Trees or shrubs, sap usually milky. *Stamens* inflexed in bud, anthers reversed. *Ovule* pendulous, anatropous.

Subtribe 1. FATOUEÆ. Male fl. in axillary cymes, with a few fem. intermixed, or fem. fl. solitary.—Shrubs or trees.

Leaves entire. Male sepals imbricate. Cotyledons twisted 7. PSEUDOSTREBLUS.

Subtribe 2. STREBLEÆ. Male fl. capitate spicate or racemose, fem. solitary or few on a common peduncle. Style 2-fid.—Shrubs or trees.

Male fl. racemed; bracts minute. Fem. sepals very short 8. TAXOTROPHIS.
Male fl. subcapitate; bracts many, large. Fem. sepals foliaceous . . . . . 9. PHYLLOCHLAMYS.
Male fl. subcapitate; bracts 2. Fem. sepals clasping the ovary . . . . . 10. STREBLUS.

Subtribe 3. BROUSSONETIEÆ. Male fl. capitate spicate or racemose, fem. in globose head. Style undivided, elongate.—Shrubs or trees.

Male fl. spicate. Achenes stipitate. Leaves 3-nerved . 11. BRUOSSONETIA.
Male fl. spicate. Achenes sessile. Leaves penninerved . 12. ALLÆANTHUS.
Male fl. in globose heads. Achenes sessile. Leaves penninerved . . . . . 13. PLECOSPERMUM.

Subtribe 4. EUMOREÆ. Male and fem. fl. spicate, or fem. subcapitate.

Fem. sepals fleshy in fruit and enclosing the achene . . 14. MORUS.

Subtribe 5. DORSTENIEÆ. Male and fem. fl. crowded on a narrow or broad flat fleshy receptacle.

Receptacle linear, like a unilateral spike.—Trees . . . 15. SLOETIA.
Receptacle flat, entire or lobed.—Herbs or shrubs . . . 16. DORSTENIA.

TRIBE V. **Artocarpeæ.** Trees or shrubs, sap usually milky. Flowers unisexual, males or all in globose heads or open or closed receptacles. Anthers erect in bud.

Flowers on the inner walls of a closed receptacle . . . 17. FICUS.
Male fl. on a disciform receptacle, fem. solitary . . . . 18. ANTIARIS.
Flowers in naked or bracteate heads, rarely racemes.
  Flowers all in globose heads; stamens 4 . . . . . 19. CUDRANIA.
  Flowers in globose oblong or cylindric heads, male monandrous . . . . . 20. ARTOCARPUS.
  Male fl. in cylindric spikes, fem. racemose . . . . 21. BALANOSTREBLUS.

TRIBE VI. **Conocephaleæ.** Shrubs, often climbing, or trees, sap usually milky. *Flowers* in unisexual heads. *Anthers* erect in bud. *Style* undivided or 2-fid. *Ovule* erect, orthotropous.

Male and fem. heads cymose, or fem. solitary. Stamens free. Style short . . . . . 22. CONOCEPHALUS.

Male and fem. heads solitary. Stamen 1. Style 2-partite	23. PRAINEA.
Male and fem. heads solitary. Stamens 2, connate. Style simple	24. KURZIA.

TRIBE VII. **Urticeæ.** Trees herbs or shrubs, sap watery. *Flowers* unisexual. *Stamens* 1–5, inflexed in bud, with the anthers reversed. *Style* undivided or 0. *Ovule* erect, orthotropous.

Subtribe 1. UREREÆ. Herbs or shrubs, rarely trees, with stinging hairs. Flowers cymose, 2–5-merous.

Leaves opposite. Achene straight; stigma penicillate	25. URTICA.
Leaves alternate; stipules connate. Achene oblique; stigma ovate or linear	26. FLEURYA.
Leaves alternate. Fem. sepals 4. Achene oblique; stigma filiform	27. LAPORTEA.
Leaves alternate. Fem. perianth tubular, 2–3-toothed	28. GIRARDINIA.

Subtribe 2. PROCRIDEÆ. Herbs, rarely shrubs, without stinging hairs. Inflorescence cymose, or flowers on a fleshy receptacle. Fem. fl. 3–5-partite. Stigma penicillate.

* *Leaves opposite.*

Flowers cymose or capitellate	29. PILEA.
Flowers on a discoid receptacle	30. LECANTHUS.

** *Leaves alternate.*

Flowers all cymose. Fem. sepals longer than the achene	31. PELLIONIA.
Flowers all on a fleshy receptacle, fem. perianth small or 0	32. ELATOSTEMA.
Male fl. cymose; fem. on a fleshy receptacle	33. PROCRIS.

Subtribe 3. BOEHMERIEÆ. Shrubs or trees, rarely herbs, without stinging hairs. Flowers not involucrate, spicate, fascicled, racemed, or panicled; male perianth 2–5-merous, fem. tubular or 0.

* *Fruiting perianth membranous or dry, including the free or adnate achene.*

Shrubs or undershrubs. Stigma filiform, persistent	34. BOEHMERIA.
A herb. Leaves opposite. Stigma ovate, persistent	35. CHAMABAINA.
Herbs. Flowers 4-merous. Stigma deciduous, filiform	36. POUZOLZIA.
A herb. Flowers dimerous. Stigma linear	37. DISTEMON.

** *Fruiting perianth more or less fleshy, including the free or adnate achene.* —*Trees or shrubs; leaves alternate.*

Leaves narrow. Ovary free; stigma penicillate	38. SARCOCHLAMYS.
Leaves broad. Ovary free; stigma linear, deciduous	39. PIPTURUS.
Leaves broad. Ovary adnate; stigma sessile, subpeltate, ciliate	40. VILLEBRUNEA.
Leaves broad. Ovary adnate; stigma penicillate	41. DEBREGEASIA.

*** *Fem. perianth minute or* 0.

Shrubs. Flowers in panicled clusters	42. MAOUTIA.

Subtribe 4. PARIETARIEÆ. Herbs or undershrubs, without stinging hairs. Leaves alternate, quite entire. Flowers in cymose involucres.

43. PARIETARIA.

Subtribe 5. FORSKOHLEÆ. Herbs or undershrubs, without stinging hairs. Leaves toothed. Flowers in naked or involucrate clusters, males monandrous.

Involucre 3–6-partite, woolly within	44. FORSKOHLIA.
Involucre campanulate, toothed	45. DROGUETIA.

1. **ULMUS,** *Linn.*

Deciduous trees. *Leaves* alternate, distichous, serrate, penninerved; stipules lateral, scarious. *Flowers* fascicled at the leaf-scars of annotinous shoots. *Perianth* campanulate, 4–8-lobed, imbricate. *Stamens* 4–8, erect in bud. *Ovary* compressed; style short 2-fid or 2-partite, branches stigmatose within to the base; ovule pendulous. *Fruit* dry flat, nucleus expanded into an orbicular obcordate or obovate reticulate wing. *Seed* flat, exalbuminous; embryo straight, cotyledons flat, equal, radicle small superior. —Species about 16, natives of N. temperate regions.

The Western Himalayan small-leaved elm, referred to by Brandis as probably the European *U. campestris*, and which he describes as a small shrub along river-beds, and a middle-sized tree where planted by villages, is, I suspect, only *U. Wallichiana*. This latter tree is very closely allied to *U. campestris*; its leaves vary as greatly as do those of *campestris* and take similar forms. *U. erosa*, Roth Nov. Sp. 183; Planch. in DC. Prodr. xvii. 163, a plant of Heyne's, is not an *Ulmus*, and is indeterminable.

1. **U. Wallichiana,** *Planch. in Ann. Sc. Nat. Ser.* 3, x. (1848) 277, and in *DC. Prodr.* xvii. 158; branchlets tomentose, leaves 4–8 in. obliquely elliptic acuminate or subobovate and cuspidate doubly or trebly serrate scabrous or smooth above pubescent or tomentose beneath, nerves 15–20 pairs, perianth 5–6-fid, samara orbicular-obovate, stipes very slender exceeding the perianth, seed in the middle. *Brandis For. Fl.* 432, t. 52; *Gamble Man. Ind. Timb.* 341. U. erosa, *Wall. Cat.* 3546 (*not of Roth*). U. lævigata, *Royle Ill.* 341. U. pedunculata, *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA; from Nepal to Kashmir, alt. 3500–10,000 ft.

A tree attaining 90 ft., with a trunk 24 in girth; bark very rough, exfoliating in diamond-shaped flakes; branches suberect, roughly pubescent or tomentose. *Leaves* usually narrowed at the very unequal base, which is cordate or round on one side acute on the other; nerves strong, pubescent beneath. *Flowers* in short dense many-fid. racemes; rachis 1 in. or less, pubescent; pedicels $\frac{1}{6}$ in., pubescent below the joint. *Perianth* turbinate, glabrous, persistent; lobes ciliate. *Stamens* 5–6. *Samara* $\frac{1}{2}$–$\frac{2}{3}$ in. long, glabrous or disk puberulous, sometimes obcordate, wings reticulate; stipes very slender, longer than the calyx.—As in the European *U. campestris*, the leaves on shoots differ greatly from those on the older branches, being larger, more coarsely doubly or trebly serrate, and more scabrous above.

2. **U. lancifolia,** *Roxb. Fl. Ind.* ii. 66; subdeciduous, leaves 1–3 in. obliquely lanceolate or ovate-lanceolate obtusely acuminate crenulate shining, nerves 15–20 pair, perianth 5-cleft, samara obliquely obovate orbicular or obcordate stipitate, seed in the middle. *Wall. Pl. As. Rar.* ii. 86, t. 200; *Planch. in Ann. Sc. Nat. Ser.* 3, x. (1848) 281; *DC. Prodr.* xvii. 162; *Kurz For. Fl.* ii. 473; *Gamble Man. Ind. Timb.* 342. U. Hookeriana, *Planch. in DC. l. c.*

SUBTROPICAL HIMALAYA; Kumaon, near Sooring, alt. 4–5000 ft., *Strachey & Winterbottom*; Sikkim, alt. 1–4500 ft., *J. D. H.* KHASIA HILLS, alt. 1–3000 ft. CHITTAGONG, *Roxburgh.* PEGU and MARTABAN, *Kurz.*

A tree attaining 70 ft., with thick bark, wide-spreading branches, and the drooping branchlets pubescent with deciduous hairs. *Leaves* hard, reticulate, shortly petioled, base acute on one side rounded on the other; petiole very short, stout, pubescent. *Flowers* in very short racemes, which are axillary or at the leaf-scars; pedicels sometimes ½ in., slender, villous; bracts many, ciliate. *Perianth* campanulate, 5-cleft, glabrous. *Samara* about 1 in. long, lobes usually incurved.

3. **U. parvifolia,** *Jacq. Hort. Schoenb.* iii. t. 262; a shrub or small tree, branchlets pubescent, leaves 2–3 in. shortly petioled coriaceous oblong-lanceolate finely serrate glabrous, nerves 14–16 pairs with axillary tufts of hairs, flowers appearing with the leaves, clusters androgynous, perianth 4-fid, samara shortly stipitate elliptic or obliquely oblong, seed in the middle. *Brand. For. Fl.* 434. U. virgata, *Roxb. Fl. Ind.* ii. 67; *Wall. Pl. As. Rar.* iii. 67, t. 290; *Cat.* 3548; *Planch. in Ann. Sc. Nat. Ser.* 3, x. (1848) 272. U. pumila, *H. f. & T. Herb. Ind. Or.*

WESTERN TIBET; Nubra, alt. 10,000 ft., *Thomson.*—DISTRIB. China, Japan.

Described by Brandis (but not from Indian specimens) as a slow-growing shrub with reddish flowers, the male and fem. mixed in scaly clusters. He gives Kumaon, Sikkim and Bhotan as habitats, but I have seen no other Indian specimens than Thomson's Tibetan, which are not in flower or fruit. Wallich's figure is of a Chinese specimen cultivated in Calcutta, and is a copy of Roxburgh's drawing. The Tibetan plant may be a small-leaved form of *U. Wallichiana.*

2. HOLOPTELEA, *Planch.*

Habit and characters of *Ulmus*, but leaves quite entire, perianth cleft to the base, and cotyledons complicated longitudinally.

H. integrifolia, *Planch. in Ann. Sc. Nat. Ser.* 3, x. 269; *DC. Prodr.* xvii. 164; *Wight Ic.* t. 1968; *Dalz. & Gibs. Bomb. Fl.* 238. Ulmus integrifolia, *Roxb. in Willd. Sp. Pl.* i. 1326, and *Fl. Ind.* ii. 68; *Cor. Pl.* 56, t. 78; *Brand. For. Fl.* 431; *Kurz For. Fl.* ii. 473; *Grah. Cat. Bomb. Pl.* 644; *Gamble Man. Ind. Timb.* 342; *Bedd. Fl. Sylvat.* t. 310; *Wall. Cat.* 3547.

Outer lower ranges of the HIMALAYA, from Jamu to Oudh, ascending to 2000 ft. From BANDA and BEHAR to TRAVANCORE, and from PEGU to MARTABAN, CEYLON, in the hot drier regions.—DISTRIB. Cochin China.

A large spreading deciduous tree; shoots pubescent. *Leaves* 3–6 in., coriaceous, elliptic or obovate-oblong, acuminate (in seedlings serrate), glabrous, or pubescent beneath, base unequally rounded or subcordate; nerves 5–7 pair; petiole ¼–⅓ in. *Flowers* ⅛ in. diam. *Sepals* pubescent. *Anthers* hairy. *Ovary* long-stipitate. *Samara* 1 in. long, obliquely elliptic or roundish, glabrous or pubescent; wings membranous or chartaceous, tip 2-fid, lobes incurved.—Planchon has three varieties: *leiocarpa* with glabrous fruit deeply notched, *hebecarpa* with similar but pubescent fruit, and *zeylanica* with smaller obsoletely notched fruit.

3. CELTIS, *Linn.*

Trees or shrubs, evergreen or deciduous. *Leaves* alternate, bifarious, ovate, entire or serrate, triple-nerved. *Flowers* small, polygamous, cymose; male and androgynous cymes usually at the base of the shoots; female in the upper axils. *Sepals* 4–5, imbricate. *Stamens* 4–5, short, erect in bud, surrounding a woolly torus. *Ovary* sessile; style central, arms plumose simple or lobed; ovule pendulous. *Drupe* small, ovoid or globose, endocarp hard smooth or rugose. *Albumen* 0 or scanty; embryo curved, coty-

ledons broad, inflexed flat or replicate, surrounding the upcurved radicle.—Species about 50, temperate and tropical, chiefly in the northern hemisphere.

The species of this genus appear to me inextricable. The Asiatic, except *C. Wightii*, are founded on very variable characters.

1. **C. australis,** *Linn. Sp. Pl.* 1043; leaves deciduous very obliquely ovate or ovate-lanceolate acuminate coarsely serrate green when dry, drupes subsolitary subglobose or broadly ovoid, putamen rugose. *Brand. For. Fl.* 428, t. 50; *Planch. in DC. Prodr.* xvii. 169; *Boiss. Fl. Orient.* iv. 1156; *Gamble Man. Ind. Timb.* 343. C. caucasica, *Willd.*; *DC. l. c.* 170; *Boiss. l. c.* 1156; *Gamble l. c.* C. Acata, *Ham. in Trans. Linn. Soc.* xvii. 211.

The SALT RANGE and TEMPERATE HIMALAYA, alt. 4–8000 ft., from Marri to Nepal (and ? Sikkim).—DISTRIB. Westwards to Spain.

A tree; branches slender, pendulous, and leaves beneath glabrous pubescent or subtomentose with often fulvous hairs. *Leaves* 3–5 in., entire towards the base, glabrous above, basal nerves not produced into the tip; stipules subulate. *Male fl.* in axillary tufts or racemed on short leafless axillary branchlets, pedicels capillary. *Sepals* oblong, obtuse, margins woolly. *Fem.* or bisexual flowers rather larger than the male. *Ovary* ovoid, woolly at the base or all over. *Drupe* very variable in size and shape, $\frac{1}{3}$ in. long or less; peduncle $\frac{1}{2}$–2 in.—I follow Brandis in referring the common W. Himalayan *Celtis* to *australis*, and uniting with it *C. caucasica*, which, according to Boissier, differs only in the drupes being yellow (they are black in European *australis*) and more rugose.

VAR. *eriocarpa*; drupe pubescent tomentose or woolly. C. eriocarpa, *Dcne. in Jacquem. Voy. Bot.* 150, t. 152; *Planch. in DC. Prodr.* xvii. 179; *Brand. For. Fl.* 429; *Gamble Man. Ind. Timb.* 343.—Has the same range as *C. australis*, but is not common. Brandis, who doubts its being a species, refers Hamilton's *C. Acata* to it, but that has a glabrous ovary. Planchon implies that the pubescent drupe alone distinguishes *eriocarpa*. I find this to be an inconstant character.

2. **C. tetrandra,** *Roxb. Hort. Beng.* 21, and *Fl. Ind.* ii. 63; leaves as in *C. australis*, but more persistent more entire usually brown when dry, flowers usually tetrandrous in shorter more robust, more often bisexual cymes, drupes solitary or binate globose or ovoid. *Planch. in Ann. Sc. Nat. Ser.* 3, x. 300; *DC. Prodr.* xvii. 179; *Kurz For. Fl.* 472; *Dalz. & Gibs. Bomb. Fl.* 337. C. trinervia, *Roxb. Fl. Ind.* ii. 65; *Gamble Man. Ind. Timb.* 344; *Wall. Cat.* 3695. C. serotina, *Planch. in Ann. Sc. Nat. l. c.*; *Wight Ic.* t. 1570; *Beddome For. Man.* 218, and *Sylv. Madr.* t. 218. C. Roxburghii, *Planch. in Herb. DC. l. c.*; *Bedd. l. c.* t. 312. C. glabra, *var.* nepalensis, *Planch. l. c.* 298.

LOWER OUTER HIMALAYA, from Kumaon eastwards, ascending to 3000 ft. in Sikkim; KHASIA MTS., CHITTAGONG, BURMA, BEHAR, and the DECCAN PENINSULA on the Eastern and Western Ghats.—DISTRIB. Malay Islands.

Except by the trifling characters given above, I do not see how this is distinguished from *C. australis*. The leaves are often subentire. The drupes vary in shape, size and length of pedicels.

VAR. *Hamiltoni*; branchlets and leaves tawny pubescent, leaves yellowish green on both surfaces when dry. C. Hamiltoni, *Planch. ll. c.* 301 and 179.—Sikkim Himalaya, the Khasia Mts., Chittagong and Burma.

VAR. *mollis*; leaves entire or subentire softly fulvous-tomentose beneath, yellowish when dry, drupes sparingly hairy. C. mollis, *Wall. Cat.* 7203; *Planch. ll. c.* 297, 179; *Kurz l. c.* 472.—Burma, *Wallich.*

3. **C. cinnamomea,** *Lindl. in Wall. Cat.* 3696; leaves evergreen coriaceous obliquely ovate acuminate crenate-serrate 3-nerved to below the

tip, cymes short, flowers stoutly shortly pedicelled, drupes racemed narrowed to the tip. *Planch. in Ann. Sc. Nat. Ser.* x. 303; *DC. Prodr.* xvii. 181; *Kurz For. Fl.* ii. 472; *Blume Mus. Bot.* ii. 72; *Miq. Fl. Ind. Bat. Suppl.* 412. C. dysodoxylon, *Thwaites Enum.* 267; *Bedd. For. Man.* 219. C. Waitzii, *Blume l. c.* 71; *Planch. in DC. l. c.* 180.

SIKKIM HIMALAYA; in the lower hills, ASSAM, CHITTAGONG and BURMA. CEYLON; Central Province, ascending to 5000 ft.—DISTRIB. Malay Islands.

I doubt this being distinct from *C. tetrandra*; the habit is the same, as is the inflorescence, but the drupes have an almost beaked apex.—The wood in Ceylon smells disgustingly.

4. **C. Wightii,** *Planch. in Ann. Sc. Nat. Ser.* 4, x. 307; *DC. Prodr.* xvii. 184; leaves very coriaceous straight oblong or elliptic-oblong acute entire or very sparsely crenate-serrate 3-nerved to the tip, drupes racemed ellipsoid obtuse or 2-cuspidate scarlet. *Wight Ic.* t. 1969; *Bedd. For. Man.* 218; *Wall. Cat.* 9056. Solenostigma Wightii, *Miq. Fl. Ind. Bat.* i. ii. 220; *Kurz For. Fl.* ii. 471. S. consimile, *Blume Mus. Bot.* ii. 68. Bosia trinervia, *Roxb. Fl. Ind.* ii. 87.

The Circars, *Roxburgh*. NILGHIRI HILLS, alt. 4–6000 ft., *Wight*, &c. ANDAMAN ISLANDS, *Kurz*. CEYLON, dry parts of the island.—DISTRIB. Malay Islands, Australia.

A large tree (*Roxburgh*); branches stiff, glabrous or tomentose. *Leaves* 4–6 in., bifarious, acute or cuspidate, yellowish when dry, glabrous or pubescent beneath, nerves very strong, cross-nervules parallel; stipules peltate, caducous. *Cymes* stout, short, axillary, male and bisexual fl. together; sepals acute. *Drupe* $\frac{1}{4}$–$\frac{1}{2}$ in. long; nut reticulate, styles deciduous.—The straight leaves with nerves produced to the tip are very different from those of the preceding species. I suspect that *C. philippinensis* is not different from *C. Wightii*.

4. TREMA, *Lour.*

Shrubs or trees, unarmed. *Leaves* alternate, serrate, base 3–7-nerved; stipules lateral, caducous. *Flowers* unisexual or polygamous, in small axillary cymes. MALE FL. *Sepals* 4–5, induplicate-valvate or subimbricate. *Stamens* 4–5, erect in bud. *Pistillode* 0 or small. FEM. FL. *Sepals* of the male in staminiferous flowers, flat and subimbricate in unisexual. *Ovary* sessile; style terminal, arms 2 linear; ovule pendulous. *Drupe* small, straight, ovoid or subglobose, usually crowned by the style, endocarp hard. *Albumen* fleshy; embryo curved or involute; cotyledons narrow; radicle upcurved, incumbent.—Species about 20, tropical and subtropical.

1. **T. timorensis,** *Blume Mus. Bot.* ii. 60; nearly glabrous, branches very slender, leaves membranous ovate-oblong or -lanceolate caudate-acuminate serrulate base rounded or subcordate, petiole very slender, cymes glabrous equalling the petiole or shorter, fruiting sepals narrow ciliate, drupe turgidly ovoid, nut rugose. *Kurz For. Fl.* ii. 469. T. virgata, *Blume l. c.* Sponia virgata, *Planch. in Ann. Sc. Nat. Ser.* 3, x. (1848) 316; *DC. Prodr.* xvii. 195. S. timorensis, *Dene. Herb. Timor.* 170; *Planch. ll. c.* 318, 196. Celtis virgata, *Roxb. in Wall. Cat.* 3694.

TENASSERIM and the MALAY PENINSULA.—DISTRIB. China, Malay Islands? Australia.

A small evergreen tree, branchlets almost filiform, pubescent, drooping. *Leaves* 3–5 in., thin, nerves slender; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Cymes* few-fld., glabrous. *Drupe* $\frac{1}{8}$ in. diam.

2. **T. angustifolia,** *Blume Mus. Bot.* ii. 58; branches very slender, leaves ovate-lanceolate finely acuminate serrulate scabrous on both surfaces base rounded rufous beneath with strigose nerves, cymes hispidulous about equalling the petioles, drupe ovoid. Sponia angustifolia, *Planch. in Ann Sc. Nat. Ser.* 3, x. 326; *DC. Prodr.* xvii. 202. Celtis angustifolia, *Lindl. in Wall. Cat.* 3691.

PENANG, *Wallich.* MALACCA, *Griffith* (*Kew Distrib.* 4685).

Very similar to *T. virgata*, and perhaps a variety of that plant, but the leaves are narrower, scabrid, rufous when dry beneath, and the flowers hispidulous.

3. **T. orientalis,** *Blume Mus. Bot.* ii. 62; branchlets appressed-pubescent, leaves rigid obliquely ovate-oblong or oblong-lanceolate acuminate crenate-serrulate scabrid above beneath silvery with appressed pubescence, base 3–7-nerved cordate, cymes lax spreading usually longer than the petiole, drupe ovoid black. *Kurz For. Fl.* ii. 468 (*var.* orientalis proper); *Benth. Fl. Austral.* vi. 158. Sponia orientalis, *Planch. in Ann. Sc. Nat. Ser.* 3, x. 323; *DC. Prodr.* xvii. 200; *Brandis For. Fl.* 430; *Bedd. For. Man.* 219. S. Wightii, *Planch. l. c.* 322; *Wight Ic.* t. 1971; *Bedd. Fl. Sylvat.* t. 311; *Dalz. & Gibs. Bomb. Fl.* 238. Celtis orientalis, *Linn. Fl. Zeyl.* 176 *in part*; *Roxb. Fl. Ind.* ii. 65; *Wall. Cat.* 3689.

Foot of the NEPAL and SIKKIM HIMALAYA; BENGAL, BEHAR, and southwards to TRAVANCORE and SINGAPORE. CEYLON common.—DISTRIB. Malay Islands.

An evergreen small tree. *Leaves* 3–6 in., nerves 3–4 pairs, stipules as long as the young petioles, deciduous. *Stigmas* villous, reflexed in fruit. *Drupe* $\frac{1}{6}$ in. long, glabrous.

4. **T. amboinensis,** *Blume Mus. Bot.* ii. 61; branchlets villous or tomentose, leaves usually large ovate-oblong caudate-acuminate serrulate scaberulous or pubescent above beneath silkily tomentose velvety or villous, cymes usually large compact and exceeding the petiole. *Benth. Fl. Austral.* vi. 159. T. orientalis, *var.* amboinensis, *Kurz For. Fl.* ii. 469. T. velutina & Burmanni, *Blume l. c.* 62. ? T. cannabina, *Lour. Fl. Coch.* Sponia amboinensis, *Dcne. in Nouv. Ann. Mus.* iii. 498; *Planch. in DC. Prodr.* xvii. 199. S. Griffithii, *Planch. in Ann. Sc. Nat. Ser.* 3, x. 324. S. amboinensis & velutina, *Miq. Fl. Ind. Bat.* i. ii. 216. S. velutina, *Planch. l. c.* 327; *Bedd. For Man.* 219. S. Burmanni, *Planch. in DC. l. c.* 200. Celtis amboinensis, *Willd. Sp. Pl.* iv. 997; *Wall. Cat.* 3690; *Brongn. in Bot. Duperr. Voy.* 212, t. 47. C. tomentosa, *Roxb. Fl. Ind.* ii. 66. C. caudata, *Wall. mss.*

SIKKIM HIMALAYA; in hot valleys, ASSAM, SILHET, and southwards to SINGAPORE and the ANDAMAN ISLANDS.

A tree with the habit of *T. orientalis*, from which it differs in the tomentose leaves, and of which it is perhaps a large form, as considered by Kurz. If it should prove to be the *Trema cannabina* of Loureiro, that author's name will stand.

5. **T. politoria,** *Planch. in Ann. Sc. Nat. Ser.* iii. x. (1848) 326; *DC. Prodr.* xvii. 202 (Sponia); branchlets stout scabridly hairy, leaves oblong- or ovate-lanceolate acuminate base nearly equal serrulate very scabrid on both sufaces, cymes compact males about equalling the petiole. *Brandis For. Fl.* 430; *Gamble Man. Ind. Timb.* 345. Celtis politoria, *Wall. Cat.* 3693.

Dry places in the SUBTROPICAL HIMALAYA, from the Salt Range eastwards to OUDH and SIKKIM, and southwards to Mount Aboo in MARWAR and CENTRAL INDIA.

A small tree, sparingly branched. *Leaves* 2–5 in., triple- and penni-nerved, very

hard and roughly shortly hispid, usually shining above, paler beneath, base rounded or cordate, hairs with swollen persistent bases; petiole ¼ in.; stipules longer than the petiole, deciduous.

5. GIRONNIERA, *Gaud.*

Evergreen unarmed trees or shrubs. *Leaves* alternate, penninerved; stipules sheathing the buds, caducous. *Flowers* diœcious, in axillary cymes, or the fem. solitary. MALE FL. *Sepals* 5, broad, obtuse, imbricate. *Stamens* 5, erect in bud. *Pistillode* woolly. FEM. FL. *Sepals* narrower than the males, acute. *Ovary* sessile; style central, arms 2 filiform; ovule pendulous. *Drupe* ovoid or suborbicular, terete or compressed, often 2-keeled, endocarp hard. *Albumen* 0, scanty or copious; embryo contorted.—Species 8 or 10, South Indian, Malayan and Chinese.

1. **G. nervosa,** *Planch. in Ann. Sc. Nat. Ser.* 3, x. (1848) 338; *DC. Prodr.* xvii. 206; branchlets petioles peduncles and leaf-nerves beneath tawny or golden silkily villous, leaves elliptic or oblong acuminate entire subsilky between the very stout nerves beneath, male cymes spiciform, drupe ovoid compressed beaked hispidulous. *Kurz For. Fl.* ii. 469; *Miq. Fl. Ind. Bat.* i. ii. 223; *Suppl.* 412; *Blume Mus. Bot.* ii. 74. Antidesma nervosum, *Wall. Cat.* 7289.

PENANG, *Porter*; PERAK, MALACCA and SINGAPORE, *Griffith*, &c.—DISTRIB. Malay Islands.

A tree attaining 70 ft. *Leaves* 5–7 in., coriaceous, opaque and glabrous above; nerves 12–15 pairs, sunk above, very strong beneath, interspaces reticulated, base acute; petiole ¼–⅓ in.; stipules ¾–1 in., silky. *Cymes* 1–1½ in.; males rather stout with few dense-fld. branches; fem. cymes of sparingly branched racemes. *Drupe* shortly pedicelled, ¼–⅓ in. long, obtusely 2-edged.—Kurz gives "Burma probably Tenasserim" as a habitat, but I have seen no specimens.

2. **G. subæqualis,** *Planch. in Ann. Sc. Nat. Ser.* 3, x. 339; *DC. Prodr.* xvii. 206; branchlets stipules young petioles leaf-nerves beneath and cymes sparsely strigose, leaves elliptic or elliptic-oblong acuminate entire scaberulous beneath between the nerves shining on both surfaces, drupe broadly ellipsoid compressed appressed-pubescent. *Miq. Fl. Ind. Bat.* i. ii. 222; *Blume Mus. Bot.* ii. 73. G. nervosa, *var.* subæqualis, *Kurz For. Fl.* ii. 470. G. costata, *Miq. in Zoll. Cat.* 88, and in *Fl. Ind. Bat. l. c.* Sponia annulata, *Teijsm. & Binnend. in Nat. Tijdsch. Neerl. Ind.* ii. 363.

PERAK, *Scortechini, King's Collector.* MALACCA, *Maingay.* ANDAMAN ISLANDS, *Kurz.*—DISTRIB. Malay Islands, China.

A tree, 70–80 ft. *Leaves* 5–8 in., sometimes 5 in. broad, pale brown when dry, very coriaceous, reticulate beneath between the 8–10 pairs of strong nerves; base acute; petiole ⅓–⅔ in.; stipules ½–¾ in. *Cymes* sparingly branched, slender, much longer than in *G. nervosa.* *Drupe* ⅓–½ in., compressed, obtusely 2-edged, usually beaked, rarely orbicular.

VAR. *ceylanica*, Thwaites Enum. 268; more slender, leaves narrower caudate-acuminate less rigid and coriaceous sometimes oblanceolate and serrulate towards the tip, stipules smaller silkily villous, fem. cymes very few-fld., drupe smaller subsolitary axillary. G. parvifolia, *β. in part, Planchon l. c.* G. subæqualis, *Bedd. For. Man.* 219, and *Fl. Sylvat.* t. 313. Helminthospermum scabridum, *Thwaites in Hook. Journ. Bot.* vi. (1854) 303, t. 9 C.—Ceylon, in the Central Province, alt. 1000–2000 ft., *Walker.*—Referred by Planchon to *G. parvifolia,* but I think, with Thwaites, that it is much nearer *G. subæqualis.* Better specimens are wanted. Beddome figures the Ceylon *G. subæqualis* as having only 4–5-nerved leaves, and the male flowers as forming minute axillary clusters.

VAR. *birmanica*; leaves large elliptic more membranous crenate-serrate above the middle.—Tenasserim, on Mount Moolyet, *Beddome* (fem. fl. only).

3. **G. parvifolia,** *Planch. in Ann. Sc. Nat. Ser.* 3, x. (1848) 338; *DC. Prodr.* xvii. 206 (*excl. syn.*); branchlets young petioles stipules and leaf-nerves beneath faintly strigose, leaves elliptic ovate or ovate-lanceolate acuminate rather shining nearly smooth beneath, male cymes very slender much branched, flowers very minute, drupe ovoid or orbicular compressed 2-edged appressed puberulous. *Miq. Fl. Ind. Bat.* i. ii. 223.

PERAK, *Scortechini, King's Collector.* PENANG, *Maingay* (*Kew Distrib.* 1470). MALACCA, *Griffith.*

A shrub or small tree; branches slender. *Leaves* 3–5 in., quite entire, reticulate, nearly smooth beneath between the 6–8 pairs of rather slender raised nerves; petiole $\frac{1}{8}$–$\frac{1}{4}$ in.; stipules $\frac{1}{2}$ in., silkily strigose. *Male cymes* with scattered clusters of 2–3 flowers, peduncle and branches filiform. *Fem.* cymes few-fld. *Drupes* 2–3 on a long slender peduncle, $\frac{1}{3}$ in. broad, often long-beaked, and with the style-arms 1 in. long. —Planchon, erroneously including the Cingalese *G. subæqualis* var. *ceylanica*, describes the leaves as serrate above the middle.

4. **G. reticulata,** *Thwaites Enum.* 268; glabrous except the youngest shoots, leaves oblong- to ovate-lanceolate acuminate or caudate base rounded or acute quite smooth and glabrous on both surfaces, male cymes much branched, fem. few-fld., drupes large solitary axillary ovoid hardly compressed quite glabrous. *Bedd. Fl. Sylvat.* t. 313. G. cuspidata, *Kurz For. Fl.* ii. 470. Sponia subserrata, *Kurz in Flora*, 1872, 448. Aphananthe cuspidata, *Planch. in DC. Prodr.* xvii. 209. Galumpita cuspidata, *Blume Mus. Bot.* ii. 73; *Miq. Fl. Ind. Bat.* i. ii. 224. Cyclostemon cuspidatum, *Blume Bijd.* 599. Helminthosperma glabrescens, *Thwaites mss.* Celtis reticulata, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 1–3000 ft., *Kurz*, &c. ASSAM; Goalpara, *Hamilton.* KHASIA MTS., alt. 2000 ft., *Mann.* UPPER BURMA, at the Serpentine mines, *Griffith.* PEGU, *Kurz.* DECCAN PENINSULA; on the Ghats from S. Canara to Travancore. CEYLON; Badulla district, ascending to 3000 ft.—DISTRIB. Java.

A lofty tree, branchlets slender, glabrous. *Leaves* 3–7 in., very long-pointed, finely reticulated on both surfaces, young serrulate above the middle, often shining above; nerves 10–12 pairs, slender; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Male cymes* shortly peduncled; branches short, many-fld.; flowers nearly glabrous; pistillode of male a very small tuft of hairs. *Drupes* about as long as their pedicel, $\frac{1}{2}$–$\frac{3}{4}$ in. long, stoutly beaked, obscurely 2-angled.

5. **G. lucida,** *Kurz For. Fl.* ii. 470; quite glabrous, leaves oblong or oblong-lanceolate or -ovate acuminate shining on both surfaces, base rounded or cuneate, male cymes shortly peduncled much branched quite glabrous, drupes large solitary axillary ovoid hardly compressed quite glabrous.

SOUTH ANDAMAN ISLANDS, *Kurz, King's Collector.*

A tree, 30–40 ft. *Leaves* 5–8 in., very coriaceous, glossy above with 10–15 pairs of impressed nerves, reticulate beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Male fl.* and drupe as in *G. reticulata*, from which *G. lucida* differs chiefly in the larger more coriaceous glossy foliage, with more leaf-nerves.

5*. HUMULUS, *Linn.*

Perennial, twining, scabrid herbs. *Leaves* opposite, lobed, palmatinerved; stipules lateral, persistent. *Flowers* dicœcious, males panicled; fem. in pairs in the axils of the broad bracts of a catkin-like ovoid spike, bracteate and 2-bracteolate. MALE FL. *Sepals* 5, imbricate. *Stamens* 5, adnate to the

sepals, erect in bud. *Pistillode* 0. FEM. FL. *Sepal*, a membranous scale. *Ovary* sessile, compressed; styles 2, subulate; ovule pendulous, campylotropous. *Fruit* an ovoid spike of imbricating bracts in the axils of which are 2 flattened achenes each enclosed in its sepal. *Albumen* scanty or 0; embryo a flat helix.—Species one Chinese and Japanese, and the following.

H. LUPULUS, *Linn. Sp. Pl.* 1028; bracts and bracteoles scarious covered with resinous glands. *A. DC. Prodr.* xvi. i. 29; *Bentl. & Trim. Med. Pl.* iv. 230; *Reichb. Ic. Fl. Germ.* xii. t. 656.

NORTH-WEST HIMALAYA, cultivated. Native of N. America, and perhaps of N. Asia.

Rootstock stout, branched; stems tall, scabrid or prickly with reversed bristles. *Leaves* 3–4 in. diam., petioled, cordate, toothed, upper ovate, lower 3–5-lobed. *Male fl.* $\frac{1}{4}$ in. diam.; panicles 3–5 in. across. *Fem. heads* $\frac{1}{2}$ in. diam., yellow; styles purple; fruiting $1\frac{1}{2}$ in. diam., scales orbicular.—The Hop.

6. **CANNABIS,** *Tournef.*

A tall erect annual herb. *Leaves* alternate or the lower opposite, upper 1–3- lower 5-11-partite, serrate, palmatinerved; stipules lateral. *Flowers* small, axillary, diœcious, males fascicled in short pendulous panicles; fem. crowded under leafy convolute bracts. MALE FL. *Sepals* 5, imbricate. *Stamens* 5, erect in bud. *Pistillode* 0. FEM. FL. *Perianth* hyaline, embracing the ovary or 0. *Ovary* sessile; style central, arms 2 filiform caducous; ovule pendulous. *Achene* compressed, crustaceous. *Seed* flattened, albumen unilateral fleshy; embryo curved, cotyledons broad thick subequal, radicle upcurved incumbent.

C. sativa, *Linn. Sp. Pl.* 1027; *Roxb. Fl. Ind.* iii. 772; *Grah. Cat. Bomb. Pl.* 187; *A. DC. Prodr.* xvi. i. 30; *Bentl. & Trim. Med. Pl.* iv. 231; *Reichb. Ic. Fl. Germ.* t. 655; *Wall. Cat.* 4665. C. indica, *Lamk. Encycl.* i. 695.—*Rheede Hort. Mal.* x. 60, 61.

Throughout INDIA; wild in the N.-W. Himalaya, cultivated elsewhere.—DISTRIB. Central Asia, wild; cultivated in temp. and trop. regions.

Stem 4–8 ft., strict, subsimple. *Leaves* 4–8 in. diam. *Flowers* green.—Hemp; produces cordage, and Bhang or Kief.

7. **PSEUDOSTREBLUS,** *Bureau.*

Unarmed glabrous trees. *Leaves* alternate, quite entire, penninerved; stipules small, lateral, caducous. *Flowers* monœcious, axillary, males in short cymes, fem. 4-bracteolate, solitary in different axils, or solitary in the male cyme. MALE FL. *Sepals* 5, orbicular, imbricate. *Stamens* 5, inflexed in bud. *Pistillode* small, linear. FEM. FL. *Sepals* 4, orbicular, concave, embracing the ovary. *Ovary* subglobose; style terminal, arms 2 filiform subequal; ovule pendulous. *Fruit* (unripe) enclosed in the enlarged perianth.—Species 3, Eastern Indian and Malayan.

P. indica, *Bureau in DC. Prodr.* xvii. 220; leaves elliptic oblong or oblong-lanceolate acuminate base acute, nerves very many parallel nearly horizontal and anastomosing.—Epicarpurus, No. 8, *Herb. Ind. Or. H. f. & T.*

KHASIA MTS.; Bor panee River, alt. 4000 ft., *J. D. H. & T. T.*

A small tree; shoots and inflorescence puberulous. *Leaves* 4–6 in., coriaceous, glabrous, drying brown, rather shining on both surfaces; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules ovate-lanceolate. *Male fl.* about $\frac{1}{5}$ in. diam.; buds globose; *fem.* much larger. *Fruit* $\frac{1}{2}$ in. diam. or more.

8. **TAXOTROPHIS,** *Blume.*

Spinous trees or shrubs. *Leaves* alternate, penninerved; stipules small, connate, caducous. *Flowers* dicœcious, axillary, males in short spikes racemes or fascicles, fem. 1–4 on a long peduncle. MALE FL. *Sepals* 4, valvate. *Stamens* 4, inflexed in bud. *Pistillode* with a dilated top. FEM. FL. *Sepals* 4, imbricate, persistent and shorter than the fruit. *Ovary* ovoid, straight, at length very oblique; style 2-partite, at length lateral; ovule pendulous. *Fruit* obliquely subglobose, fleshy on one side and at the base, apex thin. *Seed* oblique, albumen 0; cotyledons broad, fleshy, crumpled, radicle upcurved.—Species 3–4, Ceylon and Malayan.

T. zeylanica, *Thwaites Enum.* 264; glabrous, leaves rhombic or trapezoidly elliptic obtusely acuminate serrate. *Beddome Forester's Man.* 222, t. 26, f. 3. Diplocos zeylanica, *Bureau in DC. Prodr.* xvii. 215. Epicarpurus zeylanicus, *Thwaites in Hook. Lond. Journ.* iv. (1852) 1, 3, t. 2; *Wight Ic.* t. 1962 (*the lower left-hand figure*). Streblus zeylanica, *Kurz For. Fl.* ii. 464.

BURMA, *Griffith* (*Kew Distrib.* 4659). CEYLON, near Kandy, *Thwaites.*

A small evergreen tree or shrub; spines short or long, straight; shoots puberulous. *Leaves* 3–4 in., rhomboidly oblong or lanceolate, obtusely caudate, glabrous; petiole $\frac{1}{12}$–$\frac{1}{10}$ in.; stipules lanceolate. *Male fl.* minute, shortly pedicelled, subracemose, puberulous. *Fruit* size of a pea, subtended by the small lanceolate rather enlarged sepals.

9. **PHYLLOCHLAMYS,** *Bureau.*

Glabrous spinous trees or shrubs; sap milky. *Leaves* alternate, penninerved; stipules lateral, free. *Flowers* dicœcious, males in short axillary involucrate spikes or clusters; fem. solitary, peduncled. MALE FL. *Sepals* 3–4, ovate, imbricate. *Stamens* 3–4, inflexed in bud. *Pistillode* dilated at the top. FEM. FL. *Sepals* 3–4, accrescent and foliaceous in fruit. *Ovary* straight in flower, at length very oblique; style 2-partite, at length lateral; ovule pendulous. *Fruit* small, shorter than the sepals, obliquely globose or ovoid, subfleshy below, with a very thin umbonate apex. *Seed* oblique, albumen very scanty; embryo globose, one cotyledon very large 2-fid enclosing the smaller, radicle upcurved.—Species 2 or 3, Indian and Malayan.

1. **P. spinosa,** *Bureau in DC. Prodr.* xvii. 218; leaves subsessile elliptically rhombic or subtrapezoid remotely serrate on one or both margins or subentire. *Brandis For. Fl.* 411; *Bedd. For. Man.* 220, t. 26, f. 2. Epicarpurus spinosus, *Wight Ic.* 1962 (*upper and right-hand figures*). E. timorensis, *Dcne. Herb. Timor.* 171, t. 21. Taxotrophis Roxburghii, *Blume Mus. Bot.* ii. 78; *Miq. Fl. Ind. Bat.* i. ii. 279; *Thw. Enum.* 264. Trophis spinosa, *Roxb. Fl. Ind.* iii. 762 (*not of Willd.*). T. taxiformis, *Spreng. Syst.* iii. 902. T. taxoides, *Heyne in Roth Nov. Sp.* 368. T. ? Heyneana, *Wall. Cat.* 4642. Streblus taxoides, *Kurz For. Fl.* ii. 465.

DECCAN PENINSULA; the Circars, *Heyne*; Courtallam, *Wight.* BURMA and the ANDAMAN ISLANDS, *Kurz.* CEYLON, in the dry districts.—DISTRIB. Malay Islands.

A small evergreen gnarled tree; spines long, strong, often leafy and flowering. *Leaves* 2–4 in., nerves 6–8 pair, nearly straight; petiole $\frac{1}{6}$ in.; stipules acute. *Bracts* of small involucres short, imbricate. *Fem. peduncles* solitary or binate, bracteate at or below the middle. *Fruiting sepals* $\frac{1}{2}$–1 in., lanceolate, acuminate. *Fruit* size of a cherry.—Wight describes the fem. sepals as 5, but figures 4.

VAR. ? *microphylla*, Kurz l. c.; shoots and spines puberulous, leaves 1–$1\frac{1}{2}$ in. ovate to oblong obtuse mucronate crenate.—Irawaddi River in swampy forests, *Kurz*.

2. **P. Wallichii,** *King in Herb. Calcutt.*; leaves elliptic-oblong or lanceolate obtuse or obtusely acuminate quite entire or very obscurely toothed.—Erythroxyli fere facie, &c., *Br. in Wall. Cat.* 7519.

PENANG, *Porter, Curtis.* PERAK, *King's Collector.*

A thorny shrub or small tree, 10–15 ft.; branchlets quite glabrous. *Leaves* 5–7 in., coriaceous, pale when dry, strongly reticulate between the nerves beneath; petiole $\frac{1}{10}$ in. *Male fl.* in small globose sessile clusters, sparsely pubescent. *Fruit* $\frac{1}{2}$ in. diam., sepals $\frac{3}{4}$ in., oblong, obtuse.—In Wallich's specimens some branchlets are clothed with ovate acute rigid imbricating bracts or scales $\frac{1}{12}$ in. long, which no doubt led to Brown's observation (*facie Erythroxyli*) in Herb. Wallich.

10. STREBLUS, *Lour.*

Unarmed shrubs or trees, juice milky. *Leaves* scabrid, alternate, penni-nerved; stipules small, subulate. *Flowers* axillary, di- rarely monœcious, males in peduncled heads or spikes; fem. peduncled, solitary or 2–4 together. MALE FL. *Sepals* 4, imbricate. *Stamens* 4, inflexed in bud. *Pistillode* dilated at the top. FEM. FL. bracteate. *Sepals* of male embracing the ovary. *Ovary* straight, retuse; style central, arms very long; ovule pendulous. *Fruit* membranous, subglobose, not oblique, laxly clothed with the persistent sepals. *Seed* globose, testa membranous, albumen 0; embryo globose, one cotyledon very large fleshy, enclosing the other which is very small and the upcurved radicle.—Species 2, Indian and Malayan.

1. **S. asper,** *Lour. Fl. Cochin.* ii. 615; scabrid, male fl. capitate. *Bureau in DC. Prodr.* xvii. 218; *Brand. For. Fl.* 410; *Kurz For. Fl.* ii. 464; *Dalz. & Gibs. Bomb. Fl.* 240; *Bedd. For. Man.* 221, t. 26, f. 1; *Miq. Fl. Ind. Bat.* i. ii. 278, and *Suppl.* 171; *Gamble Man. Ind. Timb.* 326. Epicarpurus orientalis, *Blume Bijd.* 488; *Wight Ic.* t. 1961. E. asper, *Steud. Nomencl.* i. 556. Trophis aspera, *Retz. Obs.* v. 30 (*excl. syn.*); *Roxb. Fl. Ind.* iii. 761; *Wight in Hook. Journ. Bot.* i. (1834) 62, t. 121; *Wall. Cat.* 4640. T. cochinchinensis, *Poir. Encycl.* viii. 123. T. aculeata, *Roth Nov. Sp.* 868. Achymus patens, *Soland. mss.*—*Rheede Hort. Mal.* i. t. 48.

Drier parts of India; from ROHILKUND, eastward and southward to TRAVANCORE, PENANG and the ANDAMAN ISLANDS. CEYLON; common.—DISTRIB. Malay Islands, Cochin China, China, Siam.

A rigid shrub or gnarled tree; branchlets tomentose or pubescent. *Leaves* 2–4 in., rigid, elliptic, rhomboid, ovate or obovate, irregularly toothed; petiole $\frac{1}{12}$ in. *Male heads* globose, solitary or 2-nate, sometimes androgynous; peduncle short scabrid; flowers minute. *Fem. fl.* longer peduncled. *Fruit* pisiform; perianth yellow.

2. **S. mitis,** *Kurz For. Fl.* ii. 464; glabrous, male fl. in simple or branched spikes.

AVA; on the Kakhyen Hills, *Kurz.*

I do not know this plant, which Kurz describes as an evergreen tree with leaves

like those of *S. scaber*, but much larger (2–4 in.), membranous, oblong to obovate, with rounded base, and male spikes ½–1 in. *Fem. fl.* unknown.—Probably not a *Streblus*.

11. **BROUSSONETIA,** *Vent.*

Trees or shrubs. *Leaves* alternate, serrate or lobed; stipules lateral, deciduous. *Flowers* diœcious, in solitary capitate or cylindric spikes. MALE FL. *Perianth* 4-fid, or -lobed, valvate. *Stamens* 4, inflexed in bud. *Pistillode* minute. FEM. FL. mixed with persistent bracts. *Perianth* ovoid or tubular, 3–4-toothed, persistent. *Ovary* included, stipitate; style subulate, 2-partite; ovule pendulous. *Achenes* in small heads, surrounded with the bracts and perianths, stipitate, exserted, fleshy below crustaceous above; style excentric. *Albumen* scanty; cotyledons oblong, equal, radicle ascending incumbent.—Species 2–3, Malayan, Chinese and Japanese.

B. papyrifera, *Vent. Table Règne Vég.* iii. 547; branchlets subtomentose, leaves obliquely ovate or oblong acuminate entire or (young) sinuately 2–3-lobed and toothed scabrid above pubescent beneath. *Bureau in DC. Prodr.* xvii. 224; *Brand. For. Fl.* 410; *Kurz For. Fl.* ii. 467; *Bot. Mag.* t. 2358; *Andrews Bot. Rep.* t. 488.

MARTABAN and AVA HILLS, *Kurz.*—DISTRIB. Malay and Pacific Islands.

A small tree. *Leaves* 3–8 in., membranous; petiole 2–3 in. *Male spikes* 2–3 in., cylindric, peduncled, pubescent. *Fem. heads* longer peduncled, globose, ½–⅔ in. diam., tomentose. *Fruit* fleshy, red, shining, stipes long.

12. **ALLÆANTHUS,** *Thwaites.*

Trees, flowering after the leaves fall, sap milky. *Leaves* alternate, penninerved from the base; stipules lateral. *Flowers* diœcious, males in very long cylindric spikes, fem. capitate. MALE FL. *Perianth* 4-fid, imbricate. *Stamens* 4, inflexed in bud. *Pistillode* minute. FEM. FL. mixed with persistent bracts. *Perianth* tubular, 4-toothed, persistent. *Ovary* sessile; style elongate, undivided or with a short basal branch; ovule pendulous. *Achenes* in globose tomentose heads, oblique, sessile, surrounded with bracts and perianths, coriaceous. *Seed* exalbuminous; embryo recurved, cotyledons broad plicate, radicle ascending incumbent.—Species 2 or 3, Indian, Malayan and Cingalese.

1. **A. zeylanicus,** *Thwaites in Hook. Lond. Journ. Bot.* vi. (1854) 302, t. 9 B, and *Enum.* 263; branchlets pubescent, fem. heads solitary. *Bureau in DC. Prodr.* xvii. 223; *Bedd. Fl. Sylvat.* t. 307.

CEYLON; in the Central Province, alt. 1–2000 ft.

A deciduous tree, 30–40 ft.; branchlets terete, hairy. *Leaves* 3–4 in., distichous, hairy, cordate-lanceolate, acuminate, paler beneath; petiole ¼ in., hairy; stipules obliquely oblong, acuminate, striate. *Fem. heads* ⅓ in. diam., stoutly peduncled.

2. **A. Kurzii,** *Hook. f.*; branchlets quite glabrous, fem. heads cymose. Malaisia tortuosa, *Kurz For. Fl.* ii. 466 (*not of Blume*).

ASSAM, *Masters*; at Goalpara, *Clarke*. BURMA, *Griffith* (*Kew Distrib.* 4657). PEGU to TENASSERIM, *Kurz*.

Branchlets very long, terete. *Leaves* not seen. *Male spikes* 1–1½ in., in shortly ped uncled subracemose clusters, pendulous; bracts orbicular. *Fem. heads* ⅓ in. diam., 4–6 in a raceme, pubescent. *Achenes* 6–12 in a head, not protruded, ovoid, acute, cori aceous; style very long, undivided; cotyledons subequal, broad, thin, incurved.—

Resembles *Malaisia tortuosa*, a widely diffused Malayan and Australian plant, and mistaken for it by Kurz; it differs in the erect habit, embryo, and undivided style. The genera might well be united. The true *M. tortuosa*, though abundant from the Malay to the Pacific Islands, has not hitherto been found in the limits of British India.

13. **PLECOSPERMUM,** *Trecul.*

Glabrous trees or shrubs. *Leaves* alternate, quite entire, penninerved; stipules minute. *Flowers* diœcious, in axillary solitary or 2–3-nate peduncled heads. MALE FL. bracteolate. *Perianth-lobes* 4, concave, imbricate. *Stamens* 4, inflexed in bud. *Pistillode* minute, hairy. FEM. FL. *Perianths* fleshy, 4-toothed, connate into a fleshy many-celled head. *Ovary* straight, included; style filiform, undivided; ovule pendulous. *Achenes* few in the globose fleshy receptacle, coriaceous, adnate to the perianths. *Albumen* 0; embryo subglobose, one cotyledon very large fleshy, embracing the smaller folded one; radicle upcurved.—Species 3, an African and the following.

1. **P. spinosum,** *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 124; spinous. *Bureau in DC. Prodr.* xvii. 233; *Wight Ic.* t. 1963; *Brand. For. Fl.* 401; *Gamble Man. Ind. Timb.* 327; *Bedd. Flor. Sylvat.* t. 220. Batis spinosa, *Roxb. Fl. Ind.* iii. 762 (*excl. syn. Rumph.*). B. aurantiaca, *Wall. mss.* Trophis spinosa, *Heyne in Willd. Sp. Pl.* iv. 734; *Wall. Cat.* 4641 A, E. T. aculeata, *Roth Nov. Sp.* 368.

From the SALT RANGE, alt. 3000 ft., eastwards along the foot of the Himalaya, and southwards to TRAVANCORE and CEYLON.

A shrub or tree, spines axillary, straight; branchlets puberulous. *Leaves* 2–3 in., elliptic-oblong or obovate, obtuse or acute, glabrous; nerves obscure; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Male heads* $\frac{1}{4}$ in. diam.; sepals obtuse or notched, pubescent. *Fruiting heads* $\frac{1}{2}$ in. diam., lobed, with 1–2 achenes.—Closely resembles *Cudrania javanensis* in habit and foliage.

2. **P. andamanicum,** *King in Herb. Calcutt.*; unarmed.

TENASSERIM; banks of the Atran, *Lobb*. ANDAMAN ISLANDS, *King's Collector*.

Apparently a larger stouter species than *P. spinosum*, and unarmed, with elliptic-oblong coriaceous leaves 4–5 by 2–3 in., rounded at the base, longer petioles ($\frac{1}{2}$–1 in.) and larger fem. heads on very stout peduncles.

14. **MORUS,** *Linn.*

Trees or shrubs. *Leaves* alternate, entire toothed or 3-lobed, base 3–5-nerved; stipules small, lateral, caducous. *Flowers* mono- or diœcious, spicate. MALE FL. *Sepals* 4, imbricate. *Stamens* 4, inflexed in bud. *Pistillode* turbinate. FEM. FL. *Sepals* 4, ducussate, imbricate, accrescent and succulent in fruit. *Ovary* included, straight, 1-celled; style central, 2-partite or 2-fid; ovule pendulous. *Fruiting spikes* or *heads* many; achenes enclosed in the succulent perianths. *Seed* subglobose, albumen copious fleshy; embryo incurved, cotyledons oblong equal, radicle ascending incumbent.—Species few, tropical and temperate.

I follow Brandis as to the first four Indian species of this genus, which he knew well in a living state, and had carefully studied. *M. atropurpurea*, Roxb. Fl. Ind. 595, Wall. Cat. 4647, a Chinese species closely allied to if not a variety of *M. alba*, with long cylindric dark-purple fruit, is cultivated in India.

M. ALBA, *Linn. Sp. Pl.* 986; leaves ovate or ovate-cordate acute often lobed toothed base 3-nerved, male sepals elliptic, fem. spikes short ovoid, outer sepals keeled, inner flat or concave, styles short free. M. alba (*in part*), *Bureau in DC. Prodr.* xvii. 238; *Roxb. Fl. Ind.* iii. 594; *Brand. For. Fl.* 407, t. 47; *Gamble Man. Ind. Timb.* 327; *Reichb. Ic. Fl. Germ.* t. 657. M. serrata, *Wall. Cat.* 4648 B. M. tatarica, *Linn. Sp. Pl. Ed.* 3, 1399; *Roxb. l. c.* 598; *Pallas Fl. Ross.* i. ii. 9, t. 52.

Cultivated in the PANJAB, NORTH-WEST HIMALAYA and WESTERN TIBET, ascending to 11,000 ft.—DISTRIB. Affghanistan, N. and W. Asia, wild, or cultivated (for its fruit).

A deciduous monœcious tree, 30–40 ft.; branchlets petioles and leaves beneath puberulous or pubescent. *Leaves* 2–3 in., rather membranous; petiole ½–1 in. *Fruiting spikes* peduncled, white or red, sweet.—Roxburgh describes this as diœcious. The common black mulberry differs from *alba* in its broader firm thick often 5-nerved leaves, subsessile fem. spikes, densely hairy perianth and styles, and purple acidulous-sweet fruit, *Brandis*. *M. alba* is cultivated for its fruit.

1. **M. indica,** *Linn. Sp. Pl.* 986; leaves ovate caudate-acuminate sharply serrate often deeply lobed scaberulous, male sepals elliptic hairy, fem. spikes short ovoid, sepals obovate, outer keeled, inner flat, styles long hairy connate below. M. alba, *var.* indica, *Bureau in DC. Prodr.* xvii. 243; *Roxb. Fl. Ind.* iii. 596; *Brand. For. Fl.* 408; *Kurz For. Fl.* ii. 468; *Gamble Man. Ind. Timb.* 328; *Wight Ic.* t. 674; *Wall. Cat.* 4645 (*except* H). M. parvifolia, *Royle mss.* ? M. acidosa, *Griff. Notul.* iv. 388. M. cuspidata, *Wall. Cat.* 4646; *Gamble l. c.* M. alba, *var.* cuspidata, *Bureau l. c.* 243.

TEMPERATE and SUBTROPICAL HIMALAYA, from Kashmir to Sikkim, ascending to 7000 ft., wild and cultivated (for silkworm-feeding) in Bengal, Assam, Burma, &c.—DISTRIB. China, Japan.

Habit of *M. alba*, but cultivated usually as a shrub, of which it is perhaps a form with long points to the rougher leaves, connate styles, and obovate female sepals. Wallich's 4645 H is a very different plant, which I do not recognize.

2. **M. serrata,** *Roxb. Fl. Ind.* iii. 596; leaves broadly ovate-cordate acuminate coarsely toothed or serrate, petiole tomentose, fem. spikes short cylindric, fem. sepals 2–4 equal oblong ciliate, styles very hairy connate below, fruit shortly cylindric purple sweet. M. alba, *L.* ?, *Wall. Cat.* 4648 A; *Brand. For. Fl.* 409; *Gamble Man. Ind. Timb.* 328. M. alba, *var.* serrata, *Bureau in DC. Prodr.* xvii. 242. M. pabularia, *Dcne. in Jacquem. Voy. Bot.* 149, t. 151. M. vicorum, *Jacquem. mss.*

TEMPERATE HIMALAYA, from Kumaon westwards, alt. 4–9000 ft. (cultivated in Kunawur).

A lofty tree, attaining 60–70 ft., and girth of trunk 28 ft.; young parts pubescent or tomentose. *Leaves* 2–8 in., often lobed, membranous; petiole 1–2 in., and young leaves beneath pubescent; stipules broadly lanceolate. *Spikes*, males 1–2 in., fem. ½ in., peduncles softly tomentose. *Sepals* of male elliptic-oblong, villous; filaments flattened below. *Fruit* mucilaginous.—United with *alba* by Bureau, but I think very distinct. Roxburgh describes the leaves as rough but void of pubescence, and distinguishes the species by the long points and remarkably large teeth of the leaves, thus resembling *M. indica.*

3. **M. lævigata,** *Wall. Cat.* 4649; leaves ovate or ovate-cordate cuspidate finely serrate toothed glabrous or subscaberulous, spikes of both sexes very long-peduncled, sepals 4 rounded concave of male very hairy of fem. glabrous, styles nearly free papillose, fruit long cylindric yellowish-

white sweet, acini very small. *Brand. For. Fl.* 409; *Kurz For. Fl.* ii. 467. M. alba, *var.* lævigata, *Bureau in DC. Prodr.* xvii. 245. M. glabrata, *Wall. mss.*

TROPICAL and SUBTROPICAL HIMALAYA; from the Indus to Assam, wild and cultivated, ascending to 4000 ft. BEHAR, cultivated, *Brandis.* MARTABAN and TENASSERIM, wild, *Kurz.*

A medium-sized tree, shoots stipules and peduncles softly hairy. *Leaves* 3–7 in., membranous, young sparsely pubescent, base rounded or cordate; petiole 1 in., pubescent; stipules slender. *Male spikes* 4–5 in., slender, villous, shortly peduncled; fem. as long, glabrous. *Fruit* insipid.

VAR. *viridis*, Bureau l. c. 245; leaves rounded at the top. M. viridis, *Ham. in Wall. Cat.* 4650.—Patna, *Hamilton.*

15. **SLOETIA,** *Teijsm. and Binnend.*

Trees. *Leaves* large, alternate, entire, penninerved; stipules lateral, caducous. *Flowers* monœcious, in solitary or binate axillary long male or androgynous spikes with peltate bracts, often unilateral; fem. few, amongst the males. MALE FL. *Perianth* 3-lobed or -partite, imbricate. *Stamens* 3, inflexed in bud. *Pistillode* small. FEM. FL. *Sepals* 4, embracing the ovary. *Ovary* straight; style subcentral, persistent, arms 2, very long and slender; ovule pendulous. *Fruit* globose or turgidly ovoid, elastically ejected. *Albumen* 0; cotyledons thin, broad, unequal, concave, outer embracing the smaller, radicle elongate.—Species 3 or 4, Malayan.

1. **S. Sideroxylon,** *Teijsm. & Binnend. in Tijdschrift. Nat. Ver.* 1863; leaves petioled 10–12 by 3½–5 in. elliptic-oblong or broadly oblanceolate cuspidate base acute subequal. *Bureau in DC. Prodr.* xvii. 257; *Kurz in Journ. Linn. Soc.* viii. 168, t. 13. Artocarpus elongatus, *Miq. Fl. Ind. Bat. Suppl.* 172, 419. Morus bifaria, *Hort. Calcutt.* (*in part*).

SINGAPORE, *Kurz.*—DISTRIB. Java, Sumatra.

A tall tree; shoots puberulous; branchlets smooth. *Leaves* shining above, subscaberulous beneath; nerves 16–22 pairs; petiole ½–1 in.; stipules ½ in. *Spikes* 3–5 in., one narrow part of the rachis flowerless. *Fruit* pisiform.—Kurz l. c. describes the nerves as 12 to 15 pairs, but I find (in his specimens) 16–20.

2. **S. penangiana,** *Oliv. in Hook. Ic. Pl.* t. 1531; leaves 9–15 by 3–5 in. subsessile elongate-oblong acuminate broader at the unequal subcordate base.

PENANG; on Government Hill, *Curtis.* PERAK; at Goping, *King's Collector.*

The form of the leaf distinguishes this from *S. Sideroxylon.* Old leaves from Perak are very large, glossy above, quite smooth beneath, cordate with overlapping lobes, and have a very stout petiole ¼ in. long. *Spikes* ½–¾ in. long (perhaps not well developed).

3. **S. Wallichii,** *King mss.*; leaves 6–9 by 1–3 in. shortly petioled oblanceolate or oblong and widened upwards cuspidate or acuminate, base very unequal acute obtuse or semicordate. Urticea, *Wall. Cat.* 9090. Morus bifaria, *Hort. Calc.* (*in part*).

PENANG, *Wallich*, &c. PERAK, *Scortechini, King's Collector.* MALACCA, *Maingay* (*Kew Distrib.* 1490). SINGAPORE, *Murton.*—DISTRIB. Java? (*Herb. Hort. Bogor.*, No. 7357.)

A much smaller-leaved species than either of the foregoing, with 10–20 pairs of nerves. *Spikes* 2–4 in., with a narrow flowerless streak on one side.—The Calcutta Garden specimens have elliptic-oblong leaves quite equal at the base.

16. **DORSTENIA,** *Linn.*

Herbs or small shrubs. *Leaves* alternate or radical, entire or lobed; stipules lateral. *Flowers* monœcious, crowded on a flat simple or lobed androgynous receptacle. MALE FL. *Perianths* more or less connate and adnate with the receptacle, obscurely 2-lobed or toothed. *Stamens* 1–3, inflexed in bud. *Pistillode* 0. FEM. FL. deeply sunk in the receptacle; perianth-mouth almost closed. *Ovary* included; style excentric or lateral, arms 2 subulate; ovule pendulous. *Achene* minute, crustaceous. *Albumen* 0; cotyledons subequal, contorted, embracing the upcurved radicle.—Species about 45, all American and African but the following.

D. indica, *Wall. Cat.* 4639; stem simple, leaves alternate membranous from obovate to lanceolate acuminate sinuate-toothed, receptacle peltate broadly obconic rounded or angular with 5–12 linear arms. *Bureau in DC. Prodr.* xvii. 272; *Wight Ic.* t. 1964.

DECCAN PENINSULA; in the Nilghiri, Pulney and Dindygul Mts., *Wight.* CEYLON; Central Province, alt. 3–6000 ft.

Sparsely hairy; stem 3–10 in., erect from a creeping base, stout or slender. *Leaves* 2–3½ in., narrowed into a petiole ½–1 in., puberulous or glabrous. *Receptacles* ⅓–⅔ in. diam.

17. **FICUS,** *Linn.* (by G. King).

Trees or shrubs, sometimes scandent, sap milky. *Leaves* alternate, rarely opposite, entire, lobed, serrate or toothed; stipules various. *Flowers* minute, unisexual, on the inner walls of a fleshy receptacle, the mouth of which is closed by imbricate bracts; flowers often mixed with bracteoles. MALE FL. *Perianth* 2–6-fid or partite, imbricate. *Stamens* 1–2, rarely 3–6, erect in bud. FEM. FL. *Perianth* of the male, or imperfect, or 0. *Ovary* straight or oblique; style excentric, stigma various; ovule pendulous. *Achenes* crustaceous or fleshy. *Albumen* scanty; embryo curved, cotyledons equal or unequal, radicle upcurved.—Species about 600, mostly tropical.

In *Ficus* the receptacles are sometimes unisexual, but are usually androgynous with the males nearest the mouth. The flowers are of four kinds or forms, male, female, galls, and (rarely) neuters. The male and female fl. are described above. The gall fl. are like the female but perfect no seed, their style is short, often dilated above, and the ovary occupied by the pupa of a Hymenopterous insect. Neuter flowers, found in Sect. *Synœcia* only, have the perianth of the males.—The male, fem. and gall fl. may occupy the same receptacle; or the males and galls one set of receptacles, and the fem. and neuters in another set; or the males and galls may be in one set of receptacles and the females in another set.

I am indebted to Dr. King for the following account of the Indian Figs, extracted from his fine work on the Indo-Malayan Fici prepared for the "Annals of the Calcutta Botanical Gardens," of which the first part only, embracing the four first sections of the genus, have as yet come to hand. It will be observed that I have throughout modified the wording and arrangements of the characters, so as to bring the descriptions into harmony with those of other genera in this Flora.

Owing to the redundancy of the synonymy and citations unhappily introduced into this genus through the multiplication of the species by the late Dr. Miquel, and the numerous works in which he published, I have been compelled to abbreviate the titles of the latter, which would otherwise have occupied an unreasonable amount of space. Thus "Miq. Ann." stands for "Miquel's Annales Musei Lugduni Batavorum;" "Miq. Flor." for his "Flora Indiæ Batavæ;" and "Miq. in L. J. B." for his papers in Hooker's London Journal of Botany.—J. D. H.

KEY TO THE SECTIONS, &c.

Sect. I. PALÆOMORPHE. *Male fl.* monandrous and containing a pistillode, in the same receptacles with gall fl. *Fem. fl.* in separate receptacles, their perianth gamophyllous (except in *M. gibbosa*).—Small trees or erect or subscandent shrubs. Sp. 1–6.

Sect. II. UROSTIGMA. *Flowers* unisexual or asexual. *Male, fem.* and *gall fl.* in the same receptacle; stamens 1 (sometimes 2 in Nos. 52 and 53); stigma elongate, usually acute.—Usually trees or powerful climbers, epiphytal, at least in early life. *Leaves* alternate, entire, rarely membranous. *Receptacles* axillary, or from the scars of fallen leaves, base tribracteate (bracts at the base of the peduncle in Nos. 34 and 42).

Series 1. *Leaves* coriaceous or subcoriaceous; petiole short or moderately long, nerves jointed to the blade.

a. Leaves coriaceous, more or less ovate and cordate, pubescent when young.—Sp. 7–12.

b. Leaves coriaceous, more or less ovate or elliptic, base not cordate, glabrous even when young (except *F. altissima*).—Sp. 13–20.

c. Leaves coriaceous, tapering at both ends; basal bracts of receptacles large and prominent.—Sp. 21–24.

d. Leaves coriaceous, tapering at both ends; basal bracts of receptacles not large nor prominent.—Sp. 25–27.

e. Leaves coriaceous, narrowly elliptic or oblanceolate, tips broad obtuse.—Sp. 28–29.

f. Leaves coriaceous or subcoriaceous; primary and secondary nerves equally prominent, close together, straight and anastomosing little, except near the margin.—Sp. 30–32.

g. Leaves subcoriaceous, ovate or elliptic subovate or sublanceolate; secondary nerves almost as prominent as the primary; anastomoses numerous, minute, distinct.—Sp. 33–41.

h. Leaves coriaceous, elliptic or oblanceolate; receptacles without basal bracts.—Sp. 42.

Series 2. *Leaves* subcoriaceous or membranous; petiole long, jointed to the blade. Sp. 43–51.

Series 3. *Leaves* coriaceous. *Stamens* 2 (or 1 in *F. callosa*). Sp. 52–53.

Sect. III. SYNŒCIA. *Flowers* unisexual or neuter; male and gall fl. in one set of receptacles, fem. and neuters in another set (neuters 0 in *F. apiocarpa*). *Male fl.* membranous.—Climbers with large coloured receptacles. *Leaves* alternate, tessellate beneath. Sp. 54–57.

Sect. IV. SYCIDIUM. *Flowers* unisexual; male and gall fl. in one set of receptacles, female in another set. *Male fl.* monandrous.—Shrubs small trees or climbers, rarely epiphytal. *Leaves* alternate, small, more or less scabrid. *Receptacles* small, chiefly axillary (rarely fascicled). Sp. 57–67.

Sect. V. COVELLIA. *Flowers* unisexual; male and gall fl. in the same receptacle. *Fem. fl.* in separate receptacles. *Male fl.* monandrous; sepals 3–4. *Fem. perianth* gamophyllous, short, or 0, rarely of 4–5 sepals.—Trees or shrubs, never epiphytes or climbers. *Leaves* alternate or opposite. *Receptacles* on long subaphyllous branches from near the base of the stem, or subhypogeal, or on tubercles of the trunk or large branches, rarely axillary.—Sp. 68–78.

Sect. VI. EUSYCE. *Flowers* unisexual; male and gall fl. in one set of receptacles; fem. fl. in distinct sets (except *F. Thwaitesii*). *Male fl.* diandrous (95 *F. hirta* is mono- triandrous, and 80 *F. lævis* is often triandrous).—Scandent or erect shrubs or small trees, rarely epiphytes. *Leaves* not scabrid or hispid. *Receptacles* small (except *F. lævis* and vars. of *F. foveolata*), axillary.

* Scandent or creeping shrubs. Sp. 79–90 (see also 91).

** Shrubs or trees. Sp. 91–103.

Sect. VII. NEOMORPHE. *Flowers* unisexual, male and gall fl. in one set of receptacles; fem. fl. in a distinct set, smaller than the males. *Male fl.* diandrous (*F. Clarkei* is triandrous); perianth inflated, 3–4-sepalous.—Trees, rarely scandent shrubs, never epiphytal. *Leaves* alternate. *Receptacles* often very large, in clusters from tubercles on the stem and larger branches.—Sp. 104–111.

Sect. I. PALÆOMORPHE (see p. 495).

1. **F. pisifera,** *Wall. Cat.* 4504; branchlets scabrid-hispid, leaves shortly petioled membranous or subcoriaceous inequilateral subobovate or elliptic-lanceolate or oblanceolate acuminate or cuspidate repand remotely serrate-toothed or subentire along the upper margin and entire towards the narrowed very unequal base, receptacles 4–10 together $\frac{1}{5}$–$\frac{1}{4}$ in. diam. peduncled mostly in the axils of fallen leaves globose scabrid or verruculose, basal bracts usually 0. *King Fic.* 3, t. 1; *Miq. in L. J. B.* vii. 427; *Flor.* i. ii. 301. F. Tremblas (*in part*), Tadjam, & hypsophila (*in part*), *Miq. Pl. Jungh.* 61, 62, 60; *Flor. l. c.* 304, 312, t. xx. C and 303. F. grewiæflora, *Blume Bijd.* 475 (*in part*); *Miq. l. c.* 306. F. saxatilis, *Miq. in Zoll. Syst.* 92. F. acuminatissima, *Miq. in L. J. B. l. c.* 233. F. Tondana, *Miq. Flor. l. c.* 305, and F. microtus, *l. c. Suppl.* 428. F. leucoxylon, *Miq. Pl. Jungh.* 61. ? F. exasperata, *Roxb. Fl. Ind.* iii. 555.

PENANG, PERAK and SINGAPORE, very common.—DISTRIB. Malay Islands.

A shrub or small tree. *Leaves* 4–7 in., subscabrid and punctulate beneath, above smoother; nerves 3–5 pairs and midrib prominent and puberulous beneath, reticulations distinct; stipules 2, $\frac{1}{3}$–$\frac{1}{2}$ in., lanceolate, puberulous, persistent. *Recepts* red with yellow dots; peduncle $\frac{1}{4}$–$\frac{1}{2}$ in., slender, scabrid, with sometimes 1–2 wart-like bracts. *Male fl.* near the top of the receptacle with gall flowers; sepals 4, united at the base; stamen 1, with a pistillode. *Gall fl.*; sepals 3, linear-lanceolate; ovary obovoid, smooth, stipitate; style short, lateral, stigma clavate. *Fem. fl.*; calyx deeply 4-cleft; achene ovoid; style subterminal, stigma capitate.—Closely allied to *F. rostrata*, Lamk., but shrubby or arboreous, leaves more unequal-sided, receptacles more hispid and more generally peduncled. Most of Blume's *grewiæfolia* are referable to this, but a few belong to *F. Ampelos*, Burm., and I have hence adopted Wallich's name. Probably Roxburgh's *F. exasperata* is this, judging from a drawing in Roxburgh's Icones. If this was certain, his name would claim priority, but no specimens of Roxburgh's plant appear to be extant.

2. **F. gibbosa,** *Blume Bijd.* 466; branchlets scaberulous often pubescent, leaves petioled coriaceous usually inequilateral elliptic-ovate to lanceolate or oblanceolate obtuse cuspidate or obtusely or acutely acuminate entire, base cuneate or obtuse 3-nerved never rounded gibbous on one or both sides, receptacles $\frac{1}{5}$–$\frac{1}{3}$ in. or in pairs or fascicled axillary or from below the leaves peduncled globose or depressed-pyriform mammillate scabrid and verruculose yellow, umbilicus rather prominent, basal bracts 0, peduncle as

long bracteate at the base. *King Fic.* 4, t. 2; *Miq. Pl. Jungh.* 62; *Flor.* i. ii. 398, and *var.* unigibba, *l. c. Suppl.* 430. F. rigida & cuneata, *Blume l. c.* 465, 468. F. paradoxa, *Blume l. c.* 467; *Miq. l. c.* 308. F. Altimeraloo, *Roxb. mss.*; *Wight Ic.* t. 650; *Miq. in L. J. B.* vii. 435, and *Flor. l. c.* 311. F. excelsa, *Vahl? in Roxb. Fl. Ind.* iii. 552 (*excl. syn. Rheede*), *Kurz For. Fl.* ii. 451; *Wall. Cat.* 4477 A to D. F. subobliqua, *Miq. Ann.* iii. 225, 293.

Bases of the hill ranges throughout INDIA from Kumaon eastwards to Burma, and southwards to the Malay Peninsula, Andaman Islands, and Ceylon.—DISTRIB. Malay Islands, Hong Kong.

A tree. *Leaves* 2½–8 in., always with prominent and usually (except in var. *parasitica*) more or less lucid nerves and veins; nerves 3–7 pairs (rarely more), pale-coloured and shining to (in vars. *cuspidata* and *parasitica*) dull and neither shining nor coloured, above glabrous, shining to dull, and (in var. *parasitica*) minutely hispid especially on the midrib and nerves, beneath firm, often more or less harsh from the prominent venation; petiole ⅓–½ in.; stipules ⅓–½ in., ovate-lanceolate, convolute. *Male sepals* 4–6, linear, fleshy, hairy; stamen 1, filament short, united by its base to an abortive (insect-attacked) pistil. *Gall fl.*; perianth of the male; ovary globose, smooth; style short, lateral. *Fem. sepals* 4, hyaline, linear, slightly hairy; achene slightly papillose, obliquely ovoid; style elongate, lateral.—The forms of this protean plant fall under four groups.

F. GIBBOSA, *Blume*; leaves variable glabrous shining purplish brown beneath when dry, midrib nerves and reticulations pale.—Malay Peninsula and Islands.

E. CUSPIDIFERA, *Miq. in L. J. B.* vii. 434; leaves elongate gradually narrowed above more or less acuminate minutely tubercled beneath opaque little coloured.—F. excelsa, *Wall. Cat.* 4477 F. F. reticulosa, *Miq. l. c.* 435. F. pervia, *Miq. l. c.* 433; *Wall. Cat.* 4777 D.—*Rumph.* iii. 58.—Throughout India, Timor.

F. PARASITICA, *Kœn. in Willd. Act. Berol.* 1798, 25, t. 3; leaves broad subrhomboid scabrid and hispid above and beneath. *Bedd. For. Man.* 224; *Miq. l. c.* 433; *Wall. Cat.* 4476 A to D; *Brand. For. Fl.* 420. F. Ampelos, *Kœn. in Roxb. Fl. Ind.* iii. 553; *Wight Ic.* t. 652. F. sclerophylla, *Roxb. l. c.* 546. Urostigma Ampelos, *Dalz. & Gibs. Bomb. Fl.* 315. U. volubile, *Dalz. l. c.* 242.—Central India, Behar and the Deccan.—Under Urostigma Ampelos, *Dalz. & Gibs.* 315, these authors suggest their *volubile* being the same species.

F. TUBERCULATA, *Roxb. Fl. Ind.* iii. 554; like *parasitica*, but leaves narrower, sometimes irregularly serrate. *Wight Ic.* t. 651; *Bedd. Forester's Man.* 224. F. angulata, *Miq. l. c.* 434.—Western Ghats and Ceylon.

3. **F. subulata,** *Blume Bijd.* 461; young parts puberulous, leaves short-petioled membranous elliptic elliptic-lanceolate or -subovate sometimes slightly inequilateral cuspidate margins entire waved, base acute 3- or more-nerved, receptacles axillary short-peduncled or subsessile solitary in pairs or clusters, the male ovoid with the umbilicus rather prominent and numerous umbilical bracts, the female globose when ripe, both ⅓–½ in. diam. scaberulous subverrucose orange-red with no basal bracts but with a few scattered irregularly along the sides, peduncles short with numerous basal bracts. *King Fic.* 8, t. 6; *Miq. Flor.* i. ii. 311; *Ann.* iii. 275, 292; *Kurz For. Fl.* ii. 452. F. acuminata, *Roxb. Fl. Ind.* iii. 538; *Wall. Cat.* 4478. F. ancolana, *Miq. Pl. Jungh.* 62. F. virgata, *Reinw. in Blume l. c.* 454.

From CHITTAGONG, southward to PEGU, PERAK and PENANG, ascending to 4500 ft.—DISTRIB. China, Malay Islands.

A semi-scandent or straggling dicœcious shrub. *Leaves* 4½–10 in., nerves 7–10 pairs, rather prominent beneath, glabrous when mature, dull when dry, rather pale beneath; petiole about ⅓ in., stout, scaberulous; stipules about 1 in., convolute, subulate curving. *Male fl.* (only in the ovoid receptacles with the gall fl.); perianth thick,

fleshy, tubular, 4-toothed; stamen 1, anther broad; pistil globose, insect-attacked. *Gall fl.* pedicelled, perianth of the male; achene subglobose, smooth; style short, lateral; stigma capitate. *Fem. fl.* (in globose receptacles without male fl.); perianth hairy, gamophyllous, with 4 long teeth; achene oblong; style lateral; stigma elongate.—Truly dicœcious. The ovoid receptacles with male fl. and gall fl. occur only in the erect shrubby form; those with globose receptacles bear only fem. fl., and are semi-scandent epiphytes.

4. **F. parietalis,** *Blume Bijd.* 462 (*excl. var.*); branchlets receptacles petioles and under surfaces of the leaves rusty-pubescent sometimes rather scaberulous, leaves coriaceous petioled elliptic -oblong -ovate or rarely -obovate sometimes inequilateral rather abruptly and shortly caudate margins entire revolute, base rounded obtuse acute or subcordate 3–5-nerved, receptacles peduncled axillary in pairs (solitary by abortion) globose or ovoid tapering towards the ebracteate base rather strongly umbonate especially when young hispid-tomentose, ripe $\frac{1}{3}$–$\frac{1}{4}$ in. diam. yellow or orange, peduncles hispid about $\frac{1}{2}$ in. sometimes with 2 or 3 small ovate-acute bracts at their base. *King Fic.* 10, t. 8; *Miq. Flor.* i. ii. 307. F. Junghuhniana and F. rufipila, *Miq. Pl. Jungh.* 56, 57. F. concentrica, *Van Has. in Miq. Choix Pl. Buitenz.* t. 11. F. cerasiformis, *Desf. Cat. Hort. Paris Ed.* 3, 413; *Miq. in L. J. B.* vii. 428; *Lemaire Ill. Hortic.* v. t. 167. F. acuminata, *Bot. Mag.* t. 3282 (*not of Roxb.*). F. phlebophylla and F. Tabing, *Miq. Flor. Suppl.* 430. F. grandifolia, *Wall. Cat.* 4525; *Miq. in L. J. B. l. c.* 432.

PENANG and SINGAPORE, *Wallich.* PERAK, *Kunstler, Wray.*—DISTRIB. Malay Islands.

A shrub or tree, often epiphytal. *Leaves* 3–12 in., glabrous smooth and shining above, beneath much paler and when young covered with short straight hairs, many or all of which disappear with age, leaving the under surface hard, subscaberulous, glabrous or glabrescent; nerves 2–3 pairs, nervules transverse, reticulations distinct, all prominent beneath; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., stout, hispid-pubescent; stipules small, ovate, acute, hirsute, about $\frac{1}{3}$ in. long. *Male fl.* few, under the oval bracts with the gall flowers; perianth gamophyllous, lobes 5, narrow, elongate; stamen 1, base of filament adnate to the pedicel of a pistillode. *Gall fl.* large, rounded; perianth of the male; style short, lateral; stigma dilated. *Fem. fl.* with a gamophyllous perianth deeply divided into three linear-lanceolate segments; achene reniform-ovoid; style rather long, subterminal, stigma cylindric.—Allied to *F. urophylla*, but is a much larger species. The receptacles with male and gall flowers are slightly larger and more umbonate than those with female flowers.

5. **F. urophylla,** *Wall. Cat.* 4483; young branches and petioles scurfy or subscabrid when dry, leaves subcoriaceous broadly ovate or ovate-elliptic abruptly caudate usually entire or sinuate towards the apex, base always entire gradually narrowed to the petiole 3-nerved, receptacles $\frac{1}{5}$–$\frac{1}{3}$ in. diam. shortly peduncled axillary subglobose umbonate scabrid-hispid without basal bracts reddish-yellow when ripe, peduncle $\frac{1}{5}$–$\frac{1}{3}$ in. hispid-hirsute. *King Fic.* ii. t. 9.

ASSAM, the KHASIA MTS., CHITTAGONG, BURMA and PERAK.

An erect shrub or small tree. *Leaves* $2\frac{1}{2}$–4 in., smooth and shining above, dull and harsh beneath; nerves 2 or 3 pairs, and midrib bold and harsh beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules subulate, minute. *Male fl.*; sepals 4; stamen 1, invariably jointed to a pistillode. *Fem fl.*; perianth 3-cleft; achene obliquely ovoid, rough; style short, diverging. *Gall fl.*; achene smooth, globose; style short, slightly hooked. —This and *F. rostrata,* Lamk., afford an excellent example of agreement in externals being associated with considerable differences in the flowers.

6. **F. celebica,** *Blume Bijd.* 461; branchlets hirsute, leaves mem-

branous short-petioled elliptic-lanceolate acuminate or caudate-serrate, papillæ beneath with 4–6 pairs of hairy nerves above the 3–5 basal, recepts subsessile solitary or fascicled axillary or from scars subglobose setose, basal bracts 0. *King Fic.* 12, t. 10; *Miq. Flor.* i. ii. 313; *Ann.* iii. 274, 292 F. lancifolia, *Miq. in L. J. B.* vii. 452; *Ann.* 292.

PERAK, *Kunstler.*—DISTRIB. Celebes, Philippines.

A subscandent shrub. *Leaves* 4–7 in., base entire, often auricled; petiole $\frac{1}{10}$–$\frac{1}{5}$ in., hirsute; stipules subulate, tomentose. *Recepts* white, about $\frac{1}{5}$ in. diam., young ovoid. *Male perianth* 3–5-cleft; *gall* 3-cleft. *Gall* ovary stipitate, smooth; style long, lateral. *Fem. fl.* not seen.—The Perak plant may be regarded as a var. (*Kunstleri*) with leaves shortly acuminate, little tapering at the base and often fascicled recepts.

Sect. II. UROSTIGMA (see p. 495).

7. **F. Dalhousiæ,** *Miq. in Hook. Lond. Journ. Bot.* vi. 571; young branches at first softly pubescent afterwards glabrous, leaves subcoriaceous petioled elliptic- or broadly ovate acute entire base cordate 3–7-nerved, receptacles in pairs shortly peduncled axillary obovoid with 3 broad triangular apical scales which and the 3 spreading broad triangular sometimes bifid basal bracts are densely hairy when ripe about $\frac{1}{2}$ in. diam. pubescent, peduncles about $\frac{1}{3}$ in. densely hairy. *King Fic.* 16, t. 11 and 81[a]; *Miq. Ann.* iii. 285.

NILGHIRI HILLS; alt. 2–3000 ft., *Wight, Gamble, King.*

An umbrageous tree, 30–40 ft. *Leaves* 4–9 in., minutely dotted and puberulous or glabrous above, beneath softly minutely pubescent; nerves 10–12 pairs, rather prominent beneath, with midrib minutely pubescent; petiole 1–$2\frac{1}{2}$ in., pubescent; stipules $\frac{1}{2}$–1 in., ovate-lanceolate, much acuminate, puberulous or glabrous. *Male fl.* very few, only near apex of receptacle, sessile, globose; sepals 3, concave, rounded; stamen 1, connective wide, filament thick adnate. *Gall fl.* on thick pedicels; perianth gamophyllous; ovary obovoid, smooth; style short. *Fem. fl.* sessile; achene ovate; style long, lateral, stigma cylindric.

8. **F. bengalensis,** *Linn. Hort. Cliff.* 471, n. 4; young parts softly pubescent, leaves coriaceous petioled ovate or orbicular-ovate to elliptic obtuse entire base rounded subcordate or slightly narrowed 3–7-nerved, receptacles sessile in pairs axillary globose puberulous red and about the size of a small cherry when ripe with 3 broad rounded spreading nearly glabrous coriaceous basal bracts. *King Fic.* 18, t. 13, 81[c]; *Linn. Sp. Pl. Ed.* 2, ii. 1514; *Beddome For. Man.* 222; *Brand. For. Fl.* 412; *Kurz For. Fl.* ii. 440. Urostigma bengalense, *Gasp. Ric.* 82, t. viii. 14–21; *Wight Ic.* t. 1989; *Miq. in L. J. B.* vi. 572; *Dalz. & Gibs. Bomb. Fl.* 240. F. indica, *Linn. Amœn. Acad. Ed.* 3, i. 27, n. 6 (*excl. 7 and* 8, *and syn. Rheede*); *Roxb. Fl. Ind.* iii. 539; *Champ. in Hook. Journ. Bot.* 1841, 284–292, t. 13, 14.—*Rheede Hort. Mal.* i. t. 28.—*Ham. in Linn. Trans.* xiii. 489.—Vuta, *Asiat. Res.* iv. 310.—*Wall. Cat.* 4560 (*in part*).

Planted in all the plains of INDIA; wild only in the SUB-HIMALAYAN FORESTS and on the lower slopes of the DECCAN HILLS.

A tree, 70–100 ft., rooting from the branches, and thus forming accessory trunks, extending the growth of the tree indefinitely. *Leaves* 4–8 by 2–5 in., glabrescent above, beneath glabrous or minutely pubescent, reticulations distinct; nerves about 5 pairs, prominent; petiole $\frac{1}{2}$–2 in., stout; stipules $\frac{3}{4}$–1 in., coriaceous. *Male fl.* rather numerous near the mouth of the receptacles; sepals 4, rather broad; stamen 1. *Gall fl.* with a similar perianth, style short. *Fem. fl.* with shorter perianth and elongated style.—Known to Europeans as the banyan, and to natives of India under a variety of names. The name *F. bengalensis* was first published by Linnæus in

1737 in the *Hortus Cliffortianus*. The figures there quoted, and the remarks about the aerial roots, prove that this name was intended for the banyan, to which he unfortunately subsequently gave the name *F. indica*. In the *Amœnitates*, ed. 3, i. 27 (1785), a list is given of three species of *Ficus* which Linnæus named *F. indica*. The third of these is probably American. The second is *F. Tjiela*, Roxb., the *Tjiela* of Rheede (*Hort. Malab.* iii. t. 63), whilst remarks on the aerial roots appended to the notice of the first make it quite clear that the banyan is there meant. But under it is quoted Rheede's *Katou alou* (*Hort. Malab.* iii. t. 57), which is really *F. mysorensis*, Heyne, as also *F. indica*, Rumph's *Varinga repens* (*Hort. Amb.* iii. t. 84), and to this the name *F. indica*, Linn., has by modern writers been confined. *F. bengalensis*, Linn., is also mentioned in the *Amœnitates* (l. c., p. 29), and under it is quoted Rheede's figure of the *Peralu* (*Hort. Malab.* i. t. 28), which is unmistakably the banyan. It is thus clear that Linnæus gave two specific names, *bengalensis* and *indica*, to the banyan, and, further, confused with the banyan the *Katou alou* of Rheede. *F. bengalensis*, Linn., is hence the earliest name which can without doubt be connected with the banyan.

9. **F. mysorensis,** *Heyne in Roth Nov. Sp.* 390; branchlets covered with rusty grey or rufous flocculent tomentum afterwards nearly glabrous and dotted, leaves coriaceous petioled ovate elliptic-ovate rarely -obovate cuspidate entire base rounded emarginate or cordate 3–5-nerved, receptacles sessile in axillary pairs oblong to subobovate truncate or slightly depressed at the apex, young flocculent-tomentose, ripe nearly glabrous 1 in. long orange-red, basal bracts 3 broadly triangular obtuse spreading. *King Fic.* 19, t. 14, 15, 81[a]; *Beddome For. Man.* 222; *Kurz For. Fl.* ii. 440; *Miq. Ann.* iii. 285. F. indica, *Linn. Sp. Pl. Ed.* 2 (1763), ii. 1514; *Amœn. Acad.* i. 27, n. 6 (*partly*). F. cotonisefolia, *Vahl Enum.* ii. 189 (*excl. syn. Rumph*). F. citrifolia, *Willd. Sp. Pl.* 1137. F. Gonia, *Ham. in Trans. Linn. Soc.* xv. 137; *Wall. Cat.* 4496 A, B and C (not D); *Rheede Hort. Mal.* iii. t. 57. Urostigma mysorense, *Miq. in L. J. B.* vi. 574.

Forests of the base of the HIMALAYA from Sikkim eastwards; the KHASIA MTS., BURMA, the DECCAN PENINSULA and CEYLON.

A large umbrageous tree; aerial roots few, embracing the stem. *Leaves* 3½–8 in.; nerves 10–13 pairs, prominent, upper glabrous and minutely dotted, beneath flocculent-tomentose, ultimately nearly glabrous; petiole ¾–1¼ in., stout; stipules ¼–½ in., broadly triangular, flocculent-tomentose. *Male fl.* near the apex of receptacle, rather numerous, pedicelled; stamen 1; anther-cells subglobose. *Gall fl.* broad, smooth; sepals 4; style short, subterminal. *Fem. fl.* with ovoid achene and elongate lateral style.—Young receptacles enclosed in calyptriform involucres (as n *F. bengalensis*, Linn.), and others. The following are varieties.

F. PUBESCENS, Roth Nov. Sp. 387; leaves smaller, nerves fewer, pubescence denser longer deeper rusty red especially in the youngest parts. F. rupestris, *Ham. in Trans. Linn. Soc.* xv. 137. F. tomentosa, *Herb. Madr. in Wall. Cat.* 4499. Urostigma dasycarpum, *Miq. in L. J. B.* vi. 574; *Dalz. & Gibs. Bomb. Fl.* 242.—Deccan Peninsula, and Ceylon with the typical form ascending to 2500 ft.

F. SUBREPANDA, *Wall. Cat.* 4568 A; leaves larger, adult glabrous subscabrid and dotted, nerves 12–20 pairs above the basal 7–9, receptacles globose (young ovoid) 1½ in. diam. smooth orange-red. F. lateritia, *Wall. Cat.* 4496 D.—Himalaya, Khasia and Burma Hills.

10. **F. pilosa,** *Reinw. in Blume Bijd.* 446; young parts covered with short flocculent (usually grey) caducous tomentum, leaves subcoriaceous elliptic-oblong to -obovate entire or margins subundulate, base narrowed rounded or truncate often subcordate occasionally slightly unequal, apex with a short abrupt obtuse apiculus, receptacles sessile in axillary pairs ovoid-cylindrical umbonate ¾ in. long reddish and glabrous when ripe with

3 minute rounded membranous ciliate basal bracts. *King Fic.* 21, t. 16, 81[e]; *Kurz For. Fl.* ii. 441. Urostigma pilosum, *Miq. in Zoll. Syst. Verz.* 90, 96, and *Flor.* i. ii. 351. U. bicorne, *Miq. Pl. Jungh.* 47, and *Flor. l. c.* 350, t. 24 A. U. subcuspidatum, *Miq. in Zoll. l. c.* 97.

UPPER TENASSERIM, *Kurz.* PENANG? (I have seen no specimen).—DISTRIB. Java, Borneo, N. Australia.

A large tree, with a few aerial roots. *Leaves* 3½ in., nerves about 8-11 pairs, curving and anastomosing near margin; petiole ½–¾ in.; stipules ⅓–⅔ in., membranous, rufous-tomentose when young. *Male fl.* on short thick pedicels; sepals 4, hyaline; anther 1, filament stout, short. *Gall fl.* with a gamophyllous 3–4-toothed, oblique, closely-embracing perianth; style elongate, stigma flattened; ovary smooth. *Fem. fl.* very like the galls, but the perianth less distinct and the achene broader and tuberculate.—Probably a var. of *mysorensis*. The only good fruit I have seen is in Queensland specimens, here described. The following variety is parallel to the var. *pubescens* of *F. mysorensis*.

F. CHRYSOCOMA, *Blume Bijd.* 443; tomentum more copious bright rufous. Urostigma chrysothrix, *Miq. in Zoll. Syst. Verz.* 90, 96.

11. **F. tomentosa,** *Roxb. Hort. Beng.*, and *Fl. Ind.* iii. 550; shoots petioles leaves beneath and receptacles covered with rusty-grey tomentum, leaves crowded towards the ends of the branches coriaceous petioled elliptic-ovate or -obovate obtusely apiculate entire, base rounded or slightly cordate 5–7-nerved, receptacles sessile in axillary pairs pisiform tomentose ¼–½ in. diam., apical scales small glabrous, basal bracts 3 large spreading pubescent sometimes 3-fid when young. *King Fic.* 22, t. 18 and 81[g]; *Willd. Spec. Plant.* iv. 1136; *Wight Ic.* t. 647; *Brand. For. Fl.* 414; *Bedd. For. Man.* 223. Urostigma tomentosum, obversum & connivens, *Miq. in L. J. B.* vi. 573. F. mollis, *Vahl Symb.* i. 82, and *Enum.* ii. 192 (*excl. syn. Willd.*). F. asinina, *Ham. in Trans. Linn. Soc.* xv. 138; *Wall. Cat.* 4497 A to D.

Drier parts of the GANGETIC PLAIN, BEHAR, BANDA, CENTRAL INDIA, the DECCAN PENINSULA, and CEYLON.

A large umbrageous tree, throwing out small aerial roots from the branches. *Leaves* 2–5 in., with about 5 pairs of nerves, upper surface glabrous or glabrescent minutely dotted when dry; petiole ¾–1 in.; stipules ⅓–½ in. densely woolly outside, margins broad scarious glabrous. *Male fl.* few, near the mouth of the receptacle; sepals 4, lanceolate; stamen 1. *Gall* and *fem. fl.* with 4 sepals shorter than the ovary; gall fl. with smooth ovary and short style; fem. fl. with tubercled achene and long style.

12. **F. bracteata,** *Wall. Cat.* 4498; young branches leaves beneath stipules petioles and receptacles densely covered with deciduous [reddish-brown flocculent tomentum, leaves coriaceous petioled obovate-oblong entire with an abrupt short obtuse apiculus, base cordate slightly unequal truncate 5-nerved, receptacles sessile crowded at the apices of the branches in the axils of the undeveloped leaves globose or turbinate slightly trigonous densely tomentose even when ripe bright orange ½ in. diam. *King Fic.* 23, t. 19, 81[h]; *Miq. in L. J. B.* vi. 576.

PENANG, PERAK and SINGAPORE, *Wallich, King.*—DISTRIB. Java.

A powerful scandent epiphyte. *Leaves* 7–11 in.; nerves 4–6 pairs, prominent beneath, upper surface smooth except the persistently rusty-tomentose midrib, lower in adult leaves pubescent or subglabrous; petiole ¾–1¾ in.; stipules flaccid, ovate-acuminate, 2 by 1 in., densely tomentose on the midrib outside; basal bracts 3 or 4, broad, rounded, scarious, glabrous. *Male fl.* scattered all over the receptacle, pedicelled; sepals 2 or 3 hyaline; anther 1, filament very short. *Gall fl.* with a gamophyllous, 3-toothed perianth closely enveloping the smooth ovoid ovary. *Fem. fl.*

with 4 loosely attached lanceolate sepals, achene elongate, often sessile.—The interior of the receptacle contains numerous lanceolate bracteoles. The enormous persistent prefoliar stipules (really leaf-scales) on the apices of the branches and surrounding the densely tomentose young fruit distinguish this from any other *Urostigma*.

13. **F. pruniformis,** *Blume Bijd.* 451; all parts except the stipules glabrous, leaves coriaceous long-petioled lanceolate or ovate-lanceolate acuminate entire, base much narrowed rarely rounded 3-nerved, receptacles long-peduncled axillary solitary or in pairs ovoid slightly umbonate and reddish when ripe about 1 in. long, apical scales small coriaceous, basal bracts 3 small coriaceous free ovate acute puberulous sometimes attached to the peduncle a little below the base of the receptacle, peduncle $\frac{1}{2}$–$\frac{2}{3}$ in. slender. *King Fic.* 24, t. 21 and 81[k]. F. depressa, *Blume l. c.* 450; *Miq. Ann.* iii. 286. Urostigma pruniforme, *Miq. Ann. l. c.* 266, 286; *in Zoll. Syst. Verz.* 91, 97; and in *Flor.* i. ii. 352, and *Suppl.* 177, 440? U. depressum, *Miq. Flor. l. c.* 351 (*not of L. J. B.*). U. peracutum, *Miq. Flor. l. c.* 343.

PERAK, *Kunstler*, alt. 1–4000 ft.—DISTRIB. Sumatra, Java.

A powerful stem-clasping epiphyte or large tree. *Leaves* 4–6 in.; nerves 6–10 pairs, prominent beneath; petiole slender, $\frac{3}{4}$–$1\frac{1}{4}$ in.; stipules linear-lanceolate, $\frac{1}{2}$–$\frac{3}{4}$ in., pubescent. *Male fl.* very numerous over all the receptacle, pedicelled; sepals 2, broad, concave, hyaline; stamen 1, anther elongate-ovate sessile. *Gall fl.* pedicelled; perianth gamophyllous, 5-cleft; ovary smooth, short, stigma obliquely truncate. *Fem. fl.* mostly sessile, the achene ovoid, tuberculate; style long, lateral; stigma flat, elongate.—Readily recognized by its large long-peduncled receptacles.

14. **F. annulata,** *Blume Bijd.* 448; all parts glabrous or (var. *valida*) the leaves and stipules beneath and petioles more or less pubescent, leaves thinly coriaceous oblong or oblanceolate or ovate-elliptic and shortly acuminate entire or margins slightly undulate, base acute or slightly rounded never cordate 3-nerved, receptacles peduncled in axillary pairs ovoid or oblong prominently umbonate smooth, ripe 1–$1\frac{1}{2}$ in. long greenish orange-yellow with white spots, basal bracts 3 ovate acute free, peduncle stout $\frac{1}{2}$–$\frac{3}{4}$ in. with a thickened annulus near the top and below the basal bracts of the receptacle. *King Fic.* 25, t. 23, 81[l]; *Miq. Ann.* iii. 285; *Kurz For. Flor.* ii. 443. F. flavescens & valida, *Bl. l. c.* 449. Urost. annulatum, *Miq. in Zoll. Syst. Verz.* 90; *Flor.* i. ii. 352, and *Suppl.* 440. U. flavescens, *Miq. in Plant. Jungh.* 48, and *Fl. Ind. Bat. l. c.* 335, and *Suppl.* 436. U. biverrucellum, *Miq. Flor. Suppl.* 436. U. validum & conocarpum, *Miq. l. c.* 337, 350. U. depressum, *Miq. in L. J. B.* vi. 576, and *Zoll. Syst. Verz.* (*excl.* F. depressa, *Bl.*).

BURMA; on the plains and lower hills. PERAK, *Kunstler*.—DISTRIB. Malay Islands.

A large stem-clasping, semi-scandent epiphyte, rarely an independent tree. *Leaves* 6–12 in.; nerves 10–15 pairs, prominent with curving submarginal anastomoses, reticulations conspicuous; petiole 1–$1\frac{1}{2}$ in.; stipules linear-oblong, flaccid, fugacious, $1\frac{1}{2}$–6 in. *Male fl.* scattered all over the interior of the receptacle, numerous, pedicelled. *Gall fl.* numerous; perianth gamophyllous, 3-toothed; achene ovoid, smooth; style long, stigma long flattened. *Fem. fl.* very few; perianth deeply 4-cleft; achene tubercled; style shorter than achene, stigma clavate.—Widely distributed and variable; the following are the two principal forms.

F. FLAVESCENS, *Blume*; leaf-base much narrowed. U. biverrucellum, *Miq.*—Burma; ascends to 5000 ft. in Java. Cultivated in Bengal as *F. magnifolia*.

F. VALIDA, *Blume*; leaves puberulous beneath especially on the nerves, stipules silky, pedicels only $\frac{1}{4}$ in. very stout deciduously tomentose.

15. **F. Beddomei,** *King Fic.* 26, t. 24 and 81[m]; all parts glabrous,

young branches thick, bark pale, leaves coriaceous long-petioled ovate-rotund or broadly ovate shortly acuminate entire or margins slightly undulate, base broad truncate or very slightly emarginate 3-nerved, receptacles peduncled in axillary pairs ovoid or subobovoid with a rather prominent apical umbilicus and several vertical ridges smooth 1 in. long about $\frac{3}{4}$ in. across, basal bracts 3 small broadly triangular coriaceous united by their bases, peduncles stout $\frac{3}{4}$ in.

DECCAN PENINSULA; Tinnevelly Hills, *Beddome*.

A tree? *Leaves* about 7 by 4 in.; nerves nearly at right angles to the midrib, about 12 pairs, prominent on both surfaces; petiole stout, about $2\frac{1}{2}$ in.; stipules lanceolate, about $\frac{1}{2}$ in. *Male fl.* numerous, scattered, shortly pedicelled; anther broad, single, sessile; sepals 2 or 3. *Gall* and *fem. fl.* shortly pedicelled; sepals 4 or 5, lanceolate (ripe *achenes* unknown). Interior of the receptacle covered between the insertions of the flowers with long, narrow, pointed scales.—A remarkable species; I have seen only three specimens.

16. **F. globosa,** *Blume Bijd.* 449; younger branches covered with deciduous brown scurf mixed with a few hairs ultimately all parts glabrous, leaves thinly coriaceous petioled elliptic or oblong suddenly shortly cuspidate entire, base broad rounded slightly emarginate (narrowed in var. *Manok*) 3-nerved, receptacles shortly peduncled in axillary pairs subglobose and umbonate when young, ripe depressed at the apex almost turbinate $\frac{1}{2}$–1 in. diam. minutely scurfy, basal bracts 3 small, peduncles stout $\frac{1}{3}$ in. *King Fic.* 27, t. 25, 81[n]; *Miq. Ann.* iii. 285. F. onusta, *Wall. Cat.* 4563; *Kurz For. Fl.* ii. 441. F. firma, *Wall. Cat.* 4564 A, B. Urost. globosum, *Miq. Flor.* i. ii. 335. U. Manok, *Miq. in Zoll. Syst. Verz.* 90, 96; *Flor. l. c.* 337. U. onustum, *Miq. in L. J. B.* vi. 57; *Flor. l. c.* 336.

BURMA and PENANG, *Wallich*. PERAK, *Kunstler*.—DISTRIB. Malay Islands.

A large climber. *Leaves* $3\frac{1}{2}$–$6\frac{1}{2}$ in.; primary nerves 6–9 pairs, nearly at right angles to the midrib, rather prominent below; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in.; stipules $\frac{3}{4}$–$2\frac{1}{2}$ in., deciduous, linear, acute. *Male fl.* few, scattered, pedicelled; sepals 4, hyaline; anther single, sessile. *Gall fl.* mostly pedicelled; perianth gamophyllous, 5-cleft; ovary smooth; style short, lateral. *Fem. fl.* few, sessile or nearly so; perianth gamophyllous, with 5 lanceolate teeth; style elongate, stigma obovate; achene ovoid, tubercled.—Miquel's *U. Manok* is a variety with a narrowed leaf-base.

17. **F. travancorica,** *King Fic.* 28, t. 26, 82°; young parts minutely pubescent all ultimately glabrous, bark of young shoots pale, leaves coriaceous lanceolate acuminate entire margins subundulate, base much narrowed 3-nerved, receptacles in axillary pairs peduncled globose smooth when ripe and about $\frac{1}{2}$ in. diam., apical scales broad flat, basal bracts 3 broadly triangular obtuse, peduncles $\frac{1}{4}$ in.

HILLS of NORTH TRAVANCORE, alt. 3500 ft., *Beddome*.

A straggling shrub. *Leaves* 5–6 in.; nerves 10–12 pairs, distinct but not thick, reticulations minute but distinct; petiole about $\frac{1}{2}$ in.; stipules linear-lanceolate, about 1 in. *Male fl.* scattered, sessile; sepals 4 or 5; anther 1, filament short. *Gall* and *fem. fl.* subsessile, sepals of both 4 or 5; ovary of the gall elongate-ovate, and style short; achene of fem. ovate, with a long style and bifid stigma.—The single specimen of this at Kew is the only one I have seen; it approaches *F. Beddomei*, but has differently shaped leaves and much smaller receptacles.

18. **F. xylophylla,** *Wall. Cat.* 4558; branchlets thick pale scurfy when very young, other parts quite glabrous except the stipules and receptacular bracts, leaves large very coriaceous broadly elliptic or oblong to elliptic-obovate, narrowed to the strongly 3-nerved base, apex broad rounded,

margins entire revolute when dry, receptacles in axillary pairs or solitary sessile cylindro-conical base truncate, apex umbonate, ripe smooth bright red with faint white spots $1\frac{1}{2}$–2 in. long by 1 broad at base, basal bracts 3 spreading broadly triangular pubescent. *King Fic.* 29, t. 28, 82ª; *Miq. Ann.* iii. 286. Urostigma xylophyllum, *Miq. in L. J. B.* vi. 577; *Flor.* i. ii. 352, t. 23.

PERAK, PENANG and SINGAPORE, *Wallich*, &c.—DISTRIB. Sumatra.

A powerful epiphyte or small tree. *Leaves* 6–10 by 3–$4\frac{1}{2}$ in.; nerves about 5 pairs, prominent below, reticulations inconspicuous; petiole stout, about 1–$1\frac{1}{3}$ in.; stipules $1\frac{1}{3}$ in., coriaceous, broadly ovate, acute, shortly reddish pubescent, or with broad smooth margins. *Male fl.* numerous, scattered over the whole interior of the receptacle, pedicelled; sepals 4; anther 1, elongate, sessile. *Gall fl.* subsessile or pedicelled; sepals 5; ovary smooth; style elongate. *Fem. fl.* sessile; achene minutely tubercled; perianth degenerate into cellular tissue.

19. **F. altissima,** *Blume Bijd.* 444; young parts puberulous, ultimately all glabrous except the external surface of the stipules, leaves coriaceous petioled broadly ovate-elliptic rarely ovate-lanceolate shortly obtusely cuspidate entire, base rounded rarely narrowed occasionally slightly unequal never cordate 3–5-nerved, receptacles sessile axillary in pairs enveloped when young in early deciduous calyptriform bracts ovoid smooth, ripe $\frac{3}{4}$–1 in. long lake-red or yellowish, basal bracts 3 short broad obtuse united at the base pubescent or puberulous. *King Fic.* 30, t. 30, 31, 82, 82ª¹; *Miq. Ann.* iii. 285; *Kurz For. Fl.* ii. 442. F. laccifera, *Roxb. Fl. Ind.* iii. 545; *Wight Ic.* t. 656; *Brand. For. Fl.* 418; *Kurz l. c.* 441; *Bedd. For. Man.* 223; *Wall. Cat.* 4559 F, 4560 (*in part*). Urostigma altissimum, *Miq. in Zoll. Syst. Verz.* 90 and 96; *Flor.* i. ii. 349. U. lacciferum, *Miq. in L. J. B.* vi. 575.

TROPICAL HIMALAYA, from Nepal to Bhotan, and in the plains and lower hills of the DECCAN PENINSULA, and from ASSAM to Burma, the Malay Peninsula, and the Andaman Islands. CEYLON common.—DISTRIB. Malay Islands.

A large spreading tree, with few aerial roots. *Leaves* 4–7 in.; nerves 5 or 6 pairs, distinct; petiole $\frac{3}{4}$–$1\frac{1}{2}$ in.; stipules 1–$1\frac{3}{4}$ in., very coriaceous, lanceolate, greyish pubescent. *Male fl.* scattered all over the interior of the receptacles, pedicelled; sepals 4; anther subsessile. *Gall* and *fem. fl.* with a similar gamophyllous deeply 4-cleft perianth; ovary of the gall fl. smooth, of the fem. minutely tubercled; style in both elongate; gall fl. sometimes pedicelled; fem. usually sessile.—After much consideration, I cannot but regard *F. laccifera*, Roxb., as a northern form of *altissima*, best distinguished by its larger, thinner leaves.

VAR. *Fergussoni*; leaves narrower often narrowed at the base, nerves 9–12 pairs closer, receptacles smaller subglobose.—Ceylon, *Thwaites* (C.P. 2221).—Named after my friend, Mr. W. Fergusson, F.L.S., an indefatigable botanist. It is peculiar to Ceylon, and, as Dr. Trimen informs me, certainly indigenous.

20. **F. Lowii,** *King Fic.* 32, t. 33, 82ª; young branches and stipules covered with a deciduous brown scurf, ultimately all parts glabrous, leaves very coriaceous oblong or elliptic rather suddenly and shortly cuspidate, margins thickened strongly revolute, base rounded or tapering slightly to the petiole strongly 3-nerved, midrib very prominent, receptacles crowded sessile in axillary pairs globose with a broad flat apical mammilla, apical bracts 3 flat, ripe about $\frac{3}{4}$ in. diam. yellow with purplish spots, basal bracts 3 rather small broad coriaceous.

PERAK, *Wray, Kunstler.*

A powerful climber. *Leaves* 5–8 in.; nerves about 6 pairs, not prominent, reticulations obscure; beneath dull whitish, above smooth rather dull; petiole stout,

1–1¾ in.; stipules ½–1 in., ovate, acuminate, convolute. *Male fl.* over whole interior of the receptacle, pedicels thick, sepals 4; anther 1, sessile, elongate. *Gall fl.* pedicelled or sessile; sepals 5, distinct; ovary smooth; style elongate, lateral; stigma elongate, flat, bilobed. *Fem. fl.* sessile, globose, tubercled; style long; stigma clavate; perianth degenerating into a glairy cellular mass.—A remarkable and very distinct species. The leaves are very pale when dry.

21. **F. consociata,** *Blume Bijd.* 447; young parts especially the leaves beneath basal bracts and stipules densely covered with reddish-brown flocculent deciduous tomentum, otherwise glabrous, leaves coriaceous narrowly elliptic or oblanceolate (broadly subobovate-elliptic in var. *Murtoni*) with a rather short obtuse cusp entire, base narrowed 3-nerved, receptacles crowded near the apices of the branches axillary sessile depressed-spheroidal young flocculent ripe glabrous about ⅓–⅔ in. diam., apical bracts flat shining, basal 3 broadly ovate keeled sometimes bifid. *King Fic.* 33, t. 36, 37, 82[x]. Urostigma consociatum, *Miq. in Zoll. Syst. Verz.* 91, and *Flor.* i. ii. 337; *Suppl.* 177, 437; *Ann.* iii. 286.

MALACCA, (var. *Murtoni*) *Griffith* (*Kew Distrib.* 593). PERAK, (var. *Murtoni*) *King's Collector*.—DISTRIB. Sumatra, Java.

A large tree with aerial roots (*Miquel*). *Leaves* 3–7 by 1½–2½ in.; nerves 5–8 pairs, distinct, not very prominent; petiole ¾–1¼ in., stipules ¾–1¼ in., membranous, ovate-lanceolate, at first densely tomentose, ultimately glabrous, caducous. *Male fl.* numerous, scattered over the whole surface of the receptacle, pedicelled; sepals 2, concave; anther single, sessile. *Gall* and *fem. fl.* similar, sessile, sepals 5. *Gall achene* ovoid-reniform; fem. achene broadly ovoid, tubercled.—The perianth degenerates into gelatinous tissue.

VAR. *Murtoni*; all parts larger less flocculent, leaves subovately elliptic to ovate obtuse base rounded or cordate, receptacles ½ in. diam.—Malacca and Perak.—Intermediate between Javan *F. procera*, Bl., and *consociata*, approaching the former in the more or less ovate leaves, large receptacles, and smooth coriaceous basal bracts, and to *consociata* in the tomentum.

22. **F. rigida,** *Miq. in Ann. Mus.* iii. 280; perfectly glabrous, leaves petioled coriaceous lanceolate acuminate or broadly oblanceolate shortly and acutely cuspidate, margins entire recurved, base acute 3-nerved, receptacles sessile in axillary pairs subglobose smooth ½ in. diam., basal bracts 3 large orbicular glabrous. *King Fic.* 35, t. 39, 82[x]. Urostigma rigidum, *Miq. in L. J. B.* vi. 578.

PENANG, *Phillips*. Perak, *Kunstler*.

A tree ?. *Leaves* 5½–6½ in., dotted above; nerves 3–4 pairs, prominent beneath, reticulations fine; petiole ¾ in., stout; stipules coriaceous, ovate-acuminate, ⅔ in. *Male fl.* numerous, scattered, pedicelled, clavate when unexpanded; sepals 2, broad, concave; anther sagittate, filament short. *Gall fl.* sessile or pedicelled; sepals 3; style short; achene ellipsoid. *Fem. fl.* sessile; sepals 4 or 5, narrow; style elongate; achene tubercled.—There are only two specimens of this at Kew, both with immature receptacles.

23. **F. Hookeri,** *Miq. Ann.* iii. 215, 286; glabrous, leaves thinly coriaceous long-petioled broadly elliptic or subobovate with a short broad obtuse cusp entire, base rounded or slightly narrowed 3-nerved, receptacles in axillary pairs sessile obovoid depressed ripe ½–1 in. diam., large basal bracts united in an entire cartilaginous cup which envelopes the lower third of the ripe receptacle. *King Fic.* 36, t. 42, 82[x.3].

SIKKIM HIMALAYA and KHASIA HILLS, alt. 1–6000 ft.; not common.

A tree. *Leaves* 5–11 in.; nerves 6–8 pairs, not very prominent; under surface pale; stipules 1½–3½ in., linear-lanceolate, flaccid, caducous. *Male fl.* numerous,

scattered, with no proper perianth; stamen single, filament long and embraced by the anceolate bracteoles. *Gall* and *fem. fl.* alike, except as regards the contents of the ovary; sepals 4 or 5, linear-lanceolate; achenes very dark brown; style rather short, thick.—At once distinguished by the cup formed by the united basal bracts.

24. **F. glaberrima,** *Blume Bijd.* 451; glabrous, branchlets and leaves beneath puberulous, leaves subcoriaceous shining above elliptic oblong or ovate-lanceolate acuminate entire, base acute or narrowed rarely rounded 3-nerved, receptacles peduncled in axillary pairs subverrucose when young globose smooth, ripe $\frac{1}{4}$ in. diam. orange-coloured, basal bracts 3 broad minute pubescent deciduous, peduncle $\frac{1}{4}$–$\frac{1}{3}$ in. *King Fic.* 37, t. 43, 82$^{y.2}$; *Miq. Ann.* iii. 286. F. angustifolia, *Roxb. Fl. Ind.* iii. 554. ? F. bistipulata, *Griff. Notul.* iv. 398; *Ic. Plant. Asiat.* t. 559, f. 1. F. Thomsoni, *Miq. in Ann. l. c.* 215, 286; *Kurz For. Flor.* ii. 443. F. fraterna, *Miq. Ann. l. c.* 217, 287. F. aurantiaca, *Wall. Cat.* 4565 (*not Griff.*). Urostigma glaberrimum, *Miq. Fl. Ind. Bat.* i. ii. 340.

TROPICAL HIMALAYA; from Kumaon, *Duthie,* to Bhotan. BURMA and the ANDAMAN ISLANDS.—DISTRIB. Malay Islands.

A tall tree. *Leaves* 5–8 in.; nerves 8–10 pairs, nearly horizontal, not very prominent; petiole $\frac{3}{4}$–$1\frac{1}{4}$ in., slender; stipules glabrous, linear-lanceolate, fugacious, $\frac{1}{2}$–$\frac{3}{4}$ in. *Male fl.* few, only near the mouth of the receptacles, subsessile; sepals 4, lanceolate; stamen 1, anther broad, filament short. *Gall fl.* sessile or shortly stoutly pedicelled; perianth 4-cleft. *Fem. fl.* when ripe with viscid achenes and no perianth.—The receptacles are often attacked by an insect, and become three or four times their normal size. The leaves of some individuals retain their hairs much longer than others, but all ultimately become glabrous. There are two distinct forms of the leaf-base; broad and rounded in Chittagong specimens, much narrowed at the base in Sikkim and Khasian ones.

25. **F. microstoma,** *Wall. Cat.* 4566; glabrous, leaves coriaceous petioled elliptic-ovate to -obovate shortly abruptly and obtusely cuspidate occasionally rounded obtuse and non-cuspidate entire, base narrowed 3-nerved, receptacles sessile in axillary pairs pisiform dotted glabrous prominently umbonate, apex perforated, basal bracts 3 broadly ovate free. *King Fic.* 38, t. 44, 83^{a}.

SINGAPORE, *Wallich.* PERAK, *Kunstler.*

A tree. *Leaves* 3–6$\frac{1}{2}$ in.; nerves 4–7 pairs, rather prominent beneath; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in., rather slender; stipules $\frac{1}{2}$ in. *Male fl.* scattered over all parts of receptacle, pedicelled; sepals 2, broad, concave; anther 1, elongate. *Gall fl.* with ovoid ovary and hooked stigma; perianth, as of female, of 4 lanceolate sepals; achene broadly ovate; style not hooked —The scales, which usually close the mouth of the receptacle, are here partially united in a ring surrounding a comparatively wide opening into the receptacle. In the unripe receptacle this annulus is bright yellow and very conspicuous.

26. **F. indica,** *Linn. Sp. Pl. Ed.* ii. 1514 (*in part*); glabrous except the stipules, leaves coriaceous shortly petioled broadly to narrowly oblong acute or shortly caudate-acuminate entire, base narrowed with 2 prominent and sometimes 2 small basal nerves, receptacles in crowded pairs, sessile globose (ovoid or ellipsoid in var. *Gelderi*) smooth ripe yellowish-red and about $\frac{1}{3}$ in. diam., basal bracts 3 rather large ovate acute spreading. *King Fic.* 39, t. 45, 83^{b}; *Miq. Ann.* iii. 287 (*excl. many syns.*); *Kurz. For. Fl.* ii. 442. F. sundaica & rubescens, *Blume Bijd.* 450, 453. F. pellucido-punctata, *Griff. Notul.* iv. 394, and *Ic. Pl. Asiat.* t. 544. F. longifolia, *Ham. in Wall. Cat.* 4570 (C, D, *and part of* E). Urostigma rubescens &

sundaicum, *Miq. Flor.* i. ii. 338, and 339 (*in part*). U. Tjiela, *Miq. in L. J. B.* vi. 580 (*excl. syn.*), and *Flor. l. c.* 344 (*excl. all syns. but sundaicum*). ? U. pseudo-rubrum, *Miq. Flor. l. c.* 343.

BURMA, PERAK, SINGAPORE and the ANDAMAN ISLANDS, *Wallich*, &c.—DISTRIB. Malay Islands.

A large spreading tree. *Leaves* 4–7 in.; nerves about 4–6 pairs, not very prominent, reticulations distinct; both surfaces (but especially the upper) minutely tuberculate; petiole $\frac{1}{3}$–1 in.; stipules ovate-lanceolate, pubescent, $\frac{1}{2}$–$\frac{3}{4}$ in. *Male fl.* numerous, scattered; pedicels long, thin; sepals about 2, concave; anther elongate, elliptic, sessile. *Gall* and *fem. fl.* alike; ovary ovoid or elliptic; style long, lateral; stigma oblique, infundibuliform; achene tubercled and viscid; gall fl. sometimes pedicelled.—Linnæus quoted figures of several different plants for his *F. indica*, and the retention of that name for this species in particular is therefore quite arbitrary. It might be better to abandon the name.

27. **F. acamptophylla,** *Miq. Ann. Mus.* iii. 264, 287; branchlets thinly covered with rufous scurf tips pubescent, leaves thickly coriaceous glabrous subobovate oblong or elliptic shortly ohtusely cuspidate margin entire thickened subrevolute, base narrowed 3-nerved, receptacles numerous crowded in pairs towards the extremities of the branches turbinate apex much flattened, umbilical scales large smooth ripe yellow $\frac{1}{4}$ in. diam., basal bracts 3 large ovate-rotund puberulous. *King Fic.* 40, t. 46, 83[d]. Urostigma acamptophyllum, *Miq. Flor. Suppl.* 439.

PERAK, *Kunstler.*—DISTRIB. Banka.

A large tree, young epiphytal. *Leaves* $2\frac{1}{2}$–$4\frac{1}{2}$ in.; nerves 3–6 pairs, not much more prominent than the secondary, reticulations obscure; petiole $\frac{1}{2}$–$\frac{3}{4}$ in.; stipules ovate, acute, silky pubescent, about $\frac{1}{2}$ in. *Male fl.* scattered; pedicels long, thin; sepals 2 or 3, concave; anther elongate, sessile. *Gall* and *fem. fl.* similar; sepals 3, obtuse; style elongate; stigma slightly infundibuliform; achene tuberculate.

28. **F. truncata,** *King*; young parts and especially the leaves beneath thinly covered with brown deciduous powder and a few minute hairs, ultimately all parts glabrous, leaves coriaceous crowded short-petioled obovate or cuneate-oblong top broad obtuse sometimes truncate entire, base much narrowed strongly 3-nerved, receptacles much crowded near the apices of the branches sessile in axillary pairs depressed-spheroidal reddish-yellow smooth $\frac{1}{5}$–$\frac{1}{4}$ in. diam., apical scales broad flat shining surrounded by a ring, basal bracts 3 large free ovate-rotund. *King Fic.* 41, t. 48, 83[f]; *Miq. Flor.* i. ii. 336, and *Ann.* iii. 286. Urostigma truncatum, *Miq. in Zoll. Syst.* 91, 97.

PERAK, *Kunstler.*—DISTRIB. Java, Borneo.

A small tree. *Leaves* $2\frac{1}{2}$–$4\frac{1}{2}$ in.; nerves about 5 pairs, very prominent beneath, as are the reticulations; petiole $\frac{1}{3}$–$\frac{1}{2}$ in.; stipules lanceolate, about $\frac{1}{2}$ in. *Male fl.* few, only near the apex of receptacle, sessile; sepals 3, broad, longer than the single ovate, sagittate, subsessile anther. *Gall* and *fem. fl.* sessile; sepals 4 or 5, small, ovate; ovary of galls ovoid-acuminate, with long straight terminal style; achene ovate-rotund, tubercled; style subterminal, bent at right angles.

29. **F. obtusifolia,** *Roxb. Fl. Ind.* iii. 546; all parts glabrous, leaves thickly coriaceous short-petioled shining elliptic-oblong or -obovate, tip rounded obtuse or very slightly and obtusely apiculate, margins entire slightly undulate, base acute faintly 3-nerved, receptacles rather crowded in axillary pairs sessile chiefly at the scars of fallen leaves globose sub-trigonous apex depressed yellowish when ripe and dotted, basal bracts 3 coriaceous large rounded cordate. *King Fic.* 42, t. 49, 83[g]; *Wight Ic.* t. 662;

Kurz For. Fl. ii. 443. F. longifolia, *Ham. in Wall. Cat.* 4570 A, B. Urostigma obtusifolium, *Miq. in L. J. B.* vi. 569.

Tropical forests of the base of the EASTERN HIMALAYA, from Sikkim to Munnipore; ASSAM, CHITTAGONG, BURMA and PERAK.

A large tree, young often epiphytal. *Leaves* 4–7 in.; nerves obscure, about 8–10 pairs, secondary nearly as prominent as the primary, reticulations obsolete; petiole ½–¾ in., stout; stipules ½–1 in., lanceolate or ovate, acuminate. *Male fl.* scattered, very numerous, on long pedicels; sepals 3, lanceolate. *Gall fl.* pedicelled or sessile; sepals about 4; ovary spherical, white; style subterminal, elongate. *Fem. fl.* sessile; achene ovate-rotund, tubercled and viscid; style lateral, as long as the achene, stigma infundibuliform.

30. **F. Benjamina,** *Linn. Mantiss.* 129 (*excl. syn. Rheede*); all parts glabrous, leaves petioled thinly coriaceous shining more or less broadly ovate-elliptic abruptly shortly acuminate entire, base rounded or subacute, receptacles sessile in axillary pairs globose or ovoid smooth and blood-red when ripe about ⅓ in. diam. with 3 short broad rounded basal bracts or (var. *comosa*) globose narrowed at the base and about ¾ in. diam. *King Fic.* 43, t. 52, 83[h]; *Kurz For. Fl.* ii. 446; *Bedd. For. Man.* 223. F. nuda, *Miq. Ann.* iii. 288; *Kurz l. c.* 445. F. comosa, *Roxb. Cor. Pl.* ii. t. 125, and *Fl. Ind.* iii. 552; *Bedd. l. c.* 223; *Wight Ic.* t. 658. F. pendula, *Link. Enum.* ii. 450. ? F. striata, *Roth Nov. Sp.* 387. F. papyrifera, *Griff. Ic. Pl. Asiat.* t. 554. F. dictyophylla, *Wall. Cat.* 4502 A, B, D. F. hæmatocarpa & neglecta, *Blume, fid. Dcne. in Nouv. Ann. Mus.* iii. 494, 495. Urostigma Benjamina, *Miq. in L. J. B.* vi. 583, and *Flor. l. c.* 346; *Dalz. & Gibs. Bomb. Fl.* 242. U. nudum, *Miq. in L. J. B. l. c.* 584.

Cultivated in the MALAY PENINSULA, wild (var. *comosa* only) in the base of the EASTERN HIMALAYA, ASSAM, CHITTAGONG, BURMA, the ANDAMAN ISLANDS and the DECCAN PENINSULA.—DISTRIB. Sumatra, Celebes, Timor.

An umbrageous tree, branches drooping; nerves very numerous, close, straight, anastomosing just inside the margin; petiole ½–1 in.; stipules lanceolate, about ½ in. *Male fl.* very few, scattered, pedicelled; sepals 2, large, flat; anther subsessile. *Gall fl.* mostly pedicelled; sepals 3 or 4, long, spathulate; ovary ovoid, smooth. *Fem. fl.* sessile; sepals shortly spathulate; achene ovoid-reniform, longer than the style, stigma large.

VAR. *comosa*, Kurz For. Fl. ii. 446; fruit large globose narrowed at the base about ¾ in. diam. when ripe, sepals of all the flowers lanceolate-acuminate not spathulate. F. comosa, *Roxb.*, &c.—I have seen wild specimens only from Timor, Celebes and Sumatra. Beddome and Dalzell mention it as in the Western Peninsula, but I have seen no specimens.

31. **F. elastica,** *Roxb. Hort. Beng.* 65, and *Fl. Ind.* iii. 541; all parts quite glabrous, leaves shortly petioled coriaceous shining oblong to elliptic rather abruptly obtusely caudate entire, base rounded or narrowed obscurely 3–5-nerved, receptacles in pairs sessile in the axils of fallen leaves covered at first by hooded involucres which fall off and leave a basal involucral entire-edged cup when ripe ovate-oblong smooth greenish yellow about ½ in. long. *King Fic.* t. 45, 54; *Blume Bijd.* 446; *Wight Ic.* 663; *Griff. Ic. Pl. As.* t. 552; *Brand. For. Flor.* 417; *Kurz For. Flor.* ii. 444. Urostigma elasticum, *Miq. in L. J. B.* vi. 578, and *Flor.* i. ii. 347, t. 23; *Wall. Cat.* 4557 A, B, C, D. U. circumscissum, *Miq. Pl. Jungh.* 292; *Flor. l. c.* 344. U. Karet, *Miq. l. c.* 348. U. odoratum, *Miq. Pl. Jungh.* 49; *Flor. l. c.* 348, t. 24. Visiania elastica, *Gasp. Nov. Gen. Fic.* 9. Macrophthalma elastica, *Gasp. Ric.* 83, t. 8.

In damp forests at the base of the SIKKIM HIMALAYA eastwards; the KHASIA HILLS, ASSAM, BURMA and PERAK.—DISTRIB. Malayan Archipelago.

A large tree, usually epiphytic. *Leaves* 3–12 in.; primary and secondary nerves numerous, hardly distinguished from one another, all nearly horizontal; midrib thick, prominent and running nearly straight almost to the margin; petiole 1–2½ in.; stipule single, subpersistent, coloured, almost half as long as the leaves, lanceolate, flaccid. *Male fl.* scattered over interior of receptacle, pedicelled; sepals 4, ovate; anther ovate, sessile. *Gall fl.*; sepals 4; ovary smooth; style subterminal, hooked. *Fem. fl.* mostly sessile; achene ovoid, tubercled; style long; stigma large, subcapitate.

This species, though it has received many names, is not very variable. The greatest difference is, that the leaves of old fruiting-branches are very much smaller and broader in proportion than those on young shoots. In all states the close parallel straight nervation of the leaves (almost resembling that of a monocotyledon) and the enormous "stipules" form unmistakable diagnostic marks.

32. **F. Trimeni,** *King in Trimen Journ. Bot.* xxiii. 242; all parts glabrous, leaves coriaceous elliptic acute entire, base slightly tapering obscurely 3-nerved, receptacles sessile in axillary pairs globose slightly verrucose when ripe ⅓–½ in. diam, basal bracts 3 small spreading ovate-cordate slightly pubescent. Urostigma Tjiela, *Thwaites Enum.* 265 *in part.*

The DECCAN PENINSULA and CENTRAL PROVINCES of INDIA. CEYLON; Central Province, *Thwaites.*

A gigantic tree, with very few aerial roots. *Leaves* 3–4½ in.; nerves diverging at a low angle from the thick prominent midrib, very numerous, close, straight, anastomosing just within the slightly thickened revolute margin; petiole about ¾ in., stout; stipules ovate, acuminate, ⅓–⅔ in. *Male fl.* scattered, peduncled; sepals 3, broadly ovate; anther sessile. *Gall fl.* pedicelled; fem. fl. sessile; sepals of both 5, lanceolate; achenes similar; style of both elongate; stigma flattened, especially in the gall flower.—Approaches *Tsiela*, Roxb., and *retusa*, L., var. *nitida*, but differs by its more numerous straight primary nerves, much more spreading habit, and fewer aerial roots.

33. **F. dubia,** *Wall. Cat.* 4561; all parts glabrous, leaves petioled thickly coriaceous shining from broadly oblanceolate to elliptic acute entire, base narrowed 3-nerved, receptacles peduncled solitary axillary ovoid-globose slightly narrowed to the peduncle smooth dull red with yellowish spots when ripe 1–1⅓ in. diam., peduncle thick ¼ in. with basal bracts 3 short broad rounded. *King Fic.* 46, t. 56, 83[k].

PENANG, *Wallich*; MALACCA, *King.*—DISTRIB. Sumatra.

An epiphytal climber or small umbrageous tree. *Leaves* 4–5 in.; nerves 6–8 pairs, reticulations minute but distinct; petiole about ¾ in., rather stout; stipules linear-lanceolate, flaccid, caducous, 1¼–2½ in. *Male fl.* numerous, scattered, elongate; sepals 3, elongate-spathulate; stamen 1, filament long. *Gall fl.*; sepals of the male; ovary ovoid, pedicel as long as the perianth; style short, subterminal. *Fem. fl.* sessile; sepals 3, long, lanceolate, acuminate; style longer than the smooth-ovoid achene.—The flowers are mixed with numerous linear bracteoles.

34. **F. Kurzii,** *King Fic.* 47, t. 57, 83[l]; all parts glabrous, leaves petioled thinly coriaceous ovate-elliptic or elliptic upper surface minutely tubercled shortly acuminate entire, base narrowed obscurely 3-nerved, receptacles axillary peduncled (in pairs?) globose when ripe about ½ in. diam. dark purple and apparently tubercled, apical scales prominent, bracts at base of receptacle 0 but at base of the peduncle 3 minute glabrous caducous. F. nuda, *Miq., var.* macrocarpa, *Kurz For. Flor.* ii. 446. ? F. euphylla, *Kurz l. c.* 445.

BURMA, *Kurz.*—DISTRIB. Java (*Zollinger, Herb.* 2228).

A tree. *Leaves* 4 in.; nerves 10–14 pairs, obsolete above, distinct beneath, diverging from the midrib at a high angle, secondary almost as prominent as the primary and more numerous; petiole about ½ in.; stipules lanceolate, glabrous, ⅓ in. *Male fl.* few, only near the mouth of the receptacle, on thick pedicels; sepals 2, broad, ovate, hyaline; anther single, ovate-rotund, sessile. *Gall fl.* pedicelled; perianth 4-toothed; ovary ovate, with broad ends, smooth; style elongate, stigma flat. *Fem. fl.* sessile; achene ovate-reniform, minutely tubercled.

35. **F. rhododendrifolia,** *Miq. Ann.* iii. 286; quite glabrous except the stipules, leaves thinly coriaceous shining smooth elongate-elliptic or oblong rarely elliptic-ovate acuminate entire, base narrowed or subcuneate rarely rounded, receptacles in axillary pairs sessile smooth globose purplish-red when ripe about ½ in. diam., basal bracts 3 broad rounded glabrous persistent. *King Fic.* 47, t. 58, 83[m]. Urostigma rhododendrifolium, *Miq. in L. J. B.* vi. 579 (*not of others*); *Kurz For. Fl.* ii. 445.

At the base of the SIKKIM and BHOTAN HIMALAYA; the KHASIA and PEGU HILLS.

A tree. *Leaves* 4–5 in.; main nerves slightly more prominent than the secondary, from 12–14 pairs, anastomosing near the margin; petiole ½–¾ in.; stipules lanceolate, ½ in., deciduously pubescent. *Male fl.* few, only near the mouth of the receptacle, sessile; sepals 2, broadly ovate, flat, longer than the stamen; anther ovate, apiculate, filament very short. *Gall fl.* shortly pedicelled, perianth with 3 sharp teeth; ovary globose; style elongate; stigma flat. *Fem. fl.* sessile; sepals 3, lanceolate; achene triangular, prominently but minutely tubercled; style elongate; stigma small.—A species badly represented in herbaria, and not well understood. Kurz is, I believe, in error in giving the Andaman Islands as a habitat.

36. **F. caudiculata,** *Trimen in Journ. Bot.* xxiii. 243; all parts glabrous, leaves petioled thickly membranous narrowly elliptic shortly cuspidate margins entire when dry subrevolute, base broad rounded or subtruncate, receptacles shortly peduncled axillary solitary or in pairs globose smooth bright red when ripe about ½ in. diam., basal bracts 3 broad obtuse united in a shallow cup, peduncle ⅙ in. *King Fic.* 48, t. 58 A.

CEYLON; in the Western Province, at Paregodde and Padun Korle.

A large tree. *Leaves* 2½–3½ in.; lateral nerves about 12 pairs, prominent, nearly at right angles to the strong broad midrib, reticulations dark-coloured, small, but very distinct beneath; petiole stout, about ½ in.; stipules ovate, much acuminate, about 1 in., membranous, rather persistent. *Male fl.* few, scattered, sessile; sepals 3, lanceolate, scarcely covering the single stamen; anther ovate, apiculate, filament short broad. *Gall* and *fem. fl.* similar, sessile or pedicelled; perianth 4–5-cleft; ovary ovoid; style elongate when young, short when ripe from breaking off.

The affinities are with *F. nemoralis*, Wall., from which the thicker and more elliptic leaves, and larger stipules and receptacles distinguish it.

37. **F. pisocarpa,** *Blume Bijd.* 454; glabrous except the stipules, leaves crowded at the extremities of the branches membranous elliptic rarely subobovate-elliptic very shortly cuspidate margin entire undulate, base 3-nerved obtuse rounded or very slightly narrowed, receptacles crowded along the branches in pairs from the scars of fallen leaves sessile small turbinate-globose smooth ¼ in. diam., basal bracts 3 broad obtuse. *King Fic.* 48, t. 59, 83[n]. Urostigma pisocarpum, *Miq. Flor.* i. ii. 344.

PERAK, *Kunstler.*—DISTRIB. Java.

A small tree. *Leaves* 1¾–2½ in.; nerves 5–7 pairs, prominent, reticulations fine, distinct; petiole slender, ½–¾ in.; stipules ovate-lanceolate, pubescent externally, ⅓ in. *Male fl.* few, only near the mouth of the receptacles, sessile; sepals 2, broadly

ovate, longer than the stamen, anther ovate, filament short. *Gall* and *fem. fl.* alike; sepals 1 or 2, hyaline or 0; achene elongate-ovoid, smooth; style elongate, stigma cylindric.—I have not seen the specimens from Java on which Blume founded the species, but Kunstler's plant agrees well with the description.

38. **F. glabella,** *Blume Bijd.* 452; young parts pubescent or all glabrous, leaves petioled thinly coriaceous obovate-oblong or oblanceolate (except in vars.) shortly cuspidate entire, base 3-nerved acute or cuneate rarely rounded jointed to the petiole, receptacles rather crowded in axillary pairs from the scars of fallen leaves sessile or peduncle $\frac{1}{10}$–$\frac{1}{5}$ in. spheroidal apex often slightly depressed smooth dark-bluish purple with sometimes yellow dots $\frac{1}{5}$–$\frac{1}{3}$ in. diam., basal bracts minute broadly triangular. *King Fic.* 49, t. 60, 83°; *Miq. Ann.* iii. 286. F. parvifolia, *Miq. l. c.* F. affinis, *Wall. Cat.* 4524; *Kurz For. Fl.* ii. 444. F. subpedunculata, *Miq. l. c.* 217, 286. F. Wightiana, *Benth. Fl. Hongk.* 327. Urostigma glabellum & Moritzianum, *Miq. Flor.* i. ii. 340 and 342. U. canaliculatum & parvifolium, *Miq. in L. J. B.* vi. 579, and *Flor. l. c.* 340, 343.

EASTERN HIMALAYAS, the KHASIA MTS., CHITTAGONG and BURMA.

A tree. *Leaves* 2–4 in.; nerves 7–10 pairs, not very prominent, reticulations distinct; petiole $\frac{3}{4}$–1 in.; stipules ovate-lanceolate, $\frac{1}{3}$ in. *Male fl.* few, only near mouth of receptacle, sessile; sepals 2, ovate, hyaline, larger than the single subsessile anther. *Gall* and *fem. fl.* alike, sessile or shortly pedicelled; sepals 4, hyaline, free or 0; achene spherical or ovoid, smooth; style very long, stigma obovate.—The following is one variety, and there are others in the Malay Islands, &c.

F. AFFINIS, *Wall. Cat.* 4524; leaves ovate-lanceolate acuminate shining, base narrowed, nerves up to 12 pairs, receptacles peduncled. *Herb. Griff.* (*Kew Distrib.* 4589, 4590); *Herb. H. f. & T. Ficus,* 113.

39. **F. retusa,** *Linn. Mant.* 129; quite glabrous, leaves shortly petioled coriaceous broadly ovate obovate or rhomboid obtusely cuspidate or subacute, base 3-nerved narrowed into the petiole, receptacles small sessile in axillary pairs $\frac{1}{3}$ in. diam. yellow or reddish, basal bracts broadly ovate obtuse spreading persistent. *King Fic.* 50, t. 61, 62, 84ᵇ; *Brand. For. Fl.* 417; *Kurz For. Fl.* ii. 444; *Bedd. For. Man.* 223. F. dilatata, *Miq. Ann.* iii. 218, 288. F. nitida, *Thunb. Fic.* 14; *Blume Bijd.* 455; *Wight Ic.* t. 642. F. rubra, *Roth Nov. Sp.* 391 (*excl. syn.*). F. littoralis, *Blume l. c.* 455. F. microcarpa, *Linn. f. Suppl.* 442. F. Benjamina, *Willd. Sp. Pl.* iv. 1143 (*excl. syn. Lin.*); *Roxb. Fl. Ind.* iii. 550. Urostigma retusum & nitidum, *Miq. Flor.* i. ii. 345; *Dalz. & Gibs. Bomb. Fl.* 241, 242. U. microcarpum, *Miq. l. c.* 346. U. ovoideum (*excl. syn.*) & pisiferum, *Miq. in L. J. B.* vi. 580.

Base of the EASTERN HIMALAYA, KHASIA HILLS, ASSAM, BURMA, the MALAYAN and DECCAN PENINSULAS.—DISTRIB. Malay Islands, China, New Caledonia.

A large umbrageous evergreen tree, with a few aerial roots. *Leaves* 2–4 in.; nerves 5 or 6 pairs, not much more prominent than the secondary nerves; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules lanceolate, about $\frac{1}{2}$ in. *Male fl.* numerous, scattered, sessile or shortly pedicelled; sepals 3, subspathulate; stamen single; anther cordate-apiculate, as long as the filament. *Gall fl.* sessile or pedicelled; sepals 3, broadly spathulate; ovary smooth. *Fem. fl.* sessile or pedicelled; achene ovoid or obovoid, perianth much smaller than in the gall; styles of both short, stigma cylindric or clavate.—The following are the prevalent forms.

F. RETUSA, *Linn. l. c.*; leaves inclining to round apiculate, base narrowed.—The Deccan Peninsula, Penang, Ternate and Australia.

F. NITIDA, *Thunb. l. c.*; leaves ovate to rhomboid elliptic apiculate, base narrowed.—Transgangetic India, &c.

40. **F. Talboti,** *King Fic.* 51, t. 63, 84q; all parts glabrous, leaves petioled thinly coriaceous shining above ovate or elliptic shortly caudate-acuminate entire, base narrowed 3–5-nerved, receptacles in axillary pairs sessile obovoid rather depressed at the apex smooth when ripe about ¼ in. diam., basal bracts 3 ovate acute.

Forests of CANARA, *Talbot.*

A large tree. *Leaves* 3½–4 in.; nerves 6–9 pairs, rather prominent on both surfaces; petiole ¾–1 in.; stipules ovate, about ¼ in. *Male fl.* few, only near the mouth of the receptacle, sessile; sepals 3, broadly ovate; anther 1, filament short. *Gall fl.* sessile or pedicelled; sepals 3, lanceolate; ovary ovate, narrowed to each end; style terminal. *Fem. fl.*; perianth of the galls; achene ovoid or obovoid, minutely tubercled; style short, lateral.—Near *F. retusa,* Linn., but differs in the form and venation of the leaf.

41. **F. Maclellandi,** *King Fic.* 52, t. 64, 84r; young parts softly tomentose ultimately all glabrous except the stipules and receptacles, leaves coriaceous oblong or narrowly elliptic obtusely and shortly cuspidate entire, base rounded or slightly narrowed both surfaces in adult leaves minutely tubercled, receptacles in axillary pairs sessile globose covered with pale flocculent tomentum about ⅕ in. diam., basal bracts small broadly ovate silky.

PEGU, *M'Clelland.*

A tree? *Leaves* 3½–4½ in.; nerves about 12 pairs, not much more prominent than the secondary, reticulations rather small, distinct; petiole ½–¾ in.; stipules lanceolate, tomentose, about ⅓ in. *Male fl.* not seen. *Fem. fl.* sessile; sepals 3, lanceolate; ovary ovoid, acuminate; style terminal, as long as ovary.—This has been collected only once, and it is poorly represented in collections.

42. **F. nervosa,** *Roth Nov. Sp.* 338; young parts appressed pubescent or puberulous at length glabrous except the puberulous stipules, receptacles and midribs occasionally appressed pubescent, leaves ½–1 in. thinly coriaceous elliptic oblong-lanceolate to obovate-elliptic or oblanceolate abruptly rather narrowly acuminate entire or margin slightly undulate and revolute shining on both surfaces lower minutely tubercled, base narrowed rarely rounded subequal 3–5-nerved, receptacles in axillary pairs peduncled young subverrucose ripe depressed globose ¼–1 in. diam., peduncles ⅓–½ in. slender, bracts at the base 0 but 3 small free rounded-ovate pubescent bracts low down on the peduncle. *King Fic.* 53, t. 65; *Kurz For. Fl.* ii. 453; *Wight Ic.* t. 660; *Miq. Ann.* iii. 286; *Bedd. For. Man.* 223. F. montana, *Wall. Cat.* 4514 A to D. F. magnoliæfolia, *Blume Bijd.* 448; *Miq. l. c.* 263, 286. F. modesta, *Miq. l. c.* 286. Urostigma nervosum & modestum, *Miq. in L. J. B.* vi. 585. U. euneuron, *Miq. Flor.* i. ii. 353.

SIKKIM and BHOTAN HIMALAYA, ASSAM, the KHASIA MTS., BURMA, the MALAY and DECCAN PENINSULAS and CEYLON.—DISTRIB. Malay Islands, China.

A tree. *Leaves* 3½–8 in.; nerves 7–10 pairs, nearly horizontal, prominent beneath; petiole ¼–½ in.; stipules lanceolate or ovate-lanceolate, membranous, puberulous, about ½ in. *Male fl.* few, only near mouth of receptacle, pedicelled; sepals 2, long, spathulate; stamen 1, filament as long as the anther adnate to one sepal. *Gall fl.* sessile or pedicelled; sepals 3, elongate, acuminate; ovary ovoid, smooth; style short. *Fem. fl.* rarely pedicelled; sepals 3, lanceolate; achene ovoid, acuminate; style twice as long, stigma clavate.

VAR. *minor*; smaller, more puberulous, nerves 5–7 pairs. U. modestum, *Thwaites Enum.* 266.—Nilghiri Hills, Ceylon, 3–5000 ft.

43. **F. Rumphii,** *Blume Bijd.* 437; all parts glabrous, leaves long-petioled subcoriaceous minutely tuberculate above when dry shining

broadly ovate acuminate margins entire subundulate, base broad slightly narrowed towards the petiole, basal nerves 5 rarely 7 (2 minute), receptacles sessile in axillary pairs or at leaf-scars globose smooth when young whitish with dark spots when ripe nearly black ½ in. diam., basal bracts 3 rotund small. *King Fic.* 54, t. 673, 84ᵗ; *Dcne. in N. Ann. Mus.* iii. 493; *Miq. Ann.* iii. 287; *Kurz For. Flor.* ii. 448. F. cordifolia, *Roxb.* (not *Bl.*) *Fl. Ind.* iii. 548; *Brand. For. Flor.* 416, t. 48; *Wight Ic.* t. 640. Urostigma Rumphii, *Miq. in Zoll. Syst. Verz.* 90, and *Flor.* i. ii. 332. U. cordifolium, *Miq. in L. J. B.* vi. 564. F. species, *Griff. Itin. Notes* iii. n. 145, and *Ic. Plant. Asiat.* 549.—*Wall. Cat.* 4484, A to G.

On the dry lower slopes of the mountains of the PANJAB; and NORTHERN, WESTERN and CENTRAL INDIA, ASSAM, BURMA and the Malay Peninsula.—DISTRIB. Malay Islands.

A large tree, often epiphytal. *Leaves* 4–6 in.; nerves 3–6 pairs, rather irregular, prominent when young, apex forming about ⅙ of the blade; petiole 2½–3½ in.; stipules ovate-lanceolate, ½–1 in. *Male fl.* few, only near mouth of receptacle; sepals 3, spathulate; stamen 1; filament about as long as the anther. *Gall* and *fem. fl.*; sepals 3, lanceolate; gall ovary smooth, usually obovoid; achene minutely tubercled, mucilaginous; style in both elongate, stigma clavate.

44. **F. religiosa,** *Linn. Hort. Cliff.* 471; leaves long-petioled coriaceous shining above minutely tubercled when dry beneath ovate-rotund narrowed upwards and caudate margins entire undulate, base broad rounded to truncate or a little narrowed occasionally emarginate or when young cordate 5–7-nerved, receptacles in axillary pairs sessile smooth depressed spheroidal when ripe dark purple ½ in. diam., basal bracts 3 broad spreading coriaceous. *King Fic.* 55, t. 67 A, 84ᵘ; *Blume Bijd.* 436; *Roxb. Fl. Ind.* iii. 547; *Wight Ic.* t. 1967; *Bedd. Fl. Sylvat.* t. 314; *Brand. For. Flor.* 415; *Kurz For. Flor.* ii. 448. F. affinior, *Griff. Notul.* iv. 392, and *Ic. Pl. Asiat.* t. 553. Urostigma religiosum, *Gasp. Ric.* 82, t. 7, f. 1; *Miq. Flor.* i. ii. 333, t. 23, *in L. J. B.* vi. 563; *Dalz. & Gibs. Bomb. Fl.* 241. U. affine, *Miq. in L. J. B.* vi. 564.—*Rheede Hort. Mal.* i. 47, t. 27.—*Wall Cat.* 4487 A, B to E.

Wild in the SUB-HIMALAYAN FORESTS, in BENGAL and in CENTRAL INDIA. Universally planted in India and Ceylon, less frequently in Burma, and rarely in the Malayan region.

A large, glabrous, usually epiphytal tree. *Leaves* 4½–7 by 3–4½ in.; nerves about 8 pairs, reticulations fine, distinct, the tail forming about a third of the blade; petiole 3–4 in., slender; stipules minute, ovate, acute. *Male fl.* very few, only near the mouth of some receptacles (often absent), sessile; sepals 3, broadly ovate; anther 1, ovate-rotund, filament short *Gall* and *fem. fl.* sessile or pedicelled; sepals 5, lanceolate; style short, lateral; stigma rounded. *Gall* much more numerous than the fem., many without perianth.—I reduce *F. affinior*, of Griffith, here with some hesitation: for his figure shows a slight difference from ordinary *religiosa* in the nervation. It agrees, however, in this respect no better with *F. Rumphii*.

45. **F. Arnottiana,** *Miq. Ann. Mus.* iii. 287; everywhere glabrous, leaves long-petioled subcoriaceous broadly ovate narrowed to the shortly caudate-acuminate apex entire, base from truncate-emarginate to deeply cordate never narrowed to the petiole 7-nerved, receptacles mostly from the axils of fallen leaves in pairs or clusters from tubercles sessile or short-peduncled depressed-globular smooth when ripe purple with greenish dots, ¼–½ in. diam., basal bracts 3 brown membranous, peduncles 0 or $\frac{1}{10}$–$\frac{1}{5}$ in. *King Fic.* 56, t. 68, 84ᵛ. F. populifolia, *Wall. Cat.* 4485 A, C (*in part*).

Urostigma Arnottianum, *Miq. in L. J. B.* vi. 564; *Thwaites Enum.* 264. U. cordifolium, *Dalz. & Gibs. Bomb. Fl.* 242.

The DECCAN PENINSULA and CEYLON, in rocky places.

A tree or shrub. *Leaves* 3–8 in.; nerves 5–7 pairs, reticulations lucid, minute; petiole 2–6 in.; stipules ovate-lanceolate, ½–1 in., caducous, reddish-brown when dried. *Male fl.* few, near the mouth of the receptacles, sessile; sepals 3, loose, inflated, broadly acuminate, much larger than the single small ovate-rotund subsessile anther. *Gall* and *fem. fl.* undistinguishable except by contents of ovary, sessile or pedicelled; perianth lax, toothed, completely investing the ovary; style elongate; stigma flat.

VAR. *courtallensis*; leaves smaller, base less cordate. U. courtallense, *Miq. in L. J. B. l. c.* 564.

46. **F. Mooniana,** *King Fic.* 57, t. 69, 84[w]; leaves subcoriaceous elliptic or ovate-oblong shortly cuspidate glabrous prominently minutely reticulated margin entire minutely undulate, base rounded or slightly narrowed 3-nerved not cordate, receptacles crowded below the ends of the branches solitary or in pairs chiefly in the axils of fallen leaves globose ⅓–½ in. diam. punctate, peduncle ½ in. Urostigma Wightianum, *Miq., var.* majus, *Thwaites Enum.* 265.

CEYLON; in the Central Province.

A large tree. *Leaves* 4½–6½ in.; nerves 10–15 pairs; petiole about 1½ in.; stipules about ⅓ in., puberulous. *Male fl.* few, only near the mouth of the receptacles, sessile; sepals 3, lanceolate, not quite covering the single stamen; anther ovate-apiculate, filament as long. *Gall* and *fem. fl.* sessile or pedicelled; perianth 4-toothed, shorter than the ovary; gall ovary ovoid; achene broadly triangular ovoid. —Differs from *Wightiana* and any form of *infectoria* in the straighter, more numerous and spreading nerves and longer peduncles.

47. **F. Tjakela,** *Burm. Fl. Ind.* 227; all parts glabrous, leaves coriaceous very glossy above long-petioled oval to ovate shortly abruptly acuminate margins entire slightly undulate, base broad rounded or subtruncate rarely narrowed 3–5-nerved, receptacles in clusters of 2–6 on very short crowded tubercles in the axils of the leaves or most frequently at the scars of fallen leaves sessile rarely very shortly peduncled depressed-globose whitish-yellow and dotted when ripe ⅕ in. diam., basal bracts 3 broad deeply bifid. *King Fic.* 57, t. 70, 84[x]; *Miq. Ann.* iii. 287. F. venosa, *Ait. Hort. Kew* iii. 451; *Poir. Encycl. Suppl.* ii. 657; *Ham. in Trans. Linn. Soc.* xv. 151. F. infectoria, *Willd.* (*not Roxb.*) *Sp. Pl.* iv. 1137; *Ait. l. c.* 485. F. caulocarpa, *Miq. Ann. l. c.* 287 (*excl. syn. caulocarpa*). Urostigma Tjakela, infectorium (*in part*), caulobotryum & ceylonense, *Miq. in L. J. B.* vi. 566, 567, 568.—*Wall. Cat.* 4519 A, B.—*Rheede Hort. Mal.* iii. t. 64.

The DECCAN PENINSULA and CEYLON, ascending to 4000 ft.

A very tall tree without aerial roots. *Leaves* 5–7½ in.; nerves 7–10 pairs, slightly prominent on both surfaces; petiole 1¾–2½ in., slender; stipules small, ovate-lanceolate, ½ in.; leaf-scales of young branches large, linear-lanceolate, flaccid, caducous, 3–5 in. *Male fl.* few, only near the mouth of the receptacle, sessile; sepals 3, ovate, shorter than the single stamen; anther ovate, filament about as long. *Gall* and *fem. fl.* alike; sepals 3 or 4; achene obovate; style elongate, stigma cylindric.—A distinct and beautiful species, allied to *F. infectoria,* Roxb., with which it has been confused. It is distinguishable by its minute receptacles in clusters of 4 to 6, and when dry by the dark greenish-grey leaves, with the upper surface smooth and glistening. The large, membranous, caducous, flaccid leaf-scales resemble the stipules of *F. elastica,* but are more fugacious. A small form collected by Mr. Gamble in the Cuddipore Forests has leaves only about 3½ in. long.—Under *F.*

infectoria in the London Journal of Botany, Miquel has mixed up references to both *infectoria* and *Tjakela*.

48. **F. insignis,** *Kurz For. Flor.* ii. 447; branchlets tomentose ultimately pubescent or glabrous, leaves long-petioled glabrous glossy above dull beneath very coriaceous elliptic or ovate-elliptic subinequilateral tip short abrupt obtuse, margins entire slightly revolute and undulate, base slightly narrowed obscurely 3–5-nerved, receptacles crowded towards the apices of the branches axillary or at the scars of fallen leaves globose, apex mammillate, when ripe greyish-white with pink dots and densely tomentose except the glabrous mammilla, peduncle short tomentose ½ in., basal bracts 3 small ovate-rotund glabrous scarious. *King Fic.* 58, t. 71, 84y.

PEGU; forests of Prome, *Kurz.*

A tree. *Leaves* 4½–7 by 2¼–4 in.; nerves 10–12 pairs, reticulations obscure; petiole jointed to the blade, 2–2½ in.; stipules small, very broadly ovate, tomentose. *Male fl.* few, only near mouth of receptacles; perianth toothed, shorter than the filament of the single stamen; anther broad, thick. *Gall* and *fem. fl.* with a 3- or 4-toothed perianth, shorter than the ovary; gall ovary ovoid; achene triangular, ovoid, minutely tubercled; style elongate, stigma cylindric.—Collected only by Kurz. It is near *F. geniculata*, but distinguished by its much more coriaceous leaves, and tomentose stipules and receptacles.

49. **F. Tsiela,** *Roxb. Fl. Ind.* iii. 549; all parts glabrous, leaves coriaceous broadly ovate or ovate-lanceolate acute or broadly obtusely cuspidate entire with a thickened marginal nerve, base narrowed or rounded 3-nerved, receptacles crowded at the ends of the branches axillary or at leaf-scars sessile globose, when ripe purple smooth about ½ in. diam., basal bracts 3 minute broadly ovate scarious. *King Fic.* 59, t. 74, 84z.2; *Ham. in Trans. Linn. Soc.* xv. 149; *Wight Ic.* t. 668; *Bedd. For. Man.* 314; *Miq. Ann.* iii. 286. F. amplissima, *Smith in Rees Cyclop.* xiv. 1. F. indica, *var.*, *Linn. Sp. Pl. Ed.* 2, 1514. F. Benjamina, *Wall. Cat.* 4503 B, C. Urostigma pseudo-Tjiela, *Miq. in Hook. L. J. B.* vi. 566, and *Ann. l. c.* 286; *Dalz. & Gibs. Bomb. Fl.* 241. U. pseudo-Benjamina, *Miq. ll. c.* 566 and 286. U. Tjiela, *Miq. in L. J. B. l. c.* 580; *Thwaites Enum.* 265.—*Rheede Hort. Mal.* iii. t. 63.

The DECCAN PENINSULA, from the Concan southward. CEYLON.

A large spreading tree without aerial roots. *Leaves* 2–4½ in.; nerves indistinct (until the leaf is dry), from 8–10 pairs; petiole 1¼–2 in.; stipules ovate, acuminate, ⅓–1 in. *Male fl.* few, sessile; sepals 3, ovate, acuminate, longer than the single stamen; anther broadly ovate, filament longer thick. *Gall fl.* sessile or pedicelled; fem. mostly sessile; sepals of both 3, ovate, shorter than the achene; fertile and gall achenes ovate-reniform, fertile broadest; style in both long, stigma cylindric.—A sport is common at Madras (Wall. Cat. 4503 C) with tufts of very long petioled leaves at the ends of the branches.

50. **F. infectoria,** *Roxb. Fl. Ind.* iii. 550 (*excl. syn. Rheede, not Willd.*); all parts glabrous, leaves membranous on rather long slender petioles oblong-ovate or ovate abruptly shortly acuminate, margins entire subundulate, base usually rounded and emarginate or subcordate sometimes narrowed or acute 3-nerved, receptacles in axillary pairs sessile globose, when ripe ¼ in. diam. whitish flushed with red and dotted, basal bracts 3 ovate-rotund minute. *King Fic.* 60, t. 75 to 79; *Brand. For. Fl.* 414 (*excl. syn.*); *Kurz For. Fl.* 446; *Bedd. For. Man.* 222 (*excl. syn.*); *Wight Ic.* t. 665. F. Tjela, *Wall. Cat.* 4520. F. venosa, *Wall. Cat.* 4515 D, F,

4529 A. F. Lacor, *Ham. in Trans. Linn. Soc.* xv. 150. F. terminalioides, *Griff. Notul.* iv. 393; *Ic. Pl. Asiat.* t. 550. F. lucescens, *Blume Bijd.* 444. Urostigma infectoria, *Miq. Flor.* i. ii. 339; *Dalz. & Gibs. Bomb. Fl.* 241. U. timorense, *Miq. in L. J. B.* vi. 569; *Ann.* iii. 286; *Flor. l. c.* 343. U. leucocarpum, *Miq. in L. J. B.*; *Ann. ll. c.* 576 and 286. U. lucescens, *Miq. Flor. l. c.* 339.

Plains and lower hills of INDIA, from the Salt Range to Sikkim; BENGAL, ASSAM, BURMA, both PENINSULAS, and CEYLON; not common wild, frequently planted.—DISTRIB. Malay.

A deciduous, low tree. *Leaves* 3½–5 in.; nerves 5–7 pairs, not very prominent; petiole 1½–2 in., sometimes indistinctly jointed with the blade; stipules about ½ in., broadly ovate, acute, pubescent. *Male fl.* few, sessile, near the mouth of the receptacles; anther broadly ovate, filament short; sepals 4 or 5, linear. *Gall* and *fem. fl.*; sepals 3 or 4, like those of the male, the latter often sessile; style of fem. long, of gall fl. short, stigma elongate.—Several geographical forms occur, of which 3 are Indian and 2 more Eastern.

F. INFECTORIA PROPER; leaf-base emarginate subcordate or slightly narrowed, receptacles sessile.

F. LAMBERTIANA, *Miquel Ann. Mus.* iii. 286; leaves coriaceous, base broad rounded emarginate or subcordate, receptacles ⅓–½ in. diam., pedicel pubescent ⅕–⅓ in. F. punctata, *Heyne in Wall. Cat.* 4569. F. rigida, *Ham. in Wall. Cat.* 4527, 4585 B. Urostigma Lambertianum & ægeirophyllum & perseæfolium, *Miq. in L. J. B.* vi. 565, 567; U. Lambertianum, *Dalz. & Gibs. Bomb. Fl.* 241.—Western and Central India, from the Sewaliks to the Deccan Peninsula and Ceylon.

F. WIGHTIANA, *Wall. Cat.* 4540; leaves smaller often only 2½ in., base narrowed, receptacles large, peduncles about ⅕ in. pubescent. *Bedd. For. Man.* 222; *Miq. Ann. l. c.* 286. Urostigma Wightianum, *Miq. in L. J. B. l. c.* 566.—South edge of the Gangetic Plain and Western Ghats.

51. **F. geniculata,** *Kurz For. Flor.* ii. 447; glabrous except the pubescent stipules, leaves subcoriaceous broadly elliptic or ovate-rotund cuspidately acuminate, margins subundulate, base rounded or narrowed sometimes emarginate 3-nerved, receptacles crowded shortly peduncled or sessile in groups of 2 to 4 at the scars of fallen leaves depressed-globose ¼–⅓ in. diam. when ripe reddish with dots, basal bracts 3 broadly ovate. *King Fic.* 64, t. 80, 84$^{x.2}$.

TROPICAL SIKKIM HIMALAYA and ASSAM to CHITTAGONG, BURMA and the MALAY PENINSULA.—DISTRIB. Malay Islands.

A large tree. *Leaves* 4–7 by 2½–4 in.; nerves 8–12 pairs, nearly horizontal, nervules and reticulations distinct; petiole 2½–4 in., separating from the blade when dry; stipules about ⅓ in., broadly ovate, pubescent. *Male fl.* near the mouth of the receptacles, rather numerous; sepals connate, barely covering the single stamen; anther broad, filament short. *Gall* and *fem. fl.* with 2 or 3 lanceolate sepals; style of gall fl. short, of fem. fl. long.—Closely allied to *infectoria*, but separable by the rounder leaves, longer petioles, and gamophyllous male perianth.

52. **F. callosa,** *Willd. in Act. Acad. Berol.* 1798, 102, t. 4; branchlets hoary warted, leaves rigid coriaceous petioled elliptic or oval, tip rounded or shortly obtusely acuminate, margins entire slightly recurved, base broad rounded sometimes slightly narrowed to the petiole 3–5-nerved, receptacles pedunculed solitary axillary pubescent-scabrid subglobose very slightly depressed at the apex contracted at the base into a short stalk, basal bracts 3 broadly ovate pubescent when ripe yellow about 1 in. diam., peduncle proper about ¾ in. pubescent-scabrid. *King Fic.* 64 to 85, 84$^{v.2}$; *Miq. Ann.* iii. 295; *Kurz For. Fl.* ii. 454. F. scleroptera, *Miq. Pl. Jungh.* 63, and

Flor. i. ii. 314. F. cinerascens, *Thw. Enum.* 266; *Bedd. For. Man.* 224. F. artocarpifolia, *Roxb. mss.*

DECCAN PENINSULA, from Canara southwards; BURMA, the ANDAMAN ISLANDS and CEYLON.—DISTRIB. Java.

A large tree. *Leaves* 5–8 in. (12 or more in barren shoots); nerves 5–12 pairs, slender but prominent beneath, as are the nervules and reticulations; above smooth, shining, and hard; beneath pale, minutely papillose, pubescent when young, ultimately glabrous but subscabrid; petiole $1\frac{1}{4}$–$1\frac{3}{4}$ in.; stipules ovate-lanceolate, $\frac{1}{3}$–$\frac{1}{2}$ in., pubescent. *Flowers* intermixed with many ovate-lanceolate bracteoles. *Male fl.* rather numerous, scattered, pedicelled, 1–2-androus; sepals 3, spathulate; stamens 1 or 2, anther small, ovate, filament short thin. *Gall* and *fem. fl.*; perianth deeply divided above into 3 or 4 broadly lanceolate segments; style elongate, stigma deeply bifid; achene obovoid.—The bracteoles are often with difficulty distinguished from the perianth. I follow Miquel in adopting Willdenow's name *callosa* for his *scleroptera* and Thwaites' *cinerascens*, though I rather doubt Willdenow's description really referring to this plant.

53. **F. vasculosa,** *Wall. Cat.* 4482; quite glabrous, leaves pale green when dry coriaceous petioled elliptic or obovate-oblong entire obtuse or obtusely cuspidate gradually narrowed to the acute or cuneate obscurely 3-nerved base, receptacles in axillary pairs peduncled globose glabrous minutely tubercled base constricted and minutely 3-bracteate pale yellow, $\frac{1}{5}$–$\frac{1}{2}$ in. diam., pedicel $\frac{1}{3}$–$\frac{1}{2}$ in. slender. *King Fic.* 65, t. 86, $84^{w.2}$; *Miq. in L. J. B.* vii. 454, and *Flor.* i. ii. 315; *Kurz For. Fl.* ii. 453. F. Championi, *Benth. in Hook. Kew Journ.* vi. 76, and *Fl. Hong Kong*, 328.

TAVOY, *Wallich.* PERAK, *King's Collector.* PENANG and SINGAPORE, *Curtis,* &c.—DISTRIB. Banka, Java, China.

A tree. *Leaves* 2–3 in.; nerves 6–12 pairs, nearly transverse, slender but prominent below, reticulations rather distinct; both surfaces pale and perfectly glabrous and shining, $\frac{1}{2}$–$\frac{2}{3}$ in.; petiole $\frac{1}{2}$–$\frac{2}{3}$ in.; stipules $\frac{1}{4}$ in., ovate, acute. *Male fl.* few and only near the mouth of the receptacle, pedicelled, diandrous; sepals 4, ovate or obovate. *Fem.* and *gall fl.* alike, sessile or pedicelled; perianth 4-toothed; ovary obovoid; style lateral, elongate, stigma 2-armed.

Sect. III. SYNŒCIA (see p. 495).

54. **F. aurantiaca,** *Griff. Notul.* iv. 394, and *Ic. Pl. Asiat.* t. 504, f. 2; scabrid, leaves thickly coriaceous elliptic-ovate subinequilateral shining and smooth above, hispidly scabrid beneath, nerves 8–9 pairs, receptacles ovoid-cylindric base ebracteate. F. trachycoma, *Miq. in Zoll. Syst. Verz.* 92; *Flor.* i. ii. 304; *Ann.* iii. 293. F. ? dimidiata, *Wall. Cat.* 4515.

MALACCA, *Wallich, Griffith* (*Kew Distrib.* 460).—DISTRIB. Java.

A scandent scabrid shrub. *Leaves* $2\frac{1}{2}$–4 in., acute or apiculate, margins entire recurved, above hispid when young, beneath often pale pustular and hispidulous, nerves strong; petiole $\frac{1}{2}$ in., stout, scabrid; stipules in pairs, ovate-lanceolate or subulate, glabrous. *Receptacles* $2\frac{1}{4}$ by $1\frac{1}{2}$ in., solitary, russet-red, peduncled, young umbonate scabrid, ripe smooth, umbilicus with large bracts; peduncle $\frac{1}{2}$ in., scabrid; basal bracts 3, broad, rounded. *Fem. fl.* mixed with neuters, subsessile; sepals 5, linear; ovary ovoid; style short, lateral, stout; stigma large, arms 2–3 subulate. *Neuter fl.* shortly pedicelled, sepals 3.

55. **F. punctata,** *Thunb. Fic.* 9; branchlets reddish-pubescent, leaves often dimorphous coriaceous oblong to oblanceolate or subrhomboid very inequilateral obtuse or subacute above glabrous shining beneath tessellately dotted and coloured, nerves 2–4 pairs, receptacles solitary or

fascicled globose ovoid obovoid or pyriform glabrous. *Miq. in L. J. B.* vii. 440; *Ann.* iii. 268, 269. F. stipulata, *Wall. Cat.* 4574. Syncœcia falcata, *Miq. in L. J. B. l. c.* 470, t. 11; *Flor.* i. ii. 329. S. serpens, *Miq. Pl. Jungh.* 67.

PERAK, PENANG and SINGAPORE, *Wallich*, &c.—DISTRIB. Malay Islands.

A branching creeper. *Leaves* shortly petioled, base rounded or truncate, nerves sometimes obscure; reticulations white beneath; stipules in pairs, equalling the petiole. *Receptacles* about ½ in. long, on stem and branches, young usually pubescent and umbonate, ripe russet-brown to orange, peduncle thick, bracts 3, united. *Sepals* 3, of male fl. broad, of gall fl. linear, of fem. linear; ovary oblong stipitate, margins hyaline, stigma 2-fid. The following are the principal forms.

F. PUNCTATA, *Thunb.*; leaves oblanceolate subequal tapering below.
F. FALCATA, *Miquel*; leaves oblong or subrhomboid not tapering below.

56. **F. callicarpa,** *Miq. Ann. Mus.* iii. 268, 289, t. 10 B; glabrous short-petioled subrhomboidly obovate shining above beneath smooth or sparsely strigose, reticulations tessellate not pale, nerves 3–4 pairs, receptacles solitary subglobose papillose. F. pomifera, *Kurz For. Fl.* ii. 454. Syncœcia sumatrana, *Miq. Flor.* i. ii. 329.

UPPER TENASSERIM, *Kurz*. PERAK, *Kunstler*. SINGAPORE, *King*.—DISTRIB. Malay Islands.

Stem strong, creeping or climbing, often flattened. *Leaves* 2½–4 in., narrowed to the subequal obscurely 3-nerved base, entire, reticulations distinct minute with interposed minute hairs; petiole ⅓–½ in., scurfy; stipules in pairs, narrow, glabrous, shorter than the petiole, persistent. *Receptacles* on the stem and branches, peduncled, 1½–2¼ in. long, subumbonate, ripe papillose mottled yellowish; bracts 3, about its middle, ovate acute united.

57. **F. apiocarpa,** *Miq. Ann. Mus.* iii. 269, 289; shoots scurfily pubescent, leaves long-petioled coriaceous ovate or ovate-oblong acuminate above glabrous shining beneath puberulous when young only, nerves 2–3 pairs, reticulations distinct, receptacles peduncled dimorphous ovoid or long-pyriform glabrous, neuter fl. 0. F. tetrargys, *Miq. Flor. Suppl.* 432. Urostigma apiocarpa, *Miq. l. c.* 440.—*Wall. Cat.* 4570 E (*leaves only*).

PERAK, *Kunstler*. SINGAPORE, *Wallich*. MALACCA, *Griffith*.—DISTRIB. Malay Islands.

Leaves 4½–10 in., base narrowed or rounded, reticulations coloured beneath; petiole 1½–2 in.; stipules in pairs, ½ in., ovate-lanceolate, puberulous. *Receptacles* in axillary pairs or solitary, 1¼–2 in. long, ripe dark red, spotted yellow; peduncle 1–2 in.; bracts 3, basal, minute, ovate. *Male fl.* pedicelled; sepals 3 linear. *Gall. fl.*; sepals of male, ovary ovoid-elliptic rough. *Fem. fl.*; perianth 3-partite; achene elliptic edges pale.

Sect. IV. SYCIDIUM (see p. 495).

58. **F. heterophylla,** *Linn. fil. Suppl.* 442; leaves membranous from long-lanceolate to broadly ovate acuminate entire or 3–∞-lobed coarsely toothed or repand scabrid above and beneath, nerves 4–8 pairs, receptacles solitary axillary peduncled spherical to elongate pyriform young scabrid old smooth. *Roxb. Fl. Ind.* iii. 532; *Brand. For. Fl.* 424; *Kurz For. Fl.* ii. 456; *Dalz. & Gibs. Bomb. Fl.* 243; *Wight Ic.* t. 659; *Miq. ll. c.* F. truncata and F. denticulata, *Vahl Symb.* i. 83. F. truncata, repens & rufescens, *Ham. in Trans. Linn. Soc.* xv. 143. F. rufescens, *Vahl Enum.* ii. 203. F. aquatica, *Kœn. in Willd. Sp. Pl.* iv. 1133. F. scabrella, *Roxb. l. c.* 532; *Wight Ic.* t. 661; *Miq. in L. J. B.* vii. 229; *Kurz l. c.* 455. F. repens,

Willd. l. c. 1149; *Roxb. l. c.* 535; *Wight Ic.* t. 636; *Miq. l. c.* 226. F. rubifolia, *Griff. Notul.* iv. 399, and *Ic. Pl. Asiat.* t. 557, ii. iii. F. assamica, acutiloba, elongata & subpanduræformis, *Miq. in L. J. B. l. c.* 226, 227, t. xi. A, 231, 235. F. grossularioides, *Burm. Fl. Ind.* 227. Covellia Griffithii, *Miq. l. c.* 467.

Throughout the HOTTER PARTS OF INDIA, near water, from the Gangetic Plain eastwards, and southwards to PERAK and CEYLON.—DISTRIB. Malay Islands.

A creeping pubescent shrub. *Leaves* 2–5 in., base rounded or cordate, petiole $\frac{1}{2}$–$2\frac{1}{2}$ in.; stipules in pairs, $\frac{1}{3}$–$\frac{1}{2}$ in., ovate. *Receptacles* $\frac{1}{2}$–1 in., umbilicus partially open; basal bracts minute; peduncle $\frac{1}{2}$–1 in. *Male* and *gall perianth* 3–4-cleft, fem. 4-cleft; gall ovary smooth ovoid, style short lateral. *Achene* subglobose tubercled, viscid, style long lateral, stigma cylindric.—Polymorphous under two pretty constant forms.

F. SCABRELLA, *Roxb.*; leaves shortly petioled narrow not lobed, receptacles globose or subpyriform, peduncle short.

F. REPENS, *Willd.*; leaves long-petioled broad, receptacles long peduncled more or less pyriform.

59. **F. bhotanica,** *King*; branchlets tomentose, leaves petioled membranous oblong or obovate-oblong to broadly lyrate toothed or lobed, base rounded or subtruncate 3-nerved, above strigose-scabrid, beneath tomentose, nerves about 5 pairs, stipules ovate-lanceolate scarious, receptacles in axillary pairs peduncled ovoid young hispid old smooth.

BHOTAN, *Griffith*; ASSAM, *Masters, Mann.*

Shrubby, erect. *Leaves* $3\frac{1}{2}$–$4\frac{1}{2}$ by $1\frac{1}{2}$–$3\frac{1}{2}$ in., more or less acuminate; petiole $\frac{1}{2}$–$\frac{3}{4}$ in.; stipules $\frac{1}{2}$ in., midrib tomentose. *Receptacles* $\frac{3}{4}$ by $\frac{1}{2}$ in.; umbo prominent, many-bracted; basal bracts 3, ovate, acute; peduncle $\frac{1}{6}$ in., tomentose. *Male fl.* pedicelled; sepals 5, linear-lanceolate; stamens 1 or 2, anthers broadly ovate. *Gall fl.* with perianth longer than the male; ovary ovoid smooth, style short subterminal. *Fem. fl.* perianth of the male but half as long; achene triangular rounded smooth, style lateral shorter than the ovary.

60. **F. quercifolia,** *Roxb. Fl. Ind.* iii. 534; shoots hispid, leaves short-petioled thickly membranous entire lobed ovate elliptic or elliptic obovate coarsely crenate-serrate acuminate, nerves 5–7 pairs scabrid beneath and often above, receptacles usually in axillary pairs ovoid or pisiform scabrid. *Wight Ic.* t. 646; *Miq. passim*; *Lodd. Bot. Cat.* t. 1540. F. humilis, *Roxb. l. c.* 535; *Wight Ic.* t. 635; *Miq. Flor. l. c.* 299; *Ann. l. c.* 271, 291. F. sinuosa, *Miq. in L. J. B. l. c.* 232; *Ann. l. c.* 291. F. inconstans, *Miq. in L. J. B. l. c.* 252, 330. F. biglandula, *Blume Bijd.* 475. F. biglandulosa, *Miq. Flor. l. c.* 298, and *Suppl.* 426; *Bedd. For. Man.* 224. F. anastomosans, *Wall. Cat.* 4513, 4546; *Kurz For. Fl.* ii. 455. ? F. montana, *Burm. Fl. Ind.* 226; *Blume Bijd.* 471.

BURMA and the MALAY PENINSULA; in crevices of rocks.—DISTRIB. Malay Islands.

A shrub, often creeping or decumbent. *Leaves* 2–5 in., base acute or cuneate rarely rounded, nerves 3–5 pairs prominent above and beneath, petiole $\frac{1}{2}$–1 in. hirsute; stipules in pairs, $\frac{1}{4}$ in., lanceolate. *Receptacles* $\frac{1}{4}$–$\frac{1}{2}$ in. diam., rarely from below the leaves, young umbonate, ripe globose or tip depressed, crimson; peduncle $\frac{1}{4}$–$\frac{1}{2}$ in.; bracts 1–2 above the base, linear. *Male sepals* 2, anther broadly ovate. *Gall sepals* about 3; ovary ovoid-globose, smooth; style short, lateral. *Fem. sepals* 3, minute; achene broadly ovoid tuberculate, style long, stigma cylindric.—Resembles *F. heterophylla* in habit, &c., but male fl. and receptacles very different. There are two leading forms: *F. quercifolia*, Roxb.; leaves coarsely sinuate-crenate deeply lobed, and *F. humilis*, Roxb.; leaves subentire or serrate not lobed.

61. **F. nigrescens,** *King*; leaves alternate petioled broadly or rounded ovate shortly acuminate coarsely serrate toothed above minutely strigose beneath harshly pubescent, nerves 3 pairs above the cordate 5-nerved base, receptacles solitary or in pairs shortly peduncled harshly pubescent.

MUNNIPORE and KEGARONA in the NAJA HILLS, alt. 5–5800 ft., *Clarke.*

A small creeping shrub, rooting at the nodes; shoots at first softly pubescent. *Leaves* 1½–2 in.; petiole ½–¾ in., pubescent; stipules in pairs, lanceolate scarious glabrous about ½ in. *Receptacles* ½ in. diam. on short scaly tubercles at the leaf-scars. *Fem. fl.* stoutly pedicelled; sepals 3, lanceolate; style lateral longer than the minutely tubercled achene, stigma cylindric. Figs nearly black (Clarke).—*Male fl.* unknown, but species clearly allied to *heterophylla* and *Ampelos.*

62. **F. rostrata,** *Lamk. Encycl.* ii. 498; leaves alternate petioled narrowly oblong elliptic or lanceolate rarely subobovate abruptly caudate entire or subsinuately toothed above the middle, nerves 3–6 pairs, recepts subsessile in axillary pairs or clustered ovoid then globose scabridly hispid, basal bracts 0. *Blume Bijd.* 465; *Miq. Flor.* i. ii. 307; *Ann.* iii. 274, 293. F. radicans, *Roxb. Fl. Ind.* iii. 536; *Wight Ic.* t. 67; *Miq. passim.* F. acuminata, *Kunth & Bouché Ind. Sem.* 21; *Wall. Cat.* 4478 A to D. F. saxatilis, parietalis *var.* ovalis, & quercifolia, *Blume Bijd.* 460, 462, 466, 468. F. obtusidens, *Miq. Pl. Jungh.*, and *Flor. l. c.* 305, and angulidens, *l. c.* 310. F. Lobbii & raridens, *Miq. ll. c.* 233, 430, and *Flor.* 305, 309. F. uniglandulosa, *Wall. Cat.* 4479; *Kurz For. Fl.* ii. 453; *Miquel ll. c.*

Forests at the base of the hills in BHOTAN, the KHASIA, CHITTAGONG, BURMA and the MALAY PENINSULA.—DISTRIB. Malay Islands.

A scandent or creeping rarely erect shrub. *Leaves* 2½–8 in., glabrous, base (rarely suddenly) narrowed 3-nerved, nerves and reticulations strong, above shining beneath pale harsh; petiole ¼–½ in. scurfy; stipules minute, subulate. *Receptacles* in axillary pairs or fascicles or from leaf-scars, ⅕–⅓ in. diam., young boldly umbonate, ripe red-yellow; peduncle 0–¾ in. *Male* and *gall sepals* linear, gall ovary pedicelled globose smooth, style short lateral. *Fem. perianth* 2–3-cleft; achene ellipsoid, notched at the style base; stigma cylindric.

63. **F. cuspidata,** *Reinwdt. in Blume Bijd.* 474; leaves shortly petioled elliptic-lanceolate or linear-oblong caudate-acuminate glabrous, nerves 6–8 pairs horizontal, recepts clustered in the leaf-axils subsessile ovoid or subglobose scabrid, basal bracts 0. *Miq. in L. J. B.* vii. 429; *Flor.* i. ii. 308; *Ann.* iii. 274, 292. F. tenuiramis, *Kunth & Bouché Ind. Sem.* 21; *Miq. l. c.* 432. F. angulifolia, *Blume l. c.* 463. F. fallax, *Miq. Flor. l. c.* 308; *Ann.* 292.

PERAK, *Kunstler.*—DISTRIB. Sumatra, Java.

A shrub or tree, never scandent or creeping, branches slender. *Leaves* 3–5½ in., tail long straight, base 3-nerved acute, shining above, dull and minutely subscabrid beneath; petiole ⅙–¼ in.; stipules ¼–⅓ in. convolute. *Recepts* ⅙–⅕ in., umbonate; peduncle 0–⅙ in. slender, with one bract about the middle and several at the base. *Male sepals* 3–4, lanceolate, stamens 1–2, anther short subsessile. *Gall fl.*; sepals 3, lanceolate, ovary pedicelled smooth, style short lateral. *Fem. fl.*; sepals 2–3; achene ellipsoid notched at the lateral style base, stigma dilated.

VAR. *sinuata*; leaves larger narrowly oblong sinuate or lobed.

64. **F. clavata,** *Wall. Cat.* 4495; shoots scabrid, leaves alternate short-petioled membranous oblong-lanceolate or oblanceolate cuspidate or caudate glabrous coarsely toothed above the middle, nerves 4–6 pairs, recepts shortly peduncled axillary solitary dimorphic obovoid and subglobose smooth scabrid or warted, fem. recepts smaller than those with male and gall. fl.

Miq. in L. J. B. vii. 431; *Ann.* iii. 275. F. trachycarpa, *Miq. in L. J. B. l. c.* 430; *Brand. For. Fl.* ii. 421. F. caudata, *Wall. Cat.* 4494; *Miq. in L. J. B. l. c.* 431; *Ann.* 275. F. Chincha, *Roxb. Fl. Ind.* iii. 534.

Lower hills of the HIMALAYA, ascending to 4500 ft.; from the Sutlej to Bhotan; MUNNIPORE, the KHASIA MTS., BURMA and MALACCA.

An erect shrub, shoots scabrid. *Leaves* 4–5 in.; base acute, 3–5-nerved, nerves prominent harsh punctulate beneath; petiole $\frac{1}{5}$–$\frac{1}{3}$ in.; stipules $\frac{1}{3}$ in., lanceolate, caducous. *Recepts* strongly umbonate in the obovoid forms and $\frac{1}{2}$ in. diam., $\frac{1}{3}$ in. in the globose, umbilical bracts often large, basal small, ripe yellow; peduncle $\frac{1}{10}$–$\frac{1}{5}$ in. *Male* and *gall fl.* 5–6-cleft, anther broadly ovoid. *Fem. fl.* campanulate, 5-toothed; achene ovoid subpapillose, style subterminal elongate, stigma cylindric.—*F. clavata*, Wall., has the obovoid large recepts, with male and gall flowers intermixed all over. *F. caudata*, Wall., has subglobose scabrid ones, some exclusively female, others male and gall; they are often wrinkled in both.

65. **F. sikkimensis,** *Miq. Ann. Mus.* iii. 225, 292; leaves alternate membranous elliptic or oblanceolate cuspidate entire, nerves 5–6 pairs, recepts small shortly peduncled solitary or clustered globose or globosely ovoid smooth warted. F. salicifolia, *Miq. in L. J. B.* vii. 431; *Ann.* iii. 292. F. caudata, *Herb. H. f. & T.*

EASTERN HIMALAYA and KHASIA MTS., alt. 2–4000 ft.

A small tree, sometimes epiphytal, shoots puberulous. *Leaves* $2\frac{1}{2}$–5 in., tip subacute, base acute or acuminate 5-nerved, under surface pale punctulate, nerves prominent, petiole $\frac{1}{8}$–$\frac{1}{3}$ in. scurfy; stipules $\frac{1}{4}$–$\frac{2}{3}$ in., convolute curved. *Recepts* $\frac{1}{6}$ in. diam., subumbonate, with long warts and sometimes whitish scales near the apex, peduncle about $\frac{1}{10}$ in., bracts at the middle or base minute. *Male fl.*; sepals 3; anther ovoid, filament with a basal process. *Gall. fl.*; ovary ovoid smooth, style short lateral tubular. *Fem. fl.*; perianth 3-toothed; achene bordered with white, style short, stigma cylindric solid.—Resembles a miniature *F. subulata*, which is a climber not found north of Chittagong.

66. **F. obscura,** *Blume Bijd.* 474; leaves short-petioled membranous oblong to oblanceolate or elliptic-obovate or subtrapezoid very unequal-sided caudate dentate serrate or subentire scaberulous, nerves 4–5 pairs, recepts solitary or in axillary pairs on the old wood subsessile ovoid or globose scabrid hispid or hirsute. *Miq. Flor.* i. ii. 302; *Ann.* iii. 272, 292. F. coronata, *Reinwdt. in Blume l. c.* 470; *Miq. Flor.* 304. F. asperiuscula, *Kunth & Bouché Ind. Sem.* 21; *Miq. in L. J. B.* vii. 234, and *Flor. l. c.* 300. F. grewiæfolia, *Hort. Berol.* F. Reemblas (*in part*), brevipes & hyphila (*in part*), *Miq. Pl. Jungh.* 58, 60; *Flor.* 304, 305, 303. F. Zollingeriana & dasycaula, *Miq. in L. J. B. l. c.* 460; *Flor. l. c.* 322. F. cyrtophylla, *Wall. Cat.* 4532; *Miq. in L. J. B. l. c.* 460. F. subdenticulata, *Miq. Flor. l. c.* 323.

EASTERN HIMALAYA, KHASIA MTS. to BURMA and the MALAY PENINSULA, ascending to 3000 ft.—DISTRIB. Malay Islands.

Shrubby or subarboreous. *Leaves* 5–10 in., narrowed to the tail, base oblique often $\frac{1}{2}$-sagittate, 3–7-nerved, above scabrous or subscabrous, hirsute or hispid, beneath with strong nerves; petiole $\frac{1}{3}$–$1\frac{1}{2}$ in.; stipules lanceolate, deciduously hirsute. *Recepts* $\frac{1}{3}$–$\frac{3}{4}$ in., young umbonate, ripe reddish or orange with 1–2 wart-like side and no basal bracts; peduncle $\frac{1}{10}$–$\frac{1}{2}$ in., with minute hispid bracts. *Male fl.* 4-sepalous and monandrous, or diandrous with 6 obovate sepals. *Gall fl.*; ovary globose, smooth, style short lateral, stigma dilated. *Fem. fl.*; sepals 5, linear, hispid; achene ovoidly globose, style long lateral, stigma cylindric.—Some narrow-leaved forms approach *F. pisifera*, Wall.

67. **F. asperrima,** *Roxb. Fl. Ind.* iii. 554; leaves petioled ovate oblong lanceolate or elliptic obtuse or acuminate subentire toothed or crenate above the entire base scabrous-hispid on both surfaces, nerves 3–5 pairs, recepts peduncled globose scabrous-hispid top depressed. *Dalz. & Gibs. Bomb. Fl.* 243; *Wight Ic.* t. 633; *Bedd. For. Man.* 224; *Miq. in L. J. B.* vii. 230. F. hispidissima, *Wight mss.*; *Miq. in L. J. B. l. c.* 229. F. politoria, *Moon Cat. Ceyl. Pl.*

CENTRAL INDIA and the DECCAN PENINSULA, and CEYLON, ascending to 3000 ft.

A tree or shrub; shoots scabrid. *Leaves* 1–1½ in., subterminal, base obtuse 3-nerved, nerves beneath very prominent; petiole ½–2 in. stout; stipules minute. *Recepts* ½–1 in. diam., ripe yellow or purple spotted yellow, umbilicus prominent, its bracts erect. *Male* and *gall* sepals 4–5, linear, scabrid. *Gall. fl.*; ovary ovate-lanceolate, style terminal thick, stigma dilated. *Fem. fl.*; achene narrow obovoid, tubercled, style filiform lateral, stigma clavate.

68. **F. lepidosa,** *Wall. Cat.* 4541; leaves petioled membranous ovate-oblong to elliptic obovate or lanceolate acute or cuspidate entire glabrous above pale and appressed pubescent beneath, nerves 7–8 pairs, recepts in axillary pairs peduncled pubescent male ellipsoid fem. globose or subpyriform. *Kurz For. Fl.* ii. 450. F. Lamponga, *Miq. Flor. Suppl.* 430; *Ann.* iii. 294. F. Lamponga *var.* 1, *Kurz l. c.* 451. F. martabanica, *Wall. Cat.* 4551.

BHOTAN, *Gamble*; ASSAM, CHITTAGONG and BURMA, *Wallich*, &c.; PERAK, *King's Collector.*

A small tree, branchlets pubescent. *Leaves* 4–7 in., rather harsh, base obtuse or subacute 3-nerved, subglabrous above, beneath pale with prominent nerves, nervules straight, petiole ½–1½ in. pubescent, stipules ½ in. lanceolate, midrib pubescent. *Receptacles* ½ in. diam., ripe orange-red, young umbonate; basal bracts 3, ovate, acute; peduncle ⅕–½ in. *Male sepals* 4. *Gall ovary* globose, smooth, style lateral, stigma tubular; fem. fl. mixed with hairs; sepals 4–5; achene oblong oblique rugose, style subterminal, stigma cylindric.

VAR. *martabanica*; leaves elongate lanceolate acuminate.

Sect. V. COVELLIA (see p. 495).

69. **F. conglobata,** *King*; hispid, leaves elliptic or subobovate acuminate serrulate or denticulate, nerves 4 pairs, recepts long-peduncled in crowded panicles from the base of the stem subglobose or pyriform nearly smooth.

TROPICAL SIKKIM HIMALAYA, *Griffith's Collectors* (*Kew Distrib.* 4639), *J. D. H., King*; CHITTAGONG, *Lister.* Munnipore, *Watt.*

A small tree. *Leaves* opposite and alternate, 6–14 in., above sparsely strigose with hispid-tomentose nerves, beneath papillose with setose nerves; petiole 1½–6 in. setose; stipules ¾ in. hispid. *Receptacles* ½ in. diam., in the axils of scarious bracts, oral bracts large, basal 3 united below glabrous. *Male sepals* 3 broad. *Gall* and *fem. perianth* short, tubular, or 0; style short lateral, stigma dilated. *Achene* broad rhomboid rough.—Leaves of *F. hispida,* receptacles more or less hypogeal.

70. **F. hispida,** *Linn. f. Suppl.* 442; hispid, leaves ovate oblong or subobovate acute or cuspidate entire or toothed, nerves 3–5 pairs, recepts short-peduncled fascicled on the old wood or leafy branches, turbinate obovoid or subpyriform. *Blume Bijd.* 469; *Brand. For. Fl.* 423; *Kurz For. Fl.* ii. 460; *Bedd. For. Man.* 224; *Miq. Ann.* iii. 282, 296. F. oppositifolia, *Willd. Sp. Pl.* iv. 1151; *Roxb. Cor. Pl.* 124, and *Fl. Ind.* iii. 561;

Wight Ic. t. 638; *Dalz. & Gibs. Bomb. Fl.* 243. F. dæmonum, *Kœn. in Roxb. l. c.* 562; *Wight Ic.* 641; *Wall. Cat.* 4538. F. prominens, *Wall. Cat.* 4537; *Miq. Ann.* iii. 291. F. mollis, *Willd. in Act. Berol.* 1798, 103, t. 5. F. scabra, *Jacq. Hort. Schœnb.* iii. t. 315. Covellia dæmonum, *Miq. in L. J. B.* vii. 461; *Dalz. & Gibs. l. c.* 244. C. oppositifolia, *Gasp. Rich.* 85; *Miq. in L. J. B. l. c.*; *Griff. Ic. Pl. Asiat.* t. 560. C. setulosa, courtallensis, Wightiana, assamica & dasycarpa, *Miq. in L. J. B. l. c.* 461 to 464; *Flor.* i. ii. 323. Sycomorpha Roxburghii, *Miq.*

Throughout INDIA, from the PANJAB in the N.W. to MALACCA and CEYLON.—DISTRIB. Malay Islands, China, Australia.

A shrub or small tree. *Leaves* usually opposite, 4–12 in.; base rounded cuneate or subcordate, rather scabrid above, hispid beneath; petiole $\frac{1}{2}$–$1\frac{1}{2}$ in., or on shoots 3–$3\frac{1}{2}$ in., hispid; stipules $\frac{1}{2}$ in., pubescent, often in whorls of 4 on the receptacles with leafless branches. *Receptacles* ripe hispid yellowish, with bracts scattered on the sides; peduncle $\frac{1}{5}$–$\frac{1}{2}$ in.; basal bracts 3. *Flowers* much as in *F. conglobata*, but fem. style hairy and stigma cylindric tubular.—Receptacles often hypogeal in sandy coast of Coromandel.

71. **F. saemocarpa,** *Miq. Ann. Mus.* iii. 232, 296; branchlets hirsute, leaves opposite crowded linear-lanceolate or oblanceolate entire, nerves 6–8 pairs, recepts solitary axillary or in short panicles from the old wood subglobose, base constricted 8–10-ribbed warted and hispid. F. pyrrhocarpa, *Kurz For. Fl.* ii. 424. F. tuberculata, *Wall. Cat.* 4539. F. squamosa, *Roxb.*, and F. laminosa, *Hardw. in Roxb. Fl. Ind.* iii. 531.

Foot of the HIMALAYA; in sandy and rocky streams from Kumaon to Bhotan. ASSAM, the KHASIA HILLS and BURMA.

A low shrub; branchlets hirsute. *Leaves* 3–9 in., smooth, rarely scabrid above, beneath smooth or scaberulous, rarely hispid, base narrowed, 3-nerved; petiole $\frac{1}{3}$–1 in., pubescent; stipules in pairs, $\frac{1}{3}$–$\frac{1}{2}$ in., ovate, acuminate, nearly glabrous. *Recepts* $\frac{1}{2}$–1 in. diam., with scattered bracts on the sides, umbilicus large; peduncle $\frac{1}{5}$–$\frac{1}{2}$ in., pubescent; basal bracts 3, triangular, deciduous. *Male fl.*; stamen 1, anther ovate or obovate. *Fem. fl.*; perianth 0. *Gall ovary* smooth, style short lateral. *Achene* rhomboid, and very long style hairy.—Leaves variable as to pubescence.

72. **F. Cunia,** *Ham. in Roxb. Fl. Ind.* iii. 561; leaves alternate elliptic to oblong-lanceolate inequilateral acuminate entire or serrate, above scabrid or smooth, beneath more or less pubescent, base semisagittate, nerves 9–14 pairs, recepts in pairs or clusters on scaly usually leafless branches globose or pyriform hispid. *Wight Ic.* t. 648; *Miq. Ann.* iii. 282, 296; *Brand. For. Fl.* 421; *Kurz For. Fl.* ii. 461; *Bedd. For. Man.* 224. F. conglomerata, *Roxb. l. c.* 559; *Wight Ic.* t. 669; *Wall. Cat.* 4531. Covellia Cunia, conglomerata & inæquiloba, *Miq. in L. J. B.* vii. 459.

SUB-HIMALAYAN FORESTS, from the Chenab to Bhotan; CENTRAL INDIA, ASSAM, the KHASIA MTS., CHITTAGONG and BURMA; ascending to 4000 ft.

A low tree. *Leaves* $\frac{1}{2}$–1 in., larger basal lobe 3–4-, smaller 1-nerved; petiole $\frac{1}{5}$–$\frac{2}{3}$ in., scabrid; stipules $\frac{3}{4}$–1 in., linear-lanceolate, puberulous. *Recepts* $\frac{1}{2}$ in. diam., ripe red-brown; basal bracts 3; peduncle short. *Male sepals* 3; anther ovate. *Gall* and *fem. sepals* about 4, lanceolate, united below; gall ovary globose, smooth; style very short, lateral. *Achene* broadly ovoid, emarginate on one side, tuberculate, viscid; style very long, lateral; stigma large, bifid.

73. **F. prostrata,** *Wall. Cat.* 4536; glabrous, leaves alternate oblanceolate-oblong long-acuminate entire, nerves about 10 pairs, receptacles subpyriform on long flexuous nearly simple leafless branches solitary in the

axils of scarious bracts glabrous. *Miq. Ann.* iii. 297. Covellia prostrata, *Miq. in L. J. B.* vii. 465.

SIKKIM HIMALAYA, alt. 2000 ft., *Kurz.* SILHET and the KHASIA HILLS, *Wallich*, &c.

A small tree. *Leaves* 5½–7 in., tapering from above the middle to the rather obtuse 3–5-nerved base; petiole ½ in.; stipules ¾ in., narrow, convolute. *Fruiting branches* 10–12 ft., prostrate. *Recepts* with 3 ovate acuminate basal bracts, peduncle ⅓ in. *Fem. fl.* sessile or pedicelled; sepals 3–4, linear; achene broadly ovoid; style about as long, stigma cylindric.—Male and gall fl. unknown.—Closely allied to *F. Ribes*, Reinwdt., but distinguished by its larger size, absence of hairs and larger receptacles; intermediates, however, occur.

74. **F. Miquelii,** *King*; shoots strigose, leaves subopposite and alternate obovate-oblong or oblanceolate cuspidately tailed entire subglabrous, nerves 6–8 pairs, recepts depressed globose in woody panicles from the stem pubescent. F. caulocarpa, *Miq. Ann.* iii. 235, 297 (*not Urost. caulocarpa*). F. fistulosa, *Kurz For. Fl.* ii. 459 (*in part, not of Reinwdt.*).

PEGU to TENASSERIM, *Kurz.* PERAK, *Kunstler.* SINGAPORE, *King.*—DISTRIB. Sumatra, Celebes.

A tree. *Leaves* 4½–8 in., membranous, pubescent above and beneath when young, adult almost glabrous, tail 1 in., base narrowed 3-nerved; petiole ⅓–½ in.; stipules ½ in., lanceolate, pubescent. *Fruiting branches* cauline, large, much panicled, scurfy. *Recepts* ¾ in. diam., ripe greenish with pale stripes; oral bracts many broad, basal 3 ovate acute; peduncle ½ in. *Male sepals* 3, ovate, inflated, broadly imbricate; anther broadly ovate, emarginate. *Gall* and *fem. fl.* naked. *Gall ovary* ovoid-globose; style short, lateral, stigma tubular. *Achene* obovoid, tubercled; style lateral, as long as the ovary, stigma cylindric.

75. **F. fasciculata,** *King*; shoots purplish-strigose, leaves alternate short-petioled narrowly or obovate-elliptic cuspidate subcrenate glabrous above tuberculate beneath with 4–5 pairs of appressed hairy nerves, recepts fascicled on cauline tubercles peduncled subglobose ridged glabrous.

PERAK; banks of the Kampo River, *Kunstler.*

A small tree. *Leaves* 7–9, minutely 3-nerved, base acute; petiole ½ in., hispid with purplish hairs; stipules ⅓ in., lanceolate, hispid. *Recepts* 5–8 in a cluster, russet-brown; basal bracts 3, minute, ovate; peduncle ⅓ in., pubescent. *Fem. fl.* pedicelled; perianth tubular, girding the lower half of the stipes of the obliquely ovoid tubercled achene; style subterminal, filiform, about as long as the ovary, stigma clavate.—Male and gall fl. not seen.

76. **F. Ribes,** *Reinwdt. in Blume Bijd.* 463; shoots strigose, leaves alternate petioled glabrous except the appressed pubescent midrib and nerves beneath lanceolate or oblanceolate subfalcate caudate entire, nerves 7–9 pairs, recepts on long leafless branches from the base of the stem very small peduncled subglobose constricted at the base ribbed puberulous. *Miq. Ann.* iii. 284, 297; *Kurz For. Fl.* ii. 458. F. polycarpa, *Roxb. Fl. Ind.* iii. 556; *Wall. Cat.* 4509. F. copiosa, *Steud. Nomencl.* i. 635. F. prostrata, *Wall. Cat.* 4536 (*in part*). Covellia Ribes, *Miq. Flor.* i. ii. 325. C. microcarpa & paniculata, *Miq. in L. J. B.* vii. 466, t. 9 A, and 467.

TENASSERIM to PENANG and SINGAPORE, *Wallich*, &c.—DISTRIB. Malay Islands, New Guinea.

A small tree. *Leaves* 2½–4½ in., membranous, narrowed from below the middle to the acute sub-3-nerved base; petiole ⅓ in., strigose; stipules ¾ in., convolute. *Recepts* ⅕ in. diam., young warted, mouth closed by 5 broad bracts, base constricted into a 3-bracteate stipes $\frac{1}{10}$ in. long; peduncle ⅕ in. *Male sepals* 2, large, inflated;

anther subsessile, very broad. *Gall ovary* naked, broadly obliquely obovoid; style terminal, thick. *Fem. perianth* tubular, covering the pedicel of the rhomboid tubercled achene; style much longer, stigma cylindric or clavate.

77. **F. fistulosa,** *Reinwdt. in Blume Bijd.* 470; nodes of shoots strigose, leaves opposite and alternate oblong to ovate- or obovate-lanceolate acute entire or subserrate, nerves 4–7 pairs, recepts axillary and short-peduncled or rameal or cauline and clustered depressed-globose glabrous. *Kurz For. Fl.* ii. 459 (*in part*). F. geminifolia, *Miq. in Zoll. Syst.* 93; *Flor.* 313. F. tengerensis, *Miq. Ann.* iii. 296. F. diphylla, *Wall. Cat.* 4543. Covellia subopposita, *Miq. Pl. Jungh.* 66; *Flor.* i. ii. 327, and *Suppl.* 435, and *Choix Pl. Buitenz.*, t. 15. C. tuberculata, *Miq. in Zoll. Syst.* 94, 99, and *Flor. l. c.* 325.

KHASIA HILLS, *J. D. H.*, &c. CHITTAGONG to PENANG, PERAK and SINGAPORE. —DISTRIB. Malay Islands.

A shrub or small tree. *Leaves* 3½–10 in., granulate beneath with coloured nerves; petiole ½–1½ in.; stipules ½–¾ in., scarious. *Recepts* ½–1 in. diam., sometimes constricted at base, warted and subpyriform when young; oral bracts many; basal 3, small, acute; peduncle ¼–1½ in. *Male fl.* few; sepals 2–3, concave. *Gall* and *fem. fl.* naked or perianth small round the base of the pedicel of the ovary. *Gall ovary* ovoid, smooth; style short, subterminal, stigma funnel-shaped. *Fem. fl.* as a rule in the axillary short-peduncled recepts. *Achene* obliquely obovoid, granulate; style lateral, long, stigma cylindric.

78. **F. lepicarpa,** *Blume Bijd.* 459; nodes swollen at first pubescent, leaves subopposite and alternate obovate-oblong cuspidate glabrous except the midrib and nerves, base narrowed unequal 5-nerved, nerves 7–8 pairs erect, recepts subsolitary axillary sessile ellipsoid sparsely hairy warted, bracts in a ring below the umbilicus large flat tips white. *Miq. Ann.* iii. 283, 297. F. volkhameriæfolia, *Wall. Cat.* 4542. F. inclinata, *Ham. in Wall. Cat.* 4486 A. Covellia didynama, *Miq. Pl. Jungh.* 65; *Flor.* i. ii. 327. C. lepidicarpa, *Miq. Flor.* 328. C. volkhameriæfolia, *Miq. in L. J. B.* vii. 464, t. 8.

PERAK, *Kunstler.* SINGAPORE, *Wallich*; in rocks and by streams, up to 3500 ft. —DISTRIB. Malay Islands.

A small tree. *Leaves* 7–10 in., sometimes subrepand near the tip; petiole ¾–1¼ in.; stipules ¾–1 in., large. *Receptacles* usually solitary; basal bracts 3, ovate, spreading. *Male sepals* 8, inflated; filament adnate short curved. *Gall perianth* a pellucid sack enclosing the ovary, style terminal, stigma dilated. *Fem. perianth* small, tubular, toothed; achene obliquely obovoid; style lateral, long, stigma cylindric.—Miquel describes the recepts as sometimes long-peduncled and cauline, but I have not seen them so.

79. **F. obpyramidata,** *King*; shoots at first tomentose, leaves elliptic ovate or subobovate acute margins subentire undulate, nerves 6 pairs, recepts in small clusters from leafless cauline branches peduncled obpyramidal ridged warted puberulous.

PERAK; at Laroot, *Kunstler.*

A tree, 25–30 ft. *Leaves* 6–7 in., base 7-nerved rounded or cordate, above substrigose, nerves and midrib beneath pubescent; petiole ½ in., tomentose; stipules ⅔ in., hairy. *Recepts* 1 in. diam., umbilicus depressed. *Fem. perianth* a ring at the base of the stipes of the ovary; achene ovoid, granulate, viscid; style long, subterminal, stigma cylindric or subclavate.

Sect. VI. EUSYCE (see p. 496).

80. **F. Thwaitesii,** *Miq. Ann. Mus.* iii. 229, 294; leaves polymorphous, cauline elliptic or ovate or 3-lobed and subhastate obtuse scabrid

above pubescent beneath, those on fruiting branches twice as large elliptic or obovate entire, recepts subsolitary axillary globose smooth. F. diversiformis, *Miq. in L. J. B.* vii. 441; *Ann. l. c.* 281, 294, and F. disticha, *Thwaites Enum.* 266. F. oxycoccoides, *Linn. Fl. Zeyl.* 438. F. stipulata, *Moon Cat.* 6.

CEYLON; Central Province, ascending to 5000 ft.

A slender climbing rooting shrub, with free fruiting branches. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in., base 3-nerved notched or cordate; petiole 1 in.; stipules a little longer, ovate. *Recepts* $\frac{1}{3}$ in. diam., base contracted into a $\frac{1}{10}$ in. stipes with 3 broad basal bracts. *Sepals* of all fl. 3, short, broad; gall and fem. fl. similar.

81. **F. excavata,** *King*; shoots tawny-pubescent, leaves obliquely or orbicular-ovate obtuse entire glabrous above sparsely appressed-pubescent beneath, nerves 2 pairs, reticulations lacunose, recepts in axillary clusters sessile depressed-globose pubescent.

PERAK, *King's Collector*.—DISTRIB. Borneo.

Scandent. *Leaves* $1\frac{1}{4}$–$1\frac{1}{2}$ in.; base subequal, 5-nerved; petiole $\frac{1}{5}$ in., pubescent; stipules in pairs, $\frac{1}{4}$ in., ovate, acuminate, silky, deciduous. *Recepts* in clusters of about 6, unripe orange-red (ripe unknown); basal bracts 3, triangular-ovate, glabrous. *Fem. fl.* subsessile; sepals 4; achene oblong, subpapillose, style short, subterminal.—Allied to *F. recurva* and *lanata*, Blume.

82. **F. lævis,** *Blume Bijd.* 437; usually glabrous, leaves membranous long-petioled orbicular or broadly or elliptic-ovate cuspidate entire or obscurely toothed towards the tip, nerves 3–4 pairs above the basal, recepts axillary peduncled subsolitary globose rarely pyriform. *Miq. Ann.* iii. 278, 293. F. vagans, *Roxb. Fl. Ind.* iii. 537. F. Emodi, *Wall. Cat.* 4515. ? F. pedicellata, *Wall. Cat.* 4486 (*in part*). F. ceylanica, *Miq. Ann. l. c.* 293, and in *L. J. B. l. c.* 75. Pogonotrophe lævis, *Miq. Flor.* i. ii. 330. P. assamica, *Miq. in L. J. B.* 73. P. dasyphylla, *Miq. l. c.* 74, and *Ann. l. c.* 293.

TROPICAL HIMALAYA, from Nepal eastwards, alt. 2–5000 ft.; and from ASSAM to the MALAY PENINSULA and CEYLON.—DISTRIB. Malay Islands.

A small tree or epiphyte. *Leaves* 4–7 in., glabrous above except the nerves, beneath puberulous or pubescent; base rounded to cordate rarely narrowed, 5–7-nerved; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ in.; stipules $\frac{1}{3}$–$\frac{1}{2}$ in. *Recepts* $\frac{1}{2}$–1 in. diam., ripe greenish-yellow, smooth, puberulous or tomentose, hispid within; basal bracts 3, small, spreading; peduncle slender, glabrous. *Sepals* of all fl. 5, linear-lanceolate; anthers 2–3, elongate, subsagittate. *Gall ovary* globose, smooth; style short, subterminal, stigma dilated. *Achene* ellipsoid, style terminal, nearly as long, stigma bifid.—The following are the prominent forms.

VAR. *dasyphylla*; leaves more or less appressed pubescent beneath, receptacles and peduncles tawny-tomentose.—Ceylon (the only form there).

VAR. *tomentosa*; leaves tomentose, receptacles tomentose or pubescent, peduncles 1 in.—Perak.

VAR. *assamica*; shrubby, leaves very broad rather thick puberulous, receptacles in pairs, peduncles $1\frac{1}{2}$ in. divaricate.—Khasia and Duphla Hills, Cachar.

83. **F. scandens,** *Roxb. Fl. Ind.* iii. 536; leaves ovate or elliptic-ovate subacute or acute entire base broad rounded, nerves 3 pairs above the basal, receptacles axillary long-peduncled solitary or in pairs globose scaberulous. *Wight Ic.* t. 643; *Miq. in L. J. B.* vii. 452; *Ann.* iii. 281, 294; *Brand. For. Fl.* 421; *Kurz For. Fl.* ii. 455. F. fructicosa & hederacea, *Roxb. l. c.* 533, 538. F. fruticosa, *Roxb.*?, crustacea & triplinervis, *Wall. Cat.* 4501, 4533 **A, B.**

TROPICAL HIMALAYA, from Kumaon eastwards; ASSAM, KHASIA HILLS, CHITTAGONG, BURMA and the ANDAMAN ISLANDS. BEHAR, on Parusnath.

Scandent; stem and branches often rooting. *Leaves* 2–3½ in., rugulose and subscabrid above, beneath subareolar, base strongly 3-nerved; petiole ¼–½ in.; stipules ¼ in., ovate, acuminate. *Recepts* ⅓ in. diam., yellow to red; base sometimes constricted into a stipes; umbilicus rather prominent; peduncle 3–5 in. *Sepals* of all fl. 4; anthers subsessile. *Gall ovary* obovoid, smooth; style subterminal, short, thick, stigma hooked. *Achene* oblong, smooth; margin broad, pale; style lateral, long, stigma subcapitate.—In Roxburgh's drawings of *F. scandens* and *hederacea* the male fl. are monandrous, of *fruticosa* diandrous.

84. **F. obtusa,** *Hassk. Cat. Hort. Bogor.* (1844) 75; shoots softly brown tomentose, leaves broadly or elliptic-ovate or subobovate acute or obtuse entire hispidulous above when young scabrid when old, beneath puberulous or pubescent, nerves 3 or 4 pairs above the basal, recepts subsessile in axillary pairs subglobose or depressed glabrous puberulous or subtomentose. F. alnifolia, *Miq. Pl. Jungh.* 51; *Flor.* i. ii. 330; *Ann.* iii. 278, 293, t. 8 D. F. piperifolia, *Miq. Ann. l. c.* 293. F. platycaula, *Miq. Flor. l. c.* 318. Pogonotrophe javana, *Miq. in L. J. B.* vii. 75, *Flor. l. c.* 330; *Ann. l. c.* 278, 293. P. piperifolia, *Miq. in Zoll. Verz.* 93, 99; *Flor. l. c.* F. borneensis, *Flor. l. c.* 330.

PERAK, *Kunstler.*—DISTRIB. Java.

Leaves 2¼–5 in.; base broad, rounded, rarely narrowed, cordate or notched, 5–7-nerved; petiole ½–⅔ in., tomentose or subscabrid; stipules ⅓ in., lanceolate, pubescent or villous. *Recepts* ½ in. diam., yellow-brown to crimson; basal bracts 3, broadly ovate, pubescent; peduncle 1–3 in., fulvous-tomentose. *Fem. sepals* 5; ovary long-elliptic; style long, filiform, adjacent stigmas cohering in a thick umbonate disk.

85. **F. alutacea,** *Blume Bijd.* 457; leaves coriaceous elliptic or elliptic-ovate or oblong entire acute or cuspidate, smooth and shining above, beneath pale tessellate squamulose, nerves 5–6 pairs above the basal, recepts long-peduncled in axillary pairs or cauline and fascicled globose smooth. *Miq. Flor.* i. 319.

PERAK, *Kunstler.*—DISTRIB. Java.

Shoots puberulous or glabrescent, verruculose. *Leaves* 4–7 in.; base rounded or narrowed, sub-2-auricled, 3-nerved; nerves prominent beneath; petiole ¾–1⅕ in., stout, scurfy; stipules in pairs, ⅓ in., ovate-lanceolate, puberulous. *Receptacles* ⅓–½ in. diam., ripe reddish; basal bracts 3, united; peduncle nearly 1 in., slender, glabrous.

VAR. *Teysmanniana*; branches warted, leaves pubescent beneath, especially on the nervules, receptacles axillary. F. Teysmanniana, *Miq. l. c.* 319.

86. **F. recurva,** *Blume Bijd.* 457; shoots subscabrid and deciduously villous, leaves elliptic-ovate oblong or lanceolate obtuse or acuminate entire subscabrid above glabrous or sparsely hairy beneath, nerves 2–3 pairs above the rounded or subcordate base, receptacles sessile or subsessile axillary and solitary or in pairs or clustered on short axillary tubercles depressed globose pubescent or glabrate. *Miq. Flor.* i. ii. 317; *Suppl.* 432, and *Ann.* iii. 279, 294. F. Spanogheana, *Miq. in L. J. B.* vii. 451, and *Flor. l. c.* F. villipes, *Miq. in L. J. B. l. c.* F. strigosa, *Blume l. c.* 318; *Miq. Ann. l. c.* 279, 294. F. urnigera, *Miq. in Zoll. Syst.* 92, 98, and *Flor. l. c.* 318, t. 19. F. ribesioides, *Wall. Cat.* 4522; *Miq. Ann. l. c.* 293. F. adnascens, *Wall. Cat.* 4578 B.

PENANG, *Curtis*. PERAK, *Kunstler*. SINGAPORE, *Wallich*.—DISTRIB. Malay Islands.

Stem often rooting. *Leaves* 3–5 in., above smooth and glabrous or scabrid, beneath from glabrous to sparsely pilose and hispid, nerves more or less horizontal; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., stout, glabrous strigose or scaberulous; stipules $\frac{1}{4}$ in., broadly ovate, $\frac{1}{3}$ in. on the barren shoots. *Receptacles* 2–3 in. diam., (ripe) yellow, umbilical annulus smooth sometimes open, basal bracts 3, rather large, ovate acute. *Male fl.* and galls in the upper half of the cavity; anthers subsessile, large, oblong. *Sepals* of all fl. 4, lanceolate. *Gall ovary* obliquely ovoid, smooth, style short lateral. *Achene* subobovoid or oblong, style terminal.—The following forms are distinguishable.

F. RIBESIOIDES, *Wall.* (and ADNASCENS); leaves lanceolate glabrous or sparsely hairy, receptacles $\frac{1}{3}$ in. diam. fewer in a cluster, peduncle $\frac{1}{6}$ in. or less.

F. URNIGERA, *Miq.*; leaves substrigose beneath, receptacles flattened at the top, annulus large, basal bracts large.

87. **F. foveolata,** *Wall. Cat.* 4493; shoots pubescent, leaves membranous ovate elliptic or oblong or lanceolate acute or acuminate entire glabrous above base rounded, nerves 3–6 pairs, recepts subsolitary sessile axillary globose to ovoid or obovoid. *Miq. Ann.* iii. 294; *Brand. For. Fl.* 423. F. erecta, *Miq. l. c.* 294. F. nipponica, *Franch. & Savat. Enum. Pl. Jap.* i. 436. F. Thunbergii, *Maxim. in Bull. Acad. Petersb.* xi. 339. F. impressa & Wrightii, *Benth. Fl. Hongk.* 328. F. luducca, *Roxb. in Wall. Cat.* 4493 D. F. pubigera, *Wall. Cat.* 4518; *Brand. l. c.* 424; *Kurz For. Fl.* ii. 450. F. ludens, *Wall. Cat.* 4579. Pogonotrophe pubigera, verrucosa & reticulata, *Miq. in L. J. B.* vii. 76, 77.—Ficus sp., *Griff. Notul.* iv. 400, and *Ic. Pl. Asiat.* t. 561.

OUTER HIMALAYA, from Chamba to Bhotan, alt. 2–7000 ft.; the KHASIA HILLS, CHITTAGONG and BURMA.—DISTRIB. China.

A creeper or lofty climber. *Leaves* $1\frac{1}{4}$–6 in., pubescent or glabrate beneath with prominent nerves; base 3-nerved, rounded cordate or subcuneate; petiole $\frac{1}{5}$–$\frac{1}{2}$ in., pubescent; stipules in pairs, $\frac{1}{2}$ in., villous. *Receptacles* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., or ovoid and 1 by $\frac{3}{4}$ in., umbonate puberulous warted or wrinkled or obovoid and $1\frac{1}{2}$ in. long and broad; basal bracts 3, ovate, acute, often reflexed; peduncle $\frac{1}{10}$–$\frac{1}{3}$ in. *Male fl.* pedicelled, filaments connate; anthers 2–3 ovate, pointed. *Sepals* of all fl. 4. *Gall ovary* obovoid, style short, stigma dilated. *Achene* oblong-reniform, papillose, style long subterminal.—Distinct forms are—

VAR. *oleæformis*; creeping (never on trees), leaves oblong-lanceolate, receptacles 1 in. long ovoid.—Sikkim.

VAR. *maliformis*; climbing and fruiting at the top, leaves ovate-lanceolate, recepts $1\frac{1}{2}$–2 in. diam. much umbonate.

88. **F. ramentacea,** *Roxb. Fl. Ind.* iii. 547; leaves coriaceous ovate or elliptic-ovate subacuminate entire glabrous except the 5 or 6 pairs of nerves beneath, recepts subsessile solitary or in axillary pairs or clusters depressed globose stipitate. *Kurz For Fl.* ii. 454. F. rigescens, *Miq. Ann.* iii. 293. ? F. subrigida, *Miq. Flor. Suppl.* 175. F. oligosperma, *Miq. Pl. Jungh.* 55, and *Flor. l. c.* 319. F. microcarpa, *Blume Bijd.* 442. F. vagans, *Wall. Cat.* 4562. F. leptocarpa, *Steud. Nomencl.* i. 636. F. adhærens, *Miq. Pl. Jungh.* 55; *Flor. l. c.* 319, t. 22; *Ann. l. c.* 280, 294. Pogonotrophe rigida, *Miq. in L. J. B.* vii. 74; *Flor. l. c.* 331.

SILHET, *Wallich*. BURMA, *Kurz*. PERAK, *Kunstler*.—DISTRIB. Malay Islands.

A powerful epiphyte, often eventually a tree. *Leaves* $2\frac{1}{2}$–8 in. (on shoots 11 in.), base rounded notched or cordate 3–7-nerved, nerves parallel, reticulations minute; petiole $\frac{3}{4}$–$1\frac{1}{3}$ in., stout; stipules $\frac{1}{2}$ in., villous or pubescent, caducous. *Recepts* $\frac{1}{5}$–$\frac{1}{2}$ in. diam., young sparsely hairy, suddenly contracted into the stipes; basal bracts 3, small reflexed glabrous. *Sepals* of male and gall fl. 2–3; filaments short, anthers

elongate. *Gall ovary* obovoid, smooth, style short. *Achene* elliptic, style long, stigma cylindric.—*F. adhærens* is a constant form with smaller leaves and sessile recepts.

89. **F. araneosa,** *King*; leaves ovate-lanceolate obtusely cuspidate entire glabrous above, densely flocculent beneath, recepts in axillary pairs or clusters pyriform flocculent.

PERAK; at Laroot, *Kunstler*.

Leaves $2\frac{1}{2}$–$3\frac{1}{2}$ in.; petiole $\frac{1}{3}$–$\frac{3}{4}$ in.; stipules ovate, convolute, flocculent. *Recepts* shortly peduncled, basal bracts 0. *Sepals* in all fl. 4, broad, anthers 2 elongate sagittate. *Gall ovary* narrowly obliquely ovoid; style short, subterminal. *Achene* (young) with a short thick style.

90. **F. villosa,** *Blume Bijd.* 441; shoots fulvous villous, leaves coriaceous ovate-oblong or -lanceolate acuminate entire glabrous and subrugose above except the hirsute midrib and 5–6 pairs of nerves, beneath densely fulvous villous, recepts in clusters on axillary tubercles shortly peduncled. *Miq. in L. J. B.* vii. 451; *Flor.* i. ii. 317, t. 21 B; *Ann.* iii. 294. F. dives, *Miq. Choix*, t. 12. F. obtecta & ? F. barbata, *Wall. Cat.* 4505, 4576.

PENANG and SINGAPORE, *Wallich*. PERAK, *Kunstler*.—DISTRIB. Malay Islands.

Leaves 5–$7\frac{1}{2}$ in., base 3–5-nerved rounded notched or subcordate; petiole $\frac{1}{2}$–1 in., villous; stipules in pairs $\frac{3}{4}$–$1\frac{3}{4}$ in., broadly oblong-lanceolate, glabrous, caducous. *Recepts* $\frac{1}{3}$ in. diam., (ripe) orange-yellow, umbonate; peduncle $\frac{1}{10}$–$\frac{1}{2}$ in., villous, bracts minute. *Sepals* of all fl. 4, lanceolate; anthers elongate, filaments short. *Gall ovary* narrowly elliptic, style subterminal. *Achene* ellipsoid.—Very near *F. lanata* and *recurva*, Blume.

91. **F. crininervia,** *Miq. Fl. Ind. Bat. Suppl.* 432; shoots tawny-silky, leaves coriaceous elliptic- or ovate-oblong acuminate or cuspidate entire above glabrous and minutely lepidote beneath tessellately reticulate, nerves 5–6 pairs above the cordate or subsagittate base silky beneath, recepts axillary solitary or in pairs obovoid or globose smooth in age, basal bracts 0. F. lanigera, *Wall. Cat.* 4577. F. grossinervis, *Miquel in Herb.*

ASSAM, *Griffith, Clarke*. CHITTAGONG, *Lister*.—DISTRIB. Malay Islands.

Creeping and rooting from stem and branches. *Leaves* $\frac{1}{2}$–$1\frac{1}{4}$ in., base 5–7-nerved; petiole $\frac{1}{2}$–$1\frac{1}{4}$ in., scurfy and deciduously hirsute; stipules $\frac{3}{4}$–$1\frac{1}{3}$ in., in pairs, linear-lanceolate flaccid glabrous, very conspicuous on the branchlets. *Recepts* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., subumbonate, base contracted, hairs deciduous; peduncle $\frac{1}{5}$–$\frac{1}{3}$ in., base bracteate. *Fem. sepals* 3; achene (young) obliquely ovoid; style subterminal, short, stigma large.

92. **F. diversifolia,** *Blume Bijd.* 456; leaves sessile polymorphous usually deltoid or cuneate-obovate with the apex obtuse rounded truncate or 2-fid and base narrowed glandular with a forked midrib, sometimes obovate oblanceolate or rhomboid and penninerved tip acute or obtuse, recepts axillary solitary or in pairs depressed globose ovoid or pyriform smooth. *Miq. Ann.* iii. 288. F. deltoidea, *Jack Mal. Misc.* vii. 71, and ovoidea, *l. c.*; *Wall. Cat.* 4526. F. spathulata, *Miq. in L. J. B.* vii. 441 (*excl. F. retusa*). F. sideroxifolia, *Griff. Notul.* iv. 389; *Ic. Pl. Asiat.* 551, f. 2. F. lutescens, *Desf. Hort. Par. Ed.* 3, 413. Synœcia diversifolia, *Miq. in L. J. B. l. c.* 470, t. 9 B; *Flor.* i. ii. 328. Erythrogyne frutescens, *Visiani in Gaspar. Ric.* 86; *Miq. in L. J. B. l. c.* 453.

PENANG, PERAK and SINGAPORE, *Wallich*, &c.—DISTRIB. Malay Islands.

Often epiphytal shrub or small tree. *Leaves* 1 by $\frac{3}{4}$ in., to 5 by 4 in., coriaceous or subcoriaceous, beneath granulate and with dark glands in the fork of the midrib or in the axils of the lower nerves in the penninerved forms; petiole $\frac{1}{5}$–$\frac{1}{2}$ in. ($1\frac{1}{2}$–3 in. in var. *Kunstleri*); stipules $\frac{1}{3}$–$\frac{1}{2}$ in., linear-lanceolate, convolute. *Recepts* dull yellow or reddish; basal bracts 3, short, broad, spreading, puberulous; peduncle $\frac{1}{5}$–1 in. *Male sepals* 4, obovate. *Gall sepals* 3, ovate or linear; ovary globose, smooth, or angular rough and crustaceous; style short, subterminal; stigma wide tubular. *Achenes* twice as large as the gall ovary, elongate-reniform shining; style lateral, long, stigma forked.—The leaves are usually of the obovate-cuneate type, with bifurcating midrib, rarely also elongated oblanceolate and penninerved. Such dimorphous individuals suggested Blume's name of *diversifolia*. This was not published until 1825, whereas Jack's *deltoidea* and *ovoidea* were both published in 1822. I, however, retain Blume's name, because it recognizes the dimorphism, and covers both Jack's forms. Three vars. are distinguishable.

VAR. *ovoidea*; all parts smaller, leaves narrowly obovate to oblanceolate, tip rounded entire, recepts usually in pairs subglobose or ovoid $\frac{1}{4}$ in. long. F. ovoidea, *Jack*.

VAR. *Kunstleri*; leaves large cuneate-deltoid, tip rounded or notched, petiole $1\frac{1}{2}$–3 in., recepts about $\frac{1}{2}$ in. long, male fl. long-pedicelled, perianth minute, gall sepals 3 linear much longer than the achene.—Perak.

VAR. *lutescens*; leaves pinnate-nerved subrhombic acute at both ends. F. lutescens, *Desf.*—Perak, alt. 4–5000 ft., on the ground and trees.

93. **F. palmata,** *Forsk. Fl. Ægypt.* 179; leaves membranous orbicular-ovate acute or apiculate toothed or serrate entire or obtusely 3–5-lobed subscabrous above scabrid or shortly tomentose beneath, nerves 3–6 pairs, recepts solitary axillary subglobose to pyriform, base constricted. *Vahl Symb.* i. 84, t. 24; *Miq. Ann.* iii. 290, and in *L. J. B.* vii. 225. F. caricoides, *Roxb. Fl. Ind.* iii. 529; *Miq. in L. J. B. l. c.* 224. F. pseudo-sycamorus, *Dcne. Fl. Sinaic.*; *Miq. in L. J. B. l. c.* 227; *Boiss. Fl. Orient.* iv. 1155. F. virgata, *Roxb. l. c.* 530; *Wight Ic.* t. 649; *Miq. in L. J. B.* 228, and *Fic. Afric.* 130; *Brand. For. Fl.* 419; *Wall. Cat.* 4507 A and ? B, 4492.

N.W. INDIA, from the Indus eastwards to Oudh, ascending to 3000 ft. in the HIMALAYA. MT. ABOO, *King*.—DISTRIB. Westward to Egypt and Abyssinia.

A bush or small tree, nerves epiphytal, shoots tomentose, pubescent or glabrous. *Leaves* $1\frac{1}{2}$–5 in., base 3-nerved; petiole 1–2 in.; stipules in pairs, ovate, acute, pubescent, deciduous. *Recepts* $\frac{1}{2}$–1 in. diam., umbonate, (ripe) yellow; basal bracts 3, acute, deciduous; peduncle $\frac{1}{2}$–1 in. *Male fl.* on hairy pedicels; sepals 4–5, lanceolate, hairy. *Gall fl.* sessile or pedicelled; perianth deeply 5-cleft; ovary ovoid, smooth; style very short, lateral, stigma dilated. *Fem. fl.*; perianth of gall fl.; achene trigonous, granular; style subterminal, long, hairy, stigma bifid.—The Indian representative of *F. Carica*, L.

94. **F. alba,** *Reinwdt. in Blume Bijd.* 467; leaves ovate elliptic ovate-lanceolate or subrhombic entire or acutely 3-lobed irregularly toothed scabrid or hispidulous above clothed with white or cinnamon tomentum beneath, nerves 3–4 pairs above the basal, recepts in axillary pairs sessile depressed globose or ovoid smooth when ripe. *Miq. Flor.* i. ii. 294, and F. Mappan, *Suppl.* 424, 425; *Ann.* iii. 270, 290. F. nivea, *Blume l. c.*; *Miq. Flor. l. c.* 294. F. gossypina, *Wall. Cat.* 4488; *Miq. in Hook. L. J. B.* vii. 455; *Flor. l. c.* 294; *Suppl.* 425. F. Hunteri, *Miq. in L. J. B. l. c.* 225, and *Flor. l. c.* 296. ? F. palmata, *Roxb. Fl. Ind.* iii. 529.

PENANG, PERAK, SINGAPORE and MALACCA, ascending to 4000 ft.—DISTRIB. Malay Islands.

A shrub or small tree. *Leaves* 5–8 in., base 3-nerved, narrow or broad and cordate, or the shoots large palmately 5–7-lobed and -nerved; petiole 1½–3 in., glabrous or pubescent; stipules ⅓–½ in., ovate-lanceolate, at first pubescent. *Recepts* ⅓–½ in. diam., young pubescent; basal bracts 3, broadly ovate, obtuse. *Male fl.* sessile, short, broad; sepals 3, broadly imbricate; stamens 1–2. *Gall sepals* 2, lanceolate; ovary ovoid, smooth; style short, lateral, stigma funnel-shaped. *Achene* crustaceous, tubercled; style as long, lateral, stigma cylindric.

95. **F. fulva,** *Reinwdt. in Blume Bijd.* 578; shoots hispid, leaves membranous from ovate or elliptic to rounded rhombic 3–5-sinuate or -lobed acute or apiculate denticulate above scabrid with tomentose nerves beneath tawny-tomentose, nerves 2–4 pairs, recepts crowded sessile or subsessile in axillary pairs ovoid to globose. *Miq. Ann.* iii. 269, 290; *Flor.* i. ii. 296; *De Vriese Pl. Rar. Jard. Leyd. fasc.* 1. F. Reinwardtii, *Link & Otto, Ic. Rar.* I. 6, t. 31; *Miq. in L. J. B.* vii. 457. F. suborbicularis, *Miq. Flor. Suppl.* 425. F. apiculata, *Miq. in Zoll. Syst.* 92, 98; *Flor. l. c.* 296; *Ann. l. c.* 269, 290. F. chlorocarpa, *Miq. Flor.* 294. Pogonotrophe flavidula, *Miq. l. c. Suppl.* 435.

BURMA, the ANDAMAN ISLANDS and MALAY PENINSULA.—DISTRIB. Malay Islands.

A small shady tree. *Leaves* 4–8 in., base rounded or cordate, 5–7-nerved; petiole 1½–3½ in., pubescent; stipules single, broadly ovate, acute, base truncate, hairs deciduous. *Recepts* ½–¾ in. diam., (ripe) yellow-red; basal bracts 3, broad, villous. *Male fl.* sessile; sepals 3, large, oblong, much overtopping the 2 subsessile oblong anthers. *Gall* and *fem. sepals* 5, narrow-lanceolate; gall ovary ovoid, smooth; style short, lateral, stigma funnel-shaped. *Fem. fl.* sessile or pedicelled; achene obliquely ovoid, crustaceous, granulate.—There are two principal forms: *F. fulva* with rounded leaves, and *F. flavidula & chlorocarpa* with ovate or elliptic ones.

96. **F. chrysocarpa,** *Reinwdt. in Blume Bijd.* 475; leaves membranous elliptic to oblanceolate acute serrate (not lobed or cordate) above sparsely strigose beneath pubescent or tomentose, nerves 3–4 pairs above the basal, recepts in axillary pairs ovoid or globose densely golden-hairy. *Miq. Flor.* i. ii. 302, and *Suppl.* 427; *Ann.* iii. 270, 291; *Kurz For. Fl.* ii. 596. F. aurata, *Miq. Ann. l. c.* 271, 291. F. densiserra, *Miq. Flor. Suppl.* 426. F. arguta, *Wall. Cat.* 4489. Covellia aurata, *Miq. Flor. Suppl.* 433.

MARTABAN, *Kurz.* PENANG, *Wallich.* PERAK, *Kunstler.*—DISTRIB. Malay Islands.

A tree, branchlets hollow, yellowish or rusty hirsute. *Leaves* 4–7 in., base 3-nerved; stipules ½ in., lanceolate, rufous-tomentose. *Recepts* ½ in. diam., young ovoid, interior densely hairy. *Male sepals* 4, broadly ovate, glabrous. *Gall* and *fem. sepals* 4, oblanceolate, tips penicillate. *Gall ovary* ovoid, smooth; style short, lateral. *Achene* subrhombic, wrinkled, tubercled; style long, lateral, hairy, stigma cylindric.

97. **F. hirta,** *Vahl Enum.* ii. 201; leaves polymorphous ovate elliptic rounded to oblong-lanceolate acuminate serrate entire or 3–5-lobed above scabridly hispid beneath hirsute or tomentose, nerves 2–7 pairs above the 3–7 basal, recepts in axillary pairs sessile or subsessile hispid globose with usually fem. fl. and ovoid with male and gall. fl. *Roxb. Fl. Ind.* iii. 534; *Wight Ic.* t. 672; *Miq. in L. J. B.* vii. 456; *Flor.* i. ii. 297, t. 18; *Ann.* iii. 290; *Kurz For. Fl.* ii. 449. F. setosa, *Blume Bijd.* 477; *Miq. in L. J. B. l. c.* 456; *Hook. & Arn. Bot. Beech. Voy.* 216, t. 49. F. setifera, *Steud. Nomencl.* i. 638. F. hibiscifolia, *Champ. in Hook. Kew Journ. Bot.* vi. 77.

F. Roxburghii, *Miq. in L. J. B. l. c.* 456. F. triloba, *Ham. in Wall. Cat.* 4491; *Miq. Ann. l. c.* 270, 290; *Brand. For. Fl.* 423; *Kurz For. Fl.* ii. 449. F. hirsuta, *Roxb. l. c.* 528; *Wight l. c.* t. 670.

TROPICAL HIMALAYA, from Sikkim eastwards; ASSAM, BURMA and the MALAY PENINSULA.—DISTRIB. Malay Islands, China.

A shrub or small tree. *Leaves* 5–12 in., base narrow, rounded or cordate; petiole $\frac{1}{3}$–1 in., hirsute; stipules $\frac{1}{2}$–$\frac{3}{4}$ in., ovate-lanceolate, deciduously strigose or hirsute. *Recepts* $\frac{3}{4}$–1 in. diam.; oral bracts many, some large; basal ovate, acuminate. *Sepals* of all fl. 4, lanceolate, glabrous. *Stamens* 1–3. *Gall ovary* globose or ovoid, smooth; style short, stigma funnel-shaped. *Achene* granulate, ellipsoid, notched at the base of the lateral long style, stigma cylindric.

F. hirta proper has narrower leaves and recepts $\frac{1}{3}$ in., and is the southern form. *F. triloba*, Ham. (*Roxburghii*, Miq.), has ovate or rounded ovate leaves entire or deeply lobed, and recepts $\frac{1}{2}$ in. diam. Both forms meet on the Khasia Mts.

98. **F. variolosa,** *Lindl. in Hook. Lond. Journ. Bot.* (1842) i. 492; glabrous, leaves oblong- or ob-lanceolate subacute entire, nerves 8–10 pairs, basal subhorizontal, recepts in axillary pairs peduncled globose umbonate warted glabrous. *Benth. Fl. Hongk.* 328; *Miq. Ann.* iii. 294; *Maxim. in Bull. Acad. Petersb.* xi. 336.

PERAK, *Kunstler.*—DISTRIB. Hong Kong.

A shrub. *Leaves* $2\frac{1}{2}$–$4\frac{1}{2}$ in., sometimes obtusely acuminate, base cuneate, not 3-nerved, margins recurved; petiole $\frac{1}{3}$–$\frac{1}{2}$ in.; stipules $\frac{1}{3}$ in., ovate, acuminate. *Recepts* $\frac{1}{2}$ in. diam.; oral bracts large, basal 3, triangular-ovate, connate below, spreading; peduncle $\frac{1}{3}$–$\frac{1}{2}$ in., slender. *Fem. fl.* subsessile or pedicelled; sepals 3–4; achene trigonous, wrinkled minutely; style lateral.—Male and gall fl. unknown.

99. **F. erecta,** *Thunb. Diss. Fic.* 9, and in *Trans. Linn. Soc.* ii. 327, VAR. *Sieboldi*; leaves long-lanceolate acuminate entire or subserrate towards the tip above glabrous or scabrid beneath hispid and minutely tuberculate, nerves about 8 pairs, recepts in axillary pairs peduncled pyriform smooth, base much constricted. *Kæmpf. Ic. Sel.* t. 4; *Franch. & Savat. En. Pl. Jap.* i. 435, ii. 490. F. pumila β, *Thunb. Fl. Jap.* 33. F. Sieboldi, *Miq. Ann.* ii. 199, iii. 295; *Maxim. in Bull. Acad. Petersb.* xi. 327. ? F. pyrifolia, *Burm. Fl. Ind.* 226; *Miq. Prolus.* 231. ? F. japonica, *Blume Bijd.* 440; *Sieb. & Zucc. Fl. Jap. Fam. Nat.* No. 778; *Maxim. l. c.* 328.—Itaber, *Kæmpf. Amœn. Exot.* 803.

SIKKIM HIMALAYA, *J. D. H.* KHASIA HILLS, *Mann.*—DISTRIB. China, Japan.

A small tree, shoots subglabrous. *Leaves* 2–4 in. *Recepts* $\frac{1}{2}$ in. diam., glabrous or puberulous. *Male* and *gall sepals* 3, lanceolate. *Gall ovary* globose; style short, lateral, stigma dilated. *Fem. fl.* subsessile; sepals 4; style lateral, thick, stigma 2-lobed.—The typical *F. erecta* has broadly ovate or elliptic-obovate fewer-nerved leaves, and depressed recepts less constricted below. The Hong Kong var. (*Beecheyana*) has the leaves beneath and recepts hispid or almost tomentose.—See *F. silhetensis* and *chartacea*.

100. **F. glandulifera,** *Wall. Cat.* 4481; leaves membranous ovate to subobovate-oblong cuspidate entire glabrous except the puberulous midrib and 4–5 pairs of nerves, recepts in axillary clusters smooth dimorphous subglobose with male and gall fl. or ellipsoid and female. F. aurantiaca, *Miq. Ann.* iii. 293.. Pogonotrophe aurantiaca, *Miq. in Zoll. Syst.* 93, 99, and *Flor.* i. ii. 332. P. glandulifera, *Miq. in L. J. B.* vii. 77; *Flor. l. c.* 331. P. sumatrana, *Miq. Flor. Suppl.* 436.

BURMA, *Falconer.* PENANG, *Porter.* PERAK, *Kunstler.* MALACCA, *Griffith, Maingay.*—DISTRIB. Malay Islands.

A small spreading tree, shoots and petioles rusty-pubescent. *Leaves* 3–4 in., olive-green, base broad, rounded or notched, 3-nerved; petiole ¾–1 in.; stipules ⅕ in., broadly ovate, villous. *Recepts* ⅓ in. diam., top flattened, base constricted, (ripe) yellow, nearly smooth, young softly pubescent; peduncle ¼ in., and basal bracts rusty-pubescent.—The colour of dry leaves is characteristic.

101. **F. silhetensis,** *Miq. Ann. Mus.* iii. 223, 291; leaves membranous ovate-lanceolate or oblanceolate acute or acuminate entire subglabrous above granulate and sparsely hispid beneath, nerves 3–4 pairs, recepts axillary solitary or in pairs subsessile ovoid or subglobose sparsely hairy. F. umbonata, *Wall. Cat.* 4548; *Miq. in L. J. B.* vii. 437.

ASSAM, SILHET and the KHASIA HILLS, ascending to 4000 ft., *Wallich,* &c.

A shrub, shoots tomentose. *Leaves* 2½–4 in.; margins sometimes subundulate when dry; base acute or subacute, 3-nerved; petiole ¾–½ in., hairy; stipules as long, lanceolate, glabrous. *Recepts* ⅓ in. diam., (ripe) reddish, young much umbonate; oral bracts many, basal 3, minute. *Sepals* of all fl. 3, lanceolate. *Stamens* 2–4. *Gall ovary* globose or obovoid, smooth; style short, lateral. *Achene* obovoid, flattened, granulate; margins thickened; style long, lateral, deflexed, hairy.—Probably a form of *F. erecta* of smaller size and with sessile receptacles.

102. **F. pyriformis,** *Hook. & Arn. Bot. Beech. Voy.* 216; leaves oblong- to linear-lanceolate obtusely acuminate entire smooth or scaberulous above glabrous pubescent or hispid beneath, nerves 5–10 pairs, recepts axillary solitary peduncled pyriform umbonate. *Miq. in L. J. B.* vii. 437, t. 6, f. A; *Ann.* iii. 281, 294; *Benth. Fl. Hongk.* 328. F. Millettii, *Miq. in L. J. B.* vii. 438; *Maxim. in Bull. Acad. Petersb.* xi. 336. F. Abelii, *Miq. Ann. l. c.* 281, 295. F. subpyriformis, *Miq. Ann. l. c.* 229, 294; *Kurz For. Fl.* ii. 456. F. Finlaysoniana, *Wall. Cat.* 4553. F. ichnopoda, *Miq. Ann. l. c.* 229, 294; *Kurz l. c.*

ASSAM, the KHASIA MTS., BURMA and PERAK.—DISTRIB. China.

A shrub, young parts pubescent. *Leaves* 1¾–4 in., minutely reticulate, base acute, 3-nerved; petiole ¼–½ in.; stipules as long, subulate, glabrous. *Recepts* ½–¾ in. diam., stipitate, puberulous or subhispid; basal bracts 3, triangular, those with fem. fl. smallest. *Male fl.* many; sepals 3. *Gall sepals* 4; ovary globose, smooth; style short, lateral; stigma dilated, tubular. *Achene* reniform, granulate; style subterminal, long, slender.—The following forms are connected by intermediates.

F. pyriformis, H. & A.; leaves lanceolate glabrous asperulous punctulate beneath (China).—*F. Abelii,* Miq.; leaves of type but hispid beneath, receptacles hispidulous (China).—*F. subpyriformis,* Miq.; leaves linear-lanceolate pubescent beneath, nerves about 10 pairs, recepts and peduncles pubescent (India).—*F. ichnopoda,* Miq.; leaves of *subpyriformis* but glabrous, receptacles long-peduncled glabrous (India).

103. **F. chartacea,** *Wall. Cat.* 4580; leaves membranous glabrous lanceolate or ovate- or ob-lanceolate acuminate or cuspidate entire, nerves 3–5 pairs, receptacles in axillary pairs clustered subsessile globose smooth. F. Lamponga, *var.* chartacea, *Kurz For. Fl.* ii. 451. F. torulosa, *Wall. Cat.* 4550.

BURMA, *Wallich.* PERAK, common on the coast, *Kunstler.*

A shrub, shoots appressed-pubescent. *Leaves* 2–4 in., narrowed to the cuneate 3-nerved base, scaberulous beneath; petiole ½–1 in., slender; stipules ⅕–½ in., lanceolate, convolute, glabrous. *Recepts* ¼ in., (ripe) yellow, young umbonate; basal bracts 3, minute; peduncle 0–$\frac{1}{10}$ in., glabrous. *Male fl.* sessile; sepals 3, spathulate. *Gall fl.* pedicelled; sepals 4, linear-lanceolate; ovary subglobose, smooth; style short, lateral, stigma tubular. *Fem. fl.* pedicelled; sepals of gall. fl.; achene ovoid, rugose; margin thickened; style subterminal, stigma cylindric.—Near *silhetensis,* but leaves quite glabrous, not punctulate, and recepts subsessile. Possibly a local form of *F. erecta.* *F. torulosa* is a more obovate-leaved form.

104. **F. nemoralis,** *Wall. Cat.* 4517; glabrous, leaves membranous ovate-elliptic- or ob-lanceolate acuminate entire, nerves 7–12 pairs subhorizontal, recepts subsessile axillary subglobose or clavate. *Miq. in L. J. B.* vii. 453; *Ann.* iii. 295 (*excl. verrucosa*); *Brand. For. Fl.* 424. F. gemella, *Wall. Cat.* 4516, and F. densa, *Miq. in L. J. B. l. c.* 545; *Ann. l. c.* F. Fieldingii, *Miq. in L. J. B. l. c.* 439; *Ann. l. c.* 280, 294. F. trilepis, *Miq. Ann. l. c.* 294; *Wall. Cat.* 4494 B. F. binata, *Wall. Cat.* 4554.

HIMALAYA, from Hazara to Bhotan, alt. 1500–6500 ft. KHASIA MTS. and ASSAM.

A small glabrous tree or shrub. *Leaves* 3–5½ in., base cuneate, rarely rounded, 3-nerved, nerves and reticulations prominent and dark beneath; petiole ½–1 in.; stipules lanceolate, convolute, glabrous. *Recepts* ⅓ in. diam., all with male fl.; basal bracts 3, broad, connate; peduncle ¼ in. or less. *Male fl.* pedicelled, few in the fem. recepts and near the mouth, numerous and sometimes scattered all over the gall recepts. *Sepals* in all fl. 3, lanceolate, fleshy. *Stamens* 2–3. *Gall ovary* ovoid, crustaceous. *Achene* rounded, wrinkled; style longer and more lateral than of gall fl. —The forms are disposable in two series. I. Recepts ovoid or clavate; male fl. few, fem. many, galls few or 0.—*F. nemoralis*; leaf-base rather broad, recepts ovoid shortly peduncled (Central and E. Himal., Assam).—*F. trilepis*; recepts clavate young ellipsoid truncate (Central and E. Himal.). II. Recepts subglobose, male and gall fl. many, fem. few or 0.—*F. gemella*; leaves narrow, recepts sessile (Central Himal. and Assam).—*F. Fieldingii*; leaves narrow much acuminate, recepts abruptly shortly peduncled (W. Himal. to 300 ft., E. Himal. to 8000 ft.). Approaches *Urostigma*.

Sect. VII. NEOMORPHE (see p. 496).

105. **F. macrocarpa,** *Wight mss.*; scandent, leaves long-petioled membranous broadly ovate shortly acuminate sometimes unequal-sided glabrous above pubescent beneath, nerves about 3 pairs, recepts in cauline clusters globose, basal bracts 0. Pogonotrophe macrocarpa, *Miq. in Wight Ic.* t. 1965.

NILGHIRI HILLS, alt. 5000 ft., *Wight, Gamble.*

A large climbing tree, shoots at first puberulous. *Leaves* 5 in., base rounded or subcordate; petiole 2–2½ in.; stipules ⅓ in., lanceolate. *Recepts* 1–2½ in. diam., spotted; peduncles about ⅓ in., with several bracts at their base. *Fem. fl.* sessile or pedicelled; sepals 6; ovary subovoid; style as long, subterminal, hairy; stigma 2-lobed.—Miquel (Ann. iii. 278) refers *macrocarpa*, Wight, to *vagans*, Roxb., which is *lævis*. Perhaps a form of the following.

106. **F. guttata,** *Kurz*; leaves broadly ovate cuspidate sparsely puberulous above minutely villous or glabrescent beneath, nerves about 3 pairs, recepts in cauline and rameal clusters shortly peduncled subglobose pubescent, basal bracts 3. Covellia guttata, *Wight Ic.* t. 1966.

NILGHIRI and PULNEY HILLS, *Wight, Gamble, Beddome.*

A climbing tree, branchlets tomentose at length glabrous. *Leaves* 4–5 in., base broad, rounded or subcordate, 3–5-nerved. *Recepts* 1–1¼ in. diam., (ripe) blotched. *Fem. fl.* sessile; sepals 6, style short, stigma widely funnel-shaped.

107. **F. Roxburghii,** *Wall. Cat.* 4508; leaves broadly ovate or rounded mucronate entire or toothed above glabrous or glabrescent beneath softly pubescent base cordate, nerves 3–4 pairs, recepts on short leafless cauline branchlets peduncled turbinate 8–12 ridged. *Brand. For. Fl.* 422; *Kurz For. Fl.* ii. 460. F. macrophylla, *Roxb. Fl. Ind.* iii. 550; *Wight Ic.* t. 673. F. scleroptera, *Griff. Ic. Pl. Asiat.* t. 558. F. regia, *Miq. Ann.* iii. 230, 297 (*in part*). Covellia macrophylla, *Miq. in L. J. B.* vii. 465.

OUTER HIMALAYA, from the Indus to Bhotan; KHASIA MTS., CHITTAGONG and BURMA, ascending to 5000 ft.

A low spreading tree, 10-30 ft., bark brown. *Leaves* 5–15 by $4\frac{1}{2}$–12 in., base cordate, rarely rounded, 5-7-nerved; nerves prominent on both surfaces, nervules nearly transverse; petiole 1–4 in.; stipules $\frac{1}{2}$–1 in., ovate-lanceolate, pubescent. *Recepts* 2 in. diam. and more, pubescent or glabrous, (ripe) russet-brown or purplish and spotted, umbilicus large, base sometimes constricted; basal bracts 3, rather large, triangular; peduncle $\frac{3}{4}$–$1\frac{1}{3}$ in., pubescent. *Male sepals* large, inflated, broadly imbricate; stamens 2–3, filaments long, stout. *Gall perianth* 2–3-lobed; style short, subterminal, stigma dilated. *Fem. fl.* subsessile or pedicelled, perianth of gall fl.; achene granulate, viscid; style long, lateral, curved, hairy, stigma cylindric.

108. **F. pomifera,** *Wall. Cat.* 4547; leaves glabrous or nearly so elliptic subovate or lanceolate acute coarsely serrate, nerves 4–5 pairs, recepts clustered on cauline and rameal tubercles or short leafless branches long-peduncled globose or subpyriform 4–6-grooved pubescent. F. oligodon, *Miq. Ann.* iii. 234, 297. F. regia, *Miq. l. c.* 230, 296 (*in part*); *Kurz For. Fl.* ii. 458. F. Hamiltoniana, *Wall. Cat.* 4545 A.

SIKKIM HIMALAYA, alt. 1–3000 ft., *J. D. H.*, &c. CHITTAGONG, *Lister*. BURMA, *Kurz*, &c. PERAK, *Kunstler*.—DISTRIB. Malay Islands.

A tall tree, head narrow, bark white. *Leaves* $4\frac{1}{2}$–8 in., above when young puberulous, beneath papillose puberulous or glabrous, base rounded or subcuneate, 3–5-nerved; petiole $1\frac{1}{2}$–$3\frac{1}{2}$ in., pubescent; stipules $\frac{1}{3}$–$\frac{3}{4}$ in., ovate-lanceolate. *Recepts* 1 in. diam., (ripe) reddish, sometimes warted, oral bracts large, pubescent, basal 3, ovate, acute; peduncle 1–$2\frac{1}{2}$ in. *Male sepals* 3, large, enclosing the 2 curved anthers. *Gall* and *fem. perianth* 3-toothed, of the gall fl. often enveloping the ovoid smooth ovary. *Achene* papillose; style long, lateral, stigma clavate.—Differs from *F. Roxburghii* in the white bark, smaller more glabrous not cordate leaves, and hairy receptacles on longer slenderer peduncles; it is also a more southern plant.

109. **F. variegata,** *Blume Bijd.* 459; leaves broadly or elliptic-ovate acuminate entire subrepand or denticulate glabrous above puberulous or glabrous beneath, nerves 4 pairs, recepts clustered on cauline and rameal tubercles peduncled globose smooth. *Miq. Flor.* i. ii. 320; *Ann.* iii. 295. F. subracemosa, *Blume l. c.* 469; *Miq. Flor. l. c.* 330; *Choix Pl.* t. 13. F. racemifera, *Roxb. Fl. Ind.* iii. 560; *Wight Ic.* t. 639. F. sycomoroides, *Miq. Ann. l. c.* 230, 295. F. subopaca, *Miq. Flor. l. c.* 320. F. cerifera, *Blume in Ann. Sc. Nat. Ser.* 4, iii. 333, t. 14. F. ceriflua, *Jungh. Java* i. 439. F. chlorocarpa, *Benth. Fl. Hongk.* 330; *Miq. Ann. l. c.* 296; *Maxim. in Bull. Acad. Petersb.* xi. 330. Covellia racemifera, *Miq. in L. J. B.* vii. 465; *Flor. l. c.* 325. Sycomorus capensis & gummiflua, *Miq. Pl. Jungh.* 64.—*Rumph. Herb. Amb.* 145, t. 93.

CHITTAGONG, *Lister*. ASSAM, *Mann*. PENANG, *King's Collector*.—DISTRIB. Malay Islands.

A tall spreading tree, bark pale, shoots glabrous or pubescent. *Leaves* 4–7 in., base rounded, notched or cordate, 5-nerved; nerves prominent, nervules transverse; petiole 1–2 in.; stipules $\frac{1}{2}$–$\frac{3}{4}$ in., acuminate, glabrous. *Recepts* 1 in. diam., smooth, (ripe) red, with white streaks and dots, base sometimes constricted; basal bracts 3, minute, deciduous; peduncle $\frac{3}{4}$–2 in. *Male sepals* 3 or 4, linear-lanceolate; anthers 2. *Gall perianth* 4–5-toothed; ovary ovoid, smooth, stigma funnel-shaped. *Achene* obovoid, granulate, stigma clavate.

110. **F. glomerata,** *Roxb. Cor. Pl.* ii. t. 123, and *Fl. Ind.* iii. 558; leaves membranous ovate- to obovate-oblong or -lanceolate subacute glabrous rarely softly pubescent above pubescent and glabrous or asperous beneath,

nerves 4–6 pairs, recepts on cauline and rameal short leafless scaly branches rarely axillary peduncled pyriform turbinate or subglobose all bearing male fem. and gall fl. *Wight Ic.* t. 667; *Miq. Ann.* iii. 297; *Brand. For. Fl.* 422, t. 49; *Kurz For. Fl.* ii. 458; *Bedd. For. Man.* 224; *Wall. Cat.* 4511 A. F. chittagonga, *Miq. Ann. l. c.* 294; *Kurz l. c.* 596. F. racemosa, *Wall. Cat.* 4549. F. mollis, *Miq. Ann. l. c.* 283, 296. F. Goolereea, *Roxb. Fl. Ind.* iii. 538. Covellia glomerata, *Miq. in L. J. B.* vii. 465; *Dalz. & Gibs. Bomb. Fl.* 243. C. mollis, *Miq. in L. J. B. l. c.* 466; *Flor.* 326.

OUTER HIMALAYA and plains and low hills of INDIA, from Rajpootana and the Salt Range to the Khasia Mts., Burma, the Deccan Peninsula and CEYLON.

A tree, shoots glabrous or pubescent. *Leaves* 4–7 in., tapering to the point, entire, base obtuse, rarely acute, 3-nerved; petiole 1–2 in.; stipules $\frac{1}{2}$–1 in., ovate-lanceolate, pubescent. *Recepts* $1\frac{1}{4}$ in. diam., reddish, umbilicus depressed, base of young much contracted; basal bracts 3. *Male fl.* near the mouth of the recept; sepals 3–4, inflated. *Gall* and *fem. fl.* intermixed, perianth toothed; gall ovary ovoid, rough. *Achene* granulate, stigma clavate.—Three forms are definable: *F. chittagonga*; shoots leaves beneath and pyriform recepts pubescent, leaves ovate-oblong or -lanceolate.—*F. Goolereea*, Roxb.; leaves of the type, recepts densely white-pubescent.—*F. mollis*; leaves softly pubescent above and beneath (Java).—VAR. *elongata*; leaves 7 in. oblong acute (Burma, Chittagong). Only distinguished from *F. lanceolata* by the recepts, which are not ridged and warted.

111. **F. Clarkei,** *King*; leaves glabrous unequal-sided oblong or narrow-oblong entire or 1–2-toothed near the cuspidate tip, nerves 6–8 pairs, recepts in short cauline and rameal scaly panicles peduncled pyriform smooth red.

KHASIA HILLS; alt. 5000 ft., *Clarke.*

A tall tree, bark whitish, shoots hispidly scabrid. *Leaves* 6–10 in., obscurely granulate beneath, base cuneate, 3-nerved; nerves spreading, prominent beneath; petiole $\frac{1}{2}$ in.; stipules as long, lanceolate, convolute. *Recepts* 1 in. diam., red, base contracted into a long stipes, with 3 basal ovate-lanceolate bracts; peduncle $\frac{1}{3}$ in., puberulous. *Male fl.* at the apex of the receptacle; sepals 3, large, loose; stamens 2–3, filaments short, anthers ovate apiculate. *Gall perianth* with 3 linear-lanceolate teeth; ovary ovoid, slightly tubercled; stigma cylindric. *Fem. fl.* not seen.

112. **F. lanceolata,** *Ham. in Roxb. Fl. Ind.* iii. 557; leaves membranous narrow-lanceolate entire or remotely serrate granulate beneath, nerves 6–8 pairs, recepts in cauline and rameal clusters of 6–8 peduncled pyriform glabrous with white warts, top depressed. *Wight Ic.* t. 645; *Miq. Ann.* iii. 297; *Kurz For. Fl.* ii. 457; *Wall. Cat.* 4512. Covellia lanceolata, *Miq. in L. J. B.* vii. 465.

KHASIA HILLS, *Mann.* CHITTAGONG, *Lister, Gamble.* BURMA, *Kurz.*

A much-branched glabrous shrub. *Leaves* 4–8 in., base 3-nerved; petiole $\frac{1}{3}$–$\frac{1}{2}$ in.; stipules $\frac{1}{2}$ in., lanceolate. *Recepts* 1–$1\frac{1}{4}$ in. diam., (ripe) russet-brown with white warts, young turbinate, top concave, base slightly constricted; basal bracts 3, minute, ovate, acute. *Male sepals* 3–4, large, inflated. *Gall* and *fem. perianth* 3-toothed; gall ovary ovoid, smooth; style short, subterminal, stigma dilated. *Achene* obliquely ovoid, granulate; style elongate, lateral, stigma clavate.—Related to *F. glomerata & Roxburghii.*

UNDETERMINABLE AND EXCLUDED SPECIES.

F. ABBREVIATA, *Wall. Cat.* 4573, from Singapore, is not determinable.

F. BIGLANDULOSA, *Wall. Cat.* 4480, is a Chinese species.

F. ALTERNANS, *Wall. Cat.* 4555. Siam? (*Herb. Finlayson.*) There is no specimen answering to this number in Herb. Wallich.

F. APERTA, *Wall. Cat.* 4552, is a solitary leaf, from Siam.

F. CALONEURA, *Kurz For. Fl.* ii. 448, from Burma, without locality. The leaf resembles that of an Euphorbiaceous plant, the fruit is unknown.

F. CINERASCENS, *Wall. Cat.* 4535, from Burma, is not identifiable.

F. CONGESTA, *Roxb. Fl. Ind.* iii. 559 (from Amboyna) and *Wall. Cat.* 4510, is not recognizable.

F. CUNEATA, *Wall. Cat.* 4534, is an *Erythroxylon*.

F. ? GRACILIS, *Wall. Cat.* 4572, is not a *Ficus*.

F. GRISEA, *Wall. Cat.* 4544, from Burma, consists of leaves only.

F. HAPALOPHYLLA, *Kurz For. Fl.* ii. 461, from Chittagong and the Khasia Hills, is not identifiable.

F. INCISA, *Wall. Cat.* 4490, from Ava, consists of leaves only.

F. INCLINATA, *Ham. in Wall. Cat.* 4486 B! from Silhet. There is no specimen in Herb. Wall. answering to this number and letter.

F. MACROPODA, *Kurz For. Fl.* ii. 459, from South Andaman Islands, is probably *F. copiosa*, Steud.

F. NUDA, *Kurz For. Fl.* ii. 445 (not Miquel), is probably *F. rhododendrifolia*.

F. PUBIGERA, *Kurz For. Fl.* ii. 450 (not of Wallich and Brandis), from Martaban, alt. 4000 ft., is undeterminable. Kurz has left no specimen in Herb. Calcutt.

F. ? PULCHRA, *Wall. Cat.* 4571, from Singapore, is not a *Ficus*.

F. RAMEA, *Wall. Cat.* 4556, from Mauritius, is *F. rubra*.

F. ROTUNDIFOLIA, *Roxb. Fl. Ind.* iii. 555, from N. Bengal, is undeterminable.

F. SUBREPANDA, *Wall. Cat.* 4568 B ? from Silhet, is not identifiable.

F. URTICIFOLIA, *Roxb. Fl. Ind.* iii. 533, from N. Bengal, is undeterminable.

F. VESTITA, *Wall. Cat.* 4500, from Nilghiris. There is no specimen answering to this number in Herb. Wallich.

PIPER CLYPEATUM, *Wall. Cat.* 6655, referred to in this volume, p. 96, as a species of *Ficus*, is not so; but what it is (if not a *Piper*) I cannot tell.—*J. D. H.*

18. **ANTIARIS,** *Leschen.*

Evergreen trees. *Leaves* alternate, bifarious, penninerved, entire or serrate; stipules small, lateral and connate and intrapetiolar, caducous. *Flowers* monœcious, males crowded on the surface of an axillary unisexual fleshy shortly peduncled receptacle surrounded by imbricate bracts; fem. solitary in a pyriform involucre of many bracts. MALE FL. *Sepals* 4, rarely 3, spathulate, imbricate. *Stamens* 3–8, short, erect, included. *Pistillode* 0. FEM. FL. *Perianth* 0. *Ovary* adnate to the involucre; style 2-partite, arms subulate recurved; ovule pendulous. *Fruit* fleshy, pericarp confluent with the involucre. *Seed* exalbuminous, testa hard; embryo subglobose, cotyledons equal fleshy, radicle small superior.—Species 5–6 ? Indian, Malayan and Australian.

A. toxicaria, *Leschen. in Ann. Mus. Paris* xvi. 478, t. 22; leaves oblong or elliptic-oblong acuminate and mucronate entire or serrulate scaberulous glabrous or tomentose beneath, male receptacles 3–4 together rounded concave tomentose. *Kurz For. Fl.* ii. 462; *Gamble Man. Ind. Timb.* 332; *Blume Rumph.* i. 56, t. 22, 23; *Hook. Comp. Bot. Mag.* i. 11, t. 17; *Benn. Pl. Jav. Rar.* 52, t. 13; *Trecul in Ann. Sc. Nat. Ser.* 3, viii. (1847) 143, t. 6; *Miq. Fl. Ind. Bat.* i. ii. 291; *Wall. Cat.* 7494. A. innoxia, *Blume l. c.* 172, t. 54; *Thwaites Enum.* 263; *Brandis For. Fl.* 427; *Miq. l. c.* 292. A. saccidora, *Dalz. in Hook. Kew Journ. Bot.* iii. (1851) 232; *Dalz. & Gibs. Bomb. Fl.* 244; *Wight Ic.* t. 1958; *Bedd. Fl. Sylvat.* t. 307. A. dubia, *Spanog. in Linnæa* xv. 343. Lepurandra saccidora, *Nimmo in Grah. Cat. Bomb. Pl.* 193.

The DECCAN PENINSULA, on the Ghats, from the Concan southwards. PEGU to MARTABAN, *Kurz*. CEYLON; in the drier parts of the island.—DISTRIB. Malay Islands.

A majestic tree, attaining 250 ft.; branchlets glabrous, pubescent or pruinose, young villously hirsute. *Leaves* 4–8 in., glossy, base rounded or cordate; young lanceolate, serrulate, hirsute; petiole very short. *Male receptacles* orbicular and peduncles velvety, ½ in. diam. *Fruit* like a small fig, purple, scarlet or crimson, pyriform, velvety, intensely bitter, tipped with a few bracts.—Kurz was the first to unite the western *A. saccidora* with the eastern *toxicaria*. The N. Australian *A. macrophylla*, Br., may be the same, for *A. toxicaria* is found as far eastward as Timor. According to Dalzell, the leaves on the shoots are very different from the old, being densely hirsute, elliptic-lanceolate, caudate acuminate, and serrulate; similar but much larger leaves, 6–10 by 2–3½ in., occur in Malayan specimens named *A. rufa*, Miquel, from Batsam and Suembu Pula (Hort. Bogor. No. 7311, 7302). Low sends from Perak as the Ipo (*A. toxicaria*) a species with oblong acute entire leaves 3–6 by 1½–3 in., which are scabrid above and hirsutely tomentose beneath; and Pierre has the same as *A. innoxia*, Blume, from Cochin China.

19. **CUDRANIA,** *Trecul.*

Shrubs or small trees, usually spinous, erect or scandent. *Leaves* alternate, quite entire, penninerved; stipules lateral, small. *Flowers* diœcious in small naked globose heads, bracteolate. MALE FL. *Sepals* 3–5, oblong, obtuse, adnate to 2–4 bracts, imbricate. *Stamens* 4, erect, more or less adnate to the sepals. *Pistillode* subulate or 0. FEM. FL. *Sepals* broader than in the male, embracing the ovary. *Ovary* straight; style terminal, simple or 2-partite, arms stout or slender; ovule pendulous. *Achenes* enclosed in the enlarged fleshy bracts and perianth forming a globose fleshy head, ovoid, compressed, crustaceous. *Testa* membranous, albumen scanty; cotyledons twisted and folded, equal or unequal, embracing the slender upcurved radicle.—Species 3 or 4 ? Asiatic, Australian and New Caledonian.

Habit and foliage of *Plecospermum*.

1. **C. javanensis,** *Trecul in Ann. Sc. Nat. Ser.* iii. viii. (1847) 123; branchlets pubescent, spines straight or recurved, leaves 1–3 in. oblong or obovate to oblanceolate obtuse acute or acuminate glabrous, nerves slender 8–10 pairs, style 2-fid short. *Brand. For. Fl.* 425; *Benth. Fl. Austral.* vi. 179. C. amboinensis, *Kurz For. Fl.* ii. 434. Cudranus Rumphii, *Thwaites Enum.* 262; *Bedd. For. Man.* 220, t. 27, f. 1. C. amboinensis, *Miq. Fl. Ind. Bat.* i. ii. 290. Maclura amboinensis, javanica & timorensis, *Blume Mus. Bot.* ii. 83, 84, t. 31. M. javanica, *Miq. l. c.* 280. Trophis spinosa, *Blume Bijd.* 489; *Willd. Sp. Pl.* iv. 734 (*in part*). Plecospermum cuneifolium, *Thwaites in Hook. Kew Journ.* vi. (1854) 303; *Wall. Cat.* 4641 B, D. Batis fruticosa, *Roxb.* ? *Wall. Cat.* 4643 B. Morus Cudranus, *Herb. Ham.*—Cudranus, *Rumph. Amb.* v. 22, t. 15, 16.

TROPICAL HIMALAYA, from Garwhal eastwards to the KHASIA HILLS. BURMA, CHITTAGONG, PERAK and MALACCA. CEYLON, common in the drier parts of the island.—DISTRIB. E. Africa, Malay Islands, Australia.

A straggling or subscandent shrub, or small tree with drooping branchlets. *Leaves* reticulate, base obtuse; petiole ¼ in. or less. *Flower-heads* solitary or binate, shortly peduncled, pubescent; males ¼ in. diam.; fem. smaller at first, ¾ in. diam. in fruit. *Sepals* of male 3–5, cuneate, unequal, hairy. *Fem. fl.* more or less incurved; sepals 4, tips thickened, velvety. *Fruit* 2–3 in. diam., glaucous green, velvety.—Wight's *C. javenensis* (Ic. t. 1960), founded on the *Morus scandens*, Hort. Calc. from China, differs in the obovoid or subclavate fem. heads and very long style-arms.

2. **C. fruticosa,** *Wight ex Kurz For. Fl.* ii. 434; branchlets glabrous, spines curved, leaves 4–6 in. oblong or elliptic subcaudate-acuminate glabrous, nerves 3–4 pairs very strong beneath, styles slender deeply 2-fid. Batis fruticosa, *Roxb.* ? *Wall. Cat.* 4643 A.

KHASIA HILLS, alt. 4000 ft., *J. D. H. & T. T.* CHITTAGONG, AVA and UPPER TENASSERIM, *Kurz.*

A large scandent shrub. *Leaves* membranous, base rounded, laxly reticulate; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., glabrous. *Flower-heads* globose, the size of a pea, puberulous; females in pairs on stout puberulous peduncles $\frac{1}{6}$–$\frac{1}{4}$ in. long. *Fruit* the size of a cherry, glaucous green, velvety. *Achenes* the size of a large pea, ovoid, protruding from the fleshy perianths.—This description is taken from Kurz, who gives Wight as the authority for the specific name, which I do not find elsewhere published.

3. **C. pubescens,** *Trecul in Ann. Sc. Nat. Ser.* iii. viii. (1847) 123; branchlets pubescent, spines straight, leaves 4–6 in. ovate or ovate-lanceolate cuspidately acuminate puberulous above softly pubescent beneath, nerves very strong beneath, style simple slender. *Kurz For. Fl.* ii. 435; *Miq. Fl. Ind. Bat.* i. ii. 290.

PEGU and MARTABAN, ascending to 3000 ft., *Kurz.*—DISTRIB. Java.

An evergreen woody climber; stem lenticellate. *Leaves* membranous, base rounded; petiole $\frac{1}{2}$ in. *Flower-heads* globose in pairs; peduncles long, slender, puberulous. *Fruit* the size of a large cherry, fleshy, compact, velvety, wrinkled, glaucous green. (Descr. from Kurz.)

20. **ARTOCARPUS,** *Forst.* (by G. King).

Evergreen trees. *Leaves* often very large, alternate, coriaceous, entire or pinnately lobed, penninerved; stipules various. *Flowers* monœcious, densely crowded on globose or oblong unisexual solitary axillary (rarely terminal) receptacles, often mixed with peltate bracts. MALE FL. *Perianth* 2–4-lobed or -partite; lobes obtuse, concave, valvate or slightly imbricate. *Stamen* 1, erect. *Pistillode* 0. FEM. FL. *Perianths* tubular, connate and confluent below with the receptacle, mouth minute. *Ovary* straight; style central or lateral, stigma entire, rarely 2–3-fid; ovule pendulous. *Fruit* a large fleshy oblong cylindric globose or lobed receptacle, clothed with the greatly enlarged fleshy perianths and carpels (*anthocarps*) which have hardened spinous or truncate or pyramidal or plane tips. *Achenes* deeply sunk in the fleshy mass. *Seed* exalbuminous; embryo straight or incurved, cotyledons fleshy equal or unequal, radicle very short, superior.—Species about 40, Tropical Asiatic and Pacific.

The following descriptions are mainly taken from Dr. King's monograph of the Indian species to be published in the Annals of the Calcutta Botanical Gardens.

A. incisa, Linn. f., the bread-fruit tree (*Roxb. Fl. Ind.* iii. 527; *Bot. Mag.* t. 2869–2871), a native of the Pacific Islands, with pinnatifid leaves, is occasionally cultivated in the hottest parts of India.

SECT. I. *Fruit* spinous or tubercled (tips of the anthocarps ending in a sharp spine or tubercle).

* Fruit spinous.

† *Fruit globose or subglobose.*

1. **A. Forbesii,** *King in Ann. Bot. Gard. Calc. ined.*; leaves elliptic-

oblong or -obovate glabrous shining, fruit subglobose lobed nearly glabrous, spines conical shining.

PERAK, *King's Collector*.—DISTRIB. Sumatra.

A glabrous tree, attaining 60 ft.; branches glabrous. *Leaves* 3–5½ in., obtuse or cuspidate, base narrow; nerves 5–6 pairs; petiole 1½–2 in. *Fruit* 4–8 in. diam., irregularly lobed; spines ½ in. and less, stout, spreading, recurved, glabrous, perforate.

2. **A. bracteatus,** *King in Ann. Bot. Gard. Calc. ined.*; leaves obovate or elliptic-obovate tip rounded puberulous or glabrous above softly or subhispidly puberulous beneath, fruit globose bracteate at the base, spines straight slender terete smooth. A. rufescens, *Kurz For. Fl.* ii. 431 (*not of Miquel*).

MALACCA, *Griffith* (*Kew Distrib.* 4663), *Maingay* (*K. D.* 1476).

A tree; branchlets stout, annulate, fulvous-pubescent. *Leaves* 6–8 in., reticulate; nerves 10 pairs; petiole 1 in., puberulous; stipules ovate, acute, silky. *Fruit* pedunculed, basal bracts 3–4.—"This is the *A. rufescens* of Kurz, but not of Miquel (*Fl. Ind. Bat. Suppl.* 420), which that author has subsequently (*Ann. Mus. Lugd. Bat.* iii. 211) reduced to *A. Tampang*, which is a variety of *A. Lakoocha*, Roxb." (*G. King*).

3. **A. calophylla,** *Kurz For. Fl.* ii. 431; leaves broadly ovate or oblong scaberulous above tomentose or pubescent beneath base rounded or subcordate, fruit globose ebracteate, spines straight terete hispid. *King in Ann. Bot. Gard. Calc. ined.*

UPPER TENASSERIM, *Falconer, Kurz.*

A medium-sized tree, shoots deeply striate and rugose. *Leaves* 4–6 in., acute, mucronate, base not narrowed; nerves 9–11 pairs; petiole ¾ in. or less; stipules ovate-lanceolate, tomentose. *Fruit* 4–5 in. diam.; peduncle ½–¾ in., tawny-tomentose; spines ¼ in., perforate. *Seeds* ½ in., oblong or ovoid.—Fruit of *A. echinata*, but leaves very different. King throws doubt on the fruit (collected by Kurz) and the leaves (by Falconer) belonging to the same species.

4. **A. rigida,** *Blume Bijd.* 482; leaves oblong or oblong-obovate obtuse mature glabrous above tomentose hispidulous or glabrate beneath with pubescent nerves base narrowed, fruit globose ebracteate, spines straight narrowly conical angled scabrid or hispid. *Kurz For. Fl.* ii. 431; *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 114; *Miq. Fl. Ind. Bat.* i. ii. 286; *King in Ann. Bot. Gard. Calc. ined.* A. echinata, *Roxb. Fl. Ind.* iii. 527; *Trecul l. c.* 113; *Wight Ic.* t. 680; *Miquel l. c.*; *Wall. Cat.* 4658 (*in part*). A. cuspidata, *Griff. Notul.* iv. 400.

BURMA, *Helfer* (*Kew Distrib.* 4669). PERAK, *King's Collector, Scortechini.* PENANG, *Roxburgh.* MALACCA, *Griffith* (*K. D.* 4664), *Maingay* (*K. D.* 1474).—DISTRIB. Malay Islands.

A tree, 50–80 ft.; shoots strigose. *Leaves* 4–7 in., hard, obtuse or subacute, base rounded or acute, above at first scaberulous; nerves 10–12 pairs; petiole 1 in.; stipules lanceolate, strigose. *Male receptacle* 1 in. diam., globose; peduncle hispid; sepals 2, ovate, obtuse, hispid; bracteoles with flat ciliate tips. *Fruit* about ¾ in. diam., spines ¼ in. *Seeds* ½ in., ovoid or oblong.

†† *Fruit oblong or ovoid.*

5. **A. Kunstleri,** *King in Ann. Bot. Gard. Calc. ined.*; leaves very large ovate-oblong narrowed at both ends young coarsely serrate appressed hairy beneath, fruit oblong, spines strongly reflexed hispidly tomentose.

PERAK, *King's Collector*. MALACCA, *Maingay* (*Kew Distrib.* 1484).

A tree, 40–60 ft.; branchlets annulate, fulvous-tomentose. *Leaves* 9 in. to 3 ft. by 6–15 in., minutely strigose above; nerves 10–12 pairs; petiole $1\frac{1}{2}$–3 in.; stipules 4–7 in., sheathing the buds, ovate-lanceolate, fulvous-tomentose. *Male heads* cylindric, 4–5 in., pubescent, cream-cold.; peduncle (of both sexes) 2–3 in.; sepals 2, ovate, concave, hispid. *Fruit* 4–7 in., yellow; bracteoles 0.

6. **A. hirsuta,** *Lamk. Encycl.* iii. 201; leaves broadly ovate elliptic or obovate subacute glabrous except the hispidulous strong nerves beneath, fruit ovoid, spines straight cylindric hispid. *Roxb. Fl. Ind.* iii. 521; *Brandis For. Fl.* 426; *Bedd. Fl. Sylvat.* t. 308; *Grah. Cat. Bomb. Pl.* 193; *Gamble Man. Ind. Timb.* 331; *Dalz. & Gibs. Bomb. Fl.* 244; *Wight Ic.* t. 1957. A. pubescens, *Willd. Sp. Pl.* iv. 189; *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 122; *Wall. Cat.* 4656; *King in Ann. Bot. Gard. Calc. ined.*—*Rheede Hort. Mal.* iii. t. 32.

DECCAN PENINSULA; from the Concan southwards, ascending to 4000 ft.

A lofty tree; branchlets, stipules, petioles, midribs and peduncles strigose. *Leaves* 6–9 in., entire, base slightly narrowed; nerves 7–11 pairs; petiole $\frac{3}{4}$–1 in.; stipules about as long, lanceolate. *Male heads* pendulous, 4–6 in., slender, narrowly cylindric; sepals 2, united below; bracteoles chaffy. *Fruit* erect, size of a lemon; spines $\frac{1}{4}$ in., perforate. *Seeds* $\frac{1}{2}$–$\frac{3}{4}$ in., ovoid.

** Fruit tubercled, i. e. with flattish rarely acute tips of the anthocarps.

† *Fruit oblong or cylindric.*

7. **A. integrifolia,** *Linn. f. Suppl.* 412; leaves elliptic-oblong or obovate acuminate entire or 3-lobed base acute rather rough beneath, stipules large spathaceous lanceolate, fruit large oblong or clavate, anthocarps pyramidal. *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 115; *Roxb. Cor. Pl.* t. 250, and *Fl. Ind.* iii. 522; *Griff. Notul.* iv. 402; *Brand. For. Fl.* 425; *Kurz For. Fl.* ii. 432; *Dalz. & Gibs. Bomb. Fl.* 244; *Bedd. For. Man.* 219; *Wight Ic.* t. 678; *Gamble Man. Ind. Timb.* 329; *Wall. Cat.* 4654; *King in Ann. Bot. Gard. Calc. ined.*; *Miq. Fl. Ind. Bat.* i. ii. 287; *Bot. Mag.* t. 2833, 4. Sitodium cauliflorum, *Gærtn. Fruct.* i. 345, t. 71, 72. —*Rheede Hort. Mal.* iii. t. 26—28. Polyphema Jaca, *Lour. Fl. Coch.* 547.

DECCAN PENINSULA, native of the forests of the Western Ghats, *Beddome*. Cultivated throughout the hotter parts of India and Eastern Asia.

A large evergreen tree, attaining 60 ft.; shoots and nearly all parts glabrous. *Leaves* 4–8 in., thickly coriaceous, dark green, those of young plants often lobed; nerves 7–8 pairs; petiole $\frac{1}{2}$–1 in., rather slender; stipules glabrous. *Flower-heads* embraced by spathaceous deciduous stipular sheaths, axillary and terminal, often 2-nate; peduncles $\frac{3}{4}$ in., at first slender; male cylindric, 2–6 in. by 1–2 in. diam.; bracteoles 0; sepals 2, oblong or spathulate, tips pubescent. *Fruit* 1–$2\frac{1}{2}$ ft. long. *Seeds* size of a nutmeg, oblong or reniform, testa coriaceous.—The discovery of this plant in a wild state by *Beddome* is a very interesting one.—The *Jack fruit*.

8. **A. peduncularis,** *Kurz in Trimen Journ. Bot.* iv. (1875) 331; leaves ovate or ovate-oblong obtuse base rounded, fruit erect entire or lobed cylindric, anthocarps pyramidal subacute smooth. *King in Ann. Bot. Gard. Calc. ined.*

PERAK, *King's Collector*. NICOBAR ISLANDS, *Kurz*.

A tree, 40–50 ft.; branchlets annular, puberulous. *Leaves* 5–7 in., glabrous on both surfaces; nerves 6–7 pairs; petiole $1\frac{1}{2}$–2 in.; stipules as long, linear-lanceolate,

appressed pubescent. *Flower-heads* of both sexes erect, cylindric; peduncles $2\frac{1}{2}$–$3\frac{1}{2}$ in.; male $2\frac{1}{2}$ in. long, very slender, ebracteolate; sepals 2, oblong, obtuse, hairy. *Fruit* immature, 2–$2\frac{1}{2}$ by 1 in. diam.; anthocarps 4–5-angled. *Seeds* few, $\frac{1}{2}$ in. long.

9. **A. Lowii,** *King in Ann. Bot. Gard. Calc. ined.*; leaves oblong-lanceolate acute glabrous or puberulous base narrow, stipules very long, young fruit cylindric-oblong, anthocarps pyramidal obtuse or subacute smooth.

PERAK, *King's Collector.*

A tree, 50–70 ft.; branchlets, petioles and peduncles sparsely hairy. *Leaves* 9–11 in., thinly coriaceous, minutely reticulate beneath; nerves 10–11 pairs; petiole $1\frac{1}{4}$ in.; stipules $2\frac{1}{2}$–3 in., narrowly lanceolate, puberulous. *Male heads* $\frac{1}{2}$–$\frac{3}{4}$ in., slender, erect; bracteoles ligulate; sepals 2, ovate, truncate, hirsute. *Fruit* immature, 2–3 in., erect, oblong, glabrous; anthocarps 4–5-angled.

10. **A. Polyphema,** *Persoon. Syn.* ii. 531; leaves ovate-oblong or subobovate cuspidate strigose beneath, stipules large, fruit cylindric-oblong, anthocarps low pyramidal puberulous. *Blume Bijd.* ii. 481; *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 115; *Miquel Fl. Ind. Bat.* i. ii. 286; *Wall. Cat.* 4659; *King in Ann. Bot. Gard. Calc. ined.* Polyphema Champeden, *Lour. Fl. Cochin.* 547.

PENANG, *Wallich, King's Collector.* MALACCA, *Griffith* (*Kew Distrib.* 4667), *Maingay* (*K. D.* 1473).—DISTRIB. Malay Islands, Cochin China.

A tree, 20–25 ft. in Penang; shoots, petioles, peduncles, stipules and leaf-nerves beneath strigose. *Leaves* $3\frac{1}{2}$–8 in., opaque above with pubescent nerves, shining beneath, young densely clothed with tawny bristles; nerves 5–9 pairs; petiole $\frac{1}{2}$ in.; stipules 1–$1\frac{1}{2}$ in., lanceolate, convolute. *Flower-heads* erect, cylindric; males 1–$1\frac{3}{4}$ in., ebracteolate; peduncle as long, slender; sepals 2, thick, oblong, truncate, pubescent. *Fruit* 2 in. by 1 in. diam., cylindric, not lobed.

11. **A. Maingayi,** *King in Ann. Bot. Gard. Calc. ined.*; leaves elliptic-obovate obtuse base narrowed scaberulous above appressed-pubescent beneath, petiole slender, stipules small, fruit obovoid-cylindric surface tessellate, anthocarps broad truncate.

PERAK, *Scortechini, King's Collector.* MALACCA, *Maingay* (*Kew Distrib.* 1481).

A tree, 20–40 ft.; branchlets slender, striate and annulate, scaberulous. *Leaves* $2\frac{1}{2}$–4 in., rigid, reticulate beneath, base narrowed; nerves 8–9 pairs; petiole $\frac{1}{2}$ in., pubescent; stipules $\frac{1}{2}$ in., lanceolate, silky. *Male heads* $1\frac{1}{2}$-2 in., cylindric, slender, rugulose; peduncle $\frac{1}{2}$ in., pubescent; bracteoles 0; sepals 2, flat, square. *Fruit* 1 in. long; anthocarps flat, scaberulous.—King remarks that this differs from the description of Miquel's *A. Dadah* in the leaves narrowed at the base (not rounded) and the nerves meeting the midrib at a different angle.

12. **A. Scortechinii,** *King in Ann. Bot. Gard. Calc. ined.*; leaves ovate-oblong obtuse base narrowed softly pubescent beneath, stipules large, fruit cylindric, anthocarps truncate scaberulous.

PERAK, *King's Collector, Scortechini.*

A tall tree, 60–80 ft.; branchlets annulate, warted, puberulous. *Leaves* 8–16 in., rigid, puberulous above, especially on the nerves; nerves 14–16 pairs, appressedly pubescent; petiole $1\frac{1}{2}$ in., puberulous; stipules 2–3 in., ovate-lanceolate, silky, margins recurved. *Fruit* long peduncled, immature, $2\frac{1}{2}$ in. by $1\frac{1}{2}$ in. diam.—Foliage of *A. Kunstleri, King.*

13. **A. nobilis,** *Thwaites Enum.* 262; leaves large broadly ovate cuspidate coarsely crenate glabrescent base obtuse narrowed or rounded,

stipules very large, fruit oblong transversely constricted, anthocarps broad pyramidal truncate. *Bedd. Fl. Sylvat.* t. 309; *Gamble Man. Ind. Timb.* 331. A. pubescens, *Moon Cat.* 61.

CEYLON; in the central and southern districts, ascending to 2000 ft.

A large tree, 40–50 ft.; branchlets, peduncles, petioles, stipules and nerves beneath hispidly scabrid. *Leaves* 6–14 in., more or less scaberulous on both surfaces, on young plants pinnatifid; nerves about 9 pairs; petiole ¾–1½ in., stout; stipules 3–5 in., spathaceous. *Flower-heads* erect, oblong; peduncles 3 in., stout; bracteoles in both sexes hairy, peltate; male 3–6 in. by ½–¾ in. diam.; sepals 2, broad, truncate. *Fruit* 6–8 in. by 3½–4 in. diam.; anthocarps 4–5-angled. *Seeds* ½ in. diam., subglobose.

†† *Fruit globose.*

14. **A. lanceæfolia,** *Roxb. Fl. Ind.* iii. 527; leaves ovate-lanceolate or elliptic-oblong obtusely cuspidate glabrous on both surfaces, stipules small, fruit globose, anthocarps truncate pubescent. *Wight Ic.* t. 679; *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 122; *Miq. Fl. Ind. Bat.* i. ii. 289; *King in Ann. Bot. Gard. Calc. ined.*

PENANG, *Roxburgh.* PERAK, *King's Collector.* MALACCA, *Maingay* (*Kew Distrib.* 1478).

A tree, 60–80 ft., glabrous except the flower-heads, fruit and stipules; shoots annulate. *Leaves* 9–14 in., base narrowed; nerves 8–10 pairs; petiole ½–1 in.; stipules ½–¾ in., ovate-lanceolate, appressed hairy. *Flower-heads* on peduncles, 2–3 in.; male obovoid-cylindric, ¾–1 in. by ½ in. diam.; sepals 2, narrow, entire or 2-fid; bracteoles almost funnel-shaped, entire or lobed, ciliate. *Fruit* about 3 in. diam., pubescent.

15. **A. Chaplasha,** *Roxb. Fl. Ind.* iii. 525; leaves obovate rounded or oblong tip broad rounded or cuspidate entire serrate or lobulate base narrow obtuse or subcordate scabrid on both surfaces, stipules large, fruit globose, anthocarps hispidulous. *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 112; *Wight Ic.* t. 682; *Brandis For. Fl.* 426; *Kurz For. Fl.* ii. 432; *Gamble Man. Ind. Timb.* 331; *Wall. Cat.* 4657; *King in Ann. Bot. Gard. Calc. ined.*

Transgangetic India, from BENGAL, SIKKIM and ASSAM, to TENASSERIM and the ANDAMAN ISLANDS.

A lofty deciduous tree, attaining 150 ft.; shoots rough. *Leaves* 7–12 in., on young shoots 1–2 ft. and often pinnatifid, thinly coriaceous; nerves 8–10 pairs, appressed hairy or hispid; petiole ¼–½ in., stout, hispid; stipules 1½ in., spathaceous, strigose. *Flower-heads* globose, long-peduncled, males size of a nutmeg; bracteoles peltate, pubescent; sepals 2, narrow, 2-fid. *Fruit* 3–4 in. diam., nodding, globose, not lobed. *Seeds* ½ in., oblong.

SECT. II. *Fruit* smooth (tips of the anthocarps truncate and flat).

16. **A. Lakoocha,** *Roxb. Fl. Ind.* iii. 524; leaves oblong elliptic or subobovate cuspidate softly pubescent beneath base usually rounded, stipules small, fruit globose sublobed smooth or wrinkled glabrous. *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 117; *Thwaites Enum.* 262 (*excl. var.* β.); *Wight Ic.* t. 681; *Brandis For. Fl.* 426; *Kurz For. Fl.* ii. 433; *Dalz. & Gibs. Bomb. Fl.* 244; *Bedd. For. Man.* 219; *Gamble Man. Ind. Timb.* 330; *Wall. Cat.* 4665; *King in Ann. Bot. Gard. Calc. ined.* A. mollis, *Wall. Cat.* 4661.

TROPICAL HIMALAYA, ascending to 4000 ft., from Kumaon eastwards to BURMA, and southwards to TRAVANCORE and MALACCA.

A large deciduous tree, attaining 60 ft.; branchlets softly tomentose or villous. *Leaves* 4–12 in., thinly coriaceous, above glabrous or puberulous, reticulate beneath, young sometimes serrate; nerves 8–12 pairs; petiole ½–1 in., pubescent, at length glabrous; stipules ½ in., lanceolate, pubescent. *Flower-heads* shortly peduncled, pubescent; male ½–1 in. diam., oblong or globose, pubescent; bracteoles clavate, puberulous. *Fruit* 2–3 in. diam. *Seeds* oblong.

Var. *malayana*, King l. c.; leaves more uniformly elliptic and narrower, peduncles 1 in., male sepals fleshy, fruit 1¼ in. diam.—Perak, *King's Collector*.

17. **A. Denisoniana,** *King in Ann. Bot. Gard. Calc. ined.*; leaves elliptic-oblong or -ovate cuspidate base narrowed rarely rounded beneath glaucous or subpuberulous, stipules small glabrous, fruit obovoid not lobed smooth.

Perak, *King's Collector*.

A tree, attaining 60 ft.; branchlets slender, grey, smooth, glabrous. *Leaves* 5–7 in., glabrous except the nerves and shining above; nerves 7–10 pairs; petiole ¾–1 in., glabrous; stipules ovate-lanceolate. *Flower-heads* shortly peduncled; males in the upper axils ¾–1½ in. long, slender; bracteoles stipitate, peltate, ciliate; sepals 4, oblong, truncate, hirsute, sometimes connate below, tips thickened. *Fruit* rugulose, at length smooth; bracteoles sessile, crowded, peltate.—King suggests this being possibly the Sumatran *A. tephrophylla*, Miquel (Fl. Ind. Bat. Suppl. 422), but that is described as having velvety golden stipules; in other respects the descriptions tally very closely.

18. **A. Gomeziana,** *Wall. Cat.* 4660; leaves oblong or ovate-oblong cuspidate glabrous shining above subpruinose beneath base rounded or obtuse, stipules small linear, fruit unevenly globose or ovoid. *Kurz For. Fl.* ii. 433; *King in Ann. Bot. Gard. Calc. ined.* A. rigida, *Wall. Cat.* 4658 A. A. pomiformis, *Teijsm. & Binnend. in Nat. Tijdsch. Ned. Ind.* xxv. 400.

Tenasserim; at Tavoy, *Wallich*. Perak, *King's Collector*. Malacca, *Maingay* (*Kew Distrib.* 1486). Andaman Islands, *King's Collector*.

A medium-sized tree, quite or nearly glabrous, and subpruinose. *Leaves* 6–10 in., reticulate beneath between the 8–12 pairs of very strong nerves; petiole ½–1 in.; stipules sparingly hairy. *Flower-heads* on short pubescent peduncles, more or less globose or ovoid, or the males cylindric; bracteoles of male broadly peltate, stipitate, puberulous; sepals 2, ovate, puberulous. *Fruit* smooth.

Var. *Griffithii*, King mss.; smaller in all its parts, leaves 3½–6 in. oblong or elliptic-oblong, fruit ovoid not shining or pruinose beneath.—Perak, *Scortechini*, *King's Collector*; Malacca, *Griffith* (*Kew Distrib.* 4665), *Maingay* (*K. D.* 1482); Penang, *Curtis*.

21. **BALANOSTREBLUS,** *Kurz.*

A small nearly glabrous evergreen tree. *Leaves* alternate, penninerved, spinous-toothed; stipules small, caducous. *Flowers* monœcious, axillary, bracteate; males in cylindric catkin-like spikes, fem. racemose. Male fl. *Sepals* 4, thick, obtuse, subvalvate. *Stamens* 4, erect in bud. *Pistillode* 0. Fem. fl. *Perianth* utricular, base connate with the ovary, free above, mouth minute. *Ovary* included, half-superior; style short, bifid, arms short thick villous; ovule pendulous. *Fruit* a globose drupe enclosed in the fleshy perianth.

B. ilicifolia, *Kurz in Journ. As. Soc. Beng.* xlii. 247, t. 19, and *For. Fl.* ii. 465.

Chittagong, *Kurz, J. D. H. & T. T.* Bhamo, *J. Anderson*. Ava, *Kurz*. Penang, on Prang Island, *King's Collector*.

Branchlets pubescent and rough. *Leaves* 1–3 in., very coriaceous, deep green, elliptic, orbicular, oblong, subrhomboid or lanceolate, tip and teeth spinescent, base acute or obtuse, subequal; nerves few or many pairs, straight, reticulate and anastomosing. *Spikes* ½ in.; male very dense-fld.; bracts rounded, ciliolate. *Drupe* red, tubercled and wrinkled, glabrous.

22. **CONOCEPHALUS,** *Blume.*

Climbing shrubs often very large. *Leaves* alternate, simple, quite entire, penninerved, and sometimes 3-nerved; stipules connate, intrapetiolar. *Flowers* diœcious, in axillary usually cymose heads. MALE FL. *Perianth* tubular or turbinate 4-lobed or -partite, valvate. *Stamens* 2–4, erect in bud. *Pistillode* small. FEM. FL. *Perianth* oblong or clavate, 4-lobed. *Ovary* included; style undivided, stigma linear oblique or recurved; ovule erect, orthotropous. *Achene* included. *Seed* erect, testa membranous, albumen scanty or 0; embryo straight; cotyledons fleshy or thin, equal, radicle short superior.—Species about 10, Tropical Asiatic and Malayan.

The species of this genus are (all but *C. suaveolens*) very imperfectly described.

1. **C. suaveolens,** *Blume Bijd.* 483; glabrous, leaves elliptic ovate oblong or subobovate obtuse obtusely cuspidate or acuminate, base acute obtuse rounded or cordate glabrous or puberulous on one or both surfaces, male in excessively branched cymes, heads very small, fem. of 3–5 much larger heads, fem. fl. very shortly pedicelled oblong obtusely 4-toothed. *Kurz For. Fl.* ii. 430; *Benn. Pl. Rar. Jav.* 47, t. 12; *Miq. Fl. Ind. Bat.* ii. 430. C. ovatus, pubescens, Roxburghii & suaveolens, *Trecul in Ann. Sc. Nat. Ser.* 3, viii. 87–90, t. 2, f. 37–41. C. naucleiformis, *Lindl. Bot. Reg.* t. 1203. C. gratus, *Miq. Pl. Jungh.* i. 43. Urtica naucleiflora, *Roxb. Fl. Ind.* iii. 657; *Wight Ic.* t. 684; *Wall. Cat.* 4624; *Griff. Notul.* iv. 385.

Tropical forests of the EASTERN HIMALAYA and the KHASIA MTS., southwards to TENASSERIM and MALACCA.—DISTRIB. Malay Islands, Cambogia.

An immense climber; shoots glabrous or sparsely pubescent. *Leaves* 6–10 by 3–6 in., dotted and streaked with cystoliths; nerves 8–12 pairs, above the very short basal; petiole 2–6 in.; stipules large, rusty-brown, smooth. *Male heads* ¼ in. diam., in broad shortly peduncled dichotomous cymes; stamens 3–4. *Fem. heads* 1 in. diam.; bracts rounded, concave, opposite, deciduous.—Flowers sweet-scented, flesh-cold.

2. **C. amœnus,** *King mss.*; quite glabrous, branches very stout, leaves 8–12 by 5–7 in. elliptic or broadly oblong-ovate obtuse shortly 5–7-nerved at the cordate base, nerves 12–15 pairs above the basal, petiole 3–5 in., male cymes with very short thick branches, heads ½ in. diam. pink, flowers sessile tubular angular 4-toothed, stamens 4, fem. heads fewer 1–2 in. diam., pedicels as thick as the little finger, flowers shortly pedicelled shortly 4-lobed. Urtica superba & amœna, *Wall. Cat.* 4625, 4626.

PENANG, *Porter.* PERAK, *Scortechini, King's Collector.*

3. **C. Scortechinii,** *King mss.*; quite glabrous, branches slender smooth, leaves 3–6 in. shortly petioled elliptic-oblong or -lanceolate and acuminate or subobovate and cuspidate, base acute or rounded, nerves 6–8 pairs basal 0, petiole ½–1 in., male cymes excessively branched, heads very small and numerous ⅛ in. diam., perianth 4-lobed (or partite?), stamens 4, filament very broad, fem. cymes sparingly branched, heads

½–1 in. diam. shortly stoutly peduncled, flowers shortly pedicelled, perianth obtusely 4-lobed.

PERAK, *Scortechini, King's Collector.* SINGAPORE, *Maingay* (*Kew Distrib.* 1489).

4. **C. subtrinervius,** *Miq. Fl. Ind. Bat. Suppl.* 417; glabrous, leaves 6–8 in. long-petioled oblanceolate rarely obovate-oblong cuspidate or acuminate finely reticulate beneath, base narrowed 3-nerved rounded acute or cordate, nerves 6–8 pairs above the basal, petiole 2–4 in., heads small in very short axillary and rameal cymes shortly pedicelled, males ¼–⅓ in. diam., perianth tubular 4-crenate, stamens 3–4, filaments slender, fem. heads 1 in. diam., flowers shortly pedicelled, perianth subclavate.

PENANG and MALACCA, *Griffith* (*Kew Distrib.* 4673), *Maingay* (*K. D.* 1487). PERAK, *Scortechini, Kunstler.* SINGAPORE, *Lobb.*

The leaves are of a fine brown colour when dry; the reticulations beneath enclose silvery areoles.

5. **C.** *sp.*?; quite glabrous, leaves 12 in. long-petioled elliptic-obovate obtuse, base subacute, nerves 10–12 pairs above the short basal very strong beneath, petiole 2–4 in. very stout, fem. heads 2 in. diam. shortly stoutly pedicelled, fem. fl. on pedicels very much longer than the oblong 4-toothed perianth.

MALACCA, *Maingay* (*Kew Distrib.* 1499).

The leaves resemble those of a Bangka plant ticketed as Akar Kelangis and Telangis (*Teijsm. in Hort. Bot. Bogor.* Nos. 7307, 7297). (There is quite a different plant under this name, also from Hort. Bogor.)

6. **C.** *sp.*?; quite glabrous, leaves 4–8 in. shortly petioled elliptic obtuse, base rounded, nerves 7–10 pairs above the very short basal, petiole ½–1 in. stout, male heads in pairs in very shortly peduncled cymes, perianth 4-toothed, stamens 4, fem. heads as in *C. suaveolens.*

MALACCA, *Griffith* (*Kew Distrib.* 4675). PENANG, *Maingay* (*K. D.* 1488).

7. **C.** *sp.*?; quite glabrous, leaves long-petioled 8 by 6 in. broadly ovate cordate subacute, nerves 10–14 pairs above the short basal strong, petiole 3 in., fem. heads 1½ in. diam., fem. fl. on pedicels longer than the narrow perianth which is 4-cleft to the middle. ? C. azureus, *Teijsm. & Binnend. in Tijdschr. Nedert. Ind.* (1864) xxvi. 26.

PERAK; Pluss River, *Wray.*—DISTRIB. ? Sumatra.

DOUBTFUL SPECIES.

C. CONCOLOR, *Dalzell in Dalz. & Gibs. Bomb. Fl.* 239; "leaves 1 ft. 3-nerved perfectly smooth oblong-ovate acute green on both sides, fem. fl. axillary."—Concan, at the Phoonda Ghat.

23. **PRAINEA,** *King mss.*

A lofty glabrous climber. *Leaves* alternate, quite entire, penninerved. *Flowers* of both sexes in globose axillary pedicelled heads, mixed with peltate bracts. MALE FL. minute. *Perianth* tubular, obtusely 4-toothed. *Stamen* 1, filament short, thick; anther ovoid. *Pistillode* 0. FEM. FL. much larger than the male. *Perianth* tubular-clavate, thickened upwards, mouth minute. *Ovary* included, free; style terminal, deeply 2-fid,

included; ovule erect, orthotropous. *Fruit* globose, of many dry abortive flowers and one or few oblong achenes enclosed in their enlarged fleshy perianths. *Embryo* exalbuminous, cotyledons plano-convex, radicle minute superior.

P. scandens, *King mss.*

PERAK; in dense forests, *King's Collector.*

A climber, 50–100 ft.; stem 12–15 in. diam. *Leaves* 3-8 in., thinly coriaceous, elliptic- or obovate-oblong, quite smooth on both surfaces, yellowish brown when dry, base acute; nerves 10–12 pairs, very slender; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., very slender. *Male heads* $\frac{1}{2}$–1 in. diam., peduncle stout, 1–$1\frac{1}{2}$ in.; bracts minute, hairy, long-stipitate. *Fem. heads* $1\frac{1}{2}$–2 in. diam.; flowers $\frac{1}{2}$ in. long.—Habit of *Conocephalus.*

24. **HULLETTIA** (KURZIA, p. 479), *King mss.*

Dicœcious shrubs, branchlets tomentose. *Leaves* alternate, quite entire, penninerved; stipules small. *Flowers* 10–12, sunk in cavities of axillary peduncled open funnel-shaped 3–4 lobed receptacles. MALE FL. *Perianths* oblong, tubular, connate below and with the receptacle, tip free, 2-lobed or -toothed. *Stamens* 2, filaments connate in a column; anthers ovoid, erect. *Pistillode* 0. FEM. FL. *Perianth* tubular-clavate, mouth minute. *Ovary* free, clavate; style short, central, included, stigma minute; ovule erect, orthotropous. *Fruiting receptacle* subglobose or lobed, fleshy, 1–6 seeded; pericarp membranous. *Seed* erect, subglobose or flattened; cotyledons subequal, plano-convex, radicle minute included.

Dr. King informs me that the name *Kurzia*, which he originally proposed for this genus, is preoccupied, and that he has replaced it by *Hullettia*, in recognition of Mr. Hullett's valuable contributions to a knowledge of the Singapore Flora.

1. **H. Griffithiana,** *King mss.*; leaves cordate or rounded at the contracted base, peduncles elongate slender. Dorstenia Griffithiana, *Kurz in Beng. As. Soc. Journ.*; *For. Fl.* ii. 462.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 4676), *Helfer* (*K. D.* 4676).

An evergreen shrub, branches stout. *Leaves* 8–16 in., cuspidate, coriaceous, margins undulate, shining above, scaberulous beneath; nerves 15–20 pairs, very strong beneath, spreading; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules subulate, tomentose. *Peduncles* $1\frac{1}{2}$–2 in., pubescent. *Fruiting receptacles* 1–2 in. diam., velvety; involucral bracts minute, reflexed.

2. **H. dumosa,** *King mss.*; leaves acuminate at the base, peduncles very short stout.

PERAK, *Scortechini, King's Collector.*

Habit and general characters of *H. Griffithiana.*

25. **URTICA,** *Linn.*

Annual or perennial herbs, rarely suffruticose, with stinging hairs. *Leaves* opposite, toothed or lobulate, base 3–7-nerved; stipules lateral, free or connate. *Flowers* mono- or dicœcious, in axillary unisexual or androgynous cymose clusters. MALE FL. *Sepals* 4, ovate, imbricate. *Stamens* 4, inflexed in bud. *Pistillode* cupular. FEM. FL. *Sepals* 4, outer usually much smaller. *Ovary* straight, stigma sessile or subsessile, feathery or penicillate; ovule erect, orthotropous. *Achene* embraced by the sepals, ovoid or oblong, compressed, membranous or thinly crustaceous. *Seed* erect, adherent to the pericarp, albumen scanty, cotyledons rounded.—Species about 30, temperate and subtropical.

U. pilulifera, Linn., the Roman nettle, a common European weed, occurs occasionally near Simla and elsewhere near houses in the hills.

1. **U. hyperborea,** *Jacquem. mss. in Wedd. Monogr.* 68; *DC. Prodr.* xvi. i. 45; a low tufted undershrub pubescent between the small stinging hairs, leaves subsessile broadly coarsely toothed or ovate-cordate serrate, stipules in opposite intrapetiolar pairs, cymes small androgynous, inner fruiting sepals not armed hispid larger than the achene.

WESTERN TIBET, alt. 12–17,500 ft., *Jacquemont*, *Falconer*, &c. EASTERN TIBET, north of Sikkim, alt. 16–17,000 ft., *J. D. H.*

Roots stout, woody; stems stout, ascending, densely tufted, 6–18 in., woody below. *Leaves* 1–2 in., glandular-puberulous beneath. *Cymes* very short, crowded.

2. **U. parviflora,** *Roxb. Fl. Ind.* iii. 581; herbaceous, slender, monœcious, glabrous or pubescent, stinging hairs copious stiff, leaves ovate or ovate-cordate or -lanceolate acuminate doubly crenate or serrate, stipules connate, cymes slender effuse axillary and forming an erect terminal pyramidal panicle, inner fruiting sepals rounded twice as long as the outer. *Wedd. Monogr.* 85; *DC. Prodr.* xvi. i. 55; *Wight Ic.* t. 690. U. ardens, *Link. Enum.* ii. 385. U. himalayensis, *Kunth & Bouché in Ann. Sc. Nat. Ser.* 3, vii. 182. U. virulenta, *Wall. Cat.* 4586.

TEMPERATE HIMALAYA, alt. 5–12,000 ft., from Kashmir to Mishmi. NILGHIRI HILLS, at Ootacamund, *Foulkes.*

Root perennial; stem 3–5 ft., slender, sparingly branched, obtusely angled. *Leaves* 1–4 in., membranous, wrinkled; petiole $\frac{1}{4}$–2 in.; stipules ovate-oblong, entire, puberulous. *Cymes* shortly peduncled, lower males more simple; male and fruiting sepals hispid.

3. **U. dioica,** *Linn. Sp. Pl.* 984; herbaceous, monœcious or diœcious, pubescent, stinging hairs copious, leaves ovate-cordate oblong or lanceolate serrate, stipules usually free, cymes unisexual rarely androgynous, inner fruiting sepals longer than the outer. *Wedd. Monogr.* 77; *DC. Prodr.* xvi. i. 50; *Reichb. Ic. Fl. Germ.* t. 654; *Boiss. Fl. Orient.* iv. 1146.

N.W. HIMALAYA; from Kashmir and the Salt Range to Simla, alt. 8–10,700 ft. WESTERN TIBET, alt. 8–12,000 ft.—DISTRIB. Westward to the Atlantic.

Habit of *U. parviflora*, but differing in the free stipules.—The common English Nettle.

26. FLEURYA, *Gaud.*

Annual herbs, with stinging hairs. *Leaves* alternate, toothed, 3-nerved; stipules connate in opposite pairs, or 0. *Flowers* mono- or diœcious, clustered, clusters in solitary axillary cymes or spikes, unisexual or androgynous. MALE FL. *Sepals* 4–5, ovate-lanceolate, subvalvate or imbricate. *Stamens* 4–5, inflexed in bud. *Pistillode* globose or clavate. FEM. FL. *Perianth* cupular, 4-lobed, or sepals 4, imbricate, equal or very unequal, posticous hooded, anticous minute or 0. *Ovary* oblique; style obliquely ovoid or linear, at length hooked, with sometimes 2 basal arms; ovule erect. *Achene* oblique, compressed, exserted, membranous. *Seed* nearly exalbuminous, cotyledons broad.—Species 8, Tropical, and South African.

Dr. King has sent me (from Herb. Hort. Calcutt.), as *Pilea umbrosa*, what is, I think, a species of *Fleurya* with tomentose branches, leaves and cymes; it is from Sikkim, in male fl. only.

F. interrupta, *Gaud. in Freyc. Voy. Bot.* 497, t. 83; stinging hairs scattered, leaves ovate acuminate crenate or serrate base subcordate trun-

cate or cuneate, cymes spiciform or paniculate, usually much larger than the petiole, fem. perianth cupular, 4-lobed or -toothed stipitate, style unequally 3-lobed. *Wedd. Monogr.* 115, t. 1 A, f. 9; *DC. Prodr.* xvi. i. 74; *Dalz. & Gibs. Bomb. Fl.* 238; *Wight Ic.* t. 1975; *Miq. Fl. Ind. Bat.* i. ii. 228. F. spicata & glomerata, *Gaud. l. c.* Urtica interrupta, *Linn. Sp. Pl.* 985; *Roxb. Fl. Ind.* iii. 585; *Wight Ic.* t. 692; *Wall. Cat.* 4623. U. javanica, *Blume Bijd.* 503. U. affinis, *Hook. & Arn. Bot. Beech. Voy.* 4, 69. U. lomatocarpa, *Hochstett. in Bot. Zeit.* xxxiii. 260. U. spicigera, *Steud. Nomencl.* ii. 736. Bœhmeria javanica, *Hassk. Cat. Hort. Bogor.* 79. B. interrupta, *Willd. Sp. Pl.* iv. 342.—*Burm. Thes. Zeyl.* t. 110, f. 1, 2.

KHASIA HILLS, *Griffith.* TAVOY, *Gomez.* MALACCA, *Hallett.* DECCAN PENINSULA, from the Concan southwards. CEYLON, common.—DISTRIB. Malay and Pacific Islands, China, Abyssinia.

Stem 2–4 ft., erect, flexuous, furrowed, branched. *Leaves* 2–6 in., sparsely clothed with stinging hairs; petioles as long as the blade; stipules 2-fid. *Cymes* 6–12 in., very slender, erect, branchlets recurved. *Fem. perianth* compressed, keeled on one side, the keel decurrent on the stipes, reflexed, exposing the cordate achene.

27. **LAPORTEA,** *Gaud.*

Perennial herbs, shrubs or trees, with (sometimes very minute) stinging hairs. *Leaves* alternate, entire or toothed, 3- or penninerved. *Stipules* in opposite free or connate pairs. *Flowers* mono- or dicœcious, in axillary paniculate usually unisexual cymes or racemes, upper cymes usually very long and male, flowers and fruit often reflexed. MALE FL. *Sepals* 4–5, subvalvate. *Stamens* 4–5, inflexed in bud. *Pistillode* clavate or subglobose. FEM. FL. *Perianth-lobes* or segments 4, subequal or outer small, one sometimes absent. *Ovary* at length oblique; style linear, papillose on one side; ovule erect. *Achene* oblique, flattened or compressed, membranous or fleshy, seated on the perianth, sometimes obliquely stipitate. *Seed* subexalbuminous, cotyledons broad.—Species about 25, Asiatic, Australian, African and a few North American.

Sect. I. SCLEPSION, *Wedd. Fem. sepals* 4, very unequal; pedicels broadly winged.

1. **L. terminalis,** *Wight Ic.* t. 1972; herbaceous, glabrous or pubescent, stinging hairs few or many, leaves orbicular to oblong-obovate or -lanceolate acuminate coarsely toothed or serrate base rounded or subcordate, male cymes axillary, fem. subterminal panicled long-peduncled, pedicels spathulate broadly winged, fem. sepals very unequal, achenes sharply deflexed. *Wedd. Monogr.* 125, t. 2 C, f. 1. L. evitata, *Wedd. in DC. Prodr.* xvi. i. 79. Urtica evitata, *Wall. Cat.* 4588.

SUBTROPICAL HIMALAYA, from Kumaon to Mishmi, alt. 4–8000 ft. NILGHIRI MTS., *Wight*, &c. CEYLON; Central Province, alt. 4–6000 ft.

Stem 2–4 ft., erect. *Leaves* 4–10 by 2–8 in., membranous, smooth, pubescent or scaberulous above, very variable in the amount of stinging hairs on both surfaces; petiole slender, $1\frac{1}{2}$–6 in.; stipules $\frac{1}{2}$ in. or less. *Male cymes* as long as the petioles, or longer; sepals subequal, pubescent. *Fem. cymes* much larger and very long-peduncled; branches and branchlets divaricate; lateral sepals much the largest, pubescent. *Achene* slightly tubercled on the faces.

2. **L. oleracea,** *Wedd. Monogr.* 141, and in *DC. Prodr.* xvi. i. 87; nearly glabrous and stingless, leaves broadly ovate acuminate coarsely serrate base rounded subcordate or cuneate.

SIKKIM HIMALAYA; interior valleys, alt. 7–10,000 ft., *J. D. H.*

This has the cymes in a very young state, and is, I think, a slight var. of *L. terminalis* with distinctly serrate (not toothed) leaves.

3. **L. crenulata,** *Gaud. in Freyc. Voy. Bot.* 498; shrubby, dicœcious, branches unarmed, leaves from broadly elliptic ovate oblong to elliptic lanceolate acute or acuminate, clothed beneath and often above with small stinging hairs, entire or sinuate crenulate above the middle, base rounded or cordate, cymes short flexuous suberect, fem. pedicels cylindric, sepals subequal, achenes ovate erect. *Wedd. Monogr.* 133, t. 2 C, f. 5; *DC. Prodr.* xvi. i. 85; *Brand. For. Flor.* 404; *Kurz For. Flor.* ii. 421; *Bedd. Fl. Sylvat.* t. 306; *Gamble Man. Ind. Timb.* 323; *Miq. Fl. Ind. Bat.* i. ii. 230. L. gigantea & latifolia, *Gaud. l. c.* t. 81. Urtica crenulata, *Roxb. Fl. Ind.* iii. 591; *Wight Ic.* t. 686; *Wall. Cat.* 4611. U. gigantea, *Poir.*? *Encycl. Suppl.* iv. 224. U. sinuata, *Blume*? *Bijd.* 605. U. Churta, *Ham. in Wall. Cat.* 4608. Urera javensis & gigantea, *Gaud. l. c.* 496. U. crenulata & Commersoniana, *Wedd. in Ann. Sc. Nat. Ser.* 3, xiii. 104, 105. Dendrocnide crenulata, *Miq. Pl. Jungh.* i. 31.

TROPICAL HIMALAYA; from Sikkim eastwards, ASSAM, the KHASIA MTS. and southwards to PERAK. The Concan, *Stocks.* CEYLON, ascending to 5000 ft.—DISTRIB. Sumatra, Malay Islands.

An evergreen shrub, 8–10 ft., or small tree; branches stout, terete, green. *Leaves* 9–12 in., largest 16 by 12 in., base acute obtuse cordate or notched, nerves 12–16 pairs; petiole stout, 1–4 in.; stipules ovate lanceolate. *Cymes* longer than the petioles, dichotomously branched; flower-clusters remote, often unilateral; flowers subsessile. *Male perianth* 4-partite; fem. subcampanulate, lobes acute. *Achene* oblique, ventricose, seated on the minute perianth, crowned with the style.

28. **GIRARDINIA,** *Gaud.*

Herbs or undershrubs with stout stinging hairs. *Leaves* alternate, 3-nerved, entire or lobed, serrate; stipules connate, foliaceous. *Flowers* dicœcious or monœcious, clustered, clusters in simple or panicled spikes or heads armed with stinging hairs. MALE FL. *Sepals* 4–5, valvate. *Stamens* 4–5, inflexed in bud. *Pistillode* globose or cupular. FEM. FL. *Perianth* tubular, ventricose, 2–3-toothed, at length split on one side. *Ovary* straight; stigma subulate, papillose; ovule erect. *Achene* broad, compressed, seated on the perianth, pericarp thickish. *Seed* sub-exalbuminous; cotyledons broad.—Species 7, Tropical Asia and Africa.

G. heterophylla, *Dcne. in Jacquem. Voy. Bot.* 151, t. 153; a tall coarse herb armed with very long stout stinging hairs, leaves large broad cordate variously lobed often palmately coarsely toothed pubescent, stipules large 2-fid, cymes peduncled lower male subcylindric, upper fem, with capitate clusters. *Wedd. Monogr.* 164; *DC. Prodr.* xvi. i. 100; *Blume Mus. Bot.* ii. 158; *Brand. For. Flor.* 404; *Dalz. & Gibs. Bomb. Fl.* 238; *Gamble Man. Ind. Timb.* 323. Urtica heterophylla, *Vahl Symb.* i. 76; *Roxb. Fl. Ind.* iii. 586; *Wight Ic.* t. 687; *Wall. Cat.* 4603. U. diversifolia & horrida, *Link. Enum. Hort. Berol.* ii. 385. U. palmata, *Forsk. Fl. Ægypt.* 159.—*Rheede Hort. Mal.* ii. t. 41.

TEMPERATE and SUBTROPICAL HIMALAYA, from Marri eastwards, ascending to 5000 ft. ASSAM, SILHET and southwards to BURMA; and from MARWAR and CENTRAL INDIA to TRAVANCORE. CEYLON, not uncommon.—DISTRIB. Java.

A tall stout erect tufted herb, 4–6 ft., with perennial roots; stem and branches

furrowed, pubescent hispid or hirsute. *Leaves* 4–12 in. long, often as broad, upper often palmately 3–5-lobed; petiole 4–6 in. *Male cymes* loosely paniculate, shorter than the leaves, flowers subsessile hispid; fruiting cymes elongate, lobulate (14 in. long and pendulous in Mishmi specimens); perianths hispid. *Achene* broadly ovate or subcordate, punctate, black, style persistent.—The following are varieties.

Var. G. PALMATA, *Gaud. l. c.* 498; leaves hirsute beneath, stipules large usually cordate, fruiting cymes elongate. *Wedd. in DC. l. c.* 101. G. Leschenaultiana, *Dcne. l. c.*; *Wedd. Monogr.* 165. Urtica palmata, *Leschen.* U. acerifolia, *Zenker Pl. Ind. dec.* i. t. 3, 4.—Nilghiri Mts. Ceylon, alt. 5–6000 ft.

Var. G. ZEYLANICA, *Dcne. l. c.* 152; leaves pinnatifidly lobed, stipules broadly cordate, cymes in reniform clusters, stinging hairs slender. *Wedd. Monogr. Urtic.* 167, and in *DC. l. c.* 101; *Miquel Fl. Ind. Bat.* i. ii. 233. G. hibiscifolia, *Miquel Plant. Jungh.* i. 32. Urtica zeylanica, *Burm. Thes. Zeyl.* 232. U. heterophylla, *Wight Ic.* t. 687.—Deccan Peninsula and Ceylon.

29. **PILEA,** *Lindl.*

Herbs, rarely undershrubs. *Leaves* in opposite equal or unequal pairs, entire or serrate, 3-nerved, very rarely penninerved; stipules connate into one intrapetiolar. *Flowers* monœcious or dicœcious, minute, in axillary long or short peduncled dichotomously branched cymes; bracts small or 0. MALE FL. *Sepals* 2–4, free or connate in a cup, often gibbous or horned at the back. *Stamens* 2–4. *Pistillode* conic or oblong. FEM. FL. *Sepals* 3, rarely 4, very small and unequal, dorsal longest, sometimes gibbous or hooded. *Staminodes* minute, or of scales, or 0. *Ovary* straight; stigma sessile, penicillate; ovule erect. *Achene* ovoid or oblong, compressed, membranous or crustaceous, embraced or not, and at the base only, by the sepals. *Seed* erect, albumen very scanty, cotyledons broad.—Species about 160, Tropical (none Australian).

I have been baffled in my attempts to correlate all the Indian species of *Pilea*, as named by Weddell (evidently in great haste) in the Hookerian Herbarium, with the descriptions in his Monograph of Urticaceæ and in De Candolle's Prodromus, and am unable to follow him satisfactorily in respect of their diagnoses, nomenclature and classification. The genus is an exceptionally difficult one, and I am not satisfied with my own results. Of the characters most relied on, that of monœcious or dicœcious is of little avail, for the same species may be unisexual, or have male and fem. cymes or even androgynous and unisexual cymes on the same individual. Of the commoner species the leaves are very variable in size and form, but there is usually a marked distinction between those with large deep serratures, and those with small and shallow ones. It is often impossible to say from dried specimens whether the stipules are undeveloped or have fallen away. The length of the peduncle of the cyme, and the size and form of the cymes of both sexes are so variable that it is of no use for exact diagnostic purposes. The male sepals vary as to the number in each flower that have dorsal gibbosities or spurs, as does the length of these spurs. There is an obvious difference between the female perianth of 3 subequal orbicular sepals, and that of one narrow concave dorsal and two small lateral sepals or lobes. All of the Indian species have fleshy staminodes on the fem. perianth-lobes, which in some are lengthened, inflexed, and by recurving elastically discharge the achenes. The achenes afford good characters, but they are extremely minute, usually about $\frac{1}{30}$ in. long, and there is no definite line to be drawn between those with granulate and those with smooth faces.

I have no materials that enable me to compare the Indian with the Malay Island species, and therefore have but sparingly cited Malayan synonyms.

The little *P. muscosa*, Lindl. (*P. microphylla*, Liebm., *Urtica microphylla*, Linn.), the "gunpowder plant" (so called from the cloud of pollen discharged from the anthers when the plant is shaken), a common S. American species, has been in-

troduced into India, and will no doubt soon be ubiquitous there. It occurs under two forms, as a creeping weed with very minute petioled elliptic or orbicular leaves $\frac{1}{10}$ in. broad, in the streets of Calcutta (Harrington St., *Clarke*); and in a more erect form with spathulate leaves $\frac{1}{3}$ in. long, on damp walls at Hoogly (*Levinge*), at Dacca, and in Perak (*Kunstler*). It has been found also in Ceylon. It is a penninerved entire-leaved species, but the nerves are very obscure.

A. *Leaves* penninerved throughout. *Achenes* smooth.

1. **P. ternifolia,** *Wedd. Monogr.* 202; *DC. Prodr.* xvi. i. 124; quite glabrous, stem erect usually simple, leaves opposite and ternately whorled subsessile linear or linear-oblong more or less coarsely serrate, cymes short lax or dense-fld., peduncles longer than the petioles, achenes minute oblong-ovate smooth.

Sikkim Himalaya, alt. 6–8000 ft., *Griffith*, &c. (*Kew Distrib.* 4520).

Stem 10–18 in. from a thickened base, smooth, slender, rarely branched. *Leaves* $2\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{2}$ in., flaccid, base obliquely cordate, subglaucous beneath; nerves very many, close set; petiole $\frac{1}{10}$ in.; stipules obscure. *Cymes* sometimes half as long as the leaves very slender and sparingly branched, at others short rounded or with spreading branches. *Flowers* and *achenes* very minute.—In the absence of the 3 nerves, this species suddenly departs from the typical condition of its near allies. "The incurved sepals eject the achene with elastic force" (*Clarke*).

B. *Leaves* 3-nerved, those of each pair unequal. *Achenes* smooth.

2. **P. anisophylla,** *Wedd. Monogr.* 193; *DC. Prodr.* xvi. i. 117; suffruticose, dicœcious, shoots petioles and peduncles more or less furfurously tomentose, leaves 3-nerved in unequal pairs, larger petioled obliquely oblong lanceolate caudate-acuminate base hastate or cordate, smaller sessile ovate deeply cordate auricled on one side, achenes smooth. Urtica anisophylla, *Wall. Cat.* 4594.

Eastern Suptropical Himalaya; Nepal, *Wallich*; Sikkim, alt. 3–5000 ft., *J. D. H.*, *Clarke*; Bhotan, *Griffith*. Naga Hills, alt. 6500 ft., *Clarke*.

Stem 2–3 ft., sparingly branched, rustily hairy. *Leaves* glabrous or strigose beneath, larger 4–6 in., subfalcate, entire serrulate or crenulate; petiole $\frac{1}{2}$–1 in.; smaller $\frac{1}{2}$ in. or 0; stipules small, triangular. *Cymes* half as long as the leaves paniculate, peduncle longer or shorter than the petiole. *Achene* smooth.

Var. *robusta*; stem stouter, shoots petioles and cymes more densely tomentose, small cymes very robust, flowers densely crowded along one side of the rachis and branches.—Sikkim, at Rungbee, alt. 5000 ft., *Clarke* (who states that it is monœcious).

Var. *khasiana*; larger leaves ovate or oblong, smaller petioled or sessile oblong base hastate.—Khasia Hills, at Moflong, *Griffith* (*Kew Distrib.* 4513), and Shillong, alt. 5–6000 ft. ? Mishmi Hills, *Griffith*.—Male flowers more minute than in the type; achenes not seen. The Mishmi specimens are imperfect.

3. **P. insolens,** *Wedd. in DC. Prodr.* xvi. i. 118; quite glabrous, dicœcious, leaves alternate or in very unequal pairs 3-nerved, larger long-petioled broadly ovate caudate-acuminate remotely serrate more or less, base peltate or cordate, smaller sessile orbicular-ovate base cordate or sub-hastate, cymes very slender panicled, flowers very minute, achene smooth.

Mishmi Mts. in Upper Assam, *Griffith* (*Kew Distrib.* 1425).

Stem 6–12 in., subsimple, terete. *Leaves* membranous, larger 2–4 in., 3-nerved from the insertion of the petiole, cross-nervules distant; petiole $1\frac{1}{2}$–3 in.; stipules oblong-ovate. *Cymes* (fem. alone seen) as long or shorter than the leaves; flowers rather scattered. *Achenes* very minute, obliquely ovoid.

4. **P. Clarkei,** *Hook. f.*; dwarf, nearly glabrous, dicœcious, leaves ½–1½ in. in unequal pairs oblong ovate or lanceolate obtuse or subacute oblique or not sparingly serrate 3-nerved base cordate, cymes erect longer than the leaves sparingly branched, sepals half the length of the minute straight turgid orbicular-ovate smooth achene.

SIKKIM HIMALAYA; at Tchonpong, alt. 5000 ft., *Clarke.*

Stems 3–6 in., simple or much branched, leafy. *Leaves* membranous, smaller from half to two-thirds the size of the larger; petiole about half as long as the blade, stipules broadly ovate obtuse. *Cymes* usually long-peduncled. *Achene* $\frac{1}{30}$ in. long, pale, sometimes hardly longer than the broadly ovate or narrowly oblong dorsal sepal.

C. *Leaves* 3-nerved, subwhorled at the top of the stem, very unequal.

5. **P. approximata,** *Clarke in Journ. Linn. Soc. Bot.* xv. 123; quite glabrous, dicœcious, stem short naked below, leaves crowded and almost whorled at the top of the stem lanceolate or elliptic-lanceolate coarsely serrate 3-nerved, petioles very unequal, cymes very small on very long peduncles often subglobose few-fld., achenes smooth. P. ternifolia *β.*, *Herb. Ind. Or. H. f. & T.*

TEMPERATE SIKKIM HIMALAYA, alt. 7–10,000 ft., *J. D. H., Clarke, Treutler.*

Stem 4–8 in. from a tuberous base, slender. *Leaves* 1–4 in., very variable in length, lower pair sometimes distant, smaller ovate and oblong, obtuse, all the upper crowded and spreading, base rounded or subcordate; petiole $\frac{1}{6}$–$\frac{3}{4}$ in.; stipules minute. *Peduncle* of cymes much longer than the petiole; male sepals broad, shortly mucronate; fem. very unequal, narrow, one or more nearly as long as the minute straight achene.—Mr. Duthie sends from the Jumna Valley (No. 580), Kumaon, young plants of what may be a form of this with ovate leaves ¼ in. long, or is perhaps *P. Wightii*, var. *Roylei.*

D. *Leaves* 3-nerved, those of each pair subequal, quite or nearly entire.

6. **P. smilacifolia,** *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 186; *Monogr.* 181; *DC. Prodr.* xvi. i. 110; suffruticose, quite glabrous, dicœcious, branches angular, leaves elliptic-lanceolate acuminate quite entire (rarely serrate at the tip) 3-nerved, cymes shortly peduncled, achenes smooth. P. Goglado & glaberrima, *Blume Mus. Bot.* ii. 53, 54. P. miconiæfolia, *Miq. in Zoll. Syst. Verzs.* 106; *Fl. Ind. Bat.* i. ii. 235. U. glaberrima, *Blume Bijd.* 493. U. smilacifolia, *Wall. mss.* U. Goglado, *Ham. in Wall. Cat.* 4593.

EASTERN TROPICAL HIMALAYA; from Sikkim to Mishmi, alt. 2–4000 ft. ASSAM, KHASIA MTS., SILHET and CHITTAGONG.—DISTRIB. Java.

Stems 2–4 ft., very robust, woody below, many-angled, branched above. *Leaves* 3-14 in., membranous, narrowed into a petiole 1–4 in., cross-nervules strong; stipules triangular or lanceolate, persistent. *Cymes* often in pairs, very variable in length and form, short and dense-fld., or lax and dichotomously branched; male fl. minute; fem. sepals much shorter than the achene. *Achene* $\frac{1}{20}$ in. long, broadly obliquely ovoid.—In many respects this approaches *P. scripta.* The names *Pilea smilacifolia* & *miconiæfolia* appeared in the same year.

7. **P. lancifolia,** *Hook. f.*; small, herbaceous, quite glabrous, dicœcious, slender, leaves long-petioled subfalcately lanceolate acuminate entire or sparingly serrate towards the tip 3-nerved, cymes very slender sparingly branched sometimes as long as the leaves, flower-clusters very sparse, achene smooth.

KHASIA MTS.; north of Boga pane, alt. 3000 ft., *Clarke*.

Stem 6–8 in. from a short stiff creeping base, often branched from the base; branches slender, terete. *Leaves* 2–3 by $\frac{1}{3}$–$\frac{1}{2}$ in., not flaccid, base rounded or subcordate; petiole $\frac{1}{4}$–$\frac{1}{3}$ in.; stipules triangular-ovate, obtuse. *Achenes* minute, suborbicular, rather longer than the longest linear-oblong sepal, smooth.

E. *Leaves* 3-nerved, those of each pair subequal, more or less crenate serrate or toothed (rarely entire in *P. peploides*).

* *Achenes quite smooth* (*mottled, as if rough, in* P. pachycarpa).

8. **P. peploides,** *Hook. & Arn. Bot. Beech. Voy.* 96; very small, tufted, flaccid, branched from the base, glabrous, monœcious, leaves long-petioled orbicular-ovate tip rounded entire or crenate above the middle 3-nerved, base cuneate, stipules obscure, cymes sessile androgynous capitate dense-fld., achenes most minute smooth. *Wedd. Monogr.* 179. U. peploides, *var. β., Wedd. DC. Prodr.* xvi. i. 109; *Miq. Fl. Ind. Bat.* i. ii. 237. P. pygmæa, *Miq. in Zoll. Syst. Verzsichn.* 106. Dubrueilia peploides, *Gaud. in Freyc. Voy. Bot.* 495.

UPPER WESTERN HIMALAYA, Lahul and Zanskar, *Watt.* SIKKIM TERAI, *Gamble.* CACHAR, *Keenan.* BURMA, at Mogoung, *Griffith* (*Kew Distrib.* 4582).—DISTRIB. Japan, Java, Sandwich and Gallapago Islands.

Stems or branches 3–5 in., succulent, flaccid, leafy. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in. long and broad, cuneate from the base to the middle; raphides transverse; petiole as long as the blade. *Cymes* $\frac{1}{4}$ in. diam., lobed. *Achene* about $\frac{1}{60}$ in., subglobose, quite smooth.

9. **P. Symmeria,** *Wedd. Monogr.* 246; *DC. Prodr.* xvi. i. 134; quite glabrous or leaves rarely above sparsely hairy, leaves 2–6 in. ovate oblong- or ovate-lanceolate caudate-acuminate coarsely serrate 3-nerved base rounded or notched, stipules small deciduous, peduncles long or short, male fl. large, dorsal fem. sepal longest, achenes large flattened nearly smooth, edges acute.

TEMPERATE HIMALAYA, alt. 6–10,000 ft.; Kumaon, *Strachey & Winterbottom* (No. 17). Sikkim, *Griffith* (*Kew Distrib.* 4528), *J. D. H., Clarke.* KHASIA HILLS, Shillong, alt. 4400 ft., *Clarke.*

Erect from the base, 2–3 ft., slender, monœcious or diœcious. *Leaves* membranous; petiole 1–3 in. *Cymes* very variable, when large paniculately branched; peduncle $\frac{1}{2}$–3 in. *Male fl.* $\frac{1}{8}$ in. diam., rather scattered. *Achene* $\frac{1}{12}$ in. or less, with sometimes a faint intramarginal rough line.—Best distinguished by the leaf-bases and large achenes. The stipules are probably large and caducous. Weddell does not describe the fruit, but says the fem. perianth is cupular; this latter does not differ from the ordinary form in the genus, of one long and two very short lobes or sepals.—Duthie's No. 3378, from Kumaon, alt. 9–10,000 ft., with large very coarsely serrate leaves subcordate at the base and small persistent stipules, is perhaps a state of this.

10. **P. Wightii,** *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 186; *Monogr.* 205; *DC. Prodr.* xvi. i. 125; quite glabrous, monœcious, stems creeping below, leaves ovate or rounded ovate acute or acuminate coarsely serrate 3-nerved, stipules short or 0, cymes long-peduncled suberect loosely branched androgynous, flowers minute, achenes smooth or nearly so. P. radicans, *Wight Ic.* t. 1974. P. Hugelii, *Blume Mus. Bot.* ii. 53. Urtica obesa, *Wall. Cat.* 4587.

TEMPERATE HIMALAYA; Nepal, *Wallich.* Sikkim, alt. 4–7000 ft., *J. D. H.*

NILGHIRI MTS., in the higher ranges, *Wight*, &c. CEYLON; Central Province, alt. 5–6000 ft.—DISTRIB. Java.

Stem 4–18 in., stout or slender. *Leaves* 1–3 in., flaccid, very variable in breadth, base rounded or subacute; petiole usually about half the length of the blade; stipules triangular. *Cymes* shorter or longer than the leaves, erect; male sepals broad, spurred; fem. fl. in small clusters or open panicled cymes. *Achene* ovoid, straight, about $\frac{1}{30}$ in. long, sometimes hardly longer than the perianth.—I find it difficult to distinguish between this and more glabrous forms of *P. umbrosa*, to which Weddell has referred some of the Himalayan specimens. Except by the coarse serratures and small stipules, it is not easily distinguished from *P. bracteosa*. Weddell is my authority for *P. Hugelii* being a synonym. *Urtica obesa*, Wallich, referred by Weddell to *P. umbrosa*, being quite glabrous, is, I think, rather referable here, and perhaps to the following variety.

VAR. *macrophylla*; leaves 4–6 in. deeply obtusely serrate, petiole 2–4 in., cymes sessile or shortly peduncled.—Nilghiris, in the Ochterlony Valley, *King*; Courtallam, *Wight*.

VAR. ? *Roylei*; very small, stem slender, leaves very few rounded ovate, sparsely hairy above, serratures few large. Procris racemosa, *Royle Ill.* t. 83, f. 1.—Kumaon and Garwhal, alt. 8–10,000 ft., *Royle, Duthie*. ? Sikkim, *J. D. H.*—This looks like a depauperated form of high elevations. I have alluded to it under *P. approximata*; it may be a distinct species, but better specimens are wanted. Weddell at the end of *Procris*, refers it to *Pilea Wightii*, but the synonym is not taken up under that species.

11. **P. stipulosa,** *Miquel in Zoll. Syst. Verz.* 102; *Fl. Ind. Bat.* i. ii. 236; dicœcious, glabrous, or leaves very sparsely hairy, leaves 3–4 in. long-petioled elliptic or oblong-ovate acute or acuminate 3-nerved coarsely serrate or toothed base cuneate or rounded, stipules large oblong, peduncles very short, fem. sepals subequal orbicular, achenes minute smooth. *Wedd. Monogr.* 230. P. petiolaris, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 186. P. angulata, *Blume Mus. Bot.* ii. 55; *Thwaites Enum.* 259; *Wedd. in DC. Prodr.* xvi. i. 131 (*excl. Khasia & Sikkim*). Urtica angulata, *Blume Bijd.* 494. U. stipulosa, *Miq. Pl. Jungh.* 28.

CEYLON, *Walker, Thwaites* (C.P. 2184).—DISTRIB. Java.

Tall rather stout species with the habit of *P. umbrosa*, but glabrous or with a very few hairs on the upper surface of the leaves, large green stipules and equal orbicular female sepals like those of *P. Hookeriana*. Thwaites refers Blume's *P. hygrophila* to it, no doubt rightly as far as the Ceylon specimens of that plant are concerned; he describes it as very variable. Weddell refers Sikkim and Khasia specimens collected by me to this species, but none of these have the equal fem. sepals.—Wright's Loochoo plant, referred to *stipulosa* by Miquel, differs in the dorsal sepal of the female being as long as the achene.

12. **P. bracteosa,** *Wedd. Monogr.* 245; *DC. Prodr.* xvi. i. 134: glabrous or leaves with a few sparse hairs, leaves 2–4 in. long petioled elliptic ovate or elliptic-lanceolate caudate-acuminate serrate serratures shallow often apiculate 3-nerved, base rounded or cuneate, stipules large oblong persistent, peduncles long, fem. dorsal sepals longest, achenes minute nearly smooth edges acute. ? P. oxyodon, *Wedd. Monogr.* 222; *DC. l. c.* 126.

TEMPERATE HIMALAYA; from Nepal, *Wallich*, to Mishmi, alt. 4–7000 ft. KHASIA HILLS, alt. 3–5000 ft., *Griffith*, &c. Munnipore, alt. 5–8000 ft., *Clarke*.

Stem 1–2 ft., sometimes rather woody below and often warted (by disease). *Leaves* usually small, reticulate beneath, base sometimes notched; petiole $\frac{1}{2}$–2 in.; stipules $\frac{1}{4}$–$\frac{1}{3}$ in. *Cymes* variable; peduncle usually very slender. *Achene* $\frac{1}{30}$ in., straight, with an obscure intramarginal ridge.—The fem. perianth distinguishes this

from *P. stipulosa*; the persistent stipules and minute achene from *P. Symmeria*. I suspect that Weddell's *P. oxyodon* is this; there is nothing in his description to distinguish it except its being perfectly glabrous. He describes *P. bracteosa* as having large or small serratures to the leaf, and there are Sikkim specimens of a plant altogether resembling *bracteosa* except in having smaller broader deeply serrate leaves, and which hence looks very different, and may be so.

13. **P. umbrosa,** *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 187, and *Monogr. Urtic.* 243, and in *DC. Prodr.* xvi. i. 133; more or less pubescent or tomentose, leaves 2–5 in. broadly elliptic-ovate or oblong acute acuminate or subcaudate coarsely crenate-toothed or serrate 3-nerved base cordate or rounded rarely acute, stipules subpersistent large, peduncles longer or shorter than the petioles, dorsal fem. sepal much the longest, achenes minute flattened nearly smooth with often a raised intramarginal ridge. Urtica umbrosa, *Wall. Cat.* 4598. U. paniculata, *Herb. Royle.*

TEMPERATE HIMALAYA, alt. 4–9000 ft., from Kashmir eastwards. KHASIA MTS., alt. 4–6000 ft., *Griffith*, &c.

Usually a tall robust monœcious or dicœcious species, often densely clothed with flexuous cellular hairs. *Leaves* broad, rather broadly toothed, with numerous rather distant straight or arched cross-nervules; petiole 1–3 in.; stipules membranous. *Cymes* very various, sometimes 2–4 in. long and broad; peduncles 1–3 in., rarely 0. *Male fl.* small, sepals usually without spurs. *Achenes* $\frac{1}{30}$ in., pale, straight.

** *Achenes granular or tuberculate or with a strong intramarginal ridge* (*or smooth in* Hookeriana, *see also* P. umbrosa).

14. **P. scripta,** *Wedd. Monogr.* 222; *DC. Prodr.* xvi. i. 127; quite glabrous, leaves 3–10 in. elliptic-lanceolate (rarely broad) caudate-acuminate denticulate or serrulate teeth always small and shallow, cross-nervules very many slender, base acute or narrowed and rounded rarely notched, stipules short, peduncles long or short, male fl. minute, fem. sepals broad dorsal longest, achenes minute granulate within the intramarginal ridge. *Blume Mus. Bot.* ii. 53, 57. P. scripta & Goglado, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 187, 188. Urtica scripta, *Ham. in Don Prodr.* 59. U. Hamiltoniana, *Wall. Cat.* 4590. U. triplinervis, *Ham. mss.*

TEMPERATE HIMALAYA; Dalhousie, alt. 6000 ft., *Clarke.* NEPAL, *Wallich*; Sikkim, alt. 3500-6000 ft., abundant; Bhotan and Mishmi Mts., *Griffith.* KHASIA MTS., alt. 4–5000 ft. MUNNIPORE, alt. 4000 ft., *Clarke.*

A tall branched glabrous large-leaved species, the best characters for which are the usually elliptic leaves with numerous transverse nervules and very small teeth, the small male flowers without spurs on the sepals, and the minute strongly granulate bordered achenes $\frac{1}{30}$ in. long. Small obtuse-based leaves are, however, common. The size and form of the cyme and length of its peduncle afford no characters. Munnipore specimens have very large leaves 10 by $4\frac{1}{2}$ in. The Dalhousie one is in very imperfect flower, and hence perhaps doubtful, but the leaves are characteristic. The Munnipore and some of the lower level Sikkim and Khasian specimens have more fascicled greener achenes. The Mishmi plant has broadly elliptic and even orbicular leaves, and stouter warted (by disease?) stems; though quite glabrous, it has been named *P. umbrosa* by Weddell. Some of Wallich's Nepal and other country specimens have interrupted thickened nervules, but this is a very inconstant character; they are sometimes prominent on the upper leaf surfaces.

A very large monœcious form (or different species) occurs at low elevations in Sikkim (Mongpo, 4000 ft., *Clarke*), with stem as thick as the little finger, and the typical leaves of *scripta*, but very long (4–7 in.) and slender alternately branched male cymes; the branches again divided, with scattered male flowers, all four sepals of

which are shortly spurred; fem. cymes very short, subsessile; achenes with rounded margins and the intramarginal ridge very indistinct.

VAR. *sarcocarpa*; achenes with pulvinate rugose fleshy faces and a very thick smooth margin.—Assam, *Jenkins*.

I do not recognize Weddell's var. *stipularis* with the stipules produced into a long point (Khasia Mts., *Griffith*) as founded on any stable character. In habit and achenes it approaches *P. Hookeriana*. The "*Urtica triplinervis*, Ham. mss.," cited by Weddell as a synonym of *P. scripta*, is an erroneous reading of Wallich's "4590 C? U. triplinervis, *Herb. Heyne*."

15. **P. Hookeriana,** *Wedd. Monogr.* 226; *DC. Prodr.* xvi. i. 128; quite glabrous, leaves 4–10 in. long-petioled broadly elliptic or elliptic-ovate to orbicular acuminate or caudate faintly obtusely serrate 3-nerved, base acute or rounded, stipules large oblong green, cymes sessile or subsessile, male fl. in large globose heads, fem. sepals 3 orbicular subequal, achene minute smooth or granular green not margined.

SIKKIM HIMALAYA, alt. 1–4000 ft., *J. D. H.*, *Treutler*, *Clarke*. KHASIA MTS., at Mongpo, alt. 2000 ft. Kohima in the NAGA HILLS, alt. 5500 ft., *Clarke*.

A tall robust monœcious or dicœcious species, 6 ft. high, with stem as thick below as the middle finger. *Leaves* membranous, rarely strongly serrate, cross-nervules distant; petiole 2–5 in.; stipules $\frac{1}{2}$–1 in., tip rounded. *Male cymes* very shortly peduncled; flowers large in globose heads $\frac{1}{4}$–$\frac{1}{2}$ in. diam.; sepals not spurred; fem. cymes sessile, branches short, dense-fld.; sepals ciliolate. *Achenes* $\frac{1}{25}$ in., dark green, some quite smooth and dry, others with a granular herbaceous coat.

16. **P. trinervia,** *Wight Ic.* t. 1973; quite glabrous, stem very stout internodes swollen, leaves 3–6 in. from oblong-lanceolate to broadly elliptic acuminate or caudate serrulate 3-nerved, base acute cuneate or rounded rarely notched or cordate, stipules caducous, cymes long or short peduncled usually much branched, fem. dorsal sepal much the longest, achene granular, margins obtuse. *Wedd. Monogr.* 224; *DC. Prodr.* xvi. i. 127. P. melastomoides, *Wedd. in Ann. Sc. Nat. Ser.* 3, i. 186.

DECCAN PENINSULA; damp forests of the Nilghiris and other hills. CEYLON; common, ascending to 5000 ft., *Thwaites*.—DISTRIB. Malay Islands?

A very robust succulent monœcious herb, probably 4–5 ft. high; internodes close, swollen when fresh, but when dried narrower than the nodes. *Leaves* very variable in shape, cross-nervules close-set; petiole 1–6 in. *Male cymes* often widely spreading, corymbiform and 6 in. across; flowers scattered or in globose clusters; sepals spurred. *Fem. cymes* usually slender. *Achene* $\frac{1}{25}$ in., margins obscurely thickened. —This is the only Indian species with the internodes short fleshy and conspicuously thickened.—I hesitate to quote under this the Javan species referred to it by Weddell and Miquel, viz. *P. pellucida*, *melastomoides* and *oreophila*, Blume (*Mus. Bot.* ii. 54); *P. elongata*, Miq.; and *peduncularis*, Smith in Rees Cyclop. With regard to Roxburgh's *Urtica trinervia* (Fl. Ind. iii. 582) of Chittagong, also referred here by Miquel and Weddell, Wight says that it is not his *P. trinervia*, but a *Boehmeria*.

17. **P. pachycarpa,** *Wedd. Monogr.* 225; *DC. Prodr.* xvi. i. 128; quite glabrous, leaves 2–3 in. elliptic acuminate serrulate 3-nerved, base acute or rounded, stipules small triangular persistent, cymes small shortly peduncled, fem. dorsal sepal longest, achene straight rather large with a herbaceous coat covered with depressed tubercles.

ASSAM, *Griffith*, *Jenkins*.

Apparently a large branched species, with the stem as thick as the little finger. *Leaves* rather stiff, cross-nervules not very close; petiole 1–1½ in. *Achenes* $\frac{1}{18}$ in.

long, red-brown with obtuse edges.—The material for this species is fem. only, and quite insufficient. Weddell describes the achene as marbled and smooth not granular, I find a herbaceous granulate coat covering a smooth endocarp.

18. **P. obliqua,** *Hook. f.*; glabrous, stem slender, leaves 3–5 in. long-petioled broadly obliquely ovate acuminate serrulate 3-nerved, base rounded or cordate, stipules oblong, cymes slender long-peduncled, fem. dorsal sepal longest, achenes minute straight with an intramarginal rugose or granular ridge, the faces nearly smooth.

SIKKIM HIMALAYA, alt. 1000 ft., and KHASIA MTS., at Nunklow, alt. 3500 ft., *Clarke.*

The very oblique broadly ovate leaves of this species which is a native of low levels, and the concentric ridge on the otherwise nearly smooth achenes which are only $\frac{1}{30}$ in. long, are its best characters, otherwise it is very near *P. bracteosa*.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

19. **P. cordifolia,** *Hook f.*; tall, stout, quite glabrous, leaves large broad long-petioled oblique orbicular-ovate or elliptic cuspidate or acuminate obtusely serrate 3-nerved, base cordate or rounded, petiole 3–6 in., stipules rather large broad persistent, male cymes very long-peduncled paniculately branched, sepals obtuse, dorsal of fem. fl. longest.

SIKKIM HIMALAYA, alt. 7000 ft., *J. D. H.*, at Rungbee and Darjiling, alt. 5000–6500 ft., *Clarke.* KHASIA MTS., at Churra, alt. 3–5000 ft., *J. D. H. & T. T.*

Much the largest leaved Indian species. *Stem* 2–4 ft. or more, rooting at the base. *Leaves* attaining 6 in. broad; petiole 4 in.; stipules $\frac{1}{3}$ in., green broadly triangular obtuse. *Cyme* with divergent branches and branchlets. *Achenes* minute, immature.

Weddell has named one Sikkim specimen *P. trinervis,* which it does not resemble, and a Khasia one *P. bracteosa*.

20. **P. fruticosa,** *Hook. f.*; shrubby, quite glabrous, stem branched terete woody, leaves 3–4 in. long-petioled in equal pairs elliptic or elliptic-lanceolate acute at both ends obscurely obtusely serrate 3-nerved, stipules very short, male cymes sparingly branched, peduncles longer than the petioles, flowers in small remote clusters minute, fem. cymes small sessile, flowers crowded, dorsal sepal longest, achenes very minute with an intramarginal granular ridge.

PERAK; at Goping, *King's Collector.*—Nearly allied to *P. smilacifolia,* but the stems are quite terete, and the minute achenes $\frac{1}{40}$ in. long are very different.

P. GRIFFITHII, *Blume Mus. Bot.* ii. 55; *Wedd. in DC. Prodr.* xvi. i. 131, is not recognizable from the description. Weddell had not seen it, and there is no Malaccan *Pilea* in Griffith's collection at Kew. Miquel doubtfully refers it to *P. stipulosa,* from which Blume says it differs in the lateral nerves produced to the tip of the leaf, and in the caducous stipules.

P. PRODUCTA, *Blume l. c.* 56; *Wedd. Monogr.* 265; *DC. l. c.* 136, from the Himalaya, distinguished by its authors from *P. umbrosa* by the leaves narrowed into the petiole and the more shortly peduncled cymes, is no doubt referable to that plant.

P. HYGROPHILA, *Blume l. c.* 56; *Wedd. Monogr.* 264; *DC. l. c.* 135; *Miq. Fl. Ind. Bat.* i. ii. 237. Urtica hygrophila, *Miq. Pl. Jungh.* 28, is probably a mixture, being described as having the fem. sepals either all of the same size, which would answer for a Ceylon plant of Gardner's (*P. stipulosa*), or with the dorsal larger, which would answer for the Khasian plant, whatever that may be. The Nilghiri one is probably *Wightiana.* The type of the species, Miquel's Javan *Urtica hygrophila,* is unknown to me; it is described as having the fruiting perianth one-half longer than the achene, which I have seen in no Indian species.

30. **LECANTHUS,** *Weddell.*

Characters of *Elatostema*, but leaves opposite. Differs from *Pilea* in the fleshy discoid receptacles.

L. Wightii, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 187; *Monogr.* 280, t. 9; *Miq. Fl. Ind. Bat.* i. ii. 238. L. peduncularis, *Wedd. in DC. Prodr.* xvi. i. 164. L. major and L. Wallichii, *Wedd. l. c.* 187. Elatostema ovatum, *Wight Ic.* t. 1985. E. oppositifolium, *Dalz. in Hook. Journ. Bot.* iii. 179; *Dalz. & Gibs. Bomb. Fl.* 239. Procris peduncularis, *Wall. Cat.* 4634 A; *Royle Ill.* t. 83. P. obtusa, *Royle l. c.*

TEMPERATE and SUBTROPICAL HIMALAYA, alt. 4-12,000 ft., from Chamba to Sikkim and the KHASIA and NAGA HILLS. MUNNIPORE, *Clarke*. MARWA, on Mt. Aboo, *King*. DECCAN PENINSULA, on the Ghats, from the Concan southwards. CEYLON; Matelle East, *Beckett* (C.P. 3870).—DISTRIB. Java, Tropical Africa.

Succulent, decumbent, monœcious or diœcious, very variable in size, from a weak little herb 1–2 in. high, with 2 or 3 pairs of small subentire leaves ¼–1 in. long towards the top of the thread-like stem, to a stout branched herb, 12–18 in. high, with numerous pairs of long- or short-petioled leaves coarsely serrate 6 in. long and glabrous or sparsely hairy. *Leaves* membranous, obliquely ovate, obtuse, acute, acuminate or caudate, subentire or coarsely toothed, serrate or crenate to the base or from one-third to half-way up, 3-nerved and penninerved, base cuneate acute or rounded; petiole ¼–3 in., slender; stipules scarious, entire or toothed. *Heads* of both sexes peduncled, rarely sessile; peduncle sometimes 10 in. long and very stout; receptacles flat or turbinate, ⅛–3½ in. diam.; male sepals 4–5; fem. 3, very minute and unequal. *Achene* minute, ovoid, compressed.—Weddell makes two varieties, viz. *Wallichii*, diœcious with acutely serrate leaves; and *major* (from the Concan) with leaves more obtusely serrate and male and fem. fl. in the same head. The most puzzling state of this plant is the minute one mentioned above, in which the receptacles are reduced to 1/10 in. diam. It occurs at all elevations, but is the only one also at great heights, and is found in the Himalaya, Munnipore and the Nilghiris.

31. **PELLIONIA,** *Gaud.*

Herbs with the alternate leaves and habit of *Elatostema*, but the male flowers are disposed in open or contracted sometimes capituliform cymes (not seated on a receptacle), and the fem. perianth is longer than the compressed tubercled achene.—Species about 15, Eastern Asiatic and Pacific.

* *Leaves serrate.*

1. **P. Griffithiana,** *Wedd. in DC. Prodr.* xvi. i. 165; branches and cymes pubescent, leaves sessile obliquely oblong-lanceolate caudate coarsely crenate-serrate above the entire semicordate base, male cymes long-peduncled laxly dichotomously branched.

UPPER ASSAM; in the Patkoye Mts., *Griffith*.

Stems 1–2 ft. and leaves fleshy. *Leaves* 2–6 in., nerves puberulous beneath. *Male cymes* 1–2 in. diam.; peduncle 2–3 in.; bracts lanceolate, exceeding the flowers; fem. unknown.

2. **P. heteroloba,** *Wedd. Monogr.* 283, t. 5, f. 11 inf.; *DC. Prodr.* xvi. i. 166; nearly glabrous, diœcious, leaves sessile obliquely elliptic or oblong acuminate or caudate coarsely crenate-serrate above the middle, base semicordate, cymes all peduncled, males laxly dichotomously branched, fem. subcapitate.

SIKKIM HIMALAYA; at Yoksun, alt. 5000 ft., *J. D. H.* KHASIA MTS.; at Nurtiung, alt. 4000 ft., *Clarke.*

Stem 6–10 in., stout, ascending from a creeping base. *Leaves* 2–2½ in., rather thick, quite glabrous; stipules subulate. *Male cymes* with subulate bracts and bracteoles; fem. ¼–⅓ in. diam. or shorter, slender; peduncles ¼ in. long, branches so short as to be hidden by the flowers; bracts subulate; sepals lanceolate, very unequal, much longer than the tubercled ellipsoid achenes.—The Khasian specimens are in male fl. only, and more slender than the Sikkim ones.

3. **P. stenocarpa,** *Wedd. Monogr.* 284, t. 5, f. 13, 15; *DC. Prodr.* xvi. i. 168; glabrous, leaves alternate subsessile obliquely oblong or elliptic-lanceolate acuminate coarsely serrate above the lower third or middle, base acute or obtuse, male cymes long-peduncled corymbose, fem. sessile capitate, sepals subequal mucronate, achene narrow subcylindric minutely warted.

KHASIA MTS., alt. 1–4000 ft., *J. D. H. & T. T.* (Weddell).

Dicœcious or monœcious. *Stem* erect, 4 in. *Leaves* ¾–2 by ⅓–⅔ in., membranous, whitish beneath and reticulated with cystoliths; stipules 2, linear, persistent. *Male peduncle* ⅓–1½ in. *Fem. cymes* nearly as in *Elatostema*, but with the bracteoles much shorter than the pedicels of the flowers; fruiting sepals about equal in length, but with unequal mucros. *Achene* narrowed from the middle to the tip, about twice as long as the sepals, equally minutely warted.—I find no specimens answering to this amongst Thomson's and my collections. Weddell describes the fem. heads as like those of an *Elatostema*, to which the achene would seem to refer it.

4. **P. ambigua,** *Wedd. Monogr.* 285; *DC. Prodr.* xvi. i. 168; nearly glabrous, leaves alternate sessile obliquely oblong-lanceolate or elliptic penninerved coarsely serrate above the entire obtuse or subcordate base, male cymes long-peduncled very contracted capitellate, fem. sessile, male sepals subequal mucronate with long points, achenes ellipsoid tubercled.

KHASIA MTS., alt. 0–4000 ft., *J. D. H. & T. T.*

Stem simple, 4–6 in. *Leaves* 3–5 by ¾–1½ in., puberulous on the midrib above and nerves beneath; minute linear or subulate leaves occur in some specimens alternating with the larger. *Male cymes* with very short branches forming obconical heads ¼ in. long and broad; bracts subulate; flowers rather long-pedicelled. *Fem. heads* if on the same plant with the male in the upper axils, ⅓ in. diam.; bracts subulate, exceeding the flowers.

5. **P. Duvauana,** *N. E. Br. in Ill. Hortic.* xxix. 189, t. 472; *Gard. Chron.* xviii. (1882) 712; prostrate, leaves sessile broadly obliquely oblong or orbicular coarsely crenate tip obtuse or rounded, nerves pubescent, stipules large ovate acuminate persistent, male cymes long and stoutly peduncled branched pubescent, bracts minute. Elatostema gibbosa, *Kurz in Journ. As. Soc. Beng.* xlii. ii. 104. Procris gibbosa, *Wall. Cat.* 7273.

PEGU, *Brandis.* PERAK, *Scortechini, Wray,* &c.—DISTRIB. Cochin China.

Stem or branches 1–2 ft., succulent, creeping below, tips pubescent. *Leaves* 1–2½ in., fleshy ?; stipules in pairs, ⅛ in. long, scarious. *Male peduncle* 1–5 in.; branches irregular, divaricate; flowers large, outer sepal gibbous; fem. fl. and fruit unknown.—Wallich's No. 7273 is doubtfully referred to *Elat. cornutum,* by Weddell.

6. **P. bulbifera,** *Hook. f.*; very slender, quite glabrous, axils bulbiferous, leaves membranous subsessile obliquely elliptic-oblong or -lanceolate acuminate or caudate coarsely serrate, male and fem. infl. on long slender pedicels, male fl. cymose pedicelled, fem. on a disciform involucrate head

with linear-lanceolate sepals. Elatostemma bulbiferum, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 104.

TENASSERIM; at Attran, *Kurz, Brandis.*

Stem erect, 6–12 in., branched; axillary bulbs $\frac{1}{4}$–$\frac{1}{2}$ in. diam. *Leaves* scattered, 3–5 in., with sometimes a very small opposite one; base entire, cuneate or subauricled on one side; nerves very slender, basal about half the length of the leaf; cystoliths very obscure. *Peduncles* 1–2 in., capillary; male cymes few-fld., subumbellately branched; pedicels very short; fem. recepts $\frac{1}{3}$ in. diam.; involucral bracts numerous, ovate-lanceolate, glabrous; bracteoles linear-lanceolate; sepals much longer than the young fruit.

7. **P. burmanica,** *Hook. f.*; quite glabrous, stem very slender flexuous, leaves membranous broadly obliquely ovate or ovate-oblong caudate coarsely crenate toothed or serrate, fem. heads axillary sessile disciform.

TENASSERIM, *Gallatly* (*Herb. Hort. Bot. Calcutt.* No. 1033).

Stem a span long, very flexuous. *Leaves* 2–4 in., base cuneate or subauricled on the lower margin; nerves very slender, basal not half the length of the leaf; cystoliths very obscure. *Fem. heads* $\frac{1}{3}$–$\frac{1}{2}$ in. diam.; involucral bracts numerous, lanceolate, confluent except at the tips; bracteoles lanceolate; sepals linear-oblong, exceeding the broadly elliptic tubercled achene.—Very near *P. bulbifera*, but the leaves are broader. more toothed than serrate, and the fem. heads are perfectly sessile. —Male infl. not seen.

** *Leaves large, quite entire; stipules usually large, scarious, lanceolate with long points, very persistent.*

8. **P. Heyneana,** *Wedd. Monogr.* 287, t. 5; *DC. Prodr.* xvi. i. 169; stem woody below, leaves short-petioled or subsessile falcately oblong or elliptic-lanceolate obtusely acuminate quite entire 3-nerved, base unequally cordate, nerves pubescent beneath, male and fem. infl. stoutly peduncled. Procris Heyneana, *Wall. Cat.* 7272.

DECCAN PENINSULA; Nilghiri and Travancore Mts., *Heyne*, &c. CEYLON, in the Central Province.

Stems 6–10 in., from a branched woody creeping base; tips hirsute. *Leaves* 4–8 in., coriaceous, with often minute subalternating leaflets, grey with many cystoliths when dry; petiole $\frac{1}{10}$–$\frac{1}{3}$ in., stout, and midrib hirsute; stipules large. *Male fl.* in lax or dense cymes, or capitate, and peduncle villous; fem. capitate, and peduncle glabrous; sepals of fem. subequal, denticulate, mucronate, ciliate. *Achenes* compressed, tubercled.

9. **P. Helferiana,** *Wedd. in DC. Prodr.* xvi. i. 170; stem stout creeping, leaves long-petioled subfalcately ovate-oblong caudate quite entire, nerves pubescent beneath, male infl. capitate very stoutly peduncled.

TENASSERIM, *Helfer, Griffith.* ? ANDAMAN ISLANDS, *King's Collector.*

Very near to *P. Heyneana*, but the petioles are much longer, $\frac{1}{2}$–$1\frac{1}{4}$ in. The specimens are very imperfect in young male fl. only. The Andaman Islands plant has capitate fem. infl. with more slender peduncles.

10. **P. javanica,** *Wedd. Monogr.* 187; *DC. Prodr.* xvi. i. 170; quite glabrous, stem short, leaves long-petioled subfalcately oblong or elliptic-lanceolate obtusely caudate quite entire, base subacute, fem. cymes much branched very long-peduncled. *Miq. Fl. Ind. Bat.* i. ii. 239. Pilea javanica, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 187.

PENANG, *Curtis.* SINGAPORE, *Lobb.*—DISTRIB. Java ?.

Stem woody below. *Leaves* 4–7 in , and stipules as in *Helferiana*, but petiole 2–3 in. *Achenes* compressed, tubercled.—The authority for this being a Javan plant consists in specimens in Herb. Hook. ticketed "Java, Lobb;" but as Lobb also collected in Singapore, and corresponding specimens of Lobb's in Herb. Bentham are ticketed from Singapore, it is possible that the Javan habitat is an error.

11. **P. acaulis,** *Hook. f.*; stem very short and petioles and nerves beneath villous, leaves crowded at the top of the stem falcately elliptic-lanceolate obtusely acuminate, base acute, fem. cymes capitate very shortly peduncled.

PENANG; on damp rocks, *King's Collector.*

Stems 1–2 in., rooting up to the leaf-bases. *Leaves* 2–4 in., cystoliths obscure; petiole $\frac{1}{6}$ in. *Fem. cymes* $\frac{1}{2}$ in. diam.; flowers sessile; sepals narrowly linear, ciliate; achenes compressed, tubercled.

SPECIES UNKNOWN TO ME.

12. **P. procridifolia,** *Kurz in Trimen Journ. Bot.* 1873, 330, and in *Journ. As. Soc. Beng.* xlv. ii. 149; monœcious, scandent, fleshy, glabrous, leaves 4–7 in. obversely or linear-oblong shortly or abruptly acuminate entire, base unequal acute, nerves 5–6 pairs, cystoliths slender, flowers white males in small subaxillary glabrous cymes, peduncle $\frac{1}{2}$–$1\frac{1}{4}$ in. slender, fem. forming dense axillary hemispheric clusters.

NICOBAR ISLANDS; in Katchall, *Kurz.*

Kurz observes that the leaves are very like those of *P. lævigata*, and (in Beng. As. Soc. Journ.) that the species is very near *P. frutescens*, which is a Javan hill species with serrate leaves. I find no reference elsewhere to *P. frutescens* and *lævigata*, both which names occur under *Procris* as species of Blume's.

32. ELATOSTEMA, *Forst.*

Herbs or undershrubs. *Leaves* alternate or with sometimes a minute leaf subopposite to the normal leaf, distichous, sessile or subsessile, usually very oblique and unequal-sided, triple-nerved at the base or above it; stipules intrapetiolar or lateral. *Flowers* very minute, crowded on sessile or peduncled unisexual usually involucrate receptacles; invol. bracts rounded oblong or ovate, outer sometimes with a dorsal spur or horn, bases nearly free or more or less confluent in a fleshy circular or lobed disk margined with the tips of the bracts, margin rarely quite entire; bracteoles densely crowded, of male heads usually oblong, of fem. spathulate; the flowers are often collected in clusters, each surrounded by partial bracts, giving the head a lobed appearance. MALE FL. *Sepals* 4–5, 2 or more usually tubercled or spurred at the back. *Stamens* 4–5, inflexed in bud. *Pistillode* minute. FEM. FL. *Sepals* 3–5, very minute, much shorter than the ovary, persistent. *Staminodes* minute or 0. *Stigma* penicillate; ovule erect. *Achene* minute, ellipsoid or fusiform, usually ribbed, subtended by the most minute perianth. *Seed* usually exalbuminous, testa membranous; cotyledons ovate or semiterete.—Species about 50, natives of the tropics of the Old World, except Australia.

As in the case of *Pilea* (p. 551), the type specimens of the Indian species of this genus were so hastily named by Weddell in the Hookerian Herbarium, that I have had great difficulty in identifying many of them with his descriptions, and have failed in one or two instances. The presence of small leaflets opposite the leaves not being a constant character in some of the species where these do occur, and a very obscure one in others, I have not been able to use it as a sectional character. Probably much

better divisional characters than those here adopted will be found in the form of the free or confluent bracts of the male receptacles, but these are difficult of analysis in dried ones. The character of peduncled and sessile heads will, I expect, prove very deceiving, and be abandoned. The difficulty of describing the form and nervation of the leaves is great, from their variability; and the presence or absence of cystoliths on one or both surfaces is not constant in individual specimens of many species. In some species the male and fem. receptacles are in different individuals, in others in the same, whilst many species are either monœcious or diœcious, so that I can attach no importance to this character.

Sect. I. ANDROSYCE, *Wedd.* *Male receptacle* fleshy, exinvolucrate, fig-like, at first closed, latterly bursting irregularly and expanded.

1. **E. ficoides,** *Wedd. Monogr.* 306, t. 10; *DC. Prodr.* xvi. i. 171; leaves 5–9 in. subsessile obliquely oblong or obovate-oblong caudate sharply coarsely serrate from the base penninerved sparsely setose above. E. Mariannæ, *Clarke in Journ. Linn. Soc. Bot.* xv. 114. Procris ficoidea, *Wall. Cat.* 4635. Androsyce indica, *Wedd. mss.*

CENTRAL and EASTERN HIMALAYA, alt. 4–8000 ft.; Nepal, *Wallich*; Sikkim, *J. D. H.*, &c. KHASIA MTS., *Herb. Calcutt.* MUNNIPORE; on Kohaima, alt. 6000 ft., *Clarke.*

Monœcious or diœcious, glabrous or sparsely pubescent. *Stem* 4–6 ft., grooved. *Leaves* membranous, brown when dry, base narrowed very unequal, cystoliths very minute; nerves 3–5 pairs, arched; stipules oblong-lanceolate. *Male recepts* pyriform or globose, splitting into very unequal lobes, then 1–2 in. diam.; peduncle 5–6 in., stout; flowers many, large. *Fem. recept* smaller, sessile, often in pairs. *Achenes* ellipsoid, acute at both ends, ribbed.

Sect. II. ELATOSTEMA PROPER. *Male receptacle* with usually a distinct involucre of many bracts, which are more or less free or confluent into a fleshy disk with the tips free or not; rarely laciniate (in *E. dissectum*).

* Male receptacles sessile or very shortly peduncled, peduncle rarely ½ in. long (male recept unknown in *E. Walkeræ* and *cuneatum*). (See also *E. papillosum, decipiens, Treutleri* and *surculosum.*)

† *Leaves acuminate or caudate.*

2. **E. sessile,** *Forst. Char. Gen.* 106; glabrous or pubescent, stem simple, leaves 4–8 in. sessile or shortly petioled membranous obliquely oblanceolate or oblong caudate coarsely serrate from the base to the tip, recepts sessile or shortly peduncled, involucral bracts of male free broadly ovate or rounded coriaceous. *Wedd. Monogr.* 294, t. 9, f. 9; *DC. Prodr.* xvi. i. 173. E. serratum, *Forst. mss.* E. pubescens, *Pers. Synops.* ii. 557. Procris sessilis, *Hook. & Arn. Bot. Beech. Voy.* 70. P. australis, *Spreng. Syst.* iii. 846.

TEMPERATE and SUBTROPICAL HIMALAYA, from Chamba eastwards; alt. 4–8000 ft. ASSAM, SILHET, the KHASIA and NAGA HILLS. PENANG, *Curtis*; ? Perak, *King's Collector.* NILGHIRI HILLS, *Wight*, &c. CEYLON, Rambodde, alt. 4000 ft.—DISTRIB. China, Japan, Malay and Pacific Islands, Trop. Africa.

Stem 1–2 ft., usually prostrate and rooting below. *Leaves* greenish when dry, cystoliths very abundant especially above. *Recepts* solitary or 2–3, rarely more in each axil, ¼–½ in. diam.; peduncle rarely ½ in., of fem. ebracteate; bracteoles very minute, villous, hyaline. *Achenes* very minute, ellipsoid, acute at both ends, ribbed.—The Australian plant referred here by Weddell is by Bentham regarded as a different species. *E. sessile* is a very variable plant; the following are the principal but ill-defined forms.

Var. *cuspidata*, Wedd. l. c.; leaves glabrous or setose above and pubescent on the nerves beneath, base acute rarely rounded or subauricled. E. cuspidatum, *Wight Ic.* t. 1983 (not 2091, f. 1). E. affine, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 188.—Himalaya, Silhet, Nilghiris.

Var. *pubescens*; stem and leaves more or less substrigosely tomentose, leaf-base acute or rounded.—Nilghiris, Naga Hills, Penang.

Var. *hispidula*; leaves smaller rugose, hispidly setose beneath.

Var. *polycephala*; leaves as in var. *cuspidata* but base auricled, glabrous or hispidulous beneath, receptacles small clustered shortly peduncled. E. sessile, β. punctata, *Wedd. l.c.* E. polycephalum, *Wedd. in Ann. Sc. Nat. l. c.* 189. Procris polycephala, *Wall. Cat.* 4629. P. punctata, *Ham. in Don Prodr.* 61.—Himalaya.

3. **E. molle,** *Wedd. Monogr.* 298; *DC. Prodr.* xvi. i. 173; stem and leaf-nerves beneath strigosely pubescent, leaves 3–5 in. subsessile coriaceous obliquely elliptic-lanceolate acuminate or caudate crenulate or serrulate throughout their length strongly reticulate beneath, recepts sessile and subsessile, invol. bracts of male rounded confluent below. Procris molls, *Wall. Cat.* 4633.

Assam; on the Duphla Hills, alt. 2000 ft., *Lister*. Khasia Mts., *Herb. Calcutt.* ? Chittagong, *Clarke*. Penang, *Phillips*. Singapore, *Wallich*.

Stem erect, stout, angular, branched. *Leaves* rather rigid, pale when dry, base very oblique, hardly auricled, sometimes petioled, nerves very strong beneath; cystoliths minute, crowded; stipules very long, ½–1 in., lanceolate. *Heads* dicœcious; male ½–⅔ in. diam.; invol. bracts broad, scarious, puberulous. *Fem. heads* not seen.—The very small leaf-serratures are one good character of this species.

4. **E. rupestre,** *Wedd. Monogr.* 304; *DC. Prodr.* xvi. i. 177; stem stout rigid erect and leaf-nerves beneath substrigosely tomentose, leaves 4–6 in. subsessile obliquely (or not) narrowly elliptic or linear-lanceolate caudate serrate from above the middle lower third many-nerved, base acute, recepts sessile or subsessile, invol. bracts rounded confluent at the base only. Procris rupestris, *Ham. in Don Prodr.* 60. P. punctata, *Wall. Cat.* 4627 A.

Nepal, *Wallich*. Khasia Mts., usually on rocks in beds of streams, alt. 1–4000 ft., *J. D. H.*, &c. Chittagong, *Clarke*.—Distrib. Java (Weddell).

Dicœcious. *Stems* 6–10 in., very stout, erect from a running stock, often branched. *Leaves* brown when dry, suberect, young silky, base sometimes very narrow and straight; cystoliths small, crowded; stipules ½–¾ in., linear-lanceolate, acuminate. *Receptacles* sessile or subsessile, ½–1 in. diam.; invol. bracts of male rounded, pubescent or villous; bracteoles of fem. woolly. *Achene* very minute, warted.—Differs from *E. molle* in the narrower acutely serrate leaves. I have seen no Javan specimens.

5. **E. sesquifolium,** *Hassk. Cat. Hort. Bogor.* 79; shrubby, leaves 4–10 in. (or less) subsessile or petioled obliquely oblong elliptic or lanceolate caudate-acuminate quite entire, cystoliths crowded conspicuous, recepts small usually crowded lobed subsessile, invol. bracts rounded, of male glabrate, of fem. tomentose. *Wedd. Monogr.* 308; *Miq. Fl. Ind. Bat.* i. ii. 243. E. cuspidiferum, *Miq. Pl. Jungh.* i. 22. E. Miquelianum & Zollingerianum, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 188. E. integrifolium, *Wedd. in DC. Prodr.* xv. i. 179. E. lineolatum, *in part*, *Herb. Ind. Or. H. f. & T.* Procris integrifolia, *Don Prodr.* 61. P. piperifolia, *Wall. Cat.* 4628. P. sesquifolia, *Reinwdt. in Blume Bijd.* 54.

Assam and the lower Khasia Mts., to Chittagong, Burma and the Andaman and Nicobar Islands.—Distrib. Java.

A branching shrub, 2–6 ft.; branches terete, lower woody. *Leaves* 1–3 in. broad, pale greyish brown when dry, smooth, rarely with 1–2 teeth below the tip; nerves 3–5 pairs, arched; petiole 1–2 in. in Assam specimens. *Heads* small, often lobed or branched, male and fem. in the same or separate axils or plants. *Achene* minute, turgidly ellipsoid, ribbed.—Possibly a large state of *E. lineolatum.* A specimen from Assam has fem. recepts above and male below, the latter broken up into sessile capitate branched ebracteate cymes. The female recepts are also sometimes divided.

Var. *tomentosa*; stem and leaves beneath substrigosely or hirsutely tomentose. —Khasia Hills, alt. 3–5000 ft.

6. **E. lineolatum,** *Wight Ic.* t. 1984; herbaceous or shrubby, leaves 1–6 in. subsessile oblong or oblong-lanceolate or narrowly linear-oblong or cuneately obovate acuminate or caudate coarsely crenate toothed or serrate above the middle, base always acute or cuneate, cystoliths very crowded and conspicuous, recepts small pisiform solitary or crowded, invol. bracts rounded often confluent. *Wedd. Monogr.* 312; *DC. Prodr.* xvi. i. 181. Procris punctata, *Wall. Cat.* 4627 B.

Tropical Himalaya; from Kumaon eastwards to Bhotan and the Khasia Mts., and southwards to Travancore. Ceylon, ascending to 5000 ft.

It is impossible to frame a diagnostic character for this protean plant, whose forms as recognized by Weddell to be conspecific, are as dissimilar as those of *E. surculosum.* The inflorescence, flowers and invol. bracts and achenes are as in *sesquifolium.* The following are conspicuous varieties.

Var. *major*, Thwaites Enum. 260; Wedd. in DC. l. c. 182; much branched, glabrous or tomentose on the branches and leaves beneath especially on the nerves, leaves 3–5 in. coarsely crenate or serrate above the middle. E. integrifolium, *var.* semiserrata, *Wedd. in DC. l. c.* 180. E. rupestre, *var.*? *Herb. Ind. Or. H.f. & T.* —Himalaya, Khasia and Western Ghats.

Var. *integrifolia*; leaves 3–7 in. falcately lanceolate or oblong-lanceolate gradually caudate with one or a few coarse teeth towards the tip. E. cuspidatum, *Wight Ic.* t. 2091, f. 1 (not 1983).—Khasia Mts., Nepal, Sikkim and the Concan.—This in colour and foliage seems to unite *E. sesquifolium* and *lineolatum*, and may be referred to either. A specimen from the Concan has broader leaves with more spreading nerves, and their base rounded on one side.

Var. *Helferi*; much branched, leaves 1–2 in. obliquely cuneate or oblong-cuneate or lanceolate gradually or suddenly caudate with 2–5 very large crenatures or teeth above the middle on each side, recepts heads very small.—Tenasserim, *Helfer* (*Kew Distrib.* 4503).

Var. *petiolaris*, Thwaites mss.; leaves 5 in. linear-lanceolate narrowed into a petiole $\frac{1}{2}$–$\frac{3}{4}$ in. with 3–5 very large teeth above the middle on each side and a tail 1 in. long, cystoliths abundant beneath, absent above except along the margin and midrib.—Ceylon, *Thwaites* (C.P. 3920); a very remarkable state.

Var. *falcigera*, Thwaites Enum. 260; very slender and much branched, leaves 2–5 in. narrowly falcately linear-lanceolate entire or with one or two large teeth on each side.—Ceylon.

Var. *bidentata*; slender, much branched, leaves $\frac{3}{4}$–$1\frac{1}{2}$ in. lower half cuneately obovate abruptly ending in two large teeth, between which rises an upper half which is as long ligulate obtuse, smaller elliptic leaves occur lower on the branchlets.—Ceylon, *Sir G. McKenzie*; Adams Peak, *Thwaites* (C.P. 456).—A very singular form; in some specimens the 2 large teeth are replaced by 3 or 4 rounded ones. The lower pair of nerves often end in the teeth.

Var. *linearis*, Thwaites Enum. 260; branches very slender, leaves 2–4 by $\frac{1}{8}$–$\frac{1}{6}$ in. linear obtuse quite entire or with 1–2 large teeth, nerves very obscure.—Ceylon.

Var. *tomentella*; small, leaves 1–3 in. falcately oblong-lanceolate pubescent on both surfaces.—Tenasserim, on Molyet, alt. 5000 ft., *Gallatly.*

7. **E. Walkeræ,** *Hook. f.*; stem short simple tips strigosely pubescent, leaves 3–4 in. sessile or very shortly petioled broadly obliquely oblong or cuneate-obovate caudate coarsely crenate above the middle or upper third, sparsely setose on both surfaces, penninerved, base obliquely cordate, fem. recepts small sessile, invol. bracts confluent into a fleshy disk with a membranous crenate ciliate margin.

CEYLON; Central Province, *Walker*, alt. 4000 ft., *Thwaites* (C.P. 3767).

Stem 4–10 in., woody below, terete, flexuous, rather stout. *Leaves* sometimes nearly as broad as long, rather thin, dull dark green when dry, setæ of the upper surface with sometimes bulbous bases, of the lower softer; nerves 4–5 pairs above the basal, spreading, and costa very slender and faint; cystoliths on the upper surface, minute. *Recepts* closely appressed to the branch. *Achenes* turgidly ellipsoid, ribbed, pedicel very short.—Male fl. unknown.

8. **E. subincisum,** *Wedd. Monogr.* 314; *DC. Prodr.* xvi. i. 182; herbaceous, glabrous, leaves 1–2½ in. sessile membranous obliquely oblong-lanceolate caudate deeply subpinnatifidly crenate or serrate or base subauricled on the lower margin, stipules linear-lanceolate, recepts sessile or subsessile, invol. bracts rounded outer stoutly mucronate.

SIKKIM HIMALAYA, alt. 7–10,000 ft., *J. D. H., Clarke, King.*

Stem 8–10 in., erect, usually slender, simple or branched. *Leaves* drying brown, nerves 3–4 pairs above the basal; cystoliths very minute. *Recepts* about ¼–⅓ in. diam., often androgynous; bracts hardly exceeding the flowers, inner keeled; fem. bracts membranous; bracteoles ciliate. *Achenes* ellipsoid, ribbed.—The herbaceous habit distinguishes this from *E. acuminatum.* It resembles var. *subincisa* of *E. surculosum,* but the absence of the small opposite leaves and the minute cystoliths distinguish it.

9. **E. acuminatum,** *Brong. in Duperr. Voy. Bot.* 211; slender, much branched, often woody below, quite glabrous, leaves subsessile 1–6 in. membranous obliquely oblong or oblanceolate caudate coarsely crenate-toothed above the lower third or higher, base acute or subacute, cystoliths invisible, recepts small or minute sessile, invol. bracts minute. *Wedd. Monogr.* 311, t. 9 D, f. 1–4; *DC. Prodr.* xvi. i. 181; *Miq. Fl. Ind. Bat.* i. ii. 244. E. membranifolia, *Kurz in Journ. As. Soc. Beng.* xlii. (1823) ii. 204. Procris acuminata, *Poir. Encycl.* iv. 629. P. membranacea, *Reinwdt. in Blume Bijd.* 512. Boehmeria acuminata, *Gaud. in Freyc. Voy. Bot.* 494. Langeveldia acuminata, *Gaud. Voy. Uranie Bot.* 494.

KHASIA MTS., *Griffith* (*Kew Distrib.* 4538), *Clarke,* alt. 1–3000 ft. TENASSERIM at Thoungyen, *Brandis.* PERAK, *Scortechini, King's Collector.* MALACCA, *Griffith,* &c. TRAVANCORE, on the Anamallay Hills, *Beddome.* CEYLON; in the Central Province, alt. 3000 ft., *Macrae, Thwaites.*—DISTRIB. Java.

Stem smooth, terete, woody below, slender, branches divaricate. *Heads* sessile, solitary, monœcious or diœcious, males pisiform, fem. smaller.—Thwaites' specimens have leaves 6 by 2½ in., Beddome's 3–5 by 1–1¼; the Perak, Malacca and Tenasserim ones 2–3 by ½–¾ in.; these last have fewer teeth and much longer entire points, they are sometimes glaucous beneath, and resemble those of *E. lineolatum,* var. *Wightii*; from all forms of which species the invisibility of cystoliths under an ordinary lens at once distinguishes this. The Khasia, Ceylon and Tenasserim form is that of a slender shrub with smooth terete stiff woody branches. In Thwaites' specimens I find very minute punctiform cystoliths.

10. **E. platyphyllum,** *Wedd. Monogr.* 301; *DC. Prodr.* xvi. i. 175; tall, robust, leaves 6–10 by 3–7 in. sessile or petioled coriaceous broadly obliquely rhomboid to oblong-lanceolate cuspidate or caudate-acuminate

crenulate or serrulate from near the often auricled base, male recepts lobed or clustered sessile or shortly peduncled exinvolucrate, invol. bracts confluent in a fleshy disk with lobed margins.

TROPICAL HIMALAYA; Kumaon, *Thomson*. Sikkim, alt. 1–6000 ft., *J. D. H.*, *Clarke*. KHASIA MTS., alt. 4–5000 ft., *Griffith*, &c. NAGA HILLS, on Kohima, alt. 6000 ft., *Clarke*.

The largest and stoutest Indian species, 4–5 ft. high, yellow green when dry; stem terete, grooved when dry, branches often zigzag. *Leaves* coriaceous, largest 6–10 by 3–4½ in., narrowest 6 by ¾–2 in., smooth or scaberulous above, base very variable, glabrous or pubescent beneath, cuneate or more often with a large round or incurved hooked auricle on the lower margin, which is produced far below the acute upper; cystoliths crowded; nerves all oblique; stipules 1 in., or less. *Recepts* ⅓–1 in. diam.; peduncle sometimes ½ in.; fem. small, tomentose; invol. bracts confluent with free tips. *Achene* ovoid, dotted with red.—Very variable; the leaves are sometimes quite entire below the middle.

11. **E. Stracheyanum,** *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 188; *Monogr.* 328, t. 9, f. 18; *DC. Prodr.* xvi. i. 189; very slender herbaceous, stem long creeping sending up flaccid tomentose branches, leaves 1–2 in. sessile membranous obliquely oblong or oblong-lanceolate acuminate strongly serrate throughout sparsely setulose above pubescent beneath, cystoliths minute obscure, male recepts small subsessile, invol. bracts few free rounded green pubescent.

WESTERN HIMALAYA; Kumaon, alt. 64,000 ft., *Strachey & Winterbottom*. KHASIA MTS., alt. 5–6000 ft., *J. D. H. & T. T.*

Creeping stem 2–3 ft.; branches 4–10 in. *Leaves* very membranous, lower base rounded, a minute opposite green leaflet ⅛ in. long is sometimes present; nerves very slender; stipules lanceolate. *Male recepts* ¼–⅓ in. diam., globose, few-fld.; bracteoles linear-oblong, ciliate; sepals apiculate. *Fem. heads* not seen, described by Weddell as smaller than the males with obovate bracteoles, sepals shorter than the staminodes, and the achenes as broadly elliptic and obtusely acuminate.—The leaves in form and serrature resemble those of *E. sessile*, which is perhaps its nearest ally, and from which it differs in size and its creeping habit.

12. **E. Hookerianum,** *Wedd. Monogr.* 309; *DC. Prodr.* xvi. i. 180; herbaceous, quite glabrous, stem long slender and rooting below, leaves 2–4 in. membranous or coriaceous sessile falcately oblong-lanceolate acuminate or caudate serrate in the upper half, base broad auricled on the lower margin, cystoliths minute or obscure, stipules lateral linear or filiform persistent, recepts sessile or the male shortly peduncled, male invol. bracts free mucronate, fem. confluent in a fleshy disk with a membranous crenate ciliate margin.

SIKKIM HIMALAYA, alt. 4–6000 ft., *Herb. Griffith, J. D. H.*, &c. KHASIA and NAGA HILLS, alt. 6000 ft., *Clarke*.

Monœcious or diœcious. *Stem* creeping below for sometimes a great length, then erect or inclined, stout or slender, simple or branched. *Leaves* green when dry, very uniform along the stem, rarely straight with acute bases, cystoliths imperceptible or crowded along the very margin; stipules ¼–⅓ in. *Male fl.* long-pedicelled; bracts and bracteoles glabrous; fem. fl. on a very thick pedicel shorter than the achenes, bracteoles ciliate. *Achenes* ellipsoid, obtuse, irregularly ribbed.

VAR. ? *pedunculoris*; leaves less falcate, base narrowed, cystoliths abundant.—Sikkim, alt. 4–5000 ft., *Clarke*.

†† *Leaves small short, tip rounded or cuspidate.*

13. **E. reptans,** *Hook. f.*; stem slender creeping and rooting through-

out its length pubescent or tomentose leafy throughout, leaves ½–1½ in. membranous sessile broadly obliquely oblong sharply serrate nearly throughout, tip rounded, lower base auricled, cystoliths crowded minute, male recepts small sessile, invol. bracts few rounded hyaline, outer free and sepals with a long slender dorsal spur.

SIKKIM HIMALAYA, at the foot of the outer hills, alt. 1–4000 ft., *Herb. Griffith* (*Kew Distrib.* 4535), &c. CHITTAGONG, at Burkul, *Clarke*.

Stem 1–2 ft., spreading from a perennial stock, flaccid, simple or branched. *Leaves* glabrous or nerves pubescent beneath, green or yellow when dry; nerves spreading; cystoliths minute but conspicuous; stipules small. *Male recepts* ¼ in. diam., globose; invol. bracts and bracteoles almost hyaline, with remarkably slender spurs; bracteoles ciliate.—Weddell has named this (in Herb. Hook.) *E. sessile*, var. *minor*, but it has no affinity with that species. It is very near *E. cornutum*, differing in the sessile heads and pubescence, and if, as is possible, the characters of sessile and peduncled heads are deceiving, it may prove a form of that plant.

14. **E. pusillum,** *Clarke mss.*; dwarf, very slender, suberect, glabrous or pubescent, leaves few ⅓–1 in. membranous sessile obliquely elliptic or oblong obtuse entire or with a large tooth on each margin, base acute with sometimes an opposite leaflet, recepts minute sessile, invol. bracts free oblong or lanceolate ciliate.

TEMPERATE HIMALAYA; Simla, alt. 7–8000 ft., *Thomson*; Kumaon, alt. 10–11,000 ft., *Duthie*; Sikkim, alt. 10,000 ft., *Clarke*.

Stem 1–6 in., annual, simple, solitary, flaccid. *Leaves* glabrous or puberulous; nerves very faint; cystoliths very many and crowded, large for the size of the plant. *Recepts* $\frac{1}{12}$–$\frac{1}{6}$ in. diam., of both sexes sessile; bracteoles like the bracts, but smaller. *Achene* fusiform, striate.

15. **E. cuneatum,** *Wight Ic.* t. 2091, f. 3; dwarf, stem stout and leaves pubescent, leaves few ¾–1½ in. sessile falcately cuneate or hatchet-shaped, coarsely crenate above the middle, tip rounded or subacute, base subauricled with sometimes a minute opposite leaflet, fem. heads sessile, invol. bracts of fem. confluent below in a fleshy disk, tips ovate acuminate ciliate produced beyond the flowers. *Wedd. Monogr.* 330; *Dalz. & Gibs. Bomb. Fl.* 239; *Miq. Fl. Ind. Bat.* i. ii. 246. E. Webbianum, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 190. E. approximatum, *Wedd. in DC. Prodr.* xvi. i. 190. Procris approximata, *Wall. Cat.* 4630.

SIKKIM HIMALAYA, alt. 6000 ft., *Clarke*. The CONCAN, on old walls, &c., *Law*, &c. TENASSERIM, *Gomez*; at Mergui, *Griffith* (*Kew Distrib.* 4545).—DISTRIB. Java.

Stem 4–6 in., simple, glabrous or strigose. *Leaves* membranous, drying brown, often sparsely setose above, crenate chiefly on the lower margin; nerves very slender with connecting arches within the margin, basal pair not reaching the middle; cystoliths numerous, slender; stipules ovate. *Fem. recepts* ⅛–¼ in. diam.; invol. bracts pubescent; bracteoles ciliate. *Achene* minute, ellipsoid, ribbed.

** Male receptacles on usually long peduncles; short in *E. decipiens* and *Treutleri*, sometimes in *E. Clarkei* and others; sessile in forms of *E. surculosum*. (Male fl. unknown in *E. Griffithii* and *procridioides*.)

† Leaves acuminate or caudate (except in forms of *E. surculosum*).

a. *Bracts of male receptacle rounded, or broadly ovate, none produced into a spur beyond the receptacle.*

16. **E. dissectum,** *Wedd. Monogr.* 314; *DC. Prodr.* xvi. i. 182;

quite glabrous, erect, leaves 3–5 in. sessile or petioled obliquely or falcately oblanceolate or broadly or oblong-ovate acuminate coarsely crenate or serrate from the middle of the lower margin upwards upper subentire, base acute, male recepts long-peduncled, receptacle when large lobed or lacerate often to the base exposing the flowers, fem. sessile.

SIKKIM HIMALAYA, alt. 3–8000 ft., and KHASIA MTS., alt. 4–6000 ft., *J. D. H.*, *Clarke*. MISHMI MTS., *Griffith*.

Monœcious or diœcious. *Stem* simple, erect from a shortly creeping base, 8–12 in., stout and subsucculent or slender, and leaves drying green. *Leaves* rather thick, narrowed to the entire bases, most so in Khasian specimens, which are often very acute and distinctly petioled; cystoliths very many, minute, slender; nerves meeting in the intramarginal basal one; stipules lateral, subulate or lanceolate. *Male recepts* $\frac{1}{2}$–1 in. diam., lobed; lobes fleshy, fringed with small ovate acute glabrous bracts; flowers large, pedicelled, 1–2 sepals spurred; fem. recepts much smaller, depressed, bracteoles ciliate. *Achenes* ellipsoid, subcompressed, rather fleshy, not ribbed or striate.—The male fl. are much larger than usual in the genus. Small specimens 4–8 in. high have oblanceolate leaves 2 by $\frac{1}{4}$–$\frac{3}{4}$ in.

17. **E. Griffithii,** *Hook. f.*; quite glabrous, stem stout erect, leaves 5–6 in. subsessile coriaceous obliquely oblanceolate acuminate base narrow acute obtusely serrate from near the base penninerved, fem. recepts long-peduncled large fleshy irregularly lobed with crenulate ciliate margins.

UPPER ASSAM; Mishmi Hills, *Griffith* (*Kew Distrib.* 4537).

Stem 8–10 in., erect from a densely matted fibrous root, probably fleshy. *Leaves* green when dry; cystoliths minute, abundant above and on the nerves beneath; basal nerves reaching about half-way; stipules $\frac{1}{3}$–$\frac{1}{2}$ in., linear, acute, byaline. *Male recepts* 1–1$\frac{1}{2}$ in. diam.; bracts confluent in a fleshy disk, with crenulate margins, and branching nerves; peduncles 1–2$\frac{1}{2}$ in.; bracteoles ciliate, membranous, outer broadly oblong, inner narrower or subspathulate, those towards the disk deformed very short; fem. fl. very shortly pedicelled. *Achene* ellipsoid, acute at both ends.—Named *E. ficoideum* by Weddell in Herb. Hook. (to the male receptacles of which the females of this bear some resemblance), but it is a very different species, and probably nearest *E. dissectum*. The male fl. are unknown.

18. **E. papillosum,** *Wedd. Monogr.* 327; *DC. Prodr.* xvi. i. 188; stem stout erect tomentose above, leaves 4–6 in. sessile or shortly petioled thick obliquely elliptic or subrhombic ovate caudate-acuminate crenate or toothed, nerves beneath pubescent, cystoliths microscopic or 0, male recepts stoutly peduncled, invol. bracts large broad rounded, fem. subsessile. Procris peduncularis, *Wall. Cat.* 4634 B.

SILHET, CACHAR and the KHASIA HILLS, alt. 1–4000 ft., *Wallich*, &c. CHITTAGONG, *Lister*.

Stem 8–12 in., erect from the swollen or shortly inclined base, fleshy, naked below. *Leaves* rather fleshy, drying yellow-brown, opaque, base unequally cuneate or subauricled on the lower margin; nerves few, sunk in the tissue; stipules lanceolate or linear. *Male recepts* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., hemispheric; outer invol. bracts glabrous, free, fleshy; bracteoles linear-oblong, ciliate; fem. recepts rather smaller than the males. *Achenes* ellipsoid, acute at both ends, acutely ribbed, the ribs rather granular and interrupted, with granules in the interspaces.

19. **E. Clarkei,** *Hook. f.*; quite glabrous, stem simple stout erect rigid, leaves 4–6 in. subsessile coriaceous straight lanceolate acuminate crenate-serrate from a little above the straight acuminate base, male and fem. recepts peduncled subglobose, invol. bracts of male rounded, of fem.

ovate obtuse or acute pubescent, achenes narrowly oblong terete quite smooth.

LOWER BENGAL; at Shooshung, near Mymensingh, *Clarke*. Also in MUNNIPORE and the NAGA HILLS, alt. 500 ft., *Clarke*.

Stem erect from a short creeping base, probably succulent, hard angled and grooved when dry, naked below. *Leaves* the narrowest of the large-leaved species, drying rigid and yellowish, opaque; basal nerves produced to near the tip, lateral faint very oblique; stipules linear-oblong, membranous, deciduous; cystoliths minute, conspicuous in the youngest leaves only of the Mymensingh specimens, but all over the upper surface of the Naga Hills ones. *Recepts* $\frac{1}{2}$–1 in. diam., often lobed; invol. bracts coriaceous, concave, ciliate; bracts of fem. much more numerous, outer sometimes shortly spurred at the back; peduncles $\frac{1}{2}$–1 in., erect, rather slender.

20. **E. Wightii,** *Hook. f.*; quite glabrous, stem stout branched, leaves 3–4 in. sessile subfalcately oblong-lanceolate subcaudately acuminate very coarsely subserrately toothed from above the lower third base subacute, cystoliths abundant, male recepts long and stoutly peduncled, invol. bracts rounded membranous, fem. sessile much smaller.

NILGHIRI MTS.; at Avalanche, *Wight* (*Kew Distrib.* 2692).

Dicœcious. *Stem* erect from the root, succulent, branches divaricate. *Leaves* 3–7 in., rather succulent, yellowish when dry, base unequal, of lower margin straight or rounded; cystoliths very many, small; basal nerves hardly produced beyond the middle, supra-basal one or two pairs not inarching; stipules very short, broad. *Male recepts* $\frac{1}{4}$–$\frac{1}{2}$ in.; peduncle 1–2 in., spreading, bracts green, glabrous; fem. smaller, silvery; bracteoles linear, fimbriate. *Achenes* fusiform, ribbed.

b. *Bracts of male receptacle very unequal, 2 or more of the outer spurred or acuminate and produced beyond the others* (or rounded in some vars. of *E. surculosum*).

21. **E. procridioides,** *Wedd. in DC. Prodr.* xvi. i. 180; erect, quite glabrous, leaves 4–6 in. sessile or shortly petioled elliptic or obliquely ovate-oblong acuminate quite entire, base unequal, nerves spreading, male recepts long-peduncled large, outer invol. bracts ovate or ovate-lanceolate acuminate, 2 or more with dorsal flattened horns exceeding the others.

The KHASIA MTS., *Griffith*; alt. 6000 ft., *Clarke*. UPPER ASSAM, in the Tea districts, in the MISHMI HILLS. UPPER BURMA, *Griffith*.

Stem erect from the base, probably fleshy, simple or branched, stout or slender. *Leaves* fleshy or thin, opaque and dark greenish brown when dry, paler beneath, base unequally cuneate or acute; nerves 4–5 pairs above the basal, spreading; cystoliths small, slender, numerous; petiole short; stipules $\frac{1}{4}$–$\frac{1}{2}$ in. *Male recepts* 1 in. diam. and less; peduncle 1–3 in., slender or stout; invol. bracts confluent in a fleshy disk with many ovate acute points, glabrous; bracteoles cuneate; flowers large, many; 2 or more sepals horned.—*Female recepts* not seen.

22. **E. decipiens,** *Wedd. in DC. Prodr.* xvi. i. 176; stem often tall stout erect from a long creeping base and leaf-nerves beneath rusty puberulous, leaves 4–8 in. sessile or petioled membranous broadly obliquely oblong or obovate-oblong caudate-acuminate coarsely serrate from above the subauricled base, male recepts sessile or shortly peduncled, 2 outer invol. bracts with long fleshy horns.

KHASIA MTS.; at Nunklow, alt. 4–5000 ft., *J. D. H.* MUNNIPORE; on Kohima, alt. 6000 ft., *Clarke*.

Stem rather fleshy, 2–3 ft. high. *Leaves* amongst the largest of the Indian

species, dark green when dry except the rufous nerves beneath; nerves strong, spreading, lower margin at the base produced below the upper and more or less auricled; cystoliths numerous in the Mishmi specimen, very obscure in the others. *Male receptacles* solitary or binate, $\frac{2}{3}$ in. diam.; peduncle 0–$\frac{1}{2}$ in., very stout; invol. bracts glabrous, confluent below, horns fleshy laterally compressed, flowers shortly pedicelled.—The Khasia specimen is named *E. papillosum* by Weddell in Herb. Hook.

23. **E. Treutleri,** *Hook. f.*; stem tall stout erect fleshy glabrous, leaves 4–6 in. petioled rather fleshy obliquely oblong acuminate, serratures few small above the middle only, base not auricled, nerves few broad quite glabrous beneath, cystoliths very obscure, fem. recepts large sessile and stoutly peduncled, invol. bracts confluent in a fleshy disk tips of two large and produced into long horns, of the rest very short ovate acute.

SIKKIM HIMALAYA, alt. 5000 ft., *Dr. Treutler.*

Stem probably when fresh as thick as a goose-quill. *Leaves* quite opaque when dry, dark green, quite entire except in the upper third; nerves 2 pairs above the basal, very broad compared with those of *decipiens*, &c.; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., stout; stipules of uppermost leaves $\frac{1}{2}$–$\frac{3}{4}$ in., of lower $\frac{1}{6}$ in. *Fem. recepts* $\frac{1}{2}$–1 in. diam.; the fleshy disk has a narrow rim from the margin of which the long horns proceed, whilst the very numerous smaller bracts are inserted just within the rim; bracteoles linear, fimbriate. *Achene* young, very shortly pedicelled, fusiform, striate.—A remarkable species, of which I have but one specimen.

24. **E. sikkimense,** *Clarke in Journ. Linn. Soc. Bot.* xv. 125; stem erect rusty-puberulous above, leaves 4–8 in. sessile or shortly petioled membranous obliquely or falcately oblong or obovate elliptic caudate acuminate very unequal-sided coarsely serrate above the middle, base cuneate or acute, nerves glabrous beneath, male and fem. recepts long-peduncled, invol. bracts confluent 2 outer produced into long spreading spurs.

SIKKIM HIMALAYA; on wet rocks, alt. 4500–8000 ft., *J. D. H., Clarke, Treutler,* &c.

Stem 1–3 ft., simple, erect from a creeping base, succulent, stout or slender. *Leaves* variable, from 4 by 2 in. to 8 by $2\frac{1}{2}$ in., the larger usually very falcate with the upper margin convex, dark olive-green when dry, base always acute and nearly equal, teeth very large; nerves slender, quite glabrous beneath, lateral 6–8 pairs; stipules $\frac{1}{4}$–1 in., linear, tip rounded or acute. *Recepts* pink, monœcious with the males above or diœcious; peduncles 1–4 in., stout or slender; male $\frac{1}{3}$–1 in. diam., with the flowers in two masses, one to each bract; spurs of bracts laterally flattened, $\frac{1}{6}$–$\frac{1}{4}$ in., stout or slender; bracteoles of male oblong, ciliate; flowers small; sepals rounded, outer gibbous at the back; fem. recepts smaller; bracteoles spathulate, fimbriate. *Achenes* very minute, fusiform, ribbed.—Treutler's specimens from low elevations are more succulent, and hence approach *P. decipiens*, and I should not be surprised if these proved forms of one variable species.

25. **E. nasutum,** *Hook. f.*; stem glabrous widely creeping at the base, leaves 2–3 in. sessile membranous broadly falcately ovate acuminate coarsely sharply serrate from above the auricled lower base to the tip and half-way down the upper margin, nerves glabrous beneath, male recepts peduncled, one or two outer invol. bracts with thick obtuse spreading horns, fem. sessile. E. nigrescens, *Clarke in Journ. Linn. Soc. Bot.* xv. 125 (*not of Miquel*).

SIKKIM HIMALAYA, alt. 5–7000 ft., *J. D. H., Clarke, Kurz.*

Stem 2–3 ft. long or more, stout or slender; base rooting. *Leaves* blackish green when dry, often sparsely setulose above, nerves 3–5 pairs, spreading, laxly reticulate; cystoliths invisible; stipules $\frac{1}{6}$–$\frac{1}{3}$ in., lanceolate or linear-oblong, acute, obtuse or apiculate. *Receptacles* dicœcious, or monœcious with the fem. below; males $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; peduncles $\frac{1}{6}$–$1\frac{1}{2}$ in., slender; invol. bracts glabrous, outer confluent, horns $\frac{1}{8}$–$\frac{1}{4}$ in. laterally flattened, flowers small; fem. recepts with small invol. bracts, and bracteoles and minute achenes as in *E. sikkimense*, but sessile.

26. **E. stellatum,** *Hook. f.*; stem erect rusty-puberulous, leaves 4–6 in. sessile submembranous falcately oblong caudate-acuminate coarsely serrate in the upper half, base acute, nerves glabrous beneath, male and fem. recepts on long slender peduncles, invol. bracts very many confluent below all with stellately spreading spur-like horns.

SIKKIM HIMALAYA; at Rungbee, alt. 4–5000 ft., *Clarke.*

Stem 6-8 in., suberect from the base, rigid and red-brown when dry. *Leaves* quite glabrous, thicker than in *E. sikkimense* and *nasutum*, cystoliths small many and obvious in some leaves, invisible in others; base always acute; nerves rather strong; stipules $\frac{1}{4}$–$\frac{1}{3}$ in., linear-oblong, acute. *Recepts* dicœcious or monœcious with the males above, $\frac{1}{3}$–$\frac{3}{4}$ in. diam.; peduncles 1–2 in., filiform; invol. bracts confluent in a fleshy puberulous disk, outer broadly triangular; tips of both inner and outer free, subulate, $\frac{1}{10}$ in. long, with here and there one twice or thrice as long; male fl. pinkish, sepals rounded; fem. fl. very minute; bracteoles fimbriate, outer linear, inner spathulate, and achenes as in *E. sikkimense.*

27. **E. surculosum,** *Wight Ic.* t. 2091, f. 4; stem erect from the rooting base tufted glabrous or pubescent above stout or slender, leaves $\frac{1}{2}$–3 in. glabrous sessile membranous or coriaceous polymorphous subentire crenate serrate or pinnatifid each with a small oblong subopposite one that is often deflexed, cystoliths numerous, stipules minute, male recepts sessile long-peduncled, invol. bracts of male rounded or the outer horned, fem. smaller sessile, achene slender ribbed. *Wedd. Monogr.* 329. E. diversifolium, *Wedd. in DC. Prodr.* xvi. i. 189. E. lætum, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 190. Procris diversifolia, elegans & læta, *Wall. Cat.* 4631, 4632, 4637. ? P. monandra, *Ham. in Don Prodr.* 61.

TEMPERATE HIMALAYA, from Simla, alt. 4–7000 ft., to Sikkim, alt. 4–9000 ft. The KHASIA MTS., abundant, alt. 4–6000 ft. NAGA HILLS, alt. 9000 ft., *Clarke.* NILGHIRI MTS., *Wight.* CEYLON; Central Province, ascending to 6000 ft.

Dicœcious or monœcious. *Stem* 3–12 in., stout and fleshy or slender, always tufted, prostrate or ascending, base not or very shortly creeping, stoloniferous. *Leaves* usually numerous, increasing in size upwards, membranous coriaceous or almost fleshy, small opposite ones $\frac{1}{10}$–$\frac{1}{4}$ in., green, usually oblong, obtuse, entire, the larger sometimes imbricate upwards and the smaller imbricate downwards; in form they vary from almost orbicular to cuneiform elliptic oblong ovate-lanceolate lanceolate or falcately oblanceolate; they are always perfectly glabrous, green or yellowish when dry; the tips vary from obtuse to caudate, the margins usually in the upper half only, but sometimes from the base, subentire to 2–3 crenate, or many-toothed serrate or pinnatifid, the bases from very acute to obtuse and rounded, very rarely subauricled on one side; nerves few faint, even in the most membranous forms, basal pair prolonged to the middle or beyond it. *Male recepts* $\frac{1}{3}$–$\frac{1}{2}$ in. diam, pale green; peduncles longer than the leaves, sometimes three or four times as long, very slender; invol. bracts free, broad, membranous, all rounded or one or more with a very broad spreading or recurved acute laterally compressed spur or horn, the base of which occupies the whole length of the bract; flowers few, long-pedicelled; fem. very much smaller; bracteoles ciliate.—I have seen no Nilghiri specimens. The small subopposite leaves are the best character for this species, which is extraordinarily protean in habit and foliage. **The following are extreme forms, which seem to pass into one another in a perplexing way.**

a. *Receptacles all sessile.* Male unknown in var. *serpens.*

VAR. *elegans*; stem 2–8 in. slender glabrous or pubescent above, leaves few membranous upper $1\frac{1}{2}$–2 in. from obliquely ovate to lanceolate serrate, base acute or gibbous, lower leaves rounded obovate or cuneiform, small subopposite leaves various, heads very small, invol. bracts rounded. Procris elegans, *Wall. l. c.*—The commonest form

VAR. *pinnatifida*; excessively slender 8–12 in. simple or more often divaricatingly branched, leaves rather distant very membranous upper $\frac{1}{2}$–2 in. lanceolate pinnatifidly cut base acute, lower leaves small obovate entire or crenate, small subopposite leaves linear obovate or oblong, receptacles very small, invol. bracts rounded.—Sikkim, alt. 7–9000 ft.

VAR. *subincisa*; stem 6–10 in. rather slender simple or branched, leaves more coriaceous and less deeply cut than in var. *pinnatifida*, receptacles larger, invol. bracts acuminate.—Sikkim, alt. 3–5000 ft.

VAR. *ciliata*; stem short 4–6 in. very stout and leaves beneath sometimes scurfily rusty-pubescent, leaves $\frac{1}{4}$–$\frac{3}{4}$ in. fleshy rounded elliptic or cuneiform crenate ciliate or not, uppermost sometimes larger and lanceolate, recepts very small few-fld., invol. bracts rounded or acute.—Nepal, Sikkim, alt. 6–8000 ft.

VAR. *rigidiuscula*, Thwaites mss.; quite glabrous, stem 4–8 in. simple slender or stout, leaves $\frac{1}{2}$ in. very many uniform spreading cuneately oblong or lanceolate obtusely serrate or crenate towards the tip base acute, recepts very minute 2–3-fld., invol. bracts few acute.—Ceylon, on Adam's Peak, *Thwaites.*

VAR. *serpens*; stem elongate prostrate glabrous flexuous, leaves $\frac{1}{2}$ in. uniform oblong coarsely obtusely serrate above the middle base acute, fem. recepts small, bracts as in var. *zeylanica.*—Ceylon, *Walker.*—Male recepts unknown.

b. *Male receptacles long-peduncled.*

VAR. *pedunculosa*; stem 6–10 in. stout simple or branched, leaves membranous or rather coriaceous, upper 2–3 in. obliquely ovate or lanceolate coarsely serrate above the middle, lower rounded cuneiform or obovate crenate, small opposite leaves sometimes $\frac{1}{2}$ in. long spreading or deflexed, male peduncles longer or shorter than the leaves, 2 or more of the invol. bracts with long or short recurved beaks.—Khasia and Nilghiri Mts.

VAR. *crassa*; stems short very stout and leaves fleshy, leaves as in var. *pedunculosa* but smaller and imbricating upwards, small opposite leaves imbricating downwards, peduncles of male longer than the leaves.—Khasia Mts., alt. 4–6000 ft.

VAR. *zeylanica*; habit and leaves of var. *pedunculosa* but invol. bracts more numerous lanceolate acute, male shorter, fem. strongly ciliate.—Ceylon, ascending to 6000 ft.

†† *Leaves short, broad, tips rounded or acute.* (See also *E. surculosum.*)

28. **E. obtusum,** *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 190; *Monogr.* 324; *DC. Prodr.* xvi. i. 187; stem slender creeping and rooting retrorsely hirsute or scurfy, leaves $\frac{1}{4}$–$\frac{1}{2}$ in. sessile membranous uniform cuneately obovoid or orbicular coarsely crenate above the middle glabrous or ciliolate, tip rounded, base rounded or semicordate, male recepts long-peduncled few-fld., outer invol. bracts 2–3 ovate acute spurred or long-cuspidate.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 7–10,000 ft., reaching 12,000 ft. in Sikkim. KHASIA HILLS, alt. 4–5000 ft., *Griffith, Clarke.*

Stems 1–2 ft., flaccid, branched. *Leaves* greenish, paler beneath, membranous, cystoliths visible on the upper surface only, slender; stipules lanceolate, acute. *Recepts* diœcious, $\frac{1}{4}$ in. diam., of both sexes peduncled; peduncle $\frac{1}{2}$–1 in., filiform, sparsely hispid; invol. bracts few, broadly ovate, glabrous, narrowed into a slender spur or horn; male fl. few, large, long-pedicelled.—I have seen no fem. recepts.

29. **E. cornutum,** *Wedd. Monogr.* 316; *DC. Prodr.* xvi. i. 183 (*excl. syn.* Procris gibbosa); stem slender creeping and rooting flaccid, leaves 1–2½ in. sessile or petioled obliquely or falcately oblong or orbicular obtuse or acute sharply serrate nearly throughout, base auricled on the lower side or on both and amplexicaul, male recepts long-peduncled, outer invol. bracts free rounded concave with a long slender dorsal spur.

SIKKIM HIMALAYA, alt. 1–4000 ft., *J. D. H., Clarke.* KHASIA MTS., alt. 0–4000 ft., *J. D. H. & T. T.*

Stems trailing, branched, glabrous. *Leaves* membranous, pale green, puberulous on the nerves beneath, cystoliths minute, slender; stipules lanceolate, acuminate. *Male recepts* ⅓–½ in. diam., pale green; peduncle 1–3 in.; invol. bracts glabrous, membranous, hyaline; bracteoles linear, hyaline; male fl. few, sepals apiculate.—Fem. recepts not seen. See remarks under *E. reptans.*

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

30. E. CILIATUM, *Clarke mss.*; stem simple ascending from a creeping base glabrous, leaves 5–7 in. few membranous subsessile rather obliquely linear-oblong or oblanceolate acuminate coarsely serrate pale beneath base narrowed acute or obtuse sparsely setose with slender bristles above and especially towards the margins, fem. recepts small subsessile from the stem below the leaves, invol. bracts confluent in a thick tomentose entire disk, achene costate.

MUNNIPORE; on the Barak River, alt. 300 ft., *Clarke.*

Stem ascending from a rather fleshy creeping and stoloniferous base, 6–10 in. high, rather slender, naked below. *Leaves* green when dry, young strongly ciliate, penninerved; nerves 4–6 pairs above the basal, strigosely ciliate beneath, slender but prominent, basal pair reaching beyond the middle; teeth acute or cuspidate; cystoliths abundant; stipules ¼ in., oblong, green, sometimes in pairs or scattered on the stem below the leaves. *Fem. recepts* ¼ in. diam. *Achene* turgidly ellipsoid, acute.—The specimens are indifferent. The ciliate leaves are very peculiar.

31. E. ELLIPTICUM, *Wedd. in DC. Prodr.* 186; quite glabrous, stem long slender creeping and rooting branched, leaves ½–1½ by ⅕–1 in. petioled fleshy elliptic obtuse nearly equilateral quite entire rigid when dry, base rounded or subcordate triple-nerved, cystoliths minute on the upper surface only, petiole ⅙–¼ in., stipules small ovate-lanceolate, male recepts (very young ⅙ in. long) shortly peduncled solitary ovoid.

MISHMI HILLS; at Khoshai, *Griffith.*—May be a *Pellionia* near *P. Duvauana.*

32. E. NOVARÆ, *Kurz in Journ. Beng. As. Soc.* xlv. ii. 149; a glabrous branched undershrub, leaves 3–6 in. alternate subsessile membranous black when dry obliquely lanceolate or ovate-lanceolate repand serrate subulate-acuminate, cystoliths scattered, lateral nerves confluent towards the margin, stipules ⅙–¼ in. subulate deciduous, flowers subglabrous as in *E. lineolatum*, crowded in the axils.

NICOBAR ISLANDS; at Nankowry (Novara Exped.).

Differs from *E. lineolatum* in the blackening leaves, different nervation, smaller flowers and flower clusters.—Description from Kurz; my specimens (from Dr. King) are very indifferent.

URTICA, *Griff. Notul.* iv. 404; *Ic. Plant. Asiat.* t. 562, f. 2, from Tongse, in Bhotan, may be an *Elatostema*, but the transverse nervation is unlike any species known to me.

33. **PROCRIS,** *Juss.*

Succulent herbs or shrubs, often epiphytic, with the characters of *Elatostema*, but the male flowers in axillary cymes or clusters, the fem. only being on a receptacle. *Achene* ovoid or elliptic, striolate.—Species 5 or 6, Asiatic, African and Polynesian.

1. **P. lævigata,** *Blume Bijd.* 508; quite glabrous, leaves obliquely oblanceolate acuminate entire or crenate-serrate above the middle, flowers from the naked branches, males in small sessile clusters, fem. in shortly peduncled small recepts. *Wedd. in DC. Prodr.* xvi. i. 192; *Thwaites Enum.* 260; *Miq. Fl. Ind. Bat.* i. ii. 248; *Hook. Ic. Pl.* t. 1295. P. Wightiana, *Wall. Cat.* 4638; *Wedd. Monogr.* 336. Elatostema lævigatum, *Hassk. Cat. Hort. Bogor.* 79. E. Wightianum, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 188.

Sikkim Himalaya, alt. 1–4000 ft., *J. D. H.*, and Bhotan, *Clarke.* Khasia and Mishmi Hills, alt. 1–4000 ft., *Griffith*, &c. Munnipore, *Clarke.* Deccan Peninsula, *Wight.* Ceylon, ascending to 6000 ft.—Distrib. Java, Borneo, Tropical Africa.

A succulent epiphytic undershrub, 2–5 ft. high; stem as thick as the thumb below. *Leaves* 6–10 in., narrowed into the short petiole. *Fem. recepts* $\frac{1}{4}$–$\frac{1}{3}$ in., peduncles $\frac{1}{6}$–$\frac{1}{4}$ in. *Achenes* ovoid, slightly compressed.—Subopposite or alternating minute leaflets occur, but not constantly, in this and the following.

2. **P. frutescens,** *Blume Bijd.* 510; leaves oblong-obovate or oblanceolate cuspidate nearly entire, male cymes lax-fld., fem. heads solitary sessile. *Wedd. Monogr.* 335; *DC. Prodr.* xvi. i. 192; *Miq. Fl. Ind. Bat.* i. ii. 248. Elatostema frutescens, *Hassk. Hort. Bogor.* 79.

Penang, *Porter, Curtis.*—Distrib. Java, Borneo.

An epiphyte; stem woody below, branches succulent. *Leaves* 6–8 in., very thick; petiole $\frac{1}{4}$ in. *Male fl.* not seen. *Fem. heads* $\frac{1}{2}$ in. diam. *Achenes* ellipsoid.

34. **BOEHMERIA,** *Jacq.*

Shrubs or small trees. *Leaves* opposite and alternate, toothed, 3-nerved; stipules usually free. *Flowers* in unisexual axillary or spiked racemed or panicled clusters. Male. fl. *Perianth* 3–5-lobed or -parted, valvate. *Stamens* 3–5, inflexed in bud. *Pistillode* clavate or globose. Fem fl. *Perianth* tubular, 2–4-toothed, fruiting sometimes angled winged or swollen. *Ovary* included; stigma filiform, persistent; ovule erect. *Achene* closely invested by the perianth, crustaceous, at length free. *Seed* albuminous; cotyledons ovate.—Species about 45, chiefly tropical.

* *Flower clusters* axillary. *Leaves* opposite or alternate.

1. **B. malabarica,** *Wedd. Monogr.* 355; *DC. Prodr.* xvi. i. 203; monœcious, leaves alternate subequal or the alternate smaller elliptic or ovate to oblong acuminate or caudate crenulate or serrulate from above the rounded or cordate base glabrous above pubescent beneath, clusters axillary, fruiting perianth elliptic or roundish pubescent, margins obtuse. *Kurz For. Fl.* ii. 422; *Thwaites Enum.* 260. B. travancorica, *Bedd. For. Man.* 225 (B. ramiflora), t. 27, f. 2. Urtica malabarica, *Wall. Cat.* 4610. U. aquatica, *Moon Cat. Ceyl. Pl.* 62.

Sikkim Himalaya, ascending to 5000 ft., *J. D. H.*, &c. Mishmi Hills, *Griffith.*

SILHET, the KHASIA MTS. and CHITTAGONG to TENASSERIM. The WESTERN GHATS, from the Concan southwards. CEYLON, common.—DISTRIB. Java.

An erect shrub or small tree; branches terete, pubescent. *Leaves* 4–8 in., membranous, sometimes rugose above; petiole $\frac{1}{4}$–3 in.; stipules small, deciduous. *Flower clusters* small. *Flowers* minute, sessile. *Achene* ovoid, closely invested by the acute perianth.

2. **B. Helferii,** *Blume Mus. Bot.* ii. 201; monœcious, leaves opposite subequal broadly ovate-cordate acuminate sharply toothed sparsely hairy above, nerves beneath finely pubescent, clusters axillary confluent unisexual, fem. fl. concealed by the large bracts, perianth tubular 2-toothed. *Wedd. in DC. Prodr.* xvi. i. 204; *Kurz For. Fl.* ii. 423.

TENASSERIM, *Helfer* (*Kew Distrib.* 4585).

Branches nearly glabrous. *Leaves* 3–4 in., membranous, quite smooth, serrate to the base; nerves very slender; petiole 1–3 in., very slender.—*Leaves* correctly described by Blume as opposite, but by Mueller (no doubt by lapsus, and followed by Kurz), as alternate.

3. **B. Didymogyne,** *Wedd. in DC. Prodr.* xvi. i. 204; herbaceous, monœcious, leaves alternate subequal ovate acuminate coarsely crenate toothed above the middle, sparsely hairy above, base cuneate obtuse or rounded, clusters axillary androgynous, fem. fl. usually adnate in pairs. *Kurz For. Fl.* ii. 423. Didymogyne boehmerioides, *Weddell mss.*

TENASSERIM; at Moulmein, *Parish.*

Stem simple, 1–2 ft., soft, glabrous. *Leaves* 3–4 in., very membranous, sometimes unequal-sided; nerves extremely slender; petiole 2–2½ in., slender.—A very obscure plant, of which better specimens are wanted.

4. **B. sidæfolia,** *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 203; monœcious, leaves opposite and alternate subequal elliptic or ovate-lanceolate caudate-acuminate sharply serrulate hairy on both surfaces, clusters axillary and on leafy branchlets, fruit oblong or lanceolate compressed hispid. B. diffusa, *Wedd. Monogr.* 356; *Kurz For. Fl.* ii. 423. B. comosa, *Wedd. in DC. Prodr.* xvi. i. 205. Urtica viminea, *Wall. Cat.* 4616 (*in part*). U. comosa, *Ham. mss.*

TROPICAL and SUBTROPICAL HIMALAYA, from E. Nepal and Sikkim, ascending to 4000 ft., to Mishmi, *Griffith.* ASSAM, the GARROW and KHASIA HILLS, PEGU and TENASSERIM, *Wallich*, &c.—DISTRIB. Java.

A slender erect or diffuse undershrub, hairy villous or glabrate. *Leaves* 3–5 in., membranous, smooth or rugulose, serrulate to the base; nerves sometimes strongly reticulate beneath; petiole ½–2½ in. *Flower clusters* many, often confluent.—Very variable in leaf and pubescence.

** *Flower clusters* in simple or paniculately branched spikes.

† *Leaves alternate.*

B. NIVEA, *Hook. & Arn. in Bot. Beech. Voy.* 214; monœcious, leaves alternate all equal broadly ovate or orbicular acuminate crenate-serrate scabrid above, snow-white except the nerves beneath, stipules free, clusters in axillary panicles, fruit oblong compressed hairy. *Wedd. Monogr.* 380, t. 11, f. 10–17; *DC. Prodr.* xvi. i. 206; *Hook. Kew Journ. Bot.* iii. (1851) 315, t. 8; *Brand. For. Fl.* 402; *Benth. Fl. Hongk.* 331; *Miq. Fl. Ind. Bat.* i. ii. 253; *Blume Mus. Bot.* ii. 210. B. tenacissima, *Gaud. Bot. Freyc. Voy.* 500; *Blume l. c.* 211, t. 56. B. candicans, *Hassk. Pl. Jav. Rar.* 203. Urtica

nivea, *Linn. Sp. Pl.*; *Jacq. Hort. Vind.* t. 166; *Wall. Cat.* 4606. U. tenacissima, *Roxb. Fl. Ind.* iii. 590; *Wight Ic.* t. 688. U. candicans, *Burm. Fl. Ind.* 297; *Blume Bijd.* 503. U. utilis, *Hort.* Procris nivea, *Gaud. l. c.* 499.

Cultivated in the warmer parts of INDIA, especially Assam and Bengal.—DISTRIB. Native of the Malay Islands, China and Japan.

A shrub with herbaceous shoots; branches and petioles softly hairy. *Leaves* 3–6 in.; above subscabrid, beneath white with densely appressed hairs; base cuneate or subcordate; teeth triangular often up-curved; petiole 1½–4 in.; stipules subulate, deciduous. *Panicles* shorter than the petiole, sessile; fem. upper. *Styles* exserted, hairy.—Weddell distinguishes as β. *candicans* the form under this name, and that of *tenacissima*, by the more robust habit, larger longer petioled concolorous leaves.

5. **B. rugulosa,** *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 200; *Monogr.* 373; *DC. Prodr.* xvi. i. 207; dicœcious, leaves alternate coriaceous elliptic-lanceolate acuminate crenulate strongly 3-nerved, above smooth or rugulose glabrous, beneath pale finely velvety-pubescent, stipules connate, clusters in simple spikes each with a cordate bract, fem. short simple pendulous, fem. perianth elliptic compressed ciliate. *Brand. For. Fl.* 403; *Blume Mus. Bot.* ii. 212. B. nervosa, *Madden in Journ. As. Soc. Beng.* xvii. i. 587. Urtica rugosula, *Wall. Cat.* 4597. U. venosa, *Wall. Cat.* 460 B.

SUBTROPICAL HIMALAYA; from Garwhal to Bhotan, alt. 2–4000 ft., *Wallich*, &c.

A small tree, branchlets robust, glabrous, petioles and leaves beneath hoary or yellowish white, bark wrinkled pale. *Leaves* 3–5 in., teeth obtuse, nerves penni-nervuled, nervules anastomosing; stipules ovate; petiole ½–1 in., stout. *Fl. clusters* pisiform; receptacle hirsute. *Achenes* elliptic, stipitate, acute at both ends, ventricose.—Dr. King sends as var. *tenuis* a Sikkim plant with thinner ovate coarsely serrate perfectly glabrous leaves 3–5 in. long; it is in male fl. only. Clarke gathered the same at 7000 ft. elevation, and refers it to *malabarica*, but its inflorescence is spicate. It appears to me to be quite a different species.

†† *Leaves opposite* (*and alternate in* B. platyphylla).

6. **B. macrophylla,** *Don Prodr.* 60; monœcious, leaves opposite lanceolate caudate-acuminate serrulate base acute above sparsely hispid rugulose and pustular, beneath softly or hispidly pubescent or glabrate, spikes elongate pendulous leafless simple or branched below, clusters with lanceolate bracts, fruit obovate-cuneate compressed ciliate with a 2–4-toothed neck. *Wedd. Monogr.* 375, t. 11, f. 1–9; *DC. Prodr.* xvi. i. 209; *Brand. For. Fl.* 403; *Kurz For. Fl.* ii. 424; *Blume Mus. Bot.* ii. 217. B. penduliflora, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 199. Urtica penduliflora, *Wall. Cat.* 4595. U. angustifolia, *Ham. mss.*, and U. macrostachya, *Wall mss.*, *ex Don l. c.* U. pulcherrima, *Wall. Cat.* 4596.

SUBTROPICAL HIMALAYA, from Kumaon to Mishmi, ascending to 4000 ft. KHASIA MTS., alt. 2–4000 ft. AVA HILLS, *Kurz.*

A shrub or small tree; branchlets stout, obtusely 4-angled, glabrous or strigose. *Leaves* 6–12 in., teeth obtuse, pustules on surfaces often perforate; upper surface sometimes bullate, under with deep hollows between the nervules; petiole ½–1 in., strigose or glabrous; stipules lanceolate, midrib hairy. *Spikes* shorter than or equalling the leaves; clusters globose, ⅛–¼ in. diam.

7. **B. Kurzii,** *Hook. f.*; quite glabrous except the spikes, leaves opposite elliptic-oblong or lanceolate acuminate quite entire subsilvery beneath 3-nerved, spikes very slender simple tomentose, fruit very minute

pedicelled narrowly ellipsoid beaked villous much shorter than the slender style.

PEGU, *Kurz.*

Branches slender. *Leaves* 5–7 by 2–2½ in., coriaceous, finely reticulate, base acute; nerves strong, somewhat glandular in the axils beneath; petiole ½–1½ in., rather stout. *Spikes* about equalling the leaves; male fl. villous.—Near *B. macrophylla*, but quite glabrous, with much more slender spikes, and smaller villous fruits with a longer style. The leaves more resemble *B. rugulosa*, but are opposite and quite entire. Kurz has named one specimen *B. Hamiltoniana*, Wedd., and another "nov. sp." In Herb. Calcutt. it is called var. *Kurzii* of *B. platyphylla*. I think there are traces of crenatures in some of the leaves, but they are very obscure.

8. **B. platyphylla,** *Don Prodr.* 60; monœcious or diœcious, leaves mostly opposite broadly ovate elliptic or orbicular acuminate or caudate coarsely toothed pubescent tomentose scaberulous or glabrate on both surfaces, base rounded or cordate, spikes usually longer than the leaves simple or sparingly branched, fruit compressed or angled. *Wedd. Monogr.* 364; *DC. Prodr.* xvi. i. 210; *Brand. For. Fl.* 403; *Maximov. Diagn.* xx. 641.

TROPICAL and SUBTROPICAL HIMALAYA, *from* Simla eastwards, ascending to 7000 ft., and southwards to BEHAR and TRAVANCORE on the West, and TENASSERIM on the East. CEYLON; ascending to 6000 ft.—DISTRIB. Malay Islands, China, Japan, Africa.

Shrubby, branches soft, glabrous or substrigose. *Leaves* 3–9 in., teeth usually large, triangular; 3 nerves all penninervuled; petiole 1–5 in. *Fl. clusters* pisiform. *Fruit* narrowed or beaked at the 4-toothed tip.—A most variable plant. B. andis makes three principal varieties of the North-Western forms: 1. *macrostachya*, with long-petioled leaves and simple fem. spikes; 2. *rotundifolia*, with orbicular cuspidate leaves; 3. *scabrella*, with smaller leaves and shorter spikes. Weddell enumerates still other forms, which may be approximately defined as follows.

B. PLATYPHYLLA PROPER; leaves rounded sparsely hispid or pubescent, base eglandular, fem. spikes very long pendulous. B. macrostachya, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 199; *Blume Mus. Bot.* ii. 224. B. Wightiana, *Blume l. c.* 217. B. mauritiana, *Wedd. l. c.* 200; *Blume l. c.* 216. B. caudata, *Poir. in Bonpl. Jard. Malm.* t. 15; *Kurz l. c.* 424. Splitgerbera macrostachya, *Wight Ic.* t. 1977. Urtica macrostachya, *Wall. Cat.* 4582 (*excl.* D). U. platyphylla, *Ham. mss.*

Var. *zeylanica,* Wedd. in DC. l. c. 211; leaves membranous elliptic ovate or ovate oblong caudate-acuminate crenate serrate throughout sparsely hispid above, nerves beneath hairy, spikes simple much shorter than the leaves.—Ceylon, *Thwaites,* with var. *scabrella*, under C. P. 2197.

Var. *scabrella*, Wedd. l.c.; leaves orbicular elliptic or obovate cuspidate usually rugose above and lacunose beneath, spikes short subsimple erect. B. scabrella, *Gaud. Bot. Freyc. Voy.* 499; *Miquel Fl. Ind. Bat.* i. ii. 252. B. ourantha, *Miq. Pl. Jungh.* i. 33; *Blume l. c.* 221. Splitgerbera scabrella, *Dalz. & Gibs. Bomb. Fl.* 239. Urtica caudata, *Burm. Fl. Ind.* 198; *Blume Bijd.* 492. U. scabrella, *Roxb. Fl. Ind.* iii. 581; *Wight Ic.* t. 691; *Wall. Cat.* 4581. U. uragera, *Steud. Nomencl.* ii. 736.—All India, common.—Clarke (Journ. Linn. Soc. Bot. xv. 125) considers this a very distinct species.

Var. *rugosissima,* Wedd. l. c. 212; leaves coriaceous rugose serrate throughout hispid above pubescent beneath, spikes subfascicled shorter than the leaves. B. rugosissima, *Miquel Pl. Jungh.* i. 32; *Fl. Ind. Bat.* i. ii. 251; *Blume Mus. Bot.* ii. 222. Urtica rugosissima, *Reinwdt. in Blume Bijd.* 490.—Ceylon, Sumatra, Java.

Var. *tomentosa,* Wedd. l. c.; leaves subcoriaceous acutely serrate softly tomentose or villous on both surfaces, teeth medium-sized? spikes simple often short and very stout. B. tomentosa, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 200.—Khasia Mts., alt. 4–5000 ft., Sikkim and Bhotan.

Var. *rotundifolia*, Wedd. l. c. 212; leaves broadly elliptic ovate or rounded cuspidately caudate tail often long and broad tomentose pubescent hispid or smooth, teeth usually very large sometimes confined to the upper part. B. rotundifolia, *Don Prodr.* 60. B. caudigera, *Wedd. l. c.* 199; *Blume l. c.* 219. Urtica caudigera, *Wall. Cat.* 4585. U. blanda, *Wall. mss.*—Himalaya, Khasia, the Concan, Ceylon.—Clarke (Journ. Linn. Soc. Bot. xv. 125) regards this as a very distinct species.

Var. *canescens*, Wedd. l. c. 213; leaves membranous hoary serrated to the base green when dry. B. canescens, *Wedd. l. c.* 200; *Blume l. c.* 224. B. ternifolia, *Don Prodr.* 59. Urtica macrostachya, *var.* canescens, *Wall. Cat.* 4582 D.—Kumaon, Nepal ("Herb. Madr." in *Wall. Herb.* is probably an error).

Var. *cinerascens*; stem slender flaccid hoary and with long spreading hairs, leaves membranous ovate toothed to the base, spikes short simple slender. Urtica cinerascens, *Wall. Cat.* 4591.—Nepal, *Wallich.* Duphla Hills, *Booth.*—Probably a shade-loving form passing into *U. Hamiltoniana*, but the teeth are larger.

Var. *longissima*; glabrous, leaves ovate or elliptic-oblong coarsely crenate-toothed base acute rounded or subcordate, petiole 3–6 in., spikes 12–18 in. extremely slender, fl. clusters very small hispid, beak of fruit long, style short.—Pulney Mts., *Wight* (*Kew Distrib.* 2707). Nilghiris, *Gardner.* Ceylon, *Walker.*

9. **B. Hamiltoniana,** *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 199; *Monogr.* 371; branches slender glabrous, leaves opposite membranous long-petioled lanceolate or oblong-lanceolate finely acuminate crenulate or serrulate or subentire, base acute or obtuse, petioles of opposite pairs usually very unequal, spikes simple very slender, fl. clusters small, styles shorter than or equalling the minute fruit. *Kurz For. Fl.* ii. 424; *Clarke in Journ. Linn. Soc. Bot.* xv. 124. B. platyphylla, *var.* Hamiltoniana, *Wedd. in DC. Prodr.* xvi. i. 213. Urtica Hamiltoniana, *Wall. Cat.* 4590 A, B?

Tropical Himalaya, from Nepal, *Wallich*, to Bhotan. Khasia and Mishmi Hills. Pegu and Martaban, *Kurz.*

Differs from the more flaccid green states of *B. platyphylla* in being more glabrous, the leaves subentire or with very small serratures. The axils of the basal leaf-nerves are often 2-glandular.—Hamilton's specimens are from Goalpara (Assam), and more hairy than the others with leaves 7 by 3 in.

10. **B. polystachya,** *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 200; *Monogr.* 370; *DC. Prodr.* xvi. i. 215; glabrous, branches stout, leaves large opposite or alternate coriaceous flat broadly ovate ovate-cordate or orbicular acuminate or cuspidate rather coarsely crenate or toothed from above the base, spikes panicled much shorter than the leaves, fruit sessile hispid, style short. *Clarke in Journ. Linn. Soc. Bot.* xv. 125. Urtica polystachya, *Wall. Cat.* 4584. U. venosa, *Wall. Cat.* 4602 A.

Temperate Himalaya; Kumaon, alt. 7000 ft., *Duthie*; Nepal, *Wallich*; Sikkim, alt. 4–9000 ft., *J. D. H.*, &c.; Bhotan and Mishmi Hills, *Griffith.* Khasia Mts., alt. 4–5000 ft., *Griffith*, &c. Ava, *Wallich.*

A robust shrub. *Leaves* 5–12 by 2½–6 in.; petiole stout, 2–5 in. *Spikes* often shorter than the petioles, erect even in fruit.—Weddell in DC. Prodr. says of this that he formerly saw it in Herb. Wall., and then thought it a form or subvar. of *platyphylla.* It is, however, a much more temperate plant, and with Clarke I think it must be regarded as distinct. Wallich's Ava specimen is named *B. rugulosa* by Weddell, but the leaves are strictly opposite. The specimen is not in flower.

DOUBTFUL SPECIES.

The following Indian species amongst others recklessly founded by Blume (Mus. Bot. ii. 216, &c.), often on very imperfect materials, are no doubt, as Weddell thought they probably are, varieties of *B. platyphylla.*

B. heteroidea, *Bl.*, East Indies, *Helfer*, has the perianth winged and achene with a thickened margin.

B. CUSPIDATA, *Bl.*, from Nepal.

B. SPICIFLORA, *Bl.* (Caturus spiciflorus, *Herb. Jacq. f., not of Linn.*), East Indies.

B. HUGELIANA, *Bl.*, East Indies, *Hugel.*

B. SUBPERFORATA, *Wedd. Monogr.* 383 (Urtica subperforata, *Wall.*).

35. **CHAMABAINIA,** *Wight.*

A slender diffuse herb. *Leaves* opposite, toothed, 3-nerved; stipules in pairs large, orbicular, scarious, enclosing the young flower-clusters, persistent. *Flowers* 4-merous, in axillary clusters; perianth, &c., as in *Bœhmeria*, but stigma ovate fimbriate spreading.

C. cuspidata, *Wight Ic.* t. 1981; *Wedd. Monogr.* 387, t. 12. C. squamigera, *Wedd. in DC. Prodr.* xvi. i. 218. Bœhmeria squamigera, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 203. Urtica squamigera, *Wall. Cat.* 4592.

TROPICAL HIMALAYA; Garwhal, alt. 2–7000 ft., from Kumaon eastwards to Sikkim, alt. 4–8000 ft. KHASIA HILLS, alt. 4–5000 ft. NILGHIRI HILLS, *Wight*, &c. CEYLON, *Thwaites.*

Stem rooting and branching, more or less pubescent, branches ascending. *Leaves* ½–2 in., membranous, ovate, acute, serrate, base rounded or cuneate 3-nerved, glabrous or sparsely pubescent above, more so beneath; petiole $\frac{1}{6}$–½ in.; stipules 4 at each node, very conspicuous, brown when dry. *Male fl.* in the upper axils, shortly pedicelled; sepals hairy, mucronate. *Fem. fl.* in dense clusters; bracteoles small, lanceolate; perianth hirsute, compressed. *Achene* compressed, ovate, acute.—Closely resembles *Droguetia diffusa* in habit and foliage.

36. **POUZOLZIA,** *Gauz.*

Characters of *Bœhmeria*, but with the flowers in axillary clusters, never in naked spikes, and the slender style jointed on to the top of the ovary and deciduous.—Species estimated at about 50, but reduceable to a very much smaller number, all tropical, chiefly Asiatic.

The Indian species of this genus are extraordinarily variable, and have been inordinately multiplied by Wight and Blume, the former of whom, however, first detected the fact overlooked by previous authors, that winged and wingless perianths occurred in fruits of the same clusters. Bennett's descriptions of Wallich's species in the "Flora Javæ" are quite insufficient, and overlooked the facts that winged and wingless fruits afforded no specific character, and that tetrandrous and pentandrous flowers was a remarkably constant one; it is further evident that he did not work upon the original set of Wallich's plants in the Linnean Society, for the numbers and habitats of some of these plants which he cites, on Wallich's authority, are not those attached to the specimens in that Society's possession. Weddell does not appear to have consulted Wallich's Herbarium, or he could not have confounded the northern *P. hirta* (or *quinquenervis*) with the common Deccan species. I have been fortunate in finding in Wight's Herbarium types of all the species he figured in his Icones. These were evidently published in great haste, at the very end of his Indian career, and without due consideration; in which respect his treatment of the genus is a remarkable deviation from the standard of that invaluable work.

Phenax pentandrus, *Blume* (P. Sonneratii, *Wedd.*; Pouzolzia Sonneratii, *Gaud.*), widely distributed tropical American plant closely allied to *Pouzolzia*, has been collected in India (Madras?) by Sonnerat and by Helfer in Tenasserim (*Kew Distrib.* 4584). It differs from *Pouzolzia* in the minute fem. perianth and conspicuously in the numerous broad imbricating scarious bracts which surround the flowers.

SECT. I. POUZOLZIA *proper*. Lobes or segments of the *male perianth* convex or gibbous at the back.

* Leaves toothed or serrate, base 3-nerved, nerves branching.

1. **P. viminea,** *Wedd. in DC. Prodr.* xvi. i. 228; *Brand. For. Fl.* 405; *Kurz For. Fl.* ii. 425. P. borbonica, *Wight Ic.* t. 2100, f. 44. P. ovalis, *Miq. Pl. Jungh.* i. 24, and *Fl. Ind. Bat.* i. ii. 259; *Wedd. Monogr.* 410. Bœhmeria viminea, *Wall. mss.*; *Blume Mus. Bot.* ii. 202. B. sanguinea, *Hassk. Hort. Bogor.* 367. B. ovalis, *Miq. in Zoll. Syst. Verz.* ii. 100. ? B. frondosa, *Don Prodr.* 59. Urtica viminea, *Wall. Cat.* 4616 (*in part*). U. sanguinea, *Blume Bijd.* 501. U. Chiple, punctata & parvifolia, *Ham. mss.* Margarocarpus vimineus, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 203. Leptocnide borbonica, *Blume Mus. Bot. l. c.* 294.

TROPICAL and SUBTROPICAL HIMALAYA, from the Sutlej eastwards, ascending to 7000 ft. in Sikkim; and from ASSAM to TENASSERIM and PERAK.—DISTRIB. Malay Islands.

Shrubby or subarboreous; branchlets and petioles pubescent or strigose. *Leaves* ½–5 in., alternate, ovate- or oblong-lanceolate, acuminate, above smooth or scaberulous, beneath strigose or pubescent with a grey or white tomentum; petiole ½–2 in. *Flowers* in axillary clusters, pubescent or hoary, stamens 4. *Fruit* angled and obscurely margined.—In Weddel's var. *fulgens*, the leaves are often snow-white beneath.

** Leaves quite entire, lateral nerves more or less branched.

2. **P. indica,** *Gaud. in Freyc. Voy. Bot.* 503; leaves opposite or alternate ovate to lanceolate, nerves one pair above the 3 basal sparingly branched, fruit with a 2-fid beak. *Wedd. Monogr.* 398, t. 13 B, and in *DC. Prodr.* xvi. i. 220; *Benn. Pl. Jav. Rar.* 67; *Wight Ic.* t. 1980, f. 1, 2100, f. 40; *Dalz. & Gibs. Bomb. Fl.* 240. P. suffruticosa, *Wight Ic.* vi 43, and P. procumbens, t. 2099, No. 35. P. parva, *Blume Mus. Bot.* ii. 234. Parietaria indica, *Linn. Mant.* 128. Urtica triplinervis & glomerata, *Wall. Cat.* 4617, 4619. U. suffruticosa, *Roxb. Fl. Ind.* iii. 583; *Wall. Cat.* 4618; *Wight Ic.* 694.

Throughout TROPICAL and SUBTROPICAL INDIA, from the Indus (at Iskardo, alt. 8000 ft., *Clarke*), eastward to Burma, and southward to Malacca and CEYLON.—DISTRIB. Malay Islands, China.

A perennial rooted herb; erect or prostrate, hoary pubescent hirsute or glabrate; stem stout or slender. *Leaves* ½–1 rarely 2–4 in., membranous, obtuse acute or acuminate, base usually very acute; petiole ⅛–1 in. *Flowers* in axillary clusters, strigose with simple or hooked hairs; stamens 4 rarely 5. *Fruit* subequally ribbed, winged or not.—Of the following varieties *P. angustifolia* is the only well-marked one.

VAR. *angustifolia*, Wedd. in DC. l. c. 221; tall, leaves mostly alternate, narrowly lanceolate or ovate-lanceolate. P. angustifolia, *Wight Ic.* t. 2100, f. 39. P. glomerata, *Hassk. Cat. Hort. Bogor.* and *Wedd. Monogr.* 401.—Malacca and Perak.

VAR. *alienata*, Wedd. l. c.; leaves mostly opposite long-petioled ovate base rounded. P. alienata, *Gaud. l. c.* P. zeylanica, *Benn. l. c.* 67; *Wight Ic.* t. 2101, f. 45. P. tenuis & heterophylla, *Blume Mus. Bot.* ii. 233, 237. Boehmeria alienata, *Willd. Sp. Pl.* iv. 341. B. nana, *Don Prodr.* 60. Urtica alienata, *Linn. Syst. Ed.* 13, 709; *Roxb. Fl. Ind.* iii. 582; *Wight Ic.* t. 693. U. nana, *Ham. mss.* Parietaria zeylanica, *Linn. Fl. Zeyl.* n. 371, and *Sp. Pl.* 1492.—Common in India.

VAR. *tetraptera*, Wedd. l. c. 222; leaves larger mostly alternate hairy on both surfaces, petiole short, fruit usually with 4 wings produced upwards. P. tetraptera, minor, pilosa, Johnsoniana & pyramidata, *Wight Ic.* t. 2100, fs. 42, 43, 46, 47, 48. P. trichophora, *Hohenack. Herb. Ind. Or.* No. 179.—Common in the Deccan.

VAR. *diffusa*; creeping or prostrate or with the branches ascending, leaves all opposite elliptic or ovate, stamens usually 5, fruit ribbed and narrowly 4-winged. P. diffusa, *Wight Ic.* t. 2099, f. 36; *Wedd. Monogr.* 394, and in *DC. l. c.* 226.—Nilghiris.

VAR. *microphylla*, procumbent, diffuse, leaves $\frac{1}{2}$ in. opposite subsessile ovate acute base rounded or cordate appressed villous on both surfaces, fruit ribbed and narrowly winged. P. microphylla, *Wight Ic.* t. 2098, f. 30; *Wedd. Monogr.* 397, and in *DC. l. c.* 227.—Malacca, *Griffith.*

3. **P. tuberosa,** *Wight Ic.* vi. i. 43; root of large tubers, stems flaccid 4-angled, leaves opposite below ovate to lanceolate acuminate hairy, stamens 4, fruit smooth or ribbed. *Wedd. Monogr.* 402, and in *DC. l. c.* 222. Urtica tuberosa, *Roxb. Fl. Ind.* iii. 583; *Wight Ic.* t. 697.

The CIRCARS, *Roxburgh.*

Root in Roxburgh's drawing, copied by Wight, 6 by $2\frac{1}{2}$ in. diam. with basal rootlets. *Stems* 1–6 ft., flaccid, prostrate or climbing. *Leaves* 1–3 in. petiole $\frac{1}{3}$–$\frac{2}{3}$ in.—Weddell (probably rightly) suggests this being a form of *P. indica*, of which the root according to Blume is somewhat tuberous. I have seen a rootless authentic specimen from Roxburgh in Herb. Bentham (from Herb. Forsyth); which in no way differs from *P. indica*; and a specimen of *P. indica* in Herb. Wallich (under *Urtica glomerata*, No. 4069) has a tuberous root $1\frac{1}{2}$ in. long.

4. **P. vesicaria,** *Wight Ic.* vi. 43; shrubby, erect, stem 4–6 ft., stout, leaves alternate broadly lanceolate acuminate narrowed into the short petiole, stamens 4, fruit with 6–7 basal inflated vesicles. *Wedd. Monogr.* 414, and in *DC. l. c.* 222. Urtica vesicaria, *Roxb. Fl. Ind.* iii. 587; *Wight Ic.* t. 695.

The CIRCARS, *Roxburgh.*

Stem 4–6 ft., somewhat winding, bark smooth ashy. *Leaves* 2–3 by 1 in.—Only known from Roxburgh's drawing and Wight's copy of it. I quite expect that it is a form of *P. indica.*

5. **P. auriculata,** *Wight Ic.* 1980, f. 2, and 2099, f. 37; leaves alternate long or short petioled broadly or narrowly ovate or ovate-lanceolate acute or acuminate, nerves many branching, stamens 5. *Wedd. Monogr.* 393, and in *DC. l. c.* 225. P. Rheedii, *Wight Ic.* t. 2099, f. 38. P. rostrata, 1980, f. 3, and 2099, f. 34. P. rotundifolia, t. 2068, f. 31. P. elliptica, t. 32, bicuspidata, f. 33, and scabrida, t. 2100, f. 41. P. propinqua, *Blume Mus. Bot.* ii. 230.

CENTRAL INDIA, at Singhboom, *Clarke.* EASTERN and SOUTHERN DECCAN, *Wight*, &c. CEYLON, common.

Usually tall, stout or slender, flaccid or stout. *Leaves* 1–5 in., pubescent on both surfaces; petiole 1–3 in., base usually acute. *Fruit* strigose, very variable, of which Wight's figures represent the extremes,—thus in *P. bicuspidata* and *elliptica* it is not winged; in *rotundifolia* the wings are semicordate; in *scabriada* they are narrow from above the middle to the tip. Weddell makes two varieties, one of *Rheedii* with broad triangular wings truncate above; the other of *P. rostrata*, with similar wings produced upwards.

VAR. *cymosa*, leaves all opposite short petioled, base rounded or cordate, flowers in short spreading cymes. P. cymosa, *Wight Ic.* t. 1979, f. 2; *Wedd. Monogr.* 396, and in *DC. l. c.* 227. Elkania multinervis, *Schlecht. mss.*.—Nilghiri Hills, *Wight*, *Clarke.*—Different as extreme states of this with subsessile leaves and lax-fld. peduncled cymes are from *P. auriculata*, it is united to that species by intermediates.

SECT. II. MEMORIALIS. Lobes or segments of the *male perianth* usually abruptly inflexed about the middle, transversely angled or plaited at the

flexure, buds hence truncate. *Leaves* quite entire; primary nerves 3, simple, running to the tip of the leaf or near it.

* *Stem* terminating in a bracteate spike the leaves becoming gradually or suddenly smaller (upper leaves not greatly smaller in *P. Wightii* var. *acuta*).

6. **P. pentandra,** *Benn. Fl. Jav.* 64, t. 14; nearly glabrous, stem terete below angular above, leaves rather membranous sessile or petioled, lower opposite oblong to linear-lanceolate obtuse acute or acuminate entire, upper gradually smaller mostly alternate imbricate, stamens 5, fruit with 3-broadly membranous wings. *Wight Ic.* t. 2096, No. 20; *Blume Mus. Bot.* ii. 242; *Dalz. & Gibs. Bomb. Fl.* 240. Memorialis pentandra, *Wedd. in DC. Prodr.* xvi. ii. 235²; *Boiss. Fl. Orient.* iv. 1148. M. ciliaris, *Ham. mss.*; *Wedd. Monogr.* 417. Urtica pentandra, *Roxb. Fl. Ind.* iii. 583; *Wall. Cat.* 4598 (*excl.* B); *Wight Ic.* t. 696. U. hippurioides, *Griff. Itin. notes*, 362. Gonostegia oppositifolia, *Turcz. in Bull. Soc. Hist. Nat. Mosc.* 1846, ii. 510. Hyrtanandra pentandra & javanica, *Miq. Pl. Jungh.* i. 25, and *Fl. Ind. But.* i. ii. 26. Boehmeria melastomoides, *Griff. Notul.* 386; *Ic. Pl. Asiat.* iv. 563, f. 2.

TROPICAL HIMALAYA from Kangra, eastwards to ASSAM, the KHASIA MTS. and BENGAL, and southwards to ORISSA and CANARA.—DISTRIB. Afghanistan, ? China, Java.

Annual; stem stout, 2–3 ft., glabrous or hispidulous, erect or more slender and decumbent, often branched. *Leaves*, cauline ½–4 in., base rounded or cordate, usually rigid, nerves 3 strong, hispidulous beneath, margins ciliolate; stipules short; floral leaves linear-oblong ovate or cordate. *Male fl.* pedicelled, truncate in bud with a concave top, ciliate, with often hooked hairs at the flexure; fem. perianth simple or 2–3-winged, very variable.—The following forms all pass into one another.

P. PENTANDRA PROPER; diffusely branched, stem prostrate below, leaves 1–4 in. lanceolate or linear-oblong, floral similar but much smaller. P. pentandra, *Roxb. l. c.*

VAR. *Stocksii*, branches very slender flaccid quite glabrous, leaves glabrous or nearly so, lower floral larger. P. integrifolia, β, *Dalz. in Herb. Hook.* Mem. pentendra var. Dalzellii, *Wedd in DC. l. c.* P. Stocksii, *Wight Ic.* vi. p. 41, n. 18. The Concan and Deccan.—I identify this by specimen and drawing in Herb. Wight; there is no figure of it in the Icones, and I do not understand Weddel's citation, "Wight Ic. t. 2097, n. 28, sub *ramosissima*," which is, I think, true var. *ramosissima*.

VAR. *ramosissima*, *Wedd. in DC. l. c.* 235³; stem glabrous or scaberulous, usually tall robust and excessively branched above, floral leaves small ovate-cordate acuminate. P. ramosissima, *Wight Ic.* t. 2095, f. 17, and P. Dalzellii, t. 2096, f. 21.—The Concan.

VAR. *integrifolia*; perfectly smooth and glabrous, leaves 2–2½ in. sessile base cordate oblong-lanceolate acute soft, floral ½ in. ovate-lanceolate base cordate, margins of all perfectly smooth not ciliate. P. integrifolia, *Dalz. mss.*—The Concan? *Dalzell.* A large-leaved flaccid form, unlike any other.

VAR. *Walkeriana*; stem tall erect or suberect glabrous, leavea 3–6 in. petioled flaccid lanceolate or oblong-lanceolate acuminate, base acute, floral petioled large lanceolate, all smooth and scaberulous above, margins usually not ciliate, petiole ¼–⅛ in. P. Walkeriana, *Wight Ic.* t. 2095, f. 16, and glabra, f. 15. Memorialis aquatica, *Wedd. Monogr.* 418, and *DC. Prodr.* xvi. 1, 235³ (*excl. Syns. Moon*, and var. β. cordata). Hyrtanandra Walkeriana, *Thwaites Enum.* 261. Urtica pentandra, *Wall. Cat.* 4598 B.—Ceylon.—The long petiole and acute leaf base are very unlike any ordinary state of *P. pentandra*, but Thwaites sends specimens (No. 3372) with

sessile round-based leaves. Wallich's specimens are from the Calcutta Botanical Garden.

7. **P. Wightii,** *Benn. Pl. Jav. Rar.* 66; stem tall stout hoary or pubescent, lower leaves opposite or 3-nately whorled sessile or petioled from shortly oblong to narrowly lanceolate more or less scabrid above, upper similar or gradually smaller lanceolate or ovate-lanceolate often bractlike, stamens 4, fruit grooved wingless or broadly winged, wings opaque hairy.

Throughout the WESTERN DECCAN from the Concan southwards, *Heyne*, &c.

A taller usually more robust pubescent and larger leaved and bracted plant than *P. pentandra*, always tetrandrous, with leaves more or less scabrid above.—Under this must be included all the Deccan species with the leaves shorter upwards and 4 stamens. As with most other species its extreme forms are very definable, the more marked are

P. WIGHTII PROPER; stem pubescent or puberulous, leaves lanceolate base usually rounded hardly scabrid above, transverse nervules inconspicuous, male sepals more or less hairy above the flexure. P. Wightii, *Benn. l. c.*; *Wight Ic.* t. 2093, f. 8. P. ternata, *Benn. l. c.*; *Wight l. c.* 2093, f. 7. P. ambigua, *Wight l. c.* 2095, f. 19. P. trialata, *Wight l. c.* 2097, f. 22. P. concinna, *Wight l. c.* 2093, f. 9. Memorialis ternata & ambigua, *Wedd. Monogr.* 422, 430. M. cordata β, *Wedd. Monogr.* t. 13 A. M. concinna, *Wedd. in DC. Prodr.* xvi. 1, 235⁴. M. nilghirensis, β. trialata & ε. ternata, *Wedd. in DC. l. c.* Urtica ternata, *Heyne in Wall. Cat.* 4599.—I find no difference between the type specimens of Bennett's *P. Wightii* and *ternata*, and have retained the former of these names.

VAR. *lævifolia*; stem pubescent, leaves oblong-lanceolate coriaceous smooth above harshly tomentose beneath with strong cross-nervules, male sepals glabrous except the tips. P. nilghirensis, *Wight Ic.* t. 2096, f. 26 *in part.*—Iyamallay Hills, *Wight.*—This which is marked *P. nilghirensis* in Wight's Herb. differs in the perfectly smooth upper surface of the leaves.

VAR. *nilghirensis*; stem harshly tomentose or scabrid, leaves coriaceous elliptic ovate oblong or oblong-lanceolate subacute acute or acuminate scabrid above tomentose beneath, transverse nervules strong, male sepals hirsute above the flexure. P. ovata, oblongifolia & neilgheirensis, *Wight Ic.* t. 2097, f. 24, f. 25 and f. 26. Memorialis nilghirensis, *Wedd. Monogr.* 428; *DC. Prodr.* xvi. i. 235⁴ (excl. vars. β, γ and ε).—Nilghiri and Iyamallay Hills, *Wight.*

VAR. *Wallichiana*; characters of var. *nilghirensis* with ovate-lanceolate leaves, but floral leaves closer and longer, and male sepals glabrous, as in var. *lævifolia.* P. Wallichiana, *Wight Ic.* t. 2096, f. 23. Memorialis nilghirensis, var. Wallichiana, *Wedd. in DC. l. c.* Nilghiri and Iyamallay Hills.—Wight describes the leaves as nearly glabrous above but all the named specimens in his Herbarium have them very scabrid. Possibly the *lævifolia* is the *Wallichiana* of his description. No doubt intermediates between these three last forms are common. Wight describes *Wallichiana* as shrubby and 10–12 feet high in the Nilghiris, but seeking support.

VAR. *longifolia*; stem scaberulous not elongating at the tip, leaves ovate lanceolate from a cordate base membranous subscaberulous above puberulous beneath, upper rather smaller than the lower, flowers all axillary, male sepals hirsute above the flexure. P. acuta, *Wight Ic.* t. 2092, f. 2, and P. longifolia, 2093, f. 6. Memorialis ambigua, *Wedd. Monogr.* 430, *DC. Prodr. l. c.* 235⁸ (*excl. Syn. Wight*).—Malabar, &c.—This is I think only a form of *Wightii proper*, in which the stem does not elongate into a bracteate spike.

8. **P. scabra,** *Wight Ic.* t. 2097, f. 29; scabrid all over, stem tall erect, leaves opposite or ternately whorled sessile rigid from broadly ovate acute to ovate-lanceolate, flowers in slender or stout axillary and terminal panicled spikes, bracts $\frac{1}{6}$—$\frac{1}{3}$ in. ovate or cordate-ovate acuminate, stamens 4, fruit scabrid cordate 2-winged. P. aspera, *Wight l. c.* t. 2095, f. 18. Me-

morialis scabra, *Wedd. Monogr.* 423; *DC. Prodr.* xvi. i. 235[5]. Urtica foliolosa, *Wall. mss.*—*Herb. Hohenack.* No. 335.

DECCAN PENINSULA, Canara, near Mangalor, *Schmidt*; Anamallay Hills, *Wight, Beddome.* BURMA, at Taongdong, *Wallich.*

Stem 2–4 ft., rigid, terete, and everywhere more or less scabrid. *Leaves* 3–5 in., more or less rigid, 3–5-nerved. *Spikes* 12–18, very many-fld.; flowers in rather distant clusters; bracts very variable.—The Burmese specimens in Herb. Wallich are very poor, and bear no number, but the name *Urtica foliolosa.*

9. **P. caudata,** *Benn. Pl. Jav. Ra.* 66; glabrous or nearly so, stem tall erect slender, leaves opposite sessile or subsessile membranous oblong to lanceolate acuminate, flowers in slender short axillary and terminal panicled spikes, bracts $\frac{1}{6}$—$\frac{1}{3}$ in. ovate or ovate-lanceolate acuminate, fruit costate or 2-winged. *Wight Ic.* t. 2097, f. 27. P. courtallensis, *Wight l. c.* 2093, f. 10. P. bracteata, *Benn. l. c.* 67. Parietaria bracteata, *Wight mss.* Memorialis bracteata & caudata, *Wedd. Monogr.* 421 and 425 (*excl. figs.*); *DC. Prodr.* xvi. i. 235[5], 235[6]. Urtica caudata, *Wall. Cat.* 4600. U. bracteata, *Herb. Wight.*

DECCAN PENINSULA; Cochin, *Johnston.* Anamallay Hills, *Wight.*

Stem 2–3 ft., very slender, sparsely pubescent. *Leaves* 2–5 in., smooth, nearly glabrous, 3-nerved, base rounded or subcordate. *Spikes* 1–2 ft., almost filiform; flowers in rather distant small clusters, bracts very variable.

** *Stem* not running out into a bracteate spike. Leaves all subequal, flowers axillary. (See also *P. Wightii*, var. *longifolia*).

† *Flowers pentandrous.*

10. **P. Bennettiana,** *Wight Ic.* t. 1978; glabrous pubescent or tomentose, stem erect suberect or prostrate terete, leaves opposite or ternately whorled sessile or shortly petioled membranous from elliptic-ovate to lanceolate, stamens 5, fruit costate or with 2–4 membranous reticulate wings. Memorialis hirta, *Wedd. in DC. Prodr.* xvi. i. 235[6] (*excl. many syns.*). M. hispida, *Wedd. Monogr.* 426 (*excl. α*).

The DECCAN PENINSULA; from the Concan southwards. CEYLON, ascending to 6000 ft.

This is the common Deccan species, with upper leaves as large as the lower (hence with all the flowers axillary), pentandrous flowers, and fruit with membranous wings. It includes all the varieties included by Weddell under his *Memorialis hirta* except probably vars. ε. and ζ., of which I have seen no authentic specimens. There is no specimen of it in Wallich's Herbarium, and it is not described by Bennett. Weddell has confounded it with Bennett's *P. hispida*, which is a North Indian species (identical with his *quinquenervis*), which differs in the thick opaque wings of the fruit. In the absence of winged fruit I cannot distinguish forms of each, and as I find no winged fruits in the majority of North and Eastern India, nor in any of the Sumatran, Javan, Chinese, and Philippine Island specimens, I prefer to regard all these as referable to *hispida*, with which they agree better in habit than they do with *Bennettiana*. The following forms in their extreme states look very different; winged fruits are common in all but

P. BENNETTIANA PROPER; stem erect pubescent tomentose or glabrate, leaves 4–6 in. petioled lanceolate from a rounded base acuminate glabrous puberulous or scaberulous above, glabrous or pubescent beneath, male fl. nearly glabrous. P. Bennettiana, *Wight Ic.* t. 1978; *Blume Mus. Bot.* 245. P. quadrialata & heterocarpa, *Wight l. c.* 2094, f. 12, and f. 14. P. Hugeliana, *Blume l. c.* (*fide Weddell*). Elkania? *Hohenack Pl. Exsicc. Nilgh.*, No. 1045. P. sponiæfolia, *Schlecht. Pl. Exsicc. Ind. Or.*, No. 1045, and *Blume l. c.* 244 (*fide Weddell*). Memorialis hirta, β. Bennettiana, and δ. heterocarpa, *Wedd. in DC. l. c.* 235[7].

VAR. *tomentosa*; stem erect and leaves beneath villously tomentose, leaves 2–2½ in. sessile rather coriaceous ovate or lanceolate acuminate, male sepals hirsute above the flexure. P. tomentosa, *Wight Ic.* t. 2094, f. 11. Memorialis hirta γ. tomentosa, *Wedd. l. c.*—Nilghiri Hills.

VAR. *macrophylla*; stem stout and leaves beneath tomentose or villous, leaves large 5–8 by 1–1½ in. petioled flaccid 3–5-nerved lanceolate from an acute rounded or cordate base scaberulous above, male sepals villous above the flexure.—Wight has named this *Bennettiana* in his Herb., but it is very different-looking from his other specimens so named, though clearly only a form of these.

VAR. *Gardneri*; sparsely pubescent, shrubby, prostrate or decumbent with dark-brown ascending branches and leaves above, leaves 2–5 in. opposite petioled ovate or oblong acute or acuminate base acute or rounded, stipules large acuminate brown, male sepals hispid above the flexure. P. Gardneri, *Wight Ic.* t. 2092, f. 3. P. Gardneri & obscura, *Blume Mus. Bot.* ii. 240, 241.—Ceylon, Central Province, alt. 4–6000 ft. Nilghiri Hills, Wight (Kew. Distrib. 2695).—Wight describes the stem as erect and somewhat ramous, but in the numerous specimens they are obviously prostrate or decumbent. His Nilghiri specimens are unnamed. Thwaites mentions a form with leaves not exceeding 4 in. and closely resembling *P. triandra.* In habit, foliage, colour, and the large stipules *Gardneri* is by far the most distinct form of *Bennettiana*, though both Weddell and Thwaites refer it to that species.

VAR. *ovalifolia*; stem prostrate slender glabrous branched from the base, leaves 1½–2 in. opposite membranous shortly petioled elliptic-ovate acuminate scaberulous above smooth beneath, stipules short broad, male perianth glabrous or nearly so. P. ovalifolia, *Wight Ic.* t. 2092, f. 3.—Alpine jungles, *Wight.* Belgaum, on Cheeta hill, *Ritchie.*—This closely resembles forms of *P. hirta.*

VAR. *quadrialata*; stem woody stout prostrate or decumbent, branches ascending and leaves beneath tomentose, leaves 1–3 in. opposite shortly petioled ovate to lanceolate acuminate softly pubescent above young silky, male sepals tomentose or villous above the flexure. P. quadrialata, *Wight Ic.* t. 2094, f. 12.—Nilghiri Hills, *Schmidt*, and *Herb. Wight.*—This form is omitted by Wight in the text of his Icones. The specimen so named in his Herbarium was probably received (like that in the Hookerian Herbarium, of which it is the counterpart) from the Rev. Mr. Schmidt.

VAR. *mysorensis*; stem slender 4-angled glabrous, leaves 3–6 in. opposite flaccid rather long-petioled elliptic or oblong-lanceolate acuminate base rounded or acute glabrous on both surfaces, male fl. quite glabrous, fruit costate. V. mysorensis, *Wight Ic.* t. 2092, f. 4 (*excl. magnified leaves*). Memorialis mysorensis, *Wedd. Monogr.* 428. M. hirta, *var.* mysorensis, *DC. Prodr.* xvi. 1, 235⁷.—CANARA, on the Bababooden Hills, *Law, Stocks.*—The flaccid habit is that of *P. Wightii* var. *longifolia.* Wight describes and figures the leaves as hairy, but the figure represents perfectly glabrous 3-nerved leaves of the natural size, and magnified portions of leaves with hairy surface and 4 nerves in each, and which as the portions do not extend to the midrib would indicate a 9-nerved leaf. I find traces of hairs in the very young leaves, and cilia in the margin of some mature ones. I suspect it is only a form growing in moist places.

11. **P. hirta,** *Hassk. Cat. Hort. Bogor.* 80; suberect or decumbent, stem glabrous pubescent or hispidulous, leaves 1–6 in. opposite sessile or shortly petioled lanceolate or oblong-lanceolate from a rounded or cordate base 3–5-nerved rarely ovate or shortly oblong and scaberulous above, sepals 5 ciliate at the flexure or glabrous, stamens 5, fruit lanceolate black costate, or perianth with 2–3 thick opaque nerveless wings. *Blume Mus. Bot.* ii. 239. P. hispida & quinquenervis, *Benn. Pl. Jav. Rar.* 66. P. quinquenervis, *Benth. Fl. Austral.* vi. 187. Memorialis quinquenervis, *Ham. in Wall. Cat.* 4601; *Wedd. in DC. Prodr.* xvi. 235⁸; *Benth. Fl. Hongk.* 322. M. hispida (*a* only) & quinquenervis, *Wedd. Monogr.* 426, 429. M. hispida, *Herb. Ham.* Hyrtanandra hirta, *Miquel Pl. Jungh.* 26; *Fl. Ind. Bat.* i. ii. 261. Urtica hirta, *Blume Bijd.* 495.

Tropical Himalaya, from Chamba, *Thomson*, eastwards, ascending to 5500 ft. in Kumaon and 7000 in Sikkim. Assam, the Khasia Hills, alt. 1–5000 ft., Cachar and the Jhelees. Behar, on Parusnath, alt. 3000 ft., *Clarke*. Nicobar Islands (*Kurz*).—Distrib. China, Malay Islands, Australia.

Stem 6 in. to 3 ft., often branched, slender and decumbent or subscandent. *Leaves* usually membranous, 3-nerved, with rarely a short extra basal pair; stipules broad, shortly acuminate. *Fruit* very variable in size and breadth, dull black when ripe, with strong ribs; achene black or white, shining.—I can find no character whereby to separate the common N. Indian *P. quinquenervis* from the Malayan *P. hirta*, except in that winged fruits occur here and there in specimens of the former, but never in the latter. On the other hand, winged fruits precisely like those of the Indian occur in a tropical Australian plant referred by Bentham, rightly I think, to *P. quinquenervis*, from which it differs only in a more robust habit. I have seen no specimens of *P. hirta* from the Deccan proper, though it may occur in Canara, as it does in Behar, which is the northern limit of the Deccan Flora. *P. Bennettiana*, var. *ovalifolia*, is very like states of it, except that it has transparent veined wings of the fruit.

** *Flowers* 2–4-*androus*.

12. **P. integrifolia,** *Dalz. in Hook. Journ. Bot.* iii. (1851) 134; nearly glabrous or sparsely hairy, stem slender compressed, leaves 2–5 in. opposite and ternately whorled sessile membranous triangular-lanceolate from a broad usually cordate subamplexicaul base 3-nerved, stamens 3–4, fruit costate or with 2–3 membranous wings. *Wight Ic.* t. 2979; *Dalz. & Gibs. Bomb. Fl.* 240. Memorialis integrifolia, *Wedd. in DC. Prodr.* xvi. i. 235[8]. M. Dalzellii, *Wedd. Monogr.* 431.

The Concan and Deccan; Belgaum, *Ritchie*; Phoonda Ghat on the Syhadree Mts., *Dalzell*. Canara; on the Bababoodan Hills, *Law*.

Somewhat shrubby, 3–4 ft., root thick (*Dalzell*). *Stem* with 2 lines of hairs. *Leaves* very thin, apparently flaccid when fresh, very sparsely hairy above, ciliate, narrowed from just above the sometimes 5-nerved base to the tip, young more hairy; stipules short, broad. *Male sepals* ciliate at the flexure.—The membranous leaves of an elongate triangular shape with sessile truncate or cordate bases are the best characters for this plant. Ritchie's and Law's specimens have smaller harsher leaves sometimes ovate or oblong with rounded bases, passing into *P. Bennettiana*, var. *ovalifolia*.

This is probably another form of *P. Wightii*. I have seen no winged fruits, only a lanceolate black acutely ribbed achene.

13. **P parvifolia,** *Wight Ic.* t. 2092, f. 1; procumbent, diffusely branched and rooting, stem very slender, leaves $\frac{1}{4}$–$\frac{1}{2}$ in. opposite subsessile elliptic or ovate acute or acuminate more or less strigosely hairy 3-nerved, stamens 2–3, fruit very minute costate. P. triandra, *Blume Mus. Bot.* ii. 241. Hyrtanandra triandra, *Miquel Fl. Ind. Bat.* i. ii. 262; *Thwaites Enum.* 261. Memorialis parvifolia, *Wedd. Monogr.* 432; *DC. Prodr.* xvi. i. 235[9]. M. triandra, *Wedd. in DC. l. c.* Urtica triandra, *Blume Bijd.* 496.

Ceylon; at Newera Elia, *Walker*, &c.—Distrib. Java.

Stems 6–12 in., spreading from the root, almost filiform, flaccid, more or less pubescent or hirsute. *Leaves* green when dry, paler beneath; stipules short, broad, persistent. *Flowers* minute, solitary or few together; male sepals ciliate at the flexure. *Fruit* 4–5-costate.

DOUBTFUL SPECIES.

P. confinis, *Blume Mus. Bot.* ii. 230; *Wedd. in DC. Prodr.* xvi. i. 227.—East

Indies.—It is impossible to identify this by Blume's description. It is said to be allied to *scabrida*, Wt. (*auriculata*, Wt.), but to differ in the angled branches.

P. ORIENTALIS, *Wedd. Monogr.* 413, and in *DC. l. c.* 222 (Leucococcus orientalis, *Liebm. in Kœnigl. Dansk. Vidensk. Selsk. Skr. V. Math.* ii. 312).—This, which Liebman describes as a tree from Tranquebar, *Rottler*, is undeterminable; it is probably not a *Pouzolzia*.

P. ROTHIANA, *Blume l. c.* 231; *Wedd. in DC. l. c.* 226, said to be closely allied to *P. minor*, Wight (*P. indica* var. *tetraptera*), is undeterminable.

37. **DISTEMON,** *Wedd.*

A very slender erect annual herb. *Leaves* alternate, petioled, coarsely toothed, 3-nerved and penninerved. *Flowers* monœcious, in small bracteate 3-fld. androgynous clusters which form slender axillary and long terminal spikes. MALE FL. *Perianth* campanulate, 2–3-fid, valvate. *Stamens* 2–3, inflexed in bud. *Pistillode* woolly. FEM. FL. *Perianth* tubular, ventricose. *Ovary* included and more or less adnate to the perianth; stigma linear, deciduous; ovule erect. *Achene* broadly ovoid, acuminate, included in the thickened fleshy or thin crustaceous perianth; pericarp fragile. *Albumen* copious, cotyledons broad.

D. indicum, *Wedd. Monogr.* 551, t. 20 A; *Miquel Fl. Ind. Bat.* i. ii. 275. D. grossum, *Wedd. in DC. Prodr.* xvi. i. 235[62]. Urtica grossa, *Wall. Cat.* 4615.

ASSAM, *Jenkins, Griffith* (*Kew Distrib.* 4581). BURMA, at Segain, *Wallich.*—DISTRIB. Java.

Sparsely hairy on the branches, petioles, leaves above and nerves beneath. *Stem* 2–3 ft., sub-4-gonous and deeply grooved when dry, branches erect. *Leaves* 2–3 in., membranous, broadly ovate, acuminate, base cuneate, rarely rounded or subcordate, brown when dry, paler beneath with patches of whitish cobwebby pubescence between the hairy nerves, giving a mottled appearance, cystoliths punctiform; petiole 1–1½ in., very slender. *Spikes* interrupted; terminal 4–6 in., branched below, axillary shorter; bracts broadly ovate, acuminate, concave; male fl. minute, tipped with hooked hairs; fem. strigose. *Fruit* $\frac{1}{10}$ in. long, ovoid or rhomboid, beaked.

38. **SARCOCHLAMYS,** *Gaud.*

A shrub with the habit and characters of *Boehmeria*, but the fem. perianth is campanulate, the ovary oblique, and the achene enclosed in the fleshy accrescent perianth. The leaves are alternate, and clusters of flowers in long axillary spikes.

S. pulcherrima, *Gaud. Bot. Voy. Bonite*, t. 89; *Wedd. Monogr. Urtic.* 440, t. 16 C; *DC. Prodr.* xvi. i. 235[14]; *Brandis For. Fl.* 405; *Kurz For. Fl.* ii. 426. Urtica pulcherrima, *Roxb. Fl. Ind.* iii. 588; *Wall. Cat.* 4596.

ASSAM, the KHASIA HILLS, SILHET, CACHAR, and from CHITTAGONG to TENASSERIM. BENGAL, at Mymensing, *Clarke*.—DISTRIB. Sumatra.

An evergreen tree or large shrub with tubercled stems and pubescent branchlets. *Leaves* 4–12 in., from ovate to linear-lanceolate or linear-oblong, acuminate, 3-nerved; nerves very strong, produced to the tips; base rounded, glabrous and pustulate above, beneath densely white-tomentose with the nervules tessellately reticulate; petiole ½–2 in.; stipules 2-fid. *Spikes* in branched cymes, pubescent, about equalling the petiole; fem. fl. denser, bracteoles toothed.

39. **PIPTURUS,** *Weddell.*

Trees or shrubs, erect or climbing. *Leaves* alternate, 3–5-nerved; stipules bifid. *Flowers* monœcious or diœcious, in spicate or panicled clusters; bracts minute. MALE FL. *Perianth* 4–5-fid, valvate. *Stamens* 4–5. *Pistillode* woolly. FEM. FL. on an at length fleshy receptacle. *Perianth* ovoid, narrowed to a minute mouth. *Ovary* adherent to the perianth; stigma linear, elongate; ovule erect. *Achene* free within the thinly fleshy perianth. *Albumen* scanty; cotyledons broad.—Species 8, Malayan, Mascarene, Australian and Pacific.

1. **P. mollissimus,** *Wedd. Monogr.* 449; *DC. Prodr.* xvi. i. 235[19]; leaves elliptic or obovate, tip subacute or rounded, base rounded cuneate or subcordate quite entire puberulous above tomentose beneath, fl. clusters in short spikes. Urtica mollissima, *Blume Bijd.* 501; *Wall. Cat.* 4609.

PENANG, *Porter, Curtis.* PERAK, *Scortechini.*—DISTRIB. Java.

Branches terete, woody, scurfily tomentose. *Leaves* 3–5 in., rigid and grey-brown when dry; nerves 1–2 pairs above the basal; petiole ½–1½ in. *Spikes* 1–4 in., solitary or fascicled, erect, hoary.

2. **P. velutinus,** *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 196; *Monogr.* 446, t. D, f. 4–8; hoary, subsilvery, leaves large long-petioled broadly ovate or ovate-cordate crenate-serrate white beneath, fl. clusters in simple or branched axillary spikes. P. incanus, *Wedd. in DC. Prodr.* xvi. i. 235[18]. Boehmeria velutina, *Dcne. Herb. Timor.* 163. B. incana, *Hassk. Cat. Hort. Bogor.* 79. Urtica incana, *Blume Bijd.* 497. Morus paniculata, *Roxb. Fl. Ind.* iii. 600; *Wight Ic.* t. 676.

NICOBAR ISLANDS, *King's Collector.*—DISTRIB. Malay and Pacific Islands.

A tree or shrub, branches woody terete hoary, shoots hairy. *Leaves* 4–7 in. diam., white beneath with appressed tomentum, nerves several above the basal, cross-nervules many straight; petiole slender, 2–5 in.; stipules ovate-lanceolate, ½-cordate, caducous. *Spikes* usually shorter than the petiole, slender, hoary. *Filaments* long, recurved. *Fem. perianths* succulent, in fruit forming pisiform heads with long exserted curved styles.—This is the hitherto unrecognized *Morus paniculata* of Roxburgh, cultivated in the Calcutta Garden from seeds introduced from the Moluccas.

40. **VILLEBRUNEA,** *Gaud.*

Trees with the characters of *Pipturus*, but the leaves of some species are penninerved, the fem. perianth is adnate to the ovary, and the achenes adnate to the perianth, the base of which only is fleshy.—Species about 8, Indian, Malayan and Japanese.

1. **V. integrifolia,** *Gaud. Bot. Bonite Voy.* t. 91; branches petioles and leaves beneath pubescent or tomentose, leaves 6–14 in. elliptic-oblong caudate quite entire or obscurely crenate penninerved. *Blume Mus. Bot.* ii. 166; *Wedd. Monogr.* 452. V. appendiculata, *Wedd. in DC. Prodr.* xvi. i. 235[20]. Oreocnide acuminata, *Kurz For. Fl.* ii. 427. Urtica appendiculata, *Wall. Cat.* 4604. Celtis elongata & tetrandra, *Wall. Cat.* 3692 C and 3695 F.

TROPICAL SIKKIM HIMALAYA, ASSAM, the KHASIA MTS., SILHET, BURMA, MUNNIPORE, CHITTAGONG and TENASSERIM; ascending to 4000 ft. DECCAN PENINSULA, from the Concan, *Stocks*, southwards.—DISTRIB. ? Malay Islands.

An evergreen tree. *Leaves* rather membranous, drying brown, nerves 8–15 pairs,

slender; petiole 1–6 in.; stipules silkily villous. *Flower clusters* globose, in small shortly peduncled dichotomously branched hispid cymes from the branchlets below the leaves, males 3–4-merous. *Stigma* plumose.—Weddell cites U. urophylla, *Wall. Cat.* 437, under this species, but I do not find the name in the Catalogue, and No. 437 is a *Tiarella*.

VAR. *sylvatica*; leaves 4–6 in., narrower oblong or oblong-lanceolate, entire or crenulate above the middle glabrous beneath or pubescent on the nerves only. V. sylvatica, *Blume Mus. Bot.* ii. 167, f. 16; *Wedd. Monogr.* 453, t. 15 C; *DC. Prodr.* xvi. i. 235[21]. Bœhmeria sylvatica, *Hassk. Hort. Bogor.* 79. Oreocnide sylvatica, *Miquel Pl. Jungh.* i. 40; *Fl. Ind. Bat.* i. ii. 270; *Kurz For. Fl.* ii. 427; *Beddome Forester's Man.* 225, t. 26, f. 4.—Sikkim, Assam, Burma, the Andaman and Nicobar Islands, the Western Ghats and Ceylon.

2. **V. frutescens,** *Blume Mus. Bot.* ii. 168; branchlets pubescent, leaves 4–8 in. elliptic oblong lanceolate or ovate rarely almost rounded acuminate crenulate or serrate nearly throughout 3-nerved and penni-nerved, beneath ashy or white with woolly hairs or glabrate. *Brand For. Fl.* 406; *Benth. Fl. Hongk.* 332. Morocarpus microcephalus, *Benth. in Hook. Kew Journ. Bot.* vi. (18) 74. Urtica frutescens, *Roxb. Fl. Ind.* iii. 589.—Urticea, *Wall. Cat.* 9091.

TROPICAL HIMALAYA, from Kumaon eastwards, ascending to 5000 ft. in Sikkim. KHASIA MTS., at Shillong, alt. 4000 ft., *Clarke*.—DISTRIB. Japan, China.

A small tree; branches very slender. *Leaves* membranous, sparsely pilose above, drying very dark; cross-nervules often giving the under surface a tessellated aspect; petiole ½–4 in., and nerves very slender; stipules ½ in., lanceolate, pubescent. *Male fl.* in subsessile clusters, fem. in very short cymes.

41. DEBREGEASIA, *Gaud.*

Shrubs or trees. *Leaves* alternate, serrate, 3-nerved; stipules 2-fid. *Flowers* monœcious or dicœcious, in capitate sessile panicled or spicate clusters. MALE FL. *Sepals* 3–5, valvate. *Stamens* 3–5, inflexed in bud. *Pistillode* glabrous or woolly. FEM. FL. *Receptacle* fleshy. *Perianth* ovoid or obovoid, succulent in fruit, mouth contracted very minute. *Ovary* straight, included; style short or 0, stigma penicillate; ovule erect. *Achene* at first cohering with the fleshy perianth. *Seed* with copious or scanty albumen; cotyledons short, broad.—Species 5, trop. Asia, and Africa.

* *Leaves narrow.*

1. **D. velutina,** *Gaud. Bot. Bonite Voy.* t. 90; leaves linear- or oblong-lanceolate acuminate serrulate rugose pubescent or scabrid above white- or ashy-tomentose beneath, heads in short sessile dichotomous cymes, male sepals 4 exceeding the bracteoles. *Wedd. Monogr.* 460, t. 15 A, f. 19. *Brand. For. Fl.* 405; *Kurz For. Fl.* ii. 428. D. longifolia, *Wedd. in DC. Prodr.* xvi. i. 235[24]. Missiessya velutina, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 195. Morocarpus longifolius, *Blume Mus. Bot.* ii. 156; *Kurz For. Fl.* ii. 428; *Bedd. For. Man.* 226, t. 26, f. 5. M. longifolius & angulatus, *Blume l. c.* Bœhmeria angustata & dichotoma, *Hassk. Hort. Bogor.* 79. Urtica longifolia, *Burm. Fl. Ind.* 297. U. angustata, *Blume Bijdr.* 499. U. muricata, *Heyne in Wall. Cat.* 4612. ? U. bicolor, *Wall. Cat.* 4613. U. verrucosa, *Moon. Cat. Pl. Ceylon.* Conocephalus niveus, *Wight Ic.* t. 1959; *Dalz. & Gibs. Bomb. Fl.* 239.

SUBTROPICAL HIMALAYA, alt. 2–5000 ft.; from Kumaon to Sikkim, alt. 3–6000 ft. ASSAM and the KHASIA HILLS TENASSERIM, *Gallatly*. The DECCAN PENINSULA,

from the Concan to Cape Comorin, ascending to 7000 ft. in the Nilghiris. CEYLON; alt. 1–2000 ft., *Walker*, &c.—DISTRIB. Java.

A tall shrub; branches and petioles pubescent tomentose or villous. *Leaves* 4–7 in., base rounded, smooth or scabrid above, lacunose or pitted between the nerves beneath; petiole $\frac{1}{2}$–1 in. *Fruit* $\frac{1}{3}$ in. diam., yellow; receptacle fleshy, studded with the minute achenes.

2. **D. hypoleuca,** *Wedd. Monogr.* 463, t. 15, A, f. 10, 11; branches and leaves beneath clothed with snow-white wool, leaves lanceolate or oblong-lanceolate acuminate serrulate scabrid above, heads conglobate sessile, male sepals 4 shorter than the bracteoles. D. bicolor, *Wedd. in DC. Prodr.* xvi. i. 235[25]; *Brand. For. Fl.* 405; *Boiss. Fl. Orient.* iv. 1148. Urtica bicolor, *Roxb. Fl. Ind.* iii. 589; *Wall. Cat.* 4613. Bœhmeria salicifolia, *Don Prodr.* 60. B. hypoleuca, *Hochst. in A. Rich. Fl. Abyss.* ii. 264. Missiessya hypoleuca, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 195. Morocarpus salicifolius, *Blume Mus. Bot.* 157.

WESTERN TEMPERATE HIMALAYA; from Kashmir and the SALT RANGE, alt. 3–5000 ft., to Kumaon.—DISTRIB. Affghanistan, Abyssinia.

A large shrub. *Leaves* 3–6 in. very white, pitted or not between the nerves beneath; petiole $\frac{1}{10}$–$\frac{1}{2}$ in. *Fruit* yellow, as in *D. velutina,* to which it is closely allied.

** *Leaves broad.*

3. **D. dentata,** *Hook. f.*; branchlets pubescent or scabrid, leaves long-petioled orbicular-ovate cuspidate toothed scabrid above, ashy-tomentose beneath, base cuneate or rounded, fem. heads in short sessile lax dichotomous cymes with slender divaricate branches. D. velutina, *var.* δ, *Wedd. in DC. Prodr.* xvi. i. 235[24].

CHITTAGONG, *J. D. H. & T. T., Clarke.*

A twiggy bush, 10 ft.; branches sometimes tubercled. *Leaves* 4–8 in. long and nearly as broad, membranous; petiole 3–5 in., slender. *Cymes* $\frac{1}{2}$–$\frac{3}{4}$ in. broad.—Very different from *D. velutina* in the broad leaves, long petioles, and much larger cymes with filiform branches.

4. **D. squamata,** *King in Herb. Calcutt.*; branches pubescent and softly spiculose, leaves long-petioled orbicular-ovate cuspidate toothed, softly pubescent on both surfaces, ashy-white beneath, base rounded or cordate, fem. heads in short sessile dichotomous cymes with slender divaricate branches.

PERAK; at Larut, *King's Collector.*

Branches stout, terete, rough with flattened spreading (soft ?) prickles. *Leaves* 4–6 by 3–3$\frac{1}{2}$ in., membranous; petiole 2–5 in., pubescent. *Cymes* $\frac{1}{2}$–1 in. diam., branches tomentose.—Possibly a form of *D. dentata.*

5. **D. Wallichiana,** *Wedd. Monogr.* 464, t. 14 (*excl. the Ceylon plant*); branches and petioles glabrous or sparsely cottony, leaves long-petioled broadly elliptic-ovate cuspidate entire or sinuate-serrate, base rounded or cordate, above glabrous, beneath white with closely appressed tomentum, fem. heads in long-peduncled dichotomous cymes with slender divaricate branches, male sepals 4 longer than the bracteoles. D. leucophylla, *Wedd. in DC. Prodr.* xvi. i. 235[25]. Morocarpus Wallichianus, *Kurz For. Fl.* ii. 428. Missiessya Wallichiana, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 195. Urtica leucophylla, *Wall. Cat.* 4067.

SIKKIM HIMALAYA, alt. 2–4000 ft., *J. D. H., Clarke.* KHASIA MTS., alt. 4000 ft., *Griffith,* &c. PEGU, *Kurz.* TENASSERIM, *Parish.*

A tree, 20–30 ft.; branches robust. *Leaves* 6–12 by 4–9 in., membranous, snow-white beneath with dark nerves; nervules slender parallel; petiole 2–10 in. *Cymes* from the upper axils, 2–4 in. diam., on peduncles 1–3 in.; fem. heads $\frac{1}{4}$ in., white or reddish in fruit.

6. **D. ceylanica,** *Hook. f.*; branches very stout, tips and petioles pubescent, leaves orbicular cuspidate quite entire, base rounded or cordate, above glabrous, beneath softly white tomentose, fem. heads in stoutly peduncled tomentose cymes, with short stout divaricate branches. D. Wallichiana, *Wedd. Monogr.* 464 (*the Ceylon plant only*). Morocarpus Wallichianus, *Thwaites Enum.* 262.

CEYLON; at Hantani in the Central Province, *Walker, Thwaites.*

A tree. *Branchlets* as thick as the little finger. *Leaves* 3–4 in. diam.; petiole 2–4 in., stout, somewhat furfuraceously pubescent, as are the cymes, peduncles and branches. *Cymes* with stout peduncles $1\frac{1}{2}$–2 in., each bearing 3 rarely more stoutly pedicelled fem. heads $\frac{1}{2}$ in. diam.—The orbicular leaves, the shorter stouter petioles and peduncles, and the much larger fruiting heads distinguish this from *D. Wallichiana.*

42. **MAOUTIA,** *Weddell.*

Shrubs. *Leaves* alternate, crenate, tomentose and snow-white beneath; stipules connate. *Flowers* minute, monœcious or dicœcious, in small cymose globose heads. MALE FL. *Sepals* 5, valvate. *Stamens* 5, inflexed in bud. *Pistillode* woolly. FEM. FL. *Perianth* 0. *Ovary* straight; stigma penicillate; ovule erect. *Achene* ovoid, crustaceous or with a fleshy coat, hispid; albumen scanty, cotyledons oblong.—Species 8, Eastern Asiatic and Pacific.

M. Puya, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 193; *Monogr.* 477, t. 16 B; *DC. Prodr.* xvi. i. 235[31]; leaves elliptic caudate-acuminate coarsely toothed, achene gibbously ovoid trigonous hispid. *Brand. For. Fl.* 436; *Kurz For. Fl.* ii. 429. Bœhmeria Puya, *Hook. Lond. Journ. Bot.* iii. (1851) 316, t. 7 (*excl. syn. Roxb.*). B. frutescens, *Don. Prodr.* 59 (*not of Thunb.*). Urtica Puya, *Ham. in Wall. Cat.* 4605, and ? 4606.

TROPICAL HIMALAYA, from Garwhal eastwards, the KHASIA MTS. and BURMA, alt. 1–4000 ft.

Stem 6–8 ft.; branches pubescent. *Leaves* 4–8 in., membranous, scabrid above, beneath white except the pubescent nerves; petiole 1–5 in.; stipules lanceolate 2-fid. *Cymes* axillary and terminal, spreading, slender, dichotomously branched; fem. heads $\frac{1}{6}$ in. diam., males rather larger.

43. **PARIETARIA,** *Tournef.*

Herbs, rarely undershrubs. *Leaves* alternate, quite entire, triple-nerved, exstipulate. *Flowers* polygamous, in cymose clusters, bracteate. MALE FL. *Sepals* 3–4, valvate. *Stamens* 3–4, inflexed in bud. *Pistillode* glabrous. FEM. FL. *Perianth* tubular 4-fid. *Ovary* straight; stigma recurved penicillate; ovule erect. *Achene* enclosed in the persistent perianth, crustaceous. *Albumen* copious; cotyledons oblong.—Species about 8, temperate and tropical.

1. **P. judaica,** *Linn. Sp. Pl. Ed.* 2, 1492; a tufted pubescent undershrub with a woody stock, leaves ovate or lanceolate acute base rounded or cordate, cymes few-fld. lower flower of each female, bracts broadly ovate more or less connate, fruit elongate. *Wedd. Monogr.* 508, t. 17, f. 15; *DC. Prodr.* xvi. i.

235^{43}; *Boiss. Fl. Orient.* iv. 1149; *Reichb. Ic. Fl. Germ.* xii. t. 651. P. punctata, *Willd. Sp. Pl.* iv. 953. P. tibethana, *Blume Mus. Bot.* 235^{44}.

WESTERN TIBET; Balti, and in the Indus and Shayuk Valleys, *Thomson.*—DISTRIB. Affghanistan and westwards to Greece.

2. **P. debilis,** *Forst. Prodr.* 387; annual, leaves long-petioled elliptic broadly ovate or ovate-cordate membranous obtuse, bracts linear, lobes of fem. perianth acute, fruit ovoid. *Wedd. Monogr.* 517, t. 17; *DC. Prodr.* xvi. i. 235^{45}; *Boiss. Fl. Orient.* iv. 1150. P. micrantha, *Ledeb. Fl. Alt.* iv. 303; *Ic. Fl. Ross.* t. 22.

TEMPERATE HIMALAYA, from the Panjab to Sikkim, alt. 8–12,000 ft. WESTERN TIBET, alt. 10–14,000 ft. The CONCAN and NILGHIRI MTS.—DISTRIB. Many temp. and trop. regions extending to Australia and Chili.

A diffuse flaccid pubescent herb, 6–12 in. *Leaves* ½–1 in. *Cymes* 3–7-fld.; bracts shortly united.

44. FORSKOHLEA, *Linn.*

Slender scabrous herbs or undershrubs. *Leaves* alternate, toothed, triple-nerved; stipules lateral, free. *Flowers* in axillary androgynous woolly or silky involucres, males many in the periphery of the involucres, fem. solitary in the centre. MALE FL. *Perianth* clavate, 3–5-cleft, one lobe inflexed. *Stamen* 1, inflexed in bud. *Pistillode* 0. FEM. FL. *Perianth* 0; *Ovary* straight; stigma filiform, hispid, persistent; ovule erect. *Achenes* ovoid, compressed, woolly; albumen scanty or 0; cotyledons broad. —Species 5, Indian, Oriental, African and Spanish.

F. tenacissima, *Linn. Mant.* 72; leaves rhombic orbicular or obovate obtuse base cuneate hispid or softly hairy above with hooked hairs woolly beneath, invol. bracts 2–5 lanceolate silky below hispid above. *Wedd. in DC. Prodr.* xvi. i. 235^{55}; *Boiss. Fl. Orient.* iv. 1151; *Wall. Cat.* 4666; *Lamk. Ill.* t. 388. F. latifolia, *Retz. Obs.* 51. Caidbeja adherens, *Forsk. Fl. Æg. Arab.* 82.

WESTERN PANJAB, on the Salt Range, *Aitchison.* SCINDE, *Vicary.*—DISTRIB. Westwards to Arabia and N. Africa; also S.E. Spain.

Shrubby, stem 6–24 in. *Leaves* ½–1 in., snow-white beneath; petiole ¼–½ in. *Involucre* ¼ in.

45. DROGUETIA, *Gaud.*

Slender herbs, differing from *Forskohlea* in the campanulate scabrid involucres, and of which some species have opposite leaves, and others terminal spicate involucres.—Species 4, Indian and African.

D. diffusa, *Wedd. in Ann. Sc. Nat. Ser.* 4, i. 211; *Monogr.* 541, t. 19 A, f. 1–11; diffuse, leaves opposite ovate acuminate serrate or toothed hispidly hairy above and on the nerves beneath, involucres axillary 1- or more-fld., achenes glabrous shining. D. pauciflora, *Wedd. in DC. Prodr.* xvi. i. 235^{58}. Forskohlea urticoides, *Wight Ic.* t. 1982. Pouzolzia pauciflora, *A. Rich. Tent. Fl. Abyss.* ii. 259. Didymogyne abyssinica, *Wedd. in Ann. Sc. Nat. l. c.* Bœhmeria pauciflora, *Blume Mus. Bot.* ii. 201. B. parvifolia, *Wedd. Monogr.* 359. Urtica pauciflora, *Hochst. Plant. Schimp.* No. 682. U. rivularis, *Schlecht. in Plant. Hohenack.* No. 1326.

NILGHIRI HILLS, *Wight*, &c.—DISTRIB. Abyssinia, Java.

Habit and foliage of *Chamabainia cuspidata*, Wight. *Leaves* ¼–1½ in., very membranous, green when dry, nerves faint, petiole $\frac{1}{10}$–1 in. slender; stipules small,

ovate, ciliate. *Involucre* minute, membranous, toothed, ciliate, scarcely exceeding the flowers. *Flowers* very minute, male several or solitary in the same involucre with the female, pedicelled, exserted, irregularly cleft; stamen 1, exserted; fem. fl. few, shortly pedicelled or sessile; style filiform, short, deciduous. *Achene* obliquely ovoid, compressed, hispid or glabrate.

Order CXXXVI*. Platanaceæ.

Deciduous monœcious trees with flaking bark. *Leaves* alternate palmately-lobed and -nerved; petiole calyptriform at the base, enclosing a bud; stipules caducous. *Flowers* in long-peduncled globose unisexual axillary heads; sepals on a chaffy or silky receptacle. *Male* ebracteolate; anthers numerous, subsessile, with a small basal scale, cells parallel, connectives truncate or subpeltate. *Fem.* of many naked 1-celled ovaries mixed with slender bracteoles, narrowed into a long style stigmatose on one side; ovule 1, rarely 2, pendulous, orthotropous. *Ripe carpels* coriaceous, cuneiform, angled, top thickened truncate or pyramidal; seed linear, albumen scanty or 0, cotyledons long narrow radicle inferior.—Genus 1; species 5 or 6, Oriental and N. American.

Platanus, *Linn.*

P. orientalis, *Linn. Sp. Pl.* 999; leaves broadly palmately 3–5-fid, base truncate or cordate lobes irregularly toothed or lobulate, ripe carpels with prominent pyramidal tips. *Brand. For. Fl.* 434; *Gamble Man. Ind. Timb.* 345; *A. DC. Prodr.* xvi. ii. 159; *Sibth. Fl. Græc.* t. 945; *Boiss. Fl. Orient.* iv. 1161. P. vulgaris, *Spach. in Ann. Sc. Nat. Ser.* ii. xv 292.

North-Western Himalaya; from the Sutlej westwards, alt. 5000–8500 ft., cultivated only.—Distrib. Wild from N. Persia westwards to S. Italy.

A large tree, in Kashmir attaining 75 ft. and with the trunk 25 ft. in girth; branches very spreading. *Leaves* 6–9 in. diam., usually broader than long, base cuneate at the insertion of the petiole, young woolly beneath; petiole 3–5 in.; stipules on shoots leafy and lobed. *Heads* 1–1½ in. diam., 2–3 on a slender peduncle 4–6 in. long.—The *P. occidentalis*, L., of N. America, is not. as Brandis (l. c. 435) supposes, commonly cultivated in Western Europe, where the plant so called is a var. (*acerifolia*) of *orientalis*. The true *occidentalis* differs in the truncate tips of the ripe carpels, whence the head of fruits is smooth.

Order CXXXVII. **JUGLANDEÆ.**

Trees, often strongly aromatic, monœcious. *Leaves* alternate pinnate; stipules 0. *Male fl.* in pendulous spikes; perianth 0, or of 3–6 scales on the margins of the bracts; stamens 2 or more on the bracts, anther-cells parallel. *Fem. fl.* in erect few-fld. spikes, bracteate; calyx-limb superior short, 4-toothed; petals minute or 0; ovary 1-celled, 1-ovuled; style 2-fid, arms stigmatose within; ovule erect anatropous. *Drupe* or *nut* indehiscent, or with a dehiscent nut the walls of which are sinuously inflexed and the cavity with 2–4 basal pits. *Seed* basifixed, base 2–4-lobed; albumen 0; cotyledons equal sinuous or subfoliaceous and contorted, radicle superior.—Genera 5; species about 30, chiefly North temperate.

Fem. fl. subsolitary. Bracts not enlarged in fruit. Drupe solitary, large, with a fleshy exocarp and bony 2-valved endocarp . . . . . 1. Juglans.

Fem. fl. numerous spicate; bracts produced in fruit into long veined wings. Nut small coriaceous, imbedded in the base of the membranous bract . . . . . 2. ENGELHARDTIA.

1. JUGLANS, *Linn.*

Male fl. from the scars of last year's leaves; stamens 10–40. *Fem. fl.* one or few at the ends of the branches; petals 4, minute. *Fruit* as above.—Species 3 or 4, Asiatic and N. American.

J. regia, *Linn. Sp. Pl.* 997; leaflets 5–6 pairs ovate-oblong or -lanceolate entire or subserrate. *Roxb. Fl. Ind.* iii. 631; *Brand. For. Fl.* 497; *Gamble Man. Ind. Timb.* 392; *Kurz For. Fl.* ii. 491; *Boiss. Fl. Orient.* iv. 1160. J. regia, *var.* Kumaonica, *Cas. DC. in Ann. Sc. Nat. Ser.* 4, xviii. 33; *DC. Prodr.* xvi. ii. 136. ? J. arguta, *Wall. Cat.* 4944.

TEMPERATE HIMALAYA and WESTERN TIBET, alt. 3–10,000 ft., from Kashmir and Nubra eastwards; wild and cultivated. KHASIA HILLS (cultivated). AVA HILLS, *Wallich.*—DISTRIB. Beluchistan, N. Persia, the Caucasus, Armenia.

A large deciduous tree, attaining 100 ft. with a trunk 20 ft. in girth; shoots tomentose. *Leaves* 6–12 in., young tomentose; leaflets subsessile, 3–8 in., glabrous or with the 15–20 pairs of nerves beneath pubescent, terminal petiolulate. *Male spikes* 2–5 in.; bracts stipitate, lobed. *Fem. fl.* 1–3; petals linear-lanceolate, green. *Fruit* ellipsoid green, smooth or pubescent. *Nut* thick-shelled in the wild form, with greatly thickened margins of the valves.—Kurz mentions a species with small almost globose smooth nuts as inhabiting the Shan States of Burma.—The Walnut.

2. ENGELHARDTIA, *Leschen.*

Trees or shrubs. *Leaves* pinnate entire or serrate glandular or not beneath. *Male fl.* in slender simple or branched erect or pendulous lateral spikes. *Perianth* (or *bract*) of simple lobed or laciniate usually very unequal scales, sometimes arranged so as to resemble a 4-sepaled calyx. *Stamens* 4–12, subsessile on the scales. *Fem. spikes* long, pendulous; flowers solitary, sessile on a 3–4-lobed bract; calyx adnate to the ovary, 4-lobed or toothed; stigmas 2, short sessile or long laciniate. *Fruit* a small globose nut adnate to the greatly enlarged scarious 3-lobed reticulately nerved bract, of which the midlobe is much the longest; epicarp or calyx-tube thin, glandular or hirsute; endocarp 2-valved.—*Species* 4 or 5, or fewer, Chinese, Indian, and Malayan.

1. **E. spicata,** *Blume Bijd.* 528; *Fl. Jav. Jugland.* 8, t. 1 and 5 A; leaflets 5–10 in. petiolulate linear-oblong entire or subentire, petiole and nerves beneath pubescent, at length glabrate, nut hispidly hirsute. *Cas. DC. Prodr.* xvi. ii. 140; *Kurz For. Fl.* ii. 491; *Gamble Man. Ind. Timb.* 393; *Miq. Fl. Ind. Bat.* i. i. 842. E. Roxburghiana, *Lindl. in Wall. Pl. As. Rar.* ii. 87, t. 199 (*excl. anal.*); *Brand. For. Fl.* 500; *Wall. Cat.* 4940. Juglans pterococca, *Roxb. Fl. Ind.* iii. 631 (*in part*).—*Rumph. Herb. Amb.* ii. 169.

SUBTROPICAL HIMALAYA; from Nepal, *Wallich*, eastwards to Bhotan, ascending to 6000 ft. ASSAM, MUNNIPORE, and the KHASIA MTS., and southward to Tenasserim.—DISTRIB. Java, Cochin China.

A large subdeciduous tree, gigantic in Java, petioles young leaflets midrib and petiolules more or less tomentose, glabrous in age. *Leaves* 6–12 in., petiole terete; leaflets rather membranous, except when old, obtuse or acute, base very unequal; nerves 10–12 pairs; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Spikes* 6–12 in., very slender, flexuous, pendu-

lous, hispidly pubescent; male deciduous; flowers very small, bracts entire; anthers sessile; fem. larger, bract 3-lobed. *Fruiting bract* 2–3 in.; lobes scarious and reticulated, lateral short spreading, midlobe linear-oblong, reticulately nerved on each side the midrib. *Nut* globose, $\frac{1}{4}$–$\frac{1}{3}$ in. diam., crustaceous, villously hispid.—Roxburgh's description of *Juglans pterococca* is made up of male flowers of *E. Wallichiana* (which is the *J. pterococca* of his Icones), and the female of *E. spicata* from Silhet. The plate in Wallich's Plant. Rar. of *E. Roxburghiana*, is a copy of Roxburgh's drawing of *E. Wallichiana* (inscribed *Juglans pterococca*), in which the nut is erroneously figured as hairy.

2. **E. acerifolia,** *Blume Fl. Jav. Jugland.* 11, t. 2 and 3 B; leaflets 5–7 in. sessile or subsessile linear-oblong entire or serrate, petiole and nerves beneath tomentose, nut hispidly hirsute. *Cas. DC. Prodr.* xvi. ii. 141; *Miquel Fl. Ind. Bat.* i. i. 842. Pterilema acerifolium, *Reinw. Syllog.* ii. 13 (*Flora*, 1825).

Sikkim Himalaya, alt. 1–5000 ft., *J. D. H.* Khasia Mts., *Griffith*, &c. Chittagong, *J. D. H. & T. T.*—Distrib. Java, Borneo, Philippines.

Possibly only a form of *E. spicata* with sessile or subsessile leaflets.

3. **E. Colebrookiana,** *Lindl. in Wall. Pl. As. Rar.* iii. 4, t. 208, and *Cat.* 4941; branchlets and petioles stout densely tomentose, leaflets 2–4 in. petiolulate rarely sessile broadly or narrowly oblong obtuse or tip rounded rarely acute tomentose beneath, male spikes hispid, fruiting spikes 4–6 in., nut hirsute. *Cas. DC. Prodr.* xvi. ii. 141; *Brand. For. Fl.* 499; *Gamble Man. Ind. Timb.* 393. E. villosa, *Kurz For. Fl.* ii. 491. Juglans villosa, *Wall. Cat.* 4945.

Western Himalaya, from the Chenab to Nepal. Assam and the Khasia Mts., Burma, *Wallich, Kurz*, &c.—Distrib. China.

This again is, I think, and as Brandis suspects, a form of *E. spicata*, with stouter more tomentose branches and leaves, broader shorter often coriaceous leaflets, tomentose beneath, and shorter male and female spikes. *Male spikes* hispid. The leaflet base varies from acute to almost cordate with a rounded lobe on one margin and an acute one on the other.

4. **E. Wallichiana,** *Lindl. in Wall. Cat.* 4942; quite glabrous, leaflets 4–6 in. petiolulate subfalcately lanceolate quite entire obtusely acuminate, male spikes panicled, nut globose clothed with golden scales. *Cas. DC. Prodr.* xvi. ii. 141. Juglans pterococca, *Roxb. Fl. Ind.* iii. 631, *in part.* E. chrysolepis, *Hance in Ann. Sc. Nat. Ser.* 4, xv. 227.

Penang; *Wallich, Curtis*, &c. Singapore, *Wallich.*

Branches and petioles slender. *Petiole* 3–5 in.; leaflets thinly coriaceous, bases narrowed into the petiole, opaque on both surfaces. *Male spikes* in spreading suberect panicles, 3–4 in. long; flowers clustered, very minute, of 4 unequal oblong segments or bracts; stamens about 12, irregularly inserted on the segments; anthers minute, subsessile, didymous. *Fem. perianth* 4-lobed; ovary globose, stigmas 4 sessile spreading. *Nut* globose, $\frac{1}{6}$ in. diam., crowned with the erect 4 lobes of the perianth; exocarp (tube of perianth) thin, clothed with yellow glandular scales; endocarp thick, bony, intruded base columnar; wings of bract brown, mesial 1–1½ in. long.—I suspect that all Roxburgh's description of *J. pterococca* is taken from this plant, except the nut, which he describes as very hairy and as large as a large pea, which applies to *E. spicata*, not to *Wallichiana.*

5. **E. serrata,** *Blume Fl. Jav. Jugland.* 14, t. 4, and 5 C?; branchlets petioles and leaflets beneath glandular, leaflets 4–7 pairs 2–3 in. subsessile coriaceous obliquely elliptic- or ovate-oblong acute or acuminate crenate, fruiting racemes 6–8 in., nut hirsute. *Cas. DC. Prodr.* xvi. ii. 14. E. palembanica, *Miquel Fl. Ind. Bat. Suppl.* i. 346.

PENANG; at Muka Head, *Curtis*.—DISTRIB. Java.

This accords so well in habit and foliage with Blume's figure and description of *E. serrata*, that I would have referred it without doubt to that plant, but that he describes the style as short and thick, whereas, as far as I can make out, it is rather long and hairy in the Penang plant. It is possibly a state of the following, but I have seen no male fl.

6. **E. nudiflora,** *Hook. f. Ic. Plant. ined.*; branchlets petioles and leaves beneath glandular, leaflets 2–6 pairs 1–1½ in. subsessile coriaceous elliptic-oblong or cuneate-obovate obtuse often oblique entire or subcrenate, bract of male fl. laciniate with slender antheriferous arms, anthers ellipsoid, fruiting raceme 4–6 in., style long hairy.

PENANG; on Government Hill, *Maingay* (*Kew Distrib.* 1510).

A very large tree (Maingay). *Leaves* 3–5 in., nerves 6–8 pairs, strong beneath. *Fruiting racemes* like those of *E. spicata*, but nuts smaller. This very much resembles Blume's figure and description of *E. rigida*, but he describes the bract of the male fl. as thick and the anther as ovate-cordate.

ORDER CXXXVIII. MYRICACEÆ.

Glandular and aromatic trees or shrubs. *Leaves* alternate; stipules 0. *Flowers* unisexual, in cylindric bracteate catkin-like spikes; male spikes solitary fascicled or panicled, and with sometimes fem. fl. at the top; fem. spikes axillary, bracts 1–4-fld. MALE FL. *Stamens* 3–6, rarely more, on a torus adnate to the bract, filaments short free or connate, anthers erect, 2-celled. FEM. FL. A 2–4-bracteolate sessile 1-celled ovary; style 2-fid, stigmatose inwardly; ovule 1, erect, orthotropous. *Drupe* ovoid or globose, resinous succulent or waxy, endocarp hard. *Seed* erect, testa membranous, albumen 0; embryo straight, cotyledons plano-convex, radicle short superior.—Genus 1; about 35, temperate and tropical (not Australasian).

MYRICA, *Linn.*

CHARACTERS OF THE ORDER.

M. Nagi, *Thunb. Fl. Jap.* 76; leaves lanceolate oblanceolate or obovate obtuse acute or acuminate entire or serrulate towards the tip, young sharply serrate, male spikes solitary or racemed, stamens 3–6, fruit globose or ellipsoid succulent granulate. *Cas. DC. Prodr.* xvi. ii. 151; *Kurz For. Fl.* ii. 475; *Bot. Mag.* t. 5727. M. sapida, *Wall. Tent. Fl. Nap.* 59, t. 45, and *Cat.* 6811; *Cas. DC. l. c.* 152; *Brand. For. Fl.* 495; *Gamble Man. Ind. Timb.* 391. M. integrifolia, *Roxb. Fl. Ind.* iii. 765; *Cas. DC. l. c.* 151; *Wight Ic.* t. 764, 765; *Wall. Cat.* 6812. M. missionis. *Wall. Cat.* 7297; *Cas. DC. l. c.* 152. M. Farquhariana, *Wall. Tent.* 61; *Cas. DC. l. c.* M. rubra, *Sieb. & Zucc. Fam. Nat. Jap.* ii. 106. Nageia japonica, *Gærtn. Fruct.* 1, 191, t. 39, f. 8.

SUBTROPICAL HIMALAYA, from the Ravi eastwards, alt. 3–6000 ft. The KHASIA MTS., SILHET, and southwards to SINGAPORE.—DISTRIB. Malay Islands, China, Japan.

An evergreen dicœcious tree, branchlets pubescent. *Leaves* 3–7 in., with resinous glands beneath. *Fruit* the size of a small or large cherry, flesh formed of red spindle-shaped fibres radiating from the rugose nut. No doubt *M. javanica, Blume*, and *longifolia* and *Lobbii, Teysm.* and *Binnend.*, are other forms of this very common and variable shrub.

Order CXXXIX. **CASUARINEÆ.**

Leafless trees or shrubs; branchlets cylindric, grooved, jointed, internodes terminating in a short sheath of connate subulate scales (leaves). *Flowers* unisexual; males in terminal spikes formed of short superposed toothed cups; fem. in ovoid or globose heads, bracteate and 2-bracteolate. Male fl. *Sepals* 1 or 2, concave, circumsciss at the base. *Stamen* 1, inflexed in bud; anther large. Fem. fl. *Ovary* minute, 1-celled; style 2-fid, arms filiform, stigmatose to the base. *Ovules* 2, collateral, semianatropous. *Fruit* an oblong or cylindric cone formed of the enlarged hardened bracts and bracteoles, together forming 2-valved cavities enclosing the compressed winged achenes; wing terminal, tipped by the style. *Albumen* 0; embryo straight, cotyledons flat equal, radicle very short superior.—Genus 1; species about 23, Australian, a few Malayan and Pacific.

CASUARINA, *Forst.*

Character of the Order.

C. equisetifolia, *Forst. Char. Gen.* 103, f. 53; branchlets filiform, internodes $\frac{1}{6}$ in., sheaths with 6–8 appressed teeth, male spikes cylindric or subclavate, fruit oblong or globose. *Miquel in DC. Prodr.* xvi. i. 338; *Brand. For. Fl.* 435; *Kurz For. Fl.* ii. 494; *Gamble Man. Ind. Timb.* 346; *Beddome Forester's Man.* t. 226. C. muricata, *Roxb. Fl. Ind.* iii. 519; *Wall. Cat.* 6815.

On the east side of the Bay of Bengal, from Chittagong southward, cultivated elsewhere in India.—Distrib. Malay Islands, Australia, Pacific.

A very tall dicœcious? leafless tree, branches drooping; branchlets deciduous, cylindric or sub-6–8-angled. *Male spikes* about $\frac{1}{2}$ in.; fem. peduncled. *Fruit* $\frac{3}{4}$ in. diam. with about 12 rows of puberulous achenes, hardened bracts puberulous, obovate-oblong, mucronate.

Order CXL. **CUPULIFERÆ.**

Trees or shrubs, monœcious or dicœcious. *Leaves* alternate, penninerved; stipules free, caducous. *Male fl.* spicate; sepals 1–5, free or connate or 0. *Stamens* 2–20, on a hairy torus, or on the base of the sepals. *Fem. fl.* solitary spicate or capitate; perianth adnate to the ovary or 0, limb minute; ovary 2–3, rarely 4–6-celled; styles or style-arms as many as the cells; ovules 1, or 2-collateral, pendulous, anatropous. *Fruit* included within or in the axil of often greatly enlarged bracts. *Seed* pendulous, albumen 0; cotyledons plano-convex sometimes rugose or ruminate, radicle superior.—Genera 10; species about 400, chiefly North temperate.

Tribe I. **Betuleæ.** *Male spikes* pendulous; sepals 4 or fewer; stamens 2–4. *Fem. spikes* catkin-like, pendulous or suberect; perianth 0; ovary 2-celled, 2-ovuled; styles or style-arms 2. *Nut* small, compressed, in the axils of the bracts.

Scales of fem. spikes thin, deciduous	1. Betula.
Scales of fem. spike thick, persistent	2. Alnus.

Tribe II. **Quercineæ.** *Male spikes* deciduous or persistent; perianth 4–10-lobed or parted. *Fem. fl.* 1–3 in an involucre of many bracts which enlarge in fruit forming a cup at the base of or becoming confluent and enclosing one or more nuts; ovary 3–7-celled, cells 2-ovuled.

Involucre of many imbricating appressed bracts . . . . . 3. QUERCUS.
Involucre armed with clusters of spines or tubercles . . . . . 4. CASTANOPSIS.

Tribe III. **Coryleæ.** *Male spikes* pendulous; perianth 0; stamens included between 2-bracteoles; anthers hairy at the tips. *Fem. fl.* in pairs in the axils of the leafy or coriaceous bracts that enlarge greatly in fruit; ovary imperfectly 2-celled, cells 1-ovuled.

Fem. spike minute, few-fld.; bracts minute, greatly enlarged and convolute in fruit . . . . . 5. CORYLUS.
Fem. spike of many leafy veined bracts, which are flat and elongated in fruit . . . . . 6. CARPINUS.

1. **BETULA,** *Tourn.*

Trees or shrubs, monœcious. *Leaves* alternate, deciduous, penninerved, toothed or serrate. *Male fl.* in pendulous spikes; bracts peltate, with 3 bi-bracteolate flowers; sepals 2–4; stamens 2, filaments forked separating the anther-cells. *Fem. fl.* in erect or pendulous spikes; bracts imbricate, bracteoles 2 adnate to the bract which thus appears 3-lobed; perianth 0; ovary compressed, 2-celled, cells 1-ovuled; styles 2, slender, stigmas terminal. *Fruit* a spike of lenticular winged or margined nuts; cotyledons flat.—Species about 25, N. temp. Arctic, and Andean.

1. **B. utilis,** *Don Prodr.* 58; shoots and young leaves pubescent, leaves ovate acuminate irregularly serrate glandular beneath bracts of male spikes stipitate; fem. spike stout subsolitary, bracts pubescent broader than the wings of the nut. B. Bhojpattra, *Wall. Pl. As. Rar.* ii. 7; *Cat.* 2792; *Lindl. Bot. Reg.* 1840, *Misc.* 73; *Brand. For. Fl.* 437; *Regel Monogr.* 58, t. 6, f. 13–19; t. 13, f. 7–14; *DC. Prodr.* xvi. ii. 177; *Gamble Man. Ind. Timb.* 372. B. Jacquemontii, *Spach. in Ann. Mus. Ser.* 2, xv. 189, and in *Jacquem. Voy. Bot.* t. 158; *Regel in DC. l. c.* 178. B. Bhojpattra, var. ϵ. Jacquemontii, *Regel. Monogr.* 60, t. 6, f. 60; *DC. l. c.* 177. B. castanæ, *Herb. Ham.*

TEMPERATE HIMALAYA and WESTERN TIBET; from Kashmir, alt. 7–12,000 ft., to Sikkim, alt. 9–14,000 ft., and Bhotan.—DISTRIB. Japan, Affghanistan.

A tree, 40–50 ft., or shrub at high altitudes; bark peeling in horizontal flakes. *Leaves* 2–3 in.; nerves 8–12 pairs; petiole $\frac{1}{3}$–$\frac{2}{3}$ in. *Bracts* of male ciliate, stipes scaly; anthers glabrous except the tip. *Fem. spikes* 1–2 in., by $\frac{1}{2}$–$\frac{2}{3}$ in. diam.; wings of nut equalling or narrower than the nucleus.—I see no reason for abandoning Don's name of *utilis*, as no one doubts its belonging to this plant; the barbarous name "Bhojpattra" is common to this and *B. alnoides*. Regel (*in DC.*) cites *B. Jacquemontii* as a species, and as a var. of *B. Bhojpattra*.

2. **B. alnoides,** *Ham. in Don Prodr.* 58; shoots and young leaves tomentose, leaves ovate or ovate-oblong or -lanceolate acuminate unequally doubly or trebly often cuspidately serrate pubescent beneath when young, glandular when old, spikes slender panicled, bracts of fem. narrower than the very broad wings of the nut. B. acuminata, *Wall. Pl. As. Rar.* ii. 7, 109, *Cat.* 2793; *Brand. For. Fl.* 458, t. 56; *Kurz For. Fl.* ii. 476; *Gamble Man. Ind. Timb.* 372; *Regel Monogr.* 71; *DC. Prodr.* xvi. i. 179. B. nitida, *Don l. c.*; *Wall. Cat.* 2795; *Lindl. in Wall. Pl. As. Rar.* ii. 7; *Regel Monogr.* 72; *DC. l. c.* 180. B. cylindrostachys, *Wall. l. c.*; *Cat.* 2794; *Regel Monogr.* 61, t. 6, f. 32, 34, and t. 13, f. 29; *DC. l. c.* 179. B. affinis, *Endl. Gen. Pl. Suppl.* iv. ii. 20; *Regel in DC. l. c.* Betulaster cylindro-

stachya, acuminata, affinis & nitida, *Spach. in Ann. Mus. Ser.* 2, xv. 198, 199, 200.

TEMPERATE and SUBTROPICAL HIMALAYA, alt. 5–10,000 ft., from the Sutlej to the Mishmi Hills; KHASIA and MARTABAN HILLS, alt. 3–6000 ft. MUNNIPORE, alt. 9000 ft., *Watt.*

A tree, 50–60 ft.; young plants and shoots sometimes cottony-tomentose. *Leaves* 3–6 in., base cuneate rounded or cordate; petiole $\frac{1}{2}$–$\frac{2}{3}$ in. *Male and fem. spikes* 3–5 in., slender, fascicled, pendulous; anthers fem. bracts ovary and style hairy; wings of nut rounded much broader than the nucleus.—Wallich having in his catalogue cited (as a variety) Don's *B. alnoides* under his *B. acuminata*, I do not see how the former name, given to the plant by its discoverer Hamilton, can be set aside. I follow Brandis in uniting with it *B. cylindrostachys*, for which I can find no character. Gamble, however, keeps it distinct, giving as a character the bark flaking vertically.

2. **ALNUS,** *Gærtn.*

Deciduous trees or shrubs, monœcious. *Leaves* alternate, penninerved. *Male fl.* in solitary or panicled pendulous spikes; bracts 3-fld. with 3–5 adnate bracteoles; sepals 4; stamens 4, anthers subsessile. *Fem. fl.* in short erect spikes; bracteoles 2–4, minute; perianth 0; ovary 2-celled, cells 1-ovuled; styles 2, tips stigmatose. *Fruit* a small woody cone; bracts persistent, covering the small crustaceous 1-seeded nuts; testa membranous; cotyledons flat.—Species about 14, N. temperate and Andean.

1. **A. nepalensis,** *Don Prodr.* 58; branchlets glabrous, leaves elliptic-lanceolate acute entire or subentire, fruiting spikes in large erect panicles. *Regel Monogr. Bot.* 83, t. 16, f. 4–6; t. 13, f. 40–43, and in *DC. Prodr.* xvi. i. 181; *Brand. For. Fl.* 460; *Kurz For. Fl.* ii. 476; *Wall. Pl. As. Rar.* ii. 27, t. 131; *Cat.* 2799. Clethropsis nepalensis, *Spach. in Ann. Mus. Ser.* 2, xv. 202. Betula leptostachya, *Wall. Herb.*

TEMPERATE HIMALAYA, alt. 3–9000 ft., from Chamba to the Mishmi Hills in Upper Assam. KHASIA HILLS. AVA, on the Khaken Hills, *Kurz.* YUNAN, *Anderson.*

A deciduous tree, flowering after the leaves. *Leaves* 3–7 by 2–4 in., subglaucous beneath, nerves 10–18 pairs; petiole $\frac{1}{4}$–2 in. *Male spikes* 4–10 in., in terminal drooping panicles; flowers in clusters of 6–12; stamens mixed with ciliate scales under each bract. *Fem. spikes* $\frac{1}{4}$ in., pendulous in flower. *Fruit spikes* in lateral panicles, each $\frac{1}{2}$–1 in. long, ellipsoid or subcylindric; nuts with a membranous wing.

2. **A. nitida,** *Endl. Gen. Pl. Suppl.* iv. ii. 20; branchlets pubescent, leaves elliptic-ovate or elliptic acuminate obscurely crenate or entire, base cuneate rarely rounded, fruiting spikes solitary or in short erect racemes. *Regel Monogr. Bot.* 82, t. 14, f. 23–30, and in *DC. Prodr.* xvi. i. 181; *Brand. For. Fl.* 461, t. 57. Clethropsis nitida, *Spach. in Ann. Mus. Ser.* 2, xv. 202, and in *Jacquem. Voy. Bot.* 159, t. 159.

WESTERN TEMPERATE HIMALAYA, alt. 5–9000 ft., from Kashmir to Kunawur, sometimes descending into the plains.

A large deciduous tree, attaining 100 ft., and trunk 15 ft. girth; flowering after the leaves. *Leaves* 4–8 in., sometimes $3\frac{1}{2}$ broad, nerves 8–12 pairs, axils beneath with tufts of hair; petiole 1–$1\frac{1}{2}$ in. *Male spikes* 2 in. long, in terminal erect often leafing racemes. *Fem. spikes* 1–2 by $\frac{3}{4}$ in. diam.; fruiting ovoid oblong or cylindric, $\frac{3}{4}$–$1\frac{1}{2}$ in. *Nut* with a narrow thickened margin.

3. **QUERCUS,** *Linn.*

Deciduous or evergreen trees and shrubs. *Leaves* alternate, entire

toothed or lobed, penninerved. *Flowers* monœcious, small or minute, spicate; male in pendulous or erect spikes; bracts small; female erect. MALE FL. *Perianth* campanulate, 4–7-lobed or -partite. *Stamens* indefinite, 6–12; filaments slender; anther-cells contiguous. *Pistillode* hairy or 0. FEM. FL. enclosed in imbricate bracts. *Perianth-tube* adnate to the ovary, limb very minute lobed or toothed. *Staminodes* minute or 0. *Ovary* after fecundation more or less perfectly 3- rarely 4–5-celled; styles 3–5, short; ovules 2 in each cell. *Nut* ovoid globose or depressed, 1-celled, seated in or enclosed in, and attached by a broad base or by all its surface to an involucre of imbricate hardened bracts. *Seeds* 1 or 2, testa membranous; cotyledons plano-convex, thick, fleshy, smooth grooved lobed or ruminate; radicle minute.—Species about 300, temperate and tropical; absent in S. America, Tropical and S. Africa, the Deccan Peninsula, Australia and the Pacific.

The following prodromus of the Indian Oaks is a very imperfect one. It is founded on a systematic list with references and synonyms of the Indo-Malayan species kindly sent me by Dr. King, and which embodies his ideas of the limitation of the species as they will appear in the illustrated Monograph which he is preparing, and which will doubtless supplement the shortcomings of this work. The genus is one of exceptional difficulty, from the variability of the foliage, and in the size and form of the involucre of the fruit and of the nut itself, and I doubt the possibility of identifying most of the species in many of these states by descriptions alone.

Since the above lines were written Dr. King has visited England, bringing his mss. account of the Oaks with him. This he has generously allowed me to collate with my descriptions to the great advantage of the latter.

SECT. I. LEPIDOBALANUS, *Endl.*—*Male spikes* simple, lax-fld., pendulous, deciduous. *Fruit* subsessile, on short spikes; bracts of cup imbricate, tips free. *Leaves* usually toothed serrate or lobed.

1. **Q. semecarpifolia,** *Smith in Rees Cyclop.* xxix. No. 20; leaves short-petioled elliptic or oblong entire or spinous-toothed obtuse or pungent, base cordate or rounded, cup hemispheric covering the base rarely more of the oblong or globose nut, bracts appressed acute tips often membranous. *A. DC. Prodr.* xvi. ii. 15; *Wall. Pl. As. Rar.* ii. 56, t. 174; *Cat.* 2776; *Brand. For. Fl.* 479, t. 64; *Gamble Man.* 382; *Miquel Ann. Mus.* i. 119. Q. obtusifolia & Cassura, *Don Prodr.* 56, 57; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 219.

TEMPERATE HIMALAYA; from Kumaon to Bhotan and Munnipore, alt. 6–12,000 ft. —DISTRIB. Affghanistan.

A small or large subevergreen gregarious tree, 30–80 ft., rarely 80–100 ft., with trunk 12–18 ft. in girth. *Leaves* 2–6 by 1–4 in., coriaceous, glabrous-pubescent or young stellate-pubescent; nerves 6–8 pairs, forked; petiole 0–$\frac{1}{4}$ in. *Male spikes* crowded, softly pubescent; sepals obtuse, ciliate; stamens 8–18, glabrous. *Fem. spikes* short; styles long, recurved. *Cups* solitary, $\frac{1}{2}$–1 in. diam., margin thin; nut globose, rarely ovoid, 1 in. diam., glabrous, umbo large.—Often confounded with *Q. Ilex*, from which the forked nerves distinguish it.

2. **Q. serrata,** *Thunb. Fl. Jap.* 176; leaves long-petioled oblong-lanceolate acute or acuminate spinulose-toothed many-nerved, cup half covering the globose or oblong nut, bracts free long thick coriaceous recurved. *Brand. For. Fl.* 486; *Gamble Man.* 384. Q. serrata, *var.* Roxburghii, *A. DC. Prodr.* xvi. i. 57; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 221. Q. polyantha, *Lindl. in Wall. Cat.* 2771. Q. Roxburghii, *Endl. Gen. Pl., Suppl.* iv. 28.

EASTERN TEMPERATE HIMALAYA; from Nepal, *Wallich*, to Sikkim, alt. 5–6000 ft., Bhotan. MUNNIPORE and the KHASIA HILLS, alt. 3–5500 ft.—DISTRIB. Shan Hills, China, Japan.

A deciduous tree of moderate size. *Leaves* 4–6 in., coriaceous, glabrous or with tufts of hairs in the nerve axils, young tawny tomentose beneath; nerves 14–16 pairs, ending in the often long slender teeth; petiole 1–2 in. *Male spikes* long, tomentose; stems glabrous. *Fem. spikes* short; fl. usually clustered; style slender; cups 1–1½ in. diam., at first enclosing the glabrous nut, which is ½–¾ in. long.—The Indian plant differs slightly from the Japanese in the rather broader bracts and stipules.

3. **Q. dilatata,** *Lindl. in Wall. Cat.* 2785; leaves short-petioled glabrous oblong-lanceolate entire or spinous-serrate, nerves forked and reticulate, cup hemispheric half enclosing the ovoid nut, bracts lanceolate appressed. *A. DC. Prodr.* xvi. ii. 41; *Royle Ill.* 346, and Q. dealbata, t. 84, f. 2; *Brand. For. Fl.* 482; *Gamble Man.* 383; *Wenzig in Jahrb. Bot. Gart. Berl.* v. 220. Q. floribunda, *Lindl. in Wall. Cat.* 2773.

WESTERN TEMPERATE HIMALAYA; from Kumaon to Kashmir, alt. 4500–9000 ft. —DISTRIB. Affghanistan (ascending to 10,000 ft.).

A large subevergreen gregarious tree, 50–60 ft., but often 80–100 ft.; trunk attaining 20 ft. girth; shoots flocculent. *Leaves* 2–3 in., coriaceous, shining, base rounded or cordate; nerves 8–12 pairs; petiole ¼ in. *Male spikes* crowded, 1–1½ in. *Fem. spikes* short; fl. solitary; styles 3–5, linear-clavate. *Cup* ¾ in. diam., tomentose; nut ¾ in. long.

4. **Q. Ilex,** *Linn. Sp. Pl.* 995; leaves subsessile very coriaceous elliptic oblong or orbicular entire or spinous-toothed base cuneate rounded or cordate, softly and thickly tomentose or very pubescent beneath or at length glabrous, nerves subsimple, cup campanulate obconic or turbinate at first nearly enclosing the cylindric nut, bracts appressed tips narrow. *A.DC. Prodr.* xvi. i. 39; *Brand. For. Fl.* 480; *Gamble Man.* 383; *Boiss. Fl. Orient.* v. 1167; *Reichb. Ic. Fl. Germ.* xii. t. 642; *Kotschy Eichen,* t. 38. Q. Baloot, *Griff. Itin. Not.* 328; *A. DC. l. c.*; *Boiss. l. c.* 1168; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 200.

WESTERN TEMPERATE HIMALAYA; in the drier ranges from Kumaon westwards, alt. 3000–8500 ft.—DISTRIB. Affghanistan, and from Syria westwards to the Atlantic.

An evergreen shrub or small tree, 40 ft., trunk attaining 7–8 ft. girth; shoots stellate-pubescent. *Leaves* 1–3 in., very coriaceous, young pubescent above, nerves 6–12 pairs, not strong; petiole ⅙–¼ in. *Male spikes* fascicled, stellately-pubescent. *Fem. spikes* short, usually slender, flexuous, with 1 or more flowers at the flexures; styles 3–5, linear-clavate, surrounded by the perianth-limb. *Cup* very thick, hoary; nut 1–1½ in., tip conical.—The specific identity of the Himalayan. *Q. Baloot*, Griffith, with the Mediterranean *Q. Ilex*, has been carefully studied by Thomson, Brandis and King, and settled affirmatively. The real or supposed characters for the Indian plant were the pubescence of the leaves, and the smallness and flatness of stellate hairs which have a more distinct centre and shorter more slender rays.

5. **Q. Griffithii,** *Hook. f. & Thoms. in A. DC. Prodr.* xvi. ii. 14; leaves large subsessile obovate-oblong or oblanceolate acute base cordate rounded or acute entire or coarsely sinuate toothed or serrate pale and stellately-pubescent or -tomentose or smooth and glaucous beneath, cup small sessile hemispheric embracing half the ovoid-oblong nut, bracts appressed upper acute. *Gamble Man.* 381; *Miq. Ann. Mus.* i. 104; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 218.

SIKKIM HIMALAYA; at Mongpo, alt. 3500 ft., introduced by *Clarke*. KHASIA MTS., alt. 3–5000 ft., *Griffith*, &c.; Munnipore, *Watt*, *Clarke*. ? BHOTAN, *Booth*. BURMA, *Brandis*.

A small or large deciduous tree. *Leaves* 6–10 by 2–5 in., smooth above and pale when dry; petiole $\frac{1}{10}$–$\frac{1}{6}$ in. *Male spikes* 1–2 in., crowded and glabrous; anthers hairy. *Cups* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., hoary, margin thin; nut $\frac{1}{2}$–$\frac{2}{3}$ in. long, glabrous, tip conical.—A diseased state is common in which the branchlets are replaced by globose sessile brush-like masses of imbricating subulate rigid tomentose scales.—King thinks it probable that this and the Mongolian and Japanese *Q. aliena*, Bl., *mongolica*, Fisch., *crispula*, Bl., and *grosseserrata*, Bl., are one species.

VAR. *oblonga*, King mss.; leaves oblong or oblong-obovate shortly acuminate subentire concolorous and puberulous or glabrate beneath.—Khasia Mts., *Mann*, *Clarke*.—A very constant form.

6. **Q. lanuginosa,** *Don Prodr.* 57; shoots and leaves beneath densely rusty or tawny woolly or tomentose, leaves petioled oblong-lanceolate toothed acute or acuminate, nerves many parallel very strong beneath, cups small hemispheric axillary spicate or on the old wood sessile, cup about half as long as the small oblong nuts, bracts ovate appressed. *A. DC. Prodr.* xvi. ii. 51; *Brand. For. Fl.* 481; *Gamble Man.* 384. Q. lanata, *Smith in Rees Cyclop.* xxix. No. 27, and in *Wall. Cat.* 2772; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 221 (excl. var. *incana*). Q. Banga, *Ham. mss.*

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 6000–7500 ft.

A large evergreen tree, attaining 80 ft. *Leaves* 4–8 in., very coriaceous; nerves 10–16 pairs, impressed above, simple, straight; petiole $\frac{1}{4}$–1 in., stout. *Male spikes* densely woolly, clustered, stamens glabrous. *Fem. fl.* tomentose, solitary or in pairs; styles linear. *Cups* $\frac{1}{2}$–$\frac{2}{3}$ in. diam.; margin acute; nut as long, glabrous.

7. **Q. incana,** *Roxb. Hort. Beng.* 113; *Fl. Ind.* iii. 642; leaves oblong- or ovate-lanceolate acuminate mucronate-serrate densely tomentose beneath, nerves many parallel very strong beneath, cups axillary solitary or clustered campanulate embracing half the conico-ovoid nut, bracts triangular closely appressed tips often membranous. *A. DC. Prodr.* xvi. ii. 57 (*excl. syn. lanata*); *Brand. For. Fl.* 482; *Gamble Man.* 384; *Wall. Cat.* 2770; *Miquel Ann. Mus.* i. 111. Q. dealbata, *Wall. Cat.* 2769. Q. lanata, *Smith in Rees Cyclop.* xxix. n. 27. Q. lanata, *Don*, var. incana, *Wenzig in Jahrb. Bot. Gart. Berl.* iv. i. 222. ? Q. oblongata, *Don. Prodr.* 57.

TEMPERATE HIMALAYA; from the Salt range and Murree to East Nepal, alt. 4500–7500 ft.—DISTRIB. Shan States of Upper Burma.

An evergreen tree, attaining 50–80 ft., and trunk 4–12 ft. in girth; shoots and petioles hoary or woolly. *Leaves* 3–6 in., coriaceous, glabrous above, nerves 14–20 pairs; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Male spikes* softly hairy; anthers glabrous. *Fem. fl.* usually sessile; styles linear-clavate, spreading. *Cup* $\frac{1}{2}$ in. diam., margin acute, tomentose at length glabrate, at first enclosing the nut, which is 1 in. long, hoary with a short cylindric umbo.

SECT. II. CYCLOBALANOPSIS, *Oerst.* *Male spikes* as in *Lepidobalanus*. *Bracts* of the cupular involucre connate in concentric connate or free belts. *Leaves* rarely entire.

8. **Q. oidocarpa,** *Korth. in Verh. Nat. Gesch. Bot.* 216, t. 47, t. 18; leaves long-petioled glabrous elliptic oblong abruptly caudate entire or serrate-toothed towards the tip, cup large solitary peduncled hemispheric globose or turbinate half to three-fourths as long as the ovoid or globose hoary nut, zones 5–7 entire thin. *Blume Mus. Bot.* 302; *A. DC. Prodr.* xvi. ii. 99; *Miquel Fl. Ind. Bat.* i. i. 856; *Ann. Mus.* i. 115; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 233.

BURMA, *Parish.* PERAK; at Larut, *Scortechini, King's Collector.*—DISTRIB. Sumatra, Java, Borneo.

Shoots quite glabrous. *Leaves* 6–8 in., rather thinly coriaceous, pale, shining above, reticulate beneath; nerves 8–10 pairs, slender; petiole 1 in., very slender. *Male spikes* unknown; fem. short. *Cup* $\frac{1}{3}$–1 in. diam., sessile; belts 6–8, thin, flat, crenate, pubescent; nut $\frac{3}{4}$–$1\frac{1}{2}$ in. diam. usually globose with a long conical zoned umbo.

9. **Q. semiserrata,** *Roxb. Fl. Ind.* iii. 641; leaves oblong to lanceolate acuminate repand-serrate towards the tip, subglaucous beneath, nerves laxly reticulate, petiole pubescent, cups 1–3 velvety on a short stout peduncle at first turbinate, then hemispheric and embracing the base or all of the ovoid velvety nut, belts 5–8 very thick, margin acute or obtuse and densely velvety. *A. DC. Prodr.* xvi. ii. 99; *Wight Ic.* t. 211; *Brand. For. Fl.* ii. 488; *Kurz For. Fl.* ii. 488; *Wall. Cat.* 2798; *Wight Ic.* t. 211; *Miquel Ann. Mus.* i. 112. Q. Horsfieldii, *Miquel l. c.* 856; *A. DC. l. c.*

ASSAM, SILHET, CACHAR, and the KHASIA MTS., alt. 2–3000 ft., and from PEGU to TENASSERIM.—DISTRIB. Sumatra, Banca.

An evergreen tree, 40–50 ft.; shoots and young leaves beneath tawny-tomentose. *Leaves* 5–9 in., thinly coriaceous, base acute or obtuse; nerves slender, loosely reticulate; petiole $\frac{1}{2}$–1 in., slender. *Male spikes* slender, villous; flowers minute. *Cups* 1–$1\frac{1}{2}$ in. diam., villous; belts very variable in number and thickness; nut $1\frac{1}{2}$ to nearly 2 in. long, broadly globosely ovoid or oblong, umbo long subcylindric.

VAR. *Mannii,* leaves 4–6 in. narrowed downwards, nerves 12–14 pairs straight ascending, margin of cup very thick broadly everted villous.—Khasia and Naga Hills.

10. **Q. glauca,** *Thunb. Fl. Jap.* 175; leaves long-petioled oblong to ovate-lanceolate acuminate entire or cuspidate-serrate above the middle many-nerved glaucous or not beneath, base unequal, cups 2–3 small sessile on a short axillary peduncle half as long as the oblong or ovoid thin glabrous nut, belts 4–8 silky thin outer crenate. *A. DC. Prodr.* xvi. ii. 100; *Blume Mus. Bot.* i. 289; *Miquel Ann. Mus.* i. 115; *Wenzig Jahrb. Bot. Gart. Berl.* iv. 233; *Banks. Ic. Sel. Kaempf.* t. 17. Q. annulata, *Smith in Rees Cyclop.* xxix. No. 22; *A. DC. Prodr.* xv. ii. 100; *Wall. Cat.* 2767; *Brand. For. Fl.* 488, t. 65 (*excl. syn. semiserrata*); *Gamble Man.* 387. Q. Phullata, *Ham. in Don Prodr.* 57. Q. dentosa, *Lindl. in Wall. Cat.* 2775. Q. laxiflora, *Lindl. in Wall. Cat.* 2774; *A. DC. l. c.* 108.

SUBTROPICAL HIMALAYA; from Kashmir to Bhotan, alt. 3–6000 ft. KHASIA MTS., alt. 2–4500 ft.—DISTRIB. Japan.

A large evergreen tree; buds glabrous, tetragonous. *Leaves* 3–6 in., coriaceous, young silky beneath, teeth incurved; nerves 12–14 pairs; petiole $\frac{1}{2}$–1 in., slender. *Male spikes* very slender, hairy; bracts lanceolate, much longer than the flowers; anthers glabrous. *Cup* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., belts very thin appressed; nut $\frac{1}{2}$–$\frac{3}{4}$ in., top conical; style with a large stout umbo.—Specimens with small entire leaves look very different from the type.

11. **Q. Brandisiana,** *Kurz in Journ. As. Soc. Beng.* 1873, ii. 108; *For. Fl.* ii. 488; leaves thinly coriaceous oblanceolate or elliptic or obovate-oblong acute or obtusely cuspidate coarsely repand serrate glaucous beneath, base rounded or acute, nerves 10–12 pairs straight slender, cups solitary shortly peduncled velvety, belts 5–6 erose or entire, nut hemispheric base truncate.

MARTABAN; in dry forests, alt. 1–4000 ft., *Kurz.*—DISTRIB. Shan Hills, in Burma.

An evergreen tree, 35–40 ft., shoots pubescent. *Leaves* 4–5 in., glabrous and wrinkled above, hardly shining sparsely downy and reticulate beneath, nerves slender conspicuous; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., slender. *Cup* $\frac{1}{2}$ in. diam., velvety; belts 3–4, thin, very appressed. *Nut* $\frac{1}{2}$–$\frac{2}{3}$ in. diam.

12. **Q. lineata,** *Blume Bijd.* 523; *Fl. Jav. Cupul.* 32, t. 19; *Mus. Bot.* i. 302; leaves coriaceous obovate linear oblong or lanceolate acute or acuminate spinulosely serrate tip serrulate or entire glaucous pale glabrous or pubescent beneath, nerves 16–30 pairs, cups shortly peduncled not half as long as the more or less hemispheric or subglobose smooth nut. *A. DC. Prodr.* xvi. ii. 98; *Miquel Fl. Ind. Bat.* i. i. 855; *Ann. Mus.* i. 114; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 232. Q. polyneura, *Miquel Pl. Jungh.* i. 11. Q. oxyrhyncha, *Miq. Fl. Ind. Bat. Suppl.* i. 347; *Ann. Mus. l. c.* 113. ? Q. kamroopii, *Don Prodr.* 57.

Sikkim Himalaya, alt. 4–7000 ft. Bhotan, *Griffith*; Khasia and Naga Mts., alt. 5–6000 ft.—Distrib. Java.

A small tree; branches thickly lenticellate. *Leaves* 3–7 in., shining above; nerves straight, strongly shiny beneath; petiole $\frac{3}{4}$–1 in., slender. *Male spikes* 2–4 in., tawny villous. *Cups* in very short spikes, sessile, $\frac{3}{4}$ in. or less in diameter, very variable, usually almost hemispheric, margin acute often toothed, shorter than the large or small nut.

Var. *oxyodon,* Wenzig, l. c.; branchlets glabrous, leaves lanceolate caudate crenulate, spinulous serrate glaucous beneath, nerves many close, cup $\frac{2}{3}$ in. diam., belts many thin hoary-tomentose, nut subglobose. Q. oxyodon, *Miquel Ann. Mus.* i. 114; *A. DC. Prodr. l. c.*—Khasia Mts., alt. 3–5000 ft., *J. D. H.*, &c. Naga Hills, *Prain.*

Var. *Lobbii,* Wenzig, l. c.; branchlets tawny-woolly, leaves 2–4 in. closely serrulate serratures setaceous, beneath white or yellowish and finely tomentose, nerves many close-set.—Khasia Hills, alt. about 3000 ft., *Griffith, Mann.*

Var. *Griffithii,* King mss.; leaves subentire caudate-acuminate.—Khasia Hills.

Var. *Thomsoniana,* Wenzig, l. c.; leaves glaucous or fulvous beneath serrate above the middle, nerves many strong, cups large turbinate or cupular fulvous-tomentose, belts crenate at first large loose and thin, nut 1–1½ in. hemispheric glabrous. Q. Thomsoniana, *A. DC. l. c.* 98.—Sikkim, alt. 6–8000 ft.; Bhotan, *Griffith.*

Var. *Hildebrandii,* King mss.; branchlets glabrous, leaves sinuate-denticulate glabrous and glaucous beneath, cup 1¼ in. diam. nearly flat, belts confluent into ridges, nut hemispheric 1½ in. diam., umbo small.—Arracan.

13. **Q. mespilifolia,** *Wall. Cat.* 2766; leaves ovate to oblong- or ovate-lanceolate obtuse or obtusely acuminate glabrous or midrib villous beneath coarsely serrate not glaucous beneath, young flocculent, nerves 12–14 pairs stout, cup deep hemispheric or obconic, belts 6–10 velvety, nut globose or broad and depressed hardly or half exserted hoary. *A. DC. Prodr.* xvi. ii. 102; *Kurz For. Fl.* ii. 488.

Munnipore, *Watt.* Arracan and Burma, alt. 4–5000 ft., *Wallich, Kurz.*

An evergreen tree; branchlets tawny-villous. *Leaves* 4–7 in., thinly coriaceous, shining above, reticulate beneath; nerves nearly straight, stout beneath; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., stout, woolly. *Male spikes* 4–6 in., dense-fld., woolly. *Cup* 1–1¼ in. diam., base hemispheric or obconic, belts 8–15 entire or crenate; nut 1 in. diam., globose or hemispheric, depressed, globose.

14. **Q. Helferiana,** *A. DC. Prodr.* xvi. ii. 101; leaves large coriaceous elliptic- or ovate-lanceolate acute or obtuse obtusely sinuate-serrate more or less softly tomentose beneath, nerves 10–12 pairs, cups hemispheric or flatter, belts almost free crenulate, nut turbinate or depressed hemispheric half exserted.

AVA, *Wallich*. TENASSERIM, alt. 4000 ft., *Gallatly*; Moulmein, *Helfer*. MUNNIPORE, alt. 3000 ft., *Watt*.

Branches softly tawny-tomentose or woolly. *Leaves* 8–10 in., shining above, almost woolly beneath, nerves rather slender; petiole ¾–1 in., stout. *Cups* ¾–1 in. diam., broader than the nut which has a low umbo.

15. **Q. velutina,** *Lindl. in Wall. Pl. As. Rar.* ii. 41, t. 150; *Cat.* 2768; leaves short-petioled pale thinly coriaceous lanceolate or elliptic-lanceolate acuminate at both ends obtusely or acutely serrate towards the tip glabrous, young densely villous beneath, nerves 8–10 pairs slender arched, cups few large in a very short spike very shallow half as long as the tomentose depressed hemispheric or globose or turbinate nut, belts 6 or more crenate densely silkily villous. *A. DC. Prodr.* xvi. ii. 99; *Kurz For. Fl.* ii. 487 (*in part*); *Miquel Ann. Mus.* i. 115; *Wenzig Jahrb. Bot. Gart. Berl.* iv. 236.

CHITTAGONG, *Lister, King's Collector*. PEGU and TENASSERIM, *King*, &c.

A deciduous tree, 60–80 ft.; shoots and young leaves beneath tawny- or brown-villous. *Leaves* 4–9 in., rather thin base acute, nerves slender not impressed above; petiole ½ in., slender, glabrous or pubescent. *Male spikes* densely tawny-villous. *Cups* 1½ in. diam., base broadly intruded. *Nuts* of the first year depressed, broader than long, when ripe as broad as long, pale tomentose, top conical, umbo minute.

16. **Q. lamellosa,** *Smith in Rees Cyclop.* xxix. No. 23; shoots glabrous, leaves very large shortly petioled from broadly oblong to lanceolate acuminate cuspidately serrate glabrous and glaucous or pubescent beneath, nerves very many strong and straight, fem. fl. solitary or crowded in short spikes, cups very large hemispheric silky half enclosing the subglobose or turbinate velvety nut. *A. DC. Prodr.* xvi. ii. 101 (*excl. syn.* Q. Wallichiana); *Brand. For. Fl.* 488; *Hook. f. Ill. Pl. Himal.* t. 20; *Lindl. in Wall. Pl. As. Rar.* ii. 41, t. 149; *Wall. Cat.* 2777; *Gamble Man.* 387; *Miquel in Ann. Mus.* i. 114; *Wenzig Jahrb. Bot. Gart. Berl.* iv. 236. Q. imbricata, *Ham. in Don Prodr.* 57. Q. paucilamellosa, *A. DC. l. c.*

EASTERN HIMALAYA; from NEPAL, *Wallich*, to BHOTAN, the Naga and Duphla Hills, alt. 5–8000 ft. MUNNIPORE, alt. 7–8000 ft., *Watt*.

A lofty evergreen tree, attaining 120 ft., and trunk 15 ft. girth; buds short. *Leaves* 6–12 in., sometimes 10 in. broad, dark green and shining above; nerves 20–25 pairs, impressed above, very stout beneath; petiole ½–1½ in., very stout or slender. *Cups* sometimes 2½ in. diam. and coriaceously fleshy; belts large, deeply crenate, inner incurved, much larger than the nut.—Roxburgh's locality of Penang is a mistake.

SECT. III. PASANIA, *Miquel*. *Male spikes* stout, erect, more or less persistent, simple or paniculately branched. *Fem. fl.* at the base of the male spikes or in separate spikes. *Involucre of fruit* hemispheric or discoid or saucer-shaped, bracts imbricate; nut free or adnate to the cup at the narrowed base only. Leaves entire in all except Q. *Lindleyana*.—See also Q. *eumorpha*.

The characters of the subordinate divisions of this Section founded on the form of the nut, must be taken with many exceptions.

* Nut usually longer than broad, but very variable in most (see also Q. *spicata*).

17. **Q. Kunstleri,** *King mss.*; branchlets tomentose, leaves subsessile narrowly elliptic- or obovate-oblong acute or obtusely cuspidate entire glabrous or pubescent beneath and on the nerves on both surfaces,

base rounded or cordate, nerves 8–10 pairs arched, cups solitary in long spikes turbinate much shorter than the ovoid-cylindric glabrous nut, bracts broadly ovate.

PERAK, *Scortechini, King's Collector.*—DISTRIB. Borneo.

A tree, 40–50 ft. *Leaves* 5–8 in., thinly coriaceous, pale brown when dry. *Male spikes* panicled, rachis fulvous-tomentose, flower glabrous. *Fruiting spikes* 4–10 in. *Cups* $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; bracts appressed-tomentose. *Nut* $\frac{1}{2}$–1 in. long, rarely hemispheric, umbo contracted below the persistent calyx-limb.

18. **Q. Lindleyana,** *Wall. Cat.* 2782; leaves shortly petioled coriaceous obovate base cuneate acute or obtusely cuspidate sparsely tomentose beneath entire or sinuate-toothed towards the tip, nerves 8–10 pairs arched very strong beneath, fruiting spikes long, cups small confluent in threes hemispheric woody embracing one-third of the elongate ovoid acute glabrous obscurely trigonous nut, bracts closely appressed. *A. DC. Prodr.* xvi. ii. 108; *Kurz For. Fl.* ii. 480; *Hance in Journ. Bot.* 1875, 136.

BURMA; at Taongdong, *Wallich.* UPPER BURMA, *Collett.*

Leaves 6–8 in., pale when dry, nerves slightly impressed above, cross-nervules beneath reticulate, base narrowed into a petiole $\frac{1}{4}$ in. long. *Fruiting spikes* 8–10 in., very stout; cups $\frac{1}{3}$–$\frac{1}{2}$ in. diam., sessile, hoary, margin acute entire. *Nut* $\frac{2}{3}$–$\frac{3}{4}$ in. long, shining, umbo minute.—The bracts are sometimes obscurely disposed in rings, as shown in a drawing of this species in Herb. Kew.

19. **Q. Amherstiana,** *Wall. Cat.* 2783 (*in part*); quite glabrous, leaves long-petioled elliptic-oblong to -lanceolate or oblanceolate acuminate quite entire, base acute, nerves slender arched, cups hemispheric areolate by the confluent large obscure bracts, margins often reflexed silky-velvety covering half the hemispheric obovoid-globose tomentose nut. *A. DC. Prodr.* xvi. ii. 83; *Kurz For. Fl.* ii. 484; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 223.

MARTABAN and TENASSERIM, *Wallich,* &c.

A large evergreen tree. *Leaves* 6–9 in., thinly coriaceous; nerves 6–10 pairs; petiole $\frac{1}{2}$ in. *Fruiting spikes* stout, long. *Cups* 1 in. diam., free or connate by twos or threes, subhemispheric. *Nut* depressed at the top with an obscure umbo.

20. **Q. acuminata,** *Roxb. Fl. Ind.* iii. 636; quite glabrous, leaves large shortly petioled elliptic-lanceolate caudate quite entire very shining pale and smooth on both surfaces, nerves 10–15 pairs slender impressed above, cups subhemispheric echinate from the projecting tips of the confluent bracts much shorter than the ovoid or hemispheric hoary nut, margin toothed. *A. DC. Prodr.* xvi. ii. 90; *Wight Ic.* t. 221, f. 6–9; *Kurz For. Fl.* ii. 484; *Miquel Ann. Mus.* i. 109. Q. fenestrata, *Roxb.*, var. acuminata, *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 224.

CHITTAGONG, *Roxburgh, King's Collector.*

Branchlets shining. *Leaves* 8–10 by $2\frac{1}{2}$–4 in., flat, pale, narrowed into a short stout $\frac{1}{4}$–$\frac{1}{2}$ in. petiole. *Cups* 1 in. diam., hoary. *Nut* as broad and rather longer, umbo small.

21. **Q. lappacea,** *Roxb. Fl. Ind.* iii. 637; shoots villously tomentose, leaves short-petioled oblong-lanceolate acuminate or caudate pubescent or tomentose beneath quite entire, base acute, nerves 12–15 pairs, cups hemispheric or shallower echinate or tubercled one-third to one-half the length of the broadly conico-ovoid hoary nut, bracts velvety shortly spreading. *A. DC. Prodr.* xvi. ii. 87; *Wight Ic.* t. 220; *Wall. Cat.* 2780;

Kurz For. Fl. ii. 484; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 223. Q. hirsuta, *Lindl. in Wall. Cat.* 3734. Q. Mackiana, *Hook. Ic. Pl.* t. 224.—*Wall. Cat.* 9099.

SILHET and the KHASIA MTS., ascending to 4000 ft. TENASSERIM, *Helfer.* PERAK, *Scortechini, King's Collector.*

An evergreen tree. *Leaves* 5–7 in., thinly coriaceous, young tomentose on both surfaces, nerves 10–12 pairs, slender, nervules reticulate; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., stout. *Male spikes* 4–5 in., fulvous-tomentose, slender. *Fruiting spike* 2–4 in., stout; cups $\frac{3}{4}$–1 in. diam., hoary. *Nut* 1 in. long and less, umbo prominent.

** Nut usually subglobose, base truncate, sometimes hemispheric.

22. **Q. Falconeri,** *Kurz in Journ. As. Soc. Beng.* 1875, ii. 197; *For. Fl.* ii. 485; glabrous, leaves stoutly petioled elongate linear-oblong acuminate or apiculate quite entire base acute glabrous, fruiting spikes long tomentose, cups flattish or concave coriaceous velvety within, margins thin recurved or waved broader than the large subglobose or hemispheric nut, bracts small triangular appressed.

TENASSERIM, *Falconer, Kurz.*

An evergreen tree. *Leaves* thinly coriaceous, 1–1½ ft., glossy on both surfaces; nerves about 20 pairs, impressed above, strong and arched beneath. *Fruiting spikes* 12–18 in., stout. *Cups* $\frac{3}{4}$–1 in. diam., very open, margin thin.—Kurz by error gives Upper Assam as the habitat.

23. **Q. Scortechinii,** *King mss.*; glabrous, leaves coriaceous shortly petioled elliptic quite entire base acuminate, nerves 8–10 pairs slender arched, cups shallow densely echinate with long spreading bracts covering the base only of the large subglobose nut.

PERAK, alt. about 3000 ft., *King's Collector.*

A tree, 60–100 ft. *Leaves* 6–8 in., shining above, nerves hardly depressed, pale beneath; petiole $\frac{1}{3}$ in., stout. *Fruiting spike* 6–10 in., very stout. *Cups* 1½ in. diam., conspicuous for the long bracts. *Nut* amongst the largest of the genus, sometimes turbinate.—I have seen only old leaves and fruit.

*** Nut hemispheric hardly or not longer than broad.

† Cup almost enclosing the nut (see also *Q. spicata*).

24. **Q. pachyphylla,** *Kurz in Journ. As. Soc. Beng.* 1875, ii. 197, t. 14, f. 1–4; quite glabrous, leaves petioled very coriaceous elliptic or elliptic-lanceolate caudate base acute, nerves about 8 pairs, cups large very thick woody cuneate half as long as the hemispheric glabrous nut. Q. Andersoni, *Hook. f. in Journ. Linn. Soc.* xv. (1877) 125 (name only).

SIKKIM HIMALAYA, alt. 6–10,000 ft., *J. D. H.*, &c. MUNNIPORE, alt. 7–9000 ft., *Watt.*

A shrub, or small tree, 50–60 ft., branches stout black when dry. *Leaves* 4–7 in., shining above with impressed nerves, pale beneath; nerves slightly arched, slender; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Male spikes* stout, rachis glabrous. *Cups* in confluent clusters 2–4 in. diam., each woody 1–2 in. diam. with thick incurved margins and many rows of broad appressed often confluent bracts.

25. **Q. fenestrata,** *Roxb. Fl. Ind.* iii. 633; branches glabrous or hoary, leaves coriaceous petioled elliptic or lanceolate caudate base acute glabrous or midrib pubescent beneath, nerves 6–16 pairs slender, cups thin globose velvety with a circular apical opening enclosing $\frac{3}{4}$ or all of the

hemispheric glabrous nut, bracts triangular acute appressed or spreading. *A. DC. Prodr.* xvi. ii. 84; *Wight Ic.* t. 219; *Wall. Cat.* 2784; *Kurz For. Fl.* ii. 483; *Wall. Cat.* 2784 (*in part*); *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 224 (*excl. syn. dealbata & acuminata*). Q. callicarpifolia, *Griff. Itin. Notes*, ii. 87 (*in part*).

SIKKIM HIMALAYA, alt. 5–8000 ft. KHASIA MTS., alt. 4–5000 ft. MUNNIPORE, alt. 4–8000 ft., *Watt.*

A large evergreen tree. *Leaves* 5–10 in., coriaceous, shining above with impressed slender nerves; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Male spikes* stout, erect, rachis and flowers thinly tomentose. *Cups* $\frac{3}{4}$–1 in. diam., usually clustered but hardly confluent, margin thin entire. *Nut* with a conical top and small cylindric umbo.—Leaves very like *Q. pachyphylla*; in a very large-leaved state more ovate and $3\frac{1}{2}$ in. broad. Clarke has a state from Shillong in the Khasia (alt. 6000 ft.) with slender branches and leaves 3 in. long.

26. **Q. dealbata,** *Hook. f. & Thoms. mss.* (*not Wall.*); branches glabrous or hoary, leaves coriaceous elliptic-ovate or -lanceolate acuminate quite entire glabrous or minutely pubescent beneath, nerves 6–12 pairs, spikes terminal, cups hemispheric embracing half or more of the subglobose hemispheric or subpyriform hoary nut, bracts triangular acute appressed or spreading. *A. DC. Prodr.* xvi. ii. 85; *Miquel Ann. Mus.* i. 107. Q. fenestrata, *Roxb.*, var. dealbata, *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 224. Q. callicarpifolia, *Griff. Itin. Notes*, ii. 87 (*in part*).

BHOTAN and KHASIA MTS., alt. 3–6500 ft., *Griffith*, &c. NAGA HILLS, alt. 5800 ft., *Clarke.*

A bush or small tree, near *Q. fenestrata*, but the leaves are smaller, never caudate and often finely tomentose beneath, the acorns are much smaller and the nut hoary. A Khasia form has leaves and branches flocculent, and the leaves hoary above.

†† Cup covering only the lower part of the nut (or more in *Q. spicata*

§ *Leaves quite glabrous on both surfaces.*

27. **Q. spicata,** *Smith in Rees Cyclop.* xxix. n. 12; branchlets glabrous, leaves large polymorphous subsessile or petioled oblong to lanceolate oblanceolate or obovate or subpanduriform base acute rounded or cordate, nerves 10–20 pairs slender arched reticulate, fruiting spikes long stout, cups polymorphous usually small clustered or confluent covering more or less of the ovoid subglobose or hemispheric glabrous nut, bracts minute ovate often confluent in toothed rings pubescent. *A. DC. Prodr.* xvi. ii. 85; *Don Prodr.* 56; *Wall. Pl. As. Rar.* i. 40, t. 46; *Cat.* 2781 *Brand. For. Fl.* ii. 489; *Kurz For. Fl.* ii. 486; *Gamble Man.* 385; *Miquel Fl. Ind. Bat.* i. 846; *Ann. Mus.* i. 106; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 224; *Oudem. Annot. Cupulif. Jav.* 5, 6, t. 1, 4, f. 1. Q. squamata, *Roxb. Fl. Ind.* iii. 638; *Wight Ic.* t. 213. Q. grandifolia, *Don in Spreng. Syst.* iii. 856; *Prodr.* 57, and in *Lamb. Pin.* ii. *App.* 2. Q. pyrifolia, *Blume Mus. Bot.* i. 304; *Miq. Fl. Ind. Bat.* i. i. 864. Q. elegans, *Blume in Batav. Verh.* ix. 208; *Bijd.* 518; *Fl. Jav. Cupulif.* 21, t. 10; *Oudem. Annot. Cupulif. Jav.* 5, 6, t. 2, 3. Q. racemosa, *Jack in Mal. Misc.* vii. 86; *Korthals in Verh. Nat. Gesch.* 205. Q. Arcaula, *Ham. mss. in Spreng. Syst.* iii. 857; *Blume Mus. Bot.* i. 290.

TROPICAL HIMALAYA; from Nepal eastwards, alt. 2–4000 ft. ASSAM, MUNNIPORE, and southwards to TENASSERIM and the MALAY PENINSULA.—DISTRIB. Malay Islands.

A small tree, all parts glabrous except the hoary male spikes, monœcious or

dicœcious. *Leaves* sometimes 18 in. long, usually more or less obovate, thinly coriaceous; petiole long or short. *Cups*, the larger 1 in. diam., very thick and woody with very thick margins and obscure bracts; the smaller ½ in. diam., hemispheric with well-marked elegantly imbricating bracts and acute entire margins. *Nuts* ¼–¾ in. diam., more or less sunk in the cup; umbo very small.—It is impossible to frame a diagnosis for this common and variable species; the following is King's grouping of its prevalent forms:—

Var. *brevipetiolata & depressa*, A. DC. Prodr. xvi. ii. 86; leaves obovate or panduriform base rounded or cordate, cups usually connate, nut globose or much broader than long.—Himalaya, Khasia, Tenasserim.

Var. *gracilipes*, Miquel Ann. Mus. i. 106; leaves lanceolate long-petioled, cups and nuts as in var. *brevipetiolata*. Q. gracilipes, *Miquel Fl. Ind. Bat.* i. 347.—Khasia, Burma, Malay Peninsula.

Var. *microcalyx & glaberrima*, Blume Mus. Bot. i. 290; leaves small elliptic lanceolate or oblanceolate base acuminate, cups small hemispheric sometimes confluent, nut sometimes depressed-globose with the top intruded. *A. DC. l. c.* 86 (*excl. syn.* Q. turbinata, *Roxb.*). Q. microcalyx, and Q. anceps, *Korthals in Verh. Nat. Gesch. Bot.* 204; *Oudeman Annot. Cupulif. Jav.* 6, t. 4, f. 3. L. anceps, *Korthals l. c.*—Khasia, Perak, Java, Sumatra.

Var. *Collettii*, King mss.; leaves thin lanceolate or oblanceolate narrowed to the base, nerves 15–20 pairs, cups confluent hemispheric with an acute entire margin and many rows of small very distinct hoary bracts half the length of the subcylindric-ovoid nut.—Munnipore, *Clarke*; Naga Hills, *Collett.*—Very unlike the ordinary states of *Q. spicata* in foliage, cups and nuts; perhaps a distinct species.

Var. *Chittagonga*, King mss.; leaves thin narrowly lanceolate caudate-acuminate narrowed into the slender petiole ½–1 in. long, cups small thin-edged covering half or the base only of the small ovoid globose or suboblong nut. Q. mixta, *A. DC. l. c.* 88 (*in part*).—Chittagong.

28. **Q. grandifrons,** *King*; quite glabrous, leaves very large subsessile rigidly coriaceous elliptic-oblong obtusely acuminate or caudate, nerves 15–20 pairs arched and spreading, cups pedicelled covering the lower part of the hemispheric glabrous nut.

Perak, ascending to 3000 ft., *Scortechini, King's Collector.*

A large tree, 60–100 ft. *Leaves* 9–16 by 4–6 in., very shining above with impressed nerves and a deeply impressed raised midrib, pale beneath with obscure transverse nervules; petiole ¼ in., very stout. *Male spikes* very slender, in large hoary panicles. *Cups* (young) with stout obconic pedicels, cupular with minute acute impressed bracts in superimposed series (mature not seen). *Nut* ¾ in. diam., umbo small.

29. **Q. polystachya,** *Wall. Cat.* 2789; branches hoary, leaves long-petioled ovate-lanceolate acuminate at both ends glabrous, pale above white beneath, nerves 10–11 pairs arched, cup small shallow covering the base only of the globose or globosely ovoid glabrous nut, margin acute entire smooth, bracts minute appressed. *A. DC. Prodr.* xvi. ii. 107; *Kurz For. Fl.* ii. 485. Q. bancana, *Kurz l. c.* (*not of Scheffer*).

Munnipore, alt. 600–1000 ft., *Watt.* Ava, *Wallich*, &c. Moulmein, *Parish.*—Distrib. Shan Hills.

Leaves 6–8 in., rather thinly coriaceous; petiole ½–1 in. *Fruiting spikes* 6–8 in. *Cups* ⅓–½ in. diam. *Nut* ⅓ in. diam., shining, umbo minute capping the conical summit

§§ *Leaves glabrous above, pubescent beneath.*

30. **Q. Wallichiana,** *Lindl. in Wall. Cat.* 2778; branches hoary or tomentose, leaves coriaceous short-petioled elliptic-lanceolate or oblanceolate

caudate quite entire glabrous or subtomentose beneath, nerves 8–14 pairs arched strong beneath, cups crowded shallow hoary covering the base only of the hemispheric or subglobose conic-topped hoary nut, bracts subannulate minute appressed obscure. *Hance in Seem. Journ. Bot.* viii. (1870) 4, and in *Trimen Journ. Bot.* 1874, 241.

PERAK, PENANG, SINGAPORE and MALACCA, *Wallich*, &c.

A large tree. *Leaves* 5–7 in., usually shining above, midrib often pubescent; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Cups* $\frac{1}{2}$ in. diam.; margins acute. *Nut* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., umbo small.

31. **Q. sundaica,** *Blume Batav. Verh.* ix. 216; *Bijd.* 520; *Fl. Jav. Cupulif.* 11, t. 2, 3; branches hoary, leaves subsessile coriaceous elliptic or ovate acute (not caudate) entire glabrous above pale and hoary beneath base usually rounded, nerves 8–10 pairs spreading, cups stoutly peduncled very shallow echinate covering the base only of the hemispheric conic-topped glabrous nut. *A. DC. Prodr.* xvi. ii. 89; *Miquel Fl. Ind. Bat.* i. 850; *Ann. Mus.* i. 109; *Oudem. Annot. Cupulif. Jav.* 11. Q. mappacea, *Korth. Verh. Nat. Gesch. Bot.* 202; *Miquel Fl. Ind. Bat.* i. i. 850. Q. Korthalsii, *var.* mappacea, *Blume Mus. Bot.* i. 293; *A. DC. l. c.* 90. Q. pseudomolucca, *vars.* sundaica & Korthalsii, *Wenzig in Jahrb. Bot. Gart. Berl.* i. 227. Q. muricata, *Roxb. Fl. Ind.* iii. 635. ? Q. macrophylla, *Miquel Fl. Ind. Bat. Suppl.* 351; *A. DC. l. c.* 107.

PENANG, *Roxburgh*, &c. PERAK, *Scortechini, King's Collector.* MALACCA, *Maingay* (*Kew Distrib.* 1530).—DISTRIB. Sumatra, Java, Borneo.

A lofty tree, young parts furfuraceous. *Leaves* 4–7 by 2–3 in., shining above when mature (young hoary above) with a tomentose prominent midrib, pale beneath; petiole $\frac{1}{4}$ in., very stout. *Cups* $\frac{3}{4}$–1 in. diam., pubescent. *Nut* $\frac{3}{4}$–1 in. diam., umbo rather long.—Near *Q. Wallichii*, but the leaves are broader not caudate, petiole shorter and fruit larger.

32. **Q. Lamponga,** *Miquel Fl. Ind. Bat. Suppl.* 347; branches hoary or glabrous, leaves subsessile elliptic or elliptic-lanceolate caudate glabrous entire base acute white or silvery beneath, nerves 10–14 pairs arched, cups crowded covering the base only of the conico-hemispheric hoary nut, bracts subannulate obscure appressed. *A. DC. Prodr.* xvi. ii. 95; *Miquel Ann. Mus.* i. 109; *Wenzig in Jahrb. Bot. Gart. Berlin,* iv. 229. Q. brevipetiolata, *Scheff. Obs. Phyt.* ii. 47.

PERAK, *Scortechini, King's Collector.*—DISTRIB. Malay Islands, New Guinea.

A tree. *Leaves* 4–5 in., hardly shining; nerves not impressed above, slender beneath; petiole $\frac{1}{4}$ in., slender. *Cups* $\frac{3}{4}$–1 in. diam., base flat. *Nut* as broad, narrowed into the minute umbo.—Intermediate between sections *Pasania* and *Cyclobalanus*.

§§§ *Leaves pubescent on both surfaces.*

33. **Q. Hystrix,** *Korth. Verh. Nat. Gesch. Bot.* 201, t. 43; branches densely tomentose, leaves very coriaceous elliptic or elliptic-oblong acuminate entire asperulous or softly pubescent above with 12–15 pairs of arched tomentose nerves and midrib, base acute, cups echinate tomentose covering the lower part of the low conico-hemispheric glabrous nut. *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 223. Q. Korthalsii, *Blume*, vars. Kajuu & Hystrix, *Blume Mus. Bot.* i. 293; *A. DC. Prodr.* xvi. ii. 90; *Oudem. Annot. Cupulif. Jav.* 11. ? Q. pruinosa, *var.* β., *Blume Fl. Jav. Cupulif.* 10. Castanea? purpurella, *Miquel Fl. Ind. Bat. Suppl.* 352; *Ann. Mus.* i. 108.

PERAK and SINGAPORE, *King's Collector.* MALACCA, *Maingay* (*Kew Distrib.* 1458).—DISTRIB. Sumatra, Java.

A tree, 60–80 ft.; branches and leaves beneath rufously tomentose. *Leaves* 4–6 in., hard, nerves sunk above strong beneath, cross-nervules distinct on both surfaces. *Fruiting spikes* 4–8 in., very stout, tomentose. *Cups* shortly stoutly peduncled, young with long spinous incurved bracts, mature $\frac{2}{3}$–$\frac{3}{4}$ in. diam., flat with incurved margins, silky within, and short pubescent bracts. *Nut* much broader than long, top conical with a long stout umbo.

*** Nut turbinate.

34. **Q. Curtisii,** *King mss.*; leaves subsessile elliptic-lanceolate obtusely caudate base acuminate entire pale above white or silvery beneath, nerves 8–10 pairs obliquely ascending slender, cups small quite flat thin narrower than the hoary hemispherico-turbinate conic-topped nut, bracts much appressed.

PERAK, *King's Collector.* PENANG, *Curtis, King.*

Branches pustular, pale, glabrous. *Leaves* 6–8 in., thinly coriaceous, nerves hardly impressed above; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., stout. *Fruiting spikes* long-peduncled. *Cups* crowded, $\frac{1}{3}$–$\frac{1}{2}$ in. diam., wavy, margin entire not or hardly incurved, pubescent within. *Nut* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., broader than long, umbo short.

SECT. IV. CYCLOBALANUS, *Endl.* *Male spikes* stiff, erect. *Styles* as in *Pasania.* *Invol.* of fruit cupular; bracts connate, forming entire or toothed ridges, zones or belts (as in *Cyclobalanopsis*). *Leaves* quite entire in all.

* Nut normally longer than broad.

35. **Q. eumorpha,** *Kurz in Journ. As. Soc. Beng.* 1873, ii. 107; *For. Fl.* ii. 487; glabrous, leaves long-petioled undulate elliptic-oblong obtuse or obtusely acuminate entire base acute shining above pale beneath, nerves 6–8 pairs very faint arched, cups sessile campanulate or turbinately hemispheric embracing half the broad glabrous umbonate nut, bracts confluent in indistinct belts.

MARTABAN and TENASSERIM; on Moolyet, alt. 6–7000 ft., *Kurz*, &c.

A small scraggy evergreen tree. *Leaves* 3–4 in., thinly coriaceous, pale brown when dry, minutely reticulate beneath; nerves as impressed striæ above, very slender beneath; petiole $\frac{1}{2}$–$\frac{2}{3}$ in. *Cups* narrowed to the base, $\frac{3}{4}$ in. diam. *Nut* $\frac{3}{4}$ in. long.—I have seen no good fruit.

36. **Q. conocarpa,** *Oudem. in Versl. en. Mededeel.* xii. 206; *Annot. Cupulif. Jav.* 18, t. 10; branches tomentose, leaves small short-petioled elliptic-oblong or -lanceolate obtusely caudate entire base acute puberulous above with tomentose costa whitish or brownish finely tomentose beneath with 12–14 pairs of very strong arched nerves, cups stoutly peduncled hemispheric with a flat or intruded base half embracing the conico-hemispheric umbonate pointed silky or glabrous nut, belts few thin appressed hoary. *A. DC. Prodr.* xvi. ii. 93; *Miquel Ann. Mus.* i. 113; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 230.

PERAK and SINGAPORE, *Kunstler, Scortechini.*—DISTRIB. Sumatra, Java, Borneo.

A tree, 60–80 ft. *Leaves* 3–4 in., coriaceous, very shining though puberulous above, cross-nervules strong beneath; petiole $\frac{1}{6}$ in., tomentose. *Cups* nearly 1 in. diam. *Nut* as long and as broad.

37. **Q. Bennettii,** *Miquel Fl. Ind. Bat.* i. 857; *Suppl.* 348; *Ann. Mus.* i. 112; glabrous, leaves broadly elliptic abruptly obtusely cuspidate entire base narrowed into the slender petiole, nerves 10–12 pairs arched very faint on

both surfaces, cups shortly stoutly peduncled nearly flat or saucer-shaped half embracing the conico-hemispheric glabrous nut, belts broad appressed. *A. DC. Prodr.* xvi. ii. 94; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 235. Q. Miqueliana, *Scheff. Obs. Phyt.* ii. 48; iii. 94.

SINGAPORE, *Maingay* (*Kew Distrib.* 1460).—DISTRIB. Banka, Borneo.

Branches rather slender. *Leaves* 4–5 in., opaque above, grey brown and faintly reticulate beneath. *Cups* ¾–1 in. diam., margin acute entire. *Nut* as broad, with a broad deeply intruded base, umbo small low.

38. **Q. Cantleyana,** *King mss.*; glabrous, leaves large petioled oblong or obovate-oblong obtusely cuspidate entire base acute, nerves 12–15 pairs slender slightly arched and raised, cross-nervules very faint; cups shallow stoutly pedicelled embracing the base of the depressed hemispheric densely hoary conical-topped nut, belts very obscure.

PERAK and SINGAPORE, *King's Collector.* MALACCA ?, *Lobb.*

A tree, 60–100 ft. *Branches* stout, angular. *Leaves* 6–8 in., rigidly coriaceous, pale brown, midrib raised above; petiole ½ in., stout. *Fruiting spikes* 6–8 in., young cups globose, free or connate on a stout common peduncle ¼ in. long. *Cups* ¾ in. diam., glabrous within, margin acute erect entire. *Nut* as broad, umbo small.—Lobb's specimens are marked as from Malacca in Herb. Hook., but from Singapore in others.

** Nut hemispheric.

† *Leaves glabrous at all times.*

39. **Q. Wenzigiana,** *King mss.*; glabrous, leaves short-petioled elliptic obtusely caudate entire base acute shining above with 10–12 pairs of very faint raised nerves, cross-nervules very faint, cups subsessile shallow covering three-fourths of the hemispheric nut, belts many narrow thick distinct. Q. Dæpenhorstii, *Wenzig in Jahrb. Bot. Gart. Berl.* 231 (*not of Miquel*).

PERAK, *King's Collector.* PENANG, *Curtis.* MALACCA, *Griffith* (*Kew Distrib.* 4483); *Maingay* (*Kew Distrib.* 1527).—DISTRIB. Borneo.

Branches slender. *Leaves* 4–6 in., coriaceous, coloured beneath like *Q. Cantleyana*, but much smaller and caudate; petiole ¼–⅓ in., slender. *Cups* ¾ in. diam., margin rounded. *Nut* not seen (described from King mss.).

40. **Q. Rassa,** *Miquel Fl. Ind. Bat. Suppl.* 350; *Ann. Mus.* i. 112; glabrous, leaves small elliptic obtusely caudate entire narrowed into the slender petiole, nerves 10–12 pairs very faint on both surfaces arched, cups small subsessile shallow turbinate much shorter than the globose or globosely conical glabrous nut, belts broad entire. *A. DC. Prodr.* xvi. ii. 95.

PENANG, *Curtis, King's Collector.* PERAK, *Scortechini, King's Collector.*—DISTRIB. Sumatra, Borneo.

A tall tree. *Branches* slender. *Leaves* 2–3 in., rigidly coriaceous, shining above pale-greyish beneath, reticulations very obscure; petiole ½–¾ in. *Cups* ½ in. diam., margin acute entire. *Nut* as broad as the cup or broader, umbo minute.

? VAR. *montana*; leaves narrower tip more slender (cup not seen), nut subcylindric-ovoid.—Perak, alt. 4–5000 ft., *King's Collector*; Sumatra, alt. 6000 ft.

? VAR. *Griffithii*; leaves with much shorter rounder tips, fruit not seen.—Mergui, *Griffith* (*Kew Distrib.* 4482).

†† *Leaves glabrous when adult only, or puberulous beneath.*

41. **Q. cyrtorhyncha,** *Miquel Fl. Ind. Bat. Suppl.* 350; glabrous,

leaves short-petioled thinly coriaceous oblong obtusely cuspidate entire base rounded or cuneate midrib raised above subglaucous beneath with 12–13 pairs of slender arched raised nerves, cups broad shallow base flat with a short conic pedicel covering half the very depressed broadly conical glabrous nut, belts many indistinct. *A. DC. Prodr.* xvi. ii. 105.

PERAK, *King's Collector*, alt. 500–3000 ft.—DISTRIB. Sumatra, Borneo.

A tree, 50–70 ft.; branches stout. *Leaves* 6–8 by 3 in., reddish brown above and minutely reticulate; petiole $\frac{1}{6}$ in., stout. *Cups* 1 in. diam., margin acute, belts obscurely toothed. *Nut* as broad, top conical, umbo small, base deeply intruded.

42. **Q. Ewyckii,** *Korth. in Verh. Nat. Gesch. Bot.* 212, t. 46; var. latifolia, *King*; branches glabrous, leaves short-petioled elliptic or elliptic-oblong abruptly caudate entire base acute glabrous above with raised nerves obscurely puberulous beneath with 11–14 pairs of slender nerves and close cross-nervules, cups flattish embracing the base of the hemispheric conic-topped glabrous nut, belts thin confluent appressed.

PERAK, *King's Collector*.—DISTRIB. Sumatra.

A large tree. *Leaves* 4–6 in., coriaceous, brown, shining above, pale beneath; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Fruiting spikes* long. *Cups* subsessile, rather thin, $\frac{3}{4}$–1 in. diam. *Nut* 1 in. diam., umbo very small.

**** Nut turbinate or hemispheric.*

43. **Q. Clementiana,** *King mss.*; glabrous, leaves coriaceous oblong acuminate entire shining above with a stout raised midrib and on both surfaces 10–12 pairs of very oblique slender nerves pale beneath base acute, cups large saucer-shaped embracing the base of the turbinate nut, margin and belts very thick.

PENANG, *Maingay* (*Kew Distrib.* 1529). PERAK ?, *Scortechini*.

Branches black, angled when dry. *Leaves* 6–8 in., grey brown above; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., stout. *Cups* $1\frac{1}{2}$ in. diam., woody. *Nut* $1\frac{1}{2}$ in. diam., broader than long.

44. **Q. lucida,** *Roxb. Fl. Ind.* iii. 635; glabrous, leaves oblanceolate or obcuneately oblong tip obtuse or rounded red brown when dry narrowed into the short petiole, nerves 6–10 pairs subhorizontal faintly raised on both surfaces, cups large saucer-shaped, margins acute belts many, nut hemispheric glabrous top conic umbo minute. Q. cuneata, *Herb. Roxb. in Wall. Cat.* 3732; *A. DC. Prodr.* xvi. ii. 108; *Miquel Fl. Ind. Bat.* i. i. 863; *Ann. Mus.* i. 116.

PENANG, *Roxburgh*, *Maingay* (*Kew Distrib.* 1526). SINGAPORE and PERAK, *King's Collector*.

A tree, 60–100 ft., branches angled when dry. *Leaves* 5–7 in., margins often recurved; petiole $\frac{1}{8}$ in. *Cups* 1–$1\frac{1}{2}$ in. diam. *Nut* often obtusely trigonous, $1\frac{1}{4}$ in. diam., very thick and hard.

45. **Q. Omalkos,** *Korth. in Verh. Nat. Gesch. Bot.* 214; glabrous, leaves small elliptic-oblong or oblanceolate obtuse or cuspidate entire very pale narrowed into the short petiole, midrib stout raised on both surfaces, nerves 15–20 pairs very slender horizontal obscure on both surfaces, cups large saucer-shaped margin thick belts obscure, nut hemispheric glabrous. *A. DC. Prodr.* xvi. ii. 92; *Blume Mus. Bot.* i. 301; *Miquel Fl. Ind. Bat.* i. 860; *Ann. Mus.* i. 112; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 231.

PERAK, *Scortechini, King's Collector*, ascending to 3000 ft.—DISTRIB. Sumatra.

A large tree, 80–100 ft. *Leaves* 2–4 in., coriaceous. *Cups* 1–1½ in. diam., belts rather acute; nut with a small abrupt umbo.

46. **Q. cyclophora,** *Endl. Gen. Pl. Suppl.* iv. ii. 28; glabrous, leaves shortly petioled very coriaceous oblong or oblong-lanceolate caudate entire base acute midrib raised pale beneath with 16–20 pairs of very strong arched oblique nerves, cups very large sessile saucer-shaped margin very thick rounded, belts wavy, nut very much depressed. *A. DC. Prodr.* xvi. ii. 102; *Miquel Ann. Mus.* i. 113. Q. depressa, *Roxb. Fl. Ind.* iii. 640 (*not of H.B.K. or Blume*). Q. placentaria, *Wall. Cat.* 2779 (*not of Blume*); *Hance in Journ. Bot.* 1875, 364. Q. penangensis, *Miquel Fl. Ind. Bat.* i. 859. Q. umbonata, *Hance in Trimen Journ. Bot.* 1874, 241; 1875, 364.

PENANG and SINGAPORE, *Wallich*, &c., *Maingay* (*Kew Distrib.* 1528). PERAK, ascending to 3000 ft., *King's Collector.*

A tree, 70–150 ft. *Leaves* 6–10 in., brown and shining above, yellowish or grey beneath; petiole stout, ¼–½ in. *Cups* 2–2½ in. diam., embracing half the almost flat nut, which has a depressed top and stout erect umbo.

47. **Q. Eichleri,** *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 236; glabrous, leaves very coriaceous elliptic-lanceolate elongate caudate entire base acuminate shining above, nerves 8–10 pairs arched slender on both surfaces, cups large saucer-shaped margin acute as high as the flattened hoary nut, belts obscure.

PERAK, *King's Collector.*—DISTRIB. Sumatra.

A large tree, 70 ft. *Leaves* 6–12 in., pale when dry; narrowed into a petiole ⅛–¼ in. *Cups* 1–1½ in. diam., margin much incurved, overlapping the nut, which has a conical top and minute umbo.

48. **Q. Thomsoni,** *Miquel Ann. Mus.* i. 109; glabrous, leaves coriaceous elliptic-lanceolate caudate base acute entire subsilvery beneath, nerves 10–13 pairs obliquely arched slender above strong beneath, cups shortly pedicelled saucer-shaped hoary narrower than the globose or turbinate depressed nut margin acute belts obscure. Q. turbinata, *Roxb. Fl. Ind.* iii. 636 (*not of Blume*); *Wight Ic.* t. 221. Q. leucocarpa, *Hook. f. & Thoms. mss.*; *Wenzig in Jahrb. Bot. Gart. Berl.* i. 225.

SILHET and the KHASIA MTS., ascending to 5000 ft., *Griffith*, &c. CHITTAGONG, *Roxburgh.* BURMA, *Kurz.*

A tree, 80–100 ft. *Leaves* very variable in size, 3–10 in., young with very long points; petiole ⅙–¼ in. *Cups* ½–¾ in., very shallow, margins spreading. *Nut* ¾–1 in. diam., very thickly hoary, top sometimes deeply depressed, base adnate to the base of the cup, umbo small.

SECT. V. CHLAMYDOBALANUS, *Endl.* *Male spikes* erect, stiff. *Styles* as in *Pasania.* *Invol. of fruit* ovoid or globose, tubercled or belted, closely embracing the whole nut (or with the tip of the nut alone free), but not adnate to it except at the base. *Nut* at length free. *Leaves* quite entire in all. See also *Q. fenestrata* and *Q. costata.*

* *Involucre of fruit tubercled or spinous.*

49. **Q. Blumeana,** *Korth. Verh. Nat. Gesch. Bot.* 208, t. 44; glabrous, leaves very coriaceous petioled oblong or oblong-lanceolate acuminate entire base acute appressed puberulous beneath, nerves 12–14 pairs very strong beneath with parallel cross-nervules, involucres thin depressed globose young echinulate mature with broad faint belts, nut globose or hemispheric

with a conic base truncate, exposed top densely white-tomentose. *A. DC. Prodr.* xvi. ii. 103; *Blume Mus. Bot.* i. 288; *Miquel Fl. Ind. Bat.* i. i. 803; *Ann. Mus.* i. 116; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 237.

PERAK, alt. 3–4000 ft., *Scortechini*, ! *King's Collector*.—DISTRIB. Sumatra, Borneo.

A densely leafy tree, 40–50 ft.; branches glabrous. *Leaves* 6–8 in., brown above with the midrib prominent, paler beneath; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., very stout. *Involucres* sessile or stoutly pedicelled, $\frac{3}{4}$ in. diam., hoary, when young depressed and clothed with minute confluent bracts, when mature smooth or obscurely annulate, dehiscing vertically.

50. **Q. discocarpa,** *Hance in Journ. Bot.* 1874, 242; leaves coriaceous subsessile oblong-lanceolate acuminate entire base acute beneath with cinnamon appressed pubescence, nerves 8–10 pairs ascending straight and midrib sunk above strong beneath, involucres crowded at the tips of the branches disciform hoary with 3–4 belts of simple or compound prickles wholly enclosing the depressed silky nut. Castanopsis discocarpa, *Hance in Journ. Bot.* 1878, 201.

PERAK, *King's Collector*.—DISTRIB. Banka.

A tree, 100–130 ft. *Branches* purple, glabrous. *Leaves* 3–6 in., pale above, obtusely acuminate; petiole $\frac{1}{6}$ in.—I have seen no fruit. Hance describes it as closely adherent to the base of the involucre, subangular, depressed-pyramidal, pale brown, with a short thick style.

51. **Q. confragosa,** *King mss.*; glabrous, leaves very coriaceous elliptic-lanceolate or broadly oblong acuminate obtuse or obtusely cuspidate entire base acute, nerves 6–8 pairs arched sunk above strong but slender beneath, involucre globose rugosely reticulated or tubercled completely enclosing the densely hoary globose or turbinate nut.

PERAK, *King's Collector*.

A large tree, 60 ft. *Leaves* rigid, 5–7 by 2–3 in.; petiole $\frac{1}{2}$ in., stout. *Involucres* in slender spikes, $\frac{3}{4}$–$1\frac{1}{2}$ in. diam., reticulatedly pitted when dry. *Nut* with a concave truncate base.

** *Involucre of fruit zoned.*

52. **Q. lanceæfolia,** *Roxb. Fl. Ind.* iii. 634; glabrous, leaves thin long-petioled lanceolate subcaudate entire base acute or rounded grey or subsilvery beneath, nerves 8–15 pairs slender arched raised on both surfaces, involucres in long spikes obliquely ascending ovoid hoary with 3–4 broad wavy often interrupted concentric ridges enclosing the ovoid thin puberulous nut. *A. DC. Prodr.* xvi. ii. 102 (*excl. syn. Q. lucida*); *Wall. Cat.* 3733; *Wight Ic.* t. 212; *Miquel Ann. Mus.* i. 116; *Wenzig Jahrb. Bot. Gart. Berl.* iv. 236. Q. glomerata, *Wall. Cat.* 2791 (*not of Roxb.*). Q. fenestrata, *Wall. Cat.* 2784 (*in part, not of Roxb.*). Castanopsis lanceæfolia, *Kurz For. Fl.* ii. 482. Castanea tribuloides, *Wall. Cat.* 2765 B.

SIKKIM and BHOTAN HIMALAYA, alt. 1–2000 ft., *J. D. H.* ASSAM and the KHASIA MTS., *Wallich*, &c. MUNNIPORE, *Clarke*. CHITTAGONG, *J. D. H. & T. T.* UPPER BURMA, *Anderson*.

A small or large tree. *Leaves* very variable in size, 4–10 in., always membranous, grey green above, pale reddish grey beneath, base rarely rounded, nerves reticulate; petiole $\frac{3}{4}$–1 in. *Involucre* 1–$1\frac{1}{2}$ in. long, very stoutly pedicelled, bursting irregularly.

Var. *semicristata*, King; ridges wavy crested or more or less tubercled. Q. Kurzii, *Hance in Journ. Bot.* 1878, 328. Castanea semicristata, *Kurz mss.*—Khasia Mts., alt. 4000 ft.

53. **Q. encleisocarpa,** *Korth. Verh. Nat. Gesch. Bot.* 208, t. 45; glabrous, leaves petioled elliptic-lanceolate obtusely caudate or acuminate entire base acute subglaucous beneath with 6–8 pairs of strong arched nerves, involucres long and stoutly pedicelled depressed or globose then smooth or obscurely belted not quite surrounding the densely velvety white nut. *A. DC. Prodr.* xvi. ii. 104; *Miquel Fl. Ind. Bat.* i. i. 862; *Ann. Mus.* i. 116; *Wenzig in Jahrb. Bot. Gart. Berl.* iv. 238.

PERAK, *King's Collector.* PENANG, *Maingay* (*Kew Distrib.* 1531), *Curtis*, &c. SINGAPORE, *Cantley.*—DISTRIB. Sumatra.

A tree, 60–80 ft. *Branches* slender, black when dry. *Leaves* 3–7 in., dark grey or brown above, polished or not; nerves slender, raised on both surfaces, reticulate beneath; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., slender. *Male spikes* very slender, puberulous. *Involucre* 1–$1\frac{1}{4}$ in. diam., base flat or intruded; pedicel $\frac{1}{2}$–$\frac{3}{4}$ in., very stout indeed, conical, margin thin split and torn. *Nut* silvery white with retrorse hairs, umbo ringed, endocarp with intruded plates.

Var. *aperta*, King mss.; involucre more open.—Perak, *Scortechini, King's Collector.*

SECT. VI. LITHOCARPUS. *Male spikes* stiff, erect. *Styles* as in *Pasania*. *Invol.* of fruit large, woody, ovoid or urceolate, turbinate or subglobose, completely enclosing (except in *Q. costata*) and more or less adnate to the nut, tubercled or concentrically or obliquely belted. *Leaves* quite entire in all.

* *Involucre of fruit zoned.*

54. **Q. costata,** *Blume Bijd.* 522; *Fl. Jav. Cupulif.* 26, t. 14; *Mus. Bot.* i. 302; glabrous, leaves coriaceous oblong or elliptic obtusely caudate entire narrowed into the petiole, nerves 10–12 pairs very obscure above faint beneath there pale and reticulated, involucre very stoutly pedicelled thick woody very broadly turbinate belted with acute concentric ridges or belts adnate to the base and incurved over the sides of the large disciform convex-topped woody glabrous nut.

PERAK, *Scortechini, King's Collector.*

A tree, 60–80 ft. *Leaves* 4–6 in., subglaucous beneath, midrib raised above; petiole $\frac{1}{6}$–$\frac{1}{3}$ in., rather slender. *Involucres* $1\frac{1}{2}$–2 in. diam., hoary, concentric ridges acute, one forming a prominent edge to the broadest part of the involucre, succeeded by smaller ones towards its acute incurved margin. *Nut* $\frac{1}{2}$ in. high by $1\frac{1}{2}$ diam., walls thick, laminated with intruded vertical plates, base convex.

55. **Q. Maingayii,** *Benth. in Hook. Ic. Pl.* t. 1315; branches and fruit finely rusty-tomentose, leaves coriaceous long-petioled elliptic oblong or obovate-oblong acuminate entire pale beneath, nerves 14–20 pairs faint above very strong spreading and subarched beneath, involucres very stoutly pedicelled thick woody turbinately obovoid subtruncate distinctly belted, nut adnate to the involucre except at the flattened tomentose top which is exposed or not.

PENANG, *Maingay* (*Kew Distrib.* 1464), *Curtis.*

A very large tree. *Leaves* 10–20 by 3–4 in., grey, hardly glaucous beneath, base acute; petiole 1 in. *Involucres* with the thick pedicel $1\frac{1}{2}$–2 in. long, sometimes decurved, with one or two slightly raised concentric belts on the side, top 1 in. broad, contracted into an umbo (not of the nut). *Nut* $\frac{1}{3}$ in. diam., confluent with the walls of the involucre, inner walls with intruded lamellæ.

56. **Q. Beccariana,** *Benth. in Hook. Ic. Pl.* t. 1315; glabrous, leaves coriaceous petioled elliptic-lanceolate obtusely acuminate entire base acute

polished above whitish beneath, nerves 6–8 pairs arched obscure above strong beneath, involucres very large turbinately obovoid thick woody umbonate glabrous belted with distant ridges enclosing and adnate to the nut.

PENANG, *Curtis*.—DISTRIB. Borneo.

A tree, 60–70 ft. *Leaves* 2–3 in., very dark brown and polished above, nervules beneath finely reticulate; petiole $\frac{1}{2}$–$\frac{2}{3}$ in., slender. *Involucre* 3 in. long, pedicel $\frac{1}{2}$–1 in., top convex with a very large persistent umbo (not of the nut).

** *Involucre of fruit tubercled, not zoned.*

57. **Q. xylocarpa,** *Kurz in Beng. Journ. As. Soc.* 1875, ii. 196, t. 14, f. 5–8; *For. Fl.* ii. 489; branches hoary, leaves thickly coriaceous petioled lanceolate caudate entire opaque above with a slender pubescent midrib subsilvery beneath with a fine appressed pubescence base acute, nerves 10–15 pairs arched ascending impressed above strong beneath, involucres sessile confluent globose clothed with soft spinous pubescent bracts, nut globose the umbo only exserted, adnate to the involucre except the convex glabrous top.

ASSAM, *Jenkins*; on the Naga Hills, *Clarke*. MUNNIPORE, *Watt*. ARRACAN, alt. 4–5000 ft., *Kurz*.

Leaves 4–6 by 1–1½ in.; nerves rather brown beneath; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., slender. *Involucres* in masses 1$\frac{1}{3}$ in. diam., each about $\frac{1}{3}$ in. diam., thick but not woody. *Nut* with very thick walls, the inner forming intruded lamellæ.

58. **Q. truncata,** *King mss.*; leaves thinly coriaceous oblong lanceolate or ovate-lanceolate acuminate or caudate entire base acute opaque above pale beneath, nerves 12 pairs slender arched sunk above much raised beneath, involucres sessile broadly pitcher-shaped thick woody hoary base broad flat sides subrugose top truncate with a small opening, nut globose or turbinate adnate to the involucre except at the convex top.

ASSAM, *Jenkins*. NAGA HILLS, alt. 2000 ft., *Collett*. MUNNIPORE; on Kohima, *Watt*, *Prain*, *Clarke*, alt. 3500–7000 ft.

A tree, 30–40 ft. or more. *Leaves* 5–8 by 2–4 in.; midrib prominent above, cross-nervules slender, reticulate beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Involucres* $\frac{3}{4}$–1$\frac{1}{4}$ in. by $\frac{2}{3}$–1 in. across the truncate top, solitary or confluent in twos or threes, sides with large obscure confluent bracts, margin incurved with many rows of bracts. *Nut* with a depressed hemispheric top and small conical umbo.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

Q. ? DIVARICATA, *Lindl. in Wall. Cat.* 2790; *A. DC. Prodr.* xvi. ii. 105, from Tavoy, *Wallich*, is in flower only and undeterminable. The specimen presents no salient character. Kurz refers it to *Castanopsis rhamnifolia*.

Q. GLOMERATA, *Roxb. Fl. Ind.* iii. 660, Penang, *W. Roxburgh*; "leaves elliptic entire polished on both sides, flowers in long terminal glomerate spikes, acorn ovate smooth half hid in the tubercled cup." *Roxb.*

Q. JENKINSIANA, *Benth. in Hook. Ic. Pl.* t. 1312, 1313, is a mixture of leafing specimens of two very distinct plants, and the fruit of what may belong to either or to a third. The latter only is from Colonel Jenkins, who gave it to Mr. Griffith; it apparently belongs to the section *Lithocarpus*. Of the leafing specimens, one is probably a *Quercus*, the other probably a *Castanopsis* (see end of that genus). The following is a description of the *Quercus*.

QUERCUS SP., *Benth. in Hook. Ic. Pl.* t. 1313 only; bark of branches white, leaves 8–12 by 2½–5 in. elliptic-oblong acuminate entire coriaceous base acute, above bright brown and polished with a raised midrib, beneath pale or whitish with 9–14 pairs of

strong arched ascending nerves, petiole 1–2 in., fem. panicle erect pyramidal with slender horizontal distant white-tomentose branches, bracts densely tomentose 1-fld.—Upper Assam, *Griffith* (*Kew Distrib.* 4472, 4464), *Brandis, Mann*; on the Duphla Hills, *Lister*.

QUERCUS (Lepidobalanus) SP., *Benth. in Hook. Ic. Pl.* t. 1312 (the fruit only). Involucre 1½ in. long, broadly ovoid oblong, thickly crustaceous when dry, finely tomentose rounded at both ends, surface with adnate rather distant bracts in broken transverse series longer more crowded and recurved towards the apex; nut very broadly oblong wholly included adnate all but the very small terminal pubescent area to the walls of the involucre, walls excessively thick and strong, seed conform the cavity, cotyledons fleshy not ruminate.—Assam, *Jenkins*.

Q. MIXTA, *A. DC. Prodr.* xvi. ii. 83, consists of imperfect specimens of possibly two species mixed in Wallich's Herbarium (Cat. 2783) with *Q. Amherstiana*.

Q. (Lithocarpus) OLLA, *Kurz in Journ. Beng. As. Soc.* 1875, ii. 197, t. 14, f. 9, from Assam, *Jenkins*. Described from the fruit alone, of which Dr. King has kindly sent me a specimen; it is broadly pitcher-shaped, ¾ in. high, with a broad flat base 1 in. diam., and thick walls narrowing to the mouth which is ⅔ in. diam., sides hoary clothed with many series of appressed broadly triangular cuspidate bracts, mouth thick rounded with the bracts inflexed. *Nut* with the depressed top level with the mouth of the cup, umbo capitate stipitate.—Probably nearest *Q. truncata*.

QUERCUS SP.? In the Kew collection of drawings of plants of Singapore there are some made by or for a Mr. Parry, and amongst them one represents a magnificent species of oak, with stout branches, elliptic-oblong cuspidate dark-green leaves 12 by 5½ in., obtuse at both ends or tip cuspidate, with 10 pairs of spreading arched nerves, and a petiole 1 in.; cups sessile on a short rachis, shallow, broadly campanulate, 2 in. diam. across the broadly spreading recurved mouth, which is formed of very stout obtuse bracts ⅓ of an inch long; nut 1½ in. long, broadly oblong, with a rounded umbonate top and deeply intruded base, the walls are represented as very thick; seed broader than long, vertically grooved, and with a large conical umbo; the base only of the nut appears to be embraced by the cup.

QUERCUS SP., "Antidesmeæ? *Herb. Finlayson, Wall. Cat.* 9144," and

QUERCUS SP., "Antidesmeæ? *Wall. Cat.* 9145," Tavoy, are *Querci* in flower only, and undeterminable.

4. **CASTANOPSIS,** *Spach.*

Habit and character of *Quercus*, Sect. *Chlamydobalanus*; differs in the closed fruiting involucre enclosing 1–4 nuts and being covered with clusters of spines or tubercles, and often splitting irregularly.—Species about 25, one Californian, the rest Eastern Tropical Asian.

A genus inseparable from *Quercus* by any constant character; the male and female inflorescences of the two are undistinguishable, except when the fem. involucres contain more than one flower, which is very rare in *Quercus*. The fruits present internally several very distinct types of structure, but my attempts to ascertain these from dried specimens have failed. The statement under *Quercus* (p. 601) of my indebtedness to Dr. King for aid in the description of its most difficult species, applies to this equally difficult genus. His forthcoming monograph of the Indo-Malayan species of both genera will be indispensable for their determination.

A. *Involucre* ovoid or globose, rarely transversely elongate, dehiscent, spinous.

* Walls of involucre more or less concealed by the crowded subulate spines.

† *Leaves beneath pubescent or minutely tomentose.—See also* C. catalpæfolia.

1. **C. indica,** *A. DC. in Seem. Journ. Bot.* i. (1863) 182; *Prodr.* xvi. ii. 109; branches and inflorescence rufous-tomentose or -villous, leaves short-petioled oblong or obovate-oblong sinuate-toothed or -serrate finely pubescent beneath, nerves 15–20 pairs very strong beneath, spines of involucre close-set $\frac{1}{4}$–$\frac{1}{2}$ in. long. *Miq. Ann. Mus.* i. 119; *Brand. For. Fl.* ii. 490. Castanea indica, *Roxb. Fl. Ind.* iii. 643; *Blume Mus. Bot.* i. 284; *Wight Ic.* t. 417; *Kurz For. Fl.* ii. 478; *Wall. Cat.* 2761. Quercus serrata, *Roxb. Fl. Ind.* iii. 641 (*not of Willd.*). Q. dubia, *Lindl. in Wall. Cat.* 2786.

Tropical Himalaya, from Nepal eastwards, alt. 1–4000 ft. Assam, the Khasia Mts. and Silhet, alt. 4000 ft. Chittagong, *J. D. H. & T. T.*, &c.

A small or large tree. *Leaves* 5–8 in., rusty-red when dry, thinly coriaceous, opaque and glabrous above obtuse acute cuspidate or acuminate, base rounded acute or narrowed into the petiole, serratures subspinular; nerves straight ascending, cross-nervules fine parallel; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Male spikes* densely tomentose. *Involucres* subspherical, 1–1$\frac{1}{2}$ in. diam.

2. **C. Hystrix,** *A. DC. in Seem. Journ. Bot.* i. (1863) 182; *Prodr.* xvi. ii. 111; branches glabrous or nearly so, leaves petioled lanceolate acuminate entire or obtusely serrate above the middle appressed tomentose pubescent or puberulous beneath, nerves 10–12 pairs, spines of involucre dense $\frac{1}{4}$–$\frac{1}{3}$ in. long. *Miquel Ann. Mus.* i. 119. Q. rufescens, *Herb. Ind. Or. H. f. & T.*

Eastern Himalaya; Sikkim, alt. 4–8000 ft., *J. D. H.*, &c. Khasia Mts., alt. 2–4000 ft., *Griffith*, &c. ? Perak, alt. 4–5000 ft., *King's Collector.*

A large or small tree. *Leaves* 3–4, rarely 7 in., very coriaceous, sometimes oblong-lanceolate and caudate, very variable as to pubescence beneath, base rounded or acute; nerves very oblique strong though sometimes obscured by thick red-brown tomentum; petiole $\frac{1}{6}$–$\frac{1}{2}$ in. *Involucres* 1 in. diam., or less, walls very thick; spines simple or compound, pubescent. *Nuts* 2–3, silky, free.

3. **C. diversifolia,** *King mss.*; branches tomentose, leaves (young very large) short-petioled broadly oblong or ovate-oblong quite entire, nerves 12–15 pairs very strong beneath arched tomentose on both surfaces, cross-nervules very strong, involucre large, spines close-set. Castanea diversifolia, *Kurz in Journ. Beng. As. Soc.* xliv. ii. 198; *For. Fl.* ii. 479.

Pegu and Martaban, in hill forests, *Kurz*; alt. 3500–6000 ft., *Brandis.*

A tree, 40–60 ft. *Leaves*, young 7–9 by 4–4$\frac{1}{2}$ in., on the old branches 4$\frac{1}{2}$–6 in., more elliptic; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., stout, pubescent.—I have seen specimens of only the large-leaved state, which according to Kurz is the young, and no fruit or flower; the leaves are pale when dry with deeply sunk nerves above highly raised beneath, base rounded or subcordate. King describes the involucre as indistinctly ribbed and the spines as nearly $\frac{1}{2}$ in. long, and the species as differing from all others in the diverse forms of the leaf.

4. **C. javanica,** *A. DC. in Seem. Journ. Bot.* i. (1863) 182; *Prodr.* xvi. ii. 111; branches glabrous or nearly so, leaves petioled oblong to ovate-oblong or oblong-lanceolate entire subacute or cuspidate rufous subpubescent beneath, nerves 9–12 pairs very strong beneath arched or nearly straight, involucres very large, spines in dense clusters, walls very thick and woody. *Miquel Ann. Mus.* i. 120. C. costata, *A. DC. l. c.* 110; *Miquel l. c.*; var. bancana, *Scheff. Obs. Phyt.* ii. 50. C. trisperma, *Scheff. l. c.* Castanea javanica, *Blume Bijd.* 525; *Fl. Jav. Cupulif.* 44, t. 23;

Mus. Bot. i. 283; *Miquel Fl. Ind. Bat.* i. i. 867; *Kurz For. Fl.* ii. 479. C. montana, *Blume Bijd.* 526; *Miquel Fl. Ind. Bat. l. c.* C. costata, *Blume Mus. Bot.* i. 284; *Miquel l. c.* 866. C. brevicuspis, *Miquel l. c.* C. spectabilis, *Miquel l. c.*; *Ann. Mus.* i. 120.

MARTABAN and TENASSERIM, *Kurz, Parish.* MALACCA, *Maingay* (*Kew Distrib.* 1461). PENANG, *Phillips.* PERAK, *Scortechini, King's Collector.* SINGAPORE, *Cantley.*—DISTRIB. Sumatra, Java.

A large evergreen tree. *Leaves* 3–10 in., very coriaceous, base rounded or acute, shining above with faintly raised nerves, more or less rufous beneath, but sometimes pale and glabrate; cross-nervules very faint; petiole ½–1 in. *Involucres* tomentose, sometimes 2 in. diam.; spines ⅓–⅔ in., tips glabrous. *Nut* apparently adnate to the involucre and villous, but the structure of the interior is very obscure in dry specimens.

†† *Leaves glabrous on both surfaces—puberulous in* C. catalpæfolia.

5. **C. argentea,** *A. DC. in Seem. Journ. Bot.* i. (1863) 182; *Prodr.* xvi. ii. 112; branches nearly glabrous, leaves petioled lanceolate or oblong-lanceolate acuminate entire glabrous subsilvery beneath, nerves 10–12 pairs rather slender beneath arched, involucre solitary and clustered globose tomentose, spines close-set branched pubescent, nut solitary half adnate to the involucre free part thin pubescent. *Miquel Ann. Mus.* i. 120. Castanea argentea, *Blume Bijd.* 525; *Flor. Jav. Cupulif.* 40, t. 21; *Mus. Bot.* i. 282; *Miquel Fl. Ind. Bat.* i. i. 867; *Kurz For. Fl.* ii. 479, and var. Tungurrut (not C. Tungurrut, *Blume*). C. martabanica, *Wall. Cat.* 2764; *Pl. As. Rar.* ii. 6, t. 107.

TENASSERIM and MARTABAN, *Wallich, Parish, Kurz, Helfer* (*Kew Distrib.* 4443).—DISTRIB. Malay Islands.

An evergreen tree, 50–60 ft. *Leaves* 5–7 in., thinly coriaceous, base obtuse or acute, shining above with faintly raised nerves, sometimes quite silvery beneath; petiole ⅓–⅔ in., slender. *Involucre* ¼–1 in., spines about ¼ in.—Leafing and flowering specimens of this may be referable to *Q. argyrophylla*, and *vice versa*. Nor can I without fruit be sure that Blume's, Miquel's, Wallich's, and Kurz's plants are conspecific. Kurz's var. *Tungurrut* is a stunted form from elevations of 4–5000 ft. in Tenasserim.

6. **C. castanicarpa,** *Spach Hist. Veg. Phan.* xi. 185; leaves large petioled lanceolate or oblong-lanceolate acuminate or caudate entire base acute, nerves 10–12 pairs slanting arched rather slender beneath, cross-nervules very faint, involucre ovoid pubescent densely clothed with slender quite glabrous simple spines, nut solitary glabrous. *A. DC. Prodr.* xvi. ii. 111; *Miquel Ann. Mus.* i. 119. Castanea Roxburghii, *Lindl. in Wall. Pl. As. Rar.* ii. 480; *Kurz For. Fl.* ii. 480. Quercus castanicarpa, *Roxb. Cor. Pl.* iii. 93, t. 296; *Fl. Ind.* iii. 640; *Wight Ic.* t. 769.

CHITTAGONG, *Roxburgh, J. D. H. & T. T., Clarke.* MUNNIPORE, *Watt.*

A large evergreen tree; branchlets glabrous or pubescent. *Leaves* 6–12 in., thinly coriaceous, glabrous on both surfaces, more or less shining above; petiole ⅙–⅓ in., glabrous or puberulous. *Involucre* 1 in.—I have seen only very small fruits ½–¾ in. long, with straight spines ⅓ in. long, and ovoid free nuts with a broad flat or convex areola.

7. **C. catalpæfolia,** *King mss.*; leaves very large very stoutly shortly petioled oblanceolate or obovate-oblong acute entire shining above puberulous beneath, nerves 18–20 pairs very strong spreading and arched beneath, involucres large globose, spines clustered stout flattened glabrous.

PERAK, *King's Collector.*

A large tree, 60–80 ft. *Leaves* 18–20 in., very coriaceous, midrib and slender nerves raised above, under surface pale reddish brown with a very stout midrib long arched nerves and rather distant slender cross-nervules, base sometimes much narrowed into the very stout ½ in. petiole. *Involucre* 1–2 in. diam.; spines ⅓ in. long. *Nuts* 1–2, silky, 1 in. long.

** Walls of involucre with tufts or ridges of spines that do not conceal its walls.

8. **C. argyrophylla,** *King mss.*; leaves elliptic or oblong to lanceolate acute entire glabrous more or less glaucous beneath, nerves 10–12 pairs rather slender, involucre ovoid thin-walled glabrous densely clothed with subulate hooked radiating spines.

PEGU; at Rangoon, *M'Lelland, Maingay* (*Kew Distrib.* 1457/2). ARRAKAN, *Hildebrand.* ? TENASSERIM, *Helfer* (*Kew Distrib.* 4446).

Leaves 4–6 in., thinly coriaceous; petiole ¾–1¼ in. *Involucre* 1¼ in. long, brittle, spines ¼ in. *Nuts* 1–3, rusty tomentose.—I have seen no fruit, which Dr. King informs me is very characteristic, being large and glabrous, as are the spines.—Under *L. argentea* I have stated my difficulty in distinguishing leafing specimens of this and that plant.

9. **C. armata,** *Spach Hist. Veg. Phan.* xi. 185; glabrous, leaves small lanceolate or oblong- or ovate-lanceolate acuminate shining above often subsilvery beneath, nerves 6–8 pairs arched slender raised on both surfaces, involucres large globose tomentose loosely covered with stout shortly substellately branched spines. *Miquel Ann. Mus.* i. 119. C. argentea, *var.* martabanica, *A. DC. Prodr.* xvi. ii. 112. Quercus armata, *Roxb. Cor. Pl.* iii. 92, t. 296; *Fl. Ind.* iii. 640; *Wight Ic.* t. 770. Castanea tribuloides, *var.* armata, *Kurz For. Fl.* ii. 480. C. Falconeri, *Hance in Journ. Bot.* 1875, 367. C. sphærocarpa, *Lindl. in Wall. Cat.* 3736, and in *Plant. As. Rar.* ii. 5.

ASSAM and the KHASIA HILLS, TIPPERA, CHITTAGONG and BURMA, alt. 2–3000 ft.

A small or large tree. *Leaves* 3–6 in., pale when dry, coriaceous, quite glabrous, reticulate beneath; petiole ⅙–½ in., rather slender. *Involucres* 1–1½ in. diam.; tufts of spines often in zones, ⅙–¼ in. long, branching from a very stout conical base. *Nuts* usually solitary.

10. **C. tribuloides,** *A. DC. in Seem. Journ. Bot.* i. (1863) 182; *Prodr.* xvi. ii. 111 (*excl. C armata*); branchlets glabrous or pubescent, leaves petioled from lanceolate to oblong acuminate or caudate glabrous or hoary beneath or silvery rarely pubescent entire or coarsely serrate above the middle, nerves 6–10 pairs arched slender raised beneath, nervules finely reticulate, involucres small globose finely tomentose covered with long slender or short substellate spines or tubercles in sessile subsessile or stipitate clusters.

Tropical, subtropical and lower temperate HIMALAYA, and all the hill ranges of TRANSGANGETIC INDIA to BURMA.

An exceedingly variable tree (40–60 ft.), or possibly more than one species are included here, to determine which a study of the flowers of both sexes on the living plants is necessary. The involucres are largest and spines longest in var. *longispina*; they are smaller with shorter spines in *tribuloides, ferox* and *echidnocarpa* successively.

C. TRIBULOIDES PROPER; leaves usually small lanceolate 4–6 in. rarely serrate, spines close-set slender ¼–⅓ in. often curved, nuts usually solitary.

C. tribuloides, *A. DC. l. c.* C. armata, *Don Prodr.* 56 (*not of Roxb.*). Quercus tribuloides, *Smith in Rees Cyclop.* xxiv. No. 13. Q. acuta, *Herb. Ham.* Castanea tribuloides, *Wall. Cat.* 2765; *Pl. As. Rar.* ii. 6; *Kurz For. Fl.* ii. 480. C. microcarpa, *Lindl. in Wall. Cat.* 3735 (by error 2735).

SUBTROPICAL HIMALAYA; common from Kumaon eastwards to ASSAM, the KHASIA MTS. and MUNNIPORE, alt. 4–7000 ft.

VAR. *longispina*, King mss.; leaves usually larger and broader but sometimes ovate-lanceolate often 5–7 in. and elliptic-oblong pubescent or glabrous beneath, nerves 10–12 pairs, involucres larger 1 in. diam., spines very long and stout often ½ in., nuts 1–3. Castanea tribuloides, *var.* ferox, *Kurz For. Fl.* ii. 480.—Sikkim, Assam, Khasia and Munnipore, alt. 1–4000 ft.

VAR. *ferox*, King mss.; leaves ovate-lanceolate entire rarely serrate, involucres ⅓ in. diam., spines short about ¼ in. stout spreading, nuts 1–3.—Castanopsis ferox, *Spach Hist. Pl. Phan.* xi. 180. Quercus ferox, *Roxb. Fl. Ind.* iii. 639; *Wight Ic.* t. 218.—Common in Sikkim, the Khasia Mts., &c., alt. 4–7000 ft.

VAR. *echidnocarpa*, King mss.; leaves small elliptic-lanceolate or lanceolate caudate often serrate above the middle glabrous, nerves 6–10 pairs, involucres much smaller, hoary spines fewer very short often reduced to compound tubercles, nut solitary. Castanopsis echidnocarpa, *A. DC. in Seem. Journ. Bot.* 1863, 182; *Prodr.* xvi. ii. 112. Castanea echidnocarpa, *Herb. Ind. Or. H. f. & T.* Quercus ? caudata, *Lindl. in Wall. Cat.* 2787.—Bhotan, Khasia, Assam, Munnipore and Burma, alt. 4–7000 ft.

VAR. *Wattii*, King mss.; involucre small thick almost woody densely clothed with very short branched often rufous spines, inner surface rufous-villous, nuts 2–3.—Munnipore, alt. 2000 ft., *Watt.* Khasia Hills (at Maobleh), *Clarke*, alt. 4000 ft.

11. **C. Clarkei,** *King mss.*; branches slender tomentose, leaves elliptic-oblong or -lanceolate rarely -oblanceolate acuminate serrate nearly to the base pale and puberulous beneath, nerves 16–18 pairs, fruiting spikes very slender, involucres globose, (young) spines slender.

SIKKIM HIMALAYA; at Kalempoong, alt. 5000 ft., *Clarke.*

A monœcious tree, 120 ft., at once distinguished from all states of *C. tribuloides* by the very pale many-nerved leaf, serrated always from ⅔ or more of its length. The leaves are puberulous, almost white beneath, the petiole 1 in. *Flowering spikes* very slender.

B. *Involucre* subglobose to subovoid, more or less depressed; walls with transverse tubercled zones. *Nuts* usually more than one.

12. **C. sumatrana,** *A. DC. in Seem. Journ. Bot.* 1863, 182; *Prodr.* cvi. ii. 113; leaves oblong- or elliptic-lanceolate or oblanceolate acuminate entire glabrous base acute, nerves 10–15 pairs, involucres large sub-ovoid or -globose more or less lobulate or angled tubercled in wavy interrupted zones. C. mitifica, *Hance in Journ. Bot.* 1878, 200. Castanea inermis, *Lindl. in Wall. Pl. As. Rar.* ii. 6; *Cat.* 2762; *A. DC. Prodr.* 116; *Kurz For Fl.* ii. 481. C. glomerata, *Blume Mus. Bot.* i. 283. Quercus glomerata, *Wall. Cat.* 2791 (*not of Roxb.*). Callæocarpus sumatrana, *Miquel Pl. Jungh.* 13; *Fl. Ind. Bat.* i. i. 868 (*excl. syn.*); *Suppl.* 353; *Ann. Mus.* i. 118.

UPPER BURMA, at the Amber Mines, *Griffith* (*Kew Distrib.* 4471). PERAK, alt. 0–5000 ft., *King's Collector.* PENANG, SINGAPORE, *Wallich*, &c. MALACCA, *Griffith* (*Kew Distrib.* 4442, 4470), *Maingay* (*Kew Distrib.* 1457).—DISTRIB. Borneo.

A large tree. *Leaves* thinly coriaceous, 4–9 in.; petiole ¾–1 in. *Spikes* long-peduncled, hoary. *Involucre* 1–1¼ in. long, bursting irregularly, walls very thick, young depressed. *Nuts* 1–3, subsilky.

13. **C. Hullettii,** *King mss.*; leaves elliptic or oblong-lanceolate acute

or subacute entire, glabrous and shining above, rufous and puberulous beneath, nerves 16–18 pairs glabrescent prominent beneath, involucres subglobose obscurely angled grooved vertically and with wavy zones of tubercles 3–4-valved.

SINGAPORE and PERAK; *Hullett, King's Collector.* MALACCA, *Maingay* (*Kew Distrib.* 1459, 1463).—DISTRIB. Riou and Billiton Islands.

A large tree. *Leaves* coriaceous, 5–9 by 2–3 in., base acute or rounded, midrib strong; petiole ¾–1½ in. *Involucre* 1½ in. diam., often depressed, or with the base contracted. *Nuts* 2–4, sparsely hairy.

C. *Involucre* subglobose, flattened on one side, indehiscent, adnate to the nut, flattened surface smooth, the rest clothed with short prismatic or patelliform spines or tubercles.

14. **C. rhamnifolia,** *A. DC. Prodr.* xvi. ii. 113; leaves elliptic-ovate or oblong obtusely acuminate entire glabrous or midrib puberulous, nerves 7–8 pairs, involucres ovoid flattened on one side thick-walled furfuraceous, flat side smooth, convex sides with conical tomentose spines, nut solitary. Quercus rhamnifolia, *Miquel Fl. Ind. Bat.* i. 853. Castanea rhamnifolia, *Kurz For. Fl.* ii. 481. Callæocarpus rhamnifolia, *Miquel Fl. Ind. Bat. Suppl.* 353; *Ann. Mus.* i. 118; *Scheffer Obs. Phyt.* iii. 95.

BURMA, *Kurz.* SINGAPORE, *Cantley.*—DISTRIB. Sumatra, Banca.

Leaves thinly coriaceous, nerves slightly raised beneath; petiole ¼ in. *Involucre* hoary-tomentose, about 1 in. long; spines ⅕ in., conical, spinous tipped. *Nut* flattened on one side.

15. **C. Wallichii,** *King mss.*; leaves lanceolate or ovate-lanceolate acuminate entire glabrous above, puberulous or hoary beneath, nerves 6–7 pairs, involucres ovoid flattened on one side indehiscent thick-walled rounded surface covered with flattened pyramidal hooked pubescent spines flattened surface less so, nut solitary. Castanea Tungurrut, *Wall. Cat.* 2763 (*not of Blume*).

PENANG, *Wallich.* SINGAPORE, *Cantley.* PERAK, *King's Collector.* MALACCA, *Griffith* (*Kew Distrib.* 4444), *Maingay* (*Kew Distrib.* 1465).

Leaves coriaceous, 2–3½ in., base acute, sometimes flocculent beneath, nerves raised beneath; petiole ¼ in. *Involucres* 1½ in. long, walls thick. *Nut* depressed globose.

16. **C. nephelioides,** *King mss.*; leaves elliptic oblong or subobovate obtusely acuminate entire glabrous above sparsely furfuraceous beneath, nerves 9–12 pairs, involucres obovoid flattened on one side thin crustaceous covered with patelliform simple short obtuse tubercles.

PERAK, *Scortechini, King's Collector.*

A tree, 30–60 ft. *Leaves* thinly coriaceous, 3½–5 in.; petiole ⅓ in. *Involucres* 1 in. long, adnate to the solitary nuts, puberulous.

DOUBTFUL SPECIES.

CASTANOPSIS?; branches stout dark, leaves 6–10 by 3–4 in. very coriaceous oblong obtuse or acute glabrous entire brown-green and polished above silvery or pale brown beneath with 12 pairs of strong spreading arched nerves and rather distant cross-nervules, midrib and nerves slender and raised above, base acute or rounded, petiole ½–¾ in., fem. spikes as long as the leaves or longer very stout tomentose simple or sparingly branched, involucres tomentose 1-fld.; young fruiting spikes very stout woody, involucres sessile ½–⅔ in. diam. globose covered with tomentose short very thick spines. Quercus Jenkinsii, *Benth. in Hook. Ic. Pl.* t. 1312 (*excl. fruit*).—

Upper Burma, Lamoom and banks of Mogoung River, *Griffith* (*Kew Distrib.* 4460, 4463).—See at end of *Quercus* for other plants included under *Q. Jenkinsii*. Wallich, No. 9145, from Tavoy, resembles this a good deal, but its nerves are more numerous, fem. spikes more slender, and it is from a very different region.

5. **CORYLUS,** *Linn.*

Deciduous monœcious trees or shrubs, flowering before leafing. *Leaves* alternate, doubly serrate, plicately penninerved. *Male fl.* solitary in the bracts of a many-fld. pendulous spike, 2-bracteolate; perianth 0; stamens 4–8, filaments forked, separating the anther-cells. *Fem. fl.* in pairs in the upper bracts of a minute few-fld. many-bracteate spike or head, bracteole solitary 3-partite; perianth superior, limb annular, toothed; ovary 2-celled, cells 1-ovuled; style-arms linear. *Nut* large, woody or bony, enclosed in the greatly enlarged coriaceous bracts, 1-seeded.—Species 7, of North temperate regions.

1. **C. ferox,** *Wall. Pl. As. Rar.* i. 77, t. 87; *Cat.* 2797; leaf-buds lanceolate silky, leaves oblong or ovate-oblong acuminate very finely laciniately serrate, fruiting bracts tomentose spinescent and lobed. *Brand. For. Fl.* 494; *Gamble Man. Ind. Timb.* 390; *A. DC. Prodr.* xvi. ii. 129.

Central and Eastern Himalaya; Nepal, *Wallich*; Sikkim, alt. 8–10,000 ft., *J. D. H.*

A small tree; shoots puberulous. *Leaves* 4–5 in., young pubescent, old puberulous beneath; nerves 10–12 pairs; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., hairy. *Male spikes* clustered, 1–2 in.; bracts obovate, acute, densely villous; stamens 4–6, subsessile; anther-cells contiguous, tips hairy. *Fem. fl.* subcapitate; spines of invol. $\frac{1}{2}$ in. long, slender, branched. *Nuts* in nodding clusters, 2–4 in. diam., of 3–6 each, ovoid or globose, very hard, $\frac{3}{4}$ in. diam.

2. **C. Colurna,** *Linn. Sp. Pl.* 999; leaf-buds short rounded, leaves obovate acuminate lobulate and toothed, base cordate, bracts velvety unarmed outer fruiting laciniate inner longer sheathing ribbed cleft into serrate glandular-hairy lobes. *Brand. For. Fl.* 494; *Gamble Man. Ind. Timb.* 390; *A. DC. Prodr.* xvi. ii. 131; *Boiss. Fl. Orient.* iv. 1176. C. lacera, *Wall. Cat.* 2798. C. Jacquemontii, *Dcne. in Jacquem. Voy. Bot.* 160, t. 160.

Western Temperate Himalaya, alt. 5500–10,500 ft., from Kashmir to Kumaon.—Distrib. Asia Minor, Thrace and Hungary.

A small gregarious tree, 40–50 ft. *Leaves* 5–8 by $2\frac{1}{2}$–6 in., glabrous or nearly so, membranous, nerves 10–12 pairs, terminating the lobes; petiole 1–$1\frac{1}{2}$ in. *Male spikes* clustered, 1–2 in., very stout; bracts obovate, acute with about 8 anther-cells on the midrib, their filaments variously connate. *Nut* globose, very hard.

6. **CARPINUS,** *Tourn.*

Deciduous trees or shrubs, monœcious. *Leaves* alternate, serrate, plicately penninerved. *Male fl.* in lateral pendulous spikes, bracts ovate, bracteoles 0; perianth 0; stamens 3 or 4 on a hairy torus adnate to the bract, filaments 2-fid separating the anther-cells. *Fem. fl.* in erect terminal spikes; bracts foliaceous, bracteoles 2; perianth limb minute, superior, toothed; ovary 2-celled, cells 1-ovuled; style-arms 2 long, stigmatose on the inner face. *Nut* ribbed, enclosed in the base of the elongate foliaceous bract and bracteoles. *Cotyledons* fleshy, enclosing the radicle.—Species 9, of N. temp. regions.

1. **C. viminea,** *Wall. Cat.* 7800; branches warted, leaves ovate caudate doubly serrate, fruiting bracts lanceolate unequal-sided obtusely toothed on the broader side entire on the other or base lobulate. *Lindl. in Wall. Pl. As. Rar.* ii. 4, t. 106; *A. DC. Prodr.* xvi. ii. 127; *Brand. For. Fl.* 492; *Kurz For. Fl.* ii. 477; *Gamble Man. Ind. Timb.* 390.—Ament., *Wall. Cat.* 9146.

TEMPERATE HIMALAYA; from Chamba eastwards, alt. 5–7000 ft. KHASIA MTS., alt. 5–6000 ft. MARTABAN HILLS, alt. 5–6000 ft., *Kurz.*

A rather small tree, with slender pendulous branches; buds slender, softly hairy. *Leaves* 3–4 in., thin; petiole $\frac{1}{8}$–$\frac{1}{2}$ in., hairy. *Male spikes* 1–2 in., fem. 2–3 in. *Fruiting bracts* 1 in., 3–5-nerved. *Nut* $\frac{1}{8}$ in., 7–8-nerved, glandular.

2. **C. faginea,** *Lindl. in Wall. Pl. As. Rar.* ii. 5; branches tomentose, leaves ovate-oblong acute subdoubly serrate, fruiting bracts triangular oblong-lanceolate very unequal-sided narrow side (with the nerve submarginal) entire, the other coarsely toothed. *A. DC. Prodr.* xvi. ii. 127; *Brand. For. Fl.* 492, t. 66.

TEMPERATE HIMALAYA; from Jamu eastwards, alt. 4–7000 ft.

A moderate-sized tree. *Leaves* 3–5 in., often falcate, young pubescent; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., pubescent. *Fruiting bracts* $\frac{2}{3}$ in., pubescent; nerves 4–6 pairs. *Nut* $\frac{1}{8}$ in.

ORDER CXLI. **SALICINEÆ.**

Deciduous, dicœcious trees or shrubs. *Leaves* alternate, base 3–5-nerved, stipulate. *Flowers* in catkins, one under each bract, ebracteolate; perianth 0; disk a scale or cupular or of glands; stamens 2 or more; filaments free or connate; ovary sessile or stipitate, 1-celled, style short or 0, stigmas short notched or lobed; ovules few or many on 2–4 subbasal or parietal placentas, erect, anatropous. *Capsule* ovoid or lanceolate, 2–4-valved. *Seeds* few or many, funicle with a pencil of long silky hairs, albumen 0; cotyledons plano-convex, radicle short inferior.—Genera 2, species about 180, chiefly N. temperate.

Disk of 1 or 2 separate glands	1. SALIX.
Disk cupular or annular	2. POPULUS.

1. **SALIX,** *Linn.*

Characters as above.—Species about 160, very rare in the tropics and thern hemisphere, absent in Australia and the Pacific.

Nothing of importance has been added to the descriptions of the Indian Willows contained in Andersson's monograph (A. DC. Prodr. xvi. ii.) published in 1868, except the excellent remarks of Brandis, contained in his Forest Flora. Many of the species are very incompletely represented in Herbaria, and all are as protean as are their European congeners. I have thought it best in many cases of doubt to adhere to Andersson's determinations, leaving it to Indian Botanists to note carefully the variations of all the species (which no one has hitherto attempted), and which will no doubt profoundly modify the characters and specific limits as here given.

SECT. I. PLEIANDRÆ. *Stamens* 3–12; filaments free, villous at the base. (See also *S. alba* & *fragilis*, which are sometimes 3–4-androus.)

1. **S. tetrasperma,** *Roxb. Cor. Pl.* i. 66, t. 97; *Fl. Ind.* iii. 573; leaves petioled narrowly or broadly ovate-lanceolate acuminate serrulate rarely entire usually glaucous beneath, catkins very slender, flowers in

scattered clusters, bracts subspathulate, stamens 5–10, capsules long stipitate glabrous or puberulous, stigmas subsessile short entire. *Anderss. Monogr.* 1, f. 1; *DC. Prodr.* xvi. ii. 192; *Wight Ic.* t. 1954; *Brand. For. Fl.* 462, t. 58; *Kurz For. Fl.* ii. 493; *Beddome Fl. Sylvat.* t. 302; *Wall. Cat.* 3700 A *in part*, E, 3707, 9104, 9106; *Dalz. & Gibs. Bomb. Fl.* 220; *Gamble Man. Ind. Timb.* 375; *Miq. Fl. Ind. Bat.* i. ii. 460; *Forbes Salicet. Wob.* t. 31. S. disperma, *Don Prodr.* 58; *Anderss. in Act. Holm.* 1850, 500; *in Journ. Linn. Soc.* iv. 42. S. Horsfieldiana, *Miq. l. c.* 461. S. nilagirica, *Miq. Plant. Hochst. Exsicc.* 1851, n. 982. S. tetrasperma, β. nilagirica, *Anderss. Monogr.* 3; *DC. l. c.* 193.

Throughout TROPICAL and SUBTROPICAL INDIA, from the Panjab eastwards to Mishmi, Assam and Munnipore, ascending the Himalaya to 7000 ft., and southwards to Travancore and Singapore. (Absent from Ceylon.)—DISTRIB. Sumatra, Java.

A small tree, 20–40 ft., flowering after leafing, trunk stout, attaining 10 ft. girth; head large, branches suberect. *Leaves* 3–8 in., glabrous or the young as well as the branchlets more or less softly tomentose or silky; petiole ¼–1 in.; stipules ovate or orbicular, deciduous. *Male catkins* 2–4 in., on leafy branchlets, sweet-scented; bracts obovate or spathulate, pale, hairy; fem. 3–5 in., bracts smaller; disk small, ½-annular. *Capsules* very variable in length and breadth, ⅛–⅙ in.; stipes as long or shorter. *Seeds* 4–6.—A polymorphous plant, of which the prevalent N.W. Indian form differs very much from the southern and eastern in the longer narrower leaf, like those of *S. daphniphylla*, pale green or yellowish when dry, with more oblique nerves, and much larger shortly stipitate pale capsules; the eastern and southern forms have (when dry) dark-brown usually shorter and often broader leaves shining above, with more horizontal nerves, smaller dark capsules, on often very slender stipes; of these southern and eastern forms, some have glabrous branchlets and young leaves, in others they are tomentose or almost silky. Roxburgh describes the style as being as long as the capsule, and the latter as cordate at the base; the first character never applies, and the capsule is only cordate after dehiscence. Of the varieties founded by authors on looser or denser-fld. catkins and form of the leaves and capsule none seem to me to be tenable.

VAR. *pyrina*, Anderss. in Journ. Linn. Soc. iv. 42; shoots petioles young leaves beneath and rachis of catkins softly tomentose or woolly, capsules narrow, mature leaves often subsilky on both surfaces. S. pyrina, *Lindl. in Wall. Cat.* 3705; *Anderss. in Act. Holm.* 1850, 486; *Monogr.* 4; *DC. Prodr. l. c.* 193; *Miq. Fl. Ind. Bat.* i. ii. 461. S. Wallichii, *Wimm. in Herb. Vind.* S. lenta, *Fries Nov. Fl. Sv. Mant.* i. 78; *Anderss. l. c.* and *Monogr.* 4, f. 2.—Common from Nepal eastwards and southwards.—Andersson, who makes a variety of *pyrina* in Journ. Linn. Soc., quotes that work in the Prodromus for it as a species.

VAR. *suaveolens*, Anderss. in Journ. Linn. Soc. iv. 41; DC. l. c. 193; branches chestnut-red quite glabrous, leaves ovate-lanceolate 3 in. broad very coriaceous and shining at length glabrous and densely glaucous beneath, male bracts very broadly ovate densely villous. S. suaveolens, *Anderss. in Act. Holm.* 1850, 491. S. Myurus & Hugelii, *Wimmer in Herb. Vind.*—Ajmir and N.W. Himalaya.

VAR. *viridifolia*; shoots and young leaves glabrous, leaves lanceolate acuminate serrate pale yellow-green on both surfaces when dry.—Coimbatore, *Herb. Wight.*—This, which is in male fl. only, may be a different species. There are scraps in Herb. Wallich under No. 3702, which consists of this, *S. tetrasperma* and *ichnostachya*.

S. GLABRESCENS, *Lindl. in Wall. Cat.* 3706, omitted by Andersson in his various works, is probably a form of *tetrasperma*, said to be from both Oude and Rohilkunds with old hoary capsules and branches.—Andersson has written on the sheet "*S. laurinæ* × *macrostachya* valde affinis," Wall. Cat. 3707 D. *S. tetrasperma*, var. *pubescens*, Lindl., with large rounded stipules, is probably the same.

S. CUSPIDATA, *Wall. Cat.* 3703 (omitted by Andersson); *Don Prodr.* 58. There are two sheets from Herb. Wight; A is *tetrasperma* with long bracts and glabrous capsules, B consists of leaves only, and is labelled by Andersson *S. apiculata*, Anderss.

S. CALOPHYLLA, *Wall. Cat.* 9102, from Attran (Burma), consists of a glabrous branch with very large long and stoutly petioled ovate-lanceolate leaves, resembling those of *S. ichnostachya*; it is probably a form of *tetrasperma*. It is overlooked by Andersson.

S. DENSA, *Wall. Cat.* 9103, from Martaban, also overlooked by Andersson, consists of a glabrous branch with linear-oblong petioled leaves 6 in. long. It is also probably referable to *tetrasperma*.

S. NOBILIS, *Fries*; S. TETRASPERMA, var. NOBILIS, *Anderss. in Act. Holm.* 1850, 492, and in *Journ. Linn. Soc.* iv. 42 (omitted in the Prodromus), from Nepal, is described as having a very long 2-fid style with linear split stigmas.

2. **S. ichnostachya,** *Lindl. in Wall. Cat.* 3704; shoots and young leaves silky-pubescent, leaves petioled lanceolate or ovate-lanceolate acuminate serrulate usually glaucous beneath, catkins densely woolly sessile or pedicelled, male sparse-fld., fem. rather dense-fld., stamens 6–8, capsules shortly stipitate globosely ovoid densely woolly, style short 2-fid. *Anderss. in Act. Holm.* 488; *Wight Ic.* t. 1953. S. tetrasperma, *var.* ichnostachya, *Anderss. in Journ. Linn. Soc.* iv. 41; *DC. Prodr.* xvi. ii. 193. S. pondicheriana, *Anderss. mss.*

The DECCAN; Pondicherry, *Perrottet*; Maisor; near Salem, *Wight.*

Habit and foliage of *S. tetrasperma*, from which the densely woolly catkins and the shape and woolliness of the capsules distinguish it.

3. **S. acmophylla,** *Boiss. Diagn.* vii. 98; *Fl. Orient.* iv. 1183; leaves linear-lanceolate upper caudate-acuminate quite entire or serrulate glaucous beneath, catkins short shortly peduncled, bracts ovate or oblong concave villous, stamens 4–6, capsules ovoid-oblong shortly stipitate, stigmas sessile short entire. *Anderss. Monogr.* 7, f. 76; *DC. Prodr.* xvi. ii. 195; *Brand. For. Fl.* 463. S. glauca and S. acmophylla, *Anderss. in Act. Holm.* 1850; *Journ. Linn. Soc. l. c.* 43. S. octandra, *Del.*; *Aitch. Cat. Panjab Pl.* 140.

NORTH-WESTERN INDIA, from the Beas westward; (cultivated at Delhi, *Aitchison.*) —DISTRIB. Affghanistan, Beluchistan (cultivated all over it, *Stocks*) and westward to Syria.

A moderate-sized quite glabrous tree, flowering after leafing; trunk attaining 7 ft. girth; crown rounded, branches often pendulous. *Leaves* 2–5 in., pale, lower often subacute or mucronate. *Male catkins* 1–2 in., cylindric, dense-fld.; fem. 1 in., nodding, with deciduous long-haired bracts.—Brandis observes that *S. acmophylla* is both geographically and structurally intermediate between *S. tetrasperma* and the N. African *S. Sufsuf*, Forsk.

SECT. II. DIANDRÆ. Fem. catkins sessile or peduncled; bracts coloured, persistent. *Stamens* 2 (or more in *S. alba* & *fragilis*), free. *Disk* of one or two scales.

* Capsules usually stipitate; style 0.

4. **S. Wallichiana,** *Anderss. in Act. Holm.* 1850, 447; *Monogr.* 80, f. 46; *DC. Prodr.* xvi. ii. 223; shoots and leaves beneath silky, leaves oblong lanceolate or ovate-lanceolate smooth quite entire, catkins densely silky subsessile with small leaves at the base, males 1–1½ in. erect, fem. 3–4 in. drooping, bracts black, stamens 2 free, capsules shortly stipitate slender silky, stigmas erect subsessile. *Brand. For. Fl.* 468; *Gamble Man. Ind. Timb.* 376; *Wall. Cat.* 3700 A *in part*, B, C.—Salix, *Herb. Strach. & Wint.* No. 3, 5, 11.

TEMPERATE HIMALAYA, from Kashmir to Bhotan, ascending to 9000 ft., and in the PANJAB PLAINS; wild or cultivated.—DISTRIB. Afghanistan.

A shrub or small tree, flowering before leafing. *Leaves* 2–3 in., young silvery-tomentose on both surfaces, sometimes obscurely crenate; nerves numerous, not very distinct. *Male catkins* 1 in., short, stout, tip rounded; fem. 3–5 in., rachis tomentose. *Capsules* ¼ in., valves slender.—Andersson has the following varieties.

Var. *grisea*, Anderss. Monogr. 80; DC. l. c.; leaves serrulate glabrate above base narrow or rounded, catkins crowded scales long acute pale with brown tips, capsules subsessile very slender hoary, stipes hardly longer than the disk. S. grisea, *Wall. Cat.* 3700 G. S. pseudo-grisea, *Steud. Nomencl.*

Var. *julacea*, Anderss. Monogr. l. c.; DC. l. c. 224; leaves ovate-oblong sub-obtuse minutely distantly serrulate, catkins shortly peduncled very long slender flexuous, bracts glabrate tips brown, capsules sparsely hairy, stipes 3–4 times as long as the disk.—Hyderabad, *Jacquemont*.—I have not seen this.

Var. *sericea*, Anderss. ll. c.; leaves silky on both surfaces, catkins stout shortly pedicelled, bracts acute black glabrous, capsules short pale, stipes about three times as long as the disk.—Kashmir.

S. Caprea, *Linn. Sp. Pl.* 1020; leaves elliptic oblong or obovate crenate rugose beneath and grey-pubescent with crispy or cottony down, nerves 8–12 pairs strong beneath, stipules large subreniform, catkins subsessile densely silky, male 1 in. erect ovoid-oblong, bracts dark, stamens 2 free, fem. 2–3 in. slender nodding, bracts tipped with black, capsules shortly stipitate cylindric from an ovoid base downy, stigmas subsessile erect. *Anderss. in DC. Prodr.* xvi. ii. 222; *Brand. For. Fl.* 467, t. 60; *Reichb. Ic. Fl. Germ.* t. 577; *Boiss. Fl. Orient.* iv. 1188.

Cultivated in Rohilkund and N.W. India.—Distrib. Europe, W. Asia.

A tree, 25–30 ft., flowering before leafing; trunk attaining 3–4 ft. girth, often a shrub. *Leaves* 2–4 in., dark green above, margins often recurved, base cuneate rounded or cordate. *Male catkins* very stout, sweet-scented; fem. 2–3 in. *Capsules* ½ in.—Sallow, or Goat Willow.

S. alba, *Linn. Sp. Pl.* 1021; a tree, leaves narrow lanceolate acuminate glandular-denticulate silky beneath, stipules lanceolate deciduous, catkins on leafy peduncles, male cylindric dense-fld. drooping, bracts oblong ciliate, stamens 2 free, fem. lax-fld., bracts yellow ciliate, capsules subsessile ovoid glabrous, style very short, stigmas 2-fid. *Anderss. in DC. Prodr.* xvi. ii. 211; *Brand. For. Fl.* 466; *Reichb. Ic. Fl. Germ.* t. 608; *Boiss. Fl. Orient.* iv. 1485.

North-West Himalaya and Western Tibet, cultivated only.—Distrib. Europe, N. Asia.

A tree, attaining 80 ft., flowering after leafing; branchlets olive-green, yellow, red, or purple. *Leaves* 2–4 in., dull green above, young silky on both surfaces, old glabrous, often glaucous beneath; petiole eglandular. *Male catkins* 1–1½ in.; fem. 2–3 in. *Disk scales* 2. *Capsules* with narrowed tips.—White Willow.

S. babylonica, *Linn. Sp. Pl.* 1017; a tree with weeping branches, leaves linear-lanceolate acuminate serrulate glabrous or sparsely hairy beneath, stipules falcate serrate, catkins very slender on leafy peduncles, male short slender curved pale yellow, stamens 2 free, fem. as long, bracts small lanceolate pale, capsules sessile narrowly conic glabrous or nearly so, stigmas sessile entire. *Anderss. in DC. Prodr.* xvi. ii. 212; *Brand. For. Fl.* 465, t. 59; *Wall. Cat.* 3709; *Boiss. Fl. Orient.* iv. 1185.

Cultivated in the plains of India, and the Himalaya, ascending to 9000 ft.; and elsewhere in gardens, &c.—Distrib. Europe, N. and W. Asia.

A tree, attaining 50 ft.; trunk 12 ft. in girth, flowering and leafing together; males much commoner than fem. *Leaves* 3–6 by ½ in., midrib prominent. *Male*

catkins ½–1 in.; bracts lanceolate; fem. as long; bracts as in the male. *Capsule* $\frac{1}{12}$ in., pale green.—Weeping Willow.

5. **S. elegans,** *Wall. Cat.* 3699; shoots petioles and midrib above usually pubescent, leaves elliptic obovate or oblong acute or obtuse or tip rounded serrulate very glaucous and reticulate beneath, catkins slender on leafy peduncles, bracts small yellow, male compact, stamens 2 free, fem. much longer slender drooping, bracts minute yellow subpubescent, capsules shortly stipitate conic obtuse, stigmas subsessile 2-partite. *Anderss. in DC. Prodr.* xvi. ii. 256; *Brand. For. Fl.* 466; *Gamble Man. Ind. Timb.* 377. S. kumaonensis, *Lindl. in Wall. Cat.* 3701. S. denticulata, *Anderss. in Act. Holm.* 481, and in *Bot. Reise Pr. Wald.* 119, t. 89.

Western Himalaya; from Nepal to Marri, alt. 6–11,000 ft., and Gilgit.

A shrub or small tree, flowering after leafing; branches black or brown. *Leaves* 1–2 in., young membranous, old rigid; petiole ¼ in. *Male catkins* 1½ in.; fem. 3–5 in. *Capsules* ⅙ in.; stigmas spreading.

Var. *Govaniana*, Anderss. in DC. l. c. 257; taller, leaves larger almost lanceolate more sharply serrulate more glaucous beneath. S. Govaniana, *Wall. Cat.* 3699. S. himalensis, *Klotzsch in Herb. Berol.* S. denticulata, *var.* himalensis, *Anderss. in Act. Holm.* 482. S. elegans, *var.* himalensis, *Anderss. Monogr.*—Nepal and Kumaon.

6. **S. sclerophylla,** *Anderss. Monogr.* 148; *DC. Prodr.* xvi. ii. 248; branches stout glaucous, buds large, leaves small oblong quite entire glabrous base rounded or subcordate, catkins small sessile short ovoid-oblong, base not leafy, male erect, fem. curved, bracts obovate obtuse tips brown or not ciliate, capsules sessile conic beaked hoary, stigmas sessile stout spreading. Salix, No. 8 and 10, *Herb. Strach. & Winterb.*

North-Western Himalaya and Tibet; Laptal, alt. 15,000 ft., *Strachey & Winterbottom*; Dras, alt. 10,000 ft., *Thomson.*

A stout much-branched shrub, flowering before leafing; branches glaucous. *Leaves* 1 in., rigid, pale beneath; nerves strong, arched. *Male catkins* ¼–½ in. *Disk* surrounding the base of the capsule, which is about ⅙ in. long.—Andersson compares this with the European *S. repens*, L., in habit; he makes 2 varieties, *α. glabra*, with leaves glabrous and bright green on both surfaces, and *β. pubescens*, with rigid leaves apiculate rounded at both ends and white villous on both surfaces, but especially beneath.

** Capsule stipitate (*stipes very short in* S. fragilis); style produced.

S. fragilis, *Linn. Sp. Pl.* 1017; a tree, branchlets smooth polished fragile at the insertion, leaves lanceolate caudate-acuminate glandular-serrate glabrous young hairy, stipules ½-cordate deciduous, catkins on leafy peduncles, bracts long narrow pale, male cylindric drooping, stamens 2–4 free, fem. longer slender, capsules narrowly conic shortly stipitate glabrous narrowed into a 2-fid style, stigmas 2-fid. *Anderss. in DC. Prodr.* xvi. ii. 209; *Brand. For. Fl.* 466; *Reichb. Ic. Fl. Germ.* t. 609; *Boiss. Fl. Orient.* iv. 1184.

Cultivated in Lahoul and Western Tibet.—Distrib. N. and W. Asia, Europe.

A tree, 80–90 ft. (in Europe), flowering after leafing; branches divaricate. *Leaves* 3–6 in., green, silky when young; petiole often glandular at the top. *Disk* 2-glandular. *Capsule* ¼ in.—Crack-Willow.

7. **S. hastata,** *Linn. Sp. Pl.* 1017; shoots silkily hairy, leaves oblong to lanceolate obtuse acute or apiculate toothed glabrous or midrib and

nerves beneath hairy, stipules broadly ovate or ½-cordate, catkins subsessile or shortly peduncled robust with small leaves at the base, male cylindric compact silkily hairy, bracts subspathulate dark, stamens 2, anthers yellow, fem. longer, capsules stipitate glabrous, style filiform, stigmas spreading 2-fid. *Anderss. in DC. Prodr.* xvi. ii. 259; *Brand. For. Fl.* 467; *Reichb. Ic. Fl. Germ.* t. 570; *Boiss. Fl. Orient.* iv. 1191. S. arbuscula? *Herb. Ind. Or. H.f. & T.*

WESTERN HIMALAYA, in the inner ranges, and TIBET, from Garwhal westwards, alt. 9–15,000 ft. SIKKIM; at Tallum Samdong, alt. 11,500 ft., *J. D. H.*—DISTRIB. N. and W. Asia, Subalpine Europe.

A small shrub, flowering and leafing together; branches dark brown or black, glabrous. *Leaves* 1–3 by ¾–2½ in., membranous, green on both surfaces but paler beneath; petiole ¼–½ in.; stipules large or 0. *Male catkins* 1–1½ in.; fem. 2–7 in. *Disk* half as long as the stipes of the ovary. *Capsules* ⅛–¼ in., ovoid, beaked.—The Sikkim specimens are in leaf only, and the leaves are 3–4½ in. long. Andersson refers them to *S. hastata*.

*** Capsules sessile or subsessile; style produced (very shortly in *S. longiflora* & *Lindleyana*).

† *Trees or large shrubs, leaves glabrous glaucous silky or villous beneath.*

8. **S. daphnoides,** *Villars Delph.* iii. 765; branches shining or glaucous, buds large downy, leaves oblong- or linear-lanceolate acuminate serrate shining above glaucous beneath, nerves prominent, stipules ½-cordate acuminate, catkins sessile stout, bracts black-tipped villous, male erect, stamens 2 free, anthers yellow, fem. longer nodding, capsule subsessile glabrous, style filiform, stigmas diverging entire. *Anderss. in DC. Prodr.* xvi. ii. 261; *Brand. For. Fl.* 469, t. 62; *Gamble Man. Ind. Timb.* 377; *Reichb. Ic. Fl. Germ.* t. 602, 603; *Boiss. Fl. Orient.* iv. 1191. S. daphnoides, *var.* indica, *Anderss. in Journ. Linn. Soc.* iv. 46. S. acutifolia, *Willd. Herb. Ind. Or. H.f. & T.*

TEMPERATE HIMALAYA, from Kumaon westwards, from 2500 ft. in the outer ranges to 15,000 in the inner and in WESTERN TIBET.—DISTRIB. N. and W. Asia, Europe.

A large shrub, or a tree attaining 60 ft., and trunk 9–12 ft. in girth, flowering before leafing; branchlets yellowish or reddish. *Leaves* 3–5 in., broader in the lower elevations; nerves many, glabrous or silky beneath; stipules lanceolate in the Indian forms (½-cordate in European). *Male catkins* 1–1½ in., cylindric; fem. 2–4 in. *Disk* surrounding the base of the ovary. *Capsules* with the style ¼ in.

9. **S. insignis,** *Anderss. in Journ. Linn. Soc.* iv. 47; *DC. Prodr.* xvi. ii. 262; shrubby or arboreous, branches stout glaucous, buds large, leaves elliptic lanceolate acuminate at both ends glandular-serrate glaucous (or silky) beneath sometimes silky on both surfaces, stipules ½-cordate persistent, catkins sessile with brown deciduous basal scales, male stout, bracts black with yellow hairs, stamens 2 free, fem. longer acute erect, bracts obtuse glabrate, capsules shortly stipitate conic puberulous, style short, stigmas stout erect entire. *Brand. For. Fl.* 470.

WESTERN TEMPERATE HIMALAYA; Kunawur to Kashmir, alt. 5–12,000 ft.

Perhaps a variety of *S. daphnoides* (as named by Andersson in Herb. Wall.) with puberulous longer stipitate capsules, shorter styles, and often very silky leaves.—Andersson describes a hirsute form with narrower leaves, and tomentose shoots.

10. **S. viminalis,** *Linn. Sp. Pl.* 1021; shoots silky, leaves linear-

lanceolate acuminate reticulate above silvery-silky beneath, margins entire revolute, stipules linear-lanceolate (or ½-cordate), male catkins sessile, bracts brown- or black-tipped silkily ciliate, stamens 2 free yellow, fem. much longer subsessile cylindric, capsules subsessile tomentose, style slender, stigmas slender spreading. *Anderss. in DC. Prodr.* xvi. ii. 264; *Brand. For. Fl.* 470; *Gamble Man. Ind. Timb.* 377; *Reichb. Ic. Fl. Germ.* t. 597; *Boiss. Fl. Orient.* iv. 1191.

TEMPERATE HIMALAYA, from Jamu westwards, alt. 5–9000 ft.—DISTRIB. N. and W. Asia, Europe.

A shrub or small tree, flowering before the leaves, branchlets slender flexible. *Leaves* 4–5 in., pubescent or glabrate above. *Male catkins* 1 in., erect, golden yellow; disk-gland narrow; fem. 2–4 in. *Capsules* ¼ in., beaked, narrowed into the style.—The Osier.

VAR. *Smithiana*; stipules ½-cordate, leaves broader, style shorter. *Anderss. in DC. l. c.* 267. S. Smithiana, *Willd. Enum. Hort. Berol.* ii. 1008; *Anderss. in Journ. Linn. Soc.* iv. 48.—Sikkim, alt. 5–8000 ft.—Brandis refers a Sikkim willow collected by me at 5–8000 ft. in Sikkim to this. Andersson regards the European *Smithiana*, which is common in osier-grounds, as a hybrid between *viminalis* and *Caprea*. The Sikkim plant is probably *S. eriophylla* of the Khasia Mts.

11. **S. obscura,** *Anderss. in DC. Prodr.* xvi. ii. 269; a diffuse shrub, shoots tomentose, leaves elliptic or linear-lanceolate acute dull green above brown when dry, beneath glabrous or subsilky reddish or glaucous, margins entire or very remotely toothed, fem. catkins sessile, bracts minute acute black tips hairy, capsules small sessile broadly ovoid puberulous, style slender thickened upwards, stigmas very short erect entire.

SIKKIM HIMALAYA; Lachen, alt. 9–14,500 ft., *J. D. H.*, *Pantling*.

Branches stout, smooth, bark black. *Leaves* 2–3 in., midrib pubescent above, young villous and somewhat shining beneath; stipules not seen. *Fem. catkins* 1–1½ in., narrowly cylindric. *Capsules* about $\frac{1}{12}$ in., conic-ovoid, narrowed into the style.—Possibly a form of *S. viminalis*.

12. **S. sikkimensis,** *Anderss. in DC. Prodr.* xvi. ii. 269; branches very stout angled glaucous, leaves (young) ovate-lanceolate obtuse quite entire glabrous above densely silkily villous and coppery beneath, male catkins subsessile with deciduous basal leaves stout curved villous, stamens 2 free, bracts obovate-cuneate villous tip toothed densely villous with long hairs, fem. as long but narrower, capsules sessile conic densely silkily villous narrowed into the deeply cleft style, stigmas sub-2-fid brown spreading.

SIKKIM HIMALAYA, alt. 9–14,000 ft., *J. D. H.*, *&c.*

A tree, becoming shrubby at higher elevations, branches smooth, erect, shining, bark very dark. *Leaves* (not mature) 1–1½ in., dark brown when dry. *Catkins* about 1 in., silky; male very stout, ¾ in. diam. *Capsules* ⅛ in., nearly hidden by the villous bracts. *Anthers* linear-oblong. *Style* nearly as long as the capsule.

13. **S. Daltoniana,** *Anderss. in Journ. Linn. Soc.* iv. 49; *DC. Prodr.* xvi. ii. 269; branches black, leaves lanceolate acute, margins flat quite entire or minutely glandular-serrulate silky and coppery beneath, catkins on leafy peduncles very long slender flexuous, bracts linear-oblong or spathulate yellow-brown tip notched or crenate hairy, capsules small sessile narrow silky at length glabrous, style very slender cleft, stigmas slender flexuous entire or 2-fid.

SIKKIM HIMALAYA, alt. 9–14,000 ft., *J. D. H.* BHOTAN, *Griffith* (*Kew Distrib.* 4498).

A small tree, becoming a shrub at high altitudes; shoots puberulous. *Leaves* 1–3 in., dull green above with impressed nerves. *Male catkins* 1 in.; fem. 4–6 in., erecto-patent, peduncle tomentose with 3–4 short leaves rounded at the base; bracts broadest at the tip, often notched or 2-fid. *Capsule* $\frac{1}{12}$ in., gradually narrowed into the style.

VAR. *crassijulis*, Anderss. in DC. l. c. 270; leaves smaller, catkins 1 in. dense-fld., bracts broader, style subentire, stigmas shorter.—Sikkim with the type.

14. **S. eriophylla,** *Anderss. in Journ. Linn. Soc.* iv. 48; *DC. Prodr.* xvi. ii. 270; a large bush, shoots tomentose, leaves coriaceous lanceolate acute or acuminate sinuate-crenate dull green above with impressed nerves, densely silvery silky or woolly beneath, catkins shortly peduncled dense-fld., stamens 2 free, bracts broadly obovate densely villous, capsules minute sessile subglobosely ovoid obtuse woolly, style deeply cleft, stigmas suberect 2-fid. S. psilostigma, *Anderss. in Act. Holm.* 1850, 496. S. viminalis, *var.* stipularis, *Herb. Ind. Or. H.f. & T.*

KHASIA HILLS, alt. 4–5000 ft., *J. D. H. & T. T.*

A spreading shrub with suberect branches. *Leaves* 2–4 in., very shortly petioled, base usually rounded or subcordate; stipules subcordate. *Male catkins* 1 in., narrow; bracts very obtuse, villous; stamens hairy, anthers yellow; fem. $1\frac{1}{2}$–2 in.; disk narrow. *Capsule* about $\frac{1}{12}$ in.; stigmas very short.—Andersson seems to have abandoned the name of *psilostigma*, which has priority in the Linn. Journ.; he describes the style as nearly hidden by the hairs of the capsule.

15. **S. eriostachya,** *Wall. Cat.* 3704; branches more or less glaucous, leaves elliptic-lanceolate acute entire sparsely pubescent or silky on both surfaces old glabrate or silky on the midrib, catkins on long leafy peduncles, stamens 2 free, bracts broadly obovate hairy, capsules sessile ovoid-conic pubescent at length glabrate, style 2-cleft, stigmas long filiform quite entire. *Anderss. in Act. Holm.* 1850, 493; *Journ. Linn. Soc.* iv. 46.

NEPAL, *Wallich.* ? BHOTAN, *Griffith.*

A large shrub or a tree, branches reddish or ashy, quite glabrous. *Leaves* 2–$2\frac{1}{2}$ in., acute at both ends, disk green with an ashy midrib above, pubescence short beneath and hardly glaucous. *Fem. catkins* $1\frac{1}{2}$–2 in., curved, spreading, peduncle pubescent. *Capsules* $\frac{1}{8}$–$\frac{1}{6}$ in., angled, dark brown.—Andersson regards this as nearest to *S. Daltoniana.*

16. **S. longiflora,** *Anderss. in Journ. Linn. Soc.* iv. 50; *DC. Prodr.* xvi. ii. 271; shoots and petioles silky, branchlets glabrous divaricate, leaves elliptic or elliptic-lanceolate acute quite entire dull green above glabrous and glaucous when old not shining beneath, fem. catkins on leafy peduncles very slender lax-fld. pendulous, bracts obtuse brown glabrous or sparsely pubescent, capsules small sessile broadly ovoid acute quite glabrous, style very short slender 2-fid, stigmas erect 2-partite.

SIKKIM HIMALAYA; Lachen, alt. 9000 ft., *J. D. H., Pantling.*

A small tree, 10–30 ft.; bark of branches black. *Leaves* variable, smaller 1–2 larger 3–6 in.; petiole slender. *Fem. catkins* 2–5 in., $\frac{1}{6}$ in. diam., nearly glabrous, flexuous; bracts $\frac{1}{20}$ in., membranous, shortly villous. *Capsules* $\frac{3}{4}$ in., base thickened; stigmatic lobes spreading.—Andersson compares the catkins with those of *S. elegans*, the leaves with those of *S. Daltoniana.* In the London Journal and De Candolle's Prodromus Andersson cites *longiflora* as a plant so named by Wallich in Herb. Hook., but this is an oversight; on some of the specimens he has himself written "*S. longiflora*, Anderss." Neither species or name exists in Wallich's Herbarium, nor did Wallich ever see the plant.

†† *Small usually prostrate* (S. Thomsoniana *is suberect*) *shrubs, often*

half buried in the soil with ascending short branches. Leaves small, usually coriaceous and strongly nerved.

17. **S. Serpyllum,** *Anderss. in Journ. Linn. Soc.* iv. 55; *DC. Prodr.* xvi. ii. 292; leaves very small subdistichous obovate- or elliptic-lanceolate flat serrulate towards the tip pale or glaucous beneath, catkins terminating long leafy branchlets short subclavate dense-fld., stamens 2 free, bracts rounded cuneate black crispily hairy at length glabrous ciliate, capsules sessile turgid glabrous a little longer than the black oblong bracts, style long 2-cleft, stigmas yellow shortly 2-fid. S. longipes, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 10–14,000 ft., *J. D. H.*

Stem and branches stout, creeping and rooting; leafing branchlets slender, very short. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., lingulate, deep green above, narrowed into the petiole, subglaucous beneath. *Male catkins* $\frac{1}{2}$–1 in., erect; fem. $1\frac{1}{2}$ in.; filaments brown, base woolly. *Capsules* $\frac{1}{12}$ in., turgidly conic, brown.—Represents *S. Myrsinites* of the European Alps.

VAR. *pusilla*, Anderss. in DC. l. c. 293; branchlets longer, leaves $1\frac{1}{2}$ in., margins subrevolute glaucous beneath, catkins $\frac{1}{4}$ in. on shorter peduncles.

18. **S. flabellaris,** *Anderss. in Act. Holm.* 497; *in Bot. Reise Pr. Wald.* 120, t. 90; *DC. Prodr.* xvi. ii. 295; branches prostrate very stout, leaves long-petioled obovate or broadly obovate acute or obtuse crenulate glabrous paler or glaucous beneath, catkins on leafy branchlets usually very short few-fld., stamens 2 free, bracts lingulate-obovate glabrous dark, capsules subsessile turgidly ovoid quite glabrous red, style not long, stigmas entire. *Brand. For. Fl.* 471. S. lucida, *Jacquem. mss.* S. obovata, *Wall. Cat.* 3698. S. rotundifolia, *Herb. Royle.*

WESTERN HIMALAYA; from Kumaon to Kashmir, alt. 11–15,000 ft., *Royle,* &c. SIKKIM; at Lachoong, *J. D. H.*

A procumbent shrub; branches angled, glabrous, reddish, subflabellately leafy. *Leaves* $\frac{3}{4}$–1 in., bright green above, paler beneath with reticulate nerves, rounded spathulate or obovate; petiole $\frac{1}{4}$ in. *Male catkins* about 1 in., bracts subcrenulate; anthers yellow; fem. as long or longer, purplish; bracts half as long as the red capsules; rachis glabrous.—Distinguished from *S. Lindleyana* & *calyculata* by the larger glabrous leaves green on both surfaces. Andersson suggests this being a Himalayan form of the European *S. arctica*, from which it differs in broader crenulate leaves, longer catkins and brown capsules. Duthie sends specimens from Kumaon with red or yellow leaves 2 in., petiole $\frac{1}{4}$–$\frac{3}{4}$ in., and fem. catkins 3 in. The smooth red capsules $\frac{1}{6}$ in. long are very characteristic of all the specimens.

19. **S. Lindleyana,** *Wall. Cat.* 3697; a prostrate creeping and rooting shrub, leaves petioled small oblong-lanceolate quite entire serrulate or crenulate glabrous glaucous beneath, catkins on short leafy branchlets ovoid few-fld., bracts oblong-obovate quite glabrous, capsules shortly pedicelled much longer than the bracts conic quite glabrous, style minute, stigmas stout. *Anderss. in Act. Holm.* 1850, 499; *Journ. Linn. Soc.* iv. 56; *DC. Prodr.* xvi. ii. 296; *Brand. For. Fl.* 471. Salix, No. 12 and 14, *Herb. Str. & Wint.*

ALPINE HIMALAYA; from Kumaon, alt. 11–14,000 ft., to Sikkim, ascending to 16,000 ft.

Branches often running along the ground. *Leaves* variable in breadth and serrulation. *Catkins* $\frac{1}{2}$–1 in. *Capsules* $\frac{1}{6}$–$\frac{1}{4}$ in., dark brown, valves narrower than *S. flabellaris.*—Andersson has two varieties, *latifolia*, with leaves $\frac{1}{6}$–$\frac{1}{4}$ in., serrulate almost throughout, and *microphylla*, with narrower leaves $\frac{1}{12}$–$\frac{1}{6}$ in., deeply channelled down the centre and with revolute margins. He likens the species in habit (only) to

S. fruticulosa, and in other respects to *S. retusa* of the Alps, which it represents in the Himalaya, differing in the narrower leaves, shorter catkins and reddish glaucous capsules. Andersson in the Prodromus likens this to *S. fruticulosa*, probably alluding to his *S. fruticulosa* described in Journ. Linn. Soc., a species overlooked in the Prodromus. (See end of the Genus.)

Forma major, *Anderss. in Herb. Wall.*, has leaves 1–1½ in. rounded obovate narrowed into a petiole ½ in., and capsules nearly ¼ in. long. S. clavata, *Wall. Cat.* 3698.—Kumaon, *Blinkworth.*—Omitted in all Andersson's works.

20. **S. calyculata,** *Hook. f. Herb. Ind. Or.*; leaves petioled elliptic or broadly obovate tip subacute or rounded ciliate with silky hairs entire or crenulate towards the tip, young villous, old glaucous beneath, catkins on leafy branchlets subsessile short oblong, bracts oblong-obovate brown glabrous, capsules very shortly stipitate ovoid-conic glabrous, style thick not long, stigmas short erect. *Anderss. in Journ. Linn. Soc.* iv. 55; *DC. Prodr.* xvi. ii. 296.

Sikkim Himalaya, alt. 14–15,000 ft., *J. D. H.*

A very small gnarled shrub, with ascending branchlets. *Leaves* about 1 in., dull green above, with the nerves impressed, dark when dried; petiole $\frac{1}{12}$ in. *Male catkins* ⅓ in., almost hidden amongst the leaves, broadly ovoid; fem. rounded. *Capsule* ⅛ in., pitchy brown; stipes longer than the glabrous disk-gland.—Andersson says that he retains this species on my authority, but that he regards it as doubtful, and intermediate between *flabellaris* and *Serpyllum*. My opinion is that if the two latter are kept as distinct species, so must *S. calyculata*, but that all are best united. The name, he observes, is derived from the stamens being almost connate in a tube. In Journ. Linn. Soc. he describes them as free except in a monster in which the filaments are united in a tube which is thickened and bifid above the divisions, ovate acute and subantheriferous within, concealed by the dilated disk-scale. My impression is that the long bracts of the catkin suggested the specific name.

21. **S. oreophila,** *Hook. f. Herb. Ind. Or.*; leaves shortly petioled obovate or oblong-cuneate pale green glabrous tips deeply serrulate, catkins minute hidden amongst the leaves few-fld., bracts pale obovate glabrous, disk-scale very large, stamens 2 free, capsules subsessile conic glabrous thrice as long as the lingulate bracts, style very short, stigmas short entire. *Anderss. in Journ. Linn. Soc.* iv. 57; *DC. Prodr.* xvi. ii. 296.

Sikkim Himalaya, alt. 15–16,000 ft., *J. D. H.*

A very dwarf shrub, flabellately branched; branches prostrate, curved. *Leaves* $\frac{1}{12}$–¼ in., densely imbricate, rugulose above, quite glabrous except the slightly hairy base. *Catkins* very small, fem. ¼ in. with the flowers subumbellately spreading. *Capsule* ⅛–⅙ in., rather obtuse brown shining.

Var. *secta*, Anderss. in DC. l. c. 297; forming rounded tufts at very high elevations, leaves rosulate $\frac{1}{12}$ in. laciniate, catkins 2–4-fld., capsules conic, stigmas minute. S. secta, *Hook. f. Herb. Ind. Or.*; *Anderss. in Journ. Linn. Soc.* iv. 57.—Sikkim, alt. 14,000 ft.—Andersson remarks that this is both the smallest and most alpine willow known to him. It is, perhaps, a form of *S. Lindleyana*.

22. **S. Thomsoniana,** *Anderss. in. Journ. Linn. Soc.* iv. 54; *DC. Prodr.* xvi. ii. 297; a dwarf shrub, branches stout ascending, leaves elliptic-lanceolate acuminate remotely serrulate hoary or silkily villous beneath with hirsute nerves, catkins on leafy branchlets elongate cylindric males slender lax-fld., fem. few-fld., bracts broadly obovate hirsute with white hairs, disk-scale very long black, stamens 2 free, capsule minute sessile globose woolly, style cleft to the base, segments divaricate, stigmas short subbifid. S. vagans, *Herb. Ind. Or. H. f. & T.*

Sikkim Himalaya, alt. 8–10,000 ft., *J. D. H.*; Lachoong, *Pantling*.

A prostrate shrub with branches about a foot high, or (according to Brandis) with a stout trunk, and prostrate and rooting rarely erect brown branches. *Leaves* 1 in., rather broadest above the middle, narrowed at both ends, dull green above, margin narrowly revolute, hoary beneath. *Male catkins* 1½–2½ in., flexuous; filaments free, much longer than the bracts, and anthers didymous, brownish; fem. shorter, more dense-fld.; bracts rounded, longer than half the white capsule.—This has no affinity with the preceding species.

SECT. III. SYNANDRÆ. *Stamens* 2, filaments more or less connate.

23. **S. pycnostachya,** *Anderss. in Journ. Linn. Soc.* iv. 44; *DC. Prodr.* xvi. ii. 309; branches shining, leaves lanceolate subacute flat quite entire or serrulate glabrous young silky beneath, catkins stout males on leafy peduncles cylindric, bracts minute obtuse yellow tips brown ciliate, filaments connate, capsules sessile ovoid silky, style short tip thickened, stigmas short broad erect 2-fid. *Brandis For. Fl.* 470. S. purpurea, *L.*?, *Herb. Ind. Or. H.f. & T.*

WESTERN HIMALAYA in the drier regions, and WESTERN TIBET, alt. 12–15,000 ft., wild and cultivated.

A shrub, 6–7 ft., or a small tree attaining 16 ft., with a trunk 2 ft. girth and divaricate branches, flowering after the leaves; shoots silky; branches violet brown red or blackish. *Leaves* 2–3 in., midrib prominent; nerves many, oblique, inconspicuous; petiole $\frac{1}{12}$–$\frac{1}{8}$ in., and midrib often with galls. *Catkins* nodding; bracts oblong; filaments united throughout; fem. 2 in. *Capsule* $\frac{1}{10}$ in., subacute, base gibbous.—Andersson compares this species with the European *S. rubra* and *S. daphnoides.*

VAR. *alpina*, Hook. f.; Anderss. in DC. l. c.; smaller, branches slender yellowish, leaves pubescent on both surfaces, male catkins very short with brown rounded obovate bracts.

24. **S. oxycarpa,** *Anderss. in Journ. Linn. Soc.* iv. 45; *DC. Prodr.* xvi. ii. 310; shrubby, branches hoary or glabrate, leaves lanceolate acute entire or subserrate old rigid glabrous shining glaucous beneath, stipules small ½-lanceolate, catkins (appearing before the leaves) sessile very long flexuous lax-fld., bracts yellow or brown, capsules large sessile elongate-conic acute silky, style very short, stigmas short subclavate. *Brandis For. Fl.* 471. S. zygostemon, *Boiss. Herb. Ind. Or. H.f. & T.*

WESTERN HIMALAYA; Kishtwar, alt. 6–11,000 ft., *Thomson.*

Brandis describes this as differing from *S. pycnostachya* only in the flowers appearing a little before the leaves, the larger more pubescent serrate leaves, black bracts of the male, and brown of the fem. catkins, and which latter attain 4 in. The filaments are united to the middle, and capsules ⅓ in. long.—Andersson describes it as very close indeed to the N. Persian *S. zygostemon*, Boiss.; he makes 2 varieties, β. *serrata* (*serratifolia* in Journ. Linn. Soc. iv. 46) with sessile very lax catkins 4–5 in., leaves 3 in. exactly lanceolate acutely glandular-serrate, midrib and nerves yellowish elevated glaucous beneath, capsules rufescent glabrous, from Simla, 8000 ft., *Thomson*, and which I cannot distinguish from *S. daphnoides*; and γ. *breviuscula*, with narrow lanceolate remotely serrulate leaves glabrous on both surfaces opaquely glaucous beneath, shorter catkins, and silky at length glabrate capsules.

25. **S. angustifolia,** *Willd. Sp. Pl.* iv. 699; branches slender glabrous, leaves very narrowly linear subsessile silky or glabrate, midrib prominent, margins revolute, catkins subsessile leafy at the base male very small, bracts oblong or linear obtuse glabrous yellow, filaments connate, capsules sessile silky narrowed into the short style, stigmas spreading cleft. *Anderss. in DC. Prodr.* xvi. ii. 315; *Brand. For. Fl.* 471; *Boiss. Fl. Orient.* iv. 1187; *Trautvett. Salicet.* 627, t. 3.

WESTERN TIBET; Nubra and Shayuk Valleys, alt. 11–12,000 ft., *Thomson*.—DISTRIB. Soongaria, N. Persia and the Caucasus.

A shrub, 4–15 ft., flowering after leafing, branches strict, shoots silky. *Leaves* 1–3 by $\frac{1}{12}$–$\frac{1}{6}$ in., subsessile, rigid, sometimes denticulate. *Catkins* suberect, male $\frac{1}{2}$ in., fem. $\frac{3}{4}$–1 in.; filaments united throughout. *Capsules* $\frac{1}{12}$ in., longer than the bracts; stigmas red.—Andersson describes the capsules as sessile (which they are) in the diagnosis, but as distinctly stipitate in the remarks that follow it.

26. **S. divergens,** *Anderss. in DC. Prodr.* xvi. ii. 316; a small excessively branched shrub, leaves small oblong or obovate-oblong obtuse or acute glaucous green above quite entire beneath paler glabrous silky or glaucous, catkins on short leafy peduncles oblong-ovoid dense-fld., bracts rounded obovate villous with white hairs, filaments connate, capsules minute sessile ovoid-conic densely silky, style minute yellow, stigmas stout entire erect. S. myricæfolia, *Anderss. in Act. Holm.* 1850, 483; *Journ. Linn. Soc.* iv. 53.

NORTH-WESTERN HIMALAYA, in the interior ranges of Zanskar and Kishtwar alt. 12,000 ft., *Thomson*.

A shrub, about a foot high, with widely divaricate rather stout branches. *Leaves* shortly petioled, $\frac{1}{2}$–$\frac{2}{3}$ in., tip often rounded and apiculate. *Male catkins* $\frac{1}{3}$–$\frac{1}{2}$ in.; filaments united above the middle, fem. longer, bracts pale. *Disk-gland* pale, reaching the base of the capsule. *Capsules* $\frac{1}{24}$ in., twice as long as the bracts.—Andersson says of this that it is altogether analogous to the *S. cæsia*, Vill., of the Alps, nor except by the revolute margin of the leaf of the latter do I see how he distinguishes them specifically. *S. myricæfolia*, the earlier name of the author, is, I assume, abandoned by him as being quite inapplicable.

DOUBTFUL SPECIES.

S. UROPHYLLA, *Lindl. in Wall. Cat.* 3708; *Anderss. in Act. Holm.* 1850, 487; *Monogr.* 5; *DC. Prodr.* xvi. ii. 194. The specimens in Herb. Wall. are in ripe fruit only, and too incomplete to found a species upon, and further are from a plant no doubt cultivated at Oude; they resemble *S. acmophylla*, but are worthless for any identification. Andersson refers to it the Javan *S. Zollingeriana* of Miquel, which from the description is *tetrasperma*. There is in Herb. Hook. a specimen of apparently the same species from Delhi marked as cultivated.

S. CALOSTACHYA, *Anderss. in Act. Holm.* 1850, 489; *Journ. Linn. Soc.* iv. 42; *Monogr.* 5, from alt. 6000 ft. (Kahvata to Mahadeb, *Jacquemont*), described as with the habit of *S. alba*, but long-stipitate capsules, is probably *tetrasperma*.

S. MYRTILLACEA, *Anderss. in Journ. Linn. Soc.* iv. 51. The plant here described is from Sikkim (Lachen, alt. 12,000 ft.), in old fem. fruit only; it resembles *S. obscura*, Anderss., but the shoots and very short petioles are glabrous, leaves $\frac{3}{4}$–1 in., elliptic, apiculate, brown on both surfaces. It is omitted in DC. Prodr.

S. SERICOCARPA, *Anderss. in Journ. Linn. Soc.* iv. 43 (omitted by Andersson in DC. Prodr.), is from Kashmir, *Thomson*, alt. 6000 ft., and described as similar to *S. alba*, but differing in the leaves, bracts and capsules. In Hook. Herb. Andersson has named it a var. of *alba*, from which it appears to me to differ in the densely silky carpels.

S. FRUTICULOSA, *Anderss. in Journ. Linn. Soc.* iv. 53 (*not of Kerner*) (omitted in DC. Prodr.), from Pindari (Kumaon), *Strachey & Winterbottom*, and Zanskar, alt. 15,000 ft., *Thomson*, is perhaps *S. Lindleyana*.

2. POPULUS, *Linn.*

CHARACTERS AS ABOVE (p. 626).—Species about 18, North temperate regions.

The Lombardy Poplar, a pyramidal form of the Black Italian (*P. nigra*, L., var. *pyramidalis*, Spach, *P. fastigiata*, Desf.), is cultivated here and there in the N.W. Himalaya, from Simla westward, and in Western Tibet up to 12,500 feet. Griffith considered it to be wild in Affghanistan. The common spreading form is wild in Western Asia and Central Europe. *See* Brand. For. Fl. 472, and Royle Ill. 344.

1. **P. ciliata,** *Wall. Cat.* 2796; leaf-buds viscidly resinous, branches angled, leaves ovate or ovate-cordate acuminate unequally toothed glabrous teeth gland-ciliate, base 3-nerved, stigmas 3–4 obcordate, capsules stipitate ovoid 3–4-valved. *Brand. For. Fl.* 475; *Royle Ill.* 346, t. 84[a]; *Wesm. in DC. Prodr.* xvi. ii. 329. P. pyriformis, *Royle l. c.* 344; *Gamble Man. Ind. Timb.* 379. P. rotundifolia, *Griff. Notul.* i. 382; *Itin. Notes* 172, No. 881; *Ic. Pl. Asiat.* t. 546.

Temperate Himalaya, alt. 4–10,000 ft., from Kashmir to Bhotan.

A tree, 60–70 ft., with a trunk attaining 10 in girth. *Leaves* 3–7 in., nerves 4–5 pairs above the basal; petiole 2–5 in., compressed vertically. *Male catkins* short, bracts $\frac{1}{3}$ in.; *fem.* 6–9| in., disk toothed embracing half the ovary. *Capsule* $\frac{1}{4}$–$\frac{1}{2}$ in., stipes as long.

2. **P. balsamifera,** *Linn. Sp. Pl.* 1034; leaf-buds viscidly resinous, branches angled, leaves ovate acuminate obtusely toothed glabrous, base rounded or cordate, stigmas 2–3 2-lobed, capsules subsessile 2–4-valved. *Brand. For. Fl.* 476; *Gamble Man. Ind. Timb.* 379; *Wesmael in DC. Prodr.* xvi. ii. 329. P. suaveolens, *Loud. Encycl.* 830. P. laurifolia, *Ledeb. Fl. Altaic.* 297; *Icon.* t. 479.

Inner ranges of the N.W. Himalaya; from Kunawur, alt. 8–13,000 ft., westwards, and in Western Tibet, up to 14,000 ft., wild and planted.—Distrib. Central and N. Asia, N. America.

A tree, 60–70 ft., strongly balsamic; shoots glabrous or pubescent. *Leaves* 2–5 in., rather coriaceous, pale, sometimes brown beneath; petiole 2–5 in. *Male catkins* sessile, drooping, rachis winged; stamens 20-30, filaments slender; fem. peduncled, drooping; fruiting 5–6 in.; disk crenate. *Capsule* $\frac{1}{4}$ in.

3. **P. euphratica,** *Oliv. Voy.* iii. 449, t. 45, 46; leaf-buds pubescent, not viscid, branches terete, leaves polymorphous, stigmas 2–3 semilunar, capsule ovoid subsessile 2–3-valved. *Brand. For. Fl.* 474, t. 63; *Gamble Man. Ind. Timb.* 378; *Boiss. Fl. Orient.* iv. 1194; *Wesmael in DC. Prodr.* xvi. ii. 326; *Monogr.* t. 10–13. P. diversifolia, *Schrank. Enum.* 1842, 15. Balsamiflora deltoides, *Griff. Notul.* iv. 382; *Itin. Notes* 211, No. 73; *Ic. Pl. Asiat.* t. 526.

Along the Indus Valley, in Scind, the Panjab, and Western Tibet, where it ascends to 13,500 ft., and planted in the N.W. Provinces.—Distrib. Western and Central Asia, and westward to Syria and Egypt.

A tree, 40–50 ft., trunk attaining 8 ft. in girth. *Leaves* of young shoots 3–6 in. long and broad linear, or oblong entire and shortly petioled; of older parts 2–3 in., ovate, oblong, rhombic, or orbicular, more or less lobed or cut, base cuneate rounded or cordate, 3–5-nerved; petiole 1–2 in. *Catkins* lax-fld.; male fl., bracts oblanceolate, incised; disk orbicular, 8-cleft; stamens 8–12; fem. fl., disk tubular, 8–12-cleft, membranous, caducous. *Capsule* large, $\frac{1}{4}$–$\frac{1}{2}$ in., turgidly lanceolate.—From Griffith's plate this is certainly his Affghan *Balsamiflora deltoides* (a "nom de plume" which he never would have published), but I am puzzled by his description of the buds as being gummy, and suspect he had *P. balsamifera* in his mind, a species he also collected in Affghanistan.

4. **P. alba,** *Linn. Sp. Pl.* 1034; leaf-buds shoots and leaves beneath white with cottony tomentum, leaves oblong-ovate or broadly ovate or

orbicular sinuately lobed or toothed, palmately on young shoots, base 5-nerved more or less cordate, stigmas 2, 2-partite, arms linear, capsule pedicelled 2-valved. *Brandis For. Fl.* 473; *Boiss. Fl. Orient.* iv. 1193; *Reichb. Ic. Fl. Germ.* t. 614.

N.W. HIMALAYA, alt. 4–10,000 ft., from Kunawur westwards, wild and cultivated, and in WESTERN TIBET.—DISTRIB. Western Siberia, Syria, Asia Minor, Europe, and N. Africa.

A lofty tree in Europe, in India not exceeding 40 ft. (Brandis). *Leaves* 2–4 in., dull green above; petiole 1–2 in., laterally compressed. *Catkins* hairy; male 2–4 in.; stamens 6–10; fem. shorter; bracts lanceolate, tips crenate, ciliate; disk shallow, entire. *Capsule* ¼ in., shortly pedicelled.

5. **P. microcarpa,** *Hook. f. & Thoms. Herb. Ind. Or.* 4495; leaf-buds and shoots glabrous, leaves long-petioled orbicular sinuate base 3-nerved rounded or subcordate, capsules minute subsessile.

BHOTAN; about Panga and towards Chupeh, alt. 7600 ft., *Griffith.*

Leaves 3–4 in. diam., when dry black above and grey beneath; nerves 4–5 pairs above the basal; petiole 1–2½ in., very slender, laterally compressed. *Fruiting spikes* 3–5 in., very slender, rachis tomentose. *Capsules* ⅛ in., broadly ovoid hoary, pedicel very short.

ORDER CXLII. CERATOPHYLLEÆ.

Submerged monœcious slender fragile branched herbs. *Leaves* whorled, dichotomously cleft into filiform toothletted lobes; stipules 0. *Flowers* minute, axillary. sessile. MALE FL. solitary; perianth (or involucre) of 6–12 narrow subvalvate 2-fid segments; stamens 20–30, filaments very short; anthers erect, extrorse, connective at the top truncate or 2-toothed. FEM. FL. *Perianth* of the male. *Ovary* sessile, ovoid, 1-celled; style subulate, stigmatic on one side; ovule solitary, pendulous, orthotropous. *Fruit* a small coriaceous ovoid or ellipsoid somewhat compressed nut terminating in an elongate subulate style, and with a styliform spur projecting from above the base on either side. *Seed* exalbuminous; embryo straight, cotyledons thick, radicle very short inferior, plumule many-leaved. —Species one, very variable.

CERATOPHYLLUM, *Linn.*

CHARACTERS OF THE ORDER.

C. demersum, *Linn. Sp. Pl.* 992; *Gærtn. Fruct.* t. 44; *Boiss. Fl. Orient.* iv. 1202. C. verticillatum, *Roxb. Fl. Ind.* iii. 624; *Wight & Arn. Prodr.* 309.

Throughout INDIA and CEYLON, in tanks and still waters.—DISTRIB. All temp. and tropical countries.

Stem 8 in. to 3 ft., densely leafy, green. *Leaves* about 1 in. long, segments spreading in the water, collapsing in a tassel when removed, variable in thickness and amount of toothing. *Segments* of perianth (or involucre) subulate. *Fruit* very variable.—I have failed in establishing species amongst the dried specimens of the Indian forms of *Ceratophyllum*, but there are differences in those figured by Wight, that require to be verified by living specimens, and especially the simple and bifid segments of the perianth, and the truncate and bicuspidate connectives of the anthers. I find very great variety in the fruits upon which species have generally been founded, but in no Indian specimen have I seen the short lateral spines which are characteristic of the European species or variety *submersum*. The following are the principal Indian forms of fruit.

C. TUBERCULATUM, *Chamiss. in Linnæa* iv. 504, t. 5, f. 6 *d*; fruit ellipsoid

nearly smooth or tubercled, sides rounded, lateral spines deflexed, anthers 2-cuspidate. *Wight & Arn. Prodr.* 309; *Wight Ic.* t. 1948, t. 3; *Miquel Fl. Ind. Bat.* i. i. 800. C. indicum, *Herb. Willd.* C. demersum, *Klein mss.*—Chamisso's *C. oxyacanthum*, f. 6 b, is the smooth-fruited state of this.

C. MURICATUM, *Cham. l. c.* f. 6 c; fruit ellipsoid or ovoid more compressed winged wing toothed, surface tubercled, lateral spines horizontal or deflexed, anther (in Wight's figure) truncate. *Wight Ic.* t. 1948, f. 1, 2.—In Wight's fig. 1 the leaf segments are entire, in f. 2 they are denticulate, and the perianth segments of the male fl. are entire. C. platyacanthum, *Cham. l. c.* f. 6 a, seems to be this.

C. MISSIONIS, *Wall. Cat.* 7007; fruit ellipsoid compressed tubercled narrowly winged and wings toothed, lateral spines decurved, connective bicuspidate. *Wight Ic.* t. 1948, f. 4.

CLASS, GYMNOSPERMÆ.

ORDER CXLIII. **GNETACEÆ.**

Trees or shrubs; branches jointed at the nodes. *Leaves* opposite, large and green or minute scale-like, exstipulate. *Flowers* in axillary or terminal spikes or cones, monœcious or diœcious. MALE FL. tubular or of 2–4 sepals. *Anthers* 2–8, subglobose, 1–3-celled, sessile or subsessile on the top of a column formed of the connate filaments. FEM. FL. *Ovule* erect with 2 or 3 coats of which one is produced into a styliform tube with a discoid mouth. *Seed* dry or drupaceous, albumen copious or scanty; embryo straight, cotyledons appressed, radicle long superior.—Genera 3, species about 40, temperate and tropical.

Shrubs, leafless or nearly so	1. EPHEDRA.
Trees or shrubs with large green leaves	2. GNETUM.

1. **EPHEDRA,** *Linn.*

Erect or subscandent rigid shrubs, branches opposite or fascicled, terete, striate, with opposite scales at the nodes which are rarely produced into linear leaves. *Flowers* in the axils of the decussately opposite bracts of solitary or fascicled cones; bracts dry or fleshy in fruit, lower empty, upper 1-fld. MALE FL.; perianth of 2 opposite compressed membranous sepals; anthers 2–10, sessile or stipitate on the top of a column formed by the connate filaments, cells 2 globose. FEM. FL., a naked ovule with the outer coat produced into a styliform tube. *Seeds* usually oblong, plano-convex, testa dry.—Species 8 or 10, Europe, Temp. Asia, S. America.

It is impossible to define the limits of the West Asiatic species of *Ephedra* without careful observations on the living plants; young and old specimens of the same species appear to differ very considerably, as do individuals from localities differing in altitude and humidity. Dr. Aitchison's and Griffith's copious suites of specimens from Affghanistan and Beluchistan are very puzzling, and the forms (of *vulgaris?*) from the dry region of Tibet are no less so. I have many specimens from N.W. India that I do not know whether to refer to *vulgaris* or *pachyclada*.

1. **E. vulgaris,** *Rich. Conif.* 26 (*excl. figs.* a, D, E, F); branches rather slender erect striate nearly smooth, bracts connate to the middle not margined eciliate, anthers 6–10 sessile or subsessile. *Parlat. in DC. Prodr.* xvi. ii. 355; *Brand. For. Fl.* 501. E. distachya, *Linn.*; *Boiss. Fl. Orient.* v. 713. E. monostachya & distachya, *Linn. Sp. Pl.* 1040; *Reichb. Ic. Fl. Germ.* t. 539. E. Gerardiana, *Wall. Cat.* 6048; *Royle Ill.* 348; *Parlat. in DC. l. c.* 359. E. macrocephala, *Bertolon. Miscell.* xxiii. 17, t. 3.

TEMPERATE and ALPINE HIMALAYA and WESTERN TIBET in the drier regions, alt. 7–12,000 ft.; 12–16,000 ft. in Sikkim.—DISTRIB. Europe, W. and Central Asia.

A low-growing rigid tufted shrub with usually a gnarled stem and erect green branches, 6 in.–4 ft. *Spikelets* $\frac{1}{4}$–$\frac{1}{3}$ in., subsessile, often whorled; fruiting with often fleshy red succulent bracts, 1–2-seeded. *Seeds* biconvex or plano-convex.—I follow Brandis in referring *E. Gerardiana* to *vulgaris*. From its locality I suspect that Regel's *E. glauca* is the same as a common West Tibetan form.

2. **E. pachyclada,** *Boiss. Fl. Orient.* v. 713; branches rather stout erect striate scaberulous, bracts connate to the middle margined eciliate, anthers about 6 sessile or subsessile.

WESTERN HIMALAYA in the drier regions, and WESTERN TIBET, from Garwhal westwards, ascending to 15,500 ft., *Thomson, Edgeworth, Clarke,* &c.—DISTRIB. Affghanistan, E. Persia.

A rather tall shrub, described by Boissier from male plants alone; it is generally more robust than *E. vulgaris*, and more scabrid. Gilgit specimens collected by Clarke are very scabrid. I can find no good characters in the spikes and flowers except the more or less margined bracts.

3. **E. peduncularis,** *Boiss. Fl. Orient.* v. 717; scandent, branches slender, leaves often developed filiform, male catkins sessile or peduncled 6–20 fld., anthers sessile, fem. bracts 4 pairs ciliate, lower pairs confluent patelliform uppermost shortly 2-fid. E. Alte, *Brand. For. Fl.* 501, t. 69. E. alata (? *misprint for* Alte), *Edgew. in Journ. Linn. Soc.* vi. 194.

The PANJAB, RAJPOOTANA and SCINDE; Balewala, *Edgew.*; the Salt and Margulla Ranges, *Vicary, Fleming,* &c.—DISTRIB. Affghanistan to Syria.

A tall sarmentose climber, covering rocks and bushes, often glaucous; branchlets often fascicled and filiform, sometimes scaberulous. *Male catkins* often on a peduncle 1–1½ in., rarely axillary and fascicled, fem. peduncles often recurved. *Fruit* with often fleshy red bracts that sometimes are so large and juicy as to resemble grapes and be eatable.—Boissier distinguishes *peduncularis* from *Alte* by the minute male catkins, and slender recurved peduncles of the female, but these characters I find to be valueless, and I quite believe that these, together with *E. foliata*, Boiss., and *ciliata*, Fisch. & Meyer, will prove to be one species.

2. GNETUM, *Linn.*

Climbing monœcious or diœcious evergreen shrubs or erect trees, branches jointed. *Leaves* opposite, quite entire, penninerved. *Flowers* whorled in the axils of the cup-shaped bracts of axillary or terminal solitary or panicled spikes, often surrounded with jointed hairs. *Male fl.*; perianth narrowly clavate, entire or valvately 2-fld.; anther-cells 2, slits terminal. *Fem. fl.* (some imperfect); ovule ovoid or globose, inner integument produced into a slender exserted tube with often a toothed or fimbriate mouth. *Seed* drupaceous.—Species about 15, Tropical Asia, Africa, America and Pacific.

The species of this genus want further investigation; they are evidently very variable in foliage and in the size and form of the seed. I cannot identify several of the species enumerated in Griffith's "Notulæ," and of which analyses are given in his "Icones."

* *Ovary and seed sessile.*

1. **G. Gnemon,** *Linn. Mant.* 125; an erect monœcious tree or shrub, leaves from elliptic-lanceolate to broadly oblong acuminate or cuspidate; spikes solitary or panicled, hairs round the ovary white, seed ovoid acute sessile. *Endl. Conif.* 250; *Parlat. in DC. Prodr.* xvi. ii. 349; *Roxb. Fl.*

Ind. iii. 518; *Kurz in Flora* lv. (1872) 350; *For. Fl.* ii. 497; *Blume in Ann. Sc. Nat. Ser.* 2, ii. 105; *Rumph.* iv. 3, t. 176; *Miq. Fl. Ind. Bat.* ii. 1067; *Brongn. in Duperr. Voy. Bot.* 6, t. 1; *Wall. Cat.* 8025, 8026. G. Brunonianum, *Griff. in Lindl. Veg. Kingd.* 233; *Trans. Linn. Soc.* xxii. 308, t. 55, f. 9–20, and t. 56, f. 27, 28, 41, 43, 44–47; *Notul.* 30; *Kurz in Flora* lv. (1872) 349. G. Griffithii, *Parlat. l. c.* 349, 352.

KHASIA and MUNNIPORE HILLS, and southward to SINGAPORE.—DISTRIB. Malay Islands.

Usually a shrub, rarely a small tree, 10–15 ft. *Leaves* membranous or coriaceous, 4–8 in., very variable in length breadth and the number and direction of the nerves, which are either strong or faint, often brightly polished above, yellow green or brown when dry, base acute; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Spikes* about 1 in., slender; cupular bracts at length distant. *Seed* $\frac{1}{2}$ in. long, orange-cold., shining.—A very slender form from Tenasserim, also named *G. Brunonianum* by Griffith, is noted by him as being scandent. A specimen of apparently the same is in Wallich's herbarium from Penang, under No. 8024 B; it has pedicelled young fruit. These possibly may be a different species, but the flowering spikes do not differ from those of *G. Gnemon*.

2. **G. ? neglectum,** *Blume Rumph.* iv. 6, t. 175, f. 2, and t. 184; *Mus. Bot.* i. 28; a dicœcious climbing shrub, leaves rigidly coriaceous elliptic-oblong or -lanceolate obtusely cuspidately acuminate or apiculate, spikes solitary or panicled, hairs round the ovary rusty-red, seed sessile. *Parlat. in DC. Prodr.* xvi. ii. 350; *Kurz in Flora* lv. (1872) 350; *For. Fl.* ii. 496. G. microcarpum, *Blume Rumph. l. c.* t. 175, f. 1; *Mus. Bot. l. c.* 29. G. apiculatum, *Griff. in Trans. Linn. Soc.* xxii. 308, t. 55, f. 21, 24–26, and t. 56, f. 29–40; *Notul.* iv. 31.

ARRACAN and TENASSERIM, *Griffith*, &c. (*Kew Distrib.* 4972). PERAK, *Wray.* PENANG, *Wallich, Curtis.* MALACCA, *Griffith.*

An evergreen climber. *Leaves* 3–4 in., very variable, usually very glossy above, base rounded obtuse or acute, margins sometimes recurved; nerves very faint; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Spikes* short, fem. flowering $\frac{1}{2}$–$\frac{3}{4}$ in.; young fruiting 2 in.; young seeds very acuminate.—I am doubtful as to this being Blume's *G. neglectum*, which he figures with acutely acuminate leaves (and describes as "rarissime obtusiuscula") and fruiting spikes 6 in. long. Griffith (Linn. Soc. Trans. l. c.) gives "Silhet, Roxburgh," as a locality, but I have seen no specimens from so far north.

3. **G. macrostachyum,** *Hook. f.*; scandent, dicœcious, leaves large oblong or oblong-lanceolate very coriaceous base acute rounded or cordate, fem. spikes as thick as the finger hairs round the ovules brown.

SINGAPORE, *Hullett.* ? PENANG, *Curtis.* MALACCA, ? Mt. Ophir, *Maingay.*

Leaves; in Singapore specimens a lower pair are 8 by 4 in., cuspidate, with a cordate base; the upper are smaller, 7 by $2\frac{1}{2}$ in., acuminate, base acute, very coriaceous, shining on both surfaces and reticulate. *Young male spikes* $2\frac{1}{2}$ in. by $\frac{1}{3}$ in. diam.; fem. 4 in. long by $\frac{3}{4}$ in. diam.; cupular bracts short, close together, separated only by the profuse hairs. *Ovules* acuminate, quite glabrous. The Penang specimens are in ripe seed, have less coriaceous leaves narrowed into the petiole, and the very old solitary fem. rachis sessile with close articulations, and a sessile broadly ellipsoid seed $\frac{3}{4}$ in. long, with rounded base and top. The Mt. Ophir specimens are in young male fl. only. Possibly the Mt. Ophir and the Penang plant may not be the same as the Singapore one, of which the great fem. spikes are most remarkable. A drawing apparently of this species (in Herb. Kew) has oblong-lanceolate or oblanceolate acuminate leaves, short very stout fruiting spikes 8 in. long, and elliptic-oblong green sessile seeds $1\frac{1}{2}$ in. long, with both ends rounded; it is in a collection of drawings of Singapore plants (by Parry).

** *Seed stipitate.*

4. **G. scandens,** *Roxb. Fl. Ind.* iii. 518; a lofty dicœcious climber,

leaves oblong or ovate obtusely cuspidate, spikes in stiff brachiate panicles, hairs round the ovary rusty (when dry), seed gradually stoutly stipitate young often silvery scaly. *Parlat. in DC. Prodr.* xvi. ii. 351; *Griff. in Trans. Linn. Soc.* xxii. 309, t. 55, f. 1–8, 22, 23, and t. 56, f. 39, 40, 42; *Notul.* iv. 29; *Brand. For. Fl.* 502; *Grah. Cat. Bomb. Pl.* 188; *Dalz. & Gibs. Bomb. Fl.* 246. G. edule, *Blume Nov. Pl. Fam.* 31; *Rumph.* iv. 6; *Kurz in Flora* lv. (1872) 350; *For. Fl.* ii. 495; *Miq. Fl. Ind. Bat.* ii. 1068. G. gnemonoides and G. Ula, *Brongn. in Duperr. Voy. Bot.* 12. G. funiculare, *Wight Ic.* t. 1955 (*not of Blume*). G. pyrifolium, *Miquel in Herb. Hohenack.* No. 489. G. latifolium, *Parlat. l. c.* 350 (*not of Blume*). Thoa edulis, *Willd. Sp. Pl.* iv. 477.—Gnetum, *Wall. Cat.* 8023 and 8024.—*Rheede Hort. Mal.* vii. t. 22.

EASTERN TROPICAL HIMALAYA, from Sikkim eastwards, and from ASSAM to SINGAPORE and the ANDAMAN ISLANDS. The DECCAN; on the Ghats from the Concan to the Nilghiris.—DISTRIB. Malay Islands.

Trunk compressed, 4–5 ft. girth. *Leaves* 5–7 in., usually black when dry, smooth and shining, reticulations lax; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Male bracts* closely imbricate, fem. interrupted. *Fruiting spikes* 3–10 in. *Seed* oblong, 1–1½ in. long, terete, orange-cold., top rounded, narrowed into a very stout stipes about $\frac{1}{4}$ in. long, but often much shorter.—Kurz describes the ovarian hairs as rusty, Griffith as white. Neither Blume nor Roxburgh describes the silvery scales on the ovule and young seed, which Kurz relies on for distinguishing this from *G. funiculare.* In many specimens I find no trace of them. The Deccan specimens have stouter male spikes than the Eastern.

Var. ? *apoda*; seed small $\frac{3}{4}$ in. sessile.—Sikkim Himalaya in the Terai.—Perhaps a distinct species, but the specimens are very imperfect.

5. **G. funiculare,** *Blume Nov. Pl. Fam.* 32; *Ann. Sc. Nat. Ser.* 2, v. 2, 106; *Rumph.* iv. 7; a lofty diœcious climber, leaves oblong ovate or lanceolate cuspidate or apiculate shining finely reticulate beneath, spikes in stiff brachiate panicles, hairs round ovary rusty, seed quite glabrous suddenly stipitate, stipes slender. *Endl. Conif.* 252; *Parlat. in DC. Prodr.* xvi. ii. 351; *Kurz in Flora* lv. (1872) 350; *For. Fl.* ii. 496; *Miq. Fl. Ind. Bat.* ii. 1068; *Brongn. in Duperr. Voy. Bot.* 12. Abatua indica, *Lour. Fl. Coch.* 630.—Gnetum, *Wall. Cat.* 8024 C.

ASSAM, *Lister*; PEGU and BURMA, *Wallich, Kurz.*

Stem as thick as the arm (Kurz). *Leaves* 5–7 in., very variable in form and breadth, very shining brown or black when dry; base acute or obtuse; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Male bracts* hardly imbricate, fem. spikes twice as long as in *G. scandens,* bracts interrupted. *Seeds* $\frac{1}{2}$–$\frac{3}{4}$ in. long, oblong, apiculate, stipes $\frac{1}{4}$–$\frac{1}{3}$ in.

6. **G. macropodum,** *Kurz in Trimen Journ. Bot.* xiii. (1875) 331; a lofty climber, leaves broadly oblong or elliptic, fem. spikes rameal panicled, involucres cupular very short, hairs round ovule short ashy yellow, seed smooth obtuse apiculate, stipes $\frac{3}{4}$–1½ in. long slender.

NICOBAR ISLANDS; at Kamorta, *Kurz.*

Leaves 6–7 by 3½–4 in., base subacute, thinly coriaceous, conspicuously but laxly reticulate.—I have seen only fragmentary specimens. Kurz says it is very near *G. scandens,* differing in the less coriaceous leaves and very long stipes of the seed.

ORDER CXLIV. CONIFERÆ.

Trees or shrubs, wood-cells studded with disks. *Leaves* usually alternate, rigid, linear or subulate, rarely broad, solitary or fascicled in mem-

branous sheaths. *Flowers* monœcious or diœcious; males in deciduous catkins, females solitary or in cones. *Perianth* 0. *Male fl.* of many 1- or more-celled anthers, seated on the scales of the catkin, sessile or filaments connate. *Fem. fl.* of one or more sessile naked orthotropous or anatropous ovules, seated on a scale (an open carpellary leaf), which is free, or adnate to the scale (bract) of a cone. *Seeds* often winged, testa thick or thin, albumen densely fleshy; embryo axile, straight, cotyledons 2 or more, radicle terete often attached to a crumpled thread (suspensor).—DISTRIB. Genera 33, species about 300, chiefly in cold regions, very rare in Trop. Africa and America; absent in the Western Peninsula and Plains of India and in Ceylon.

Thuja orientalis, L. (Wall. Cat. 6047) is commonly cultivated in India.

It is unnecessary in this Order to cite under each species all the (chiefly) horticultural works in which the Indian Conifers are enumerated or described, and which add nothing to what is known of them beyond what the cited authorities give.

A. Ovules erect.

Tribe I. **Cupressineæ.** *Scales* of the fem. cone opposite, in several series. *Ovules* usually 2 or more on each scale. *Leaves* very short or subulate.

Scales of cone woody; testa winged . . . . . 1. CUPRESSUS.
Scales of cone cohering into a globose berry-like fruit, enclosing the seeds; testa hard, not winged . . . . . 2. JUNIPERUS.

Tribe II. **Taxodieæ.** *Scales* of fem. cone spirally crowded. *Ovules* 2 or more on each scale. *Leaves* scattered or distichous.

Leaves linear, distichous; seed large, drupe-like . . . . . 3. CEPHALOTAXUS.

Tribe III. **Taxeæ.** *Scales* of fem. cone or spike few, imbricate, all or the upper only ovuliferous. *Ovule* solitary on each scale, erect. *Leaves* scattered or bifarious.

Fem. cone minute, 1-fld.; seed seated in a symmetric fleshy cup; anthers connate in a whorl . . . . . 4. TAXUS.
Fem. spike 1–6-fld.; seed seated in a very oblique fleshy peduncle; anthers free . . . . . 5. DACRYDIUM.

B. Ovules reversed.

Tribe IV. **Podocarpeæ.** *Scales* of fem. cone very few, spirally crowded, often fleshy. *Ovule* 1 under each scale.

Seed on a fleshy stipes . . . . . 6. PODOCARPUS.

Tribe V. **Araucarieæ.** *Scales* of fem. cone many, spirally arranged in several series, bract and ovuliferous scale confluent as one scale.

Anther-cells 5 or more; ovules 1, rarely 2; seeds winged . . 7. AGATHIS.

Tribe VI. **Abietineæ.** *Scales* of fem. cone many, spirally arranged in several series; scale distinct from the bract beneath it.

Leaves persistent, in bundles of 2, 3, or 5, narrowly linear; scales of cone persistent . . . . . 8. PINUS.
Leaves persistent, in bundles of many, acicular; scales of erect cone deciduous . . . . . 9. CEDRUS.
Leaves scattered, not distichous, usually subulate, jointed on the branches; scales of reflexed cones persistent . . . 10. PICEA.

Leaves distichous, flat; scales of small reflexed cone persistent 11. TSUGA.
Leaves more or less distichous, linear; scales of large erect cone deciduous . . . . . 12. ABIES.
Leaves deciduous in bundles of many, acicular; scales of erect cones persistent . . . . . 13. LARIX.

1. **CUPRESSUS,** *Linn.*

Evergreen, monœcious trees or shrubs. *Leaves* opposite, small and scale-like, very rarely subulate, densely appressedly imbricate and decurrent. *Male fl.* a subsessile terminal column of decussately opposite 2–6-celled peltate anthers. *Fem. fl.* a globose or shortly oblong cone of 3–6 series of opposite peltate at length woody scales, with 4–6 erect ovules at the base of the 2nd and 3rd series. *Seeds* small, winged; testa coriaceous or hardened; cotyledons 2–4.—Species about 12, S.E. Europe, Temp. Asia and America.

C. glauca, *Lamk. Encycl.* ii. 243 (*DC. Prodr.* xvi. ii. 470; *Brand. For. Fl.* 534; *Dalz. & Gibs. Bomb. Fl. Suppl.* 83. C. lusitanica, *Mill. Gard. Dict.*; *Willd. Sp. Pl.* iv. 511), commonly known as the Goa Cypress, is extensively cultivated in the Western Ghats, and thence introduced into Portugal. It is doubtful whether it is referable to *C. torulosa* or *C. sempervirens.*—The Yunan *Libocedrus macrolepis*, Benth. (Gen. Pl. iii. 426) (*Calocedrus macrolepis*, Kurz in Trimen Journ. Bot. (1873) 196, t. 133), with elongate cylindric cones and flattened branches, may be expected to be found in the mountains of N.W. Burma.

1. **C. torulosa,** *Don Prodr.* 55; crown broadly pyramidal, branches spreading tips pendulous, leaves triangular-ovate obtuse, cones sessile erect $\frac{1}{2}$ in. diam. bluish, scales rugose, seeds narrowly winged. *Endl. Conif.* 58; *Parlat. in DC. Prodr.* xvi. ii. 469; *Wall. Cat.* 6046; *Brand. For. Fl.* 533; *Gamble Man. Ind. Timb.* 410; *Griff. Itin. Notes* 240; *Ic. Pl. Asiat.* t. 372.

WESTERN HIMALAYA; from Nepal to Chamba, alt. 5500–8000 ft., on dry slopes.

A tree, attaining 150 ft., and girth of trunk 17 ft.; branches with the leaves on terete or obscurely 4-angled. *Leaves* $\frac{1}{20}$ in. long, with an oblong gland on either side of the midrib. *Anthers* 3–4. *Scales of cone* 8–10, umbonate, 4–6-ovuled. *Seeds* nearly orbicular, nucleus convex on both sides, not angled.—Though described as with spreading branches in a wild state, all the specimens cultivated at Kew are fastigiate.

C. SEMPERVIRENS, *Linn. Sp. Pl.* 1002; crown (in India-grown specimens) narrowly cylindrical, branches and their tips erect, leaves ovate-oblong, cones scattered peduncled 1 in. diam. globose or oblong, scales tubercled, seeds angled and narrowly winged. *Gærtn. Fruct.* ii. t. 91; *Richard Conif.* t. 9; *Brand. For. Fl.* 533; *Gamble Man. Ind. Timb.* 411; *Boiss. Fl. Orient.* v. 705. C. Roylei, *Carr. mss.* C. sempervirens, *var.* indica, *Parlat. in DC. Prodr.* xvi. ii. 468. C. pyramidalis, *Targ. Obs. Dec.* iii. v. 53. C. fastigiata, *DC. Fl. Franc.* v. 336. C. horizontalis, *Mill.* & fastigiata, *DC.*, *Endl. Conif.* 56, 57. C. Whitleyana, *Carr. Conif.* 128; *Gord. Pinet.* 72, *Suppl.* 27. C. Doniana, *Hort.*

NORTH-WEST INDIA; planted only.—DISTRIB. The horizontally branched var. is wild in N. Persia, Syria and Asia Minor; the fastigiate is only known in cultivation.

A tall tree, attaining 100 ft., and 9 ft. girth of trunk; branches with the leaves 4-angled. *Leaves* ovate-oblong, convex with a gland on either side. *Anthers* about 4.

Scales of cone 3–14, usually with a short horn or boss. *Seeds* ovoid or oblong, nucleus angle d.—Parlatore separates the Indian form as a variety with globose cones, and umbonate scales mucronate at the tip.

C. FUNEBRIS, *Endl. Conif.* 58; crown very broadly pyramidal, branches horizontal branchlets pendulous distichous compressed, leaves ovate acute, cones small $\frac{1}{4}$–$\frac{1}{2}$ in. diam., scales rugulose, seeds angled and broadly winged. *Parlat. in DC. Prodr.* xvi. ii. 471; *Brand. For. Fl.* 534; *Gamble Man. Ind. Timb.* 410; *Flore des Serres* vi. 90 with fig. C. pendula, *Staunton, Embass. to China* ii. 525, t. 41; *Griff. Itin. Notes* 131, 143, No. 679 a; *Lamb. Pin. Ed.* 2, 124, t. 66.

Planted near Buddhist temples in NEPAL, SIKKIM and BHOTAN, alt. 4–8000 ft.—DISTRIB. Wild in China.

A very handsome tree, attaining 60 ft., remarkable for its wide-spreading branches, and pendulous distichous branchlets.—*C. pendula* is the first name given to this species, but it was preoccupied for *Thuja pendula*, Lamb., the *Biota pendula*, Endl., which genera are now reduced to *Cupressus*.

2. **JUNIPERUS,** *Linn.*

Characters of *Cupressus*, but leaves more often subulate and 3-nately whorled, scales of cone fleshy and coherent or connate in fruit, and seeds with a thick hard testa and often connate into a hard several-celled mass.—Species about 25; temperate and cold regions of the N. Hemisphere.

1. **J. communis,** *Linn. Sp. Pl.* 1040; shrubby erect or decumbent, leaves $\frac{1}{4}$–$\frac{3}{4}$ in. all oblong-lanceolate or subulate pungent base narrowed flat or concave above convex or keeled beneath, fruit subglobose about 3-seeded. *Endl. Conif.* 15; *Parlat. in DC. Prodr.* xvi. ii. 479; *Wall. Cat.* 6044; *Brand. For. Fl.* 535; *Gamble Man. Ind. Timb.* 411; *Boiss. Fl. Orient.* v. 707; *Richard. Conif.* 33, t. 5; *Reichb. Ic. Fl. Germ.* t. 535. J. nana, *Willd. Sp. Pl.* iv. 854.

WESTERN HIMALAYA, from Kumaon westward, alt. 5500 to 14,000 ft.—DISTRIB. Temperate and Subarctic Europe, Asia, N. Africa, and N. America.

A bush in the Himalaya, rarely 6–7 ft., prostrate at high elevations with broader leaves; foliage grey green. *Leaves* crowded. *Fruit* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., blue black, glaucous, with scarious empty scales at the base.—The common Juniper.

2. **J. pseudo-sabina,** *Fisch. & Mey. Ind. Sem. Hort. Petrop. Animad.* 65; a robust shrub or tree, leaves dimorphous, those on the lower branches linear pungent, those on the terminal branchlets 4-farious closely imbricate appressed, fruit erect ovoid $\frac{1}{4}$–$\frac{2}{3}$ in., endocarp very thick bony 1-seeded, seed slender. *Endl. Conif.* 21; *Parlat. in DC. Prodr.* xvi. ii. 482; *Ledeb. Fl. Ross.* iii. 682. J. excelsa, *Wall. Cat.* 6041 (not of Bieb.). J. Wallichiana, *Hook. f. & Thoms. Herb. Kew*; *Brand. For. Fl.* 537; *Gamble Man. Ind. Timb.* 412. J. sabina? *Herb. Ind. Or. H. f. & T.* J. indica, *Bertoloni Miscell.* xxiii. 16, t. 1.

TEMPERATE HIMALAYA, from Kashmir to Bhotan, and WESTERN TIBET, alt. 9–15,000 ft.—DISTRIB. Siberia, Soongaria.

A bush in the N.W. Himalaya; a tree, 60 ft., in Sikkim, with stout trunk and black thick ramification and foliage. *Largest leaves* $\frac{1}{3}$ in., rather spreading, the smaller $\frac{1}{10}$ in., rhombic ovate, closely imbricate, tips free, back obtusely keeled.

Fruit black or blue shining, not glaucous.—Brandis points out that this differs from the description of the Siberian plant in the fruit not being recurved. Bertoloni's figure of *J. indica* is a very poor one, but I think it is of this species. I have seen no specimens of the Siberian and Soongarian plants.

3. **J. recurva,** *Ham. in Don Prodr.* 55; a glaucous blue prostrate or erect bush or small tree with fastigiate branches, which are decurved and ascending with pendulous branchlets in large plants, leaves subulate imbricate appressed, back convex, fruit $\frac{1}{3}$–$\frac{1}{2}$ in. ovoid. *Endl. Conif.* 18; *Parlat. in DC. Prodr.* xvi. ii. 481; *Griff. Notul.* iv. 26; *Ic. Plant. Asiat.* t. 373, 374; *Wall. Cat.* 6042; *Brand. For. Fl.* 536; *Gamble Man. Ind. Timb.* 412; *Boiss. Fl. Orient.* v. 708. J. squamosa, *Ham. in Wall. Cat.* 6043.

TEMPERATE and ALPINE HIMALAYA, alt. 7500–15,000 ft.—DISTRIB. Affghanistan.

As a tree attains 30 ft., with a straight trunk, conical crown and pendulous branchlets; at higher elevations it becomes stunted, and in alpine or exposed situations passes into

VAR. *squamata,* Parlat. in DC. l. c. 482; a decumbent or prostrate bush, leaves broader often incurved. J. squamata, *Ham. in Lamb. Pin. Ed.* i. ii. 17; *Don Prodr.* 55; *Endl. Conif.* 18. J. densa, *Gord. Pinet. Suppl.* 32. J. Lambertiana & rigida, *Wall. mss.* J. religiosa, *Royle Ill.* 350 (*name only*).

4. **J. macropoda,** *Boiss. Fl. Orient.* v. 709; a small tree, branchlets subdistichous slender, leaves dimorphic, of the lower branches subulate pungent, of the upper and branchlets scale-like imbricate closely appressed ovate acute with a dorsal large gland, male catkins on a scaly peduncle, fruit subglobose $\frac{1}{4}$ in. diam. black glaucous 2–5-seeded, tips of the scales forming transverse crests. J. excelsa, *Brand. For. Fl.* 538, t. 68, and *Wall. Cat.* 6041 (not of Bieb.); *Gamble Man. Ind. Timb.* 412. J. gossainthaneana, *Loddig. Cat.* 1836, 48; *Loud. Encycl.* 1090.

Inner drier ranges of the HIMALAYA, from Nepal westward, and WESTERN TIBET, alt. 5–14,000 ft.—DISTRIB. Affghanistan, Beluchistan, Persia, Arabia.

A tree, attaining 50 ft., with girth of trunk over 33 ft.; branchlets like those of *Cupressus torulosa,* trunk generally gnarled; foliage light green.—The above notes are from Brandis. Boissier distinguishes this from *J. excelsa* by the scaly peduncles of the male catkins, and the crest-like tips of the scales of the fruit, and the fewer seeds. I doubt its proving distinct from *J. excelsa,* Bieb.

3. CEPHALOTAXUS, *Sieb. & Zucc.*

Evergreen yew-like diœcious shrubs or trees. *Leaves* alternate, distichous, linear, flat, often falcate. *Male fl.* in axillary globose heads of 1-fld. scales; anthers few, subsessile, cells 2–4 deflexed; connective with an incurved claw. *Fem. cone* terminal, small, ovoid, sessile or peduncled, surrounded with imbricating bracts; ovuliferous scale adnate to the bract, 2-ovuled; ovules erect. *Seed* large, drupe-like, ellipsoid or globose; testa fleshy without, hard within; albumen hard, fleshy; cotyledons 2.—Species about 6, Eastern Asia, China and Japan.

1. **C. Mannii,** *Hook. f. Ic. Pl.* t. 1523; leaves linear acuminate subfalcate green beneath.

KHASIA MTS.; in the Lankhla Woods, alt. 5000 ft., *G. Mann, Clarke.*

A small tree. *Leaves* 2 by $\frac{1}{8}$–$\frac{1}{6}$ in., shining above, paler beneath, base acute or obtuse, margins recurved when dry; midrib stout on both surfaces. *Male heads*

globose, peduncle scaly; anthers about 12, mucronate. *Fem. cones* 3–4, on a common peduncle, pedicelled; bracts adnate, ovate, obtuse. *Seed* 1½ in. long, obovoid-oblong, mucronate, narrowed at the base.

2. **C. Griffithii,** *Hook. f.*; leaves linear acuminate falcate white beneath, base rounded.

UPPER ASSAM; Mishmi Hills, alt. 6000 ft., *Griffith* (*Kew Distrib.* 5000). MUNNIPORE, *Watt.*

Very similar in a dried state to *C. Mannii*, but the leaves are white beneath.—I have seen no fruit. The plant has long been cultivated at Kew, having been sent from the Calcutta Botanical Garden by Dr. Thomson.

4. **TAXUS,** *Tournef.*

Evergreen diœcious (rarely monœcious) trees or shrubs with very tough wood. *Leaves* bifarious, linear, obtuse acute or acuminate, 1-nerved. *Male fl.* a pedicelled whorl of 3–8 anther-cells on a peltate scale. *Fem. fl.* a single erect orthotropous ovule, terminating a short peduncle clothed with imbricating scales, and seated on a thick scale that enlarges as a fleshy red cup. *Seed* ovoid, subcompressed, testa hard; cotyledons 2, radicle superior.—Species one, variable; or several differing only in foliage, all N. temperate.

T. baccata, *Linn. Sp. Pl.* 1040; leaves more or less falcate acute or acuminate, paler beneath. *Endl. Conif.* 242; *Parlat. in DC. Prodr.* xvi. ii. 500; *Wall. Cat.* 6055; *Brand. For. Fl.* 539; *Gamble Man. Ind. Timb.* 413; *Boiss. Fl. Orient.* v. 711. T. nucifera, *Wall. Tent. Fl. Nep.* 44, t. 57 (*excl. syn.*); *Cat.* 6054 (not of Kæmpfer). T. virgata, *Wall. mss.* T. Wallichiana, *Zucc. in Abhandl. Bayr. Akad. Classe Math. Phys.* iii. 803, t. 5; *Endl. l. c.* 244. T. orientalis, *Bertoloni Misc.* xxiii. 17, t. 2. T. nepalensis, *Jacquem. mss.* T. contorta, *Griff. Itin. Notes* 351, No. 536; *Notul.* iv. 128; *Ic. Pl. Asiat.* t. 376.

TEMPERATE HIMALAYA, alt. 6–11,000 ft. KHASIA HILLS, alt. 5000 ft. UPPER BURMA.—DISTRIB. N. and Temperate E. Asia, all Europe, N. Africa, N. America.

A tree, in the Himalaya attaining 100 ft., and 20 in girth of trunk; branches spreading; bark thin, flaking. *Leaves* ⅓–1½ in., dark green, coriaceous. *Fruit* ⅓ in. long, ovoid; cup mucilaginous, sometimes concealing the olive-green seed.—Bertoloni's *T. orientalis* is a narrow long-leaved form from Sikkim, collected by myself.

5. **DACRYDIUM,** *Soland.*

Evergreen diœcious trees or shrubs. *Leaves* either scale-like and 4-fariously imbricate, or distichous scattered and subulate, both forms sometimes on the same branch. *Male fl.* small, sessile, at the tips of the branches; anthers spirally crowded on a short stipes; cells 2, globose, deflexed, connective with an apical claw. *Fem. fl.* in small lax spike-like cone; ovuliferous scale free, concave or cup-shaped, at length exceeding the bract; ovule 1, erect or oblique. *Seed* small, ovoid, erect, longer than the cup-shaped enlarged ovuliferous scale; testa hard, striate; albumen not ruminate.—Species about 12, Malayan, Australasian and Pacific.

D. elatum, *Wall. Cat.* 6045; leaves of two forms, some on the

barren branchlets acicular 4-angled subpungent, those on the fruiting branchlets small closely imbricate ovate-oblong obtuse or mucronate, male spikes cylindric. *Endl. Conif.* 226; *Parlat. in DC. Prodr.* xvi. ii. 494; *Kurz For. Fl.* ii. 499; *Hook. Lond. Journ. Bot.* ii. (1843) 144, t. 2; *Blume Rumph.* iii. 221, t. 172; *Miquel Fl. Ind. Bat.* ii. 1075. Juniperus elata, *Roxb. Fl. Ind.* iii. 838. J. Phillippsiana & rigida, *Wall. mss.*

TENASSERIM ? *Kurz.* PENANG, *Wallich.* MALACCA; on Mount Ophir, *Griffith, Lobb.* SINGAPORE, *Schomburgk.*—DISTRIB. Sumatra, Borneo, Cambodia.

A lofty pyramidal tree with spreading branches and weeping branchlets. Barren *branchlets* in brush-like clusters, $\frac{1}{2}$–$\frac{3}{4}$ in. diam., densely clothed with erect subulate or acicular shining subulate or acicular deeply-grooved shiny leaves, $\frac{1}{3}$–$\frac{2}{3}$ in. long; fertile branchlets very slender, terete, clothed with minute imbricating triangular-ovate obtuse leaves $\frac{1}{30}$ in. long; branchlets with leaves of all sizes and forms between these extremes occur. *Seeds* scattered on the sides of the fertile branchlets, $\frac{1}{6}$ in. long, ovoid, obliquely seated on the shallow cup-like scale.

6. **PODOCARPUS,** *L'Herit.*

Evergreen, monœcious or diœcious trees or shurbs. *Leaves* opposite or alternate, scattered and linear or distichous, or broad and oblong with a midrib or with parallel nerves, or of two forms on the same branch some scale-like and imbricate, others distichous linear or subulate. *Male fl.* solitary, fascicled or spicate, with imbricate bracts; anthers sessile, spirally crowded; cells 2 parallel, slits extrorse or lateral; connective with an apical claw or appendage. *Fem. fl.* solitary or few and spicate; bract forming a peduncle to the also fleshy ovuliferous scale; ovule adnate to the scale, reflexed. *Seed* small, globose or ovoid, seated on an enlarged fleshy peduncle (scale and bract); testa hard, often fleshy without; albumen fleshy; cotyledons 2.—Species about 40, tropical and S. temperate.

The *P. chinensis,* Wall. Cat. 6057, from the Calcutta Garden, is referred by Maximovicz (Diagn. viii. 562) to a variety (*β. chinensis*) of the *P. macrophylla,* Don.

1. **P. latifolia,** *Wall. Pl. As. Rar.* i. 26, t. 30; *Cat.* 6050; leaves opposite and subopposite oblong to lanceolate acute or acuminate ecostate many-nerved. *Endl. Conif.* 208; *Parlat. in DC. Prodr.* xvi. ii. 508; *Gamble Man. Ind. Timb.* 414; *Bedd. Sylv. Madr.* t. 257; *Hook. Lond. Journ. Bot.* i. (185) 658, t. 23; *Miq. Fl. Ind. Bat.* ii. 1071. P. agathifolia, *Blume Rumph.* iii. 217, t. 173. Nageia latifolia, *Gord. Pinet.* 138; *Kurz For. Fl.* ii. 500.

The KHASIA MTS., alt. 3000 ft. Hill forests of BURMA and the MALAY PENINSULA. SOUTH DECCAN; Tinnevelly, alt. 3–5000 ft., *Beddome.*—DISTRIB. Java.

An evergreen glabrous tree, attaining 80 ft., with aromatic wood. *Leaves* 4–7 by $\frac{1}{2}$–2 in., very coriaceous, acute at both ends; nerves very many, close and slender; petiole 0–$\frac{1}{4}$ in. *Male spikes* $\frac{1}{2}$ in. long, 2–5 together, sessile or on a short peduncle; bracts ovate, acuminate, denticulate. *Seeds* solitary, subglobose, $\frac{3}{4}$ in. diam., blue-black, seated on a cylindric fleshy scaly peduncle.—Foliage of *Agathis loranthifolia.*

2. **P. neriifolia,** *Don in Lamb. Pin. Ed.* 1, 122, *Ed.* 3, 74; leaves scattered linear or linear-lanceolate obtuse acute or acuminate 1-nerved. *Endl. Conif.* 215; *Parlat. in DC. Prodr.* xvi. ii. 514; *Brand. For. Fl.* 541; *Brown in Benn. Fl. Jav.* 40; *Flor. des Serres,* viii. 49, t. 768. P. bracteata,

Blume Enum. i. 881; *Rumph.* iii. 214, t. 172, f. 1; *Parlat. l. c.* 515; *Gamble Man. Ind. Timb.* 414. P. polystachya, *Brown l. c.* 40; *Parlat. l. c.* 515; *Endl. l. c.* P. macrophylla, *Wall. Cat.* 6052. Nageia bracteata, *Kurz For. Fl.* ii. 501.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3000 ft., *J. D. H.* KHASIA HILLS and forests of BURMA, the MALAY PENINSULA and ANDAMAN ISLANDS.—DISTRIB. Java, Sumatra, Borneo.

A glabrous evergreen tree. *Leaves* 4–8 in. (in saplings to 8 in.), coriaceous, straight or falcate, base narrowed, midrib prominent on both surfaces; petiole $\frac{1}{6}$–$\frac{1}{2}$ in. *Male spikes* 1 in., solitary or clustered, sessile, cylindric, surrounded at the base by broad acute keeled bracts. *Seeds* solitary, globose, $\frac{1}{4}$–$\frac{1}{3}$ in. diam., seated on an oblong fleshy peduncle.

3. **P. cupressina,** *Br. ex Mirb. in Mem. Mus.* xiii. 75, and in *Benn. Fl. Jav.* 35, t. 10; leaves on older branches minute quadrifarious lanceolate mucronate keeled, on the younger distichous spreading linear and falcate or compressed and tetragonous. *Endl. Conif.* 222; *Blume Rumph.* iii. 218, t. 172, f. 2, and 172 B, f. 2. P. imbricata, *Blume Enum.* 89. P. Horsfieldii, *Wall. Cat.* 6049.

UPPER BURMA; at Bhamo, *Griffith.* MALACCA; on Keddah Peak, *Griffith.* PENANG, *Wallich, Maingay* (*Kew Distrib.* 1501).—DISTRIB. Malay Islands.

A lofty tree. *Branchlets* of 3 forms; (1) short, flat, feather-like, 1–2 in. long, with a slender rachis and close-set distichous horizontally-spreading linear falcate acuminate shiny leaves $\frac{1}{3}$–$\frac{1}{2}$ in. long; (2) terete, filiform branchlets, clothed with minute imbricate ovate acute leaves $\frac{1}{20}$ in. long; (3) stouter, terete, fruiting branchlets with subulate leaves $\frac{1}{10}$–$\frac{1}{3}$ in. long. *Seeds* globose, $\frac{1}{4}$ in. diam., on short decurved lateral branchlets.

7. AGATHIS, *Salisb.*

Evergreen monœcious or diœcious trees. *Leaves* coriaceous, broad, nerves parallel. *Male fl.* solitary, peduncled; peduncle clothed with decussate imbricate scales; anthers densely spirally crowded in a cylindric or oblong column; cells 5 or more, pendulous from the top of a rigid stipes, slits introrse; connective with an apical inflexed claw. *Fem. cone* ovoid or globose; scales closely spirally imbricate, tips broad; ovuliferous scale thin and confluent with the scale; ovules 1, rarely 2, reversed and adnate to the scale. *Ripe cone* globose or oblong; scales hard, broad, persistent. *Seed* 1 on one side of the scale (rarely 2 perfect), reversed, compressed, ovate or oblong, testa thin winged; albumen fleshy; cotyledons 2.—Species about 6, Malayan, Australasian and Polynesian.

A. loranthifolia, *Salisb. in Trans. Linn. Soc.* viii. 312, t. 15; leaves petioled subopposite or alternate oblong-lanceolate to linear-lanceolate obtuse, anther-cells with an orbicular cuneate claw, fem. cones subglobose, scales rounded, wing of seed horizontal. *Wall. Cat.* 6057; *Blume Enum. Fl. Jav.* 90. A. Dammara, *Rich. Conif.* 83, t. 19. Dammara alba, *Rumph. Herb. Amb.* ii. 174, t. 57; *Parlat. in DC. Prodr.* xvi. ii. 374. D. orientalis, *Lamb. Pin. Ed.* 2, ii. 97, t. 54; *Endl. Conif.* 189. D. Rumphii, *Presl. Epimel.* 236. Abies Dammara, *Poiret. Dict.* v. 35.

PENANG, *Wallich, Maingay* (*Kew Distrib.* 1500 ft.). PERAK; at Larut, *Low.*—DISTRIB. Malay Islands.

A lofty resiniferous tree, with a pyramidal crown and whorled branches. *Leaves* 3–7 in., usually opposite, very coriaceous, obtuse, acute, or tip rounded, very like those of *Podocarpus latifolia*, ecostate, very many-nerved. *Male cones* $\frac{1}{2}$–2 in.,

cylindric-oblong. *Fem. cone* 1–2 in. diam., globose or ovoid; scales broadly cuneate, ½ in. across. *Seeds* ⅓ in. long, including the falcate decurved obtuse wing.—Dammar.

8. **PINUS,** *Linn.*

Evergreen monœcious trees. *Leaves* dimorphic, primary consisting of small membranous scales, secondary linear in clusters of 2, 3, or 5 in the axils of the primary; clusters girt at the base by a sheath of hyaline scales. *Male fl.* spicate; staminal column ovoid oblong or cylindric; anthers in many series, shortly stipitate; cells 2; connective produced at the tip. *Fem. cones* globose or ovoid, bracts spirally imbricate; ovuliferous scale much larger than the bracts; ovules 2, at the base of the scale, reflexed. *Ripe cone* ovoid or oblong, bracts obsolete or small; scales persistent, formed of the enlarged thickened usually woody ovuliferous scales the tips of which are often square and with a boss. *Seeds* 2, reversed, usually winged, the wing formed by the adhesion of the hard testa to a thin separable layer of the scale; cotyledons 2 or more.—Species 70, confined to the Northern Hemisphere, very rare in its tropics.

Pinus Royleana, Jameson in Journ. Hort. Soc. Lond. ix. 52, with a woodcut (Parlatore in DC. Prodr. xvi. ii. 390), a species which on the authority of Royle is a native of the Nepal Himalaya, alt. 8–10,000 ft., is referred by Gordon (Pinetum Ed. 2, 170) to *P. mitis* of N. America, and if it came from Nepal was no doubt from the Residency Garden. *P. nepalensis*, Royle (*P. Latteri*, Madden mss.), is *P. Pinaster*, also no doubt from the Residency Garden. *P. nepalensis*, Forbes, Pinet. Woburn. 34, referred by Endlicher to *P. sinensis*, and by Parlatore l. c. to *P. Kasya*, is known only from Forbes's insufficient description, which states that it is a very tender species, a native of Nepal, procured for Messrs. Lawson of Edinburgh, with leaves in pairs, occasionally in threes or fours, glaucous when young, green when old. Neither flower nor fruit are known; and it is not worth further notice. Wallich's "Pinus No. 7278 an *P. Pinea*," from specimens cultivated in Nepal or Kumaon, is one of above.

* *Leaves in clusters of* 5–8.

1. **P. excelsa,** *Wall. Pl. As. Rar.* iii. t. 201; *Cat.* 6059 (by error 5059); leaves 4–8 in. slender drooping, sheaths and primary leaves deciduous, cones peduncled cylindric penduious, scales rhomboidly ovate hardly thickened at the rounded apex, seeds oblong, wing subfalcate obliquely truncate. *Endl. Conif.* 145; *Parlat. in DC. Prodr.* xvi. ii. 404; *Griff. Notul.* iv. 18 (*Itin. Notes* 123, No. 398); *Ic. Pl. Asiat.* 366; *Brand. For. Fl.* 510; *Cleghorn Pines of N.W. Himal.* t. 2; *Gamble Man. Ind. Timb.* 398; *Lamb. Pin. Ed.* 2, 40, t. 26. P. pendula, *Griff. Journ.* 211, &c. P. Griffithii, *M'Clelland in Griff. Notul.* iv. 17 (*Itin. Notes* 145, No. 21?); *Ic. Pl. Asiat.* t. 365.

Temperate Himalaya, alt. 6–12,500 ft. (absent in Central and N.W. Kumaon and in Sikkim).—Distrib. Affghanistan, Macedonia?

A lofty symmetrical tree, attaining 150 ft. *Leaves* filiform, triquetrous, grey- or blue-green, margins serrulate, white on two of the faces, falling in the second or third year; sheaths ¾ in., wholly deciduous, entire. *Male spikes* short cylindric-oblong. *Cone* 6–10 in.; scales concave. *Seeds* about 1 in., cotyledons usually 9.—The *P. Peuce* of Macedonia is hardly distinguishable by definable character in a dry state. *P. Griffithii*, M'Clelland, is founded on Griffith's drawing of the ripe cone of *P. excelsa*.

** *Leaves in clusters of* 3.

2. **P. longifolia,** *Roxb. Fl. Ind.* iii. 651; leaves 9–12 in. slender triquetrous, back obtuse, sheaths persistent, cones peduncled ovoidly conical, scales with a greatly thickened 4–6-lobed tip which is beaked in the centre, seeds oblong with an oblanceolate unequal-sided wing. *Endl. Conif.* 158; *Pariat. in DC. Prodr.* xvi. ii. 390; *Royle Ill.* 353, t. 85, f. 1; *Lamb. Pin. Ed.* 2, 32, t. 22; *Wall. Cat.* 6065; *Brand. For. Fl.* 506; *Cleghorn Pines of N.W. Himal.* t. 3; *Gamble Man. Ind. Timb.* 396; *Griff. Notul.* iv. 18; *Ic. Pl. Asiat.* t. 369, 370.

Outer Himalayan Ranges, from the Indus to Bhotan, alt. 1500–6000 ft., and to 7500 ft. in Kumaon.—Distrib. Affghanistan.

A large tree, attaining 110 ft., but often stunted and gnarled; trunk usually naked, rarely 12 ft. girth; bark very thick and furrowed. *Leaves* dark or light green, serrulate, falling about the third to fourth year; sheaths fimbriate. *Male spikes* cylindric. *Cones* solitary or clustered, 4–7 by 3 in. diam. at the base; scales $1\frac{1}{2}$–2 by $\frac{3}{4}$ in., beak pungent or obtuse. *Seeds* with the wing $\frac{1}{2}$–1 in. *Cotyledons* about 12.

3. **P. Khasya,** *Royle in Gardn. Mag.* 1840, 8; leaves 5–9 in. semiterete grooved above, sheaths persistent, cones long-peduncled ovoid, tips of scales thickened flat or convex transversely keeled, seeds with an oblong wing. *Parlat. in DC. Prodr.* xvi. ii. 390; *Brand. For. Fl.* 508. P. Kasya, *Kurz For. Fl.* ii. 499; *Gamble Man. Ind. Timb.* 397. P. Khasyana, *Griff. Notul.* iv. 18 (*Itin. Notes* 58, No. 901); *Ic. Plant. Asiat.* t. 367, 368; *Hook. f. Himal. Journ.* ii. 282. P. Keseya, *Royle ex Endl. Conif.* 158.

Khasia, Chittagong and Burmese Hills, alt. 3–7000 ft.

Usually a small tree in the Khasia, but in Burma attaining 200 ft., with a trunk 10 ft. in girth; bark very thick and cracked. *Leaves* very slender, green, serrulate; sheaths $\frac{1}{2}$–$\frac{3}{4}$ in. *Cones* 2–3 in., young recurved; peduncle bracteate. *Seeds* $\frac{2}{3}$ in. long with the round-topped wing.

4. **P. Gerardiana,** *Wall. in Lamb. Pin. Ed.* 3, t. 79; *Cat.* 6064; leaves stout 3–5 in. stiff compressed and triquetrous, sheaths and bracts deciduous, cones peduncled ovoid or oblong-ovoid tips of scales broad obtusely triangular with a recurved spine from the upper margin, seeds cylindric wing short caducous. *Endl. Conif.* 159; *Parlat. in DC. Prodr.* xvi. ii. 391; *Royle Ill.* 353, t. 85, f. 2; *Brand. For. Fl.* 508, t. 67; *Cleghorn Pines of N.W. Himal.* t. 4.

Dry interior valleys of the N.W. Himalaya, alt. 5800–12,000 ft., from Kunawur westwards, and in Garwhal.—Distrib. Affghanistan.

A tree, attaining 60 ft., with a stout trunk sometimes 12 ft. in girth, and a roundish head; branches horizontal or decurved, tips ascending; bark smooth, often silvery, deciduous in long flakes. *Leaves* dark green, persistent for 3–4 years, serrulate; sheaths $\frac{1}{2}$ in., entire. *Cones* 6–9 by 4–5 in., glaucous, young erect, peduncle 1 in., bracteate. *Seeds* 1 in. long.

*** *Leaves* 2 *in a sheath.*

5. **P. Merkusii,** *Jungh. & De Vriese in Plant. Nov. Ind. Bat. Or.* 5, t. 2; leaves 8–10 in. slender semiterete grooved above, sheaths persistent, cones ovoid-oblong, scales with thickened 4–5-angled pyramidal tips and a transverse ridge and depressed scars. *Endl. Conif.* 176; *Parlat. in DC. Prodr.* xvi. ii. 389; *Kurz For. Fl.* ii. 499; *Gamble Man. Ind. Timb.* 398; *De Boer Conif. Archip. Ind.* 5; *Blume Rumph.* iii. 210; *Miq. Fl. Ind. Bat.* ii. 1069. P. sumatrana, *Jungh. in Bot. Zeit.* (1846) 698. P. Finlaysoniana,

Wall. Cat. 6062. P. Latteri, *Mason in Journ. As. Soc. Beng.* xviii. (1849) 74, and *Burma*, 545; *Kurz in Flora*, 1872, 264.

MARTABAN and UPPER TENASSERIM, alt. 500–2500 ft., *Kurz*. TENASSERIM; on Thoungyong, alt. 3–4000 ft., *Riley*.—DISTRIB. Sumatra, Borneo.

A tree, 50–60 ft. in Burma (60–100 ft. in Sumatra). *Leaves* quite smooth, slender; sheaths $\frac{1}{3}$ in. long, fimbriate. *Cones* about 3 in., erect, scales with a pyramidal boss, and small transverse rough scar.—Kurz describes the tips of the cone scales as "not zonate, with a depressed umbonate tubercle." Parlatore adds "radiation rugose."

9. **CEDRUS,** *Loud.*

Large trees, evergreen. *Leaves* triquetrous, in dense clusters, acicular, jointed near the base. *Cone* of *Pinus*, but scales deciduous, leaving a columnar axis.—Species 1, with three marked forms, a Himalayan, an Oriental, and an Algerian.

C. Libani, *Barrel.*, var. DEODARA, *Hook. f. Himal. Journ.* i. 257, and in *Nat. Hist. Rev.* (1861) ii. t. 1–3; branches and leader with drooping tips, leaves 1–1$\frac{1}{2}$ in., cones oblong, scales broadly flabellately triangular. C. Deodara, *Loud. Arb. Brit.* iv. 2428, f. 2283–2286; *Forbes Pinet. Wob.* 149, t. 48, 49; *Parlat. in DC. Prodr.* xvi. ii. 408; *Brand. For. Fl.* 516; *Cleghorn Pines of N.W. Himal.* t. 1; *Gamble Man. Ind. Timb.* 400; *Boiss. Fl. Orient.* v. 699. Abies Deodara, *Lindl. in Penny Cyclop.* 34. Pinus Deodara, *Roxb. Fl. Ind.* iii. 651; *Lamb. Pin. Ed.* 2, 68, t. 42; *Ed.* 3, 93, t. 52; *Endl. Conif.* 135; *Antoine Conif.* 59, t. 22, f. 2; *Griff. Ic. Pl. Asiat.* t. 364; *Wall. Cat.* 6060 (by error 5060).

N.W. HIMALAYA, from Kumaon westwards, alt. 3500–12,000 ft.—DISTRIB. Affghanistan.

A lofty robust tree, attaining 250 ft., with a girth of trunk 36 ft., and 600 years' age; bark thick, furrowed vertically and cracked transversely. *Leaves* usually glaucous green, acute, persistent for 3–5 years; sheaths very short. *Cones* 4–5 by 3–4 in., erect, top rounded; scales very numerous, margin thin. *Seeds* $\frac{1}{4}$ in. long; wing longer, broadly triangular with rounded sides.

10. **PICEA,** *Link.*

Large evergreen trees. *Leaves* scattered, acicular, jointed at the base. *Cones* cylindric, pendulous, or erect when young, scales thin, not thickened at the tip, persistent.—Species 12, N. Temperate and Arctic.

P. Morinda, *Link. in Linnæa*, xv. 522; branchlets slender pendulous glabrous, leaves 1–1$\frac{1}{2}$ in. acicular tetragonous pungent, cones 4–6 in., scales broadly ovate or subreniform from a cuneate base, outer margin rounded, seeds oblong with a broad spathulate wing. A. Smithiana, *Forbes Pinet. Woburn.* 103, t. 30; *Loud. Arboret.* iv. 2317, f. 2229; *Brand. For. Fl.* 525; *Cleghorn Pines of N.W. Himal.* t. 5; *Gamble Man. Ind. Timb.* 407. P. Khutrow, *Carr. Conif.* 258. Abies spinulosa, *Griff. Journ.* 259; *Itin. Notes* 145, No. 694; *Ic. Pl. Asiat.* t. 363. Pinus Smithiana, *Lamb. Pin.* iii. t. 88; *Wall. Pl. As. Rar.* iii. 24, t. 246; *Cat.* 6063; *Parlat. in DC. Prodr.* xvi. ii. 416. P. Kutrow, *Royle Ill.* 353, t. 84, f. 1; *Endl. Conif.* 122.

TEMPERATE HIMALAYA; throughout the range at elevations of 6–11,000 ft.—DISTRIB. Affghanistan.

A conical tree, attaining 150 ft., with a trunk 21 ft.; branches whorled, spreading;

bark tessellated. *Leaves* dark green, stiff. *Cones* 4–6 by 1–2 in. diam., obtuse; scales rounded, concave, dark brown and shining. *Seeds* $\frac{2}{3}$ in long with the obliquely truncate wing.

11. **TSUGA,** *Carrière.*

Evergreen trees. *Leaves* more or less distichous, narrow, 1-nerved, petiole very short, jointed on the branch. *Cones* small, ripening in the first year, scales few, persistent, thin, not thickened at the tip.—Species about 7, a Himalayan, a Japanese and several N. American.

T. Brunoniana, *Carr. Conif.* 188; branches spreading, branchlets pendulous pubescent, leaves $\frac{1}{2}$–1 in. narrowly linear white beneath margins recurved tips serrulate, cones 1 in. ovoid, scales obtuse. Abies Brunoniana, *Lindl. in Penny Cyclop.* i. 31; *Griff. Itin. Notes* 131, No. 529. A. dumosa, *Loud. Arb.* iv. 2325, f. 2233, 2234. Pinus dumosa, *Don Prodr.* 55; *Parlat. in DC. Prodr.* xvi. ii. 429; *Lamb. Pin. Ed.* 2, ii. 7; *Ed.* 3, 80, t. 46. P. Brunoniana, *Wall. Cat.* 6061; *Pl. As. Rar.* iii. 24, t. 247; *Endl. Conif.* 84; *Antoine Conif.* 82, t. 32, f. 1. P. decidua, *Wall. mss.*—Taxaceæ, *Griff. Notul.* iv. 28; *Ic. Pl. Asiat.* t. 375.

Temperate Himalaya, from Kumaon to Bhotan, alt. 8–10,500 ft.

A tree, attaining 120 ft., with 28 ft. girth of trunk; branchlets very slender; bark thick, rough. *Leaves* $\frac{1}{12}$ in. broad, caducous after the branch is cut, dark green. *Cones* terminal, erect or horizontal. *Seeds* $\frac{1}{3}$ in. long with the oblong obtuse wing; nucleus very small.

12. **ABIES,** *Juss.*

Lofty evergreen trees with tabular branches. *Leaves* more or less bifarious, linear, rarely 4-gonous, 1-nerved, jointed on to the branch. *Cone* erect, cylindric or oblong, scales very many, thin, tip hardly thickened, deciduous, leaving a woody axis as in *Cedrus*, bract more or less free under the scale and sometimes produced beyond it.—Species about 18, N. Temperate and Arctic.

A. Webbiana, *Lindley in Penny Cyclop.* i. 30; leaves 1–2 in. linear flat retuse or bicuspidate rarely rounded or subacute white beneath on either side the midrib, cones oblong or cylindric dark purple. scales much longer than the bracts, seeds with a broadly obovate truncate wing. *Link in Linnæa*, xv. 532; *Forbes Pinet. Woburn.* 117, t. 41; *Griff. Notul.* iv. 19; *Ic. Pl. Asiat.* t. 371; *Brand. For. Fl.* 528; *Gamble Man. Ind. Timb.* 408. A. densa, *Griff. Journ.* 258; *Notul.* iv. 19 (*Itin. Notes* 141, Nos. 662, 663). A. spectabilis, *Spach Hist. Phaner.* xi. 422. Picea Webbiana, *Loud. Arboret.* iv. 2344, f. 2251–2253; *Cleghorn Pines of N.W. Himal.* t. 6. Pinus Webbiana, *Wall. in Lamb. Pin. Ed.* 3, 77, t. 44; *Cat.* 6058 (by error 5058); *Endl. Conif.* 106; *Antoine Conif.* 61, t. 24, f. 1; *Parlat. in DC. Prodr.* xvi. ii. 425. P. striata, *Ham. mss.* P. spectabilis, *Lamb. Pin. Ed.* 2, ii. 3, t. 2; *Don Prodr.* 55.

Temperate and Subalpine Himalaya, alt. 7–12,000 ft. in the west, and 8500–13,000 ft. in the east.—Distrib. Affghanistan.

A lofty black stout tree, attaining 150 ft., and a girth of trunk of 30 ft.; crown cylindric, branches horizontal flat. *Leaves* spirally arranged but more or less bifarious, very variable in length, persisting for 8–10 years, flat, about $\frac{1}{12}$ in. broad, channelled down the middle, very dark green and shining, tip very variable; midrib raised beneath; petiole very short. *Male cones* sessile, solitary or clustered.

Fem. cones 4–6 by 1½–3 in. diam., ripening in the same year, top and base rounded; outer margins of scales rounded. *Seeds* oblong or obovoid, with the wing ½–1 in. long.

VAR. *Pindrow*, Brand. For. Fl. 528; leaves longer (2–3 in.), cones usually slender and cylindric. A. Pindrow, *Spach l. c.* 423. Picea Pindrow, *Loud. Arboret.* iv. 2346, f. 2254, 2255. P. Herbertiana, *Madden mss.* P. Naphta, *Knight in Loud. Encycl. of Trees*, 1053. Pinus Pindrow, *Royle Ill.* 354, t. 86; *Endl. Conif.* 106; *Lamb. Pin.* iii. t. 92; *Antoine Conif.* 62, t. 24, f. 1. P. Naphtah, *Antoine Conif.* 80. Taxus? Lambertiana, *Wall. Cat.* 6056.—N.W. Himalaya, in better soil and in more sheltered places than *Webbiana proper*.—The question of the specific distinctness of *P. Pindrow* has long been a subject of doubt. Dr. Brandis has decided against its claim. Royle figures the cone as pale purple, 4½ by 3½ in., and seeds ⅓ in. long.

13. **LARIX,** *Miller.*

Tall pyramidal trees. *Leaves* in dense clusters, acicular, deciduous, jointed near the base, 1-nerved. *Cones* of *Picea*, but erect, with the bract often exserted beneath the scale.—Species 8, N. Temperate and Arctic regions.

L. Griffithii, *Hook. f. & Thoms. Ill. Himal. Pl.* t. 21 (*excl. f.* 1–4); branchlets long pendulous, leaves 1 in. slender, cones cylindric, bracts exserted twice the length of the scales, with reflexed cuspidate tips. *Brand. For. Fl.* 531; *Gamble Man. Ind. Timb.* 410. L. Griffithiana, *Gord. Pinet.* 126; *Carriére Conif. Ed.* 2, 359. Abies Griffithiana, *Lindl. & Gord. in Journ. Hort. Soc. Lond.* v. 214. Pinus Griffithii, *Parlat. in DC. Prodr.* xvi. ii. 411.

EASTERN NEPAL, SIKKIM and BHOTAN, alt. 8–12,000 ft.

A small tree, 20–60 ft., with pale-green foliage; bark thick, brown; heart wood red. *Leaves* 30–50 in a cluster, linear, flat. *Cone* erect from the pendulous branchlets, 2–3 in. long; bracts persistent, obovate-spathulate, notched, the cusp longer than the bract. *Seeds* oblong, wing oblong twice as long as the nucleus.—The male flowers figured in "Ill. Himal. Pl." are those of *Cedrus Deodara*, which were mixed with specimens of *L. Griffithii* in Griffith's collections.

ORDER CXLV. **CYCADACEÆ.** (By W. T. Thiselton Dyer.)

Shrubs or small trees, with a thick simple (rarely forking) stem and terminal crown of leaves, or stemless with leaves arising from a tuberous simple or branched rootstock. *Leaves* in alternate series of short coriaceous scales and of palm-like pinnate rarely 2–3-pinnate leaves with membranous or coriaceous leaflets. *Flowers* diœcious; *males* in one or more terminal cones formed of numerous fleshy flat or variously peltate scales bearing beneath crowded 1-celled anthers; *females* of flat carpellary leaves (*carpophylls*) crowded round the apex of the stem (*Cycas*) or cones of flat or thickened variously peltate scales. *Ovules* large, sessile, orthotropous, either numerous and erect in notches on either margin of the carpophyll or solitary and inverted on either side of the peltate scales. *Seeds* large, drupaceous, external coat more or less fleshy, internal crustaceous or bony; albumen copious, fleshy then horny, and with one or more embryonic cavities; embryo usually single by abortion, slender, radicle superior attached to the crumpled suspensory cord, cotyledons 2.—Genera 9, species about 80, natives of the tropics and S. temperate regions.

1. **CYCAS,** *L.*

Shrubs or trees with a simple or rarely branched cylindric trunk clothed with the woody bases of the petioles. *Leaves* in terminal crowns, linear-oblong, pinnate; leaflets linear, 1-nerved, quite entire, involute in vernation, lower often reduced to spines. *Male cones* apparently terminal, peduncled; scales cuneate, closely imbricate, apex often long-acuminate; anthers ellipsoid, in groups of 3–5. *Carpophylls* numerous, crowded round apex of the stem, densely woolly, appressed into an apparently terminal cone, then spreading, elongate, flattened, dilated above into an entire, crenate or pectinate blade. *Ovules* 1–5 in notches on either side of the stalk of the carpophyll, distant, alternate or opposite, nearly erect. *Seeds* ellipsoid or globose.—Species about 12; Tropical Africa to Polynesia.

C. revoluta, Thunb., a Japanese species with the foliage of *C. Beddomei*, is commonly cultivated in Indian gardens.

* Margins of leaflets flat.

† *Margins of blade of carpophylls spinous-toothed.*

1. **C. circinalis,** *Linn. Sp. Pl.* 1658; antheriferous scales long-acuminate, acumen turned upwards, blade of carpophyll ovate or lanceolate tapering into a long acumen, crenate or more or less spinous-toothed throughout. *A. DC. Prodr.* xvi. ii. 526; *Grah. Cat. Bomb. Pl* 198; *Dalz. & Gibs. Bomb. Fl. Suppl.* 83; *Miq. Monogr.* 27, *Anal. Bot. Ind.* ii. t. 5, f c (antheriferous scales), and *Linnæa* xix. 413, t. i. (carpophyll); *Pet. Th. Hist. Veg.* 1804, 2, t. 1 and 2; *Richard Conif.* t. 24–26; *Bot. Mag.* t. 2826 and 2827. *Thw. Enum.* 294; *De Vriese Descr.* t. 4 and 5; *Bedd. Forester's Flor.* 227. C. sphærica, *Roxb. Fl. Ind.* iii. 747. C. Thuarsii, *Br. Prodr.* 347. C. madagascariensis, *Miq. Comm.* 127, *in Linnæa* xvii. 699.—Todda Panna, *Rheede Hort. Malab.* iii. 9, t. 13–21.

Malabar Coast, *Rheede, Buchanan.* Dry hills in W. Madras to 3500 ft., *Beddome.* Ceylon to 1500 ft., *Thwaites.*—Distrib. E. Tropical Africa, Comoro Islands, Madagascar, Sumatra, Java.

An evergreen palm-like tree, 15 ft. and upwards, rarely forked when old, glabrous throughout. *Leaves* 5–9 ft. long; petiole 18 in. to 2 ft., with short distant slightly deflexed spines to near the base; leaflets 10–12 in. long, about $\frac{1}{2}$ in. wide, elongate-linear-lanceolate, subfalcate, acuminate. *Male cone* shortly peduncled, often $1\frac{1}{2}$ ft. long, cylindric-ovoid; antheriferous scales $1\frac{1}{2}$–2 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. wide, obovate-deltoid, prolonged into an upward curved subulate acumen about 1 in. long, clothed with a brown tomentum externally, glabrous above. *Carpophylls* about 1 ft. long, long-stalked, with 3–5 pairs of ovules above the middle, ferruginous-tomentose; blade 3–4 in. long, 1–$1\frac{1}{2}$ in. wide. *Seeds* about the size of a pigeon's egg.—From the materials at Kew obtained by Sir John Kirk and others I have no hesitation in identifying the African plant with this species; the antheriferous scales, however, figured by Du Petit Thouars and Richard have a short acumen as in *C. Rumphii*; but the African plants appear to be variable in this respect. To *C. circinalis* must also be referred a form, probably existing under unfavourable conditions, which has been several times introduced into cultivation from S. India (see Gard. Chron. Aug. 27, 1881, 270, 271). It is *C. squamosa*, Lodd. Cat.; *C. squarrosa* (*sphalmate*), Steud. Nomencl. ed. 2 (*Ind. Or*); Miq. Linn. xvii. 702; DC. Prodr. xvi. pars 2, 529; *C. pluma*, Bull, Retail List, 1877, 4, and *C. Boddami*, Hort. I am indebted to Herr Wendland for a frond of Loddige's plant, which he informs me was originally obtained from Travancore; it agrees with a plant of low and stunted habit which appears to be not uncommon in the neighbourhood of Bangalore, and only to differ from the type in the smaller leaves with narrower leaflets.

2. **C. Rumphii,** *Miq. in Bull. Sc. Phys. et Nat. Néerl.* 1839, 45, *Monogr.* 29, *Anal. Bot. Ind.* ii. t. 5, f. A and B (antheriferous scales), and *Linnæa* xvii. 688; antheriferous scales shortly acuminate, blade of carpophyll ovate-rhomboid, spinous-toothed above entire below, more or less abruptly acuminate. *A. DC. Prodr.* xvi. ii. 527; *De Vriese Descr.* t. 2 and 3 (male plant); *Kurz For. Fl.* ii. 502; *Bedd. For. Flor.* 227. C. circinalis, *Roxb. Fl. Ind.* iii. 744; *Griff. Notul.* iv. 1 *et seq.*; *Ic. Pl. As.* t. 361. C. circinalis, *var.* angustifolia, *Miq. Comm.* 119. C. Wallichii, *Miq. Monogr. Cycad.* 32; *in Linnæa* xvii. 695. C. glauca, *Miq. Monogr.* 30. C. macrocarpa, *Griff. Notul.* iv. 11; *Ic. Pl. As.* t. ccclxii. f. 2; C. sp., *Griff. Notul.* iv. 16; *Ic. Pl. As.* t. ccclx. (unnumbered figs.). Zamia Corsoniana, *G. Don in Gard. Mag.* 1842, 371.—Olus calappoides, *Rumph. Amboin.* i. 86, 87, t. 22, 23.

S. TENASSERIM, *Kurz*; Mergui, *Griffith.* MALACCA, the ANDAMAN ISLANDS and NICOBARS, *Griffith.* Often cultivated in Indian gardens.—DISTRIB. Moluccas, New Guinea, North Australia.

Similar in habit to the preceding species, but said to reach 20 ft. or more, and often much branched. *Leaves* usually described as somewhat shorter and with fewer leaflets. *Antheriferous scales* thickened and obliquely truncate at the apex with a short upward curved, sometimes caducous, acumen. *Carpophylls* narrower with an entire often subulate acumen. *Seeds* ellipsoid, 2–2¾ in. long, 1½–1¾ in. diam.—The anatomical details given by Griffith *Icon. Pl. As.* t. ccclxxvii. and ccclxxviii., refer apparently to this species. Miquel figures as the carpophylls of this species (*Linn.* xxv. 589, t. ii.) monstrous states probably belonging to *C. circinalis.* *C. Scratchleyana*, F. Muell., Victorian Naturalist, April 1885, is only a state with the acumen of the antheriferous scales evanescent. It closely approaches in this respect a form in Herb. Kew from Cape York.

†† *Margins of blade of carpophylls pectinate.*

3. **C. pectinata,** *Griff. Notul.* iv. 10; *Ic. Pl. As.* t. ccclx., f. 3; a palm-like tree 8–10 ft., leaves 5–7 ft. long recurved, leaflets 7–10 in. long narrow linear tapering into a minute spine subfalcate, blade of carpophyll broadly orbicular long-acuminate, margin deeply subulate-pectinate. *Kurz For. Fl.* ii. 503; *Gamble Man. Ind. Timb.* 415. C. Jenkinsiana, *Griff. Notul.* iv. 9; *Ic. Pl. As.* t. ccclx., f. 1 and 2, and ccclxii., f. 1. C. dilatata, *Griff. Notul.* iv. 15.

NEPAUL, *Wallich.* SIKKIM; Great Runjeet Valley, *J. D. H. & T. T.* EAST BENGAL; Khasia, 2000 ft., *J. D. H. & T. T.* ASSAM; Gowhatty, *Jenkins & C. B. Clarke.* CHITTAGONG, *J. D. H. & T. T.* MARTABAN and TENASSERIM; eng and pine forests, *Kurz.*

An evergreen palm-like tree, glabrous throughout. *Leaf-petioles* about 18 in. long with a few small distant spines, leaflets ⅓ in. broad. *Male cone* 18 in. long, 6 in. diam., cylindric-ovoid; antheriferous scales 1½ in. long, 1 in. diam., deltoid-clavate, apex much thickened, abruptly acuminate, acumen 1½ in. long subulate, ascending. *Carpophylls* 6 in. long, densely tawny-villous throughout, stalk about equal in length to blade with 2–3 pairs of ovules above the middle; blade 2½–3½ in. diam., margin deeply pectinate with spinous subulate teeth ¾ in. long; acumen 1½ in. long, tapering from a flat base, with one or two spinous teeth. *Seeds* about 1½ in. long, ovoid.

4. **C. siamensis,** *Miq. in Bot. Zeit.* 1863, 334; an evergreen shrub or small palm-like tree, stems 2–6 ft. much swollen at the base, leaves 2–4 ft. stiff spreading, leaflets 3–8 in. linear mucronate-acuminate, blade of carpophyll ovate-rhomboid long-acuminate, margin deeply pectinate lacerate. *A. DC. Prodr.* xvi. ii. 528; *Kurz For. Fl.* ii. 503; *Regel in Ill. Hort.* t. 433; *Carrière, Rev. Hort.* 1881, 396. C. aurea, *Hort. Verschaffelt.*

BURMA; dry forests of the Prome district, *Kurz*; Shan States, *Aplin*.—DISTRIB. Siam, Cochin China.

Very close to *C. pectinata*, and perhaps only a geographical form. The enlarged base of the stem calls to mind the habit of some species of *Dasylirion*. *Antheriferous scales* about $\frac{3}{4}$ in. long, with a slender acumen of the same length. *Carpophylls* somewhat smaller than in *C. pectinata*, wholly tawny-villous when young; blade afterwards glabrescent above, marginal teeth above 1 in. long; acumen about 2 in. long, flat from a broad base and spinous dentate in Burmese specimens, almost subulate and entire in those from Cochin China. *Seeds* $1\frac{1}{2}$ long, obovoid-oblong (*Kurz*).

** Margins of leaflets revolute.

5. **C. Beddomei,** *Dyer in Linn. Trans. Ser.* 2, *Bot.* ii. 85, t. 17; antheriferous scales long-acuminate, acumen in upper half of cone strongly deflexed, blade of carpophyll ovate-lanceolate tapering into a long acumen strongly dentate-lobate. C. revoluta, *Bedd. For. Flor.* 227 (*not of Thunb.*).

E. MADRAS; abundant on Cuddapah and other hills, *Beddome*.

A low shrub. *Stems* only a few inches high, clothed with the glabrescent closely imbricated leaf-bases. *Leaves* about 3 ft. long, 9 in. wide, rachis subquadrangular; petiole about 6 in. long, strongly 4-angled, with a few minute teeth in upper third clothed at base with a tufted tomentum; leaflets about $\frac{1}{8}$ in. wide, strongly revolute. *Male cone* about 1 ft. long, 3 in. diam., very shortly peduncled; antheriferous scales tapering acuminate from an oblong-deltoid base, ascending at the base of the cone, strongly deflexed in the upper half or two-thirds. *Carpophylls* 6–8 in. long, with two pairs of ovules above the middle; blade 3 in. long, 1 in. wide. *Seeds* globose, $1\frac{1}{2}$ in. diam.

CLASS, MONOCOTYLEDONES.

ORDER CXLVI. HYDROCHARIDEÆ.

Aquatic herbs. *Leaves* undivided. *Flowers* monœcious or dicœcious, enclosed in an entire or 2-leaved spathe, fem. solitary; perianth superior. *Sepals* 3, green or petaloid. *Petals* membranous or 0. *Stamens* 3–12, anthers 2-celled. *Ovary* inferior, placentas parietal or projecting and almost meeting; styles or style-arms 3–12; ovules anatropous or orthotropous. *Fruit* rarely dehiscent, membranous or fleshy, few- or many-seeded. *Seeds* exalbuminous, embryo various.

Tribe I. **Hydrilleæ.** Fresh-water herbs; stem branching, leafy. *Spathes* small, sessile.

Leaves whorled.	Perianth double.	Ovules anatropous . .	1. HYDRILLA.
Leaves scattered.	Perianth single.	Ovules orthotropous . .	2. LAGAROSIPHON.

Tribe II. **Vallisnerieæ.** Fresh-water herbs, stemless, or with stolons only. *Leaves* sessile, long and narrow. *Spathes* on long scapes.

Flowers unisexual.	Perianth single	3. VALLISNERIA.
Flowers uni- or bi-sexual.	Perianth double	4. BLYXA.

Tribe III. **Stratioteæ.** Fresh-water herbs, stemless or with a creeping rootstock. *Spathes* peduncled. *Perianth* double. *Leaves* various.

Flowers unisexual.	Male spathes 2–3-fid.	Ovary not beaked	5. HYDROCHARIS.

Flowers unisexual, solitary. Fruit winged . . . . . 6. OTTELIA.
Flowers unisexual. Male spathes many-fld. Ovary stoutly beaked . . . . . 7. BOOTTIA.

Tribe IV. **Thalassieæ.** Salt-water herbs. *Spathes* 2-leaved. *Ovary* beaked in all.

Male spathes many-fld. Perianth double . . . . . 8. ENHALUS.
Male spathes 1-fld. Perianth single . . . . . 9. HALOPHILA.

1. HYDRILLA, *Richard.*

A submerged leafy dicœcious herb. *Leaves* short, 3–4-nately whorled, or the lower opposite. *Male fl.* solitary, shortly pedicelled, in a subglobose sessile muricate spathe; sepals 3, ovate or obovate, green; petals 3, oblong or cuneiform; stamens 3, anthers large reniform, opening elastically; pistillode small. *Fem. fl.* 1–2, sessile in a tubular 2-toothed spathe; perianth of the male, but leaflets narrower; ovary produced beyond the spathe in a filiform beak, 1-celled; styles 2–3, linear, undivided; stigmas 3, fimbriate; ovules anatropous. *Fruit* subulate, smooth or muricate; seeds 2–3, oblong, testa shortly produced at each end.

H. verticillata, *Casp. in Monatsber. Akad. Berl.* 1857; *Pringhs. Jahrb.* i. 493; *Boiss. Fl. Orient.* v. 8; *Benth. Fl. Austral.* vi. 259. H. ovalifolia, *Rich. in Mem. Inst. Fr.* 1811, ii. 76, t. 2; *Thwaites Enum.* 331; *Dalz. & Gibs. Bomb. Fl.* 377. H. dentata, *Casp. in Bot. Zeit.* 1854, 56. H. Wightii, *Planch. in Ann. Sc. Nat. Ser.* 3, xi. 79. H. angustifolia, *Blume Mus. Bot.* i. 82. Leptanthes verticillata, *Herb. Wight.* Serpicula verticillata, *Linn. f. Suppl.* 416; *Roxb. Fl. Ind.* iii. 578; *Cor. Pl.* ii. t. 164; *Wall. Cat.* 5048. Vallisneria verticillata, *Roxb. Fl. Ind.* iii. 751. Hottonia serrata, *Willd. Sp. Pl.* i. 816.

Still and slowly running waters throughout INDIA and CEYLON.—DISTRIB. Central Europe, Mauritius, Madagascar, Tropical Asia and Australia.

Plants forming large masses. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ in., 4–8 in a whorl, with a short sheathing one at the base of each branch and a short pair above this, linear or oblong-linear, serrulate or entire. *Flowers* $\frac{1}{6}$–$\frac{1}{4}$ in. long; perianth segments very variable. *Fruit* smooth or sometimes muricate or (in Ceylon, Thwaites) squarrose with filaments above the middle.—The male fl. escape from the sheath when mature, and float on the top of the water.

2. LAGAROSIPHON, *Harv.*

Submerged dicœcious herbs. *Leaves* scattered, fascicled or subwhorled, lower opposite, serrulate. *Male fl.* minute, many in an ovoid 2-fid axillary sessile spathe; sepals petaloid; petals rather shorter; anthers 2 or 3, ovoid, with often 3 staminodes; pistillode 0. *Fem. fl.* solitary, sessile in a narrow oblong spathe; perianth of the male; staminodes 0; ovary oblong, produced into a filiform beak; styles 3, stout, notched; ovules many, orthotropous. *Fruit* ovoid, oblong or linear, many-seeded.—Species 5, India, Africa, and Madagascar.

L. Roxburghii, *Benth. in Gen. Pl.* iii. 451; leaves 2–4 in. scattered linear-lanceolate. Nechamandra alternifolia, *Thwaites Enum.* 332. N. Roxburghii, *Planch. in Ann. Sc. Nat. Ser.* 3, xi. 78 (*excl. syn. Roxb. Cor. Pl.*); *Dalz. & Gibs. Bomb. Fl.* 277. Vallisneria alternifolia, *Roxb. Fl. Ind.*

iii. 750; *Wight in Hook. Bot. Misc.* ii. 344, *Suppl.* t. 11; *Ham. in Brewst. Edinb. Journ. Sc.* i. (1824) 34.

Common in tanks throughout INDIA and CEYLON.—DISTRIB. Tropical Asia.

Stems filiform. *Leaves* 3–4 in., nerveless, acute, often twisted. *Male spathes* at length 2-valved; flower on a short spadix; anthers 2, dehiscence transverse.

3. **VALLISNERIA,** *Linn.*

A submerged tufted stemless stoloniferous diœcious herb. *Leaves* very long, linear. *Male fl.* very numerous, minute, in an ovoid 3-lobed shortly peduncled spathe; sepals 3; petals 0; stamens 1–3; anthers didymous; pistillode 0. *Fem. fl.* solitary in a tubular 3-toothed spathe terminating a very long filiform spiral scape; perianth of the male; staminodes 3, 2-fid; ovary narrow, not produced upwards; stigmas 3, broad, notched; ovules numerous. *Fruit* linear, included in the spathe, many-seeded.

V. spiralis, *Linn. Sp. Pl.* 1015; *Reichb. Ic. Fl. Germ.* t. 60; *Hook. Bot. Misc.* iii. 87, *Suppl.* t. 23, 24; *Benth. Fl. Austral.* vi. 259; *Boiss. Fl. Orient.* v. 3; *Wall. Cat.* 5045. V. spiraloides, *Roxb. Fl. Ind.* iii. 750.

Throughout INDIA and CEYLON.—DISTRIB. Westward to Spain, and in warm regions of the Old and New Worlds.

Very variable in size. *Leaves* long, 10 by $\frac{1}{2}$ in., or shorter according to the depth of water, green, translucent, entire or tips serrulate. *Male spathes* $\frac{1}{4}$ in., breaking off at the base, when the flowers emerge rise to and float on the surface, pedicels long slender. *Fem. spathe* carried to the surface in flower by the uncoiling of the scape, which after fertilization again coils close and brings the ovary down to ripen under water.

4. **BLYXA,** *Thouars.*

Submerged tufted, stemless, scapigerous, hermaph. or diœcious annuals; scapes long or short. *Leaves* linear, acute, entire or minutely serrulate. *Male fl.* several in a tubular 2-toothed spathe; sepals 3, linear; petals 3, longer, linear; stamens 3–9, 1 or more arrested, anthers narrow erect; pistillodes 3, slender. *Fem. fl.* solitary, sessile in its spathe; spathe and perianth of the male; staminodes 0, or minute; ovary very slender, beaked; style very short; stigmas 3, filiform; ovules many. *Fruit* very slender included in the ventricose ribbed spathe, many-seeded; seed with a mucilaginous testa.

Under this genus the following Indian forms occur. These present such diverse characters that it is difficult to suppose they do not represent species; on the other hand, water plants are so variable, and herbarium specimens of them are so unsatisfactory, that I must leave it to Indian botanists to work up the genus. I refrain from citing extra-Indian authorities.

* *Leaves broad at the base, narrowed upwards to the acuminate tip.*

1. **B. Roxburghii,** *Rich. in Mem. Inst. Fr.* 1811, 77, t. 5; leaves 8–24 in., flowers diœcious, stamens 8, capsule 2–4 by $\frac{1}{6}$ in., compressed? seeds small $\frac{1}{24}$ in. tubercled with or without short tails. Vallisneria octandra, *Roxb. Cor. Pl.* ii. 34, t. 165; *Fl. Ind.* iii. 752.

BENGAL, and the MALAY and DECCAN PENINSULAS, common in still water.—DISTRIB. Trop. Asia, Australia.

Roxburgh does not describe or figure the seeds, and I have therefore described these from the common Bengal form, which I assume is the plant he had under his eye.

2. **B. echinosperma,** *Hook. f.*; leaves $\frac{1}{2}$–4 ft., flowers bisexual, stamens 3, capsule 2–3 by $\frac{1}{8}$ in. terete, seeds $\frac{1}{16}$ in., spinescent with a long filiform tail at each end. Hydrotrophus echinospermus, *Clarke in Journ. Linn. Soc. Bot.* xiv. 8, t. 1.

BENGAL, *Clarke.* CANARA, *Stocks, Talbot,* &c.
The seed including the tails is sometimes $\frac{1}{2}$ in. long.

3. **B. Griffithii,** *Planch. in Herb. Hook.*; leaves 4 in.–2 ft., scape compressed, flowers bisexual, stamens 9, capsules linear narrow, seeds $\frac{1}{2}$ in. faintly tubercled, tails 0. ? Saivala vallisnerioides, *Wall. Cat.* 5047. Sáivála, *Jones in As. Research.* iv. 275.

BENGAL, CHITTAGONG, to MALACCA.—DISTRIB. Sumatra.
Sir W. Jones describes the flowers of Sáivála as hermaphrodite, the stamens as 9, and the seeds as muricate. Parish sends fine specimens from Moulmein, with flowers and stamens as above, but no seeds. The Chittagong specimens gathered by myself are flowerless; the leaves are 4–5 in. and capsules 2 in. on short scapes. Griffith's Malacca specimens are not in flower, but have capsules 2–2½ in. on very long scapes; the leaves are 2 ft. long. Mergui specimens from Griffith in fruit only, have leaves intermediate between those of the Malacca and Chittagong forms.

4. **B. oryzetorum,** *Hook. f.*; leaves 4–6 in., flowers 2-sexual, stamens 3, capsule 1–1½ by $\frac{1}{6}$ in., scape very short, seeds $\frac{1}{14}$ in. sparsely tubercled, tails 0 or very short. Diplosiphon oryzetorum, *Dcne. in Jacquem. Voy. Bot.* 167, t. 167.

BANDA, *Edgeworth.* KASHMIR, *Jacquemont.* KHASIA MTS. abundant.—DISTRIB. ? Hongkong.

5. **B. ceylanica,** *Hook. f.*; leaves 6 in.–2 ft., flowers bisexual, stamens 3, capsule 1–2 by $\frac{1}{6}$ in., scape as long, seeds obscurely tubercled apiculate at both ends. B. octandra, *Planch. in Thw. Enum.* 332.

CEYLON, *Walker, Thwaites.*
Very near the Madagascar *B. Aubertii,* Rich., which is unisexual.

** *Leaves narrowed from below the middle to the base.*

6. **B. lancifolia,** *Hook. f.*; leaves 4–6 in. linear-lanceolate, capsules 1–2 in. slender, scape as long, flower bisexual, stamens 3, seeds sparsely tubercled, tail 0 or very short.

KHASIA HILLS, alt. 5000 ft., at Myrung and Nunklow, *Clarke.*
The Myrung specimens have large seeds $\frac{1}{12}$ in. long with no tails at all, and very obscure tubercles; the Nunklow ones have much smaller and more tubercled seeds with short tails.

7. **B. Talboti,** *Hook. f.*; leaves 4–6 in. linear-lanceolate serrulate, flowers unisexual, capsules 1–2 in. by $\frac{1}{8}$ in., seeds very strongly echinate with a short tail at each end.

NORTH CANARA, *Talbot.*
I have seen only fem. fl.

5. **HYDROCHARIS,** *Linn.*

A floating herb. *Leaves* orbicular or reniform, quite entire. *Male fl.* 2–3 in a peduncled 2-leaved spathe; sepals 3, herbaceous; petals 3, membranous, white; stamens 6–9, with 3–6 staminodes; filaments forked, anther-cells basifixed. *Fem. spathe* 1-fld., flower long-peduncled; perianth of the male; staminodes 6, in pairs; ovary ovoid, 6-celled; stigmas 6, linear, 2-fld. *Fruit* ovoid or oblong, fleshy, 6-celled; seeds many, testa pulpy, full of spiral vessels; embryo ovoid.

H. Morsus-ranæ, *Linn. Sp. Pl.* 1036; *Boiss. Fl. Orient.* v. 5; *Reichb. Ic. Fl. Germ.* t. 62. H. asiatica, *Miquel Fl. Ind. Bat.* iii. 239.

KASHMIR, *Jacquemont.* BENGAL, Jheels at Manda, near Beaulea, *Clarke.*—DISTRIB. Europe, N. Asia, China, Japan, Australia, ? Java.

Stoloniferous; roots fibrous and bulbiferous. *Leaves* 1–1½ in. diam., often reddish beneath. *Flowers* erect, 1½ in. diam.; sepals small, oblong; petals broadly obovate, rumpled, fem. with a fleshy tubercle at the base.

6. **OTTELIA,** *Pers.*

Submerged fresh-water herbs. *Leaves* crowded, the submerged narrow, the floating long-petioled ovate-lanceolate oblong or cordate. *Flowers* solitary, sessile on a tubular 2-fid spathe. *Sepals* linear or oblong. *Petals* larger obovate or orbicular, base with fleshy appendages. *Stamens* 6–15; anthers erect. *Ovary* oblong, beaked, almost 6-celled; styles 6, linear, 2-fid; ovules many, on the placentas and walls. *Fruit* oblong, 6-valved enclosed in the spathe. *Seeds* many, oblong, testa pulpy.—Species 6–7, tropical and subtropical.

O. alismoides, *Pers. Synops.* i. 400; leaves orbicular- or oblong-cordate, spathe 5–6-winged. *Rich. in Mem. Instit. Fr.* 1811, ii. t. 7; *Benth. Fl. Austral.* vi. 257. O. indica, *Planch. mss.*; *Dalz. & Gibs. Bomb. Fl.* 278. Damasonium indicum, *Willd. Sp. Pl.* ii. 276; *Roxb. Fl. Ind.* ii. 216; *Cor. Pl.* ii. 45, t. 185; *Bot. Mag.* t. 1201. Stratiotes alismoides, *Linn. Sp. Pl.* 535.—*Rheede Hort. Mal.* ix. t. 46.

In tanks and ditches throughout INDIA and CEYLON.—DISTRIB. Trop. Asia, Australia.

Root fibrous. *Leaves* extremely variable, from 2–6 by 1–2 in. to broadly rounded and cordate, 7 in. diam., 7–11-nerved, usually submerged; petiole 1–10 in. *Spathe* 1–1½ in.; wings waved, unequal. *Petals* 1 in. broad, white. *Fruit* oblong, crowned with the withered perianth, 6-grooved, from linear-oblong to globose, and attaining 2 in. diam.

7. **BOOTTIA,** *Wall.*

Habit and characters of *Ottelia*, but the flowers are diœcious, the males very numerous in the spathe, the fem. solitary; the ovary beaked, the styles petaloid, and the fruit ribbed but not winged.—Species 3–4, Burma and Trop. Africa.

B. cordata, *Wall. Pl. As. Rar.* i. 51, t. 65; *Cat.* 7271; *Miq. Fl. Ind. Bat.* iii. 238.

BURMA; in the Irawaddi River near Ava, and in ponds on the summit of the Taongdong Mts., *Wallich.*

Densely tufted; stem with bases of leaves 1–3 in. *Leaves* fleshy, submerged, sessile, oblong, obtuse, 12–18 by 2–3 in., green with purplish cross bands beneath, midrib very stout; upper leaves 4–6 in. long, stout, petioled, oblong-ovate, deeply cordate with overlapping rounded lobes. *Male spathe* 3 in. either way, ampulliform, compressed, mouth toothed, ribs many tuberculate. *Flowers* 1¼ in. diam., white with yellowish tinge.

8. **ENHALUS,** *Richard.*

A submerged marine monœcious or diœcious herb; rootstock crinite with the remains of old leaves. *Leaves* narrowly linear, enclosed in twos or threes in a basal sheath. *Male fl.* many, minute, enclosed in a short compressed subsessile 2-leaved spathe, at length escaping and floating; sepals and petals broadly elliptic; stamens 3, anthers subsessile, oblong; pistillode 0. *Fem. fl.* much larger, solitary, sessile in a longer spathe, scape spiral; sepals oblong, imbricate; petals longer, linear, subvalvate, wrinkled, staminodes 0; ovary ovoid with 6 papillose ridges, long-beaked, almost 6-celled; styles 6, bipartite, arms slender, fimbriate; ovules few on each placenta, anatropous. *Fruit* ovoid, beaked, indehiscent, deliquescent, spathe persistent, placentas nearly meeting in the centre, spongy. *Seeds* few, large, conoid, testa mucilaginous; plumule many-leaved.

E. Koenigii, *Rich. in Mem. Institut. Fr.* 1811, ii. 64; *Miq. Fl. Ind. Bat.* iii. 237. E. acoroides, *Zoll. Verz. Ind. Archip. Pfl.* ii. 69; *Boiss. Fl. Orient.* v. 6; *Ascherson in Nuov. Giorn. Bot. Ital.* iii. 299, and in *Linnæa* xxxv. 158. Stratiotes acoroides, *Linn. f. Suppl.* 268. Enhalus, *Griff. Notul.* 175; *Ic. Pl. Asiat.* t. 249, 250. E. marinus, *Griff. l. c.* 178; *Thwaites Enum.* 332.—*Rumph. Herb. Amboin.* vi. 191, t. 75, f. 2.

Shores of the Malay Peninsula, *Griffith, Beccari.* CEYLON, *Thwaites.*—DISTRIB. Malay Seas, Australia.

Rootstock extensively creeping in sand. *Leaves* 2–3 ft. by ½–¾ in., margins thickened, tip rounded denticulate. *Spathes* 2 in. long, strigose. *Ovary* with papillose margins. *Fruit* raised to the surface for ripening.

9. **HALOPHILA,** *Thouars.*

Submerged marine plants. *Leaves* in pairs from the axil of a scarious or hyaline scale at every node of a slender creeping stem, petioled, ovate or oblong, penninerved. *Spathes* of both sexes small, of 2 bracts, solitary, sessile between the pairs of leaves, 1-fld. *Male fl.* pedicelled; sepals 3; petals 0; anthers 3, alternate with the sepals, subsessile, linear-oblong, extrorse; pistillode 0. *Fem. fl.* sessile; sepals 3, minute. *Ovary* long-beaked, 1-celled; styles 3, filiform, papillose all over; ovules 2-seriate on 2 parietal placentas. *Fruit* included, subglobose, beaked. *Seeds* many, subglobose, testa membranous; embryo thick with the spiral cotyledon in a cavity at the side.

H. ovata, *Gaud. in Freyc. Voy. Bot.* t. 40, f. 1; leaves elliptic-oblong or -lanceolate. H. ovalis, *Hook. f. Fl. Tasm.* ii. 45; *Miq. Fl. Ind. Bat.* iii. 230; *Boiss. Fl. Orient.* v. 2; *Benth. Fl. Austral.* vii. 182; *Aschers. in Nuov. Giorn. Bot. Ital.* iii. 301, and in *Linnæa* xxxv. 173. Barkania punctata, *Ehrb. Symb. Phys. Bot. in Abhandl. Berl. Akad.* i. 429. Diplanthera, *Griff. Ic. Pl. Asiat.* t. 161 C, f. 2. ? Thalassia stipulacea, *Miq. Fl. Ind. Bat.* iii. 226 (*excl. citations*). Caulinia ovalis, *Br. Prodr.* 339.

MADRAS, *Cleghorn*, *Drew*. CEYLON, at Batticaloa, *H. Nevill*.—DISTRIB. Indian, Malayan, Australian and Pacific Seas.

Stems creeping and rooting at the nodes, with 2 convolute stipular scales at each node. *Leaves* 2–2½ in., membranous, with a broad costa and slender oblique nerves.

DOUBTFUL SPECIES.

Thwaites gives (Enum. 333) Thalassia stipulacea, *Koen.* (*Halophila stipulacea*, Aschers.), as being found at Trincomalee by Dr. Harvey. I have seen no specimens from Ceylon, and suspect that *H. ovata* is intended. *H. stipulacea* is a Red Sea species with short petioles, and is remarkable for its (when dry) bullate leaves.

ORDER CXLVII. **BURMANNIACEÆ.**

Herbs. *Leaves* linear, chiefly radical, entire, or reduced to scales. *Flowers* bisexual, regular, spicate or racemed along one side of a forked rachis, each opposite a bract. *Perianth* superior, persistent, 6-lobed or cleft, rarely 3-lobed, lobes valvate. *Anthers* 3 or 6, 2-celled, sessile on the corolla. *Ovary* inferior, 3-celled or 1-celled with 3 parietal placentas; style single, stigmas various; ovules numerous. *Capsules* loculicidal, or dehiscence transverse. *Seeds* minute, testa reticulate, nucleus homogeneous. —Genera about 10, and species 54.

Stem often leafy below. Ovary 3-celled. Stamens 3	1. BURMANNIA.
Stem scaly. Ovary 1-celled. Stamens 6	2. THISMIA.

1. **BURMANNIA,** *Linn.*

Annual herbs with ensiform acuminate radical leaves (sometimes reduced to scales or 0). *Stem* simple or divided. *Flowers* solitary, or few, or more and unilateral on the branches of a forked cyme. *Calyx-tube* winged or angled, limb 3-lobed. *Petals* smaller or 0. *Anthers* 3, sessile or subsessile, cells short separated by a broad connective, crested dorsally, dehiscence transverse. *Ovary* 3-celled; style 3-lobed. *Capsule* sometimes dehiscing transversely.

I find no characters in the perianth-lobes of the species whereby to distinguish them.

* *Radical leaves ensiform.*

1. **B. disticha,** *Linn. Sp. Pl.* 287; stem short, root-leaves 1–2½ in., midrib obscure, flowers ½–¾ in. crowded and secund on the branches of an erect forked cyme oblong or elliptic in outline, wings truncate or rounded at the top. *Roxb. Cor. Pl.* iii. t. 242; *Fl. Ind.* ii. 117; *Grah. Cat. Bomb. Pl.* 223; *Don Prodr.* 44; *Wall. Cat.* 9004; *Benth. Fl. Austral.* vi. 397. B. distachya, *Br. Prodr.* 265; *Burm. Fl. Zeyl.* 50, t. 20, f. 1.

TROPICAL HIMALAYA; Nepal, *Wallich*. SIKKIM, *Griffith's Collector*. KHASIA MTS. abundant. The DECCAN PENINSULA; from the Concan southwards to Ceylon. —DISTRIB. China, Australia.

Root fibrous. *Leaves* many, ¼–½ in. broad. *Forks of cyme* 1–3 in.; bracts ½ in.; flowers bright blue.

VAR. *sumatrana*; leaves narrower more gradually tapering. B. sumatrana, *Miq. Fl. Ind. Bat. Suppl.* 617.—Malacca, on Mt. Ophir, *Griffith*, &c. Sumatra, Banca, China.

2. **B. longifolia,** *Beccari Malesia* i. 244, t. 13, f. 1–5; stem long

leafy, leaves 3–6 in. narrow recurved, midrib stout, flowers $\frac{1}{2}$ in. secund on the branches of a deflexed forked cyme, wing narrow.

PERAK; alt. 3–4000 ft., *Scortechini, King's Collector.*—DISTRIB. Borneo at 5000 ft.

Root fibrous. *Leaves* 1 in. broad. *Forks of cyme* 1 in.; bracts $\frac{1}{2}$ in.; flowers pale blue; perianth-segments long, narrow.

3. **B. cœlestis,** *Don Prodr.* 44; stem 4–8 in. slender leafy or nearly leafless, radical leaves $\frac{1}{4}$–$\frac{2}{3}$ in., flowers solitary or 2–3 $\frac{1}{4}$–$\frac{1}{2}$ in. oblong obcordate or orbicular in outline blue, wings rounded truncate or retuse at the top. *Royle Ill.* 373, t. 91; *Wall. Cat.* 9005. B. uniflora, *Herb. Rottl.* B. azurea, *Griff. Notul.* iii. 236; *Ic. Pl. Asiat.* t. 272, f. 1; *Beccari Males.* i. 242, t. 15, f. 1–3. B. javanica, *Blume Enum. Pl. Jav.* i. 28; *Miquel Fl. Ind. Bat.* iii. 614. B. bifurca, *Herb. Ham.* B. triflora, *Roxb. Fl. Ind.* ii. 117. Cryptonema malaccensis, *Turcz. in Flora* 1848, i. 590. Nephrocœlium malaccense, *Turcz. l. c.* 1853, i. 287 (and by error Nephrocodium in *Walp. Ann.* vi. 41).

TROPICAL HIMALAYA; Nepal, *Wallich.* KHASIA MTS.; CHITTAGONG and southward to MALACCA and the ANDAMAN ISLANDS. CENTRAL INDIA and the DECCAN PENINSULA, from Hazarebagh, *Clarke,* to TRAVANCORE and CEYLON.—DISTRIB. Mauritius, China, the Malay Islands and N. Australia.

Very variable in size, stout or slender, leafy or almost leafless, and in the form and size of flowers; oblong or elliptic and orbicular perianths occur on the same specimen. The principal varieties are—

1. Stem 6–10 in. rather stout with numerous erect radical and cauline leaves $\frac{1}{2}$–1 in. long, the radical narrow or short and $\frac{1}{6}$ in. broad.—Malacca, Mergui, Singapore, Borneo, China, Cochin China.

2. Stem 4–8 in. slender, leaves very few or reduced to scales in the stem.—Common. Passes into *B. pusilla.*

4. **B. pusilla,** *Thwaites Enum.* 325; stem 2–6 in. very slender, leaves very few radical $\frac{1}{8}$ in., cauline 0 or 1–2, flowers 1–3 $\frac{1}{4}$ in. oblong orbicular or obcordate, wings rounded at the top. *Benth. Fl. Austral.* vi. 397. Tripteranthes pusillus, *Wall. Herb.* Cyananthus pusilla, *Miers in Wall. Cat.* 9008. Gonyanthes pusilla, *Miers in Trans. Linn. Soc.* xviii. 537, t. 38, f. 3.

TENASSERIM; at Tavoy, *Gomez.* NORTH and SOUTH CONCAN, *Law.*—DISTRIB. Cambodia.

I suspect this is a small state of *B. cœlestis.*

** *Radical leaves* 0.

5. **B. candida,** *Griff. mss.*; stem 4–8 in. filiform naked or with a few minute subulate scales, flowers $\frac{1}{4}$–$\frac{1}{3}$ in. solitary or 2–3 white or blue orbicular deltoid or obcordate in outline, wings rounded truncate or retuse at the top. ? Gonyanthes candida, *Blume Enum. Pl. Jav.* 29; *Miquel Fl. Ind. Bat.* iii. 615; *Miers in Trans. Linn. Soc.* xviii. 537.

KHASIA MTS., alt. 4–5000 ft., *Griffith,* &c. BURMA; at Amherst, *Wallich.* TENASSERIM, *Griffith, Parish.* DECCAN PENINSULA, from Canara southwards. CEYLON.—DISTRIB. Siam, Cochin, Madagascar.

This I can distinguish from small forms of *B. cœlestis* or *pusilla* only by the absence of radical leaves, possibly the effect of growing in water. The flowers are usually blue, but Griffith has given the name to a white-flowered state. I have no specimens of Blume's *Gonyanthes candida,* which he describes as being fleshy and growing on the dead roots of trees.

6. **B. nepalensis,** *Hook. f.*; stem 2–6 in. capillary 1–4-fld. naked, flowers $\frac{1}{6}$– in. obcordate white or yellowish, wings rounded or retuse at the top. Gonyanthes nepalensis, *Miers in Trans. Linn. Soc.* xviii. 537, t. xxxviii. f. 1. Cyanotis nepalensis, *Miers in Wall. Cat.* 9006.

NEPAL, *Wallich.* KHASIA HILLS, alt. 3–4000 ft., *J. D. H. & T. T., Clarke.*—DISTRIB. Cochin China, Hong Kong.

An extremely delicate white species.

7. **B. Wallichii,** *Hook. f.*; stem 4–6 in. naked or with a few minute lanceolate scales, flowers 1–5 $\frac{1}{3}$–$\frac{2}{3}$ in. linear triquetrous or narrowly 3-winged. Gonyanthes Wallichii, *Miers in Trans. Linn. Soc.* xviii. 537, t. 38, f. 2; *Benth. Fl. Hongk.* 364. Burmannia sp., *Griff. Ic. Pl. Asiat.* t. 272, f. 2.

BURMA, *Wallich.* TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 5592). TRAVANCORE; on the Anamallay Hills, *Wight.*—DISTRIB. Hong Kong.

Very variable in stature and robustness; the Mergui specimens are filiform or even capiliary, the Anamallay ones quite robust and branched.

8. **B. Championii,** *Thwaites Enum.* 325; stem 4–6 in. rather stout scaly 5–12-fld., flowers subcapitate $\frac{1}{4}$–$\frac{1}{3}$ in. tubular trigonous white. B. pseudo-alata, *Champ. mss.*

CEYLON; in forests of the Saffragan and Hinidoon Corle districts, *Champion, Thwaites.*

Apparently a very distinct species; the perianth-lobes are larger than usual in the genus, and the stigmas are on longer branches of the style.—Near *B. tuberosa,* Beccari, of Borneo.

2. THISMIA, *Griff.*

Dwarf fleshy coloured simple herbs with leaves reduced to scales. *Flowers* few or solitary, large, terminal. *Calyx-tube* produced far above the ovary, at length circumsciss, campanulate or turbinate, mouth annulate, contracted; lobes 3, recurved, subulate. *Petals* ovate oblong or subulate, recurved. *Stamens* 6, subsessile on the throat, connective very broadly dilated, connate or conniving as a deflexed membranous tube concealing the 2 parallel distinct elliptic cells. *Ovary* short, broad, 1-celled; style short, conic; stigmas 3, stout, erect; ovules many on 3 parietal placentas. *Fruit* turbinate, top falling away with the calyx-tube.—Species 7 or 8, Tropical Asiatic and American.

1. **T. Brunoniana,** *Griff. in Trans. Linn. Soc.* xix. 341, t. 39; stem several-flowered, calyx-lobes broadly ovate.

TENASSERIM; on decayed wood, *Griffith.*

A fleshy saprophyte, yellow, 4–8 in. high; stem stout, flexuous; scales scattered, ovate-lanceolate. *Flowers* racemose, pedicels stout, bracts like the scales. *Calyx-tube* $\frac{3}{4}$ in. long, yellow tessellated with scarlet, warted. *Connectives* very large, membranous, truncate and denticulate at the apex, connate for half their length, with a 2-lobed gland? at each commissure. *Fruit* broadly truncate.—Description from Griffith, l. c.

2. **T. Gardneriana,** *Hook. f. in Thwaites Enum.* 325; stem 1-fld., calyx-lobes rounded. T. Brunoniana, *Miers in Trans. Linn. Soc.* xx. t. 15, f. 20, 21 (*not of Griff.*). Tribrachys Gardneriana, *Champ. mss.*

CEYLON; at the roots of trees near Galle, *Champion.*

Whole plant 3–4 in. high, very closely allied to *T. Brunoniana*, but differing in the solitary flower and orbicular perianth-lobes.

Order CXLVIII. **ORCHIDEÆ.**

Herbs of various habit, rarely shrubby, of two principal forms: 1, terrestrial, tuberous-rooted herbs, with annual herbaceous simple stems and solitary or spicate or racemose flowers; 2, epiphytes with perennial stems or branches variously thickened and forming a pseudobulb, flowering from the top sides or base of the pseudobulb. *Perianth* superior, irregular, of 6 free or variously combined pieces; 3 outer (sepals) more or less alike, the 2 lateral sometimes united into a short or long sac or spur-like base (*mentum*); 3 inner (petals) dissimilar, the 2 lateral alike, the other (*lip*) usually very differently shaped. *Stamens* and *style* united in a column opposite the lip, anther (except in *Cypripedieæ*) solitary on the front or top or back of the column and free or adnate to it, 2-celled or by subdivisions 4-celled; top of the column sometimes produced in front (towards the lip) into a beak (*rostellum*); pollen grains usually cohering in each cell into 1, 2, or 4 pairs of oblong globose or pyriform waxy or powdery masses (*pollinia*) which are free or attached by pairs or fours to a viscus or gland, or a stalk (*caudicle*) that terminates in a gland and by which the pollen mass or masses may be removed entire. *Ovary* inferior, 1-celled (3-celled in *Apostasia*), usually linear and twisted; stigma a viscid surface on the top or concave face of the column, opposite the lip and below the anther (in *Cypripedium* the anthers are 2, one on each side of the base of a short style with a discoid stigma). *Seeds* minute, testa lax enclosing a homogeneous nucleus.—Genera 340, species about 5000, temperate and tropical, rarely arctic.

KEY TO THE TRIBES AND SUBTRIBES.

Tribe I. **Epidendreæ.** *Anther* 1, opercular, usually deciduous, cells parallel, distinct. *Pollinia* waxy, 1–4 in each cell, free, or those of each cell held together at the base by a viscid appendage, not attached by their bases or by a caudicle to the rostellum. (5 *Tipularia* has caudicled pollinia, and in *Calanthe* and other *Cœlogyneæ* the long bases of the pollinia resemble caudicles.)

Subtribe 1. Malaxeæ. Stems simple, leafy, rarely leafless, with often a pseudobulbous base. Inflorescence terminal. Flowers small or minute. Anther erect or inclined, usually persistent, not incumbent. Pollinia 4 (or 8), subequal, close together, usually free (without a viscid appendage).

Subtribe 2. Dendrobieæ. Inflorescence terminal, lateral, or on a leafless scape. Pollinia 4, rarely 2, 1seriate, parallel, appendage 0.

Subtribe 3. Erieæ. Inflorescence lateral, or on a leafless scape. Pollinia 8, subequal, appendage 0 or obscure.

Subtribe 4. Bletieæ. Inflorescence usually lateral. Pollinia 8, except in *Anthogonium*, usually in 2 series, parallel, ascending, connected by a granular appendage.

Subtribe 5. Cœlogyneæ. Inflorescence terminal. Pollinia 8 or 4, subequal, connected by viscus or an appendage (in *Calanthe* and others, the pollinia are appendaged, but the appendage is an undeveloped portion of the pollen itself, and is not derived from the rostellum).

TRIBE II. **Vandeæ.** *Anther* 1, posticous, opercular, resting on the rostellum, cells usually confluent. *Pollinia* waxy, usually 2 or 4 in superposed pairs, attached singly or in pairs to a gland or process of the rostellum which is carried away with them when they are removed.

Subtribe 1. EULOPHIEÆ. Leaves on pseudobulbs, plaited and nerved. Scape leafy or not. Lip spurred.

Subtribe 2. CYMBIDIEÆ. Leaves on pseudobulbs, plaited and nerved. Scape leafy or leafless. Lip not spurred. Column not produced into a foot.

Subtribe 3. SARCANTHEÆ. Stem without pseudobulbs, rooting. Leaves distichous (rarely 0), not plaited. Peduncle lateral or axillary.

Subtribe 4. NOTYLIEÆ. Stem with a 1-leaved pseudobulb, or slender. Leaves small, distichous. Anther behind and parallel to the terminal erect or inclined rarely horizontal rostellum. Pollinia with a simple or double stipes, pendulous from the tip of the rostellum.

TRIBE III. **Neottieæ.** *Stem* not bulbous (roots often bulbous). *Anther* 1, posticous, opercular, or erect and persistent; cells distinct, parallel. Pollen granular, powdery or in small masses.

Subtribe 1. VANILLEÆ. Stem tall, erect or climbing, often branched. Racemes or panicles terminal or terminal and axillary. Anther subopercular, incumbent on a short rostellum.

Subtribe 2. CORYMBEÆ. Stem tall, sometimes branched. Leaves broad. Racemes or panicles terminal. Anther erect, parallel to the erect rostellum.

Subtribe 3. SPIRANTHEÆ. Stem simple erect; root not tuberous. Leaves membranous or 0. Anther erect or inclined forward, parallel to the elongate rostellum.

Subtribe 4. DIURIDEÆ. Stem simple, erect from an underground tuber. Anther erect or inclined forward; rostellum usually short.

Subtribe 5. ARETHUSEÆ. Stem simple, erect from an underground tuber. Anther opercular, incumbent or suberect.

Subtribe 6. LIMODOREÆ. Stem simple, usually leafy, erect from an underground rootstock. Anther opercular, incumbent or suberect.

TRIBE IV. **Ophrydeæ.** *Anther* 1, posticous, erect, inclined or reflexed. *Cells* parallel or diverging, adnate to the column and often continuous with the rostellum. *Pollinia* 1, rarely 2 in each cell, granular, produced into short caudicles attached to a gland or to the rostellum.—Terrestrial herbs.

Subtribe 1. EUOPHRYDEÆ. Anther erect. Pollinia with their glands enclosed in a pouch of the rostellum.

Subtribe 2. HABENARIEÆ. Anther erect. Pollinia with their glands naked or partially included in a groove or fold of the rostellum.

Subtribe 3. DISEÆ. Anther reclinate or reflexed on the back of the column, rarely suberect. Stigma broad, subterminal or subadnate to the lip.

TRIBE V. **Cypripedieæ.** *Anthers* 2, one on each side of the ros-

tellum, sessile or stipitate. *Anther* posticous. *Pollinia* granular.—Terrestrial herbs.

KEY TO THE GENERA.

TRIBE I. **Epidendreæ.**

Subtribe 1. MALAXEÆ (and LIPARIDEÆ, *Gen. Pl.*).

1. OBERONIA. Epiphytic. Leaves distichous, fleshy, laterally compressed, nerveless. Flowers very minute, in cylindric spikes or racemes; column very short.

2. MICROSTYLIS. Terrestrial. Leaves membranous, base sheathing. Flowers small. Column very short.

3. LIPARIS. Terrestrial or epiphytic. Leaves membranous or coriaceous, base sheathing. Flowers small or medium-sized. Column long.

4. PLATYCLINIS. Epiphytic; pseudobulb 1-leaved. Flowers small; bracts rigid, glumaceous, ribbed, margins convolute. Column long or short with long or short membranous side arms.

5. TIPULARIA. Terrestrial; pseudobulb 1-leaved. Lip with a long spur.

6. OREORCHIS. Terrestrial, 1-leaved. Sepals and petals suberect. Column long.

7. CORALLORHIZA. Leafless. Root coralloid. Sepals and petals suberect. Column long.

Subtribe 2. DENDROBIEÆ.

* *Inflorescence lateral on a leafy or leafless stem, or terminal, or from the top of a* 1–2*-leaved pseudobulb.*

8. DENDROBIUM. Lip adnate to the produced foot of the column, contracted at the base or clawed, base erect and incumbent on the column, not mobile.

** *Inflorescence distinct from the pseudobulb.*

9. BULBOPHYLLUM. Racemes or spikes elongate, rarely 1-fld. or umbelliform. Sepals usually subequal, free. Lip jointed on the foot of the column and mobile.

10. SUNIPIA. Characters of *Bulbophyllum*, but anther turned away from the rostellum and dehiscing upwards. Flower spicate, coriaceous, concealed by the concave bracts.

11. CIRRHOPETALUM. Flowers umbellate. Lateral sepals longer than the dorsal, placed under the mobile lip or connate.

12. TRIAS. Scape 1-fld. Sepals spreading equally. Anther produced into a long appendage. Very small herbs, pseudobulbs 1-leaved.

13. DRYMODA. Scape 1-fld. Lateral sepals far removed from the dorsal. Pollinia connate in pairs. Pseudobulb small, 1-leaved; leaf caducous.

14. MONOMERIA. Raceme long, lax-fld.; flowers large. Lateral sepals broad, far removed from the dorsal. Pseudobulb 1-leaved; leaf narrow, petioled, coriaceous.

15. DENDROCHILUM. Flowers small, racemose. Sepals equal, spreading. Pseudobulb 0, or on a rigid creeping stem; leaf narrow.

16. PANISEA. Scape slender, few-fld. Sepals subequal. Lip very narrow, with a long sigmoid claw. Pollinia 4, distinct. Pseudobulb narrow, crowded, 1-leaved.

17. ACROCHÆNE. Scape loosely many-fld. Mentum saccate. Petals fimbriate. Lip jointed on the base of the column. Pollinia 2, globose, connected by a granular appendage.

18. Chrysoglossum. Scape tall, raceme long. Mentum saccate. Lip not jointed on the column. Anther 2-celled. Pollinia 2, not connected. Leaf plaited.

Subtribe 3. Erieæ.

19. Eria. Peduncles 1–many-fld., axillary or subterminal on a leafy stem or on a pseudobulb. Column short, produced into a foot. Habit very various.

20. Pheatia. Peduncle lateral or from a leafless rootstock, flowers minute. Column very short, produced into a foot. Stem short, leaves distichous.

21. Pachystoma. Scape leafless. Sepals conniving. Column elongate, produced into a foot. Capsule deflexed. Pseudobulb 1–2-leaved.

22. Spathoglottis. Scape distinct from the 1–2-leaved pseudobulb. Sepals spreading. Column elongate, foot 0. Capsule erect or nodding. Leaves elongate, plicate.

Subtribe 4. Bletieæ.

23. Acanthephippium. Sepals connate into a broad fleshy cup. Petals included, adnate to the base of the short column, which is prolonged into a long foot. Flower large in short few-fld. racemes.

24. Phaius. Flowers large, racemose. Sepals free. Lip gibbous or spurred, lateral lobes embracing the long column, which is not prolonged into a foot. Leaves often large, plaited.

25. Nephelaphyllum. Flowers racemose on a leafless scape. Sepals free. Lip spurred. Column 2-winged, foot 0. Pseudobulb very narrowed above and jointed with the membranous leaf.

26. Tainia. Flowers racemose on a leafless scape. Sepals and petals acute, caudate; lateral sepals inserted on the short foot of the column. Lip spurred or gibbous. Pseudobulbs thick, 1-leaved.

27. Anthogonium. Flowers racemose on a leafless scape. Sepals connate in a slender tube. Petals linear, claws free within the sepals. Column elongate, foot 0. Pollinia 4 (upper series wanting). Leaves few, grass-like, from a pseudobulb.

Subtribe 5. Cœlogyneæ.

* *Pseudobulb* 0. *Peduncle elongate, branched. Flowers small.*

28. Josepha. Lateral sepals forming a mentum. Column narrowly winged, foot 0. Pollinia 4.

** *Flowers capitate. Lateral sepals forming a mentum with the foot of the column.*

29. Glomera. Stem leafy. Flowers in a dense head. Pollinia 4.

30. Agrostophyllum. Stem leafy. Flowers in a dense head. Pollinia 8.

31. Ceratostylis. Flowers in a lax head, which is adnate to the solitary leaf. Column with 2 long arms. Pollinia 8.

*** *Flowers spicate or racemose. Lateral sepals united in a mentum.*

32. Cryptochilus. Pseudobulbs 1–2-leaved. Sepals connate in a 3-toothed tube. Clinandrum very broad; pollinia 8.

33. Trichosma. Stem not thickened, 2-leaved. Sepals spreading. Clinandrium elevated, toothed; pollinia 8. Flowers large.

**** *Flowers solitary, spicate or racemose. Sepals free. Column without a foot.*

34. Cœlogyne. Pseudobulbs distinct, 2-leaved. Lip sessile, its base embracing the elongate column. Pollinia 4. Flowers racemose, often large.

35. Otochilus. Pseudobulbs superposed, uppermost 2-leaved. Lip sessile, base saccate, lateral lobes ear-like. Column elongate; pollinia 4. Peduncle terminal, sheathed.

36. Pholidota. Pseudobulbs 2-leaved, solitary or superposed. Lip saccate. Column short, broadly 2-winged; pollinia 4. Peduncle sheathed.

37. Calanthe. Terrestrial herbs. Leaves plicate, produced after the racemose flowers. Lip usually spurred, claw connate into a tube with the column.

38. Arundina. Terrestrial herbs; stem leafy. Sepals spreading. Lip sessile, not spurred, base concave embracing the column.

Tribe II. **Vandeæ.**

Subtribe 1. Eulophieæ.

39. Eulophia. Scape usually leafless. Petals like the dorsa sepal. Lip gibbous or saccate, rarely spurred. Gland of the rostellum usually produced into a stipes.

Subtribe 2. Cymbidieæ.

40. Cymbidium. Sepals and petals subequal, spreading. Lobes of the lip embracing the unwinged column. Pollinia with a transverse granular appendage. Leafy stems short, pseudobulbous.

41. Cyperorchis. Lip erect from the base, narrow; lateral lobes embracing the column. Stem short, leafy. Scape sheathed, leafless.

42. Geodorum. Sepals and petals erecto-patent, subequal. Lip sessile, broad from the base, ventricose, erect, almost complicate. Stem short, leafy, and leafless scapes arising from a stout subtuberous rootstock.

43. Grammatophyllum. Sepals and petals spreading. Pollinia after removal attached to the lobes or horns of a lunate or curved stipes. Stem leafy; scape many-fld., leafless.

44. Dipodium. Sepals and petals spreading. Pollinia after removal attached to 2 distinct stipes. Stems leafy or leafless; pseudobulb 0.

45. Thecostele. Sepals and petals spreading. Lip adnate to the base of the column, united at the base with it into a short tube, then spreading. Column sigmoid. Pseudobulb 1-leaved. Scape leafless, lateral, recurved.

46. Bromheadia. Sepals and petals spreading. Lip erect; lateral lobes embracing the 2-winged column. Pseudobulb 0; flowering stem with distichous leaves; peduncle terminal, sometimes branched, rachis of raceme often thickened serrate by the distichous bracts.

47. Polystachya. Sepals conniving or subpatent; lateral connate into a mentum with the foot of the short column. Flowering stems short, few-leaved, at length pseudobulbous, flowers small racemose or panicled.

Subtribe 3. Cyrtopodieæ.

48. Plocoglottis. Terrestrial. Lip saccate at the base, connate by a plaited membrane with the column. Pollinia affixed to distinct filiform stipes. Scape erect, raceme simple.

Subtribe 4. Sarcantheæ.

* *Lip not spurred* (*see* Arachnanthe). *Column without a foot, short, not winged.*

49. Luisia. Sepals and petals not spreading widely. Lip not jointed at the base, usually longer than the sepals. Stipes of the pollinia ovate, flat. Leaves terete; flowers in short spikes.

50. Cottonia. Sepals spreading widely, broader than the petals. Lip not

jointed at the base. Stipes of the pollinia long, narrow. Flowers in simple or branched, very long peduncled racemes.

51. STAUROPSIS. Sepals and petals spreading widely. Lip not jointed at the base. Stipes of pollinia long, narrow. Flowers medium-sized, in simple or branched racemes.

52. ARACHNANTHE. Sepals and petals widely spreading. Lip jointed at the base, gibbous or shortly spurred. Stipes of the pollinia flat, acute from a broad base. Flowers large, loosely racemed.

** *Lateral sepals adnate to the foot of the column, forming a mentum. Spur, if present, distant from the base of the lip, sometimes recurved and ascending.*

53. PHALÆNOPSIS. Lip spreading from the base or erect at the base, not spurred. Column erect, foot short. Stipes of the pollinia linear or spathulate. Flowers large, in simple or branched racemes.

54. DORITIS. Lip with a long claw, incumbent, 3-lobed, not spurred. Column winged, foot long. Flowers small or medium-sized, in simple or branched racemes.

55. RHYNCHOSTYLIS. Lip saccate at its union with the foot of the column, then narrowed, blade ovate or tongue-shaped. Column wingless, foot short. Stipes of the pollinia subfiliform. Flowers rather large, in long dense racemes.

56. SARCOCHILUS. Lip shortly incumbent or adnate to the base of the column, blade fleshy, top often inflexed, gibbous or shortly stoutly spurred. Stipes of the pollinia linear or oblong. Flowers usually small, in simple racemes.

57. TRICHOGLOTTIS. Lip with a long foot adnate to the base of the column. Flowers few, small.

58. AERIDES. Lip jointed on to the long foot of the column, blade with an ascending or recurved hollow spur. Stipes of the pollinia narrow. Flowers in simple or branched racemes.

*** *Lip saccate or spurred at the base (not under the blade). Column wingless.*

59. RENANTHERA. Sepals and petals spreading widely; lateral sepals usually the largest, parallel and placed under the small lip. Stipes of the pollinia flat, narrow. Racemes branched.

60. VANDA. Sepals and petals fleshy, widely spreading from a narrow base. Stipes of pollinia broad. Flowers large, in simple racemes.

61. SACCOLABIUM. Sepals and petals widely spreading. Column without appendages. Stipes of pollinia usually slender. Flowers small, in simple or branched racemes.

62. SCHŒNORCHIS. Flowers of *Saccolabium*, but column with 2 erect linear appendages.

63. UNCIFERA. Sepals and petals erecto-patent. Spur of lip strongly incurved. Stipes of the pollinia with a dilated sub-2-lobed tip. Flowers small, in dense-fld. racemes.

64. ACAMPE. Sepals and petals thick, concave. Stipes of pollinia slender. Flowers small, crowded in a short rigid simple or branched peduncle.

65. SARCANTHUS. Sepals and petals fleshy, spreading. Spur of the lip internally divided longitudinally. Flowers small, in simple or panicled slender racemes.

66. CLEISOSTOMA. Spur of the lip almost closed with a callus or lamella. Flowers small, crowded in simple or branched racemes.

67. ORNITHOCHILUS. Sepals spreading; lateral connate at the base of the claw of the lip, and together with it forming a mentum. Lip broadly 2–3-lobed, often fimbriate. Stipes of the pollinia strap-shaped. Flowers small, in simple or branched slender racemes.

68. TÆNIOPHYLLUM. Sepals connivent or subpatent, bases often connate. Pollinia 4, distinct; stipes short. Dwarf herbs, leafless or few-leaved; flowers minute.

69. MICROSACCUS. Sepals and petals spreading. Pollinia 4, distinct; stipes linear. Small herbs with many small distichous leaves, and 1–2 minute flowers.

70. DIPLOCENTRUM. Sepals and petals widely spreading. Lip 2-spurred towards the base.

Subtribe 5. NOTYLIEÆ.

71. ACRIOPSIS. Sepals narrow, spreading; lateral connate. Petals broader. Claw of lip connate with the column, and forming a broad pitcher. Top of column hooded, membranous. Pollinia 2 or 4, stipes simple. Pseudobulbs with 1–2 narrow leaves. Flowers small, in simple or branched slender lax racemes.

72. PODOCHILUS. Sepals erect. Lip jointed on to the foot of the column. Stipes of the 4 pollinia 2. Leaves small, distichous; pseudobulb 0. Flowers small, in a terminal raceme.

73. APPENDICULA. Sepals erect. Lip continuous with the foot of the column, not jointed. Leaves distichous; pseudobulbs 0. Flowers small, in lateral or subterminal racemes.

74. THELASIS. Sepals erect. Lip erect, undivided. Column without a foot. Stipes of pollinia simple. Herbs with 1-leaved pseudobulbs, or leaves distichous as in *Oberonia*. Flowers minute, in terminal racemes.

TRIBE III. **Neottieæ.**

Subtribe 1. VANILLEÆ.

75. GALEOLA. Climbers. Leaves 0 or on flowerless branches. Sepals spreading or broadly concave. Lip broad, concave, loosely investing the column.

76. VANILLA. Climbers. Leaves 0 or coriaceous. Claw of the lip adnate to the column; limb broad, concave, embracing the column.

Subtribe 2. CORYMBIEÆ.

77. CORYMBIS. Sepals and petals narrow, cohering in a tube. Lip linear Column elongate. Flowers loosely panicled.

78. TROPIDIA. Lateral sepals connate, forming a mentum. Lip sessile. Column short. Spikes short, dense-fld.

Subtribe 3. SPIRANTHEÆ.

* Lip spurred, or with a prominent sac.

79. PHYSURUS. Lip above the spur abruptly contracted, hollow, spreading; blade entire or 2-lobed. Clinandrium hardly prominent. Leaves membranous, ovate or lanceolate.

80. ANŒCTOCHILUS. Claw of the lip long, spreading, fimbriate; blade 2-lobed. Clinandrium cupular. Leaves subradical, ovate, often coloured.

81. VRYDAGZINIA. Lip sessile. Base of column with 2 processes descending into the spur. Stem leafy.

82. CYSTORCHIS. Lip sessile; spur obtuse or saccate; blade lanceolate, entire. Leaves subradical, ovate, often coloured.

83. HERPYSMA. Lip erect, concave, margins connate with the column; spur long; blade spreading. Clinandrium hooded. Pollinia with rigid caudicles. Stem leafy.

** *Lip not spurred, if saccate the sac concealed by the sepals.*

† *Lip clawed, ventricose above the base* (*or sessile in* Spiranthes).

84. ODONTOCHILUS. Lateral sepals connate, forming a mentum. Claw of lip toothed or fimbriate. Stem leafy; flowers loosely spiked.

85. HÆMARIA. Sepals free. Claw of lip concave, entire; blade 2-lobed. Clinandrium cupular. Stem leafy; flowers loosely spiked or racemed.

86. DOSSINIA. Sepals free. Lip with erect side lobes and a 2-fid midlobe. Column with a long appendage in front.

87. SPIRANTHES. Dorsal sepals and petals together forming a hood; lateral and column decurrent on the ovary or spike, lax or dense-fld., often secund or spiral.

†† *Lip not clawed* (*see also* Spiranthes) *sessile or adnate to the column; base not ventricose.*

88. NEOTTIA. Leafless scaly herbs. Sepals and petals free. Lip 2-fid.

89. LISTERA. Stem with 2 opposite or subopposite leaves. Sepals and petals free, spreading.

90. CHEIROSTYLIS. Stem laxly leafy. Sepals combined in a tube.

††† *Lip sessile, not clawed, often adnate to the column, usually shorter than the sepals, base ventricose* (*except* Zeuxine).

91. ZEUXINE. Sepals free, dorsal with the petals cohering in a hood. Column without appendages.

92. HYLOPHILA. Dorsal sepal hooded; lateral obliquely adnate to the base of the column. Lip with a small linear inflexed blade.

93. GOODYERA. Sepals free. Lip erect, entire. Clinandrium cup-shaped.

94. HETÆRIA. Sepals free or connate below. Lip at the base more or less adnate to the column, entire or with 2 spreading lobes.

Subtribe 4. DIURIDEÆ.

95. APHYLLORCHIS. Leafless herbs. Sepals free.

96. CRYPTOSTYLIS. Leaves one or few. Sepals and petals subulate, convolute. Lip superior, broad, embracing the base of the very short column.

97. CORYSANTHES. Dorsal sepal large; lateral small, linear or filiform. Lip tubular. Low herbs, flower solitary, very large for the plant.

Subtribe 5. ARETHUSEÆ.

98. POGONIA. Sepals erect or spreading. Lip undivided or 3-lobed. Column elongate, not winged. Flowering stem leafy, or leafless with the leaf produced afterwards.

99. DIDYMOPLEXIS. Perianth bilabiate, upper lip formed by the dorsal sepal and petals, lateral sepals connate, forming a 2-fid lower lip. True lip very broad, undivided. Slender leafless herbs, flowers small.

100. GASTRODIA. Sepals and petals united into a ventricose 5-lobed tube. Lip undivided. Leafless herbs.

101. EPIPOGUM. Sepals narrow, free. Lip concave, saccate or shortly spurred at the base. Column short. Leafless herbs.

Subtribe 6. LIMODOREÆ.

102. CEPHALANTHERA. Sepals conniving. Lip concave or shortly spurred at the constricted base. Stem leafy; flowers and capsules erect.

103. EPIPACTIS. Sepals free, spreading. Lip concave above the constricted base. Stem leafy; flower and capsules nodding or pendulous.

TRIBE IV. **Ophrydeæ.**

Subtribe 1. SERAPIEÆ.

104. ORCHIS. Lip spurred. Glands of the pollinia both in one pouch.

Subtribe 2. HABENARIEÆ.

105. HERMIRIUM. Lip not spurred. Low small-fld. herbs.

106. HABENARIA. Lip spurred. Sepals equalling or exceeding the petals. Flowers spicate or racemose. Rostellum not elongate.

107. DIPLOMERIS. Lip spurred. Sepals much smaller than the petals. Flowers solitary, large.

108. HEMIPILIA. Lip spurred. Sepals larger than the petals. Leaf radical, solitary; raceme few-fld. Rostellum very prominent.

Subtribe 3. DISEÆ.

109. SATYRIUM. Lip erect, 2-spurred. Flower spicate.

Subtribe 4. CORYCIEÆ.

110. DISPERIS. Lateral sepals spurred or saccate. Lip not spurred, tip 2-lipped or variously dilated.

TRIBE V. **Cypripedieæ.**

111. CYPRIPEDIUM. Sepals spreading. Lip inflated. Anthers 2. Ovary 1-celled. Flowers large.

112. APOSTASIA. Sepals, petals and lip all similar. Anthers 2. Ovary 3-celled. Flowers small.

113. NEUWIEDIA. Sepals and petals similar. Lip rather broader. Anthers 3. Ovary 3-celled. Flowers small.

TRIBE I. EPIDENDREÆ (see p. 667).

1. **OBERONIA,** *Lindl.*

Tufted epiphytes. *Leaves* distichous, equitant, ensiform (very rarely terete). *Flowers* very minute in dense subcylindric spikes or racemes. *Sepals* broadly ovate or oblong, subequal. *Petals* smaller. *Lip* sessile, concave, entire or 2–4-lobed. *Column* very short; anther terminal, incumbent; pollinia 4, waxy, cohering by a viscus.—Species about 60, Tropical Asiatic, Australian and Pacific.

The flowers are generally 2 to each bract, which is lanceolate and free or broader and more or less convolute, sometimes very broad and forming a tube round both flowers; the upper flower has often a sheathing obtuse bracteole.—The genus wants a careful study of living specimens. I am far from satisfied with the following delimitation of species, the specimens being in some cases quite insufficient for a sure diagnosis.

Sect. I. **Oberonia** PROPER. *Stem* very short, rarely 2–4 in. *Leaves* ensiform, chiefly radical or subradical. *Sepals* subequal.

* Side lobes or all the lobes of lip deeply toothed or laciniate.

1. **O. iridifolia,** *Lindl. Gen. & Sp. Orchid.* 15; *Fol. Orchid. Oberon.* 1; stem short, leaves 3–5 in. broadly ensiform, spike long slender decurved, flowers not whorled sessile, bracts broad erose convolute sheathing the ovary, petals oblong erose, lip more or less quadrate deeply toothed tip broadly 2-fid. *Wall. Cat.* 1948/2 (*in part*). Malaxis iridifolia, *Reichb. f. in Walp. Ann.* vi. 208.

SIKKIM HIMALAYA, *Griffith.* SILHET and the KHASIA HILLS, *Roxburgh*, &c. TENASSERIM, *Griffith, Parish.* NILGHIRI and PULNEY HILLS, *Wight*, &c.

Very variable if, as I think probable, the following forms are correctly referred to it. The perianth alone is exposed from the broad sheathing scarious bract as in *O. ensiformis* and others. The rachis is stout or slender, the capsule sessile. There is such a mixture of specimens in a very bad state under Wallich No. 1948 that a reference to them is of no use.

O. IRIDIFOLIA PROPER; leaves 6–10 by $\frac{3}{4}$–1 in., lip broader than long quadrate glabrous or pubescent. Cymbidium iridifolium, *Roxb. Fl. Ind.* iii. 458.—Sikkim, Silhet and Tenasserim.

Var. *denticulata*; leaves 4–5 by $\frac{3}{4}$–1 in., scape shorter flattened, lip longer than broad more triangular glabrous less deeply toothed. O. denticulata, *Wight Ic.* t. 1625; *Lindl. Fol. Orchid. Oberon.* 2; *Walp. l. c.* 208.—Nilghiri and Pulney Hills.

Var. *angustifolia*; leaves 8–10 by $\frac{1}{2}$ in. straight, scape longer narrowly winged, lip short glabrous with a small square midlobe.—Khasia Hills.

Var. *brevifolia*; leaves 2–4 by $\frac{1}{2}$–$\frac{3}{4}$ in. falcate, scape and spike shorter, lip triangular glabrous tip broadly bifid. O. flexuosa, *Parish mss.*—Moulmein, *Griffith, Parish.*

2. **O. Clarkei,** *Hook. f. Ic. Pl.* t. 1779 A; very small, stem short, leaves 1 in. linear-ensiform acute or obtuse, scape short many-bracteate and spike very slender, flowers very minute whorled subsessile longer than the broad acuminate toothed bracts, petals broadly ovate obtuse nearly as large as the sepals, lip 3-lobed about equalling the sepals, lateral lobes pectinately toothed, midlobe small obcuneate truncate.

KHASIA MTS.; Shillong, alt. 5000 ft., *Clarke.*

Whole plant 2 in. high. *Leaves* about $\frac{1}{6}$ in. broad, straight. *Scape* adnate at the base to the uppermost leaf, rachis filiform; flowers red, about $\frac{1}{30}$ in.—I have seen only one specimen of this little species, which is most nearly allied to *O. Griffithiana*, Lindl.

3. **O. Jenkinsiana,** *Griff. mss.*; stem elongate, leaves linear, scape terete sparsely bracteate, spike decurved, flowers minute subsessile densely imbricate, bracts short erose, petals oblong, lip very short 3-lobed, lateral lobes deeply toothed, terminal small quadrate crenate. *Lindley Fol. Orchid. Oberon.* 4. Malaxis Jenkinsiana, *Reichb. f. in Walp. Ann.* vi. 211.

KHASIA HILLS, *Griffith*, &c., Joowye and Kumroot, alt. 4000 ft., *Clarke, J. D. H. & T. T.*

Stem 2–4 in. *Leaves* 3–6 by $\frac{1}{6}$–$\frac{1}{3}$ in., straight or falcate, acuminate. *Scape* adnate to the upper leaf, with the spike 3–4 in.; flowers dark brown, about $\frac{1}{30}$ in.; lip with a concave disk.—The lip resembles that of *O. iridifolia.*

4. **O. Griffithiana,** *Lindl. Sert. Orchid.* t. 8 B; *Fol. Orchid. Oberon.* No. 44; stem elongate, leaves linear, scape slender naked, spike very slender, flowers very minute pedicelled more or less whorled, bracts lanceolate subentire, petals narrow linear, lip short 3-lobed, lobes subequal lacerate. O. cimicina, *Griff. Notul.* iii. 275; *Lindl. Fol. Orchid. Oberon.* 1. Malaxis Griffithiana & cimicina, *Reichb. f. in Walp. Ann.* vi. 208, 216.

PEGU, *M'Lelland, Kurz.* MARTABAN and TENASSERIM, *Griffith, Parish.*

Stem $\frac{1}{2}$–3 in. (plant sometimes acaulescent). *Leaves* 1–2 by $\frac{1}{8}$–$\frac{1}{4}$ in., acute or obtuse, straight or falcate. *Scape* and *spike* together 2–3 in., decurved; flowers pedicelled, purplish brown, about $\frac{1}{50}$ in., sometimes in separate whorls; lip about equalling the sepals, midlobe irregularly lacerate or more or less 2-lobed.

** Lip entire or 3-lobed, margins quite entire or erose, never pectinate.

† Petals broad elliptic oblong or ovate.

a. Lip quadrate or orbicular entire, or if lobed with the midlobe very small and short.

5. **O. maxima,** *Parish mss.*; leaves very long and broad, scape very stout, flowers sessile most densely imbricate round a thick straight rachis, bracts broad obtuse erose sheathing the subsessile ovary, petals short broad quite entire, lip orbicular crenulate, disk thickened.

TENASSERIM; at Moulmein, *Parish.*

This and *O. ensiformis* are the largest-leaved species, and this has the stoutest scapes, 3–4 by $\frac{1}{4}$–$\frac{1}{3}$ in., and thickest spikes, which are 4–6 in. long. The flowers are appressed to the spike with very short ovaries. *Leaves* 12 by $1\frac{1}{2}$ in., nearly straight.

6. **O. orbicularis,** *Hook. f.*; leaves narrowly ensiform acute, scape subcompressed, flowers densely imbricate on a stout rachis, bract orbicular erose sheathing the shortly pedicelled ovary, petals broad quite entire, lip orbicular crenulate notched.

SIKKIM HIMALAYA; at Dikkeeling, alt. 3000 ft., *Clarke.*

Leaves 4–6 by $\frac{1}{4}$–$\frac{3}{4}$ in., nearly straight. *Scape* 2–3 in.; spike 3–5 in., straight or slightly curved; flowers about $\frac{1}{20}$ in.

7. **O. brachystachys,** *Lindl. Sert. Orchid.* (*under* t. 8); *Fol. Orchid. Oberon.* 4; leaves short oblong obtuse thin, scape very short, raceme about equalling the leaves, bracts lanceolate, flowers whorled shortly pedicelled, petals broad erose, lip very short crenulate, lateral lobes large rounded terminal short truncate. Malaxis brachystachys, *Reichb. f. in Walp. Ann.* vi. 211.

TENASSERIM; at Mergui, *Griffith.*

Leaves 1–2 by $\frac{1}{3}$–$\frac{1}{2}$ in. *Raceme* flexuous or decurved, rachis slender; lower bracts longer than the flowers, which are about $\frac{1}{30}$ in. *Fruit* pedicelled.

8. **O. truncata,** *Lindl. Fol. Orchid. Oberon.* 3; leaves linear ensiform subacute, scape adnate to a leaf greatly flattened above it, spike stout short lax-fld., flowers subwhorled sessile, bracts acuminate serrulate, petals oblong quite entire, lip much broader than long subreniform with rounded oblong lateral lobes and an obscure midlobe. Malaxis truncata, *Reichb. f. in Walp. Ann.* vi. 210.

CEYLON; at Hantani, *Champion.*

Leaves 3–4 by $\frac{1}{3}$–$\frac{1}{2}$ in., straight. *Scape* above the adnate leaf very short and broad; spike $2\frac{1}{2}$ in., stout; flowers much smaller than the rachis is broad, very pale, about $\frac{1}{20}$ in.; lip quite unlike that of any other species, succulent, more than twice as broad as long, margins quite entire, midlobe a low broad rounded projection on the margin as it were of the edge furthest from the column.—Described from a single specimen.

β. Lip oblong or obcordate, longer than the sepals, side lobes undeveloped or minute, midlobe 2-fid.

9. **O. verticillata,** *Wight Ic.* t. 1626; leaves small narrowly ensiform acute or acuminate, scape short terete, racemes very long, flowers whorled pedicelled, bracts lanceolate, petals oblong, lip twice as long as the sepals

obcordate with rounded lobes and an acute sinus. *Lindl. Fol. Orchid. Oberon.* 3 (*excl. some vars.*). Malaxis verticillata, *Reichb. f. in Walp. Ann.* vi. 211.

TRAVANCORE and NILGHIRI MTS., *Wight*, &c.—DISTRIB. Java?

Leaves 2–4 by $\frac{1}{4}$–$\frac{1}{3}$ in., rather thin, nearly straight. *Scape* 1–2 in.; racemes 4–6 in., decurved; bracts erose, about equalling the pedicels; flowers $\frac{1}{10}$–$\frac{1}{8}$ in., pale yellow; lip with narrow rounded shoulders, contracted quite entire sides and rather diverging lobes. *Capsules* pedicelled.—The Javan plant has a much narrower lip and much larger capsules.

10. **O. pyrulifera,** *Lindl. Fol. Orchid. Oberon.* No. 15; leaves small narrowly ensiform acute or subacute, scape terete with slender subulate bracts, racemes short decurved, flowers whorled pedicelled, bracts lanceolate, petals oblong, lip oblong cleft to the middle into two parallel acute lobes. O. verticillata, *var.* khasiana, *Lindl. Fol. Orchid. Oberon.* 3. Malaxis verticillata *var.* khasiana and M. pyrulifera, *Reichb. f. in Walp. Rep.* vi. 210, 211.

KHASIA MTS., alt. 4–6000 ft., *J. D. H. & T. T.* MUNNIPORE, *Watt.*

Leaves 1–2$\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., straight or falcate. *Scape* and *raceme* together 2–3 in.; flowers pale yellow-green, about $\frac{1}{15}$ in.—Differs from *O. verticillata* in the small size, short racemes, very small flowers and lip with acute parallel lobes. I find no difference between *O. pyrulifera* and *O. verticillata* var. *khasiana*; the petals are very obscurely erose and crenulate at the tip.

11. **O. Thwaitesii,** *Hook. f.*; leaves ensiform coriaceous straight subacute, scape terete, spike long suberect rigid, flowers sessile minute in separated whorls, bracts ovate obtuse fimbriate, petals oblong erose, lip longer than the sepals gradually widening to the 2-lobed base, lobes rounded with a broad sinus. O. verticillata, β. pubescens, *Lindl. Fol. Orchid. Oberon.* 3. Malaxis verticillata, *var.* pubescens, *Reichb. f. in Walp. Ann.* vi. 210.

CEYLON, *Thwaites* (C.P. 2516 in Herb. Hook, which is the number of *Strychnos colubrina*).

Whole plant of a whitish hue when dry. *Leaves* 3–4 by $\frac{1}{2}$ in. *Scape* and *spike* 6–10 in.; rachis firm and rather stout, but not swollen; flowers few in a whorl, about $\frac{1}{20}$ in., yellow; ovary extremely short, so that the perianth is close on the rachis. *Capsules* very small, sessile, subglobose.—Very different from *O. verticillata* in the bracts, habit and minute sessile flowers; I find no trace of the pubescence described by Lindley.

12. **O. Falconeri,** *Hook. f.*; leaves short broadly ensiform acute, scape short stout bracteate, raceme stout erect or decurved, bracts ovate-lanceolate or oblong serrulate, flowers shortly pedicelled, petals ovate, lip oblong or subquadrate with small rounded or tooth-like lateral lobes, tip with two small incurved lobes separated by a broad sinus. *Hook. f. Ic. Plant.* t. 1780. O. iridifolia, *Wall. Cat.* 1948/1 and 3.

TROPICAL HIMALAYA, KUMAON and the Deyra Dhoon, *Falconer, Wallich.* BEHAR and Chola Nagpore, *J. D. H., Clarke.* The CONCAN; at Bombay, *Law,* &c.

Leaves 1–2 by $\frac{1}{4}$–$\frac{1}{2}$ in., straight or falcate, coriaceous. *Scape* terete, much shorter than the leaves; racemes longer; rachis stout, deeply grooved in fruit; flowers about $\frac{1}{20}$ in., greenish yellow. *Capsules* shortly pedicelled.—Nearly allied to *O. khasiana*, but more robust with shorter broader leaves, short lateral lobes or shoulders to the lip, the terminal lobes of which are short and distant.

13. **O. longibracteata,** *Lindl. Gen. & Sp. Orchid.* 3; *Fol. Orchid.*

Oberon. 2; stem elongate, leaves linear or oblong-linear, scape subterete above where adnate to the upper leaf, spike short, bracts subulate much exceeding the sessile flowers, petals broadly oblong entire, lip short, lateral lobes small orbicular, midlobe large rounded-obcordate obscurely 2-lobed. Malaxis longibracteata, *Reichb. f. in Walp. Ann.* vi. 209.

CEYLON; Hantani and Hewahetti districts, *Walker*, &c.

Stems 1–6 in., flexuose, flattened above. *Leaves* 2–3 by $\frac{1}{4}$–$\frac{1}{3}$ in., acute. *Scape* and sharply decurved spike 1–2 in.; flowers pale red, lip red (*Thwaites*). *Capsules* subsessile.—In habit intermediate between the caulescent and stemless species.

14. **O. Helferi,** *Hook. f. Ic. Plant.* t. 1785 A; leaves small membranous ensiform acuminate, scape filiform naked, raceme about as long as the leaves filiform, bracts lanceolate, petals oblong obtuse, lip twice as long as the sepals linear-oblong with narrow lateral lobes and linear midlobe cleft to the base into two narrow parallel acute arms.

TENASSERIM, *Helfer*.

Leaves $\frac{1}{2}$–1 in., translucent when dry. *Scape* with raceme 1–2 in., erect or curved; flowers very membranous, loosely clustered, very pale, about $\frac{1}{20}$ in. long.—The narrow lateral lobes of the lip extend about half-way down, and end in an obtuse tooth. A very delicate species.

γ. *Lip deeply 3-lobed, side lobes broad or long, midlobe obcordate or 2-fid.*

15. **O. ensiformis,** *Lindl. Fol. Orchid. Oberon.* 4; leaves very long coriaceous ensiform acuminate, scape subterete naked, spike dense-fld., bracts sheathing the flowers erose, petals broad erose, lateral lobes of erose lip broad rounded midlobe obcordate. O. trilobata, *Griff. Notul.* iii. 273. O. acaulis, *Hook. Bot. Mag.* t. 5056 (*not of Griff.*). Malaxis ensiformis, *Smith in Rees Encycl.*; *Reichb. f. in Walp. Ann.* vi. 212 (*excl. syn.*).

NEPAL, *Hamilton*. Khasia Mts., *Griffith*.

Leaves 10–18 by $\frac{1}{2}$–$\frac{3}{4}$ in., narrowed to the tip. *Racemes* shorter than the leaves, nearly straight or curved; bracts tubular with truncate tips, perianth alone exserted, membranous; flowers about $\frac{1}{20}$ in., orange-yellow; lip hardly longer than the sepals.

16. **O. ferruginea,** *Parish mss.*; leaves long coriaceons narrowly ensiform falcate acuminate, scape short stout terete naked, spike shorter than the leaves, bracts broadly ovate subacute sheathing the subsessile flowers, petals linear-oblong fimbriate, lip short fimbriate, side lobes narrow short ascending, midlobe obcordate lobules rounded crenate sinus acute.

TENASSERIM; at Moulmein, *Parish*.

Leaves 6–10 by $\frac{1}{2}$–$\frac{2}{3}$ in. *Scape* with raceme 4–5 in., bracts membranous; flowers about $\frac{1}{20}$ in., perianth alone exserted; lip covered with large dots, side lobes acute or obtuse.

17. **O. myriantha,** *Lindl. Fol. Orchid. Oberon.* 4; leaves narrowly ensiform straight acuminate, scape stiff terete naked or with erect subulate bracts, raceme elongate, flowers pedicelled more or less whorled, bracts erose lower subulate upper ovate, petals broad entire, lip longer than the sepals, lateral lobes broad, midlobe oblong or obcordate deeply 2-lobed lobules oblong or rounded sinus acute. *Walp. Ann.* vi. 212. O. sikkimensis, *Lindl. l. c.* O. acaulis, *Griff. Notul.* iii. 275; *It. Notes* 76

No. 1130; *Ic. Pl. Asiat.* t. 286, f. 1. Malaxis myriantha & sikkimensis, *Reichb. f. in Walp. Ann.* vi. 212.

SIKKIM HIMALAYA, alt. 4–5000 ft., *J. D. H.*, *Clarke.* KHASIA MTS., alt. 3500–5000 ft., *Griffith*, &c.; Naga Hills, *Clarke.*

Leaves 4–10 by $\frac{1}{2}$–$\frac{2}{3}$ in., coriaceous. *Scape* sometimes adnate to the uppermost leaf; spike and raceme longer or shorter than the leaves, straight or decurved, rachis slender but stiff; flowers about $\frac{1}{10}$ in., pale yellow-green, lateral lobes of lip rounded, or rather truncate and notched or crenate; terminal lobes variable in length. *Capsules* pedicelled.—Except in the shorter racemes, I find no character for *sikkimensis*, and they are as short in some specimens of *myriantha*.

18. **O. demissa,** *Lindl. Fol. Orchid. Oberon.* 4; leaves short thin linear-oblong obtuse, scape short adnate to the uppermost leaf, bracts short ovate acute erose, spike short erect or decurved dense-fld., flowers minute subsessile, petals broadly oblong denticulate, lip very short, lateral lobes broad truncate crenate terminal short broad quadrate. *Hook.f. Ic. Plant.* t. 1785 B. Malaxis demissa, *Reichb. f. in. Walp. Ann.* vi. 211.

SIKKIM HIMALAYA; at the foot hills, *J. D. H.*

Leaves 2 by $\frac{1}{2}$ in., obtuse. *Scape* $\frac{1}{2}$ in.; raceme $1\frac{1}{2}$ in., pale green; flowers about $\frac{1}{30}$ in., obscurely whorled; lateral sepals orbicular, much larger than the dorsal. —Specimens very few.—The species had perhaps better be referred to the group with *O. orbicularis.* Lindley describes the midlobe of the lip as ovate, acute, but I find it to be as described above in his and my own specimens.

19. **O. recurva,** *Lindl. in Bot. Reg.* 1839, *Misc.* No. 8; *Fol. Orchid. Oberon.* 5; leaves small oblong-lanceolate acuminate, scape very short, raceme slender dense-fld., flowers very minute not whorled, bracts lanceolate, petals obovate oblong and lip erose, lateral lobes rounded midlobe 2-fid. *Hook. f. Ic. Plant.* t. 1784 A. O. setifera, *Lindl. l. c.* 3. Malaxis setifera & recurva, *Reichb. f. in Walp. Ann.* vi. 210, 212.

The CONCAN, *Law*, *Dalzell*, &c.

Leaves 1–$1\frac{1}{2}$ in., thin. *Scape* and *raceme* 2–3 in., more or less recurved or decurved; bracts shorter than the pedicels; flowers $\frac{1}{30}$ in., hyaline, sparsely gland-dotted; lip equalling or longer than the sepals; divisions of midlobe variable in breadth, sinus acute or obtuse. *Capsules* on pedicels as long as themselves.—I have failed to find in Lindley's or other specimens the setaceous petals described by that author.

†† Petals linear.

a. Lip orbicular or quadrate, entire or obscurely lobed.

20. **O. zeylanica,** *Hook. f. Ic. Plant.* t. 1782 A; leaves linear ensiform obtuse, scape flattened with a small adnate leaf about the middle, spike shorter than the leaves decurved, flowers loosely imbricate, bracts ovate subentire, petals linear entire, lip quadrate quite entire or with obscure lobes at the outer angles. O. Browneana, *Thwaites Herb.* (C.P. 3869). O. longibracteata, *Thw. in part* (C.P. 543).

CEYLON; at Matelle East, *Beckett*; Hantani, *Thwaites.*

Leaves 4–7 by $\frac{1}{2}$–$\frac{3}{4}$ in., nearly straight. *Scape* 3–4 in., about $\frac{1}{6}$ in. diam., stout, hardly compressed above the adnate leaf, which is very small. *Spike* 3 in., curved or decurved; flower $\frac{1}{10}$ in., pale. *Fruit* sessile.—I advance this species with much hesitation, for I suspect that there has been some confusion in the distribution of Thwaites' *Oberonias*, and more specimens are wanted of all.

21. **O. Wallichii,** *Hook. f.*; leaves short broad fleshy falcate obtuse, scape much flattened adnate below to a broad leaf, spike decurved, flowers densely imbricate, bracts ovate acuminate erose, lip quadrate or rounded tip retuse or 2-auricled. O. iridifolia, *Wall. Cat.* 1948/2 in part.

SILHET, *De Silva.*

Leaves 3–5 by $\frac{3}{4}$–$1\frac{1}{4}$ in., falcate. *Scape* $\frac{1}{4}$ in. broad above the adnate leaf. *Spike* 6 in., decurved; flowers $\frac{1}{20}$ in., sessile, sheathed in blunt bracteoles.—This is the Khasian *O. Brunoniana* of Lindley, which differs from the Peninsular plant in the very small flowers, and much shorter leaves and scapes.

22. **O. forcipata,** *Lindl. Fol. Orchid. Oberon.* 2; leaves ensiform obtuse or acute, scape slightly 2-winged short, spike long slender decurved, flowers minute sessile densely imbricate, bracts ovate acute erose or fimbriate, petals narrow, lip as broad as long quadrate entire or with obscure entire or toothed side lobes, or contracted into a forcipate terminal lobe. *Hook. f. Ic. Plant.* t. 1782 B. Malaxis forcipata, *Reichb.f. in Walp. Ann.* vi. 209.

CEYLON; Peradenya and Hewahetti district, alt. 1–3000 ft., *Thwaites.*

Leaves 4–5 by $\frac{1}{3}$–$\frac{3}{4}$ in., slightly falcate. *Scape* 1–2 in., free; spike 4–7 in., covered with very pale flowers about $\frac{1}{18}$ in. long; bracts not exceeding the flowers; ovary very short; lip variable in form and when lobed in the abruptness of the line between the terminal and lateral lobes. *Capsules* short, sessile, turgid.—A very elegant species. Some specimens might almost be referred to the section with the terminal lobe of the lip produced.

23. **O. pachyrachis,** *Reichb.f. in Herb. Kew*; leaves 3–4 in. narrowly ensiform acuminate, scape very broad flat adnate to a leaf, spike straight, flowers sessile most densely imbricate on a very thick rachis, bracts very short semi-orbicular erose, petals narrow, lip orbicular or rounded-ovate quite entire.

TROPICAL HIMALAYA; Garwhal, *Falconer.* Kumaon, *Strachey & Winterbottom.* SIKKIM, *J. D. H.*

Leaves 3–4 by $\frac{1}{4}$–$\frac{1}{2}$ in., apparently flaccidly fleshy when fresh, base not broadened. *Scape* 2–4 in., very variable in breadth $\frac{1}{4}$–$\frac{1}{3}$ in., with the adnate leaf in various positions and its free portion long and narrow or short broad and recurved; spike 4–5 in., rachis cylindric, tip slender; flowers very minute, about $\frac{1}{30}$ in., depressed on one another; lip concave towards the base. *Fruit* sessile, short, turgid, often gibbous, the ribs less prominent than usual in the genus.

β. *Lip* 3-*lobed, side lobes large, midlobe much smaller.*

24. **O. Brunoniana,** *Wight Ic.* t. 1622; leaves linear-oblong very coriaceous, scape much flattened and adnate to the upper leaf, spike erect, rachis very stout, bracts lanceolate erose, flowers sessile densely imbricate, petals narrow, lip orbicular with a short terminal auricle. *Lindl. Fol. Orchid. Oberon.* 2. Malaxis Brunoniana, *Reichb.f. in Walp. Ann.* vi. 209.

Mountains of CANARA, MALABAR and TRAVANCORE, *Wight*, &c.

Stem rather elongate. *Leaves* 6–14 by $\frac{3}{4}$–$1\frac{1}{4}$ in., succulent. *Scape* 2–8 in.; adnate leaf 1–4 in., variable in position. *Spike* 4–6 in., like a rat's tail; flowers $\frac{1}{8}$–$\frac{1}{6}$ in.; lip dirty yellow, with an orbicular concave disk; terminal auricles variable.—Some of Wight's specimens have much longer, narrower and more acuminate leaves than those figured in his Icones.

25. **O. Lindleyana,** *Wight Ic.* t. 1624; leaves shortly broadly

ensiform obtuse or subacute, scape stout flattened, spike stout decurved, flowers sessile densely imbricated all round the stout rachis, bracts broadly ovate obtuse fimbriate, petals linear entire, lip rather longer than the sepals broadly 3-lobed crenate, midlobe broad rather smaller than the lateral 2-lobed. *Lindl. Fol. Orchid. Oberon.* 2. Malaxis Lindleyana, *Reichb. f. in Walp. Rep.* vi. 210.

NILGHIRI and TRAVANCORE MTS., *Wight, G. Thomson.*

Leaves 3–5 by $\frac{3}{4}$–$1\frac{1}{4}$ in., very fleshy, subfalcate, broad to the base. *Scape* with spike 4–6 in., very stout; flowers pale with an orange? centre of lip, about $\frac{1}{18}$ in. long; lip gland-dotted. *Capsules* small, sessile on the thickened rachis.—Very near *O. Brunoniana* & *Wallichiana*, but the midlobe of the lip is well developed though smaller than the side lobes together.

26. **O. platycaulon,** *Wight Ic.* t. 1623; leaves long narrowly ensiform straight subacute, scape very broad flat adnate to a leaf to the top, spike straight, flowers large densely imbricate, bracts broad sheathing the sessile ovary erose obtuse, petals narrow, lip with broad rounded lateral lobes and a very short 2-fid or 3-fid terminal one. *Lindl. Fol. Orchid. Oberon.* 2. Malaxis platycaulon, *Reichb. f. in Walp. Rep.* vi. 239.

On the WESTERN GHATS; from the Concan, *Graham*, to the Nilghiris, *Lobb*, and Pulneys, *Wight*.

Leaves 6–10 by $\frac{1}{2}$–$\frac{3}{4}$ in., coriaceous. *Scape* shorter than the leaves, $\frac{1}{4}$–$\frac{3}{4}$ in. broad, very coriaceous, with the apex of the adnate leaf at the base of the spike which is 3–5 in. with a stout rachis; flowers about $\frac{1}{5}$ in.; lip broader than long. *Fruit* sessile.—The largest-flowered Indian species. *O. platycaulon* of Thwaites is a very different species in fruit only.

27. **O. bicornis,** *Lindl. in Wall. Cat.* 1949; *Gen. & Sp. Orchid.* 16; *Fol. Orchid. Oberon.* 4; leaves very small membranous acute or obtuse, scape short very slender with subulate bracts, raceme short slender, bracts setaceous longer than the very minute flowers, petals narrow, lip much broader than long, side lobes ascending as erect horns, terminal very small quadrate. Malaxis bicornis, *Reichb. f. in Walp. Rep.* vi. 211.

KHASIA HILLS, *De Silva, J. D. H. & T. T.*

Leaves $\frac{1}{2}$–1 in., straight or falcate, very thin when dry, nerveless. *Racemes* lengthening after flowering to twice the length of the leaves; rachis very slender, curved or flexuous; flowers about $\frac{1}{30}$ in., pale.

28. **O. tenuis,** *Lindl. Fol. Orchid. Oberon.* 3; leaves short linear-oblong obtuse or acute, scape bracteate and raceme very slender, bracts setaceous hyaline longer than the very minute pedicelled flowers, petals linear quite entire, lip with a very small short hatchet-shaped midlobe and linear erect incurved side lobes that form a circle round the ovary. *Hook. f. Ic. Plant.* t. 1779 B. Malaxis tenuis, *Reichb. f. in Walp. Ann.* vii. 211.

CEYLON; at Hittawahe, *Thwaites.*

Whole plant $2\frac{1}{2}$ in. *Leaves* $\frac{1}{2}$–$\frac{2}{3}$ in. *Flowers* ochreous red; lip dark red. *Outer edge* of midlobes of lip truncate and obscurely 3-lobed.—Described from a single specimen and Lindley's drawing.

γ. *Lip with no side lobes or very small or narrow ones, midlobe large or long.*

29. **O. caulescens,** *Lindl. Fol. Orchid. Oberon.* 7; subcaulescent, leaves

linear acute or acuminate, scape terete bracteate, raceme very slender, bracts lanceolate, flowers subwhorled pedicelled, petals narrow, lip twice as long as the sepals obscurely lobed at the base with two acute parallel lobes at the tip and a short tooth in the sinus. *Wall. Cat.* 1950. Malaxis caulescens, *Reichb. f. in Walp. Ann.* vi. 215.

NEPAL, *Wallich.* KHASIA HILLS, *Lobb*, Kala Panee and Pomrang, alt. 5000 ft., *J. D. H. & T. T.*

Stem 2–3 in., rather slender. *Leaves* 2–3 by $\frac{1}{6}$ in. *Scape* with the raceme, 2–3 in.; flowers pale, about $\frac{1}{30}$ in. *Capsules* on slender pedicels.

30. **O. rufilabris,** *Lindl. Sert. Orchid.* t. 8 A; *Fol. Orchid. Oberon.* 5; leaves small narrowly oblong thin, scape short with many setaceous spreading bracts and rachis filiform, spike very slender, flowers minute very shortly pedicelled in dense separate whorls, bracts setaceous, petals linear-oblong, lip longer than the sepals oblong with filiform lateral lobes close to the narrow base and two parallel short terminal lobes with recurved acute tips and a broad lobule in the sinus. Malaxis rufilabris, *Reichb. f. in Walp. Ann.* vi. 213.

BURMA, *Berkeley*; at Moulmein, *Griffith.*

Leaves 1–1$\frac{1}{2}$ in., acute or obtuse. *Scape* and *raceme* together 1–2 in.; flowers $\frac{1}{25}$–$\frac{1}{30}$ in.; lip red-brown; column with two subulate teeth.

δ. *Lip with broad or long side lobes and a large midlobe.*

31. **O. Scortechini,** *Hook. f.*; leaves long narrowly ensiform, raceme very long slender, bracts ovate-lanceolate as long as the pedicels, petals linear, lip 3-lobed, side lobes lanceolate longer than the small orbicular or rhomboid midlobe.

PERAK, *Scortechini, King's Collector.*

Rootstock creeping. *Leaves* 6–10 by $\frac{1}{4}$–$\frac{1}{3}$ in., falcate, narrowed from the base to the acuminate tip. *Scape* short, cylindric, puberulous; raceme 12–18 in.; bracts white, $\frac{1}{12}$ in.; flowers yellowish; lateral sepals revolute, oblong, obtuse.—A very remarkable species with a stout creeping rootstock, quite unlike any other in the flowers, which more resemble those of a minute-fld. *Liparis.*

32. **O. Wightiana,** *Lindl. in Bot. Reg.* 1839, *Misc.* No. 9; *Fol. Orchid. Oberon.* 5; leaves short linear-oblong or ensiform acute, scape short terete naked or sparsely bracteate, raceme slender curved or decurved, flowers shortly pedicelled, bracts oblong or lanceolate erose, petals linear, lip equalling or exceeding the sepals, lateral lobes very large oblong or rounded terminal narrow with diverging often toothed lobes. *Wight Ic.* t. 1627; *Hook. f. Ic. Plant.* t. 1784 B. O. Arnottiana, *Wight l. c.* 1628. O. stachyoides, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 15, t. 1 A. Malaxis Wightiana, *Reichb. f. in Walp. Ann.* vi. 212.

TRAVANCORE and NILGHIRI MTS., *Wight*, &c. CEYLON, *Walker*, &c.

Leaves 1–4 by $\frac{1}{4}$–$\frac{1}{3}$ in., acute, rarely falcate. *Scape* and *raceme* together 3–6 in., usually decurved; bracts longer or shorter than the pedicels; flowers whorled or not, very variable in size, $\frac{1}{30}$–$\frac{1}{16}$ in., pale yellow-green. *Capsules* long-pedicelled.—Resembles strongly *O. myriantha* & *verticillata*, from the first of which the lip distinguishes it, and the narrow petals from both. *O. Arnottiana* is, I think, a longer pedicelled variety. The variety figured in *Ic. Plant.* is a very small state.

33. **O. Treutleri,** *Hook. f. Ic. Plant.* t. 1786 A; subcaulescent leaves short linear oblong or oblong-lanceolate, scape adnate below to the upper leaf flat, above it very short bracteate, spike short, bracts ovate-lanceolate

acuminate erose, flowers in dense separate whorls minute subsessile, petals linear-oblong, lip hardly longer than the sepals thick subequally 3-lobed obscurely crenate, lateral lobes oblong or rounded, midlobe very shortly obcordate.

SIKKIM HIMALAYA, alt. 6000 ft., *Treutler*.

Leaves 1–2 by $\frac{1}{4}$–$\frac{1}{3}$ in., rather thin, subalternate on the rather elongate stem. *Scape* and *spike* together $1\frac{1}{2}$ in. (above the leaf); bracts rather longer than the whorls; flowers about $\frac{1}{20}$ in.—The specimens are few, and resemble *O. demissa*, with the same tendency to elongation of the stem, which suggests its belonging to the caulescent group. The crowded separate whorls of flowers resemble those of *obcordata* and *rufilabris*; the size of the midlobe of the lip removes it from group with *O. Brunoniana*. Reichb. f. refers it to a form of *obcordata*, as var. *latifolia*, possibly rightly, but the foliage seems different.

34. **O. anthropophora,** *Lindl. in Wall. Cat.* 1951; *Gen. & Sp. Orchid.* 16; § *Fol. Orchid. Oberon.* 7; leaves narrowly linear, scape short sparsely bracteate, flowers very minute subwhorled, bracts ovate erose, petals linear, side lobes of lip rather broad decurved, midlobe elongate ending in two parallel tails. Malaxis anthropophora, *Reichb. f. in Walp. Ann.* vi. 215.

TENASSERIM, *Wallich*.

Stem 2 in. *Leaves* $\frac{1}{2}$–2 by $\frac{1}{4}$ in. *Scape* with raceme 6 in.; flowers about $\frac{1}{20}$ in.; dorsal sepal small oblong, lateral much larger.—The specimens are very few.

35. **O. obcordata,** *Lindl. Fol. Orchid. Oberon.* 7; leaves linear acute, scape very short, spike long or short, flowers very minute densely clustered in whorls which are much exceeded by the lanceolate bracts shortly pedicelled, petals linear-oblong or linear, lip with a narrow base oblong straight or falcate and long or short lateral lobes and a large obcordately 2-lobed terminal lobe. *Hook. f. Ic. Pl.* t. 1783. Malaxis obcordata, *Reichb. f. in Walp. Ann.* vi. 216.

SIKKIM HIMALAYA, *Griffith, J. D. H. & T. T.*, alt. 5–9000 ft., *Clarke*. KHASIA HILLS, alt. 5000 ft., *Griffith, Clarke*.

Stem 1–2 in., flat, flexuous. *Leaves* 1–$1\frac{1}{2}$ by $\frac{1}{6}$–$\frac{1}{4}$ in., usually falcate. *Scape* with spike 1–$1\frac{1}{2}$ in.; flowers $\frac{1}{20}$ in., yellow.

VAR. ? *bracteata*; larger, bracts much larger $\frac{1}{10}$ in. long, flowers pink, lateral lobes of lip longer subacute midlobe narrower with shorter lobes.—Sikkim, at the foot of the hills, *Thomson*.—Perhaps a different species. The lip is more like that of the following.

36. **O. angustifolia,** *Lindl. Fol. Orchid. Oberon.* 5; leaves narrow linear subacute, scape very short, spike short, bracts subulate exceeding the clusters of very minute flowers, petals ovate lanceolate, lip with oblong deflexed lateral lobes and a broad obcordate midlobe. Malaxis angustifolia, *Reichb. f. in Walp. Ann.* vi. 213.

KHASIA HILLS, *Lobb*; at Kala Panee and Pomrang, *J. D. H. & T. T.*

Stem rather slender, 2–4 in., flat, flexuous. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ by $\frac{1}{6}$ in., usually falcate. *Scape* with raceme 1–$1\frac{1}{2}$ in.; flowers subsessile, $\frac{1}{30}$ in., pale. *Capsules* very small, shortly pedicelled.—More materials are wanted for a satisfactory description.

Sect. II. **Scylla.** *Stem* short or 0. *Leaves* ensiform. *Sepals* very unequal, dorsal lanceolate, lateral very much larger, orbicular.

37. **O. Scyllæ,** *Lindl. Fol. Orchid. Oberon.* 5; leaves linear or lanceolate acuminate, scape with filiform flaccid bracts, raceme slender erect

or decurved, bracts subulate from a lanceolate base, petals and dorsal sepal incurved green ciliate, lip very small lunate entire crinite, lateral lobes erect on each side the column narrowly lanceolate. *Hook. f. Ic. Plant.* t. 1781. Malaxis Scyllæ, *Reichb. f. in Walp. Ann.* vi. 213.

CEYLON; Maturatte and Elephant Plains, alt. 4–6000 ft., *Thwaites.*

Stem very short or 0. *Leaves* 1½–2½ by ⅙–⅓ in. *Scape* 1½ in., crinite (in one specimen) with filiform flaccid hyaline bracts; raceme about as long; flowers whorled, longer than the bracts, about ⅛ in. long, incurved, the lanceolate acuminate dorsal sepal and two petals being all quite equal and similar and curving upwards and inwards like the beak of a bird, whilst the orbicular hyaline lateral sepals look like a globose pouch at the base of the flower; the minute lip most resembles that of *O. tenuis*; its lateral lobes resemble a pair of erect horns.—A very singular plant.

Sect. III. **Myosurus.** *Leaves* all radical, elongate, terete, fleshy.

38. **O. Myosurus,** *Lindl. in Wall. Cat.* 1947; *Gen. & Sp. Orchid.* 16; *Fol. Orchid. Oberon.* 8; leaves 3–4 by ⅓ in. diam. linear terete curved, scape very short stout bracteate, spike very short dense-fld., bracts lanceolate denticulate, petals narrow linear, lateral lobes of the lip rounded sinuate toothed, midlobe oblong-quadrate with toothed sides and two curved ascending spurs from each side of the truncate or retuse tip. *Hook. f. in Ic. Plant.* t. 1786 B. Malaxis Myosurus, *Walp. Ann.* vi. 216. Epidendrum Myosurus, *Forst. Prodr.* No. 317. Dendrobium Myosurus, *Swartz in Nov. Act. Upsal.* vi. 82.

NEPAL, *Wallich.* MOULMEIN, *Parish.*—DISTRIB. ? Society Islands.

A very singular plant. The leaves are described by Parish as papillose; the short stout scape is densely clothed with subulate bracts; the spike in the only specimen seen is less than half an inch long, with crowded pale minute shortly pedicelled flowers which are shorter than the bracts.

Sect. IV. **Caulescentes.** *Stem* elongate, with many equitant short cultriform leaves.

39. **O. anceps,** *Lindl. Sert. Orchid. under* t. 8; *Fol. Orchid.* 6; leaves ovate-oblong tip rounded, spike stout subsessile dense-fld., bracts short broad erose, petals small broad, lip truncate tip crenulate. O. imbricata, *Wight Ic.* t. 1629 (*not of Blume*). O. Griffithii, *Wight Ic.* v. 4. Malaxis anceps, *Reichb. f. in Walp. Ann.* vi. 214.

TENASSERIM, *Parish.* PERAK, *Scortechini*, &c. MALACCA, *Maingay.*—DISTRIB. Malay Islands.

Stems 12–18 in., stout, tufted, ½–¾ in. across the leaves. *Leaves* suberect, subincurved. *Spike* 2–3 in.; flowers about 1/20 in. *Capsule* sessile, globose.

40. **O. miniata,** *Lindl. in Bot. Reg.* 1843, *Misc.* 8; *Fol. Orchid. Oberon.* 6; leaves falcate acute, spike long slender lax-fld., pedicels pubescent, bracts lanceolate, petals oblong, lip fleshy base dilated concave narrowed into a linear emarginate tip. Malaxis miniata, *Reichb. f. in Walp. Ann.* vi. 215.

SINGAPORE (Hort. Loddiges).—DISTRIB. Philippine Islands.

Leaves 1–1½ in. *Raceme* 4–8 in., decurved, puberulous, lax-fld.; flowers 1/20 in.; pedicels slender, 1/12 in., longer than the membranous bracts.

41. **O. gracilis,** *Hook. f.*; slender, leaves straight suberect lanceolate acute, spike lax-fld., flowers subsessile, bracts very short triangular-ovate,

dorsal sepal orbicular, lateral ovate, petals linear, lip with two basal oblong cylindric obtuse ascending horns and a flat quadrate obtusely 2-fid midlobe.

PERAK; at the Kinla River, *King's Collector*.

Stems 6–8 in., tufted, flexuous; roots fibrous. *Leaves* 1 in., membranous when dry. *Spike* 4-6 in., flowering to the base; flowers reddish, $\frac{1}{30}$ in.

INDETERMINABLE SPECIES.

O. GARDNERIANA, *Thwaites Enum.* 296 (C.P. 593), closely allied to *Wightiana*, but flowers pale red, petals oblong denticulate.—Ceylon, Ambagamowa district, *Gardner*.

O. PLATYCAULON, *Thwaites* (C.P. 3913), in fruit only, is not Wight's plant of that name.

O. SPIRALIS, *Griff. Notul.* iii. 275, wants description and locality.

2. MICROSTYLIS, *Nutt.*

Terrestrial or epiphytic, pseudobulbous or not. *Leaves* 1 or more, continuous with their sheath. *Flowers* small, in terminal racemes, resupinate. *Sepals* spreading or recurved. *Petals* as long, slender. *Lip* adnate to the base of the column, usually flat, sides often produced upwards beyond the column as broad or long auricles. *Column* very short, with short spreading arms; anther subterminal, pollinia 4.—Species about 50, temperate and tropical.

* Sides of the lip produced upwards into large auricles.

† *Apex of the lip entire or notched* (*not serrate or pubescent*).

1. **M. Wallichii,** *Lindl. in Wall. Cat.* 1938; *Gen. & Sp. Orchid.* 20; leaves 2–4, bracts spreading shorter than the ovary, auricles of the lip acute or obtuse, blade with a rounded notched or bifid tip. *Ridley in Journ. Linn. Soc.* xxiv. 337. Malaxis acuminata, *Don Prodr.* 29 (*note in Herb. Wall.*).

TEMPERATE and SUBTROPICAL HIMALAYA, alt. 4–7000 ft., from Simla to Sikkim. KHASIA MTS., alt. 5–6000 ft., *J. D. H. & T. T.* ANDAMAN ISLANDS, *Kurz.* TRAVANCORE Hills on the Anamallay Hills, *Beddome* (*Ridley*).—DISTRIB. Cambodia.

Stem 2–3 in. *Leaves* 3–5 in., sessile or petioled, ovate-lanceolate, often discoloured. *Scape* 3–8 in. *Flowers* about $\frac{1}{2}$ in. long, greenish purplish or yellowish; sepals oblong, dorsal 1–3-nerved, lateral 3–5-nerved; petals 3-nerved; auricles of lip very variable. The Andaman specimen has an acute lip.—A very variable plant, if, as I think, the following are varieties.

VAR. *omphaloides*, Parish; leaves more unequal at the base, auricles of lip rounded and overlapping, *Ridley l. c.* 338.—Moulmein, *Parish*.

VAR. *biloba*; leaves usually longer, pedicels shorter, blade of lip contracted below the level of the column, tip bifid, arms of column larger. M. biloba, *Lindl. in Wall. Cat.* 1940; *Gen. & Sp. Orchid.* 20; *Ridley l. c.* 337.—Nepal, &c.—Wallich's 1940 is a mixture of specimens from Kumaon, Nepal and Burma.

VAR. *brachycheila*; leaves lanceolate, auricles acute, blade very short with a forcipate tip.—Moulmein, *Parish*.

2. **M. khasiana,** *Hook. f.*; leaves 3–4 petioled ovate or lanceolate, bracts spreading equalling the ovary, sepals broad hooded, auricles of

concave lip obtuse dilated below, blade constricted into a broadly subreniform rounded or obcordate terminal lobe.

KHASIA MTS., alt. 4–5000 ft., *Lobb*, &c.

Stem 1–2 in. *Leaves* 3–5 in. *Flowers* $\frac{1}{6}$ in. across, chestnut-red; auricles of lip shorter than or equalling the blade.—This is the chestnut-red flowered plant alluded to by Ridley under *M. Wallichiana*, from which it differs in the small flowers, short pedicels, and form of the lateral sepals and lip.

3. **M. biaurita,** *Lindl. in Wall. Cat.* 1941; *Gen. & Sp. Orchid.* 30; leaves 3–5 rather small sessile, bracts equalling the ovary, auricles of lip narrowed into the triangular-ovate blade, arms of the sessile column large rounded crenulate. *Ridley in Journ. Linn. Soc.* xxiv. 335.

KHASIA MTS., *Wallich*. ? SOUTH ANDAMAN ISLANDS, *Kurz*.

Leaves basal, 2–3 in. *Scape* stout, 3–6 in. *Flowers* smaller than in *Wallichii*, yellow? pedicel $\frac{1}{4}$ in.; dorsal sepal narrow; lip ovate-lanceolate in outline, auricles acute.—Pundua, the locality assigned to this and other of Wallich's collections, includes the Khasia Mts.

4. **M. purpurea,** *Lindl. Gen. & Sp. Orchid.* 20; leaves 4–6 petioled base very unequal, bracts equalling or shorter than the ovary, auricles of the concave lip dilating downwards and then narrowing to the obtusely 2-fid tip, column very short, arms obscure. *Ridley in Journ. Linn. Soc.* xxiv. 340.

CEYLON, *Macrae*; near Galle, alt. 1000 ft., *Thwaites*.

Leaves 4–5 by 2–2½ in., on a stout sheathed stem 3–4 in. high. *Scape* 6–10 in. *Flowers* dark purple, $\frac{1}{2}$ in. from tip of broad flat 3-nerved dorsal sepal to tip of lip; lip rather fleshy and very concave, auricles obtuse, broad sides of blade almost like lobes.

5. **M. Josephiana,** *Reichb. f. in Bot. Mag.* t. 6325; leaves 4–5 sessile, scape stout acutely angled few-fld., bracts much shorter than the ovary, flowers large, sepals broad revolute, lip cucullate deeply cupped, auricles short broad rounded, column very stout thickly winged. *Ridley in Journ. Linn. Soc.* xxiv. 336.

TROPICAL SIKKIM HIMALAYA, *Anderson, Gammie, Clarke*.

Pseudobulbs 2–4 in., narrowly ovoid, compressed; stem from the base of the pseudobulb, short. *Leaves* 3–4 in., elliptic-lanceolate, acuminate, plaited, often purplish-brown above. *Scape* and *raceme* 8–10 in.; pedicels ¾ in. *Flowers* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., golden-yellow blotched with red-brown round the column; sepals connate at the base, dorsal saccate at the base, all 3-nerved; petals broadly linear, revolute; lip forming a deep hemispheric cup.—A remarkable species, like a *Eulophia*. My specimens are not good.

6. **M. Scottii,** *Hook. f.*; leaves 2–5 sessile obliquely ovate acuminate crenate blackish brown with a broad pale dotted border, scape elongate red, bracts reflexed, lateral sepals broadly oblong as long as the length of the linear-oblong dorsal and petals, lip green rhomboidly orbicular, auricles erect obtuse as long as the broad rounded blade which has a contracted 2-fid apex.

PEGU; at Rangoon, *Scott*.

Leaves 3–4 in., falcate, 5–7-nerved from the base, most remarkable for their colouring. *Scape* 6–8 in. *Lip* $\frac{1}{3}$ in. long and broad.—A beautifully coloured species, which I have named after the late Mr. John Scott, of the Calcutta Botanical Garden, who discovered it at Rangoon. It is eminently worth cultivating. Described from a drawing in Herb. Calcutt.

†† *Blade of lip toothed or pectinate.*

7. **M. plantaginea,** *Steud. Nomencl.* ii. 144; leaves about 6 long-petioled elliptic, scape short, raceme long, bracts lanceolate deflexed, lip with the long erect auricles much longer than rounded pectinate blade, column with incurved arms. *Cuzent. Tahiti* 239. M. Rheedii, *Lindl. Gen. & Sp. Orchid.* 21 (*excl. syn. Rheede*); *Ridley in Journ. Linn. Soc.* xxiv. 342. M. bella, *Reichb. f. in Gard. Chron.* 1886, 8; *Ill. Hort* t. 581. Malaxis Rheedii, *Swartz in Act. Holm.* 1800, 235; *Willd. Sp. Pl.* iv. i. 90. Crepidium Rheedii, *Blume Bijd.* 387, f. 63. Pterochilus plantagineus, *Hook. & Arn. Bot. Beech. Voy.* 71, t. 17. Epidendrum resupinatum, *Forst. Prodr.* No. 322.

PERAK, *Scortechini, King's Collector.* — DISTRIB. Java, Society Islands, Tahiti.

Rootstock stout, creeping; stem 1–4 in., stout. *Leaves* 4–6 in., base very unequal; petiole ½–2 in. *Scape* with *raceme* 4–6 in.; flowers ⅔ in. long, purple or greenish; disk of lip concave, teeth incurved.—Blume, following Willdenow and Swartz, referred this to Rheede's xii. t. 57, which is, as Wight first showed, a very different species (see *M. Rheedii*, Wight).

8. **M. polyodon,** *Hook. f.*; leaves 5 petioled elliptic, scape stout, bracts minute, auricles of lip broad erect, blade rounded or subquadrate pectinately toothed, column short, arms spreading. M. Rheedii, *Reichb. f. in Trans. Linn. Soc.* xxx. 138 (not of Wight, Lindley or Willdenow).

TENASSERIM; at MOULMEIN, *Parish.*

Stem short, stout, base tuberous. *Leaves* 3–5 in., exclusive of the broad petiole. *Scape* 4 in.; raceme 6 in., many-fld.; pedicels ⅓ in. *Flowers* yellow, about ⅓ in. across the sepals; disk of lip with a raised 3-lobed callus surrounding the central pit. —I have seen only one specimen; it is referred to *M. Rheedii* by Parish and Reichb. f., from which it differs in the minute bracts, colour of flower, and blade of lip toothed all round.

9. **M. acutangula,** *Hook. f. Ic. Pl.* t. 1835; leaves 3–5 shortly petioled lanceolate acuminate, scape stout flowering to the base, bracts lanceolate deflexed, lip with triangular acute auricles thin outer margins terminating downwards in an acute angle, blade much narrower and shorter than the auricles deeply pectinate all round or on each side with a broad rounded sinus at the tip, arms of the column large rounded.

PERAK; at Batang Padong (*Wray in Herb. Calcutt.*).

Stem short, very stout. *Leaves* 4–7 in., 5–7-nerved, acuminate, bases subequal. *Raceme* 9 in.; lower bracts ¼–⅓ in., very slender; pedicels ½ in., slender; flowers nearly ½ in. broad, white; sepals 3-nerved; lip with a large central concavity with raised edges.

10. **M. micrantha,** *Hook. f. Ic. Pl.* t. 1834; leaves 6–8 petioled ovate-lanceolate subacute, scape slender, bracts lanceolate deflexed, flowers minute, lip subquadrate, auricles erect subacute shorter than the broad blade which is pectinate with 3 long teeth on each side and two at the tip, arms of column small.

PERAK, *Scortechini.*

Rootstock creeping and rooting. *Leaves* 2–3 in., 5-nerved, base unequal, petiole ½–1 in. *Scape* and *raceme* together 7 in., slender; pedicels short; flowers ⅛ in. across; sepals 3-nerved, obtuse; lip broadest below the auricles, or with the auricles diverging; laciniæ all pointing downwards.—I have seen but one specimen.

** Sides of the lip not produced upwards into auricles.

† *Lip quite entire, or bearded at the tip only.*

11. **M. muscifera,** *Ridley in Journ. Linn. Soc.* xxx. 333; leaves 2 sessile or petioled, bracts equalling or shorter than the pedicels, flowers minute, lip ovate acute, margins thickened, column sessile, arms very short. Dienia muscifera, *Lindl. in Wall. Cat.* 1935; *Gen. & Sp. Orchid.* 23.

TEMPERATE HIMALAYA, alt. 8–12,000 ft., from Kashmir to Sikkim.—DISTRIB. Affghanistan.

Variable in size, 6–18 in.; stem tuberous at the base, sheathed. *Leaves* 2–4 in., oblong or rounded, obtuse. *Scape* about equalling the raceme, together 4–10 in.; flowers yellow green, $\frac{1}{10}$ in. broad; pedicel $\frac{1}{8}$–$\frac{1}{6}$ in., erect.

12. **M. cylindrostachya,** *Reichb. f. in Walp. Ann.* vi. 207; leaf solitary, bracts equalling or shorter than the pedicels, lip ovate acute, margins thickened, column stout, arms none. *Ridley in Journ. Linn. Soc.* xxiv. 333. Dienia cylindrostachya, *Lindl. in Wall. Cat.* 1934; *Gen. & Sp. Orchid.* 22.

TEMPERATE HIMALAYA; from Simla, alt. 7–8000 ft., to Sikkim, alt. 8–12,000 ft. CENTRAL INDIA, *Hope* (*in Herb. Clarke*).

Habit, &c., of *M. muscifera*, but leaf solitary, stem and scape usually more slender (but often very stout) and frequently curved or flexuous; pedicels shorter and column longer.—Ridley gives by error Sylhet Wallich as a locality, and omits Sikkim where it is abundant.

13. **M. discolor,** *Lindl. Gen. & Sp. Orchid.* 20; leaves 3–6 broad, margins crisped, bracts equalling or exceeding the pedicels, flowers minute, lip ovate-cordate or subreniform tip rounded, column short, arms long. *Thwaites Enum.* 297; *Ridley in Journ. Linn. Soc.* xxiv. 336; *Reichb. f. in Walp. Ann.* vi. 206; *Wight Ic.* t. 1631; *Bot. Mag.* t. 5403.

CEYLON; in the Central Province, *Walker*, *Thwaites*.

Stem stout below, base not tuberous. *Leaves* 2–3 in. long and broad, subcaudately acuminate, dark vinous purple with a green crisped margin. *Scape* and *raceme* 2–3 in.; pedicels about $\frac{1}{12}$ in.; flowers yellow in bud, then red; lip with a yellow margin.—Wight represents the lip as obscurely 3-lobed.

14. **M. Maingayi,** *Hook. f. Ic. Pl.* t. 1826; leaf large radical sessile amplexicaul, scape short stout, bracts lanceolate, lip cuneate-oblong with 3–4 long teeth at each angle of the truncate tip, column rather long, arms obscure.

PENANG, Maingay (*Kew Distrib.* 1602).

Stem very short, tuberous. *Leaf* 6 by $3\frac{1}{2}$ in. or less, broadly elliptic, acuminate, very many-nerved. *Scape* and *raceme* together about equalling the leaf, stout; pedicels $\frac{1}{2}$ in., filiform; flowers $\frac{1}{2}$ in. long; sepals subequal, narrowly oblong, petals very narrow; lip slightly dilated towards the tip, coriaceous.

VAR. ? *Kunstleri*; lip longer, angles of tip fimbriate, flower dark blue.—Perak, alt. 3500 ft., *King's Collector*.

†† *Lip* 2–3-*lobed or cleft.*

15. **M. congesta,** *Reichb. f. in Walp. Ann.* vi. 206; leaves 3–6 lanceolate, bracts shorter than the very short pedicels, flowers minute, lip subquadrately ovate concave with a fold under the column and a 3-lobed apex. *Ridley in Journ. Linn Soc.* xxiv. 334. M. Bernaysii, *F. Muell. Fragment.* xi. 21. M. fusca, *Reichb. f. l. c.* 207. M. trilobulata, *Kurz*

Andam. Rep. App. B. xix.; *N. E. Br. in Gard. Chron.* 1883, 392. M. flavescens, *Lindl. Gen. & Sp. Orchid.* 20; *Ridley l. c.* 337. M. fusca, *Reichb. f. in Walp. Ann.* vi. 207. Dienia congesta, *Lindl. in Wall. Cat.* 1936; *Gen. & Sp. Orchid.* 22; in *Bot. Reg.* under t. 825; *Reichb. f. in Bonpland.* iii. 259. D. fusca, *Lindl. Gen. & Sp. Orchid. l. c.* Malaxis latifolia, *Smith in Rees Cyclop.* M. plicata, *Roxb. Fl. Ind.* iii. 456. Crepidium flavescens, *Blume Bijd.* 388.

TROPICAL HIMALAYA; from Nepal eastwards. KHASIA MTS. and MUNNIPORE, BEHAR on Parusnath, *Clarke.* BURMA, the ANDAMAN ISLANDS, the DECCAN PENINSULA and CEYLON.—DISTRIB. Malay Islands, China, Australia.

Stem 2–6 in., stout, base tuberous. *Leaves* 3–10 in., sessile or petioled, ovate elliptic or lanceolate. *Scape* with *raceme* 2–8 in., stout or slender; pedicel $\frac{1}{8}$ in.; ovary trigonous and grooved; flowers $\frac{1}{8}$–$\frac{1}{10}$ in., yellow green to pale brown or purplish. *Capsules* $\frac{1}{8}$ in., crowded, erect.

16. **M. parvula,** *Hook. f. Ic. Pl.* t. 1827 B; leaf small solitary sessile on the small globose pseudobulb ovate acuminate, bracts minute, flowers very minute, sepals broad 1-nerved, lip narrowly panduriform papillose terminating in two slender tails separated by a broad sinus, column-arms rounded spreading.

PERAK; on rocks, alt. 3–4000 ft., *King's Collector.*

Pseudobulb $\frac{1}{2}$ in. diam., sheathed. *Leaf* 1 in., membranous. *Scape* and *raceme* 2–3 in.; pedicels very short; flowers dark blue, $\frac{1}{16}$ in. across; sepals broadly oblong obtuse, and petals nearly flat; lip cellular, with an obtuse tooth or lobule between the tails, disk and 3 med an obtuse ridges.

17. **M. furcata,** *Hook. f. Ic. Pl.* t. 1827 A; leaf small solitary on the small subglobose pseudobulb elliptic and acute or ovate and acuminate, bracts lanceolate, flower very small, sepals obtuse 1-nerved, lip narrowly panduriform 2-lobed beyond the middle, lobes linear-oblong fimbriate on the outer edge, sinus subacute, column-arms spreading.

PERAK, *Scortechini.*

Pseudobulb $\frac{1}{2}$ in., sheathed. *Leaf* 1–$2\frac{1}{2}$ in., membranous. *Scape* with *raceme* 2–5 in.; bracts shorter than the pedicels; flowers $\frac{1}{12}$ in. across; sepals oblong obtuse, and petals nearly flat; lip contracted at the middle, 3-nerved at the base.

††† *Lip crenulate, toothed or pectinate.*

18. **M. Rheedii,** *Wight Ic.* t. 902 (*not of others*); stem stout, leaves 3–5 shortly petioled broadly ovate or elliptic, raceme elongate lax-fld., bracts lanceolate deflexed, lip rounded reniform or fan-shaped pectinate. *Dalz. & Gibs. Bomb. Fl.* 260 (*excl. syn.*); *Hook. f. Ic. Pl.* t. 1832. M. versicolor, *Lindl. Gen. & Sp. Orchid.* 21; *Wall. Cat.* 1939; *Ridley in Journ. Linn. Soc.* xxiv. 343. Liparis priochilus, *Lodd. Bot. Cab.* t. 1751. ? L. intermedia, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 17, Malaxis Rheedii, *Herb. Heyne.*—*Rheede Hort. Mal.* xii. t. 27.

The DECCAN PENINSULA, common in the Western Ghats.

Stem 3–6 in., slender or stout, stoloniferous. *Leaves* 3–7 by $1\frac{1}{2}$–3 in., acute or acuminate, 5–7-nerved, base equal or not; petiole $\frac{1}{2}$–3 in., rarely 0. *Scape* with *raceme* 4–12 in., stout or slender; flowers very variable in size and colour, greenish yellow or purplish, sweet-scented; sepals obtuse, dorsal often the longest and narrowest.—This is unquestionably Rheede's plant, to which the Javan and Pacific *M. plantaginea* has been erroneously referred. Rheede describes the abundant spiral vessels, which are so conspicuous in this genus and in *Liparis.*

19. **M. versicolor,** *Wight Ic.* t. 901 (*not of Lindl.*); stem short, pseudobulb ovoid, leaves 2 rarely 3 sessile or shortly petioled ovate to lanceolate, raceme usually dense-fld., bracts lanceolate deflexed, flowers small, lip short cuneate or subreniform pectinately toothed, style-arms spreading subacute. M. pratensis, *Ridley in Journ. Linn. Soc.* xxiv. 344. Liparis densiflora, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 18, t. 1 B.

The DECCAN PENINSULA; on the hills from the Nilghiris southwards. CEYLON; at Ratnapoora, *Thwaites.*

Nearly allied to *M. Rheedii*, but always small and pseudobulbous, with sessile or subsessile leaves and smaller flowers in denser spikes. The lip accords well, as does the column. *Flowers* yellow or purple. Thwaites, and, following him, Ridley, refer Thwaites' 2743 to *M. Rheedii*, but its habit and pseudobulbs are entirely those of *versicolor*; on the ticket Thwaites names it *M. luteola*, to which species also Ridley refers it (by oversight in one or the other case).

VAR. *luteola*; flowers larger. M. luteola, *Wight Ic.* t. 1632; *Ridley l. c.* 345 (*excl. Hab. Ceylon*).—Nilghiri Hills, *Wight.*—I find no other difference than the size of the flower whereby to distinguish this from *M. versicolor*.

20. **M. lancifolia,** *Thwaites Enum.* 269; stemless, pseudobulb small or 0, leaves 5–8 rather long-petioled lanceolate acuminate, raceme dense-fld., bracts lanceolate suberect, flowers small, lip short almost semicircular with the convex margin to the column the other deeply 6–8-toothed, column stout, arms suberect. *Ridley in Journ. Linn. Soc.* xxiv. 346; *Hook. f. Ic. Plant.* t. 1830.

CEYLON; in the Saffragam and Ambagamowa districts, *Thwaites.*

Root fibrous. *Leaves* 2-4 by $\frac{1}{3}$–$\frac{2}{3}$ in., 3-nerved; petiole $\frac{1}{2}$–$1\frac{1}{4}$ in., rather slender. *Scape* and *raceme* 4–6 in.; flowers about $\frac{1}{6}$ in. across, yellow ?—Resembles a narrow-leaved *M. versicolor* with long petioles. The suberect bract is an excellent character indicated by Thwaites.

21. **M. Stocksii,** *Hook. f. Ic. Pl.* t. 1833; leaves 2–3 shortly petioled ovate or ovate-lanceolate, bracts lanceolate deflexed, flowers rather large, lip much broader than long transversely oblong or very broadly flabelliform deeply palmately lobed strongly nerved, arms of column suberect rather broad. M. luteola, *Herb. Ind. Or. H.f. & T.* (*not of Wight*).

The DECCAN PENINSULA; on the Bababoodan Hills in Canara, *Stocks*, &c.

Stem 1–2 in. *Leaves* $1\frac{1}{2}$–3 in., 3–5-nerved. *Scape* with *raceme* 2–4 in.; flowers yellow, $\frac{1}{2}$ in. across.—This differs from all the preceding species in the great breadth and deep laciniæ of the lip, and further from *M. versicolor* (to the var. *luteola* of which it approaches in the large flowers) in the absence of pseudobulbs.

22. **M. crenulata,** *Ridley in Journ. Linn. Soc.* xxiv. 346; stem short hardly pseudobulbous, leaves 1 or 2 shortly petioled lanceolate, scape and raceme 4 in., bracts lanceolate deflexed, flowers small, lip shortly clawed rounded-reniform crenulate, column broader and shorter than in *M. Rheedii*.

WESTERN NILGHIRIS, *Beddome* (*in Herb. Mus. Brit.*).

The above description from the work quoted barely suffices to distinguish this from *M. Rheedii*, except by the fewer leaves, and less deeply cut lip.

3. LIPARIS, *Richard.*

Terrestrial or epiphytic; pseudobulbous or not. *Leaves* 1 or more,

membranous and continuous with their sheath, or thicker and jointed on the sheath or pseudobulb. *Flowers* small, in terminal racemes, resupinate. *Sepals* spreading, recurved or revolute, margins often revolute. *Petals* as long, very slender. *Lip* adnate to the base of the column, usually broad, deflexed from a very short base, or recurved. *Column* long, incurved, margined or winged towards the tip; anther terminal; pollinia 4. —Species about 100, temperate or tropical.

Sect. I. MOLLIFOLIÆ. *Leaves* membranous, not jointed at the base on their sheath or pseudobulb, usually broad, often petioled.

* *Lip* broad, abruptly deflexed from very base, flat or with deflexed sides. *Sepals* narrow and petals with recurved or revolute margins; lateral sepals usually placed under the lip.

† *Leaf solitary.*

1. **L. cordifolia,** *Hook. f. Ic. Pl.* t. 1811; leaf solitary sessile broadly rounded-ovate deeply cordate amplexicaul, bracts small triangular or lanceolate, pedicels long filiform, sepals lanceolate acute 3-nerved, lip large flat obcordate or orbicular-obovate apiculate crenulate, column very slender incurved.

NORTH-WEST HIMALAYA (*drawing in Herb. Kew*). SIKKIM; at Yoksun, alt. 6000 ft., *Clarke*. KHASIA MTS., alt. 3–6000 ft., *Griffith*, *J. D. H. & T. T.* (*Liparis*, No. 8).

Pseudobulbs short, stout, crowded. *Stem* short, stout. *Leaves* 2–5 by $1\frac{1}{2}$–4 in., acuminate; nerves distant, faint. *Scape* naked, with the raceme 4–5 in. *Sepals* lanceolate, 3-nerved; lip $\frac{1}{3}$–$\frac{1}{2}$ in. long, yellow-green, base narrow, callus obscure. *Column* obscurely winged.—Referred to *L. rupestris*, Griff., by Ridley, but the flowers are large and the bracts minute.

2. **L. rupestris,** *Griff. Notul.* iii. 276; "pseudobulb formed after flowering obpyriform sheathed, leaf solitary petioled broadly cordate acute, scape angled and winged, bracts minute lanceolate much shorter than the pedicels, flowers small resupinate, sepals linear convolute, lateral placed under the flat oblong membranous veined lip, column forming a semicircle top clavate margined."—*Griffith.*

KHASIA MTS.; on rocks at Nunklow, *Griffith*.

I know of no Khasian small-flowered plant answering to this description, nor can I follow Ridley in his reference to it of Reichenbach's *L. rostrata*, or of the Nunklow plant of myself and Thomson (which is, I think, *nepalensis*), or of Royle's and Thomson's N.W. Indian species. Ridley's var. *purpurascens*, with 2 leaves, from Sikkim, collected by myself, is *L. pulchella*.

3. **L. Thwaitesii,** *Hook. f.*; leaf solitary petioled ovate-cordate acute 5-nerved, bracts lanceolate, sepals lanceolate 3-nerved, lip broadly oblong or subobovate retuse base 2-toothed, column slender incurved with 2 erect teeth. L. Wightiana *in part*, *Thwaites Enum.* 294; *Ridley in Journ. Linn. Soc.* xxii. 278.

CEYLON; in the Central Province, alt. 3–5000 ft., *Thwaites* (C.P. 3179).

Pseudobulbs tufted; stem 1–3 in., rather slender, sheaths acute. *Leaf* 2–3 in., crenulate, nerves strong. *Scape* 2-6 in.; bracts $\frac{1}{3}$ in., shorter than the capillary pedicels; lip $\frac{1}{3}$ in. long, red-purple, covering the sepals, contracted below the narrow 2-auricled base.—Very different from Wight's *L. atropurpurea*, with which Thwaites and Ridley have united it, in the solitary petioled crenulate leaf, column, &c.

4. **L. Glossula,** *Reichb. f. in Linnæa* xli. 43; leaf sessile or shortly petioled oblong or linear-oblong obtuse or acute entire, scape stout, bracts long slender lanceolate, sepals lanceolate acute 3-nerved, lip large flat broadly obovate-oblong cuspidate crenulate, calli 0. *Ridley in Journ. Linn. Soc.* xxii. 268; *Hook. f. Ic. Pl.* t. 1809.

Western and Central Himalaya; Kumaon, alt. 5–7500 ft., *Edgeworth, Strachey & Winterb.* (Liparis nepalensis), *Duthie*; Nepal, *Wallich*; Sikkim, at Chumbi, *King's Collector.*

Pseudobulbs large for the plant. *Stem* 1–3 in.; sheaths appressed, obtuse. *Leaf* 2–4 by $\frac{2}{3}$–$1\frac{1}{3}$ in.; nerves many, slender. *Scape* 4–7 in.; bracts $\frac{1}{2}$–$\frac{2}{3}$ in., shorter than the pedicels; lip $\frac{1}{3}$–$\frac{1}{2}$ in. long, overlying the lateral sepals. *Column* not long, curved, wings very short.

5. **L. Gamblei,** *Hook. f. Ic. Pl.* t. 1812; leaf sessile oblong obtuse or acute often crenulate, scape stout, bracts short ovate acute, sepals oblong-lanceolate obtuse 3-nerved, lip elliptic acute crenulate sides reflexed, calli 2 small near the base, column slender incurved with notched wings.

Sikkim Himalaya; at Rungbee, *Clarke*; Sinchul, alt. 6500 ft., *Gamble.*

Habit of *L. Glossula,* but leaf often crenulate, bracts much broader, flowers much smaller, and lip very different.

6. **L. diodon,** *Reichb. f. in Linnæa* xli. 43; leaf elongate spathulate fleshy membranous oblong obtuse, scape angled naked, bracts minute, sepals linear, petals filiform, lip cuneate and angled on both sides at the base then dilated subquadrate crenulate at the end and apiculate column slender curved 2-toothed at the base. *Ridley l. c.* 285.

N.W. Himalaya; Kumaon, in the Debra Doon, *Hort. Wil. Sanders.*

The "fleshy membranous" leaf is anomalous. Reichenbach places this amongst the *Mollifoliæ.* Ridley removes it to *Coriifoliæ,* but gives no reason.

†† *Leaves* 2, *rarely* 3.

7. **L. nepalensis,** *Lindl. in Wall. Cat.* 1945; *Bot. Reg. sub.* t. 882; *Gen. & Sp. Orchid.* 28; leaves 2 large petioled from ovate to orbicular acute base rounded or cordate, bracts large lanceolate, sepals lanceolate acuminate, lip sessile ovate or ovate-lanceolate acuminate, calli small, column incurved, wings obscure. *Ridley in Journ. Linn. Soc.* xxii. 278. Malaxis cordifolia, *Smith in Rees Cyclop.* Acianthus petiolatus, *Don Prodr.* 29.

Subtropical Himalaya; Nepal, *Wallich*; Sikkim, alt. 3–5000 ft., *Griffith,* &c. Khasia Hills, *J. D. H. & T. T.*

Rootstock creeping, stout; pseudobulbs short, $\frac{3}{4}$–1 in.; stem usually developed, $\frac{1}{2}$–3 in. *Leaves* usually both petioled, but upper sometimes sessile on the scape. *Scape* and *raceme* 4–10 in.; bracts $\frac{1}{3}$–$\frac{1}{2}$ in.; pedicels $\frac{1}{2}$ in.; lip $\frac{1}{2}$ in. long or less, dark purple; base not amplexicaul, sides reflexed.

8. **L. pulchella,** *Hook. f. Ic. Pl.* t. 1810; leaves 2 broadly ovate-cordate subacute radical long-petioled or one sessile on the slender scape the other free, racemes few- and lax-fld., bracts lanceolate, sepals lanceolate 3-nerved green, lip flat broadly orbicular-oblong retuse or obtuse and petals purple, column very slender incurved with a small decurved rounded or tooth-like wing. L. rupestris, *var.* purpurascens, *Ridley l. c.* 268.

Khasia Mts.; at Myrung, Moflong and Sururecm, alt. 5–6000 ft., *J. D. H. & T. T.* (*Liparis,* No. 7). Naga Hills, *Prain.*

Rootstock slender, creeping; pseudobulbs $\frac{1}{3}$ in.; stem slender, 1–3 in. *Leaves*

1½–2 in., subacute, nerves very faint; petiole as long, slender. *Scape* and *raceme* 3–6 in., slender; bracts ¼–⅓ in.; pedicels slender; lip ⅓ in. long, calli very obscure, base rounded.—Near *L. nepalensis*, but much smaller, more slender, and with lip of a different shape and a column with hooked wings.

9. **L. rostrata,** *Reichb. f. in Linnæa* xli. 44; leaves 2 opposite subsessile or petioled elliptic ovate or oblong obtuse or subacute narrowed at the base, bracts small broad, sepals lanceolate 3-nerved, lip very broadly obcordate flat crenulate apiculate yellow-green, calli 0, column short rather stout incurved with a small rounded wing. *Hook. f. Ic. Pl.* t. 1813. L. olivacea *in part, Herb. Ind. Or. H. f. & T. (not of Lindl.).* L. rupestris *in part, Ridley in Journ. Linn. Soc.* xxii. 145 (*not of Griffith*).

TEMPERATE HIMALAYA, *Royle*; Simla, alt. 6–8000 ft., *Thomson*; Kumaon, 5–7000 ft., *Edgeworth.*

Pseudobulbs ½–¾ in., tufted on a short rootstock, broadly ovoid; stem stout, erect, 1–3 in. *Leaves* ½–3 in.; petiole broad. *Scape* stout with the raceme 2–6 in.; bracts ⅛–⅙ in., base broad; pedicels slender, ⅓–½ in.; lip ⅓–½ in. broad, base contracted, cordate, calli 0.—Differs conspicuously from *L. olivacea* in the small bracts. Ridley has referred this to Griffith's *rupestris*, and gives Assam and the Khasia Mts. as localities. It cannot, however, be Griffith's *rupestris* (which has a solitary cordate leaf and lanceolate bracts), nor is it a Khasian plant. It is certainly Reichenbach's *rostrata*, under which that author refers to the specimen in Lindley's herbarium fastened on a sheet with *L. olivacea.*

10. **L. Cathcartii,** *Hook. f. Ic. Pl.* t. 1808; leaves 2 opposite petioled oblong ovate or subcordate, bracts minute broad, sepals lanceolate acuminate 3-nerved, lip obcordate or rounded obovate flat entire or obscurely crenulate, calli 2 basal elongate, column long and very slender curved truncate with very obscure rounded wings. L. rupestris *in part, Ridley in Journ. Linn. Soc.* xxii. 145 (*not of Griffith*).

SIKKIM HIMALAYA, alt. 8–10,000 ft., *J. D. H., Clarke.*

Habit of *L. rostrata*, but with a narrower lip and very different column. A figure of apparently this species is amongst the Cathcart drawings in Herb. Kew with a straw-coloured lip; in my specimens the lip was pale purple.

11. **L. olivacea,** *Lindl. in Wall. Cat.* 1942; *Gen. & Sp. Orchid.* 27; leaves 2 opposite sessile lanceolate acuminate plicate, bracts linear-lanceolate deflexed, sepals linear-oblong obtuse 5-nerved, lip flat orbicular subcrenulate, calli 2-tubercled, column rather stout slightly curved, wings very narrow. *Ridley in Journ. Linn. Soc.* xxii. 263.

NEPAL, *Wallich.*

Pseudobulb small, pyriform; stem 1 in., sheathed. *Leaves* 2½–3 in., spreading, 5-nerved. *Scape* 3–5 in., stout; pedicels about ⅛ in.; lip ¼ in. diam., suddenly contracted into a very short narrow neck, veined.—I have seen only Wallich's three specimens.

12. **L. campylostalix,** *Reichb. f. in Linnæa* xli. 43; pseudobulb tunicate, leaves 2 cuneate oblong obtusely acute, scape angular, bracts most minute triangular, flowers as large as *L. Loeselii*, sepals linear-lanceolate, lip embracing the base of the column obtusely 5-angled behind retuse in front, callus 0, column curved broader near the fovea. *Ridley in Journ. Linn. Soc.* xxii. 273.

INDIA; locality unknown.

Evidently near *L. Cathcartii*, which, however, has an obcordate lip.

13. **L. platyphylla,** *Ridley in Journ. Linn. Soc.* xxii. 265; stem slender, leaves 2 spreading ovate or ovate-lanceolate acute 7-nerved, bracts lanceolate, at length reflexed equalling the pedicels, sepals lanceolate ligulate, lip orbicular-obovate subretuse crenulate 2-tubercled, column short thickish, wings long narrow obtuse.

TRAVANCORE; on the Anamallay Hills, alt. 3500 ft., *Beddome.*

Stem 1–2 in. *Leaves* 4 by 3 in. *Scape* a foot, weak, many-fld.—Allied to *L. olivacea*, but differing in the broader leaves and crenulate lip. Description from Ridley, l. c.

14. **L. Wightiana,** *Thwaites Enum.* 295; leaves 2 opposite sessile ovate-lanceolate acuminate, bracts lanceolate, sepals lanceolate acuminate 3-nerved, lip orbicular or orbicular-oblong flat dull purple entire, calli 2 minute, column very slender sigmoidly incurved, wings very obscure. *Ridley in Journ. Linn. Soc.* xxii. 278. L. atropurpurea, *Wight Ic.* t. 904 (*not of Lindl.*).

TRAVANCORE; on the Pulney Mts., *Wight.* CEYLON, *Walker*; Central Province, alt. 3–5000 ft., *Thwaites.*

A small delicate species. *Pseudobulbs* tufted; stem very short. *Leaves* 1½–2 in. *Scape* with *raceme* 2–4 in.; bracts ⅓ in. shorter than the capillary pedicels; lip ¼–⅓ in. long.—I have seen no Travancore specimens.

15. **L. Beddomei,** *Ridley in Journ. Linn. Soc.* xxii. 268; leaves 2 rarely 3 ovate-lanceolate acuminate, scape angled, bracts minute, sepals narrowly ligulate, lip flat orbicular-oblong obtuse green with a purple spot on the disk, column very slender arched, wings minute.

TRAVANCORE; on the Pulney Mts., alt. 5000 ft., *Beddome.*

This, which inhabits the same mountains as *L. Wightiana*, appears to differ only in the minute bracts $\frac{1}{12}$ in. long. I have seen no specimens.

16. **L. venosa,** *Ridley in Journ. Linn. Soc.* xxiv. 350; tall, stout, leaves 2 opposite, sepals broadly ovate, bracts minute, pedicels long slender, sepals lanceolate 5-nerved, lip flat obovately obcordate retuse with a semilunar ridge at the base, column short straight, wings decurrent.

MALACCA, *Maingay* (*Kew Distrib.* 1600). PERAK, *Scortechini.* SINGAPORE (a drawing).

Rootstock creeping, as thick as the little finger, with crowded tufts of thick roots; stem short, stout, sheathed. *Leaves* 2–3 in. broad, nerves red beneath. *Scape* and *raceme* stout, 2 ft.; flowers scattered; pedicels very slender, ½–1 in. *Sepals* nearly ½ in. long, yellow. *Lip* sessile, but not embracing the column, red purple.—The specimens are very badly preserved.

17. **L. Trimenii,** *Ridley in Journ. Linn. Soc.* xxiv. 350; small, leaves 2 unequal ovate-lanceolate, scape terete, bracts lanceolate, flowers shortly pedicelled, bracts erecto-patent, lip flat broadly elliptic obtuse, margins faintly waved, tip rounded, calli 2 small basal, column long incurved, wings minute. *Hook. f. Ic. Pl.* t. 1836.

CEYLON; at Hangkela, *Trimen.*

Pseudobulb not developed. *Leaves* 1–1½ in., 5-nerved. *Scape* with *raceme* 1–3 in.; bracts about equalling the pedicels. *Lip* sessile, not embracing the column, ⅛ in. long.—I am indebted to Dr. Trimen for specimens. Except by its much smaller size, it is undistinguishable from *L. Wightiana*, Thw.

** Lip usually broad deflexed or recurved. Lateral sepals spreading.

† *Bracts very small, short.* (*See also* L. paradoxa & brachyglottis.)

18. **L. bituberculata,** *Lindl. in Bot. Reg. sub.* t. 882; stem usually tall, leaves 2 or more subopposite sessile or petioled elliptic-lanceolate acute, bracts minute broad, sepals linear-oblong obtuse, lip decurved cuneately obovate retuse purple 2-tubercled, column curved, wings narrow rounded. *Ridley in Journ. Linn. Soc.* xxii. 263. Empusa paradoxa, *Wall. Cat.* 1937/2. Cymbidium? bituberculatum, *Hook. Exot. Fl.* t. 116. Sturmia bituberculata, *Reichb. f. in Bonplandia*, ii. 22.

SUBTROPICAL HIMALAYA; Kumaon, *Blinkworth*; Nepal, *Wallich*; Sikkim, alt. 5–7000 ft., *Griffith, J. D. H.*

Stems 2–4 in., tufted, hardly pseudobulbous. *Leaves* 3–5 in., very variable, nerves rather strong. *Scape* stout, few- or many-fld.; bracts $\frac{1}{16}$–$\frac{1}{10}$ in., ovate, acute; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. *Lateral sepals* often revolute or recurved. *Lip* shorter than the sepals, margins quite entire.—Ridley describes the bracts as lanceolate; they are very small, by which character the species is best distinguished from all its allies but the two following.

Var. ? *khasiana*, leaves broader more ovate or orbicular-ovate sessile or shortly petioled, lip cuneately obcordate, column much shorter and broader, capsule $\frac{1}{2}$–$\frac{3}{4}$ in.—Khasia Mts., alt. 4–6000 ft., *Griffith*, &c.—Perhaps a different species.

19. **L. macrocarpa,** *Hook. f.*; tall, robust, leaves 4–6 large broadly petioled obliquely elliptic-ovate or -oblong acuminate nerves 7 strong, bracts minute, capsules $1\frac{1}{4}$–$1\frac{1}{2}$ in. elliptic-oblong.

SIKKIM HIMALAYA and the KHASIA MTS., in tropical forests, *J. D. H.*

Resembles a very large state of *L. bituberculata*, but is, I have no doubt, a very distinct species; the stem is sometimes as thick as the little finger, more or less naked and fleshy, the leaves very unequal at the base, with petioles 1–3 in., and the fruiting scape is 12–18 in. high.

20. **L. acuminata,** *Hook. f.*; leaves 5–6 sessile erect broadly sheathing lanceolate finely acuminate, bracts minute ovate, flowers large, sepals spreading, lateral falcately oblong-lanceolate acute 5-nerved, dorsal linear, lip slightly recurved transversely oblong subcrenulate contracted into a short 2-tubercled neck, column slender incurved truncate, wings very small.

KHASIA MTS., *Griffith.*

Stem 3–5 in., many-sheathed to the base which is not swollen. *Leaves* very membranous, slightly recurved; nerves very slender. *Scape* 4–6 in.; bracts $\frac{1}{10}$ in., ovate; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in.; buds $\frac{1}{2}$ in., falcate; lip with erect sides, slightly recurved.

21. **L. barbata,** *Lindl. Gen. & Sp. Orchid.* 27; small, leaves 2 opposite subsessile elliptic subacute, bracts minute broad, flower small pale, sepals obtuse, lateral oblong 3-nerved, dorsal rather longer and narrower 1-nerved, lip oblong, base 2-auricled 2-tubercled, tip truncate slightly dilated erose and subfimbriate, column incurved, wings short rounded toothed. *Ridley in Journ. Linn. Soc.* xxii. 276.

CEYLON, *Macrae.*

Stem $1\frac{1}{2}$ in., not pseudobulbous. *Leaves* 2 by $1\frac{1}{4}$ in., nerves very slender. *Scape* and *raceme* 2 in., pedicels $\frac{1}{3}$ in.; flower about as much across, apparently green.—Described from a solitary specimen in Herb. Lindl. I find in two flowers examined no trace of the hairs on the lip described by Lindley and Ridley.

†† *Bracts lanceolate* (shorter in *L. paradoxa* & *brachyglottis*).

22. **L. ferruginea,** *Lindl. in Gard. Chron.* 1848, 55; tall, leaves 4–6 subcoriaceous very narrowly linear-lanceolate acuminate, scape 1½–2 ft., bracts lanceolate, sepals 5-nerved, lateral falcately oblong obtuse spreading, dorsal longest linear-oblong obtuse, lip revolute cuneately obovate, base 2-auricled, apex shortly 3-lobed papillose beyond the middle, column short stout. *Ridley in Journ. Linn. Soc.* xxii. 264.

PERAK, *King's Collector.* MALACCA, *Griffith.*—DISTRIB. Borneo, Siam.

Stems tufted, swollen at the base. *Leaves* 6–12 by ⅓–1 in., subplicate, nerves strong. *Scape* sometimes as thick as a swan's quill, ribbed, nearly naked; bracts ⅙ in.; pedicels ¼–⅓ in. *Dorsal sepals* ⅓ in. long; lip yellow-brown. *Capsules* ¾ in., clavate, twice as long as their pedicels.

23. **L. Jovis pluvii,** *Parish* and *Reichb. f. in Trans. Linn. Soc.* xxx. 155; stem short, leaves 2–4 sessile or petioled ovate to lanceolate acuminate, bracts lanceolate reflexed after flowering, flowers very small, sepals obtuse, lateral short falcately oblong obtuse 5-nerved, dorsal much longer lanceolate 3-nerved, lip recurved reniform crenulate base 2-tubercled, column incurved, wings short rather broad uncinate.

TENASSERIM; at Moulmein, *Lobb, Parish.*

Stem short, thickened, but hardly pseudobulbous below. *Leaves* 3–5 in., very membranous, 5-nerved, petiole broad if present. *Scape* 6–8 in., slender; bracts slender, ⅓ in. and less; flowers about ⅛–⅙ in. diam.; lip variable in breadth, narrowed into a very short 2-auricled claw. *Capsule* clavate.—Flowers in the rainy season, whence the name.

24. **L. deflexa,** *Hook. f.*; stem short, leaves 2 opposite sessile or petioled ovate-lanceolate acuminate, scape tall, bracts slender at length deflexed, sepals 3–5-nerved obtuse, lateral oblong, dorsal longer oblong-lanceolate, lip flabelliform, calli obscure, column short straight flattened truncate, wings 0.

SIKKIM HIMALAYA; at Darjeeling, *Griffith's Collectors.*

Stem with a pseudobulbous base; sheaths few. *Leaves* 4–8 in., very membranous, 5-nerved. *Scape* and slender and many-fld. raceme 8–12 in.; bracts very slender, lower ½ in.; pedicels ½ in.; flower about ⅓ in. across. *Lip* with a contracted 2-auricled base. *Column* compressed from back to front. *Capsule* ¾ in., clavate.—The column distinguishes this at once from *L. tuberculata* and *Jovis pluvii.*

25. **L. stenoglossa,** *Parish* and *Reichb. f. in Trans. Linn. Soc.* xxx. 154; leaves 3–4 subradical petioled elliptic-lanceolate acuminate, scape slender lax-fld., bracts very long spreading lanceolate nearly as long as the ovary, sepals 5-nerved subacute, lateral spreading oblong-ovate, dorsal longer narrower, lip short reflexed cuneately obovate shortly broadly 2-lobed constricted above the middle, base 2-auricled and 2-tubercled, column incurved, wings very narrow. *Ridley in Journ. Linn. Soc.* xxii, 279.

TENASSERIM; at Moulmein, *Parish.*

Stems very short, tufted, base slightly swollen. *Leaves* 3–4 in., narrowed into a petiole 1⅓ in. or shorter. *Scape* slender, 5–6 in.; bracts ⅓ in.; flowers about as much across. *Lip* with a broad acute sinus at the broad tip.

26. **L. paradoxa,** *Reichb. f. in Walp. Ann.* vi. 218; leaves 1–5 sessile erect alternate sheathing lanceolate acuminate, nerves strong, scape stout

angular, bracts spreading ovate not reflexed after flowering lanceolate, flowers coriaceous, sepals short obtuse 5-nerved, lateral falcately oblong spreading and recurved, dorsal longer narrower, lip recurved cuneately obovate or obcordate, base 2-tubercled, column incurved, wings narrow. *Ridley in Journ. Linn. Soc.* xxii. 261. L. odorata, *Lindl. Gen. & Sp. Orchid.* 26; *Thwaites Enum.* 295. Empusa paradoxa, *Lindl. in Wall. Cat.* 1937 A *in part*; *Bot. Reg. sub.* t. 825; *Gen. & Sp. Orchid.* 17; *Miquel Prolus. Fl. Jap.* 135; *Thwaites Enum.* 426. Empusaria sp., *Reichb. f. Conspect.* 69. Malaxis lancifolia, *Smith in Rees Cyclop.* M. odorata, *Willd.*—*Rheede Hort. Mal.* xii. t. 28.

TEMPERATE and SUBTROPICAL HIMALAYA; Kumaon, alt. 6000 ft., *Blinkworth*; Nepal, *Wallich*. KHASIA MTS., alt. 4–6000 ft., *Griffith*, &c. BENGAL, at Mymensingh, *Clarke*. The CONCAN and MYSORE, *Stocks*, *Law*, &c. CEYLON; alt. 2–5000 ft., *Thwaites*.—DISTRIB. Java, Siam, China, Japan.

Very variable in habit, 6–18 in. high; stem tufted, base sometimes pseudobulbous. *Leaves* 2–8 in., rarely elliptic-lanceolate and narrowed into a broad petiole, membranous or subcoriaceous. *Scape* 4–10 in., naked or nearly so, rigid; bracts variable in length, $\frac{1}{6}$ in. and longer, not reflexed; pedicels usually short and stout; flowers about $\frac{1}{3}$ in. across, yellow-brown; ribs of ovary wrinkled. *Lip* variable in breadth, sides erect. *Capsules* clavate.—I follow Ridley in accepting the name of *paradoxa* for this plant, though, as he points out, *L. odorata* is the oldest. The latter name is, as Thwaites states, inapplicable. I have seen no Ceylon specimens.

VAR. *Parishii*; leaves narrowed at the base or broadly petioled flat more membranous, scape taller and flowers longer.—Tenasserim, *Lobb*, *Parish*.

27. **L. Dalzellii,** *Hook. f.*; tall, stem as thick as the thumb, leaves 2–3 sessile elliptic-ovate acute, scape stout, bracts lanceolate not deflexed spreading, flowers $\frac{1}{2}$ in. across, sepals 5-nerved obtuse sides recurved, lateral falcately oblong, dorsal longer linear-oblong, lip broadly obcordate fleshy dark purple, base 2-tubercled, column stout incurved, wings rounded.

SOUTH CONCAN, *Dalzell*.

I have seen only one specimen of this remarkably gigantic species, of which the sheathed stem 4 in. long, and $\frac{2}{3}$ in. diam., terminates below in a small pseudobulb. *Leaves* 4–6 by $2\frac{1}{2}$–3 in. *Scape* stout; bracts $\frac{1}{3}$ in. long, not deflexed; pedicels $\frac{1}{2}$ in., stout; flowers twice as large as those of *L. paradoxa*.

28. **L. Walkeriæ,** *Graham in Bot. Mag.* t. 3770; stem stout, leaves 2–3 petioled ovate or orbicular acute, racemes many-fld., bracts lanceolate spreading, sepals obtuse 5-nerved, lateral flat falcately oblong, dorsal longer linear-oblong sides recurved, lip orbicular recurved crenulate, base contracted 2-tubercled, column incurved, wings uncinate. *Thwaites Enum.* 295; *Ridley in Journ. Linn. Soc.* xxii. 277.

DECCAN PENINSULA; on the Ghats from the Nilghiri Hills to Travancore, *Wight*, &c. CEYLON; Central Province, alt. 3–5000 ft., *Walker*, &c.

Stem 2–4 in., base pseudobulbous. *Leaves* 2–4 by $1\frac{1}{2}$–4 in., 7-nerved, base sometimes very unequal; petiole 0–$1\frac{1}{2}$ in. *Scape* with *raceme* 3–6 in.; bracts $\frac{1}{6}$ in., not deflexed; pedicels rather large; flowers about $\frac{1}{3}$ in., pale. *Lip* wrinkled and rather fleshy.—I have examined many flowers, but find no lip to be at all oblong, but always more or less rounded, as described by Graham; but when the lip is figured as oblong, it is because of the sides being incurved and foreshortened. It is very difficult to flatten out the lips of species in which it is recurved.

29. **L. atropurpurea,** *Lindl. Gen. & Sp. Orchid.* 28; stem stout, leaves 3–4 petioled ovate or orbicular, base very oblique and unequal, bracts lanceolate spreading, sepals very long linear obtuse, all with recurved sides,

dorsal 3- lateral 5-nerved, lip recurved orbicular-obovate fleshy with 2 large long tubercles at the narrowed base, column very slender curved, wings large rounded. *Thwaites Enum.* 295; *Kidley in Journ. Linn. Soc.* xxii. 277 (*excl. syn. L. livida*); *Bot. Mag.* t. 5529. L. olivacea, and L. Walkeriæ, *Wight Ic.* t. 903, 905.

TRAVANCORE; on the Pulney Mts., *Wight.* CEYLON, *Macrae*; elevated parts of the Central Province, *Thwaites*, &c.

Habit and foliage of *L. Walkeriæ*, but leaves always extremely unequal at the base, with one side rounded or auricled and the other acute, margins smooth or crisped; scapes taller, racemes longer, and flowers very much larger and dark vinous purple, the dorsal sepal $\frac{2}{3}$ of an inch long.—*L. livida*, Lindl., included under *atropurpurea* by Ridley, is a very different plant (see end of genus). Lindley has fastened on the same sheet with this in his Herbarium a specimen of *L. Walkeriæ* with the habitat "Khasia, *Lobb*," which I doubt not is an error for the Nilghiri Hills, where Lobb also collected.

30. **L. brachyglottis,** *Reichb. f. in Trimen Cat. Pl. Ceylon*; small, leaves 2 alternate petioled or the upper sessile ovate or ovate-cordate acuminate, bracts ovate concave, flowers very small, sepals obtuse 3-nerved, lateral broadly ovate-oblong, dorsal much longer lanceolate, lip short transversely oblong with obscure basal thickenings, column short straight truncate. *Ridley in Journ. Linn. Soc.* xxii. 275.

CEYLON; Central Province, alt. 5000 ft.; on Wateakelle Hill, *Thwaites.*

Stem 2–3 in., rather slender, not pseudobulbous. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ in., 5-nerved. *Scape* and *raceme* 2–3 in.; bracts $\frac{1}{8}$ in., persistent, concave, not reflexed; pedicels $\frac{1}{6}$ in.; flowers about $\frac{1}{6}$ in. across, red-purple.

31. **L. biloba,** *Wight Ic.* vi. 1633; small, leaves 2–3 petioled ovate acute undulate, flowers small, bracts $\frac{1}{4}$ in. lanceolate, sepals oblong-lanceolate acute, lateral hardly falcate, lip cuneate straight shortly clawed 2-lobed 2-tubercled, lobes oblong or lanceolate obtuse, column slender curved, wings small obtuse. *Walp. Ann.* vi. 218; *Ridley in Journ. Linn. Soc.* xxii. 276.

NILGHIRI HILLS; at Ootacamund, *Wight.*

Whole plant purplish. *Stem* $\frac{3}{4}$ in., pseudobulb $\frac{1}{4}$ in. *Leaves* 1 by $\frac{1}{2}$–$\frac{3}{4}$ in., green or purple. *Scape* $1\frac{1}{2}$ in.; flowers very dark purple.—Wight likens it to *L. atropurpurea*, from which the 2-lobed lip distinguishes it.

Sect. II. CORIIFOLIÆ. *Leaves* jointed at the base upon the leaf-sheath or on a pseudobulb, usually coriaceous.

* Leaf usually solitary on the pseudobulb. Lip as long as the lateral sepals or nearly so (when spread out).

† *Sepals* 3-*nerved* (*obscurely in* L. Prainii).

32. **L. elegans,** *Lindl. in Wall. Cat.* 1943, *in Herb. Lindl.* (*in part*), *Gen. & Sp. Orchid.* 40; leaf solitary 6–12 in. narrowly obovate-oblong or oblanceolate acute, scape tall stout many-fld., bracts setaceous, flowers very small, pedicels short, sepals obtuse revolute, lip reflexed cuneately oblong truncate, tip erose retuse, calli 0, column slender, wings very small. *Rolfe in Gard. Chron.* 1886, 158; *Ridley in Journ. Linn. Soc.* xxiv. 350.

PENANG, *Porter, Maingay* (*Kew Distrib.* 1599). PERAK, *King's Collector.*

Rootstock stout creeping; pseudobulbs hardly developed. *Leaves* $\frac{3}{4}$–$1\frac{1}{4}$ in. broad, 5–7-nerved. *Scape* with *raceme* 12–18 in.; bracts $\frac{1}{6}$ in., pedicel about as long; flowers as broad, yellowish. *Lip* obscurely 5-nerved. *Capsule* $\frac{1}{3}$ in. long.—Like

L. longipes, with which it was mixed in Herb. Lindl., whilst in Herb. Wall. only fragments of the former are retained. The Perak specimens have obscure side-lobes.

33. **L. bootanensis,** *Griff. Notul.* iii. 278; *Itin. Notes*, 98; *Ic. Pl. Asiat.* t. 287; leaf solitary sessile 5–10 in. linear- or ob-lanceolate acuminate, scape very slender flexuous margined lax-fld., bracts subulate shorter than the filiform pedicels, flowers rather large, sepals straight, sides revolute, lip recurved cuneately oblong, tip rather dilated truncate erose, calli 2 minute, column slender, wings hooked. *Ridley in Journ. Linn. Soc.* xxii. 285, *in part.*

SIKKIM HIMALAYA (*Ic. in Herb. Kew*); BHOTAN, at the foot of the hills, *Griffith.* KHASIA MTS., alt. 4–6000 ft.

Pseudobulb oblong, formed after flowering. *Leaf* $\frac{2}{3}$–1 in. broad, narrowed to the base but not petioled, many-nerved. *Scape* long; bracts $\frac{1}{8}$–$\frac{1}{4}$ in.; pedicels $\frac{1}{3}$–$\frac{1}{2}$ in.; flowers $\frac{1}{2}$–$\frac{3}{4}$ in. broad, ochreous or reddish.—Ridley describes the leaves as sometimes in pairs.

34. **L. lancifolia,** *Hook. f. Ic. Pl.* t. 1855; pseudobulbs narrow, leaf linear-lanceolate acuminate narrowed into a slender petiole, scape slender naked, bracts lanceolate shorter than the slender pedicels, sepals straight, margins revolute, lip recurved cuneately obovate, tip rounded, calli obscure, column slender, wing hooked. L. bootanensis, *in part, Ridley l. c.*

KHASIA MTS.; at Churra and Pomrang, alt. 4–5000 ft., *J. D. H. & T. T.* (*Liparis*, No. 18); on Shillong, alt. 6000 ft., *Clarke*, *Mann.*

Pseudobulbs 1–1½ in., many on a creeping stock; sheaths long, acuminate. *Leaves* 5–8 in., including the 1–2 in. petiole, thin, many-nerved. *Scape* straight or curved, hardly margined; flowers dirty yellow, like those of *bootanensis*. *Capsule* ½ in., narrowly pyriform on a decurved pedicel.—Differs from *bootanensis* in the long narrow pseudobulbs and long petioled leaves, but may prove a form of that species.

35. **L. pachypus,** *Parish* and *Reichb. f. in Trans. Linn. Soc.* xxx. 155; pseudobulb large fleshy ovoid, leaf 1½–2½ in. sessile oblanceolate acuminate, scape short bracteate, bracts lanceolate shorter than the pedicels, sepals narrow obtuse straight, margins recurved, lip recurved cuneate, tip broad truncate retuse crenulate, nerves 5 outer branching, calli obscure, column slender, wings obscure. *Ridley in Journ. Linn. Soc.* xxii. 288.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs tufted, ovoid, 1 in. or more long and as broad. *Leaf* ⅔ in. diam., sessile, thin, midrib slender, nerves obscure. *Scape* few-fld.; bracts ¼ in. and less; flowers about ⅔ in. across, yellow?

36. **L. Griffithii,** *Ridley in Journ. Linn. Soc.* xxii. 285 (*in part*); leaf linear-lanceolate, scape stout and rachis broadly 2-winged, bracts very slender longer than the lower short stout pedicels, flowers small, sepals straight obtuse, sides revolute, lip recurved deltoidly obcordate with a shallow crenulate sinus, calli minute, nerves 5, lateral branched, column slender curved, wings 0. *Griff. Ic. Pl. Asiat.* t. 307, f. 1.

BHOTAN, *Griffith.*

Pseudobulb 0 on the single flowering specimen. *Leaf* 12 in., and base of short stem clothed with equitant acute sheaths. *Scape* 8 in., nearly ¼ in. broad; bracts ⅓–½ in., green.—Ridley's description includes fruiting specimens of *L. plantaginea.*

37. **L. Prainii,** *Hook. f. Ic. Pl.* t. 1857 A; dwarf, pseudobulb small. leaf linear-oblong coriaceous keeled, scape stout strict many-fld., bracts

lanceolate equalling the pedicels, flowers minute, lateral sepals flat oblong obtuse obscurely 3-nerved, dorsal longest, lip recurved oblong-quadrate apiculate, base auricled embracing the column, which has minute acute apical wings.

Naga Hills in UPPER ASSAM, *Prain*.

Pseudobulbs $\frac{1}{3}$ in., flagon-shaped. *Leaf* 1 in., sessile, obtuse. *Scape* and *raceme* 3 in.; bracts $\frac{1}{8}$ in.; flowers $\frac{1}{10}$ in.; petals flat.

†† *Sepals* 1-*nerved* (*unknown in* L. Mannii).

38. **L. pusilla,** *Ridley in Journ. Linn. Soc.* xxii. 294; leaf 2–4 in. linear-lanceolate acute, scape slender, raceme dense-fld., bracts lanceolate equalling the slender pedicels, flowers minute, sepals obtuse flat or revolute, margins not recurved, lip recurved broadly oblong 5-nerved, tip rounded entire or notched, calli 0, column short incurved obscurely winged. *Hook. f. Ic. Pl.* t. 1856 A. L. auriculata, *Reichb. f. in Flora*, 1872, 277 (*not of Miquel*).

SIKKIM HIMALAYA; at Rungbee, *Clarke*. KHASIA MTS., alt. 4–6000 ft., common. TRAVANCORE; on the Anamallay Hills, *Beddome* (fid. *Ridley*).

Pseudobulbs $\frac{1}{2}$–$\frac{2}{3}$ in., broad or narrowly ovoid. *Leaf* $\frac{1}{3}$–$\frac{1}{2}$ in. broad, pale green, costa and nerves obscure. *Scape* 3–6 in., terete or margined; bracts $\frac{1}{3}$ in.; flowers $\frac{1}{8}$ in. across, white. *Lip* thick, base 2-auricled, nerves simple. *Capsule* $\frac{1}{6}$ in., globose.—Reichb., followed by Ridley, describes the lip as panduriform, but I do not find it so; and I have Ridley's authority for this being his *pusilla*. Name singularly inappropriate. I have seen no Travancore specimens.

39. **L. Mannii,** *Reichb. f. in Flora*, 1872, 275; *Ridley l. c.* 286; leaf chartaceous linear-lanceolate acuminate, scape 2-edged, bracts setaceous, lower longer than the pedicelled ovary, upper much shorter, sepals linear-ligulate obtuse acute, lip recurved 3-fid, side lobes $\frac{1}{2}$-falcate, isthmus very short narrow, midlobe transversely ovate crenulate in front, column broader above, anther acute.

ASSAM; at Obres, *Mann*.

Densely cæspitose; pseudobulbs cylindric, many-sheathed; upper sheath elongate, acuminate.—I have seen no specimens. *Description is from the author.*

40. **L. Duthiei,** *Hook. f. Ic. Pl.* t. 1857 B; leaf $\frac{3}{4}$–1 in. petioled elliptic- or linear-lanceolate acute 5-nerved, scape slender equalling the leaf, bracts subulate rather shorter than the ovary, flowers minute, sepals revolute, margins not or slightly recurved, lip recurved quadrately oblong 5-nerved, tip truncate crenate, calli 0, column stout curved obscurely winged.

WESTERN HIMALAYA; Kumaon, in the Gori Valley, alt. 2–3000 ft., *Duthie*.

Pseudobulbs $\frac{1}{3}$–$\frac{1}{2}$ in., ovoid, tufted. *Leaf* $\frac{1}{4}$–$\frac{1}{3}$ in. broad. *Raceme* 1–$1\frac{1}{2}$ in., rather dense-fld.; bracts $\frac{1}{10}$ in.; flowers about $\frac{1}{12}$ in. across, yellowish (when dry); lip hardly auricled at the base; nerves simple.

41. **L. obscura,** *Hook. f. Ic. Pl.* t. 1886; leaf solitary 3–4 in. narrowly oblanceolate, scape equalling or shorter than the leaf, bracts equalling or exceeding the ovary, flowers very minute, sepals lanceolate acute recurved or revolute, lip broadly oblong 3–5-nerved, tip broad subacute, column short suberect, wings obscure. L. angustifolia, *Thwaites Enum.* 206 (*not of Lindl.*). L. cæspitosa, *Ridley in Journ. Linn. Soc.* xxii. 290 (*not of Lindl.*).

CEYLON; Central Province, alt. 2–5000 ft., *Thwaites*.

Pseudobulbs tufted, 1 in., narrow. *Leaf* $\frac{1}{3}$–$\frac{2}{3}$ in. broad, subacute. *Flowers* $\frac{1}{12}$ in.

diam., yellow; sepals revolute, but margins not recurved; petals flat; lip rather thick. *Capsule* $\frac{1}{10}$–$\frac{1}{12}$ in.—Very near the Javan *L. angustifolia*, but the flowers and fruit are much smaller, and the lip shorter almost quadrate. The Mauritian *L. cæspitosa* also closely resembles it, but has a lanceolate lip. The capsules of all three are alike, broadly pyriform, with high ribs and flat nerved interstices.

** Leaves 2 or more rarely solitary on the pseudobulb or stem. Lip as long as the lateral sepals or nearly so (when spread out).

† *Sepals* 3-*nerved* (*unknown in* L. Scortechini).

42. **L. bistriata,** *Parish* and *Reichb. f. in Trans. Linn. Soc.* xxx. 155; pseudobulbs elongate, leaves 2 2–4 in. elliptic-oblong or -lanceolate, scape longer than the leaves bracteate stout margined or winged, bracts lanceolate equalling the ovary, sepals oblong-lanceolate obtuse, sides revolute, lip recurved panduriform 5-nerved, tip dilated broadly truncate, calli 0, column slender incurved, wings usually hooked. *Ridley l. c.* 288; *Hook. f. Ic. Pl.* t. 1858.

Sikkim Himalaya, *Griffith's Collector*; alt. 7000 ft., *J. D. H.* Khasia Mts., alt. 5–6000 ft. Naga Hills, in Assam, *Prain.* Tenasserim, *Parish.*

Pseudobulbs stem-like, 4–6 in., cylindric. *Leaves* $\frac{2}{3}$ in. broad, obtuse or apiculate, many-nerved, coriaceous, base narrowed. *Scape* 4–6 in.; bracts $\frac{1}{4}$ in.; flowers yellowish; lip undulate, sides with obscure rounded lobes, base auricled; side nerves branching.

Var. *robusta*; pseudobulbs shorter stouter with 2 large acute sheaths, scape very stout, bracts and flowers larger, lip obcordately panduriform, columnar wings rounded, capsule larger clavate.—Naga Hills, on Kohima, *Prain.*—Perhaps a different species.

43. **L. lacerata,** *Ridley in Journ. Linn. Soc.* xxii. 284; pseudobulbs ovoid, leaves 2 8–10 in. narrowly oblanceolate acuminate, scape slender laxly many-fld., bracts lanceolate shorter than the ovary, sepals straight, sides recurved, lip recurved from the broad base, then straight oblong 7-nerved, tip with 2 lacerate lobes, column slender incurved, wings small rounded.

Tenasserim; at Mergui, *Griffith.* Perak, *Scortechini, King's Collector.*—Distrib. Borneo.

Pseudobulbs 1 in., oblong or ovoid. *Leaves* $\frac{2}{3}$–$1\frac{1}{2}$ in. broad. *Scape* with the *raceme* 9–10 in.; pedicels $\frac{1}{3}$–$\frac{1}{2}$ in.; flowers $\frac{1}{2}$ in. across, light pink; lip red, contracted below the rounded shoulders.

44. **L. plantaginea,** *Lindl. Gen. & Sp. Orchid.* 29; leaves 2 opposite 6–10 in. sessile linear- or oblong-lanceolate acute, scape stout not winged, bracts large ovate-lanceolate, sepals obtuse 3-nerved straight, sides revolute, lip large deflexed from the base orbicular erose or crenulate veined suddenly contracted into a 2-auri:led 2-tubercled short neck, column incurved, wings 0. *Ridley in Journ. Linn. Soc.* xxii. 286. L. selligera, *Reichb. f. in Linnæa* xli. 42. L. orbicularis, *Loddiges mss.*; *Gard. Chron. N. S.* xvi. (1881) 592. L. Griffithii in part, *Ridley l. c.* 285.

Sikkim Himalaya, alt. 1–2000 ft., *Clarke.* Upper Assam; at Brahmakoond, *Griffith* (*Kew Distrib.* 5069).

Pseudobulbs 2–3 in.; sheath large, membranous, acute. *Leaves* 1–$1\frac{1}{2}$ in. broad, petioled or not, 5-nerved. *Scape* with the *raceme* 8–12 in., flexuous; bracts $\frac{1}{3}$–$\frac{2}{3}$ in., green, concave; pedicels rather longer; flowers 1 in. across the sepals, greenish. —The Assam specimens are flowerless. Mr. Ridley in his monograph included them under his *L. Griffithii*, but in the Kew Herbarium has separated them, marking the Assam plant as probably a form of *L. plantaginea.* The Bhotan

habitat is an error. In Lindley's Herbarium the plant is ticketed by Griffith as from the Brahmakoond.

45. **L. Scortechini,** *Hook.f.*; pseudobulb long stout, leaf 14 by $2\frac{1}{2}$ in. linear-oblong acute 5-nerved, scape as long as the leaf flowering to the base, rachis very stout, bracts small lanceolate, sepals recurved, margins recurved, lip nearly straight longer than the sepals flabellately obcordate from a narrow 2-auricled 2-tubercled neck, lobes deeply crenate, column slender incurved, wings obscure.

PERAK, *Scortechini.*

Pseudobulb subcylindric, $4\frac{1}{2}$ by 1 in. *Leaves* sessile. *Raceme* laxly many-fld., rachis $\frac{1}{8}$ in. diam.; bracts $\frac{1}{4}$ in.; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in.—Near *L. latifolia* of Java, but the bracts are much smaller, lip with a longer narrower neck and much smaller limb. A very fine species, of which I have seen only a drawing by Father Scortechini, numbered 1518, but which does not correspond with the plant so numbered in his collection.

46. **L. flaccida,** *Reichb. f. in Linnæa* xli. 44; leaves 2 6–10 in., scape and raceme very long slender, bracts minute, pedicels decurved, flowers very small, sepals obtuse 3-nerved flattish, lateral at length revolute, lip recurved narrow oblong dilated below the middle and there ciliate, tip 2-fid, lobes triangular subacute, calli 0, column incurved, wings obscure. *Ridley in Journ. Linn. Soc.* xxii. 296.

PERAK, *King's Collector.*—DISTRIB. Java, Borneo.

Pseudobulb in Perak spns. small; in Javan very large, 2 by 1 in. *Leaves* in Perak spns. 8–10 by $\frac{3}{4}$ in., narrowed from near the lip to the base, in Javan much broader, nerves 5–9. *Scape* with *raceme* much longer than the leaves, flowering nearly to the base, bracts lanceolate membranous; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in.; flower about $\frac{1}{10}$ in. across.

†† *Sepals* 1-*nerved* (*unknown in* L. vestita).

47. **L. longipes,** *Lindl. in Wall. Pl. As. Rar.* i. 31, t. 35, *Cat.* 1943 (*in part*); *Gen. & Sp. Orchid.* 40; leaves 2 linear obovate-oblong or oblanceolate, scape many-fld., bracts small lanceolate acuminate, flowers very many small white, sepals obtuse at length revolute 1-nerved, lip recurved yellow broadly ovate subacute rather fleshy, calli 0, column incurved, wings rounded. *Ridley in Journ. Linn. Soc.* xxii. 293 (*excl. syn. L. elegans*, Lindl.); *Wight Ic.* t. 906; *Thwaites Enum.* 295. L. pendula, *Lindl. in Bot. Reg.* 1838, *Misc.* 180; *Regel Ind. Sem. Hort. Petrop.* 1868, 79. L. spathulata, *Lindl. in Bot. Reg.* 1842. ? L. nesophila, *Reichb. f. Ot. Hamb.* i. 56. ? L. Boothii, *Regel Ind. Sem. Hort. Petrop.* 1864, *Suppl.* 14.

TROPICAL HIMALAYA, alt. 1–5000 ft., from Kumaon eastwards to MUNNIPORE and the KHASIA MTS., alt. 3–5000 ft., and southwards to PERAK and PENANG. NILGHIRI HILLS and southwards. CEYLON, common below 3000 ft.—DISTRIB. Malay and Pacific Islands, China.

Pseudobulbs short and ovoid, or long sometimes 6 in. and cylindric. *Leaves* 4–12 by $1\frac{1}{2}$–$1\frac{1}{4}$ in., obtuse, acute or acuminate, 5–7-nerved. *Scape* and *raceme* 6–10 in. with a few bracts below the flowers, slender.—Variable in habit and foliage, but constant in inflorescence and flowers. The sepals are not acute, as sometimes described. The form with short pseudobulbs (*L. spathulata*) occurs everywhere with the long pseudobulbed, and intermediates abound.

48. **L. vestita,** *Reichb.f. in Flora* 1872, 274; pseudobulbs approximate subterete rod-like 2-leaved, young clothed with broad sheaths, leaves cu-

neately oblong-ligulate acute, scape subterete naked below, raceme dense-fld., bracts lanceolate equalling the ovary, sepals ligulate obtuse, lip oblong retuse angled on both sides crenulate in front, column enlarged at the base and apex. *Ridley in Journ. Linn. Soc.* xxii. 294.

ASSAM; at Obres, *Mann* (*in Herb. Reichb.*).

Of this, which I have not seen, the author says that "it is not *L. longipes*, which differs in the retuse lip."

49. **L. distans,** *Clarke in Journ. Linn. Soc.* xxv. 71, t. 29; leaves 2 very narrowly oblanceolate acuminate thin, scape slender as long as the leaves 2-winged few-fld., flowers 1 in. across, bracts membranous shorter than the long pedicels, sepals narrow linear obtuse obscurely 1-nerved, margins revolute, lip recurved spathulately obovate obtuse crenulate obscurely nerved 2-tubercled near the concave base, column slender, wings narrow. L. macrantha, *Hook. f. Ic. Plant.* t. 1854.

UPPER ASSAM; Naga Hills, *Prain, Clarke.*

Pseudobulb elongate, narrow, enclosed in one long sheath. *Leaves* 12 by 1 in., many-nerved, narrowed into a petiole. *Flowers* green; sepals, petals and lip $\frac{3}{4}$ in. long.—The largest-flowered Indian species. Leaves distinctly jointed in the pseudobulb where hidden by the sheath, which is 4 in. long.

50. **L. condylobulbon,** *Reichb. f. in Hamb. Gartenzeit.* 1882, 34; leaves 2–8 in. linear-oblong, scape short, raceme dense-fld., flowers minute very shortly pedicelled, bracts as long as the short pedicels, sepals obtuse 1-nerved, lateral revolute, lip recurved oblong with an entire rounded tip fleshy nerveless, calli 0, column slender, wings small. L. parviflora, *Ridley in Journ. Linn. Soc.* xxii. 296.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulb 1–2 in., narrow. *Leaves* 1 in. broad, 7-nerved. *Scape* with *raceme* 6 in. Much resembling *L. gladiata*, and with flowers yellowish when dry of the same size, but the bracts are longer, slender and membranous, and the lip is very different. —The above is from Reichenbach. Ridley makes it a synonym of the Javan *L. parviflora*, but it differs *in toto* from the description he gives of that species.

51. **L. viridiflora,** *Lindl. Gen. & Sp. Orchid.* 31; leaves 2 3–4 in. elliptic-lanceolate or oblanceolate membranous, raceme many-fld. subsecund, bracts lanceolate, pedicels short decurved, sepals flat broad obtuse or subacute 1-nerved, lip recurved orbicular-ovate subacute very obscurely 3-lobed concave rather fleshy, calli 0, column short incurved. *Ridley in Journ. Linn. Soc.* xxii. 289; *Thwaites Enum.* 295. L. elliptica, *Wight Ic.* t. 1735. L. Wightii, *Reichb. f. in Walp. Ann.* vi. 218. L. Hookeri, *Ridley l. c.* 288. Malaxis viridiflora, *Blume Bijd.* 392, t. 54.

SIKKIM HIMALAYA, alt. 4–6000 ft. UPPER ASSAM, KHASIA, and NILGHIRI HILLS. CEYLON, alt. 3–7000 ft.—DISTRIB. Java.

Pseudobulbs very variable, $\frac{1}{2}$–1 in. long, from ovoid to subcubical or subglobose. *Leaves* $\frac{3}{4}$–1 in. broad, elliptic and sessile, or $\frac{1}{4}$–$\frac{3}{4}$ in. broad oblanceolate and petioled, acute or acuminate; nerves many, slender. *Scape* 4–6 in., erect or recurved, with scattered filiform membranous bracts below the raceme; flowers ascending from the recurved pedicel. *Sepals* white or yellowish, not widely spreading, about $\frac{1}{10}$ in. long. —The subsecund raceme and flowers ascending from the recurved pedicel are quite peculiar to this species. I find no character whereby to separate *L. Hookeri*, nor is this species related to *L. bistriata.*

52. **L. luteola,** *Lindl. in Wall. Cat.* 1944; *Gen. & Sp. Orchid.* 32; leaves 2 2–4 in. erect narrowly oblanceolate coriaceous, midrib stout, scape

exceeding the leaves few-fld., bracts lanceolate, pedicels long, sepals subfalcate lanceolate subacute, margins revolute, lip recurved cuneate truncate apiculate, base auricled, calli 2 minute, column slender curved, wings obscure. *Ridley in Journ. Linn. Soc.* xxii. 289; *Griffith Notul.* iii. 277.

KHASIA HILLS, alt. 4–5000 ft., common. UPPER BURMA, *Griffith*. TENASSERIM, at Moulmein, *Parish*.

Pseudobulbs densely tufted, very small, depressed-globose. *Leaves* $\frac{1}{6}$–$\frac{1}{4}$ in. broad. *Scape* 2–4 in.; bracts $\frac{1}{6}$ in., green; pedicels $\frac{1}{3}$–$\frac{1}{2}$ in.; flowers $\frac{1}{4}$ in.

*** Lip minute much shorter than the sepals quadrate. Sepals straight or lateral subfalcate, margins revolute.—A peculiar group of small species.

53. **L. resupinata,** *Ridley in Journ. Linn. Soc.* xxii. 290; leaves 3–4 1–3 in. linear-lanceolate acuminate, scape much longer than the leaves slender, bracts lanceolate green longer than the pedicels, flowers $\frac{1}{3}$ in., sepals straight broadly oblong obtuse 1-nerved, margins recurved, lip broadly ovate-oblong with rounded basal lobes 2-tubercled, tip broad rounded, column broadly winged to the base, wings with a capiliary tail. *Hook. f. Ic. Plant.* t. 1888.

SIKKIM HIMALAYA, alt. 5–6000 ft., and the KHASIA MTS., common, alt. 4500–6500 ft. ? NILGHIRI MTS., *Wight*.

Pseudobulbs tufted, $\frac{1}{2}$–1 in., narrow. *Leaves* alternate, sessile, submembranous, rather distant, 7-nerved. *Scape* bracteate, with the raceme 5–7 in., many-fld.; lower bracts $\frac{1}{4}$–$\frac{1}{3}$ in.; pedicels $\frac{1}{4}$ in.; flowers yellow.—The capillary tail of each wing of the column is peculiar to this and the following species. Ridley gives Nilghiri Mts. Wight as a habitat, but there are no specimens in Wight's Herbarium.

54. **L. Ridleyi,** *Hook. f. Ic. Plant.* t. 1887; leaves 3–4 3–5 in. linear-lanceolate acuminate, scape much longer than the leaves slender bracteate, bracts lanceolate green shorter than the pedicels, flowers $\frac{2}{3}$ in., sepals straight obtuse 1-nerved, margins recurved, dorsal lanceolate, lateral oblong-lanceolate, lip ovate-oblong with rounded basal lobes 2-tubercled, tip rounded, column broadly winged to the base, wings with a capillary tail.

SIKKIM HIMALAYA, alt. 4–6000 ft., common.

Habit, &c., of *L. resupinata*, under which Ridley has placed it, but a larger plant, with flowers more than twice as large, and much narrower sepals.

55. **L. delicatula,** *Hook. f. Ic. Plant.* t. 1889; leaves 2 1–1$\frac{1}{2}$ in. petioled elliptic-lanceolate membranous, scape much longer than the leaves filiform, bracts ovate much shorter than the pedicels, flowers $\frac{1}{6}$ in., sepals straight broadly oblong obtuse 1-nerved, margins revolute, lip straight orbicular-oblong with small rounded basal lobes and 2 tubercles, tip broad rounded abruptly caudate, column broadly winged. L. decurrens, *in part, Ridley in Journ. Linn. Soc.* xxii. 291 (*the Khasian plant only*).

KHASIA MTS., alt. 4–5000 ft., *Lobb, J. D. H. & T. T.* MISHMI HILLS, in Upper Assam, *Griffith*.

Pseudobulbs tufted, $\frac{1}{2}$ in., ovoid or oblong. *Leaves* $\frac{1}{6}$–$\frac{1}{3}$ in. broad, pale, obscurely 3-nerved, acute or apiculate. *Scape* 3–5 in., very slender, bracteate; bracts $\frac{1}{6}$ in., acute, membranous; flowers white. *Column* with uncinate wings near the top, and narrow lateral wings (not confluent with the terminal) descending to the base.—Placed under the Javanese *L. decurrens* by Reichb. f. and Ridley, but differs from

that plant in the filiform scape, ovate bracts, and eciliate sepals and petals. Blume figures the sepals of his *Malaxis decurrens* as papillose all over.

56. **L. platyrachis,** *Hook. f. Ic. Plant.* t. 1890; leaves 2–3 1–1½ in. petioled linear-lanceolate membranous, scape much longer than the leaves flattened or 2-winged, bracts minute subulate, flowers ⅙ in., sepals subfalcate oblong obtuse 1-nerved, lip recurved quadrately panduriform, basal portion 2-auricled 2-tubercled, distal with acute upper angles and a rounded sometimes apiculate base, column with small upper wings and winged sides.

SIKKIM HIMALAYA, alt. 4–5000 ft., *Treutler, Clarke.*

Habit and size of *L. delicatula*, from which it differs in the winged rachis, minute subulate bracts, and form of the lip, which, as in all the species of this group, is very difficult of analysis, being crumpled in drying.

57. **L. perpusilla,** *Hook. f. Ic. Plant.* t. 1856 B; leaves 4–5 recurved ½–1 in. linear acute, midrib stout, margins recurved, scape much longer than the leaves, bracts ovate-lanceolate, flowers $\frac{1}{10}$ in., sepals very broadly elliptic-oblong obtuse 1-nerved, lip minute quadrate with 2 rounded side lobes and 2 tubercles, tip very broad rounded, column short stout broadly winged.

SIKKIM HIMALAYA, on trees, alt. 7–8000 ft., *J. D. H., Clarke, Gamble.*

Pseudobulbs tufted, ⅙–¼ in., ovoid or oblong. *Leaves* $\frac{1}{12}$–$\frac{1}{10}$ in. diam., coriaceous. *Scape* curved, obscurely margined, naked; bracts $\frac{1}{10}$ in.; flowers yellow.—A singular little plant which I found in 1848 on trees upon Sinchal near Darjeeling, and made a drawing of, but have lost the specimens.

Sect. III. DISTICHÆ. Bracts of the short flat raceme distichous and imbricating, coriaceous, ensiform.

58. **L. disticha**, *Lindl. in Bot. Reg. sub.* t. 882; leaf solitary 5–10 in. coriaceous linear, scape naked, sepals oblong-ovate acute 3-nerved, lip recurved, lateral lobes rounded and inflexed at the base, midlobe orbicular-ovate obtuse, column very short erect dorsally compressed with very broad coriaceous wings dilating downwards. *Ridley in Journ. Linn. Soc.* xxii. 292; *Miquel Fl. Ind. Bat.* iii. 623. L. gregaria, *Lindl. Gen. & Sp. Orchid.* 33; *Thwaites Enum.* 296. L. mucronata, *Lindl. l. c.* 32. Malaxis disticha, *Thouars Orchid. Isles Austr. d'Afrique*, t. 89. Malaxis mucronata, *Blume Bijd.* 391; *Moon Cat.* 467.

TENASSERIM; at Moulmein, *Parish.* CEYLON, *Walker*, &c.—DISTRIB. Malay Islands, Timor, Mauritius, Bourbon.

Rootstock slender, creeping; pseudobulbs distant, ⅓–⅔ in., pyriform. *Leaves* ⅓–½ in. broad, acuminate. *Scape* usually shorter than the leaves, stout, margined or winged; raceme ½–2 in., rachis flattened; bracts $\frac{1}{6}$–¼ in.; flowers ½ in., ochreous yellow. *Lip* fleshy, with a large basal callus. *Capsule* ⅓ in. long, pedicelled.

59. **L. compressa,** *Lindl. Gen. & Sp. Orchid.* 32; leaf solitary 10–12 in. linear-lanceolate strongly nerved beneath, scape naked, sepals lanceolate, lip cuneately flabelliform from a narrow 2-tubercled claw, tip broadly truncate or rounded crenulate apiculate, column slender incurved, wings 0. *Ridley in Journ Linn. Soc.* xxii. 291; *Miquel Fl. Ind. Bat.* iii. 621. Malaxis compressa, *Blume Bijd.* 390, t. 54.

PERAK, *Scortechini, King's Collector*, alt. 3000–3500 ft.—DISTRIB. Sumatra, Java.

Pseudobulb 1 in. or more. *Leaf* 1–1½ in. broad. *Scape* winged; raceme as in *L. disticha*, but bracts and flowers larger.

DOUBTFUL AND EXCLUDED SPECIES.

L. ALATA, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 17; pseudobulbs ovoid, sheaths lax membranous acute, leaves usually 2 subpetioled sheathing membranous ovate acute entire, base rounded, spike elongate few-fld., rachis compressed winged, lip subcordate convex quite entire, base erect embracing the column.—Nilghiri Hills, moist woods at the Waterfall, *Perrottet*.—This may be either a *Liparis* or *Microstylis*.

L. BIDENTATA, *Griff. Notul.* iii. 277; *Ic. Pl. Asiat.* t. 286, f. 2, from the Naga Hills, is not a *Liparis*.

L. CUMINGII, *Ridley in Journ. Linn. Soc.* xxii. 292, founded on Cuming's No. 2141, is erroneously described as a Malaccan plant. Cuming collected it in the Island of Bopol, one of the Philippians. It is hardly different from *L. compressa*.

L. DECURSIVA, *Reichb. f. in Gard. Chron.* 1884, ii. 38; pseudobulb tumid subpyriform very obtusely angled on both sides, leaves 2 cuneate-oblong chartaceous, scape narrowly winged, bracts lanceolate acuminate keeled the lower exceeding the pedicelled ovaries, sepals triangular-ligulate, lip with a short channelled claw, blade large abruptly transversely hastate emarginate with a tooth in front serrulate, claw with a notched tubercle, column incurved dilated towards the base angled on both sides next the pit.—E. Indies (*Hort. Glasnevin*).—*Description from Reichenbach f. l. c.*

L. GROSSA, *Reichb. f. in Gard. Chron.* 1883, i. 110; pseudobulbs short stout pyriform 2-leaved, leaves broadly ligulate obtuse, tip unequal, raceme many-fld., rachis depressed, base with an acute compressed foliaceous sheath, and many scarious sheaths above, flowers yellow-brown, bracts linear-cuspidate hardly equalling the pedicelled ovary, sepals ligulate acute, lip ligulate, base minutely obtusely auricled abruptly constricted in the middle, apex divergently 2-lobed, side lobes quadrate denticulate on the outer margin, basal calli obscure. *Ridley in Journ. Linn. Soc.* xxii. 288.—Burma, *H. Low.*—Allied to *L. pachypus*, but much larger, with a very different lip. *Description from Reichb. f. l. c.* I have seen no specimens.

L. LIVIDA, *Royle Ill.* 364, name only, from Nepal.—In the Kew collection of Indian drawings there is one named by Lindley "*L. livida*," but which is so incorrectly drawn (the petals being represented as lateral sepals) that no confidence can be placed in it. It may be a form of *L. bituberculata*. In Lindley's Herbarium there is a copy of this drawing, and on the same sheets is fastened a specimen of what is clearly *L. Walkeriæ*, ticketed "Khasia, *Lobb*," but which is probably from the Nilghiri Hills, where Lobb also collected.

L. OBCORDATA, *Vahl. ex King Cat. of N.W. Indian plants in Atkinson's Notes on the Economic Products of N.W. India, Part V.* 318.—This is undescribed.

L. ODONTOSTOMA, *Reichb. f. in Linnea* xli. 97; *Ridley l. c.* 263; 2 ft. high, pseudobulb subterete?, leaves about 4 membranous cuneate-oblong acute, raceme many-fld., dorsal sepal lanceolate 3-nerved, lateral oblong-ligulate 4-nerved curved, claw of lip with the base obtusely angled, blade as long as the claw subquadrate emarginate and apiculate, calli 2 conical, column angled at the base and apex.—Sikkim, alt. 3–5000 ft., *J. D. H.*—I suspect this to be a form of *L. bituberculata*. The bracts are not described, and the 4-nerved lateral sepals are anomalous.

L. STACHYURUS, *Reichb. f. in Flora* 1872, 274; *Ridley l. c.* 295; pseudobulbs ligulate (2-edged?) 2-leaved, leaves cuneately oblong-ligulate acuminate, scape dense-fld., bracts setaceous about equalling the pedicelled ovaries, sepals ligulate obtuse, lip trifid, side lobes semicordate at the base obtuse-angled in front, midlobe triangular, column dilated at the apex, anther acute.—Assam, *Mann.*—Placed in the section *Coriifoliæ* and near *L. longipes* by Ridley, who does not say that he has seen the plant. I have not.

L. STRICKLANDIANA, *Reichb. f. in Gard. Chron.* 1880, i. 232; *Ridley l. c.* 295; pseudobulbs conico-ovoid 2-(1–3)-leaved, leaves linear-ligulate acute, scape ensiform winged, raceme rather dense-fld., bracts triangular shorter than the pedicelled ovaries, sepals ligulate, petals linear retuse, lip 3-lobed from a cuneate transversely dilated base, lateral lobes rounded, midlobe short triangular, lobes all

minutely denticulate in front, calli minute, column curved hardly dilated in front.—Assam? (*Hort. Strickland*).—Unknown.

L. TRISTIS, *Loddiges Orchid.* p. 4, cult. by Loddiges, from Ceylon; name only.

LIPARIS, "Ceylon, *Loddiges*" *l. c.*, name only. Ridley has referred to this (*Journ. Linn. Soc.* xxii. 297) as *L.* "*zeylanica*," but Loddiges has given it no specific name.

4. **PLATYCLINIS,** *Benth.*

Tufted epiphytes, pseudobulbs narrow or 0. *Leaves* solitary, petioled. *Flowers* small, in a terminal raceme; bracts very rigid, straight, convolute. *Sepals* and *petals* spreading. *Lip* sessile or shortly clawed, narrow or broad. *Column* erect, short or rather long, sides produced into 2 membranous points, wings or arms, tip produced into an entire or cleft hood; anther incumbent, 2-celled; pollinia 4, waxy, ovoid, superposed, cohering in pairs in separate cells.—Species about 20, Malayan.

The rigid pale narrow convolute grooved glumaceous bracts are very characteristic of this genus.

1. **P. gracilis,** *Hook. f.*; leaves linear-lanceolate obtuse, scape very slender, bracts acute half as long as the very shortly pedicelled flowers, sepals $\frac{1}{6}$ in. long broadly lanceolate finely acuminate 3-nerved, petals as long linear-oblong, lateral lobes of lip rounded crenulate, tips lanceolate spreading, midlobe cuneate, tip rounded, disk with an elevated green coriaceous 3-furcate ridge, column slender with gladiate arms.

PERAK; alt. 4–5000 ft., *King's Collector.*

Pseudobulbs 1 in., subcylindric. *Leaf* 4–6 by 1 in., petiole 1 in. *Scape* naked and *raceme* 12 in.; bracts $\frac{1}{8}$ in.; flowers yellowish-white. *Lateral nerves* of sepals and petals very faint.

2. **P. Kingii,** *Hook. f.*; leaves linear-lanceolate, raceme long-peduncled few-fld., bracts almost as long as the flowers, sepals $\frac{1}{4}$ in. ovate-lanceolate finely acuminate, lateral 5-nerved, lip with rounded crenulate side lobes, midlobe ovate acute veined, disk with 2 small curved calli, column very short, hood with a very thick dorsal ridge.

PERAK, *Scortechini, King's Collector.*—DISTRIB. ? Borneo (*Beccari,* No. 2095).

Pseudobulb $\frac{1}{2}$–1 in., narrowly ovoid. *Leaves* 3–7 in., subacute or acuminate, rather thin; petiole 1 in. *Scape* and *raceme* about equalling the leaves; bracts $\frac{1}{6}$ in., acute; flowers $\frac{1}{3}$ in. across, pale yellow, lip light green.—The Bornean plant differs in having a longer column which has not a dorsal ridge, and its wings are longer. The column of *P. Kingii* is so minute and short that I had great difficulty in finding the wings.

5. **TIPULARIA,** *Nutt.*

Terrestrial herbs; pseudobulb small. *Leaf* solitary, ovate, petioled. *Scape* long; flowers loosely racemose. *Sepals* spreading and petals narrow, subequal. *Lip* much smaller than the sepals, sessile, suberect, lateral lobes rounded, midlobe flat; spur long, slender. *Column* slender erect, anther 2-celled with a short filiform stipes ending in a gland attached to the rostellum (as in *Vandeæ*); pollinia 4, distinct.—DISTRIB. The following and a N. American species.

T. Josephi, *Reichb. f. mss.*; sepals 3-nerved, petals 1-nerved, lip with large side lobes, midlobe ovate or ovate-lanceolate acute. *Lindl. in Journ. Linn. Soc.* i. 174.

TEMPERATE SIKKIM HIMALAYA; in woods of the interior, alt. 10–12,000 ft., *J. D. H.*

Pseudobulb ½ in. *Leaf* 2–3 in., 5–7-nerved; petiole ½–1 in. *Scape* with the *raceme* 8–12 in., slender; bracts very minute; flower ⅓ in. across. *Sepals* with revolute margins and petals obtuse; lip 3-nerved, spur rather longer than the ovary and short pedicel.—Differs from the American *T. discolor* in the much smaller flowers, shorter 3-nerved sepals, larger side lobes of the lip, ovate midlobe, and much shorter spur and column.

6. **OREORCHIS,** *Lindl.*

Terrestrial herbs, stem tuberous or pseudobulbous, 1–2-leaved. *Leaves* long, narrow. *Scape* slender; flowers small, racemose. *Sepals* and *petals* subsimilar, erect, 5-nerved. *Lip* adnate to the base of the column, claw erect, side lobes short, erect; midlobe spreading, entire. *Column* elongate, subclavate, truncate; anther 1-celled, with a stipes (as in *Tipularia*); pollinia 4, subglobose, distinct.—Species 4, North Asiatic.

1. **O. foliosa,** *Lindl. in Journ. Linn. Soc.* iii. 27; flowers pedicelled, dorsal sepal linear-oblong subacute, lateral falcately oblong acuminate, petals broadly oblong obtuse, base of lip produced into a sac, lateral lobes of lip large rounded, midlobe as large as both lateral rounded. Corallorhiza sp. with leaves, *Lindl. in Royle Ill.* 362.

TEMPERATE HIMALAYA; Simla, alt. 7800 ft., *Gamble*; Garwhal, *Royle*; Sikkim, Lachen Valley, alt. 11–12,000 ft., *J. D. H.*

Root a tuber rather than pseudobulb. *Leaf* 3–6 in., linear-lanceolate, nerves strong. *Scape* with *raceme* 6–12 in., few-fld.; sheaths 2–3, tubercled; bracts lanceolate, caducous; flowers ½ in. long, red-brown; pedicel and ovary ½ in.; lip many-nerved, median keels very obscure.

2. **O. indica,** *Hook. f.*; flowers sessile, dorsal sepal linear-lanceolate, lateral subfalcately lanceolate, petals narrowly subfalcately oblong obtuse, mentum 0, lip clawed, side lobes ear-shaped incurved obtuse, midlobe rounded entire or sub-2-lobed, disk with a raised median lamella between the lateral lobes. Corallorhiza indica, *Lindl. in Journ. Linn. Soc.* iii. 26 (*not of Dcne.*).

TEMPERATE WESTERN HIMALAYA; Simla, on Hattu, *Thomson*; Garwhal, alt. 8–9000 ft., *Edgeworth.*

Much more robust than *O. foliosa*; flowers much larger, sepals ½ in. long.—Edgeworth's specimen has a tuberous lobed root, and a broken leaf 1 in. broad, which removes the plant from *Corallorhiza.*

3. **O. micrantha,** *Lindl. in Journ. Linn. Soc.* iii. 27; dorsal sepal obtuse, mentum 0, lip with small lanceolate falcate basal lobes, midlobe large with a 2-lobed crumpled tip, disk with a very elevated linear channelled fleshy callus.

WESTERN HIMALAYA; Kumaon, alt. 8–10,000 ft., *Thomson, Strachey & Winterbottom* (*Orchid.* No. 56).

Pseudobulb globose. *Leaves* 2, ¼–⅓ in. broad, narrowly linear. *Scape* 12–18 in., with 2–3 tubular sheaths; flowers ¼ in. long.

7. **CORALLORHIZA,** *Br.*

Leafless, red-brown, erect, terrestrial herbs; rhizome coralloid, jointed. *Scape* simple, sheathed; flowers small, whitish, in a terminal spike or

raceme. *Sepals* and *petals* subequal, linear; petals ascending, incurved. *Lip* clawed, adnate to the base of the column, erect, entire or 3-lobed, spur minute or 0. *Column* erect, incurved; anther 4-celled; pollinia 4, ovoid, soft, cohering by a viscus.—Species about 12, in N. temperate regions.

C. innata, *Brown in Hort. Kew* v. 209; scape slender few-fld., flowers subsessile, bracts minute, lip 3-lobed, side lobes narrow, midlobe retuse. *Lindl. Gen. & Sp. Orchid.* 533; *Reichb. Ic. Fl. Germ.* xiii. t. 490. C. Jacquemonti, *Dcne. in Jacquem. Voy. Bot.* 165, t. 165.

KASHMIR, *Jacquemont.*—DISTRIB. Europe, N. Asia, N. America.

Scape 6–10 in., slender; sheaths lax; flowers $\frac{1}{4}$ in. long; sepals ovate lanceolate, lateral deflexed; lip (in European specimens) whitish with purple blotches.

8. **DENDROBIUM,** *Swartz.*

Epiphytes; stems elongate or pseudobulbous. *Leaves* never plaited. *Flowers* racemose, often large and handsome. *Sepals* subequal, lateral obliquely adnate to the foot of the column, and forming with it a sac or mentum. *Lip* contracted at the base, rarely clawed, adnate to and incumbent on the foot of the column, side lobes embracing the column or spreading or 0, terminal narrow or broad, flat, convex, concave or saccate, disk often lamellate. *Column* short, foot long or short, top angled or 2-toothed; anther 2-celled; pollinia 4, free, ovoid or oblong, compressed, closely collateral in pairs in each cell.—Species about 300, Tropical Asiatic, Australasian and Polynesian.

The following attempt to arrange the Indian species of this vast and very intricate genus into definable groups is open to much criticism in detail. It has entailed many months of labour, and it must stand or fall according to the verdict of those who may use it.

Series I. Inflorescence terminal (that is, from the base of a terminal arrested internode), or both terminal and lateral. (See also some species of sect. *Aporum*; lateral in *Formosa.*

Sect. I. SARCOPODIUM. *Pseudobulbs* short, erect, uninodal, seated singly on a stout creeping rhizome. *Leaves* 2, terminal, opposite, coriaceous, flat, persistent. *Flowers* solitary from between the leaves, or on a 1–few-fld. scape, large or medium-sized; mentum short, rounded.—Habit of *Bulbophyllum*, sect. *Sestochilus.*

Sect. II. BOLBODIUM. *Pseudobulbs* erect, as in *Sarcopodium*, but more tufted, clavate and stipitate. *Leaves* 2, terminal, opposite, coriaceous, flat, persistent. *Flowers* solitary or few from between the leaves, medium-sized, white; mentum large, longer than the lateral sepals, conical, incurved.

Sect. III. CADETIA. *Stem* branched, pendulous, branches forming chains of uninodal sessile or stipitate pseudobulbs. *Leaf* solitary, terminal, coriaceous, flat, persistent. *Flowers* 1–2 from the base of the leaf, medium-sized, white or pale; mentum short or elongate.

Sect. IV. STACHYOBIUM. *Stems* tufted, forming a small polynodal pseudobulb, or more or less elongate, often compressed, simple or branched. *Leaves* many, narrow, membranous, deciduous or persistent. *Flowers* solitary, or in slender terminal or terminal and lateral racemes, small or medium-sized, often white; mentum rather long, conical, incurved, or short and obtuse; lip with often a flat keel on the disk that terminates in a truncate crenate callus on the midlobe.—Small species of this section resemble *Eria*, sect. *Bryobium.*

Sect. V. FORMOSÆ. *Stems* rather short, tufted, leafy, usually suberect, often with deciduous black hairs on the sheaths. *Flowers* solitary or racemose, often large,

white or pale buff with faint colouring on the lip; mentum usually long and funnel-shaped, or conical, acute, straight or incurved (short in *D. albo-sanguineum*); mid-lobe of lip often fimbriate on the margin or disk.—Similarly hairy sheaths occur in sect. *Virgatæ* and in *D. nutans* and a few others.

Series II. Inflorescence lateral on the stem or pseudobulb (terminal in some species of *Aporum*).

Sect. VI. APORUM. *Stems* tufted, compressed, leafy. *Leaves* shortly ensiform distichous, sheaths equitant, imbricating, fleshy or coriaceous, nerveless, persistent. *Flowers* small, white or yellowish with pink markings, shortly pedicelled, solitary or in bracteate heads or short racemes, sometimes appearing racemose from occupying the leafless ends of the branches; mentum stout, as long as or longer than the short broad lateral sepals.

Sect. VII. STRONGYLE. *Stems* tufted, slender, often branched, terete. *Leaves* terete, subterete or subulate, persistent. *Flowers* small, white or pale, solitary or as if racemed on the leafless ends of the stem or branches; mentum as in *Aporum*.—This section is not very well distinguished from the preceding and following.

Sect. VIII. VIRGATÆ. *Stems* tufted, elongate, slender, but hard, rigid and polished, simple or branched, leafy, often swollen above the base. *Leaves* distichous, long, linear (shorter and oblong in *D. tuberiferum* & *crumenatum*), persistent. *Flowers* small or medium-sized, white or yellow with often pink or green markings, solitary or few on a leaf-opposed tubercle, or appearing racemed on the leafless ends of the stem or branches; sheaths sometimes pubescent with black hairs; mentum usually long, stout, incurved; petals and lip often very narrow.

Sect. IX. BREVIFLORES. *Stems* tufted, long or short, terete or clavate, sparingly leafy. *Leaves* oblong or lanceolate, persistent or deciduous. *Flowers* few, small, in short racemes or heads, pink or yellow, often dingy; mentum large, saccate; lip very short, deeply concave or urceolate, truncate or lobes short.

Sect. X. PEDILONIUM. *Stems* tufted, long, terete, simple, stout or slender, erect or pendulous, leafy. *Leaves* distichous, oblong or lanceolate, coriaceous or submembranous, persistent or deciduous. *Flowers* medium-sized, pink or yellow, rarely white, in short leaf-opposed often dense-fld. secund racemes, or in corymbs or tufts, rarely solitary; mentum stout and often very long, equalling or longer (often much) than the short triangular sepals; lip usually very long and narrow, clawed, with often a small lamella, callus or spur on the claw near the base.—*D. sanguinolentum* is perhaps better referred to Sect. XII.

Sect. XI. DISTICHOPHYLLÆ. *Stems* tufted, elongate, stout or slender, leafy throughout. *Leaves* short, uniform, distichous, bases imbricating, persistent, emarginate or 2-fid. *Flowers* small, usually white or yellow, solitary or in short leaf-opposed racemes; mentum stout, spur-like, as long as the lateral sepals or longer; lip short, broad, sides recurved.—Habit of *Appendicula*.

Sect. XII. EUDENDROBIUM. *Stems* tufted, elongate, stout or slender, clavate or nodose in some species. *Leaves* various, distichous (terminal and solitary in *D. aggregatum* only), membranous or coriaceous, persistent or deciduous. *Flowers* usually large in lateral pairs, fascicles or racemes, very rarely solitary, highly coloured or white.—This section is best characterized by wanting the sum of the characters of any of the others. The species with narrow sepals, petals and a long mentum approach *Formosæ* and *Pedilonium*.

Sect. I. SARCOPODIUM (see p. 710).

* *Flowers solitary.*

1. **D. amplum,** *Lindl. in Wall. Cat.* 2001; *Gen. & Sp. Orchid.* 74; leaves petioled oblong, scape long, sepals lanceolate acuminate, lip sessile 3-lobed, side lobes short rounded, midlobe broad acute crenulate, disk

3-lamellate between the side lobes. *Wall. Pl. As. Rar.* i. 25, t. 29; *Paxt. Mag.* t. 121; *Griff. Notul.* iii. 307; *Ic. Pl. Asiat.* t. 304. Sarcopodium amplum, *Lindl. in Paxt. Fl. Gard.* i. 155; *Fol. Orchid.* 1. Bolbophyllum amplum, *Reichb. f. in Walp. Ann.* vi. 244.

TROPICAL HIMALAYA, from Nepal eastwards, ASSAM and the KHASIA MTS., alt. 4–5000 ft.

Pseudobulbs 1–2 in., oblong. *Leaves* 4–6 in., often 2 in. broad; petiole ½–1 in. *Flowers* white to dull green and purple; sepals 1½ in. long; midlobe of lip dark purple, variable in size and breadth.

2. **D. fuscescens,** *Griff. Notul.* iii. 308; *Ic. Pl. Asiat.* t. 309; leaves petioled elliptic or linear- or oblong-lanceolate, sepals ovate-lanceolate caudate-acuminate, petals shorter very narrow, lip sessile, base lamellate, side lobes oblong, midlobe larger orbicular-ovate acuminate. Sarcopodium fuscescens, *Lindl. in Paxt. Fl. Gard.* i. 155; *Fol. Orchid.* 2. Bolbophyllum fuscescens, *Reichb. f. in Walp. Ann.* vi. 244.

SIKKIM HIMALAYA, alt. 6500 ft., *Clarke.* KHASIA MTS., alt. 4-5000 ft., common. NAGA HILLS, alt. 6–7000 ft., *Prain.*

Pseudobulbs ovoid or ellipsoid, ½–1½ in. *Leaves* 2–4 in. *Flowers* purplish brown; sepals 1–2 in.; bracts large, sheathing.

3. **D. rotundatum,** *Benth. in Gen. Plant.* iii. 499; leaves elliptic-oblong notched, scape shorter than the membranous bracts, sepals and petals subequal erect ovate acute fleshy, lip sessile, base lamellate, side lobes small rounded, midlobe largest. *Fol. Orchid.* 2. Bolbophyllum rotundatum, *Reichb. f. in Walp. Ann.* vi. 244.

SIKKIM HIMALAYA, alt. 6–7000 ft., common. NAGA HILLS, *Prain.*

Pseudobulbs 1–2 in., ovoid or ellipsoid, sheathed. *Leaves* 4–6 in., sessile or petioled. *Flowers* pale chesnut-brown.

4. **D. Cœlogyne,** *Reichb. f. in Gard. Chron.* 1871, 136; leaves broadly elliptic-oblong notched, flowers very large, sepals lanceolate acuminate, petals narrower, side lobes of lip narrow, midlobe trapezoidly ovate.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs very stout, 1½–2 in. long. *Leaves* 3–6 in., very coriaceous, sessile or petioled. *Flowers* the largest of the section, yellowish mottled with red; bracts large, sheathing; sepals 2½ in. long; lip deep dull purple.

5. **D. longicolle,** *Lindl. in Bot. Reg.* 1840, *Misc.* 172; pseudobulb compressed long-necked, leaf linear-oblong obtuse concave, flower solitary, sepals and petals narrowed from a broad base into purple filiform tips, lip ovate, side lobes small, midlobe plaited crisped and lobulate, disk with 2 crisped lamellæ. *Walp. Ann.* vi. 302.

SINGAPORE, *Cuming* (*cult. in Hort. Loddiges*).

The only specimen I have seen is in Lindley's Herbarium, and consists of a stem as thick as a quill, composed of 2 internodes, each 3–4 in. long, a sessile leaf 5 by 1 in., and a flower with subfalcate sepals and petals ½ in. long and three times the length of the lip; the ovary is 2 in. long, filiform and jointed on the peduncle, bracts sheathing as long as the ovary, and the pedicel and bract 1 in.—The habit is not that of a *Cadetia.* Only one leaf remains, but there appear to have been two. This is possibly a several-fld. species.

** *Scape several-fld.*

6. **D. perakense,** *Hook. f.*; pseudobulbs short, leaves lanceolate

acuminate narrowed to the base, scape stout bracteate many-fld., sepals lanceolate acuminate many-nerved, petals linear-lanceolate, mentum short rounded, lip with rounded side lobes and a narrower ovate-lanceolate acute midlobe, disk between the side lobes with 3 crenate ridges.

PERAK, *Scortechini.*

Stem stout, woody; pseudobulbs enclosed in many acute sheaths. *Leaves* 6–9 in., broadest (1–1½ in.) in the middle, strongly nerved. *Scape* as long as the leaves; bracts short, sheathing. *Flowers* shortly pedicelled; sepals ¾ in. long; lip as long; column acute dorsally.

7. **D. macropodum,** *Hook. f.*; leaves short elliptic obtuse, scape stout much longer than the leaves 4–6-fld., pedicels very short, ovary 1½ in., sepals lanceolate and linear petals many-nerved, mentum rounded, side lobes of lip rounded, midlobe small orbicular-ovate with strongly nerved margins, disk from the base to the tip with irregular thickened ridges.

PERAK, *Scortechini, Wray* (*in Herb. Calcutt.*).

Stem very stout, densely sheathed; pseudobulbs ovoid, 1–1½ in. *Leaves* 2–2½ in., very coriaceous. *Scape* 8 in.; bracts small, ovate, acute; sepals ⅔ in. long; lip auricled at the base. *Column* very stout, tip notched.—Remarkable for the long angular ovary, as in *D. cymbidioides.*

8. **D. geminatum,** *Lindl. mss.*; pseudobulbs small, leaves linear-oblong obtuse, scapes 2-nate shorter than the leaves 4–6-fld., sepals linear-lanceolate and narrow, petals many-nerved, mentum rounded, side lobes of short lip rounded, midlobe ovate acute, disk with thickened ridges between the side lobes.

PERAK, *Scortechini, King's Collector*; on rocks, alt. 3–4000 ft.—DISTRIB. Java.

Stem apparently straight as if suberect, stiff, 2–3 ft.; pseudobulbs ½–¾ in., equidistant. *Leaves* 1½–3 in., very coriaceous, sessile. *Scape* slender; pedicels with ovary ¾ in.; bracts small; flower yellow; sepals ⅔ in. long; lip coriaceous; anther 2-lobed at the tip.

9. **D. longipes,** *Hook. f.*; leaves small elliptic-oblong notched, scape very much longer than the leaves erect 3–4-fld., sepals linear-lanceolate and narrower petals many-nerved, mentum rounded, side lobes of short lip truncate with recurved edges, midlobe dagger-shaped acuminate, disk between the side lobes with 3 ridges ending in elongate tubercles.

PERAK, *Scortechini.*

Stem creeping, with very thick vermiform roots; pseudobulbs obpyriform, ¾–1 in., rather close set. *Leaves* 1½ in., very thickly coriaceous, subsessile, prominently 5-nerved beneath. *Scape* 6–8 in., pedicel with ovary 1 in.; bracts small; flowers white?; sepals 1¼ in. long; lip coriaceous.—Scortechini has two drawings of this, one with leaves as described above, the other with narrower longer petioled leaves.

Sect. II. BOLBODIUM (see p. 710).

10. **D. pumilum,** *Roxb. Hort. Beng.* 61; *Fl. Ind.* iii. 479 (*in part*); pseudobulbs oblong to cylindric, leaves short orbicular to elliptic obtuse, flowers solitary shortly pedicelled, lateral sepals broadly triangular, dorsal much smaller ovate, petals linear-oblong, mentum very large obtuse incurved, lip oblong or obovate-oblong with 2 rounded crisped terminal lobes. *Griff. Notul.* iii. 315; *Lindl. in Journ. Linn. Soc.* iii. 6.

CHITTAGONG, *Roxburgh.* PEGU, at Rangoon, *Ic. in Herb. Calcutt.* TENASSERIM, *Griffith*, &c. PERAK, *Scortechini.*—DISTRIB. Borneo.

Pseudobulbs of one many-grooved internode 1–1½ in. long, sessile or stipitate. *Leaves* ¾–½ in., coriaceous, sessile. *Flowers* 1 in. long, white; pedicel shorter; lateral sepals 7-nerved; lip with an obscurely caruncled yellow horse-shoe spot at the base of the lobes.—Roxburgh's description of this has been mixed up with that of an *Eria* in Fl. Ind., doubtless through an error of a transcriber or printer; his drawing is excellent.

11. **D. quadrangulare,** *Parish mss.*; pseudobulbs narrowly clavate acutely 4-angled stipitate, leaves linear-oblong, flowers fascicled. D. pumilum, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 150, t. 31.

TENASSERIM; at Moulmein, *Griffith, Parish.*

Parish considered this to be different from *D. pumilum*, and his drawing seems to confirm it; the deeply 4-grooved terminal internode or pseudobulb 1½–2½ in. long and ⅓ in. broad, preserves its 4-angled character from its earliest stage (when only ½ in. long); it is supported on a stipes of 2–3 slender internodes. The flowers are quite like *D. pumilum.*

Sect. III. CADETIA (see p. 710).

12. **D. Macraei,** *Lindl. Gen. & Sp. Orchid.* 75; *in Journ. Linn. Soc.* iii. 6; leaf linear-oblong obtuse, flowers 2–3 shortly peduncled, sepals and petals erecto-patent linear-lanceolate acute, mentum short conic, side lobes of lip oblong obtuse, midlobe small with 2 diverging lobules crenulate and crisped, disk between the side lobes with 2 fleshy crests. *Thwaites Enum.* 297; *Dalz. & Gibs. Bomb. Fl.* 260. D. fimbriatum, *Lindl. Gen. & Sp. Orchid.* 76 (*not of Hook.*). D. nodosum, *Dalz. in Hook. Journ. Bot.* iv. (1852) 292. D. Rabani, *Lindl. Journ. Linn. Soc. l. c.* 7. D. pardalinum, *Reichb. f. in Gard. Chron.* 1885, ii. 230. D. Flabellum, *Reichb. f. in Bonplandia* 1857, 56; *Xen. Orchid.* ii. t. 118. Desmotrichum fimbriatum, *Blume Bijd.* 329.

SIKKIM HIMALAYA, alt. 7–8000 ft. (*Herb. Hort. Calc.*). KHASIA MTS., alt. 4000 ft., *J. D. H. & T. T.* The CONCAN, at Ram Ghat, *Dalzell.* NILGHIRI HILLS, *G. Thomson.* CEYLON, not uncommon, *Thwaites.*—DISTRIB. Java.

Rootstock creeping, annulate; stems pendulous, 2–3 ft.; branches ending in fusiform pseudobulbs 2–2½ in. long. *Leaves* 4–8 in., sessile. *Flowers* ¾–1 in. long, white; pedicels ¾–1 in.; bracts basal, sheathing; side lobes of lip sprinkled with red, midlobe variable.—I find no characters whereby to distinguish the species included above under *D. Macraei.* Thwaites says of the Ceylon plant "leaves usually 2-nate," but I have never seen more than one in any specimen or drawing.

13. **D. lonchophyllum,** *Hook. f.*; leaf linear-lanceolate acuminate, flower subsolitary, dorsal sepal ovate-oblong acute, petals linear-oblong, mentum as long as the rest of the flower upcurved, side lobes of lip triangular acute many-nerved, midlobe with a short undulate limb and two oblong divaricate rounded lobes, disk not crested or ridged.

PERAK, *Scortechini.*—DISTRIB. ? Java.

Stems slender; pseudobulbs 1–1½ in., fusiform. *Leaves* 3–5 in., base cuneate. *Flowers* ⅓ in. long, nerves and cross nervules very slender. *Lip* cuneate. *Column* with incurved subulate tips; anther with a very long stipes.—Closely resembles the drawing of a Javan plant in Herb. Lindl.

14. **D. Kunstleri,** *Hook. f.*; leaves large elliptic-lanceolate acuminate, mentum much shorter than sepals conic acute nearly straight, lip

much larger than the sepals, side lobes triangular acute, midlobe very large quadrate-orbicular with 2 crenulate lamellæ on the disk and plaited undulate sides.

PERAK, *Scortechini, King's Collector*, alt. 500–1000 ft.

Branches long, stout; pseudobulbs 2–3 in., fusiform. *Leaf* 6–10 by 2–3½ in., very coriaceous, base narrowed. *Flower* 1 in. long, very membranous, white mottled with red, nerves and nervules very slender; sepals and petals lanceolate, acuminate; midlobe of lip ⅔ in. across. *Column* with incurved subulate tips.

Sect. IV. STACHYOBIUM (see p. 710).

* Stem simple or nearly so, often a small pseudobulb.

† Flowers small (except *D. ciliatum*). Petals not broader than the dorsal sepal.

§ *Side lobes of lip strongly inciso-serrate.*

15. **D. denudans,** *Don Prodr.* 34; stems 4–6 in. suberect, leaves linear-oblong caducous, racemes elongate drooping many-fld., bracts very small, sepals and petals long slender, mentum incurved obtuse, lip much shorter than the sepals, side lobes inciso-serrate, midlobe small crisped, disk 2-lamellate. *Wall. Cat.* 2014 (*in part*); *Lindl. Gen. & Sp. Orchid.* 84; *in Bot. Reg.* 1838, *Misc.* 156, and 1844, 61; *in Journ. Linn. Soc.* iii. 19; *Walp. Ann.* vi. 300.

SUBTROPICAL and TEMP. HIMALAYA, alt. 4–7000 ft., from Kumaon eastwards to Sikkim.

Stem clothed with broad sheaths, ½ in. long. *Leaves* 3–8 in., obtuse or notched. *Scape* with *raceme* 4–6 in., very slender; flowers ⅔–1 in. long, usually white with red veins on the lip, sometimes yellowish with a green lip; dorsal sepals 3-nerved, lateral 5-nerved; petals 1-nerved.

16. **D. eriæflorum,** *Griff. Notul.* iii. 316; *Ic. Pl. Asiat.* t. 307; stem 3–4 in. erect, leaves linear-lanceolate acute or notched, racemes many-fld., bracts very small, mentum incurved obtuse, sepals lanceolate, lip nearly as long as the sepals broadly ovate, side lobes subfimbriately serrate, midlobe broad undulate, disk longitudinally crested. *Lindl. in Journ. Linn. Soc.* iii. 19.

SIKKIM HIMALAYA, alt. 6000 ft. KHASIA MTS., alt. 4–5000 ft., *Griffith*, &c.

Stem 3–8 in., basal internode sometimes thickened.—Very closely allied to *D. denudans*, but the racemes are shorter and fewer-fld., the sepals and petals shorter and broader, and the lip stronger in comparison. The colours are as variable as in that plant, between which and *D. alpestre* it is intermediate in characters.

17. **D. alpestre,** *Royle Ill.* 370, t. 88, f. 2; stem pseudobulbous, leaves 3–4 linear-oblong, scape short erect 3–5-fld., sepals ovate-lanceolate, petals oblanceolate, mentum short obtuse, lip lanceolate, side lobes inciso-serrate, midlobe small crisped acute, disk 2-lamellate. *Lindl. in Bot. Reg.* 1844, *Misc.* 61; *Walp. Ann.* vi. 300. D. denudans, *Wall. Cat.* 2014 (*in part*). ? D. pusillum, *Don Prodr.* 35.

TEMPERATE HIMALAYA, alt. 5–6000 ft., from Garwhal, *Royle*, &c., to Nepal, *Wallich*, &c.

Resembles a dwarf state of *D. eriæflorum*; the flowers are fewer and smaller, but of the same colour, the sepals and petals broader in proportion to their length.—

Lindley refers Don's *D. pusillum* to his *D. pygmæum*, which is a Nepal and Wallichian plant, and agrees better with *alpestre*.

18. **D. strongylanthum,** *Reichb. f. in Gard. Chron.* 1878, i. 462; racemes lateral dense-fld., sepals acuminate, lateral lanceolate, dorsal linear, mentum obtusely angled, lip clawed dilated triangular, sides pectinately serrate to the middle, apex narrowed with small abrupt fleshy calli on each side, disk with a depressed callus very papillose in front keeled in the middle.

INDIA (*Hort. Hincks*).

Stem 12 in., erect, as thick as a goose-quill, closely sheathed. *Flowers* rather small, yellow green; bracts lanceolate, about equalling the pedicelled ovaries; base of sepals dark violet-brown, petals spotted brown; sides and tip of lip dark violet; column 3-toothed, constricted in the middle.—Nearest to *eriæflorum*, *denudans*, and *pycnostachyum*, *R. f.* l. c. I have seen no specimens. The lateral racemes are exceptions in the group.

§§ *Side lobes of lip entire, serrulate or crenulate.*

19. **D. microbulbon,** *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 19, t. 8; pseudobulbs small crowded ovoid, leaves 2 linear-oblong acute, scape solitary erect 4–8-fld., bracts about equalling the pedicel, lateral sepals obtuse, petals narrowly subspathulate, mentum long incurved, lip thick, side lobes broad acute, midlobe small round crenulate, disk with a channelled ridge thickened at the end. *Lindl. in Bot. Reg.* 1844, 61; *in Journ. Linn. Soc.* iii. 19; *Dalz. & Gibs. Bomb. Fl.* 261; *Walp. Ann.* vi. 307. D. humile, *Wight Ic.* t. 1643; *Walp. l. c.* 308. D. crispum, *Dalz. in Hook. Journ. Bot.* iv. (1852) 111; *Walp. l. c.*

DECCAN PENINSULA; on the Western Ghats, from the Concan, *Law*, &c., to the Nilghiris, *Perrottet*, &c., and Anamallay Hills, *Wight*.

Pseudobulbs ½–¾ in. diam.; sheaths membranous, which decaying leave a network of fibres. *Leaves* 2–3 in., rather thick, caducous. *Scape* 1–2 in., flowers white with a pink lip; sepals ⅓ in. long; lip attached above the base of the acute or obtuse mentum.

20. **D. porphyrochilum,** *Lindl. in Journ. Linn. Soc.* iii. 18; stem very short erect, leaves 1–4 ligulate, scape short solitary few-fld., bracts about equalling the pedicels, sepals lanceolate, petals shorter, mentum rounded, lip short ovate acute concave, disk with 2 broad plates and 3 ridges.

SIKKIM HIMALAYA, alt. 6000 ft. KHASIA MTS., alt. 4–6000 ft., *Griffith*, &c.

Stem ½–1 in., often pseudobulbous. *Leaves* 1–3 in., obtuse or obliquely notched. *Sepals* ⅓ in. long, dirty yellow; lip brown purple.—The Sikkim specimens are in young bud only, and the bracts are longer than the flowers; it may be a different species.

21. **D. cuspidatum,** *Lindl. in Wall. Cat.* 2015; *Gen. & Sp. Orchid.* 84; *in Bot. Reg.* 1844, *Misc.* 61; stem short stout erect, leaves 2–5 linear-oblong, scape short subsolitary erect 3–6-fld., bracts lanceolate as long as the pedicels, sepals narrowly lanceolate, petals oblanceolate, mentum short incurved, side lobes of lip large rounded, midlobe ovate acuminate quite entire, disk with a channelled ridge rising into 2 lamellæ at the base and fleshy at the tip.

TENASSERIM, *Wallich, Lobb, Parish.*

Stem 1–2 in. *Leaves* as long, rather coriaceous. *Scape* rather stout; flowers white; sepals $\frac{1}{2}$–$\frac{2}{3}$ in. long; lip rather shorter, inserted above the base of the short mentum.

22. **D. pygmæum,** *Lindl. in Wall. Cat.* 1999; *Gen. & Sp. Orchid.* 85; *in Bot. Reg.* 1844, *Misc.* 62; pseudobulbs tufted ovoid, leaves 2–3 linear, scapes many terminal and lateral erect short dense-fld., bracts exceeding the ovary, sepals lanceolate, lateral decurved, petals oblanceolate, mentum long acute, lip obovate, side lobes narrow subacute, midlobe triangular crisped, disk with a crenate fleshy ridge. D. peguanum, *Lindl. in Journ. Linn. Soc.* iii. 19.

SIKKIM HIMALAYA, at the foot of the hills, *Gamble.* PEGU, *M'Lelland.* TENASSERIM, *Parish.*—DISTRIB. ? Borneo.

Pseudobulbs $\frac{1}{2}$–$1\frac{1}{2}$ in., of several internodes. *Leaves* caducous. *Scape* with *raceme* 1 in.; bracts nearly $\frac{1}{4}$ in.; sepals $\frac{1}{3}$ in., white or purplish; lip with purple veins.—Lindley in Gen. & Sp. Orchid. refers *D. pusillum*, Don, doubtfully to this, and without a doubt in Bot. Reg., but I think incorrectly (see *D. alpestre*).

23. **D. panduratum,** *Lindl. in Journ. Linn. Soc.* iii. 19; pseudobulbs ovoid, leaves subsolitary lanceolate acuminate, scape erect capillary few-fld., bracts minute, sepals lanceolate acuminate, petals oblanceolate, mentum long straight acute, lip panduriform, side lobes narrow acute, midlobe short rounded crenulate. *Thwaites Enum.* 298 (*excl. syn.*).

CEYLON; in the Central Province, ascending to 6000 ft., *Thwaites.*

Pseudobulb $\frac{1}{3}$–$\frac{1}{2}$ in. *Leaf* 1–2 in. *Scapes* 1–3 in.; flowers $\frac{1}{2}$ in. long, very narrow, white tinged with purple; mentum much longer than the dorsal sepal, lip inserted much above its base.

24. **D. Diodon,** *Reichb. f. in Linnæa* xli. 89; pseudobulbs crowded, leaves linear-oblong unequally notched coriaceous, scapes 1–2 terminal few-fld., bracts ovate acuminate rather shorter than the pedicel, sepals lanceolate acuminate, petals subfalcately linear-oblong, mentum obtuse incurved notched, lip as long as the sepals, claw narrow dilating into a nearly rounded reticulately nerved limb, side lobes with short acute fronts, midlobe broad crenate and crisped, disk with a depressed channelled ridge with a notched tip. D. albidulum, *Thwaites in Trim. Cat. Ceyl. Pl.* 88.

CEYLON; at Hakgalle, *Thwaites.*

Pseudobulbs $\frac{1}{2}$ in., pyriform, of several internodes, at first enclosed in membranous sheaths. *Leaves* 1–$\frac{1}{2}$ in., base narrowed. *Scape* with the *raceme* 1–$1\frac{1}{2}$ in.; pedicels $\frac{1}{3}$ in.; sepals as long, and lip? white.—The specimens are few, and flowers far advanced.

25. **D. nanum,** *Hook. f. Ic. Pl.* t. 1853; pseudobulbs ovoid, leaves 2–3 elliptic-lanceolate, scapes 1–2 terminal many-fld., bracts shorter than the pedicels, sepals subequal, dorsal oblong-lanceolate obtuse, lateral ovate-lanceolate decurved, petals linear-oblong obtuse, mentum incurved obtuse, lip long-clawed limb suborbicular serrulate, side lobes small, midlobe rounded disk with a broad depressed fleshy truncate ridge.

MALABAR; on the Bababoodan Hills, *Law.*

Pseudobulbs $\frac{1}{4}$–$\frac{1}{2}$ in. *Leaves* 1–$1\frac{1}{2}$ in., obtuse or subacute. *Scape* and *raceme* $1\frac{1}{2}$–3 in.; pedicel and ovary $\frac{1}{2}$–$\frac{2}{3}$ in.; bracts lanceolate; flowers $\frac{1}{2}$ in. diam., white? lip glandular ?-serrate; column very short.

26. **D. miserum,** *Reichb. f. in Gard. Chron.* 1869, 381; pseudobulbs

fusiform, leaves ligulate aristulate microscopically serrulate, raceme terminal, bracts small triangular, dorsal sepal ligulate acute, lateral triangular, petals ligulate acuminate, lip clawed ovate subacute serrulate, disk with a linear depressed keel which is dilated at the apex.

ASSAM (*Hort. Day*).
Description from the author cited. I have not seen specimens.

27. **D. Heyneanum,** *Lindl. in Wall. Cat.* 1995; *Gen. & Sp. Orchid.* 90; *in Bot. Reg.* 1839, *Misc.* 41; stem erect flexuous, leaves linear-lanceolate acute, scapes long slender, bracts shorter than the short pedicels, sepals and petals ovate-lanceolate, mentum long straight acute, side lobes of lip acute, midlobe rounded crenate, disk with a channelled ridge ending in a fleshy callus. *Wight Ic.* t. 909; *Walp. Ann.* vi. 298.

The DECCAN PENINSULA; on the Ghats of Malabar, *Heyne*, &c.
Stem 4–8 in. *Leaves* 3–4 in. *Scapes* terminal and axillary, with the few- or many-fld. racemes as long as the leaves or longer; flowers white; sepals $\frac{1}{2}$ in. long; mentum as long as the dorsal sepal, lip inserted above its base.—Habit of *D. denudans*.

28. **D. pycnostachyum,** *Lindl. in Journ. Linn. Soc.* iii. 19; stem erect fleshy, scape terminal, raceme dense-fld., bracts lanceolate equalling the ovary, sepals and petals lanceolate, mentum short obtuse incurved, side lobes of lip very narrow, midlobe longer ovate serrate and crisped, disk with a channelled ridge 2-fid at the tip.

TENASSERIM, *Lobb.*
I have seen no good specimens, and no leaves. A drawing apparently of this species (in Herb. Hort. Calc.) represents a leafless stem a foot long, tapering to the tip, and ending in a many-fld. raceme 4 in. long; the flowers are shortly pedicelled, white with a green lip.

29. **D. incurvum,** *Lindl. in Journ. Linn. Soc.* iii. 18; stems usually narrowed upwards, leaves linear-oblong obliquely notched, scapes terminal and leaf-opposed shorter than the leaves flexuous few-fld., bracts membranous equalling the pedicels, sepals lanceolate, petals narrower, mentum conic acute, lip oblong-lanceolate acute or acuminate concave crisped, disk with a ridge ending in 2 teeth. Dendrob. No. 9, *Griff. Notul.* iii. 314. D. Actinia, *Lindl. in Journ. Linn. Soc.* iii. 9.—Actinia, *Griff. Notul.* iii. 320; *Ic. Pl. Asiat.* t. 351 A, fig. 21.

TENASSERIM; at Mergui, *Griffith, Parish.*
Stem 3–6 in., internodes $\frac{1}{2}$–$\frac{3}{4}$ in. *Leaves* 2–3 in. *Scape* with the *raceme* 1–1$\frac{1}{2}$ in.; bracts $\frac{1}{8}$ in.; pedicel with ovary twice as long; sepals $\frac{1}{4}$ in., white; lip greenish with purple veins.—Habit of *D. eriæflorum*. Griffith's *Actinia* is a Pelorian form.

30. **D. graminifolium,** *Wight Ic.* t. 1649; rhizome creeping, stem slender, leaves narrowly linear acute, racemes terminal short solitary or 2-nate capillary erect few-fld., bracts minute, sepals 5-nerved, lateral falcately lanceolate, mentum long straight spur-like, petals as long linear-lanceolate 3-nerved erose, lip with small short spreading side lobes, midlobes oblong flat crenate.

TRAVANCORE; at Courtallam, *Wight.*
Stem 4–8 in. *Leaves* 2–3 in, grass-like. *Scapes* much shorter than the leaves, 4–6-fld.; pedicels short; flowers $\frac{1}{3}$ in. long, white; lip veined.—Wight remarks that this differs from its allies in its long slender creeping rhizome.

31. **D. ciliatum,** *Parish in Bot. Mag.* t. 5430; tall, leaves linear unequally notched, scapes strict long terminal and axillary, racemes laxly many- and large-fld., bracts minute, lateral sepals falcate decurved, petals spathulate, mentum short conical obtuse, lip cuneately-oblong, side lobes incurved, midlobe small ovate fimbriate with long clavate hairs on the nerves. *Veitch Man. Dendrob.* 30.

TENASSERIM, *Parish*. ARRACAN, *Benson* (fid. *Reichb. f.*).

Stem 12–18 in., terete, leafy above. *Leaves* 3–4 by $\frac{1}{2}$ in. *Scape* with the *raceme* 6-8 in., rather stout; pedicels $\frac{3}{4}$ in.; flowers nearly 1 in. long, pale green; lip yellow-green; dorsal sepal and petals erect; side lobes of lip veined with red.—In stout habit and large flowers this is very unlike others of the section.

†† *Flowers rather large. Petals much broader than the dorsal sepals.*

32. **D. chlorops,** *Lindl. in Bot. Reg.* 1844, *Misc.* 44; leaves oblong-lanceolate, scapes terminal and axillary stout many-fld., flowers sub-corymbose, lateral sepals oblong obtuse, petals twice as broad obovate, mentum short conic incurved, lip flat, side lobes small rounded, midlobe large subquadrate, disk hairy and with a channelled ridge. *Dalz. & Gibs. Bomb. Fl.* 261; *Walp. Ann.* vi. 299; *Veitch Man. Dendrob.* 27. D. barbatulum, *Wight Ic.* t. 910. Cymbidium ovatum, *Willd. Sp. Pl.* iv. i. 101.—*Rheede Hort. Mal.* xii. t. 7.

The DECCAN PENINSULA; from the Concan to Malabar on the Ghats.

Stems 12–18 in., sometimes very stout and $\frac{3}{4}$ in. diam.; internodes 1–1$\frac{1}{2}$ in., terete. *Leaves* 1–4 in., caducous. *Scapes* 3–5 in.; bracts small; flowers white, greenish or yellowish, $\frac{3}{4}$ in. long, very variable in size and colour.

33. **D. barbatulum,** *Lindl. in Wall. Cat.* 2013; *Gen. & Sp. Orchid.* 84; *in Journ. Linn. Soc.* iii. 20; *in Part. Fl. Gard.* iii. 113, fig. 285; leaves narrowly lanceolate acuminate, scapes stout terminal and lateral strict many-fld., lateral sepals lanceolate falcate, dorsal narrow, petals much larger elliptic-lanceolate, mentum conical acute, lip flat, side lobes small short obtuse, midlobe much larger ovate acute, disk hairy. *Bot. Mag.* t. 5918; *Dalz. & Gibs. Bomb. Fl.* 261; *Veitch Man. Dendrob.* 21; *Walp. Ann.* vi. 299.

The DECCAN PENINSULA; from the Concan to Kurg.

Stems 10–15 in., tapering to the top; internodes $\frac{3}{4}$–1 in., swollen. *Leaves* 3–4 in., caducous. *Flowers* $\frac{1}{2}$ in. diam., whitish; bracts minute.

34. **D. Fytcheanum,** *Batem. in Gard. Chron.* 1864, 100, and 1863 1317; erect, leaves linear-lanceolate, racemes terminal and lateral many-fld., sepals lanceolate acute, petals much larger rounded-obovate, mentum long spur-like, lip subcordately obovate, side lobes minute incurved. *Veitch Man. Dendrob.* 46; *Berkeley in Gard. Chron.* 1887, 209 (*var.* rosea). D. barbatulum, *Batem. in Bot. Mag.* t. 5444.

ARRACAN, RANGOON, and TENASSERIM, *Parish, Berkeley*.

Stem 12–18 in. *Leaves* 3–4 in., deciduous. *Flowers* 1$\frac{1}{2}$–2 in. across, white or rosy; pedicels sheathed; bracts small.

** Stems long, copiously branched. Flowers small.

35. **D. herbaceum,** *Lindl. in Bot. Reg.* 1840, *Misc.* 69, and 1844, *Misc.* 58; leaves linear-lanceolate acuminate caducous, racemes terminal very short few-fld., sepals and petals linear-oblong obtuse 3-nerved, mentum very

short rounded, lip very small narrow, side lobes very narrow, tips rounded, midlobe shorter ovate rugose. *Walp. Ann.* vi. 295. D. ramosissimum, *Wight Ic.* t. 1648; *Dalz. & Gibs. Bomb. Fl.* 261; *Walp. l. c.* 300.

BEHAR; on Parusnath, *Thomson.* DECCAN PENINSULA; from the Concan to Kurg, *Jerdon*, &c.; Godaveri district, *Gamble.*

Stem pendulous, 2–3 ft. long, and lower part of branches naked, upper with short sheaths. *Leaves* (in *Wight Ic.*) 2 in. long. *Racemes* subsessile, $\frac{1}{4}$–$\frac{1}{3}$ in. long; bracts minute, lanceolate; pedicels nearly as long, capillary; flowers yellow; sepals shorter than the pedicels.—Wight describes the midlobe of the lip as suborbicular, but it is not so in his figure or in the specimens. The Parusnath specimens are stouter than the Concan ones, and the Godaveri ones still more so, and shorter. The name *herbaceum* is inappropriate, but claims priority.

36. **D. parcum,** *Reichb. f. in Gard. Chron.* 1866, 1042; *Xen. Orchid.* ii. t. 169; racemes extremely short 2–4-fld., petals linear-spathulate, mentum broad obtuse much longer than the oblong obtuse 3-nerved sepals, lip exceeding the sepals straight narrow with a dilated cuneiform truncate tip dull yellow speckled with purple.

TENASSERIM, *Parish.*

Stems 12–18 in., like those of *herbaceum*. *Raceme* $\frac{1}{8}$–$\frac{1}{3}$ in.; flowers $\frac{1}{3}$ in. long, greenish yellow.

Sect. V. FORMOSÆ (see p. 710).

37. **D. longicornu,** *Lindl. in Wall. Cat.* 1997; *Gen. & Sp. Orchid.* 80; *Bot. Reg.* t. 1315, and 1844, *Misc.* 53; *in Journ. Linn. Soc.* iii. 16; sheaths hirsute, flowers lateral and terminal, sepals lanceolate acuminate not keeled, petals narrower acuminate, mentum slender funnel-shaped straight acute as long as the dorsal sepal or longer, side lobes of lip rounded, midlobe small orbicular fringed, disk with 3 crenate or wrinkled ridges, nerves rarely papillose, ovary terete. *Veitch Man. Dendrob.* 56; *Walp. Ann.* vi. 292. D. flexuosum, *Griff. Notul.* iii. 317.

TEMPERATE HIMALAYA; from Nepal eastwards, ascending to 8000 ft. in Sikkim. KHASIA and NAGA HILLS, common.

Stem 6–12 in., rather slender, flexuous; internodes 1–$1\frac{1}{2}$ in. *Leaves* linear-lanceolate, unequally obtusely 2-fid. *Flowers* 2 in. long, white; lip variable in breadth and in the length of the fimbriæ of the midlobe.

VAR. *hirsuta*; usually larger leaved, sepals petals and lip broader, nerves and ridges of lip copiously setosely fimbriate. D. hirsutum, *Griff. Notul.* iii. 328; *Ic. Pl. Asiat.* t. 305; *Reichb. f. in Gard. Chron.* 1884, ii. 488.—Khasia Hills, alt. 4000 ft., *Griffith*, &c. Munnipore, *Watt.*—After examining many specimens, I think that Lindley was right in uniting this with *D. longicornu*, of which it is an extreme form.

38. **D. cariniferum,** *Reichb. f. in Gard. Chron.* 1869, 611; sheaths sparsely hairy, leaves linear-oblong, flowers 2–3 on a short peduncle, sepals lanceolate keeled, petals broader than the sepals elliptic-oblong apiculate, mentum as long as the dorsal sepal corniform acute incurved, side lobes of lip rounded crenate, midlobe obovate or rounded crisped papillose, disk fimbriate, ovary triquetrous. *Veitch Man. Dendrob.* 27.

MUNNIPORE, *Watt.* BURMA, at Bhamo, *Berkeley.*

Stem 6–10 in.; internodes $\frac{1}{2}$–$\frac{3}{4}$ in. *Leaves* 2–3 in., coriaceous. *Sepals* $1\frac{1}{2}$ in., pale buff; disk of lip with golden streaks.—Flowers coriaceous when dry, fragrant.—Var. *lateritia*, Reichb. f. in Gard. Chron. 1883, i. 656, has brick-red on the lip.

39. **D. Wattii,** *Reichb. f. in Gard. Chron.* 1888, ii. 725; sheaths sparsely pubescent, leaves linear, flowers on leafless stems subsolitary white, sepals ovate-lanceolate acuminate keeled, petals broader than the sepals elliptic-oblong acute, mentum corniform as long as the dorsal sepal straight obtuse, side lobes of lip rounded, disk yellow, midlobe small oblong crisped papillose, ovary terete. D. cariniferum, *var.* Wattii, *Hook. f. in Bot. Mag.* t. 6715.

MUNNIPORE, *Watt.*

Very near *cariniferum*, differing in the slenderer stems, narrower less coriaceous leaves, larger flowers that are membranous when dry, and the terete ovary.

40. **D. Infundibulum,** *Lindl. in Journ. Linn. Soc.* iii. 16; sheaths pubescent above, leaves oblong or lanceolate, flowers few together large white, sepals ovate-lanceolate, petals much larger broadly obovate, mentum as long as the sepals funnel-shaped incurved, lip obovate-oblong toothed white, disk golden, side lobes rounded incurved, midlobe large shortly 2-lobed. *Bot. Mag.* t. 5446; *Gard. Chron.* 1862, 1194; *Ill. Hortic.* 1874, t. 172; *Veitch Man. Dendrob.* 50.

TENASSERIM; on Thoungyun, alt. 4–5000 ft., *Lobb, Parish.*

Stem 1–2 ft. *Leaves* 3–5 in., deeply 2-fid. *Flowers* 3–4 in. diam.; pedicels 1½ in.; bracts ½ in.—Var. *Jamesiana*, Veitch l. c. (D. Jamesianum, *Reichb. f. in Gard. Chron.* 1869, 554; *Williams Orchid. Alb.* t. 221; *Gartenfl.* 1867, 549, f. 137; *Godef. Orchidoph.* 1886, 189, *with fig.*; *Flor. & Pomol.* 1869, 187, *with fig.*), is stouter, more rigid, side lobes of lip rough within, dull red. Var. *ornatissima*, Reichb. f. in Gard. Chron. 1883, i. 656, has cinnabar markings on the lip.

41. **D. formosum,** *Roxb. in Wall. Cat.* 1998; *Fl. Ind.* iii. 485; stout, sheaths pubescent, leaves oblong, flowers very large in terminal or lateral racemes, sepals oblong-lanceolate acuminate, petals much larger suborbicular cuspidate undulate, mentum half as long as the dorsal sepal conical, lip broadly obovate entire, side lobes small rounded, midlobe dilated retuse apiculate, disk golden with 2 tubercled ridges. *Lindl. Gen. & Sp. Orchid.* 81; *in Wall. Pl. As. Rar.* 34, t. 39; *in Bot. Reg.* 1838, *Misc.* 86, 1839, t. 64; *in Journ. Linn. Soc.* iii. 16; *Paxt. Mag.* vi. p. 49, *with fig.*; *Fl. des Serres*, t. 226, t. 1633–4 (var. *gigantea*); *Williams Orchid. Alb.* vii. t. 308; *Veitch Man. Dendrob.* 44, *with fig.*; *Ann. de Gand.* 1848, t. 171. D. Infundibulum, *Reichb. f. in Gartenfl.* t. 1253.

TROPICAL HIMALAYA; from Nepal to Bhotan; the KHASIA HILLS, ASSAM, and southwards to TENASSERIM and the ANDAMAN ISLANDS.

Stem 12–18 in., as thick as the little finger. *Leaves* 3–5 by 1½ in., subamplexicaul. *Flowers* 3–5 in. diam.; bracts short, ovate.—Var. *Berkeleyi*, Reichb. f. in Flora 1882, 534; in Gard. Chron. 1883, i. 110, 210, has smaller flowers, shorter petals, and a narrower lip. Var. *sulphurata*, Hook. ex Reichb. f. l. c. 1882, ii. 437, has the throat of the lip sulphur-cold. Var. *gigantea*, Reichb. f. in Gard. Chron. 1882, i. 369, f. 54, is a large state.

42. **D. Williamsoni,** *Day & Reichb. f. in Gard. Chron.* 1869, 78; sheaths and leaves puberulous, leaves oblong or lanceolate, flowers 1–2 on a short bracteate peduncle, sepals lanceolate acuminate, dorsal ovate acute, petals hardly broader oblanceolate, mentum funnel-shaped nearly as long as the dorsal sepal, side lobes of lip rounded, midlobe orbicular ciliate, disk obscurely 3-ridged.

ASSAM, *Williamson.* KHASIA HILLS, *Gallatly* (*Ic. in Herb. Calcutt.*).

Stem 6–8 in., stout, sometimes fusiform. *Flowers* yellowish without, white within, except the yellow lip, which is often dashed with red within.

43. **D. albo-sanguineum,** *Lindl. in Part. Fl. Gard.* ii. 93, t. 57 (*very inaccurate*); stems subclavate erect, leaves linear-lanceolate obtuse or subacute, racemes erect lateral or subterminal on the leafing stems, bracts very small, flowers large cream-cold. with red bars on the very base of the lip, sepals oblong obtuse, petals twice as broad apiculate, mentum rounded, lip large broadly obovate expanded waved with a short convolute base. *Bot. Mag.* t. 5130.

TENASSERIM; on the Attran River, *Lobb.*

Stem 6–16 in., glabrous; internodes 1–1½ in. by ½ in. diam., lower narrower. *Leaves* 5–7 by 1 in. *Raceme* 3–4 in., stout, erect; bracts sheathing; flowers 3 in. diam., slightly scented.—The figure in Paxton's Magazine (copied in Fl. des Serres vii. t. 721, and Jard. Fleur. t. 203) is, as Lindley implies, a made up one, and differs *in toto* from that in the Bot. Mag., having 2-nate lateral flowers on a very stout leafless stem. Lindley, however, cites Lobb for the flowers being racemose, as they really are.—A very anomalous plant.

44. **D. draconis,** *Reichb. f. in Bot. Zeit.* 1862, 214; *Xen. Orchid.* ii. 130, t. 146; *in Gard. Chron.* 1883, i. 598; stems clavate, sheaths pubescent, leaves coriaceous, flowers solitary or fascicled large, sepals lanceolate acuminate, mentum long straight, petals large undulate, lip lanceolate, side lobes small rounded, midlobe long acuminate crenate. *Warn. Orchid. Alb.* iii. t. 103; *Veitch Man. Dendrob.* 39. D. eburneum, *Reichb. f. in Bot. Mag.* t. 5459; *Rev. Hortic.* 1883, 332, *with fig.*

TENASSERIM; at Moulmein, *Parish.*—DISTRIB. Siam, Cochin China.

Near *D. longicornu*, but stems much stouter, clavate after leafing, leaves much broader, and midlobe of lip larger.

45. **D. Lubbersianum,** *Reichb. f. in Gard. Chron.* 1882, i. 460; stem hirsute with black hairs, leaves oblong hispidulous on both surfaces, sepals triangular acute carinulate, petals oblong apiculate, mentum conical rather shorter than the pedicelled ovary, lip cuneate dilated 3-fid, side lobes obtuse-angled toothed in front, midlobe short lobulate fimbriate retuse and with pectinate filiform processes, disk with a thickened grooved ridge between the side lobes.

BURMA (*Hort. Veitch*, where it no longer exists).

Sepals and *petals* yellowish white; lip with 3 carnation blotches.—Description from the author. I have seen no specimens.

46. **D. virgineum,** *Reichb. f. in Gard. Chron.* 1884, ii. 520; 1888, ii. 725; hirsute with black hairs, leaves oblong ligulate, tip 2-lobed, raceme terminal, lateral sepals triangular obscurely keeled, dorsal oblong obtuse, petals rhombic, mentum short conical, side lobes of lip ½-ovate crenulate, midlobe rounded notched crenulate, disk with 2 parallel depressed ridges.

BURMA (*Hort. Low*).

Like *D. Infundibulum*, but leaves nearly twice as broad, flowers one-third smaller, ivory-white, ridges of lip red.—Description from the author, l. c.

Sect. VI. APORUM (see p. 711).

* *Flowers on the leafless extremities of the branches.*

47. **D. Serra,** *Lindl. in Journ. Linn. Soc.* iii. 3; stem long, leaves short ovate acute, flowers very small very shortly pedicelled, mentum short, lip linear-oblong with 2 terminal auricles or lobules. D. micranthum,

Lindl. l. c.; *Walp. Ann.* vi. 279. D. aloefolium, *Reichb. f. l. c.* Aporum Serra, *Lindl. in Wall. Cat.* 2021; *Gen. & Sp. Orchid.* 71. A. micranthum, *Griff. in Calc. Journ. Nat. Hist.* iv. 375, t. 17, and v. 369; *Lindl. in Journ. L. S. l. c.* Macrostomium aloefolium, *Blume Bijd.* 335, fig. 37. Oxystophyllum macrostoma, *Hassk. in Tijdsch. Nat. Gesch.* x. i. 22.

PENANG, *Porter, Maingay* (*Kew Distrib.* 1604). SINGAPORE, *Wallich*. PERAK, *Scortechini*.—DISTRIB. Java.

Stems 2–3 ft., naked extremities 4–8 in., sometimes branched. *Leaves* $\frac{3}{4}$–1 in. *Flowers* $\frac{1}{10}$ in., arising from a small globose tuft of rigid bracts; sepals obtuse.—Griffith's *D. micranthum* is unquestionably *D. Serra*: the specimen he figures has lost all of the naked end of the branch but the lowest node.

48. **D. acinaciforme,** *Roxb. Fl. Ind.* iii. 487; leaves lanceolate, flowers small, mentum as long as the rest of the flower, lip elongate-cuneate, tip rounded crenulate. *Griff. in Calc. Journ. Nat. Hist.* v. 370.

ASSAM, *Jenkins*. KHASIA MTS., alt. 3–4000 ft.; at Nowgong, *J. D. H. & T. T.*; at Bhorlasa, *Clarke*.

Stems 1–3 ft., with long naked extremities. *Leaves* $1\frac{1}{2}$–2 in. *Flowers* $\frac{1}{3}$ in. long, yellowish white; bracts minute; pedicel as long as the flower.—Roxburgh states this to have been sent to the Calcutta Garden from Amboyna, but the Khasia plant so perfectly agrees with his description and figure, that I suspect some mistake. Lindley, who had not seen Roxburgh's drawing, nor the then unpublished 3rd vol. of the Fl. Ind., doubtfully refers *D. acinaciforme* to *Serra*.

** *Flowers in terminal heads of many bracts.*

49. **D. Leonis,** *Reichb. f. in Walp. Ann.* vi. 280; stout, leaves very thickly coriaceous broadly ovate as broad as long obtuse, head of bracts solitary fibrous, mentum very broad as long as the rest of the flower, lip linear with involute margins and a rounded crenulate tip carunculate on the disk. Aporum indivisum, *Lindl. in Wall. Cat.* 2018; *Gen. & Sp. Orchid.* 70 (*not of Blume*). A. Leonis, *Lindl. in Bot. Reg.* 1840, *Misc.* 59; *Griff. in Calc. Journ. Nat. Hist.* v. 368.

SINGAPORE, *Prince*. MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1605). PERAK, *Scortechini, Wray*.

Stem 6–10 in. *Leaves* $\frac{3}{4}$ in. long and broad, not striated, margins thickened when dry. *Flowers* shortly stoutly pedicelled, $\frac{3}{4}$ in. long, dirty purplish and yellow (pale citron tinted with claret, *Wray*).—*A. indivisum*, Blume (fid. Herb. Lindley), has much longer not thickened leaves, and a transverse lamina on the lip (like *D. eulophotum*); it is Cuming's 2068.

*** *Flowers in lateral or lateral and terminal heads of many bracts.*

50. **D. eulophotum,** *Lindl. in Journ. Linn. Soc.* iii. 5; leaves oblong or lanceolate, flowers shortly pedicelled, mentum about as long as the rest of the flower, tip broad 2-lobed, lip linear-oblong with incurved margins and a truncate broad flat lamella on the disk, and a dilated rounded crenulate tip.

TENASSERIM, *Griffith, Helfer* (*Kew Distrib.* 5066), *Parish*. PERAK, *Scortechini*.—DISTRIB. Java.

Stem stout, 6–10 in. *Leaves* 1–2 in., obtuse, acute or acuminate, striate when dry. *Flowers* about $\frac{1}{4}$ in., yellow and red; lamella on lip with 2 spur-like recurved processes in the Javan specimens and in a drawing by Scortechini, truncate or retuse in the Tenasserim specimens and in another drawing by Scortechini.

51. **D. grande,** *Hook. f.*; very stout, leaves lanceolate acuminate, flowers pedicelled, mentum about as long as the rest of the flower incurved, lip cuneate with a toothed lamella on the disk and a spreading fan-shaped 2-lobed tip, the lobes broadly truncate.

PERAK, *Scortechini.* PENANG (*Ic. in Herb. Kew*). ? S. ANDAMAN ISLANDS, *Kurz.*

Stem 6–18 in., very broad (1 in.) above. *Leaves* 2–2½ in. *Flowers* about ½ in. long, yellow, with red on the disk of the sepals and petals.—Described from the Kew and Scortechini's drawings.

52. **D. atropurpureum,** *Miquel Fl. Ind. Bat.* iii. 644; leaves lanceolate or linear-lanceolate acute, flowers subsessile in axillary shortly peduncled bracteate heads, mentum as long as the sepals, lip thick ciliate linear, tip dilated obscurely 3-lobed, disk caruncled. D. concinnum, *Miq. l. c.* Oxystophyllum atropurpureum, *Blume Rumph.* iv. 41, t. 193, f. 4, and 198 C; *Walp. Ann.* iii. 530. O. carnosum, *Blume Bijd.* 336, fig. 38; *Lindl. Gen. & Sp. Orchid.* 72. Aporum concinnum, *Lindl. in Wall. Cat.* 2019; *Gen. & Sp. Orchid. l. c.*

TENASSERIM; at Moulmein, *Parish.* PERAK, *Scortechini.* SINGAPORE, *Wallich.* —DISTRIB. Siam, Malay Islands.

Stem 4–6 in. *Leaves* 1–1½ in., variable, not striate. *Flowers* about ½ in., yellowish or pink; lip with a tubercle under the tip.

**** *Flowers axillary or terminal; bracts minute, inconspicuous.*

53. **D. sinuatum,** *Lindl. ex Walp. Ann.* vi. 280; leaves very many close set lanceolate acuminate, flowers axillary solitary, lip fleshy elongate cuneate with a carunculate ridge within the margin at the tip ciliate. Aporum sinuatum, *Lindl. in Bot. Reg.* 1841, *Misc.* 1; *Griffith in Calcutt. Journ. Nat. Hist.* v. 368; *Walp. Ann.* vi. 280.

PENANG, *Maingay* (*Kew Distrib.* 1603). MALACCA, *Griffith.* SINGAPORE, *Cuming* (*Hort. Loddiges*).—DISTRIB. Borneo.

Resembles *D. atropurpureum,* but stems 6–10 in., leaves 1½ in., more numerous, close set and shining when dry, flowers very much larger and solitary with small basal bracts.

54. **D. anceps,** *Swartz in Act. Holm.* 1800, 246; leaves lanceolate or ovate-lanceolate acute, flowers axillary very shortly pedicelled, mentum longer than the sepals, lip cuneately oblong obscurely 3-lobed membranous veined, margins crisped. *Willd. Sp. Pl.* iv. 136; *Roxb. Fl. Ind.* iii. 487; *Walp. Ann.* vi. 279. Aporum anceps, *Lindl. Gen. & Sp. Orchid.* 71 (*excl. cit. Wall.*); *Bot. Reg.* t. 1239; *Bot. Mag.* t. 3608; *Lodd. Bot. Cab.* t. 1895; *Griff. in Calc. Journ. Nat. Hist.* v. 368.

GANGETIC DELTA, *Roxburgh.* Sikkim Himalaya, in hot valleys, *J. D. H.* ASSAM, *Hamilton.* TENASSERIM, *Parish.*

Stem 1–3 ft., stout, flattened, sometimes ½ in. broad. *Leaves* 1–1½ in., striate when dry. *Flowers* ½ in. long, greenish or yellowish.

55. **D. Nathanielis,** *Reichb. f. in Schill. Cat. Orchid. Ed.* 3 (1857) 26; leaves lanceolate acuminate, flowers very small, pedicel capillary, mentum longer than the sepals, lip membranous cuneate elongate, side lobes small, midlobe broad 2-lobed. D. cuspidatum, *Lindl. in Journ. Linn. Soc.* iii. 4. D. multiflorum, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 149, t. 31, f. 2. Aporum cuspidatum, *Wall. in Bot. Reg.* 1841, *Misc.* 2. A. anceps, *Lindl. in Wall. Cat.* 2020.

CACHAR, *Keenan.* TENASSERIM and MARTABAN, *Wallich, Parish.*

Habit and foliage of *A. anceps*, but the flowers are much smaller, $\frac{1}{6}$ in. long, very membranous, and have capillary pedicels. *Lip* with a flat ridge on the disk that ends abruptly opposite the side lobes.—Lindley (in Journ. Linn. Soc.) has confounded this with *acinaciforme.*

56. **D. terminale,** *Parish & Reichb. f. in Trans. Linn. Soc.* xxx. 149; leaves small ovate or ovate-oblong acute, flower terminal solitary large, mentum broad much longer than the rest of the flower, lip triangular-cuneate truncate or 2-lobed.

TENASSERIM, *Parish.* MALACCA (*Ic. in Herb. Calcutt.*).

Stems 4–6 in. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in. *Flower* $\frac{2}{3}$ in. long, white, lip yellowish.—The large flower at once distinguishes this from its allies.

57. **D. Spatella**, *Reichb. f. in Hamb. Gartenzeit.* xxi. 298; leaves not imbricating ascending fleshy triangular, flowers solitary minute, dorsal sepal triangular, lateral twice as large oblong most obtusely acute, petals $\frac{1}{2}$-ovate acute, mentum moderate, lip spathulate or cuneately dilated $\frac{1}{2}$-ovate in front crenulate angled, disk with 3 elevated yellow lines, column very short obtuse.—*Descript. from the author, l. c.*

ASSAM (*Hort. Day*).

Sect. VII. STRONGYLE (see p. 711).

* *Flowers terminal.*

58. **D. parciflorum**, *Reichb. f. ex Lindl. in Journ. Linn. Soc.* iii. 4; stem stout terete, leaves 2 in. straight stout obtuse, flower solitary terminal 1 in. long, dorsal sepals and petals subequal oblong obtuse half the length of the very large broad obtuse nearly straight mentum, free part of lateral sepals triangular, lip obovate truncate, tip broad crenulate and crisped. Aporum Jenkinsii, *Griff. in Calc. Journ. Nat. Hist.* v. 367, t. xxv.

ASSAM, *Jenkins.*

Stem 6–10 in., terete. *Leaves* $\frac{1}{4}$ in. diam. at the base, gradually narrowed to the obtuse tip. *Flower* solitary, white; disk of lip yellow; peduncle much shorter than the mentum.—I have seen no specimens.

59. **D. kentrophyllum**, *Hook. f.*; stem stout, leaves $\frac{1}{2}$–1 in. recurved or straight stout acute, flower solitary terminal $\frac{1}{2}$ in. long, dorsal sepal ovate-oblong, lateral obtuse, petals oblanceolate, mentum more than twice as long as the dorsal sepal stout incurved narrowed to the obtuse base, lip spathulate with a long claw.

PERAK, *Scortechini.*

Near *D. parciflorum*, but distinguished by the above characters.

60. **D. aciculare**, *Lindl. in Bot. Reg.* 1840, *Misc.* 81; stem short slender tapering from a conic base, leaves few acicular, bracts many scale-like at the top of the short (1-fld. ?) peduncle, flower yellowish tinged with pink, lip 3-lobed, side lobes rounded serrulate in front, midlobe ovate serrulate. *Walp. Ann.* vi. 281.

SINGAPORE, *Cuming* (*Hort. Loddiges*).—DISTRIB. Philippines.

I doubt this species being from Singapore. Cuming's herbarium specimens (No. 2112) are marked, Bohol Island (Philippines).

61. **D. junceum**, *Lindl. in Bot. Reg.* 1842, *Misc.* 11; stem very slender except at the fusiform base branched above, leaves 2–3 in. very slender pungent, flowers 2 at the ends of the branches $\frac{3}{4}$ in. long, mentum much longer than the linear-oblong very obtuse dorsal sepal broadly obtusely conical, petals linear-oblong, tips rounded, side lobes of lip rounded, midlobe orbicular emarginate, disk scabrid. *Reichb. f. in Gard. Chron.* 1873, 361; *Walp. Ann.* vi. 281.

SINGAPORE (*Hort. Loddiges*).—DISTRIB. Borneo.

Stem 12–18 in.; fusiform base 4–5 by $\frac{1}{2}$ in. *Flower* green, lip purple veined.

62. **D. subulatum**, *Hook. f.*; stem slender flexuous, leaves $\frac{1}{2}$ in. recurved terete fleshy acute, flowers solitary at the nodes of the leafless ends of the stems $\frac{1}{3}$ in. long, bracts membranous convolute, dorsal sepal and petals broadly oblong obtuse, mentum 3–4 times as long as the dorsal sepal very stout slightly incurved obtuse, lip cuneately obovate, tip obscurely emarginate. Podochilus bicolor, *Miq. Choix*, t. 22, f. 3.

PERAK, *Scortechini*.—DISTRIB. Java, Borneo.

Very near *D. acerosum*, but smaller in all its parts, and with very different sepals and petals.

63. **D. acerosum**, *Lindl. in Bot. Reg.* 1841, *Misc.* 86; stem rather slender flexuous, leaves $\frac{1}{2}$ in. recurved subacute fleshy, flowers solitary, bracts 1 in. membranous convolute ovate-lanceolate, petals narrow acute, mentum twice as long as the dorsal sepal stout incurved obtuse, lip narrowly cuneate, tip dilated retuse waved. *Walp. Ann.* vi. 281. Aporum subteres, *Griff. in Calc. Journ. Nat. Hist.* v. 371.

TENASSERIM, *Parish*. SINGAPORE, *Hort. Loddiges*. MALACCA, *Griffith*.—DISTRIB. Borneo.

Stem 6–10 in., including the leafless ends. *Flowers* $\frac{1}{3}$ in. long, pale rose-cold. —Griffith describes the flowers as racemose, but they are solitary in his specimens (in Herb. Lindley).

64. **D. teres**, *Lindl. in Bot. Reg.* 1840, *Misc.* 111; stem almost filiform, leaves 2–3 in. distant slender obtuse, bracts spathaceous, mentum as long as the ovate-lanceolate acuminate dorsal sepal straight conical slender, petals linear-lanceolate, lip cuneate truncate serrulate cuspidate, ridges 3 crested. *Walp. Ann.* vi. 281.

SINGAPORE, *Hort. Loddiges*.

Stem 12–16 in. *Leaves?* *Flowers* $\frac{3}{4}$ in., fragrant, whitish, tip of the lip orange. —Described from scanty materials.

Sect. VIII. VIRGATÆ (see p. 711).

* *Lower nodes of stem not swollen. Mentum long or short.*

65. **D. conostalix,** *Reichb. f. in Walp. Ann.* vi. 292; leaves suberect linear unequally 2-fid, sheaths hispidulous, flowers small solitary or 2-nate leaf-opposed greenish pendulous from a tubercle-like decurved bracteate peduncle, sepals ovate, lateral revolute, petals narrower linear-oblong, mentum longer than the triangular acute lateral sepals, lip linear-oblong with 2 tooth-like spreading side lobes and a small orbicular thickened midlobe. D. calcaratum, *Lindl. in Bot. Reg.* 1840, *Misc.* 89.

SINGAPORE and MALACCA, *Cuming, Lobb, Maingay* (*Kew Distrib.* 1606).

Stem 12–18 in., as thick as a crow-quill, internodes 1–1½ in. *Leaves* 2–3 by ⅛ in. *Flowers* ½ in. long, nearly straight; column with rounded tips.

66. **D. bambusæfolium,** *Parish & Reichb. f. in Trans. Linn. Soc.* xxx. 149; leaves linear-lanceolate unequally 2-fid, flowers 1–3 on a leaf-opposed tubercle, pedicel slender, dorsal sepal oblong-lanceolate, petals linear-lanceolate acute, mentum as long as the ovate acute lateral sepals cylindric-conic obtuse, lip narrowly spathulate entire or oblong membranous veined, tip rounded or emarginate, sides involute.

TENASSERIM, *Parish.*

Stem 2 ft., stouter than in *D. conostalix,* polished. *Leaves* 5–6 by ½ in., sheaths minutely granulate. *Flowers* ½ in. long, green or white with purple on lip, which is described by Parish as "strangely different on one and the same specimen."—Habit and foliage of *D. gemellum,* of which it may be a var. Parish figures a more oblong lip, notched at the end, unlike that which I examined; he informs me that the lip is very variable.

67. **D. hæmoglossum,** *Thwaites Enum.* 429; habit, size and characters of *D. bambusæfolium,* but pedicels shorter, flowers smaller, petals ovate lanceolate, and mentum very short depressed conical, lip tongue-shaped acute undulate.

MALABAR, *Jerdon.* CEYLON; at Matele and the Dolosbagey district, alt. 3000 ft., *Gardner, Thwaites.*

So like *D. bambusæfolium* that without the flowers the specimens seem to be inseparable.

68. **D. Cathcartii,** *Hook. f.*; leaves linear-lanceolate unequally 2-fid, flowers in leaf-opposed pairs yellow with purple on the lip, pedicel slender, dorsal sepal ovate-lanceolate acute, petals similar but narrower, mentum stout incurved shorter than the lanceolate lateral sepals, lip elliptic-oblong acute quite entire.

SIKKIM HIMALAYA (*Ic. Cathcart* and *Ic. Hort. Bot. Calc.*).

Stem 12–18 in., internodes 1 in. *Leaves* 4–6 by ½–¾ in. *Flowers* 1 in. long.—A very distinct species with golden flowers, three times as large as *D. bambusæfolium* according to the drawings.

69. **D. gemellum,** *Lindl. Gen. & Sp. Orchid.* 81; *in Bot. Reg.* 1840, *Misc.* 192; 1844, *Misc.* 62; leaves linear-lanceolate unequally 2-fid, flowers 2 on a leaf-opposed tubercle, "lip oval acute, tip subcrisped with 3 inconspicuous serrulate ridges, 3-lobed." *Walp. Ann.* vi. 286. Pedilonium biflorum, *Blume Bijd.* 322.

SINGAPORE, *Cuming* (*Hort. Loddiges*). MALACCA; at Bronang, *Griffith.*

Only seen in Herb. Lindley; the two specimens exactly resemble *bambusæfolium,* but are flowerless; a drawing accompanies them of an oblong-lanceolate acute lip, with 3 serrulate ridges (not at all spathulate as in *bambusæfolium*).

70. **D. pachyglossum,** *Parish & Reichb. f. in Trans. Linn. Soc.* xxx. 149; young sheaths hispid, leaves very slender acuminate, flowers solitary or geminate, sepals triangular-ovate, petals narrowly linear acuminate, mentum equalling the sepals recurved obtuse, side lobes of lip very small, midlobe minute retuse, disk 2-keeled.

TENASSERIM; at Moulmein, *Parish.*

Stem 6–8 in., narrowed at the base and apex. *Leaves* 2–3 by ⅛ in. *Sepals* streaked with brown. *Lip* white, with brown streaks.—Reichenbach, from whom the description is taken, says, "Very like *D. attenuatum,* Lindl."

71. **D. villosulum,** *Wall. Cat.* 2006 (*not of Lindl.*); sheaths hirsute, leaves 1 in. linear-lanceolate unequally acutely 2-fid, flowers very small solitary shortly pedicelled white, mentum cylindric obtuse longer than the oblong obtuse 3-nerved sepals, petals linear obtuse 1-nerved, lip very narrow, the long stiff claw gradually dilated into 2 narrow incurved acute side lobes, midlobe long slender rigid spur-like with a thickened tip and inflexed beak.

PENANG, *Porter.*

Stem as thick as a crow-quill; internodes ½ in. *Leaves* rather rigid, channelled, margins recurved. *Flowers* ½ in. from the tip of the dorsal sepal to that of the lip.—Lindley's Wallichian specimen was flowerless, and as the stem precisely resembles that of *D. nutans*, he referred the latter to *villosulum.*

72. **D. Lobbii,** *Teijsm. & Binnend. in Nat. Tijdsch. Neerl. Ind.* iii. 399; stems erect leafy terete rusty-pilose, leaves sessile lanceolate lepidote beneath, tip obliquely notched, flowers solitary leaf-opposed pendulous, sepals linear acute, petals narrower erect, lip erect with 3 ridges, side lobes acute, midlobe toothed emarginate. *Walp. Ann.* vi. 292.—*Description from the authors, l. c.*

SINGAPORE, *Lobb.*

** *Lower internodes of stem tuberous or fusiform. Mentum equalling or exceeding the lateral sepals.*

73. **D. tuberiferum,** *Hook. f.*; leaves short coriaceous oblong obtuse, margins recurved, flowers small hyaline 1–2 at the nodes of the leafless ends of the stems very shortly pedicelled, dorsal sepal oblong, petals narrower lanceolate falcate ciliate, mentum cylindric straight obtuse twice as long as the lateral sepals, lip obcordate with a minute ciliate lobe between the rounded side lobes and a truncate raised ridge in front.

PERAK, *Scortechini* (drawing only). SINGAPORE, from Guning Hijan, *Murton.* ? CHITTAGONG (*Ic. Hort. Calcutt.*).

Stem 12–18 in., often branched; internodes ¼–¾ in., basal tuber globose or fusiform. *Leaves* 1½–2 in. *Flowers* ⅓–½ in. long, veins and cross-venules slender.—Scortechini's drawing represents the lateral sepals as rounded and midlobe of lip as ovate; in the Singapore specimens the former are acute, and the latter linear and longer. Very near *D. Boothii*, Teijsm. & Binnend. (Miquel Choix, t. 24, f. 2), which has larger flowers and fimbriate bracts.

74. **D. podagraria,** *Hook. f.*; leaves linear-oblong or linear obtuse or emarginate, flowers small solitary on bracteate tubercles at the upper nodes or leaf axils, dorsal sepal lanceolate, petals narrow oblong-lanceolate 3-nerved, mentum longer than the ovate uncinate 7-nerved lateral sepals stout incurved obtuse, lip obcordate from a narrow base, side lobes rounded, midlobe small rounded, sinus with a plate and caruncle. D. angulatum, *Wall. Cat.* 2010 (*not of Lindl. Gen. & Sp. Orchid.*).

BURMA; at Attran, *Wallich.* TENASSERIM, *Griffith, Parish.*

Stem 1–3 ft., branched; internodes 1½ in.; basal tuber 1–5 in. *Leaves* 1½–2 by ¼–⅓ in. *Flowers* ½ in. long, white with pink veins on the lip.

75. **D. clavipes,** *Hook. f.*; leaves erect linear, tip rounded, flowers small solitary axillary, dorsal sepal ovate obtuse, petals narrower lanceolate 3-nerved, mentum stout obtuse longer than the obtuse 7-nerved lateral

sepals, lip obcordate, with rounded side lobes, a minute midlobe, and a caruncle at the sinus.

PERAK, *Scortechini*.—DISTRIB. Java.

Stem as thick as a sparrow's quill, basal tuber ½–1 in., globose or fusiform, branches also thickened at the base. *Leaves* 1–1½ in., strict, striate. *Flowers* ¼ in., white?, midlobe of lip very variable.—The Javan specimens seem to have narrower petals and more acute lateral sepals than the Perak ones.

76. **D. crumenatum,** *Swartz in Act. Holm.* 1800, 246; stem tall branched, base fusiform, leaves oblong obtuse or notched, flowers many on the leafless ends of the branches large white, dorsal sepal ovate-lanceolate 7-nerved, petals linear-oblong 5-nerved, mentum equalling the lanceolate acuminate lateral sepals conical acute incurved, side lobes of lip narrow, midlobe much larger suborbicular crisped, disk with crenate ridges. *Lindl. Gen. & Sp. Orchid.* 88; *in Bot. Reg.* 1839, t. 22; *in Trans. Hort. Soc.* vii. 70; *Griff. Notul.* iii. 315; *Bot. Mag.* t. 4013; *Miquel Choix*, t. 22; *Walp. Ann.* vi. 291. Onychium crumenatum, *Blume Bijd.* 326.—*Rumph. Herb. Amb.* vi. t. 47, f. 2.

TENASSERIM, the ANDAMAN ISLANDS and MALAY PENINISULA, common.—DISTRIB. Malay Archipelago, S. China, Siam, &c.

Stem 2–3 ft., stout. *Leaves* 2–3 in., coriaceous. *Flowers* 1–1¼ in. long; sheathed peduncle ¼–⅓ in.; pedicel ½ in.; lip with a primrose disk and sometimes pink veins.—In a drawing in Hort. Calcutt. of a plant very like this from Penang, named *D. flexuosum*, Wall., the sepals and petals are obtuse, and the midlobe of the lip quite entire, rounded at the tip; the mentum is shorter and straight. The Ceylon locality attributed to *D. crumenatum* is no doubt an error.

Sect. IX. BREVIFLORES (see p. 711).

77. **D. bicameratum,** *Lindl. in Bot. Reg.* 1839, *Misc.* 85; leaves linear-lanceolate, flowers crowded on a short sheathed peduncle, dorsal sepal ovate-oblong subacute 5-nerved, mentum urceolate, foot of column 3-lamellate, lip broadly cuneate truncate, side lobes spreading small acute, midlobe small fleshy caruncled. *Saunders Refug. Bot.* t. 143; *Walp. Ann.* vi. 299. D. breviflorum, *Lindl. in Journ. Linn. Soc.* iii. 14.

SIKKIM HIMALAYA, alt. 2000 ft., *Mann* (*Ic. in Hort. Bot. Calc.*). KHASIA HILLS, *Gibson*. BEHAR; on Parusnath (*Ic. in Hort. Bot. Calc.*). TENASSERIM, *Parish*.

Stem clavate, fusiform or elongate, and 12–18 in. *Leaves* 3–4 in., obliquely 2-fid. *Flowers* ⅓ in. broad, yellow with stripes of red speckles; lip golden yellow.—Apparently very variable. The figure in Refug. Bot. has fusiform stems with internodes ½–¾ in., and a rounded midlobe of the lip. The Parusnath plant has stems 6–7 in. narrowed at both ends, internodes ¾–1¼ in., dirty-yellow flowers, and a narrower mentum; the midlobe of lip is very short. Lindley's specimen of *D. breviflorum*, erroneously supposed to be from Singapore, is a mere frustule of a stem. A note of Dr. Thomson's attached to a drawing of this species (in Hort. Calc.) states that it was introduced from Parusnath into the Calcutta Garden; it has pale rose-cold. flowers. Lindley by an oversight says of the flowers, "A little smaller than those of *Maxillaria stapelioides*," which he figures (Bot. Reg. 1839, t. 17) with flowers 2½ in. diam.

78. **D. bolbobflorum,** *Falc. mss.*; stem short fusiform or subclavate, leaves oblong or lanceolate acute, flowers very small fascicled on a very short bracteate peduncle subsessile, dorsal sepal broadly ovate obtuse 7-nerved rather broader than the obovate 5–7-nerved petals, lateral sepals

triangular acute, mentum urceolate, base rounded, lip triangular broadly truncate, apex formed of the spreading acute side lobes which are longer than the very short broad sessile carnncled apiculate midlobe, column with 2 spurs at the base.

SIKKIM HIMALAYA; Rungbee, alt. 3000 ft., *Clarke*; Darjeeling, alt. 7000 ft., *Gamble*.

Stems 4–8 in., often curved or subflexuose, internodes very obscure. *Leaves* 2–3 in., many-nerved. *Flowers* $\frac{1}{6}$ in. long and broad, greenish; pedicels as long; bracts scarious; column short and broad; anther short.—The name *bolbiflorum* is attached by Falconer to a drawing of this plant in Hort. Bot. Calc., but no locality is given.

79. **D. aduncum,** *Wall. in Bot. Reg.* 1842, *Misc.* 62, 1846, t. 15; stems slender pendulous, leaves linear-lanceolate, flowers on the leafless stems in short racemes, bracts obtuse, dorsal sepal ovate acute, petals rather broader, mentum very large urceolate as long as the triangular acuminate lateral sepals, lip small cymbiform cuspidate ciliate, claw short, disk villous, column bearded in front. *Bot. Mag.* t. 6784; *Veitch Man. Dendrob.* 14; *Walp. Ann.* vi. 295.

SIKKIM HIMALAYA, alt. 7000 ft., *Pantling*. BHOTAN, *Lister*. ASSAM, *Jenkins*, &c.—DISTRIB. China.

Stems 1–2 ft. *Leaves* 2–3 in., thin, acute or obtuse. *Flowers* $\frac{1}{2}$ in. broad, translucent, rose-pink; peduncle clothed with membranous scales; perianth segments recurved; tip of column crenate; anther purple, papillose.—The Chinese *D. hercoglossum*, Reichb. f. in Hamb. Gartenzeit. xlii. 558, resembles a form of this with more acute sepals and petals, and deeper rose-cold. flowers.

Sect. X. PEDILONIUM (see p. 711).

80. **D. secundum,** *Wall. Cat.* 1996; stem stout, racemes shortly peduncled secund dense-fld., bracts small membranous, dorsal sepal ovate obtuse, petals narrower linear-oblong, mentum as long as the dorsal sepal or longer, lip spathulately oblanceolate cymbiform and entire subacute, claw saccate, disk with a semilunate transverse ridge. *Lindl. Gen. & Sp. Orchid.* 81; *in Bot. Reg.* t. 1291 and 1844, *Misc.* 65; *Reichb. Fl. Exot.* t. 269; *Bot. Mag.* t. 4352; *De Vriese Illust.* t. 6; *Veitch Man. Dendrob.* 72. Pedilonium secundum, *Blume Bijd.* 322.

MARTABAN, *Wallich*. TENASSERIM, *Griffith, Helfer*. PENANG, *Wallich*. DISTRIB. Sumatra, Java, Cochin China.

Stem 10–24 in., pendulous, sometimes $\frac{3}{4}$ in. diam., grooved. *Leaves* very variable, 2–4 by 1–2 in., oblong to linear-oblong, obtuse or retuse. *Racemes* 2–4 in., decurved, rachis very stout; flowers hardly expand, and vary from deep red to white, with yellow on the lip.—Var. *nivea*, Reichb. f. in Gard. Chron. 1881, i. 733.

81. **D. cornutum,** *Hook. f.*; stem long slender, flowers on the leafless stems 2–3 on a very short peduncle, bracts minute, dorsal sepal oblong obtuse 5-nerved, petals narrower elliptic or oblanceolate, mentum cylindric stout 2–3 times as long as the broadly ovate lateral sepals, lip entire very narrowly spathulate, claw long with involute margins and a small fleshy tubercle near the base.

PERAK, *Scortechini*; Summit of Gunong Batu Pateh, *Wray*.

Stems 12–18 in.; internodes 1 in. *Leaves* 4 by $\frac{1}{4}$ in., linear-lanceolate, acuminate, membranous, strict; sheath $\frac{1}{2}$ in., dotted with black. *Flowers* 1 in., often arched like a bow, bright rose-cold.; pedicel $\frac{3}{4}$ in., capillary; column short, tips crenu-

late, stipes of anther long subulate.—Near ***D. Kuhlii,*** Lindl., of Java (Bot. Reg. 1847, t. 17), which has broadly elliptic leaves.

82. **D. cumulatum,** *Lindl. in Gard. Chron.* 1855, 756 ; stem rather slender, racemes subcorymbose, dorsal sepal subacute, petals much broader obovate or rounded obtuse erose, mentum as long as the acute lateral sepals subcylindric incurved, lip obovate-spathulate erosely toothed, claw short with a small tubercle above the base. *Bot. Mag.* t. 5703; *Reichb. f. in Gard. Chron.* 1868, 6 ; *Veitch Man. Dendrob.* 34.

SIKKIM HIMALAYA (*Ic. in Herb. Calc.*). BHOTAN, *Lister.* TENASSERIM, *Parish, Benson.* ? PERAK, *Scortechini.*

Stem 1–2 ft., rather slender, pendulous. *Leaves* 3–4 in., oblong-lanceolate, acuminate. *Racemes* 3–4 in. long and broad; flowers 1–1½ in. broad, more expanded than in others of the section, rose-cold., vanilla-scented ; lip suffused with yellow, very variable in breadth.

VAR. *Jenkinsii* ; petals orbicular-obovate, lip with an orbicular-oblong waved limb speckled with red. D. Jenkinsii, *T. Anders. mss.*—Assam (*Ic. in Herb. Calcutt.*).

83. **D. sanguinolentum,** *Lindl. in Bot. Reg.* 1842, *Misc.* 73, 1843, t. 6, 1844, *Misc.* 52; pendulous, flowers on leafless stems 3–5 on a short, peduncle, bracts small, sepals ovate obtuse, petals orbicular-oblong, mentum stout obtuse compressed, lip clawed, side lobes rounded, midlobe quadrate retuse trapezoid or obreniform, claw with a retrorse spine. *Veitch Man. Dendrob.* 72.

PENANG (Ic. in Herb. Kew), *Maingay* (*Kew Distrib.* 1615).

Stem 2–3 ft., sulcate ; sheaths purplish. *Leaves* 2–8 in., ovate or lanceolate, red beneath. *Peduncle* ¼–½ in. ; pedicels ¾ in. ; flowers 1 in. diam., yellow with violet tips and a red blotch on the lip; mentum as long as the sepals.—The Ceylon habitat usually given is an error. An anomalous ***Pedilonium*** ; perhaps a *Eudendrobium* near *D. Ruckeri.*

84. **D. kentrochilum,** *Hook. f.* ; stem subclavate, flowers axillary 2-nate, bracts minute, lateral sepals ovate-oblong, petals suborbicular obtuse, mentum very stout, lip clawed rhombic-obovate obscurely subequally 3-lobed, claw with a strong spine.

PERAK ; in the Balang Padung Valley, *Wray.*

Stem elongate, internodes ½–⅔ in. *Leaves* 5–6 by 1¼–1½ in., coriaceous, oblong, obtuse. *Flowers* 1 in. diam., white, not veined ; mentum as long as the broadly obovate dorsal sepal.—Like the Bornean *D. pictum* (Lindl. in Gard. Chron. 1862, 548), but the leaves and sepals are obtuse, flowers white, and lip much broader.

85. **D. megaceras,** *Hook. f.* ; stem terete, racemes very short 3–5-fld., bracts minute, dorsal sepal elliptic-oblong obtuse, petals as large obovate 7-nerved, mentum very long stout, lip membranous clawed cuneate with lacerate shoulders and a small orbicular crenate midlobe, claw with a lamella on the disk.

MALACCA, *Maingay* (*Kew Distrib.* 1613).

Stem 2 ft., stout. *Leaves* 3–4 in., rather membranous, lanceolate, acuminate. *Peduncle* and *rachis* of raceme together ½ in. ; bracts recurved ; flowers 1½ in. long, "dull yellowish green, spur pinkish" (*Maingay*).

86. **D. rhodocentrum,** *Reichb. f. in Gard. Chron.* 1872, 426 ; stem stout, racemes subcorymbose, dorsal sepal linear-oblong, petals much broader erose, mentum as long as the acuminate lateral sepals conical,

lip very shortly clawed obovate, side lobes very short acute, midlobe large erose, claw naked, column with a tuft of hairs in front.

INDIA? (*Hort. Buller*).

Very like *D. cumulatum* in habit, foliage, and inflorescence, but mentum shorter, side lobes of lip smaller, its claw unarmed, and column bearded.—*Description from the author.*

87. **D. hymenanthum,** *Hook. f.*; flowers solitary? on the leafing stems very membranous, dorsal sepal ovate obtuse, lateral ovate-lanceolate subacute and elliptic obtuse petals 7-nerved, mentum twice as long as the dorsal sepal nearly straight obtuse, lip with a long slender channelled claw and obovate denticulate limb which has two linear-oblong calli at its base.

PERAK, alt. 3400 ft., on Gunong Batu Pateh, *Wray*.

Stems 10–12 in., internodes 1 in. *Leaves* 3–4 by $\frac{2}{3}$–$\frac{3}{4}$ in., oblong-lanceolate, coriaceous, tip oblique. *Flowers* $\frac{3}{4}$ in. diam., "white tinted with rose and green," *Wray*; column with recurved apical auricles that are 1-toothed on the dorsal margin.

88. **D. ionopus,** *Reichb. f. in Gard. Chron.* 1882, ii. 808; racemes short, bracts minute, flowers yellow with red blotches, sepals and petals triangular, mentum elongate falcate, claw of lip elongate thick keeled with a flat retrorse tooth, limb dilated and 3-lobed, side lobes obtuse angled, midlobe produced retuse emarginate, column trifid.—*Description from the author, l. c.*

BURMA (*Hort. Low*).

89. **D. Perula,** *Reichb. f. in Hamb. Gartenzeit.* xxi. 298; internodes short green sheathed, flower 2-nate subterminal (of *Pedilonium*) sulphur with orange veins, dorsal sepal and petals subequal ligulate acute, lateral triangular, mentum oblong $\frac{1}{2}$-lunate saccate elongate anteriorly, lip cuneate-oblong lobulate and crenulate in front, with $\frac{1}{2}$-lunate calli from the thickened veins, column short unifalcate on each side.

ASSAM (*Hort. Day*). Description from the author, l. c.

Sect. XI. DISTICHOPHYLLÆ (see p. 711).

90. **D. revolutum,** *Lindl. in Bot. Reg.* xxvi. (1840), *Misc.* 53; stem stout, flowers solitary pedicelled, sepals and petals revolute, dorsal sepal ovate subacute, petals narrower oblong-lanceolate, spur longer than the ovate obtuse lateral sepals, mentum funnel-shaped nearly straight subacute, lip broad, side lobes very small, midlobe rhomboidly suborbicular emarginate, sides deflexed, disk 3-nerved. *Bot. Mag.* t. 6076; *Paxt. Fl. Gard.* i. 63, fig. 42; *Walp. Ann.* vi. 291. D. uniflorum, *Griff. Notul.* iii. 305; *Ic. Pl. Asiat.* t. 303.

TENASSERIM, *Parish.* SINGAPORE, *Walker.* MALACCA, on Mt. Ophir, *Hullett, Maingay* (*Kew Distrib.* 1610).

Stem 12–18 in., internodes $\frac{1}{2}$ in., deeply channelled. *Leaves* 1–2 in., linear-oblong or oblong emarginate, back keeled, very variable in breadth, base cordate. *Flowers* 1 in. diam., white with a brown lip; pedicel $\frac{1}{2}$ in.

91. **D. bifarium,** *Lindl. in Wall. Cat.* 2002; stem rather slender, flowers solitary sessile, dorsal sepal ovate subacute 5-nerved, petals lanceolate 3-nerved and sepals erect, mentum longer than the ovate

acuminate 5-nerved lateral sepals conical obtuse, lip hardly lobed obovate-spathulate contracted about the middle, basal half 7-nerved with convex sides fleshy with 7–9 close-set crested ridges. D. excisum, *Lindl. in Bot. Reg.* 1841, *Misc.* 77.

PENANG, *Wallich, Maingay* (*Kew Distrib.* 1611).

Very like *D. revolutum* in habit, but stems shorter not so robust, internodes longer, leaves smaller linear-oblong unequally 2-toothed, flowers about half the size white sessile, and lip very different.—Lindley (in Hook. Journ. Bot. vii. (1825) 355) erroneously refers this to *Appendicula bifaria*.

92. **D. metachilinum,** *Reichb. f. in Bonplandia,* iii. 122; flowers fleshy in short corymbiform racemes, bracts short, dorsal sepal ovate obtuse 5-nerved, petals obovate oblong obscurely 3-nerved, mentum longer than the recurved acute lateral sepals conical straight obtuse, lip spathulate concave lamellate at the base, tip with two small short side lobes that overlie the subreniform small caruncled concave fleshy midlobe.

MALACCA, *Cuming, Maingay* (*Kew Distrib.* 1612).

Stem rather stout, 12–18 in., deeply grooved when dry. *Leaves* 2–3 in., linear-oblong, unequally 2-fid, recurved, coriaceous, complicate below, lowest sometimes longer and lanceolate. *Flowers* nearly ½ in. diam., chrome yellow; bracts minute; peduncle and pedicels each ⅓–½ in.

Sect. XII. EUDENDROBIUM (see p. 711).

* Mentum as long or nearly as long as the dorsal sepal. Flowers like those of sect. *Formosæ,* but lateral, yellow, or white with yellow or red markings; lip usually narrower than broad, very narrow in *D. nutans, Jerdonianum & Arachnites.* (See also *D. amœnum* for long spur.)

93. **D. xanthophlebium,** *Lindl. in Gard. Chron.* 1857, 268; *in Journ. Linn. Soc.* iii. 16; flowers on the leafless branches 2-nate white with yellow and brown veined lip, sepals and petals lanceolate acute, mentum conical acute, lip broad, side lobes large triangular subacute, midlobe orbicular crisped scabrid, disk fleshy. *Batem. in Bot. Mag. under* t. 1515; *Veitch Man. Dendrob.* 84. D. marginatum, *Batem. l. c.* t. 5454.

TENASSERIM; at Moulmein, alt. 4500 ft., *Parish, Lobb.*

Habit and foliage of *D. longicornu,* but stems glabrous, striped green and white, and flowers axillary, much more open, 1½–2 in. diam.

94. **D. Ruckeri,** *Lindl. in Bot. Reg.* 1843, *Misc.* 8, t. 60; stems slender pendulous, flowers with the leaves solitary or 2-nate from a short sheathed peduncle shortly pedicelled, pale yellow with lip pink or yellow with red veins, dorsal sepal and narrower petals subspathulately oblong obtuse, lateral larger obtuse, mentum ventricose, tip contracted obtusely 2-lobed, lip sessile subtrapezoidly obovate, base auricled, lateral lobes large rounded convolute, midlobe orbicular crisped, disk with a villous green ridge. *Walp. Ann.* vi. 288.

KHASIA MTS. (*Ic. in Herb. Calcutt.*). — DISTRIB. Philippines (fid. *Lindley*).

Stem 1–2 ft., often branched; internodes 1–2 in. *Leaves* 3–5 in., lanceolate, acute. *Flowers* 1½ in. from tip of dorsal sepal to that of mentum, pale primrose.—Spur twisted and lip pink in the Khasia plant.

95. **D. luteolum,** *Batem. in Gard. Chron.* 1864, 269; stem erect, leaves linear-oblong acute coriaceous, flowers 2–4 on a short axillary peduncle yellow, sepals oblong subacute, petals much broader obtuse,

mentum stout obtuse, lip broadly ovate-oblong, side lobes rounded, midlobe ovate subacute undulate, disk with 3–5 villous ridges. *Bot. Mag.* 5441; *Veitch Man. Dendrob.* 57, *with fig.*

TENASSERIM; on the Attran River, *Parish.*

Stem 10–12 in., furrowed, striped. *Leaves* 3–4 in., sessile. *Flowers* 2½ in. across; sheaths of peduncle obtuse; pedicels ½ in.; lip with red veins between the side lobes.—Var. *chlorocentrum*, Reichb. f. in Gard. Chron. 1883, i. 340, fig. 48; Williams Orchid. Album, vii. t. 322, has greenish hairs on the lip.

96. **D. lasioglossum,** *Reichb. f. in Gard. Chron.* 1868, 682; 1869, 277; stem slender branched, flowers on the leafing stems 2–4 on very short axillary peduncles shortly pedicelled white with a purple veined lip, sepals oblong obtuse, petals broadly obovate, mentum as long as the dorsal sepal conical incurved, side lobes of sessile lip rounded entire purple veined, midlobe shorter subquadrate crisped, disk villous, yellow or greenish. *Bot. Mag.* t. 5825; *Veitch Man. Dendrob.* 52.

BURMA, *Parish.*

Stem 10–18 in., internodes 1–2 in. *Leaves* 3–5 in., lanceolate, acuminate, base acute. *Flowers* 1½–2 in. diam.

97. **D. Jerdonianum,** *Wight Ic.* t. 1644; stems stout very slender below, leaves linear-oblong, base broad, tip broad deeply acutely cleft, sheaths hirsute, flowers 2–3 racemose on a very short peduncle yellow, sepals lanceolate acuminate, petals linear-oblong, mentum half as long as the sepals, lip linear-oblong, side lobes small, midlobe elongate, margins crisped.

NILGHIRI and KURG HILLS, *Wight.*

Stems 8–18 in., very slender below, sulcate. *Leaves* 1–2 by ⅓ in. *Peduncle* ¼ in.; bracts small, ovate; flowers 1–1¼ in. long. *Capsules* ¾ in. long, pedicel decurved.—I can scarcely, without further evidence, unite this with *D. nutans*, as Reichenbach has done; it is a much more robust and larger-flowered plant, with broader, more oblong, deeply cleft leaves, and much larger flowers.

98. **D. nutans,** *Lindl. Gen. & Sp. Orchid.* 90; *in Bot. Reg.* 1844, *Misc.* 52; stems very slender below and linear-lanceolate acute leaves pubescent, tip narrowed obliquely notched, flowers 2–3 racemose on a short lateral peduncle, sepals and petals linear-lanceolate, lip as in *D. Jerdonianum*. *Walp. Rep.* vi. 292; *Thwaites Enum.* (*excl. syn. Jerdonianum*).

CEYLON; in the Central Province, alt. 4–6000 ft., *Macrae, Walker,* &c.

Stems 6–10 in., rather slender and swollen in the middle, but hardly clavate, sulcate. *Leaves* 2–2½ by ⅙–¼ in. *Flowers* ⅔ in. long.—Lindley describes the peduncles as subterminal, and the flowers as white tinged with green, but in an excellent drawing by Mr. Walker they are leaf-opposed on most of the nodes, and bright ochreous yellow.

99. **D. Arachnites,** *Reichb. f. in Gard. Chron.* 1874, 354; stems very short tufted terete, leaves linear-lanceolate acute, flowers 1–3 ochreous, sepal very narrow 5-nerved, dorsal oblanceolate obtuse, lateral linear-lanceolate from a broad base subacute, petals narrower than the dorsal sepal 3-nerved, mentum very short conical, lip nearly as long as the sepals subpanduriformly lanceolate acuminate shortly clawed slightly recurved, disk 2-ridged at the very base. *Veitch Man. Dendrob.* 19.

TENASSERIM; at Moulmein, *Boxall.*

Stems 2–3 in., internodes shining, slightly swollen upwards. *Leaves* 1–3 in.;

sepals spotted; petals paler, lip purple-veined.—One of the narrowest-sepaled species. I have seen only a flower.

** Mentum short conical or rounded (long in *D. amœnum*). Flowers white or more or less purple. Lip not calceolar. (*Porphyrantha.*)

† Petals as narrow as the sepals or narrower. Lip narrower than broad.

100. **D. candidum,** *Wall. in Lindl. Bot. Reg.* 1838, *Misc.* 54, and 1844, *Misc.* 52; stem slender erect flexuous terete, leaves lanceolate, flowers on the leafless stems 2–3 on a short sheathed peduncle erect pure white, sepals and petals subsimilar linear-oblong obtuse, mentum rounded, lip ovate-lanceolate or narrowly trapeziform, base cuneate, side lobes narrow, midlobe ovate obtuse, disk bearded and with a long callus. *Paxt. Fl. Gard.* i. 63, fig. 41; *Walp. Ann.* vi. 286.

TROPICAL HIMALAYA; Kumaon, alt. 3000 ft., *Strachey & Winterbottom*; Nepal, *Wallich*; Sikkim, alt. 7000 ft., *King's Collector*; Bhotan, *Griffith.* KHASIA HILLS, *Gibson* (*Ic. in Hort. Bot. Calc.*).

Stem 6–12 in., internodes 1–1½ in. *Leaves* 3–5 in. *Flowers* 1–1¼ in., fragrant; bracts ¼ in., ovate; pedicels ¾ in.

101. **D. macrostachyum,** *Lindl. Gen. & Sp. Orchid.* 78; *in Bot. Reg.* t. 1865, and 1844, *Misc.* 50; stems long pendulous terete, leaves membranous ovate-oblong acute, flowers 2–3 on a short peduncle from the subleafless stems small long-pedicelled yellowish, sepals and petals lanceolate acuminate recurved, mentum rather long funnel-shaped, lip oblong acute flat with a convolute base crenulate. *Wight Ic.* t. 1647; *Walp. Ann.* vi. 286.

TRAVANCORE, *Wight.* CEYLON, common in the Central Province.

Stems 1–2 ft., rather slender. *Leaves* 3–4 in. *Flowers* 1 in. long, fragrant; bracts small; pedicels ¾ in., slender; lip with purplish veins; sepals and petals sometimes tinged with pink.

102. **D. scabrilingue,** *Lindl. in Journ. Linn. Soc.* iii. 25; stems erect subclavate hirsute, leaves linear-oblong broadly 2-lobed, flowers 2-nate on a short peduncle from the leafing or leafless stems white, lip yellow with green veins, sepals ovate-lanceolate subacute, petals more oblong, mentum conical green, side lobes of oblong lip narrow, midlobe oblong retuse recurved, disk scabrid and 5-ridged. *Reichb. f. in Trans. Linn. Soc.* xxx. 150; *Veitch Man. Dendrob.* 72. D. hedyosmum, *Batem. in Bot. Mag.* t. 5515.

TENASSERIM; at Moulmein, *Parish.*

Stems 6–12 in., internodes ⅔ in., nodes sometimes ½ in. diam. *Leaves* 2½ in., coriaceous, unequally obtusely 2-fid. *Flowers* 1½ in. diam., sweet-scented; pedicels short; bracts very small.

†† Petals as narrow or narrower than the sepals. Lip as broad as long.

103. **D. primulinum,** *Lindl. in Gard. Chron.* 1858, 223; *in Journ. Linn. Soc.* iii. 12; stems short pendulous, leaves coriaceous broadly oblong, flowers solitary on the leafless stems shortly pedicelled white or pink, lip primrose, sepals and petals subequal linear-oblong obtuse, mentum rounded,

lip large shortly clawed pubescent orbicular or reniform with a short convolute base, margins everted ciliate. *Trans. Russ. Hort. Soc.* 1861, t. 52; *Regel Gartenfl.* 1861, t. 326; *Williams Orchid. Alb.* vi. t. 286; *Veitch Man. Dendrob.* 70, *with fig.*, and var. *gigantea*, 71. D. nobile, *var.* pallidiflora, *Hook. Bot. Mag.* t. 5003.

TROPICAL HIMALAYA; Nepal and Sikkim.

Stems 10–12 in., often ½ in. diam. *Leaves* 4 in., smaller upwards. *Flowers* 2½ in. diam., odour of cowslips; bracts small; lip 2 in. diam. in var. *gigantea*, tip rounded acute or emarginate.—Near *D. Pierardi*, but stem shorter and stouter, sepals and petals narrower and subequal.

104. **D. cretaceum,** *Lindl. in Bot. Reg.* 1847, t. 62; stems stout curved pendulous, sheaths large loose, leaves lanceolate, flowers solitary on the leafless stems shortly stoutly pedicelled nearly white, lip crimson-veined, sepals and petals subequal linear-oblong obtuse, mentum conical obtuse, lip shortly clawed orbicular from a short convolute base pubescent ciliate. *Bot. Mag.* t. 4686; *Jard. Fleur.* iv. t. 344; *Fl. des Serres* viii. t. 818; *Veitch Man. Dendrob.* 33.

ASSAM, the KHASIA HILLS, and southward to TENASSERIM.

Stems 6–12 in., ⅔ in. diam, internodes ½–1 in. *Leaves* 3–4 in. *Flowers* 1½–2 in. diam.; bracts small. *Capsule* ½ in., clavate.

105. **D. cruentum,** *Reichb. f. in Gard. Chron.* 1884, i. 604; stems erect terete, base swollen, leaves obliquely oblong emarginate, flowers 1–2-nate axillary green, lip with crimson side lobes, bracts lanceolate convolute, sepals triangular-ovate acuminate keeled, petals linear acute, mentum rounded, lip 3-lobed, side lobes erect oblong crimson, midlobe ovate apiculate green with a tumid warted scarlet crest and 3 red ridges. *Veitch Man. Dendrob.* 33; *Warn. Orchid. Alb.* iv. t. 174.

MALAYAN PENINSULA, on the west coast (*Hort. Sanders*).

Stems 1 ft. *Leaves* deciduous. *Flowers* 1½–2 in. diam.; margins of midlobe of lip scarlet; column green, margins crimson.

106. **D. ramosum,** *Lindl. in Wall. Cat.* 2003; *Gen. & Sp. Orchid.* 82; stems long slender branched pendulous, leaves lanceolate acuminate, flowers in pairs on a short peduncle from the leafless stems, sepals lanceolate acuminate, petals spathulately oblong, mentum obtuse, lip broadly obcordate from a short cuneate claw 3-lobed glabrous, side lobes rounded as long as the small intermediate orbicular waved or crisped midlobe.

SILHET; at Pundua, *Wallich.*

Stems 2–3 ft., internodes 1½–2 in. *Leaves* 2–3 in., thin. *Flowers* 1–1½ in. diam., "yellow-green, lip with red lines."—The specimens are very bad, and Lindley's description consequently erroneous. The colours are from a note on Wallich's specimens.

††† Petals broad. Lip narrower than broad.

a. Flowers in short few-fld. racemes (*hardly racemose in* D. spathaceum).

107. **D. Macarthiæ,** *Thwaites in Bot. Mag.* t. 4886; *Enum.* 297; stems slender terete pendulous, leaves lanceolate acuminate, flowers 3–5 racemose from the leafing stems rosy, sepals lanceolate acuminate, petals ovate oblong acute, mentum stout, lip spathulately rhomboid, side lobes obscure rounded, midlobe broadly ovate subacute, disk glabrous.

Warner Orch. Alb. vii. t. 319; *Veitch Man. Dendrob.* 58, *with fig.*; *Walp. Ann.* vi. 290.

CEYLON; in forests between Ratnapoora and Galle, *Thwaites.*

Stems 1–2 ft., internodes 1½–2 in., mott'ed. *Leaves* 2½–4 in., thin. *Racemes* 2–3 in.; rachis stout, flexuous; bracts ½ in.; flowers 3–4 in. long, flattened dorsally, not spreading widely; d sk of lip dark purple or maroon.

108. **D. sphegidoglossum,** *Reichb. f. in Bonpland.* ii. 58; stems rather slender grooved, leaves linear-oblong, flowers small in few-fl. racemes on the leafless stems white, sepals oblong acute lateral keeled, petals broadly ovate acute erose, mentum short, lip cuneately obovate, lobes subequal short rounded villous and ciliate with long gland-tipped hairs. *Walp. Ann.* vi. 290. D. stuposum, *Lindl. in Bot. Reg.* 1838, *Misc.* 52, and 1844, 52.

KHASIA HILLS, alt. 3–5000 ft. TENASSERIM, *Parish.*

Stems 6–10 in., internodes 1–1½ in. *Leaves* 3–4 in., rather thin. *Raceme* ½–¾ in.; bracts linear-oblong, obtuse; flowers ½ in. long; pedicels capillary; lip white with red veins and a yellow band.

β. *Flowers solitary or* 2–4 *on a very short peduncle.*

109. **D. spathaceum,** *Lindl. in Journ. Linn. Soc.* iii. 15; stems very slender flexuous, leaves lanceolate obtuse, bracts lanceolate, flowers on the leafless stems 1–2 on a short sheathed peduncle white, dorsal sepals linear-oblong acute, lateral lanceolate from a broad base acuminate, petals obovate-oblong obtuse, mentum rounded, lip oblong-lanceolate subacute waved with 2 rounded lobes above the middle, disk between the lobes with 2 elongate calli.

SIKKIM HIMALAYA; on rocks by the Lachen River, alt. 6–7000 ft., *J. D. H.*

Stems 6–10 in., terete, as thick as a crow-quill, internodes 1–1½ in.; roots filiform, long and matted. *Leaves* 3 in., tip obliquely 2-fid. *Flower* odorous; pedicel ½ in., slender; sheaths of peduncle ¼–⅓ in., hyaline.—Apparently a very distinct species, with the habit of *D. amœnum*, of which it is perhaps a narrow-lipped state. The specimens are very scanty.

110. **D. heterocarpum,** *Wall. in Lindl. Gen. & Sp. Orchid.* 78; *Pl. As. Rar.* ii. 84, t. 196; stems subclavate suberect, leaves oblong-lanceolate, flowers 1–3 on a very short peduncle from the leafless stem white or straw-cold., lip yellow, sepals linear-oblong acute, petals ovate-lanceolate acuminate, mentum large conical truncate, lip ovate-lanceolate acute recurved, base with incurved sides, disk pubescent. *Lindl. in Bot. Reg.* 1844, *Misc.* 49; *Bot. Mag.* t. 4708 and 4970 (var. *Henshallii*); *Fl. des Serres* viii. t. 842; *Jard. Fleur.* iv. t. 386; *Gard. Chron.* 1885, i. 472, fig. 84 B. D. aureum, *Lindl. Gen. & Sp. Orchid.* 77; *in Bot. Reg.* 1839, t. 20 (var. *pallida*); *Wight Ic.* t. 1646; *Veitch Man. Dendrob.* 19 *with fig.*; *Reichb. in Gard. Chron.* 1880, 72 (var. *philippinensis*); *Reichenbachia* ii. t. 63. D. rhombeum, *Lindl. in Bot. Reg.* 1843, t. 17.—Dendrob. sp., *Griff. Notul.* iii. 304; *Ic. Pl. Asiat.* t. 306.

TROPICAL HIMALAYA, from Nepal eastwards, ASSAM, the KHASIA and PATKOYE MTS., BURMA, MALABAR, and CEYLON.—DISTRIB. Java, Philippine Islands.

Stems 9–18 in., ribbed; internodes ½–1½ in. *Leaves* 4–5 in., tip oblique and subacute or emarginate. *Flowers* 2–2½ in. diam., fragrant, often tinged with green; pedicels short; lip variable in colour, yellow, or white with a yellow disk and 2 red or purple blotches on the disk.

111. **D. transparens,** *Wall. Cat.* 2008/1; stems slender pendulous, leaves linear-lanceolate acute, flowers in pairs on the leafless stems white and pink, lip purple within, bracts very large, sepals lanceolate acute, petals broader ovate, mentum conic, lip clawed elliptic-oblong from a convolute cuneate base obtusely lobed recurved pubescent. *Lindl. Gen. & Sp. Orchid.* 79; *in Bot. Reg.* 1844, *Misc.* 62; *in Journ. Linn. Soc.* iii. 12; *Bot. Mag.* t. 4663; *Paxt. Fl. Gard.* i. 134, t. 27; *Jard. Fleur.* t. 68; *Veitch Man. Dendrob.* 81. D. Henshallii, *Reichb. f. in Bonpland.* iii. 226.—Dendrob., *Griff. Notul.* 198, No. 1135.

TROPICAL HIMALAYA; from Kumaon, alt. 3000 ft., eastwards; ASSAM, the KHASIA and GARROW HILLS.

Stems 11–18 in., internodes 1–1½ in. *Leaves* 3–4 in. *Flowers* 1½ in. diam.; bracts ⅓–½ in., oblong, acute; pedicels short; lip with a broad purple single or double blotch.

112. **D. amœnum,** *Wall. in Lindl. Gen. & Sp. Orchid.* 78 (*excl. syn.*); stems slender pendulous, leaves linear-lanceolate acuminate, flowers 2–3 on a short peduncle from the leafless stems white with violet tips and purple lip, bracts small, sepals oblong-lanceolate obtuse, petals larger ovate, mentum conic stout, lip shortly clawed ovate obtuse undulate crenate ciliolate, disk villous. *Lindl. in Bot. Reg.* 1844, 49; *in Journ. Linn. Soc.* iii. 12; *Bot. Mag.* t. 6199; *Floric. Cab.* t. 117; *Reichb. f. in Gard. Chron.* 1875, i. 305, figs. 57, 58; 1881, ii. 625, fig. 126; *Veitch Man. Dendrob.* 17. D. mesochlorum, *Lindl. in Bot. Reg.* 1847, *under* t. 36; *Paxt. Fl. Gard.* i. 63, fig. 43. D. Egertoniæ, *Lindl. l. c.*; *Paxt. l. c.*, fig. 44.

TROPICAL HIMALAYA, from Garwhal eastwards to Bhotan, SILHET, BURMA.

Stems 1–2 ft.; internodes 1–2½ in., smooth. *Leaves* 2–4 in., membranous. *Flowers* 1½–2½ in. diam., violet-scented; bracts on the peduncle imbricating. *Lip* amethyst-purple bordered with white, base yellow.—Flowers very variable in size and colour.

113. **D. marmoratum,** *Reichb. f. in Gard. Chron.* 1875, 492; stems stout greyish black terete, flowers 2-nate on the leafless stems (white with purple tips, lip purplish in front), mentum short retuse, lip oblong from a cuneate base ciliate densely velvety towards the base.

BURMA, *Boxall* (*Hort. Low*).

Description from the author, l.c.

†††† Petals much broader than the sepals. Lip as broad as long or broader.

§ Flowers solitary or 2–3-nate on a short peduncle or simply pedicelled. Margin of lip entire or slightly erose.

a. Internodes cylindric.

114. **D. Pierardi,** *Roxb. in Hook. Exot. Flor.* t. 9; *Fl. Ind.* iii. 482; stems slender pendulous, leaves sessile lanceolate acuminate, flowers 2–3 on a short peduncle from the usually leafless stems rose-cold., lip yellow, bracts small, sepals oblong-lanceolate subacute, petals broader oblong, mentum short, lip orbicular cucullate pubescent ciliate, base tubular. *Lindl. Gen. & Sp. Orchid.* 79; *in Bot. Reg.* t. 1756; *Wall. Cat.* 2007; *Bot. Mag.* t. 2584; *Wight Ic.* t. 908; *Lodd. Bot. Cab.* t. 750; *Veitch Man. Dendrob.* 69.

EASTERN TROPICAL HIMALAYA, Sikkim. BENGAL, in the Soonderbunds, and southward to TENASSERIM.

Stems 2–3 ft., smooth. *Leaves* 2–4 in., membranous. *Flowers* 1–2 in. diam., translucent.—Var. *latifolia*, Fl. des Serres, t. 955, is a doubtful plant, a good deal like *D. primulinum* in the flowers.

VAR. *cucullata*; flowers smaller 1½ in. diam., pedicels shorter, lip with a longer tubular base and short limb with incurved tip. D. cucullatum, *Brown in Bot. Reg.* t. 548; *Bot. Mag.* t. 2242; *Lindl. in Bot. Reg.* 1844, *Misc.* 49; *Reichb. Fl. Exot.* t. 65; *Walp. Ann.* vi. 284. Limodorum aphyllum, *Roxb. Cor. Pl.* i 34, t. 41; *Fl. Ind.* iii. 462. Cymbidium aphyllum, *Swartz in Nov. Act. Ups.* vi. 73; *Willd. Sp. Pl.* iv. 100.—Sikkim Himalaya, *J. D. H.*; Coromandel, *Roxburgh.*—Lindley refers Roxburgh's *L. aphyllum* to *D. amœnum*. *D. cucullatum* is the earliest name for the species, but it applies to an obvious variety.

115. **D. crystallinum,** *Reichb. f. in Gard. Chron.* 1868, 572; *Xen. Orchid.* ii. 210, t. 193, f. 1; stems pendulous, leaves falcately lanceolate acute, flowers 1–3-nate on a very short peduncle long-pedicelled white, tips purple, lip orange, sepals oblong-lanceolate acute, petals much broader, mentum short, lip shortly clawed suborbicular, disk puberulous, base shortly convolute, anther elongate papillose. *Bot. Mag.* t. 6319; *Veitch Man. Dendrob.* 34.

SIKKIM HIMALAYA, alt. 3–5000 ft., *J. D. H., Treutler.* ARRACAN, *Benson.* TENASSERIM, at Moulmein, *Parish.*

Stems 12–18 in.; internodes 1 in., terete, striate. *Leaves* 4–6 in., membranous. *Flowers* 2 in. diam.; bracts ovate-lanceolate; pedicels 1–1½ in.; lip with a pale margin and ochreous base.—Named from the remarkable anther.

116. **D. Bensoniæ,** *Reichb. f. in Bot. Zeit.* 1867, 230; stems stout, leaves linear, flowers 1–3 on a short peduncle from the leafless stems (pale yellow or white, lip yellow with 2 purple spots), bracts very small, sepals linear-oblong obtuse, petals very large, mentum short, lip large shortly clawed orbicular concave tomentose erose, base shortly convolute. *Bot. Mag.* t. 5679; *Floral Mag.* t. 355; *Jennings Orchid.* t. 32; *Linden.* iv. t. 148; *Orchidoph.* 1886, 49, *with fig.*; *Veitch Man. Dendrob.* 21, *with fig.*

PEGU; Rangoon, *Kurz.* ARRACAN, on the Kareen Hills. TENASSERIM, at Moulmein, *Benson.*

Stems 1–3 ft., suberect or drooping, terete; internodes 1–1½ in. *Leaves* 2–3 in., tip notched. *Flowers* 2½ in. diam.; lip with a golden disk, purple spots sometimes confluent, or obsolete.—In Jennings' figure and Veitch's Manual, the flowers are on a very short peduncle; in Bot. Mag. and specimens from Rangoon, they are 2–3 racemose on peduncle ½–1 in.

117. **D. aqueum,** *Lindl. in Bot. Reg.* 1843, *Misc.* 6, t. 54; 1844, *Misc.* 53; *in Journ. Linn. Soc.* iii. 14; stems decumbent compressed, leaves ovate-lanceolate acuminate, flowers 2–3-nate axillary cream-white, sepals ovate subacute, petals obovate, mentum short incurved, lip sessile rhombic pubescent erose, side lobes small incurved, midlobe broad triangular. *Bot. Mag.* 4640; *Jard. Fleur.* t. 262; *Veitch Man. Dendrob.* 18; *Walp. Ann.* vi. 289. D. album, *Wight Ic.* t. 1645; *Paxt. Fl. Gard.* ii. 175, fig. 226.

DECCAN PENINSULA; on the Nilghiri and Iyamalley Hills, *Wight*, &c.

Stems 10–20 in., subclavate, ½ in. diam.; internodes ½–1 in. *Leaves* 3–5 in. thin, wavy. *Flowers* 1½–2 in. diam.; lip suffused with pale yellow.

118. **D. crepidatum,** *Lindl. in Paxt. Fl. Gard.* i. 63, fig. 45; stems stout erect, leaves linear-lanceolate acute, flowers 1–3-nate shortly peduncled on the leafless stems long pedicelled white or pink, lip yellow, bracts small, sepals oblong obtuse, petals more obovate, mentum short obtuse, lip shortly clawed orbicular or broadly obovate retuse pubescent or ciliolate, margins waved. *Bot. Mag.* t. 4993, 5011; *Veitch Man. Dendrob.* 33. D. Lawanum, *Lindl. in Journ. Linn. Soc.* iii. 10; *Dalz. & Gibs. Bomb. Fl.* 261. Dendrochilum roseum, *Dalz. in Hook. Kew Journ.* iv. (1852) 291.

Assam and the Khasia Mts. (*Ic. in Herb. Calcutt*). The Southern Concan and Canara, *Dalzell*, &c.

Stems 6–18 in., loosely sheathed, striated green and white. *Leaves* 2–3 in., subcoriaceous. *Flowers* 1–1½ in. diam., waxy; pedicels purple; lip with a basal pit and ridge across the claw.—A specimen in Herb. Kew marked Garwhal Falconer is perhaps a cultivated one.

119. **D. lituiflorum,** *Lindl. in Gard. Chron.* 1856, 372; stems slender pendulous, leaves linear-lanceolate, flowers 1–5 on a short very large-bracted peduncle from the naked stems purple or white with purple and white lip, sepals linear-oblong subacute, petals broadly elliptic, mentum short saccate, lip trumpet-shaped puberulous, mouth large orbicular, margins recurved. *Bot. Mag.* t. 6050; *Warner Sel. Orchid.* ii. t. 3; *Reichb. f. Xen. Orchid.* iii. 36, t. 214; *Veitch Man. Dendrob.* 54; *Gartenfl.* t. 1086 (*var.* Farmeri). D. Hanburyanum, *Reichb. f. in Bonpland.* iv. 329.

Assam, Rangoon and Burma, *Griffith*, &c.

Stems 12–24 in.; internodes 1–1½ in., very smooth. *Leaves* 3–4 in. long. *Flowers* 2–2½ in. diam., variable in colouring; bracts ⅓–½ in., white, scarious; tube of lip ½–¾ in., purple and white; limb upcurved, deep purple within, with a broad white ring within the purple margin.—Var. *candida*, R. f. in G. C. 1880, i. 586, has white flowers with a pale yellow lip. Var. *Freemanii*, R. f. l. c. 1887, 744, has short stiff stems, and purple sepals and petals.

120. **D. nobile,** *Lindl. Gen. & Sp. Orchid.* 24; *Sert. Orchid.* t. 3; *in Bot. Reg.* 1844, *Misc.* 48; *in Journ. Linn. Soc.* iii. 12; stems erect compressed, leaves oblong obliquely notched, flowers 2–4 subracemose on a short peduncle from the leafing or leafless stems purple or white with purple tips and lip, sepals linear-oblong obtuse, petals much broader, mentum short broad, lip subsessile broadly ovate-oblong pubescent, margins recurved, base shortly convolute. *Paxt. Mag.* vii. t. 7; *Hartm. Parad.* i. t. 11; *Reichb. f. in Gard. Chron.* xvii. 366; *Williams Orchid. Alb.* t. 214; *Reichenbachia* ii. t. 58 (var. *Sandersiana*); *Veitch Man. Dendrob.* 63, *with fig.* and var. *nobilius*, 64. D. cœrulescens, *Wall. in Lindl. Sert. Orchid.* t. 18; *Bot. Reg. l. c.* D. Lindleyanum, *Griff. Notul.* iii. 309 (*excl. fig.*); *Lindl. in Journ. Linn. Soc.* iii. 13.

Eastern Himalaya; Sikkim, ascending to 5000 ft., *J. D. H.*; Bhotan, *Griffith.* The Khasia Mts., *Gibson*, &c.—Distrib. China.

Stems 1–2 ft. *Leaves* 3–4 in., coriaceous, "persistent for 2 years," *Veitch.* *Flowers* 2½–3 in. diam., variable in colour, almost racemose; bracts oblong, ¼ in.—A multitude of varieties have been described, and of hybrids especially with *D. heterocarpum* (see Reichb. f. in Gard. Chron. 1884, 338, 445, 576, and Veitch Man. Dendrob. 63).

121. **D. Parishii,** *Reichb. f. in Bot. Zeit.* 1863, 237; *Xen. Orchid.* ii. 140, t. 152; stems stout decurved, leaves oblong-lanceolate, bracts rather

large, flowers 1–3 on a short peduncle from the leafless stems rose-purple or white, lip with two maroon blotches, sepals oblong acuminate, petals broadly elliptic, mentum short obtuse, lip shortly clawed convolute with a small ovate obtuse tomentose and ciliate recurved limb. *Bot. Mag.* t. 5488; *Jennings Orchid.* t. 39; *Veitch Man. Dendrob.* 68.

UPPER BURMA, *Berkeley*. TENASSERIM, *Parish*.

Stems 6–12 in.; internodes $\frac{1}{2}$–$\frac{2}{3}$ in., when old contracted in the middle. *Leaves* 3–5 in., coriaceous. *Flowers* $1\frac{1}{2}$-2 in. diam.; pedicels 1 in.: bracts $\frac{1}{4}$ in.; limb of lip small compared with the tube; claw with a pit and transverse ridge. *Column* white, anther purple.

122. **D. rhodopterygium,** *Reichb. f. in Gard. Chron.* 1875, i. 684: stems terete decurved, leaves linear-oblong, bracts minute, flowers 1–3-nate on a short peduncle from the leafless stems rose-purple, lip with pale border, sepals oblong-lanceolate acute, petals ovate-lanceolate, lip with a cylindric convolute base streaked with purple and an orbicular erosely ciliate mouth rough or hispid on the disk. *Veitch Man. Dendrob.* 71. D. polyphlebium, *Reichb. f. l. c.* 1887, i. 702; *Warner Orchid. Alb.* vii. t. 299.

TENASSERIM; at Moulmein, *Boxall, Berkeley*.

Habit, leaves and inflorescence of *D. Parishii*, but bracts smaller, flowers much larger, 3 inches in diameter, of a paler rose-purple, often mottled with white, and lip with an orbicular mouth broadly or narrowly bordered with pale yellow, no maroon blotches, the disk not downy but rough, column white, anther purple.—Reichenbach suggests *polyphlebium* being a hybrid between *Pierardi* and *rhodopterygium*.

123. **D. Scortechini,** *Hook. f.*; stems long, leaves oblong-lanceolate obliquely notched, flowers solitary or 2-nate on the leafing stems waxy white, lip purple, peduncle stout, sepals lanceolate acuminate, petals broadly elliptic acute erose, mentum large broadly conical obtuse, lip rose-purple with a large ventricose tube and small acute limb tomentose towards the recurved fimbriate margin on both surfaces and closely veined.

PERAK, *Scortechini*.

Stems a foot and more, as thick as a goose-quill; internodes 1 in. *Leaves* 3 in., coriaceous. *Flowers* on the leafless upper part of the leafing stems, 3–$3\frac{1}{2}$ in. diam.; pedicels with ovary $1\frac{1}{2}$ in.; bracts small; sepals clawed, sometimes rose-pink, lip much deeper-cold.; column short, "anther dark purple with a 3-lobed top," *Ic. Scortechini*.

β. *Internodes swollen at the top* (*slightly in* D. gratiosissimum).

124. **D. pendulum,** *Roxb. Fl. Ind.* iii. 484; stems stout decurved, nodes subglobose, leaves linear-lanceolate, flowers 1–3-nate on the leafless stems stoutly pedicelled white or tips purple, lip with yellow disk, sepals linear-oblong subacute, petals much broader, mentum obscure, lip orbicular subcordate pubescent ciliolate. D. crassinode, *Bens. & Reichb. f. in Gard. Chron.* 1869, 164; 1870, 417; 1875, 93 (var. *albiflora*); 1876, 567 (var. *Barberiana*); *Bot. Mag.* t. 5766; *Warn. Orchid. Alb.* iv. t. 152; *Veitch Man. Dendrob.* 31, *with fig.* ? D. polyanthum, *Wall. Cat.* 2009; ? *Lindl. Gen. & Sp. Orchid.* 81; *in Bot. Reg.* 1844, *Misc.* 57. D. Wardianum, *Warner Sel. Orchid. Ser.* i. t. 19; D. melanophthalmum, *Reichb. f. in Gard. Chron.* 1869, 164; 1870, 417.

CHITTAGONG, *Roxburgh*. ARRACAN, *Benson*.—DISTRIB. Siam.

Stems 1–2 ft.; internodes ¾–1½ in., as broad at the nodes. *Leaves* 4–5 in., membranous. *Flowers* 2–2½ in. diam., variable in colour; pedicels 1–1½ in.—Wallich's specimens of *D. polyanthum* are indeterminable; they are from Burma, and quite like *D. pendulum*. I doubt if Lindley's is the same plant.

125. **D. Findlayanum,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 149; *in Gard. Chron.* 1877, i. 334; stems flexuous, internodes long clavate, leaves lanceolate, flowers 2 on a very short peduncle from the leafless stems very long pedicelled pale lilac, lip yellow, sepals oblong-lanceolate subacute, petals much broader, mentum subcylindric, lip shortly clawed orbicular from a short convolute base pubescent, tip acute. *Bot. Mag.* t. 6438; *Warner Orchid. Alb.* ii. t. 92; *Veitch Man. Dendrob.* 43.

BURMA; in the confines of Siam, *Findlay* (*Parish*).

Stems 1–2 ft.; internodes 1–2½ in., compressed, ¾ in. broad above the middle. *Leaves* 3–4 in., obtuse, acute or unequally notched. *Flowers* 3 in. diam., widely spreading; pedicels 2–3 in.; bracts short.

126. **D. Falconeri,** *Hook. Bot. Mag.* t. 4944; stems slender much branched pendulous, leaves small 1–3 in. narrow acute, flowers solitary on the subleafless stems rose-cold. or white with purple tips, lip purple and orange, sepals narrowly oblong acuminate, petals ovate-lanceolate, mentum incurved, lip broadly ovate acute or acuminate from a short convolute base, mouth undulate, margins recurved pubescent ciliate. *Lindl. in Gard. Chron.* 1856, 692; *Fl. des Serres*, t. 1197; *Belg. Hortic.* 1874, t. 15; *Floral Mag. N. S.* t. 226; *Ill. Hortic. N. S.* t. 243; *Linden.* i. t. 4; *Williams Orchid. Alb.* vi. t. 257 (var. *gigantea*); *Veitch Man. Dendrob.* 40; *Reichb. f. in Gard. Chron.* 1876, 688, 689 (var. *albidula*); 1879, 76 (var. *robusta*). D. Wardianum, *var.* assamica, *Jennings Orchid.* t. 2.

BHOTAN HIMALAYA, alt. 4000 ft.; ASSAM, KHASIA MTS., MUNNIPORE and UPPER BURMA.

Stems 2–3 ft., straggling; internodes ½–¾ in., contracted in the middle, striated. *Leaves* 1–4 in. *Flowers* 2–4½ in. diam., colour variable; pedicel 1–1½ in.; bracts large, membranous.—The var. *gigantea* rather resembles *D. Wardianum*, which may prove only a form.

127. **D. Wardianum**, *Warner Sel. Orchid.* i. t. 19; stems stout erect or pendulous, leaves 3–4 in. linear-lanceolate, flowers 1–2 on a very short peduncle from the leafless stems white or tips purple, lip ochreous with maroon blotches, sepals oblong acute, petals twice as broad, mentum rounded, lip clawed, mouth orbicular or ovate subcordate densely pubescent, margins recurved, base short convolute. *Ill. Hortic.* xxxvii. t. 277; *Floral Mag. N. S.* t. 212 (var. *Lowii*); *Williams Orchid. Alb.* iii. t. 113 (var. *gigantea*); *Reichenbachia* i. t. 9; *Reichb. f. in Gard. Chron.* 1876, ii. 460 (var. *candida*); *Veitch Man. Dendrob.* 83, *with fig.* D. Falconeri, var., *Bot. Mag.* t. 5058.

ASSAM, the KHASIA MTS. and BURMA.

Very near and perhaps only a form of *Falconeri*, from which it is difficult to distinguish some of the published drawings; stem stouter, sometimes 1 in. diam., not so nodose.—I have referred to this the *D. Falconeri*, var., sepalis petalisque obtusioribus, of Bot. Mag., which differs from the typical *Falconeri* (t. 4944) in the much stouter (though long and pendulous) stems, larger leaves, broader more obtuse sepals and petals, shorter lip with an orbicular limb, and much shorter anther.

128. **D. gratiosissimum,** *Reichb. f. in Bot. Zeit.* 1865, 99; *Xen. Orchid.* ii. 211, t. 193; stems slender pendulous striate, leaves ovate-lanceolate acute, flowers 1–2 on a short peduncle from the leafless stems long-pedicelled white with purple tips or purplish, disk of lip yellow, sepals oblong-lanceolate acute, petals broader, mentum short conical, lip orbicular or broadly ovate from a broad cuneate base entire undulate glabrous. *Veitch Man. Dendrob.* 47. D. Bullerianum, *Batem. in Bot. Mag.* t. 5652. D. Boxalli, *Reichb. f. in Gard. Chron.* 1874, 315; *Xen. Orchid.* ii. 212, t. 194; *Floral Mag.* 1874, t. 114; *Jennings Orchid.* t. 19; *Veitch l. c.* 24.

TENASSERIM; at Moulmein, *Parish*.

Stems 1–3 ft.; internodes 1–1½ in., slightly swollen upwards; sheaths purplish. *Leaves* 3–4 in. *Flowers* 2½ in. diam.; pedicels 1 in.; bracts small; lip white with a large circular golden disk, sometimes purple-spotted or -striated.—In Veitch's Manual the sepals and petals of *D. Boxalli* are described as equal and similar, but I find the petals to be much the broadest. In that work *D. gratiosissimum* and *Boxalli* are kept distinct, and *D. Bullerianum* referred to the latter. They all appear to me to be like forms of one species.

129. **D. Aphrodite,** *Reichb. f. in Bot. Zeit.* 1862, 246; stems branched, internodes long clavate, leaves linear-oblong subacute, flowers solitary on the leafless stems stoutly pedicelled pale primrose or white, lip orange and purple, sepals linear-oblong obtuse, petals ovate-oblong, mentum obscure, lip shortly clawed orbicular-ovate from a short convolute base pubescent entire, anther purple. *Veitch Man. Dendrob.* 17. D. nodatum, *Lindl. in Gard. Chron.* 1862, 177; *Bot. Mag.* t. 5470; *Flor. des Serres*, t. 1582.

TENASSERIM; at Moulmein, *Parish*.

Stem 1–2 ft.; internodes 1½ in. *Leaves* few, 2–3 in. *Flowers* 2 in. diam.; pedicel 1–1½ in.; bracts small, appressed, sometimes many and imbricate; lip bright orange with a broad pale border, and purple blotches on the tube.

§§ Flowers solitary, 2-nate or racemose. Lip fimbriate.

130. **D. Devonianum,** *Paxt. Mag.* vii. 169, *with fig.*; stems long pendulous, leaves linear-lanceolate acuminate, flowers 1–2 on a very short peduncle from the leafless stems white or pale yellow with purple-tipped sepals and lip, sepals lanceolate acute, petals broadly ovate ciliate, mentum saccate, lip orbicular-cordate from a short convolute base densely deeply fimbriate. *Bot. Mag.* t. 4129; *Lindl. in Bot. Reg.* 1844, *Misc.* 48; *Jard. Fleur.* t. 11; *Fl. des Serres* vii. t. 647; *Belg. Hortic.* iii. t. 31; *Ill. Hortic.* 1857, t. 145; *Warner Sel. Orchid* ii. t. 11; *Veitch Man. Dendrob.* 38, *with fig.* D. pictum, *Griff. fid. Lindl. in Journ. Linn. Soc.* iii. 12. D. pulchellum, *Lindl. l. c.* (*not of Lodd.*).

BHOTAN HIMALAYA, *Griffith*. ASSAM, the KHASIA and NAGA HILLS, and southwards to TENASSERIM.

Stems 2–3 ft., terete. *Leaves* 3–4 by ⅓ in. *Flowers* 3 in. diam.—Var. *Elliotliana*, Reichb. f. in Gard. Chron. 1876, i. 756, is described as having thicker sepals and denticulate petals.—Var. *rhodoneura*, R. f. l. c. 1868, 682, has shorter sepals, a rounded lip with violet veins, and an odour of *Patchouli*.—Var. *candidula*, R. f. l. c. 1876, i. 654, wants the purple tip.

131. **D. Dalhousieanum,** *Wall. mss. in Paxt. Mag.* xi. t. 115;

stems stout, leaves linear-oblong, base cordate, racemes 5–12-fld., flowers very large rosy or yellowish with crimson on the lip, sepals oblong acute, petals much broader, mentum rounded, lip shortly clawed orbicular-oblong, tip and sides densely glandular-villous, disk with 2 pectinate fringed lamellæ. *Lindl. in Bot. Reg.* 1836, t. 10; *in Journ. Linn. Soc.* iii. 18; *Flor. des Serres* vii. t. 698; *Ill. Hortic.* 1864, t. 423; *Warner Sel. Orchid.* i. t. 22; *Veitch Man. Dendrob.* 35, *with fig.* Dendrob. sp., *Griff. Ic. Plant. Asiat.* 308.

SIKKIM HIMALAYA, *J. D. H.* UPPER ASSAM, *Griffith.* ARRACAN to TENASSERIM.

Stems 3–4 ft., purple-spotted; internodes 1–1½ in. *Leaves* 4–6 in., obtuse or acute. *Flowers* 3½–5 in. diam., on leafing and leafless stems; bracts small.—Var. *Rossiana*, Reichb. f. in Gard. Chron. 1882, i. 796, is a large yellow-fld. var.

132. **D. tortile,** *Lindl. in Gard. Chron.* 1847, 797, *with fig.*; stems subfusiform compressed, leaves narrow retuse, racemes 3–6-fld. on leafless stems, flowers pale or rose-lilac, lip yellow, sepals and petals oblong undulate and twisted, mentum conical, lip subsaccate with a dilated orbicular everted erose limb pubescent and ciliate. *Bot. Mag.* t. 4477; *De Puydt Les Orchids* 54, *with fig.*; *Veitch Man. Dendrob.* 81; *Walp. Ann.* vi. 284.

CHITTAGONG and BURMA to TENASSERIM, *Lobb*, &c.

Stems 6–12 in., ¾ in. broad, grooved and ribbed. *Leaves* 3–4 in., subcoriaceous, recurved. *Flowers* 3–3½ in. diam.—Near *primulinum* and *Pierardi*, according to Veitch, with lip like *lituiflorum*.

** Mentum short. Lip calceolar (pyriform or hemispheric with inflexed margins). Flowers pink, coppery or yellow.

133. **D. Calceolaria,** *Carey in Hook. Exot. Flor.* t. 184; stems erect terete, leaves ovate-oblong to -lanceolate, flowers 6–15 in an elongate raceme from the leafing stems large many white or pink purplish or golden yellow, sepals elliptic-oblong, petals broader, mentum stout, lip calceolar pyriform or hemispheric with broadly incurved fimbriate margins. *Lindl. Gen. & Sp. Orchid.* 83; *De Puydt Les Orchid.* t. 15. D. moschatum, *Wall. in Don Prodr.* 34; *Pl. As. Rar.* ii. 83, t. 195; *Lindl. l. c.* 82; *in Bot. Reg.* 1844, *Misc.* 57; *in Journ. Linn. Soc.* iii. 8; *Bot. Mag.* t. 3837; *Paxt. Mag.* ii. t. 241 (*excl. syn. D. clavatum*); *Maund. Bot.* i. t. 37; *Hort. Parad.* ii. t. 2; *Veitch Man. Dendrob.* 61; *Warner Orchid. Alb.* t. 165 *var.* (cuprea); *Walp. Ann.* vi. 296. D. cupreum, *Herbert in Bot. Reg.* t. 1779. Epidendrum moschatum, *Ham. in Syme's Embassy*, iii. 315, *with fig.*

TROPICAL HIMALAYA; from Kumaon, *Strachey & Winterbottom*, eastwards to ASSAM and the KHASIA MTS., and southwards to TENASSERIM.

Stems 3–5 ft.; internodes 1–1½ in. *Leaves* 3–5 in., coriaceous, acute or unequally notched. *Flowers* 2½–3½ in. diam., odour musky or sweetish; perianth reticulate, extraordinarily variable in colour, especially the lip, which has fimbriate veins within, and often 2 large purple blotches.—The name *D. Calceolaria* (1823) is much the oldest.—The examination of a very extensive series of published and unpublished drawings of this plant convinces me that the names quoted above are all referable to our plant, which is so variable that to attempt a definition of its varieties would be impossible in this work.

134. **D. chrysocrepis,** *Parish & Reichb. f. in Bot. Mag.* t. 6007; *in Trans. Linn. Soc.* xxx. 150; stems subclavate above, leaves lanceolate, flowers on the leafless stems solitary or shortly peduncled golden yellow,

sepals oblong subacute, petals broadly obovate, mentum short, lip pyriform calceolar villous, disk rufously villous within. *Veitch Man. Dendrob.* 29.

TENASSERIM; at Moulmein, *Parish.*

Stems 6–10 in.; internodes sometimes 2 by $\frac{1}{3}$ in. and flattened. *Leaves* 2–3 in., acute or unequally notched. *Flowers* $1\frac{1}{2}$ in. diam., resupinate; pedicel $\frac{3}{4}$ in.—The flowers are those of a small *D. Calceolaria*, but are solitary on leafless stems.

*** Mentum short. Lip not calceolar. Stem often swollen at the very base. Flowers golden yellow (or pale pink in *D. Farmeri*. Mentum long in *D. lamellatum*).—*Xanthina* or *Holochrysa.*

† Stem terete (not clavate). Flowers racemose.

§ *Lip fimbriate.* (*See also* D. Gibsonii.)

135. **D. fimbriatum,** *Hook. Exot. Fl.* t. 71; leaves lanceolate acuminate, racemes usually on leafing stems pendulous, flowers many orange-yellow, sepals and erose petals subequal, mentum short, lip orbicular equally deeply fringed, base truncate. *Wall. Cat.* 2001; *Lindl. Gen. & Sp. Orchid.* 83 (not 76); *Paxt. Mag.* ii. 172; *Fl. Gard.* iii. t. 84; *Veitch Man. Dendrob.* 42, *with fig.*; *Jard. Fleur.* t. 314; *Flor. Cab.* t. 109; *Warner Sel. Orchid. Ser.* 2, t. 19; *Walp. Ann.* vi. 293.—Dendrob. sp., *Griff. Notul.* iii. 113.

SUBTROPICAL HIMALAYA, from Kumaon, alt. 5500 ft., *Strachey & Winterbottom*, eastwards, to the KHASIA HILLS, MUNNIPORE, ARRACAN and BURMA.

Stems 4–5 ft., base swollen. *Leaves* 6 in. *Racemes* 7–12-fld.; flowers 2–3 in. diam.; bracts small.

VAR. *oculata*, Hook. Bot. Mag. t. 4160; stems stouter deeply grooved, leaves 6–8 in. strongly nerved, lip with a deep purple blotch. *Ill. Hortic.* 1, t. 15; *Warner Sel. Orchid.* ii. t. 19. D. Paxtoni, *Paxt. Mag.* vi. 169 (*not of Lindl.*); *Fl. des Serres* vii. t. 725.

136. **D. Hookerianum,** *Lindl. in Journ. Linn Soc.* iii. 8; stems terete, leaves oblong-lanceolate acuminate, racemes on leafing stems pendulous lax-fld., flowers very large golden, lip with 2 purple blotches, sepals and entire petals subequal, mentum rounded, lip orbicular deeply equally fringed, base cuneate. *Bot. Mag.* t. 6013; *Reichb. f. in Gard. Chron.* 1857, 616; *Veitch Man. Dendrob.* 49. D. chrysotis, *Reichb. f. l. c.* 1870, 1311; *Ill. Hort.* 1873, t. 155; *Warner Sel. Orchid. Ser.* 3, t. 6; *Flor. & Pomol.* 1871, 145, *with fig.*

TROPICAL SIKKIM HIMALAYA, *J. D. H.* ASSAM and the KHASIA HILLS, alt. 2–5000 ft., common.

Stems 6–8 ft., base swollen. *Leaves* 2–6 in. *Flowers* 3–4 in. diam.; bracts short, rounded; pedicel with ovary $1\frac{1}{2}$ in. *Capsule* 3 in., fusiform.

137. **D. Brymerianum,** *Reichb. f. in Gard. Chron.* 1875, ii. 323; 1876, i. 366; 1879, i. 475, fig. 65; 1881, ii. 689, fig. 140; stems terete, leaves lanceolate acuminate, racemes on leafless stems 2–3-fld., flowers large yellow, sepals oblong-lanceolate, petals linear-oblong entire, mentum obscure, lip 3-lobed deeply fimbriate, base subcordate, fimbriæ of the oblong midlobe much longer than the limb. *Bot. Mag.* t. 6383; *Flor. Mag. N. S.* t. 459;

Veitch Man. Dendrob. 24, *with fig.*; *Lindenia* iv. t. 183; *Gartenfl.* 1883, t. 371; 1887, t. 183, 548; *Orchidoph.* 1881, t. 148. ? D. criniferum, *Lindl. in Bot. Reg.* 1844, *Misc.* 55; *Walp. Ann.* vi. 303.

Burma, *Berkeley.*

Stems 1–2 ft., narrowed below, sulcate, old subfusiform. *Leaves* 4–5 in., 5–7-nerved. *Raceme* erect; sheaths short, lower not tubular; pedicels stout, 1½–2 in. (with the ovary); flowers 3 in. diam., often triandrous.—The leaves are stated in Veitch's Manual to be persistent, but in the native specimens the flowers are on leafless stems.—Var. *histrionica,* Reichb. f. l. c. 1888, i. 104; Veitch l. c. 25 has more fusiform stems, smaller flowers with much shorter fimbriæ on the lip or 0. Of Lindley's *D. criniferum,* supposed, but erroneously, to be from Ceylon (an island credited with Orchids as natives, which were no doubt sent from its Bot. Gardens there), nothing is known beyond the description, which differs from that of *Brymerianum* in the branched stem.

138. **D. moulmeinense,** *Parish mss.*; stems slender, leaves (narrowly linear-lanceolate, *Parish*), flowers on the leafless stems lower racemose upper 1–2 on a short peduncle, pedicels slender, bracts ovate concave, sepals oblong-lanceolate acute, petals elliptic acute erose, mentum subcylindric obtuse, lip large broader than long flabellately orbicular expanded sessile, base cuneate pubescent above glabrous beneath fimbriate all round.

Tenasserim; at Moulmein, *Parish.*

Stems about as thick as a duck's quill; internodes 1 in. *Flowers* 1¼–2 in. diam., membranous; rachis of 2–4-fld. raceme ¾ in., slender, base with a lunate sheath; bracts ⅛ in., thin; sepals and petals pale yellow ?, lip primrose-yellow with spotted bars at the very shortly convolute base; column very short.

§§ *Lip with the margin entire or erose* (*subfimbriate in* D. Gibsonii).

139. **D. Gibsonii,** *Lindl. in Paxt. Mag.* v. 169; *Fl. Gard.* ii. 133, fig. 204; stems slender, leaves lanceolate acuminate, racemes many-fld. pendulous, basal sheaths tubular, flowers orange-yellow, lip with 2 brown spots, sepals suborbicular, petals broader entire, mentum short, lip suborbicular cochleate villous obtuse, margins everted subfimbriate, base cuneate. *Veitch Man. Dendrob.* 47; *Walp. Ann.* vi. 293. D. fuscatum, *Lindl. in Journ. Linn. Soc.* iii. 8; *Bot. Mag.* t. 6226.

Sikkim Himalaya, *J. D. H.*; Assam, the Khasia Mts. and Burma, common.

Near *D. fimbriatum*, but stems shorter and more slender, flowers smaller, petals not erose, lip broader, margins rather villous than fimbriate.

140. **D. dixanthum,** *Reichb. f. in Gard. Chron.* 1865, 674; 1883, i. 814; stems long slender, leaves linear-lanceolate, racemes on the leafless stems often whorled 2–5-fld., flowers golden yellow, sepals oblong subacute, petals broader obtuse ciliolate, mentum subglobose, lip dilated from the 2-auricled base flat puberulous ciliolate. *Bot. Mag.* t. 5564; *Veitch Man. Dendrob.* 39.

Tenasserim; at Moulmein, *Parish, &c.*

Stems 2–3 ft., smooth. *Leaves* 4–6 by ⅓ in., erect, caducous. *Racemes* 3–4 at each node; bracts minute; peduncle and pedicels slender; flowers 1½ in. diam.; lip darker than the sepals, minutely barred with red at the base.

141. **D. clavatum,** *Wall. Cat.* 2004; stems stout slightly clavate, leaves linear-oblong obtuse, racemes on the leafless stems short few-fld., flowers large ochreous yellow, lip paler with blood-red disk, bracts large,

sepals linear-oblong, petals much broader, mentum short, lip with a short convolute base and transversely oblong pubescent limb, margin recurved erose. *Lindl. in Paxt. Fl. Gard.* ii. 104, fig. 189; *Bot. Mag.* t. 6993; *Walp. Ann.* vi. 293.

TROPICAL HIMALAYA; from Kumaon eastwards. KHASIA HILLS, alt. 5–6000 ft., *Mann.*

Stems 1½–2½ ft., as thick as the finger. *Leaves* 3–5 in., coriaceous. *Racemes* with membranous oblong tubular sheaths; flowers 2–2½ in. diam., glossy; petals suborbicular. *Capsule* 2 in., fusiform.

142. **D. binoculare,** *Reichb. f. in Gard. Chron.* 1869, 785; stems slender, leaves lanceolate acuminate, racemes ascending, bracts very small, flowers small coppery orange with 2 maroon spots on the lip, sepals elliptic-oblong, petals obovate, lip clawed reniform pubescent plicately denticulate or crenate, disk concave. *Veitch Man. Dendrob.* 23.

PEGU; hills east of Prome, *Benson.*

A little known plant, differing, according to Veitch, from *D. fuscatum* (*Gibsonii*) by its more slender stems, smaller leaves and flowers (½ in. diam.), and differently shaped lip.

†† Stem terete (not clavate). Flowers solitary or 2–3. (See also *D. aggregatum.*)

143. **D. chrysanthum,** *Wall. Cat.* 2012; stems pendulous, leaves lanceolate acuminate, flowers 2–4-nate on an obscure leaf-opposed peduncle fleshy yellow, lip with a blood-red spot, sepals broad concave, petals orbicular fimbriate, mentum broad crested, lip clawed orbicular from a cuneate base villous, margins toothed or subfimbriate, everted. *Lindl. Gen. & Sp. Orchid.* 80; *in Journ. Linn. Soc.* iii. 8; *in Bot. Reg.* t. 1299; *Gartenfl.* t. 446; *Trans. Hort. Soc. Russ.* 1864, t. 154; *Veitch Man. Dendrob.* 28. D. Paxtoni, *Lindl. in Bot. Reg.* 1839, *Misc.* 56 (*not of Paxt. Mag.*); *Fl. des Serres* vii. t. 725.

TROPICAL HIMALAYA, from Nepal eastwards, alt. 2–5000 ft. KHASIA HILLS, *Griffith.*

Stems 5–7 ft., ribbed, leafy throughout; internodes short; sheaths large, cupular. *Leaves* 4–7 in., 5-nerved. *Flowers* 1½–2 in. diam., waxy; back of petals subcristate; pedicel with ovary 1½–2½ in.; bracts small, ovate, acute. *Capsule* 2 in., subclavate.—In Veitch's Manual the flowers are described as 4–6 and racemose, but in the native specimens they are 2–4 and hardly racemed.—Vars. *anophthalma*, Reichb. f. in Gard. Chron. 1883, i. 44, has an unspotted lip, and *microphthalma* Reichb. l. c. 1879, i. 366, has sepals without dorsal crests, petals subserrate or very shortly fimbriate.

144. **D. Harveyanum,** *Reichb. f. in Gard. Chron.* 1883, 624; stems short fusiform, leaves 2–3 ovate-oblong, flowers 3 or more on a short lateral peduncle (yellow), sepals lanceolate acute, petals larger oblong fimbriate, mentum short retuse, lip orbicular concave papillose fringed. *Veitch Man. Dendrob.* 48.

BRITISH BURMA (*Liverpool Hortic. Association*).

Stems 6–9 in. or less. *Flowers* 2 in. diam., bright canary-yellow; petals fimbriate as in *D. Brymerianum*, but less so.—I have seen no specimens.

145. **D. ochreatum,** *Lindl. in Wall. Cat.* 7410; *in Bot. Reg. under*

t. 1765; stems short stout decumbent, leaves ovate-lanceolate acuminate, flowers 2-nate on a leaf-opposed peduncle golden yellow, disk of lip blood-red, sepals oblong obtuse, petals larger quite entire, mentum stout, lip with a convolute claw and orbicular concave blade pubescent, margins revolute erose. *Veitch Man. Dendrob.* 66; *Walp. Ann.* vi. 287. D. Cambridgeanum, *Paxt. Mag.* vi. t. 265; *Lindl. in Bot. Reg.* 1841, *Misc.* 171; *Bot. Mag.* t. 4450.

KHASIA MTS., *Griffith*, &c. CHITTAGONG, *Wallich.*

Stems 6–9 in., internodes contracted in the middle; sheaths inflated. *Leaves* 4–5 in., base very unequal, subcordate, twisted. *Flowers* 3 in. diam.; pedicel with ovary 1–1½ in.

146. **D. chryseum,** *Rolfe in Gard. Chron.* 1888, i. 233; stems slender erect, leaves few linear-oblong, tip notched, flowers on the leafless stems solitary or in short sheathed racemes orange-yellow, bracts large sheathing, sepals oblong-lanceolate acuminate, petals broader, mentum conical, lip broadly clawed orbicular from a cuneate base pubescent subfimbriate.

BHOTAN HIMALAYA (*Ic. in Herb. Calcutt.*). ASSAM (*Hort. Veitch*). SYLHET, *Melville* (*Ic. Jerdon in Herb. Kew*).

Stems 1–2 ft., rather slender. *Leaves* 3–4, subterminal. *Flowers* 1½ in. diam; bracts ½–¾ in., sheathing; lip with sometimes faint crimson streaks at the base.

147. **D. normale,** *Falc. in Ann. Nat. Hist.* iii. 196 (*name only*); stems terete, leaves linear-lanceolate acuminate, flowers 2–3 subracemose on a lateral peduncle with tubular basal sheaths golden yellow, sepals equal ovate acute entire, petals and lip all equal and similar larger than the sepals broadly ovate acute serrulate, column monstrous. *Griff. Notul.* iii. 255; *Ic. Pl. Asiat.* t. 284; *Lindl. in Journ. Linn. Soc.* iii. 10.

WESTERN HIMALAYA; Garwhal, alt. 3–6000 ft., *Falconer, Thomson.*

Stems 12–16 in., sulcate; internodes 1–1½ in. *Leaves* 4–5 in., thin. *Peduncle* or *rachis* 1–1½ in., pedicels ½ in., bracts small membranous; flowers 1½ in. diam.; sepals and petals suberect.—It can hardly be but that this evidently monstrous form is a state of some better known plant, but I fail to detect its origin.

††† Stem clavate.

§ *Flowers racemose or* 1–2 *in form of* D. aggregatum. *Petals in all but* lamellatum *broader than the sepals.*

148. **D. densiflorum,** *Wall. Cat.* 2090; stems narrowly clavate pendulous terete or 4-angled, leaves subterminal acute, flowers many crowded in decurved racemes white or yellow, lip orange, bracts very large membranous, sepals obtuse, petals broader erose, mentum large subglobose, lip large funnel-shaped hippocrepiform retuse in front pubescent serrulate. *Lindl. in Wall. Pl. As. Rar.* i. 34, t. 40; *Gen. & Sp. Orchid.* 90; *in Bot. Reg.* t. 1828; *in Journ. Linn. Soc.* iii. 7; *Paxt. Mag.* v. 121; *Bot. Mag.* t. 3418 and t. 5780 (var. *albo-lutea*); *Fl. des Serres*, t. 1397; *Warner Sel. Orchid. Ser.* 3, t. 21 (var.); *Orchid. Alb.* vi. t. 303; *Veitch Man. Dendrob.* 37. D. clavatum, *Roxb. Fl. Ind.* iii. 481. D. thyrsiflorum, *Reichb. f. in Ill. Hortic.* xxii. t. 207; *Gartenfl.* t. 1021; *Flor. Mag. N. S.* t. 449; *Veitch Man. Dendrob.* 80, *with fig.*; *Gard. Chron.* 1877, i. 653, fig. 105; *Lindenia* i. t. 46. Epidendrum Dumunsattei, *Herb. Ham.*

TROPICAL HIMALAYA; from Nepal eastwards to the KHASIA HILLS, and southwards to TENASSERIM.

Stems 12–18 in. *Leaves* subterminal, 4–6 in. *Flowers* 2 in. diam.; pedicel with ovary ½–¾ in.; bracts twisted and revolute, strongly nerved. *Capsule* 3 in.—Veitch observes that almost the only characters of *thyrsiflorum* are the terete more slender stems and white sepals and petals; he refers to it the var. *albo-lutea* of Bot. Mag. He has a var. *Walkeriana* (Warner Sel. Orchid. iii. t. 21) with longer stems and racemes and larger flowers; also a var. *Schroederi* (Flor. Mag. t. 502) of true *densiflorum*, with looser racemes, larger flowers, french white petals and sepals, and pale yellow anterior margin of the lip.

149. **D. sulcatum,** *Lindl. in Bot. Reg.* 1838, t. 65; stems stout compressed grooved, leaves subterminal oblong acuminate, flowers many in short racemes from the leafless stems (dull orange or paler), bracts minute, sepals oblong obtuse and rather broader obovate, petals concave, mentum broad, lip broadly ovate hirsute, base saccate convolute, margins ciliate revolute. *Bot. Mag.* t. 6962; *Veitch Man. Dendrob.* 76; *Rolfe in Gard. Chron.* 1887, i. 607.

KHASIA HILLS, *Gibson*, &c.

Stems 6–10 in.; internodes about 6, compressed, green. *Leaves* 4–8 in., coriaceous, 3-nerved. *Flowers* 1 in. diam.; sepals and petals erect.

150. **D. Griffithianum,** *Lindl. in Bot. Reg. under* t. 1756; stems elongate clavate grooved, leaves oblong-lanceolate obtuse, flowers many in pendulous racemes white or yellow, lip orange, bracts small, sepals ovate-lanceolate acute spreading, petals broader ciliolate, mentum rather long incurved, lip orbicular papillose, base convolute, margin denticulate. *Reichb. f. in Gard. Chron.* 1877, i. 590; *Veitch Man. Dendrob.* 48. D. aggregatum, *Wall. Cat.* 7411 B.

BURMA; at Chappedong, *Wallich, Griffith.*

Stems 12–18 in., obscurely 4-angled, base very slender. *Leaves* few, 3½ by 1½ in., very coriaceous. *Flowers* 1½–2 in. diam.

VAR. *Guibertii,* Veitch l. c; stems more abruptly narrowed below, leaves broadly elliptic, racemes longer, flowers larger brighter-coloured. D. Guibertii, *Carriere in Rev. Hortic.* 1876, t. 431; *Ill. Hortic. N. S.* t. 258; *De Puydt Les Orchid.* t. 16.

151. **D. lamellatum,** *Lindl. Gen. & Sp. Orchid.* 89; stems short pyriform flattened, leaves few ovate subacute, flowers 3–5 in a short drooping raceme yellow, bracts minute, sepals ovate apiculate suberect, petals smaller obovate, mentum long flattened, lip clawed cuneate truncate erose, disk many-grooved. D. compressum, *Lindl. in Bot. Reg.* 1842, *Misc.* 76; 1844, t. 53; *Walp. Ann.* vi. 307. Onychium lamellatum, *Blume Bijd.* 526, fig. 10.

TENASSERIM; at Moulmein, *Parish.* PERAK, *Scortechini, King's Collector.*—DISTRIB. Borneo.

Stems 3–4 by 1¼ in., proliferously branched; internodes 3–4. *Leaves* 1–1½ in.; sheaths very short, broad. *Flowers* ¾ in. long, yellow in Ic. Bot. Reg.; petals white in Ic. Herb. Kew of Bornean plant; flower pale pink with white petals in Ic. Parish. —This is by error described as a native of Ceylon; if imported from that country, it was doubtless from the Bot. Gardens there.

152. **D. aggregatum,** *Roxb. Fl. Ind.* iii. 477; stems fusiform, leaf solitary oblong, tip notched, flowers 1–2 or many in a loose drooping

lateral raceme (yellow), bracts minute, sepals small ovate obtuse spreading, petals much broader ovate, base cuneate, mentum subglobose, lip shortly clawed transversely oblong from a short subconvolute base, disk concave pubescent, margin quite entire ciliolate. *Lindl. in Wall. Cat.* 7411 A; *in Bot. Reg.* t. 1695; *Bot. Mag.* t. 3643; *Paxt. Mag.* vi. t. 145; *Veitch Man. Dendrob.* 15. D. Lindleyi, *Steud. Nomenc.* i. 490. D. Jenkinsii, *Wall. in Bot. Reg.* 1839, t. 37; *Warn. Sel. Orch.* ii. t. 28; *Veitch l. c.* 50; *Walp. l. c.* 307.

ASSAM, *Jenkins*; ARRACAN, MARTABAN, TENASSERIM and PERAK.—DISTRIB. S. China.

Stems 1½–2 in., angled. *Leaf* 2–3 by 1 in. *Raceme* from the axil of a small scale; flowers at first primrose, at length orange, 1½ in. diam.; column yellow. *Capsule* 4 in., fusiform.—A plant now flowering at Kew shows both *aggregatum* and *Jenkinsii* in the same clump.

153. **D. chrysotoxum,** *Lindl. in Bot. Reg.* 1847, *under* t. 19 and t. 36; stems short grooved, leaves 2–8 oblong to lanceolate, tip 2-fid, flowers many in lateral slender decurved racemes (golden, lip orange streaked or blotched with red), sepals oblong obtuse, petals twice as large, mentum rounded, lip orbicular pubescent, base convolute, margin pectinately fimbriate. *Bot. Mag.* t. 5053; *Ill. Hortic.* 1858, t. 164; *Veitch Man. Dendrob.* 29; *Benson in Gard. Chron.* 1870, 796; *Walp. Ann.* vi. 305. D. suavissimum, *Reichb. f. in Gard. Chron.* 1874, 406; *Xen. Orchid.* iii. 2, t. 202; *Warn. Orchid. Alb.* t. 13.

ARRACAN and BURMA, on the hills and plains.

Stems 3–15 in., very variable, from subglobose to narrowly clavate. *Leaves* 3–4 in., coriaceous. *Racemes* 6–9 in.; flowers 2 in. diam.—*D. suavissimum* is regarded by Veitch as a variety with shorter stouter stems and broader leaves.

154. **D. Farmeri,** *Paxt. Mag.* xv. 241, *with fig.*; *Fl. Gard.* iii. 104; stems erect clavate 4–5-grooved, leaves 2–4 elliptic or oblong, flowers many in lax pendulous lateral racemes golden or pink with yellow lip, bracts small, sepals ovate-oblong, petals much broader, mentum rounded, lip shortly clawed orbicular with lateral inflexed folds pubescent, margin erose. *Bot. Mag.* t. 4659; *Fl. des Serres* vii. t. 741; *Jard. Fleur.* t. 307; *Pescatorea* i. t. 4; *Gartenfl.* t. 595; *Jennings Orchid.* t. 24; *Veitch Man. Dendrob.* 42, *with fig.* D. densiflorum, *var.* Farmeri, *Regel Gartenfl.* t. 788.

TROPICAL EASTERN HIMALAYA, and ASSAM to BURMA.

Stems 10–18 in., 4-angled, base slender. *Leaves* 4–8 in., coriaceous, striate. *Flowers* 2 in. diam., variable in colour, sepals and petals usually pink or golden yellow tinged with pink, disk ochreous.—There are two principal varieties; *aureo-flava*, Bot. Mag. t. 5451; Williams Orchid. Alb. iii. t. 99; and *albiflora*, Belg. Hortic. 1860, t. 21; Gartenfl. 1868, t. 595; Fl. des Serres 1882, t. 2461.

155. **D. palpebræ,** *Lindl. in Journ. Hort. Soc.* v. 33; stems clavate 4-angled, leaves 3–5 oblong-lanceolate acute, flowers in loose lateral racemes (white or rose, disk of lip orange), bracts small, sepals oblong, petals broader clawed ciliolate, mentum rounded, lip oblong softly downy, base shortly clawed convolute and villously fringed. *Paxt. Fl. Gard.* i. 48; *Veitch Man. Dendrob.* 67.

SIKKIM HIMALAYA; in the Teesta Valley (*Ic. in Herb. Calcutt.*). BURMA, *Lobb, Berkeley.*

Stems 7–9 in. *Leaves* 4–6 in. *Flowers* 1½–2½ in. diam., faintly fragrant.—Near *D. densiflorum*, but bracts very different. Nearer *D. Griffithianum*, but mentum short.

156. **D. capillipes,** *Reichb. f. in Gard. Chron.* 1867, 997; *Xen. Orchid.* ii. 164, t. 169; stem very short fusiform, leaves 1–2 lanceolate acute, flowers 1–4 on a capillary lateral peduncle golden yellow, bracts small lanceolate, sepals small oblong-lanceolate, petals much broader, mentum short, lip with a convolute base and reniform retuse undulate limb. *Veitch Man. Dendrob.* 26.

BURMA; on hills N. of Thayetmyo, *Parish.*

Stem 2–6 in., 3–4-nodal. *Leaves* small, lanceolate. *Lip* with a deep orange blotch; anther elongate, conico-pyramidal.

Var. *elegans*, Reichb. f. in Gard. Chron. 1880, i. 743; stems taller, base of lip dark orange.

157. **D. senile**, *Parish & Reichb. f. in Gard. Chron.* 1865, 434; pseudobulb short subclavate and 2–3 leaves softly hairy, flowers lateral solitary or 2-nate long-pedicelled golden, bracts minute, sepals lanceolate acute, petals broader, mentum rounded, lip broadly ovate obscurely 3-lobed, side lobes rounded, midlobe ovate obtuse, disk puberulous, margins quite entire glabrous. *Xen. Orchid.* ii. 143, t. 155; *Bot. Mag.* t. 5520; *Veitch Man. Dendrob.* 74.

TENASSERIM; at Moulmein, *Parish.*

Stems 2–4 in.; internodes 4–6, ½–1 in. *Leaves* 2–3 in., flat, subacute, subfalcate. *Flowers* 2 in. diam., ochreous between the side lobes of the lip.

158. **D. trigonopus,** *Reichb. f. in Gard. Chron.* 1887, ii. 682; stem short and leaves at first and sheaths hispidulous, leaves 1–3 subterminal, peduncle 1-fld. (? always), flowers yellow, ovary trigonous, sepals ligulate acuminate, petals shorter broader, mentum obtuse, lip clawed dilated 3-fid, side lobes quadrate and semi-orbicular, midlobe denticulate, disk very rough.

BURMA (*Hort. Low*).

Stem at length sulcate. *Leaves* oblong-ligulate. *Flowers* larger than *D. Cambridgeanum*, as thick in texture as in *Vanda tricolor*. *Lip* yellow, with a row of red transverse lines superposed on each side of the disk between the side lobes, and a green area on the midlobe.—Descript. from the author.

SPECIES UNKNOWN TO ME, AND AN ERRATUM.

D. ACROBATICUM, *Reichb. f. in Gard. Chron.* 1871, 802; stems with stalked bulbs on the opposite sides, leaves oblong-ligulate, racemes lateral few-fld. at the top, flowers yellowish, sepals ligulate obtuse, petals oblong with a bigibbous callus at the base within, lip rhombic obtuse-angled, claw with a transverse callus, disk minutely velvety, column hatchet-shaped on each side.—TENASSERIM (*Hort. Veitch*).—Reichenbach says of this, "Near *D. polyanthum*, Lindl.," but Lindley's *polyanthum* is a very doubtful plant, and not Wallich's. Of the growth he says, "One stalked bulb comes out of the side of the first, and the third very high up on the opposite side."

D. AURANTIACUM, *Reichb. f. in Gard. Chron.* 1887, ii. 98. I regret having omitted to compare *D. chryseum*, Rolfe (p. 748, No. 146), with Reichenbach's previously published description of *aurantiacum*, of which there are no specimens at Kew. I have now done so with Mr. Rolfe, and we are convinced that the name *chryseum* must give place to *aurantiacum*, Reichb. f.

D. CREPIDATUM, *Griff. Notul.* iii. 319 (*not of Lindl.*). Of Griffith's description Lindley rightly says, in *Journ. Linn. Soc.* iii. 21, "It is so confused and self-contradictory that I have not been able to identify the species."

D. FLORIBUNDUM, *Don Prodr.* 34; stem few-leaved, leaves linear nerved very finely serrulate, scape 6–12 in. longer than the leafing stems sheathed many-fld., flowers rose-cold., sepals lingulate obtuse flat, base elongate, petals oval-oblong, lip

oval flattish obtuse reticulate bearded erosely serrulate yellow above.—NEPAL, *Wallich*.—This must be in Wallich's collection, but I fail to recognize it.

D. FUGAX, *Reichb. f. in Gard. Chron.* 1871, 1257; pseudobulbs 1–2 in. stipitate short fusiform 1-leaved, leaves 5 by 1 in. cuneate-ligulate obtusely acute, flowers terminal subsolitary membranous fugacious (yellow, lip white with purple and yellow marks), dorsal sepal ligulate acute, lateral subequal broader, petals much narrower, mentum rectangular, lip dilated from a cuneate base, side lobes obtuse-angled, midlobe clawed abruptly hastate flabelliform dilated emarginate retuse, sides undulate, two membranous keels run from the base to the top of the claw crenulate and lobulate in front, column very short.—INDIA (*Hort. Day*).—The flowers last but a few minutes.—Descript. from the author, l. c., who says it is near *convexum*, Lindl., and *xantholeucum*, R. f.

D. HUGHII, *Reichb. f. in Gard. Chron.* 1882, ii. 764; stems slender, leaves linear acuminate, flowers solitary (2–3 ?) fleshy like those of *D. revolutum*, pure white with a sulphur wart on the disk of the lip, sepals ligulate acute, petals oblong rhombic, mentum conico-cylindric, lip subrhombic from a cuneate base, lower half narrower constricted and angled in the middle, upper subcordate obtusely acute, lamellæ in the outer margin free obtuse-angled extrorse and incumbent on the surface, column broader above.—SINGAPORE, *H. Low*.—Near *revolutum*, but leaves thinner grassy.—*Descript. from the author, l. c.* Said to be a form of *D. crumenatum*.

D. LEUCOCHLORUM, *Reichb. f. in Gard. Chron.* 1879, i. 202; pseudobulb cylindric channelled thickish stipitate, raceme 1–2-fld., sepals triangular, petals as long oblong acute, mentum conical, lip 3-lobed in the middle, side lobes obtuse, midlobe produced broad retuse, disk muricate between the side lobes, column short.—TENASSERIM, at Moulmein (*Hort. Veitch*).—Flowers as large as *D. sphegidoglossum*, white, mentum green, lip white, yellow green without, side lobes with purple lines.—*Descript. from the author, l. c.*

D. PARVIFLORUM, *Don Prodr.* 34; stem 1 in., leaves few $1\frac{1}{2}$ in. lanceolate acute, raceme $\frac{1}{2}$–2 in. peduncled many-fld., bracts lanceolate shorter than the straight pedicels, flowers small ochroleucous, lip oblong obtuse concave crenulate, sepals and petals subequal lanceolate, base hardly saccate.—NEPAL, *Wallich*.—Perhaps an *Eria*; it must be in Wallich's collection, but I do not recognize it.

D. PRÆCINCTUM, *Reichb. f. in Gard. Chron.* 1871, 750; stems subterete grooved, leaves narrow cuneate-ligulate 2-toothed, peduncle 2-fld., sepals ligulate obtusely acute, petals rhombic obtuse, mentum large obtuse-angled dorsally gibbous, lip cuneate dilated 3-fid ciliate, side lobes linear-ligulate obtuse, midlobe ligulate produced velvety with crests and threads, disk with 3 angled keels, column with a triangular excavate base.—Imported with *D. Devonianum* (*Hort. Veitch*).—Stem obscurely olive-green, sheaths ashy white, flowers yellow-white, sepals and petals margined with purple, lip yellow and orange, column sulphur.—*Descript. from the author, l.c.*

D. VEXABILE, *Reichb. f. in Gard. Chron.* 1881, i. 271, is a doubtful species or hybrid, something like *D. Ruckeri*, very imperfectly described. It was seen by Prof. Reichenbach in Low's nursery amongst a multitude of *D. luteolum*.—Nothing further is known of it.

9. BULBOPHYLLUM, *Thouars.*

Pseudobulb from a creeping rhizome (rarely 0), 1- very rarely 2-leaved. *Scape* from the base of the pseudobulb, rarely distant from it. *Flowers* solitary, capitate, umbelled, spicate or racemose. *Sepals* subequal, or the dorsal rather shorter (rarely only half as long), lateral adnate to the foot of the column. *Petals* various, usually much smaller than the dorsal sepal. *Lip* jointed on the foot of the column, mobile, usually very small and strongly recurved. *Column* very short, often 2-aristate at the top; anther 2-celled; pollinia 4 (2 rarely suppressed).—Species about 100, tropical and subtropical, chiefly Asiatic, a few African, American and Australian.

A polymorphous genus, of which § III. A resembles *Sarcopodium* of *Dendrobium*, but differs in its mobile lip, and scape lateral on the pseudobulbs.—See under *Cirrhopetalum* for further remarks.

Sect. I. EPICRIANTHES. *Rhizome* creeping, pseudobulbous. *Flowers* solitary, axillary, very shortly pedicelled. *Petals* represented by 6–7 elongate narrowly strap-shaped stipitate pendulous mobile threads.—Epicrianthes, *Blume.*

1. **B. Epicrianthes,** *Hook. f.*; Epicrianthes javanica, *Blume Bijd.* 306 (Epicranthes); *Fl. Jav. Præf.* vi.; *Lindl. Gen. & Sp. Orchid.* 61; *Miquel Fl. Ind. Bat.* iii. 654.

TENASSERIM; at Moulmein, *Parish.*—DISTRIB. Java.

Rhizome ascending, as thick as a crow-quill; pseudobulbs ½ in., narrow. *Leaf* 1 in., sessile, elliptic-oblong, acute, coriaceous. *Scape* ¼ in., 1-fld.; bracts lanceolate; flowers green and red; sepals about ¼ in., subequal, ovate-lanceolate, spreading; threads of petals nearly as long; lip sessile, ovate-lanceolate, acute, warted, base 2-lobed; column truncate.—Described from a drawing and notes of Parish. I assume he is right in referring his plant to Blume's *E. javanica*; he describes the threads of the petals as 6, in threes, membranous, Blume as 7, fleshy. There being a *Bulb. javanicum*, I have adopted the generic name for the specific.

Sect. II. OXYSEPALA. *Stems* many from a rooting base, densely tufted, very slender, pendulous, much branched, clothed with scarious silvery sheaths; pseudobulbs few, minute, ovoid. *Flowers* very small, solitary or 2-nate on a very short scape which is concealed by the sheaths; bracts cymbiform. *Sepals* very slender, connivent.

2. **B. clandestinum,** *Lindl. in Bot. Reg.* 1841, *Misc.* 77; *Walp. Ann.* vi. 248. B. trisetosum, *Griff. Notul.* iii. 283; *Ic. Pl. Asiat.* t. 293. Oxysepala ovalifolia, *Wight Ic.* t. 1736; *Walp. l. c.* Epidendrum sessile, *Kœnig in Retz. Obs.* vi. 60 (*ex Herb. Rottler*).

TENASSERIM; at Mergui, *Griffith.* PERAK, *Scortechini.* MALACCA, *Griffith* (*Kew Distrib.* 5295).—DISTRIB. Borneo.

Stems 6–12 in., as thick as a crow-quill; internodes ¼ in., sheaths appressed, ribbed. *Leaf* ½–1 in., oblong or linear, retuse. *Scape* capillary; bracts many, hyaline; flowers ¼ in. long, erect, cellular, yellow-white. *Sepals* subequal, lanceolate, caudate acuminate; petals half as long, ovate-oblong, acute, 1-nerved; lip shortly stipitate, lanceolate, obtuse; column short, 2-toothed.

Sect. III. EUBULBOPHYLLUM. *Rhizome* creeping, bearing distant or approximate pseudobulbs (sometimes very small or 0, see p. 765). *Inflorescence* various. *Lip* usually strongly recurved and much shorter than the sepals.—The divisions of this section are in great measure artificial. (See remarks under *Cirrhopetalum.*)

A. *Flowers* solitary, rarely 2–3, usually large. *Scape* sometimes very short, with the pedicel of the flower long and scape-like. *Petals* and *lip* usually much larger than in other groups. (Species 3–18.)

* Column truncate, teeth at the apex in front 0, or minute.

† *Lip sessile*, i. e. *foot of column not produced beyond the insertion of the lateral sepals.*

3. **B. macranthum,** *Lindl. in Bot. Reg.* 1844, t. 13; scape 0, pedicel longer than the petiole of the elliptic oblong leaf, flower 2 in. diam., petals lanceolate 9-nerved as long as the sepals, lip small ovate acuminate, base

truncate. *Walp. Ann.* vi. 245. Sarcopodium macranthum, *Lindl. in Paxt. Fl. Gard.* i. 155; *Fol. Orchid.* 3.

TENASSERIM; alt. 3636 ft., *Parish.* SINGAPORE (*Hort. Loddiges*).

Rhizome stout, crinite at the nodes. *Leaf* 4–8 in. *Pedicel* 4–5 in., with appressed basal sheaths; flower ringent, rather fleshy, red-purple and spotted; anther small.

4. **B. megalanthum,** *Griff. Notul.* iii. 286; *Ic. Pl. Asiat.* t. 292; scape very short, pedicel stout shorter than the oblong-lanceolate leaf, flower ¾ in. diam., petals lanceolate long-acuminate rather shorter than lanceolate acuminate falcate sepals, lip long narrow slender, basal lobes acute. *Walp. Ann.* vi. 246.

MALACCA; on Pulo Bessar, abundant, *Griffith.*

Pseudobulbs very small. *Leaves* 4 in.; petiole short. *Pedicel* 2–3 in.; flowers pale brown, purple-spotted; sepals 3 in. long, lateral scythe-like, deflexed and crossed over the very long lip. *Fruit* 2 in. long.—Described from Griffith, who says the lip is sessile, but his figure shows a stipes.

5. **B. psittacoglossum,** *Reichb. f. mss.*; scape very short stout 1-3-fld., pedicel longer than the petiole of the broadly elliptic leaf, flower 1–1½ in. diam., petals ovate 5-nerved as long as the falcately ovate lateral sepals, foot of column forked, lip with membranous toothed basal lobes. Sarcopodium psittacoglossum, *Reichb. f. in Bot. Mag.* t. 5408.

TENASSERIM, *Parish.*

Pseudobulbs ovoid, enclosed in a reticulate sheath. *Leaf* 2–4 in. long and broad. *Scape* 1–1½ in., sheath basal; pedicel 1 in., stout; sepals greenish yellow with red nerves, dorsal incurved. *Lip* spongy, yellow and scarlet, obtuse, base deeply 2-lobed; tips of column acute.

6. **B. nasutum,** *Reichb. f. in Gard. Chron.* 1871, 1482; flower subsessile, sepals subequal triangular-ovate, petals very small linear, lip sessile as long as the sepals oblong, tip rather dilated rounded, base with a hooked incurved auricle on each side, anther conical.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs crowded, short, obturbinate. *Leaf* 2–3 in., sessile, lanceolate, very thick. *Pedicel* with ovary ½ in.; flower 1 in. diam.; sepals and petals 5-nerved, pale yellow; lip with a red-purple base, auricles as in *B. Careyanum.*—The specimens are very insufficient.

7. **B. pileatum,** *Lindl. in Bot. Reg.* 1844, *Misc.* 73; scape 0, pedicel slender, sepals ovate-oblong obtuse, petals nearly as long narrower ovate-oblong obtuse 5-nerved, lip nearly as long as the sepals tongue-shaped obtuse with 2 mesial ridges from the base to beyond the middle, column terete, anther conical. *Walp. Ann.* vi. 246. Sarcopodium pileatum, *Lindl. Fol. Orchid.* 4.

SINGAPORE (*Hort. Loddiges*). PENANG, *Maingay* (*Kew Distrib.* 1676), and *Ic. in Herb. Kew.* PERAK, *Wray.*—DISTRIB. Sumatra (*Ic. Marsden*).

Rhizome long, rooting, and crinite at the nodes. *Leaf* 3–5 in., elliptic or obovoid-oblong, rather membranous. *Pedicel* 1–3 in., often distant from the pseudobulb; flower 1½ in. diam., yellow, ridges of lip red.—The materials are very indifferent.

8. **B. Reinwardtii,** *Reichb. f. in Walp. Ann.* vi. 246; pseudobulbs long slender, leaf long-petioled, scape and pedicel slender, petals ovate-lanceolate caudate-acuminate rather shorter than the uncinate lanceolate lateral sepals, lip cordate-lanceolate. Sarcopodium Reinwardtii, *Lindl.*

Fol. Orchid. 4; *Miquel Fl. Ind. Bat.* iii. 652. Dendrobium grandiflorum, *Reinwardt mss.*

PERAK, alt. 3–4000 ft., *Wray, King's Collector.*—DISTRIB. Java.

Pseudobulbs 3–4 in., terete. *Leaf* 6–8 in., thin, elliptic, acuminate, many-nerved. *Peduncle* 3–4 in., distant from the bulb, sheaths several; flower ¾ in. long; mentum globose.—Colour of flowers variously described: "saffron-cold., lip white above, crimson beneath," *Wray*; "pale greenish yellow, brown inside, lip bright reddish blue," *King's Collector*; "pale pink tinted with crimson," *Wray* (1889).

†† *Lip stipitate by the produced foot of the column.*

9. **B. Lobbii,** *Lindl. in Bot. Reg.* 1847, *sub.* t. 29; scape 0, pedicel much exceeding the petiole of the linear-oblong leaf, petals narrow 9-nerved as long as the falcately ovate-lanceolate lateral sepals, lip large broadly ovate recurved. *Bot. Mag.* t. 4532; *Reichb. f. in Gard. Chron.* 1847, 423; *Saunders Refug. Bot.* t. 116 (var. *siamense*); *Walp. Ann.* vi. 245. B. Henshallii, *Lindl. in Gard. Chron.* 1852, 422. B. siamense, *Reichb. f. l. c.* 1867, 572. Sarcopodium Lobbii, *Lindl. in Paxt. Fl. Gard.* i. 155; *Jard. Fleur.* t. 183. S. Lobbii, *var.* Henshallii, *Henfrey in Gard. Mag. Bot.* iii. 269, *with woodcut.* Sestochilos uniflorum, *Breda Orchid. Jav.* t. 3.

TENASSERIM; on Donnatong, *Parish.*—DISTRIB. Siam, Java.

Rhizome stout; pseudobulbs ovoid. *Leaves* 4–8 in. *Pedicel* 4–6 in., speckled; sheaths loose, spotted; flowers 2½–4 in. diam., very variable in colour, ochreous or reddish yellow with red nerves or with yellow and pink speckles and striate with brown.

10. **B. uniflorum,** *Griff. Notul.* iii. 293; *Ic. Pl. Asiat.* t. 295; *Itin. Notes* 110, No. 138 (*not of Kuhl & Hassk.*); scape very short sheathed, pedicel very long, dorsal sepal ovate-oblong obtuse very much larger than the uncinately incurved broadly ovate lateral, petals linear 3-nerved, lip with recurved acute basal auricles. *Walp. Ann.* vi. 247. Sarcopodium uniflorum, *Lindl. Fol. Orchid.* 16.

BHOTAN HIMALAYA; at Dewangiri, *Griffith.* MISHMI HILLS, towards Lung, *Griffith* (*in Herb. Lindley*).

Rhizome very stout; pseudobulbs 1–2 in., cylindric. *Leaf* 3–6 in., subsessile. *Pedicel* 3–4 in.; flower ¾ in. diam.; sepals orange-yellow spotted with purple; lip tipped with red and petals with white.—Very like *B. capillipes* in habit. The basal auricles of the lip are as in *B. Careyanum.*

11. **B. capillipes,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 150, t. 37; scape very short, pedicel very long slender pendulous, petals ovate obtuse 5-nerved rather shorter than the oblong dorsal sepal all much smaller than the broadly triangular-ovate obtuse 7–9-nerved lateral sepals, lip very short pyramidal, basal angles acute.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs 1 in., narrowly obpyriform. *Leaf* 3–4 in., subsessile, linear. *Pedicel* 2–3 in.; flowers ⅔ in. diam., yellow with red nerves; lip violet-purple.—Very like *B. uniflorum* in habit.

12. **B. striatum,** *Reichb. f. in Walp. Ann.* vi. 257; scape 1–3-fld. longer than the long petiole of the elliptic leaf, petals ovate-lanceolate acute 1-nerved half the length of the subequal oblong-lanceolate 5-nerved sepals, lip linear-oblong obtuse. Sarcopodium striatum, *Lindl. Fol. Orchid.* 5. Dendrobium striatum, *Griff. Notul.* iii. 318.

KHASIA HILLS, alt. 4000 ft., *Griffith* (*Kew Distrib.* 5156), *Lobb*, &c.

Pseudobulbs ½–¾ in., obpyriform. *Leaf* 2–3 in.; petiole 1–2 in., rather slender. *Scape* with several ovate membranous bracts, as if normally several-fld.; flowers ½ in. diam., yellow-green striped with purple; lip rather large and thin.

13. **B. affine,** *Lindl. in Wall. Cat.* 1982; *Gen. & Sp. Orchid.* 48; scape very short (rarely 2-fld.), pedicel longer than the petiole of the linear-oblong leaf, petals ovate-lanceolate acute 3–5-nerved about a third shorter than the reflexed falcate lanceolate lateral sepals, lip shortly stipitate. *Walp. Ann.* vi. 246. Sarcopodium affine, *Lindl. in Paxt. Fl. Gard.* i. 155; *Fol. Orchid.* 5.

NEPAL, *Wallich.* KHASIA HILLS, alt. 4–5000 ft., *J. D. H. & T. T.* NAGA HILLS, *Prain.*

Rhizome very stout; pseudobulbs oblong. *Leaves* 3–6 in.; petiole short. *Pedicel* 1–2 in.; basal sheaths short; flowers white, papillose, streaked with red; lip red-brown; column yellow.

** Column with two long teeth or spines at the top.

14. **B. leopardinum,** *Lindl. in Wall. Cat.* 1981, *Gen. & Sp. Orchid.* 48; scape very short 1–3-fld., pedicel stout shorter than the long petiole of the elliptic or oblong leaf, flower subglobose, petals broadly ovate acute 7-nerved, shorter than the similar 9-nerved sepals, lip long-stipitate with toothed basal auricles. *Walp. Ann.* vi. 247. Sarcopodium leopardinum, *Lindl. in Paxt. Fl. Gard.* i. 155. Dendrobium leopardinum, *Wall. Tent. Fl. Nep.* 39, t. 28.

NEPAL, *Wallich.* KHASIA HILLS, alt. 3–5000 ft., *H. f. & T., Clarke,* &c.

Rhizome very stout, pseudobulbs 1–1½ in., crowded, narrow. *Leaf* 3–8 in.; petiole 1–2 in. *Scape* and *pedicel* about as long as the pseudobulb; bracts large; flowers 1 in. diam., greenish or yellowish, spotted purple; mentum hemispheric; columnar spurs stout; anther conic.

15. **B. Griffithii,** *Reichb. f. in Walp. Ann.* vi. 247; scape very short pedicel longer stout, petals oblong obtuse 3-nerved shorter than the ovate obtuse 5-nerved subequal sepals, lip stipitate oblong obtuse. Sarcopodium Griffithii, *Lindl. Fol. Orchid.* 6. Bulboph. sp., *Griff. Ic. Pl. Asiat.* t. 296, f. 2 (*not of Notul. & It. Notes*). Dendrob. Bulbophylli, *Griff. It. Notes* 65, No. 1019 (fide Lindley).

KHASIA HILLS; in Myrung Woods, alt. 5000 ft., *Griffith, H. f. & T.*

Pseudobulbs small, crowded. *Leaf* 1½–2 in., linear-oblong; scape with a short loose bract; flower 1 in. diam., greenish-yellow, spotted with brown.

16. **B. Dayanum,** *Reichb. f. in Gard. Chron.* 1865, 434; *Xen. Orchid.* 128, t. 144; scape 0, pedicel very short sigmoid, flowers ciliate with long hairs, petals oblong much smaller than the broadly ovate obtuse equal sepals, lip sessile trigonous sharply toothed, basal auricles uncinate incurved, columnar teeth short. *Bot. Mag.* t. 6119; *Reichb. f. Xen. Orchid.* ii. t. 144; *Fl. des Serres,* t. 2236; *Saunders Refug. Bot.* t. 115.

TENASSERIM; at Moulmein, *Parish,* &c.

Pseudobulbs 1 in., crowded. *Leaf* 3 in., elliptic, reddish beneath; petiole short. *Flower* 1 in. diam.; sepals green, streaked with purple specks; petals blood-red, margins yellow; lip green, disk with blood-red ridges.

17. **B. membranifolium,** *Hook. f. Ic. Pl. ined.*; leaf elliptic-lanceolate membranous narrowed into a petiole, scape short 1-bracteate, petals elliptic-lanceolate 7-nerved smaller than the ovate-lanceolate many-nerved acute lateral sepals, lip stipitate, column with long falcate decurved then ascending arms.

PERAK; on Gunong Batu Pateh, *Wray.*

Pseudobulb 1 in., narrow, with rigid basal fibres. *Leaf* 6–8 in., with many slender nerves and cross nervules. *Scape* with pedicel about 2 in.; bract $\frac{1}{2}$ in., lanceolate; flower nearly 1 in. long, "pale greenish yellow with dotted crimson lines, lip claret-cold.," *Wray.*

18. **B. moniliforme,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 151; pseudobulbs pisiform with the filiform rhizomes forming moniliform creeping tufts, scape capillary 1-fld., petals oblong 1-nerved, tip rounded much shorter than the lanceolate acute strongly 5-nerved lateral sepals, lip stipitate.

TENASSERIM; Moulmein, *Parish*; on trunks of Betel-nut Palms.

Leaf unknown. *Scape* $\frac{1}{2}$–1 in.; bracts sheathing, obtuse; pedicel $\frac{1}{4}$ in. *Flower* $\frac{1}{3}$ in. diam.; dorsal sepal a third shorter than the lateral, 5-nerved; lip obtuse, auricles rounded. *Columnar spurs* long, slender.—A remarkable little species, like a small *Eria.*

B. Flowers capitate or subumbellate. (See also 57. *repens*, and 59. *xylophyllum.*)—In this division the scape is often distant from the pseudobulb. (Sp. 19–31.)

* *Sepals* 5- *or* 7-*nerved. Petals* 1- *or* 3-*nerved.*

19. **B. Medusæ,** *Reichb. f. in Walp. Ann.* vi. 262; scape stout loosely sheathed, flowers in a large dense globose head, bracts large lanceolate, sepals lanceolate with long capillary tips, dorsal 5-nerved more than half as long as the 7-nerved lateral, petals ovate-lanceolate 1-nerved, tips capillary, lip nearly straight. Cirrhopetalum Medusæ, *Lindl. in Bot. Reg.* 1842, t. 12; 1843, *under* t. 49; *Bot. Mag.* t. 4977; *Hort. Parad.* ii. t. 5. *Belg. Hortic.* viii. t. 12.

SINGAPORE (*Hort. Loddiges*). PERAK, *Scortechini, Wray.*

Rhizome stout; pseudobulbs 1–$1\frac{1}{2}$ in., obpyriform, often curved. *Leaf* 5–6 in., linear-oblong, 2-fid, very coriaceous; petiole stout. *Scape* 6–8 in., curved; sheaths 1 in.; head $1\frac{1}{2}$ in. diam.; bracts $\frac{1}{2}$ in.; flowers 3 in. long, yellow spotted red; columnar teeth very long.

20. **B. albidum,** *Hook. f.*; scape stout 2–3-sheathed, umbel 6–8-fld., sepals lanceolate acuminate 5-nerved, dorsal one-third shorter than the lateral, petals elliptic-oblong 3-nerved, tip rounded, lip stipitate, posterior angles acute recurved, column shortly toothed. Cirrhopetalum albidum, *Wight Ic.* t. 1653.

NILGHIRI HILLS, *Wight.*

Rhizome very stout, copiously rooting; pseudobulbs short, broadly ovoid, golden when dry. *Leaf* 1–2 in., elliptic-oblong. *Scape* 2–3 in.; flowers pedicelled, $\frac{2}{3}$ in. long, white freckled with pale brown.

21. **B. confertum,** *Hook. f. Ic. Plant. ined.*; scape slender much shorter than the linear-lanceolate long-petioled leaf, flowers small subracemose, sepals 5-nerved finely acuminate, dorsal ovate-lanceolate about a third shorter than the lanceolate falcate 5-nerved gibbous-based lateral, mentum large rounded, petals half as long as the lateral sepals ovate-oblong acute 3-nervéd serrulate, lip minute stipitate, column dorsally 3-toothed, spurs very slender.

KHASIA HILLS, *Griffith* (*Kew Distrib.* 5170).

Pseudobulbs $\frac{1}{2}$–1 in., densely crowded, narrowly ovoid. *Leaf* $2\frac{1}{2}$–3 in., narrowed into a slender 1 in. petiole. *Scape* $1\frac{1}{2}$–2 in., naked; bracts lanceolate, shorter than the slender $\frac{1}{6}$ in. pedicels; sepals $\frac{1}{4}$ in., dorsal suberose.

** *Sepals* 3-*nerved*. *Petals* 3-*nerved, or* 1-*nerved in* B. radiatum.

22. **B. radiatum,** *Lindl. in Wall. Cat.* 1986; *Gen. & Sp. Orchid.* 55; scape slender shorter than the linear-obtuse leaf, flowers umbellate long-pedicelled, sepals subequal narrowly caudate-lanceolate 3-nerved, petals half as long narrowly lanceolate from an ovate 1–3-nerved base finely acuminate, mentum 0, lip minute stipitate, columnar spurs slender. *Walp. Ann.* vi. 264.

TENASSERIM; at Tavoy, *Wallich*; Moulmein, *Parish*.—DISTRIB. Hong Kong.

Pseudobulbs 1 in., very narrowly conical or subcylindric, crowded on a stout rhizome. *Scape* 2–3 in.; bracts setaceous, pedicel $\frac{1}{4}$–$\frac{1}{3}$ in., capillary; flowers yellowish; sepals $\frac{1}{2}$ in.

23. **B. stenobulbon,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 153; scape short slender, sheaths 3–5 small, flowers fascicled on the top of the scape few very small subsessile, sepals subequal lanceolate finely acuminate 3-nerved three times as long as the oblong obtuse 3-nerved petals, lip sessile, columnar spurs long.

TENASSERIM, *Helfer* (*Kew Distrib.* 5166); at Moulmein, *Parish*.

Pseudobulbs $\frac{1}{2}$–1 in., cylindric; rhizome slender. *Leaf* 1–2 in., linear, notched. *Scape* $\frac{1}{2}$–1 in.; bracts small, lanceolate; flowers $\frac{1}{6}$–$\frac{1}{4}$ in. long, yellow.

24. **B. cauliflorum,** *Hook. f. Ic. Plant. ined.*; scape capillary distant from and much shorter than the long pseudobulb, flowers small umbelled, sepals subequal lanceolate caudate-acuminate 3-nerved, petals nearly as long lanceolate 3-nerved, lip very small stipitate, columnar spurs slender.

SIKKIM HIMALAYA, *Griffith's Collectors* (*Kew Distrib.* 5165), *J. D. H.* KHASIA HILLS, *Griffith* (*Kew Distrib.* 5139).

Rhizome stout, branched, divaricate; pseudobulbs $1\frac{1}{2}$–2 in., subcylindric, distant. *Leaf* 2–5 by 1–$1\frac{1}{2}$ in., oblong, obtuse; petiole $\frac{1}{3}$-$\frac{1}{2}$ in. *Scape* $\frac{1}{2}$–$\frac{3}{4}$ in., bracts ovate-lanceolate, shorter than the slender $\frac{1}{8}$ in. long pedicel; flowers $\frac{1}{4}$ in. long, yellow-green, inodorous.—The slender tails of the sepals and 3-nerved petals distinguish this from *B. odoratissimum*.

25. **B. protractum,** *Hook. f. Ic. Plant. ined.*; scape capillary much shorter than the leaf, flowers very small umbelled, bracts setaceous sepals subequal lanceolate acute 3-nerved, petals nearly as long 3-nerved lip very small subsessile, columnar spurs slender.

TENASSERIM (on Andaman Islands), *Helfer* (*Kew Distrib.* 5164).

Rhizome long, nearly straight; pseudobulbs $\frac{3}{4}$–1 in., narrow, distant. *Leaf* 2–3 in., shortly petioled, linear-lanceolate, acute, rather thin. *Scape* 1 in., sheath slender; pedicel $\frac{1}{10}$ in.

*** *Sepals* 3-*nerved*. *Petals* 1-*nerved*.

26. **B. odoratissimum,** *Lindl. in Wall. Cat.* 1987; *Gen. & Sp. Orchid.* 55; scape stout loosely sheathed, flowers in a dense globose head, bracts longer than the ovary, sepals subequal lanceolate caudate 3-nerved, tips solid obtuse, petals minute 1-nerved, lip minute sessile papillose. Stelis odoratissima, *Smith in Rees Cyclop.* xxxiv. S. caudata, *Don Prodr.* 32. Tribrachia odoratissima, *Lindl. Coll. Bot.* 41.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 4–7000 ft., *J. D. H.* KHASIA HILLS, *Lobb*, &c. TENASSERIM, *Helfer* (*Kew Distrib.* 5167, 5168).—DISTRIB. China.

Rhizome stout; pseudobulbs $\frac{1}{2}$–$1\frac{1}{2}$ in., subcylindric. *Leaf* 1–3 in., linear-oblong, notched. *Scape* sometimes distant from the bulb; bracts oblong or lanceolate; heads $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; pedicels $\frac{1}{6}$ in.; flower $\frac{1}{4}$–$\frac{1}{3}$ in. long, yellow, sweet-scented; column truncate.

27. **B. capitatum,** *Lindl. Gen. & Sp. Orchid.* 56; rhizome ascending, pseudobulbs narrow erect, scape very short, flowers few subcapitate, sepals subequal lanceolate acuminate 3-nerved much longer than the elliptic obtuse 1-nerved petals, lip small stipitate obtuse, columnar spurs long. *Miquel Fl. Ind. Bat.* iii. 649. Diphyes capitata, *Blume Bijd.* 314.

PERAK; on Gunong Batu Pateh, *Wray*.

Rhizome very long and apparently scandent; pseudobulbs parallel to it, i. e. erect, $\frac{3}{4}$–1 in. *Leaf* 1–3 in., linear, striate. *Scape* $\frac{1}{4}$–$\frac{1}{2}$ in.; flowers shortly pedicelled, yellow; sepals $\frac{1}{6}$ in. long, cellular.

28. **B. caudatum,** *Lindl. in Wall. Cat.* 1983; *Gen. & Sp. Orchid.* 56; leaf small, scape very short and stout sheathed at the base, flowers small umbellately capitate, sepals lanceolate caudate 3-nerved, lateral much longer than the dorsal and three times as long as the oblong obtuse 1-nerved petals, lip shortly stipitate, columnar spurs slender.

NEPAL, *Wallich*.

Rhizome slender; pseudobulbs $\frac{1}{4}$–$\frac{2}{3}$ in., ovoid. *Leaf* $\frac{1}{2}$–1 in., oblong, obtuse or retuse. *Scape* hardly longer than the pseudobulb; bracts many, ovate-lanceolate, exceeding the ovary; flowers $\frac{1}{3}$ in. long, papillose.—Near *Cirrhopetalum*.

29. **B. modestum,** *Hook. f. Ic. Pl. ined.*; scape nearly as long as the leaf filiform few-fld., flowers very small subsessile, sepals subequal lanceolate subacute 3-nerved about twice as long as the narrowly oblong obtuse 1-nerved petals, mentum rounded, lip sessile small, columnar spurs slender.

PERAK, *Scortechini*.

Rhizome slender; pseudobulbs $\frac{1}{4}$–$\frac{1}{2}$ in., distant, narrow, curved. *Leaf* 1–$1\frac{1}{2}$ in., sessile, linear, retuse. *Scape* as long, 1-sheathed about the middle; bracts ovate-lanceolate, longer than the pedicels; flower $\frac{1}{4}$ in. long.

30. **B. leptanthum,** *Hook. f. Ic. Pl. ined.*; scape capillary equalling the cylindric pseudobulb, flowers few subracemose, bracts large finely acuminate, sepals 3-nerved lanceolate narrowed into capillary tips twice as long or more than the oblong apiculate 3-nerved sepals, lip very small stipitate, columnar spurs slender.

KHASIA HILLS, alt. 4–5000 ft., *Griffith*, &c.

Rhizome rather stout; pseudobulbs $\frac{1}{2}$–1 in., narrow, terete, distant. *Leaf* 2–3 in., subpetioled, linear, obtuse. *Scape* 1–2 in., 2–4-fld.; bracts much longer than the pedicels; flowers $\frac{1}{4}$ in. long, sweet-scented.

VAR. ? *Gamblei*; rhizome very slender, pseudobulbs shorter, scape longer, sepals rather broader, petals longer linear-lanceolate.—Sikkim, at Goompahar, alt. 7000 ft., *Gamble*.—Probably a distinct species.

31. **B. petiolare,** *Thw. Enum.* 298; leaf obovate-oblanceolate or linear-lanceolate long-petioled, scape long slender, flowers very small fascicled, sepals subequal oblong ovate obtuse strongly 3-nerved, lateral falcate, petals ovate acuminate, lip stipitate fleshy tongue-shaped, columnar teeth broad acute.

CEYLON, Ambagamowa.

Pseudobulbs as in *B. purpureum*, from which this differs in the longer scape, longer petioled leaves, more fascicled rather larger flowers, larger purple lip. In one

drawing lent by Dr. Trimen, the flowers are pale pink with broad red stripes, in another yellow with slender red stripes.

C. Flowers racemose or spicate (capitate in 57. *repens*, and 59. *xylophyllum*). (Sp. 32–72.)

* Lip with recurved lateral basal auricles. Except sp. 32 and 40, all want revision.

32. **B. fusco-purpureum,** *Wight Ic.* t. 1651; scape stout, raceme few-fld., flowers large, sepals subequal ovate-oblong acuminate, petals very small tipped with a clavellate capillary awn, lip sessile broad papillose, columnar teeth short. *Walp. Ann.* vi. 256.

NILGHIRI HILLS; at the Kaitia Falls, *Jerdon*, *Wight*.

Rhizome stout; pseudobulbs ½–1½ in., ovoid. *Leaf* 2–4 in., shortly petioled, oblong, obtuse. *Scape* twice as long, suberect, raceme drooping; sheaths loose; bracts short; sepals 1 in., 5-nerved, dark purple; petals subserrate; auricles of purple lip crenate.

33. **B. Kingii,** *Hook. f. Ic. Pl. ined.*; scape short stout pendulous, raceme dense-fld., bracts large, dorsal sepal ovate, lateral ovate-lanceolate acute, petals nearly as long as the dorsal sepal ovate-oblong ciliate, auricles of the lip deeply toothed, column truncate.

SIKKIM HIMALAYA, alt. 6000 ft., *King* (*Ic. in Herb. Calcutt.*).

Rhizome stout; pseudobulbs 1½ in. diam., globose and deeply grooved, as if lobed. *Leaf* 6 in., linear-oblong, acute; petiole 1½ in. *Scape* with raceme 5 in., sheaths short ventricose, and flowers green sprinkled with red; bracts ½ in.; flowers 1 in. diam.; lip dark green.—Described from an excellent (but probably enlarged) native drawing.

34. **B. Careyanum,** *Spreng. Syst. Veg.* iii. 732; scape very stout many-sheathed longer than the pseudobulb, bracts equalling or exceeding the densely imbricating flowers, sepals oblong-ovate acute, dorsal shorter, petals minute broadly ovate aristate 1-nerved, auricles of shortly stipitate lip subentire, columnar spurs long-aristate from a broad base. *Wall. Cat.* 1990/1; *Lindl. Gen. & Sp. Orchid.* 51; *Walp. Ann.* vi. 256. Anisopetalum Careyanum, *Hook. Fl. Exot.* t. 149. Pleurothallis purpurea, *Don Prodr.* 33. Tribrachia purpurea, *Lindl. Coll. Bot.* 41.

TROPICAL HIMALAYA; from Nepal, *Wallich*, eastwards. KHASIA HILLS and Burma.

Rhizome very stout; pseudobulbs globose ovoid or oblong. *Leaf* 4–10 by 1–2 in., subpetioled, oblong or linear-oblong. *Scape* 3–5 in.; raceme 2–4 in., decurved; bracts ½ in., oblong or lanceolate; flowers ¼–⅓ in. long, orange-yellow or greenish, more or less spotted or suffused with red-brown or purple, sometimes almost all blue-purple.—I find it impossible from dried specimens to ascertain if there be more than one species here, and if the two following are, if distinct, accurately distinguished by the characters given.

VAR. *ochracea*; flowers ochraceous unspotted, lip red-brown. B. cupreum, *Bot. Mag.* t. 5316.—Arracan.

35. **B. crassipes,** *Hook. f.*; scape very stout shorter than the pseudobulbs concealed by ventricose sheaths, bracts sepals petals and lip as in *B. Careyanum*, but column longer with short erect spurs. B. Careyanum, *Wall. Cat.* 1990/2; *Bot. Mag.* t. 4166.

SIKKIM TERAI, *Clarke*. MARTABAN, *Wallich*. Arracan (*Herb. Calcutt.*). PENANG (*Herb. Lindl.*).

36. **B. sicyobulbon,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 152; habit and scape of *B. Careyanum*, but pseudobulbs very large, flowers orange-yellow, bracts narrower, petals subserrulate, column and its spurs as in *B. crassipes.*

TENASSERIM; at Moulmein, *Parish.*

37. **B. cupreum,** *Lindl. in Bot. Reg.* 1838, *Misc.* 95; scape slender decurved, sheaths distant, raceme elongate lax-fld., bracts narrow equalling the yellow or reddish-yellow flowers, sepals and (not aristate) petals ovate-lanceolate acuminate, lip narrow, auricles entire or obscurely toothed, columnar spurs slender. *Walp. Ann.* vi. 257; *Reichb. f. in Trans. Linn. Soc.* xxx. 152 (*var.* stenopetala).

TENASSERIM, *Parish.* MANILLA (*Hort. Loddiges*).

This again so closely resembles a lax-flowered state of *B. Careyanum*, as to be with difficulty distinguishable in the dried state. Lindley describes the flowers as copper-coloured and smelling of Valerian roots. Reichenbach's var. *stenopetala* seems hardly different; it has orange-yellow flowers. His *var.* flava, *Gard. Chron.* 1882, i. 330, of which the habitat is unknown, may be *B. nilgherrense*?

38. **B. nilgherrense**, *Wight Ic.* t. 1650; scape stout elongate, sheaths few distant, racemes lax-fld, bracts acute much shorter than the flowers, lateral sepals oblong, dorsal broadly ovate, petals triangular-ovate acuminate, auricles of lip entire or toothed, columnar spurs lanceolate. *Bot. Mag.* t. 5050; *Walp. Ann.* vi. 256.

MALABAR; on the NILGHIRI HILLS, &c., *Wight.*

Habit of *B. Careyanum,* but scape more slender, with few sheaths. racemes fewer and larger flowered, and bracts very short. *Flowers* described by Wight as sepals dull brownish-yellow, lip greenish-brown; in Bot. Mag. figure the sepals are green and purple, the lip purple. In a plant cult. at Kew apparently of this the auricles of the lip are wanting.

39. **B. rufilabrum,** *Parish mss.*; scape short, racemes many and dense-fld., bracts very small, flowers small, sepals subequal ovate-oblong obtuse, dorsal narrower, petals broadly ovate acuminate, tip serrulate, lip shortly stipitate scabrid, columnar teeth short. B. limbatum, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 152 (*not of Lindl.*).

TENASSERIM; on trees at Mergui, *Parish.*

Rhizome slender; pseudobulb broadly ovoid or subglobose, $\frac{1}{2}$-$\frac{3}{4}$ in. long. *Leaf* $1\frac{1}{2}$-2 in., subsessile, elliptic or oblong. *Scape* with raceme $2\frac{1}{2}$ in., sheath loose; bracts equalling the ovary; flowers $\frac{1}{6}$ in. long, dull purple.—Colours described from Parish's drawing named *limbatum* by Reichenbach, who describing them from a living plant (in Hort. Saunders) says that the dorsal sepal is red spotted with yellow, the lateral brown spotted yellow and with a green mesial line, the lip as dark purple. The leaves he says are lurid violet beneath.

40. **B. microtepalum,** *Reichb. f. in Walp. Ann.* vi. 253; scape slender, sheaths small distant, raceme dense-fld., bracts lanceolate equalling the small flowers, sepals ovate-lanceolate acuminate, petals very broadly triangular shorter than the column, lip minute, spurs of column recurved, tips toothed.

TENASSERIM; at Moulmein, *Lobb* (*in Herb. Lindl.*).

Rhizome stout; pseudobulbs 1 in., ovoid. *Leaf* 4 in., rather longer than the scape and raceme, shortly petioled, linear-oblong, obtuse, coriaceous. *Flowers* $\frac{1}{6}$ in. long; auricles of lip obscurely toothed.—The small flowers, minute petals ("tepals," Reichb. f,), and peculiar spurs of the column distinguish this.

** Lip without basal auricles.

† Sepals pubescent.

41. **B. lemniscatum,** *Parish mss.*; *Bot. Mag.* t. 5961; scape erect slender or thickened upwards, spike short pendulous, flowers minute globose villous, sepals orbicular-ovate connate below, midrib of each below the apex with a long slender pendulous appendage, petals linear-oblong obtuse 1-nerved, lip sessile short obtuse purple, columnar spurs stout incurved. *Fl. des Serres*, t 2476. B. lemniscatum & *var.* tumida, *Reichb. f. in Trans. Linn. Soc.* xxx. 151.

TENASSERIM; at Zwabakir in Moulmein, *Parish.*

Pseudobulbs ¾ in. diam., crowded, globose, strongly tubercled. *Leaves* 3 on the shoots, lanceolate (not seen on pseudobulbs). *Scape* 4–6 in., slender below, sometimes tumid above the middle; spike ¾ in., dense-fld.; bracts ovate, acuminate; flower green and purple, ⅙ in. long; appendages three times as long, 10-angled by as many crenate lamellæ, banded white and red; lip purple.—A very curious plant. I suppress var. *tumida*, Par. & Reichb., the characters of which apply to the type, well figured in Bot. Mag. l. c.

42. **B. gracile,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 152; scape and elongate suberect raceme filiform, flowers minute subglobose glandular and villous, dorsal sepals oblong shorter than the orbicular-ovate obtuse 3-nerved lateral, petals linear obtuse 1-nerved, lip subsessile oblong-lanceolate obtuse, columnar spurs slender incurved. *Reichb. f. in Gard. Chron.* 1874, ii. 162.

TENASSERIM; on Moolee-it, alt. 3000 ft., *Parish.*

Pseudobulbs ¾ in. diam., subglobose, tubercled (when dry), young 2-leaved? *Scape* with lax-fld. raceme 6 in.; bracts setaceous, longer than the very short pedicels; flowers ⅛ in., green mottled with brown.

43. **B. hirtum,** *Lindl. in Wall. Cat.* 1989; *Gen. & Sp. Orchid.* 51; *Bot. Reg.* xxxiii. (184) *under* t. 66; scape tall stout, spike long many-fld. drooping, flowers sessile tomentose, dorsal sepal lanceolate 3-nerved rather shorter and narrower than the broad-based falcately-lanceolate 3-nerved lateral, petals small oblong obtuse ciliate, lip subsessile clawed linear-oblong truncate hispid below the middle, columnar spurs short. B. suave, *Griff. Notul.* iii. 292. Stelis hirta, *Smith in Rees Cyclop.* xxxiv. Tribrachia hirta, *Lindl. Collect.* 41.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3–6000 ft., *J. D. H.*, &c. KHASIA MTS., *Griffith*, &c. TENASSERIM, *Parish.*

Pseudobulbs 1–1½ in., ovoid-oblong, terete, 2-leaved. *Leaves* 1–2, 4–8 in., oblong to lanceolate, obtuse, rather thin. *Scape* with spike 8–12 in.; flowers ¼–⅓ in. long, yellow or greenish white, scented of *Anthoxanthum*; bracts ovate, acute, exceeding the ovary; pollinia globose, one pair minute.

44. **B. comosum,** *Collett & Hemsl. in Journ. Linn. Soc. ined.*; scape robust 2–3-sheathed, raceme inclined cylindric truncate, flowers most densely crowded ⅔ in. long horizontally spreading, sepals subequal hyaline subulate-lanceolate villous with flaccid hairs, petals small linear obtuse 1-nerved, lip shortly stipitate lanceolate recurved, columnar teeth short.

EASTERN BURMA; Shan Hills, alt. 6000 ft., *Collett.*

Pseudobulbs and *leaves* unknown. *Scape* 10 in., curved, as thick as a crow-quill, kneed at the top so that the racemes form an angle of 45° with it. *Racemes* 2½ by 1½ in. diam., like a bottle brush, the flowers being perfectly horizontal and densely villous with unicellular hairs; bracts subulate, as long as the very short pedicel and ovary;

sepals membranous, nerves 1–3 very slender.—A very remarkable species, resembling no other, but allied to *hirtum* and *auricomum*.

45. **B. Lindleyanum,** *Griff. Notul.* iii. 287; scape tall, raceme many-fld. drooping and pedicelled flowers tomentose, sepals subequal ovate acuminate 5-nerved, lateral with an outer basal angle, petals small oblong crinite, lip shortly stipitate lanceolate villous, columnar arms slender.

TENASSERIM; shores of Mergui, *Griffith, Parish.*

Pseudobulbs 1 in. diam., depressed ovoid. *Leaf* 3–6 in., oblong-lanceolate, acute. *Scape* 4–8 in.; bracts ovate, aristately acuminate, longer than the pedicel and ovary; flowers $\frac{1}{3}$ in. diam., when closed as if spurred by the mentum; pedicels $\frac{1}{6}$ in.; sepals greenish with purple stripes and margins.

46. **B. parviflorum,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 152; scape slender, raceme elongate, bracts minute, flowers small very shortly pedicelled, sepals subequal ciliate, dorsal lanceolate 1-nerved narrower than the ovate acute sub-3-nerved lateral, petals half as long oblong obtuse ciliate, lip shortly stipitate oblong obtuse laxly hairy, columnar spurs short.

TENASSERIM; on trees in the mountains, *Parish.*

Pseudobulbs depressed globose; rhizome stout. *Leaf* 4–5 in., petioled, ligulate, obliquely 2-fid. *Scape* longer, with the raceme 6 in.; flowers $\frac{1}{10}$ in. diam., yellow?; mentum rounded.—Reichenbach describes the dorsal spur of the column as plumose. I do not find it so.

47. **B. lasianthum,** *Lindl. in Gard. Chron.* 1855, 53; scape stout many-sheathed, raceme drooping, flowers large, sepals hispid, dorsal shortest linear-oblong, lateral with an ovate concave base, petals one-third shorter lanceolate acuminate glabrous, lip broadly stipitate glabrous. *De Vriese Ill. Orchid. Ned. Ind. cum Ic.*; *Miquel Fl. Ind. Bat.* iii. 649. Anisopetalum lasianthum, *Kuhl mss.*

PERAK (*Scortechini*). PENANG (*Ic. in Herb. Kew*).—DISTRIB. Sumatra.

Rootstock very stout; pseudobulbs 2–3 in. *Leaf* large, 5–7 by 2–3 in., elliptic or linear-oblong, acute, many-nerved. *Scape* 6–10 in.; bracts $\frac{1}{3}$ in., ovate-lanceolate; flowers dark purple; sepals 1 in. long, tips slender, nerves 5 strong.—Perhaps the largest species of the genus. The flowers are described as fleshy and copiously covered with fleshy hair-pointed bristles. Lindley's *Manilla* habitat is probably an error.

48. **B. limbatum,** *Lindl. in Bot. Reg.* 1840, *Misc.* 74; rhizome very stout, pseudobulb depressed subglobose, scape stout many-fld., flowers small, sepals subequal ovate obtuse, sides strongly ciliate, petals spathulate villous, lip as long as the sepals sessile ovate obtuse concave, disk smooth, margins scabrid.

SINGAPORE (*Hort. Loddiges*).

Rhizome thicker than a duck's quill. *Leaf* not seen. *Scape* with spike 4 in.; bracts minute; flowers dingy purple; sepals $\frac{1}{4}$ in. long; lip dull-green purple at the base.—I have seen only a very poor specimen in *Herb. Lindl.*

49. **B. tremulum,** *Wight Ic.* t. 1749; leaf ovate-lanceolate acute, scape slender erect lax-fld., flowers large, sepals subequal linear-lanceolate, sides villously ciliate 3-nerved, petals very small fringed, lip linear-oblong straight fringed with long hairs, columnar teeth short.

NILGHIRI HILLS, *Wight*, in the Wynaad, *Jerdon.*

Pseudobulbs subglobose. *Leaf* $1\frac{1}{3}$–2 in., sessile, base rounded. *Scape* with

raceme 6–8 in.; bracts very small; pedicels short; sepals $\frac{3}{4}$ in. long, white with broad red-purple nerves and lips; petals acuminate; anther pubescent.—Described from Wight's figure and a coloured drawing by Jerdon.

†† Sepals glabrous or faintly ciliate. Petals ciliate or serrulate. (See *B. Blepharistes* in *Cirrhopetalum*.)

50. **B. Penicillium,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 151; scape long stout, raceme lax-fld., bracts lanceolate, sepals narrow subequal 5-nerved long-acuminate, dorsal ovate-lanceolate, lateral lanceolate from a broad gibbous base, petals small oblong obtuse fleshy crinite, lip sessile on the broad short foot of the column lanceolate crinitely hirsute with purple hairs, columnar spurs long slender.

Tenasserim; at Moulmein, *Parish*.

Pseudobulbs 1 in., stout, ovoid; rhizome stout. *Leaf* 6 in., linear, notched; petiole $1\frac{1}{2}$ in. *Scape* 12 in., lower empty bracts $\frac{1}{3}$ in., floral shorter; pedicels $\frac{1}{6}$ in.; flower $\frac{1}{3}$ in. long; mentum rounded; sepals yellow striped with purple, dorsal obscurely ciliolate.

51. **B. eublepharum,** *Reichb. f. in Walp. Ann.* vi. 252; scape tall stout, raceme long lax-fld., bracts ovate-lanceolate aristate, sepals ovate-lanceolate acuminate, dorsal concave, lateral broader and longer, petals oblong obtuse erosely fimbriate, lip stipitate oblong-lanceolate, columnar spurs very long.

Sikkim Himalaya, alt. 7–10,000 ft., *Griffith's Collectors*, &c.

Pseudobulbs $1\frac{1}{2}$–3 in., cylindric. *Leaf* 3–8 in., shortly petioled, linear-oblong, acute. *Scape* 10–18 in.; sheaths 3–4; raceme 4–6 in.; bracts $\frac{1}{4}$–$\frac{1}{3}$ in.; sepals $\frac{1}{3}$ in. long, white, flushed or speckled with pink; mentum rounded; lip purple, base cordate.

52. **B. gymnopus,** *Hook. f. Ic. Plant. ined.*; scape rigid flexuous, raceme elongate, bracts minute, pedicels slender, sepals lanceolate acuminate 3-nerved, lateral falcate inserted at the apex of the naked foot of the column, petals linear serrulate, lip subsessile laterally compressed, columnar teeth short. Bulbophyll., *Griff. Notul.* 294; *Ic. Pl. Asiat.* t. 297; *Itin. Notes* 104, No. 65.

Rhotan Himalaya, alt. 2200 ft., *Griffith* (*Kew Distrib.* 5133). Khasia Hills, *Griffith* (*K. D.* 5134); at Joowye, alt. 3500 ft., *Clarke*.

Rhizome very stout, sheathed, with stout runners from the base of the narrow pseudobulbs. *Leaf* 4–7 in., petioled, very thick, linear, 2-fid. *Scape* flowering to near the base; basal sheaths imbricate; bracts ovate; pedicels $\frac{1}{6}$ in.; flower pale greenish white; mentum rounded; lip obtuse, yellow.—Insertion of lateral sepals as in 62. *B. Wrayi*.

53. **B. Thomsoni,** *Hook. f. Ic. Plant. ined.*; scape flexuous, raceme elongate, flowers minute subsessile, bracts minute, sepals lanceolate acuminate 3-nerved, lateral broadest, petals oblong obtuse ciliate 1-nerved, lip stipitate much compressed obtuse loosely villous, columnar teeth short.

Sikkim Himalaya, *Thomson*.

Habit and foliage of *B. gymnopus*, but pseudobulbs short and strongly curved, leaf thinner, scape not floriferous to near the base, flowers subsessile, lip hairy and above all lateral sepals in normal position. Flowers pale green, lip yellow.

54. **B. secundum,** *Hook. f Ic. Plant. ined.*; scape very slender

much longer than the leaves, raceme secund, bracts minute, flowers small shortly pedicelled, sepals obtuse, dorsal ovate 1-nerved, lateral broadly obliquely ovate obtuse 3-nerved, mentum rounded, petals oblong obtuse crinite, lip stipitate ovate-cordate ciliate, columnar teeth minute.

UPPER ASSAM; Naga Hills, on Kohima, *Prain*.

Pseudobulbs $\frac{1}{2}$ in. diam., subglobose. *Leaf* $1\frac{1}{2}$–$2\frac{1}{2}$ in., petioled, linear, obtuse, nerves strong. *Scape* with raceme 5–6 in.; pedicels $\frac{1}{10}$ in.; sepals $\frac{1}{10}$ in. long, obscurely ciliolate.

55. **B. auricomum,** *Lindl. in Wall. Cat.* 1985; *Gen. & Sp. Orchid.* 50; scape slender ascending, raceme long many-fld. puberulous cernuous, bracts small lanceolate, sepals elongate-lanceolate membranous 3-nerved, dorsal shorter, mentum obscure, petals ovate-oblong 1-nerved ciliate, lip shortly stipitate lanceolate, columnar teeth short. B. fœnisecii, *Par. ex Reichb. f. in Bot. Zeit.* 1865, 99. Dendrobium tripetaloides, *Roxb. Fl. Ind.* iii. 479.

RANGOON, *Carey*. TENASSERIM; Tavoy, *Wallich*; Moulmein, *Parish*.

Pseudobulbs $\frac{3}{4}$–1 in., subcylindric, terete, or obpyriform. *Leaf* not seen. *Raceme* 3–6 in.; bracts $\frac{1}{10}$ in.; pedicels very short; flowers yellow, sweet-scented (of *Anthoxanthum*); sepals $\frac{1}{3}$ in. long.

††† Sepals and petals glabrous, eciliate.

§ *Pseudobulbs 0, or very small.*

56. **B. cylindraceum,** *Lindl. Gen. & Sp. Orchid.* 53; scape tall with usually a large upper sheath, spike erect cylindric, flowers imbricate, bracts small, dorsal sepal triangular much smaller than the oblong obtuse lateral, petals small oblong 1-nerved, lip ovate, columnar spurs short erect. *Wall. Pl. As. Rar.* i. t. 69.

NEPAL, *Wallich*. SIKKIM HIMALAYA, alt. 6–7000 ft., *Clarke*. KHASIA MTS., alt 4–6000 ft., common.

Rhizome very stout. *Leaf* 4–10 in., obtuse; petiole 1–4 in. *Scape* 6–10 in.; sheaths 1–2; bracts ovate, acute; flowers $\frac{1}{3}$ in. long, dorsally flattened, white, pink or deep purple; dorsal sepal with sometimes a spiral tip; lip green or purple; ovary very short.—There are two forms found in both Sikkim and the Khasia Hills.

B. CYLINDRACEUM PROPER; upper sheath of scape embracing the base of the spike. B. imbricatum, *Griff. Notul.* iii. 289.—Wallich's figure is probably grossly exaggerated (made in Nepal, there are no specimens in his herbarium), with yellow flowers, leaves 10–12 by $1\frac{1}{2}$–2 in., scape 18 in., and spike 6–8 in.

VAR. *khasiana*; upper sheath smaller distant from the spike. B. khasianum, *Griff. Notul.* iii. 284; *Reichb. f. in Gard. Chron.* 1878, ii. 716.

57. **B. repens,** *Griff. Notul.* iii. 293; *Ic. Pl. Asiat.* t. 294; scape slender much shorter than the leaf, flowers in a dense globose head, bracts short, sepals 3-nerved, dorsal triangular much shorter than the broadly oblong obtuse lateral, petals minute cuneately obovate 1-nerved, lip sessile oblong convex obtuse, columnar spurs simple or branched. B. khasyanum, *Reichb. f. in Trans. Linn. Soc.* xxx. 138 (*not of Griff.*).

KHASIA HILLS; at Myrung, alt. 5000 ft., *Griffith*. TENASSERIM, *Parish, Gallatly* (*Ic. Herb. Calcutt.*).

Rhizome very stout, densely fibrous. *Leaves* 2–6 by $\frac{3}{4}$–1 in., very thick; petiole 1–3 in. *Head of flowers* $\frac{1}{2}$ in. diam.; flowers purple, $\frac{1}{8}$ in. long and broad, much flattened dorsally.—Griffith's drawing is a very bad one, and the specimen in Herb. Lindley is flowerless; the scape is much longer in the Tenasserim plants.

58. **B. conchiferum,** *Reichb. f. in Walp. Ann.* vi. 253; scape tall, spike long erect lax-fld., bracts ovate acuminate, dorsal sepal broadly ovate obtuse shorter than the oblong obtuse concave 3–5-nerved lateral that are connate beyond the foot of the column, petals oblong apiculate 1-nerved, lip stipitate compressed, columnar teeth very short. B. rufinum, *Reichb. f. Xen. Orchid.* ii. 45, t. 219.

SIKKIM HIMALAYA, alt. 3–4000 ft., *Griffith's Collectors* (*Kew Distrib.* 5291), *Clarke*, &c.

Leaf 6–10 in., oblanceolate, obtuse or acute; petiole 3–4 in. *Scape* 2–3-sheathed; spike 3–5 in., rachis stout; bracts $\frac{1}{8}$–$\frac{1}{6}$ in.; flowers distant, erect, $\frac{1}{4}$ in. long, green and yellow with purple veins; tips of lateral sepals rounded; ovary and column very short.

59. **B. xylophyllum,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 151; scape distant from the leaf slender erect, flowers capitate fleshy dorsally flattened, bracts very small, dorsal sepal with a minute spur at the base on each side ovate obtuse 3-nerved, lateral broadly falcately oblong, petals small oblong, lip oblong obtuse, columnar spurs falcate toothed dorsally.

TENASSERIM; at Moulmein, *Parish.*

Leaf $1\frac{1}{2}$–2 by $\frac{3}{4}$–1 in., broadly elliptic or orbicular, very thick, smooth. *Scape* 2 in., sheaths minute, head of fl. $\frac{1}{3}$ in. diam.; flowers suborbicular, $\frac{1}{6}$ in. broad, greenish, lip tumid, tip rounded.—The minute spurs at the base of the dorsal sepal answer to the much longer ones in *B. bisetum.*

60. **B. alcicorne,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 151; scape slender, top decurved, spike drooping short dense-fld., bracts minute, flowers fleshy compressed, sepals subequal oblong obtuse 3-nerved, petals ovate-oblong 1-nerved, arms of column 3-branched.

TENASSERIM, *Parish.* BURMA, *Berkeley.*

Rhizome with annular pits at the leaf insertions. *Leaf* 2–3 in., sessile, oblanceolate or subspathulate, obtuse, very thick. *Scape* 4–5 in.; sheaths small; spike 1–$1\frac{1}{2}$ in.; flowers $\frac{1}{3}$ in. long; ovary and column very short.

61. **B. apodum,** *Hook. f. Ic. Plant. ined.*; scape much shorter than the leaf, basal sheaths large, spike lax-fld., bracts small, sepals subequal lanceolate acuminate 1–3-nerved, lateral falcate, petals linear-lanceolate 1-nerved, lip sessile oblong, columnar teeth minute.

MALACCA, *Maingay* (*Kew Distrib.* 1619). PERAK; top of Batu Kurau, *Scortechini.*

Leaf 5–8 in., linear-oblong or oblanceolate, obtuse, coriaceous; petiole 1–3 in. *Scape* 3–4 in., rigid, stout below, flowering nearly to the base; basal sheaths rigid; flowers $\frac{1}{6}$ in. diam., greenish yellow; mentum rounded.—Near *B. gymnopus,* but without pseudobulbs, and with the lateral sepals inserted all along the foot of the column.

62. **B. Wrayi,** *Hook. f. Ic. Plant. ined.*; scape tall stout erect, raceme stout lax-fld., bracts ovate-lanceolate, sepals 3-nerved lanceolate arched, lateral falcate inserted at the apex of the naked foot of the column, petals broadly oblong 3-nerved, lip stoutly stipitate, columnar spurs erect.

PERAK; on Gonong Brumbar Pahang, alt. 8000 ft., *Wray.*

Rhizome stout, very woody. *Leaf* 4–6 in., thick, linear-oblong, narrowed into a petiole 4 in. long. *Scape* longer than the leaf; sheaths 1–2, appressed; raceme 3 in., rachis stout; pedicel $\frac{1}{4}$ in.; flowers pale green, spotted red; sepals

½ in. long, subacute; lip subterete, obtuse, with large rounded basal auricles; column large.—Insertion of lateral sepals as in 52. *B. gymnopus.*

63. **B. leptosepalum,** *Hook. f. Ic. Plant. ined.*; scape capillary, raceme lax-fld, bracts lanceolate exceeding the ovary, sepals subequal lanceolate caudate-acuminate, lateral from a broad gibbous base, petals small linear-lanceolate, lip stipitate membranous 3-nerved, columnar spurs slender.

PENANG; on Gov't Hill, *Curtis.* PERAK, *Scortechini.* MALACCA, *Maingay* (*Kew Distrib.* 1674).

Rhizome short, tufted. *Leaves* 4–6 in., crowded, petioled, linear-lanceolate, subacute, margins recurved. *Scape* shorter than the leaves; raceme flexuous; flowers ⅓ in. long, white, cellular; pedicel very short; mentum rounded; lip with rounded basal auricles.

64. **B. hymenanthum,** *Hook. f. Ic. Plant. ined.*; rhizome very slender, pseudobulbs 0, leaves small elliptic or suborbicular, scape capillary 2-fld., sepals subequal acuminate from a broadly ovate base 3-nerved, petals linear 1-nerved, lip stipitate oblong obtuse, column with obtuse arms.

KHASIA HILLS; at Myrung, alt. 5000 ft., *J. D. H. & T. T.*

Rhizome tortuous, as thick as packthread. *Leaf* ⅓–½ in., subpetioled, coriaceous, nerveless, tip rounded. *Scape* 1 in.; flowers ½ in. diam. when spread out, close together, but one superposed; bracts minute, sepals and petals hyaline, colourless.—A remarkable little species.

§§ *Pseudobulbs ovoid or globose.*

65. **B. bisetum,** *Lindl. in Ann. Nat. Hist.* x. 186; scape very slender, raceme short erect dense-fld., bracts lanceolate recurved, sepals subequal broadly ovate obtuse dorsally winged, dorsal with a fleshy spur at the base on each side, petals narrowly spathulate 1-nerved, lip stipitate narrow acute pubescent, columnar spurs long. B. cirrhopetaloides, *Griff. Notul.* iii. 290. Bulb. sp., *Ic. Pl. Asiat.* t. 296, f. 1. B. carinifloruum, *Reichb. f. in Walp. Ann.* vi. 253.

KHASIA HILLS, alt. 4–5000 ft., *Griffith* (*Kew Distrib.* 5140), *H. f. & T.* (*Bulboph.* 23), &c.

Rhizome slender; pseudobulbs ½–1 in., ovoid, narrow or broad. *Leaf* 3–4 in., shortly petioled, lanceolate, obtuse. *Scape* 2–3 in. (pendulous, *Ic. Griff.*); sheaths slender; raceme ½–¾ in.; flowers ¼–⅓ in. long, shortly pedicelled, dark purple.—The fleshy appendages at the base of the dorsal sepal are very singular, and homologous with the spurs of *B. xylophyllum.*

66. **B. Globulus,** *Hook. f. Ic. Plant. ined.*; pseudobulbs small globose, scape many-fld. longer than the linear-oblong coriaceous leaf, bracts minute, sepals subequal 3-nerved, dorsal linear-oblong, lateral lanceolate subacute, petals half as long ovate obtuse 1-nerved, lip very small shortly stipitate recurved acuminate, column subtruncate.

PERAK, *Scortechini.*

Pseudobulbs ½ in. diam., crowded. *Leaf* 1½–2 in., obtuse. *Scape* arched; flowers ½ in. diam., membranous.—The single specimen is indifferent, but shows the species to be quite unlike any other.

67. **B. polyrhizum,** *Lindl. Gen. & Sp. Orchid.* 53; pseudobulbs crowded globosely ovoid leafless when flowering, scape erect slender, dorsal sepal ovate-oblong obtuse rather smaller than the subfalcately oblong

obtuse lateral, petals ovate-oblong obtuse, lip sessile obtuse, columnar teeth short.

NEPAL ?, *Wallich* (*Ic. in Herb. Kew*). ? SIKKIM, *Lister* (*Ic. in Herb. Calcutt.*).

Rhizome very short, excessively branched; pseudobulbs size of a small hazel nut, rooting profusely. *Scape* with 6–8-fld. spike 3–5 in.; bracts minute; flowers green, ¼ in. long, suberect.—Of this remarkable plant there is a drawing of Wallich's artist, no doubt made in Nepal; its pseudobulbs are smooth and flowers green. A drawing of a very similar plant from Sikkim has pseudobulbs marked with superposed zones of oblong tubercles; the flowers are pale yellow flushed with pink on the dorsal sepal. Both are represented as leafless.

68. **B. suavissimum,** *Rolfe in Gard. Chron.* 1889, i. 297; scape very slender, raceme elongate decurved, flowers secund, sepals subequal narrowly linear-oblong obtuse 3-nerved, petals not half as long ovate or ovate-lanceolate obtuse 1-nerved obscurely erose, lip sessile small linear-oblong obtuse recurved, columnar teeth broad acute.

UPPER BURMA, *Cooper* (*Hort. C. Bill.*).

Pseudobulbs 1 in., ovoid-oblong, sheathed. *Leaf* 4 in., narrowly oblanceolate, obtuse, rather thin. *Scape* with raceme 8–10 in.; sheaths 2, membranous, appressed; bracts very small; flowers ⅓ in. long, pendulous, shortly pedicelled, very sweet-scented; sepals and petals primrose; lip golden.—Very like *B. auricomum*, and as deliciously scented, but perfectly glabrous.

69. **B. purpureum,** *Thw. Enum.* 298; small, scape short, flowers minute in a dense short spike, bracts very minute, sepals subequal oblong obtuse falcate strongly 3-nerved, petals linear-oblong obtuse, lip stipitate spongy, columnar arms curved obtuse.

CEYLON; in the Ambagamowa district, *Thwaites*.

Rhizome slender; pseudobulbs fusiform, densely crowded. *Leaf* ½–1½ in., obovate or spathulate, retuse, coriaceous. *Scape* sheathed; spike ½–⅔ in. long; pedicel deflexed; ovary erect; flower $\frac{1}{10}$ in. long.—Of three drawings kindly lent by Dr. Trimen, the sepals are in one rose-pink with deep-red nerves, in another lilac with purple nerves, in a third dull purple.

70. **B. triste**, *Reichb. f. in Walp. Ann.* vi. 253; scape slender, top decurved, spike pendulous densely many-fld., bracts minute acute, flowers small, dorsal sepal shortest triangular-ovate obtuse 3-nerved, lateral falcately oblong obtuse concave, petals ovate-oblong acute 1-nerved, lip stipitate broad convex obtuse, columnar spurs slender.

TENASSERIM; on the Toungoo Mts., *Lobb, Parish, Berkeley*.

Rhizome as thick as a duck's quill; pseudobulbs conico-globose, ¾ in. diam. *Leaf* not seen. *Scape* 4–5 in.; sheaths narrow; spike 1–2 in.; rachis slender; flowers ⅓ in. long, purple?; ovary very short.—"Odour strong, pungently fœtid," *Berkeley*.

71. **B. micranthum,** *Hook. f. Ic. Plant. ined.*; scape slender, spike decurved or pendulous densely many-fld., bracts minute acute, flowers very small, dorsal sepal shortest triangular-ovate acute 3-nerved, lateral falcately ovate acute concave 3-nerved, petals ovate acute 1-nerved, lip large stipitate, columnar spurs slender.

TENASSERIM; on Teongoo and Ta-ok, *Parish*.

Pseudobulbs and habit of *B. triste*, to which Parish and Reichb. f. have referred it, but the flowers are spreading, not half the size, and the sepals are acute.

72. **B. reptans,** *Lindl. in Wall. Cat.* 1988; *Gen. & Sp. Orchid.* 51; pseudobulbs obpyriform, scape shorter than the linear-obtuse leaf

sheathed, spike lax-fld., bracts oblong-lanceolate as long or half as long as the sessile flowers, sepals subequal narrowly lanceolate acute 3-nerved, lateral with a broad gibbous base, mentum rounded, petals broadly oblong obtuse 1–3-nerved, lip stipitate recurved, spurs of very minute column slender. B. Clarkei, *Reichb. f. in Journ. Linn. Soc.* xxv. 72. Tribrachia reptans, *Lindl. Coll. Bot.* t. 41 A.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 6–7000 ft., *Griffith's Collectors* (*Kew Distrib.* 5129). KHASIA and NAGA HILLS, alt. 5–6000 ft., *Griffith* (*K. D.* 1573).

Pseudobulbs $\frac{1}{2}$–$\frac{3}{4}$ in., distant; rhizome slender. *Leaf* 4–6 in., narrowed into a petiole. *Scape* and lax-fld. raceme together 2–4 in.; bracts $\frac{1}{6}$–$\frac{1}{3}$ in.; sepals yellow green with pink nerves; lip yellow.

VAR. *subracemosa*; bracts much shorter oblong obtuse, flowers often shortly pedicelled. B. grandiflorum, *Griff. It. Notes* 146, n. 705; *Notul.* iii. 293; *Ic. Pl. Asiat.* t. 294, f. 1.—Sikkim, Bhotan and the Khasia Mts., *Griffith* (*Kew Distrib.* 5130), &c.—Griffith's name *grandiflorum* must be a blunder of the Editor of his works; it does not occur in Griffith's mss.

Sect. IV. IONE. *Lateral sepals* usually connate and placed under the lip. *Lip* rather large, straight, rigid. *Pollinia* 4, attached in pairs to two cartilaginous glands.

* *Flowers* $\frac{3}{4}$–1 *in. long. Lateral sepals* 5–7-*nerved.*

73. **B. paleaceum,** *Benth. in Gen. Pl.* iii. 503; scape tall much longer than the leaf, bracts spathaceous much exceeding the ovary, flowers large racemose, sepals many-nerved, lateral wholly connate, petals broadly oblong 1–3-nerved, lip ovate-lanceolate. Ione paleacea, *Lindl. Fol. Orchid.* 2; *Bot. Mag.* t. 6344 (*excl. syn. Griff.*); *Walp. Ann.* vi. 636.

SIKKIM HIMALAYA; at Dorjeeling, *Griffith's Collectors* (*Kew Distrib.* 5176). DAMSONG, in Western Bhotan, alt. 5–6000 ft., *Clarke, Gamble.*

Pseudobulbs 1–1$\frac{1}{2}$ in., obpyriform. *Leaf* 4–6 in., petioled, linear-oblong. *Scape* with the 4–6-fld. erect raceme 8–14 in.; bracts $\frac{3}{4}$–1 in., oblong-lanceolate, acuminate; flowers $\frac{3}{4}$–1 in. long, drooping; sepals greenish, nerves pink; petals spreading, subserrate; lip purple, entire or crenate, tip thickened or slender.

74. **B. mishmeense,** *Hook. f.*; scape tall much longer than the leaf, bracts ovate imbricate equalling the ovary, flowers large racemose, lateral sepals free, petals acute, lip ovate-cordate, tip elongate stout terete. Ione fusco-purpurea, *Lindl. Fol. Orchid. Ione* 2; *Walp. Ann.* vi. 636. Dipodium, *Griff. Notul.* iii. 405; *Ic. Pl. Asiat.* t. 327, *left-hand figure.*

UPPER ASSAM; Mishmee Mts., on Thumathya, *Griffith.*

Habit and stature of *B. paleaceum*, but bracts and sepals much broader and shorter; lateral sepals free, light brown, purple-veined; lip greenish brown, margin purplish.—I have seen only a mutilated specimen in Herb. Lindl.

75. **B. cirrhatum,** *Hook. f. Ic. Plant. ined.*; scape equalling the leaf, bracts cucullate exceeding the ovary, flowers large racemose, lateral sepals connate, petals rounded quite entire, lip ovate-oblong entire with two elevated lines which are clavate at the base. Ione cirrhata, *Lindl. Fol. Orchid.* 1; *Walp. Ann.* vi. 635.

SIKKIM HIMALAYA, alt. 4000 ft. (*Ic. Cathcart*).

"Very similar to *B. virens*, but leaves longer; lip not serrate, but with 2 elevated white lines. *Flowers* dirty white, with purple streaks and a deep violet lip.—Described from Cathcart's figure." *Lindl. l. c.*

76. **B. virens,** *Hook. f.*; scape longer than the leaves, bracts ovate acuminate longer than the ovary, flowers large racemose, lateral sepals connate, petals quite entire, lip oblong serrulate narrowed into a long stout terete striate point. Ione virens, *Lindl. Fol. Orchid.* 1; *Walp. Rep.* vi. 636. Dipodium, *Griff. Notul.* 405; *Ic. Pl. Asiat.* t. 328, f. 1.

UPPER ASSAM; Mishmee Hills, *Griffith.*

Closely allied to *B. paleaceum.* "Bracts whitish with purple veins; lateral sepals white, margins greenish, veins purple; petals purple and blood-red." *Griffith.*

77. **B. elegans,** *Gard. mss. in Thwaites Enum.* 298; scape very slender longer than the leaf 1-fld., flower large, dorsal sepal ovate acute half the length of the free or coherent oblong lanceolate acuminate lateral, petals ovate-lanceolate, lip with an orbicular membranous waved base traversed by a broad hard axis that terminates in a dagger-shaped apex, columnar spurs long slender.

CEYLON; in the Hantani, &c., districts, alt. 3–5000 ft., *Gardner, Thwaites.*

Pseudobulbs $\frac{1}{3}$–$\frac{1}{2}$ in., ovoid, close-set on a slender rhizome. *Leaf* 3–4 in., linear-lanceolate. *Scape* 1–2 in.; sheath 0; bract small, acute; pedicel with ovary slender, $\frac{3}{4}$–1 in.; flower 1–1$\frac{1}{2}$ in. long, purplish green spotted, lateral sepals forming a boat-shaped body; lip yellow purple spotted.

** *Flowers* $\frac{1}{3}$–$\frac{1}{2}$ *in. long. Lateral sepals 3-nerved.*

78. **B. bicolor,** *Hook. f.*; scape slender shorter than the leaf, bracts lanceolate longer than the ovary, flowers small, sepals subequal linear-lanceolate acuminate, lateral connate at the bases, petals ovate or oblong obscurely serrate, lip panduriform traversed by a rigid axis that terminates in a short or long rigid emarginate point, sides membranous lacerate. Ione bicolor, *Lindl. Fol. Orchid.* 3; *Walp. Ann.* vi. 637. Sunipia bicolor, *Lindl. Gen. & Sp. Orchid.* 179; *Sert. Orchid. Frontisp.* f. 5. I. khasiana, *Lindl. Fol. Orchid.* 2; *Reichb. f. l. c.* 636. Dipodium khasianum, *Griff. Notul.* 354; *Ic. Pl. Asiat.* t. 327, f. 2.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 5–6000 ft., and Bhotan, *Griffith* (*Kew Distrib.* 5137), &c. KHASIA MTS., alt. 5000 ft., *Griffith* (*K. D.* 5138), &c.

Pseudobulbs $\frac{3}{4}$–1 in., obpyriform, distant on a slender rhizome. *Leaf* 3–5 in., subpetioled, linear, obtuse. *Scape* with spike 1$\frac{1}{2}$-2 in.; bracts $\frac{1}{4}$–$\frac{1}{3}$ in.; flower very membranous, $\frac{1}{4}$–$\frac{1}{3}$ in. long; sepals whitish with pink veins; lip purple.—Very like *B. reptans*, under which name it is alluded to by Bentham under *Ione* (*Gen. Pl.* iii. 503).

79. **B. candidum,** *Hook. f. Ic. Plant. ined.*; habit inflorescence and flower of *B. bicolor*, but rather smaller, sepals white, lip yellow dagger-shaped with membranous serrulate sides in the basal half. Ione candida, *Lindl. Fol. Orchid.* 3; *Reichb. f. in Walp. Rep.* vi. 637.

KHASIA HILLS, alt. 4–5000 ft., *J. D. H. & T. T.* NAGA HILLS, *Prain.*

SPECIES EXCLUDED AND UNKNOWN TO ME.

B. ADENOPETALUM, *Lindl. in Bot. Reg.* 1842, *Misc.* 85, which was supposed to be a native of Singapore, is a Philippine Island species.

B. ALOPECURUM, *Reichb. f. in Gard. Chron.* 1880, ii. 70; like *B. triste* but larger, pseudobulb spherical, flowers shorter, sepals connate conchoid equal, petals and conchoid connate equal sepals nerveless.—Burma (*Hort. Low*).

B. CRASSIFOLIUM, *Thw. mss. in Trimen Journ. Bot.* 1885, 244; pseudobulbs pisiform smooth, leaf $\frac{1}{2}$–$\frac{3}{4}$ in. sessile fleshy oval obtuse, flowers solitary very small shortly peduncled in the sheath of a short truncate bract, sepals subequal broadly

ovate, dorsal arched erect, lateral spreading yellow-green densely dotted with red, petals minute broad truncate, lip very small truncate obtuse white.—Ceylon; Kukul Korle in the Western Province, *Thwaites*, C.P. 3879.

B. INERS, *Reichb. f. in Gard. Chron.* 1880, i. 776; pseudobulbs ½–¾ in. brown pyriform, leaf 3 by ¾ in. cuneate-ligulate subacute thick purple beneath, scape slender, top nodding, bracts equalling the ovary, flowers subumbellate white, bracts linear acute, sepals 3-nerved, dorsal triangular shorter than the ligulate attenuate acute lateral, petals triangular 3-nerved, lip cordate-triangular, column 3-toothed.—Assam? (*Hort. Bull*).

B. OLIGOGLOSSUM, *Reichb. f. in Hamb. Gartenzeit.* xxi. 297; allied to *B. odoratissimum*, bracts scarious lanceolate 3–5-nerved longer than the pedicelled ovary, sepals oblong flat to the acuminate tips, petals 3 or 4 times shorter ovate subacute 1-nerved, lip much smaller than the petals cordate obtuse-angled 3-toothed apiculate, mid-tooth produced obtuse, column short angled on both sides.—Burma (*Hort. Low*).

B. PSYCHOON, *Reichb. f. in Gard. Chron.* 1878, ii. 170; pseudobulbs crowded ovoid furrowed, scape exserted many-bracteate at the top 1-fld. (normally umbelled), flowers pale green, dorsal sepal triangular acuminate deflexed, lateral lanceolate acuminate decurved, inner side inflexed, petals much smaller acute minutely denticulate, lip thick semisigmoid, base erect cordate, column with a tooth on each side.—Assam (*Hort. Bull*).—Allied to *B. radiatum*, L.; *odoratissimum*, L.; *oligoglossum*, R. f.

B. SCHMIDTIANUM, *Reichb. f. in Hamb. Gartenzeit.* xxi. 357; allied to *B. psittacoglossum*, raceme long-pedicelled 2-fld., flowers as large as *B. macranthum* golden spotted with brown, mentum oblique obtuse, sepals obtusely acute, dorsal oblong ligulate, lateral broader oblique, petals short ovate acuminate, lip long-clawed fleshy oblong acute, base rounded hastate with a few serratures on each side, column stout 3-toothed angled in the middle on both sides.—*Hort. Schiller, from Calcutta.*

B. SILLENIANUM, *Reichb. f. in Gard. Chron.* 1884, ii. 166; pseudobulb subglobose, leaves cuneate ligulate, peduncle longer than the leaf 1-fld., flowers nearly orange, dorsal sepal ligulate obtuse acute, lateral much broader oblong-triangular, petals ligulate falcate obtuse acute, lip long-clawed cordate 5-angled mauve above whitish beneath, tip inflexed acute, column very short broad, top obtusely angled, anther with a linear apical ridge.—Burma (*Hort. Schlim.*).

9/1. **HENOSIS,** *Hook. f.*

Habit of *Bulbophyllum*, but flowers very long-pedicelled. *Sepals* adnate to the prolonged foot of the column, falcately oblong, acute. *Petals* oblong, adnate by one margin to the column throughout its length, the other decurrent on the foot of the column nearly to its apex. *Lip* articulate with the foot of the column, linear, villously fringed. *Column* membranous, elongate, forming with the longer petals a 2-winged membrane; anther marginal in the sinus between the wings, shortly stipitate, subhemispheric, 2-celled; pollinia 2, oblong, laterally flattened; clinandrum small, transverse.

H. longipes, *Hook. f. Ic. Plant. ined.*—Bulbophyllum longipes, *Reichb. f. in Walp. Ann.* vi. 253.

TENASSERIM; at Moulmein, alt. 4–5000 ft., *Lobb in Herb. Lindl.*

Rhizome as thick as a goose-quill, naked; pseudobulbs ¾–1 in. long, broadly ovoid, smooth. *Leaf* 3–4 in., subsessile, elliptic-lanceolate, subacute, very coriaceous. *Scape* with raceme 9 in., very slender, 10–12-fld.; sheaths 2–3, appressed; bracts ⅛ in., oblong; pedicel with ovary 1–1½ in., filiform; sepals ½ in. long, dorsal erect, subacute; lateral rather longer; foot of column ⅛ in.—A curious plant; very inaccurately described by Reichenbach, who failed to perceive its remarkable structure.

10. **SUNIPIA,** *Lindl.*

A tufted epiphyte; rhizome creeping; pseudobulbs narrow, 1-leaved. *Leaf* coriaceous, many-nerved. *Flowers* small in a distichous spike, concealed by the imbricating bracts. *Sepals* very broad, subequal, spreading. *Petals* minute, rounded-ovate. *Lip* small, sessile on the base of the column, erect, broadly tongue-shaped; midlobe thick, oblong, concave, margins recurved. *Column* very short, broad; anther suberect, sessile, persistent, cells distant; pollinia 4, ovoid, free or cohering by a viscus.

S. scariosa, *Lindl. in Wall. Cat.* 7373; *Gen. & Sp. Orchid.* 179; *Orchid. Scel.* 25; *Sert. Orchid. Frontisp.* No. x.; *Fol. Orchid.* 1. Ornithidium bracteatum, *Wall. mss.*

Subtropical Himalaya; Nepal, *Wallich*; Sikkim, alt. 4–6000 ft., common. Khasia Mts., alt. 3–4000 ft., *Lobb*, &c. Tenasserim; at Moulmein, *Parish.*

Pseudobulbs 1–1½ in., ovoid. *Leaf* 4–6 by ¾–1 in., subsessile, subacute, or tip rounded. *Scape* 5–10 in., very slender; sheaths distant, tubular, truncate; spike curved, 2–6 in.; bracts ¼–⅓ in., very broadly ovate, acute, complicate, scariously coriaceous, nerved; flowers rosy, subsessile; ovary very short, obconic; sepals obscurely 3-nerved, and petals obtuse, very thick; disk of lip with an oblong callus.

11. **CIRRHOPETALUM,** *Lindl.*

Habit and characters of *Bulbophyllum*, but here distinguished by the more often and more regularly whorled flowers, and by the short dorsal sepal, rarely half the length of the almost invariably much longer lateral. *Lip* very small and stipitate in all the species.—Species 30 or more, chiefly Indian and Malayan.

The species of *Bulbophyllum* and *Cirrhopetalum* are in many cases so allied by cross affinities, that the two genera might well be regarded as one. My keeping them apart is due to the consideration of convenience, and the fact that all my attempts to commingle the species of both have resulted in a chaotic aggregate, with most unsatisfactory sectional characters; in fact, a far less natural result than the keeping them apart. The species of this genus are far the most difficult of the two, as regards analysis from dried specimens, on account of the delicacy of the perianth, and the fact that the length, form, colour, and consistence of the lateral sepals alter greatly during development. *C. viridiflorum* and *Blepharistes* have the longer dorsal sepal of *Bulbophyllum*.

A. Flowers solitary (occasionally solitary in imperfectly developed species of other groups).

1. **C. merguense,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 154 (Bolbophyllum); lateral sepals 1½ in. linear-lanceolate acute 5-nerved very much longer than the ovate concave 5-nerved dorsal the tip of which is ciliate with rigid bristles, petals like the dorsal sepal 3-nerved, lip hispid, arms of column rounded.

Pegu; near Rangoon, *Berkeley.* Tenasserim, *Parish.*

Pseudobulbs 1 in., narrow, 5-angled. *Leaf* 1½–2 in., narrowly oblong. *Scape* 2–3 in., filiform, sheaths 2; bracts linear; pedicels ¼ in., slender; flowers yellow and purple; lip purple.

2. **C. lasiochilum,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 153 (Bolbophyllum); lateral sepals 1 in. spreading falcately lanceolate subacute 5-nerved twice as long as the lanceolate coriaceous ciliolate dorsal, petals nearly as long as the dorsal sepal thick lanceolate scabrid ciliate obscurely 3-nerved, lip laterally strigose, columnar teeth short hooked.

TENASSERIM; at Mergui, *Griffith, Parish.*

Pseudobulbs 1 in., oblong. *Leaf* 1–2 in., very coriaceous, linear-oblong. *Scape* as long as the pedicel and ovary; bracts lanceolate. *Dorsal sepal* and *petals* dark purple; lateral sepals at the end of the naked foot of the column, connate beyond the stipes of the lip.

B. Flowers capitate.

3. **C. vaginatum,** *Lindl. in Wall. Cat.* 1979; *Gen. & Sp. Orchid.* 59; *Bot. Reg.* .1842, *under* t. 12, and 1843, *under* t. 49; scape laxly sheathed, flowers capitately racemose, bracts long lanceolate, sepals ending in capillary tails, dorsal ovate acuminate ciliate 5-nerved many times shorter than the lanceolate 5-nerved lateral, petals oblong, tip rounded ciliate faintly 3-nerved, lip oblong 2-ridged, columnar spurs long slender erect. C. caudatum, *Wight Ic.* t. 1658 (*not of Wallich*). Bulbophyllum vaginatum, *Reichb. f. in Walp. Ann.* vi. 261.

PENANG, *Curtis.* SINGAPORE, *Wallich,* &c. MALACCA, *Griffith.*—DISTRIB. Borneo.

Pseudobulb $\frac{1}{2}$–1 in., conic, rhizome very stout. *Leaf* 2–4 in., oblong, emarginate, densely coriaceous. *Scape* 2–3 in.; bracts $\frac{1}{2}$ in., much longer than the slender pedicels; flowers 1 in. or more.—Closely allied to *Bulb. Medusæ.*

C. Flowers umbelled; umbels rarely reduced to 1–2 flowers.

* *Dorsal sepals and petals ciliate fimbriate or appendaged.*

4. **C. grandiflorum,** *Wight Ic.* t. 1656 (*excl. left-hand anal.*); sepals acuminate, lateral 2 in. linear 5-nerved twice as long as cymbiform ciliate 3-nerved dorsal, petals subulate-lanceolate 3-nerved ciliate, arms of large column erect 2-toothed. Bulbophyllum Wightii, *Reichb. f. in Walp. Ann.* vi. 262.

CEYLON; Central Province, alt. 3–6000 ft., *Walker.*

Pseudobulbs conic. *Leaf* 3–5 in., shortly petioled, linear-oblong, obtuse. *Scape* as long, stout; sheaths 2; bracts $\frac{1}{3}$–$\frac{1}{2}$ in., lanceolate, thick; umbels few-fld.; pedicels $\frac{1}{2}$ in., stout; flowers purple.

5. **C. ornatissimum,** *Reichb. f. in Gard. Chron.* 1882, ii. 424; lateral sepals 2–4 in. linear-lanceolate with filiform tips 6-nerved much longer than the cymbiform acuminate 5-nerved dorsal, petals subulate-lanceolate falcate 3-nerved and dorsal tipped with a brush of slender red paleæ, lip strigose, columnar arms large decurved. *Warner Orchid. Alb.* t. 369.

SIKKIM HIMALAYA (*Ic. in Herb. Calcutt.*). ASSAM, *Griffith.*

Pseudobulbs 1–2 in., 3–4-angled. *Leaf* 4–6 in., linear-oblong, obtuse, petiole short. *Scape* very robust; bracts $\frac{1}{2}$ in.; pedicels $\frac{1}{4}$ in.—In the Herb. Calcutt. drawing the flower is 4 in. long, sepals and petals yellow-green with streaks of purple dots.

6. **C. Collettii,** *Hemsley in Journ. Linn. Soc. ined.*; lateral sepals 4–5 in. linear-lanceolate with very long filiform tips, dorsal cymbiform narrowed into a long tail fringed with large lanceolate paleæ, petals very short broad ciliate abruptly narrowed into a linear tip fringed with large cuneate-obovate toothed paleæ, lip glabrous, columnar teeth short.

EASTERN BURMA; Shan Hills, alt. 6000 ft., *Collett.*

Rhizome very stout; pseudobulbs very small, young enclosed in coriaceous sheaths. *Leaf* 1–1$\frac{1}{2}$ in., sessile, ovate to elliptic-oblong, thick. *Scape* 3–6 in., very robust; umbel many-fld.; bracts $\frac{1}{4}$–$\frac{1}{3}$ in.; pedicel with ovary $\frac{1}{2}$–$\frac{2}{3}$ in.; dorsal sepal $\frac{2}{3}$ in.,

5-nerved, paleæ sessile or with a capillary stipes, mobile, terminal often largest; petals ⅓ in., very oblique, nerves 3, distant; paleæ about 12; lip thick, obtuse, recurved, papillose, base sagittate.—A beautiful plant.

7. **C. fimbriatum,** *Lindl. in Bot. Reg.* 1839, *Misc.* 72; lateral sepals 1–1½ in. linear acute flat coherent 5-nerved many times longer than the triangular-ovate caudate long-ciliate dorsal, petals triangular caudate long-ciliate 1-nerved, lip tumid, columnar arms long horizontal. *Wight Ic.* t. 1655; *Bot. Mag.* t. 4391; *Dalz. & Gibs. Bomb. Fl.* 261. Bulbophyllum fimbriatum, *Reichb. f. in Walp. Ann.* vi. 260. ? C. Wallichii, *Grah. Cat. Bomb. Pl.* 205.

The CONCAN and CANARA; from Bombay southwards, *Law*, &c.

Pseudobulbs globose, smooth, leafless when flowering. *Umbels* many-fld.; flowers subsessile, green with red cilia.

8. **C. gamosepalum**, *Griff. Notul.* iii. 296; lateral sepals ⅔ in. linear-oblong or -lanceolate acute flat at first coherent 5-nerved many times longer than the ovate obtuse long-ciliate dorsal, petals longer than the dorsal sepal lanceolate caudate 3-nerved long-ciliate, lip membranous 3-nerved, columnar arms rounded. C. Andersonii, *Kurz in Report Veg. Andaman.* 51. Bulbophyllum Griffithianum, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 153.

TENASSERIM, *Griffith, Parish.* PERAK, *Scortechini.* MALACCA, *Maingay* (*Kew Distrib.* 1622–3). ANDAMAN ISLANDS, *Kurz.*—DISTRIB. ? Borneo.

Pseudobulbs 1–1½ in. *Leaf* 2–5 in., linear-oblong or oblanceolate, obtuse, trabeculate with cross nervules when dry, subpetioled. *Scape* 4 in., slender; umbels many-fld.; bracts setaceous; pedicels ¼ in.; dorsal sepal and petals bright red, lateral speckled with purple at length widely divergent.

9. **C. Roxburghii,** *Lindl. Gen. & Sp. Orchid.* 58; *in Bot. Reg.* 1843, *under* t. 49; lateral sepals ⅔ in. linear subfalcate obtuse 3–4 times longer than the broadly ovate aristate ciliate dorsal, petals 3-nerved equalling and similar to the dorsal, lip smooth, column unarmed. *Hook. f. Ic. Plant. ined.* Bulbophyllum Roxburghii, *Reichb. f. in Walp. Ann.* vi. 263. Aerides radiatum, *Roxb. Fl. Ind.* iii. 476.

GANGETIC DELTA, *Carey* (*Roxburgh*).

Pseudobulbs small, subglobose. *Leaf* 3–4 in., linear-oblong. *Scape* longer than the leaf; umbel many-fld.; dorsal sepal and petals yellow striped with red; lateral yellow; lip red-purple.—I have seen no specimens, but an excellent drawing of Roxburgh's artist.

** *Dorsal sepal glabrous or nearly so. Petals erose ciliate or fimbriate.*

10. **C. cornutum,** *Lindl. in Bot. Reg.* 1838, *Misc.* 75; 1843, *under* t. 49; lateral sepals 1½ in. linear-lanceolate obtuse convex coherent 5-nerved many times longer than the small cymbiform dorsal, petals ovate acute ciliate 3-nerved, lip smooth, columnar arms acute. *Bot. Mag.* t. 4753. Bulbophyllum cornutum, *Reichb. f. in Walp. Ann.* vi. 261.

SIKKIM HIMALAYA (*Ic. Cathcart*). KHASIA HILLS, alt. 5–6000 ft., *Simons*, &c.

Pseudobulbs 1–5 in., ovoid or columnar, terete. *Leaf* 6–10 in., linear-oblong, obtuse; petiole long. *Scape* long, slender; umbels many-fld.; lateral sepals red-brown, dorsal and petals green blotched with purplish brown.

11. **C. picturatum,** *G. Loddiges in Bot. Reg.* 1840, *Misc.* 49; lateral sepals 1–2½ in. linear-lanceolate acuminate convex coherent 5-nerved 3–5 times longer than the cymbiform abruptly aristate dorsal, petals caudate-

acuminate erose 3-nerved, column large, arms subulate. *Lindl. in Bot. Reg.* 1843, *under* t. 49; *Bot. Mag.* t. 6802. Bulbophyllum picturatum, *Reichb. f. in Walp. Ann.* vi. 262.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs 2–7 in., ovoid, smooth, angled. *Leaf* 3–5 in., linear-oblong, tip rounded. *Scape* 5 in., slender; bracts ½ in.; slender; pedicels as long; flowers purple, stained with dark red; lip hastate with incurved uncinate basal lobes.

12. **C. simillimum,** *Reichb. f. Ot. Hamburg.* 49; lateral sepals ¾–1 in. linear-lanceolate acuminate 5-nerved three times as long as the ovate-lanceolate acute 5-nerved dorsal, petals nearly as large as the dorsal sepal ovate acute 3-nerved serrulate, lip scabrid, column unarmed.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs 1 in. *Leaf* 4 in., linear-oblong, obtuse. *Scape* slender, 4–5 in.; umbels few-fld.; bracts ⅙ in., subulate; flowers spotted with purple.—My specimen is very indifferent; the absence of the awn on the dorsal sepal at once distinguishes it from the preceding, and the 3-nerved serrulate petals from *elatum.*

13. **C. cæspitosum,** *Wall. in Bot. Reg.* 1838, *Misc.* 35; lateral sepals ¾ in. linear-lanceolate obtuse 5-nerved three times as long as the cymbiform subacute 5-nerved dorsal, petals broadly ovate-oblong subacute erose 3-nerved, columnar teeth minute. *Lindl. in Bot. Reg.* 1843, *under* t. 49. Bulbophyllum scabratum, *Reichb. f. in Walp. Ann.* vi. 259.

KHASIA HILLS, *Gibson, Griffith.*

Pseudobulbs ovoid. *Leaves* 4–6 in., linear- or oblong-lanceolate. *Scape* loosely sheathed; umbel few-fld.; flowers cellular or papillose, pale ochreous yellow, nerves of sepals and petals flexuous.

**** Dorsal sepal and petals glabrous, quite entire.*

† *Lateral sepals more than ½ in. long.* (A very vague character; see note under generic description.)

14. **C. bootanense,** *Griff. Notul.* iii. 297; *Ic. Pl. Asiat.* t. 299; flowers dorsally compressed coriaceous, lateral sepals dimidiate-oblong obtuse cohering in a subpanduriform blade three times as long as the suborbicular apiculate dorsal, petals oblong obtuse 3-nerved, lip shortly stipitate, columnar teeth slender erect. Bulbophyllum bootanense, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 153, t. 32, f. 2.

BHOTAN HIMALAYA, *Griffith.* TENASSERIM, *Parish.*

Pseudobulbs 1½–2 in., narrow. *Leaf* 2–3 in., linear-oblong or lanceolate, notched. *Scape* stout, shorter than the leaves; umbels few-fld.; bracts large; pedicels stout; flowers rose-red sprinkled with purple.—In Griffith's drawing the flowers are umbelled, in Parish's sketch there are but two flowers, their pedicels springing from the base of the pseudobulb. This species resembles no other, and is closely related to *Bulboph. cylindraceum* and *repens*, but its flowers are normally umbelled, and the dorsal sepal is shorter.

15. **C. elatum,** *Hook. f. Ic. Plant. ined.*; lateral sepals 1–1¼ in. linear-lanceolate subacute 5-nerved convex 3–4 times as long as the broadly ovate obtuse 5-nerved dorsal, petals broadly ovate apiculate 1-nerved, lip convex, columnar teeth very short.

SIKKIM HIMALAYA, alt. 5000 ft., *Gamble, Clarke.*

Pseudobulbs 2–4 in., ovoid or columnar. *Leaf* 8–10 in., linear-oblong, obtuse; petiole stout. *Scape* 10 in., stout, speckled with purple; sheaths 3, loose; umbels

many-fld.; bracts $\frac{1}{3}$–$\frac{1}{2}$ in.; pedicels as long; flowers dirty yellow, speckled with purple.—Size and habit of *C. picturatum*, but the dorsal sepal has no awn, the petals are not erose, and the column has very short teeth.

16. **C. maculosum,** *Lindl. in Bot. Reg.* 1841, *Misc.* 81; 1843, *under* t. 49; scape much shorter than the leaf, lateral sepals $\frac{1}{2}$–$\frac{2}{3}$ in. falcately ovate-lanceolate from a broad base acute 7-nerved twice as long as the broadly ovate acute dorsal, petals small ovate acute 3-nerved, lip short broad stipitate, columnar teeth short. Bulbophyllum umbellatum, *Lindl. in Wall. Cat.* 1984; *Gen. & Sp. Orchid.* 56 (*not of Bot. Reg.* 1845, t. 44). Bulbophyllopsis maculosa, *Reichb. f. in Walp. Ann.* vi. 243. B. Morphologorum, *Reichb. f. in Bot. Zeit.* 1852, 933.

Western Himalaya; Nepal, *Wallich*; Garwhal and Kumaon, alt. 3–4000 ft., *Falconer, Strachey & Winterbottom*, &c.

Rhizome slender. *Leaf* 5–6 in., linear, notched. *Scape* 2–3 in., stout; umbels 2–5-fld.; flowers subracemose, pale yellow-green, unspotted; bracts ovate-lanceolate.—Quite intermediate in flower between this genus and *Bulbophyllum*, but habit of this.

Var. *fuscescens*, flowers dull pale pink yellowish or brownish.—Nepal, Sikkim.

17. **C. guttulatum,** *Hook. f.*; scape equalling or exceeding the leaf, lateral sepals $\frac{1}{2}$–$\frac{3}{4}$ in. ovate-lanceolate from a broad base 7-nerved hardly twice as long as the broadly ovate obtuse 5-nerved dorsal, petals ovate obtuse 3-nerved, lip short nearly as broad as long, columnar spurs long slender. Bulbophyllum umbellatum, *Lindl. in Bot. Reg.* 1844, t. 44 (*not elsewhere*). B. guttulatum, *Wall. mss.*

Subtropical Himalaya; Nepal, *Wallich*; Sikkim, alt. 3–6000 ft.

Pseudobulbs 1–2 in., ovoid. *Scape* 6–10 in., sprinkled with purple; umbel few-fld.; sepals spreading, yellow or greenish, speckled with purple; lip pale purple.—The longer scape and long spurs of the column at once distinguish this from *C. maculosum*.

18. **C. retusiusculum,** *Reichb. f. in Gard. Chron.* 1869, 1182; lateral sepals 1 in. linear subacute coherent 3-nerved many times longer than the broadly oblong retuse 3-nerved dorsal, petals broadly oblong as long as the dorsal 3-nerved, tip rounded, lip lanceolate recurved, columnar spurs short erect.

Tenasserim; on Moolee, alt. 5–6000 ft., *Benson, Parish.*

Pseudobulbs $\frac{1}{2}$–1 in., obpyriform, striate. *Leaf* 2–3 in., subspathulate, obtuse. *Scape* 3–4 in., slender; sheaths 2; umbels many-fld.; bracts $\frac{1}{4}$ in., slender; pedicel with ovary $\frac{1}{2}$ in., slender.—The specimens are poor, and colours unknown.

19. **C. Wallichii,** *Lindl. in Wall. Pl. As. Rar.* i. 53, t. 67; *Gen. & Sp. Orchid.* 59 (*not of Bot. Reg.*); lateral sepals 1–1$\frac{1}{4}$ in. linear-lanceolate acuminate falcately incurved 5-nerved 3–4 times as long as the oblong obtuse 3-nerved dorsal, petals as long as the dorsal oblong, tip rounded or retuse 3-nerved, lip subacute, columnar teeth very short. ? Bulbophyllum muscicola, *Reichb. f. in Flora* 1872, 275.

Temperate Himalaya; Nepal, *Wallich*; Sikkim, alt. 5–7000 ft., *Griffith's Collectors*, &c.

Pseudobulbs $\frac{3}{4}$–1 in., subglobose or ovoid, or elongate. *Leaf* 2–4 in., elliptic-oblong, acute or obtuse. *Scape* slender, equalling or exceeding the leaves; umbels few-fld.; bracts subulate, $\frac{1}{4}$–$\frac{1}{3}$ in., shorter than the pedicels; flowers red-brown.—**On Jillapahar (Sikkim), alt. 7500 ft., I found and drew a species closely resembling this, but with a linear leaf 5 in. long, a small quadrate dark red ribbed dorsal sepal**

and yellowish lateral sepals with red nerves. Reichenbach's *B. muscicola* (from the Eastern Himalaya, alt. 9000 ft.) is, I suspect, the same; the leaf is described as oblong ligulate, the lateral sepals coherent to the tip, the dorsal sepal and petals ovate obtusely retuse, the lip complicate sagittate, and the column as 3-toothed. It is said to be near *retusiusculum*.

20. **C. Andersoni,** *Hook. f. Ic. Plant. ined.*; lateral sepals ¾ in. dimidiate-obovate from a narrow base obtuse apiculate coherent nearly throughout five times longer than the orbicular dorsal, petals ovate acuminate.

SIKKIM HIMALAYA; near Darjeeling, alt. 7000 ft., *T. Anderson* (*Ic. in Herb. Calcutt.*).

Pseudobulbs 1–1½ in., narrow. *Leaf* 4–6 in., petioled, narrowly linear-oblong, acute. *Scape* 4–5 in., slender; umbels about 6-fld.; flowers shortly pedicelled, ⅓ in. across the coherent sepals, white sprinkled with red-purple.—A beautiful plant, described from a drawing in Herb. Calcutt.

21. **C. brevipes,** *Hook. f. Ic. Plant. ined.*; scape very short sheathed, lateral sepals 1 in. falcately lanceolate acute free, three times as long as the broadly obovate obtuse dorsal, petals broadly ovate, tip rounded.

SIKKIM HIMALAYA, between Yoksun and Jongri, alt. 8000 ft., *T. Anderson.*

Rhizome long, slender, suberect, probably scandent, bearing very distant erect narrow pseudobulbs 1–1½ in. long. *Leaf* 2 in., linear-oblong, apiculate. *Scape* ½–1 in.; sheaths lanceolate; umbels 3–4-fld., flowers rose-pink.—Described from a drawing in Herb. Calcutt. The erect habit is singular.

22. **C. aureum,** *Hook. f. Ic. Plant. ined.*; small, lateral sepals ⅔ in. linear-oblong acute incurved three times as long as the orbicular ovate obtuse dorsal, petals oblong, tip rounded, column with spreading obtuse arms.

MALABAR; in the Wynaad, *Jerdon* (*Ic. in Herb. Kew*).

Pseudobulbs ovoid, distant on a slender rhizome. *Leaf* 1½ in., linear-oblong. *Scape* slender, shorter than the leaf; umbel 2-fld.; flowers golden yellow; lateral sepals at first cohering.—Described from Jerdon's drawing. I find nothing like this beautiful little plant in any collection.

23. **C. Wightii,** *Thwaites Enum.* 299 (*in part*); lateral sepals ⅔ in. linear-oblong subacute convex 5-nerved three times as long as the broadly ovate obtuse 5-nerved dorsal, petals ovate acute erose 3-nerved, columnar teeth short. C. Macraei, *Wight Ic.* t. 1652 (*not of Lindl.*). Bulbophyllum Elliæ, *Reichb. f. in Walp. Ann.* vi. 263; *Trimen in Journ. Bot.* 1874, 199 *in part.*

CEYLON; Newera Elia, *Walker*; Central Province, alt. 4–7000 ft., *Thwaites.*

Rhizome stout; pseudobulbs ovoid. *Leaf* 1½–2½ in., very coriaceous, elliptic or linear-oblong; petiole short. *Scape* rather stout, shorter or longer than the leaf, green speckled with red; umbels 6–8-fld.; flowers ochreous-green; sepals with a marginal line of red specks.—There are (as Thwaites suggests) several species included under Thwaites' numbers 632, 2740, 3160, and these numbers do not apply to the same species in all herbaria, nor are they represented by sufficiently good specimens in any. I therefore hesitate to quote their numbers.

24. **C. Thwaitesii,** *Reichb. f. in Walp. Ann.* vi. 263, and in *Trimen Journ. Bot.* 1874, 198 (Bulbophyllum); lateral sepals ½ in. lanceolate obtuse widely spreading 5-nerved twice as long as the ovate obtuse or acute dorsal, petals ovate acute, columnar teeth very short.

CEYLON; Newera Elia, alt. 4–7000 ft., *Thwaites.*

There are two drawings of this in Herb. Peradenzia, both ticketed by Thwaites

C. Wightii, var., C.P. 2740 ; in one the leaves are short broadly elliptic, the scape stout and pedicels and ovaries with red granulations, the dorsal sepal elliptic obtuse, and the petals oblong rounded ; in the other the leaves are linear, the scape slender, the dorsal sepal lanceolate acuminate, and the petals ovate obtuse or acute. The flowers of both are pale straw-coloured.

25. **C. nilgherrense,** *Wight Ic.* t. 1654; lateral sepals ¾–1 in. linear-lanceolate acuminate 5-nerved coherent thrice as long as the ovate acute 5-nerved dorsal, petals broadly oblong thickly 3-nerved, tip rounded, columnar spurs short erect. Bulbophyllum kaitiense, *Reichb. f. in Walp. Ann.* vi. 262.

NILGHIRI HILLS ; at Conoor and below Kaitia, alt. 6000 ft., *Wight, Gamble.*

Pseudobulbs ¾–1 in., ovoid. *Leaf* 3–4½ in., linear-oblong, obtuse. *Scape* 3–4 in.; sheaths small ; umbels many-fld. ; bracts and pedicels ⅙ in.; flowers papillose ; sepals, pedicels and bracts yellowish mottled with red ; petals with broad red nerves.—I do not find the pubescence on the lip beneath and face of the column described by Wight. Except in the much greater size in Wight's figure this hardly differs from *C. acutiflorum.*

26. **C. Gamblei,** *Hook. f. Ic. Plant. ined.* ; lateral sepals ½ in. linear-oblong subacute 5-nerved puberulous towards the base three times as long as the broadly ovate 3-nerved dorsal, petals broadly oblong 3-nerved, tip rounded, lip with rounded basal angles, columnar teeth minute.

NILGHIRI HILLS ; at Conoor, alt. 6000 ft., *Gamble.* BABABOODAN HILLS, *Law.*

Pseudobulbs ½ in., ovoid. *Leaf* 1–2 in., linear-oblong or -lanceolate. *Scape* 1–2 in., very slender ; sheaths 1–2, loose ; bracts and pedicels ⅛ in. ; flowers yellow, streaked and dotted with red.

27. **C. Thomsoni,** *Hook. f.*; lateral sepals ½ in. falcately lanceolate acute 5-nerved three times as long as the ovate subacute 5-nerved dorsal, petals broadly oblong 3-nerved, tip rounded, column truncate.

NILGHIRI HILLS, *Wight, G. Thomson* ; at Neddivuttum, alt. 7000 ft., *Clarke.*

Pseudobulbs ¼–½ in., ovoid. *Leaf* 1–3 in., linear-oblong, petioled. *Scape* very slender ; sheaths 2–3, small, and bracts ⅙ in., ovate-lanceolate, membranous ; dorsal sepal and petals purple ; lateral yellow, purple at the base.—Near *C. nilgherrense,* but much smaller, leaves shorter, umbels fewer-fld., lateral sepals narrower, and colour very different.

†† *Lateral sepals about ½ in. long or less.*

28. **C. Pumilio,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 153 (Bulbophyllum); bracts minute, lateral sepals ½ in. linear-lanceolate acuminate 3-nerved three times as long as the ovate acuminate 3-nerved dorsal, petals orbicular-oblong broader than the dorsal 3-nerved, lip ovate-lanceolate spongy, columnar spurs short erect.

TENASSERIM ; on trees, Zuggick, *Parish.*

Rhizome slender ; pseudobulbs small, conico-globose. *Leaf* 1–1½ in., linear-oblong. *Scape* 2 in., slender ; bracts ⅛ in. ; pedicels as long, capillary ; lateral sepals yellow, and dorsal and petals streaked with purple.

29. **C. parvulum,** *Hook. f. Ic. Plant. ined.* ; bracts longer than the pedicel and ovary, lateral sepals ½ in. elongate-lanceolate acuminate 3-nerved thrice as long as the elliptic obtuse 3-nerved dorsal, petals elliptic-oblong 3-nerved, tip rounded, lip subacute, columnar teeth short slender.

SIKKIM HIMALAYA; at Darjeeling (*Griffith's Collectors*).

Rhizome slender, flexuous; pseudobulbs $\frac{1}{4}$–$\frac{1}{3}$ in., ovoid or narrower. *Leaf* 1 in., elliptic or linear-oblong obtuse; petiole short. *Scape* 2 in., naked; flowers 2–3, scarcely umbelled; bracts $\frac{1}{4}$–$\frac{1}{3}$ in.

30. **C. acutiflorum,** *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 18, t. 7 (Bolbophyllum); lateral sepals $\frac{1}{2}$ in. linear-lanceolate acuminate 7-nerved twice or thrice as long as the falcately ovate-lanceolate long-acuminate 5-nerved dorsal, petals broadly oblong 3-nerved, tip rounded, lip with uncinate recurved basal lobes, columnar teeth minute. *Reichb. f. in Walp. Ann.* vi. 263.

NILGHIRI HILLS; at Ootacamund, *Perrottet*; Conoor, *Wight*.

Pseudobulbs $\frac{3}{4}$–1 in., globosely ovoid. *Leaf* $1\frac{1}{2}$–2 in., oblong. *Scape* slender, about equalling the leaves; sheaths 2–3; umbels 6–8-fld.; bracts $\frac{1}{4}$ in., lanceolate; pedicels longer, slender; flowers greenish white or creamy.—Specimens very indifferent. Very near *Bolboph. albidum*.

D. Flowers racemose (or very shortly subumbellate in *C. Macraei*). See also *C. parvulum*, and others in Sect. C.

31. **C. refractum,** *Zollinger in Flora* 1847, 457; lateral sepals 1–$2\frac{1}{2}$ in. strap-shaped acuminate cohering to the tips, many times longer than the lanceolate awned ciliate dorsal, petals lanceolate ciliate and pubescent, columnar spurs long slender decurved. *Walp. Ann.* i. 776. C. Wallichii, *Lindl. in Wall. Cat.* 1980; *in Bot. Reg.* 1839, *Misc.* 71; 1843, *under* t. 49 (*not of Wall. Pl. As. Rar.*). C. tripudians, *Par. & Reichb. f. in Gard. Chron.* 1876, 817. Bulbophyllum tripudians, *ejusd. in Trans. Linn. Soc.* xxx. 154. B. refractum, *Reichb. f. in Walp. Ann.* vi. 259.

SUBTROPICAL HIMALAYA, from Kumaon, alt. 3700 ft., *Strachey & Winterbottom*, to Sikkim, alt. 4–5000 ft., *J. D. H.*, &c. TENASSERIM, *Parish*.—DISTRIB. Java.

Pseudobulbs short, conical, crowded. *Leaves* 2 on young pseudobulbs, 4–5 in., lanceolate, acute. *Scape* stout, 4–6 in.; raceme few- or many-fld., nodding; bracts large, ovate or lanceolate; pedicels very short; dorsal sepal 3-nerved, orange; lateral 3–5-nerved, golden yellow; petals 3-nerved and lip speckled with red; lip subcylindric, hispid or glabrate.

32. **C. viridiflorum,** *Hook. f. Ic. Plant. ined.*; lateral sepals $\frac{2}{3}$ in. ovate-lanceolate acute cohering to the tips twice as long as the ovate acute dorsal, petals suborbicular, columnar arms erect hatchet-shaped apiculate.

SIKKIM HIMALAYA, alt. 6–7000 ft., *Treutler*, &c. KHASIA HILLS; at Shillong, alt. 5500 ft., *Clarke*.

Pseudobulbs 1 in., subovoid. *Leaves* 2, 4–6 in., elliptic-lanceolate, subacute. *Scape* as long; raceme 2–4 in., nodding; bracts ovate-lanceolate, membranous; flowers subsessile; sepals 5–7-nerved, green; petals 1-nerved and short lip purple.—Closely allied to *C. refractum*, though the dorsal sepal is long enough for a *Bulbophyllum*.

33. **C. Blepharistes,** *Reichb. f. in Trans. Linn. Soc.* xxx. (Bolbophyllum); lateral sepals 1 in. linear-lanceolate acuminate coherent three times as long as the lanceolate acuminate dorsal, petals broadly oblong or obovate fimbriate, columnar arms minute.

KHASIA HILLS, *Badgeley* (*Ic. in Herb. Calcutt.*). TENASSERIM, *Parish*.

Pseudobulbs $1\frac{1}{2}$–3 in., on a very stout rhizome, oblong. *Leaves* 2–3 in., oblong, very thick. *Scape* 6–12 in.; raceme short, erect, dense-fld.; rachis stout; bracts minute, acute, persistent; pedicels $\frac{3}{4}$ in., slender; lateral sepals 7-nerved, pale

yellow-green with faint red nerves, bases rounded together forming a cordate-lanceolate blade; petals 5-nerved, yellow tipped with red.—Dorsal sepal of a *Bulbophyllum*, but whole habit of *Cirrhopetalum*. The colours are taken from the drawing with obovate petals.

34. **C. Macraei,** *Lindl. Gen. & Sp. Orchid.* 59; *in Bot. Reg.* 1841, *Misc.* 52; lateral sepals 2 in. narrowly linear-lanceolate with long filiform tips coherent three times as long as the lanceolate acuminate dorsal, petals falcately ovate-lanceolate, columnar arms long broad horizontal crenate on one side. *Bot. Mag.* t. 4422. C. Walkerianum, *Wight Ic.* t. 1657. Bulbophyllum Walkerianum, *Reichb. f. in Walp. Ann.* vi. 263.

CEYLON; in the Hantani and Hewahette districts, alt. 3–4000 ft.

Pseudobulbs small, ovoid. *Leaves* 3–5 in., petioled, oblong, subacute. *Scape* 6 in., very slender; flowers between umbelled and racemose; bracts long, ovate-lanceolate; pedicels very short; sepals pale yellow and scarlet, lateral 5- dorsal 3-nerved; petals 3-nerved, scarlet.

SPECIES UNKNOWN TO ME.

B. (Cirrhopetalum) MANNII, *Reichb. f. in Flora* 1872, 275; leaf petioled cuneate-oblong obtusely acute dilated above, peduncle deflexed, umbel few-fld., mentum angled, sepals golden with many brown specks, dorsal lanceolate aristate, lateral contiguous caudately narrowed from a broad base, petals ligulate decurved awned from the middle, lip thick curved somewhat margined 2-edged with a small callus at the base of the claw, column dilated at the base, arms curved retuse, base above 1-toothed, lip 2-toothed, lower tooth obtuse.—Assam, *Mann.*—Probably near *C. cornutum.*

C. TÆNIOPHYLLUM, *Par. & Reichb. f. in Trimen Journ. Bot.* 1874, 198 (Bolbophyllum); pseudobulb conic, top narrowed, when dry furrowed lengthwise and across, leaf cuneate ligulate obtuse acute longer than the peduncle, flowers yellow with purple dots, bracts broadly triangular 1-nerved not equalling the pedicelled ovary, dorsal sepal short triangular 1-nerved, lateral 3–4 times longer coherent, bases free acute 3-nerved, petals ligulate acute 3-nerved, lip 2-edged ½-lunate, column bisetose. —Tenasserim, *Parish.*

12. TRIAS, *Lindl.*

Small epiphytes with the habit and foliage of *Bulbophyllum.* *Scape* lateral, 1-fld. *Sepals* subequal, spreading, 7-nerved, lateral adnate to the foot of the column. *Petals* small, oblong or linear. *Lip* small, coriaceous or fleshy, jointed on to the foot of the column, inflexed, incumbent, mobile. *Column* short, broad, tip angled, winged or toothed; anther erect, caducous, 2-celled, produced into a long horn; pollinia subcoherent in pairs in each cell.—Species 3, all Indian.

1. **T. oblonga,** *Lindl. in Wall. Cat.* 1977; *Gen. & Sp. Orchid.* 60; leaves elliptic or oblong obtuse, sepals subacute, petals ovate, lip trulliform subacute with erect auricles, horn of anther notched at the tip. *Wall. Pl. As. Rar.* i. 55, t. 70. Bolb. oblongum, *Reichb. f. in Walp. Ann.* vi. 249. Dendrobium tripterum, *Wall. mss.*

TENASSERIM; at Moulmein, *Wallich, Griffith, Parish.*

Pseudobulbs ½–⅔ in. diam. *Leaves* 1–1½ in. long. *Scape* very slender, ½–1 in. *Flower* 1 in. diam.; lip grooved in the middle.—Lindley describes the flowers as brownish green, and lip as purple. Parish has flowers yellow.

2. **T. picta,** *Benth. in Gen Plant.* iii. 505; leaves ovate or elliptic-lanceolate contracted at the tip or at both ends, sepals subacute, petals obovate deflexed, lip oblong granulate, tip rounded, horn of anther entire.

Bolbophyllum pictum, *Parish & Reichb. f. in Trans. Linn. Soc.* xxx. 150. ? B. moulmeinense, *Reichb. f. in Walp. Ann.* vi. 249.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs $\frac{3}{4}$ in. diam. *Leaves* 2–$2\frac{1}{2}$ in. *Flowers* $\frac{3}{4}$ in. diam.; sepals greenish white with purple spots; lip not grooved, surface convex.

3. **T. Stocksii,** *Benth. mss.*; leaves elliptic acute, sepals obtuse, petals ovate-lanceolate erect, lip oblong, shoulders convex, tip rounded, horn of anthers slender, tip entire.

The DECCAN PENINSULA; Canara, *Stocks*; N. & S. Concan, *Law.*

Pseudobulbs $\frac{3}{4}$ in. *Leaves* 1 in. *Scape* $\frac{1}{2}$ in. *Flowers* $\frac{1}{2}$–$\frac{2}{3}$ in. diam.; lip convex, smooth.

4. **T. ovata,** *Lindl. Gen. & Sp. Orchid.* 60; leaves ovate, petals white striped with purple, lip green.

EAST INDIES, *Wallich.*

Described by Lindley as above, from a drawing, with the remark that it may be a variety of *T. oblonga.*

13. DRYMODA, *Lindl.*

A very small epiphyte; pseudobulbs disciform, 1-leaved. *Scape* basal, filiform, 1-fld.; sheaths 1–2 near its base, minute. *Sepals* spreading; dorsal small, broadly ovate; lateral at the end of the naked foot of the column, oblong-lanceolate. *Petals* minute, orbicular. *Lip* very small, stipitate on the foot of the column, base saccate, lobes short rounded. *Column* very short, with 2 linear-oblong decurved wings and a long naked foot; pollinia 4, globose, sessile on a large gland.

D. picta, *Lindl. Sert. Orchid.* t. 8 C; *Bot. Mag.* t. 5904; *Walp. Ann.* vi. 467.

BURMA, *Griffith.* TENASSERIM; on mountains, alt. 5000 ft., *Parish.*

Pseudobulbs $\frac{1}{2}$ in. diam., appressed to the bark. *Leaf* $\frac{1}{2}$ in., sessile, ovate, acute, fugacious. *Scape* $1\frac{1}{2}$–2 in.; flower $\frac{1}{2}$ in. long; lateral sepals yellow-green with purple stripes; lip dark red-purple; column and its foot and wings green, purple-spotted.

14. MONOMERIA, *Lindl.*

Pseudobulbs 1-leaved, on a stout long rhizome. *Leaf* long, flat, thick, petioled. *Scape* from the rhizome long; flowers loosely racemed. *Dorsal sepal* broad, erect, complicate, acuminate; lateral much longer at the end of the naked foot of the column. *Petals* minute, broad, fimbriate. *Lip* small, jointed on the foot of the column, subcordate, margin revolute; side lobes small, horn-like, apex terete obtuse, disk broadly lamellate. *Column* very short, broad, 3-toothed; anther 1-celled; pollinia 4, cohering by a globose gland.

M. barbata, *Lindl. in Wall. Cat.* 1798; *Gen. & Sp. Orchid.* 61; *Sert. Orchid. Frontisp.* M. Crabro, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 143, t. 28. Epicranthes barbata, *Reichb. f. in Walp. Ann.* vi. 265.

NEPAL, *Wallich.* TENASSERIM, at Moulmein, *Parish.*

Pseudobulbs 2–3 in., ovoid, smooth. *Leaf* 8–10 in., thickly coriaceous, tip

obliquely obtusely 2-fid, narrowed into the 4–6 in. petiole. *Scape* 12–18 in., flexuous; sheaths short, distant; raceme long; bracts $\frac{1}{6}$ in.; flowers white speckled with purple, about 1 in. long; lip orange-brown.—I find no character whereby to distinguish *M. Crabro*; the analysis of the lip in the plate does not conform to mine. Possibly the Nepal habitat is an error.

15. **DENDROCHILUM,** *Blume.*

Epiphytes; rhizome creeping, scaly; pseudobulbs narrow, 1-leaved. *Leaf* flat, narrow, coriaceous. *Scape* lateral, slender; flowers small, in slender spikes or racemes. *Sepals* subequal, spreading; lateral adnate to the foot of the column. *Petals* smaller. *Lip* jointed on the foot of the column, subsessile, erecto-patent, oblong, base umbonate. *Column* short, with lateral or terminal teeth or arms; anther 2-celled; pollinia 4, ovoid, bases cohering by a slight viscus.—Species 3–4, Indian and Malayan.

1. **D. pallidiflorum,** *Blume Bijd.* 398, t. 52; leaf elliptic-oblong, sepals linear obtuse 1-nerved, lip oblong obtuse, base with 2 bosses, arms of column from above the middle. *Lindl. Gen. & Sp. Orchid.* 34.

TENASSERIM, *Parish.* PERAK, ascending to 4000 ft., *Scortechini, King's Collector.*—DISTRIB. Java.

Rhizome 2–4 ft., rigid. *Pseudobulbs* $\frac{3}{4}$ in., ovoid. *Leaf* 3–5 in., shortly petioled. *Scape* slender, bracteate below the 3–4 in. raceme; bracts shorter than the ovary, ovate, acute; flowers $\frac{1}{8}$–$\frac{1}{2}$ in. diam.; sepals thickened beyond the middle.—Perak specimens have smaller flowers than the Tenasserim. I have seen no authentic Javan ones.

2. **D. linearifolium,** *Hook. f. Ic. Plant. ined.*; leaf narrowly linear obtuse, sepals acuminate 3-nerved, lip oblong or obovate-oblong obtuse, base 3-ridged, arms of column basal elongate.

PERAK, *Scortechini*; on Batang Padong, alt. 4900 ft., *Wray.*

Pseudobulbs $\frac{1}{2}$ in., curved. *Leaf* $1\frac{1}{2}$–2 in., petioled. *Scape* 1–2 in., raceme as long, lax-fld.; bracts lanceolate, equalling the ovary; flowers $\frac{1}{3}$ in. diam., greenish; sepals and subequal petals lanceolate.

3. **D. bracteosum,** *Reichb. f. in Walp. Ann.* vi. 24; leaf elliptic-lanceolate or oblanceolate acute, sepals lanceolate acuminate 3-nerved, lip subpanduriform, base 3-ridged and with 2 recurved teeth, terminal lobe orbicular apiculate, arms of column subterminal erect acute.—Liparis bracteosa, *Wall. Cat.* 7406.

MALAY PENINSULA, *Finlayson.*

Rhizome short, stout, crinite; pseudobulbs 3 in., slender. *Leaf* 6 in.; petiole short. *Scape* 3–8 in., slender, curved; spike 3–7 in.; bracts obovate-oblong, equalling the ovary, truncate, scarious; flowers $\frac{1}{3}$ in. diam.; petals linear-lanceolate.

16. **PANISEA,** *Lindl.*

Small tufted epiphytes; pseudobulbs crowded, 2-leaved. *Leaves* plaited. *Scape* lateral; flowers few, racemed; bracts membranous. *Sepals* and *petals* subequal, narrow, erect; lateral sepals saccate at the base. *Lip* as long as the sepals, adnate to the base of the column; claw sigmoid. *Column* slender, erect, 2-winged above; anther 2-celled; pollinia 4, ovoid, free or subcoherent by a viscus.

Very near *Cœlogyne* (to which Bentham has referred Lindley's other species), differing chiefly in the clawed lip.

1. **P. parviflora**, *Lindl. Fol. Orchid.* 1; lip narrowly lanceolate. P. reflexa, *Lindl. l. c.* Cœlogyne parviflora, *Lindl. Gen. & Sp. Orchid.* 44. Dendrobium demissum, *Don Prodr.* 34.—Androgyne, *Griff. Notul.* iii. 279.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 4–10,000 ft., *Clarke.* KHASIA MTS., *Griffith*, &c.

Pseudobulbs ½–1 in., narrow. *Leaves* 2–3 in., petioled, elliptic-lanceolate, acute. *Scape* filiform; bracts ⅓ in., oblong, acute; raceme 3–5-fld.; flowers ⅔ in. long, white; lateral sepals membranous, lanceolate, acute, 5-nerved; dorsal linear-oblong; petals ovate-lanceolate, 3-nerved, base gibbous; lip 3-nerved, subacute, tip of slender claw 2-tubercled; column pale brown, tip entire or toothed. *Capsule* ⅓ in. long, turgidly obovoid.

2. **P. apiculata**, *Lindl. Fol. Orchid.* 2; lip broadly oblong apiculate. Cœlogyne apiculata, *Par. & Reichb. f. in Gard. Chron.* 1865, 1035.

TENASSERIM; at Moulmein, *Lobb, Parish.*

Pseudobulbs ½ in., ovoid, 2-leaved. *Leaves* 2½–3 in., shortly petioled, linear-lanceolate. *Scape* 1–2-fld., shorter than the leaves; basal sheaths membranous; bracts shorter than the pedicel; flowers ½–⅔ in. diam., greenish or white with two small brown blotches on the lip; sepals keeled, acute; petals ovate-lanceolate, acuminate; lip with a saccate sigmoid claw, sides obscurely angled, tip sometimes obtusely 3-toothed.

17. ACROCHÆNE, *Lindl.*

A large epiphyte; pseudobulbs on a stout rhizome, 1-leaved. *Leaf* long-petioled, linear-oblong, coriaceous. *Scape* lateral, erect; raceme long. lax-fld.; bracts large, membranous. *Sepals* spreading, subequal, lateral obliquely adnate to the foot of the column. *Petals* small, lacerate. *Lip* erect, shorter than the sepals, jointed to the foot of the column, claw short; side lobes induplicate, adnate to the face of the narrow oblong obtuse blade. *Column* very short, stout, foot long; anther transversely oblong, 1-celled; pollinia 2, globose, cohering by a short flat granular at length 2-partite viscus.

A. punctata, *Lindl. Fol. Orchid.* 1; *Walp. Ann.* vi. 635.

TROPICAL SIKKIM HIMALAYA, *J. D. H.*

Pseudobulbs 1 in., conic or subglobose. *Leaf* 5–6 by 1¼–2 in.; petiole 3–4 in. *Scape* 6–10 in., stout, base broadly sheathed; bracts ¾ in., acute, deciduous; flowers 1 in. diam.; pedicel slender; sepals membranous, 7-nerved, dorsal oblong-ovate; lateral gibbously triangular-ovate, acuminate; petals with capillary ends of the fimbriæ; lip incurved, side lobes very convex, obtuse, adnate to the narrow short thick truncate midlobe.

18. CHRYSOGLOSSUM, *Blume.*

Terrestrial; rhizome creeping; pseudobulb narrow or 0, 1-leaved. *Leaf* solitary, elliptic-lanceolate, plaited. *Scape* lateral from the rhizome, long, erect, sheathed; flowers laxly racemed. *Sepals* subequal, lateral connate into a mentum with the base of the lip. *Petals* narrower. *Lip* erect. broadly 3-lobed and with sometimes an auricled base, disk with 3 lamellæ. *Column* incurved, margins 2-auricled or lobed about the middle; anther 2-celled; pollinia 2, free.—Species 4–5, Indian and Malayan.

Entirely resembles *Tainia* and *Plocoglottis* in habit, but pollen very different.

1. **C. villosum**, *Blume Bijd.* 338, t. 17; *Orchid. Archip. Ind.* 162. t. 47; leaf very large shortly petioled villous on both surfaces. *De Vriese Ill. Orchid.* 290, t. 12, f. 4; *Walp. Ann.* vi. 206.

PERAK, *Scortechini.*—DISTRIB. Java.

Leaf 6–12 in., broadly elliptic or ovate; petiole 1–2 in. *Scape* with *raceme* 1–2 ft., and flowers villous; bracts $\frac{1}{3}$–$\frac{3}{4}$ in., shorter than the ovary; flowers $\frac{3}{4}$ in. diam., yellow, banded with purple; dorsal sepal linear, lateral decurved; petals upcurved; lip clawed, side lobes truncate, midlobe panduriform; lamellæ undulate or crisped. *Columnar arms* long, ascending, truncate.

2. **C. erraticum,** *Hook. f. Ic. Plant. ined.*; glabrous, leaf long-petioled, scape slender, pedicels long slender, lip hastately 3-lobed, base 2-auricled, mentum very short.

TROPICAL SIKKIM HIMALAYA; at Rishep, alt. 4000 ft., *Clarke.*

Leaf 16 by $2\frac{1}{2}$ in., 5–7-nerved; petiole 3 in., ending below in a narrow pseudobulb. *Scape* with *raceme* 2 ft.; bracts $\frac{1}{2}$ in.; pedicel with ovary $1\frac{1}{4}$ in.; flower green speckled brown; sepals and petals falcately oblong-lanceolate, acute; side lobes of lip broad, recurved, midlobe orbicular; disk 3-lamellate; auricles of column rounded.—Only one specimen seen.

3. **C. assamicum**, *Hook. f. Ic. Plant. ined.*; glabrous, leaf long-petioled, scape slender, lip cuneately 3-lobed, lobes rounded, base obscurely auricled, mentum spurred.

ASSAM, *Griffith.*

Leaf 10 by 2 in.; nerves 5, strong; petiole 4 in.; base not thickened. *Scape* with *raceme* $1\frac{1}{2}$–2 ft.; bracts $\frac{1}{2}$ in., as long as the pedicel and ovary; flowers $\frac{1}{2}$–$\frac{2}{3}$ in. diam.; sepals and petals 3-nerved, obtuse; lip with a broadly cuneate base above the rounded auricles, disk 3-lamellate; spur horn-like, free of the lateral sepals, as long as the lip, incurved, subacute; auricles of column rounded.—Only one specimen seen.

4. **C. maculatum,** *Hook. f. Ic. Plant. ined.*; glabrous, leaf short-petioled, scape stout, lip cuneately 3-lobed, base 2-auricled, mentum minute. Ania maculata, *Thwaites Enum.* 301.

CEYLON; in the Central Province, alt. 5000 ft., *Thwaites.*

Leaf 7–12 by 3–4 in., elliptic-lanceolate, 5–7-nerved; petiole 1–4 in., thickening into a conical elongate pseudobulb. *Scape* with *raceme* as long as the leaf or longer; bracts $\frac{1}{3}$–$\frac{1}{2}$ in., shorter than the ovary; sepals $\frac{1}{2}$ in., 5-nerved and 3-nerved petals obtuse, pale green with lines of purple specks; lip white, base purple-spotted, side lobes and short auricles rounded; midlobe concave; column with rounded side auricles and two small basal ones.

18/2. **COLLABIUM,** *Blume.*

Terrestrial?; rhizome creeping; pseudobulbs narrow, 1-leaved. *Leaf* plicate. *Scape* from the base of the pseudobulb; flowers in a long raceme. *Lateral sepals* adnate to the trumpet-shaped foot of the column. *Petals* ovate or linear. *Lip* short, articulate with the mentum or foot of the column; side lobes ear-shaped, erect; midlobe very broadly obcordate, pubescent. *Column* long, incurved, sides at top angled or with two subterminal incurved arms; anther small, hemispheric, 2-celled; pollinia 2, double, united by a viscus.

C. Wrayi, *Hook. f. Ic. Plant. ined.*; leaf lanceolate, bracts short ovate acute, mentum not spur-like, column with 2 incurved arms.

PERAK; on Waterfall Hill, *Wray, Scortechini.*

Pseudobulb 3 in., narrowly oblong, curved. *Leaf* 12 by 2 in., subacute. *Scape* with *raceme* 16 in., slender, flexuous, with many scattered bract-like sheaths; flowers $\frac{1}{2}$ in. diam.; sepals acute, 5-nerved, united to the base only of the upcurved trumpet-shaped hollow foot of the column, which rises in front in 2 obtuse horns, and is open in front just over the insertion of the lip.—This species requires a modification of

the generic character, the original *C. nebulosum*, Bl. (Miq. Choix, t. 26), of Java, having broad petals, no arms to the column, and the mentum spur-like. A figure of this by Scortechini represents a pendulous plant with 2 double pollinia sessile on a broad semilunate gland? (he has no specimens). Reichenbach's Bornean *C. simplex* can hardly be a congener.

19. **ERIA**, *Lindl.*

Epiphytes of various habit. *Flowers* never large or bright-coloured. *Sepals* free (very rarely connate), adnate to the elongate foot of the column, and with it forming a short or long and spur-like or saccate mentum (mentum 0 in *E. leiophylla*). *Lip* sessile on the foot of the column and incumbent (mobile in *E. pulchella* and *barbata*). *Anther* imperfectly 4- or 8-celled; pollinia normally 8, pyriform or broadly obovoid, attached in fours by narrow bases to a viscus.—Species upwards of 100, Tropical Asiatic.

Perhaps the most polymorphous genus of Orchids, and very difficult of division into definable groups. Though never confounded with *Dendrobium*, the only available distinctive character between these is the oblong pollinia of the latter genus, and more or less pyriform of *Eria*. In the following descriptions of the species, I have omitted many characters of the column, anthers, and pollen that are doubtless of first-rate importance, but cannot be sufficiently well detected or examined in dried specimens as to afford safe sectional characters. I am unable to retain as sections *Urostachya* and *Cylindrolobus*. The monotypic sections *Xiphosium*, *Dilochiopsis*, and *Pellaianthus*, are aberrant. *E. pulchella*, Lindl. (Callostylis, *Blume*), should form a section (or genus), if the lip is, as Blume says, mobile; perhaps together with *E. barbata*, which, according to Griffith, has a tremulous lip. The thickened nerves, calli, &c., of the lip in many species are very variable in development; and considerable allowance must be made for faulty characters due to the unsatisfactory condition of complicated organs that have been dried for years, and restored by maceration or boiling.

KEY TO THE SECTIONS.

I. PORPAX, *Lindl.* (Gen.). Small species. *Pseudobulbs* depressed, clothed with reticulated sheaths, 2-leaved. *Leaves* sessile, membranous, caducous. *Flowers* 1–3, subsessile on the top of the pseudobulb; sepals free or connate; column very short.—Species 1–5.

II. CONCHIDIUM, *Griff.* (Gen.). Small species. *Pseudobulbs* naked or sheathed, and leaves as in *Porpax*. *Flowers* solitary or few, on a slender scape from the top of the pseudobulb.—Sp. 6–9.

III. BRYOBIUM, *Lindl.* (Gen.). Small species. *Pseudobulbs* ovoid or depressed, 2–3-leaved. *Leaves* membranous. *Scape* from between the leaves, filiform. *Flowers* racemose, small, glabrous.—Sp. 10–15.

IV. ERIURA, *Lindl.* *Stem* tall (rarely short), terete, leafy. *Leaves* distichous, long, narrow. *Flowers* minute, woolly, in subterminal spikes, racemes or fascicles; lateral sepals short, broad; column very short.—Sp. 16–20.

V. MYCARANTHES, *Blume* (Gen.). *Pseudobulbs* on a creeping rhizome, elongate, cylindric or clavate, naked. *Leaves* 2–3, terminal, narrow. *Flowers* minute, woolly, in secund spikes from the side of the pseudobulb or from between the leaves.—Sp. 21, 22.

VI. HYMENERIA, *Lindl.* (and UROSTACHYA, *Lindl.*). *Pseudobulbs* short or long, 1–∞-noded, often forming a fleshy stem, or crowded on the creeping rhizome. *Flowers* small or medium-sized, glabrous or pubescent, rarely woolly, in lateral or subterminal spikes or racemes.

* Flowers small or minute, in dense spikes, racemes or clusters.—Sp. 23–27.

** Flowers small or medium-sized, in lax spikes or racemes.—Sp. 28–51.

*** Flowers medium-sized, 1–3, long-pedicelled, on a short subterminal scape with as many large spreading white or coloured bracts. *Stem* erect, elongate,

usually fleshy, cylindric. (Cylindrolobus, *Blume*, Gen.) (See also Gen. **33.** TRICHOSMA).—Sp. 52–60.

VII. DENDROLIRION, *Lindl.* *Stems* or *pseudobulbs* very various. *Leaves* one or few, terminal or subterminal on the pseudobulbs, or on a creeping rhizome. *Flowers* in terminal or subterminal spikes or racemes, or subsolitary on the rhizome, woolly or densely tomentose.

* Pseudobulbs usually large. Inflorescence white-woolly.—Sp. 61–68.

** Pseudobulbs large. Inflorescence brown-tomentose.—Sp. 69–70.

*** Pseudobulbs very small or 0.—Sp. 71–76.

VIII. BAMBUSIFOLIA, *Hook. f.* *Stem* tall, terete, leafy. *Leaves* distichous, elliptic or lanceolate, glabrous. *Flowers* in leaf-opposed racemes, glabrous or tomentose.—Sp. 77–79.

IX. TRICHOTOSIA, *Blume* (Gen.). *Stems* usually long, terete, leafy (short and creeping in *E. sedifolia*), often hirsute. *Leaves* narrow, distichous. *Flowers* in leaf-opposed clusters, spikes or racemes, more or less hirsute; lip usually very narrow and stiff; mentum short.—Sp. 80–90.

X. XIPHOSIUM. *Pseudobulb* uninodal, 1-leaved. *Scape* from the base of the pseudobulb, clothed below with equitant sheaths, the uppermost ensiform. *Flower* rather large; sepals keeled; ovary and pedicel tripterous.—Sp. 91.

XI. ACRIDOSTACHYA, *Hook. f.* *Pseudobulb* very short, 1-leaved, sheathed as in *Xiphosium*. *Scape* from the base of the pseudobulb, stout, erect. *Flowers* minute, in dense rusty-tomentose spikes; sepals very short; mentum long, spur-like.—Sp. 92.

XII. DILOCHIOPSIS, *Hook. f.* *Stems* tufted, tall, erect, leafy. *Leaves* distichous, ensiform. *Flowers* in a short terminal branched panicle with large deciduous rigid bracts.—Sp. 93.

XIII. PELLAIANTHUS, *Hook. f.* *Stems* terete, short, erect from a creeping rhizome. *Leaves* 2, terminal. *Spike* short, lateral; perianth very thick; column with a very short foot or 0.—Sp. 94.

Sect. I. PORPAX (see p. 785).

1. **E. reticulata,** *Benth. in Gen. Pl.* iii. 509; sepals united in a sub-campanulate very short broadly 3-lobed tube, petals spathulate 5-nerved, mentum obscure, lip half the length of the petals very shortly clawed panduriform, base with a long erect spur. Porpax reticulata, *Lindl. in Bot. Reg.* xxxi. (1845), *Misc.* 62; *Walp. Ann.* vi. 266. Cryptochilus reticulatus, *Reichb. f. in Bot. Zeit.* 1862, 214. Aggeianthus reticulatus, *Wight Ic.* t. 1737.

The DECCAN PENINSULA; Iyamallay Hills, *Wight.* Canara; at Chandway, *Ritchie.*

Pseudobulbs $\frac{3}{4}$ in. diam., densely crowded. *Leaves* not seen. *Flower* $\frac{1}{2}$–$\frac{3}{4}$ in. long, purple-brown, minutely hispid; pedicel very short, with a very large broad bract and many sheaths; nerves strong, petals and lip subcrenulate; pollinia 4 or 8, pyriform.

2. **E. Meirax,** *N. E. Br. in Gard. Chron.* 1880, 603; sepals glabrous 5-nerved coherent into a gibbous-based tube with free ovate acute lobes, petals broadly oblong 5–7-nerved ciliate, lip minute ovate-cordate 5-nerved serrulate. E. Elwesii, *Reichb. f. in Gard. Chron.* 1883, i. 402. Cryptochilus Meirax, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 148.

TENASSERIM; at Moulmein, *Parish.* SIKKIM HIMALAYA, *Elwes.*

Pseudobulbs $\frac{1}{3}$ in. diam., minutely reticulate. *Leaves* not seen in Moulmein specimens, in Sikkim 1 in., oblong-lanceolate, acute, petioled. *Flowers* $\frac{1}{2}$ in. long; bracts very large, hemispheric, with a long mucro.—Mr. Brown indicates the

probability of *E. Elwesii* not differing from *E. Meirax*, and no distinctive characters for it are given.

3. **E. Lichenora,** *Lindl. in Journ. Linn. Soc.* iii. 46; leaves orbicular-ovate ciliate, perianth 2-labiate, lateral sepals connate pubescent, petals linear 1-nerved, mentum small rounded, lip very small shortly clawed ovate-cordate, sides toothed, tip acute or subulate. E. Jerdoniana, *Reichb. f. in Walp. Ann.* vi. 267. Lichenora Jerdoniana, *Wight Ic.* t. 1738.

MALABAR; on the Bababoodan Hills, *Jerdon*, &c.; Travancore, *Johnson*.

Pseudobulbs $\frac{1}{2}$–$\frac{3}{4}$ in. diam., crowded. *Leaves* 1 in., dark green or purplish. *Flowers* $\frac{1}{3}$ in. long, tawny; pedicel very short, with a very broad ciliate bract, and many subsimilar sheaths; dorsal sepal orbicular-ovate, 5-nerved, united lateral concave.

4. **E. ustulata,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 147; leaves elliptic or broadly ovate subacute ciliolate, perianth 2-labiate pubescent, lateral sepals connate, mentum obscure, petals subspathulate 3–5-nerved, lip orbicular with a short tip erosely ciliate.

TENASSERIM; at Moulmein, *Parish*.

Very similar to *E. Lichenora*, but the flowers are much smaller and the lip different; the latter is described by the authors of the species as oblong acute undulate umbonate at the base.

5. **E. Parishii,** *Lindl. & Reichb. f. in Trans. Linn. Soc.* xxx. 147; leaves ovate acute ciliolate, sepals free glabrous 3-nerved, dorsal large orbicular-ovate obtuse, lateral short uncinately recurved obtuse, mentum large rounded, petals lanceolate falcate 3–5-nerved, lip very small elliptic subacute at both ends.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs $\frac{1}{3}$–$\frac{1}{2}$ in. diam. *Leaves* $\frac{3}{4}$ in. *Flowers* minute; sepals $\frac{1}{10}$ in. long; pollinia pyriform.

Sect. II. CONCHIDIUM (see p. 785).

6. **E. reticosa,** *Wight Ic.* t. 1637; leaves lanceolate or elliptic-lanceolate, flowers rather large, sepals acute 5-nerved, dorsal linear-lanceolate, lateral falcate, mentum broad incurved, petals lanceolate acute 5–7-nerved, lip nearly as long as the sepals linear-oblong 3-lobed, side lobes rounded terminal ovate, disk with 2 crested ridges. E. uniflora, *Dalz. in Hook. Kew Journ. Bot.* iv. (1852) 111. E. braccata, *Dalz. & Gibs. Bomb. Fl.* 262 (*not Lindl.*).

On the WESTERN GHATS, from the Concan to the Nilghiris, *Wight*, &c.

7. **E. braccata,** *Lindl. in Journ. Linn. Soc.* iii. 46 (*excl. syn. Wt. & Dalz.*); leaves oblanceolate, flowers large, sepals obtuse 5-nerved, dorsal oblong-lanceolate, lateral nearly straight, mentum broad incurved, lip narrowly oblong entire as long as the sepals, disk with 2 crested ridges. Dendrobium braccatum, *Lindl. Gen. & Sp. Orchid.* 75.

CEYLON; Central Province, *Walker*, &c.

Pseudobulbs $\frac{1}{4}$–$\frac{2}{3}$ in. diam., not netted. *Leaves* 1–1$\frac{1}{2}$ in. obtuse, apiculate. *Scape* 1–1$\frac{1}{2}$ in.; bract cucullate. *Sepals* $\frac{1}{2}$–$\frac{2}{3}$ in. long.

8. **E. pusilla,** *Lindl. in Journ. Linn. Soc.* iii. 48; leaves 1–3 spathu-

lately obovate with a terminal seta, flowers small, sepals acuminate and linear-lanceolate petals 3-nerved, mentum large incurved, lip lanceolate obscurely serrulate. *Walp. Ann.* vi. 267. Conchidium pusillum, *Griff. Notul.* 321; *Ic. Pl. Asiat.* t. 310 (*greatly enlarged*). Phreatia uniflora, *Wight Ic.* t. 1734.

KHASIA MTS., alt. 4–5000 ft., *Griffith*, &c.

Pseudobulbs $\frac{1}{8}$–$\frac{1}{4}$ in. diam., distant on the slender rhizome. *Leaves* $\frac{1}{2}$–1 in. *Scape* $\frac{1}{2}$–1 in., capillary, 1-fld., with often a rudimentary second within the concave bract; sepals $\frac{1}{4}$ in. long.—Lindley overlooked this in the Herb. Ind. Or. H. f. & T., referring it to *Bolbophyllum*.

9. **E. extinctoria,** *Oliver in Bot. Mag.* t. 5910; dorsal sepal much smaller than the lateral ovate obtuse 5-nerved, lateral triangular acute 5-nerved, mentum longer than the lateral sepals conical incurved 2-lobed, petals oblong obtuse 3-nerved, lip larger than the sepals obcordate with a 2-lobuled undulate midlobe in the sinus. Dendrobium extinctorium, *Lindl. in Bot. Reg. under* t. 1756, *and in Journ. Linn. Soc.* iii. 11; *Walp. Ann.* vi. 308.

TENASSERIM; at Moulmein, *Griffith, Parish*.

Pseudobulbs crowded, $\frac{1}{4}$–$\frac{1}{3}$ in. diam., naked. *Leaves* not seen. *Scape* 2–3 in., filiform, with 1–2 small sheaths; mentum $\frac{1}{4}$–$\frac{1}{3}$ in. long; disk of lip with 3 hispid ridges, lobules of midlobe orbicular, with a scarlet blotch at the base; column very short.

Sect. III. BRYOBIUM (see p. 785).

10. **E. articulata,** *Lindl. in Journ. Linn. Soc.* iii. 47; pseudobulbs ellipsoid adhering end to end like a chain, scape from the point of juncture of the bulbs capillary, spike flexuous, bracts cymbiform, flowers minute distant, sepals obtuse lanceolate, dorsal recurved, lateral with upcurved tips, mentum large incurved, petals small lanceolate, lip minute with a long slender claw and horseshoe-shaped limb. Alwisia tenuis, *Lindl. Fol. Orchid.* 1; *Thwaites Enum.* 300.

CEYLON; in the Ambagamowa district, *Walker, Thwaites*.

Pseudobulbs $\frac{1}{4}$–$\frac{1}{3}$ in. long. *Leaves* 1–2, $\frac{1}{2}$–1 in. long, oblanceolate, apiculate. *Scape* 1–3 in., naked; bracts broad, cucullate, acute; flowers buff, $\frac{1}{10}$ in. long; ovary very short; nerves of sepals very obscure.

11. **E. exilis,** *Hook. f. Ic. Plant. ined.*; pseudobulbs as in *E. articulata*, scape short capillary, flowers distant in a flexuous spike, bracts cymbiform, sepals obtuse nerveless, dorsal largest oblong, lateral short falcately decurved, tips thickened, mentum as long as the sepals very stout incurved, petals linear-oblong 1-nerved, lip minute elliptic-oblong obtuse fleshy.

TRAVANCORE, *Johnson* (*Herb. Wight*).

Much smaller than *E. articulata*, but closely resembling it in scape, bracts, and spike; leaves not seen; flowers $\frac{1}{12}$ in. long; pseudobulb small, with a membranous coat.

12. **E. perpusilla,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 148; pseudobulbs clustered depressed, scape filiform, spike rather dense-fld., bracts ovate-lanceolate, sepals obtuse 1-nerved, dorsal triangular-ovate, lateral lanceolate, mentum obscure, petals linear 1-nerved, lip lanceolate 3-nerved, margins waved.

TENASSERIM; at Moulmein, *Parish, Lobb* (*in Herb. Lindl.*).

Pseudobulbs ½–¾ in. diam., smooth. *Leaves* not seen. *Scape* 2–2½ in.; spike ½–¾ in.; bracts ⅒ in., hyaline; sepals about as long.

13. **E. Dalzellii,** *Lindl. in Journ. Linn. Soc.* iii. 47; pseudobulbs clustered depressed, scape filiform, spike many-fld. secund, bracts lanceolate, sepals 1–3-nerved, dorsal ovate-lanceolate, lateral falcately ovate or lanceolate subacute or acuminate, mentum short rounded, petals lanceolate 1–3-nerved, lip small panduriform with 2 thickened nerves meeting near the rounded tip. *Dalz. & Gibs. Bomb. Fl.* 262; *Walp. Ann.* vi. 268. E. microchilos, *Lindl. l. c.*; *Dalz. & Gibs. l. c.*; *Walp. Ann. l. c.* E. filiformis, *Reichb. f. l. c.* 268 (*in part*). Dendrobium microchilos, *Dalz. in Hook. Kew Journ.* iii. (1851) 345. D. filiforme, *Wight Ic.* t. 1642 (*central and left-hand figs.*).

DECCAN PENINSULA; on the Ghats from the Concan southwards.

Very variable. *Pseudobulbs* ⅓–½ in. diam. *Leaves* 1–4 in., linear to oblanceolate, tip rounded, apiculate. *Scape* with spike 1–3 in.; flower yellow; sepals ⅛–⅓ in. long, lateral straight or falcate.

VAR. *fimbriata*; petals and in a less degree the lateral sepals fringed with translucent gland-tipped hairs. Dendrobium fimbriatum, *Dalz. in Hook. Kew Journ.* iv. (1852) 292. D. Dalzellii, *Hook. l. c.*

14. **E. nana,** *A. Rich. in Ann. Sc. Nat. Ser.* 2, xi. 19; leaves 2 elliptic-lanceolate, scape and spike short, flowers secund, sepals linear-lanceolate 3-nerved, mentum short, petals linear acuminate, base 3-nerved, lip half as long as the sepals, linear slightly contracted in the middle 3-nerved, tip rounded crenulate. *Lindl. in Journ. Linn. Soc.* iii. 46; *Walp. Ann.* vi. 269. Dendrobium filiforme, *Wight Ic.* t. 1642 (*lower right-hand fig.*).

NILGHIRI HILLS on trees, *Wight, Sir F. Adam.*

Closely allied to *E. Dalzellii*, but leaves more oblong, scape shorter, flowers twice as large, and lip much narrower.—An authentic specimen in Herb. Lindl. certifies Wight's figure quoted above, and his specimens being the plant of A. Richard. Lip not acute, as described by A. Richard and Lindley.

15. **E. muscicola,** *Lindl. in Journ. Linn. Soc.* iii. 47; leaves 2–3 petioled oblanceolate apiculate, scape and raceme longer than the leaves, flowers very small, bracts ovate or lanceolate, sepals lanceolate finely acuminate 1–3-nerved, lateral falcate, petals narrowly lanceolate 1–3-nerved, mentum rounded, lip narrow lanceolate or slightly dilated in the middle. Dendrobium muscicola, *Lindl. in Wall. Cat.* 2017; *Gen. & Sp. Orchid.* 75.

NEPAL, *Wallich.* KHASIA MTS., alt. 3–4000 ft., *Griffith*, &c. TENASSERIM, *Parish.* CEYLON; Central Province, alt. 5–7000 ft., *Gardner.*

Very like a small state of *E. Dalzellii* (with which Reichb. is disposed to unite it), but the lip is never panduriform. There may be more than one species here. Wallich's (imperfect) specimens are very small-flowered. I do not share Lindley's doubts (Journ. Lin. Soc. l. c.) as to their being from Nepal, for the specimens bear (in his own writing) the date of 1821, the year in which Wallich was in that country. In Tenasserim specimens the lip has very narrow side lobes about the middle, and an obtuse tip. In the Ceylon ones the flowers are larger (sepals ¼–⅓ in.), and lip ovate-lanceolate, subacute, margins waved. The Khasia ones are in fruit only, capsule ⅓ in., pyriform.

Sect. IV. ERIURA (see p. 785).

16. **E. paniculata,** *Lindl. in Wall. Pl. As. Rar.* i. 32, t. 36; *in Bot. Reg.* xxviii. 1842, *Misc.* 38; *in Journ. Linn. Soc.* iii. 55; leaves 10–

12 in. linear fleshy nerveless, bracts ovate-lanceolate reflexed, lip suborbicular, side lobes falcately oblong, midlobe reniform or 2-lobed crenate, hypochile greatly thickened with a disciform elevated basal tubercle and a very large heel-like one concave towards the column on the midlobe.

SIKKIM HIMALAYA, at Kursiong, *J. D. H.* KHASIA MTS., alt. 4000 ft., *Griffith*, &c. Naga Hills in UPPER ASSAM, *Prain*.

Stem 1–2 ft., as thick as a goose-quill. *Leaves* $\frac{1}{8}$–$\frac{1}{3}$ in. broad, taper-pointed, in Sikkim specimens loaded with crystalline concretions. *Branches* of panicle 6–8 in.; bracts $\frac{1}{4}$ in.; mentum short, rounded; petals elliptic, obtuse, 3-nerved.

17. **E. obliqua,** *Lindl. in Journ. Linn. Soc.* iii. 55; stem 1–2 in., sheaths coriaceous, leaves 2 in. linear subacute thickly coriaceous, raceme erect capillary tomentose, bracts ovate-lanceolate, flowers minute, lip broadly cuneate, side lobes elongate triangular-lanceolate acute, midlobe very short truncate, angles acute, disk with a large erect fleshy spur on the midlobe and pulvinus at the base. Mycaranthes obliqua, *Lindl. in Bot. Reg.* 1840, *Misc.* 77.

SINGAPORE, *Cuming*; at Kranji in Mangrove Swamps, *Ridley*.

Stem erect from a very stout rhizome with fibrous roots. *Leaves* $\frac{1}{6}$–$\frac{1}{4}$ in. diam., strict, erect; sheaths $\frac{1}{2}$ in., tubular, truncate. *Racemes* terminal, 2 in., stellately tomentose; pedicels slender, longer than the membranous bracts; sepals $\frac{1}{12}$ in. long, ovate, acute; petals linear, 1-nerved; mentum rounded; lip much broader than long; midlobe very short indeed, subapiculate and thickened at the broad truncate tip; spur flattened, incurved.—A curious little species.

18. **E. Kingii,** *Hook. f. Ic. Plant. ined.*; stem stout, leaves 4–7 in. linear-lanceolate unilaterally acuminate much shorter than the 1–3 scapes, bracts minute reflexed, pedicels slender, lip suborbicular, side lobes falcately oblong with a tooth at the sinus, midlobe subreniform, axis with a thick woolly ridge leading from 1 or 2 small papillæ at the base to a woolly knob on the midlobe.

PERAK, alt. 3–4000 ft., *King's Collector, Scortechini*.

Stems 2–3 ft., as thick as a swan-quill. *Leaves* coriaceous, nerved. *Racemes* 8–12 in.; bracts $\frac{1}{12}$ in.; flowers blue within; mentum cylindric; petals oblanceolate, 3-nerved. *Capsule* $\frac{3}{4}$ in., linear.

19. **E. iridifolia,** *Hook. f. Ic. Plant. ined.*; leaves 12–14 by $\frac{3}{4}$–1 in. ensiform gradually narrowed from a broad sheathing base, much longer than the several simple slender hoary scapes, flowers in dense spikes white-tomentose, bracts ovate, lip broadly oblong from a rounded base, side lobes large membranous obtuse, disk with a broad tomentose ridge ending in a minute exserted thickened tip or midlobe.

PERAK; on Gunong Batu Pateh, *Wray*.

Stem at base 1 in. thick. *Leaves* coriaceous, spreading, uppermost longest. *Spike* and *scape* stellately hoary or tomentose; bracts acute, nearly glabrous; perianth tomentose, about $\frac{1}{16}$ in. long; mentum shortly cylindric; lip with 2 strong nerves parallel to the central ridge, and 3 calli at the very base.

20. **E. longifolia,** *Hook. f. Ic. Plant. ined.*; stem clothed with very long sheaths, leaves 12–14 in. grass-like, spikes solitary short shortly peduncled dense-fld., bracts minute, mentum short rounded, lip minute cup-shaped obtusely pointed.

PERAK, alt. 5000 ft., *Wray*.

Stem swollen at the base; internodes few, long; basal sheaths long, free, acuminate, lower 3–4 in., upper 4–6 in. *Leaves* unilaterally acuminate, many-nerved. *Spike* and peduncle 2 in.; flowers $\frac{1}{10}$ in.; sepals gland-dotted; petals

elliptic; lip very curious, like a short round-bottomed cup attached by the margin with a broad oblique mouth produced in front.—Only one specimen seen.

Sect. V. MYCARANTHES (see p. 785).

21. **E. stricta,** *Lindl. Coll. Bot.* t. 41 B; *in Journ. Linn. Soc.* iii. 52; pseudobulb elongate cylindric, spikes 1–2 terminal, lip 3-lobed with a basal oblong and subapical globose woolly callus. *Walp. Ann.* vi. 271. E. secundiflora, *Griff. Notul.* iii. 302; *Ic. Pl. Asiat.* t. 30. Mycaranthes stricta, *Lindl. in Wall. Cat.* 1970; *Gen. & Sp. Orchid.* 63; *Wight Ic.* t. 1763. Octomeria secunda, *Wall. mss.*

EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, *Griffith's collectors*, alt. 3–4000 ft., *J. D. H.* Naga Hills in UPPER ASSAM, *Griffith.* KHASIA HILLS, alt. 4000 ft., *J. D. H. & T. T.*—DISTRIB. Siam (alt. 7000 ft., *Murton*).

Pseudobulb 1–5 in., from a stout oblique rhizome, as thick as a goose-quill, basal sheaths very large, membranous. *Leaves* 3–4 in., oblong-lanceolate. *Scape* and *raceme* 3–5 in.; bracts cupular; petals oblong, 3-nerved.—The Siam specimen has a panduriform lip.

22. **E. merguensis,** *Lindl. in Journ. Linn. Soc.* iii. 52; pseudobulb clavate, spikes lateral, lip 3-lobed with a pubescent callus on each side lobe. *Reichb. f. in Gard. Chron.* 1880, 616.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 5120), *Helfer* (*Kew Distrib.* 5381), *Parish*, &c.

Pseudobulb 2–3 in., stipitate. *Leaves* as long, linear-lanceolate, obtuse or acute. *Scape* with *raceme* 2–5 in.; bracts obsolete; petals elliptic, 1-nerved.

Sect. VI. HYMENERIA (see p. 785).

* Flowers small or minute in dense spikes or racemes. See also 46. *E. recurvata.*

23. **E. convallarioides,** *Lindl. in Wall. Cat.* 1975; *Gen. & Sp. Orchid.* 70; *in Bot. Reg.* 1841, t. 62, *Misc.* 58; *in Journ. Linn. Soc.* iii. 53; stem after flowering very stout, leaves elliptic-lanceolate acuminate plicate, flowers in nodding oblong spikes small densely crowded concealing the membranous bracts, sepals very broad obtuse 5–7-nerved, mentum rounded, petals 3-nerved, lip cuneate truncate or with a broadly triangular warted tip. *Walp. Ann.* vi. 276. Octomeria spicata, *Don Prodr.* 31. O. convallarioides, *Wall. mss.* Pinalia alba, *Ham. mss.*

TROPICAL HIMALAYA, from Kumaon, alt. 4000 ft., *Strachey & Winterbottom*, eastwards to the KHASIA and NAGA HILLS, ascending to 5000 ft. TENASSERIM, *Parish.*

Stem after flowering 2-8 in., sometimes 1 in. diam. *Leaves* 4–7 by 1–2 in., loosely sheathed. *Scape* 2–3 in., stout; spike as long, ovoid; flowers subglobose, glabrous or sparsely pilose, white or straw-cold.; bracts equalling the ovary, lowest longest. *Capsule* ⅓ in., ellipsoid.—Var. *major*, Lindl. in Bot. Reg. 1847, t. 23, is only a large specimen.

24. **E. pumila,** *Lindl. in Wall. Cat.* 1972; *Gen. & Sp. Orchid.* 68; *in Bot. Reg.* 1838, *Misc.* 79; pseudobulbs 2–3 in. subcylindric or clavate, leaves lanceolate acuminate, flowers minute subcapitate on a short lateral peduncle, sepals very broad obtuse 3-nerved, mentum rounded, petals linear acute 1-nerved, lip broadly oblong 3-nerved, side lobes long spreading lanceolate acuminate close under the small orbicular midlobe. *Walp. Ann.* vi. 278.

KHASIA HILLS, *Wallich.* TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs ⅓–½ in. diam., tufted. *Leaves* petioled, acuminate. *Spike* ½ in., oblong; bracts very broad, membranous; flowers ⅛ in. diam., subglobose. *Capsule* ¼ in., pubescent.

25. **E. floribunda,** *Lindl. in Wall. Cat.* 7408; *Bot. Reg.* 1843, *Misc.* 43; 1844, t. 23; *in Journ. Linn. Soc.* iii. 60; stem very stout, erect terete fleshy, leaves subterminal linear-lanceolate to elliptic, flowers small very many in leaf-opposed or lateral decurved spikes, lateral sepals very short and obtuse, mentum deeply saccate, side lobes of lip basal acute separated from the small fan-shaped truncate midlobe by a strong ridge. *Walp. Ann.* vi. 276.

Malayan Peninsula; from Tenasserim to Singapore.—Distrib. Sumatra, Siam, Borneo.

Stem 10–18 in., as thick as the thumb or less. *Leaves* 2–5, 5–10 by ½–2½ in., many-nerved. *Scape* short and rachis stout, pubescent; spike 3–6 in.; bracts ⅛ in., broadly ovate, reflexed; flowers ⅙–¼ in. broad, white tinged with pink; dorsal sepal small, broad, obtuse, 3–5-nerved; petals ovate-oblong, obtuse; column very short; pollinia very narrow.—The specimens present great differences in size, breadth of leaf, and the tip of the lip, but I am unable to find specific characters for the forms.

26. **E. bipunctata,** *Lindl. in Bot. Reg.* 1841, *Misc.* 83; stem oval compressed, leaves lanceolate acuminate 11-nerved, racemes axillary cylindric densely many-fld., flowers very minute subglobose, sepals ovate obtuse broadly oblong and acute, petals 3-nerved, mentum rounded, lip short, side lobes rounded spreading narrower than the rounded fleshy convex midlobe.

Khasia Hills, *Gibson.*

Stems 2–3 in., flat, green, old light purplish. *Leaves* as in *E. floribunda.* *Racemes* drooping, slightly pubescent; bracts ovate, acuminate, reflexed; flower very shortly pedicelled; sepals membranous, $\frac{1}{10}$ in. long; lip peculiar, claw broad short continuous with the foot of the column, the lateral ribs of which run along its sides, diverge opposite the side lobes enclosing a sunk space, and there form a thickened margin to the midlobe meeting at its apex; a strong ridge or nerve traverses the axis of the lip.—I have examined flowers only (in Herb. Lindl.), and seen no leaves.

27. **E. scabrilinguis,** *Lindl. in Journ. Linn. Soc.* iii. 51; quite glabrous, leaves 2 broadly elliptic-lanceolate acuminate, scape stout erect, spike dense-fld., bracts minute, sepals ½ in. oblong-lanceolate subacute, mentum rounded incurved, petals nearly as broad falcate, lip as long as the sepals, side lobes narrow with two mesial ridges, midlobe orbicular hispid with lines of purple papillæ.

Sikkim Himalaya, *Ic. Cathcart in Herb. Kew.*

Pseudobulbs 1½–2 in., ovoid or ellipsoid, green, sulcate. *Leaves* 5–7 by 1¾–2¼ in., 3-nerved. *Scape* from between the leaves, very short, and rachis purplish; spike 2½ in.; ovary ⅓ in.; sepals and petals white; lip with pale rosy side lobes and purple midlobe.—Described from Ic. Cathcart.

** Flowers small or medium-sized, in lax many-fld. spikes or racemes.

† Lip entire or nearly so. (See also 37. *E. vittata* and 49. *E. saccifera.*)

28. **E. polystachya,** *A. Rich. in Ann. Sc. Nat. Ser.* 2, xi. 20, t. 9; pseudobulbs 2–4 in. as thick as the thumb, racemes from amongst the lanceolate leaves suberect densely pubescent, flowers ¼ in. long, sepals

narrow obtuse 3-nerved, dorsal longest, petals linear oblong-ovate obtuse 3-nerved, lip entire ovate subpanduriform subacute, side nerves forming a 2-arched thickened purple ridge towards the base. *Wight Ic.* 1635 (E. pubescens *on the plate*); *Walp. Ann.* vi. 275.

NILGHIRI HILLS; on the West slope, *Perrottet, Wight.*

Leaves 3–5 in., acute or acuminate. *Racemes* as long or shorter, very many-fld.; pedicels shorter than the bracts; flowers yellowish.

29. **E. pubescens,** *Wight Ic.* 1634 (*E. polystachya* on the plate); pseudobulbs short as thick as the thumb, racemes from amongst the (lanceolate) leaves drooping slightly pubescent, flowers $\frac{1}{2}$–$\frac{3}{4}$ in. long, sepals lanceolate acute 5–7-nerved, dorsal longest, petals linear-lanceolate 5-nerved, lip entire ovate-subcordate acute, side nerves forming arched thickened ridges. *Walp. Ann.* vi. 275.

NILGHIRI HILLS; on the West slope, *Wight.*

Readily distinguished from *E. polystachya*, by its much larger flowers, nearly glabrous racemes, and 5–7-nerved sepals, which are white with pale streaks; lip with purple blotches and yellow tip.

30. **E. mysorensis,** *Lindl. in Journ. Linn. Soc.* iii. 54; pseudobulbs short thick, racemes from amongst the (lanceolate) leaves curved glabrous, flowers $\frac{1}{2}$ in., sepals lanceolate acute, nerves 3–5 very strong and reticulate, petals lanceolate acute 3-nerved, side nerves branching, lip clawed entire from ovate- to oblong-lanceolate subpanduriform, side nerves usually forming arched thickened ridges.

MALABAR and DHARWAR; on the Bababoodan Hills, *Law.*

This will probably prove to be a form of *E. polystachya.* Lindley describes the lip (which is very variable in size, shape, and nervation) as wholly smooth, but though the arched ridges are sometimes slender, they are always present, and often very thick and even crenate.

31. **E. bicolor,** *Lindl. Gen. & Sp. Orchid.* 65 (*not elsewhere*); pseudobulb 4–6 in. columnar, leaves linear, racemes from amongst the linear sessile leaves erect puberulous, flowers $\frac{1}{2}$ in. long, sepals lanceolate acute 3-nerved, outer nerves branching, petals linear acute 3-nerved, lip entire ovate-lanceolate acute obscurely lobed at the side smooth, claw very large deeply saccate. *Thwaites Enum.* 299.

CEYLON; Central Province, alt. 4–7000 ft., *Macrae*, &c.

Readily distinguished from *mysorensis* by the narrow leaves, stout scape and raceme, and by the remarkable sac at the base of the lip, which is constant.

32. **E. ringens,** *Reichb. f. in Bonplandia,* v. 222; pseudobulb 5 in. fusiform, leaves linear-lanceolate acuminate, racemes lateral glabrous, bracts ovate much shorter than the pedicels, flowers $\frac{1}{4}$ in., sepals lanceolate and broadly linear, petals 3-nerved, lip small ovate acute 5-nerved with an oblong thickening on each side below the middle. *Walp. Ann.* vi. 275.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulb as thick as the finger in the middle. *Leaves* 5–6 in., terminal. *Raceme* 2–2$\frac{1}{2}$ in., suberect.—Lindley (in Journ. Linn. Soc. iii. 55) refers this to *E. ovata*, B. R. xxx. (1844) under t. 29, of the Philippines, which has ovate obtuse leaves and a pubescent raceme.

33. **E. obesa,** *Lindl. in Wall. Cat.* 1976; *Gen. & Sp. Orchid.* 68; *in Bot. Reg.* 1844, *under* t. 29; *in Journ. Linn. Soc.* iii. 53; pseudobulbs

1–3 in. very stoutly clavate silvery green and with scarious sheaths, racemes lateral subcorymbose few-fld. puberulous, bracts large, flowers ¾ in. long, sepals lanceolate acuminate falcate 5-nerved, mentum subconic, petals oblong-lanceolate 3-nerved, lip nearly as long as the sepals linear-oblong, sides obscurely lobed, disk with 3 thickened ridges. *Walp. Rep.* vi. 277. E. Lindleyana, *Griff. Notul.* iii. 300.

MARTABAN, *Wallich.* TENASSERIM; at Mergui, *Griffith, Parish.*

Leaves "lanceolate or ovate-lanceolate," *Griffith.* *Flowers* white, lip pale yellow with purple lines. *Capsule* 1½ in. long, slender.

†† Lip 3-lobed.

§ Flowers sessile or subsessile.

34 **E. elata,** *Hook. f. Ic. Plant.* t. 1848; leaves coriaceous 6–12 in. oblanceolate acuminate, sheaths at their base 4–5 in., scape 12–14 in. very stout lax-fld., bracts ¾–1 in. glabrous, lateral sepals ⅔ in. strongly falcate 5–7-nerved, petals oblong 5-nerved, lip semilunar with a short rough midlobe in the sinus and 3 ridges in the axis.

PERAK, *Scortechini.*

Pseudobulb 4–5 in., base tuberous. *Bracts* lanceolate, much exceeding the broad incurved flowers; ovary and base of sepals pubescent; mentum rounded, incurved; column very long and slender, foot with a few hairs at the base.—A very peculiar species, quite unlike its allies, with much the habit of sect. *Xiphosium.* Perhaps referable to sect. *Dendrolirion*, but is nearly glabrous.

35. **E. fragrans,** *Reichb. f. in Bot. Zeit.* xxii. 415; leaves lanceolate acuminate, spikes long drooping pubescent, bracts lanceolate equalling the ovary, sepals ¾–1 in. and narrower, petals lanceolate acuminate falcate 5-nerved, lip with 5 crenulate ridges from the base nearly to the tip, side lobes ear-like, midlobe as long lanceolate.

TENASSERIM; at Moulmein, *Falconer, Parish.*

Pseudobulb 2–3 in., ovoid, sheathed. *Leaves* 8–12 in., variable in breadth. *Spikes* longer; flowers very sweet, white; side lobes of lip red; mentum rounded, incurved; column very short.

36. **E. vittata,** *Lindl. in Journ. Linn. Soc.* iii. 51; leaves 2 elliptic or lanceolate, spikes decurved glabrous, base sheathed, lateral sepals ½ in. short strongly decurved acute 5-nerved, petals linear-oblong falcate 5-nerved, lip sessile oblong with 5 crenulate ridges from the base to the apex, margins waved contracted towards the tip into a very short and broad midlobe. *Reichb. f. in Gard. Chron.* 1882, i. 330.

SIKKIM HIMALAYA, *Ic. Cathcart & Hort. Kew.* MUNNIPORE, alt. 4000 ft., *Watt.*

Pseudobulbs 2–5 in., oblong or cylindric. *Leaves* very variable, 4–8 in. *Rachis* of spike stout; flowers broad, green striped with red; mentum nearly as long as the sepals, broadly conic or saccate; column long.—*Bracts* not seen, probably deciduous.

37. **E. graminifolia,** *Lindl. in Journ. Linn. Soc.* iii. 54; leaves 4–6 linear-lanceolate, spikes erect puberulous, bracts broadly ovate shorter than the pubescent ovary, lateral sepals ½ in. ovate-lanceolate subacute 3–5-nerved, petals linear-lanceolate acute 3-nerved, lip short, side lobes oblong recurved with a short ridge or auricle, midlobe orbicular, axis with sometimes a crenulate ridge from base to tip. *Hook. f. Ic. Plant.* t. 1847. E. alba, *var.* β., *Lindl. l. c.*

SIKKIM HIMALAYA, *Griffith's Collectors* (*Kew Distrib.* 5115, *E. alba*?), alt. 5–6000 ft., *J. D. H.*

Pseudobulbs short or elongated into a naked or sheathed vermiform cylindric stem, 5–6 in., and as thick as a pencil, at first sheathed. *Leaves* 4–6 in., subovate, rigid. *Spike* shorter; flowers glabrous, white; mentum rounded; lip very variable as to ridges, &c.; its spreading and recurved side lobes are a good character.—A drawing (in Herb. Hort. Calc.) of a Sikkim plant which may be a form of this has small side lobes of the lip pointing upwards, a ridge on the centre only of the midlobe, and two calli? between the side lobes. The habit is entirely that of *graminifolia*.

38. **E. Andersoni,** *Hook. f. Ic. Plant. ined.*; leaves 2 narrowly linear-lanceolate, spike suberect stout pubescent, bracts large broadly ovate or ovate-lanceolate revolute, lateral sepals triangular ovate acuminate, mentum broadly conical obtuse, petals oblong-lanceolate acute, lip obovate, side lobes short erect, midlobe orbicular, disk with 2 median ridges, column short.

SIKKIM HIMALAYA; at Darjeeling, *T. Anderson* (*Ic. in Herb. Calcutt.*).

Pseudobulbs 2–5 in., cylindric, striate. *Leaves* 4–6 in. *Spike* much shorter than the leaves, rather dense-fld.; bracts $\frac{1}{3}$–$\frac{2}{3}$ in., green; ovary $\frac{1}{2}$ in., sessile, tomentose; lateral sepals $\frac{1}{3}$ in., pinkish; lip purplish, midlobe yellow.—Described from two drawings in Herb. Hort. Calcutt.

39. **E. excavata,** *Lindl. in Wall. Cat.* 1974 (*in part*); leaves 4–6 narrow strongly nerved, scape shorter and spikes pubescent, bracts lanceolate, sepals $\frac{1}{3}$ in. ovate-lanceolate falcate, petals 5-nerved, mentum 0, lip short sessile with 3 central crenate ridges, side lobes basal ovate obtuse spreading, midlobe large suborbicular or obovate or transverse, column very short broad, foot deeply excavate. *Hook. f. Ic. Pl.* t. 1846. E. excavata, *in part*, *Lindl. Gen. & Sp. Orchid.* 67. E. sphærochila and E. flava, *var.* rubida, *Lindl. in Journ. Linn. Soc.* iii. 54, 49. Octomeria excavata, *Wall. mss.*

NEPAL, *Wallich.* SIKKIM and KHASIA MTS., alt. 4–6000 ft., *J. D. H.*

Pseudobulbs 1–2 in., ovoid or subcylindric, never much elongate. *Leaves* 5–6 in., sessile, rigid, lanceolate. *Spike* few-fld.; very short pedicel with ovary $\frac{1}{2}$–$\frac{2}{3}$ in.; flowers white, lip yellow with pink side lobes and very strong purple nerves, base saccate.—The only species of this group with basal spreading side lobes of the lip. Wallich's No. 1974 consists of flowering specimens of this, and flowerless of *E. confusa* (which has not an excavate column); but in the distribution of his Herbarium, Lindley received flowering specimens of *confusa* only, the character of the stem of which he introduced into that of *excavata*.

40. **E. alba,** *Lindl. Gen. & Sp. Orchid.* 67; pseudobulbs not elongating, leaves 3–5 narrow strongly nerved, scape and ovary pubescent, bracts lanceolate, sepals $\frac{1}{2}$–$\frac{3}{4}$ in. ovate-lanceolate 3–5-nerved glabrescent, petals linear-oblong 3-nerved, mentum rounded, lip oblong broadly clawed, side lobes about the middle pointing forward obtuse, midlobe orbicular, disk with usually 2 thick obtuse ridges between the side lobes and a slender mesial one on the rough midlobe, column short. *Hook. f. Ic. Pl.* t. 1845. Octomeria alba, *Wall. mss.*

SUBTROPICAL HIMALAYA; from Kumaon, alt. 3–6000 ft., *Edgeworth, Royle, Strachey & Winterbottom* (*E. excavata*), to Sikkim, alt. 6–7000 ft.

Habit of but differing from *excavata* in the pronounced mentum, and different column and lip, on which latter the ridges are sometimes obsolete or represented by 2 calli; nerves of sepals and petals sometimes anastomosing; flowers white, lip yellow and red; column small, but not broad and excavate.

41. **E. Eriopsidobulbon,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 148; leaves 2–3 narrow, spike short puberulous, bracts equalling the very small glabrous flowers, lateral sepals ovate-lanceolate obtuse and linear-oblong acute petals 3-nerved, mentum short incurved, lip obovate with 2 thickened arched ridges on the disk, side lobes above the middle, midlobe small semicircular 5-ridged, column long.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs 2 in., oblong or ovoid. *Leaves* 4–6 in., linear-lanceolate, nerves slender. *Spike* 2 in.; nerves of sepals and petals quite simple.

§§ Flowers pedicelled.

a. Bracts large, lanceolate or ovate-oblong.

42. **E. confusa,** *Hook. f. Ic. Plant.* t. 1850; pseudobulbs elongating into cylindric stems, leaves 2–8 narrow rigid strongly nerved, racemes lateral tomentose, bracts large lanceolate pubescent, sepals ½–⅔ in. broadly ovate-oblong obtuse 5-nerved pubescent, mentum broadly conic, petals elliptic-lanceolate 3–5-nerved, lip broadly obovate, side lobes incurved with 3 thick middle ridges, midlobe orbicular or ovate thickened, column rather long. E. excavata, *in part, Lindl. Gen. & Sp. Orchid.* 67, and in *Wall. Cat.* 1974.

NEPAL, *Wallich.* SIKKIM, alt. 4–6000 ft., *J. D. H.*, &c. (*E. alba*).

Pseudobulbs 2–4-nodal, lengthening into terete striate stems 3–10 in. long, and as thick as the finger. *Leaves* lanceolate. *Racemes* 2–4 in., inclined; flowers white, lip yellow; pedicel with ovary ¾–1 in.; bracts ½ in.; nerves of perianth not branching.—Near *E. bractescens*, differing in the stiff narrow leaves and bracts. A drawing of it in Herb. Calcutt. shows no ridges on the side lobes of the lip, but 2 small spots on the disk and a mesial crest on the yellow midlobe.

43. **E. acervata,** *Lindl. in Journ. Hort. Soc.* 1851, 57, *with woodcut*; and in *Paxt. Fl. Gard.* i. 170; pseudobulbs crowded, leaves 3–5 oblanceolate flaccid, racemes and flowers glabrous, scape interfoliar, bracts lanceolate, lateral sepals ovate-lanceolate acuminate 5–7-nerved, petals linear-oblong or -lanceolate 5-nerved, mentum rounded or broadly conic, lip oblong or obovate with 3 median ridges, side lobes about the middle incurved, midlobe ovate or orbicular, column very short. *Reichb. f. in Gard. Chron.* 1878, 106; *Hook. f. Ic. Pl.* t. 1849; *Walp. Ann.* vi. 269. Dendrobium seriatum, *Wall. mss.*

SIKKIM HIMALAYA (*Ic. in Hort. Bot. Calc.*). KHASIA HILLS, alt. 4–5000 ft., *J. D. H. & T. T.* ? TENASSERIM, *Parish.*

Pseudobulbs 1–2 in., ellipsoid, grooved or flask-like and flattened if too crowded, not lengthening into long stems. *Leaves* 4–8 in., obtuse or acute, pale green, many-nerved. *Racemes* 2–3 in., slender; pedicels with ovary ¾–1 in.; bracts half as long; flower broad, white or yellowish, membranous.—The texture of the leaves is peculiar. In Herb. Calcutt. is a drawing of a Sikkim plant which I take to be a form of this with a more conical incurved mentum. Parish's Tenasserim plant has short broad leaves of a different texture.

44. **E. bractescens,** *Lindl. in Bot. Reg.* 1841, *Misc.* 18; 1844, t. 29; leaves 2–3 oblong, racemes slender and long-pedicelled white flowers glabrous or puberulous, bracts large, lateral sepals ¼–⅓ in. ovate-lanceolate acuminate falcate and linear-oblong petals 5-nerved, mentum conical subacute, hypochile cuneate-obovate with 3 thickened ridges, the lateral short, side lobes pink rounded, midlobe quadrate. *Walp. Rep.* vi. 277.

SINGAPORE, *Cuming* (*Hort. Loddiges*). TENASSERIM; at Mergui, *Parish*.

Pseudobulbs 1–1½ in., crowded, oblong, 2–3-nodal. *Leaves* 3–4 in., obliquely 2-fid. *Raceme* suberect; bracts linear-oblong or elliptic, lower ⅔ in., empty, margins recurved; pedicel very slender, with the ovary 1 in.; column rather long.

VAR. ? *Kurzii*; pseudobulb 2–3 by ½–1 in. diam. brown, leaves 3–5 by 1½–2 in. elliptic shortly petioled, bracts elliptic flat tipped with pink, flowers much larger white, ridges of lip yellowish, midlobe orbicular-cordate. E. Kurzii, *T. Anders. mss.* —Andaman Islands, *Ic. in Herb. Calcutt.*

VAR. ? *affinis*; pseudobulbs elongate rugose, leaves lanceolate, bracts yellowish tinged with brown, racemes sparsely pubescent, flower white, base of green lip pale orange, foot of column red. E. affinis, *Griff. Notul.* iii. 297.—Mergui, *Griffith*, who suggests its being a variety of his *E. pulchella* (*Griffithii*, R. f.).

45. **E. Griffithii,** *Reichb. f. Xen. Orchid.* ii. 163; leaves 2–3 shortly petioled elliptic-lanceolate, racemes erect pubescent equalling the leaves, flowers ochreous, bracts large oblong, margins revolute, lateral sepals lanceolate acute, mentum rather long, petals ovate-lanceolate, hypochile cuneate 3-ridged, side lobes rounded purple, midlobe ovate acute yellow. E. pulchella, *Griff. Notul.* iii. 297.

TENASSERIM; at Mergui, *Griffith, Parish*.

I cannot distinguish dried specimens of this from *E. bractescens*. There is an excellent drawing of it by Griffith in Herb. Lindley and by Parish at Kew.—Identified by Lindley with *bractescens*. Griffith's specimens have ovoid rugose almost grooved pseudobulbs, 2–3 in. long, and leaves narrowed into a petiole, but in his drawing the pseudobulbs are small and leaves sessile.—The endeavour to distinguish the species of this section, of which the specimens are often insufficient, has been very laborious, and the result is far from satisfactory.

46. **E. recurvata,** *Hook. f. Ic. Plant. ined.*; pseudobulbs 6–8 in. stout terete, leaves long-petioled elliptic-lanceolate acuminate, racemes lateral many-fld. pubescent, bracts ovate-lanceolate acuminate as long as the ovaries, sepals falcately lanceolate acuminate 5-nerved and lanceolate acuminate petals recurved from the middle, mentum long 2-lobulate incurved, side lobes of lip narrow rounded, midlobe obcordate apiculate, disk with a flattened broad ridge between the side lobes.

PERAK, *Kunstler* (*Ic. in Herb. Calcutt.*).

Pseudobulbs subtortuous, 3–4-nodal, grooved. *Leaves* 6–10 by 1–1½ in., plicate; petiole 1–2 in. *Racemes* 6 in., drooping; bracts yellow, flat or concave, lower 1 in.; sepals ½ in., glabrous, white with pink veins and tips; lip with purplish side lobes and a yellowish disk and midlobe; column very short.—A very fine species, perhaps better referred to the section with dense flowers (after *scabrilinguis*).

47. **E. myristiciformis,** *Hook. Bot. Mag.* t. 5415; pseudobulbs ellipsoid, leaves 2–3 oblanceolate, racemes erect and flowers glabrous, bracts lanceolate exceeding the ovary reflexed, lateral sepals ovate acute 5-nerved, petals oblong 3-nerved, mentum rounded, lip obovate with 2 long calli between the small rounded side lobes and an ovate crested midlobe, disk ridged.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs of the size and form of nutmegs, striate. *Leaves* 5–7 in., acute. *Racemes* much shorter than the leaves; pedicels with ovary 1 in.; flowers pure white; lip yellowish; column very short.—Specimens insufficient. Parish's *E. trilophata*, mss., referred by Reichenbach to *E. dasypus*, is, I think, this.

β. *Bracts small or narrow.*

48. **E. saccifera,** *Hook. f. Ic. Plant. ined.*; pseudobulbs elongate

cylindric, leaves few 8–12 in. petioled elliptic-lanceolate, racemes slender laxly many-fld. drooping subtomentose, bracts linear-oblong shorter than the slender ovaries, flowers small, lateral sepals short acute, mentum subcylindric-sacciform, base rounded, petals elliptic acute 3-nerved, lip with a long claw expanding into a subreniform or fan-shaped rugose limb.

PERAK; on Gunong Batu Pateh, *Wray.*

Pseudobulbs 3 in., tufted, base swollen. *Leaves* 2–3, contracted into a slender 1–1½ in. petiole, plaited. *Racemes* 5 in., brown-pubescent; bracts ⅛ in.; pedicels with ovary longer than the saccate mentum; flowers about ¼ in. diam., membranous, glabrous within, "shades of dull pink, claret, and yellow," *Wray.*—An anomalous species, with the habit of this group, but a very different lip.

49. **E. concolor,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 148; pseudobulbs fusiform, leaves linear-lanceolate, racemes suberect few-fld. sparsely pubescent, bracts small ovate-lanceolate, lateral sepals ⅓ in. ovate-lanceolate acuminate and oblong acute petals 3–5-nerved, hypochile oblong, base narrow cuneate, side lobes very narrow, disk with a thick ridge, midlobe orbicular retuse apiculate.

TENASSERIM, *Parish*; on Moolyet, *Gallatly.*

Pseudobulbs 1–3 in., young clothed with truncate cupular imbricating sheaths. *Leaves* 4–6 in., very narrow, rather membranous. *Racemes* very slender; flowers 2–4, pale yellow-green; mentum obtusely triangular; epichile dirty yellow; column rather long.—Described chiefly from Parish's drawing. Very like *Griffithii*, except in the small bracts.

50. **E. Maingayi,** *Hook. f. Ic. Plant. ined.*; pseudobulbs tufted fusiform, leaves 2–3 linear-lanceolate thickly coriaceous, racemes very slender lax-fld. puberulous, bracts oblong as long as the very slender pedicels, flowers small, lateral sepals triangular-ovate acute and linear-oblong obtuse petals 5-nerved, mentum stout incurved, hypochile broadly obovate-oblong 3-ridged, base rounded, side lobes rounded crenate small, midlobe orbicular.

PENANG; on Government Hill, *Maingay* (*Kew Distrib.* 1632).

Pseudobulbs 1–1½ in. *Leaves* spreading rigidly horizontally. *Racemes* 2 in., flowering nearly to the base; bracts ⅓ in. long, nerved; sepals about ⅛ in. long.—Reichenbach has given this the mss. name of *E. anthomeniaca* (in Herb. Kew), the application of which I fail to see.

51. **E. tricolor,** *Thwaites Enum.* 429; pseudobulbs tufted fusiform, leaves many 5–9 in. lanceolate, bases sheathing, racemes slender laxly many-fld. furfuvaceous, bracts small elliptic obtuse 1-nerved, sepals ovate and linear-oblong petals obtuse white, mentum broad, hypochile cuneate with subfalcate side lobes, midlobe rounded, tip recurved obtuse.

CEYLON; in higher parts of the Central Province, *Thwaites.*

Pseudobulbs 3–5 in., polynodal, brown; young clothed with many short obtuse imbricating sheaths. *Leaves* 6–8 in., forming a distichous terminal tuft, recurved. *Racemes* from the sides of the pseudobulb, erect, as long as the leaves; bracts green, shorter than the ovary; flowers ⅔ in. diam.

*** Stem elongate, terete, cylindric or clavate (broad and compressed in *E. bifolia*), fleshy or rigid. *Leaves* few, usually subterminal. *Flowers* 1–3, medium-sized, usually long-pedicelled on a short sometimes obsolete lateral or subterminal peduncle; bracts large, often coloured, sessile

amongst the leaves when the peduncle is short or 0; flowers usually white.

52. **E. pauciflora,** *Wight Ic.* t. 1636; stem slender below clavate above, leaves 2 linear-oblong, flowers 1–2, pedicels very slender with 2–3 oblong bracteoles, bracts basal oblong obtuse, lateral sepals ½ in. ovate acute glabrous 5-nerved, mentum rounded, petals oblong 3-nerved, lip sessile cuneately oblong truncate, lobes obscure, disk with 2 calli, axis ridged, column short. *Lindl. in Journ. Linn. Soc.* iii. 58 (*excl. Khasia hab.*); *Walp. Ann.* vi. 272.

NILGHIRI HILLS, *Wight.*

Stems 5–6 in., from a creeping stock; internodes ½–1 in.; sheaths short, truncate. *Leaves* 2–5 in., obtuse or subacute. *Scape* 1–1½ in., very slender; bracts ½ in., membranous; bracteoles scattered, ⅙–¼ in.; flowers white; outer nerves of petals branching; lip strongly nerved.—The bracteoles are anomalous.

53. **E. Lindleyi,** *Thwaites Enum.* 299; stem elongate clavate, leaves elliptic-lanceolate, scape short 2–3-fld., bracts very large oblong, sepals ovate or lanceolate 7–9-nerved glabrous, mentum rounded, petals linear-oblong falcate obtuse 3–5-nerved, broad lateral lobes of hypochile almost as long as the suborbicular epichile, disk with 2 calli between the lobes, column long. E. ephemera, *Reichb. f. in Walp. Ann.* vi. 272. E. bicolor, *Lindl. in Journ. Linn. Soc.* iii. 58 (*not of Gen. & Sp.*). Dendrobium bicolor, *Lindl. Gen. & Sp. Orchid.* 90.

CEYLON; in the Central Province, ascending to 7000 ft., *Walker, Thwaites.*

Stem 6–18 in., sometimes 1 in. diam. above, smooth; internodes not swollen. *Leaves* 3–4 in. *Peduncle* 1–1½ in.; bracts ½–¾ in., very variable in shape; flowers white; sepals ½–⅔ in., variable in breadth.

54. **E. truncata,** *Lindl. in Journ. Linn. Soc.* iii. 58; stem subcylindric, leaves lanceolate, scape short and flowers tomentose, bracts large oblong, sepals oblong-ovate obtuse 7-nerved, mentum rounded, petals linear-oblong falcate 5-nerved, lip sessile fleshy semicircular truncate with a slender triple ridge, column rather long and broad.

TENASSERIM; on Thoung-gyun, alt. 4–5000 ft., *Lobb.*

Stem 4–6 in., covered with obtuse sheaths. *Leaves* 3–5 in., thick, acute. *Peduncle* ½ in., stout, pedicel with ovary as long; sepals ¾ in. long, white.

55. **E. clavicaulis,** *Wall. mss. ex Lindl. Bot. Reg.* 1840, *Misc.* 90 (*not of Journ. Linn. Soc.*); stem elongate subclavate, leaves 2–4 elliptic-lanceolate, scape 2–3-fld., bracts elliptic or oblong, lateral sepals triangular acute, mentum broad rounded or incurved, petals broadly oblong 5-nerved, hypochile broadly obovate, side lobes large rounded sometimes embracing the smaller rounded crenate puberulous epichile, disk with a tomentose ridge thickened at the sinus and 2 elongate lateral calli, column long. *Walp. Ann.* vi. 278. E. khasiana, *Lindl. in Journ. Linn. Soc.* iii. 59.

KHASIA HILLS, *Griffith (& Ic. in Hort. Bot. Calc.).*

Stems 6–8 in., crowded, terete; internodes 2 in.; sheaths short, acute. *Leaves* 3–4 in., terminal, acuminate. *Scape* ½–1 in.; pedicels about as long, slender; bracts ½–1 in., many-nerved; flowers glabrous, white, lateral sepals ⅓–½ in., and lip white with purple margins.—The habitat of Wallich's *E. clavicaulis* is not recorded; the cultivated specimens in Herb. Lindley have larger flowers than the native ones, with a broader lip.

56. **E. amica,** *Reichb.f. Xen. Orchid.* ii. 168, t. 3, f. 6–9; stem cylindric, leaves cuneately oblong-ligulate, raceme few-fld., rachis and sepals puberulous, bracts large ovate acute, lateral sepals triangular, petals linear-lanceolate, lip cuneately dilated 3-fid, side lobes obtusely angled, isthmus narrow, midlobe obcordate, disk 3-keeled.

ASSAM, *Hort. Day.*

Pseudobulb cylindric, 4–5 by $\frac{1}{3}$ in. *Leaves* acuminate. *Bracts* 7-nerved, $\frac{1}{3}$ as long as the pedicel with the ovary. *Flowers* pale straw-colour with red nerves; lip dark purple, midlobe pale yellow; androclinium immersed, foot with two small horns in the hollow.—Description from Reichb.

57. **E. acutifolia,** *Lindl. in Bot. Reg.* 1842, 38; stem short oblong, leaves fleshy lanceolate coriaceous very acute as long as the erect 5–6-fld. pubescent scape, bracts oblong reflexed, flowers glabrous, side lobes of hypochile very acute, epichile oblong obtuse concave with 3 fleshy nerves, column deeply hollowed. *Walp. Ann.* vi. 278.

INDIA (*Hort. Loddiges*).

Near *E. clavicaulis. Leaves* 2–3 in. *Flowers* white, veined with violet; lip with purple base and dull yellow tip.—Description from Lindley; I find no specimens in his Herbarium.

58. **E. marginata,** *Rolfe in Gard. Chron.* 1889, i. 200; stem clavate slender below, leaves 3 linear-oblong obtuse, scape short 2-fld. and sepals white-tomentose, bracts large oblong, lateral sepals triangular-lanceolate acuminate 5-nerved, petals oblong obtuse 7-nerved, mentum rounded, hypochile oblong, side lobes uncinate much shorter than the rounded crenate pubescent epichile, disk with a tomentose ridge and tubercle at the base of the epichile.

BURMA (*Hort. Bonham Carter*).

Stem 3 in. *Leaves* as long. *Scape* $\frac{1}{2}$ in., bracts $\frac{1}{2}$ in., petaloid, glabrate, yellow; pedicel with ovary as long; flower 1 in. diam., white flushed with pink; lip pale yellow, margined with red.—Described from one specimen.

59. **E. nutans,** *Lindl. in Bot. Reg.* 1840, *Misc.* 83; *in Journ. Linn. Soc.* iii. 58; stem terete leafy sheathed throughout, leaves lanceolate acuminate, bracts broad flat fleshy acute, flower pedicelled solitary campanulate glabrescent, lateral sepals broad and petals obtuse, hypochile sessile lunate embracing the small orbicular epichile, disk with a central ridge from base to apex and two short lateral ones. *Walp. Ann.* vi. 272.

PENANG, *Maingay* (*Kew Distrib.* 1679, 1679/2). PERAK, *Scortechini.* SINGAPORE, *Cuming* (*Hort. Loddiges*).

Stem 6–10 in.; sheaths imbricate, acute. *Leaves* 4–7 in., lanceolate, acuminate. *Bracts* flesh-cold.; pedicel $\frac{1}{4}$–$\frac{3}{4}$ in.; flowers white tinged with bright red; tips of petals and lip yellow.—Amongst Scortechini's Perak drawings is one like this (*Dendrobium*, 892), but with ovate-lanceolate spreading side lobes of lip, and a much larger orbicular midlobe.

60. **E. biflora,** *Griff. Notul* iii. 302 (*not of Lindl.*); stem clavate, internodes very short, leaves elliptic-lanceolate, scape very short lateral 2-fld., bracts ovate-cordate, flowers very small glabrous, sepals oblong-lanceolate and linear-oblong petals obtuse 3-nerved, mentum short incurved, lip elliptic obtuse, disk with 2 broad lamellæ and a median ridge, column very short.

SIKKIM HIMALAYA (*Ic. Herb. Calcutt.*). TENASSERIM; at Mergui, *Griffith.*

Stems 4–6 in., tufted, slender below; internodes $\frac{1}{2}$ in., terete. *Leaves* 3 in.

Scape $\frac{1}{8}$ in. ; bracts twice as long ; flower $\frac{1}{4}$ in. diam., yellow-white.—The Sikkim habitat is from a drawing of a garden specimen. Lindley, in founding his *E. biflora* on Griffith's *Trichotosia biflora*, overlooked Griffith's *E. biflora*.

Sect. VII. DENDROLIRION (see p. 786).

* *Pseudobulbs usually large. Inflorescence white- or yellowish-tomentose or woolly.*

61. **E. flava,** *Lindl. in Wall. Cat.* 1973 (*in part*) ; *Gen. & Sp. Orchid.* 65 ; *in Journ. Linn. Soc.* iii. 49 (*excl. var.* β.) ; pseudobulbs large 3–5-leaved, scape and sessile flowers white-tomentose, lateral sepals $\frac{2}{3}$ in ovate-lanceolate obtuse 9-nerved, mentum subcylindric, petals obtuse 3-nerved, hypochile broadly oblong puberulous, lobes short broad, epichile subquadrately rounded. E. pubescens, *Lindl. in Bot. Reg. under* t. 904. E. laniceps, *Reichb. f. in Hamb. Gartenzeit.* xix. 10. Dendrobium ? pubescens, *Hook. Exot. Fl.* t. 124. Octomeria flava, *Wall. mss.* O. pubescens, *Spreng. Syst.* iv. 310.

TROPICAL HIMALAYA, from Garwhal eastwards to Bhotan.

Pseudobulbs 3–4 in. ; base sheathed ; young leafy throughout. *Leaves* 6–10 in., petioled, acuminate, often loaded with concretions. *Scape* 6–10 in., stout ; bracts $\frac{1}{2}$–1 in., ovate, acuminate ; ovary $\frac{2}{3}$–1 in. ; flowers yellow with purplish markings on the disk of the lip, which is tumid or variously thickened, claw very broad ; column short, broad.—In the Fl. Exot. figure the petals are ovate-oblong, obtuse. In a Garwhal specimen marked by Reichenbach as the true plant of Fl. Exot. the claw of the lip is pointed, and the thick disk of the midlobe trifid in front. In Garwhal specimens of Falconer's marked *E. laniceps* by Reichb. the disk of the midlobe is thickened on each side with a central callus and another above the claw. Wallich's 1973 includes *E. flava, elongata* & *tomentosa*.

VAR. *lanata* ; flowers smaller, lip narrower, midlobe purplish with thickened nerves on the disk. E. lanata, *Griff. Notul.* iii. 301 ; *Lindl. in Journ. Linn. Soc.* iii. 49.—Sikkim Himalaya, *J. D. H.* Tenasserim, *Griffith* (*Kew Distrib.* 5123), *Helfer* (*Kew Distrib.* 5122).

62. **E. elongata,** *Lindl. in Journ. Linn. Soc.* iii. 49 ; characters of *E. flava*, but spikes often much longer, flowers smaller, often pedicelled, petals oblanceolate. E. flava, *Griff. Notul.* iii. 301 ; *Wall. Cat.* 1973/3 (*in part*).

TENASSERIM and AVA, *Wallich, Griffith, Lobb, Parish.*

I doubt this being more than a variety of *E. flava*, but there may be several species included under this and *E. flava*.

63. **E. andamanica,** *Hook. f. Ic. Pl. ined.* ; pseudobulbs as in *E. flava*, leaves elliptic-lanceolate, lateral sepals $\frac{3}{4}$ in. long acuminate 9-nerved, petals oblanceolate 5-nerved, lip 1 in. long narrowly oblong from a broad claw pubescent, side lobes narrow acute, axis thickened, midlobe as broad but much shorter subquadrate 2-fid veined, column long.

SOUTH ANDAMAN ISLANDS, *Kurz.*

I advance this as a species with great hesitation, but the long column, nearly half as long as the dorsal sepal, and the corresponding long lip are very strong characters (if constant).

64. **E. pulchella,** *Lindl. in Wall. Cat.* 7407 ; *in Bot. Reg.* 1841, *Misc.* 52 ; *in Journ. Linn. Soc.* iii. 51 ; pseudobulbs ellipsoid or clavate, leaves 2–5 subcoriaceous, flowers few in a stout leaf-opposed white-tomentose

scape, sepals short thick spreading from the base tomentose on both surfaces, mentum 0, lip small sessile entire orbicular or subcordate, disk thickened pubescent, column long stout, foot very short with a large purple shining tubercle at the base. *Walp. Ann.* vi. 271. E. discolor, *Lindl. in Journ. Linn. Soc. l. c.* Callostylis rigida, *Blume Bijd.* 340, f. 74; *Lindl. Gen. & Sp. Orchid.* 129. Tylostylis, *Blume Fl. Jav. Præf.* vi.

SIKKIM HIMALAYA, alt. 3–4000 ft., *J. D. H.* TENASSERIM, alt. 4000 ft., *Parish.* PERAK, *Scortechini.* MALACCA, *Cuming.*—DISTRIB. Siam, Java.

Pseudobulb 1–pluri-nodal, 2–10 in. long, contracted at both ends. *Leaves* 3–5 in., sessile, obtuse or notched. *Scape* 2–3 in., base sheathed; bracts orbicular, coriaceous; flowers yellow, $\frac{1}{2}$–$\frac{2}{3}$ in. diam.; lateral sepals broadly ovate; petals linear-oblong, tomentose; lip with a minute claw, mobile (*Blume*).—Very distinct from its congeners in the spreading flowers, lip, and foot of column; perhaps a distinct section with *E. barbata*, which also has a mobile lip.

65. **E. sicaria,** *Lindl. in Journ. Linn. Soc.* iii. 50; pseudobulbs narrowly oblong, leaves linear or linear-lanceolate semi-terete fleshy channelled, scape slender and flowers white-woolly, bracts ovate acuminate, lateral sepals ovate obtuse 5–7-nerved, petals linear- or obovate-oblong 5-nerved, mentum obscure, lip shortly broadly clawed, side lobes spreading rounded, midlobe obcordate, disk with a tricrural thickened ridge.

TENASSERIM; at Mergui, *Griffith, Parish.*

Pseudobulbs $1\frac{1}{2}$–2 in. long, from a stout woody rhizome. *Leaves* 4–6 in., acuminate, tapering to the base (dry pustulate). *Scape* 4–6 in.; bracts $\frac{1}{4}$ in.; pedicel with slender ovary $\frac{3}{4}$ in.; flowers spreading, $\frac{3}{4}$ in. across, white with purple markings on the lip.

66. **E. Dayana,** *Reichb. f. in Gard. Chron.* 1877, ii. 102; pseudobulbs ovoid, leaves 3 linear-lanceolate very coriaceous, raceme lax-fld. tomentose, bracts linear-lanceolate scarious equalling the lower pedicelled ovaries, sepals triangular tomentose, petals narrower, lip broad, side lobes oblong narrow, midlobe oblong emarginate, callus longitudinally ligulate with retrorse arms at the end.

EAST INDIES (*Hort. Day*).

Allied to *E. sicaria*, Lindl. Unknown to me. Description from Reichb. f.

67. **E. dasypus,** *Reichb. f. in Bot. Zeit.* 1864, 415; pseudobulb cylindric, leaves 2–3 narrowly oblanceolate obtuse, racemes lateral slender white-woolly few-fld., bracts broadly ovate apiculate, pedicels slender and ovate oblong obtuse 3–4-nerved sepals woolly, petals oblong 3-nerved, lip cuneate-obovate with 3 median ridges, side lobes oblong, almost as long as the transverse midlobe, column long.

TENASSERIM; at Mergui, *Parish.*

Pseudobulbs $1\frac{1}{2}$–2 in., as thick as the little finger, erect. *Leaves* as long. *Racemes* 1 in., very slender; bracts membranous, apiculate; pedicel $\frac{1}{3}$ in.; sepals $\frac{1}{4}$ in.; mentum rounded, subincurved.

68. **E. pellipes,** *Reichb. f. in Herb. Kew*; pseudobulbs small very close set on the creeping rhizome 1-leaved, leaf obtuse very thick terete or subcompressed, scape slender and 1–2 flowers white-woolly, bracts small, lateral sepals triangular-ovate acute 5-nerved, mentum large saccate, petals linear 3-nerved woolly, lip coriaceous subspathulate or linguiform, tip rounded or retuse, back woolly.

PENANG, and MALACCA on Mount Ophir, *Maingay* (*Kew Distrib.* 1630/2). PERAK, *Wray*.—DISTRIB. Borneo (*Beccari*, No. 483).

Pseudobulbs $\frac{1}{2}$–$\frac{3}{4}$ in., sessile, more or less tomentose, conic or subglobose. *Leaves* 2–3 in., straight or curved, smooth, thick and spongy; basal sheaths short, woolly. *Scape* equalling the leaf, erect; peduncle with ovary about $\frac{3}{4}$ in., lengthening to $1\frac{1}{4}$ in fruit; sepals about $\frac{1}{3}$ in. long; column very short; capsule $\frac{3}{4}$ in., narrowly ellipsoid.

** *Pseudobulbs large. Flowers brown-tomentose.*

69. **E. barbata,** *Reichb. f. in Walp. Ann.* vi. 270; pseudobulbs broadly ovoid 2-leaved, leaves large petioled lanceolate, scape and pedicels very long, bracts large, lateral sepals lanceolate falcate 5-7 nerved, mentum incurved, petals very narrow, lip stipitate narrowly lanceolate Erioidea, *Griff. It. Notes* 83. Tainia barbata, *Lindl. in Gard. Chron.* 1857, 68.

KHASIA HILLS; in the Suniassee Valley, *Griffith* (*Kew Distrib.* 5297); Shillong, alt. 5000 ft., *Clarke*.

Pseudobulbs 2 in. long and broad. *Leaves* 12–14 in., plicate, long-acuminate. *Scape* 3 ft., very stout below, pubescent; bracts $\frac{1}{2}$–1 in., lanceolate; flowers distant; pedicels 1 in., lengthening in fruit; sepals $\frac{2}{3}$ in. long, yellow tessellated with blood-red (*Griff.*), dorsal linear; petals red-purple, tip spathulate; lip tremulous (*Griff.*), revolute, strongly nerved, tip scabrid; column stout; pollinia broadly pyriform, attached to a stiff viscus. *Capsule* 1 in., narrowly oblong.

70. **E. tomentosa,** *Hook. f.*; pseudobulbs large ovoid, leaves few elliptic-oblong very thick, scape terminal very stout and raceme brown-villous, bracts very large, pedicels with the long ovary 1–$1\frac{1}{2}$ in., sepals coriaceous falcate lanceolate, mentum large incurved, petals oblanceolate, lip oblong strongly nerved, claw broad, side lobes narrow, midlobe clawed subquadrately cordate. E. ornata, *Lindl. in Journ. Linn. Soc.* iii. 48 (*not of Gen. & Sp. Orchid.*). E. flava, *Wall. Cat.* 1973/2 (*in part*). Epidendrum tomentosum, *Kœnig in Retz. Obs.* vi. 53.

SILHET, *Wallich*. KHASIA HILLS, alt. 3–4000 ft., and CHITTAGONG, at Seetakoond, *J. D. H. & T. T.* (*E. ornata*). TENASSERIM (*Ic. in Herb. Lindl. & Parish*).

Pseudobulbs 2–4 in., from a very stout woody rhizome, 3–4-leaved when young. *Leaves* 3–6 by $1\frac{1}{2}$–3 in., nerveless, smooth and almost spongy, contracted into a very thick petiole. *Scape* 6–12 in., as thick as a goose-quill or less, base with short coriaceous sheaths; rachis of raceme stout, scarred after fruiting; bracts 1 in. and less, oblong or lanceolate, not reflexed, coarsely veined with a broad thickened roughened central area from the base to the apiculate tip.—This differs from the Philippine Island *E. ornata* in the much shorter bracts and lip.

*** *Pseudobulbs very small or* 0. (*See also* 68. E. pellipes.)

71. **E. Thwaitesii,** *Hook. f.*; pale tomentose all over, rhizome very stout with short 3–7-leaved branches, leaves linear-lanceolate subacute thickly coriaceous, scapes 1–2 terminal lax-fld., bracts small, flowers small coriaceous, lateral sepals broad obtuse, petals linear subacute, lip tongue-shaped recurved fleshy tomentose, side lobes very small. E. velutina, *Thwaites Enum.* 299 (*not of Lodd.*).

CEYLON; in the Central Province, alt. 3000 ft., *Thwaites*.

Rhizome as thick as a swan's quill, internodes very short; sheaths woolly. *Leaves* 2–4 in., often subfalcate or oblanceolate, midrib distinct. *Scape* with *raceme* 3–4 in., suberect; bracts $\frac{1}{3}$ in., oblong, obtuse, woolly; pedicels very short; sepals $\frac{1}{4}$ in. long, yellow. *Capsule* $\frac{1}{2}$ in.

72. **E. ferruginea,** *Lindl. in Bot. Reg.* 1839, t. 35; *in Journ. Linn. Soc.* iii. 57; brown-tomentose, rhizome stout, branches short 2-leaved, leaves lanceolate thickly coriaceous, scapes from the bases of the branches, bracts large, flowers coriaceous, lateral sepals very broad 9-nerved, petals obovate-oblong, hypochile broad saccate shortly clawed, lobes small, epichile short crisped, disk with large toothed crests. *Walp. Ann.* vi. 274.

KHASIA and JYNTEA HILLS, alt. 4000 ft., *Griffith*, &c.

Rhizome as thick as a swan's quill, jointed, young sheathed. *Leaves* 5–8 in., acuminate, base narrowed. *Scape* 4–6 in., base sheathed; raceme 3–5 in., rachis stout; bracts 1 in. and less, lanceolate; flowers 1 in. diam., white; lip pink; column short, stout.—Referred to sect. *Trichotosia* by Lindley.

73. **E. pannea,** *Lindl. in Bot. Reg.* 1842, *Misc.* 64; *in Journ. Linn. Soc.* iii. 50; stems very short 1–4-leaved from a creeping rootstock, leaves linear terete fleshy, scape 1–2-fld. and large ovate bracts and sepals densely woolly, sepals ovate-lanceolate obtuse, petals linear-oblong woolly, mentum rather long obtuse, lip oblong obtuse thick concave with an oblong granulate callus at the base and near the tip. *Walp. Ann.* vi. 273. ? E. teretifolia, *Griff. Notul.* iii. 298; *Ic. Pl. Asiat.* t. 300.

SIKKIM HIMALAYA, *Herb. Griffith*, alt. 1–2000 ft., *J. D. H.* KHASIA HILLS, alt. 3–4000 ft., *J. D. H. & T. T.* TENASSERIM, *Parish.* PERAK, *Scortechini.* MALACCA, on Mount Ophir, *Lobb.* SINGAPORE, *Hort. Lodd.*—DISTRIB. Borneo.

Rhizome as thick as a crow-quill; stems woolly, sometimes forming small globose pseudobulbs. *Leaves* 1–10 in. by $\frac{1}{8}$–$\frac{1}{6}$ in. diam., often pustulate. *Scape* 2–3 in.; flower sessile; lateral sepals $\frac{1}{3}$ in. long; column very short.—Griffith's *teretifolia* from Malacca, together with the Perak and Singapore plants, may be different from the Sikkim and Khasia ones, the former having narrow lanceolate and the latter broadly ovate bracts.

74. **E. Pleurothallis,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 147; small, tufted, leaf solitary from a very short stem which is hidden by imbricating reticulately nerved sheaths coriaceous petioled linear-oblong or oblanceolate obtuse, scapes from sheaths on the side of the stem filiform and very small solitary flower woolly, sepals $\frac{1}{8}$ in. long broad obtuse 3-nerved, petals narrow 1–3-nerved, lip with a broad claw orbicular, side lobes and midlobe small solid globose.

TENASSERIM; on Moolyet, alt. 5000 ft., *Parish.*

Tufted, pseudobulb 0; stem $\frac{1}{8}$ in.; sheaths $\frac{1}{2}$ in., acute. *Leaves* when young ensiform, mature 2–$2\frac{1}{2}$ in. *Scape* much shorter; bract under the flower small, membranous, sheathing; mentum large, rounded; column very short.

75. **E. pygmæa,** *Hook. f. Ic. Plant. ined.*; size habit and inflorescence of *E. Pleurothallis*, but leaves fleshy, flowers very much larger, lateral sepals $\frac{1}{3}$ in. ovate 5-nerved, petals elliptic-oblong 5-nerved, lip very narrow, claw narrowly cuneate, side lobes short oblong obtuse, midlobe ellipsoid.

PERAK, *Wray.*

At first I was disposed to regard this as a large-fld. state of *E. Pleurothallis* but the differences in the flowers are too great.

76. **E. lancifolia,** *Hook. f. Ic. Plant. ined.*; stems 1–2 in. tufted, pseudobulbs small appearing after flowering fleshy loosely sheathed, leaves 1–3 terminal petioled elliptic-lanceolate thin plicate, spikes from the side of the stem slender laxly many-fld. and ovary white-woolly, flowers small, lateral sepals $\frac{1}{6}$ in. triangular ovate 5-nerved, mentum rounded, petals

oblong obtuse 3-nerved, lip narrow fleshy ?, side lobes tooth-like, midlobe narrow tongue-shaped or oblong.

PERAK; at low elevations, *King's Collector.*

Pseudobulbs at first the sheathed thickened lower internode of the stem, after the fall of the sheaths ovoid-oblong, ½–⅔ in. long; sheaths 1 in., ovate. *Leaves* 3–4 in., many-nerved, tip unequally 2-fid. *Racemes* 1–2 in., 6–10-fld.; bracts ⅛ in., broadly ovate, membranous, quite glabrous, as long as the woolly ovary; "flowers waxy white, blue inside;" sepals sparsely woolly.

Sect. VIII. BAMBUSIFOLIA (see p. 786).

77. **E. bambusifolia,** *Lindl. in Journ. Linn. Soc.* iii. 61; leaves large linear-oblong or oblong-lanceolate, racemes as long simple or branched slender laxly many-fld. and flowers densely brown-tomentose, bracts small orbicular apiculate, lateral sepals ovate-lanceolate falcate 5-nerved, mentum long incurved, petals oblanceolate acuminate falcate 3-nerved, lip clawed ovate-oblong strongly nerved, side lobes very small, midlobe small orbicular, column long decurved.

TROPICAL SIKKIM HIMALAYA, *J. D. H.* KHASIA MTS.; at Borpanee, alt. 3–4000 ft., *Simonds, Griffith* (*Kew Distrib.* 5112).

Stem 2–3 ft., as thick as the thumb or less. *Leaves* a span long and less, 1–2 in. broad, acuminate, many-nerved. *Raceme* longer than the leaves; rachis slender; bracts ⅛ in., reflexed; pedicel ¼–⅓ in.; ovary slender; lateral sepals ½ in. long. *Capsule* 1–1½ in., slender, subterete, ribs slender.

78. **E. crassicaulis,** *Hook. f. Ic. Plant. ined.*; leaves subterminal elliptic ovate or elliptic-lanceolate, racemes as long slender laxly many-fld. and flowers brown-tomentose, bracts small orbicular, lateral sepals broadly oblong very obtuse 5-nerved, mentum short incurved, petals oblong 3-nerved, lip banded with purple shortly clawed, side lobes narrow, midlobe emarginate, base not contracted, claw axis and midlobe furfuraceous as are sometimes the 2 lateral nerves on the disk, column large decurved. E. clavicaulis ?, *Lindl. in Journ. Linn. Soc.* iii. 59.

KHASIA MTS.; at Pomrang, alt. 4–5000 ft., *J. D. H. & T. T.*

Stem 10–12 in., as thick as the thumb or less; lower internodes 2–3 in. *Leaves* 4–6 in., acutely unequally 2-fid, coriaceous, nerved. *Racemes* as long; bracts ¼ in.; pedicels with ovary ¾–1 in.; flowers pale, banded with purple; lateral sepals ⅓ in., dorsal as long; pollinia broadly pyriform.—Much less leafy than *E. bambusifolia*, more pseudobulbous in habit, with shorter ovary and very differently shaped sepals, petals and lip; the racemes and bracts of the two are singularly alike. The Khasia specimens have only stem, leaves, raceme and bracts; the description of the flowers is from Kew Garden specimens, and a fine drawing in Herb. Calcutt. of a form with stem ½ in. diam.

79. **E. leptocarpa,** *Hook. f. Ic. Plant. ined.*; leaves linear-lanceolate, tip dimidiate, peduncle subracemosely 3–5-fld., bracts ovate acute, lateral sepals ovate-lanceolate acuminate and oblong petals 3-nerved, mentum large obtuse incurved, lip broadly clawed, side lobes oblong incurved overlapping the larger broadly orbicular pubescent midlobe, axis with 3 ridges thickened at the sinus, column very short, capsule 3 in. very slender.

PERAK; *Scortechini, King's Collector.*

Stem 2–3 ft., nearly as thick below as the little finger, and hollow; internodes 1–1½ in. *Leaves* 6–8 in., thinly coriaceous, obtuse, tip of one side ½ in. longer than the other. *Peduncle* 1 in., and bracts ¼–½ in., fleshy ?; flowers yellow mottled with

brown, cream-cold. within; pedicel and ovary 1 in.; lateral sepals $\frac{1}{3}$ in., falcate; anther completely 4-celled; capsule strict, $\frac{1}{8}$ in. diam., angled.—The long capsule resembles *E. nutans*.

Sect. IX. TRICHOTOSIA (see p. 786).

* *Large more or less hirsute species. Column long.*

80. **E. vestita,** *Lindl. in Bot. Reg.* 1844, *Misc.* 76; 1845, t. 2; stem stout rufously hispid, leaves 5–7 in. thickly coriaceous glabrous above nerveless, spike long laxly many-fld., bracts large ovate, sepals lanceolate, petals linear obtuse, lip oblong shortly clawed 5–7-lamellate. *Bot. Mag.* t. 5807; *Walp. Ann.* vi. 274; *Blume Mus. Bot.* ii. 184 Dendrob. vestitum, *Wall. Cat.* 2005 (*in part*); *Lindl. Gen. & Sp. Orchid.* 82.

SINGAPORE, *Wallich.* MALACCA, *Maingay* (*Kew Distrib.* 1626). PERAK, alt. 4200 ft., *Curtis.*—DISTRIB. Borneo.

Stem as thick as a swan's quill. *Leaves* tomentose beneath, midrib raised, otherwise nerveless. *Spike* 6–10 in.; bracts $\frac{1}{2}$–$\frac{3}{4}$ in.; sepals within and petals white; mentum half as long as the sepals; side lobes of lip narrow, obtuse; midlobe transverse, crisped, emarginate; column glabrous; pollinia very slender. *Capsule* 1 in., oblong, walls very thick.—Wallich's 2005 consists of detached stem, leaves and fruit of this; a good fruiting specimen of *E. ferox*, and leaves of a third species. Lindley received from him a good specimen of this, and none of *ferox*.

81. **E. ferox,** *Blume Mus. Bot.* ii. 184; stem stout hispidly hirsute, leaves 3–4 in. many-nerved, spikes 2–3 in., bracts ovate-lanceolate, sepals ovate obtuse, petals subspathulate 3-nerved, lip cuneate-spathulate. Trichotosia ferox, *Blume Bijd.* 342; *Lindl. Gen. & Sp. Orchid.* 132; *De Vriese Ill.* t. 9 and t. 11, f. 5.

PENANG; *Lobb, Maingay* (*Kew Distrib.* 1625). PERAK, ascending to 4500 ft., *Wray*, &c.—DISTRIB. Java, Borneo.

Stem 4–6 ft., very stout. *Leaves* with very distinct nerves when dry. *Flowers* rather close set; bracts equalling the flowers; mentum broad, uncinate, nearly equalling the sepals; lip very variable, veined, side lobes waved, crenate, midlobe emarginate, with 2–3 rough calli; disk with 2–3 rugose nerves; foot of column flat, glabrous.

82. **E. monticola,** *Hook. f.*; stem below and narrowly lanceolate leaves glabrous, flowers 2-nate on a short peduncle, bracts lanceolate nearly equalling the glabrescent rigid keeled lateral sepals, petals narrowly oblong 3-nerved, lip narrowly spathulate pubescent all over within. E. biflora, *Lindl. in Journ. Linn. Soc.* iii. 56 (*not of Griff.*). Trichotosia biflora, *Griff. Notul.* iii. 331, t. 315.

MALACCA; Mount Ophir, *Griffith, Maingay* (*Kew Distrib.* 1628/2).

Stem 12–18 in., as thick as a goose-quill, upper sheaths and young leaves hispid or villous. *Leaves* distinctly nerved when dry. *Bracts* ovate, acuminate; mentum not half as long as the sepals; lip with terminal rounded lobes, disk concave; foot of column pubescent. *Capsule* $\frac{1}{2}$ in., subglobosely ellipsoid.—Griffith doubtfully refers Blume's *T. pauciflora* to this, but in that the lip is emarginate.

Var. ? *hirsuta*; leaves softly tomentose beneath, flowers hirsute, sepals not keeled, lip broader more obcuneate, lobes broader.—Perak, *Scortechini.*

83. **E. gracilis,** *Hook. f. Ic. Plant. ined.*; stem slender, leaves $1\frac{1}{2}$–2 in. narrowly lanceolate glabrous above and beneath, peduncle $\frac{1}{2}$ in. 2–3-fld., bracts ovate-lanceolate, sepals narrow 3–5-nerved, petals linear

3-nerved, lip with a long straight claw and small flabelliform limb densely pubescent except the margin.

PERAK, *Scortechini.*

Stem 6–8 in., as thick as a duck's quill, upper sheaths hirsute. *Leaves* slightly hairy when young. *Peduncle* hirsute or glabrescent; bracts $\frac{1}{2}$–$\frac{2}{3}$ in.; mentum half as long as the sepals; lip straight, limb thick crenate; column glabrous, foot tumid villous.—The smallest species of this sub-section.

84. **E. oligantha,** *Hook. f. Ic. Plant. ined.*; nearly glabrous, leaves 2–2$\frac{1}{2}$ in. thickly coriaceous ovate-lanceolate glabrous above tomentose beneath, flowers 1–2 sessile glabrescent, sepals ovate acuminate 5–7-nerved, petals narrowly oblanceolate acute 3-nerved, lip narrow, claw long pubescent, limb half as long obovate villous.

PENANG, *Maingay* (*Kew Distrib.* 1629).

Stem 10–12 in., curved, as thick as a goose-quill, tips hirsute. *Leaves* with strongly recurved margins when dry, not nerved. *Flowers* $\frac{1}{2}$ in. long, at first hirsute; mentum as long as the sepals; side lobes of lip narrow, rounded; terminal thickened, crenulate, emarginate; column and its foot pubescent.

85. **E. velutina,** *G. Loddiges in Bot. Reg.* 1840, *Misc.* 86; stem above and leaves softly villous, leaves 2–3 in. thickly coriaceous oblong-lanceolate, flowers few in subsessile spikes, bracts ovate coriaceous, sepals ovate-lanceolate, petals linear obtuse 5-nerved, lip very long-clawed, glabrous with a villous cushion on the cuneate obovate limb. *Walp. Ann.* vi. 274.

SINGAPORE, *Cuming* (*Hort. Loddiges*). MALACCA, *Maingay.* TENASSERIM, *Helfer* (*Kew Distrib.* 5110).

Stem 1–2 ft., as thick as a goose-quill. *Leaves* with strongly revolute margins when dry. *Spikes* dense-fld.; mentum as long as the sepals; side lobes of lip rounded, midlobe short, 2-fid; foot of column puberulous.—The flowers are described in Bot. Reg. as solitary.

86. **E. pulvinata,** *Lindl. in Journ. Linn. Soc.* iii. 56; villously hirsute, stems short, leaves 1$\frac{1}{2}$–2 in. ovate subacute, flowers solitary hirsute, sepals ovate-lanceolate, petals linear, lip spathulate emarginate hairy and with a pubescent cushion within the tip.

TENASSERIM; at Mergui, *Griffith.*

Described by Lindley from (an evidently enlarged) drawing by Griffith. Parish has a drawing of a plant named *E. pulvinata* with tufted erect stems 6 in. long swollen at the base, flowers white 2-nate nearly 1 in. long, mentum truncate much shorter than the sepals.

87. **E. tuberosa,** *Hook. f. Ic. Plant. ined.*; stem short glabrous except the tips and base, leaves 2–2$\frac{1}{2}$ in. lanceolate thickly coriaceous glabrous on both surfaces, flowers 2 on a short peduncle hirsute, bracts orbicular or ovate very coriaceous, sepals ovate-lanceolate falcate, petals narrowly spathulate obtuse 3-nerved, lip obovate, axis tomentose, midlobe short broad 2-winged or retuse.

PERAK, *Scortechini.*

Stems 6–8 in., as thick as a goose-quill, curved, tumid base $\frac{1}{4}$–$\frac{1}{2}$ in. diam. *Flowers* $\frac{2}{3}$ in. long; mentum half the length of the sepals, tip swollen; side lobes of lip obscure; midlobe with thickened nerves, column and its tumid foot pubescent.

88. **E. rufinula,** *Reichb. f. in Hamb. Gartenzeit.* xix. 13; hirsute, leaves 3–4 in. narrowly lanceolate very coriaceous, spikes short 2–4-fld.

hispid, bracts long narrow recurved, sepals lanceolate, petals oblanceolate acute 3-nerved, lip glabrous except the ciliate base, claw broad, limb obcordate. E. annulata, *Lindl. in Journ. Linn. Soc.* iii. 57 (*not of Blume*).

Sikkim Himalaya, alt. 5000 ft., *J. D. H.* Cachar, *Keenan.* ? Tenasserim, *Helfer.*

Stem 10–12 in., about as thick as a duck's quill. *Leaves* subfalcate, usually (in Sikkim) loaded with concretions. *Flowers* ½ in. long, smaller than in the foregoing species; bracts ovate-lanceolate, acuminate, falcate; mentum much shorter than the sepals; lip much thickened along the mesial line and tip; foot of column glabrous.

89. **E. aporina,** *Hook. f. Ic. Plant. ined.*; short, villously hirsute, leaves ¾–1 in. close-set lanceolate, flowers solitary sessile, bracts small ovate acute, sepals broadly ovate obtuse 3-nerved, petals narrowly subspathulate 3-nerved, lip broadly clawed panduriform ciliolate, surfaces glabrous.

Perak, alt. 3–4000 ft., *King's Collector, Scortechini.*

Stem 6–8 in., uniformly clothed with close-set distichous leaves; internodes ¼ in. *Leaves* with revolute margins. *Flowers* ½ in. long, glabrescent; mentum as long as the sepals; side lobes of lip small, rounded; midlobe larger than both, emarginate, crenate; column and its foot glabrous.—Habit of sect. *Aporum* of *Dendrobium.*

** *Small species with procumbent or creeping stems, hirsute, column very short.*

90. **E. dasyphylla,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 147; hirsute all over, stems interlaced, leaves ½–⅔ in. sessile fleshy elliptic-obovate, flowers very small solitary shortly peduncled.

Sikkim Himalaya, *Herb. Griff.* (*Kew Distrib.* 5131); at the foot of the hills, *J. D. H.* Khasia Hills, alt. 1–2000 ft., *J. D. H. & T. T.* Pegu, *Kurz.* Tenasserim, *Helfer* (*K. D.* 5382), *Parish.*

Stems as thick as a sparrow-quill. *Leaves* subacute, convex on both surfaces. *Scape* ¼–½ in.; bracts cupular; sepals 5-nerved, dorsal very small, lateral triangular, acute; mentum large, rounded; petals broadly oblong, 1–3-nerved; lip large, cuneately obovate, side lobes small, midlobe broader, nerves strong; anther beaked; pollinia equal, pyriform.—Near *Trichotosia microphylla*, Blume, of Java.

Sect. X. Xiphosium (see p. 786).

91. **E. carinata,** *Gibs. in Calc. Journ. Nat. Hist.* v. 365; *Lindl. in Journ. Linn. Soc.* iii. 50. E. rosea, *Wall. Cat.* 7409 (*not of Lindl.*); *Reichb. f. in Walp. Ann.* vi. 269 (*in part*). E. Fordii, *Rolfe in. Gard. Chron.* 1886, ii. 584 (*excl. habitat*). Xiphosium acuminatum, *Griff. Notul.* iii. 332; *Itin. Notes* 78, No. 1153; *Ic. Plant. Asiat.* t. 316.

Sikkim Himalaya, *King, Elwes.* Khasia Mts., *Griffith* (*Kew Distrib.* 5121).

Pseudobulbs on a stout or slender rhizome, 2–4 in., ovoidly oblong, sulcate. *Leaf* thickly coriaceous, with the stout petiole 6–18 in. *Scape* 6–8 in., included up to the raceme in the sword-shaped upper sheath; bracts 1½ in., linear-lanceolate; sepals ovate or ovate-lanceolate, green and white with red nerves, keel serrate; mentum rounded; petals rhombic, acute; lip obovate-oblong, red-brown, side lobes narrow, midlobe rounded or ovate; column short.—Very near the Hong Kong *E. rosea.*

SECT. XI. ACRIDOSTACHYA (see p. 786).

92. **E. acridostachya,** *Reichb. f. mss.*; *Lindl. in Journ. Linn. Soc.* iii. 48.

PERAK, *Scortechini*; Larut, alt. 3500–4500 ft., *King's Collector.*—DISTRIB. Java.

Rhizome very stout; sheaths 1–3 in., rigidly coriaceous; upper ensiform, sometimes 3–4 in. *Leaf* 6–12 in., petioled, acute, thickly coriaceous. *Scape* stout, 6–10 in., naked; raceme 4–6 in., cylindric; flowers spreading or deflexed, coriaceous, about $\frac{1}{3}$ in. from tip of mentum to upper sepal; bracts minute; pedicel with ovary $\frac{1}{3}$ in.; lateral sepals much longer than broad, falcate, obtuse; dorsal much smaller; petals linear-oblong, obtuse; lip sessile, coriaceous, oblong, obtuse, base concave, side lobes very small; column very short, foot long, fleshy, channelled.

Sect. XII. DILOCHIOPSIS (see p. 786).

93. **E. Scortechinii,** *Hook. f. Ic. Plant. ined.*

PERAK, *Scortechini*; on trees, alt. 5–5300 ft., *King's Collector.*

Stem 3–6 ft., as thick as a goose-quill; internodes 1–1½ in. *Leaves* 3–5 in., linear-lanceolate, tips dimidiate, nerves strong. *Panicle* 4–5 in. long and broad, tomentose; bracts at the axils $\frac{1}{2}$–$\frac{3}{4}$ in., chartaceous, floral narrow; flowers sessile, waxy-white, bluish within; ovary very short; sepals $\frac{1}{6}$ in., orbicular-ovate, obtuse, 3-nerved, keel winged; dorsal oblong; petals broadly oblong, 3-nerved; mentum short; lip sessile, broadly cuneate; side lobes long, spreading, obtuse, midlobe transversely 2-winged, disk with a broad tomentose ridge ending in a large cushion on the midlobe; column not long.—Habit of *Arundina*, sect. *Dilochia*.

Sect. XIII. PELLAIANTHUS (see p. 786).

94. **E. leiophylla,** *Lindl. in Journ. Linn. Soc.* iii. 57. Ceratostylis pellita, *Reichb. f. in Herb. Kew.*

PENANG; on stones, *Maingay* (*Kew Distrib.* 1631); alt. 2000 ft., *Curtis.*—DISTRIB. Borneo.

Rhizome very stout, rusty-tomentose; pseudobulb small, depressed conical, narrowed into a cylindric sheathed 2–3-nodal fleshy erect stem 1–3 in. long. *Leaves* 2, 5–7 by $\frac{1}{2}$–1 in., linear-oblong, obtuse or notched. *Spike* far below the leaves, very short and flowers rusty-tomentose; bracts rounded; lateral sepals $\frac{1}{3}$ in., oblong, very obtuse and linear-oblong petals fleshy or thickly coriaceous; mentum obscure; lip sessile, ovate-oblong, obtuse, entire, very thick, smooth with a furfuraceous cushion towards the base and over the tip; column very short, broad; anther low, 4-celled; pollinia 2, large, compressed, angular (and ? 2 small).—A remarkable plant, described by Lindley from an imperfect Bornean specimen, and referred to sect. *Trichotosia*.

DOUBTFUL AND EXCLUDED SPECIES.

E. Rimanni, *Reichb. f. in Gard. Chron.* 1885, ii. 712; pseudobulbs 3 by 1 in. pyriform, leaves 2–4 cuneate-oblong acute coriaceous light green 11-nerved, raceme dense-fld. drooping and inflorescence rusty-pilose, flowers pellucid sulphur-cold., lateral sepals triangular, mentum long obtuse, petals oblong obtuse, lip cuneate, side lobes dimidiate-oblong, midlobe transversely oblong emarginate golden with 2 purple spots, base with a tumid callus.—Burma (*Hort. Sanders*).—Probably near *E. Griffithii*, R. f. I have seen no specimens.

E. polyura, *Lindl. in Bot. Reg.* xxviii. (1842), *Misc.* 2, is a Malayan species erroneously supposed to be a native of Ceylon.

19/1. **CLADERIA,** *Hook. f.*

Terrestrial; stem tall, terete, rooting on tree-trunks, leafy. *Leaves* large, ovate-lanceolate, finely acuminate, plicate, narrowed into strongly ribbed inarticulate sheaths. *Scape* terminal, erect, simple or sparingly branched, sheathed rachis of spike many-fld., very stout, rigid, tomentose; bracts short, broad, rigidly coriaceous, persistent; flowers large, coriaceous or fleshy, tomentose without. *Sepals* obtuse, dorsal oblong; lateral obliquely oblong, base saccate. *Petals* strongly falcate, oblanceolate, obtuse, costa stout. *Lip* as long as the sepals, concave, coriaceous, sessile at the base of the column; hypochile large, broadly oblong, base saccate, disk with 2 tomentose ridges and many horizontally spreading nerves, epichile small, of 2 orbicular lobes, their bases incumbent on the tip of the hypochile. *Column* long, sigmoid, thickened upwards; clinandrum concave; anther terminal, hemispheric, imperfectly 2-lobed; pollinia 2? pyriform.

C. viridiflora, *Hook. f. Ic. Plant. ined.*

PERAK; at Sunga Ryah, *King's Collector.* MALACCA, *Maingay*; in dense jungles.

Stem 8–10 ft., as thick as a goose-quill, terete; the lower part creeping and rooting, the upper erect and clinging to trees by side roots. *Leaves* 5–10 by 1½–3 in., 5-nerved. *Spikes* 2–5 in., very stout, strict, erect; bracts concave, ⅛ in. long, sessile by a very broad base; flowers 1½ in. diam., pale green, striped with darker; sepals and petals nearly glabrous within, strongly nerved, the nerves branching and anastomosing; lip abruptly shortly narrowed at the base.—I know nothing very like this curious plant, which I place provisionally near *Eria.*

20. **PHREATIA,** *Lindl.*

Tufted often very small plants, with the habit of *Oberonia*, pseudobulbous or not. *Leaves* distichous, articulate on equitant sheaths. *Scape* axillary or lateral, or from the rootstock, slender; flowers very minute, cellular, racemed or spicate. *Sepals* equal, connivent or spreading. *Petals* smaller. *Lip* jointed on the base of the column or its foot, sessile or clawed, broad or narrow. *Column* very short, top broad; anther low, 2–4-celled; pollinia 8, obovoid, waxy, cohering by a viscus. *Capsule* minute, ovoid, terete.—Species about 10, Indian, Malayan and Oceanic.

The flowers are of the same cellular texture as in *Thelasis.*

1. **P. Myosurus,** *Lindl. in Journ. Linn. Soc.* iii. 61; stem 0, leaves 8–12 in. strap-shaped, tip obliquely rounded, scape long, bracts ovate-lanceolate acuminate, sepals obtuse, mentum rounded, lip sessile cuneate, broad end obscurely 3-lobed. Eria (Phreatia) Myosurus, *Reichb. f. in Bonplandia.*

PERAK, alt. 3000–3500 ft., *King's Collector, Scortechini.*—DISTRIB. Java, Sumatra.

Rhizome very stout. *Leaves* ½–⅔ in. broad, flat, membranous. *Scape* and *raceme* rather longer than the leaves; bracts variable in length; flowers ⅙ in. long, waxy-white.—The Javan specimens have a shorter, broader, more rhomboid lip.

2. **P. elegans,** *Lindl. Gen. & Sp. Orchid.* 63; *in Journ. Linn. Soc.* iii. 61; stem 0 or a small pseudobulb, leaves 2½–5 in. linear-lanceolate or oblanceolate obtuse, scape longer, bracts ovate-lanceolate exceeding the

ovary, sepals acute, mentum rounded, lip with a short saccate claw and triangular blade. Thelasis elegans, *Blume Mus. Bot.* ii. 187.

KHASIA MTS.; at Pomerang, alt. 4–5000 ft., *J. D. H. & T. T.* CEYLON, *Macrae.*

Stems densely tufted. *Leaves* coriaceous, obtuse, 1-nerved. *Spikes* 3–4 in., dense-fld.; flowers white; lateral sepals $\frac{1}{12}$ in. long, triangular, acute, 1-nerved; petals broadly ovate; lip obscurely 3-nerved; column very short; anther membranous; pollinia free, globosely pyriform.—I do not find the hairs on the lip described by Lindley.

3. **P. perpusilla,** *Benth. in Gen. Pl.* iii. 511; pseudobulbs clustered depressed, scape filiform, bracts ovate-lanceolate, sepals obtuse, lateral lanceolate, mentum obscure, lip lanceolate, margins waved. Eria (Phreatia) perpusilla, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 148.

TENASSERIM; at Moulmein, *Lobb, Parish.*

Pseudobulbs $\frac{1}{2}$–$\frac{3}{4}$ in. diam., smooth. *Leaves* not seen. *Scape* 2–2½ in.; spike $\frac{1}{2}$–$\frac{3}{4}$ in.; bracts $\frac{1}{10}$ in., hyaline; sepals about as long.

4. **P. nana,** *Hook. f. Ic. Plant. ined.*; stems short leafy, leaves $\frac{1}{2}$–$\frac{3}{4}$ in. narrowly ensiform acute, spikes axillary as long as the leaves capillary decurved, bracts ovate acute, sepals broadly ovate and very small petals obtuse, lip ovate obtuse.

PERAK, *Scortechini, King's Collector.*

Stems densely tufted, 1½–2 in., often decurved. *Leaves* about $\frac{1}{16}$ in. diam., fleshy; flowers $\frac{1}{20}$ in. diam.; ovary ellipsoid, smooth.

5. **P. minutiflora,** *Lindl. in Journ. Linn. Soc.* iii. 62; leaves equitant linear obtuse recurved, spike erect very slender as long as the leaves, bracts triangular setaceous, lip obovate concave.

SINGAPORE, *Ridley* (*in litt.*).—DISTRIB. Borneo.

Leaves about 2 in. long; flowers the smallest of the genus, in a very slender erect spike; bracts brown, setaceous, broad at the base.—Description from Lindley. I have seen no specimens.

6. **P. parvula,** *Benth. in Herb. Kew*; stem short, leaves ½ in. imbricating subcylindric acute, scape very short, spikes axillary decurved, bracts cymbiform shorter than the ovary, mentum 0, lip and petals minute, the latter cymbiform. Octarrhena parvula, *Thwaites Enum.* 3072.

CEYLON; Central Province, in forests, alt. 3–4000 ft., *Thwaites.*

Stems 1 in., densely tufted, stout, leafy from the base. *Leaves* spreading. *Spikes* longer; rachis stout; flowers pale green; lateral sepals $\frac{1}{16}$ in. long, rounded, concave, nerveless; petals oblong; lip close under the broad short column; pollinia 4–8, free, globose.—A remarkable little plant overlooked by Bentham in Gen. Plant., but the specimen he has placed in *Phreatia,* though there is no foot to the column or mentum. Thwaites wrongly referred it to *Vandeæ.*

21. PACHYSTOMA, *Blume.* (See 21/2. IPSEA.)

Terrestrial; rhizome underground, nodose. *Leaves* 1–2, often postfloral, narrow, plaited. *Scape* sheathed; flowers rather small, racemed, pendulous; bracts large, scarious. *Sepals* subequal; lateral adnate to the base of the column. *Lip* sessile on the base of the column, erect;

side lobes oblong, midlobe small; disk with 3–5 deeply crested or fimbriate ridges. *Column* slender, clavate above, foot 0; anther 4-celled; pollinia 8, pyriform.—Species 6–8, probably forms of one, Indian, Malayan and African species.

P. senile, *Reichb. f. in Bonpland.* iii. 250; bracts ovate- or linear-lanceolate longer or shorter than the flowers. P. Smithianum, Edgeworthii, montanum & Lindleyanum, *Reichb. f. l. c.*; *Walp. Ann.* vi. 642, 643. Apaturia senilis, Smithiana & montana, *Lindl. in Wall. Cat.* 3739, 3737, 3738; *Gen. & Sp. Orchid.* 130, 131. A. Lindleyana, *Wight Ic.* t. 1662.

Plains and foot-hills of N. INDIA, from GARWHAL to SIKKIM, the KHASIA HILLS and MUNNIPORE, and southwards to MALABAR and CEYLON.—? DISTRIB. Malay Islands and S. China.

Rhizome 1–2 in. *Leaf* solitary, very long and narrow. *Scape* with *raceme* 8–15 in., white or nearly so; bracts in the longest state (*P. senile* type) 2 in. long, narrow lanceolate; in the shortest state (*P. montanum*) shorter than the flowers, and spathaceous; flowers about ½ in. long, glandular-puberulous, white, greenish or pinkish; sepals membranous, acute or acuminate, 5-nerved; petals narrowly spathulate, acuminate, 3-nerved; mentum very short; lip from oblong to nearly orbicular, claw very short; side lobes large, obtuse or subacute; midlobe as long or longer, oblong or obovate, retuse or pointed, purplish; disk with 5 (rarely 3) crested ridges from the base to the midlobe, and there thickened; column puberulous.—I cannot distinguish the plants here included under *P. senile*, they all vary so much and into one another. Clarke finds the long and short bracted states growing intermixed in the Sikkim *Terai*.

21/2. **IPSEA,** *Lindl.*

Terrestrial herbs with the long narrow plicate leaves and sheathed scape of *Pachystoma*, but distinctly pseudobulbous, with few large highly-coloured flowers.—Species 3, Indian and an African.

I cannot follow Reichenbach and Gen. Plant. in uniting *Ipsea* with *Pachystoma.*

1. **I. speciosa,** *Lindl. Gen. & Sp. Orchid.* 124; flowers golden-yellow, lip 3-lobed, disk with 5 thick ridges, *Wight Ic.* t. 1663; *Bot. Mag.* t. 5701. Pachystoma speciosum, *Reichb. f. in Bonpland.* iii. 250; *Walp. Ann.* vi. 462.

CEYLON; on grassy hill-sides, alt. 4–5000 ft.

Puberulous. *Pseudobulbs* 1–1½ in., tufted, depressed. *Leaves* 6–10 in., long-petioled. *Scape* as long, 2–3-sheathed, 2–4-fld.; bracts spathaceous, equalling the ovary; flowers 2–3 in. diam.; lateral sepals ovate-oblong, subacute; lip oblong, side lobes triangular, obtuse or subacute; midlobe produced, obovate; column narrowly winged, subclavate.

2. **I. malabarica,** *Hook. f.*; midlobe of lip emarginate denticulate, disk with 5 serrated lamellæ. Pachystoma malabaricum, *Reichb. f. in Walp. Ann.* vi. 462.

MALABAR, *Jerdon.*

I do not know this plant. Wight (Ic. v. 8) says that he has a species from the Malabar Ghats, which he has not examined. I do not find it in his Herbarium.

3. **I?. Wrayana,** *Hook. f.*; flowers claret-cold., lip triangular-ovate acute with 3 narrow lamellæ.

PERAK; on Gunong Batu Patch, alt. 4500 ft., *Wray*.

Scape 9 in.; bracts $\frac{2}{3}$ in.; flowers $1\frac{1}{2}$ in. diam., resupinate; dorsal sepal ovate-lanceolate, acuminate, lateral and 3-nerved petals lanceolate; mentum with the sac of the lip produced into an incurved stout round-tipped spur; side lobes of the broad lip very short, tooth-like; column rather short, winged; pollinia 8, seated on a forked thick membrane, in superposed pairs.—A very curious plant, perhaps a *Spathoglottis*.

22. **SPATHOGLOTTIS**, *Blume*.

Pseudobulbs on a creeping terrestrial rhizome, broadly conic, 1–3-leaved. *Leaves* long-petioled, elongate, narrow, plaited. *Scape* lateral; flowers racemed, often large. *Sepals* free, subequal. *Petals* subsimilar or longer and broader. *Lip* sessile, erect; lateral lobes erect, midlobe clawed; disk at its base tubercled or crested. *Column* long, arched, subclavate above and 2-winged, foot 0; anther 2-celled; pollinia 8, slightly cohering in fours.—Species about 10, tropical Asiatic, Australian and Pacific.

* *Pseudobulbs clothed with rigid fibres of old leaves. Scape tall, stout. Petals much broader than the sepals, many-nerved.*

1. **S. plicata,** *Blume Bijd.* 401, t. 76; tall, stout, scape 2–3 ft., raceme puberulous, bracts ovate or lanceolate acuminate, flowers 1 in. diam. lilac, sepals broad acute, midlobe of lip longer than the side lobes, claw narrow dilating into a cuneately flabelliform blade. *Lindl. Gen. & Sp. Orchid.* 119; *in Wall. Cat.* 3743; *Walp. Ann.* vi. 455. S. lilacina, *Griff. Notul.* iii. 323; *Ic. Pl. Asiat.* t. 311, f. 3. Bletia angustifolia, *Gaud. in Freyc. Voy. Bot.* 421, t. 32.

MALAY PENINSULA; from Penang and Perak to Singapore, *Wallich*, *Griffith* (*Kew Distrib.* 5937, 5193), *Maingay* (*K. D.* 1637, 1639).—DISTRIB. Java, Manilla, New Guinea.

Pseudobulbs when full grown 2 in. diam. *Leaves* 2–4 ft. by 1–3 in., finely acuminate; petiole 6–18 in. *Raceme* 6–12 in., many-fld.; bracts $\frac{1}{2}$–1 in., reflexed (in young plants flowers few and bracts larger); pedicels 1 in.; calli of lip yellow, sparsely villous. *Capsule* $1\frac{1}{2}$ in., pendulous.—Griffith (Notul. l. c. 324) gives the Khasia Hills as a locality (as well as Malacca), but this is a mistake.

2. **S. aurea,** *Lindl. in Paxt. Fl. Gard.* i. 16, and in *Journ. Hort. Soc.* v. 34; tall, stout, scape 2 ft., raceme glabrous, bracts oblong obtuse, flowers $1\frac{1}{2}$ in. diam. golden, sepals broad obtuse, midlobe of lip equalling the falcate side lobes narrowly lanceolate fleshy acute. *Walp. Ann.* vi. 455. S. plicata, *Griff. Notul.* iii. 325; *Ic. Pl. Asiat.* t. 311, f. 1.

MALAY PENINSULA; PERAK, on Gunong Batu Pateh, *Wray*; Mount Ophir, *Griffith* (*Kew Distrib.* 5290), *Maingay* (*K. D.* 1638).—DISTRIB. Malay Islands.

Pseudobulbs $\frac{1}{2}$–1 in. diam. *Leaves* 12–18 in., narrowly lanceolate, acuminate; petiole as long. *Raceme* 6–8 in.; bracts $\frac{1}{2}$ in., spreading, fleshy; pedicels $\frac{1}{2}$ in.; side lobes of lip narrow, falcate.

3. **S. Wrayi,** *Hook. f. Ic. Plant. ined.*; tall, scape 12–18 in., raceme glabrous, bracts large oblong, flowers $2\frac{1}{2}$ in. diam. bright yellow, sepals broad subacute, midlobe of lip longer than the straight side lobes very narrowly spathulate.

PERAK, alt. 4500 ft., *Wray*.

Habit of *S. aurea*, but flowers nearly twice as large, pedicels $1\frac{1}{2}$ in.; bracts $\frac{3}{4}$ in. —I have seen but one specimen of this splendid species, which is 3–4-fld. The inflorescence is probably as variable as in *S. plicata*.

4. **S. Bensoni,** *Hook. f. Ic. Plant. ined.*; tall, scape 18 in. or more, raceme elongate and flowers puberulous, bracts very small ovate-lanceolate, flowers 1 in. diam., sepals subacute, midlobe of the saccate lip hardly longer than the side lobes sessile cuneately obovate.

PEGU; on the Prome Hills, *Benson* (*Herb. Maingay*).

Leaf 12 in., narrowly lanceolate. *Racemes* 6–10 in.; flowers rather distant; bracts $\frac{1}{6}$ in., pedicels $\frac{3}{4}$ in. *Capsule* 1 in.—The specimens consist of a leaf and two racemes. Side lobes of lip shorter and broader than in the preceding three species; the calli together form as it were an intermediate lobe, keeled at the back.

** *Pseudobulbs small, depressed conic, naked or nearly so. Scape usually very slender. Petals equalling or broader than the sepals, 7–9-nerved.*

5. **S. Lobbii,** *Reichb. f. in Walp. Ann.* vi. 455; *in Gard. Chron.* 1876, 534; *Ot. Hamburg.* 46; raceme 4–8-fld., bracts small lanceolate pubescent, flowers $1\frac{1}{2}$ in. diam., sepals puberulous, midlobe of lip longer than the obovate oblong side lobes, claw slender suddenly dilating into an obcordately flabelliform smooth blade.

ARRACAN; at Akyab, *Parish.*

Pseudobulbs about 1 in. diam., with a few fibres. *Leaves* not seen. *Scape* 12–18 in.; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., acute; flowers sulphur-yellow; pedicel 1 in., very slender; sepals and petals obtuse.—Very near to *S. pubescens*, but the flowers are larger, and the midlobe of the lip has a narrower claw and no ridges on the blade.

6. **S. pubescens,** *Lindl. in Wall. Cat.* 3744; *Gen. & Sp. Orchid.* 120; *in Bot. Reg.* 1845, *under* t. 19; *in Journ. Linn. Soc.* iii. 22; scape usually much longer than the very narrow leaves, racemes 6–8-fld. pubescent, bracts small lanceolate, flowers 1 in. diam., midlobe of saccate lip cuneately flabellate or obcordate longer than the broadly oblong side lobes, disk with 1–3 keeled nerves. S. Fortuni, *Lindl. in Bot. Reg. l. c.* t. 19. Pachystoma Wightii & Fortuni, *Reichb. f. in Walp. Ann.* vi. 464.

KHASIA and NAGA HILLS, alt. 3–5000 ft., *Wallich*, &c. Mts. of ARRACAN and BURMA, *Lobb*, *Parish*, *Griffith*, &c.—DISTRIB. China.

Pseudobulbs as large as a hazel or walnut. *Leaves* 2–12 in., rarely $\frac{3}{4}$ in. broad. *Scape* stout or slender; bracts $\frac{1}{3}$ in. or less; flowers golden yellow with red at base of the lip; pedicels and ovary $\frac{1}{2}$–1 in.; sepals 5–7-nerved, subacute; petals very obtuse, 9-nerved; lip variable, side lobes rather membranous, calli glabrous or villous at the base within.—The Chinese *S. Fortuni* has a broader column than *pubescens*, and the commissure of the side lobes of lip always villous, but I find no other differences.

VAR. *parvifolia*; pseudobulbs very small, leaves very narrow, sometimes quite linear, scape 4–8 in. very slender 2–3-fld. S. parvifolia, *Lindl. in Bot. Reg. l. c.*; *in Journ. Linn. Soc.* iii. 22. S. pubescens, *Wight Ic.* t. 1739. S. khasiana, *Griff. Notul.* iii. 323; *Ic. Pl. Asiat.* t. 311, f. 1. Pachystoma parvifolium, *Reichb. f. l. c.* 462. Epipactis graminifolia, *Roxb. Fl. Ind.* iii. 456.—Khasia Mts.; at Churra, alt. 4000 ft., *Griffith*, *J. D. H. & T. T.*

VAR. *Berkeleyi*; leaf 14 by $1\frac{1}{2}$ in., raceme many-fld., flowers $\frac{3}{4}$ in. diam.—Arracan Hills, *Berkeley*.—The leaves of *S. Fortuni* being sometimes nearly a foot long, I venture to regard this as a variety of *pubescens*, as suggested by Lindley.

7. **S. ixioides,** *Lindl. in Wall. Cat.* 3745; *Gen. & Sp. Orchid.* 120; *in Journ. Linn. Soc.* iii. 22; scape 4–6 in. longer or shorter than the slender leaves 1–2-fld., bracts sheathing and sepals pubescent, flower 1–$1\frac{1}{2}$ in. diam., midlobe of subsaccate lip cuneate or obcordate with a tooth or auricle on each side at its base, side lobes very broad oblong, disk pubescent. *Bot.*

Mag. t. 7060. Pachystoma Josephi, *Reichb. f. in Walp. Ann.* vi. 464. Cymbidium ixioides, *Don Prodr.* 36.

NEPAL, *Wallich, Scully.* SIKKIM, alt. 8–1000 ft., *J. D. H., Elwes.*

Possibly only a small alpine form of *S. pubescens*, which latter has not been found in the Himalaya. The accessory teeth or auricles at the base of the midlobe of the lip vary greatly in size, and are sometimes very obscure; the disk between the side lobes is pubescent; there are two short raised ridges on the disk at the base of the midlobe.

*** *Petals narrower than the sepals, 3-nerved.*

8. **S. Handingiana,** *Par. & Reichb. f. in Ot. Hamburg.* i. 45; scape 10 in. slender longer than the elliptic-lanceolate leaf, raceme many-fld. and lanceolate bracts and ovary pubescent, sepals oblong-lanceolate 5-nerved, petals linear acuminate 3-nerved, lip very slender, side lobes a mere dilatation of the axis bearing two large erect falcate cuneate oblong calli, midlobe very long filiform recurved.

NORTH BURMA; Bhamo, *Herb. Parish.*

Pseudobulb small. *Leaf* solitary?, 5 by 1 in., acuminate. *Raceme* 4 in.; bracts $\frac{1}{2}$ in., slender; pedicel with ovary 1 in., capillary; flowers 1 in. diam., membranous; sepals and petals rose-purple, lip longer than the sepals, white with yellow purple-spotted calli; column as long as the sepals, narrowly winged above; anther narrow; pollinia narrowly clavate.—A very remarkable plant, one specimen only seen.

23. ACANTHEPHIPPIUM, *Blume.*

Terrestrial; pseudobulbs 3–9-leaved. *Leaves* broad, plaited, petioled. *Flowers* few, large, fleshy, in very short lateral raceme; pedicels thickened after flowering. *Sepals* broad, cohering in a ventricose tube, with recurved tips, lateral adnate to the foot of the column; mentum very large, saccate. *Petals* erect, narrow, included. *Lip* very small, stipitate on the foot of the column, inflexed; lateral lobes broad, erect; midlobe recurved, entire; disk with a complex callus. *Column* short, stout; foot very long, inflexed; anther 2-celled; pollinia 8, erect, cohering by a granular mass.—Species 3–4, Indian and Malayan.

1. **A. bicolor,** *Lindl. in Bot. Reg.* t. 1730; sepals and petals yellow with blood-red tips, side lobes of lip hatchet-shaped, midlobe short tongue-shaped, disk 3-lamellate. *Thwaites Enum.* 307; *Maund. Bot.* iv. t. 300; *Walp. Ann.* vi. 461.

CEYLON; Central region, ascending to 2000 ft.

Pseudobulbs ovoid, 2–3 in. high, smooth, elongating into a stout short fleshy stem. *Leaves* 9–18 by $2\frac{1}{2}$–$4\frac{1}{2}$ in., bases sheathing. *Scape* 3–7-fld., sheathed; bracts 1 in., ovate-lanceolate; flowers $1\frac{1}{2}$ in., like broad gibbous-based jugs.—Lindley figures the disk as a broad 2-lobed concave plate, Thwaites as of 3 lamellæ of which the outer are tubercled, the median slender and mucronate at both ends.

2. **A. sylhetense,** *Lindl. Gen. & Sp.* 177; *in Journ. Linn. Soc.* iii. 21; leaves long petioled, sepals and petals white or straw-coloured freckled with red towards the tips, side lobes of lip falcate acute, midlobe tongue-shaped, disk with 3–5 fleshy toothed lamellæ. A. ringiflorum, *Griff. Notul* iii. 347; *Ic. Pl. Asiat.* t. 325.

SYLHET and KHASIA MTS., alt. 2–4000 ft., *Wallich, J. D. H. & T. T.* UPPER ASSAM, in the Abor Mts. *Griffith*

Pseudobulbs stout, narrow, short or lengthening into a leafy stem 4–14 in. high. *Leaves* 6–10 in., elliptic-lanceolate, acuminate. *Scape* 2–6 in., very stout, sheathed; flowers $1\frac{1}{2}$ in. long, fleshy, like those of *A. bicolor*.—Lindley unites Griffith's *ringiflorum* with *sylhetense*, but it may be another species, having white flowers.

3. **A. striatum,** *Lindl. in Bot. Reg.* 1838, *Misc.* 45; flowers white streaked with red, mentum spur-like, side lobes of lip very broad falcate obtuse, midlobe contracted acute scarlet, lip with a single median crested ridge and thickened lateral nerves. *Walp. Ann.* vi. 460.

NEPAL (*Hort. Kew*). SIKKIM, *Griffith's Collectors* (*Kew Distrib.* 5289) and *Ic. in Herb. Calcutt.*

Very near *A. sylhetense*, but the flowers are much shorter, and the side lobes of lip very different.

24. **PHAJUS,** *Lour.*

Terrestrial or epiphytic large stout herbs. *Leaves* plaited. *Scape* lateral on the pseudobulb, or axillary or terminal; flowers large, handsome, racemed. *Sepals* and *petals* subequal, spreading or suberect. *Lip* adnate to the base of and embracing the column, erect, base gibbous or spurred, midlobe various. *Column* long, stout; foot 0; anther incompletely 4-celled; pollinia 8, attached by fours to a large granular viscus.—Species about 14, tropics of the Old World.

I am not sure that the following arrangement according to the position of the scape, being derived from often imperfect dried specimens, will hold good.

* *Scape from the side of the pseudobulb, tall, stout.*

1. **P. Wallichii,** *Lindl. in Wall. Pl. As. Rar.* ii. 46, t. 158; *Gen. & Sp. Orchid.* 126; leaves 1–2 ft. elliptic-lanceolate acuminate, scape very tall, sepals and petals spreading lanceolate acuminate, spur slender short or long, lip with a tubular limb and ovate-lanceolate acute or acuminate sometimes truncate crisped midlobe. *Paxt. Mag.* vi. t. 193; *Walp. Ann.* vi. 459. ? P. Blumei, *Lindl. Gen. & Sp. Orchid.* 127; *Blume Orchid. Archip. Ind.* 2, t. 1; *De Vriese Illust.* t. 8. P. bicolor, *Lindl. l. c.* 128; *Sert. Orchid.* t. 25; *Bot. Reg.* 1839, *Misc.* 61; *Bot. Mag.* t. 4078; *Wight Ic.* t. 1659–60; *Thwaites Enum.* 300; *Blume Mus. Bot.* ii. 178; *Walp. Ann. l. c.* 458. P. grandifolius, *Lindl. in Wall. Cat.* 3747 (*not of Loureiro*). Limodorum Tankervilliæ, *Roxb. Fl. Ind.* iii. 466 (*not of Aiton*).

SIKKIM HIMALAYA; in tropical valleys, *J. D. H.* ASSAM and SYLHET, *Wallich*, &c. UPPER BURMA, *Griffith*. TENASSERIM, *Parish*. CEYLON, alt. 2–4000 ft. —DISTRIB. Malay Islands ?

Pseudobulbs 1–$1\frac{1}{2}$ in. diam., conical, sheathed by the leaf-bases. *Leaves* $2\frac{1}{2}$–8 in. broad, sometimes spotted; petiole 6–10 in. *Scape* 2–4 ft., sometimes thicker than the thumb; bracts 2 in., spathaceous, caducous; pedicel 1 in.; flowers 4–5 in. diam.; sepals and petals white greenish or rosy without, within yellow-brown with a golden margin, rarely white or concolorous; tube of lip pink or red with a yellow base, midlobe orange, red, or white and pink; spur $\frac{1}{4}$–$\frac{3}{4}$ in. long. *Capsule* 2–$2\frac{1}{2}$ in.—Possibly a form of the Chinese *P. grandifolius*, Lour. I know of no character whereby to distinguish *P. Blumei*.

2. **P. veratrifolius,** *Lindl. in Wall. Cat.* 3746; *Gen. & Sp. Orchid.* 127; scape shorter than the leafing stem, flowers crowded, bracts cymbiform lanceolate, sepals and petals dirty-white spreading and recurved lanceolate acute, spur narrowly conical, lip short broad yellow, side lobes rounded and short retuse midlobe crenulate.

SYLHET, *Wallich.*

Pseudobulbs 3–5 in., elongate, naked. *Leaves* 2–3 ft. by 2–6 in. *Scape* 12–18 in.; sheaths acuminate; flowers $1\frac{1}{2}$ in. diam., in short pyramidal racemes; bracts $1\frac{1}{2}$ in. long, subpersistent; pedicels short; lip longer than the sepals.—Described chiefly from drawings in Herb. Kew by Roxburgh and another.

3. **P. maculatus,** *Lindl. in Wall. Cat.* 3748; *Gen. & Sp. Orchid.* 127; leaves elliptic-lanceolate acuminate, scape with tubular sheaths, racemes many and dense-fld., flowers golden, sepals and petals erect oblong very obtuse concave, side lobes of lip narrow, midlobe very short broad crumpled, spur short conical. *Lodd. Bot. Cab.* t. 1803; *Bot. Mag.* t. 3960; *Blume Mus. Bot.* ii. 180; *Orchid. Archip. Ind.* 9. Bletia flava, *Wall. mss.* B. Woodfordii, *Hook. Bot. Mag.* t. 2719; *Reichb. Fl. Exot.* t. 63.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, *J. D. H.* KHASIA MTS., *Griffith.*—DISTRIB. China, Japan.

Pseudobulbs broadly ovoid, as large as the fist. *Leaves* 1–$1\frac{1}{2}$ ft., often spotted with dull yellow. *Scape* 2–3 ft.; bracts 1–$1\frac{1}{4}$ in., obtuse; pedicels very short; sepals $1\frac{1}{2}$ in., often tipped with green; midlobe of lip orange-brown or concolorous.

** *Scape from the top of the pseudobulb.*

4. **P. callosus,** *Lindl. in Gard. Chron.* 1848, 287 (*with cut of fl.*); leaves radical or subradical linear-lanceolate acuminate, scape from the top of the pseudobulb at the base of the leaves, sepals linear-oblong acute, petals linear dilated above the middle, lip with a tubular limb and short midlobe, spur short incurved. *Blume Mus. Bot.* ii. 178; *Orchid. Archip. Ind.* 4, t. 2; *Reichb. f. Xen. Orchid.* ii. t. 122. Limodorum callosum, *Blume Bijd.* 374, t. 6.

PERAK, *King's Collector.*—DISTRIB. Java.

Very similar to *P. Wallichii*, but distinguished by its more oblong sepals and the broad ends of the petals. *Flowers* dull reddish brown; tube of lip yellowish white with a pink tinge, bright red towards the apex, midlobe retuse.—The colours probably vary as in *Wallichii.*

*** *Scape axillary or from amongst the leaves.*

5. **P. mishmensis,** *Reichb. f. in Bonpl.* v. 43; *in Walp. Ann.* vi. 922, 928; hardly pseudobulbous, stem tall, leaves alternate elliptic-lanceolate, scape axillary, bracts lanceolate caducous, raceme lax-fld., sepals and petals erecto-patent linear-oblong subacute concave rose-cold., lip not exceeding the sepals, side lobes rounded and small 2-lobuled midlobe quite entire, spur narrowly conical. Limatodes mishmensis, *Lindl. & Paxt. Fl. Gard.* iii. 36.

SIKKIM HIMALAYA; in hot valleys, *Clarke*, (*Ic. Cathcart*). Mishmi Hills in UPPER ASSAM, *Griffith.*

Stem, in Ic. Cathcart, 3–4 ft., sheathed below, 6–8-leaved above. *Leaves* 6–12 by 4–5 in., acuminate. *Scapes* 1–2, rather slender, not exceeding the leaves; flowers erect, $1\frac{1}{2}$ in. long; pedicel and ovary as long; lip white, axis pubescent.

6. **P. luridus,** *Thwaites Enum.* 300; pseudobulb ?, leaves lanceolate acuminate, raceme few-fld., bracts caducous, sepals and petals lanceolate acuminate, lip rounded obscurely 3-lobed, side lobes short broad rounded, midlobe waved, disk hairy, spur very short.

CEYLON; in the Saffragam district, *Thwaites.*

Terrestrial; stem 2 ft. *Leaves* 12–18 by 3–5 in. *Scapes* 1–2, as long as the

leaves; bracts oblong, acute; flowers 2 in. broad, greenish yellow and rufous; sepals and petals spreading; lip yellow with two red blotches.—Trimen, Syst. Cat. Ceyl. Pl. 88, refers this to *P. bicolor*, but the habit is quite different, the flowers much smaller, and lip short. I have seen no drawing of this.

******** *Raceme terminating the leafy stem.*

7. **P. albus,** *Lindl. in Wall. Cat.* 3749; *Gen. & Sp. Orchid.* 128; pseudobulb 0, leaves distichous oblong- or linear-lanceolate acuminate, raceme sessile, bracts nearly as long as the flowers persistent, sepals and petals oblong-lanceolate acuminate, lip shovel-shaped with a broad toothed and crisped midlobe, disk with 5 crested ridges, spur short. *Bot. Reg.* 1838, t. 33; *Bot. Mag.* t. 3991; *Knowles & Westc.* t. 125; *Paxt. Mag.* v. t. 125; *Grah. Cat. Bomb. Pl.* 205; *Blume Mus. Bot.* ii. 181. P. Marshalliana, *Reichb. f. in Linnæa*, xli. 65; *Regel Gartenfl.* t. 1098; *Warn. Orchid. Alb.* t. 130. P. Dodgsoni, *Dean Floral Mag.* 1878, t. 329. Thunia alba, *Reichb. f. in Bot. Zeit.* 1852, 764; *Rev. Horticol.* 1874, t. 450. T. pulchra, *Reichb. f. in Gard. Chron.* 1881, ii. 166. Limodorum bracteatum, *Roxb. Fl. Ind.* iii. 466.

Tropical Himalaya, alt. 2–5000 ft., from Garwhal to Sikkim, ascending to 6000 ft. Khasia Mts., alt. 4–5000 ft. Arracan and Burma. The Concan; on Matheran Hill, *Graham*, *Dalzell*, &c.

Stems stout, 6–18 in., densely tufted, pendulous, leafy from the slightly swollen base. *Leaves* 6–14 in., soft, glaucous beneath. *Raceme* 2–3 in., distichously 4–8-fld.; bracts $1\frac{1}{2}$–$2\frac{1}{2}$ in., chartaceous, narrowly cymbiform, acute; sepals and petals erecto-patent, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, white; lip white or pale or dark yellow with purple red or ochreous veins. *Capsule* 1 in. long.—Very variable in size of flower and colour of lip. See vars. *Veitchiana*, Warn. Orchid. Alb. viii. t. 326, and *Wrigleyana*, Williams.

Var. *Bensoniæ*; flowers rose-purple, lip deep purple with a white base. Thunia Bensoniæ, *Hook. f. Bot. Mag.* t. 5694; *Jennings Orchid.* t. 35.

25. NEPHELAPHYLLUM, *Blume.*

Terrestrial creeping herbs with the habit of *Neottieæ*. *Leaves* few, petioled, ovate or cordate. *Scape* included in a large sheath with the leaf; flowers racemed. *Sepals* free, narrow, spreading or recurved. *Petals* linear. *Lip* sessile at the base of the column, erect, stoutly spurred; spur clavate, entire or 3-lobed. *Column* erect, 2-winged; anther 2-celled; pollinia 8, all parallel, adnate to a linear appendage.—Species 6, Indian, Malayan and Chinese.

1. **N. cordifolium,** *Lindl. in Journ. Linn. Soc.* iii. 23; leaves ovate-cordate acute or obtuse, racemes laxly 3–6-fld., bracts linear, lip elongate cuneate, side lobes narrow, midlobe transverse retuse, disk with 3 thickened nerves ending in flattened spines on the midlobe. Citheris cordifolia, *Lindl. in Wall. Cat.* 3750; *Gen. & Sp. Orchid.* 129; *Blume Orchid. Archip. Ind.* t. 61, f. 3, A—D.

Khasia Hills, alt. 4–5000 ft., *Wallich*, *Griffith*, &c.

Stem 1–10 in., succulent, ascending from the creeping rhizome; sheaths 1–4 in., membranous, hyaline. *Leaves* $2\frac{1}{2}$–$4\frac{1}{2}$ in., membranous, 5–7-nerved from the base; petiole 1–2 in. *Scape* 4–6 in.; sheath tubular; bracts $\frac{1}{2}$ in., equalling the pedicel and ovary; sepals $\frac{3}{4}$ in. long to tip of spur, and petals 3-nerved, greenish striped with purple; lip pale purple, longer than the sepals, disk pubescent from the base to the middle. *Capsule* $\frac{2}{3}$ in., oblong.

2. **N. pulchrum,** *Blume Bijd.* 372, t. 32; *Orchid. Archip. Ind.* 171,

t. 61, f. 1; leaves ovate or cordate, racemes densely many-fld., bracts large lanceolate, lip entire obovate-oblong with 3 crested ridges towards the rounded tip. *Lindl. Gen. & Sp. Orchid.* 24; *Reichb. f. Xen. Orchid.* i. 216, t. 88, f. 1; *Bot. Mag.* t. 5332.

PERAK, *King's Collector, Wray.*—DISTRIB. Java.

Habit of *N. cordifolium*, but stem, petioles and scape shorter, flowers in a conical spike, and lip very different. *Leaves* rather fleshy, mottled green, with a metallic lustre. *Scape* 1–3 in.; bracts ½ in., membranous; sepals ⅔ in. to the tip of the spur.—There may be two species confounded here. The Bot. Mag. plant has green sepals and a white lip with yellow ridges. King's specimens have waxy-white sepals tipped with yellow and a pink calyx; Wray figures an obcordate lip, cream-cold., pencilled with crimson, and dull-green sepals.

VAR. *sikkimensis*; sepals and petals narrower purplish or white spotted with pink.—Sikkim near Darjeeling (*Ic. Herb. Kew & Herb. Calcutt.*). Bhotan? *Griffith* (*Kew Distrib.* 5370).

3. **N. tenuiflorum,** *Blume Bijd.* 372; *Orchid. Archip. Ind.* 172, t. 61, f. 2; leaves subhastately cordate acuminate, scape tall slender lax-fld., bracts linear, lip narrowly panduriform, side lobes acute, midlobe ovate crenulate with 3 crested ridges. *De Vriese Illust. Orchid.* t. 12, f. 3 (*bad*); *Walp. Ann.* vi. 217.

PERAK, *Scortechini.*—DISTRIB. Java.

Stem 3–6 in., slender. *Leaves* 1½–3 in.; petiole 1 in. *Scape* 6–8 in., 1–10-fld.; bracts ½–⅔ in., longer than the pedicel and ovary; sepals and petals very narrow, 3-nerved, dorsal strongly keeled; lip pubescent between the side lobes.

26. **TAINIA,** *Blume.*

Terrestrial glabrous herbs; caudex creeping, bearing a solitary elliptic-lanceolate long-petioled leaf on a slender or stout pseudobulb, and with a very long scape at or near its base. *Flowers* small or middle-sized, racemose. *Sepals* narrow; lateral falcate, adnate to and forming a mentum with the saccate base of the lip, or inserted above it. *Lip* adnate by its base only to that of the slender column, hastately 3-lobed, rarely entire, disk lamellate. *Anther* with often a simple or 2-lobed boss, or 2 horns; pollinia 4 or 8, free or united by a viscus, 4 sometimes smaller.—Species 15–18, Indian, Malayan and Chinese.

Very like *Chrysoglossum*, which has 2 free pollinia, *Eulophia* which has a tuberous rhizome and 4 pollinia with stipes and gland, and *Plocoglottis* in which the sides of the lip are adnate to those of the column and the pollinia are in stipitate pairs on a gland. In habit, *Tainia* is totally distinct from *Eria*, as also in the long column. *Calanthes* are many-leaved, and the caudex is rarely creeping.

* Spur of lip free from the base of the lateral sepals.

1. **T. angustifolia,** *Benth. in Gen. Plant.* iii. 515; leaf-blade much longer than the petiole, sepals ¾ in. linear obtuse 3-nerved, petals broader linear-oblong obtuse 5-nerved, spur clavellate, lip narrowly oblong, side lobes narrow, midlobe small transversely oblong, disk with 3 ridges ending in as many lamellæ as the midlobe, anther with 2 bosses. Ania angustifolia, *Lindl. in Wall. Cat.* 3740; *Gen. & Sp. Orchid.* 129.

TENASSERIM; at Tavoy, *Wallich.*

Differs from *A. latifolia* in the narrower leaves, larger flowers, narrower lip with the lamellæ on the midlobe, and the free globosely clavellate incurved spur of the lip; "pollinia 8, 4 smaller," *Lindl.*

2. **T. penangiana,** *Hook. f.*; leaf-blade about equalling the petiole, sepals ⅔ in. linear-lanceolate acuminate and narrow petals 5–7-nerved, spur shortly conical obtuse incurved, lip oblong, side lobes subacute incurved overlapping the orbicular acuminate crisped midlobe, disk with 3 slender ridges or lamellæ thickened on the midlobe, column broadly winged.

PENANG; on stones on the top of the hill, *Maingay* (*Kew Distrib.* 1642).

Leaf 8–12 by 1½–2 in.; petiole slender, base not pseudobulbous. *Scape* twice as long, slender, bracts ⅓ in.—The specimens are in bad condition; pollinia not seen.

3. **T. viridi-fusca,** *Benth. in Gen. Plant.* iii. 515; scape tall stout, bracts long, sepals 1 in. lanceolate acuminate and oblanceolate petals 5–7-nerved, spur short obtuse, lip obovate-oblong, side lobes incurved, disk with 5 lamellæ about the middle which sink to rise again on the small suborbicular midlobe as 5 truncate very thick ridges. Calanthe viridi-fusca, *Hook. Bot. Mag.* t. 4669; *Jard. Fleur.* t. 336; *Paxt. Fl. Gard.* iii. 118, 591.

ASSAM, *Simons.* TENASSERIM; at Moulmein, *Parish.*

Pseudobulb 2–2½ in. diam. *Leaf* 20 by 3 in.; petiole as long. *Scape* 3–5 ft.; bracts ¾–1 in., exceeding the pedicel and ovary; sepals and petals green suffused with purplish brown; lip white with yellow ridges; anther hemispheric with 2 red bosses; pollinia 8, subequal.—One specimen has a narrower lip with 3 narrow lamellæ irregularly enlarged on the midlobe.

4. **T. promensis,** *Hook. f. Ic. Plant.* t. 1883; scape tall slender, bracts long, sepals ¾ in. oblong-lanceolate acute and elliptic obtuse petals 5–7-nerved, spur rather long obtuse, lip entire spathulate erose, disk concave with a dense granular cluster of truncate calli. Eulophia promensis, *Lindl. in Wall. Cat.* 7365; *Gen. & Sp. Orchid.* 181.

PEGU; on the Prome Hills, *Wallich.*

Leaf on a slender sheathed stem, blade narrow, 12 by 1¼ in., shorter than the very slender petiole. *Scape* with the 6–8-fld. lax raceme as long as the petiole; sheaths 4–5, 2–3 in.; bracts 1 in., lanceolate, longer than the ovary.—I think there are 4 flattened collateral pollinia in the only flower I have been able to examine.

** Lateral sepals forming a mentum with the base of the lip.

† *Sepals and petals not produced into long tails.*

5. **T. latifolia,** *Benth. mss.*; leaf-blade longer than the petiole, sepals ½ in. linear obtuse 3-nerved narrower than the 5-nerved petals, mentum short rounded, lip obovate-oblong, side lobes small, midlobe small orbicular or fan-shaped, disk with a narrow central and 2 broad lateral lamellæ which are evanescent on the midlobe. Ania latifolia, *Lindl. in Wall. Cat.* 3741; *Gen. & Sp. Orchid.* 130. Eria Ania, *Reichb. f. in Walp. Ann.* vi. 270.

SYLHET, CACHAR and the KHASIA MTS., *Wallich*, &c. UPPER BURMA, *Griffith.*

Leaf 6–12 by 2½–3½ in. *Scape* with the raceme 1–2 ft.; pedicels with ovary ⅓ in. long; midlobe of lip variable, rounded or retuse; anther with 2 obscure bosses; "pollinia 8 equal," *Lindl.*

6. **T. bicornis,** *Benth. in Gen. Plant.* iii. 515; pseudobulb fusiform, leaf-blade longer than the petiole, sepals linear obtuse, mentum rounded, lip obovate, midlobe broader than the narrow side lobes, disk 2-lamellate between the side lobes 3-lamellate on the midlobe, anther 2-horned. Ania

bicornis, *Lindl. in Bot. Reg.* 1842, *Misc.* 37; 1844, t. 8; *Thwaites Enum.* 301. Eria bicornis, *Reichb. f. in Walp. Ann.* vi. 269. ? Ania latifolia, *Wight Ic.* t. 914. Eria Wightii, *Reichb. f. l. c.* 270. Mitopetalum Wightii, *Blume Mus. Bot.* ii. 185.

TRAVANCORE; on the Pulney Mts.?, *Wight*. CEYLON; Hantani, alt. 3000 ft., *Thwaites*.

Habit and size of flower, according to Lindley's figure, of *T. latifolia*, but leaf much smaller and described as fleshy. Wight's represents a much larger plant, with sepals 1 in. long; his description of the lip lamellæ differs so greatly from what he figures that no reliance can be placed on either. Thwaites, however, refers it to *bicornis*. According to Lindley and Thwaites, the Ceylon plant is more or less purple. Lindley figures the flower as green and reddish, the lip and column yellow spotted with red. I have seen no Ceylon specimen or flower of the Travancore plant.

7. **T. khasiana,** *Hook. f. Ic. Plant. ined.*; leaf-blade longer than the stout petiole, scape tall, sepals $\frac{3}{4}$ in. linear obtuse and broader oblong obtuse petals 3-nerved, mentum shortly conic obtuse, lip cuneately obovate, side lobes rounded at the tip, midlobe much broader than long apiculate, disk with a slender mid-nerve and two narrow lamellæ all vanishing in the midlobe, anther hemispheric with a dorsal boss.

KHASIA HILLS; below Churra, alt. 3000 ft., *J. D. H. & T. T.*

Leaf 8 by 2 in., on a fusiform pseudobulb 3 in. long with a neck 1 in. long. *Scape* with long raceme 2 ft.; pedicel with ovary shorter than the sepals; bracts equalling the pedicel.—Only one specimen seen; it resembles Wight's figure of *Ania latifolia* (*T. bicornis*) more than any other species, but wants the 2 conical horns of the anther.

8. **T. minor,** *Hook. f. Ic. Plant. ined.*; leaf-blade 3–5 in. much longer than the petiole, scape and few-fld. raceme 8–12 in. very slender, sepals linear obtuse and rather broader petals 3-nerved, mentum very short, lip cuneate-obovate, side lobes subacute, disk with a central thickened nerve and two broad lamellæ reaching the base of the orbicular crenate midlobe which has 3–5 narrow ridges, anther with 2 conic obtuse bosses.

SIKKIM HIMALAYA; at Mahalderam, alt. 7000 ft., *Clarke*.

Pseudobulb very slender, 1–2 in. *Leaf* $1\frac{1}{2}$–2 in. broad, very membranous, nerves very slender; petiole 2–3 in. *Scape* with a narrow sheath 2 in. long below the middle; bracts $\frac{1}{4}$ in.; pedicel with ovary $\frac{1}{2}$ in., very slender; sepals $\frac{2}{3}$ in.; column slender, narrowly winged; 4 of the pollinia very small.

9. **T. hastata,** *Hook. f. Ic. Plant. ined.*; scape very slender, raceme long many- and small-fld., bracts filiform as long as the ovary, sepals $\frac{1}{2}$ in. linear acuminate and subequal petals 3-nerved, mentum rather long obtuse, lip oblong-obovate, side lobes subacute, disk with a central nerve and two broad lamellæ reaching the base of the rather fan-shaped apiculate midlobe which has 3 narrow ridges, anther hemispheric smooth. Eulophia hastata, *Lindl. in Journ. Linn. Soc.* iii. 25.

ASSAM, *Masters, Griffith*.

Scape (base wanting) 2 ft. 6 to 3 ft. *Raceme* 5–7 in., dense-fld.; bracts and pedicels $\frac{1}{6}$ $\frac{1}{4}$ in.; column very slender, narrowly winged; 4 pollinia very small.—Lindley says of this (under *Eulophia*) that it is the smallest-flowered of the aphyllous species, and that the hastate lip is unlike that of any other. The pollen shows it to be a *Tainia*, of which the leaves, rootstock, and base of scape are unknown.

10. **T. maculata,** *Hook. f.*; pseudobulb conic, leaf lanceolate delicately nerved, scape 2 ft., sepals and petals pale green lanceolate acute, sepals with 4 petals with 6 lines of purple spots, mentum short cylindric

truncate, side lobes of white lip erect obtuse, midlobe rounded subacute concave, disk 3-lamellate, base spotted with purple, column yellow. Ania maculata, *Thwaites Enum.* 301.

CEYLON; at Hapootelle, alt. 5000 ft. (a single specimen), *Thwaites.*
Description from Thwaites; I have seen no specimen.

11. **T. hologlossa,** *Benth. in Gen. Plant.* iii. 515; characters of *T. latifolia,* but lip oblong entire or with faint traces of lateral lobes, margin undulate, disk with 3 thickened ridges, anther low rounded smooth. Eria (Tainia) hologlossa, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 148.

TENASSERIM; at Moulmein, *Parish.*

12. **T. latilingua,** *Hook. f. Ic. Plant. ined.*; pseudobulb narrow, leaf as long as its petiole, scape tall, bracts as long as the ovary, sepals and petals oblong-lanceolate 3-nerved, mentum very short, lip nearly orbicular with 3 rather distant crenulate ridges from the base to near the tip, anther hemispheric smooth.

PERAK, *Scortechini.*

Leaf 8 by $2\frac{1}{2}$ in. *Scape* and many-fld. raceme $1\frac{1}{2}$–2 ft.; bracts $\frac{1}{2}$ in.; column narrowly winged; pollinia 8, equal.

†† *Sepals and petals produced into long filiform tails.*

13. **T. speciosa,** *Blume Bijd.* 354; pseudobulb very slender, leaf shorter than its petiole, sepals $2\frac{1}{2}$–3 in. long and much shorter petals 5–7-nerved, mentum triangular obtuse, lip trapezoidly ovate acuminate many-nerved, margins undulate, anther 2-horned. Eria speciosa, *Reichb. f. in Walp. Ann.* vi. 269. Mitopetalum speciosum, *Blume Fl. Jav. Præf.* 8; *Mus. Bot.* ii. 185; *Orchid. Archip. Ind.* 158, t. 50, f. 1.

PERAK, *Scortechini*; Mount Ophir, *Griffith* (*Kew Distrib.* 5293); *Maingay* (*K. D.* 1667).—DISTRIB. Java.

Leaf 4–6 by $\frac{3}{4}$ in.; petiole 6–10 in. *Scape* 1–2 ft.; bracts $\frac{1}{2}$–1 in., very slender; flowers "white, tails slightly yellow," *Maingay*; column slender; anther with erect conical obtuse horns; pollinia 4?

14. **T. Maingayi,** *Hook. f. Ic. Plant. ined.*; pseudobulbs short close-set on a stout crinite ascending rhizome, petiole very short, sepals $1\frac{1}{2}$–2 in. and petals 5–7-nerved, lip short rhombic, lobes inciso-fimbriate, lateral truncate, midlobe triangular acute strongly nerved.

PENANG; on red earth in the jungle, *Maingay* (*Kew Distrib.* 1668).

Leaf 5–10 in., narrowly elliptic-lanceolate, strongly 5–7-nerved, narrowed into a 1–2 in. petiole. *Scape* 20 in., very slender; bracts narrow, $\frac{1}{2}$ in., as long as the ovary; column slender, incurved.—I have seen but one flowering specimen, which is remarkable in habit and form of lip.

27. ANTHOGONIUM, *Lindl.*

A slender herb; pseudobulb small, 1–3-leaved. *Leaves* 1–3, very narrow, petioled, plaited. *Scape* from the base of the pseudobulb; flowers in a slender, simple or branched raceme, resupinate. *Sepals* connate in a narrow gibbously-based cylinder, free tips short, of dorsal linear straight, of lateral broad revolute. *Petals* included, linear, long-clawed. *Lip* adnate to the base of the column, long-clawed, limb flabelliform. *Column* very long and slender, tip 3-toothed; anther 2-celled; pollinia 4, ovoid, parallel, connected in pairs by a granular viscus.

A. gracile, *Lindl. in Wall. Cat.* 7398; *Gen. & Sp. Orchid.* 426; *in*

Journ. Linn. Soc. iii. 22. A. Griffithii, *Reichb. f. in Bonpland.* ii. 90; *in Allg. Gartenzeit.* 1856, 218; *in Walp. Ann.* vi. 471.—Anthog., *Griff. Notul.* iii. 383; *Ic. Pl. Asiat.* t. 345.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 7500 ft., *Treutler*. KHASIA and NAGA HILLS, alt. 4–6000 ft., *Griffith*, &c. TENASSERIM; at Moulmein, *Lobb*.

Pseudobulb size of a hazel or walnut. *Leaves* 6-12 by $\frac{1}{4}$–1 in., on a slender stem, lanceolate. *Scape* equalling or exceeding the leaves, slender; bracts very small; pedicel with ovary $\frac{1}{2}$–1 in., at right angles to the perianth, both rose-cold.; tube of perianth $\frac{3}{4}$ in. long, 2–3 times as long as the free parts; limb of lip cuneate or recurved, obscurely lobed, spotted with bright red. *Capsule* 1 in., fusiform.

28. **JOSEPHIA,** *Wight.*

Epiphytic stemless tufted herbs; root fibres very stout. *Leaves* radical, rigidly coriaceous. *Flowers* very small, on the branches of panicled spikes. *Sepals* broad, subequal, concave, connivent. *Petals* narrower. *Lip* adnate to the base of the column, erect, fleshy, concave; lateral lobes small, erect; midlobe small, entire, papillose, with a basal callus uniting the side lobes. *Column* erect, broad, nearly as long as the sepals, shortly 2-winged above, foot 0; anther acuminate, 2-celled; pollinia 4, oblong, parallel, subcaudate, attached to the rostellum by a viscus.

1. **J. lanceolata,** *Wight Ic.* t. 1742; leaves petioled linear-oblong or -lanceolate subacute. *Walp. Ann.* vi. 924. Polystachya ramosa, *Gardn. mss.*

WESTERN GHATS; from the Concan, *Stocks*, &c., to Travancore, *Wight*, &c. CEYLON; abundant in the Central Province.

Leaves 3–5 in., narrowed into a petiole $\frac{1}{2}$–2 in., young clothed with hyaline sheaths. *Scape* 4–12 in., slender, and its branches stiff; bracts short, ovate, appressed; flowers $\frac{1}{8}$ in. broad, white tinged with purple; sepals obtuse.—Inflorescence like that of a *Statice*. Wight, on Jerdon's authority, mentions the curious fact of the persistent continuously flowering spikes.

2. **J. latifolia,** *Wight Ic.* t. 1743; leaves subsessile broadly oblong obtuse. *Walp. Ann.* vi. 924.

TRAVANCORE; on the Pulney Mts., *Wight*. NILGHIRI HILLS; Wynaad, *Jerdon* (*Ic. in Herb. Kew*).

Habit of *J. lanceolata*, but leaves much broader, more coriaceous, and with a much stouter shorter petiole, purple beneath; flowers yellow with purple stripes, and tip of lip.—I have no materials for describing the flowers.

29. GLOMERA, *Blume.*

This genus, which I erroneously believed to be British Indian when I drew up the Key to the Genera, p. 670, is as hitherto known confined to the Malayan Archipelago and Pacific. It consists of two species, and is distinguished from *Agrostophyllum* solely by having only 4 pollinia. Some of the following species of the latter genus, of which I have not seen the pollen, may prove to belong to it.

30. **AGROSTOPHYLLUM,** *Blume.*

Epiphytes with tufted sheathed flattened leafy stem. *Leaves* distichous, linear; sheaths flattened, persistent. *Flowers* very small, white, crowded in sessile terminal heads, mixed with long paleaceous bracts, rarely in small racemes. *Sepals* erect, conniving, concave; lateral broader, adnate to the foot of the column. *Petals* narrow or broad. *Lip* adnate to the short foot of the column, short, erect, entire or 3-fid. *Column* short, stout, thickened above; anther 2-celled; pollinia 8, ovoid, free or connected in

fours by a small viscus.—Species 6–8, Indian and Malayan and Seychelle Islands.

* *Lip subentire or* 3-*lobed. Petals broad,* 5–*many-nerved.*

1. **A. callosum,** *Reichb. f. in Seem. Fl. Vit.* 296; sepals 5–7-nerved, petals orbicular many-nerved, lip broadly ovate or oblong obscurely 3-lobed concave with a large subbasal callus and 2 smaller ones at the lateral sinus.

EASTERN HIMALAYA, Sikkim and Bhotan, alt. 2–5000 ft., *Griffith* (*Kew Distrib.* 5215, 5217). KHASIA and NAGA HILLS, common. UPPER BURMA, *Griffith* (*K. D.* 5216).

Stem 12–18 in. *Leares* 5–7 by $\frac{1}{2}$ in., narrowed from the base to the rounded notched tip; sheaths $\frac{3}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., mouth truncate. *Heads* 1–1$\frac{1}{2}$ in. diam.; flowers $\frac{1}{4}$ in. diam., pink; lip very variable, sometimes distinctly 3-lobed with the midlobe orbicular from the same head with broadly ovate obscurely lobed lips; ovary obtusely angled, much longer than the obtuse inner bracts.

** *Lip with a concave hypochile, truncate in front, a broader epichile attached by a small base to its under surface. Petals linear,* 1–3-*nerved.*

2. **A. khasianum,** *Griff. in Calc. Journ. Nat. Hist.* iv. 378, t. 19; leaves 4–7 by $\frac{2}{3}$–$\frac{3}{4}$ in. base contracted, sheaths $\frac{2}{3}$ in. broad, ovary obtuse-angled not exceeding the acute linear bracts, sepals acuminate 3-nerved, petals linear-oblong 3-nerved, epichile reniform. A. planicaule, *Reichb. f. in Walp. Ann.* vi. 909. Appendicula Hasseltii, *Wight Ic.* t. 1748, f. 3 (*not of Blume*). Eria planicaulis, *Wall. mss.*

KHASIA HILLS, alt. 2000 ft., *Gibson, J. D. H. & T. T.* MUNNIPORE, *Clarke.* TENASSERIM; at Moulmein, *Helfer*, 5219, *Griffith*, &c.

Stem 6–8 in., few-leaved. *Leaves* almost petioled, obtuse and notched; sheaths lax, mouth very oblique. *Heads* $\frac{3}{4}$ in. diam.; flowers $\frac{1}{4}$ in. diam.

3. **A. glumaceum,** *Hook. f. Ic. Plant. ined.*; stemless or nearly so, leaves 8–18 by $\frac{1}{2}$–$\frac{2}{3}$ in., base broad, tip contracted, sheaths very long, ovary acute-angled much longer than the cymbiform acute bracts, sepals acuminate 1-nerved, petals linear acuminate 1-nerved, epichile rounded ovate, column with short triangular wings.

PERAK, *Scortechini, King's Collector.*

Stems very short, tufted. *Leaves* rather flaccid, narrowed from the upper third to the tip; sheaths 2–5 by $\frac{1}{2}$–$\frac{2}{3}$ in., mouth truncate. *Heads* broken up into short spikelets with distichous bracts $\frac{1}{10}$ in. long; flowers $\frac{1}{4}$ in. diam.—The triangular wings of the column are peculiar to this amongst Indian species.

4. **A. majus,** *Hook. f. Ic. Plant. ined.*; leaves 5–7 by $\frac{3}{4}$–1 in., base broad, tip rounded, sheaths 1–2 in. long, heads large, ovary acute-angled not longer than the inner bracts, sepals acuminate 1-nerved, petals lanceolate acuminate 1-nerved, epichile orbicular acuminate.

PERAK, *Scortechini, King's Collector.*

Stem robust, 2 ft. *Leaves* not contracted at base or tip; sheaths $\frac{1}{2}$ in. broad, truncate. *Heads* 1$\frac{1}{2}$–2 in. diam.; outer bracts very broad, inner obtuse; flowers $\frac{1}{4}$ in. diam.; column short, broad, wingless; anther 2-lobed.—Resembles a Sumatran species (Beccari, 565), also a Javan named *A. longifolia*, Blume, by Reichenbach, but which has a triangular epichile with rounded bosses at the sides, and a narrower column.

5. **A. pauciflorum,** *Hook. f. Ic. Plant. ined.*; stem slender, leaves 2 in. flaccid very narrowly linear obtuse, flowers few minute in very short axillary peduncles, sepals ovate acuminate, petals linear 1-nerved, lip clawed rhomboid.

PERAK, *Scortechini*.

Stems 18–20 in., naked below, flexuous. *Leaves* $\frac{1}{8}$ in. diam., thin. *Peduncles* $\frac{1}{12}$ in.; flowers $\frac{1}{16}$ in.

Species of doubtful position.

6. A. ZEYLANICUM, *Hook. f.*; leaves 4–5 by $\frac{1}{2}$ in. flaccid, base slightly contracted, tip rounded, sheath 1–2 by $\frac{1}{3}$ in. truncate, ovary obtuse-angled very much longer than the obtuse bracts.—Ceylon, *McKenzie*, *Walker*, "Abundant on the road to Adam's Peak on trees."—I have seen only two specimens; in one the flowers are too withered for analysis, the other is monstrous with the head filled with fascicles of setaceous bracts. The thin flaccid leaves are peculiar.

31. **CERATOSTYLIS,** *Blume.*

Epiphytic low herbs with fibrous roots; stems tufted, simple or branched, sheathed, sometimes leafless and rush-like. *Leaves* narrow, coriaceous, fleshy or subterete, rarely thin. *Flowers* minute, solitary, or few in a small cluster of bracts. *Sepals* erect, conniving; lateral broader, forming with the foot of the column a gibbous or short spur-like mentum. *Petals* narrower. *Lip* adnate to the foot of the column by a long incumbent claw; blade short, erecto-patent, fleshy, entire. *Column* short, top broad, 2-lobed, or with two spathulate erect arms; foot long; anther 2-celled; pollinia 8, small, attached in fours or all together by a small viscus.—Species 15, Indian, Malayan and Pacific.

* *Stems erect, rush-like. Flowers capitate; mentum spur-like. Arms of column long, erect.*

1. **C. teres,** *Reichb. f. in Bonpland.* ii. 89, and in *Walp. Ann.* vi. 470; flowers pubescent, lip narrowly spathulate, tip thickened concave. Appendicula teres, *Griff. Notul.* iii. 359; *Ic. Pl. Asiat.* t. 332.

UPPER ASSAM; near Negregam, *Griffith*. KHASIA HILLS; at Amwee, alt. 4–5000 ft., *J. D. H. & T. T.*

Stems 8–12 in., as thick as a crow-quill, from a stout fibrous rhizome, straight or curved, jointed (or with a terete leaf) at the head of flowers, clothed at the base with appressed scarious sheaths. *Heads of flowers* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., sessile lateral or terminal, in a tuft of sheathing bracts; flowers $\frac{1}{12}$ in. long, very shortly exserted; bracteole cymbiform, acuminate; ovary short, ovate, acuminate; lateral sepals pubescent; petals lanceolate, acute; mentum as long as the ovary, clavate; column much shorter than its spathulate arms.

2. **C. malaccensis,** *Hook. f. Ic. Plant. ined.*; flowers glabrous, lip lanceolate, tip thickened acute, disk with 3 ridges.

PERAK, *Scortechini*; on Batang Padung, alt. 4900 ft., *Wray*; Mount Ophir, *Griffith* (*Kew Distrib.* 5213).

Habit of *C. teres*, but stems shorter, flowers quite glabrous, and lip with membranous margins.—This will probably prove to be a Malay Archipelago species, but I cannot identify it with any.

** *Stem ascending or pendulous, sheathed throughout. Flowers in lateral tufts of bracts; mentum very short, rounded; column with a broad reniform top.*

3. **C. clathrata,** *Hook. f.*; glabrous, stems densely tufted, sheaths clathrately reticulate, leaves terete channelled, flowers papillose shortly

peduncled, bracts scarious sheathing, lip quadrate or very broadly triangular.

PERAK; on Batang Padung, alt. 4900 ft., *Wray*, *Scortechini*.

Stems 2–3 in., rigid, branched. *Leaves* $\frac{1}{2}$–1 in., recurved when dry, acute; sheaths appressed; nerves beautifully reticulate in squares. *Flowers* about $\frac{1}{12}$ in. long, pale brownish; bracts brown, acuminate; lateral sepals triangular, 3-nerved; dorsal much narrower; mentum rounded; petals oblong-lanceolate, 1-nerved; lip rather membranous and plaited? top of column very broadly reniform.—More flowers are wanted for a satisfactory analysis. Scortechini figures the lip as with a slender claw, and the leaves as $\frac{1}{2}$ terete. The reticulated sheaths are beautiful objects. *C. retisquama*, Reichb. f., has similar sheaths, but much longer sepals and petals.

4. **C. pendula,** *Hook. f. Ic. Plant. ined.*; glabrous, stems tufted slender creeping or pendulous loosely clothed with scarious brown ribbed sheaths, leaves linear fleshy, margins convolute when dry, flowers in clusters of oblong scarious obtuse bracts, ovary hairy, lip ovate or ovate-oblong. Trigonanthus pendulus, *Korthals mss.* (*fid. Reichb. f. in Herb. Lindl.*).

PERAK, *King's Collector*.—DISTRIB. Borneo, Celebes.

Stems 6–10 in., weak, rooting, as thick as a sparrow-quill; sheaths $\frac{1}{3}$ in., loose, subacute, tips usually broken. *Leaves* 1–1$\frac{1}{2}$ in., obtuse. *Flowering bracts* forming stellate tufts; flowers about $\frac{1}{10}$ in. long, yellowish brown; sepals ovate, obtuse, thick, glabrous, concave, 3-nerved; petals linear, concave; mentum rounded, indistinct; lip abruptly clawed, very thick, concave, subacute, with narrow membranous margins, base rounded or subcordate; column very short, arms short obtuse.—The clawed lip resembles *Bulbophyllum*; more flowers are wanted for a satisfactory description.

5. **C. himalaica,** *Hook. f. Ic. Plant. ined.*; stems densely tufted prostrate branched clothed with scarious brown ribbed sheaths, leaves linear-lanceolate thick fleshy, flowers pedicelled surrounded by acute membranous bracts; pedicel and sepals sparsely woolly. Eria ramosissima, *Wall. mss.*

EASTERN TROPICAL HIMALAYA; E. Nepal, *J. D. H.*; Bhotan, *Griffith* (*Kew Distrib.* 5214). KHASIA MTS., *Gibson* (*Ic. in Herb. Calcutt.*).

Stem 4–6 in. *Leaves* 2–2$\frac{1}{2}$ in., subacute, base narrowed. *Flowers* $\frac{1}{12}$ in. long; lateral sepals broadly ovate, acute, pale pink, 3-nerved; petals linear, acute, white streaked with purple; mentum rounded; lip obovate-oblong, obscurely 3-lobed, coriaceous, concave, with a gibbosity on the back below the papillose yellow tip; top of column broadly reniform. *Capsule* $\frac{1}{3}$ in. long, ellipsoid, pedicelled.—The few flowers I have analyzed are insufficient for a satisfactory description.

**** Stem erect or ascending. Flowers solitary or few; arms of column long.*

6. **C. lancifolia,** *Hook. f. Ic. Plant. ined.*; stem simple slender, sheaths few 1 in. long loose, leaf terminal membranous linear-lanceolate acute, flower solitary long-pedicelled, mentum short spur-like.

PERAK, *Scortechini*.

Stem 2–4 in., tufted. *Leaf* 1$\frac{1}{2}$–4 in., rather membranous, shortly petioled. *Flower* $\frac{1}{4}$ in. long; pedicel erect, filiform, pubescent; bract minute, tubular; sepals linear-lanceolate, subacute, 3-nerved; petals lanceolate, 3-nerved; mentum broader than long; lip fleshy, claw short with incurved margins; hypochile narrowly oblong; epichile as long but narrower, dagger-shaped, terete, obtuse.—Near *C. Gigas*, Bl. (*Reichb. f. Xen.* t. 127), which has broader flattened stems, and a very different lip. Also near *C. braccata*, R. f., which has a very fleshy leaf and long mentum. More flowers are necessary for a reliable description.

7. **C. robusta,** *Hook. f. Ic. Plant. ined.*; rhizome stout ascending rooting and small distant erect pseudobulbs clothed with reticulate acuminate appressed sheaths, leaves 4–5 in. solitary erect linear-lanceolate acuminate, scape enclosed in the sheath with the pseudobulb very slender 1-fld., mentum cylindric, lip long clawed spathulate obtuse.

PERAK; alt. 4900 ft., *Wray.*

Rhizome as thick as a goose-quill; trabeculately reticulate, membranous. *Scape* a little longer than the pseudobulbs; bract small, broad; flower about $\frac{1}{2}$ in., from the tip of the mentum to that of the dorsal sepal, pale yellow; mentum hoary, longer than the oblong obtuse 5-nerved sepals; lip apparently quite smooth and entire, tip fleshy.—A remarkable species, probably scandent.

32. CRYPTOCHILUS, *Wall.*

Low epiphytes; pseudobulbs crowded, 1–2-leaved. *Leaves* coriaceous, base complicate or petioled. *Scape* terminal, naked; flowers close set in distichous spikes, shorter than their persistent bracts. *Sepals* connate in an equally 3-lobed ovoid or urceolate gibbous 5-toothed tube. *Petals* narrow. *Lip* included, adnate to and incumbent on the foot of the column, narrow, erect. *Column* erect, top dilated toothed; anther 2-celled; pollinia 8, obovoid or oblong, connected in fours by a small viscus.—Species 2.

1. **C. sanguinea,** *Wall. Tent. Fl. Nep.* 36, t. 26; *Cat.* 7530; flowers pubescent longer than broad bright red, sepals acuminate. *Lindl. Gen. & Sp. Orchid.* 193; *in Journ. Linn. Soc.* iii. 21; *in Bot. Reg.* 1838, t. 23; *Wight Ic.* t. 1757; *Walp. Ann.* vi. 461.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, *J. D. H.* KHASIA and NAGA HILLS, alt. 4–5000 ft., *Griffith, Prain,* &c.

Pseudobulbs variable. *Leaves* 3–8 in., lower ensiform, upper linear-oblong, stoutly petioled. *Scape* 3–5 in., stout, naked; spike 3–5 in.; bracts linear, pubescent; petals and lip obovate; pollen green. *Capsule* $\frac{1}{2}$ in., oblong, erect.

2. **C. lutea,** *Lindl. in Journ. Linn. Soc.* iii. 20; flowers glabrous subglobose yellow, sepals obtuse. *Reichb. f. in Gard. Chron.* 1882, ii. 733.

TEMPERATE HIMALAYA; Sikkim, alt. 6000 ft., and Bhotan, *Griffith,* &c. (*Kew Distrib.* 5228, 5229, 5229/1). MUNNIPORE; on Kohima, *Clarke.*

Pseudobulbs crowded, oblong. *Leaves* 1–2, 3–5 in., linear-lanceolate, acute, subsessile or petioled. *Scape* 2–4 in., rather slender; spike as long; petals and lip lanceolate; pollen whitish. *Capsule* $\frac{1}{4}$ in., ellipsoid.

33. TRICHOSMA, *Lindl.*

Epiphytic; stem tufted, sheathed, cylindric, 2-leaved. *Leaves* terminal, subopposite, petioled. *Scape* terminal; flowers few, large, white, racemed. *Sepals* subequal, spreading, lateral broader, adnate to the base of the column. *Lip* articulate with the base of the column, claw incumbent, 3-lobed, disk lamellate. *Column* short, top toothed, anther with 2-rounded appendages; pollinia 8, broadly ovate, compressed, cohering in fours by a viscus.

Very near sect. *Hymeneria* of *Eria.*

T. suavis, *Lindl. in Bot. Reg.* 1841, *Misc.* 83. T. cylindripoda, *Griff. Notul.* iii. 299. Eria suavis, *Lindl. in Journ. Linn. Soc.* iii. 52.

E. coronaria, *Reichb. f. in Walp. Ann.* vi. 272, and in *Gard. Chron.* 1876, 234. Cœlogyne coronaria, *Lindl. in Bot. Reg.* 1841, *Misc.* 83.

SIKKIM HIMALAYA, alt. 5–6000 ft., and KHASIA HILLS, alt. 4–5000 ft.

Stems 3–6 in., from an underground soft rhizome, as thick as a goose-quill, naked, fleshy; basal sheaths few, lax. *Leaves* ovate-lanceolate acuminate, thick, 3-nerved. *Scape* 1–2 in., 2–4-fld.; bracts large; pedicel with ovary $\frac{3}{4}$–1 in.; flowers white, yellowish or purplish, sweet-scented; lateral sepals $\frac{1}{2}$–$\frac{3}{4}$ in. long, ovate-lanceolate; petals oblong; lip subsessile, ovate-oblong, streaked with purple; disk yellow, with 2 thick crenate ridges between the side lobes, and 7 on the suborbicular midlobe; anther rather fleshy.

34. CŒLOGYNE, *Lindl.*

Epiphytes; rhizome creeping; pseudobulbs 2-(rarely 1-)leaved. *Leaves* coriaceous, or thin and plaited. *Scape* usually short; flowers usually racemed, rarely (except in sect. *Pleione*) 2 or solitary; bracts long, sheathing, deciduous. *Sepals* subequal, lateral saccate at the base. *Petals* narrower. *Lip* sessile at the base of the column, erect and embracing it, base concave or saccate. *Column* long, erect, winged, foot 0; top hooded, membranous; anther more or less 2-celled; pollinia 4, cohering in pairs by a granular viscus.—Species about 70, Indian and Malayan.

In some species of this genus the flowers are produced from the undeveloped pseudobulbs; in others only from the fully developed; and this character is quite constant. Again, in some species which flower from the undeveloped pseudobulbs the sheaths of the flowering scape are closely imbricating, and all coriaceous or membranous; in others the inner sheaths are more or less foliaceous, or one or two may form fully developed leaves. This character does not so well limit species, but is very useful. Lastly, the presence or absence of sheaths on the scape of the species which flower from the mature pseudobulb, and their position, afford very constant characters. A consideration of these hitherto partially recognized characters suggests the following arrangement of the Indian species.

Sect. I. EUCŒLOGYNE. *Flowers* and *leaves* coætaneous. *Lip* 3-lobed, the terminal lobe spreading.

* Flowers from an undeveloped pseudobulb at the base of the old pseudobulb. Sheaths of the scape all basal.

† Sheaths of the scape imbricating, none becoming foliaceous (except sometimes in *C. suaveolens, occultata, breviscapa* & *sulfurea*).

§ *Racemes pendulous or decurved, many-fld.* (*or few-fld. in* C. cristata).—Sp. 1–8.

§§ *Racemes erect or inclined, rarely drooping, many- or few-fld.*—Sp. 9–20.

†† Inner sheaths of the scape more or less foliaceous. (See also *C. suaveolens, occultata, breviscapa* & *sulfurea*).—Sp. 21–29.

** Flowers from the top of the mature pseudobulb.

† Scape sheathed at the base only.—Sp. 30–35.

†† Scape not sheathed either at the base or beneath the raceme.—Sp. 36–38.

††† Scape with distichous imbricating sheaths below the raceme only.—Sp. 39–47.

Sect. II. PLEIONE. *Flowers* appearing before or after the leaves (except *C. Hookeriana*) from the base of the mature pseudobulb. *Lip* large, convolute, with a shovel-shaped mouth, very obscurely 3-lobed.—Sp. 48–53.

Doubtful species.—Sp. 54–55.

Sect. I. EUCŒLOGYNE (see above).

1. **C. Gardneriana,** *Lindl. in Wall. Pl. As. Rar.* i. 33, t. 38;

Gen. & Sp. Orchid. 41; *Fol. Orchid.* 1; pseudobulbs long narrow, leaves large petioled elliptic-lanceolate, raceme nodding, flowers large distichous white, sepals and petals narrow connivent below, base of narrow lip bisaccate. *Paxt. Mag.* vi. t. 73; *Walp. Ann.* vi. 222. C. trisaccata, *Griff. Itin. Notes* 72; *Walp. l. c.*

SUBTROPICAL HIMALAYA, alt. 4–5000 ft., eastwards, and KHASIA MTS., common.

Pseudobulbs 3–6 in., narrowly flask-shaped. *Leaves* 6–14 in. *Scape* short, closely clothed with broad obtuse sheaths; raceme 4–8 in.; bracts 1–1½ in., cymbiform, obtuse; sepals linear-oblong, acute, keeled; base saccate; petals narrower; side lobes of lip small toothed, midlobe 2-cleft rounded erose, disk yellowish with 2 waved ridges. *Capsule* 1½ in., fusiform, 6-winged.

2. **C. flaccida,** *Lindl. in Wall. Cat.* 1961; *Gen. & Sp. Orchid.* 39; *in Bot. Reg.* 1841, t. 31; *Fol. Orchid.* 2; pseudobulbs elongate, leaves long-petioled, sepals ¾ in. linear-oblong acute, petals narrower acuminate, side lobes of lip large rounded, midlobe small broadly ovate, disk with 3 yellow flexuous ridges. *Bot. Mag.* t. 3318; *Walp. Ann.* vi. 222.

SUBTROPICAL HIMALAYA; from Nepal, *Wallich*, eastwards. TENASSERIM; on rocks of Jook Long, *Ic. Parish.*

Pseudobulbs 2–6 in., sheaths large, coriaceous, purple-brown. *Leaves* 6–12 in., linear-lanceolate, acuminate; petiole 1–3 in. *Scape* with short broad obtuse basal sheaths; raceme 4–5 in., pendulous; bracts ½–¾ in., caducous; flowers ½–¾ in diam., white (said to smell offensively), side lobes of lip brown. *Capsule* 2½ in., clavate, broadly winged.

3. **C. testacea,** *Lindl. in Bot. Reg.* 1842, *Misc.* 38; *Fol. Orchid.* 2; pseudobulbs narrow ovoid, leaves petioled, sepals lanceolate subacute and rather narrower petals pale brown, side lobes of lip narrow dark brown margined with white, midlobe broad rounded crenate, disk with 4 spinulose ridges. *Bot. Mag.* t. 4785; *Walp. Ann.* vi. 223.

SINGAPORE, *Hort. Loddiges.*

Pseudobulbs 3–5 in., obtusely angled; sheaths narrow. *Leaves* 6–8 in., lanceolate, 3–5-nerved. *Scape* sheathed up to the flowers; raceme many-fld., pendulous; bracts ½ in., cymbiform, acute, persistent; flowers 1½ in. diam.; column white, anther brown.

4. **C. cristata,** *Lindl. Coll. Bot.* t. 32; *in Bot. Reg.* 1841, t. 57; *Fol. Orchid.* 8; pseudobulbs oblong, leaves sessile lanceolate, raceme few-fld., sepals and petals subequal broad obtuse white, side lobes of lip large rounded with yellow fimbriate lamellæ between them, midlobe suborbicular with 2 crenulate broad yellow plates. *Walp. Ann.* vi. 229; *Paxt. Fl. Gard.* iii. 171, f. 312; *Fl. des Serres*, t. 1807; *Pescatoria* i. t. 25; *Warner Sel. Orchid.* t. 35; *Orchid. Alb.* t. 54; *Jennings Orchid.* t. 7; *Gartenfl.* viii. t. 245; *Deutsche Gartenz.* 1866, t. 341. Cymbidium speciocissimum, *Don Prodr.* 35.

TEMPERATE HIMALAYA, alt. 5–7000 ft., from Kumaon eastwards. SYLHET, fid. *Wallich.*

Pseudobulbs 2–3 in., distant. *Leaves* 6–12 in. *Scape* with pendulous raceme 6–12 in., 3–10-fld.; bracts 1½–2 in., oblong, persistent; flowers very large; sepals 1½–2 in., undulate. *Capsule* 1½–2 in., fusiform, angles obtuse.—There are many described varieties with very slight characters, as var. *hololeuca*, R. f. in Gard. Chron. 1881, i. 562, which has white crests on the lip; var. *Lemoniana*, Orchidoph. 188, 212, with lemon-yellow on the lip; another var. *Lindenia* iv. t. 173, and *maxima*, Reichb. f. in Gard. Chron. 1886, i. 398, and in Reichenbachia i. 13, t. 8, which differs only in its larger size.

5. **C. macrobulbon,** *Hook. f.*; pseudobulbs very long narrow, leaves petioled broad, raceme many-fld., bracts subtruncate, sepals oblong-lanceolate acuminate green, petals narrowly linear, lip white mottled with yellow-brown, side lobes narrow, disk with 3 crisped ridges, the lateral double on the ovate acuminate midlobe. C. fuscescens, *Wall. Cat.* 1969/2.

PENANG, *Wallich.* PERAK, *Scortechini, King's Collector.*—DISTRIB. Borneo.

Pseudobulbs 4–8 in., distant, narrowed from the base upwards; sheaths short, acuminate. *Leaves* 6–8 by 2–4 in., broadly elliptic- or ob-lanceolate. *Scape* with loose membranous obtuse basal sheaths.—Probably near *Hüttneriana;* but the bulbs differ entirely from Reichenbach's description of that plant, as do the basal sheaths of the scape and obtuse bracts.

6. **C. tomentosa,** *Lindl. Fol. Orchid.* 3; pseudobulbs narrowly ovoid, leaves long long-petioled lanceolate, raceme bracts and ovary pubescent, sepals lanceolate and narrower petals pale red-brown, lip yellow, side lobes narrow streaked with brown, disk with 3 crisped ridges the outer double and coalescing in a broad caruncled area on the small midlobe. *Reichb. f. in Gard. Chron.* 1873, 1843; *Wawra Bot. Voy. Pr. Saxe-Cob.* ii. 154, t. 14; *Walp. Ann.* vi. 224.

PERAK; at Larut, *King's Collector.* MALACCA, top of Mount Ophir, *Hullett.*—DISTRIB. Borneo.

Pseudobulbs 3–6 in.; sheaths very long, lanceolate, rigid. *Leaves* 12–20 by 1–2½ in., petiole 2–3 in. *Scape* 12–18 in., scurfily pubescent; basal sheaths loose; bracts 1–1¼ in., subacute, persistent in flower; sepals 1–1½ in. long.

Var.? *penangensis*; pseudobulbs shorter, leaves 6–8 by 2–2½ in. elliptic-obovate, ridges of lip not coalescing on the midlobe.—Penang, on Government Hill, *Maingay.*

7. **C. Massangeana,** *Reichb. f. in Gard. Chron.* 1878, 684; 1882, i. 369; pseudobulbs obpyriform, leaves petioled elliptic-obovate, bracts short broad, sepals oblong-lanceolate and narrower petals pale straw-cold., side lobes of lip narrow blue-grey with purple tips, disk with 3 crisped compound ridges produced on to the yellow orbicular apiculate midlobe. *Bot. Mag.* t. 6979; *Floral Mag.* N. S. t. 373; *Warner Orchid. Alb.* t. 29.

ASSAM (fid. *Gard. Chron.*) (more probably Malayan).

Pseudobulbs 2 in. *Leaves* 4–5 by 1½–2 in. *Raceme* 12–18 in., pendulous, quite glabrous; bracts ½–¾ in., cuneiform when spread out, persistent, tip broad, rounded; sepals 1 in. long; side lobes of lip striped purple within.—See note under *C. assamica.*

8. **C. Hüttneriana,** *Reichb. f. in Flora* 1872, 277; pseudobulbs fusiform very rugose, leaves petioled oblong-lanceolate, bracts acuminate, sepals ovate-lanceolate acuminate, petals linear, side lobes of lip rounded, disk with 3 crisped ridges extended into the rounded ovate acuminate midlobe.

TENASSERIM; at Moulmein, *Parish.*

Scape in the only specimen seen 7 in.; sheaths closely imbricating, the outer purple-brown; raceme 8–10-fld., drooping; bracts 1 in., cymbiform.—I have seen no pseudobulbs or leaves; the flower is described from a specimen named by Reichenbach, who says "flower white and lip toothed with a ligulate midlobe."

9. **C. lentiginosa,** *Lindl. Fol. Orchid.* 3; pseudobulbs linear-oblong, leaves shortly petioled elliptic-lanceolate, raceme 5–8-fld., sepals oblong-

lanceolate acute and rather narrower petals pale green, side lobes of lip oblong obtuse, margins brown, midlobe large shortly broadly clawed nearly semicircular crenate white with orange blotches, disk with 3 obscure short crenate ridges. *Bot. Mag.* t. 5958; *Reichb. f. in Trans. Linn. Soc.* xxx. 146; *Walp. Ann.* vi. 224.

TENASSERIM; at Moulmein, *Lobb*, *Parish*.

Pseudobulbs 3–4 in., obtusely 4-angled. *Leaves* 6–8 in. *Scape* with erect raceme 4–5 in., sheathed up to the flowers; bracts $\frac{1}{2}$–$\frac{2}{3}$ in., lanceolate, persistent; flowers $1\frac{1}{2}$ in. diam.; ridges of lip not produced on to the midlobe, side lobes speckled with brown.

10. **C. Maingayi,** *Hook. f.*; pseudobulbs narrowly ovoid, leaves long-petioled elliptic-lanceolate, raceme many-fld., flowers large white, lateral sepals linear-oblong acute, petals subspathulate obtuse, lip deeply 3-lobed blotched with orange, side lobes large, midlobe obovoid crenate undulate, disk with 3 crested brownish ridges between the side lobes and 2 on the midlobe.

MALACCA, *Maingay* (*Kew Distrib.* 1636).

Pseudobulbs 4 in. *Leaves* 10 in., acute, 7-nerved; petiole 2 in. *Scape* with drooping raceme 14 in., clothed at the base with short distichous sheaths, and above up to the flowers with long tubular membranous ones; bracts $1\frac{1}{2}$ in., persistent, reflexed; flower $2\frac{1}{2}$ in. diam.—Description partly from Maingay mss.

11. **C. corymbosa,** *Lindl. Fol. Orchid.* 7; pseudobulbs short, leaves elliptic-lanceolate, raceme erect or drooping, sepals and narrower petals lanceolate acute white, lip white with 4 large yellow eyes bordered with orange, side lobes erose, midlobe ovate or ovate-lanceolate, disk with 3 low ridges. *Bot. Mag.* t. 6955; *Walp. Ann.* vi. 228; *Reichb. f. in Gard. Chron.* 1876; *Rolfe l. c.* 1887, ii. 73, f. 15.

TEMPERATE HIMALAYA; KHASIA MTS., alt. 6–9000 ft., from Sikkim eastwards.

Pseudobulbs 1–$1\frac{1}{2}$ in., crowded, obovoid or subrhomboid. *Leaves* 4–8 in. *Scape* sheathed up to the fragrant flowers; sepals 1–$1\frac{1}{2}$ in.; spots on lip variable in form, side lobes sometimes streaked with red. *Capsule* $1\frac{1}{2}$–2 in., pyriform, angles obtuse. —Var. *heteroglossa*, R. f. in G. C. 1878, ii. 8, is described as having a broader midlobe of lip.—This species is often confounded with *C. nitida*, which flowers from the mature bulbs.

12. **C. ochracea,** *Lindl. in Bot. Reg.* 1846, t. 69; *Fol. Orchid.* 5; pseudobulbs oblong, leaves petioled elliptic-lanceolate, raceme 6–8-fld., sepals linear-oblong acute and narrower petals white, lip white with confluent orange and yellow or brownish areas, side lobes serrulate, midlobe as long broadly ovate acute, base serrulate, disk 2-ridged. *Bot. Mag.* t. 4661; *Jard. Fleur.* iv. t. 342; *Walp. Ann.* vi. 226.

TEMPERATE HIMALAYA, alt. 5–7000 ft., from Kumaon to UPPER ASSAM.

Very near *C. corymbosa*, but pseudobulbs oblong polished, leaves narrower and longer petioled, scape more exserted very long in fruit, flowers smaller, sepals only 1 in. long more obtuse, and midlobe of lip broader.—Subsp. *conferta*, Par. & Reichb. f. in Trans. Linn. Soc. xxx. 146, t. 30, f. 3, with small elliptic acute leaves, shorter perianth segments, and entire side lobes of lip, may (as the authors suggest) be a different species.

13. **C. graminifolia,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 146; pseudobulbs ovoid, leaves very narrow, raceme 3–4-fld., sepals and much narrower petals oblong-lanceolate acute white, lip orange-yellow

side lobes rounded, midlobe smaller broadly ovate acute, disk with 3 dark brown or red crisped ridges. *Bot. Mag.* t. 7006; *Rolfe in Gard. Chron.* 1888, i. 168.

ASSAM, *Mann.* TENASSERIM; mountains near Moulmein, *Parish.*

Pseudobulbs 1½–2½ in., crowded; sheaths short. *Leaves* 10–12 by ⅓–½ in. *Scape* much shorter, sheathed to the middle or lower; bracts caducous; sepals 1 in.

14. **C. viscosa,** *Reichb. f. in Allgemein. Berlin Gartenz.* 1856, 218; *in Bonpland.* iv. 328; *in Gard. Chron.* 1870, 1085; pseudobulbs narrowly ovoid or fusiform shining, leaves 8–12 in. petioled linear-lanceolate, scape very short closely sheathed up to the erect few-fld. raceme, ovary viscid, sepals and narrower petals linear-lanceolate acuminate white, lip very broad rounded, side lobes streaked with brown, midlobe small ovate, disk with 3 crenulate lamellæ from the base to the middle of the midlobe.

KHASIA HILLS (*Ic. in Herb. Calcutt.*).

Reichenbach describes this as "a pretty little species in the way of *C. flaccida*;" but the pseudobulbs of specimens named by him are 2½ in. long, the scape is erect, and the flower 2 in. diam. My only materials are the above pseudobulbs and flower, another of each from Messrs. Veitch, and a rude drawing in Herb. Calcutt., of what Mr. Rolfe and I take to be the same species; and if so, it is the only authority for the habitat. In the drawing the very stout rhizome bears narrowly obpyriform pseudobulbs 3 in. long with sheaths as long, the leaves are 1–1¼ in. broad, 3-nerved, the flowers are smaller, sepals broader, and petals and lip narrower.

15. **C. suaveolens,** *Hook. f.*; pseudobulbs ovoid, leaves sessile elliptic, margins waved, scape sheathed up to the raceme, flowers distichous, sepals and petals incurved oblong acute white, lip white, side lobes rounded, midlobe broadly ovate or orbicular, disk with 4–6 crenate yellow ridges. C. undulata, *Wall. mss.* Pholidota suaveolens, *Lindl. in Gard. Chron.* 1856, 372.

KHASIA MTS., *Gibson* (*Ic. in Herb. Calcutt.*); at Mungpo, alt. 1500 ft., *Clarke.* ASSAM (*Ic. in Herb. Calcutt.*).

Pseudobulbs 2–3 in., distant on a stout sheathed rhizome. *Leaves* 6–8 in. *Scape* 6–8 in., sometimes 2-leaved, ascending, lower sheaths closely imbricate; bracts ⅔ in., deciduous; sepals ½–⅔ in. long; column rather short. *Capsule* 1–1½ in., turgid, angles acute.—Habit of *Pholidota*, and the column is rather short for *Cœlogyne*, though very different from *Pholidota.*

16. **C. occultata,** *Hook. f. Ic. Plant. ined.*; pseudobulbs turbinately obovoid, leaves 2–3 in. petioled elliptic acute, scape 3–4-fld. very short ascending thickly clothed to the top with coriaceous sheaths the upper subfoliaceous, flowers half concealed by the sheaths white, sepals and narrower petals oblanceolate acute, side lobes of lip rounded streaked with dull red, midlobe ovate-rotundate obtuse crenate, disk between the side lobes with 2 very thick yellow crenate ridges.

SIKKIM HIMALAYA, *Griffith's Collectors* (*Kew Distrib.* 5159) (*& Ic. in Herb. Calcutt.*).

Rhizome very stout, sheathed; pseudobulbs 1–1½ in. *Leaves* coriaceous, 5-nerved. *Scape* 1–1½ in., ascending or incurved; sheaths acute; petiole ⅙–½ in.; bracts 1 in., oblong, acute; sepals 1 in., sometimes flanked with yellow; lip with a brown semilunar mark on each side lobe, and a brown margin to the ridges of the disk.—Described chiefly from the drawing in *Herb. Calcutt.*

17. **C. trinervis,** *Lindl. in Wall. Cat.* 1995; *Gen. & Sp. Orchid.* 41;

Fol. Orchid. 4; pseudobulbs large ovoid, leaves long-petioled elongate-lanceolate, raceme short 4–6-fld., sepals lanceolate acute and linear-lanceolate 3-nerved petals white?, lip brown, side lobes short broad, midlobe broadly clawed subreniform retuse bordered with white, disk with 3 narrow ridges extending into the midlobe.

TENASSERIM; at Tavoy, *Wallich*; Mergui, *Griffith, Parish*.

Pseudobulbs 2–3 in., curved; rhizome very stout. *Leaves* 10–18 in., 3-nerved; petiole 2–3 in. *Scape* with short basal sheaths; bracts lanceolate, caducous; flowers $1\frac{1}{2}$ in. diam. *Capsule* $1\frac{1}{2}$ in., narrowly pyriform, angles acute.—Lip described from a drawing by Parish. Very near *C. lentiginosa*, but leaves much longer, and longer petioled, pseudobulbs larger, petals narrower.

18. **C. breviscapa,** *Lindl. Fol. Orchid.* 4; pseudobulbs ovoid, leaves shortly petioled linear-oblong subacute, raceme few-fld., bracts persistent, sepals ovate-lanceolate acute and linear-oblong petals white, lip white?, side lobes short, midlobe large rounded apiculate or retuse, disk yellowish with 2 thickened crenate and a median slender ridge. *Thwaites Enum.* 300; *Walp. Ann.* vi. 225. C. angustifolia, *Wight Ic.* t. 1641, bad (*not of A. Rich.*).

NILGHIRI HILLS, alt. 6000 ft. CEYLON, in the Central Province, *Walker*, &c.

Pseudobulbs 1–$1\frac{1}{2}$ in., crowded; sheaths short, broad, brown-purple; rhizome very stout. *Leaves* 3–5 in., coriaceous, costa strong beneath. *Scape* (with sometimes 2 young leaves) with the raceme 1–2 in., lengthening to 7 in fruit; basal sheaths obtuse; bracts $\frac{2}{3}$–1 in. long, lanceolate; flowers $\frac{3}{4}$–1 in. diam. *Capsule* $1\frac{1}{4}$ in., narrowly fusiform.—Very near *C. odoratissima*.—Lindley, misled by Wight, describes the leaves as solitary. There is a drawing in Herb. Kew by Mrs. Walker of an allied species or variety from Ramboddi in Ceylon, with pseudobulbs 3 in., leaves 9 in., yellow flowers, and 2-lobed midlobe of lip.

19. **C. fuscescens,** *Lindl. in Wall. Cat.* 1962/1; *Gen. & Sp. Orchid.* 41; *Fol. Orchid.* 11; pseudobulbs long narrow, leaves petioled elliptic, raceme 3–8-fld., bracts deciduous, sepals oblong acute and very narrow 1–3-nerved petals yellow greenish or pink, lip mottled with brown, side lobes elongate free ends small obtuse, midlobe clawed large orbicular or quadrate, disk with 3 smooth ridges. *Bot. Mag.* 5494 (var. *brunnea*); *Walp. Ann.* vi. 231. C. brunnea, *Lindl. in Gard. Chron.* 1848, 71, *with fig.* C. assamica, *Lindl. ex Reichb. f. in Koch Allgemein. Gartenzeit.* 1857, 503; *Xen. Orchid.* ii. t. 134.

TROPICAL HIMALAYA, alt. 3–5000 ft., from Nepal eastwards, and the KHASIA MTS.

Pseudobulbs 4–6 in., subcylindric, grooved; sheaths short; rhizome very stout. *Leaves* 6–10 by 3–4 in., many-nerved. *Scape* with raceme 4–8 in., suberect or drooping; flowers $1\frac{1}{2}$–2 in. diam., very variable in colouring. *Capsule* 2 in., pyriform, angles winged.

In var. *brunnea* the sinus between the mid- and side-lobes is almost obsolete. *Wall. Cat.* 1961/2 is *C. macrobulbon*.

20. **C. sulphurea,** *Reichb. f. in Bonpland.* 1857, 43; pseudobulbs ob-pyriform, leaf solitary petioled, scape slender 8–10-fld., bracts deciduous, flowers small pale green or sulphur-cold., sepals oblong-lanceolate acuminate, petals very narrow 1-nerved, side lobes of lip small, midlobe much broader 2-fid, disk with 2 lamellæ and an orange blotch. Chelonanthera sulphurea, *Blume Bijd.* 383.

PERAK, *Scortechini, Wray*.—DISTRIB. Java.

Pseudobulbs 1–$1\frac{1}{2}$ in., tufted; sheaths membranous. *Leaf* 6–8 by 1–$1\frac{1}{2}$ in.,

many-nerved; petiole 2–4 in. *Scape* with raceme 2–4 in., sometimes with 2 partially developed leaves; sheaths long, rather membranous; bracts longer than the hyaline flowers; sepals ½ in.; column broadly hooded.

21. **C. cycnoches,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 147; pseudobulbs narrow, leaves sessile elliptic, raceme drooping 6–8-fld., bracts persistent, flowers greenish and brown, sepals oblong-lanceolate acuminate, petals narrowly linear 3-nerved, side lobes of lip short, midlobe orbicular apiculate or broadly ovate, disk with 5 slender ridges.

TENASSERIM; on Douna-thong, alt. 4000 ft., *Parish.*

Very like *C. fuscescens,* but much smaller, pseudobuibs 1½–2 in., leaves 4–5 in., scape with 2 leaves emerging from the sheaths, flowers smaller, sepals 1¼ in., and side lobes of lip barred with red-brown.

22. **C. speciosa,** *Lindl. Gen. & Sp. Orchid.* 39; *in Bot. Reg.* 1847, t. 23; *Fol. Orchid.* 11; pseudobulbs ovoid, leaves elliptic or lanceolate, scape 1–2-fld. drooping, flowers large greenish yellow and brown, sepals oblong-lanceolate acute, petals narrowly linear, side lobes of lip obtuse toothed, midlobe broadly clawed rounded erose, disk with 2 compound muricate ridges. *Bot. Mag.* t. 4889. Chelonanthera speciosa, *Blume Bijd.* 384, t. 51.

PERAK; on Gunong Batu Pateh, *Wray.*—DISTRIB. Java.

Pseudobulbs 1–1½ in. *Leaves* 4–12 in., 5–7-nerved, petioled. *Scape* slender, with 2 leaves emerging from the sheaths; bracts deciduous; flowers variable in colour; sepals 2–2½ in.; lip red-brown or vinous purple. *Capsule* 2½ in., pyriform, broadly winged.

23. **C. Cumingii,** *Lindl. in Bot. Reg.* 1840, *Misc.* 76; pseudobulbs ovoid, leaves petioled lanceolate, raceme few-fld., bracts narrow persistent, sepals oblong-lanceolate acute and narrower petals white, lip white and yellow, side lobes short obtuse, midlobe large broad erose, disk with 3–5-crenulate ridges. *Bot. Reg.* 1841, t. 29; *Bot. Mag.* t. 4645; *Jard. Fleur.* iv. t. 337; *Fl. des Serres,* viii. 764; *Walp. Ann.* vi. 229.

SINGAPORE, *Cuming* (*Hort. Loddiges*).

Pseudobulbs 1½ in., distant. *Leaves* 4–6 in. *Scape* 3–5 in., erect; sheaths short, obtuse; leaves 2; bracts 1½ in., erect; sepals 1¼ in.; ridges of lip ending in orange calli at the base of the midlobe, which bears 2 short crenulate plates.

24. **C. Schilleriana,** *Reichb. f. in Berl. Allgem. Gartenz.* 1858, 189; *Xen. Orchid.* ii. t. 134; pseudobulbs globosely ovoid, leaves elliptic-lanceolate, scape 1-fld., sepals oblong-lanceolate subacute and very slender petals green or ochreous, side lobes of lip short, midlobe large rounded undulate erose yellow mottled with brown. *Bot. Mag.* t. 5072; *Fl. des Serres,* t. 2302.

Pseudobulbs ½–⅔ in. diam.; rhizome stout. *Leaves* 2–4 in., coriaceous. *Scape* very short; bracts ⅔ in.; sepals 1½ in., lateral deflexed; disk of lip with 3 smooth ridges; column very concave.—Referred to sect. *Pleione* by its author, with which it has nothing in common.

25. **C. odoratissima,** *Lindl. in Wall. Cat.* 1960; *Gen. & Sp. Orchid.* 41; *Fol. Orchid.* 5; pseudobulbs small globose or ovoid, leaves membranous elliptic-lanceolate, raceme 2–3-fld., bracts persistent, sepals oblong-lanceolate acuminate and oblanceolate petals white, lip white, side lobes small oblong falcate obtuse, midlobe large orbicular, disk yellowish with 3 crenate ridges. *Wight Ic.* t. 1640; *Bot. Mag.* t. 5462; *Walp. Ann.* vi.

226; *Thwaites Enum.* 300. C. angustifolia, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 16, t. 6. C. trifida, *Reichb. f. in Hamb. Gartenzeit.* 1863, 546; *Xen. Orchid.* ii. 144, t. 155, f. 2.

Nilghiri Hills, alt. 8000 ft. Ceylon, in the Central Province.

Pseudobulbs very variable; sheaths hyaline. *Leaves* 2–3 in., rather thin. *Scape* flowering from both undeveloped and fully formed 2-leaved pseudobulbs; bracts membranous; sepals $\frac{2}{3}$–1 in. *Capsule* 1 in., pyriform or ellipsoid, winged.—I am not clear as to the limits between this and *C. breviscapa*.

26. **C. corrugata,** *Wight Ic.* t. 1639; pseudobulbs ovoid, leaves elliptic coriaceous, raceme 2–3-fld., bracts large, sepals and subequal petals oblong-lanceolate acuminate white, lip white and yellowish, side lobes short, midlobe ovate obtuse, disk with 3 crenulate ridges. *Lindl. Fol. Orchid.* 6; *Bot. Mag.* t. 5601; *Walp. Ann.* vi. 227. C. nervosa, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 16; *Lindl. l. c.*; *Walp. l. c.* (*not of Wight*).

Nilghiri and Travancore Hills, *Wight, Perrottet,* &c.

Pseudobulbs 1–2$\frac{1}{2}$ in. long, tufted, ribbed and rugose when dry; sheaths broad, acute. *Leaves* 3–5 in. *Scape* with broad basal sheaths and 2 undeveloped leaves; bracts 1$\frac{1}{2}$ in., acute, caducous; sepals 1$\frac{1}{4}$–1$\frac{1}{2}$ in. *Capsule* 1–1$\frac{1}{2}$ in., fusiform or pyriform; ribs prominent.—Lindley keeps up both *corrugata* and *nervosa*, but I find no difference between authentic specimens of each.

27. **C. glandulosa,** *Lindl. Fol. Orchid.* 6; pseudobulbs large, leaves oblong-lanceolate, scape erect few-fld., sheaths large, bracts very large persistent, sepals and petals subequal ovate-oblong acute white, lip white and yellow-brown, side lobes obtuse, midlobe as long ligulate, disk with 3 gland-toothed ridges. *Walp. Ann.* vi. 227. C. nervosa, *Wight Ic.* t. 1638 (*not of A. Rich.*).

Nilghiri Mts.; at Pycurrah, *Wight.*

Pseudobulbs 2–3 in., ovoid, curved; rhizome very stout. *Leaves* 4–6 in., shortly petioled. *Scape* sheathed up to the flowers, sheaths large lax, with 2 more or less developed leaves; bracts 1$\frac{1}{2}$ in., cymbiform, coriaceous, subacute; sepals 1–1$\frac{1}{4}$ in.

28. **C. pandurata,** *Lindl. in Gard. Chron.* 1853, 78; *Fol. Orchid.* 3; tall, pseudobulbs very large flattened, leaves shortly petioled elliptic-lanceolate, scape very stout few-fld., lateral sepals linear-oblong acute, petals subspathulate, lip panduriform, midlobe large broad crispedly waved, disk 2-lamellate between the small subbasal subrecurved side lobes confusedly caruncled on the midlobe. *Bot. Mag.* t. 5084; *Fl. des Serres,* t. 2139; *Reichb. f. Xen. Orchid.* ii. t. 121; *Warner Orchid. Alb.* t. 63; *Orchidoph.* t. 363; *Linden.* ii. t. 86.

Perak, alt. 3500 ft., *Scortechini, King's Collector.*—Distrib. Borneo.

Pseudobulbs 3–5 in., oblong or suborbicular, grooved; rhizome very stout. *Leaves* 8–18 in., rigid, 5–7-nerved; petiole very stout. *Scape* with raceme 6–12 in.; sheaths lanceolate, rigid, inner more or less foliaceous; bracts 1 in., persistent; flowers waxy-green, fragrant; sepals 1$\frac{1}{2}$–2 in., dorsal much the largest, oblong-lanceolate, clathrately 11-nerved, lateral 5-nerved, keeled; petals clawed; lip mottled with red-purple, clathrately nerved, base cordate, midlobe subquadrate, retuse, contracted in the middle; top of column winged.—A noble species.

29. **C. asperata,** *Lindl. in Journ. Hort. Soc.* iv. 221; *Fol. Orchid.* 3; pseudobulbs very large, leaves long-petioled elliptic-lanceolate, racemes drooping many-fld., flowers waxy-white lip mottled brown and yellow, sepals oblong-lanceolate, petals linear-lanceolate, lip as in *C. pandurata*.

Warner Orchid. Alb. t. 311. C. Lowii, *Lindl. in Paxt. Mag.* 1849, 225; *Pescatorea*, i. t. 8.

PERAK; at low elevations, *King's Collector.*—DISTRIB. Borneo.

Very near *C. pandurata*, and as large, but with much thicker narrower pseudobulbs, leaves 2 ft. and under, with the petiole 6–7 in., a many-fld. drooping raceme, larger reflexed bracts, smaller flowers, and narrower petals.—The flowers are described as in the Perak plant "waxy-white, the petals mottled brown and yellow;" in the Bornean "pale cream-coloured, except the yellow and brown lip."

30. **C. fimbriata,** *Lindl. in Bot. Reg.* t. 868, 1838, *Misc.* 92; *Fol. Orchid.* 12; pseudobulbs small ovoid-oblong distant on a slender rhizome, scape 1-fld. shorter than the lanceolate leaves, sepals ovate-lanceolate yellow-green or brownish, petals filiform, lip yellow streaked with red-brown, midlobe orbicular fimbriate, disk 2-lamellate. *Lodd. Bot. Cab.* t. 1425; *Walp. Ann.* vi. 231; *Benth. Fl. Hongk.* 354.

KHASIA MTS., alt. 4000 ft., *Griffith*, &c.—DISTRIB. China.

Pseudobulbs $\frac{3}{4}$–$1\frac{1}{2}$ in.; rhizome as slender as a duck's quill. *Leaves* 2–5 in., sessile. *Scape* 1–2 in.; basal sheaths few, appressed; bracts deciduous; sepals $\frac{3}{4}$ in., acuminate; petals 1-nerved; side lobes of lip with fimbriate tips.

31. **C. ovalis,** *Lindl. in Bot. Reg.* 1838, *Misc.* 91; *Fol. Orchid.* 12; pseudobulbs fusiform distant on a slender rhizome, scape 1–3-fld. shorter than the lanceolate leaves, sepals ovate-lanceolate pale yellow-brown, petals filiform, lip white or yellowish streaked with purple, lobes and surface and margins fringed with long black hairs. *Walp. Ann.* vi. 232. C. fimbriata, *Lindl. in Wall. Cat.* 1957. C. fimbriata? *Lindl., Griff. Notul.* iii. 281; *Ic. Plant. Asiat.* 291, fig. 1. ? C. pilosissima, *Planch. Hort. Donat.* 104. Broughtonia linearis, *Wall. mss.*

TEMPERATE HIMALAYA, from Kumaon eastwards, alt. 4–7000 ft. KHASIA MTS., alt. 4000 ft.

Very near indeed to *C. fimbriata*, differing in the much longer ascending rhizome, narrower 2–3 in. pseudobulbs, and usually larger flowers; but it varies much in all these respects, as also in the breadth of the sepals and length of lamellæ on the lip. *Capsule* 1 in., turgidly pyriform.

Var. *latifolia*; pseudobulbs cylindric, leaves 4–5 by $1\frac{1}{4}$–$1\frac{1}{2}$ in. elliptic.—Munnipore, on Kohima, alt. 4500 ft., *Clarke.*

32. **C. fuliginosa,** *Lindl. in Lodd. Cat.*; *Fol. Orchid.* 12; habit and characters of *C. ovalis*, but raceme 3–4-fld., flowers orange-yellow, lip dark brown, lamellæ ending abruptly. *Lindl. Fol. Orchid.* 12 (*excl. the Khasia plant*); *Bot. Mag.* t. 4440; *Jard. Fleur.* t. 7; *Miquel Choix*, t. 25 (1-*fld. var.*). ? C. triplicatula, *Reichb. f. in Bot. Zeit.* 1864, 415; *Xen. Orchid.* ii. 159, t. 166.

TENASSERIM; at Moulmein, *Parish.*—DISTRIB. Java?

As flowered at Kew this differs from *ovalis* in the characters indicated.

33. **C. micranthum,** *Lindl. in Gard. Chron.* 1855, 173; pseudobulbs small oblong, leaves oblong- or linear-lanceolate, scape short erect few-fld., sepals oblong acute, petals filiform, side lobes of lip small oblong obtuse, midlobe large broadly oblong or rounded retuse, disk covered irregularly with lamellæ and tubercles rising into short spines towards the contracted base where there are 3 oblong calli. C. papagena, *Reichb. f. in Bot. Zeit.* 1862, 214.

KHASIA HILLS, alt. 3000 ft., *J. D. H. & T. T., Mann.* TENASSERIM; at Moulmein (*Hort. Low*).

Pseudobulbs 1½ in., on a branching rhizome; sheaths membranous. *Leaves* 3–4½ in. *Scape* with *raceme* 1–2 in.; basal sheaths small, subacute; flowers ½ in. diam., "pale brown with sooty stains on the lip," *Lindl.*; "green with black specks on the lip," *Reichb. f.*

34. **C. Treutleri,** *Hook. f. Ic. Plant. ined.*; pseudobulbs small ovoid distant, leaves small elliptic-lanceolate, scape short 1-fld., sepals lanceolate acuminate, petals narrowly linear 5-nerved, side lobes of lip small oblong, midlobe large orbicular with a broadly cuneate base, tip rounded obtusely 3-fid, disk smooth with 3 smooth lamellæ from the saccate base to the base of the midlobe.

SIKKIM HIMALAYA, *Treutler.*

Pseudobulbs ½–⅔ in., curved; rhizome as thick as a duck's quill. *Leaves* 1 in., sessile. *Scape* ¾ in., base sheathed; bracts not seen; flowers 1½ in. diam.; sepals 7–9-nerved; petals acuminate; lip narrowed at the base, much the same shape as in *micrantha,* but much larger and perfectly smooth except for the basal lamellæ; column narrowly winged.—I have seen only one specimen of this very distinct species.

35. **C. Parishii,** *Hook. Bot. Mag.* t. 5323; pseudobulbs very long columnar angled, leaves elliptic or lanceolate, raceme 3–5-fld. drooping, flowers large green, sepals lanceolate acuminate, petals larger, lip panduriform, side lobes small, midlobe large broadly clawed broader than long undulate, disk blotched with purple, ridges 4 pectinate on the midlobe warted along the mesial line.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs 4–6 in., tufted, acutely or obtusely angled; sheaths short. *Leaves* 5–7 by 2–2½ in., acute. *Scape* stout, basal sheaths imbricate; flowers 3 in. diam.; sepals and petals yellow-green; lip blue-green; base of midlobe truncate, side lobes like auricles; column narrowly winged.—Near *C. pandurata.*

36. **C. nitida,** *Lindl. Coll. Bot.* 33; *Gen. & Sp. Orchid.* 40; *Fol. Orchid.* 5 (*all in part*); pseudobulbs shining, leaves lanceolate, raceme 3–6-fld. erect or drooping, sepals oblong-lanceolate and linear 3–5-nerved petals obtuse white, lip with yellow eyes on the rounded side lobes, midlobe ovate obtuse white, disk with 3 ridges and a yellow area bordered with red. C. ocellata, *Lindl. in Wall. Cat.* 1953 (*in part*); *Gen. & Sp. Orchid.* 40; *in Bot. Reg.* 1839, *Misc.* 31; *Bot. Mag.* t. 3767 (*not good*); *Floral Mag.* N. S. t. 365; *Walp. Ann.* vi. 228. C. punctulata, *Lindl. Coll. Bot.* 33 (*ex Gen. & Sp. Orchid.*). Cymbidium nitidum, *Roxb. Hort. Beng.* 63; *Fl. Ind.* iii. 459.—? Cœlog., *Griff. Ic. Pl. Asiat.* t. 328, f. 2.

TEMPERATE EASTERN HIMALAYA; Bhotan, and the Mishmi Hills in Upper Assam, *Griffith.* KHASIA HILLS, alt. 3–6000 ft., abundant.

Pseudobulbs 1–3 in., crowded, ovoid oblong obpyriform or subglobose; sheaths broad, rigid. *Leaves* 3–10 in., petioled, variable in breadth. *Scape* not sheathed; bracts deciduous; sepals 1½ in. long; lip with a row of tubercles on each side of the midlobe, markings and spots very variable. *Capsule* 2 in., narrowly pyriform, angles obtuse.—That this is Roxburgh's *Cymbid. nitidum* (the assumed type of Lindley's *Cœlogyne nitida*) is evidenced by a specimen so named from the Calcutta Garden, and by the figure in Roxburgh's drawings, wherein, however, the colouring of the lip is imaginary. Lindley confounded it with *ochracea,* which flowers from the unformed pseudobulb. Wallich's *C. ocellata* is a mixture of *nitida, ochracea,* and *cristata*; his habitat of Sirmore is an error, as is Lindley's of Sikkim, which applies to *ochracea.*

37. **C. stenochila,** *Hook. f. Ic. Plant. ined.*; pseudobulb small, leaves

small sessile elliptic, scape short, raceme very long erect many-fld., flowers small white, lateral sepals ovate-lanceolate acuminate, petals narrowly linear 1-nerved, hypochile of lip narrow very much longer than the orbicular waved epichile, base saccate, side lobes small rounded, disk of midlobe with 3 smooth ridges running nearly to the tip.

PERAK; summit of Gunong Batu Pateh, alt. 6700 ft., *Wray*.

Pseudobulbs ½ in. *Leaves* 1–1½ in., subacute, rigid. *Scape* 1 in., compressed; raceme 8 in., 25-fld.; bracts deciduous; flowers 1 in. diam.; lip strongly nerved; column 3-lobed at the top, narrowly winged.—I have seen but one specimen of this very distinct species.

38. **C. carnea,** *Hook. f. Ic. Plant. ined.*; pseudobulbs long fusiform, leaves petioled elliptic obovate or oblanceolate, scape erect compressed 6–20-fld., rachis zigzag, sepals oblong acuminate 7-nerved, petals very narrow 1-nerved, lip saccate at base, side lobes rounded, hypochile narrow much longer than the orbicular midlobe, disk with 2 large fleshy lamellæ about the middle reaching to the midlobe.

PERAK, *Scortechini*.

Pseudobulbs 4–5 in., distant on the stout rhizome. *Leaves* 4–5 by 1¼–1½ in., subacute. *Scape* as long or longer; bracts deciduous; sepals ¾ in., nerves trabeculate and petals flesh-cold., lip the same with dark veins.

39. **C. elata,** *Lindl. in Wall. Cat.* 1959; *Gen. & Sp. Orchid.* 40; *in Wall. Pl. As. Rar.* iii. 12, t. 218; *in Bot. Reg.* 1839, *Misc.* 92; *Fol. Orchid.* 9; pseudobulbs very large oblong, leaves very long-petioled lanceolate, scape shorter stout, raceme short, flowers subsecund, sepals oblong-lanceolate cream-cold., petals linear, lip white with yellow blotches, side lobes narrow erose, midlobe rounded-ovate acute erose, disk between the side lobes with 2 tortuous crenulate lamellæ. *Bot. Mag.* t. 5001; *Walp. Ann.* vi. 230. —Cœlog., *Griff. Ic. Pl. Asiat.* t. 290.

TROPICAL HIMALAYA; from Garwhal, *Falconer*, to Bhotan, *Griffith*. UPPER BURMA, *J. Anderson*.

Pseudobulbs 3–5 by 1–2 in., narrowed upwards or not; sheaths very large, acute; rhizome as thick as the little finger. *Leaves* 5–12 by 1½–3 in.; petiole 2–4 in. *Scape* 10 in. and under; sheaths large; flowers 1–1½ in. diam. ("smell unpleasant," *Lindl.*); lamellæ of disk of lip sometimes tipped with red.

40. **C. prolifera,** *Lindl. in Wall. Cat.* 1956; *Gen. & Sp. Orchid.* 40; *Fol. Orchid.* 10; pseudobulbs ovoid or oblong compressed, leaves petioled lanceolate, scape long very many-fld., raceme erect interruptedly sheathed, flowers small greenish yellow, sepals oblong, petals narrow linear, side lobes of lip short obtuse, midlobe orbicular retuse toothed, disk 2-lamellate. *Walp. Ann.* vi. 230.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 2–4000 ft., *J. D. H.* KHASIA MTS., alt. 4–5000 ft., *Griffith*, &c.

Pseudobulbs 1½–2½ in., distant; rhizome clothed with distichous scales. *Leaves* 3–7 in., acuminate. *Scape* slender, terete; sheaths short obtuse; sepals ½–¾ in., 5–7-nerved; petals 1–3-nerved. *Capsule* ⅔–1 in., pyriform, angles obtuse.

41. **C. Griffithii,** *Hook. f. Ic. Plant. ined.*; pseudobulbs large linear-oblong compressed, leaves large petioled elliptic-lanceolate acuminate, scape many-fld., sepals broadly oblong 5-nerved, petals very slender 1-nerved, lip with very broad crenulate side lobes and a narrow truncate midlobe, disk between the lobes with 5 short lamellæ the 2 outer much the broadest.

UPPER ASSAM; summit of the Patkoye Mts., *Griffith*. MUNNIPORE, alt. 4–5000 ft., *Watt*.

Pseudobulbs 3–4 in.; rhizome as in *C. prolifera*. *Leaves* 5–10 by 2–3 in.; petiole 2 in. *Scape* 4–8 in., rachis zigzag; flowers 1 in. diam.

42. **C. barbata,** *Griff. Itin. Notes*, 721; *Notul.* iii. 280; *Ic. Pl. Asiat.* t. 291, f. 2; pseudobulb large ovoid, leaves very large petioled elliptic-lanceolate, scape and rachis very stout, flowers large white, sepals ovate-oblong acute, petals linear 3–5-nerved, lip broad, side lobes rounded white, and small ovate purple midlobe deeply fimbriate, disk with 3 fimbriate ridges. *Lindl. Fol. Orchid.* 9; *Walp. Ann.* vi. 229; *Warner Orchid. Alb.* t. 143; *Orchidoph.* 2888, p. 154; *Masters in Gard. Chron.* 1886, i. 117, fig. 23 (*frt.*); *Reichb. f. in Gard. Chron.* 1880, i. 8.

BHOTAN? *Griffith*. KHASIA MTS., alt. 4–5000 ft., *Griffith*, &c. NAGA and MUNNIPORE HILLS, alt. 5000 ft., *Prain, Watt*.

Pseudobulbs 3–4 in.; rhizome very stout. *Leaves* 6–12 in.; petiole 3–4 in. *Scape* as long as the leaves; sheaths $\frac{3}{4}$ in. and less; sepals $1\frac{1}{2}$ in.; lip very saccate at the base.

43. **C. flavida,** *Wall. mss.*; pseudobulbs short ovoid, leaves petioled narrowly lanceolate longer than the slender sometimes interruptedly sheathed scape, flowers small yellow, sepals oblong acute, petals filiform 1-nerved, side lobes of lip small obtuse, midlobe cuneately obcordate, disk faintly 2-ridged. C. flavida, *Hook. f. ex Lindl. Fol. Orchid.* 10; *Walp. Ann.* vi. 223.

SIKKIM HIMALAYA, alt. 1–4000 ft., *Griffith's Collectors*. KHASIA MTS., alt. 4–5000 ft., *Lobb*, &c. MUNNIPORE; on Kohima, *Prain*.

Pseudobulbs 1–2 in., distant on a slender scaly rhizome; sheaths narrow. *Leaves* 3–6 in., acuminate. *Scape* 8–10-fld.; flowers $\frac{1}{2}$ in. diam., suberect; side lobes of lip incumbent at the angles on the midlobe, base saccate; column narrowly winged. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in., ellipsoid.—The Munnipore specimen has a very stout rhizome.

44. **C. longipes,** *Lindl. Fol. Orchid.* 10; pseudobulbs long slender cylindric or narrowly ovoid, leaves petioled lanceolate, scape slender, flowers small yellow, sepals ovate-oblong acuminate, petals very slender 1-nerved, lip contracted at the saccate base, side lobes rounded, midlobe very broadly obcordate, disk with 2 slender lamellæ. *Walp. Ann.* vi. 230.

SIKKIM HIMALAYA, alt. 7000 ft., *Treutler, Pantling*. KHASIA MTS., alt. 4–5000 ft., *Griffith*, &c. MUNNIPORE; on Kohima, *Prain*.

Pseudobulbs 3–4 in., on a stout sheathed rhizome. *Leaves* 5–7 in., acuminate; petiole 1–2 in. *Scape* about as long as the leaves; flowers $\frac{1}{2}$–$\frac{2}{3}$ in. diam.; lip with waved margins; column very broadly winged above. *Capsule* $\frac{3}{4}$–1 in., ellipsoid, angles obtuse.

45. **C. rigida,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 146; pseudobulbs large narrowly oblong, leaves petioled elliptic-lanceolate, scape very slender rigid, raceme drooping lax-fld., sepals yellow lateral oblong-lanceolate acute, dorsal much broader, petals narrowly linear, lip saccate, side lobes large rounded yellow, midlobe suborbicular retuse or 2-lobed, disk with 2 long and a mesian short red crenulate ridges.

TENASSERIM; at Moulmein, *Parish*.

Pseudobulbs 3–5 by 1–$1\frac{1}{2}$ in., distant on a very stout rhizome. *Leaves* 4–6 by 1–$1\frac{1}{2}$ in., acuminate. *Scape* with raceme 6–8 in.; bracts 1 in., deciduous, as long as the flowers; sepals $\frac{1}{2}$ in.; column broadly winged above, top crenate.

46. **C. ustulata,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 144; pseudobulbs ovoid, leaves small elliptic-lanceolate, scape very slender erect, flowers small, sepals subequal oblong acute, petals filiform, side lobes of very broad lip rounded, midlobe small suborbicular retuse, disk with 2 curved smooth ridges.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs 1–1½ in.; rhizome stout. *Leaves* 1½–2 in., sessile or petioled, acuminate, rigid. *Scape* with raceme 4–5 in.; bracts ¼–⅓ in., deciduous; flowers amongst the smallest of the genus, yellow and brown, suberect; sepals ¼ in. long; lip saccate at the base, nearly orbicular in outline; column winged above.—Amongst Parish's admirable drawings is another plant named *C. ustulata,* with pseudobulbs 2–3 in., leaves 4–6 in. lanceolate undulate, bracts nearly 1 in. long, much larger flowers with narrow side lobes of lip and a much larger midlobe.

47. **C. anceps,** *Hook. f. Ic. Plant. ined.*; pseudobulbs ellipsoid, leaves shortly petioled elliptic subacute coriaceous, scape stout compressed, raceme erect, sepals linear-oblong acute, petals narrowly linear obtuse 3-nerved, lip long narrow, side lobes elongate with short free tips, midlobe orbicular, disk with 2 short lamellæ.

PERAK, *Scortechini.*

Rhizome very stout; pseudobulbs 1–1½ in., base contracted. *Leaves* 2½–4 by ⅔–1½ in., 7–9-nerved, stoutly petioled. *Scape* with raceme 5–10 in., sometimes narrowly winged, sheaths below the raceme ⅔ in., obtuse; sepals and petals 1 in. long lip recurved, hypochile 2–3 times as long as the epichile.

Sect. II. PLEIONE. See p. 828.

48. **C. præcox,** *Lindl. Coll. Bot.* 37; *in Wall. Cat.* 1965; *Fol. Orchid.* 16; pseudobulbs ampulliform or turbinate at length umbonate, leaf-sheaths tubercled, bracts equalling or exceeding the ovary, flowers rose-purple, lip subrepand laciniate in front, disk with 3–5 crested lamellæ, top of column 4-toothed. *Bot. Mag.* t. 4496; *Paxt. Mag.* xiv. t. 7; *Trans. Russ. Hort. Soc.* 1880, t. 69 (*var.*). C. Wallichiana, *Lindl. Gen. & Sp. Orchid.* 43; *in Wall. Plant. As. Rar.* i. 46, t. 54; *Bot. Reg.* xxvi. t. 24; *Paxt. Mag.* vi. t. 25; *Gartenfl.* t. 283; *Jennings Orchid.* t. 472; *Griff. Notul.* iii. 402. Pleione præcox, *Don Prodr.* 37. P. Wallichii, *Lindl. in Paxt. Fl. Gard. sub.* t. 51. P. Wallichiana, *Jard. Fleur.* t. 153. P. birmanica, *Reichb. f. in Gard. Chron.* 1882, ii. 840. Epidendrum præcox, *Smith Exot. Fl.* t. 97.

TEMPERATE HIMALAYA, alt. 5–8000 ft., from Garwhal eastwards. KHASIA MTS., alt. 4–6000 ft. PEGU, *Kurz.* TENASSERIM, summit of Nat-toung, *Parish.*

Pseudobulbs very variable, 1–1½ in. broad and long, at first depressed bottle-shaped, at length shortly cylindric with a depressed top conic in the middle, covered with reticulate filaments, usually dark green often blotched with red or purple. *Leaves* 1–2, 2–9 in., elliptic or lanceolate, acute; scape 3–4 in.; bracts sheathing, obtuse; flowers 2½–4 in. diam., sweet-scented; sepals and petals narrow, recurved, acute; lip 2-fid, deeply fimbriate in the Pegu and Tenasserim specimens. *Capsule* ¾–1 in., fusiform.—*C. Wallichiana* is not even a variety, and var. *sanguinea* is only characterized by the decaying leaf. A monstrous state bears imperfectly developed pseudobulbs crowned with a crinite tuft of narrow bulbils each with 2 setæ. *C. birmanica* is doubtfully described as a species by Reichenbach, distinguished by the bluish-purple pseudobulbs with many white circles and an entire border of the hood of the column.—Fl. autumn.

49. **C. humilis,** *Lindl. Coll. Bot.* 37; *Gen. & Sp. Orchid.* 43; *in Wall. Cat.* 1963; *Fol. Orchid.* 16; pseudobulbs flagon-shaped, leaf-sheaths smooth, bracts longer than the ovary, flowers white or very pale purple, lip obovate fimbriate speckled or striped with red purple orange or brown, disk with

fringed lamellæ, top of column truncate and toothed. *Bot. Mag.* t. 5674. Pleione humilis, *Don Prodr.* 37; *Paxt. Fl. Gard.* t. 51; *Jard. Fleurist.* t. 153. Epidendrum humile, *Sm. Exot. Bot.* t. 98. Cymbidium humile, *Smith in Rees Cyclop.*

TEMPERATE HIMALAYA; Nepal, *Wallich*, &c. Sikkim, alt. 7–8000 ft., *J. D. H.* Munnipore, *Wall.*

Very near *C. præcox*, but flowers much smaller, pseudobulbs usually narrow, column truncate, and base of lip adnate to the base of the column.

Var. *tricolor*, Reichb. f. in Gard. Chron. 1880, i. 394; *Williams Orchid. Alb.* t. 102, has brown spots on the lip, and var. *albata*, Reichb. f. l. c. 1888, i. 392, has mauve-purple radiating lines on the lip.—Fl. spring.

50. **C. maculata,** *Lindl. Gen. & Sp. Orchid.* 43; *in Wall. Pl. As. Rar.* i. 45, t. 53; *Fol. Orchid.* 15; pseudobulbs stout umbonate with a conical top, sheaths of scape bullate, bracts large inflated truncate, flowers white, sepals oblong-lanceolate, petals oblanceolate, lip rounded quite entire blotched with dark purple, disk yellow and red with 5–7 pectinate ridges. *Bot. Mag.* t. 4691; *Fl. des Serres*, t. 1470; *Griff. Notul.* iii. 281. C. candida, *Lindl. in Wall. Cat.* 1964. Pleione maculata, *Lindl. in Paxt. Fl. Gard.* t. 39, f. 1; *Jard. Fleur.* t. 93. ? P. diphylla, *Lindl. in Paxt. Fl. Gard. under* t. 51; *Fol. Orchid.* 15; *Walp. Ann.* vi. 234.—Cœlog., *Griff. Itin. Notes* 44, No. 684. Gomphostylis candida, *Wall. mss.*

NEPAL, *Wallich*. SIKKIM and BHOTAN, alt. 3500–4000 ft., *Clarke*, &c. KHASIA HILLS, alt. 4–5000 ft., *Wallich*, &c.

Pseudobulbs barrel-shaped, with a depressed top rising into a blunt cone, green spotted with purple. *Leaves* in pairs on the old pseudobulbs, 6–8 in., with bullate sheaths at the base. *Scape* very short, rarely 2-fld.; flowers 2–2½ in. diam.; sepals and petals variable in breadth.

Var. *virginea*, Reichb. f. in Gard. Chron. 1887, ii. 681, has a light sulphur-cold. lip, with the purple lines and spots evanescent.

51. **C. lagenaria,** *Lindl. Fol. Orchid.* 15; pseudobulbs depressed broad umbonate with a thick ring and conical top, sheaths of scape bullate, bract as in *C. maculata*, sepals pale purple lateral lanceolate acuminate, petals linear-lanceolate, lip oblong toothed white with broad purple blotches, disk yellow with 7 subpectinate ridges. *Bot. Mag.* t. 5370; *Fl. des Serres*, t. 2386; *Ill. Hortic.* t. 510. Pleione lagenaria, *Lindl. in Paxt. Fl. Gard.* ii. t. 39, f. 2; *Jard. Fleurist.* t. 93; *Warner Sel. Orchid.* t. 17; *Peydt. Orchid.* t. 36; *Jennings Orchid.* t. 47/1.

INDIA (locality unknown).

Pseudobulbs 1½ in. diam., broader than long, mottled very dark and light green; the short cylindric portion swells out into a thick ring with a depressed inner border from which the cone arises. *Leaves* not seen. *Scape* 2 in.; flowers 3 in. diam.—Near *C. maculata*, but the sepals are very acuminate and the flowers much larger.

52. **C. Reichenbachiana,** *T. Moore in Gard. Chron.* 1868, 1210; pseudobulb large flagon-shaped 5–8 grooved, top conical, sheaths of scape appressed, bracts oblong-lanceolate acute, flower pale purplish, sepals linear oblong subacute, petals linear obtuse, lip white with red spots and 3 short pectinate ridges, margin toothed. *Bot. Mag.* t. 5753.

ARRACAN; at Rangoon, *Benson* (*Hort. Veitch*).

Pseudobulbs 2–2½ in. high, green reticulate with black, gradually swelling upwards, 1–1½ in. diam. across the lobed base of the conical top. *Leaf* not seen. *Scape* 2–3 in., 1–2-fld., lower sheaths oblong green mottled; flowers 2½ in. diam.

53. **C. Hookeriana,** *Lindl. Fol. Orchid.* 14; pseudobulbs ovoid, flowering scape 1-leaved 1-fld., sheaths appressed, sepals and petals subsimilar oblong-lanceolate acute pale rose-purple, lip white with pale red-brown blotches, disk with 5 yellow ciliate ridges, margin crisped toothed or undulate. *Bot. Mag.* t. 6388.

SIKKIM HIMALAYA, alt. 7–10,000 ft., *J. D. H.*

Pseudobulbs $\frac{2}{3}$–1 in., narrow. *Leaf* 2–4 in., acuminate; sheaths at base appressed acute. *Scape* 1–1$\frac{1}{2}$ in.; bract tubular, obliquely truncate, obtuse; flowers 2 in. diam.

DOUBTFUL SPECIES (bracts very small).

54. **C. ? uniflora,** *Lindl. in Wall. Cat.* 1966; *Gen. & Sp. Orchid.* 42; pseudobulbs small ovoid, sheaths scarious, leaves narrowly lanceolate, scape short 1–2-fld., bracts very small, sepals and petals lanceolate acute, lip with small acute side lobes towards the base and a subpanduriform midlobe, disk obscurely ridged. Panisea uniflora, *Lindl. Fol. Orchid.* 2; *Walp. Ann.* vi. 240. Epidendrum, *Griff. Ic. Pl. Asiat.* t. 313, f. 1.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 3–5000 ft., *J. D. H.* KHASIA HILLS? *Griffith.* TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs 1–2 in., densely crowded. *Leaves* 3–6 in., erect. *Scape* $\frac{1}{2}$–1 in., clothed with distichous lanceolate membranous sheaths; bracts persistent; flowers white or flesh-cold.; sepals 1 in.; lip with 3–7 orange spots; column rather dilated in the middle.

55. **C ? purpurascens,** *Hook. f. Ic. Plant. ined.*; pseudobulbs very slender 1-leaved, leaf narrow coriaceous, scape from the base of the pseudobulb slender erect 1–3-fld., lip entire cymbiform. Dendrobium purpurascens, *Thwaites Enum.* 298.

CEYLON; in the elevated parts of the Central Province, *Thwaites.*

Pseudobulbs $\frac{1}{4}$ in., hardly thicker than the petiole; sheaths ovate, acute; roots very long, very thick, clothed with a loose inflated epidermis. *Leaf* 1–4 by $\frac{1}{6}$–$\frac{1}{2}$ in., erect, rigid, often purplish, margins recurved when dry. *Scape* 3–4 in., sheaths few, minute; bracts minute, rounded; flowers nearly white; pedicel with ovary $\frac{1}{4}$ in.; sepals $\frac{1}{2}$ in., erecto-patent, linear-oblong, obtuse, 3-nerved; petals linear-spathulate, obtuse, 1-nerved; lip sessile, erect, spathulate base and crenulate tip saccate, disk quite smooth; column erect, narrowly winged, tip dilated with toothed sides; anther imperfectly 4-celled, persistent, purple; pollinia 4, free, 2 larger subpyriform, 2 smaller angular. *Capsule* $\frac{1}{2}$ in., narrowly oblong, 6-ribbed.—I have long puzzled over this curious little plant, for which I had proposed the generic name *Adrorhizon,* in allusion to its remarkable roots, but await more specimens before establishing it. From *Dendrobium* it differs in habit, in the long column without a foot, and in the pollen; and it is more near *Cœlogyne* or *Panisea.*

SPECIES UNKNOWN TO ME.

C. BRACHYPTERA, *Reichb. f. in Gard. Chron.* 1881, ii. 6; pseudobulb a span high tetragonous, leaves not seen, raceme several-fld., bracts equalling the ovary persistent, sepals triangular ligulate acute light parrot-green, lateral keeled in the middle, petals filiform, lip white with a brown stain, side lobes semi-ovate short triangular in front, midlobe oblong acute undulate, keels 3 all warted in front, column hooded and retuse at the top, hood crenulate.—Flowers like *C. lentiginosa.*—(Possibly *C. Parishiana,* J. D. H.)

C. CAULESCENS, *Griff. Notul.* iii. 282, from maritime marshes at Pulo Bisar, Malacca, cannot be a *Cœlogyne,* but may be allied to *Bromheadia.* There are in Herb. Lindley fragments from Griffith so named, consisting of the rachis of a raceme, which agrees with Griffith's description, and of leaves of what I take to be of another plant.

C. (Pholidota) CORNICULATA, *Reichb. f. in Gard. Chron.* 1865, 746; raceme pendulous many-fld., sheaths large, bracts oblong cucullate apiculate exceeding the ovaries, flowers honey-coloured sweet, sepals oblong acute obtusely keeled in the lower half, petals narrowly lanceolate acute, lip deep yellow angled and saccate in the middle, side lobes bordered with brown semi-ovate acute, midlobe transverse rounded retuse obsoletely acute or minutely lobulate, (column?) slender dilated on each side near the stigma, side wings subacute, dorsal wing erect subquadrate emarginate, rostellum ascending. Very curious in the angular centre of the lip.—India, probably Assam (*Hort. Day*).—(The word "column" is omitted in the text; its slenderness is quite at variance with *Pholidota*, J. D. H.)

C. GOWERI, *Reichb. f. in Gard. Chron.* 1869, 443; pseudobulbs and leaves of *C. ocellata* (*nitida*, L.), raceme flexuous erect lax-fld., bracts equalling the ovary deciduous, flowers white as large as those of *C. fimbriata*, sepals cuneate oblong acute, petals lanceolate, lip trifid, side lobes obtuse-angled serrulate in front, midlobe oblong with an inflexed tip and a tumor on each side near the base, disk ochreous with 3 entire keels the median shorter, top of column serrulate.—Assam (*Hort. Williams*).

C. LACTEA, *Reichb. f. in Gard. Chron.* 1888, i. 521; pseudobulb short thick fusiform, leaves very thick petioled cuneate oblong acuminate, raceme porrect 6–8-fld., bracts deciduous, flowers cream-white, sepals oblong obtusely acute, petals linear-lanceolate, side lobes of lip obtuse, midlobe porrect, disk with 3 crenulate keels from the base between the side lobes, top of column 2–3-fid.—Burma (*Hort. Lendy*).—(Perhaps C. lutea, *Parish mss.*, of which the specimens are very imperfect.)

C. PLANTAGINEA, *Lindl. in Gard. Chron.* 1855, 20; pseudobulbs 6 in. elongate terete 2-leaved, sheaths acuminate scorched, leaves 1 ft. petioled oblong-lanceolate firm waved 5-ribbed, raceme long pendulous many-fld., bracts small brown acute very deciduous, flowers greenish yellow, petals linear-lanceolate, sepals rather broader keeled, lip ovate-oblong acuminate 3-lobed white streaked with brown, disk with 3 fimbriate lamellæ between the side lobes and 4 on the midlobe.—India? (*Hort. Farnham Castle*).—Approaches nearest to *C. flaccida*.

C. (Erectæ) ROSSIANA, *Reichb. f. in Gard. Chron.* 1884, ii. 803; pseudobulbs obpyriform 4-ribbed, leaves 12 by $1\frac{1}{2}$ in. long-petioled oblong-lanceolate, scape from the base of the old bulbs very short sheathed 4-fld., flowers secund cream-white, bracts linear acuminate deciduous, sepals and petals linear-lanceolate, lip 3-fid, side lobes ochreous obtuse-angled, midlobe triangular dilated, disk with 3 plaited ridges produced into the midlobe where there is an additional plaited keel on each side, column white.—Burma (*Hort. Ross*).—Apparently near *C. flaccida*, J. D. H.

35. **OTOCHILUS,** *Lindl.*

Stem articulate, branched, formed of superposed elongate pseudobulbous internodes. *Leaves* in pairs at the nodes, elliptic or lanceolate, plaited. *Scape* subterminal on the internodes, slender, bases sheathed; flowers small, racemose; bracts scarious, sides convolute. *Sepals* and *petals* subequal, free, narrow, spreading. *Lip* sessile at the base of the column, base saccate, side lobes erect, midlobe narrow, entire. *Column* very long, slender, erect, foot 0; anther-cells distinct, subglobose; pollinia 4, ovoid or subglobose, cohering in pairs or all together by a viscus.—Species 3 or 4, Indian.

1. **O. alba,** *Lindl. in Wall. Cat.* 1967; *Gen. & Sp. Orchid.* 35; sepals and petals acute, side lobes of lip very small obtuse, midlobe linear-oblong acuminate. Cœlogyne alba, *Reichb. f. in Walp. Ann.* vi. 236. Broughtonia pendula, *Wall. mss.*

SUBTROPICAL HIMALAYA, alt. 3–5000 ft., from Nepal eastwards. The KHASIA HILLS and MUNNIPORE.

Pseudobulbs 1–3 in., subcylindric. *Leaves* 4–6 by $1\frac{1}{2}$–2 in., elliptic-lanceolate.

Racemes cernuous; flowers ½ in diam., white with a pink or green column; bracts oblong, acuminate, caducous; side lobes of lip yellow or white.

2. **O. fusca,** *Lindl. in Wall. Cat.* 1969; *Gen. & Sp. Orchid.* 35 sepals and petals obtuse, side lobes of lip reduced to small teeth, midlobe linear-oblong. *Bot. Mag.* t. 3921. O. lancifolia, *Griff. Notul.* iii. 278; *Ic. Plant. Asiat.* t. 289. Cœlogyne fusca, *Reichb. f. in Walp. Ann.* vi. 236. Broughtonia ? fusca, *Wall. mss.*

SUBTROPICAL HIMALAYA, alt. 3–6000 ft., from Nepal eastwards. ASSAM, the KHASIA HILLS and MUNNIPORE.

Pseudobulbs 1–2 in., cylindric, fusiform or clavate. *Leaves* 2–5 in., linear-lanceolate, shortly petioled. *Racemes* short or long; bracts ⅓ in., subtruncate; flowers larger than in *O. alba,* pale pink; sepals ⅓ in., linear-oblong; petals narrower, dilated upwards; lip concave; column red; pollinia subglobose. *Capsule* ½ in.—The name is inappropriate.

3. **O. porrecta,** *Lindl. in Wall. Cat.* 1968; *Gen. & Sp. Orchid.* 36; sepals acuminate, side lobes of lip falcate obtuse, midlobe lanceolate. O. latifolia, *Griff. Notul.* iii. 279; *Ic. Plant. Asiat.* t. 289. Cœlogyne porrecta, *Reichb. f. in Walp. Ann.* vi. 236. Tetrapeltis fragrans, *Wall. mss.*

SUBTROPICAL HIMALAYA, from Nepal eastwards, alt. 3–6000 ft. The KHASIA HILLS and MUNNIPORE. TENASSERIM, alt. 5000 ft., *Parish.*

Pseudobulbs 2–4 in., subcylindric or clavate. *Leaves* 5–10 by 1½–2½ in., elliptic-lanceolate, rather long-petioled. *Racemes* decurved; bracts broad, acute, caducous; flowers white or pale flesh-cold.; sepals ⅓–⅔ in., linear; petals linear; lip with larger side lobes than in the two other species; pollinia globose. *Capsule* ¾–1 in.

36. **PHOLIDOTA,** *Lindl.*

Perennial herbs with the habit of *Otochilus,* or with sessile 2-leaved pseudobulbs. *Scape* or rachis of raceme often flexuous; bracts distichous, rigid; flowers small, globose. *Sepals* concave. *Petals* flat, broad or narrow. *Lip* sessile on the base of the column, erect, saccate, subentire or 3–4-lobed. *Column* very short, hooded or winged; anther-cells subglobose, rarely elongate; pollinia 4, subglobose, free or cohering in pairs by a viscus. —Species about 20, Indian, Malayan and Chinese.

* *Stems* elongate, branched, formed of pseudobulbous internodes. *Scape* from the top of the pseudobulb between the leaves.

1. **P. articulata,** *Lindl. in Wall. Cat.* 1992; *Gen. & Sp. Orchid.* 38; *in Bot. Reg.* 1839, *Misc.* 44; bracts rhombic-ovate, dorsal sepal suborbicular, lateral ovate keeled, lip cymbiform with a didymous midlobe. P. khasiana, *Reichb. f. in Walp. Ann.* vi. 238; *in Bonpland.* 1856, 329. Cœlogyne articulata, *Reichb. f. in Walp. Ann.* vi. 238. C. khasiana, *Reichb. f. l. c.*

SUBTROPICAL HIMALAYA, alt. 3–4000 ft., from Kumaon eastwards, and the KHASIA MTS., common.

Internodes 2–4 in., as thick as the little finger, terete. *Leaves* 2, 4–6 in., sessile or petioled, elliptic-lanceolate, acute. *Racemes* 2–4 in., drooping; bracts ½–⅔ in., rhombic-ovate; pedicel with ovary ½ in.; sepals ⅓ in.; lip with 5 basal lamellate nerves; column narrow, rostellum acuminate. *Capsule* ⅔–¾ in., rachis not flexuous.

2. **P. recurva,** *Lindl. Gen. & Sp. Orchid.* 37; bracts very broad

truncate, dorsal sepal suborbicular, lateral ovate obtuse faintly 3-nerved not keeled, petals oblong-ovate 1-nerved, lip cymbiform with 2 auricle-like terminal lobes. *Hook. f. Ic. Plant.* t. 1878. Cœlogyne recurva, *Reichb. f. in Walp. Ann.* vi. 238.

SUBTROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, *Griffith's Collectors.*

Internodes 1–2 in., as thick as a swan's quill, deeply 3–5-winged. *Leaves* 2, 2–3 in., elliptic- or linear-lanceolate, obtuse or acute, subsessile. *Raceme* 2–3 in., recurved; bracts $\frac{1}{4}$ in., secund, flabelliform, persistent; flowers very small; sepals $\frac{1}{8}$ in. long; base of column narrow; rostellum short, transverse; lip with 5 lamellate basal nerves. *Capsules* $\frac{1}{6}$ in., tumid; rachis stout not flexuous.

3. **P. Griffithii,** *Hook. f. Ic. Plant.* t. 1881; bracts oblong, dorsal sepal broadly ovate or suborbicular, lateral ovate-lanceolate acute 5-nerved keeled, petals elliptic-lanceolate 3–5-nerved, lip cymbiform with a didymous terminal lobe, no side lobes.

TROPICAL SIKKIM HIMALAYA, *Griffith's Collectors, J. D. H.* KHASIA MTS.; on Kollong, alt. 5000 ft., *Clarke.*

Internodes 3–5 in., as thick as a swan's quill. *Leaves* 2, 3–5 in., oblong-lanceolate. *Racemes* 1–2 in., decurved, rachis flexuous; bracts $\frac{1}{3}$ in., oblong, obtuse; sepals $\frac{1}{3}$ in.; lip with 5 basal lamellate nerves; column suborbicular; rostellum ovate, acuminate.

4. **P. obovata,** *Hook. f.*; leaves obovate retuse or apiculate, bracts oblong acute, dorsal sepal oblong, lateral ovate acute, petals obovate, lip cymbiform with a didymous terminal lobe.

BHOTAN, *Griffith.* KHASIA HILLS (*Ic. in Herb. Calcutt.*).

Internodes $2\frac{1}{2}$–4 in., cylindric. *Leaves* $2\frac{1}{2}$–$3\frac{1}{2}$ by $1\frac{1}{2}$–2 in., sessile, 5–7-nerved. *Scape* very short; raceme 3 in., many-fld., fruiting recurved; flowers $\frac{1}{2}$ in. diam. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in., ellipsoid, turgid, angles acute.—The materials for this very distinct species, which may be known at first sight by the short broad leaves, consist of fruiting specimens collected by Griffith, and a very rude drawing of a flowering specimen marked as from the Khasia by Mr. Simons of Assam. The description of the flower may not be very accurate.

** *Rhizome* elongate; internodes terete, clothed with membranous sheaths and bearing slender 1–2-leaved pseudobulbs at the nodes. *Scape* from the sheaths of the internodes.

5. **P. protracta,** *Hook. f. Ic. Plant.* t. 1877; bracts broadly ovate acute, sepals ovate obtuse 3-nerved not keeled, petals elliptic obtuse 3-nerved, lip cymbiform, terminal lobe suborbicular.

TEMPERATE SIKKIM HIMALAYA, *Griffith's Collectors* (*Kew Distrib.* 5042); at Neebong, alt. 7100 ft., *Clarke.* NAGA HILLS, *Prain.*

Rhizome flexuous, as thick as a goose-quill; internodes $1\frac{1}{2}$–3 in.; sheaths long, appressed; pseudobulbs 2–4 in., subcylindric. *Leaves* 5-6 in., elliptic-lanceolate, acuminate. *Racemes* 1–$1\frac{1}{2}$ in., subsessile, flexuous; bracts $\frac{1}{8}$ in., membranous; sepals $\frac{1}{8}$ in. long, very concave; lip gibbous above the base, 5-nerved, nerves simple. *Capsule* $\frac{1}{2}$ in. long, ellipsoid.

*** *Pseudobulbs* uninodal, seated on a very stout creeping rhizome. *Scape* from the top of the pseudobulb.

† *Bracts very broad. Lip with 2 free or connate terminal lobes.*

6. **P. imbricata,** *Lindl. in Hook. Fl. Exot.* t. 138; *in Wall. Cat.* 1991; *Gen. & Sp. Orchid.* 37; *in Bot. Reg.* t. 1213 and 1777; bracts semi-

circular, dorsal sepal orbicular 3-nerved, lateral cymbiform, keel winged, petals linear-oblong falcate 1-nerved, lip with large broad rounded sides and 2 smaller terminal lobes. *Lodd. Bot. Cab.* t. 1934; *Wight Ic.* t. 907; *Dalz. & Gibs. Bomb. Fl.* 262. P. pallida, *Lindl. in Bot. Reg.* xxi. *sub.* t. 1777. Cœlogyne imbricata & pallida, *Reichb. f. in Walp. Ann.* vi. 238. Ptilocnema bracteatum, *Don Prodr.* 33. Cymbidium imbricatum, *Roxb. Fl. Ind.* iii. 460. Ornithidium imbricatum, *Wall. mss.*—*Rheede Hort. Mal.* xii. t. 47.

TROPICAL HIMALAYA, from Kumaon, alt. 3500 ft., *Strachey & Winterbottom*, eastwards. The KHASIA MTS., CHITTAGONG, BURMA and the ANDAMAN ISLANDS. The DECCAN PENINSULA, from the Concan southwards. CEYLON.

Pseudobulbs 1–3 in. long and narrow, or short and broad. *Leaf* solitary, 6–12 in., elliptic-lanceolate, petioled, 3-nerved. *Raceme* long-peduncled, elongate, drooping, 3–8 in. long; bracts $\frac{1}{3}$ in. broad; sepals $\frac{1}{4}$ in. long, lateral connate at the base; lip 4-lobed, 5-nerved, 3 median nerves thickened at the base; column circular when spread out, rostellum truncate. *Capsule* $\frac{3}{4}$ in., ellipsoid on a thickened (not zigzag) rachis.

VAR. ? *sessilis*; raceme sessile, rostellum 2-brachiate.—Naga Hills, on Kohima, alt. 3500–5000 ft., *Prain.*

VAR. ? *coriacea*; leaf sessile coriaceous, flowers larger, 4 lobes of lip subequal in length, the lateral rather narrower.—Perak, *Scortechini, King's Collector.*

7. **P. advena,** *Reichb. f. Otia Hamburg.* 47; bracts semicircular, dorsal sepal elliptic obtuse strongly 5-nerved, lateral ovate, midrib very strong, petals elliptic-lanceolate acute 3-nerved, lip with very broad rounded sides, and 2 terminal lobes caruncled at their bases.

TENASSERIM; at Moulmein, *Helfer* (*Kew Distrib.* 5047), *Parish.*

Pseudobulbs stout or slender, distant on the stout rhizome. *Leaves* 1–2, elliptic-lanceolate, acuminate; nerves very slender. *Raceme* short, decurved, peduncled; bracts $\frac{1}{3}$ in. broad; sepals nearly $\frac{1}{3}$ in. long; lip 5-nerved, 3 median nerves thickened at the base, caruncled towards the apex which is produced between the terminal lobes; column very broad and short; rostellum very large, 2-glandular or -tubercled at the tip; anther very large, long, truncate, very different from that of its congeners; pollinia as in the genus.

8. **P. calceata,** *Reichb. f. in Walp. Ann.* vi. 238; bracts ovate, dorsal sepal orbicular 3-nerved, lateral ovate faintly 3-nerved, petals linear-oblong or ovate-lanceolate 1-nerved, lip with broad ascending subacute side lobes and 2 smaller auricle-like terminal lobes. *Hook. f. Ic. Plant.* t. 1876. Cœlogyne calceata, *Reichb. f.*

KHASIA HILLS, alt. 4–5000 ft., *Lobb, J. D. H. & T. T.*

Pseudobulbs crowded on a rather slender densely-rooting rhizome, 1–1½ in., slender, curved, rarely short and stout. *Leaf* solitary, 3–6 in., linear-lanceolate, acute, petioled, 1-nerved. *Raceme* 2–4 in., long peduncle and drooping rachis capillary; bracts $\frac{1}{4}$ in., acute or obtuse; sepals $\frac{1}{6}$ in. long, membranous; clinandrium hippocrepiform. *Capsule* $\frac{1}{2}$ in.—Much the most slender species.

†† *Bracts narrow. Lip with a simple narrow terminal lobe or* 0.

9. **P. Convallariæ,** *Hook. f. Ic. Plant.* t. 1880; leaf linear, bracts linear, raceme stout suberect, scape sheathed to the tip, dorsal sepal oblong 5-nerved, lateral ovate acuminate, midrib thick, petals broadly ovate obtuse 3-nerved, lip cymbiform nearly orbicular broader than long 3-nerved, tip emarginate. Cœlogyne Convallariæ, *Reichb. f. in Flora* 1872, 277.

KHASIA HILLS, alt. 3–4000 ft., *J. D. H. & T. T.* NAGA HILLS; on Kohima, alt. 4500 ft., *Prain.* TENASSERIM; at Moulmein, *Parish.*

Rhizome very stout; pseudobulbs 1–2 in., sessile by a broad base, subcylindric. *Leaves* 1–2, 5–7 in., coriaceous, obtuse. *Scape* 1–2 in. long; rachis stout; bracts ½ in., caducous; sepals ¼ in. long; lip obscurely 3-lobed, warted within (normally ?); column broadly obovate, tip contracted obtuse.

10. **P. rubra,** *Lindl. Gen. & Sp. Orchid.* 37; leaves elliptic-lanceolate, raceme decurved, bracts acute, sepals ovate acute 3–5-nerved, petals narrowly linear 1-nerved, lip slightly 3-lobed, side lobes broad rounded, midlobe broadly ovate acute, nerves 5 thickened at the base. *Wall. Pl. As. Rar.* iii. 21, t. 239; *Hook.f. Ic. Plant.* t. 1879. P. undulata, *Lindl. in Bot. Reg. sub.* t. 1213, and xxvii. *Misc.* 6. Cœlogyne rubra & undulata, *Walp. Ann.* vi. 238.

SUBTROPICAL HIMALAYA; Sikkim, alt. 4–6000 ft. KHASIA HILLS, alt. 4–5000 ft., *Wallich*, &c. UPPER BURMA, *Griffith* (*Kew Distrib.* 5387).

Pseudobulbs 2–3 in., on a stout rhizome, narrowed below. *Leaves* 1–2, 4–10 in., 5-nerved. *Scape* when flowering short and sheathed to the top, at length 6–10 in. and naked; raceme 4–8 in., flexuous, drooping, lax-fld.; bracts ⅓–½ in., spreading and deflexed; sepals ¼ in. long, midrib thick; column with narrower wings than in its allies, clinandrium transversely oblong. *Capsule* ⅔ in.

11. **P. micrantha,** *Hook.f. Ic. Plant.* 1891; leaves elliptic-lanceolate, raceme decurved, bracts lanceolate, sepals broadly ovate and ovate-oblong acute petals 1-nerved, lip boat-shaped subtrapezoidly ovate when spread out, gradually narrowed from the rounded side lobes into the concave 3-nerved base and ovate fleshy obtuse midlobe.

PERAK; summit of Gunong Batu Pateh, alt. 6000 ft., *Wray*.

Rhizome flexuous, scandent ?, as thick as a goose-quill, sheathed; pseudobulbs 1½–2 in., narrow, erect, parallel to the stem. *Leaves* 1–2, 1½–3 in. *Scape* with raceme 3–4 in., rachis flexuous; flowers pale pink, ⅛ in. long, trigonous. *Capsules* ¼ in.—Flower a good deal like the Javan *P. carnea*, but pseudobulb and lip very different.

37. **CALANTHE,** *Br.*

Terrestrial, often pseudobulbous. *Stem* short or tall, leafy. *Leaves* plaited. *Scape* axillary, terminal or from the side of the leafing pseudobulb; flowers small or medium-sized, racemed. *Sepals* subequal, spreading, rarely connivent. *Petals* broad or narrow. *Lip* adnate to the top or base of the column, 3-lobed, midlobe often deeply 2-fid, disk lamellate. *Column* long or short, obliquely truncate; anther conical or convex, 2-celled; pollinia 8, waxy, cohering in pairs by a granular viscus. *Capsules* drooping. —Species about 40, tropical or subtropical.

Sect. I. *Lip* at the top of the short stout column opposite to the stigmatic cavity.

* Bracts persistent. Scape usually from amongst the leaves.

† Spur 0 or minute. (See *C. gigantea* at end of genus, and *C. Mannii* in ††.)

1. **C. tricarinata,** *Lindl. in Wall. Cat.* 7339; *Gen. & Sp. Orchid.* 18; *Fol. Orchid.* 2; sepals lanceolate acuminate 7-nerved, petals nearly as broad acuminate 3-nerved, side lobes of sessile lip broadly oblong falcate, midlobe rounded or flabellate retuse or 2-fid crisped, disk with 3 large

crenulate fleshy ridges. *Walp. Ann* vi. 912. C. occidentalis, *Lindl. Fol. Orchid.* 3; *Walp. l. c.*

TEMPERATE HIMALAYA, alt. 5–9000 ft.; from Kashmir, alt. 7000 ft., *Clarke*, to Nepal, *Wallich.*

Stem 4–8 in. *Leaves* 2–3, sessile, 6–10 in., oblong, acuminate. *Scape* stout and lax-fld. raceme 12–18 in., puberulous; bracts $\frac{1}{2}$–$\frac{3}{4}$ in., shorter than the ovary; flowers 1–1$\frac{1}{2}$ in. across; sepals and petals greenish, sepals not aristate; lip brown-purple.—I can find no characters for *C. occidentalis.*

2. **C. puberula,** *Lindl. in Wall. Cat.* 7342; *Gen. & Sp. Orchid.* 352; *Fol. Orchid.* 2; lateral sepals falcately oblong aristate 5-nerved, petals very narrow 3-nerved, side lobes of sessile lip broadly oblong falcate together broader than the rhombic crenate dagger-pointed midlobe. *Walp. Ann.* vi. 912.—Bletia sp., *Griff. Ic. Pl. Asiat.* t. 313 A.

SUBTROPICAL HIMALAYA, alt. 4–6000 ft.; from Simla, *Thomson*, eastwards. KHASIA MTS., alt. 4–6000 ft., *Griffith*, &c. (*Kew Distrib.* 5274). NAGA HILLS, alt. 6500 ft., *Prain.*

Stem short or 8–10 in. *Leaves* 2–7, petioled, 6–18 in., narrow or broad, caudate. *Scape* slender and lax-fld. raceme 8–14 in., puberulous; bracts 1–1$\frac{1}{2}$ in., usually exceeding the ovary; flowers 1–1$\frac{1}{2}$ in. broad. *Capsule* $\frac{1}{2}$ in. long.

3. **C. brevicornu,** *Lindl. in Wall. Cat.* 7338; *Gen. & Sp. Orchid.* 251; *Sert. Orchid.* t. 9; *Fol. Orchid.* 3; lateral sepals ovate-oblong acute 5-nerved, petals oblong-lanceolate 3-nerved, side lobes of sessile lip falcate obtuse, midlobe clawed transversely oblong retuse crisped, disk with 3 fleshy tubercled lamellæ, spur very short conical. *Walp. Ann.* vi. 912.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 6–8000 ft., *J. D. H.*

Stem 4–8 in., stout. *Leaves* 2–3, sessile or petioled, oblong-lanceolate, acuminate. *Scape* and few-fld. raceme nearly glabrous; bracts $\frac{1}{2}$ in., as long as the puberulous pedicel and ovary; flowers $\frac{3}{4}$ in. broad; sepals not aristate and petals red-purple striped with gold; lip white and red.—Lindley's Kumaon habitat refers to *C. tricarinata.*

VAR. *Wattii*; lip with 3 small conical lamellæ on the disk of the midlobe.—Munnipore, *Watt.*

4. **C. biloba,** *Lindl. Fol. Orchid.* 3; lateral sepals broadly ovate falcate aristate 5–7-nerved, petals oblong acuminate 3-nerved, lip with a narrowly winged claw, blade very large broad deeply 2-lobed, lobes broadly hatchet-shaped or orbicular, sinus very acute with a basal apiculus, spur very short. *Walp. Ann.* vi. 912.

TEMPERATE HIMALAYA; E. Nepal and Sikkim, alt. 5–7000 ft., *J. D. H.*

Stem short. *Leaves* 8–11 in., long-petioled, broadly elliptic or oblanceolate, caudate-acuminate. *Scape* 1$\frac{1}{2}$–2$\frac{1}{2}$ ft. with the long lax-fld. raceme, puberulous; bracts 1–1$\frac{1}{2}$ in., very slender, equalling the ovary; flowers 1 in. diam.; sepals and petals pale purplish; lip as broad as the rest of the flower, pale pink, blade naked, inner angles of lobes subacute.

VAR. *obtusata*, Par. & Reichb. f. in Trans. Linn. Soc. xxx. 144; flowers larger, blade of lip with a rounded apex and 3 obscurely caruncled nerves at the base, disk yellowish.—Tenasserim, *Parish.*

VAR. *diptera*; lobes of lip divergent, axis and sides towards the base granulate.—Naga Hills, *Prain.*

VAR. *Treutleri*; quite glabrous, blade of lip lunately 2-lobed, base with a thickened transverse ridge at the claw, incurved lobes, and a deep rounded sinus.—Sikkim, alt. 6000 ft., *Treutler.*

†† Spur half as long as the sepals or longer (except *C. Mannii*).

§ *Flowers small; sepals* $\frac{1}{4}$–$\frac{1}{2}$ *in. long.* (*See also* C. veratrifolia & purpurea *in* §§.

5. **C. alismæfolia,** *Lindl. Fol. Orchid.* 8; raceme short pubescent, bracts large ovate, sepals elliptic obtuse 5-nerved, petals as broad 5-nerved, lip longer than the sepals, side lobes linear, midlobe clawed obcordate naked, base with a large yellow callus, spur slender longer than the sepals. *Walp. Ann.* vi. 918.

TROPICAL HIMALAYA; Garwhal, at Mussoori, *Falconer* (*Kew Distrib.* 1055, 1056); Sikkim Terai and low valleys, *Griffith*, &c. (*K. D.* 5276). KHASIA HILLS, *J. D. H. & T. T.*

Stems very short, from a very stout woody rhizome. *Leaves* 2–3. 4–6 in., elliptic-ovate, acuminate; petiole as long or longer, slender. *Scape* from between the leaves, 4–16 in., slender, 1-sheathed; raceme 1–4 in.; bracts $\frac{1}{2}$–$\frac{3}{4}$ in., green, recurved; buds globose; pedicels short; sepals $\frac{1}{3}$ in. long, concave, and petals white, greenish or pinkish; lip whitish or yellowish.

6. **C. diploxiphion,** *Hook. f. Ic. Plant. ined.*; raceme short pubescent, bracts large broadly ovate acuminate, sepals broadly ovate subacute 5-nerved, petals ovate obtuse, lip of two pairs of similar narrowly reniform or hatchet-shaped falcately recurved obtuse lobes, the terminal pair longest, spur very slender longer than the sepals.

PERAK; at Goping, in shady places, *King's Collector.*

Stem very short, on a stout woody rhizome. *Leaves* 2, often 18 in., long lanceolate, narrowed into a very stout ribbed petiole. *Scape* from the side of the leaves, 20 in., 5-sheathed, slender above; raceme conical; bracts $\frac{1}{2}$–$\frac{3}{4}$ in., imbricate, acuminate, green; pedicel and ovary 1–$1\frac{1}{4}$ in., slender; flowers white; lip $\frac{1}{2}$ in. long, longer than the sepals.—I have seen only one specimen; it is allied to *alismæfolia.* An unnumbered drawing of this is amongst Scortechini's Perak ones.

7. **C. angusta,** *Lindl. Fol. Orchid.* 7; scape tall many-sheathed, bracts ovate, sepals broadly ovate obtuse 5-nerved, petals broad oblong 3-nerved, side lobes of lip falcately oblong obtuse caruncled at the suture, midlobe flabellately cordate naked much longer than the sepals, lobes rounded, sinus acute, spur very slender longer than the sepals. *Walp. Ann.* vi. 916.

KHASIA MTS., alt. 3000 ft., *Lobb, Clarke.* MUNNIPORE, alt. 3500 ft., *Watt.*

Stem very short, thickened. *Leaves* sessile, lanceolate. *Scape* 6–18 in., from the side of the leafing shoot which it precedes; sheaths $\frac{1}{2}$–1 in.; raceme 1–2 in., dense-fld., puberulous; bracts $\frac{1}{2}$–$\frac{2}{3}$ in., acuminate; pedicels short; flowers white; caruncles of lip yellow.

8. **C. vaginata,** *Lindl. Fol. Orchid.* 7; scape tall very stout many-sheathed, bracts lanceolate, sepals broadly oblong tomentose 5-nerved, petals similar 3–5-nerved, side lobes of lip caruncled at the suture broadly hatchet-shaped as long and nearly as broad as the similar spreading segments of the naked midlobe, spur longer than the sepals slender and column pubescent.

ASSAM, *Jenkins.*

Scape 18 in., swollen at base and surrounded by fibrous remains of old leaves; sheaths 1–$1\frac{1}{2}$ in., obtuse or acute; raceme 2 in., dense-fld., pubescent; bracts $\frac{3}{4}$–1 in.; sepals $\frac{1}{3}$ in.; lip much longer.—Only one specimen hitherto known, without leaves.

9. **C. pachystalix,** *Reichb. f. mss.*; bracts very small, sepals ovate obtuse 3-nerved, petals linear-oblong obtuse 3-nerved, lip very short, side lobes obovate larger than the linear oblong falcate obtuse segments of the midlobe, disk with 3 caruncled nerves, spur shorter than the sepals.

WESTERN HIMALAYA, *Falconer* (*Kew Distrib.* 1054).

Leaves 12 in., sessile, linear-lanceolate, obtuse. *Scape* longer, naked, puberulous above; raceme 4 in., dense-fld.; bracts $\frac{1}{4}$ in., lanceolate, membranous; pedicels with ovary as long; sepals about $\frac{1}{4}$ in., longer than the broad lip; column very broad.—The single specimen is very imperfect, and in bud only.

10. **C. Mannii,** *Hook. f.*; bracts very small, sepals ovate-oblong obtuse 3–5-nerved pubescent, petals oblanceolate 1–3-nerved, side lobes of sessile lip rounded as broad or broader than the rounded retuse midlobe, disk with 2 tubercled ridges, spur short conical pubescent.

WESTERN HIMALAYA; Kumaon, below Ranikhet, *Duthie.* KHASIA HILLS, alt. 4000 ft., *Mann, Clarke.*

Stem very short. *Leaves* 2–3, lanceolate. *Scape* lateral, with the lax-fld. raceme 6–10 in., and flowers very pubescent; bracts membranous; flowers $\frac{1}{3}$ in. broad, drooping; sepals $\frac{1}{4}$ in. long.—The Kumaon specimens have sessile leaves 6–8 in. long; the Khasian have petioled leaves 12 by $1\frac{1}{2}$ in., and a smaller midlobe of the lip in comparison with the side lobes. This is one of the smallest-fld. species.

11. **C. Wrayi,** *Hook. f.*; bracts very short broad rigid revolute, sepals ovate acute 5-nerved, petals oblong-lanceolate acute 3-nerved, lip subequally 4-lobed, side lobes oblong spreading, tips rounded, midlobe cleft nearly to the base into two dimidiate-obovate crenulate segments, disk with conical calli, spur longer than the sepals.

PERAK, alt. 2000 ft., *Wray.*

Stem 0. *Leaves* 8–10 in., long-petioled, elliptic, acuminate, 5-nerved. *Scape* from amongst the leaves, with the long raceme $2\frac{1}{2}$ ft., slender, pubescent; raceme 3–6 in.; bracts $\frac{1}{4}$ in., $\frac{1}{2}$-amplexicaul, as broad as long, acute, twisted when dry; pedicels slender, with ovary $\frac{2}{3}$ in.; flowers white tinted with lilac; sepals about $\frac{1}{3}$ in. —Described from one specimen. Resembles a Bornean species.

Var. ? *Scortechinii*; leaves smaller subsessile, scape and raceme shorter, petals much broader 5-nerved, outer nerves branching, lobes of lip much broader.—Perak, *Scortechini.*

§§ *Flowers large; sepals* $\frac{3}{4}$–1 *in. long; petals broad* (except *Masuca*, var. *fulgens*).

12. **C. alpina,** *Hook. f. in Lindl. Fol. Orchid.* 4; raceme few-fld., bracts equalling or exceeding the decurved ovary, flowers secund, sepals ovate-oblong acuminate 5-nerved, petals elliptic-lanceolate 3-nerved, lip very short indeed suborbicular inciso-fimbriate, spur equalling the sepals stout slightly incurved. *Walp. Ann.* vi. 913.

SIKKIM HIMALAYA, alt. 9–10,000 ft., *J. D. H.*

Stem very short. *Leaves* 4–7 in., sessile, elliptic-lanceolate, acuminate. *Scape* from amongst the leaves, with raceme 6–12 in., stout, and yellowish or greenish-white inodorous flowers glabrous; bracts $\frac{1}{2}$–$\frac{3}{4}$ in., erect; perianth connivent; sepals $\frac{1}{2}$–$\frac{2}{3}$ in., apiculate; lip white striped with purple.

13. **C. Masuca,** *Lindl. in Wall. Cat.* 7337; *Gen. & Sp. Orchid.* 249; *in Bot. Reg.* 1842, *Misc.* 51; 1844, t. 37; *Fol. Orchid.* 6; leaves glabrous or nearly so, bracts large ovate-lanceolate herbaceous, sepals lanceolate acuminate 5-nerved, petals obovate or broadly oblong 3–5-nerved, side lobes of lip falcate oblong, midlobe much larger broadly or cuneately reni-

form, disk tubercled, spur longer than the sepals. *Bot. Mag.* t. 4541; *Paxt. Fl. Gard.* i. 138; *Jard. Fleuriste*, t. 62; *Walp. Ann.* vi. 915. C. versicolor, *Lindl. Sert. Orchid.* t. 42; *Bot. Reg.* 1844, *sub.* t. 37; *Fol. Orchid.* 6. C. emarginata, *Wight Ic.* t. 918; ? *Lindl. Gen. & Sp. Orchid.* 249; *Fol. Orchid.* 5. C. Wightii, *Reichb. f. in Walp. l. c.* 933. ? Amblyglottis emarginata, *Blume Bijd.* 370. Bletia Masuca, *Don Prodr.* 30. Zoduba Masuca, *Herb. Ham.*

TROPICAL HIMALAYA, from Nepal eastwards. DECCAN PENINSULA, in the Ghats of Maisor and Malabar.—DISTRIB. Java.

Stem short, stout. *Leaves* 12–18 in., subsessile or petioled, elliptic-ovate to lanceolate, glabrous or subpubescent beneath. *Scape* lateral, stout, with the lax-fld. raceme $1\frac{1}{2}$–3 ft., stout, pubescent; bracts $\frac{3}{4}$–1 in.; pedicels with ovary $1\frac{1}{4}$–$1\frac{1}{2}$ in.; flowers pale or dark purple, rarely pale rose, 2–$2\frac{1}{2}$ in. diam.; lip hardly exceeding the sepals often violet, calli yellow. *Capsule* $1\frac{1}{2}$ in.—The colour of flower and form of midlobe of lip vary much. In *C. versicolor* the perianth is white with a purple lip changing to yellow. Under *C. purpurea* (Fol. Orchid. 6) Lindley describes the leaves of *C. Masuca* as differing from those of *versicolor* in being pilose; but in his clavis of the species (p. 1) *Masuca* is described as glabrous.

VAR. *fulgens*; stem 6–8 in., leaves 12–14 by 4–5 in. at length petioled, petals narrower 3-nerved, flowers 3 in. diam., sepals almost crimson, lip deep purple. C. fulgens, *Lindl. Fol. Orchid.* 10.—Sikkim, alt. 2–4000 ft., *J. D. H.*

14. **C. purpurea,** *Lindl. Gen. & Sp. Orchid.* 2491; *in Bot. Reg.* 1844, *sub.* t. 37; *Fol. Orchid.* 6; leaves softly sparsely hairy on both surfaces, scape and few-fld. raceme tomentose, bracts ovate shorter than the long pedicels, sepals ovate or oblong-lanceolate 5–7-nerved, petals broadly oblanceolate or oblong 3–5-nerved, side lobes of lip narrow or broad, midlobe broadly or narrowly cuneately obcordate, disk warted near the base, spur very long. *Walp. Ann.* vi. 915; *Trimen Cat. Pl. Ceyl.* 88. C. Masuca, *Thw. Enum.* 308.

CEYLON; in the Ambagamowa district, alt. 2–4000 ft., *Thwaites.*

Habit and flowers of *C. Masuca*, but much smaller in all its parts, and with leaves hairy on both surfaces, small bracts, and slender spur as long as the pedicel.

15. **C. veratrifolia,** *Br. in Bot. Reg. sub. tab.* 573; leaves glabrous, bracts large ovate-lanceolate, racemes dense-fld., flowers white, sepals elliptic-obovate 5-nerved, petals broadly oblong or oblanceolate 3–5-nerved, side lobes of lip oblong obtuse, midlobe deeply divided into two linear-oblong falcately recurved segments, sinus acute, disk between the side lobes tubercled, spur slender. *Lindl. in Bot. Reg.* t. 720; *Gen. & Sp. Orchid.* 249; *Fol. Orchid.* 8; *Bot. Mag.* t. 2615; *Griff. Ic. Pl. Asiat.* t. 283, f. 4; *Walp. Ann.* vi. 917. C. comosa, *Reichb. f. in Linnæa* xix. 374. C. Perrottetii, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 68; *Wight Ic.* t. 1664; *Lindl. Fol. Orchid.* 7. Limodorum veratrifolium, *Willd. Sp. Pl.* iv. 122. ? Amblyglottis veratrifolia, *Blume Bijd.* 270. Bletia quadrifida, *Herb. Ham.* Orchis triplicata, *Willem.* (*Steud.*).

DECCAN PENINSULA, alt. 6–7000 ft., from Canara southwards. CEYLON, alt. 6–7000 ft.—DISTRIB. Malay Islands, Australia.

Habit of *C. Masuca*, with which it is easily confounded in the Herbarium, but leaves always petioled and glabrous beneath; raceme dense-fld.; flowers white, smaller but variable in size; spur more slender, equalling or exceeding the sepals; lip longer than the sepals, very variable in the size and proportion of the lobes and tubercles.—Reichb. f. refers (Walp. Ann. vi. 933) his *comosa* (which is Lindley var.

D. comosa) to *Perrottetii*, but the specimen so named by Lindley in Herb. Kew is certainly ***veratrifolia***. Thwaites has a var. *discolor* (Enum. 308), but does not define it.

16. **C. vestita,** *Lindl. in Wall. Cat.* 7345; *Gen. & Sp. Orchid.* 250; *Fol. Orchid.* 10; scape from the base of a large pseudobulb and lax-fld. cernuous raceme villous, flowers rosy white or greenish, bracts large ovate, sepals ovate-lanceolate aristate 5-nerved, petals broadly oblong 5-nerved, lip very large, side lobes cuneately obovate, midlobe flabellately deeply obcordate, sinus acute, spur very long slender involute. *Bot. Mag.* t. 4671; *Fl. des Serres*, t. 816; *Jard. Fleur.* iv. t. 333; *Paxt. Fl. Gard.* 147 (*with ic.*); *Mag.* xvi. t. 129. Cytheris Griffithii, *Wight Ic.* t. 1751–2. Preptanthe vestita, *Reichb. f. Bot. Zeit.* xvi. 128; *Walp. Ann.* vi. 460.

TENASSERIM; at Moulmein, *Wallich*, &c.—DISTRIB. Borneo.

Pseudobulb 2–5 in., ovoid, obtusely angled, leafing after flowering. *Leaves* 12–18 in., lanceolate, glabrous. *Scape* 12–18 in., stout below; sheaths few, large, acute; bracts $\frac{3}{4}$–1 in.; pedicels very slender with ovary $1\frac{1}{2}$ in.; sepals 1–$1\frac{1}{2}$ in.; petals obtuse or retuse and apiculate; lip variable, exceeding the sepals; side lobes sometimes absent.—The hybrids between this and *C. rosea*, *C. labrosa*, and others, are very numerous.

§§§ *Flowers large; sepals* $\frac{3}{4}$–1 *in. long; petals narrow.*

17. **C. chloroleuca,** *Lindl. Fol. Orchid.* 10; scape stout, bracts very small membranous, sepals ovate-lanceolate acuminate 5-nerved greenish, petals lanceolate acuminate 3-nerved yellowish, lip white, side lobes small oblong or rounded, midlobe broadly cuneately obcordate or suborbicular 2-lobed, spur stout longer than the sepals. *Walp. Ann.* vi. 920. C. galeata, *Lindl. l. c.*; *Walp. l. c.*

SIKKIM HIMALAYA, alt. 6–8000 ft., *J. D. H.*, *Treutler*.

Stem 4–6 in., stout; base pseudobulbous, sheathed. *Leaves* 6–10 in., long-petioled, elliptic, acuminate. *Scape* from amongst young leaves, 6–10 in.; bracts $\frac{1}{4}$ in., ovate-lanceolate; pedicels with ovary $\frac{1}{2}$–$\frac{3}{4}$ in., stout; sepals $\frac{2}{3}$ in. long, sometimes streaked with red; side lobes sometimes incumbent on the midlobe; spur glabrous or puberulous. *Capsule* $1\frac{1}{2}$ in.—*C. galeata* is founded on a drawing of mine, made in Sikkim, of a faded specimen with drooping flowers, and hence connivent sepals. The broad midlobe of the lip distinguishes this from *C. herbacea*.

18. **C. herbacea,** *Lindl. Fol. Orchid.* 10; bracts large oblong-lanceolate acute herbaceous, sepals oblong or oblanceolate acute and oblanceolate 3-nerved petals green, lip white, side lobes narrow falcate, midlobe deeply 2-fid, segments narrow spreading, sinus apiculate, base with 2 small yellow calli, spur longer than the sepals slender. *Walp. Ann.* vi. 920.

SIKKIM HIMALAYA, alt. 4–5000 ft., *J. D. H.*

Stem robust, sheathed. *Leaves* 8–10 in., elliptic-lanceolate, acuminate. *Scape* 12 in., from the side of the leafing stem; bracts $\frac{3}{4}$ in., green; sepals 1 in. long; lip small for the size of the flower; spur flexuous.

19. **C. Griffithii,** *Lindl. in Paxt. Fl. Gard. under* t. 31; *Fol. Orchid.* 9; bracts small lanceolate, sepals ovate-lanceolate aristate 5-nerved, petals narrowly oblanceolate 3-nerved, lip shorter than the sepals, side lobes oblong, midlobe broadly or deltoidly obcordate, disk with a solitary erect triangular lamella or callus, spur equalling or shorter than the sepals.

Walp. Ann. vi. 919. C. plantaginea, *Griff. Notul.* iii. 368; *Ic. Plant. Asiat.* t. 339 A. Calanthea, *Griff. It. Notes*, 174, No. 174.

BHOTAN HIMALAYA; at Panukka, Telagong and Chuka, alt. 6000 ft., *Griffith.*

Stem 4-6 in., sheathed. *Leaves* small during flowering, oblong, acute. *Scape* with the raceme 8–14 in., glabrous or puberulous; bracts $\frac{1}{4}$–$\frac{1}{2}$ in.; pedicels with ovary 1 in., puberulous; sepals $\frac{3}{4}$ in. long; spur straight or coiled.—The solitary large callus on the lip is characteristic, and identifies this with Griffith's *C. plantaginea.* Perianth according to Griffith greenish brown, lip ochroleucous or straw-cold.

20. **C. uncata,** *Lindl. Fol. Orchid.* 6; bracts as long as the pubescent flowers, sepals lanceolate acuminate, nerves obscure, petals oblanceolate acuminate, lip longer than the sepals, base caruncled, side lobes falcately oblong obtuse, midlobe clawed 2-fid, segments spreading, disk naked, spur uncinately incurved. *Walp. Ann.* vi. 916.

SIKKIM HIMALAYA, *Griffith's Collectors.*

Stem short, sheathed. *Leaves* broadly elliptic, petioled. *Scape* longer than the leaves; bracts $\frac{1}{2}$–$\frac{2}{3}$ in., ovate-lanceolate, lower foliaceous; sepals $\frac{1}{2}$ in. long.—Very near *C. Griffithii*, but I find no callus on the lip. I have seen only one specimen; colour of flowers unknown.

21. **C. plantaginea,** *Lindl. in Wall. Cat.* 7346; *Gen. & Sp. Orchid.* 250; *Sert. Orchid.* t. 24; *Fol. Orchid.* 9; bracts small lanceolate, sepals ovate-lanceolate 3–5-nerved, petals oblanceolate acuminate 3-nerved, side lobes of lip cuneate-obovate, midlobe cuneately obovate subtruncate apiculate, spur very slender longer than the sepals. *Walp. Ann.* vi. 920.

TEMPERATE WESTERN HIMALAYA, from Garwhal, alt. 9000 ft., *Royle*, &c., to Nepal. BHOTAN, alt. 7–7500 ft., *Griffith.*

Stem 3–10 in.; sheaths long, tubular. *Leaves* 8–12 in., petioled, elliptic-lanceolate. *Scape* with raceme 6–16 in., puberulous; bracts $\frac{1}{6}$–$\frac{1}{4}$ in.; pedicels with ovary 1–1$\frac{1}{2}$ in., slender, puberulous; flowers white or pale lilac; sepals $\frac{3}{4}$ in., glabrous; lip longer than the sepals, with 3 small basal lamellæ.

22. **C. odora,** *Griff. Notul.* iii. 365; raceme dense-fld. radical, bracts foliaceous equalling the pubescent ovaries, flowers (before the leaves) large white smelling strongly of hyacinths, sepals ovate or oblong-ovate mucronate, petals much narrower spathulate-lanceolate mucronate, lip adnate to the column, side lobes obliquely oblong, midlobe broadly deeply obcordate white or cream-coloured, base with erect yellow lobed calli, spur one-third longer than the ovary filiform, lip unequally 2-lobed pubescent without and within. *Lindl. Fol. Orchid.* 11.

UPPER ASSAM; at Suddya, *Griffith.*

I have seen no specimens; it is, no doubt, near *C. plantaginea.*

23. **C. elytroglossa,** *Reichb. f. mss.*; scape and raceme pubescent, bracts large green, pedicels very long, sepals oblanceolate acute green, nerves obscure, petals narrowly oblanceolate 1-nerved, side lobes of lip ovate obtuse caruncled at the suture, midlobe broadly cuneately cordate from a narrow base, lobes subfalcate, spur much longer than the sepals.

SIKKIM HIMALAYA, alt. 6–8000 ft., *Treutler*, *Clarke.*

Stem very short. *Leaves* 6–10 in., petioled, elliptic ovate or lanceolate. *Scape* from amongst the leaves with the raceme 2–3 ft.; bracts $\frac{3}{4}$–1 in., acute; pedicels with ovary 1–1$\frac{1}{2}$ in.; flower 1$\frac{1}{2}$ in. diam., fleshy; sepals and petals green or yellow; lip white; spur 1 in., slender.—The long pedicels are characteristic.

** *Bracts* caducous as the raceme elongates, equalling or exceeding the flowers. *Scape* shorter than the leaves. *Flowers* black when dried.

24. **C. curculigoides,** *Wall. Cat.* 7340; scape and dense-fld. cylindric raceme glabrous, sheaths inflated, bracts equalling the ochreous or orange flowers, lip subhastate, side lobes small obtuse, midlobe subpanduriform, tip dilated acute, spur short stout, tip hooked. *Lindl. Gen. & Sp. Orchid.* 251; *in Bot. Reg.* 1847, t. 8; *Fol. Orchid.* 4; *Bot. Mag.* t. 6104; *Walp. Ann.* i. 792, vi. 913. Styloglossum nervosum, *Kuhl & Hassk. in Herb. Lindl.*; *Breda Orch. Jav.* t. 10. ? C. pulchra, *Lindl. Gen. & Sp. Orchid.* 250. Amblyglottis pulchra, *Blume Bijd.* 371.

MALAY PENINSULA; Malacca, Perak, Penang and Singapore, *Wallich, Griffith, Maingay* (*Kew Distrib.* 1659), &c.—DISTRIB. Java.

Stem 0. *Leaves* 1–2 ft., linear-lanceolate, petioled. *Scape* from the side of the leafing stem, 6–18 in., stout or slender; raceme 2–10 in.; pedicel and ovary $\frac{1}{3}$ in.; flower rather longer, perianth connivent; sepals oblong, subacute.

25. **C. Foerstermanni,** *Reichb. f. in Gard. Chron.* 1883, i. 814; "raceme cylindric dense-fld., bracts about equalling the yellow flowers, midlobe of whitish-yellow lip obreniform apiculate, spur clavate half the length of the pedicelled ovary."

EASTERN BURMA, *Foerstermann.*

I have seen no specimens of this species, which is evidently very near *C. curculigoides.*

26. **C. clavata,** *Lindl. in Wall. Cat.* 7343; *Gen. & Sp. Orchid.* 251; *Fol. Orchid.* 5; scape loosely sheathed, bracts much longer than the yellow flowers, sepals oblong acuminate, petals broad, lip short broad, base rounded, side lobes small, midlobe suborbicular emarginate, base with 2 triangular lamellæ, spur clavate as long as the ovary. *Walp. Ann.* vi. 914.

SIKKIM HIMALAYA, alt. 4000 ft., *J. D. H.* KHASIA HILLS, *Wallich, Griffith* (*Kew Distrib.* 5272, 5391, 5392). ASSAM and UPPER BURMA, *Griffith.*

Rhizome creeping; stem 4–8 in.; sheaths long. *Leaves* 1–2 ft., long-petioled, narrowly lanceolate; nerves strong. *Scape* lateral, 10–20 in., stout or slender; young raceme crinite with bracts which are $1\frac{1}{2}$ in. long; pedicels $\frac{1}{4}$ in., very slender; sepals $\frac{1}{3}$ in.; lip very variable. *Capsule* $\frac{1}{2}$ in., pendulous.

27. **C. angustifolia,** *Lindl. Gen. & Sp. Orchid.* 251; *Fol. Orchid.* 5; scape slender, sheaths appressed, raceme short many-fld., flowers white with a yellow centre, sepals oblong acute, petals very broad, lip as broad as long subequally 4-lobed, midlobe retuse apiculate, base with 2 triangular lamellæ, spur clavate equalling the sepals. C. phajoides, *Reichb. f. in Bonpland.* v. (1857) 37; *Xen. Orchid.* i. 207, t. 19. ? Amblyglottis angustifolia, *Blume Bijd.* 369. Limodorum striatum, *Reinwardt mss.*

PERAK, alt. 5–7000 ft., *Scortechini*, &c.—DISTRIB. Java.

Stem very short or 0. *Leaves* 1–2 ft., petioled, narrowly lanceolate. *Scape* basal, 6–10 in.; bracts not seen; pedicels very slender, with ovary $\frac{1}{2}$ in.; sepals $\frac{1}{3}$ in. long, 3–5-nerved; petals broader, 5-nerved, outer nerves branched. *Capsule* $\frac{3}{4}$ in., pendulous.—Near *C. clavata*, but stemless, with differently coloured flowers and different lip.

28. **C. Scortechinii,** *Hook. f.*; scape with large loose sheaths, raceme short, sepals broadly obovate-oblong aristate, petals as broad aristate 3-nerved, lip small short, side lobes very small obtuse, midlobe

deltoidly cordate retuse apiculate, base with 2 triangular lamellæ, top of column clavate, spur more or less clavate about as long as the sepals or shorter.

PERAK, *Scortechini*.

Leaf 2 ft. 6 in., long-petioled, narrowly lanceolate. *Scape* 12 in.; sheaths 1½–2 in.; pedicels slender, with ovary 1 in.; sepals ½ in., 3–5-nerved; petals 3-nerved, nerves faint, outer branching; top of column (above the lip), unlike that of other species, produced backwards, rostellum very long.—I have seen but one specimen.

Sect. II. *Lip* inserted at the base of the column, which is not embraced by its side lobes. *Bracts* very long, slender, caducous. *Scape* always shorter than the leaves.

29. **C. densiflora,** *Lindl. in Wall. Cat.* 7344; *Gen. & Sp. Orchid.* 250; *in Bot. Reg.* t. 1646; *Fol. Orchid.* 9; scape radical, sheaths inflated, raceme short dense-fld., bracts lanceolate much exceeding the yellow flowers, sepals oblong acute, petals as broad, lip broadly oblong, base rounded, side lobes small, midlobe small sessile emarginate, spur cylindric. *Knowles & West Flor. Cab.* t. 23; *Walp. Ann.* vi. 919.

SIKKIM HIMALAYA, alt. 5–6000 ft., *Treutler*, &c. KHASIA HILLS, alt. 4–5000 ft., common.

Rhizome short, stout. *Leaves* 8–10 in., narrowly lanceolate; petiole as long, slender. *Scape* 4–8 in.; raceme subglobose; bracts 1¼ in., membranous; pedicels slender, with the ovary ½–¾ in.; perianth connivent; sepals ¾ in.; petals 3-nerved; lip as long as the sepals, base with 2 large triangular lamellæ, column arched. *Capsule* ⅔ in., turgidly ellipsoid.—Habit and spur of *C. clavata* with lip of *gracilis*.

30. **C. tubifera,** *Hook. f.*; stem tall, internodes long, sheaths cylindric, leaves many distichous alternate narrow, scape lateral, sheaths inflated, raceme pubescent lax-fld., lip as in *C. densiflora*, spur 0.

UPPER BURMA, *Griffith*.

Stem 15 in., about as thick as the middle finger; internodes loosely clothed with tubular sheaths 3–4 in. long. *Leaves* many, 6–14 in., sessile, linear-lanceolate. *Scape* 12 in.; raceme 6 in.; bracts not seen; sepals ¾ in. long, lanceolate, acuminate; petals subsimilar; lip as long, twice as long as the column, without lamellæ, lateral nerves divergent crested, midlobe crisped.—Allied to *C. gracilis*, but much larger, with flowers twice as large and pubescent.

31. **C. gracilis,** *Lindl. in Wall. Cat.* 7341; *Gen. & Sp. Orchid.* 251; stem tall, internodes long cylindric, scape very slender, raceme laxly many-fld., bracts linear much exceeding the puberulous flowers hair-pointed, lip with 2 velvety basal patches, lateral nerves narrowly lamellate, spur 0. *Bot. Mag.* t. 4714; *Griff. Notul.* iii. 367; *Walp. Ann.* vi. 922. Limatodes gracilis, *Lindl. Fol. Orchid.* 1.

KHASIA HILLS, alt. 3–4000 ft., *Wallich*, &c.—DISTRIB. China.

Stems 12–18 in., tufted; sheaths 2–3 in. *Leaves* many, subterminal, 6–12 in., ovate or lanceolate, decurved. *Scape* lateral, 8–14 in.; bracts 1 in., very slender, membranous; flowers greenish yellow; sepals ½–⅔ in. and petals linear, acute, recurved; lip yellow; side lobes incurved; midlobe crisped; column short, white, base tumid in front.

Sect. III. *Lip* inserted at the top of the broad short column, its side lobes convolute and embracing the column.

32. **C. rosea,** *Benth. in Gen. Plant.* iii. 521; scape from the base of a large pseudobulb and many-fld. raceme villous, bracts ovate-lanceolate persistent, flowers large rosy, lip with narrow convolute side lobes and a large obovate oblong entire spreading midlobe, spur slender shorter than the sepals. Limatodes rosea, *Lindl. in Paxt. Fl. Gard.* t. 81; *Fol. Orchid.* 1; *Bot. Mag.* t. 5312; *Walp. Ann.* vi. 921.

TENASSERIM; at Moulmein, *Parish.*

Pseudobulbs 4–8 in., obpyriform or fusiform, acutely keeled and grooved, leafing after flowering. *Leaves* 8–18 in., elliptic-lanceolate, acuminate. *Scape* 12–18 in., slender; pedicel and ovary $1\frac{1}{2}$ in.; bracts $\frac{1}{2}$–1 in., green; flowers $1\frac{1}{2}$ in. across; sepals ovate-lanceolate; petals oblong, acute; lip $1\frac{1}{2}$ in. long, base yellow edged with scarlet; spur shorter, villous; column very short, pubescent.—In many respects allied to *C. vestita*, with which it hybridizes.

33. **C. labrosa,** *Hook. f.*; habit, foliage and inflorescence of *C. rosea*, but sepals yellow without, purplish within, as are the petals, lip flabelliform from a cuneate base retuse crisped pale purple with darker purple spots at the base, and spur longer than the sepals. Limatodes labrosa, *Reichb. f. in Gard. Chron.* 1879, i. 202.

TENASSERIM; at Moulmein (*Hort. Veitch*).

I have seen only a portion of a raceme.

DOUBTFUL SPECIES AND SPECIES OF DOUBTFUL POSITION.

34. **C. gigantea,** *Hook. f.*; stem tall, leaves alternate distichous, scape basal very tall and stout, raceme long puberulous very many-fld., bracts short $\frac{1}{2}$-amplexicaul rigid revolute, flowers coriaceous, sepals and petals linear-lanceolate falcate caudate-acuminate, lip very small fleshy sessile opposite the stigma of the pubescent column quadrate truncate apiculate puberulous, side lobes mere coriaceous auricles, spur obsolete.

PERAK; in dense jungles, *King's Collector, Wray.*

Stem 2 ft., as thick as the middle finger. *Leaves* 6–10 in., sessile, lanceolate, acuminate. *Scape* with raceme 3–4 ft., as thick as the stem; bracts very broad with subulate tips; pedicels very short; flowers 1 in. diam., pubescent, yellow spotted with crimson; sepals spreading, many-nerved; petals narrower; sides of lip decurrent on the short almost hispid column; anther hispid, 4-celled; pollinia 8, each group of 4 consists of 2 large subhemispheric placed face to face, and 2 very much smaller, all attached to one viscus.—A remarkable plant, black when dry.

C. CARINATA, *Lindl. Gen. & Sp. Orchid.* 183 (not taken up in Fol. Orchid.), is founded on Willdenow's *Limodorum carinatum*, and that again on Rheede's xii. t. 26, which is possibly *C. nutans*, L.

C. SULPHUREA and C. TRICOLOR, *Hort. Huegel*, in *Heyne Nomencl.* ii. 105, are names only.

38. ARUNDINA, *Blume.*

Terrestrial erect herbs with rigid terete sheathed simple stems, and narrow grassy distichous leaves. *Flowers* large, red, in terminal erect stiff simple or branched racemes or panicles. *Sepals* free, spreading, lanceolate, acuminate, flat, many-nerved. *Petals* broader, many-nerved. *Lip* large, broad, sessile on the base of the column and embracing it. *Column* long, slender, narrowly winged; foot 0. *Anther-cells* 2, pollinia 8 in compressed superposed pairs cohering by a viscus.—Species 6–8, Indian, Malayan and Chinese.

Sect. I. EUARUNDINA. *Raceme* simple or sparingly branched; bracts small, broadly ovate, acute, persistent. *Lip* very variable but always large, oblong, broad, subentire or with obscure side lobes, a small crisped terminal lobe and 2 or more lamellate nerves at the base.

1. **A. bambusifolia,** *Lindl. in Wall. Cat.* 3751; *Gen. & Sp. Orchid.* 125; *in Bot. Reg.* xxvii., *Misc.* 2; *in Journ. Linn. Soc.* iii. 22; leaves 8–12 by $\frac{2}{3}$–1 in., raceme 6–12 in., sepals 1–$1\frac{1}{2}$ in., petals orbicular-obovate apiculate, side lobes of lip short or 0, midlobe small 2-fid crisped, disk with 3 lamellate nerves. *Wight Ic.* t. 1661; *Griff. Notul.* iii. 329, 331; *Ic. Pl. Asiat.* t. 314; *Walp. Ann.* vi. 457. Cymbidium bambusifolium, *Roxb. Fl. Ind.* iii. 460. Bletia graminifolia, *Don Prodr.* 29. Limodorum graminifolium, *Ham. mss.*

TROPICAL HIMALAYA, from Nepal eastwards. ASSAM and the KHASIA MTS. to Munnipore and Chittagong. MALABAR, *fid. Wight.*—DISTRIB. Java.

Stem 5–7 ft., sometimes as thick as the thumb below. *Raceme* stout, simple or laxly panicled; bracts $\frac{1}{4}$ in., broad, coriaceous, subacute. *Lip* brighter red than the sepals. *Capsule* decurved, 2–$2\frac{1}{2}$ in.—Griffith at p. 331 describes the petals and sepals as white, at p. 329 as flesh-cold. Lindley errs in describing the petals as lanceolate, and Wight in giving Ceylon as the locality for his drawing, which is from a specimen in his Herbarium marked "Assam, *Griffith.*"

2. **A. densiflora,** *Lindl. in Bot. Reg.* xxviii. t. 38, *Misc.* 26; *in Journ. Linn. Soc.* iii. 23; leaves 6–10 by $\frac{1}{3}$–$\frac{1}{2}$ in., raceme very short, flowers as in *bambusifolia*, but midlobe of lip very obscure. *Walp. Ann.* vi. 456. ? A. speciosa, *Blume Bijd.* 401, t. 73; *Lindl. in Journ. Linn. Soc. l. c.*

PERAK, SINGAPORE and MALACCA; on Mount Ophir, *Maingay*, &c. (*Kew Distrib.* 1635, *A. speciosa*).

A more slender plant than *A. bambusifolia*, with a shorter raceme; but I doubt its specific difference. Perhaps the *A. speciosa*, Bl., but the petals are not lanceolate.

3. **A. chinensis,** *Blume Bijd.* 502; stem 8–12 in., leaves 4–7 by $\frac{1}{4}$–$\frac{1}{3}$ in. spreading and recurved, racemes 1–3 in. few-fld. simple, sepals $\frac{3}{4}$–$1\frac{1}{2}$ in., petals ovate-oblong, lip yellow in the middle. *Hook. & Arn. Bot. Beech. Voy.* 217; *Lindl. in Hook. Kew Journ. Bot.* vii. (1855) 34; *Benth. Fl. Hongk.* 355; *Walp. Ann.* vi. 457. A. affinis, *Griff. Notul.* iii. 330; *Ic. Pl. Asiat.* t. 351 A, f. 28 (anther); *Lindl. in Journ. Linn. Soc.* iii. 22; *Walp. l. c.*

SIKKIM HIMALAYA, on the outer hills, *J. D. H.* KHASIA HILLS; in grassy places, alt. 3–5000 ft., common, *Griffith* (*Kew Distrib.* 5195, 6796), &c.—DISTRIB. China.

Apparently identical with the Chinese plant, and distinguished from *A. bambusifolia* by the small size and yellow on the lip. Lindley says it has only 2 ragged lameliæ on the lip instead of the 5 of the former plant, but I find 5 thickened and lamellate nerves. The raceme is rarely 7-fld., the flowers extremely variable in size. Griffith doubts its specific difference, but if so, all the Indian species (except sect. *Dilochia*) should be united, in which I might concur.

4. **A. minor,** *Lindl. Gen. & Sp. Orchid.* 125; stem 8–12 in., leaves 2–5 by $\frac{1}{6}$–$\frac{1}{4}$ in. erect strict, raceme long peduncled few-fld., sepals and petals as in *A. chinensis*, but smaller.

CEYLON; in the Central district, ascending to 4000 ft., not uncommon.

This differs from *A. chinensis* in the shorter suberect strict leaves that are acuminate or subacute with an apiculus and smaller flowers. *Capsule* 1–1½ in.

5. **A. revoluta,** *Hook. f.*; leaves 4–7 by $\frac{1}{6}$–$\frac{1}{4}$ in. recurved, margins strongly revolute, sepals and petals white, tips light red, lip yellow within, wings purple, tip blue.

PERAK; on rocks in streams, *Scortechini, Wray, King's Collector.*

Very distinct-looking; about the size of *A. minor*, but the leaves are longer, much narrower, and the capsule only $\frac{3}{4}$–1 in. long.

Sect. II. DILOCHIA. *Raceme* or *panicle* branched. *Bracts* large, deciduous. *Anthers* 3.

6. **A. Wallichii,** *Reichb. f. Xen. Orchid.* ii. 13, t. 105, f. 13–15; leaves elliptic-lanceolate long-acuminate, branches of panicle few erect very stout, lip with 3 ridges, anthers 3. Dilochia Wallichii, *Lindl. Gen. & Sp. Orchid.* 38; *Wall. Cat.* 1952; *Blume Orchid. Archip. Ind.* t. 8 and t. 5 A.

SINGAPORE, *Wallich.*—DISTRIB. Borneo.

Stem 2 ft., pendulous. *Leaves* 4–6 by $1\frac{1}{2}$–2 in., base contracted. *Panicle* branched from the base, branches 6–8 in.; bracts 1 in., oblong, cymbiform, acute; sepals and petals 1 in., linear-oblong, obtuse, dull yellow; lip oblong, white with a red disk. *Capsules* $\frac{2}{3}$ in. long, ellipsoid, beaked.

7. **A. Cantleyi,** *Hook. f. Ic. Plant. ined.*; leaves ovate or ovate-lanceolate long-acuminate, branches of decurved panicle many divaricate, lip with 5 crenate ridges.

PERAK; on Gunong Batu, alt. 4500–5400 ft., *Cantley, Wray.*

Stem as in *A. Wallichii.* *Leaves* 3 by 1 in., base rounded. *Panicle* very many-fld.; bracts $\frac{1}{3}$–$\frac{1}{2}$ in., orbicular, subacute, saccate; flowers pale yellow pencilled with crimson; sepals $\frac{2}{3}$ in. long; lip cuneate with a flabelliform midlobe.—Bears a certain resemblance to *Eria Scortechinii.* There were, I think, 3 anthers, but they have fallen away.

The Addenda and Corrigenda to the *Orchideæ*, with a revision of the Key to the Genera, will be placed at the end of the Order in Vol. VI.

ADDITIONS AND CORRECTIONS, VOL. V.

P. 102. MYRISTICA.—Since the publication of the Indian species of this genus in 1886, a good many additional specimens have been received, including twelve species from Singapore, collected by the late Mr. Cantley. Most of them are known species, but the following two are such remarkable novelties, that though I am unable to refer them to their sections of the genus, I think it desirable to make them known.

M. PENDULINA, *Hook. f.*; branchlets very long and young leaves beneath and panicles finely rusty-tomentose, leaves 10–14 by 2–3 in. close-set subsessile pendulous linear acuminate, nerves 30–50 pairs, fem. panicles 3–4 in. very robust, flowers shortly stoutly pedicelled $\frac{1}{4}$ in. long ellipsoid glabrous shortly 2-fid, ovary ovoid glabrous, stigma terminal minute sessile.

SINGAPORE, *Cantley*.

A tree; branches spreading, 15 ft. long, as thick as the fore-finger at the base, slender towards the tip, clothed throughout with crowded leaves; bark black when dry, except at the tips. *Leaves* rather coriaceous, old glabrous beneath, base cuneate or rounded, narrowed into a very short broad petiole. *Fem. fl.* thickly coriaceous, ebracteate.—This very remarkable species resembles in the leaf *M. sylvestris*, Houtt., of Ternate, but the nerves are far more numerous.

M. SPHÆRULA, *Hook. f.*; branches slender furrowed, tips and leaf-nerves beneath and inflorescence and fruit very finely tawny-tomentose, leaves 3–5 by $\frac{2}{3}$–$1\frac{1}{4}$ in. petioled narrowly linear-oblong acuminate subsilvery glaucous beneath with 10–16 pairs of very slender nerves, female fl. shortly pedicelled racemose on short very stout rugosely scarred simple peduncles urceolate 3-fid, ovary broadly ovoid silky narrowed into a short style with a lacerate stigma, fruit small spherical.

MALACCA, *Cantley*.

A tree, 20 ft. high. *Leaves* thinly coriaceous, shining above, midrib and nerves beneath reddish, base acute; petiole slender, $\frac{1}{3}$–$\frac{1}{2}$ in. *Flowering peduncles* numerous, axillary, and on the branches $\frac{1}{2}$–$\frac{3}{4}$ in. long, $\frac{1}{8}$ in. diam., straight, closely scarred from the base to the tip (as if continuously growing and flowering at the tips). *Fem. fl.* $\frac{1}{6}$ in. long; pedicels as long. *Fruit* exactly globose, about $\frac{1}{2}$ in. diam., apiculate.—Native name, Chindarah Padi.

P. 136. MACHILUS.

The loan from Dr. King of the rich collection of *Machili* in the Herbarium of the Royal Gardens, Calcutta, enables me to define better many of the species of this very perplexing genus. It leaves, however, more than it accomplishes towards finally discriminating the Indian species.

* Fruit oblong or ellipsoid. Flower quite glabrous.

1. M. ODORATISSIMA, Nees in part (p. 139); branchlets and young leaves beneath glabrous or slightly silky, leaves 4–6 in. elliptic-lanceolate impressed punctate, nerves 7–13 pairs, panicles shorter than the leaves and flowers and filaments quite glabrous, fruit $\frac{1}{2}$–$\frac{3}{4}$ in. long.

TEMPERATE HIMALAYA from Kashmir and Hazara eastwards, alt. 5–7000 ft., to Bhotan, ascending to 8000 ft. in Sikkim. KHASIA MTS., alt. 5–6000 ft. MARTABAN, alt. 3–7000 ft., *Kurz*.

Of Wallich's *Laurus odoratissima* (Cat. 2607), as described by Nees under *Machilus* (Plant. As. Rar. ii. 70), letter A, from Nepal is in bud only. The panicle and buds are silkily pubescent, and it is possibly a large-leaved form of *M. bombycina*. B from Chercoolie in the Deyra Dhoun (Kumaon), with perfectly glabrous panicle and old flowers and oblong fruit, is what I believe Wallich intended for

odoratissima; it is very sweet-scented both in leaf and flower, and is the plant so called by Brandis and accepted by the Forest department. C, the *L. Champa*, Herb. Ham., from Rungpore and Patgong with globose small fruit, and D? from Goalpara, are all the cultivated *M. bombycina*, King, and E? from Silhet with a silky perianth and long glaucous leaves is probably *M. Kurzii*, King. F, said to be from Singapore, is unquestionably the same as B, and the habitat is almost certainly erroneous. Meissner's *M. odoratissima* is an even greater mixture than Nees', and not worth unravelling, the specimens described being almost uniformly without fruit. Loureiro's *L. indica*, cited by both the above authors, is probably *M. rimosa*, Kurz. Kurz's *M. indica* with oblong fruit and glabrous panicles is, no doubt, *M. odoratissima*, as is Brandis' plant of the latter name, and Strachey and Winterbottom's *Ocotea ligustrina*. Gamble's is a mixture of plants from the plains up to 8000 ft. Blume's *M. odoratissima* may be anything.

2. M. PARVIFLORA, *Meissn.* (p. 137); branchlets and young leaves glabrous or faintly silky, leaves linear-lanceolate or oblanceolate often large 6–10 in. quite glabrous and very glaucous blue beneath with 6–10 pairs of distant nerves, panicles and small flowers quite glabrous, filaments short broad, fruit $\frac{3}{4}$ in. long.

KHASIA, and Duphla Hills, in ASSAM, alt. 4000 ft., common.

** Fruit globose or nearly so. Flowers silky tomentose or pubescent in all but *M. Gammieana*.

† *Young leaves villously pubescent or tomentose beneath.*

3. M. VILLOSA, *Hook. f.* (p. 140); nerves of leaf 6–8 pairs very strong, panicle long-peduncled, flowers about $\frac{1}{6}$ in. diam., sepals short ovate obtuse, fruit young $\frac{1}{3}$ in. diam.

NEPAL, *Wallich* (*in Herb. Hook.*). SIKKIM HIMALAYA, ascending to 6000 ft. GARROW, KHASIA, and PATKOYE HILLS.

Nees' *Phœbe glaucescens* may be a mixture of this and *M. macrantha*. There is no corresponding Nepal specimen in Wallich's Herb. to that in Herb. Hook., which was received about 1822.

4. M. EDULIS, *King* (p. 138). I have nothing to add to the description.

†† *Young leaves glabrous or finely silky beneath.*

5. M. GAMMIEANA, *King* (p. 137), and M. CLARKEANA, *King* (p. 137), seem to be one species; the leaves attain 10 in., glaucous beneath with many faint nerves beneath; flowers quite glabrous; the filaments are glabrous or hairy. The flowering specimens with few-nerved leaves sent with the fruiting and referred to at the end of the description of *M. Gammieana*, were those of *Phœbe lanceolata*. The quite glabrous flowers distinguish this from *M. Duthiei*.

6. M. LISTERI, *King* (p. 138). Two plants were here mixed. The true *M. Listeri* (to the description of which I have nothing to add) has cuneately obovate leaves glaucous and puberulous beneath with 10–12 pairs of parallel nerves, a short (immature) hoary panicle, and fruit 1 in. diam.; young leaves unknown. The Narainpore specimens certainly belonged to *M. Gamblei*.

7. M. GAMBLEI, *King mss.*; shoots and young leaves beneath finely silky, leaves 3–6 in. obovate or oblanceolate quite glabrous beneath impressed punctate on both surfaces, nerves 8–10 pairs very slender, sepals silky on both surfaces, filaments glabrate, fruit globose $\frac{1}{4}$–$\frac{1}{2}$ in. diam.

NEPAL, *Wallich*. SIKKIM HIMALAYA, ascending to 7000 ft. ASSAM and the DUPHLA HILLS.

The Assam specimens have more slender panicles, and more resemble *M. bombycina*, but the leaves are glabrous beneath.

8. M. KURZII, *King mss.*; shoots and young leaves glabrous, leaves 3–5 in. as in *M. Gamblei*, but more glaucous with 10–12 pairs of very indistinct nerves beneath, panicle subsilkily tomentose, sepals linear-oblong silky on both surfaces, filaments nearly glabrous, fruit $\frac{1}{2}$ in. diam.

SIKKIM HIMALAYA, alt. 6–9000 ft. (a large tree), *King*, *Kurz*, *Clarke*, &c. ? UPPER BURMA, at Lamoom, *Griffith*.

9. M. BOMBYCINA, *King mss.*; altogether like *M. Gamblei*, but with the leaves more or less finely pubescent beneath and hairy along the midrib, fruit $\frac{1}{4}$ in. diam. M. odoratissima, *Wall. Cat.* 2607 D. Laurus Champa, and L. bombycina, *Herb. Ham.*

Cultivated in the ASSAM VALLEY and along the LOWER HIMALAYA, as far west as Nepal, for silkworm-feeding. The Soom-tree of Upper Assam (*Mann*). Perhaps a cultivated form of *M. Gamblei* or *Kurzii*, or all forms of one.

10. M. DUTHIEI, *King mss.*; branches and young leaves glabrous or very finely silky, leaves 5–10 in. oblanceolate or elliptic-lanceolate very coriaceous 12-20-nerved pale and glaucous beneath, petiole $\frac{1}{2}$–1 in., flowers large $\frac{1}{3}$ in. diam., sepals linear-oblong finely silky, filaments glabrous, fruit globose $\frac{1}{2}$ in. diam. in often elongate drooping panicles with thickened pedicels.

WESTERN HIMALAYA; from Chamba, alt. 6000 ft., *Thomson*, to Kunawur, alt. 7000 ft.; Simla, 5000 ft., *Brandis, Madden*; Kumaon, alt. 2000 ft., *Strachey & Winterbottom*. ? SIKKIM, alt. 4–5000 ft., and KHASIA MTS., *J. D. H.*, &c. (without fl. or frt.).

11. M. FRUTICOSA, *Kurz* (p. 140); leaves (young not seen) thickly coriaceous glabrous, nerves 10–12 pairs very slender, petiole $\frac{1}{4}$–$\frac{1}{2}$ in., panicle long-peduncled hoary, flowers small $\frac{1}{6}$ in. diam. hoary, filaments glabrous, "fruit pisiform, pedicel elongate thickened," *Kurz*.

TENASSERIM and MARTABAN, alt. 4000 ft., *Griffith, Helfer*, &c.

12. M. MACRANTHA, *Nees* (p. 140); leaves glabrous, nerves 10–12 pairs, petiole 1–1$\frac{1}{2}$ in., panicle long- or short-peduncled hoary, flowers small $\frac{1}{8}$–$\frac{1}{4}$ in. diam., sepals tomentose, filaments villous, fruit $\frac{1}{2}$–$\frac{3}{4}$ in. diam.

DECCAN PENINSULA; on the Ghats, ascending to 6000 ft. from the Concan southwards.

The specific name is inappropriate. In Herb. Calcutta are specimens of what may be a different species from the Anamallay Hills in Travancore, with smaller more obovate shorter-petioled very coriaceous leaves and short panicles.

Species of which the fruit is unknown.

M. BOOTANICA, *Meissn.* (p. 138). I have nothing to add to the description of this very distinct plant.

M. ? KHASYANA, *Meissn.* (p. 137). This also is a very distinct plant, with leaves sometimes 11 in. long, of a thin texture, very blue beneath, and with a rusty-brown pubescence. (It may not be a *Machilus*.)

M. SERICEA, *Blume* (p. 139). The materials in the Calcutta Herbarium do not help to clear up this species, which had, perhaps, better be suppressed.

Under *L. sericea*, No. 2606 (in Herb. Hook. only) are specimens with white bark on the branches, and I collected apparently the same in Sikkim; the young leaves are perfectly glabrous, as are the branches of the panicle, leaves 3–5 in. elliptic, deeply punctate, flowers $\frac{1}{3}$ in. diam., sepals oblong, silky on both surfaces, filaments glabrous. It approaches *M. Gammieana*, which has sometimes white bark, but the flowers are much smaller.

M. KINGII, *Hook. f.* A small tree common in the Khasia at 4–5000 ft. elevation with very small leaf-buds, glabrous shoots and young leaves, leaves small 3–4 in. elliptic-lanceolate or oblanceolate coriaceous pale and closely punctate above with a deeply depressed costa, glaucous beneath with 8–10 pairs of very slender diverging nerves, petiole $\frac{1}{2}$–1 in., panicle slender sparsely puberulous, flowers $\frac{1}{3}$ in. diam., sepals appressed-pubescent on both surfaces, filaments nearly glabrous.

M. RIMOSA, *Blume Mus. Bot.* i. 330? (*DC. Prodr.* xv. i. 42). Specimens of one or more species closely resembling this, but having neither mature flowers nor fruit, are in the Kew Herbarium from Burma, *Griffith*, and Chela in the Khasia Mts., *Clarke*. The branches are stout and very young leaves glabrous, leaves

5–7 in. broad and usually large, elliptic or obovate with few (8–10) strong arched nerves beneath. Meissner (in DC. l. c.) refers to this species a very much smaller-leaved plant of Lobb's from Moulmein. The identification of any of these with the Javanese *M. rimosa*, the fruit of which is undescribed, is mere guess-work. Meissner's *rimosa* from Moulmein, *Lobb*, is probably *M. fruticosa*. Javan specimens in Herb. Hook. are named *M. Madang* and *M. odoratissima* ϵ. *latifolia* by Miquel, who unites *rimosa* with *odoratissima*.

M. PUBESCENS, *Blume Mus. Bot.* i. 330; *Meissn. in DC. Prodr.* xv. i. 40. This is unrecognizable by description.

M. *sp.* ?, Penang, *Curtis*, No. 942, is a small plant with glabrous young leaves, the old leaves 3–4 in. elliptic-lanceolate above finely reticulate beneath glaucous, nerves 10–12 pairs very slender, petiole very slender, panicle slender nearly glabrous, few-fld., flowers $\frac{1}{6}$ in. diam., sepals short nearly glabrous as are the filaments.

P. 116. After 5. *Endiandra* insert—

Perfect stamens 6; anthers 2-celled	5/1. MICROPORA.

P. 127. Before 6. *Syndiclis* insert—

5/1. MICROPORA, *Hook. f.*

A tree; branches slender. *Leaves* elliptic-oblong, acute. *Flowers* small, hermaphrodite, in slender axillary few-fld. racemes or panicles. *Perianth* very short, lobes 6 orbicular. *Stamens* 6, exserted, eglandular; anthers thick, sessile, subquadrate, 2-celled, tomentose, cells opening by minute pores; staminodes very short, thick, tomentose, opposite the stamens. *Ovary* ovoid, sessile, quite smooth, narrowed into a very short style; stigma minute.

M. CURTISII, *Hook. f. Ic. Plant.* t. 1547. Hexapora Curtisii, *p.* 189 *of this volume.*

PENANG; close to the Chalet, elev. 500 ft., *Curtis*.

Branches and racemes puberulous. *Leaves* 3–5 by 1½–2 in., young membranous, old coriaceous, beautifully reticulate, petiole $\frac{1}{3}$–$\frac{2}{3}$ in. *Racemes* 1–1½ in. long; flowers globose, about $\frac{1}{10}$ in. broad.

P. 182. In remarks under LINDERA, after the word Indian *erase* 2-celled, and *insert* after plants—with 2-celled anthers.

P. 185. Under *L. melastomacea* insert the following habitats:—BHOTAN, *Griffith* (Kew Distrib. 4319). KHASIA MTS., alt. 3–4000 ft. MUNNIPORE, alt. 4000 ft., *Watt*.

P. 189. In the note respecting the genus near Endiandra for Hexapora *read* MICROPORA, and *for* three anthers *read* six anthers.

P. 193. D. CANNABINA. Madden describes two forms, a white and a purple-flowered, in the Western Himalaya, inhabiting different elevations.

P. 199. To habitats of *Gyrinops Walla*, add—Tinnevelly Ghats, *Beddome*.

P. 237. BALANOPHORA INDICA. In a paper on this genus by W. C. Fawcett, F.L.S., in the Linnean Transactions, Ser. 2, ii. 233, that author points out that Wallich's *B. typhina* includes *B. indica*, Wall., and *B. polyandra*, Griff.; also that *B. gigantea*, Wall., differs from *B. indica* in the rhizome having no pustules, but being tessellated rather than warted; it may, however, he observes, be a variety of *indica*.

P. 238. B. THWAITESII. Dr. Trimen, in Journ. Linn. Soc. xxii. 330, inclines to regard this as a well-marked var. of *B. indica*. Its chief characters which he gives are, its large size, bright yellow colour, larger stellate pustules, its longer prominent crenate flower bracts in the male, ovoid or pyriform exserted fem. heads and shortly stalked fem. fl. inserted on the pedicels and very rarely attached to the bases of the spadicels.

P. 638. Under 3. P. EUPHRATICA, for *Balsamiflora* read *Balsamifera*.

P. 640. EPHEDRA. As this sheet was passing through the press, I received a copy of Dr. Stapf's elaborate "Arten der Gattung Ephedra," published in the 56th volume of the "Denkschrift der Mathem.-Naturwissenschaft. Classe der Kais. Akad. der Wissenschaft" (Wien. 1889). The conspectus of his views which I here give will enable Indian botanists to estimate the value of the characters adopted for the discrimination of the species of this most puzzling genus. With the exception of the few references between brackets ( ), the following is a translation from Stapf's memoir.

Sect. PSEUDOBACCATÆ. Bracts not winged, margins sometimes membranous.

Tribe SCANDENTES. Scandent or subscandent shrubs (or prostrate in *E. foliata*).

1. E. FOLIATA (*Boiss.*), *Stapf l. c.* 49, t. 2, and 10, f. 1–11; male spikes usually clustered rarely subsolitary, peduncles very long and unequal, anthers 3–4, fem. cones 2-fld.

Var. *α. ciliata*; branchlets dense pseudoverticillate or fascicled slender. *Aitchison Fl. Kurum Valley*, 187. E. foliata, *Aitch. Bot. Affghan. Bound. Comm.* 112. E. Alte, *Brand. For. Fl.* 501, t. 69. E. peduncularis, *Boiss. Fl. Orient.* v. 717. E. asparagoides, *Griff. Notul.* ii. 340. (E. alata (? Alte), *Edgew. in Journ. Linn. Soc.* vi. 194.)—Western Panjab and Scinde (Rajpootana).—*Distrib.* Turkestan and westwards to Syria.

Tribe PACHYCLADÆ. Shrubs. Branchlets very rigid, stout, strict. Male spikes densely crowded, sessile. Tubule of ovule (and seed) twisted.

2. E. INTERMEDIA (*Schrenk & Mey.*), *Stapf l. c.* 61, t. 2, and 15, f. 1–9; anthers densely crowded usually sessile, bracts of fem. cone connate beyond the middle, seeds very shortly exserted plano-convex. E. pachyclada, *Boiss. Fl. Orient.* v. 713.

Var. *glauca*; lowly, rarely exceeding 20 in., erect or ascending from a short prostrate base, glaucous, rarely subglaucous, branchlets numerous elongate and naked above often densely subparallelly approximate, clusters of male spikes often large.—Kashmir.—*Distrib.* from Mongolia to Kashmir and Turkestan.

Var. *tibetica*; a low shrub, erect or prostrate below with sometimes long lax branchlets, internodes elongate more slender rarely short thick, bark scabrous or scaberulous glaucous sometimes bluish.—Western Tibet.—*Distrib.* Affghanistan, Khoten.

Tribe LEPTOCLADÆ. Low or middle-sized shrubs, branchlets slender rigidulous, rarely subflexuous. Male spikes variously disposed. Tubule of ovule (and seed) straight or twisted.—In *E. Gerardiana* specimens occur with thick branches.

3. E. GERARDIANA (*Wall*)., *Stapf l. c.* 75, t. 3, and 18, f. 1–9, and 31, f. 1; a low shrub, branches short, terminal buds short usually constricted at the base, male spikes solitary or few sessile crowded, fem. cones 1–2 fld., innermost bracts scarcely connate to the middle, seeds always, sometimes much, exserted.

Var. *α. Wallichii*; branches appressed to the ground, branchlets short slender curved ascending, terminal buds much constricted at the base, male spikes solitary small. *Wall. Cat.* 6048; *Royle Ill.* 40, 348. E. vulgaris, *Aitch. Fl. Kurum Vall.* 186. *Brandis For. Fl.* 501.—Western Tibet, Kunawur, Garwhal, Kumaon.—*Distrib.* Central Tibet at Talatschu, Karakoram.

Var. *β. saxatilis*; taller than var. *Wallichii*, bark softer when dry more distinctly striate and usually blackening, branchlets usually arcuately

ascending rarely erect. E. vulgaris, *Brand. For. Fl.* 501.—Garwhal and Kumaon.

Var. γ. *sikkimensis*; branchlets 12 in. high usually erect robust but softish, furrowed when dry and brownish, sheaths of leaves elongate, male spikes larger. E. vulgaris, *Brandis l. c.*, the Sikkim plant. (E. macrocephala, *Bertolon. Misc.* xxiii. 17, t. 3.)—Sikkim.

4. E. NEBRODENSIS (Tineo), *Stapf l. c.* 77, t. 3, xx. f. 1–7; an erect shrub, branches slender rigid usually strict, male spikes few or solitary crowded sessile, fem. cones 1-fld., innermost bracts connate for one-third of their length.

Var. *procera*; branchlets perfectly smooth, semi-mature fem. cones narrower longer, seeds elongate-ovate.—Kuhlwar, Lahul, and Western Tibet.—*Distrib.* Affghanistan and eastward to Greece.

(With regard to *E. vulgaris*, A. Rich., to which I have referred *E. Gerardiana* and *nebrodensis* var. *procera*, Stapf describes it as *E. distachya*, Linn. It may be useful to give Stapf's diagnosis of it, so as to enable Indian botanists to compare the three, premising that he places it in tribe *Leptocladæ*.

E. DISTACHYA (*Linn.*), *Stapf l. c.* 66, t. 2, xvii. f. 1–5; low or very low shrub, erect or ascending from a long or short prostrate base, male spikes solitary clustered or subracemosely panicled, bracts of the fem. cone shorter than the two seeds, tubule of ovule (and seed) erect.)

P. 667. The Key to the genera of Orchideæ having been compiled from the Genera Plantarum before the analysis of the Indian species was far advanced, requires revision, the results of which will be given at the end of the Order in Vol. VI.

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ERRATA. (See also p. 859.)

P. 142. Under P. pallida, *for* P. glaucescens & fuscans *read* P. glaucescens, var. fulvescens.

P. 154. *For* A. leiantha *read* A. leiophylla, *Hook. f.*, and *for* Litsæa leiantha, *Kurz*, *read* L. leiophylla, *Kurz*.

P. 618. *For* Q. Jenkinsiana *read* Q. Jenkinsii.

P. 759. Under 3 B. leptanthum, *for* 3-nerved sepals *read* 1-nerved petals.

P. 784. Chrysoglossum maculatum. This I subsequently referred to *Tainia*, but under that genus I inadvertently omitted to refer to its description (p. 821).

P. 821. Under *T. maculata*, enter as a synonym *Chrysoglossum maculatum*, p. 784.

END OF VOL. V.

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