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THE

FLORA OF BRITISH INDIA.

BY

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ASSISTED BY VARIOUS BOTANISTS.

VOL. VI.

ORCHIDEÆ TO CYPERACEÆ.

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FLORA OF BRITISH INDIA.

Order CXLVIII. **ORCHIDEÆ.**

Continued from Vol. v. p. 858.

Tribe II. **Vandeæ.** (See Vol. v. p. 671.)

39. **EULOPHIA,** *Br.*

Terrestrial quite glabrous herbs; rhizome tuberous, rarely pseudobulbous. *Leaves* appearing with or after the flowers, plaited. *Scape* lateral, flowers racemose, rarely panicled. *Sepals* and *petals* free, spreading. *Lip* erect from the base or foot of the column; base saccate or with a mentum or short spur; lateral lobes erect, embracing the column, rarely 0; midlobe spreading or recurved; disk crested, softly spinous or lamellate. *Column* short or long, top oblique, entire; anther terminal, 2-celled; pollinia 2 or 4, sessile or attached by a short strap to a discoid gland of the rostellum.—Species about 50, tropical, chiefly Asiatic.

I follow Blume, and others, in removing *Cyrtopera* from *Cyrtopodium* (where it is placed in Gen. Plant.), and including it as a section under *Eulophia*, there being a direct passage from the species with, to those without, a foot to the column. In sect. *Cyrtopera* the lateral sepals are inserted either on the foot of the column, leaving the spur or sac of the lip free, or their insertion extends along the spur, which then is technically a mentum. The perianth of *Eulophia* is undistinguishable from that of *Dipodium*, *Geodorum*, *Plocoglottis*, and *Tainia*, of which the two first might but for habit be united with it; the two latter differ in having creeping rhizomes, usually solitary leaves, and more than 2 pollinia. *Chrysoglossum* resembles a *Eulophia* with the pollinia free from the rostellum.

Sect. I. **Eulophia** proper. *Column* not produced into a foot.

* Leaves and flowers coetaneous, or nearly so.

† Pseudobulb very large, epigeal, green. Leaves very narrow. Scape often branched.

1. **E. virens,** *Brown in Bot. Reg. sub* t. 573 (*Eulophus*); leaves grass-like, bracts very small ovate acute, sepals linear-oblong subacute or obtuse, petals elliptic obtuse, lip obovate-oblong, side lobes small, disk with 5-crested nerves. *Lindl. Gen. & Sp. Orchid.* 182; *in Journ. Linn. Soc.* iii. 24; *Wight Ic.* t. 913; *Bot. Mag.* t. 5579; *Walp. Ann.* vi. 647. E. carinata, *Lindl. Gen. & Sp. Orchid.* 183. Aerobium carinatum, *Spreng. Syst. Veg.* iii. 718. Serapias epidendrea, *Retz Obs.* vi. 65. Limodorum virens, *Swartz in Nov. Act. Upsal.* vi. 79; *Roxb. Cor. Pl.* i. t. 38; *Fl. Ind.* iii. 467. L. epidendroides, *Willd. Sp. Pl.* iv. 124.—*Rheede Hort. Mal.* xii. t. 26, and ? 25.

Bengal and the Deccan Peninsula; in dry ground, *Roxburgh*, &c. Ceylon, in the Central Province, *Walker*, &c.

Pseudobulb large, conico-obpyriform. *Leaves* many, 6–10 by ⅝ in., midrib stout. *Scape* 1–3 ft.; sepals ¾–1 in., and petals green with reddish nerves; lip as long as the sepals, white with red crested nerves; spur short, subcylindric or conical.—Rheede's xii. t. 26 is, I think, this; his t. 25 may be *E. graminea.*

2. **E. graminea,** *Lindl. in Wall. Cat.* 7372; *Gen. & Sp. Orchid.* 182; *in Journ. Linn. Soc.* iii. 23; leaves grass-like, bracts small lanceolate, sepals lanceolate acuminate and elliptic-lanceolate acute petals tessellate, lip obovate-oblong, side lobes small, disk with 3–5 lamellate or crested nerves which are fimbriate on the rounded midlobe. E. inconspicua, *Griff. Notul.* 349; *Ic. Pl. Asiat.* t. 326; *Lindl. in Journ. Linn. Soc.* iii. 25.

ASSAM, *Mann.* BENGAL, *J. D. H., Clarke.* TENASSERIM, *Parish.* NICOBAR ISLANDS, *Kurz.* SINGAPORE, *Wallich.* MALACCA, *Maingay.* TRAVANCORE, *Wight.* CEYLON, at Dumballa, *Trimen.*

Habit of *E. virens* and colour of flower, but leaves usually shorter, flowers much smaller, and spur cylindric with often a clavate tip.—Cuming's specimens No. 2059 are marked as from Malacca in some collections, from Bohol Island (Philippines) in others.

†† Roots tuberous, hypogeal. Leaves elliptic-lanceolate. Scape unbranched.

§ *Lip longer than broad, side lobes short or* 0.

3. **E. ochreata,** *Lindl. in Journ. Linn. Soc.* iii. 24; leaves elliptic acuminate, scape with broad loose ochreate sheaths, bracts lanceolate equalling the ovary, sepals linear-oblong, petals broadly elliptic acute, lip broadly ovate entire, tip rounded, nerves all fimbriate. *Dalz. & Gibs. Bomb. Fl.* 265.

The CONCAN and CANARA, *Law, Dalzell,* &c.

Stem stout. *Leaves* 3–5, 4–10 in., many-nerved, sessile. *Scape* 10–12 in., very stout below; raceme many- and rather dense-fld., bracts ⅓–½ in.; sepals ⅔ in. long; spur a small sac.

4. **E. herbacea,** *Lindl. Gen. & Sp. Orchid.* 182; *in Journ. Linn. Soc.* iii. 24; bracts very long, flowers large, sepals linear-lanceolate acuminate, petals elliptic or lanceolate obtuse or acute very many-nerved, lip obovate-oblong, side lobes small rounded, midlobe ovate-oblong, disk with many fimbriate nerves. *Dalz. & Gibs. Bomb. Fl.* 265. E. brachypetala, *Lindl. in Journ. Linn. Soc. l. c.* E. albiflora, *Edgew. mss.* Limodorum bicolor, *Roxb. Fl. Ind.* iii. 469.

WESTERN HIMALAYA; Garwhal, alt. 4–7000 ft., *Royle, Falconer, Edgeworth,* &c. BENGAL, *Roxburgh*; at Rungpore, *Clarke.* CONCAN, *Dalz. & Gibs. l. c.*

Stem 4–6 in., rather slender, sheathed. *Leaves* 6–8 in., linear-lanceolate, variable in breadth, many-nerved. *Scape* 2–3 ft., stout; sheaths large, acuminate; raceme short, 8–10-fld.; bracts 1½–2 in.; pedicel with ovary ½–1 in.; sepals 1½ in., green; petals very variable, white, nerves purple; lip white, nerves yellow; spur very short, obtuse.—The flowers seem to be often produced before the leaves. Lindley gives Ceylon, Macrae, as a habitat, probably by the same error as affects *E. explanata.*

5. **E. lachnocheila,** *Hook. f.*; scape stout, raceme lax-fld., bracts equalling or exceeding the ovary subspathaceous, sepals lanceolate acuminate and shorter elliptic petals many-nerved, lip narrow pubescent, side lobes short rounded, midlobe obovate-oblong retuse, margin waved, disk densely softly spiny.

UPPER BURMA; at Maypongo, *Herb. Hort. Calcutt.*

Tuber globose. *Stem* 4–6 in. *Leaves* 2, linear-lanceolate, acuminate. *Scape* with the raceme 18 in.; sheaths 2, acuminate; raceme 6–8-fld.; bracts ½–1 in., membranous, linear-lanceolate, subspathaceous; flowers 1 in. diam.; lateral sepals inserted at the base of the column; lip shorter than the sepals; hypochile obovate, as long as the rather narrower epichile; spur short, cylindric; column rather long.

6. **E. bracteosa,** *Lindl. in Wall. Cat.* 7366; *Gen. & Sp. Orchid.* 180; *in Journ. Linn. Soc.* iii. 23; bracts very long, sepals oblong, tip rounded, petals broadly obovate very many-nerved, lip narrowly obovate-oblong, obscurely 3-lobed, disk with 5-crenulate veins. E. grandiflora, *Lindl. Gen. & Sp. Orchid.* 181.

KHASIA HILLS; on the north slopes, alt. 3–4000 ft., *J. D. H. & T. T.* CHITTAGONG, *Wallich.* TENASSERIM, alt. 3500 ft., *Parish.*

Stem 4–6 in., sheathed. *Leaves* 1–3, 10–18 in., linear-lanceolate, petioled, 3-nerved. *Scape* stout, shorter than the leaves, clothed with long sheaths; raceme short, few-fld.; flowers fleshy; bracts 1–1½ in.; sepals ⅔ in., yellow; lip white or lilac, streaked; spur short, obtuse. *Capsule* 1 in.—Lindley's habitat of Ceylon for *grandiflora* is no doubt an error.

7. **E. elata,** *Hook. f.*; bracts equalling the ovaries, sepals falcate lanceolate acuminate 5-nerved, petals elliptic-lanceolate obtuse strongly 5-nerved, lip narrowly ovate-oblong obtuse entire, disk with 3 slender moniliform nerves.

PERAK, *Scortechini*, 2023.

Leaves 12–14 in., petioled, elongate, linear-lanceolate. *Scape* 3½ ft., very stout below, sheaths appressed; raceme elongate, lax-fld.; bracts ½–¾ in.; sepals as long, fleshy; lip equalling the sepals; spur a small sac; column short, stout, hooded; young fruit 2 in., deflexed.

8. **E. explanata,** *Lindl. Gen. & Sp. Orchid.* 180; bracts shorter than the ovary, sepals oblong-ovate subacute and broader elliptic petals 5-nerved, lip subpanduriform, base saccate with spreading nerves, disk with two thick crenate lamellæ, midrib greatly thickened and caruncled towards the truncate emarginate tip. Dipodium scariosum, *Herb. Ham.*

NEPAL; at Maghada, in the Morung, *Hamilton.* NORTH-WEST INDIA (*Ic. Falconer*).

Leaves very young at the flowering time, surrounded at the base, along with 1 or 2 scapes, with short broad ½–1 in. long sheaths. *Scape* 4–8 in., rather stout, 10–12-fld.; bracts ⅓–½ in.; pedicels with ovary ⅔ in.; perianth yellow and purplish, spreading, ⅔–¾ in. diam.; lip sessile, base adnate to the lateral sepals; sac or spur broadly conical, obtuse; column very short.—An anomalous species. Lindley's specimens being counterparts of Hamilton's, his Ceylon habitat is doubtless an error.

§§ *Lip broader than long, side lobes short or* 0.

9. **E. obtusa,** *Hook. f.*; bracts equalling the ovaries, sepals oblong-lanceolate acute 7-nerved and broadly elliptic obovate obtuse many-nerved petals tessellate, lip clawed 3-lobed, side lobes rounded, midlobe much longer oblong, disk with 2 lobed calli at the mouth of the spur and 3–5 thickened nerves ending in calli within the apex, claw with a reniform callus on each side. Cyrtopera obtusa, *Lindl. Gen. & Sp. Orchid.* 190.

NORTH-WEST INDIA; on the banks of the Tonse river, *Royle.*

Leaves 12 in., narrowly ensiform. *Scape* very tall; raceme elongate, lax-fld.; bracts ⅓–½ in., ovate-lanceolate, acuminate; sepals ⅔ in.; petals rather shorter, but

much broader; lip as long as the sepals; spur conic, acute, curved, placed between the lateral lobes; column short, stout.—Placed by Lindley in *Cyrtopera*, but there is no foot to the column; he also errs in describing the sepals and bracts as obtuse.

10. **E. pratensis,** *Lindl. in Journ. Linn. Soc.* iii. 25; bracts shorter than the ovary, sepals oblong obtuse 5-nerved, petals subsimilar, lip sessile broader than long, side lobes large oblong rounded, midlobe small semicircular, disk with three crenate nerves ending in crenate calli on the midlobe. *Dalz. & Gibs. Bomb. Fl.* 265. E. ramentacea, *Wight Ic.* t. 1666 (*not of Lindl.*).

The DECCAN PENINSULA; in pastures, from the Concan southwards.

Leaves few, 10–12 in., long-petioled, narrowly lanceolate, strongly 3-nerved. *Scape* 1–3 ft.; sheaths acute, appressed; bracts ½–⅔ in., ovate-lanceolate; sepals ¾ in., fleshy; spur conical, acute. *Capsule* 1¼ in., elliptic, turgid.—The broad lip is like that of *E. macrostachya*. Lindley and the Bombay Flora err in describing this species as leafless when flowering.

11. **E. macrostachya,** *Lindl. Gen. & Sp. Orchid.* 183; *in Bot. Reg.* t. 1972; bracts lanceolate, sepals lanceolate acute, petals rather broader, lip broader than long, side lobes short obtuse, midlobe revolute rounded, disk 2-lamellate at the base. *Bot. Reg.* t. 1972; *Bot. Mag.* t. 6246; *Wight Ic.* t. 1667–8; *Walp. Ann.* vi. 646.

TRAVANCORE and NILGHIRI HILLS, *Wight.* CEYLON, in the Central Province, ascending to 4000 ft., *Thwaites*, &c.

Pseudobulb 2–6 in., fusiform. *Leaves* 2–3, 6–10 in., petioled, elliptic-lanceolate, 3-nerved. *Scape* stout and raceme together 2–3 ft.; sheaths appressed, obtuse; bracts caducous; sepals and petals ½ in., green; lip golden yellow with red stripes; spur a 2-lobed green sac. *Capsule* 2 in.

12. **E. Mannii,** *Hook. f. Ic. Plant. ined.*; scape tall, raceme many-fld., bracts shorter than the ovary, sepals oblong-lanceolate acute many-nerved, petals broader elliptic many-nerved, lip rhomboidly ovate obtuse obscurely lobed, disk with branching crested nerves. Cyrtopera Mannii, *Reichb. f. in Flora* 1872, 274.

UPPER ASSAM, *Mann.*

Leaves 12 by ½ in., narrowly linear-lanceolate. *Scape* with raceme 3 ft.; sheaths appressed, acute; bracts ¼–⅓ in., ovate-lanceolate; sepals ⅔ in. long, lip shorter; spur conical; column short, clavate.

** Flowers appearing long before the leaves. (I have not seen the leaves of any species of this subdivision.)

13. **E. campestris,** *Wall. Cat.* 7617; bracts variable, raceme many-fld., sepals ½–⅔ in. linear-lanceolate acute 5–7-nerved, petals oblanceolate 3–5-nerved, lip cuneate-obovate or oblong, side lobes short, midlobe orbicular quadrate or oblong crenulate, disk with 3 central nerves lamellate at the base and tubercled or spinulose on the midlobe. *Lindl. Gen. & Sp. Orchid.* 185; *in Journ. Linn. Soc.* iii. 24 (*excl. syn. Wight*); *Walp. Ann.* vi. 647. E. ramentacea & rupestris, *Lindl. in Wall. Cat.* 7367, 7368; *Gen. & Sp. Orchid.* 185; *in Journ. Linn. Soc.* iii. 25. E. hemileuca, *Lindl. in Journ. Linn. Soc.* iii. 25. Limodorum ramentaceum, *Roxb. Hort. Beng.* 63; *Fl. Ind.* iii. 467. L. dubium, *Ham. mss.* Bletia Dabia, *Don Prodr.* 30. Dipodium ramentaceum, *Herb. Ham.*

PLAINS OF INDIA; from the Panjab to Oudh, Bengal, Chittagong, and the Deccan.—DISTRIB. Affghanistan.

Scape 6–18 in., stout or slender from a deformed tuber; sheaths subappressed, acute; flowers many, subsecund; sepals slightly attached to the base of the lip, variable in breadth, acute or acuminate, yellow or green striped with pink; petals narrower; lip as long as the sepals, side lobes rounded or subacute, midlobe usually purple; spur conical, subclavate or subacute; column rather slender. *Capsule* ¾ in., ellipsoid.—The lip of *E. hemileuca* is rather tubercled than spinulose.

14. **E. stenopetala,** *Lindl. in Journ. Linn. Soc.* iii. 26; scape-sheaths loose, bracts longer than the ovaries, raceme few-fld., sepals ½ in. linear-oblong 5-nerved, petals lanceolate acuminate 3-nerved, lip broadly cuneate, side lobes rounded much larger than the suborbicular crisped midlobe, disk with 3 nerves tubercled between the side lobes and on the midlobe.

BHOTAN HIMALAYA; dry hills at Punaka, *Griffith.*

Scape 12–18 in., slender; sheaths obtuse; bracts ½–⅔ in.; lip as long as the sepals, spur clavellate.—Specimens indifferent. Very near *E. campestris,* but the lip is much broader and side lobes more spreading.

15. **E. decipiens,** *Griff. in Journ. As. Soc. Beng.* xlvii. 155, t. 13, f. 8–12; flowers secund, bracts minute, sepals and petals ½ in. linear hardly falcate acute 5-nerved, lip obovate concave 3-lobed above the middle, midlobe much the largest, margin crisped, disk 5-nerved at the base, 10–13-nerved in the middle of which 4–5 form fleshy fibres on the midlobe, spur short slender saccate.

NICOBAR ISLANDS; at Kamorta, *Kurz.*

Scape 2–3 ft.; root tuberous; sheaths small, lanceolate. *Leaves* not seen. *Raceme* 3–4 in.; pedicel with ovary ½–⅔ in.; sepals and petals white; spur ⅛ in.—"Closely resembles *Pachystoma senile,* but pollinia of *Eulophia.*" I have seen no specimens.

16. **E. densiflora,** *Lindl. in Journ. Linn. Soc.* iii. 25; scape robust, bracts shorter than the ovaries, sepals 1–1½ in. narrowly oblanceolate acuminate, petals narrower, lip obovate-oblong, side lobes small rounded, midlobe orbicular, disk with 3 lamelliform nerves which are crenate or interrupted from the middle to near the apex, spur long slender.

SIKKIM HIMALAYA; at the foot of the hills, *J. D. H.* BHOTAN, *Griffith.*

Scape 1–3 ft., from a depressed tuber; lower sheaths obtuse, upper acuminate; raceme many-fld.; flowers secund, deflexed, very narrow; column short.—The long narrow flowers are very characteristic of this species.

17. **E. burmanica,** *Hook. f.*; scape robust, sheaths short loose, raceme many- and dense-fld., bracts filiform equalling the ovary, sepals ⅓ in. oblong obtuse many-nerved, petals narrower 3-nerved, lip cuneately obovate, side lobes short rounded, midlobe small ovate, disk with 2 caruncular nerves.

UPPER BURMA; Bhamo, *Griffith.*

Tuber or base of scape oblong. *Scape* 14 in.; sheaths 1 in.; raceme 4 in.; bracts ½–⅔ in., almost capillary, reflexed; pedicel with ovary as long; spur conical; column short; pollinia globose.—A remarkable species, of which there is but one very bad specimen, with twisted scape; it is possibly near *E. macrobulbon.*

Sect. II. **Cyrtopera.** *Column* produced into a foot.

* *Lateral sepals inserted on the spur of the lip* (*see also* C. explanata).

18. **E. nuda,** *Lindl. in Wall. Cat.* 7371; *Gen. & Sp. Orchid.* 180; tall, raceme elongate many-fld., bracts various, flowers large green

or purple, sepals linear-oblong acute, petals shorter elliptic-oblong many-nerved, lip obovate-oblong obtuse, side lobes obscure, midlobe rounded or retuse crisped, disk crested with many crenulate or tubercled nerves. E. bicolor, *Dalz. in Hook. Kew Journ. Bot.* iii. (1857) 343; *Dalz. & Gibs. Bomb. Fl.* 264; *Walp. Ann.* vi. 647. Cyrtopera fusca, *Wight Ic.* t. 1690; *Lindl. in Journ. Linn. Soc.* iii. 31; *Thwaites Enum.* 429; *Walp. l. c.* 668. C. plicata, *Lindl. in Wall. Cat.* 7362; *Gen. & Sp. Orchid.* 190. C. nuda, *Reichb. f. in Flora* 1872, 274. C. Gardneri, *Thwaites Enum.* 302. C. mysorensis, *Lindl. in Journ. Linn. Soc.* iii. 32. C. laxiflora, *Gardn. mss.* Dipodium Roniayte & plicatum, *Herb. Ham.*—? *Rheede Hort. Malab.* xii. t. 26.

TROPICAL HIMALAYA, from Nepal eastwards, ASSAM, the Khasia Hills, MUNNIPORE, PEGU and TENASSERIM. UPPER BURMA (*Herb. Hort. Calcut.*). The DECCAN PENINSULA; from the Concan southwards. CEYLON; in the Central Province.

Tuber large. *Leaves* 10–14 in., elliptic-lanceolate, very variable in breadth. *Scape* 1–3 ft., stout; sheaths appressed; bracts rarely equalling the ovary; sepals 1 in.; mentum rounded or conical; lip shorter than the sepals. *Capsule* 1½ in., fusiform.—There may be more than one species here, so great are the differences in colour of the flower, from a pale green to a dull purple. There is in Herb. Wight a very fleshy-flowered species or variety (*C. Brunoniana*, Wight mss.) from the Kaitea Falls (Nilghiris), with a root as large as the fist, the lip with a short horn and a linear-oblong pointed shaggy disk; its sepals are green and petals and lip white.

19. **E. squalida,** *Lindl. in Bot. Reg.* 1841, *Misc.* 77; raceme elongate many-fld., bracts equalling the ovary, sepals oblong-lanceolate acuminate, petals elliptic-oblong many-nerved, lip as broad as long subequally 3-lobed strongly closely nerved, midlobe crisped retuse, disk naked. Cyrtopera squalida, *Reichb. f. in Bonpland.* 1857, 38; *Lindl. in Journ. Linn. Soc.* iii. 31; *Walp. Ann.* vi. 668.

PENANG; on Govt. Hill, *Curtis.* SINGAPORE, *Ridley.*—DISTRIB. Malay Islands.

Stem rooting from the base without a tuber. *Leaves* 8–12 by 1½–2 in., narrowly lanceolate, some long-petioled. *Scape* 18–24 in., stout or slender; sheaths appressed; sepals ⅔–1 in. long; lip ⅔ in. across the side lobes, base rounded; mentum conical.

** *Lateral sepals inserted on the foot of the column, free of the spur of the lip or nearly so.*

20. **E. bicarinata,** *Hook. f.*; raceme oblong densely many-fld., sepals linear-oblong acute undulate, petals shorter broader many-nerved, lip obovate-oblong, side lobes narrow, midlobe large orbicular crisped, two lateral nerves forming long calli at the base of the disk and with the median nerve tubercled on the midlobe. Cyrtopera bicarinata, *Lindl. in Wall. Cat.* 7363; *Gen. & Sp. Orchid.* 189; *in Journ. Linn. Soc.* iii. 31 (*excl. cit. Ic. Griff.*). Epipactis ? bicarinata, *Herb. Ham.* Cymbidium, *Griff. Notul.* iii. 343, No. 9; *Ic. Plant. Asiat.* t. 320, f. 3 (*pollen*).

SIKKIM HIMALAYA, *Gamble.* ASSAM, *Hamilton.* KHASIA HILLS, alt. 2–3000 ft., *Clarke.* MUNNIPORE, *Watt.* UPPER BURMA, *Griffith.*

Flowering before leafing. *Scape* 8–30 in., stout or slender; sheaths inflated; bracts slender, short or long; flowers resupinate, purplish brown, greenish or yellowish; sepals 1½ in. long; lip longer than the sepals, tip rounded or notched; spur conical, obtuse.—*Flowers* often streaked with pink. I have not seen leaves, and Griffith does not describe them; he says the flowers are purplish brown and the lip broadly obtusely spurred.

21. **E. candida,** *Hook. f.*; flowering with the leaves, scape slender,

raceme short many-fld., bracts shorter than the ovary, sepals linear-oblong, petals shorter elliptic obtuse, side lobes of lip short, midlobe large orbicular crisped, nerves of disk as in *E. bicarinata*. Cyrtopera candida, *Lindl. in Journ. Linn. Soc.* iii. 31 (*in part*).

SIKKIM HIMALAYA, alt. 3–4000 ft., *J. D. H.* ASSAM, *Mann.*

Flowering before leafing. *Leaves* 8–18 by 3–3½ in., elliptic-lanceolate, caudate, 5-nerved; petiole 6–8 in., slender. *Scape* 18–24 in.; sheaths rather loose; raceme 3–4 in.; bracts ½–½ in., more turgid than in *E. bicarinata*; flowers 1¼ in. diam., white or greenish; spur conical. *Capsule* 1 in., narrowly ellipsoid.—Perhaps a var. of *E. bicarinata*. Lindley's description is taken from a specimen gathered by myself, and a drawing of *E. nuda* (Ic. Cathcart), from which the root, the colour, and the anther are taken.

22. **E. flava,** *Hook. f.*; tall, robust, flowers very large, sepals oblong-lanceolate finely acuminate, petals as long much broader elliptic many-nerved, lip large saccate, side lobes large rounded, midlobe orbicular, disk with 2 small pyriform basal calli and 3 crenate lamellæ. Cyrtopera flava, *Lindl. in Wall. Cat.* 7364; *Gen. & Sp. Orchid.* 189; *Royle Ill.* 370, t. 88; *Reichb. f. in Gard. Chron.* 1870, 1407. C. Culleni, *Wight Ic.* t. 1754; *Walp. Ann.* VI. 667. Dipodium flavum, *Herb. Ham.*

WESTERN TROPICAL HIMALAYA; from Garwhal, alt. 4–5000 ft., to Nepal. TRAVANCORE, *Cullen.*—DISTRIB. Hong Kong.

Flowering before leafing. *Scape* 2–5 ft., as thick as the finger or less; raceme 1–2 ft.; bracts ½–⅔ in.; flowers lemon-yellow; sepals 1–1¼ in. long, variable in breadth; lip as long as the sepals; spur a broad sac; anther with a 2-fid top, and long anterior process; pollen obtusely angled.—Wight describes the leaves as 2 ft. long, lanceolate.

23. **E. macrobulbon,** *Parish & Reichb. f. in Trans. Linn. Soc.* XXX. 144; scape robust, raceme densely many-fld., bracts filiform, sepals linear-oblong acute, petals shorter elliptic obtuse many-nerved, lip cuneate, side lobes short subterminal, midlobe small orbicular crisped, disk with two nerves thickened at the base and together with the middle nerve crenate towards the apex.

SIKKIM HIMALAYA (*Ic. in Herb. Calcutt.*). TENASSERIM; at Moulmein, *Parish.*

Tuber large. *Scape* with raceme 18 in., as thick as the little finger; sheaths basal, ooso; bracts ½–⅔ in., equalling the filiform pedicels; sepals ½–⅔ in. long; petals rather broader; lip shorter than the sepals; spur conic, obtuse; anther with a produced 2-fid top; pollinia oblong.—Parish describes the leaves as oblong, acuminate (more likely elliptic-lanceolate), sepals and petals brown, lip yellow, spotted red. The Sikkim drawing represents a stem as thick as the middle finger, with sessile obovate leaves 1–2 ft. long, purple beneath and on the margin; a scape as thick as a goose-quill, dark purple, as are the flowers; raceme 12 in., many-fld.; bracts very slender, as long as the ovary; sepals ⅔ in. long and petals violet-purple; lip paler.

24. **E. macrorhizon,** *Hook. f.*; scape robust, raceme lax-fld., bracts long slender, sepals lanceolate acuminate and shorter obovate petals many-nerved, lip broad obtusely 3-lobed many-nerved, 3 median nerves tubercled, disk of mid- and side-lobes rough, spur conical.

SIKKIM HIMALAYA; at Ryang, alt. 2000 ft., *King* (*in Herb. Calcutt.*).

Rootstock elongate, as thick as the thumb, ringed. *Leaves* not seen. *Scape* 8–12 in., sheaths 3–4, loose, obtuse; raceme 2–4 in.; bracts ½–¾ in., about equalling the ovary; flowers 1 in. diam., reddish sepals adnate to the foot of the column but free of the spur of the lip; lip much shorter than the sepals, nerves slender, con-

tracted above the broad rounded base, then dilating into the rounded side lobes, margins of midlobe crisped and crenate.

25. **E. sanguinea,** *Hook. f.*; flowers large, sepals ovate-lanceolate acuminate, petals shorter elliptic apiculate many-nerved, lip short, side lobes rounded, midlobe orbicular or ovate, disk with many crenulate nerves. Cyrtopera sanguinea, *Lindl. in Journ. Linn. Soc.* iii. 32; *Bot. Mag.* t. 6161.

SIKKIM and BHOTAN HIMALAYA, alt. 2–5000 ft., *J. D. H.*, &c. KHASIA HILLS, alt. 5000 ft., *Mann.*

Flowering before leafing. *Scape* 6–10 in., stout; sheaths loose. *Raceme* 6–12-fld.; bracts slender, about equalling the ovaries; flowers 1½ in. diam.; disk red purplish or brown; lip white, pink or green; spur large, broad, obtuse; petals (always?) with an apiculate notch at the apex; top of anther obscurely notched, pollinia ovoid.—Leaves unknown.

26. **E. andamanensis,** *Reichb. f. in Flora* 1872, 276; raceme lax-fld., bracts short, sepals linear-lanceolate 3–5-nerved acuminate, petals rather broader obtuse 3-nerved, side lobes of lip obtuse, midlobe large broadly clawed orbicular crisped retuse, disk with the 3 median nerves thickened between the side lobes, all other nerves thick divaricating and much branched.

TENASSERIM; at Moulmein, *Parish.* ANDAMAN ISLANDS, *Kurz.*

Stem at the base tuberous, with thick roots. *Leaves* short during flowering, linear-lanceolate. *Scape* 1–2 ft.; sheaths short; bracts shorter than the pedicels; sepals ⅜ in. long; lip shorter than the sepals, white with green edges and nerves; spur conic, obtuse; anther 2-tubercled.—This much resembles *E. virens*, but the leaves are much broader, and the column produced into a foot.

SPECIES UNKNOWN TO ME.

CYRTOPERA RUFA, *Thwaites Enum.* 302; rootstock tuberous, leaves not seen, scape 2 ft. reddish, sheaths 3 distant, bracts narrowly lanceolate equalling the ovary, flowers rufous 2 in. diam., sepals oblong-lanceolate acute rather longer than the obovate acute petals, lip cucullate, nerves within pilose, side lobes obtuse, midlobe as long rounded apiculate, spur short obtuse, column linear slightly contracted in the middle, capsule 2½ in. long oblong.—Ceylon, at Hantani, alt. 3000 ft., *Thwaites* (C.P. 3566).

E. ATRO-VIRENS, *Lindl. Gen. & Sp. Orchid.* 183, described by Lindley from a drawing made for Wallich in the Calcutta Garden, and hence supposed to be a native of India, is a Mauritian species, *E. monophylla*, Spens. Moore in Baker's Flora of the Mauritius, p. 360 (where it is erroneously confounded with the Brazilian *E. maculata*).

EULOPHIA sp., *Trimen Cat. Pl. Ceyl.* 89 (C.P. 3958). Not named or described.

I fail to recognize the following *Eulophias* described in Griffith's Notulæ, vol. iii. p. 162, and Ic. Pl. Asiat. t. 285, f. 2; p. 263 and t. 285, f. 2; p. 266 and t. 285, f. 3; p. 350 and t. 351 B, f. 14.

40. CYMBIDIUM, *Swartz.*

Epiphytes, rarely terrestrial; stem very short, rarely elongate and pseudobulbous; roots tufted. *Leaves* very long, narrow and coriaceous, rarely short. *Scape* loosely sheathed; flowers often large in suberect or drooping racemes. *Sepals* and subequal *petals* free, erect or spreading. *Lip* sessile at the base of the column and embracing it upwards, base

concave, side lobes erect, midlobe recurved; disk with usually 2 pubescent median ridges. *Column* long, foot 0; anther 1- or imperfectly 2-celled; pollinia 2 deeply grooved or 4, subglobose or pyramidal, sessile on the broad strap or gland.—Species about 30, tropical and subtropical, on the Mountains of Asia, with a few African and Australian.

* Leaves rudimentary or 0 at flowering time.

1. **C. macrorhizon,** *Lindl. Gen. & Sp. Orchid.* 162; terrestrial, rootstock creeping branched, bracts narrow membranous.

N.W. INDIA, *Royle, Falconer.* KHASIA HILLS, alt. 5–6000 ft., *Lobb*, &c.; NAGA HILLS (*Herb. Calcutt.*).

Rootstock as thick as a goose-quill, branched. *Scape* very short, with the raceme 6–9 in., ascending, 6–8-fld.; basal sheaths short, or elongating to 2 in. and narrowly subfoliaceous; bracts ¼–⅓ in., narrow, membranous; pedicel with ovary 1 in.; flower 1¼–1¾ in. broad, sepals linear-lanceolate, acuminate, and rather broader petals white or pale yellowish with pink striæ; lip white spotted with crimson, side lobes narrow, midlobe ovate obtuse, disk with 2 thick ridges between the side lobes; anther papillose; pollinia 4, subhemispheric.—A remarkable species, a parasite according to Clarke. Lindley describes the rootstock as jointed, and the ridges of the lip as arcuate.

2. **C. sikkimense,** *Hook. f.*; epiphytic, bracts minute triangular-ovate.

SIKKIM HIMALAYA; Lachen Valley, alt. 6000 ft., *J. D. H.*

Rootstock very stout. *Scape* with many obtuse basal sheaths 2–3 in. long, those higher up 1 in. long; raceme 4–8 in., more or less decurved, rather stout, 20–30-fld.; bracts ⅓ in.; pedicel with ovary ½–⅔ in.; dorsal sepal linear-oblong, obtuse; lateral lanceolate, acute, subfalcate; petals elliptic, acute; lip as broad as long, rhombic-ovate, side lobes obscure rounded, narrowed into the very short ovate midlobe, disk without ridges but with 2 obscure rounded calli.—A very distinct species, overlooked by Lindley when studying my Sikkim Orchids, and mixed up with *C. aloifolium.*

** Leaves elliptic-lanceolate.

3. **C. lancifolium,** *Hook Exot. Fl.* t. 51; leaves long-petioled plicate, scape shorter than the leaves few-fld., bracts lanceolate shorter than the ovary, flowers long-pedicelled, disk of glabrous lip with two median lamellæ between the side lobes. *Lindl. Gen. & Sp. Orchid.* 164; *in Journ. Linn. Soc.* iii. 30; *Wall. Cat.* 7351; *Lodd. Bot. Cab.* t. 927. C. Gibsoni, *Paxton Fl. Gard.* iii. 618, fig. 301; *Walp. Ann.* vi. 623. C. javanicum, *Blume Bijdr.* 380; *Lindl. l. c.* 170.—*Griff. Ic. Plant. Asiat.* t. 300, fig. 1.

SUBTROPICAL HIMALAYA; from Nepal to Mishmi. KHASIA HILLS, alt. 4–6000 ft., *Griffith*, &c. PERAK, alt. 2–4000 ft., *Scortechini*, &c.—DISTRIB. Java, China, Japan.

Stem 2–6 in., fleshy, fusiform; sheaths ovate-lanceolate, acuminate; roots very long, thick and spongy. *Leaves* 6–10 in., petiole slender, sometimes as long. *Scape* nodding, 6–8-fld.; flowers 1½–2 in. diam.; sepals white, yellowish or greenish, lanceolate, acuminate; petals rather broader, white with a pink midrib; lip white spotted with red-purple, side lobes narrow, midlobe ovate obtuse.

4. **C. tigrinum,** *Parish in Bot. Mag.* t. 5457; leaves short-petioled very coriaceous, scape with raceme longer than the leaves few-fld., bracts lanceolate shorter than the ovary, flower long-pedicelled, lip with 2 glabrous ridges on the disk between the side lobes.

TENASSERIM; on Moolee-it, alt. 6000 ft., *Parish.* BURMA? on the Siam frontier, *Berkeley.*

Pseudobulbs 1–1½ in., turgidly ovoid, top contracted. *Leaves* 3–5 in., recurved, petiole rarely 1 in. *Scape* suberect, with the raceme 6–8 in., 3–5-fld.; sheaths few; bracts small, ovate-lanceolate; pedicel with ovary 1–1½ in.; flowers 2–2½ in. diam.; sepals linear, subacute, dull yellow-green; petals subsimilar; lip narrowed at the base, white spotted with red, side lobes rounded erect, midlobe oblong, tip rounded apiculate; anther smooth; pollinia 3 angular, gland broadly triangularly obtuse above, sides acute.

5. **C. Devonianum,** *Paxt. Mag. Bot.* x. 97, *cum ic.*; leaves stoutly petioled thickly coriaceous, petiole articulate, scape with raceme as long as the leaves drooping very many-fld., bracts very small, pedicels very short, disk of lip with two short ridges with swollen tips between the side lobes. *Warner Orchid. Alb.* t. 170; *Reichb. f. in Gard. Chron.* 1881, i. 395.

SIKKIM HIMALAYA, *Mann.* KHASIA HILLS, *Gibson;* on Kollong rock, alt. 5000 ft., *J. D. H. & T. T.*

Stem very stout at the base, obscurely pseudobulbous. *Leaves* several, 6–12 in., narrowed into a petiole 3–5 in. *Scape* very stout, 8–10 in.; basal sheaths 1½ in., imbricating; bracts ⅓ in.; pedicel with ovary ½–¾ in.; flowers 1½ in. diam.; sepals oblong-lanceolate and petals green speckled with red, or pale reddish yellow streaked with red; lip short, side lobes rounded narrowing into a small triangular ovate obtuse midlobe, purple with a darker blotch on each side lobe; anther and pollen as in *C. eburneum,* var. *Parishii. Capsule* 1½ in., turgidly ellipsoid.—The flowers appear to vary extremely in colour. Reichenbach describes the sepals and petals as light brown with dull mauve streaks and blotches. In a specimen from Assam the tip of the lip is white with purple spots.

*** Leaves loriform, very long, tip broadly unequally 2-lobed.

6. **C. aloifolium,** *Swartz in Nov. Act. Upsal.* vi. 73; *in Schrad. Journ. Bot.* 1779, ii. 218; racemes elongate pendulous or decurved many-fld., flowers 1½–2 in. broad, sepals and petals linear-oblong subacute, epichile broadly oblong or suborbicular equalling or shorter than the hypochile, disk with 2 curved thick lamellæ. *Roxb. Fl. Ind.* iii. 458; *Lindl. Gen. & Sp. Orchid.* 165; *Wall. Cat.* 7352 C; *Walp. Ann.* vi. 624 (*excl. Ic. Wight*). C. pendulum, *Swartz, & Lindl. ll. c.*; *Walp. l. c.* (*excl. cit. Bot. Reg.*); *Roxb. Cor. Pl.* i. 35, t. 44; *Fl. Ind.* iii. 458. C. crassifolium, *Wall. Cat.* 7357. C. Mannii, *Reichb. f. in Flora* 1872, 274. Epidendrum aloifolium, *Linn. Sp. Pl.* 953. Ærides Borassi, *Smith in Rees Cyclop. Suppl.—Rheede Hort. Mal.* xii. t. 8.

TROPICAL HIMALAYA, from East Nepal eastwards. ASSAM and southwards to TENASSERIM and the ANDAMAN ISLANDS. (? Malabar, *Rheede.*)—DISTRIB. China?

Stem short, stout. *Leaves* 1–3 ft. by ⅝–2 in. *Raceme* 12-18 in.; flowers variable in colour and size, usually dull purplish brown with pale borders.—I am much puzzled with this and the following species, which appear to differ, in so far as all my copious materials show, only in the comparative length of the epichile and hypochile of their lips, and in their geographical ranges, *aloifolium* being strictly northern and eastern, and *bicolor* as strictly western. These characters would be absolute were it not that Rheede's figure of the Malabar plant has the lip of *aloifolium.* According to drawings in Herb. Kew and Calcutta, *C. aloifolium* is very variable in other respects, and three varieties are distinguishable. 1. Racemes shorter suberect fewer-fld., sepals and petals obtuse dull purple with yellowish pale margins. This exactly resembles the Chinese? *C. aloifolium,* Lodd. Bot. Cat. t. 967; Jacq. Hort. Schoenb. iii. 69, t. 383.—2. Flowers larger, sepals and petal sub-

acute bordered with white, lip yellowish streaked with red—all as described by Rheede.—3. Swartz's *C. pendulum*, which he says is too near *C. aloifolium*; flowers small or large, sepals and petals pale dirty yellow or greenish with a more or less broad dirty purple centre, lip streaked with red. To this belongs Wallich's *C. crassifolium* with pale flowers.—Lindley distinguishes *C. pendulum* from *aloifolium* chiefly by the lamellæ of the lip of the former being interrupted clavate and arched behind, and of the latter continuous, approximate, confluent at their tips. Thwaites gives *aloifolium* as a native of Ceylon (Jaffna, *Gardner*), but as he cites Wight's Ic., no doubt *bicolor* is intended. Lindley's *aloifolium* of Journ. Linn. Soc. iii. 27 includes this, *bicolor* and *sikkimense*. Reichenbach's description of *C. Mannii* is that of *aloifolium*, of which there are specimens in Mann's Herb. (kindly lent to me); as to his habitat of "Obres," Mr. Mann informs me he knows of no such place.

7. **C. bicolor,** *Lindl. Gen. & Sp.* 164; characters of *C. aloifolium*, but epichile longer than the hypochile ovate-oblong narrowed towards the tip. C. aloifolium, *Wight Ic.* t. 1687-8; *Dalz. & Gibs. Bomb. Fl.* 266; *Thwaites Enum.* 308. ? C. erectum, *Wight Ic.* t. 1753. Epidendrum aloifolium, *Bot. Mag.* t. 387.

The DECCAN PENINSULA, from the Concan southwards, and CEYLON.

For remarks on this see under *C. aloifolium*, from which Lindley distinguishes it chiefly by the saccate base of the lip and sigmoidly curved clavate lamellæ, which are interrupted in the middle and callous at the base, and the smaller differently coloured flowers, none of which characters appear to me to be satisfactory. He cites the Javanese *C. aloifolium*, Blume Bijdr. t. 19, for it.—Wight's figure of *C. erectum* from the Iyamallay Hills, which has an erect raceme, and flowers nearly 2 in. diam., is, I have little doubt, an exaggeration; the sepals described as obtuse are figured as acute. The only Iyamallay Cymbidium in his herbarium is much smaller flowered, and true bicolor.

8. **C. Finlaysonianum,** *Lindl. in Wall. Cat.* 7358; *Gen. & Sp. Orchid.* 164; habit, foliage, inflorescence and bracts of *C. aloifolium*, but flowers larger, 2½ in. diam., midlobe of lip oblong contracted at the base, ridges on disk straight continuous or interrupted. C. Wallichii, *Lindl. Gen. & Sp.* 165. C. aloifolium, *Wall. Cat.* 7352 A, B. C. pendulum, *Bot. Reg.* 1840, t. 25 (*excl. syn.*). C. pendulum, *var.* brevilabris, *Lindl. in Bot. Reg.* XXX. t. 24. C. tricolor, *Miq. Choix*, t. 19.

PENANG, *Porter, Curtis.* Singapore, *Hort. Loddiges.*

Leaves 1–2 ft. by ⅔–1⅔ in. *Raceme* 2–3 ft., slender; basal sheaths short, inflated; flowers 1–2 in. apart; sepals and petals subequal, linear-lanceolate, acute or obtuse, dull yellow; lip not saccate, side lobes acute, streaked with red, midlobe white, red-purple towards the tip.

9. **C. pubescens,** *Lindl. in Bot. Reg.* 1840, *Misc.* 75; 1841, t. 38; leaves 1–2 ft. by ½ in. obtuse, scape short naked decurved, raceme short pendulous 6–10-fld., flowers 1–1¼ in. broad, sepals and petals linear obtuse, lip pubescent, hypochile saccate, disk with thick arched lamellæ, side lobes acute, midlobe as long as the hypochile ovate-oblong obtuse.

SINGAPORE, *Cuming* (*Hort. Loddiges*). DISTRIB. Borneo (*Ic. in Herb. Kew*).

A much smaller plant with narrower leaves, shorter racemes, and fewer flowers than any other of this section. *Sepals* and *petals* similar, dark purple with a yellow or green margin; lip yellow with a broad band of red-purple, or red-purple within the margin of the midlobe.

******** Leaves linear or elongate linear-lanceolate acute or acuminate.

† *Bracts very small.*

10. **C. eburneum,** *Lindl. in Bot. Reg.* 1847, t. 67; *in Journ. Linn.*

Soc. iii. 28; scape suberect 2–3-fld. sheathed to the top, flowers 4–5 in. diam. white, hypochile of lip with a very thick 3–5-grooved pubescent golden ridge. *Bot. Mag.* t. 5126; *Paxt. Mag. Bot.* xv. t. 145; *Warner Sel. Orchid.* t. 21; *Jennings Orchid.* t. 16; *Gartenfl.* 1880, t. 155; *Orchidoph.* 1882, 297; *Wien. Ill. Gartenz.* 1887, t. 7, 8; *Gard. Chron.* 1882, i. 496, f. 78; 1884, ii. 77, f. 17. C. syringodorum, *Griff. Notul.* iii. 338.

EASTERN HIMALAYA; Nepal (*Ic. in Herb. Kew*). Sikkim, alt. 1000 ft., *Clarke.* KHASIA MTS., alt. 5000 ft., *Gryffith*, &c.

Leaves 12–24 by ⅜–¾ in., acute or acutely 2-fid. *Scape* 8–12 in.; sheaths equitant, erect, lanceolate, finely acuminate; bracts acuminate; pedicel with ovary 1½–2 in.; flowers very odorous; sepals very variable in breadth; petals subfalcate; side lobes of lip narrow, obtuse, midlobe small, short, undulately crenate, dark yellow.

Var. *Parishii*; leaves broader, lip blotched with dark purple or crimson. C. Parishii, *Reichb. f. in Trans. Linn. Soc.* xxx. 144; *Xen. Orchid.* iii. 55, t. 224 (*very bad*); *in Gard. Chron.* 1874, i. 338, 566; 1878, ii. 74; *Warner Orchid. Alb.* t. 25.—Tenasserim, on Nat-toung, alt. 5000 ft., *Parish.*—Reichenbach distinguishes this by the callus of the lip having no velvety line, by the spots on the lip, and by acute setiferous angles of the pollinia. The sepals and petals are very much narrower than in Warner's figure.

Var. *Williamsiana*, Reichb. f. in Gard. Chron. 1881, i. 530, has the midlobe and sides of the lip light purple and column light rose-cold.

Var. *Dayana*; leaves 4 ft. by ¼ in. corky beneath, flowers yellow white with purple streaks. C. Dayanum, *Reichb. f. in Gard. Chron.* 1869, 710.—Assam (*Hort. Day*). —I have not seen this.

11. **C. grandiflorum,** *Griff. Notul.* iii. 342; *Ic. Plant. Asiat.* t. 321; leaves 8–24 by ⅛–1 in., scape very robust decurved, sheaths lax, raceme 6–12-fld., flowers 3–4 in. diam., sepals and petals oblong-lanceolate acute green, lip yellowish pubescent and ciliate, midlobe large suborbicular waved and crenate blotched or speckled with red. C. Hookerianum, *Reichb. f. in Gard. Chron.* 1866, 7; *Batem. in Bot. Mag.* t. 5574. C. giganteum, in part, *Lindl. in Journ. Linn. Soc.* iii. 29.—Cymbidium sp., *Griff. Itin. Notes* 145, No. 698.

EASTERN HIMALAYA; East Nepal, Sikkim and Bhotan, alt. 5–7500 ft., *Griffith*, &c.

Leaf-sheaths 2–8 in., deeply ribbed and grooved. *Scape* 12–18 in.; lower sheaths short, obtuse, upper 4 in., acute; racemes 10–18 in., drooping; bracts very small; flowers fleshy, sweet-scented; dorsal sepal incurved, lateral recurved; lip with 2 hairy ridges on the disk between the side lobes.

12. **C. giganteum,** *Wall. Cat.* 7355; leaves 1–2 ft. by ⅜–1½ in. elongate lanceolate acuminate, scape very robust 6–12-fld., decurved or suberect, flowers 2–2½ in. diam., sepals and petals oblong-lanceolate acute green streaked with red, lip yellow blotched with purple pubescent and ciliate all over, midlobe large orbicular waved. *Lindl. Gen. & Sp. Orchid.* 163; *Sert. Orchid.* t. 4; *Bot. Mag.* t. 4844; *Paxt. Mag. Bot.* 241, and *Fl. Gard.* ii. 14, f. 143 (*flower*); *Warner Orchid. Alb.* vi. t. 284; *Griff. Notul.* iii. 341; *Walp. Ann.* vi. 626. Iridiorchis gigantea, *Blume Orchid. Archip. Ind.* 91, t. 26. Limodorum longifolium, *Ic. Hamilt.* (*fid. Lindl.*).

TROPICAL HIMALAYA; from Kumaon, ascending to 4000 ft. eastwards to Bhotan and the KHASIA MTS., alt. to 4-5000 ft.

Habit of *C. grandiflorum* and leaves nearly as broad, but flowers smaller and differently coloured.—Blume founds the genus *Iridiorchis* on the protuberant base of the column forming a small sac, a character not shown in his analysis, and which I do not find in drawings on dried specimens. There are drawings of several varieties of

this in Herb. Kew and Calcutta, varying much in the depth of colouring of the flowers. The veins of the lip are very strong, arched and purple on the broad hypochile, which has 2 central hairy ridges, villous and diverging, and again meeting at the base of the epichile.

Var. ? *Lowiana*, Reichb. f. in Gard. Chron. 1887, i. 684; leaves 2–3 ft. by ½–⅝ in., finely acuminate, side lobes of lip pale yellow green, midlobe dark purple with golden margins. C. Lowianum, *Reichb. f. in Gard. Chron.* 1879, 332, 405, f. 56; *Floral Mag. N. S.* t. 353; *Berlin Gartenz.* 1885, t. 73; *Orchidoph.* 1882, 321; 1885, 145.—Burma, *Boxall* (*Hort. Low*).—Perhaps a distinct species; the leaves are more like those of *C. longifolium*. The racemes attain 5 ft. in length, the very numerous flowers vary in colour, and the lip in breadth.

13. **C. longifolium,** *Don Prodr.* 36; leaves 2–3 ft. by ½–⅝ in. narrowly linear finely acuminate, scape suberect or decurved many-fld., flowers 2–2½ in. diam., sepals and petals linear-oblong or -lanceolate acute greenish streaked with red or purple, lip papillose within not ciliate, midlobe broadly ovate or orbicular white or yellowish spotted with red. *Lindl. Gen. & Sp. Orchid.* 163; *in Journ. Linn. Soc.* iii. 29; *Reichb. f. in Gard. Chron.* 1874, 14. C. erythræum, *Lindl. l. c.* 30. Limodorum angustifolium, *Herb. Ham.* (*ex Lindl. Gen. & Sp.*).

SUBTROPICAL HIMALAYA, alt. 5–6000 ft., from Kumaon, *Blinkworth*, eastwards. KHASIA MTS., common.

Resembles *C. giganteum*, but the leaves are very narrow, flowers smaller, and their colouring different. The lip is similar in shape, in the strong purple nerves, and pubescent ridges. Lindley's *C. erythræum* is founded on a drawing of mine of the flowers and fruit of a plant gathered in Sikkim, but of which I preserved no specimens; it has a small golden midlobe of the very narrow lip, but it otherwise does not seem to differ from *longifolium*, to which the specimens of *erythræum* in Lindley's Herbarium certainly belong.

†† *Bracts large, lanceolate or cymbiform.*

14. **C. cyperifolium,** *Wall. Cat.* 7353; leaves 2–3 ft. by ⅓–½ in., scape erect few-fld, bracts very slender equalling or exceeding the ovary, sepals and petals linear-lanceolate acute pale green and yellow streaked with red, lip narrow glabrous, greenish or white spotted with red. *Lindl. Gen. & Sp. Orchid.* 163; *in Journ. Linn. Soc.* iii. 28. C. hæmatodes, *Lindl. Gen. & Sp. Orchid.* 162. C. viridiflorum, *Griff. Itin. Notes* 126, No. 451. Cyperorchis ? Wallichii, *Blume Orchid. Archipel. Ind.* 92. Limodorum longifolium, *Roxb. Fl. Ind.* iii. 468.

SUBTROPICAL HIMALAYA; from Garwhal, alt. 5000 ft., *Edgeworth*, eastwards. The KHASIA, NAGA and MUNNIPORE HILLS, alt. 3500–6500 ft.

Leaves rigid, often petioled. *Scape* shorter than the leaves, slender; sheaths ½–2 in., distant; flowers 4–7, distant, sweet-scented; lip pubescent within; pollinia 4, broadly oblong, plano-convex, each pair of a large and small placed face to face. The Roxburghian figure of *L. longijlorum*, from the Khasia Hills, agrees in every respect except that the flowers are rose-cold.; it is described in the Flora Indica as having a fusiform bulb and calcarate lip; in the drawing the bulb is the caudex denuded of leaves, and there is no trace of a spur; the bracts, which in the drawing are 1½–2 in. long, are undescribed. The species approaches *Cyperorchis*, differing in habit. Lindley gives Ceylon, *Macrae*, as a habitat for his *C. hæmatodes* (which is certainly *cyperifolium*), probably through the same error as affects other plants attributed by him to that country and collector.

15. **C. ensifolium,** *Swartz in Nov. Act. Upsal.* vi. 77; leaves 2–3 ft., by ¾–1⅜ in. sessile or petioled ensiformly lanceolate, bracts shorter than the

ovary, sepals and petals lanceolate acute green streaked with red, lip glabrous white or yellowish spotted with brown or red. *Willd. Sp. Pl.* iv. 112; *Lindl. Gen. & Sp. Orchid.* 162; *Bot. Reg.* t. 1976 (var. *estriata*); *Bot. Mag.* t. 1751. C. sinense, *Lindl. in Journ. Linn. Soc.* iii. 30 (? *Willd.*). Epidendrum ensifolium, *Linn. Sp. Pl.* 90; *Smith Spicileg. Bot.* 22, t. 24; ? *Bot. Repos.* t. 344. Limodorum ensatum, *Thunb. Fl. Jap.* 29; *Kæmpf. Ic.* t. 3.

SIKKIM HIMALAYA; in the Terai. KHASIA HILLS, alt. 2–4000 ft., *J. D. H. & T. T.*, &c. CEYLON; in the Central Province, *Thwaites.*—DISTRIB. China, Japan.

The Khasia plant agrees very well with Kæmpfer's figure, which alone represents the leaves as narrowed into a long petiole. In the Bot. Repos. the leaves are only a span long and quite sessile. The Bot. Mag. represents a very small plant with spotted lip. The Ceylon *ensifolium* has broader inflated lanceolate bracts. The Sikkim specimen has sessile leaves, many flowers, and a white lip with pale brown bars along the margin of the midlobe (much as in the Bot. Reg. figure) and no spots. I doubt *C. sinense* differing from *ensifolium*. Lindley would combine them.

DOUBTFUL AND EXCLUDED SPECIES.

C. ASSAMICUM, *Linden Cat.* 1863 (*name only*), *ex Ill. Hortic.* xxviii. (1881) 95.

C. CARNOSUM, *Griff. Notul.* iii. 339, is probably a *Eulophia.*

C. CHLORANTHUM, *Lindl. in Bot. Reg.* 1843, *Misc.* 68; *in Journ. Linn. Soc.* iii. 29; *Bot. Mag.* t. 4907, is C. variciferum, *Reichb. f. in Bonpland.* 1854, 91, an Australian species.

C. IRIDIOIDES, *Don Prodr.* 36, from Nepal, *Wallich*, doubtfully referred by Lindley to *C. giganteum*, is probably a *Cœlogyne.*

CYMBID. sp., *Griff. Notul.* iii. 343; *Ic. Plant. Asiat.* t. 319, is *Tainia latifolia.* The reference is omitted at vol. v. p. 820.

41. **CYPERORCHIS,** *Blume.*

Habit, foliage and inflorescence of *Cymbidium*, but racemes dense-fld., perianth segments narrow and connivent below the middle or higher, lip nearly straight, erect, epichile small and very much shorter than the elongate hypochile, and pollinia usually pyriform on a short subquadrate gland.—Species 3, all Indian.

Except by the narrow lip, long hypochile, and small usually orbicular epichile (or midlobe), it is not easy to separate this genus from *Cymbidium*, for the pollinia vary much in form in both genera, and *Cyp. Mastersii* resembles very much *Cymb. eburneum.*

1. **C. elegans,** *Blume Rumph.* iv. t. 47; *Orchid. Archip. Ind.* 93, t. 48 C; raceme elongate, flowers 1–1½ in. long straw-cold. or white, lip sparsely hairy towards the base, central ridges terminating below in 2 long pubescent calli, capsule 1 in. *Bot. Mag.* t. 7007. Cymbidium elegans, *Lindl. in Wall. Cat.* 7354; *Gen. & Sp. Orchid.* 163; *Sert. Orchid.* t. 14; *in Journ Linn. Soc.* iii. 28; *Reichb. f. in Gard. Chron.* 1875, i. 429. C. densiflorum, *Griff. Notul.* iii. 337 (the Myrung plant only).

SUBTROPICAL HIMALAYA, alt. 4–7000 ft., from Nepal to Bhotan. KHASIA MTS. and MUNNIPORE, alt. 4–6000 ft.

Leaves 1½–2 ft. by ½–1 in. *Scape* 6–18 in., curved, densely clothed with imbricating compressed lanceolate acuminate sheaths 2–5 in. long; raceme pendulous, 4–8 in. long; rachis slender; flowers densely imbricate, inodorous; bracts small, membranous, acute; sepals and petals linear-oblong, acute, tips concave; lip as long as the petals, very slightly recurved; hypochile narrowly cuneate, side lobes spreading, broadly oblong, obtuse, nearly as long as the suborbicular or obcordate undulate midlobe; column very slender, base hairy in front. *Capsule* turgidly ellipsoid.—

In Griffith's Herb. this is named *C. syringodorum*, doubtless through a misplacement of labels (see *C. eburneum*, p. 12). In Herb. Calcutt. there are drawings of 3 forms apparently of this:—1. raceme laxer-flowered, flowers larger nearly white flushed with pale pink, lip not represented; 2, leaves 12–18 in., scape stout, sheaths distant, 2 in. long, and raceme inclined, flowers few, secund, drooping, pale yellow-green, lip yellow, no ridges shown; 3, a smaller plant, leaves 9 in., scape 7 in., densely clothed with imbricating sheaths 3 in. long; raceme suberect, secund, 5-fld.; flowers yellowish, 1¾ in. long: this last is named *Cymbid. elegans*, var. *lutescens*.

2. **C. Mastersii,** *Benth. in Journ. Linn. Soc.* xviii. 318; raceme short, flowers 2 in. long white, lip quite glabrous purple spotted, central ridge evanescent below, column glabrous, capsule 2 in. long. Cymbidium Mastersii, *Griff. mss. ex Lindl. in Bot. Reg.* 1845, t. 50; *in Gard. Chron.* 1845, 643; *Paxt. Fl. Gard.* t. 78; *Floral Mag. N. S.* t. 391; *Jard. Fleur.* t. 289; *Reichenbachia*, t. 66. C. micromeron, *Lindl. in Journ. Linn. Soc.* iii. 29 (*excl. lip*). ? C. affine, *Griff. Notul.* iii. 336; *Ic. Plant. Asiat.* t. 291, f. 3; *Lindl. l. c.* 28.

Assam, *Mann.* Khasia Mts., alt. 4–5000 ft., *Griffith*, &c.

Habit and foliage of *C. elegans*, but raceme very short, decurved at the top, flowers larger, always white with a little red on the lip and smelling of almonds, lip broader, without the basal calli and quite glabrous; column stouter and pollinia broader; capsule very much larger.—It is not easy in the case of indifferent dried specimens to distinguish this from *Cymbid. eburneum* except by the smaller flower. Lindley's *Cymbid. micromeron* consists of a flowering and fruiting specimen of this, together with the loose lip and column of a *Cœlogyne*, from which the specific character is drawn. The same author, referring to Griffith's description of *C. affine* (from Churra), to that of *C. densiflorum* from Myrung, and of another species from Sururcem (all in the Khasia Mts.), observes, "It is impossible to reconcile the statements made for Griffith by his editor, without assuming that some confusion has taken place." To this confusion Lindley has added by transferring the name *affine*, Griff., from the Churra to the Sururcem plant. Of the three the only one certainly recognizable by the description is *C. densiflorum*, which is certainly *Cyperorchis elegans* (I have gathered it at Myrung). *C. affine* and the unnamed one, having white flowers, are both probably *C. Mastersii*, a name which Griffith's *affine* would have superseded, had he really given it; but on referring to his mss. preserved at Kew, I find no such name, Griffith's description being headed "Cœlog. affine," meaning simply that it is a plant allied to *Cœlogyne*, and the Churra plant is so ticketed by himself in both his own herbarium (at Kew) and in Lindley's, to whom he sent a specimen No doubt the error was the editor's, who replaced *Cœlog.* by *Cymbidium*. The name of *Mastersii* is an mss. one of Griffith's given to cultivated specimens which he sent from the Calcutta Gardens to the Royal Horticultural Society.

C. affine, Warner Orchid. Alb. t. 140; Floral Mag. N. S. t. 346, is certainly not the plant described and figured under that name by Griffith; it has widely spreading sepals and petals, and the lip of a true *Cymbidium*.

3. **C. cochleare,** *Benth. in Journ. Linn. Soc.* xviii. 318; raceme elongate, sepals and petals very narrow, flowers 2 in. long, greenish brown, lip glabrous, median ridge strong 2-fid or spathulate at the tip vanishing downwards, column very slender glabrous, pollen pyriform, capsule 1½ in. long. Cymbidium cochleare, *Lindl. in Journ. Linn. Soc.* iii. 28.

Sikkim Himalaya, alt. 4–6000 ft., *J. D. H.*, &c. Khasia Hills, alt. 5–6000 ft., *Clarke*; at Myrung, *Griffith*. Tezpore in Assam, *Mann*.

Leaves 2–3 ft. by ½–¾ in. *Scape* 12–18 in., very slender; sheaths 3–4 in., lax; sepals and revolute petals brownish green; lip yellow speckled with red, midlobe suborbicular, golden-yellow.

41/1. **CREMASTRA,** *Lindl.*

A terrestrial herb; rootstock tuberous. *Leaves* radical, elliptic, plicate. *Scape* solitary, stout, sheathed. *Flowers* in secund racemes, pendulous. *Sepals* and *petals* very long, narrow, connivent in a tube below, lanceolate acuminate and spreading and recurved above. *Lip* adnate to the base of the column, erect, linear, base subsaccate, tip dilated 3-lobed, lobes linear, disk with a tongue-shaped appendage. *Column* very long, slender, straight, top dilated 3-lobed; anther shortly stipitate, 1-celled; pollinia 4, ovoid, compressed, caudicle and gland membranous.

C. Wallichiana, *Lindl. Gen. & Sp. Orchid.* 172; *Franch. & Savat. Enum. Pl. Jap.* ii. 24. Hyacinthorchis variabilis, *Blume Cent. Plant. Nov.* 1829, 4; *Mus. Bot.* 48, fig. 16; *Walp. Ann.* iii. 628.

TEMPERATE HIMALAYA; Nepal, *Wallich.* Sikkim, alt. 5–7500 ft., *J. D. H.*, &c. —DISTRIB. Japan.

Tuber the size of a chestnut. *Leaves* 6–10 by 2–2½ in., subsessile or petioled. *Scape* with raceme 1–2 ft.; sheaths long, loose; flowers 1½ in. long, narrow, purple; pedicels short; bracts linear.—I find no evidence of Blume's "Centuria" ever having been published, or even printed; if it was so, his name has priority.

42. **GEODORUM,** *Jackson.*

Terrestrial herbs, rootstock tuberous hypogeal. *Leaves* elliptic, acute, plicate. *Scape* from the rootstock, stout, erect, sheathed, shorter than the leaves; flowers crowded in decurved racemes, bracts narrow membranous. *Sepals* and broader *petals* conniving or spreading. *Lip* sessile on the base or short foot of the column, cymbiform, membranous, margins involute, disk with or without ridges ending in calli, and with a forked b sal callus. *Column* short, stout; anthers 2, cells, appendaged after dehiscence by the persistent detached faces of the cells; pollinia 2, broad foveolate sessile or subsessile on a broad strap or gland.—Species 6–8? Indian, Malayan and Australian.

I am unable to define the species from Herbarium specimens, or to reduce to any system the descriptions and drawings of Roxburgh, Brown, Lindley and Griffith. The following descriptions are provisional only. I have spent days to no purpose in endeavours to improve on it by the analysis of specimens.

1. **G. purpureum,** *Br. in Hort. Kew, Ed.* 2, v. 207 (*Char. reform.*); usually tall, leaves at length petioled, sepals linear-oblong acute 3-nerved, petals rather broader obovate-oblong apiculate 5-nerved, lip subpanduriformly oblong, tip dilated 2-lobed, disk with a broad channelled ridge ending in rased calli or a crenate callus. *Lindl. Gen. & Sp. Orchid.* 175; *Dalz. & Gibs. Bomb. Fl.* 266. G. dilatatum, *Wall. Cat.* 7376. Limodorum nutans, *Roxb. Cor. Pl.* i. t. 40; *Fl. Ind.* iii. 470 (*descr. and fig. in both erroneous*). Malaxis nutans, *Willd. Sp. Pl.* iv. 93.

TROPICAL HIMALAYA, from Nepal eastwards; BENGAL, ASSAM, BURMA, &c. DECCAN PENINSULA and CEYLON.—DISTRIB. Malay Islands, Australia?

Brown's *G. purpureum* was founded on Roxburgh's drawing of *Limodorum nutans*, a native of the Circars, but of which no specimen is recorded to exist. It is represented and described as having the scape longer than the leaves, a lax-fld. raceme, and an acute lip; characters not hitherto found in any *Geodorum*. But if it be allowed that the elongate scape and lax-flowered raceme are due to the lengthening

of the axis of the scape after flowering, and that the appearance of an acute lip is due to the infolding of its margins towards the apex, then the *G. purpureum* is the commonest and widest-distributed Indian species. Dalzell and Gibson alone identify a plant with *G. purpureum*, Br., and I have examined authentic specimens of it, which they did not, for they give Brown's characters for the species, whilst those of their specimens are what I have given above. *G. purpureum* is the tallest and largest-leaved Indian species; its flowers vary from white veined with red-purple to pale purple with stronger veins.

2. **G. dilatatum,** *Br. in Hort. Kew, Ed.* 2, v. 207; leaves usually sessile, sepals linear-oblong subacute 3–5-nerved, petals obovate-oblong 5–7-nerved, lip broadly cymbiform, tip dilated recurved crenulate or undulate, disk smooth or with granulate nerves ending in irregular small tubercles. *Lindl. Gen. & Sp. Orchid.* 175; *Lodd. Bot. Cab.* t. 1797; ? *Wight Ic.* t. 912. Limodorum recurvum, *Roxb. Cor. Pl.* i., 33 t. 39; *Fl. Ind.* iii. 469. Malaxis cernua, *Willd. Sp. Pl.* iv. 93. Otandra cernua, *Salisb. in Trans. Hort. Soc.* i. 261.

ASSAM, SILHET, BURMA, the DECCAN PENINSULA and CEYLON (*all more or less doubtful*).

If I am right in respect of this species, it differs from *purpureum* in its lower stature, broader petals and lip, the disk of which is smooth, granulate or subcaruncled. Wight's figure is probably an exaggeration of the flowers. Dalzell and Gibson describe it as a Concan plant, but I have seen no specimens so named by them.

3. **G. candidum,** *Wall. Cat.* 7374; flowers ascending or erect, sepals linear-oblong, petals almost orbicular 7–9-nerved, lip very broad narrowed upwards from the 2-crested dilated base, disk nearly naked, tip crenulate. *Lindl. Fol. Orchid.* (*in part*). G. attenuatum, *Griff. in Calc. Journ. Nat. Hist.* v. 358, t. 24.

BURMA, *Griffith*; Tenasserim, at Moulmein, *Wallich*.

Griffith further describes his *G. attenuatum* (which is certainly the same as Wallich's *candidum*) as having a truncate spike, subequal sepals and petals (which they are not in his drawing in Herb. Calcutt.), inodorous white wide flowers, less spreading than usual, tip of lip concave, almost conduplicate, emarginate, crenate, disk with a callus, column sprinkled with cellular pubescence below the stigma and along the broad nerves of the lip, and a very short column with a bidentate tooth on each side of the apex.—It is a very distinct species. A single specimen of *G. citrinum* is on the sheet with Wallich's specimens of this.

4. **G. citrinum,** *Jackson in Andrews' Bot. Rep.* t. 626; flowers 1½ in. diam. yellow, sepals and petals very broad acute, lip large oblong deeply saccate with an obtuse gibbosity or spur, more or less streaked with red or purple, disk nearly smooth yellow, tip rounded or emarginate. *Lindl. Gen. & Sp. Orchid.* 176; *Fol. Orchid.* 3; *Bot. Mag.* t. 2195; *Wall. Cat.* 7375; *Walp. Ann.* vi. 633.

CHITTAGONG, *Wallich*. MOULMEIN, *Wallich, Parish*. PENANG (*Ic. in Herb. Kew*).

The figure in the Bot. Repository represents a plant with bracts hardly exceeding the ovary, 4–5 pale yellow flowers 1½ in. in diameter, a large saccate subcalcarate lip broadly oblong with recurved margins, emarginate tip, and yellow and faint purple markings on each side of the smooth disk. The Bot. Mag. plant has flowers as large, but pale green, the lip is similar but not emarginate, and is streaked with red nerves; the pedicels are much longer with the ovary 1¼ in. long, and there are many long bracts below, but not on, the raceme, where they are small. The *G. citrinum*, Jacks. ? of Wall. Cat. 7375 has the long bracts below the inflorescence of the Bot. Mag. plant, but very short pedicels and a smooth lip with incurved and then reflected margins.—The Penang drawing shows short pedicels, pale greenish white flowers, a saccate lip with recurved margins and red nerves; there are only one or two bracts below the

inflorescence, and the floral are as long as the ovaries.—The var. *β. albido-purpureum*, Par. & Reichb. f. in Trans. Linn. Soc. xxx. 145, from Moulmein, has bracts as long as the flowers, but none below the inflorescence, green sepals and petals, and a dingy purple streaked lip.

DOUBTFUL SPECIES.

G. PALLIDUM, *Wall. in Don Prodr.* 31. There is no specimen of this in Wallich's Herbarium, nor is the name in his Catalogue; but there is a *Geodorum* in Herb. Kew, sent to Sir W. Hooker by Wallich from Nepal in 1818, which is, I think, *purpureum* as defined above. *G. pallidum*, Griff. l. c. 357, from Assam and Silhet, described from garden specimens, is perhaps the white-fld. *purpureum*; its flowers are described as rather small.

G. APPENDICULATUM, *Griff. in Calc. Journ. Nat. Hist.* v. 360, t. 24, is probably, as suggested by Griffith, Brown's *G. dilatatum*.

G. CANDIDUM, *Lindl. Fol. Orchid.* 3, Limodorum candidum, *Roxb.*, from Silhet, Khasia and Moulmein, is probably *dilatatum*; it is certainly not *G. candidum*, Wall. Cat. 7374.

G. DILATATUM, *Lindl. in Bot. Reg.* t. 675, is, I think, pale-fld. *purpureum*.

G. FUCATUM, *Lindl. in Bot. Reg.* t. 1687; *Fol. Orchid.* 5, from Ceylon, resembles a small *G. purpureum*. Thwaites states that he has never seen it.

G. LAXIFLORUM, *Griff. l. c.* 356, t. 24, from Assam, *Jenkins*, strongly resembles *G. citrinum* in its broad petals, dilated undulate emarginate white lip with the disk tinged with yellow and purplish base.

G. HARIFLORUM, *Lindl. Fol. Orchid.* 3, from Assam, is, I think, certainly *G. purpureum*.

GEODORUM sp., a narrow-leaved plant, with the habit of *G. purpureum*, from Mount Ophir, Malacca, *Griffith*, resembles the Philippine *G. semicristatum*, Lindl.

G. JAVANICUM, *Lindl. Fol. Orchid.* 2. (*Cistella cernua*, Blume Bijdr. 293, t. 55), of Java, is a small-fld. species confidently referred by Reichenbach (*Bonpland.* 1857, 43) to *G. dilatatum*, with the observation that Wight's *G. dilatatum* is a totally different plant.

43. GRAMMATOPHYLLUM, *Blume.*

Large stout epiphytes. *Leaves* linear, distichous, jointed on their sheaths. *Scapes* lateral, long, stout; flowers large, racemose. *Sepals* and *petals* subequal, spreading. *Lip* small, adnate to the base of the column (mobile?) erect, concave; its side lobes embracing the column, midlobe short recurved. *Column* semiterete, foot 0, top incurved; anther broad, 2-celled; pollinia 2, subglobose, 2-cleft, attached one to each horn of a curved strap or gland.—Species 3 or 4, Malayan.

G. speciosum, *Blume Bijdr.* 377, fig. 20; *Rumph.* iv. 47, t. 191; gigantic, flowers 6 in. diam. golden spotted with brown. *Lindl. Gen. & Sp. Orchid.* 628; *Miquel Fl. Ind. Bat.* iii. 708; *Bot. Mag.* t. 5157; *Part. Fl. Gard.* ii. t. 69; *Fl. des Serres*, t. 1386; *Batem. 2nd Cent. Orchid.* t. 181; *Jard. Fleur.* t. 235; *Gard. Chron.* 1878, ii. 181, f. 36; 1890, i. 289, f. 46; *Walp. Ann.* vi. 628. G. fastuosum, *Lindl. in Paxt. Fl. Gard.* ii. 159 *under* t. 69. G. macranthum, *Reichb. f. Xen. Orchid.* ii. 16; *Walp. Ann. l. c.* Pattonia macrantha, *Wight Ic.* t. 1750. Gabertia scripta, *Gaud. in Freyc. Voy. Bot.* 425. Cymbidium scriptum, *Swartz in Schrad. Diar.* 1799, 228; *Willd. Sp. Pl.* iv. 100. Epidendrum scriptum, *Linn. Sp. Pl.* 1351.—*Rumph. Amboin.* vi. 95, t. 42.

TENASSERIM, *Parish.* PERAK, *Scortechini.* MALACCA, *Griffith* (*Kew Distrib.* 5318), *Maingay* (*K. D.* 1655).—DISTRIB. Java, Borneo.

Stems 8–10 ft., tufted, as thick as the wrist. *Leaves* 1½–2 ft. by 1½–1¾ in., equitant, lorate, acute. *Scape* 4–6 ft., as thick as the finger, terete; bracts ovate; pedicels 4–6 in., as thick as a goose-quill; sepals and petals fleshy, obovate-oblong, variable in breadth, undulate, spreading and reflexed; lip half the length of the sepals, side lobes short, subacute; midlobe ovate, hirsute, disk with depressed

straight nerves and two linear ridges between the side lobes.—I cannot find characters whereby to distinguish *G. fastuosum* & *macranthum*; the latter was founded on Griffith's specimens. The flowers vary much in size, and the sepals and petals of the Perak plant are narrower than in the others.

44. **DIPODIUM,** *Brown.*

Stems leafy, tufted and epiphytic in the Indian species (terrestrial and leafless in Australian). *Leaves* coriaceous, jointed on their sheaths, equitant. *Racemes* long-peduncled, flowers rather large; perianth of *Grammatophyllum*, but with the base of the lip forming a small sac with the column, and the side lobes reduced to small teeth; pollinia separately stipitate on a globose gland.—Species 6, Australian, Malayan and Pacific.

1. **D. pictum,** *Reichb. f. Xen. Orchid.* ii. 15, and 20, t. 107; stem elongate scandent epiphytic from a terrestrial root, leaves spreading and recurved linear. *Walp. Ann.* iii. 562, vi. 647. Wailesia picta, *Lindl. in Journ. Hort. Soc.* iv. (1849) 262; *in Part. Mag. Bot.* xvi. 321, *with fig.* Grammatophyllum scandens, *Griff. Notul.* iii. 345; *Ic. Pl. Asiat.* t. 324. Leopardanthus scandens, *Blume Rumph.* iv. 47; *Mus. Bot.* i. 47, t. 15.

MALACCA, *Griffith, Maingay.*—DISTRIB. Java.

Leaves 12–18 in., tip oblique acute. *Peduncle* with the raceme 10–12 in., purple; bracts short, ovate; pedicels short, stout; flowers 1½ in. diam., yellowish white blotched with crimson; sepals and petals elliptic-oblong obtuse; lip ovoid, narrowed into a broad tomentose claw; side lobes linear acute, midlobe ovate acute concave, pinkish streaked with crimson, disk and lip villous.

2. **D. paludosum,** *Reichb. f. Xen. Orchid.* ii. 15; stem and scape strict erect, leaves strict ensiform erect. *Walp. Ann.* vi. 648. Grammatophyllum paludosum, *Griff. Notul.* iii. 344. G. affine, *Griff. Ic. Pl. Asiat.* t. 323. Wailesia paludosa, *Reichb. f. in Bonpland.* 1854, 93.

MALACCA, in swamps, *Griffith* (*Kew Distrib.* 5317), *Maingay* (*K. D.* 1657) PERAK, *Wray.*

Stem 1–2 ft. *Peduncle* as long; bracts small, ovate, acute; pedicels very short; flowers 1½ in. diam., sweet-scented, white blotched with purple; sepals and petals reflexed; lip lanceolate, acute, with a villous ridge from the base to the cuspidate tip; side lobes reduced to small teeth.

45. **THECOSTELE,** *Reichb. f.*

Epiphytes, pseudobulbous. *Leaf* 1, shortly petioled. *Scape* basal, slender; flowers racemed. *Sepals* subequal, broad. *Petals* much narrower. *Lip* connate with the foot of the column, 3-lobed; base with the foot forming a ventricose tube perforate in front; side lobes small, erect; midlobe entire or 3-lobulate, velvety. *Column* slender, arched, with incurved apical wings; anther 2-celled; pollinia 2, subglobose, separately stipitate on a scale-like gland.—Species 3.

1. **T. Zollingeri,** *Reichb. f. in Bonpland.* v. 37; *Xen. Orchid.* ii. 133, t. 147; side lobes of lip subclavate sigmoid, midlobe broadly obcordate. T. alata, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 135. Cymbidium alatum, *Roxb. Fl. Ind.* iii. 459.

CHITTAGONG, *Roxburgh.* TENASSERIM, *Parish.*—DISTRIB. Borneo.

Pseudobulbs the size of a nutmeg or narrower. *Leaf* 5–9 in., oblong or linear-oblong. *Scape* with the raceme 5–8 in., decurved; bracts minute, acute, persistent; flowers ¾ in. diam., blotched with brick-red; sepals acute, dorsal lanceolate geniculately arched, lateral falcate ovate.

2. **T. Maingayi,** *Hook. f. Ic. Plant ined.*; side lobes of lip fan-shaped, midlobe broadly ovate reflexed.

MALACCA, *Maingay.*

Pseudobulbs oblong, ⅔–1 in. *Leaf* 3–5 in., from obovate- to linear-oblong. *Scape* with 6–8-fld. raceme 4 in.; flowers 1 in. diam.; sepals acuminate.—Only one specimen seen.

3. **T. quinquefida,** *Hook. f. Ic. Plant ined.*; side lobes of lip linear, midlobe deeply 3-lobulate, side lobules hatchet-shaped, mid-lobule ovate acute.

MALACCA, *Maingay.*

Pseudobulbs 1 in., oblong. *Leaf* 5–7 in., linear-oblong, tip obtuse very oblique. *Scape* with raceme 3 in.; flowers 1 in. diam.; sepals acute, lateral very broad; lip 5-fid from the deep lobing of the midlobe.

46. BROMHEADIA, *Lindl.*

Terrestrial erect rigid leafy herbs, pseudobulb 0. *Leaves* distant. *Flowers* in terminal simple or branched rigid racemes or panicles; bracts thick, imbricate, persistent. *Sepals* and *petals* subequal, narrow, widely spreading. *Lip* adnate to the base of and embracing the column, erect, side lobes erect, midlobe spreading, entire. *Column* membranous, broadly 2-winged, foot 0, top hooded; anther sub-2-celled; pollinia 2, ovoid, sulcate, sessile on a scale-like gland.—Species 2.

1. **B. palustris,** *Lindl. in Bot. Reg.* 1841, *Misc.* 89; 1844, t. 18; tall, leaves 3–5 in., racemes many-fld. *Bot. Mag.* t. 4001; *Wight Ic.* t. 1740; *Walp. Ann.* vi. 630. B. Finlaysoniana, *Reichb. f. in Walp. l. c.* 882. Grammatophyllum ? Finlaysonianum, *Lindl. in Wall. Cat.* 7561; *Gen. & Sp. Orchid.* 173.

PENANG, PERAK, MALACCA and SINGAPORE (in dry exposed places, *Ridley*).—DISTRIB. Sumatra, Philippines.

Stem 4–8 ft., terete, very stout. *Leaves* 3–5 by ⅔–½ in., tip 2-lobed, many-nerved. *Peduncle* 6–12 in., strict; sheaths many, appressed; raceme 1–7 in., bracts ovate, obtuse, thickly coriaceous (rachis appearing serrate); pedicel with ovary 1 in.; flowers 2½–3 in. diam., sweet-scented; sepals linear-oblong, obtuse, spreading and recurved, white or pale pink; petals broader; lip white, disk purple, side lobes subacute streaked with purple; midlobe rounded apiculate, yellow, granulate; column elongate cymbiform.

? 2. **B. aporoides,** *Reichb. f. Ot. Bot. Hamb.* 44; dwarf, leaves 1½–2 in., peduncle very short 1–2-fld.

TENASSERIM; at Moulmein, *Parish.*

Stems tufted, 1–1½ in., clothed to the base with coriaceous falcate ensiform acute leaves. *Peduncle* ½ in., clothed at the base with small coriaceous imbricate sheaths; flowers 1 in. long; sepals and petals oblong-lanceolate, acute, white; lip oblong, side lobes triangular acute streaked with red, midlobe small ovate yellow papillose; column slender; gland of pollinia lunate.—I have seen only very imperfect specimens, which differ so greatly in habit, foliage and the slender column from *B. palustris*, that I suspect the species will prove to be generally distinct. The habit is that of *Dendrobium atropurpureum.*

47. POLYSTACHYA, *Hook.*

Pseudobulbous leafy epiphytes. *Leaves* few, distichous, narrow, coriaceous, jointed on their sheath. *Scape* terminal, sheathed; flowers very small, in narrow panicles. *Sepals* free, dorsal ovate, lateral triangular adnate to the foot of the column. *Petals* very narrow. *Lip* superior, clawed, jointed on the foot of the column, erect, 3-lobed, side lobes small

erect, midlobe spreading or recurved. *Column* short, broad; anther 1- or sub-2-celled; pollinia 4, ovoid, cohering or connate in pairs, attached to a very short strap, or gland?—Species about 40, all tropical, chiefly American.

1. **P. Wightii,** *Reichb. f. in Walp. Ann.* vi. 640; stem 4–6 in., flowers yellow, lip broader than long, side lobes nearly as long as the short broad rounded midlobe, disk with the median ridge densely furfuraceous. P. luteola, *Wight Ic.* t. 1678.

MALABAR; on the Iyamallay Hills, *Wight* (*Kew Distrib.* 2990). ? PENANG, *Curtis.* ? CEYLON.

Leaves 2–3, 4–6 by ¾–1 in. *Stem* stout; panicle glabrous, branches short; sheaths long, coriaceous, flattened; bracts small, acute, persistent; flowers yellow; sepals ½ in. long, acute. *Capsule* ½ in. long.—*P. luteola,* Hook. Exot. Flor. t. 105, figured from a cultivated specimen said to have been sent by Wallich, has been pronounced by Lindley (Bot. Reg. 1838, Misc. 78) to be a West Indian plant. No original specimen of it was preserved. Lindley distinguishes it from the Indian plant by the capsule being nerveless between the ribs, whilst those of the latter are reticulated. The figure in Flor. Exot. represents the sepals as obtuse. Much better specimens of the Indian species are wanted to determine their differences from one another and from the Mauritian and others, and the genus wants working up.

2. **P. purpurea,** *Wight Ic.* t. 1679; flowers purplish, lip longer than broad, side lobes much shorter than the large rounded midlobe, disk with a short median ridge furfuraceous. *Walp. Ann.* vi. 640.

TRAVANCORE; on the Iyamallay Hills, *Wight* (*Kew Distrib.* 2991).

Very near if not a variety of *P. Wightii,* but the flowers are smaller, and if my analysis is correct (the materials are unsatisfactory) the lip is much narrower.

3. **P. zeylanica,** *Lindl. in Bot. Reg.* 1838, *Misc.* 78 (*excl. Syn.*); stem 12–18 in., lip cuneate-obovate, side lobes small acute, midlobe rounded, disk furfuraceous, capsule ½ in. reticulate between the ribs. *Walp. Ann.* vi. 639.

CEYLON, *Walker, Gardner.*

A very much larger plant than either of the former, with a stout stem, and panicle 6–10 in. long with branches 1–3 in. long, flowers larger, and leaves larger and broader upwards. The Mauritian *P. mauritiana,* Spreng. Syst. Veg. iii. 742 (Dendrobium polystachys, *Thou. Orchid. Afric.* t. 85), which Lindley referred to this more resembles *P. Wightii.*

48. PLOCOGLOTTIS, *Blume.*

Terrestrial herbs with the creeping rhizome, habit and inflorescence of *Tainia* and *Chrysoglossum,* from which they are only distinguishable by the short erect quadrate lip having its sides confluent with the sides of the short column, and by having the four pollinia attached in pairs by 2 stipes to a gland.—Species 4 or 5, Indian and Malayan.

1. **P. acuminata,** *Blume Mus. Bot.* i. 46; leaf solitary, bracts lanceolate as long as the pedicel or longer, raceme puberulous. *Miquel Fl. Ind. Bat.* iii. 676.

PERAK, alt. 2–3000 ft., *King's Collector.*—DISTRIB. Java, Sumatra.

Leaf-blade 10–12 by 2½–3 in., elliptic-lanceolate, longer than the slender petiole. *Scape* as long or longer, slender; raceme very lax-fld., simple or with a branch from the base; bracts ½ in., lanceolate, acuminate; pedicel with ovary as long; flowers 1 in. diam., sparsely puberulous; dorsal sepal lanceolate; erect lateral oblong-lanceolate, falcate, finely acuminate, 5-nerved; petals narrowly lanceolate, falcate; lip quadrate, contracted above the base, angles rounded, retuse in front with a long cusp; spur a conical gibbosity.—The specimen is not very good, but I think it is *P. acuminata.*

2. **P. javanica,** *Blume Bijdr.* 380, t. 21; *Orchid. Archip. Ind.* t. 14; *Mus. Bot.* i. 46; leaf solitary, bracts short ovate, raceme glabrous. *Lindl. Gen. & Sp. Orchid.* 132.

PERAK, alt. 3–1200 ft., *Scortechini, King's Collector.*—DISTRIB. Java.

Leaf-blade 10–12 by 3–4 in., as long as the very slender petiole. *Scape* much longer than the leaf, very slender; raceme 8–10 in.; bracts ⅛–¼ in., often recurved; flowers ⅜ in. diam., pale yellow speckled with red; dorsal sepal long, arched, narrowly lanceolate; lateral oblong-lanceolate, falcate, acute; petals narrowly oblanceolate, falcate; lip broadly obovate, angles and tip rounded, acuminate or cuspidate; spur a gibbosity.—A *Plocoglottis* from Malacca, *Maingay,* resembles this, but has a shorter raceme, and is described (by Maingay) as having obtuse sepals; the specimen is flowerless

49. LUISIA, *Gaud.*

Tufted epiphytes; stem terete, rigid, sheathed, pseudobulbs 0. *Leaves* elongate, terete, obtuse. *Flowers* drooping, small, spicate on a short or very stout erect axillary rachis; bracts very short, thick, imbricating, persistent. *Sepals* subequal or the decurved dorsal smaller. *Petals* often longer, narrower. *Lip* sessile on the base of the column, base flat concave or saccate. *Column* very short, truncate; anther 2-celled; pollinia 2, subglobose, seated on a replicate short strap. *Capsule* narrow, erect.—Species about 15, tropical Asia to N. Caledonia.

The materials at my disposal for the elucidation of this remarkable genus are, though considerable, far from being sufficient. Above all careful drawings for living plants should be obtained, when the following attempt at diagnosing the Indian species will want revision and probably correction.

* *Petals not much longer than the lateral sepals (most so in* L. primulina).

1. **L. teretifolia,** *Gaud. Bot. Freyc. Voy.* 427, t. 37; leaves 4–6 in., flowers small, lateral sepals subacute keel winged, petals linear-oblong obtuse hardly longer than the sepals, hypochile subquadrate saccate, epichile broadly cordate. *Blume Rumph.* i. t. 194, f. 3, t. 197 D; *Mus. Bot.* i. 63; *Lindl. Fol. Orchid.* 2 (*excl. in all Syn. Ep. triste*). L. burmanica, *Lindl. l. c.* L. brachystachys, *var.* flaveola, *Par. & Reichb. f. in Trans. Linn. Soc.* XXX. 144 L. platyglossa, *Reichb. f. in Walp. Ann.* vi. 622. L. zeylanica, *Lindl. l. c.* Cymbidium triste, *Roxb. Fl. Ind.* iii. 461 (*not of Willd.*); *Bot. Mag.* t. 3648; *Wight Ic.* v. 11 (*text, not Ic.*); *Griff. Notul.* iii. 340 (*the Mergui plant*). C. tenuifolium, *Wight l. c.* t. 1689 (*Ic., not text*).

SIKKIM HIMALAYA (*Ic. Cathcart*). The KHASIA MTS., at Churra (*Ic. Jerdon*). BENGAL; in the Sunderbunds, *Roxburgh.* PEGU and TENASSERIM, *Griffith,* &c. The WESTERN GHATS, from Canara to Travancore. CEYLON, *Macrae,* &c.—DISTRIB. Malay Islands to New Caledonia.

Stem 6–12 in., stout; internodes ½–¾ in. *Leaves* variable in thickness. *Rachis of spike* ⅛–⅓ in. *Petals* ⅛–¼ in. long. *Lip* equalling or rather exceeding the sepals. *Column* very short. *Capsule* ¾–1½ in.—Blume erred in referring Willdenow's *Cymbidium triste* to Gaudichaud's *Luisia teretifolia.* The latter appears to accord with the Indian plant, and Wight's t. 1689 is very characteristic. Blume's t. 194 has larger flowers. A coloured drawing of Lindley's *burmanica* by Griffith is excellent. The petals vary in length and form, but never much exceed the sepals. The lip is in five Indian drawings purple. Blume figures a purple hypochile and yellow epichile with purple disk. Roxburgh describes the lip as dark purple with yellow spots. Griffith figures it green with black purple blotches. Wight says, "Flowers pale pink, lip conformable, afterwards purple." In var. *flaveola,* Par. & R. f., the flowers are yellow, the hypochile purple and epichile streaked with purple. Lindley's *L. zeylanica* (Macrae, 1829) is identical with the Peninsular species, but there are along with it flowers of a different and a garden plant, which he referred to *Vanda trichorhiza,* Hook. Reichenbach's *L. brachystachys,* founded on Wight's t. 1689, is

consequently *teretifolia*. Lindley's *L. trichorhiza* consists of three Nilghiri specimens of *L. teretifolia* (mislabelled Khasia Mts.), and one fruiting Khasian specimen (as indicated by Reichenbach in Herb. Lindl.). For *Cymbid. triste*, Willd., see *L. tristis*.

2. **L. brachystachys,** *Blume Rumph.* iv. 50; *Mus. Bot.* i. 64; leaves 2–6 in. slender, sepals and petals as in *L. teretifolia*, lip obovate-oblong nearly flat grooved hardly constricted at the base of the broadly ovate epichile. *Reichb. f. Xen. Orchid* i. 204, t. 78, f. 1; *Lindl. Fol. Orchid.* 3. Mesoclastes brachystachys, *Lindl. in Wall. Cat.* 1991; *Gen. & Sp. Orchid.* 45.

TROPICAL WESTERN HIMALAYA; Garwhal, *Falconer*; Kumaon, *Stewart.* SILHET and the KHASIA HILLS, *Wallich.* BENGAL, at Jessore and Dacca, *Clarke.* TENASSERIM (*Ic. Parish*).

A more slender plant than *L. teretifolia*, but perhaps a variety; flowers of the same size, but with a very different lip, which varies a little in breadth, and in the distinctness of the hypochile from the epichile. The lip is rather thin, with usually strong parallel grooves or nerves, though sometimes it is very thick and fleshy when the grooves are not visible (in the dried state). *Column* very short. *Capsule* ¾–1 in.—Clarke describes the sepals green without, rose-purple within; petals rose-purple with green tip and base; lip yellow at base, black-purple for ⅔ of upper part, but variable.

3. **L. trichorhiza,** *Blume Mus. Bot.* i. 63; leaves 4–6 in. stout, flowers twice as large as in *L. teretifolia*, petals ½ in. long about as long as the lateral sepals, lip obovate-oblong rather longer than the sepals flat grooved constricted at the insertion of the broadly ovate epichile with the quadrate hypochile, column rather long. *Lindl. Fol. Orchid.* 2; *Reichb. f. Xen. Orchid.* t. 77. f. 878. ? Vanda ? trichorhiza, *Hook. Fl. Exot.* t. 72.

TROPICAL HIMALAYA, *Wallich*; Garwhal, *Falconer.*

I have seen only two native specimens of this plant, a flowering and a fruiting, from Garwhal, they bear the mss. name of *L. retusa*, Reichb. f. It is the only species that approaches the Flora Exotica *Vanda ? trichorhiza* in the size of the flower and length of the column, differing from it only in the lip not being longer than the sepals, which is a very variable character. Flowers of *V. ? trichorhiza* in Lindley's Herbarium closely resemble this, except in having a longer lip. A spike of flowers of *V. trichorhiza* in Herb. Hook. is presumably from the type plant; the flowers are on slender pedicels, with the lip grooved as in *brachystachys*, but with the sepals and petals narrower and more acute. Of the hairy roots of *V. trichorhiza* described in Fl. Exot. I know nothing, but Lindley, who no doubt saw the original plant, says that it has sometimes an enormous development of downy roots.

4. **L. filiformis,** *Hook. f.*; stem elongate slender, leaves 6–12 in., very slender, rachis of spike very stout short few-fld., flowers ½–⅔ in. diam., lateral sepals cymbiform, keel broadly winged, petals linear and lip fleshy, hypochile broad flat smooth, epichile subquadrate deeply many-grooved, tip incurved fleshy, column very short broad.

SILHET; at Terrya Ghat, *Mann.*

Stem probably several feet long; internodes 1-2 in. *Leaves* as thick as a crow quill. *Petals* hardly longer than the lateral sepals.—Except in the short petals this a good deal resembles *L. Grovesii.*

5. **L. micrantha,** *Hook. f.*; stem short robust, leaves 2 in. slender, rachis of spike short thick few-fld., flowers ⅓ in. diam., lateral sepals ovate subacute midrib very stout, petals oblong obtuse, hypochile of lip oblong concave with 2 strong incurved teeth on each side, epichile lozenge-shaped fleshy, column rather long.

ASSAM, *Griffith* (*in Herb. Wight*). KHASIA HILLS, alt. 3–4000 ft., *Mann*

Stem 2–5 in.; internodes ½–½ in. *Leaves* as thick as a sparrow quill. *Rachis* of spike clothed with imbricate ovate acute bracts; pedicels decurved; flowers punctulate; dorsals sepal oblong obtuse and similar petals 1-nerved; lip as long as the sepals, epichile about half as long as the hypochile both concave.—Griffiths' specimens are not in flower but appear to be the same as Mann's, which are so.

6. **L. primulina,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 144, t. 30, f. 1; stem short very stout, leaves 3–4 in. very stout, rachis short few-fld., sepals subequal oblong acute, petals larger obovate-spathulate obtuse, lip much longer than the lateral sepals yellow, hypochile small short saddle-shaped, epichile large triangular-ovate obtuse, margin obscurely lobulate.

TENASSERIM; at Moulmein, *Parish.*

Stem 3–4 in.; internodes short. *Leaves* ½ in. diam. *Flowers* ⅔ in. diam., pale yellow with a purple column.—Described chiefly from a drawing by Parish. A drawing in Herb. Calcutt. of apparently the same species (collected at Moolyet, Moulmein) has elliptic-acute sepals, a shorter cordate epichile, a larger hypochile with a purple disk, and a yellow column; its concave lateral sepals are spurred at the back. There are in Herb. Kew flowers and leaf of a cultivated plant from Burma (Hort. Kew), resembling this, but with a purple lip.

7. **L. macrotis,** *Reichb. f. in Gard. Chron.* 1869, 1110; habit and leaves of *L. Psyche,* sepals triangular keeled, petals longer triangular ligulate acute flat base broad, lip much longer than the sepals violet-black triangular-ovate from a broad 2-auricled base sulcate.

ASSAM (*Hort. Day*).

I have seen only flowers of what I take to be this (Hort. Kew), in which the sepals are ovate-oblong, subacute, the petals much longer (⅓ in. long), linear-oblong, obtuse, and the lip very like that of *L. primulina,* and of the same size, but dark purple. The shape of the petals distinguishes it from *primulina.*

** *Petals much longer than the sepals.*

8. **L. Psyche,** *Reichb. f. in Bot. Zeit.* 1863, 98; *in Gard. Chron.* 1865, 342; stem tall stout, leaves 3–5 in. stout, rachis short, flowers few large, petals linear-spathulate or obovate obtuse twice as long as the obtuse concave sepals, lip broadly ovate-oblong retuse, base contracted saccate 2-auricled. *Bot. Mag.* t. 5558.

TENASSERIM; at Moulmein, *Parish.* ? KHASIA HILLS, alt. 3000 ft., *Mann.*

Stem 1 ft., internodes 1 in. *Leaves* strict, ¼ in. diam. *Sepals* ½ in. long, petals 1¼ in., variable in breadth, both pale greenish yellow. *Lip* convex, nearly 1 in. long, violet-brown, tessellated with white or yellow, auricles erect, embracing the white column. *Capsule* 1½–2 in. long.—Mann's specimen is in fruit only. It has a large clavate capsule as figured by Parish in his drawing of *L. Psyche.*

9. **L. tenuifolia,** *Blume Rumph.* iv. 50; *Mus. Bot.* i. 63; stem long slender, leaves 4–7 in., rachis ½ in., flowers few large, petals narrow twice as long as the ovate subacute concave sepals, lip narrowly panduriform convex base broad 2-auricled, lip with 2 divergent lobes. *Lindl. Fol. Orchid.* 2; *Thwaites Enum.* 302; *Dalz. & Gibs. Bomb. Fl.* 266; *Walp. Ann.* vi. 619. L. Birchea, *Blume Rumph.* iv. 50; *Mus. Bot.* i. 63. L. zeylanica, *Thwaites mss.* (C. P. 2347). Birchea teretifolia, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 66, t. 10. Cymbidium tenuifolium, *Lindl. Gen. & Sp. Orchid.* 167 (*excl. Syn.*). C. triste, *Wight Ic.* t. 911 (*non Willd.*).

On the WESTERN GHATS, from the Concan to Travancore, *Wight, Dalzell,* &c. CEYLON; in the Central Province, *Macrae, Thwaites.*

Leaves very variable in thickness, sometimes very long and slender. *Sepals* ½–¾ in. long, yellowish green stained or streaked with red; petals more green;

lip twice as long as the lateral sepals, white or greenish with deep purple base and lobes, or purple and streaked with paler lines (Dalzell), disk with 3 large calli. Macrae's Ceylon specimen is like the Malabar plant. A. Richards' figure of *Bircheа teretifolia* is a very bad one. Rheede's figure in xii. t. 5, on which Linnæus' *Epidendrum tenuifolium* (*Cymbidium*, Willd.) was founded, is not a *Luisia*, the leaves are grooved, and spike very different.

10. **L. volucris,** *Lindl. Fol. Orchid.* 1; stem stout, leaves 3–5 in. stout, lateral sepals cymbiform with an acute dorsal wing, petals 2–4 times as long 1–1½ in. linear dilating to the rounded tip, hypochile oblong with incurved basal auricles, epichile as long much broader ovate-cordate obtuse fleshy. *Walp. Ann.* vi. 619.

SIKKIM HIMALAYA, *J. D. H.* KHASIA MTS. and SILHET, *Lobb, J. D. H. & T. T.* ? Chittagong Hills, *Ic. in Hort. Calcutt.*

Stem 6–10 in., internodes ½ in. *Rachis of spike* ½ in., very stout. *Petals* and *sepals* very pale yellow-green; lip dark purple, epichile hardly cordate (as described by Lindley). *Capsules* 1 in.—Flowerless specimens closely resemble *L. teretifolia.* In the drawing of the Chittagong plant the stem is slender, the internodes are 1½ in. and leaves 7–9 in., the petals not dilated at the tip, and the epichile of the lip green and grooved.

11. **L. antennifera,** *Blume Rumph.* iv. 50; *Mus. Lugd. Bat.* i. 64; stem stout, elongate, leaves 3–4 in., rachis of spike very stout ¾–1½ in., petals linear ⅔ in. long twice as long as the cymbiform sepals, lip cuneately oblong, epichile hardly distinct from hypochile which has a broadly 2-auricled base. *Reichb. f. Xen. Orchid.* i. 265, t. 78, f. 2.

PERAK, *Scortechini, King's Collector.*—DISTRIB. Borneo (*Low*).

Stem a foot and upwards; internodes 1 in. (the largest of the genus except *tristis*), as are the spikes. *Flowers* in Low's drawing pale green with purple lip as long as the sepals; in note by King's collector, "pale greenish white waxy inner petals dark blue," possibly the dark blue is meant for the lip. The form of lip is the same in a drawing by Scortechini of the Perak plant.

12. **L. tristis,** *Hook. f.*; stem stout elongate, leaves stout 3–5 in., rachis of spike very stout 1–2 in., petals ⅔ in. long linear twice or thrice as long as the sepals, hypochile of lip quadrate base 2-auricled, epichile short broadly ovate-cordate grooved. Cymbidium triste, *Willd. Sp. Pl.* iv. 99. Epidendrum triste, *Forst. Prodr.* No. 314.

PENANG, *Curtis.*—DISTRIB. New Caledonia.

Very like *L. antennifera*, having the same stout habit, foliage, and thick long rachis of the spike, but the lip is very different, and is as far as can be judged from the indifferent specimens in Herb. Forster, identical with that of his *Epidendrum triste.*

13. **L. Grovesii,** *Hook. f.*; stem very slender elongate, leaves 6–10 in. filiform, rachis of spike very short few-fld., flowers 1 in. diam., lateral sepals cymbiform, petals twice or thrice as long narrowly linear obtuse, hypochile of lip subquadrate flat, epichile broadly cordate, column very short broad.

EASTERN BENGAL; in the Looshai Hills, *G. B. Groves* (*in Herb. Calcutt.*).

Closely resembles *L. filiformis*, but at once distinguished by the long petals.—Described from two drawings of plants cultivated in Hort. Calcutta, one of a specimen without locality, the other localized as above. The sepals and petals are pale yellowish, the hypochile and column dark purple, the epichile pale purplish in one with darker margins, greenish in the other, in both dark purple at the base.

DOUBTFUL SPECIES.

L. MICROPTERA, *Reichb. f. in Gard. Chron.* (1870) 1503; leaves terete rather stout, raceme few-fld., flowers small, sepals ligulate acute, longer than the petals, both straw-cold., lip half purplish half yellow, hypochile ovate uncinate at the base

on each side, epichile broadly triangular-ovate, column purplish, anther with 2 yellowish eyes in the centre of each half.—Assam, *Benson* (*Hort. Veitch*).—Description from the author l. c. Possibly the sepals longer than the petals is an error, due to the omission of a comma in the phrase "sepalis ligulatis acutis petalis longioribus."

CYMBIDIUM TENUIFOLIUM, *Willd. of Thwaites mss.* (C. P. 3530) is certainly not *L. tenuifolia*, Bl., having short petals and a broad lip. It is probably a new species near *filiformis*, but the specimen being solitary and only 1-fld. I leave it undescribed.

50. **COTTONIA,** *Wight.*

An epiphyte, stem leafy. *Leaves* long, narrow, coriaceous. *Scape* tall, very slender, branched. *Flowers* in short terminal racemes. *Sepals* subequal and narrower petals widely spreading. *Lip* sessile at the base of the column, much longer than the sepals, flat, spreading; side lobes minute basal; midlobe subpanduriform, retuse. *Column* short, foot 0; anther short, 2-celled; pollinia 2, pyriform, 2-cleft; strap linear, sides recurved; gland minute. *Capsule* slender, elongate.

C. macrostachya, *Wight Ic.* t. 1755; *Dalz. & Gibs. Bomb. Fl.* 263; *Lindl. in Journ. Linn. Soc.* iii. 39; *Bot. Mag.* t. 7099. C. peduncularis, *Reichb. f. in Cat. Orchid. Schiller* 1857, 52; *Thwaites Enum.* 303; *Walp. Ann.* vi. 860. Vanda peduncularis, *Lindl. Gen. & Sp. Orchid.* 216; *Paxt. Fl. Gard.* iii. t. 253.

The DECCAN PENINSULA; on the Ghats from the Concan southwards. CEYLON; in the Central Province.

Stem 4–8 in., leafy; internodes short. *Leaves* 5–6 by ½–¾ in., lorate, recurved, unequally obtusely 2-lobed. *Scape* 12–18 in., strict, erect; branches few, tipped by short racemes; pedicels long, slender; bracts ovate; flowers ¾ in. diam.; sepals oblong and subspathulate; petals dirty orange with red streaks; lip dark purple with a broad villous golden margin; side lobes ear-like with 3 calli between them, the median pubescent, disk of midlobe with median callus; column puberulous; rostellum obscure. *Capsule* 1½ in.—*Lip* like that of *Ophrys aranifera.*

50/1. **DIPLOPRORA,** *Hook. f.*

Stem short, slender. *Leaves* falcately lanceolate, acuminate. *Scape* short, simple, few-fld. *Sepals* widely spreading, keeled. *Petals* obovate. *Lip* as long as the petals, margins adnate to the sides of the column, cymbiform and sigmoidly curved, suddenly narrowed into a compressed 2-caudate tip, disk keeled. *Column* very short, foot 0; anther 2-celled; pollinia 2, globose; strap short linear, sides recurved; gland small. *Capsule* slender.

D. Championi, *Hook. f.*; *Ic. Plant. ined.* Cottonia Championi, *Lindl. in Hook. Journ. Bot* vii. (1855) 35; *in Journ. Linn. Soc.* iii. 39; *Benth. Fl. Hongk.* 357. Luisia bicaudata, *Thwaites Enum.* 302. Vanda bicaudata, *Thwaites l. c.* 429.

BHOTAN HIMALAYA, *Gammie.* KHASIA MTS., alt. 3–4000 ft., *J. D. H. & T. T.* TENASSERIM, *Parish.* CEYLON, *Thwaites.*—DISTRIB. Hong Kong.

Stem 1–3 in., ascending. *Leaves* 3–4 by ½–¾ in., thin and many-nerved when dry. *Scape* 1–2 in., stout; rachis flexuous; flowers few, ½ in. diam., yellow; lip with a deep longitudinal ridge within, sides streaked with red; column papillose. *Capsule* 1½ in.—Very distinct from *Cottonia* in habit, foliage, inflorescence and lip, and much nearer *Phalænopsis*, but wants the appendages on the disk of the lip and the side lobes, and differs strikingly in habit.

51. STAUROPSIS, *Reichb. f.*

Epiphytes; stem stout, leafy. *Leaves* distichous, coriaceous, flat, 2-lobed. *Flowers* in lateral racemes. *Sepals* and similar but smaller *petals* widely spreading. *Lip* sessile, adnate to the base or sides of the column, incurved, base simple or saccate, lobes narrow, disk naked or hairy. *Column* short, thick, foot 0, top truncate; anther 1-celled; pollinia 2, subglobose, 2-cleft; strap broad, gland large.—Species about 8, Malayan.

1. **S. giganteus,** *Benth. in Gen. Plant.* iii. 572; flowers very large golden-yellow ocellately blotched with cinnamon, sepals and petals spathulately obovate, lip white hatchet-shaped obtuse, base cordate, side lobes rounded, midlobe narrow obtuse fleshy, disk with a broad conical callus. Fieldia gigantea, *Reichb. f. Xen. Orchid.* ii. 39; *Walp. Ann.* vi. 871. Vanda gigantea, *Lindl. in Wall. Cat.* 7326; *Gen. & Sp. Orchid.* 215; *Fol. Orchid.* 2; *Bot. Mag.* t. 5189. *Reichb. f. l. c.* 38, t. 112; *Ill. Hortic.* 1861, 277; *Rev. Hortic.* 1874, t. 291. V. Lindleyana, *Griff. Notul.* iii. 353.

TENASSERIM; at Moulmein, *Wallich, Griffith.*

Stem pendulous. *Leaves* 1–2 ft. by 2–3 in., very thick, flat. *Raceme* 10–15 in., decurved, many-fld.; rachis very stout; bracts short, broad; flowers 3 in. diam.; lateral sepals horned behind below the tip.—Griffith describes two sterile stamens between the lateral sepals and petals.

2. **S. undulatus,** *Benth. mss.*; flowers 1½ in. diam. nearly white, sepals and petals spathulately oblanceolate waved, base of lip saccate adnate to the sides of the column, midlobe laterally compressed 3-ridged Vanda undulata, *Lindl. in Journ. Linn. Soc.* iii. 42; *Reichb. f. in Gard Chron.* 1875, ii. 212; 1878, i. 168.

EASTERN SUBTROPICAL HIMALAYA; Sikkim and Bhotan, ascending to 6000 ft. The KHASIA HILLS, alt. 5–6000 ft.

Stem 6–10 in.; sheaths and scape minutely warted. *Leaves* 3–4 by ½–¾ in., unequally obtusely 2-lobed. *Scape* 5–8 in. and raceme strict, erect, laxly few-fld. near the top; bracts ¼ in. long, broad, obtuse; flowers white flushed with pink or purplish; sepals acuminate, undulate, lateral deflexed; petals similar but smaller; lip yellow, base orbicular, sides streaked with pink; midlobe linguiform; tip truncate, sometimes purplish; pollinia globose, strap short, gland large transverse.—I am very doubtful as to the affinity of this plant, which differs from *S. giganteus* in the base of the lip being adnate to the sides of the column, and forming with it a cup with a thickened rim.

52. ARACHNANTHE, *Blume.*

Characters of *Stauropsis*, but lip jointed on to the base of the column and mobile.—Species 5 or 6, Himalayan and Malayan.

This character of the mobile lip requires confirmation in the living plant of some species.

* *Flowers in simple racemes. Side lobes of lip much smaller than the midlobe.*

1. **A. Cathcartii,** *Benth. in Gen. Plant.* iii. 573; scape few-fld., lateral sepals and petals broadly elliptic obtuse, side lobes of lip small rounded. Esmeralda Cathcartii, *Reichb. f. Xen. Orchid.* ii. 38; *Walp. Ann.* vi. 871. Vanda Cathcartii, *Hook. f. Ill. Himal. Pl.* t. 23; *Bot. Mag.* t. 5845; *Lindl. Fol. Orchid.* 8; *Ill. Hortic.* 1858, 187; *Flore des Ser.* t. 1251; *Warner Orchid. Alb.* t. 168; *Jenning's Orchid.* t. 10; *Floral Mag. N. S.* t. 66; *Gard. Chron.* 1870, 1409.

EAST NEPAL and SIKKIM HIMALAYA, alt. 3–6000 ft., *Griffith's Collectors, J. D. H.*, &c. BHOTAN (*Ic. in Hort. Calcutt.*).

Stem 12–18 in., stout. *Leaves* 6–9 by 1–1½ in., flaccidly coriaceous, lorate, unequally obtusely 2-lobed. *Scape* longer than the leaves, 4–6-fld.; bracts short, broad; flowers 2–2½ in. diam., fleshy; sepals whitish beneath, above yellowish closely barred with chocolate or red, dorsal obovate; lip shorter than the sepals, oblong, variable in breadth, side lobes erect speckled with red; midlobe shoe-shaped, obtuse, yellow, margins incurved sharply 2-keeled. *Capsule* 4 in., linear-oblong or sub-pyriform.

2. **A. bilinguis,** *Benth. in Gen. Plant.* iii. 573; scape few-fld., lateral sepals and petals oblanceolate, lip with a large recurved spur under the limb, side lobes very small rounded. Renanthera bilinguis, *Reichb. f. Xen. Orchid.* i. 7, t. 4. R. labrosa, *Reichb. f. l. c.* 88. Arrhynchium labrosum, *Lindl. in Paxt. Fl. Gard.* i. 142.

TENASSERIM; at Moulmein, *Parish*, &c. The KHASIA MTS.; at Nurtiung (*Ic. Jerdon*).

Stem elongate, as thick as a swan's quill or less. *Leaves* 5–8 by ½–¾ in., keeled, coriaceous, unequally 2-lobed. *Scape* long or short, greenish brown; flowers 4–6, distant, 1½ in. diam.; sepals and petals obtuse, yellowish with broad red-brown or blotched margins; lip yellow, very narrow, recurved; spur adnate, recurved, as long as the limb, the tip of which is hence bifid with the lobes superposed; strap of pollinia short, gland large.

3. **A. Clarkei,** *Rolfe in Gard. Chron.* 1888, ii. 567; scape few-fld., sepals and petals linear-spathulate obtuse. *Bot. Mag.* t. 7077. Esmeralda Clarkei, *Reichb. f. in Gard. Chron.* 1886, ii. 552.

SIKKIM HIMALAYA, alt. 6000 ft., *Clarke*. BHOTAN (*Ic. in Hort. Calcutt.*).

Stem 12–18 in., stout. *Leaves* 5–6 by 1¼–1½ in., flaccidly coriaceous, lorate, unequally obtusely 2-lobed. *Scape* 2–3-fld.; flowers 3½ in. diam., yellow barred with pale cinnamon-brown; lateral sepals and petals falcate; dorsal sepal erect; lip half the length of the sepals, base narrowed; side lobes short, broad, obtuse; midlobe ovate-cordate, obtuse, ridged; column speckled with red. *Capsule* 2½ in., oblong, very thick.

** *Flowers panicled. Side lobes of lip nearly equalling or exceeding the midlobe.*

4. **A. Maingayi,** *Hook f.*; lateral sepals broadly obovate, dorsal narrower, petals linear-spathulate falcate, side lobes of clawed lip quadrate, midlobe as long oblong fleshy, spur red beneath.

MALACCA, *Maingay* (*Kew Distrib.* 1645).

Stem 4–6 ft., sheaths smooth. *Leaves* 3–5 in., linear-oblong; tip narrowed, notched. *Panicle* 1–3 ft.; branches short, divaricate; pedicel and ovary stout; flowers 2 in. diam.; lip fleshy, not half as long as the sepals, yellow, sides blotched with red ("claw elastic," *Maingay*); column short, truncate; strap of large oblong furrowed pollen broadly linear, gland transverse.

5. **A. moschifera,** *Blume Rumph.* iv. t. 196, 199; lateral sepals and petals narrowly linear-spathulate falcate, dorsal sepal straight, side lobes of lip quadrate, midlobe as long obovate acuminate shortly spurred beneath. Arachnis moschifera, *Blume Bijdr* 365, t. 26. Aerides arachnites, *Swartz in Schrad. Journ.* 1799, 233; *Willd. Sp. Pl.* iv. 131. Renanthera Arachnitis, *Lindl Gen. & Sp. Orchid.* 217. R. Flos-aeris, *Reichb. f. Xen. Orchid.* i. 88; *Walp. Ann.* vi. 878. Limodorum Flos-aeris, *Swartz in Nov. Act. Upsal.* 1740, 37. Epidendrum Flos-aeris, *Linn. Sp. Pl.* 1348.

PERAK, alt. 4–6000 ft., *King's Collector*.—DISTRIB. Java, Borneo.

Stem 4–6 ft., as thick as a swan's quill, sheaths smooth. *Leaves* 4–7 in., loriform or linear-oblong, tip narrowly notched. *Panicle* 2–3 ft.; branches very short, divaricate, 2–3-fld.; pedicel with ovary 1 in.; flowers 3–4 in. diam., dark green or yellow barred with maroon; upper margin of side lobes recurved; anther broad, truncate; pollinia very large, flattened; strap broad with a median ridge.

53. **PHALÆNOPSIS,** *Blume.*

Epiphytes; stem short, leafy; pseudobulb 0. *Leaves* distichous, coriaceous. *Scape* lateral; flowers usually large, loosely racemed. *Sepals* widely spreading. *Petals* narrower or broader. *Lip* clawed or sessile, adnate to the base or foot of the column, side lobes erect, midlobe various, spur 0; disk variously appendaged, with usually a forked plate or callus. *Column* suberect, foot long short or 0; anther 2-celled; pollinia 2, sulcate or 2-partite, strap linear or spathulate, gland large or small.—Species about 25, Indian and Malayan.

The genus requires revision, and a careful examination of the lip, which is very imperfectly figured and described by the authors who have had access to living specimens. The beautiful *P. amabilis* has been sent from Singapore, where it is cultivated.

* Lateral sepals inserted by a narrow base to the base or very short foot of the column.

† *Rachis of raceme compressed; bracts fleshy, distichous.*

1. **P. Cornu-cervi,** *Par. & Reichb. f. in Hamb. Gartenz.* 1860, 116; scape 6–10 in., flowers 2 in. diam. yellow-green barred with brown. *Rolfe in Gard. Chron.* 1886, ii. 276. Polychilus Cornu-cervi, *Breda Orchid. Jav.* t. 1; *Bot. Mag.* t. 5570.

TENASSERIM; at Moulmein, *Lobb, Parish.* PERAK, *Scortechini.*—DISTRIB. Sumatra, Java, Borneo.

Leaves 3–8 in., oblanceolate. *Scape* stout, simple or branched; rachis 3–5 in.; bracts ¼ in., oblong, tip rounded; sepals oblong-lanceolate; petals shorter; lip subsessile, side lobes oblong, midlobe ovate acute with a short falcate wing on each side of the tip; disk with a broad 2-awned plate at the base, and a flattened sword-shaped compressed spur in front of it.—Habit of a *Sarcochilus.*

2. **P. violacea,** *Teysm. & Binn. in Batav. Nat. Tydschr.* xxiv. (*reprint* 10); scape 2–12 in., flowers 1 in. diam. *Reichb. f. in Gard. Chron.* 1878, ii. 234; 1881, ii. 145, fig. 32, 187; *Warner Orchid. Album,* t. 182; *Flor. Mag.* N. S. t. 342; *Rolfe in Gard. Chron.* 1886, ii. 277; *Ill. Hortic.* 1855, 173 (var. *Schræderi*). Stauritis violacea, *Reichb. f. in Hamb. Gartenzeit.* 1802, 34.

PERAK (*Ic. Scortechini*). SINGAPORE (*fid. Warner l. c.*)—DISTRIB. Sumatra.

Leaves 4–10 in., elliptic or oblanceolate, acute. *Scape* very stout, 1–7-fld.; bracts ovate, acute; lateral sepals oblong-lanceolate, unequal-sided, acute, deflexed; petals smaller, oblanceolate; lip narrow, incurved, broadly clawed or stipitate; side lobes erect, narrow, linear, truncate; midlobe cuneately obovate, apex triangular acute crenulate, disk with a bicuspidate appendage at the base; column rather long. —Colours of flower apparently very variable; Scortechini describes the sepals and petals as deep carnation with green tips, the side lobes of lip yellow dotted with purple, the midlobe purple; Warner's figure has a very short scape, few flowers, a violet lateral sepal with cream-cold. inner margins, cream-cold. dorsal sepals and petals, and a violet lip. According to Reichenbach the raceme is sometimes branched.—Perhaps two species are confounded under *violacea.*

†† *Rachis of raceme terete.*

3. **P. Lowii,** *Reichb. f. in Bot. Zeit.* 1862, 214; *in Gard. Chron.* 1862, 979; *Xen. Orchid.* ii. t. 151; petals fan-shaped very much larger than the oblong sepals, rostellum much longer than the column. *Bot. Mag.* t. 5351; *Fl. des Serres,* t. 1910; *Warner Select. Orchid. Ser.* 2, t. 15; *Rolfe in Gard. Chron.* 1886, ii. 276.

TENASSERIM; at Moulmein, *Parish.*

Leaves 3–5 in., ovate-oblong or lanceolate, acute. *Scape* with lax-fld. raceme 10–24 in., slender, simple or branched; flowers 1½–2 in. diam.; sepals white, dorsal largest and broadest; petals flushed with violet towards the base; lip sessile, as long as the lateral sepals, narrowly oblong, side lobes small, uncinately recurved yellow, midlobe obcuneately oblong truncate and crenate at the tip purple; disk keeled and furnished with a transverse forked plicate callus at the base of the side lobes in front, and with some soft spines behind; column and rostellum pale purple.

4. **P. Mannii,** *Reichb. f. in Gard. Chron.* 1871, 902; 1876, 503; lateral sepals lanceolate acuminate, petals oblanceolate, lip clawed, side lobes falcately oblong, midlobe panduriform truncate with two spreading and recurved oblong caruncled apical lobules. *Rolfe in Gard. Chron.* 1886, ii. 276.

ASSAM, *Mann.*

Leaves 6–10 in., oblong-lanceolate. *Scape* 12 in., branched; flowers many, scattered, 1½ in. diam.; sepals and petals yellow blotched with brown; lip white with purple blotches, disk with a forked appendage at the base of the midlobe, in front of which is a flattened sword-shaped spur; foot of column very short.—Flower and appendages of lip very like those of *P. Cornu-cervi*; in both the column is long, the pollinia ellipsoid.

5. **P. speciosa,** *Reichb. f. in Gard. Chron.* 1881, i. 562; 1882, ii. 744, fig. 130–132; sepals elliptic-lanceolate acute, petals similar but smaller, lip sessile, side lobes small linear-oblong truncate toothed, midlobe laterally compressed fleshy, tip dilated mallet-like papillose. *Warner Orchid. Album,* t. 158; *Gard. Chron.* 1882, ii. 745, f. 130–132; 1886, ii. 277, fig. 56–58; *Reichenbachia,* ii. t. 57; *Rolfe in Gard. Chron.* 1886, ii. 277.

ANDAMAN ISLANDS, *Berkeley.*

Leaves 8–12 in., obovate-oblong or -lanceolate. *Scape* tall, simple or branched; flowers 2 in. diam., scattered, white or rosy with darker blotches; lip with a forked callus; column long, tip toothed, foot very short; pollinia oblong.—Var. *Christiana,* R. f., has rose-madder sepals and white petals; var. *purpurata,* R. f., has rose-purple flowers.

6. **P. tetraspis,** *Reichb. f. Xen. Orchid.* ii. 146; *in Gard. Chron.* 1881, ii. 562, 656; flowers as in *P. speciosa,* but waxy white with 2 2-awned basal calli on the hairy disk. *Rolfe in Gard. Chron.* 1886, ii. 277.

ANDAMAN ISLANDS, *Col. Man.*—DISTRIB. Sumatra.

Leaves 12 by 2–4 in., cuneately obovate. *Scape* tall, stout, branched.—I have seen no flower of this.

7. **P. Kunstleri,** *Hook. f.*; sepals obovate apiculate, petals rather smaller, tip rounded, lip shortly clawed, side lobes small broadly cuneate truncate, midlobe obovate with 7 thick parallel ridges, tip rounded.

PERAK, *Kunstler.*

Leaves 4–6 in., obovate oblanceolate or elliptic-lanceolate, acute, pale green. *Scape* about equalling the leaves, 2–3-fld. at the tip; bracts very small, ovate; flowers

1 in. diam.; sepals and petals dull yellow green mottled closely with dull red for the basal half; lip small, white, side lobes erect streaked with red, midlobe red purple between the ridges; forked appendage small, with a 2-lobed callus behind it; column about half the length of the lip; pollinia globose, strap short, cuneate, gland quadrate.—Described from dried flowers and a drawing of the whole plant in Hort. Calcutt.

** Lateral sepals inserted by a broad base on the elongate foot of the column.

8. **P. Esmeralda,** *Reichb. f. in Gard. Chron.* 1874, ii. 582; lateral sepals orbicular-ovate, petals broadly obovate, claw of lip long geniculate with two narrow recurved auricles, side lobes broadly falcately obovate, midlobe oblong. *Rev. Hortic.* 1877, t. 107; *Warner Orchid. Alb.* vii. t. 21. *Floral Mag.* N. S. t. 358; *Rolfe in Gard. Chron.* 1886, ii. 276; *Orchidoph.* 1881, t. 9. P. antennifera, *Reichb. f. in Gard. Chron.* 1878, 398; 1882, 520; *Rolfe l. c.* 1886, ii. 276.

BURMA, *Hort. Low.*—DISTRIB. Cochin China.

Leaves 4–6 in. *Scape* 1–2 ft., simple or branched, slender; rachis elongate; flowers 1 in. diam., amethystine; side lobes of lip erect, appressed, red-purple; disk with a 2-awned callus in front of the auricles, and a raised thickened fleshy ridge from the base of the side lobes to the tip of the midlobe.

9. **P. Parishii,** *Reichb. f. in Gard. Chron.* 1865, 410; 1871, 802; *Xen. Orchid.* i. 144, t. 156, f. 1. *in Saunders' Refug. Bot.* t. 85; flowers small, lateral sepals subrotund, lip short sessile, side lobes small falcate, midlobe much broader shortly stipitate reniformly cordate. *Bot. Mag.* t. 5815; *Rolfe in Gard. Chron.* 1886, ii. 276.

EASTERN HIMALAYA, *Lobb, Mann.* CACHAR, *Keenan.* TENASSERIM, *Lobb.*

Leaves 3–5 in., linear or obovate-oblong. *Scape* 3–4 in., 6–8-fld.; flowers ¾ in. diam.; sepals and obovate petals cream-cold.; lip mobile, purple-brown; disk with a narrow 4-awned appendage at the base overlapping a much broader ciliate lamina; rostellum 3-partite.—The figure in Saunders' Refug. is of var. *Lobbii,* R. f., which has a white lip with two chestnut bands.

SPECIES OF DOUBTFUL POSITION.

P. FUSCATA, *Reichb. f. in Gard. Chron.* 1874, ii. 6; "allied to *P. Cornu-cervi,* roots short, leaves very broad oblong obtuse acute, flowers medium-sized, sepals oblong obtusely acute, petals cuneately oblong obtuse, lip 3-partite, side segments ligulate retuse one toothed on each side, umbonate on the middle of the lower side, mid-segment oblong acute keeled in the middle, base with a 2-toothed callus, and with an aristate ligula on each side behind it, column not angled (*exangulata*) at the base."—Malayan Peninsula, *Hort. Bull.*—Characters from Reichenbach l. c., who does not describe the inflorescence, or whether the column has a foot or not.

54. DORITIS, *Lindl.*

Characters of *Phalænopsis,* and having the same 2-awned plate on the disk of the lip, but the column is narrowly winged, its foot longer forming a spur-like mentum with the side lobes of the lip.—Species 5, Indian and Malayan.

D. pulcherrima, *Lindl. in Wall. Cat.* 7348 (*Gen. & Sp. Orchid.* 178, *Reichb. f. Xen. Orchid.* ii. 7), a Siam species, with flowers nearly 1 in. diam. in a panicle 2–3 ft. long, probably occurs in the Straits region.

1. **D. tænialis,** *Benth. in Gen. Plant.* iii. 574; scape short few-fld., mentum acute, side lobes of lip very narrow spathulate reflexed on the disk, tips of the forked appendage of the lip hooked. *Ærides tæniale,*

Lindl. Gen. & Sp. Orchid. 239; *in Journ. Linn. Soc.* iii. 41. Æ. carnosum, *Griff. Notul.* iii 365; *Ic. Plant. Asiat.* t. 338 A.

SUBTROPICAL HIMALAYA; from Kumaon, alt. 3–6000 ft., eastwards to BHOTAN, the KHASIA MTS., MUNNIPORE and BURMA.

Roots 1–3 ft., flat, ⅛–¼ in. broad, forming large tortuous tufts. *Leaves* few, 3–5 in., obovate-oblong, obtuse or subacute, narrowed to the sessile base, soft when dry. *Scape* 1–2 in.; bracts small, broad; flowers ⅔ in. diam., mauve purple; midlobe of lip dark red or purple. *Capsule* 1½ in., fusiform.

2. **D. Wightii,** *Benth. in Gen. Plant.* iii. 574; scape elongate simple or branched, side lobes of spreading lip broad cuneate-obovate, midlobe obcordate. Phalænopsis Wightii, *Reichb. f. in Bot. Zeit.* 1862, 214. Ærides latifolium, *Thwaites Enum.* 430.

EASTERN HIMALAYA; Sikkim (*Ic. in Hort. Calcutt.*); Bhotan, *Lister.* CHITTAGONG (*Hort. Calcutt.*). BURMA; Moulmein, *Parish*; Mougong, *Griffith.* The CIRCARS, *Heyne.* MALABAR, *Wight*, &c. CEYLON, *Thwaites.*

Habit of *D. tænialis*, but leaves rather larger, scape much longer, and lip very different.

55. RHYNCHOSTYLIS, *Blume.*

Epiphytic, stem stout leafy, pseudobulbs 0. *Leaves* very thick, linear, 2-lobed. *Flowers* in long dense drooping cylindric racemes, bright-cold. *Sepals* and broader petals obtuse, spreading, contracted at the base. *Lip* adnate to the base of the column, deeply saccate, mouth of sac pubescent within, side lobes 0, outer margin produced into a clawed dilated limb. *Column* short stout, foot 0; rostellum shortly beaked; anther imperfectly 2-celled; pollinia 2, subglobose, 2-cleft, strap filiform, gland small.—Species 2 or 3, Indian or Malayan.

R. retusa, *Blume Bijdr.* 286, t. 49; leaves deeply channelled keeled præmorse or retuse, raceme drooping, sac cylindric much longer than the limb of the lip. R. præmorsa, *Blume l. c.* R. guttata, *Reichb. f. in Bonpland.* ii. 93. R. Garwalica, *Reichb. f. in Walp. Ann.* vi. 888. Saccolabium guttatum, *Lindl. in Wall Cat.* 7308; *Gen. & Sp. Orchid.* 220; *in Journ. Linn. Soc.* iii. 32; *Bot Mag.* t. 4108; *Wight Ic.* t. 1745-6; *Dalz. & Gibs. Bomb. Fl.* 263; *Hartm. Parad.* ii. t. 3; *Orchidoph.* 1888, 273 (var. *gigantea*); *De Vriese Orchid.* t. 14. *Warner Sel. Orchid. Ser.* 2, t. 18; *Griff. Ic. Pl Asiat.* t. 819. S. præmorsum, *Lindl. l. c.* 221. S. Rheedii, *Wight Ic.* v. 19. S. retusum, *Fl. des Serres* xiv. 191, t. 1463-4. S. Heathii, *Hort., ex Gard. Chron.* 1885, 369. S. Blumei, *Lindl. Sert.* t. 47; *in Bot. Reg.* 1841, *Misc.* 55; *Ill. Hortic.* t. 545; *Puydt.* t. 37; *Warner Orchid. Alb.* t. 169 and t. 238 (var.); *Pescator.* t. 21. S. garwalicum, *Lindl. in Journ. Linn. Soc.* iii. 32; *in Gard. Chron.* 1879, 102. Sarcanthus guttatus, *Lindl. in Bot. Reg.* t. 1443. Ærides guttatum, *Roxb. Fl. Ind.* iii. 471; *Regel Gartenfl.* 1863, 415. Æ. retusum, *Swartz in Schrad. Diar.* 1799, 130; *Willd. Sp. Pl.* iv. 130; *Grah. Cat. Bomb. Pl.* 204. Æ. spicatum, *Don Prodr.* 31. Al. præmorsum, *Willd. l. c.* Limodorum retusum, *Swartz in Nov. Act. Upsal.* vi. 80. Epidendrum retusum, *Linn. Sp. Pl.* 1351. E. Hippium, *Herb. Ham.*—*Rheede Hort. Mal.* xii. t. 1.

TROPICAL HIMALAYA, from Garwhal eastwards to Assam and Tenasserim, and southwards to BENGAL, the WESTERN PENINSULA and CEYLON.—DISTRIB. Malay Islands.

Stem stout, creeping in trees. *Leaves* 6–20 by ¾–2 in., curved. *Racemes* 4–18 in.; bracts broad, obtuse, membranous; flowers ½–¾ in. diam., white blotched with pink or violet; lateral sepals gibbously orbicular-ovate, obtuse or apiculate, dorsal oblong;

petals elliptic, obtuse; epichile of lip very variable in size, usually cuneiform, entire or emarginate at the tip, disk flat or obscurely channelled. *Capsule* 1–1½ in., clavate.—Lindley errs in describing the fruit of *R. Garwalica* as different from *R. retusa*, also in describing the blade of the lip of *Sacc. guttatum* as lanceolate, which misled Wight, who founded his *S. Rheedii* on the difference.

SPECIES UNKNOWN TO ME.

SACCOLABIUM BERKELEYI, *Reichb. f. in Gard Chron.* 1883, i. 814; from the author's remarks (there is no description) this appears to be near *R. retusa*, but the lip is acute; the flowers are white with amethyst spots. Its habitat is unknown, but probably Indian.

SACCOLABIUM LITTORALE, *Reichb. f. l.c.* 1881, ii. 198, has very long leaves, a short raceme, and the epichile cucullate, keeled and turned obliquely on one side.

56. SARCOCHILUS, *Br.*

Epiphytes, stem short or long, pseudobulbs 0. *Leaves* distichous, or 0 at flowering time. *Flowers* racemose or spicate. *Sepals* spreading; lateral adnate by a narrow base to the base of the column, or by a broad base to its foot, and sometimes to the lip also. *Petals* usually narrower. *Lip* sessile or clawed, very varied in form, side lobes small or large fleshy or petaloid, midlobe sometimes reduced to a pubescent callus, disk very various with often a callus or spur within. *Column* short or long, foot more or less produced; anther 2-celled; pollinia 2, sulcate, or 4 in pairs, strap short broad. *Capsule* usually long, strict, slender.—Species about 40 known, tropical Asiatic, Australian and Pacific.

A polymorphous genus, no doubt to be dismembered when better known. The following attempt to group the Indian species possibly indicates the lines upon which some of the genera may be established.

A. Flowers loosely inserted all round the rachis of a more or less elongate raceme or spike.

* *Lateral sepals inserted by a narrow base to the base of the column, or base of the column and sides of the lip. Foot of column* 0 *or very short.*

Sect. I. *Lip* shortly clawed. *Column* short; rostellum minute. PTEROCERAS, *Hasselt.* (Sp. 1–4.)

Sect. II. *Lip* sessile or subsessile. *Column* long; rostellum very long, slender. STEREOCHILUS, *Lindl.* (Sp. 5.)

Sect. III. *Lip* long-clawed. *Column* short; rostellum very short. (Sp. 6–7.)

Sect. IV. *Stem* elongate, scandent. *Lip* sessile. *Column* short; rostellum very long; strap of globose pollinia very slender, gland minute. MICROPERA, *Lindl.* (Sp. 8–11.)

** *Lateral sepals inserted by a very broad base to the elongate foot of the column.*

Sect. V. Leafless when flowering. *Stem* 0. Side lobes of *lip* large, erect, midlobe a tomentose pulvinus. CHILOSCHISTA, *Lindl.* (Sp. 12–15.)

Sect. VI. Leafing and flowering together. *Lip* various. (Sp. 16–19.)

B. Flowers in very short spikes at the apex of a slender scape, bracts persistent, imbricate.

Sect. VII. FORNICARIA. (Sp. 20–26.)

C. Flowers distichous on a compressed rachis, which is pectinate from the uniform persistent laterally compressed fleshy bracts.

Sect. VIII. *Peduncles* stout, solitary. *Lip* stipitate, articulate with the foot of the column. CUCULLA. (Sp. 27–33.)

Sect. IX. *Peduncles* filiform, fascicled. *Lip* sessile. RIDLEYA. (Sp. 34.)

Sect. I. PTEROCERAS, *Hasselt* (gen.). (See above.)

1. **S. suaveolens,** *Hook. f.*; leaves lorate acutely 2-fid, raceme

elongate glabrous, side lobes of lip falcate, midlobe decurved with a recurved tip. Ærides suaveolens, *Roxb. Fl. Ind.* iii. 473. Ornitharium striatulum, *Lindl. in Paxt. Fl. Gard.* iii. 473 (*figure bad*). Ornithochilus striatulus, *Hort. Calcutt.* Thrixspermum teres, *Reichb. f. Xen. Orchid.* ii. 121, 123 t. 140 (*excl. syn.*), *in Trans. Linn. Soc.* xxx. 136.

CHITTAGONG, *Roxburgh.* TENASSERIM; at Moulmein, *Parish.*

Stem slender, scandent. *Leaves* 3–5 by ⅔–¾ in., many-nerved, coriaceous, base contracted. *Racemes* 3–6 in., shortly peduncled, lax-fld.; rachis stout; bracts small, rounded; flowers ½–⅓ in. diam., yellow speckled with red, very fragrant; lip rather laterally compressed; midlobe light purple or speckled with pink.—Reichenbach has referred this to the Javan *P. radicans*, Hassk. (*Dendrocolla teres*, Blume), a very much larger plant, with oblong obtusely 2-lobed or notched leaves, racemes 2–3 ft. long, and larger flowers (of which there is a drawing in Herb. Lindl.). The lip is curious, the limb being a terete spur with a minute mouth close to the claw, much as in *Micropera* and *Sarcochilus Berkeleyi.*

2. **S. muriculatus,** *Reichb. f. in Gard. Chron.* 1881, ii. 198; leaves 6–9 in. lorate, racemes very short, peduncle and rachis viscid, lip shortly clawed saccate, side lobes broadly ovate obtuse, midlobe small obtusely 2-partite pubescent.

ANDAMAN ISLANDS, *Kurz, Berkeley.*

Stem 6–8 in., stout, rooting below. *Leaves* 1-in. broad, obliquely notched or 2-lobed, lobes rounded. *Scape* with raceme 2½–3 in., strict; bracts broad, obtuse; flowers about ¼ in. diam., light yellow, sweet-scented; sepals and petals with two purple bars; column rather long; anther ovate, pollinia globose, strap short flat, gland small.—The lip is that of Sect. II.

3. **S. stenoglottis,** *Hook. f.*; stem very short stout, leaves broadly lorate, tip broad rounded emarginate, peduncle shorter than the leaves pendulous many-fld., sepals subsimilar oblong obtuse, petals as long narrower obovate-oblong acute, lip nearly as long as the sepals very narrow laterally flattened curved shortly clawed, with two small rounded auricles beyond the claw, an elongated cup with toothed margins along the top and an ellipsoid compressed terminal spur.

? PERAK, *Scortechini.*—DISTRIB. Sumatra, *King's Collector.*

Stem as thick as the thumb. *Leaves* decurved, 6–10 by 1½-2 in., nearly flat. *Peduncle*, 3 in., stout, deflexed, dull purple; bracts very small, ovate; pedicel with ovary ½ in.; flowers ½–⅔ in. diam., very pale primrose; sepals and petals many-nerved; lateral sepals with faint red bars near the base; lip white, the elongated cup on the upper margin is edged with pink, and extends for about two-thirds of its length, a perforation at the distal end leads to the hollow compressed ellipsoid straight spur, which is in a straight line with the body of the lip, and resembles a terminal lobe; column winged narrowly to near the base, tip acute, rostellum beaked; anther shortly beaked, membranous; pollinia long, strap spathulate, gland small.—Described from similar materials as *S. aureus.*

4. **S. brachyglottis,** *Hook. f.*; stem very short, leaves elongate oblanceolate acuminate, peduncle short few-fld., sepals spreading subequal lanceolate acuminate, tips horned at the back, petals nearly as long oblong-obovate obtuse, lip very small laterally flat as seen in profile subcuneate and obtusely 3-lobed in front, column very short subglobose, foot 0.

PERAK, *King's Collector.*

Stem 1–2 in., curved. *Leaves* 4–8 by 1–1½ in., pendulous, finely acuminate, nearly flat, keeled beneath. *Peduncle* 1 in., stout; bracts minute, broad, persistent; flowers ¼ in. diam.; sepals and petals white with a faint pink blush, nerves obscure; lip not half the length of the sepals, adnate to the foot of the column, so compressed

that the sides are almost in contact, leaving a narrow slit along the top as the opening to the cavity; of the three short lobes seen in looking sideways at it, that towards the column represents the side lobes, a shorter below it a spur? and the intermediate the apex of the lip; there are no internal caruncles or sepals; the edges of the lip are smooth and yellow, and there are a few red spots on the side; column with a narrow base, very oblique top, sloping backwards, and very concave face; rostellum minute, erect, 2-fid; anther shortly beaked, 2-celled; pollinia globose, strap short, gland oblong.—It is impossible to describe the form of the minute lip of this curious species intelligibly. I shall hope to give figures of it and of *S. aureus* in King's "Annals of the Calcutta Botanical Gardens."

Sect. II. STEREOCHILUS, *Lindl.* (gen.). (See p. 33.)

5. **S. hirtus,** *Benth. in Gen. Plant.* iii. 576; leaves lorate very thick straight horizontal, raceme pubescent, lip a conical sac with short acute 2-toothed side lobes and a large double callus below the column within. Stereochilus hirtus, *Lindl. in Journ. Linn. Soc.* iii. 58.

KHASIA MTS., alt. 5000 ft., *J. D. H. & T. T.* TENASSERIM, *Parish.*

Stem very short. *Leaves* 3–5 in., very thick. *Racemes* 1–3 in., drooping; peduncle and rachis slender; bracts short, broad, membranous; flowers ½-¾ in. diam., pink, pubescent; lateral sepals adnate to the obscure foot of the column and base of lip; petals narrower, falcate, obtuse; lip white and pink; column white; anther purple, long-beaked, 2-celled; pollinia 4, oblong, stipitate in pairs on the spathulate end of a very long slender strap, gland minute. *Capsule* not seen.—Lindley errs in describing the lip as solid with a pair of horns at the base; it is a conical cup, the mouth oblong, and the horns are the 2-fid side lobes which appear to rise out of the cup. The callus below the column is that of *Cleisostoma,* and the strap and stipitate pollinia are those of *Saccolab.* § *Uncifera.*

Sect. III. (See p. 33.)

6. **S. aureus,** *Hook. f.*; stem very short, leaves large long loriform 2-lobed, peduncle stout several-fld., flowers large, sepals lanceolate acuminate many-nerved, petals subsimilar, lip shorter than the sepals, claw long narrow rigid linear, side lobes falcately cuneate, midlobe a short erect crest at the base of the globose subdidymous spur.

PERAK, *King's Collector.*

Stem as stout as the little finger. *Leaves* 4–10 by 1½–2 in., very coriaceous, keeled. *Peduncle* from below the leaves, 2–7 in., stout, nearly straight; flowers scattered towards the end of the peduncle; bracts very short, broadly ovate, persistent; pedicel with ovary ⅔ in., straight; sepals 1 in., and petals golden yellow; lip about ⅓ shorter than the sepals, claw caruncled where it expands to meet the blade, and then perforated for the passage to the globose spur; side lobes erect, white barred with dull pink; disk with a caruncled transverse crest over the base of the spur; column stout, rostellum inconspicuous; anther very shortly beaked, pollinia globose, strap subspathulate, gland narrow.—A beautiful species, described from several drawings lent by Herb. Calcutt. and the analysis of dried flowers.

7. **S. cladostachys,** *Hook. f.*: stem very short, leaves loriform tip narrowed bifid, peduncle much shorter than the leaves clavate few-fld., sepals and petals narrowly elliptic-lanceolate finely acuminate, lip shorter than the sepals, claw narrow rigid linear, side lobes oblong obtuse, midlobe 3-fid, side lobules quadrate retuse, mid-lobule (spur?) short rounded.

MALAYA, *Kunstler* (*Ic. in Herb. Calcutt.*). ? PERAK, *Ic. Scortechini.*

Stem 1 in., not very stout. *Leaves* recurved and pendulous, 6–12 by 1¼–2 in., flat, keeled. *Peduncle* 1½ in. or more, green; bracts ovate; pedicel with ovary ¼ in.; flowers white, 1½ in. diam.; sepals ⅔ in. long, and petals spreading, cream-cold.;

claw of lip spotted with purple, lateral lobes purple, midlobe cream-cold., spur speckled with purple; column rather short; anther hardly beaked, yellow, pollinia subglobose, strap short.—Described from a drawing in the Calcutta Gardens. Evidently allied to *S. aureus* in the form of the lip, but the whole plant is much smaller. The peduncle is clavate, the sepals and petals much smaller and narrower, and as well as the lip differently coloured. Scortechini's drawing is of a young plant.

Sect. IV. MICROPERA, *Lindl.* (gen.). (See p. 33.)

8. **S. purpureus**, *Benth. mss.*; raceme peduncled lax-fld., flowers pale purple, lip strongly laterally compressed hatchet-shaped, side lobes 0, sac with a strong included recurved spine under the tip. Micropera pallida, *Wall. Cat.* 7321 (*in part*). Camarotis purpurea, *Lindl. in Wall. Cat.* 7329; *Gen. & Sp. Orchid.* 219; *Sert. Orchid.* t. 19; *in Journ. Linn. Soc.* iii. 37; *Paxt. Mag. Bot.* vii. t. 25. C. rostrata, *Reichb. f. in Walp. Ann.* vi. 881. Ærides rostratum, *Roxb. Fl. Ind.* iii. 474.

KHASIA MTS., near Churra. SILHET and CHITTAGONG, *Roxburgh, Wallich.*, &c.

Stem 2–3 ft., as thick as a goose-quill. *Leaves* 3–4 by ½ in., obtusely 2-lobed, toothed or notched. *Racemes* equalling or exceeding the leaves, laxly many-fld.; bracts short, broad; flowers ½–¾ in. diam.; sepals and rather smaller petals very obtuse; beak of column turned on one side, flexuous. *Capsule* 1½-2 in. long, slender.

9. **S. Roxburghii**, *Hook. f.*; raceme long-peduncled decurved rather dense, flowers cream-white, lip slipper-shaped laterally compressed, side lobes large rounded, sac with an exserted spine under the tip. Micropera pallida, *Lindl. in Bot. Reg. under* t. 1522; *in Wall. Cat.* 7321 (*in part*); *Gen. & Sp. Orchid.* 219. Camarotis pallida, *Lindl. in Journ. Linn. Soc.* iii. 37. Ærides pallidum, *Roxb. Fl. Ind.* iii. 475 (*not of Lindley*).

BENGAL; at Comilla, *Clarke.* CHITTAGONG, *Roxburgh*, &c. TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 5241), *Helfer* (*K. D.* 5251).

Stem 2–3 ft. *Leaves* 2–3 by ½ in., tip rounded, notched. *Peduncle* with raceme longer than the leaves; bracts persistent; flowers many, ⅓ in. diam.; sepals and petals as in *M. purpurea*, but nearly white; beak of column straight. The *Micropera pallida* of Wallich's Herb. in Linn. Soc. consists of one sheet of *S. purpurea*, one of *Saccolab. ramosum*, and one of *Sarcanthus secundus*; but there are specimens of *pallida* under his number 7321 in Herb. Lindley.

10. **S. obtusus**, *Benth. mss.*; raceme very shortly peduncled erect, lip slipper-shaped tip obtuse decurved, side lobes incurved; anticous scale erect under the truncate 3-lobed tip. Camarotis obtusa, *Lindl. in Bot. Reg.* 1884, *Misc.* 73; *Walp. Ann.* vi. 881.

TENASSERIM; at Moulmein, *Griffith, Parish.*

Stem 6–8 in., not so thick as a goose-quill, simple or branched. *Leaves* 2–3 by ⅓ in., subacute, keeled, often recurved. *Raceme* subsessile, lax-fld.; bracts broad, acute; flowers ¼ in. diam., pale rose-cold.; sepals and petals linear-oblong, obtuse; lip yellowish with a subsaccate decurved apex, mouth with an exserted anticous lamella, midlobe minute 3-toothed; beak of column long, obliquely incurved.

11. **S. Mannii**, *Hook. f.*; raceme very short sessile few-fld., lip slipper-shaped obtuse decurved, side lobes obtusely triangular incurved, anticous scale truncate, close under the fleshy entire tip.

KHASIA HILLS, alt. 2–3000 ft., *Mann.*

Stem as thick as a goose-quill. *Leaves* very coriaceous, 4 by ½–⅔ in. *Raceme* ½–¾ in. long; flowers ¼ in. diam., apparently pale; sepals and petals spathulately

oblong; lip with the claw as long as the saccate portion.—Very much stouter and larger more coriaceous-leaved than *S. obtusus*. *Lip* with a ridge along the posticous face.

Sect. V. CHILOSCHISTA, *Lindl.* (gen.). (See p. 33.)

12. **S. usneoides,** *Reichb. f. in Walp. Ann.* vi. 497; racemes elongate many-fld., flowers white, capsule 1½–2 in. Chiloschista usneoides, *Lindl. in Wall Cat.* 7330; *Gen. & Sp. Orchid.* 219; *Bot. Reg. under* t. 1522; *Sert. Orchid. Frontisp.* f. 4; *in Journ Linn. Soc.* iii. 43; *Gard. Chron.* 1846, 135. Thrixspermum usneoides, *Reichb. f. Xenia*, ii. 120.

TROPICAL HIMALAYA; Nepal, *Wallich.* SIKKIM, *J. D. H.*

Roots densely tufted, tortuous; stem 0. *Racemes* 3–6 in.; bracts ovate, acute, membranous; flowers subsessile, ½ in. diam.; sepals spreading, oblong, obtuse; side lobes of lip linear-oblong, obtuse; disk between the lobes pubescent; midlobe truncate, emarginate; column very short; rostellum indistinct; anther broadly ovate, with 2–3 slender setæ; pollinia 2, 2-lobed, strap very short broad, gland large. *Capsule* slender, slightly curved, glabrous.

13. **S. luniferus,** *Reichb. f. in Gard. Chron.* 1868, 786 (Thrixspermum); racemes elongate, many-fld. flowers yellow spotted with purple. Sarcochilus luniferus, *Bot. Mag.* t. 7044.

SIKKIM HIMALAYA, *J. D. H.*; at Mungpo (*Ic. in Hort. Calcutt.*). TENASSERIM; at Moulmein *Parish.*

Except in the colour of the flowers I can find no difference between this and *S. usneoides*, the authority for the colours of which latter is a drawing made by Wallich's artists during his visit to Nepal, and another in Sikkim. Parish observes that very small leaves are sometimes produced, and these have been seen in Kew Gardens.

14. **S. Wightii,** *Hook. f.*; racemes short few-fld., flowers white or cream-coloured, capsule ¾ in. long. Chiloschista usneoides, *Wight Ic.* t. 1741 (*excl. the left-hand figure*) (*not of Lindl.*); *Walp. Ann.* vi. 498. ? Æceoceadus Retzii, *Lindl. Gen. & Sp. Orchid.* 237. Epidendrum pusillum, *Retz Obs.* vi. 49. Limoderum pusillum, *Willd. Sp. Pl.* iv. 126.

MALABAR; at Cochin, *Johnson.* NILGHIRI HILLS; on the western slope of the Wynaad, *Wight*, &c. CEYLON, on trees in the Botanical Gardens; *Trimen.*

A very imperfectly known species; Wight's figure represents the side lobes of the lip as somewhat crenate, and the sepals and petals as glabrous without and hairy within, the flowers as much smaller than in *C. usneoides*, the capsules as much shorter and stouter.—The left-hand figure (No. 7) on Wight's plate represents a very different plant, which I do not recognize. There is in Herb. Kew a specimen, apparently of *S. Wightii*, from Ceylon (Herb. Hort. Peradeniya), sent by Dr. Trimen (C.P. 4017), who has since informed me of its locality.

15. **S. minimifolius,** *Hook. f.*; raceme few-fld., capsule ⅓ in. long Cymbidium minimifolium, *Thwaites mss.*

CEYLON; Central Province, at Hattegodde Hill, *Thwaites.*

Roots much more slender than in *S. usneoides*. *Leaves* 2, very minute. *Raceme* ½–¾ in.; flowers ¼ in. diam.; side lobes of lip rounded, nearly as large as the lateral sepals. *Capsule* much curved, pubescent.—The specimens are insufficient for a further description.

Sect. VI. (see p. 33).

16. **S. Berkeleyi,** *Reichb. f. in Gard. Chron.* 1882, 557 (Thrixspermum); raceme elongate decurved, lip long-clawed produced into an elongate clavate laterally compressed obtuse spur with an inflated tip, side lobes small erect, midlobe minute incurved.

NICOBAR ISLANDS; *Berkely.*

Leaves 6–9 by 1–1½ in., lorate, narrowed from above the middle to the base, obliquely obtusely 2-lobed. *Peduncle* short, compressed; raceme 4–6 in., drooping, with many erect white flowers; bracts short, broad, membranous; sepals ⅓ in. long, broadly ovate, lateral inserted on the long foot of the column; petals broadly obovate; midlobe of lip violet; column rather long, rostellum 2-cuspidate; anther broad, low; pollinia 2, globose, strap short broad, gland orbicular. *Capsule* 5 in., narrow, curved. —The lip is unlike that of any other species of the genus, resembling rather that of *Ærides*.

17. **S. leopardinus,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 145 (Thrixspermum); stem short, raceme few-fld. much shorter than the leaves, sepals broadly oblong, petals much smaller, lip sessile, side lobes wing-like oblong obtuse, midlobe small, spur large urceolate.

TENASSERIM; at Moulmein, *Parish.*

Stem 2–3 in., curved. *Leaves* 4–6 by ¾–1 in., lorate, fleshy, narrowed from the middle downwards, obtuse, many-nerved. *Peduncle* very stout; lower sheaths annular; bracts short, broad, obtuse; flowers yellow spotted with purple; sepals ⅓ in. long, obtuse, lateral inserted on the long foot of the column, dorsal smallest; lip with a large dorsal callus over the mouth of the descending fleshy round-based spur; midlobe recurved, broadly ovate, caruncled, white spotted with purple; anther depressed, pollinia broadly pyriform, sessile on a small gland.

18. **S. viridiflorus,** *Hook. f.*; stem very short, leaves 2 by ⅔ in. falcately oblong, raceme shorter than the leaves 4–8 fld., lip narrowly clawed, side lobes falcate obtuse as long as the cylindric obtuse spur, midlobe reduced to a broad humid carunculate lobe. Ærides viridiflorum, *Thwaites Enum.* 430.

CEYLON; on trees in the Central Province, *Gardner* (C.P. 3385), *Trimen* (C.P. 4016).

Leaves sessile, fleshy, nerveless, obliquely notched. *Raceme* half as long, few-fld.; bracts small, broad, obtuse, membranous; flower ⅓ in. diam.; lateral sepals broadly obliquely ovate, obtuse, 5-nerved, adnate to the short foot of the column for half its length, the other half forming the claw of the lip; petals linear oblong, obtuse, 1-nerved.—I have seen only one small specimen and a coloured drawing.

19. **S. hirsutus,** *Hook. f.*; stem short, leaves lorate emarginate base narrowed, peduncle and very short raceme hirsute, lateral sepals ovate obtuse, petals oblong-obovate, lip very short stipitate on the prolonged foot of the column, side lobes elongate falcate, midlobe laterally compressed, disk with a broad transverse plate in front of the side lobes.

PERAK, *Kunstler* (*Hort. Bot. Calc.*)

Leaves 4–8 by 1–1½ in., flat, narrowed from beyond the middle downwards, tip rounded with a notch. *Peduncle* with 4–6-fld. raceme 1–2 in.; bracts ovate; pedicel with ovary ⅓ in.; flower subglobose, expanded ⅔ in. diam.; sepals and petals golden barred with carmine; lip pale, half as long as the sepals, claw dilated and concave at the base of the side lobes, a short serrated cupular membrane rises between the base of the side lobes over the base of the narrow compressed midlobe; column rather long, base contracted; anther shortly beaked, apiculate behind, 1-celled; pollinia globose, strap short linear, gland small.—Described from drawing in Hort. Calcutt., and analysis of dried flower. It is very difficult to describe the structure of the lip; its claw may be the base of the column produced beyond the insertion of the broad-based lateral sepals.

Sect. VII. FORNICARIA, *Benth. in Gen. Plant.* iii. 575. (See p. 33.)

20. **S. Hystrix,** *Reichb. f. in Walp. Ann.* vi. 500; peduncle about as

long as the short loriform leaves, bracts erect subulate-lanceolate, side lobes of the lip glandular-hairy. Dendrocolla Hystrix, *Blume Bijdr.* 291. Ærides Hystrix, *Lindl. Gen. & Sp. Orchid.* 242. Thrixspermum Hystrix, *Reichb. f. in Trans. Linn. Soc.* xxx. 145. Grosourdya Hystrix, *Reichb. f. Xen. Orchid.* ii. 123; *in Bot. Zeit.* 1864, 297.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 5232), *Parish.*—DISTRIB. Java.

Stem 1–3 in. *Leaves* 2–3 by ⅓–⅔ in., obtusely 2-lobed; sheaths ribbed. *Peduncle* 2–3 in., stout or slender, 2–3 sheathed; spike ¼–½ in.; flowers white; sepals and petals ¼ in. long, lanceolate, acuminate; lip stoutly clawed, spotted with yellow, base saccate, side lobes triangular, midlobe truncate glandular-pubescent within; column very short; anther broad; pollinia 2 bipartite or 4 in very unequal pairs, strap broad, gland rounded. *Capsule* 2½–4 in., linear, straight.—Reichenbach is my authority for this being a Javan plant, and for the Javan synonymy.

21. **S. pulchellus,** *Trim. Cat. Ceyl. Plants,* 89; characters of *S. Hystrix,* but side lobes of lip glabrous. Dendrocolla pulchella, *Thwaites Enum.* 430. Cylindrochilus pulchellus, *ibid. l.c.* 307.

CEYLON; in the Central Province, ascending to 2000 ft.

Bentham (Gen. Plant. iii. 575) suspects that this and *Hystrix* are one, but in the absence of good specimens of either I hesitate to unite them.—*Capsule* 2–2½ in.; the sepals and petals are lanceolate, acute, lateral inserted on the very short foot of the short column. *Capsule* 2½–3½ in., slender, straight, subacute.

22. **S. hirtulus,** *Hook. f. Ic. Plant. ined.*; peduncles hirtulous, much shorter than the falcately lanceolate obtusely acuminate leaves, bracts minute, spur long incurved, column very long contracted at the base.

PERAK, *Scortechini.* MALACCA, *Maingay.*

Stem very short, or 0. *Leaves* 3–5 by ⅓–⅔ in., coriaceous, falcate, narrowed from the middle downwards, tip recurved. *Peduncle* ½–1 in.; spike ⅓–¼ in.; bracts spreading; flowers membranous; lateral sepals ¼ in. long, obovate-oblong, acute, 3-nerved; petals narrower; lip clawed, side lobes very narrow, elongate, recurved, midlobe much broader than long, formed of two falcately recurved lobes with an intermediate tooth; spur swollen above the narrow apex; anther shortly beaked; pollinia 2, globose, stipitate on the cuneiform strap, gland minute. *Capsule* 1¼ in., very slender.—A curious little plant with a longer column than usual in the genus.

23. **S. recurvus,** *Hook. f. Ic. Plant. ined.*; peduncles much longer than the shortly loriform leaves, spike oblong, bracts broadly ovate densely imbricate acuminate recurved.

PERAK; Limbo Hills, in Larut, *King's Collector.*

Stem very short. *Leaves* 1–2 in., narrowed to the base, obtuse or retuse. *Peduncles* 4–5 in., rather stout; spike ½–⅔ in.; bracts very coriaceous; flowers not seen.

24. **S. trichoglottis,** *Hook. f. Ic. Plant. ined.*; stem elongate, peduncles shorter than the shortly loriform leaves, spike short, bracts ovate-lanceolate, lip sessile saccate hirsute within, side lobes rounded hairy on both surfaces, midlobe a minute tooth.

PERAK, *Scortechini, King's Collector.* SINGAPORE, *Ridley.*

Habit and foliage of *S. Hystrix,* but sepals and petals much narrower, and lip hairy.—Described from King's specimen and drawings by Scortechini and Ridley, who has sent me a sketch of a flower of what appears to be this species from Singapore. The lateral sepals are inserted at the base of the footless column.

25. **S. filiformis,** *Hook. f. Ic. Plant. ined.*; stem elongate, leaves

8–10 in. filiform terete, peduncle much shorter than the leaves, lip a spur-like cylindric sac with orbicular side lobes.

PERAK; at Larut, on branches of trees, *King's Collector.*

Stem in the only specimen 3 in.; sheaths ⅛ in., strongly ribbed; roots very long and slender. *Leaves* about ⅛ in. diam., flexuous. *Peduncles* 1½–3 in.; spike ¼–⅓ in.; bracts ⅓ in., broadly ovate, obtuse, fleshy; pedicel and ovary ⅛ in.; flowers white; sepals ½ in., oblong-lanceolate, obtuse, lateral adnate to the broad foot of the column; petals obtuse, 7-nerved; lip sessile, side lobes large, midlobe the lunate apex of the subcylindric round basal sac, calli 0; column very short, foot broad fleshy.—Flowers much like those of *S. Trimeni*, but habit very different.

26. **S. merguensis,** *Hook. f. Ic. Plant. ined.*; stem short, peduncles much shorter than the small linear-oblong leaves, bracts imbricate erect, capsule 1–1½ in. linear terete beaked.

TENASSERIM; at Mergui, *Griffith* (*in Herb. Lindl.*).

A remarkable little species, with the stem ½ in. long, clothed with the imbricating bases of the distichous leaves, which are about an inch long. *Peduncles* ½–1 in., filiform; raceme ½ in.; bracts ovate, acuminate. *Capsule* shortly pedicelled, ⅛ in. diam., striate, beak ⅓₂ in.

Sect. VIII. CUCULLA, *Benth. in Gen. Plant.* iii. 575. (See p. 33.)

27. **S. lilacinus,** *Griff. Notul.* iii. 334; *Ic. Pl. Asiat.* t. 320, f. ii.; stem elongate, leaves amplexicaul ovate-cordate, peduncle very long, sepals and petals broadly ovate many-nerved, lip saccate, side lobes falcate obtuse, midlobe small recurved, disk with a prominent callus. *Walp. Ann.* vi. 499. S. amplexicaulis, *Reichb. f. in Walp. l. c.* Dendrocolla amplexicaulis, *Blume Bijdr.* 288. Ærides amplexicaule, *Lindl. Gen. & Sp.. Orchid.* 239. Orsidice amplexicaulis, *Reichb. f. in Bonpland.* ii. 93. Thrixspermum amplexicaule & lilacinum, *Reichb. f. Xen. Orchid.* ii. 121.

MALAY PENINSULA; from Perak to Singapore, in marshes.—DISTRIB. Malay Islands.

Stem 2–3 ft., as thick as a goose-quill, decumbent, internodes 1–2 in.; roots very slender. *Leaves* 1½–2 in., tip rounded, sheaths smooth. *Peduncle* 8–10 in.; sheaths obtuse, appressed; raceme 1–8 in., few or many-fld.; rachis 4-angled; bracts ¼ in., obtuse, not imbricating; ovary very slender; sepals ½ in., lateral adnate to the produced foot of the column, and petals white lilac or bluish; lip white, yellowish and pubescent within, base with a tuft of hairs; column very short; anther hyaline; pollinia 4, pairs very unequal, oblong, sessile on a reniform strap. *Capsule* 4–6 in., linear, straight, angles narrowly winged.

28. **S. Scopa,** *Reichb. f. mss. in Herb. Kew* (Thrixspermum); leaves linear-oblong sessile obtuse, peduncle rather longer than the leaves, sepals and petals lanceolate with very long capillary tails many-nerved, lip shortly stipitate saccate, side lobes falcate acute, midlobe small acute papillose, disk with a columnar callus.

PERAK; at Larut, on branches of trees, *King's Collector.*

Stem and roots like those of *S. lilacinus*; internodes 2 in. *Leaves* 3–4 in., coriaceous. *Peduncle* 2–3 in., at right angles to the stem; raceme 1 in.; bracts ⅛ in., ensiform, subacute; sepals 1½ long and petals many-nerved, margins of lip papillose.

29. **S. Scortechini,** *Hook. f.*; leaves oblong lorate 2-lobed, peduncle very long rather slender, sepals and petals lanceolate with long narrow tips, lip saccate, side lobes short, midlobe conical obtuse fleshy.

PERAK, *Scortechini.*

Stem 6 in., very stout, covered by the sheaths, internodes ¾ in. *Leaves* 4–6 by 1–1½ in., coriaceous. *Peduncle* equalling or longer than the leaves (9 in. in Ic. Scort.); raceme 2 in., bracts close set, ⅔ in. long; sepals 2½ in. long, ¼ in. broad at the base and petals yellow; lip yellowish, thickly mottled with rusty red outside; pollinia 4, 2 much smaller, adnate to the larger; gland lunate, strap oblong. *Capsule* 4–5 by ½ in.—I know these noble species only from a drawing and description by Scortechini.

30. **S. Arachnites,** *Reichb. f. in Walp. Ann.* vi. 498; stem elongate, leaves loriform, peduncles shorter than the leaves, sepals and petals linear-lanceolate caudately acuminate 3–5-nerved, lip saccate, side lobes falcate, midlobe tongue-shaped laterally flattened obtuse puberulous. S. serræformis, *Reichb. f. l.c.* Dendrocolla Arachnites, *Blume Bijdr.* 287, t. 67. Ærides Arachnites, *Lindl. Gen. & Sp. Orchid.* 238. Liparis serræformis, *Lindl. in Wall. Cat.* 1946; *Gen. & Sp. Orchid.* 33 (*excl. Ceylon plant*). Thrixspermum Arachnites, *Reichb. f. Xen. Orchid.* ii. 121.

ASSAM, *Jenkins, Mann.* KHASIA MTS., alt. 4000 ft., *Clarke.* TENASSERIM and TAVOY, *Wallich, Parish.* PENANG, *Kunstler* (*Ic. in Hort. Calcutt.*).—DISTRIB. Java.

Stem 6–12 in., curved or tortuous, internodes short; roots most numerous and long. *Leaves* 3–6 by ½–¾ in. *Peduncles* many, 2–4 in., solitary or in pairs, bracts ⅛ in.; sepals and petals 1½ in., yellow; lip mottled with red; column very short; pollinia oblong, curved, strap very small, quadrate, gland still smaller, lunate. *Capsule* 2–2½ in.

31. **S. complanatus,** *Hook. f.*; habit, foliage and inflorescence of *S. Arachnites*, but flowers very much smaller, sepals and petals ⅓–½ in. acute not caudate, lip a small sessile cup with an incurved minute midlobe and a callus in the concavity. Dendrocolla serræformis, *Lindl. Gen. & Sp. Orchid.* 33 (*the Ceylon plant only*); *Thwaites Enum.* 307. Epidendrum complanatum, *Retz Obs.* vi. 50. Limodorum complanatum, *Willd. Sp. Pl.* iv. 126; *Lindl. Gen. & Sp. Orchid.* 127.

CEYLON, *Macrae, Walker;* Ambagamowa and Saffragam districts, rare, *Thwaites.*

Like *S. Arachnites.* I can distinguish it only by the very different flower and form of the lip; and for these characters I am indebted to a copy of a drawing in the Peradeniya Bot. Garden. The leaves vary from 2–7 by ½–⅔ in., obtuse or unequally notched; the peduncle from 1–3 in., and the raceme from 1–5 in.; capsule 2–2½ in., linear, straight; pollinia 4 in unequal pairs narrow, quite distinct, and without strap or gland in the figure.—There is a specimen of this in Herb. Rottler, without habitat, named *Epidendrum complanatum*, Retz. Obs. vi. 50.

32. **S. brachystachys,** *Hook. f.*; stem rigid, sheaths ½–¾ in. strongly ribbed when dry, leaves oblong, peduncle with the few-fld. raceme much shorter than the leaves, sepals oblong and obovate-oblong petals obtuse, side lobes of sessile lip falcate incurved, midlobe as long fleshy oblong, spur scrotiform.

PENANG; on blocks of stone amongst decayed leaves, *Maingay.*

Stem as thick as a goose-quill. *Leaves* 2½–3 by ⅔–1 in., obtuse, notched. *Peduncles* at every node with the raceme 1 in., very stout, rigid; bracts 3–4, ¼ in. long, rounded; sepals and petals about 1 in. long, keel narrowly winged; column very short; anther low, not beaked.

33. **S. pauciflorus,** *Hook. f.*; stem rigid, leaves rather distant oblong obtuse, peduncle much shorter than the leaves 2–3-fld., sepals oblong-lanceolate acute, petals nearly as large obovate-oblong obtuse, lip stipitate,

side lobes broad rounded obtuse, midlobe small fleshy obtuse with a conic callus at its base, sac or spur short recurved obtuse.

PERAK; on the Larut range, alt. 3000 ft., *Scortechini.*

Stem ¼ in. diam., flexuous. *Leaves* 2½–3 by 1½–1⅝ in., coriaceous. *Peduncle* with raceme 1 in., basal sheaths imbricate; bracts ⅛ in., subacute; sepals ⅜ in. long, white; lip yellow, with a broad lamella between the side lobes; column very short; anther depressed; pollinia 2, each 2-lobed, strap short.

Sect. IX. RIDLEYA, gen.? (See p. 33.)

34. **S. notabilis,** *Hook. f. Ic. Plant. ined.*; sepals and petals filiform from a narrowly lanceolate 3-nerved base, lip sessile at the base of the column deeply saccate, mouth dilated, tip contracted into a capillary tail.

SINGAPORE, *Ridley.*

Stem very short. *Leaves* 1½–2 in., subsessile, elliptic oblong, strongly striate when dry. *Peduncles* 3 or more from one point on the stem, 4½ in. long, curved, naked; raceme 2½ in., rachis ⅛ in. diam. across the ovate incurved coriaceous subacute bracts; pedicel and ovary very slender, ½ in. long; perianth very membranous, white? sepals and petals ⅜ in. long, 3-nerved at the base; lip a large sac rounded at the base, delicately veined; column very short, foot 0; anther low, membranous, 2-celled; pollinia 2, clavate, sessile on a rather large gland.—A very singular and beautiful little plant, which I hesitate to remove from *Sarcochilus* as a genus, and dedicate to its discoverer. It closely resembles in flower *S. Arachnites*, but the stemless habit, foliage, inflorescence and footless column are very different.

SPECIES UNKNOWN TO ME OR IMPERFECTLY KNOWN.

THRIXSPERMUM FREEMANI, *Reichb. f. in Gard. Chron.* 1877, 749; dwarf, roots warted, leaves 6–7 by 1½ in. ligulate unequally 2-toothed, racemes many-fld., bracts semiovate larger than the small ovary, sepals linear long narrow, petals a little shorter, lip small saccate 3-toothed, with 4 small stipitate globose warted bodies before the base, centre white, lateral parts yellow with brown streaks.—Assam, *Freeman.*—Raceme like a yellow-brownish spotted broom.

S. SILLEMIANUS, *Reichb. f. in Gard. Chron.* 1882, i. 524; habit of *Vanda teres*, leaves slender elongate terete, peduncle 2-fld., bracts very short triangular, flowers milk-white suffused with yellow, mentum long, dorsal sepals elliptic, lateral cuneate-oblong, petals obtusely rhomboid, lip erect trifid, spur corniform nearly as long as the pedicel of the ovary, side lobes subquadrate striped with purple, midlobe shorter thick retuse 4-grooved, white outside with 2 purple blotches, yellow within, calli 0, column short thick, anther inappendiculate.—Burma?

S.—Sect. Cuculla; resembles *S. brachystachys*, but stem much more slender, internodes ¾–1 in., not strongly ribbed when dry.—Mergui, *Griffith* (No. 1124).

S.—Sect. Cuculla; resembles *S. Arachnites*, but capsule 4 in. long and proportionately stout.—Perak, *Scortechini.*

S.—Sect. Cuculla; a very small species; stem 1–2 in., curved, peduncle 1 in., slender, bracts few distant acute, young capsule 1 in., very slender.—Khasia Hills, at Amwee, *J. D. H. & T. T.*

57. TRICHOGLOTTIS, *Blume.*

Epiphytes; stem elongate, leafy. *Leaves* distichous, flat, narrow. *Flowers* in branched panicles or solitary or few in very short racemes. *Sepals* and *petals* widely spreading oblanceolate or subspathulate. *Lip* adnate to the sides of the very short column, narrow, base saccate or spurred; side lobes one or two pairs of narrow processes; midlobe straight, or decurved from the middle, hairy. *Column* very short, sides produced into

2 spurs or horns; anther incompletely 2-celled; pollinia 2, globose, strap rather short, gland moderate.—Species 3 or 4 ? Malayan.

In the absence of good materials, I am doubtful as to the correctness of the above definition of *Trichoglottis*. Bentham refers Blume's *T. retusa* to *Saccolabium*; and by replacing that author's character of "lip adnate to the whole length of the column, with a process on each side," by "lip adnate to the foot of the column and forming with it a long horizontal spur-like mentum" and omitting that of a hairy lip, he excludes the others. I am disposed to regard the hairy-lipped species figured by Blume in his Bijdragen (*T. retusa*, 360, fig. viii.) as the type of the genus. That this is Kurz's and Reichenbach's view appears from the plants they have referred to it. In this case *Trichoglottis* is referable to the group with no foot to the column. There are amongst Scortechini's drawings of Perak Orchids, one or two that are referable to this genus, but the analyses are insufficient.

1. **T. Dawsoniana,** *Reichb. f. in Gard. Chron.* 1872, 699; flowers panicled pale green spotted with brown or purple, sepals and petals cuspidate on the back below the concave tip, lip saccate at the base tip 2-fid. Cleisostoma Dawsoniana, *Reichb. f. in Gard. Chron.* 1868, 815.

TENASSERIM; at Moulmein, *Parish.*

Stem 1–2 ft., stout, rooting. *Leaves* few 3–6 by ½–1 in.. *Panicle* 18 in., erect, stiff, branches spreading; bracts broadly ovate; pedicel with ovary ½ in.; flowers 1–1½ in. diam.; anther 2-lobed, crested; pollinia large, strap short slender.—Near *T. fasciata*, R. f., erroneously supposed to be a native of Ceylon, of which there is a fine drawing in Hort. Calcutt., giving Manilla as the habitat.

2. **T. quadricornuta,** *Kurz in Journ. Beng. As. Soc.* xlv. 156, t. 13; glabrous, leaves linear-lanceolate subsessile acuminate, flowers solitary or 3–4-panicled, sepals obovate-oblong obtuse, petals similar but narrower, lip strongly arched inflexed 2 posterior lobes acute twice as long as the basilar, with a hirsute callus between them, terminal lobes reflexed linear 2-fid, with a callus under the tip, spur subobtuse rather longer than the midlobe.

NICOBAR ISLANDS; forests of Kamorta, *Kurz.*

Leaves 2–3½ in., base narrowed, twisted. *Flowers* leaf-opposed; pedicel ½ in.; sepals ⅓ in. long, lateral subfalcate; column very short; pollinia globose.—Description from Kurz l. c., I have seen no flowers.

58. ÆRIDES, *Lour.*

Epiphytes; stem leafy, pseudobulbs 0. *Leaves* linear, coriaceous. *Flowers* usually many and highly coloured, in dense or lax decurved racemes (few large or sessile in Sect. I.). *Sepals* broad, spreading, lateral adnate to the base or foot of the column. *Petals* broad, spreading. *Lip* spurred, side lobes large small or 0; midlobe larger than the side lobes or smaller and incurved between them. *Column* short, foot long or short, rostellum short or long and bifid; anther 2-celled, beaked or not, pollinia 2, globose, sulcate; strap long or short, gland large or small.—Species about 10, Eastern Asiatic.

I am indebted for aid in determining the cultivated species of Sect. ii. & iii. to Messrs. Veitch for specimens, and to great knowledge of his assistant, Mr. Kent, and of Mr. Rolfe (of the Kew Herbarium) for valuable information respecting them.

Sect. I. *Leaves* terete, grooved in front. (See also *Æ. mitratum.*) *Peduncle* 1–2-fld. *Spur* slightly incurved, with a callus half way down the tube. *Anther* shortly beaked.

1. **Æ. Vandarum,** *Reichb. f. in Gard. Chron.* 1867, 997; 1875, 590; 1885, ii. 629, fig. 143; leaves 6–10 in., peduncle stout, side lobes of lip narrowly lanceolate, outer margin toothed, midlobe clawed tip dilated 2-partite. *Æ. cylindricum, Hook. Bot. Mag.* t. 4982 (*not of Lindl.*); *Lindl. in Journ. Linn. Soc.* iii. 41 (*the Sikkim plant*); *Warner Orchid. Alb.* iii. t. 116.

SUBTROPICAL SIKKIM HIMALAYA, alt. 5000 ft., *J. D. H.* KHASIA HILLS, alt. 4–5000 ft., *J. D. H. & T. T.* MUNNIPORE, alt. 4000 ft., *Watt.*

Stems 1–2 ft., tufted, as thick as a goose-quill; roots ¼ in. broad, flat. *Leaves* as thick as a duck's-quill. *Peduncle* 1–1½ in.; flowers 1½–2 in. diam., white; perianth with crisped margins; sepals obovate-oblong; petals broader; side lobes of lip flexuous, as long as the cylindric spur; segments of midlobe orbicular, toothed; pollinia globose; strap narrowly cuneate, gland large. *Capsule* 1½–2½ in., fusiform.

2. **Æ. longicornu,** *Hook. f. Ic. Plant. ined.*; leaves 6–8 in., peduncle very slender, side lobes of lip 2-partite, segments elongate subulate, midlobe narrow clawed, tip slightly dilated 2-fid. Mesoclastes uniflora. *Lindl. in Wall. Cat.* 1993; *Gen. & Sp. Orchid.* 45. Luisia uniflora, *Blume Rumph.* iv. 50; *Mus. Bot.* i. 64; *Lindl. Fol. Orchid.* 3.

NEPAL, *Wallich.* UPPER ASSAM; Naga Hills, alt. 5500 ft., *Clarke.*

Much more slender than *Æ. Vandarum. Leaves* as thick as a sparrow-quill. *Peduncle* 1 in.; flowers 1 in. diam., white; perianth with crisped margins; lateral sepals much larger than the orbicular-oblong petals; side lobes of lip shorter than the long spur, segments curved forwards, outer shortest, midlobe membranous, lobes divaricate. *Capsule* 2 in., fusiform; peduncle and pedicel very slender.

3. **Æ. cylindricum,** *Lindl. in Wall. Cat.* 7317; *Gen & Sp. Orchid.* 240; leaves 2–6 in., peduncle short stout, side lobes of lip oblong obtuse, midlobe short cuneiform fleshy many-ridged. *Wight Ic.* t. 1744; *Gard. Chron.* 1875, i. 537; 1886, i. 405, fig. 81. Epidendrum subulatum, *Retz Obs.* vi. 50. Limodorum subulatum, *Willd. Sp. Pl.* iv. 126. Cymbidium elegans, *Herb. Heyne.*

DECCAN PENINSULA; from the Coorg Hills, *Heyne*, to Travancore, *Wight*, &c.

Stem elongate, as thick as a goose-quill. *Leaves* as thick as a crow-quill, very obliquely acuminate. *Flowers* 2–3, 1½ in. diam., white or tinged with pink; sepals obovate-oblong, obtuse, lateral decurved; petals broader, shorter; side lobes of lip erect, nearly as large as the midlobe, which is yellowish at the base; spur recurved; column rather long; strap of pollinia short, broad. *Capsule* 2 in., fusiform or subclavate.—The ridged lip is that of *Vanda.*

Sect. II, *Leaves* lorate, keeled (semi-terete in *Æ. mitratum*). Side lobes of *lip* very small, midlobe large; spur incurved.

* *Lip horizontal or inflexed.*

4. **Æ. mitratum,** *Reichb. f. in Bot. Zeit.* 1864, 415; leaves very long filiform, side lobes of lip minute uncinate, midlobe broadly ovate retuse, spur short inflated. *Bot. Mag.* t. 5728.

TENASSERIM; at Moulmein (*Hort. Day*).

Stem 1–2 in., and roots very stout. *Leaves* 2–3 ft., ⅛ in. diam., deeply grooved above. *Racemes* many, suberect, 3 in. long, cylindric; peduncle very stout; bracts minute, acute; flowers ⅔ in. diam.; petals and sepals subsimilar, oblong, tips rounded, white or tipped with violet; lip longer and broader than the sepals, violet; spur contracted at the neck, inflated, compressed, base truncate, obtuse, tip pointing forwards.

5. **Æ. multiflorum,** *Roxb. Cor. Pl.* iii. 63, t. 271; *Fl. Ind.* iii. 475; midlobe of lip hastately ovate tip rounded, spur short straight. *Belg. Hortic.* 1876, 286; *Walp. Ann.* vi. 897. Æ. affine, *Wall. Cat.* 7316;

Lindl. Gen. & Sp. Orchid. 239; *Sert. Orchid.* t. 15; *in Journ. Linn. Soc.* iii. 41; *Bot. Mag.* t. 4049; *Warner, Sel. Orchid. Ser.* i. t. 21. Æ. roseum, *Lodd., ex Paxt. Fl. Gard.* ii. 109, t. 60; *Jard. Fleur.* ii. t. 200; *Gartenfl.* viii. 253, t. 267; *Ill. Hortic.* iii. t. 88. Æ. Lobbii, *Hort. ex. Ill. Hort.* 1868, t. 559 (*an Teism. & Binn.* ?). Æ. Veitchii, *Hort. ex Morren in Belg. Hortic.* 1876, 291; *William's Man.* 70. Æ. trigonum, *Klotzsch. in Otto & Dietr. Allgem. Gartenz.* 1855, 177. Epidendrum geniculatum, *Herb. Ham.*

TROPICAL HIMALAYA; from Garwhal eastwards, the KHASIA HILLS, and southward to TENASSERIM.

Stem 4–10 in., stout. *Leaves* 6–8 in., deeply channelled and keeled, variable in breadth, 2-lobed. *Racemes* 6–12 in., rarely branched, shortly peduncled; flowers ¾–1¼ in. diam., rose purple, sometimes spotted with darker; sepals and petals subequal, oblong, tips rounded; lip twice as long, sides recurved, claw geniculately inflexed, spur ¼ as long as the midlobe, pointing forwards under it with an incurved fleshy 2-lobed callus on the base of the midlobe; column beaked; anther long-beaked, strap long slender. *Capsule* ⅔–2 in., subclavate, stoutly pedicelled.—Common and variable. Lindley overlooked Roxburgh's works. In Griffith's Eastern Himalayan collections, a fruiting specimen of which is a different species, or perhaps a very large var. of this or the following, with leaves 12–14 by 1¼ in., and a stout raceme 12–16 in, the capsules are of *multiflorum*.

6. **Æ. Fieldingii,** *Lodd. ex Morren in Belg. Hortic.* 1876, 286, t. 10; characters of *Æ. multiflorum*, but a much more robust plant, with a different habit of growth, and an acute apex of the hastate midlobe of the lip. *Jenning's Orchid.* t. 20; *Reichb. f. in Hamb. Gartenzeit.* 1855, 225; *Morren. Belg. Hortic.* 1876, 286. Æ. Williamsi, *Warner Sel. Orchid. Ser.* i. t. 21.

SIKKIM HIMALAYA and ASSAM.

I am indebted to Mr. Kent, of Messrs. Veitch's establishment, for calling my attention to the differences between this and *Æ. multiflorum*. They are difficult of detection in Herbarium specimens. According to the published figures the flowers vary in colour, white, red, and purple. *Æ. Williamsi* is a white flowered variety. The figure of *Æ. affine* in Bot. Mag. (cited above under *multiflorum*) is referred to *Fieldingii* by Morren, but it is of far too slender a habit.—The Foxbrush Orchid. of gardens.

7. **Æ. maculosum,** *Lindl. in Bot. Reg.* 1845, t. 58; *in Gard. Chron.* 1845, 691; midlobe of lip ovate tip broad obtuse or retuse margins undulate, spur slender uncinately incurved. *Paxt. Mag. Bot.* xii. t. 49; *Walp. Ann.* v. 897; *Pescatorea*, i. t. 33; *Lindenia*, i. t. 11. Saccolabium speciosum, *Wight Ic.* t. 1674, 1675.

WESTERN GHATS; from the Concan to Travancore. RAJPOOTANA; on Mt. Abo.

Near *Æ. multiflorum*, but stem shorter, leaves more flat, racemes more often branched, flowers larger but very variable in size, pale spotted with purple, tip bright rose, spur longer and more slender.—Var. *Schrœderi*, Jard. Fleurist. t. 54; Gardner's Mag. Bot. ii. 121, *with fig.*; Pesiatorea, t. 36. Æ. illustre, *Reichb. f. in Gard. Chron.* 1882, 7, is a robust form with fewer shorter leaves, and large flowers blotched with purple, and amethystine tip.

8. **Æ. crispum,** *Lindl. in Wall. Cat.* 7319; *Gen. & Sp. Orchid.* 239; *in Bot. Reg.* 1841, t. 55; *in Gard. Chron.* 1842, 711 (*with fig.*); *in Journ. Linn. Soc.* iii. 41; midlobe of lip large broadly ovate-oblong obscurely 3-lobed crenate or toothed, spur very short obtuse. *Bot. Mag.* t. 4427; *Dalz. & Gibs. Bomb. Fl.* 265; *Flore des Serres*, v. t. 48; *Walp. Ann.* vi. 896; *Ill. Hortic.* 1847, 123; *Gard. Chron.* 1859, 24, *with Fig.*; *Belg. Hortic.* 1876, 287; *Warner Orchid. Alb.* vii. t. 293 (*var.*). Æ. Lindleyanum, *Wight*

Ic. t. 1677 *bis.*; *Lindl. in Journ. Linn. Soc.* iii. 41; *Wall. l. c.* 879. A. Brookeii, *Lindl. in Gard. Chron.* 1841, 518; 1842, 559; *Batem. in Bot. Reg.* 1841, *Misc.* 55; *Paxt. Mag. Bot.* ix. t. 145; *Flore des Serres*, t. 151. A. Warneri, *Hort.*

WESTERN GHATS; from the Concan to Travancore.

Stem 4–10 in., very stout. *Leaves* 4–8 in., from oblong to lorate, variable in breadth, thickly coriaceous, lobes unequal rounded. *Racemes* 8–12 in., inclined or drooping, simple or branched; pedicels very robust; flowers 1½ in. diam., sweet-scented; sepals and petals very broad, pale rose; lip geniculately inflexed at the claw, rose or purple, 2-cornute at the base; spur much shorter than the blade, and projecting forwards under it; anther long-beaked, strap of pollinia slender below, dilated above. *Capsule* 1½-2 in., clavate or pyriform, angles subalate.—I find no character whereby to separate *Æ. Lindleyanum*. Lindley says of *Æ. Brookeii*, more odorous than *Æ. odoratum*.

9. **Æ. falcatum,** *Lindl. in Paxt. Fl. Gard.* ii. 142; side lobes of lip half as long as the clawed midlobe dimidiate oblong or falcate, midlobe ovate or ovate-cordate sides replicate erose, spur parallel to the midlobe and concealed under it. *Reichb. f. Xen. Orchid.* i. 220, t. 92; *Morren Belg. Hortic.* 1876, 288; *Walp. Ann.* vi. 897. *Æ.* Larpentae, *Hort. Makoy Prix Cour.* 1862; *Reichb. f. in Otto & Dietr. Gartenz.* 1856, 219. *Æ.* retrofractum, *Wall. mss.*

TENASSERIM, *Wallich, Parish*, &c.

Stem 6–8 in., robust. *Leaves* 8–12 by 1–1½ in. *Raceme* decurved or pendulous, lax-fld.; flowers 1–1½ in. diam., white, pale-violet, purple or pink; sepals and petals often tipped with a darker shade, and lip usually darker; lateral sepals with a very broad base; column beaked; foot elongate; anther long-beaked; strap of pollinia slender, gland small.

10. **Æ. crassifolium,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 145; characters of *Æ. falcatum*, but much more robust, with shorter leaves, dark purple flowers and the spur geniculate at the base and not hidden under the midlobe of the lip. *Reichb. f. in Gard. Chron.* 1877, i 633, and ii. 492, fig. 96; *Otia Hamburg.* 43; *Warner Sel. Orchid. Ser.* 3, t. 12. *Æ.* expansum, *Reichb. f. l. c.* 1882, ii. 40.

TENASSERIM; at Moulmein, *Parish.*

Very nearly allied to *Æ. falcatum*, the chief difference being the form of the spur and that the sides of the midlobe of the lip are so reflected as that their under surfaces meet.—Var. *Leonæ*, Reichb. f. in Bull. Soc. Tor. d'Orticult. x. t. 14; Williams' Orchid. Man. t. 14, is described as having retuse side lobes of the lip and an expanded midlobe.

** *Lip deflexed.*

11. **Æ. radicosum,** *A. Rich. in Ann. Sc. Nat. Ser.* xv. 65, t. i. c.; stem short very stout, leaves 4–10 by ¾–1¼ in. unequally 2-lobed, racemes or panicles very stout rarely exceeding the leaves, sepals orbicular and rather smaller petals 5-nerved, side lobes of lip minute, midlobe ovate, disk with 2 large basal calli, spur longer than the sepals stout incurved obtuse. Saccolabium Wightianum, *Lindl. in Wall. Cat.* 7303 (*in part*); *Gen. & Sp. Orchid.* 221 (*excl. Syn.*); *in Journ. Linn. Soc.* iii. 36 (*excl. Khasia*); *Wight Ic.* t. 917. S. rubrum, *Wight Ic.* 1673 (*not of Lindl.*). S. ringens, *Lindl. in Wall. Cat.* 7313; *Gen. & Sp. Orchid.* 220; *in Journ. Linn. Soc.* iii. 36; *Walp. Ann.* vi. 884.

The DECCAN PENINSULA; on the Nilghiri and Pulney Hills, and at Quilon, *Wight*, &c.

Stem as thick as the thumb. *Leaves* leathery, rigid, mottled with purple in

Wight's *S. rubrum*. *Peduncle* very short and stout; raceme simple or sparingly branched, rachis stout; bracts minute; flowers ⅜ in. diam., bright red in Wight's *S. rubrum*, nearly white with rosy tips in his *S. Wightianum*; spur about as long as the blade of the lip, incurved, obtuse; anther beaked; strap of pollinia short, subtriangular, gland large. *Capsule* ¾ in. long, pyriform, angled and grooved.

12. **Æ. lineare,** *Hook. f.*; stem short stout, leaves 6–12 by ½–¾ in. very unequally 2-lobed, panicle long peduncled much branched longer than the leaves, flowers as in *Æ. radicosum*, but rather smaller rose-cold. Saccolabium lineare, *Lindl. in Wall. Cat.* 7312. S. paniculatum, *Wight Ic.* t. 1676; *Reichb. f. in Bonpl.* iii. 225. Cymbidium lineare, *Herb. Heyne.*

DECCAN PENINSULA; on the Ghats from Canara southwards, alt. 5–7500 ft., *Wight*, &c. CEYLON; in the Doombera district, *Thwaites.*

As far as I can judge from dried specimen *Æ lineare* is with difficulty distinguishable from *Æ. radicosum*, except by the more slender very much branched panicle, and rather smaller flowers. Wallich's specimens of *Sacc. lineare* are very bad.—The synonyms of this and the preceding may be mixed.

Sect. III. *Leaves* lorate, keeled. Midlobe of *lip* incurved between the much larger side lobes.

13. **Æ. odoratum,** *Lour. Fl. Coch.* 525; lobes of leaf large rounded, lateral sepals much larger than the dorsal and petals, midlobe of lip oblong-lanceolate acute entire or erose. *Lindl. Gen. & Sp. Orchid.* 239; *in Journ. Linn. Soc.* iii. 41; *Bot. Mag.* 4139; *Paxt. Fl. Gard.* ii. t. 143; *Flor. Cal.* ii. 75; *Maund Botanist.* iv. t. 180; *Knowles & West.* t. 75; *Hartm. Parad.* ii. t. 4; *Walp. Ann.* vi. 898, *Lindenia*, t. 14 (*var.*). Æ. cornutum, *Roxb. Hort. Beng.* 63; *Fl. Ind.* iii. 472; *Bot. Reg.* t. 1485.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, *J. D. H.* The KHASIA HILLS, SILHET, CHITTAGONG and TENASSERIM. The CONCAN, *Heyne in Herb. Rottl.*—DISTRIB. Java, China, Cochin-China.

Stem 4–12 in., very stout. *Leaves* 6–10 by ¾–1¾ in. *Racemes* many, 10–12 in.; peduncle and rachis stout; flowers purple to nearly white, sweet-smelling, often purple-spotted or -tipped; side lobes of lip subcuneate, midlobe short; spur very large, uncinately incurved; column short; anther obtuse; strap of pollinia not long, linear, gland small. *Capsule* 1–1½ in., oblong-clavate, angles obtuse; pedicel ⅓ in., very stout.

VAR. *bicuspidata*; midlobe of lip with a bicuspidate tip.—MALACCA, *Maingay* (*Kew Distrib.* 1648). PERAK (*Ic. in Hort. Calcut.*). A specimen of this sent from Calcutta (Garden?) to Herb. Hooker by Dr. Carey is named by the latter *Æ. cornutum.*

14. **Æ. suavissimum,** *Lindl. in Journ. Hort. Soc.* iv. 263; *in Paxt. Fl. Gard.* ii. 141, t. 66; differs from *Æ. odoratum* in the midlobe of the lip being longer and emarginate. *Jard. Fleur.* t. 213; *Rolfe in Gard. Chron.* 1890, i. 43; *Walp. Ann.* vi. 898. Æ. Reichenbachii, *Linden in Koch & Fintelm. Wochenschrift*, 1858, 61; *Reichb. f. Xen. Orchid.* ii. 11, t. 104. Æ. nobile, *Warner Sel. Orchid. Ser.* 1. t. 11; *Gartenfl.* 40, t. 641. Æ. Rohanianum, *Reichb. f. in Gard. Chron.* 1884, i. 206. Æ. flavidum, *Lindl. in Paxt. Fl. Gard.* ii. 101. Æ. Ballantinianum, *Reichb. f. in Gard. Chron.* 1885, ii. 198.

PENANG and BURMA.

Said to be the sweetest scented species of the genus, but more definite characters are wanting to distinguish it from *Æ. odoratum*. The sepals and petals are rosy with often darker tips, the spur yellow mottled red. *Æ. Ballantinianum* is an early flowering form.

15. **Æ. Emericii,** *Reichb. f. in Gard. Chron.* 1882, 586; lobes of

leaf long narrow subacute, sepals longer than the petals, midlobe of lip lanceolate acute.

ANDAMAN ISLANDS, *Berkeley.*

Stem 6–8 in. *Leaves* 10–12 by $\frac{3}{4}$–$1\frac{1}{2}$ in., lobes much longer than in *Æ. odoratum.* *Racemes* 6–8 in.; flowers $\frac{1}{2}$ in. diam., pale lilac, pedicels 1 in., side lobes of lip rounded, entire; spur short, stout; foot of column very short; anther shortly beaked; strap of pollinia long, linear.—Much the smallest flowered of the Indian species.

SPECIES UNKNOWN TO ME.

Æ. BORASSI, *Ham. ex. Smith in Rees Cyclop.* xxxix. No. 8, is undeterminable.

Æ. DECUMBENS, *Griff. Notul.* iii. 365 (*without descript.*); *Ic. Plant. Asiat.* t. 320, fig. 1; *Lindl. in Journ. Linn. Soc.* iii. 423; from Mogoung in Burma. *Stem* very short. *Leaves* 2–4 in., elliptic, acute, many-nerved; peduncles several, short, stout, few-fld.; bracts small, triangular; pedicels with ovary $\frac{3}{4}$ in., erect; flowers $\frac{3}{4}$ in. diam.; lateral sepals very broad, obtuse.—This has the habit of a *Phalænopsis.*

Æ. LASIOPETALUM, *Willd. Sp. Pl.* iv. 130, is undeterminable.

Æ. LEPIDUM, *Reichb. f. in Gard. Chron.* 1883, i. 466; leaves lorate obtusely 2-lobed, flowers white ascending, sepals and petals subequal oblong apiculate, tips and of lip and spur purple, side lobes of lip short triangular, midlobe larger triangular, spur filiform curved as long as the pedicelled, with a slender curved ascending tooth in the middle of the cavity.—British India, *Berkeley.*

Æ. MENDALII, *Jenning's Orchid. under* t. xxx., without description, is probably *Æ. falcatum.*

Æ. PACHYPHYLLUM, *Reichb. f. in Gard. Chron.* 1880, ii. 230; leaves short most fleshy obtusely unequally 2-lobed, raceme short few-fld., sepals and rather shorter petals oblong-ligulate obtusely acute crimson-lake, side lobes of lip subtriangular short, midlobe purple triangular minute, spur white cylindric obtuse inflated longer than the pedicelled ovary, column white.—Burma (*Hort. Veitch.*).

Æ. RIGIDUM, *Ham. ex. Smith in Rees Cyclop.* xxxix. No. 12, is undeterminable.

59. **RENANTHERA,** *Lour.*

Epiphytes; stem elongate, branched, leafy; pseudobulbs 0. *Leaves* rigid, 2-lobed. *Flowers* large or medium sized, in lateral spreading panicles. *Sepals* narrow, widely spreading, dorsal erect, lateral deflexed or placed under the lip, oblanceolate or spathulate, at first parallel or connate. *Petals* narrow. *Lip* very small sessile, jointed on the base of the column, saccate, side lobes erect. *Column* short, truncate, foot 0; pollinia large, 2-grooved or 2-partite, strap short, gland transverse.—Species 5, Indian, Chinese and Malayan.

1. **R. coccinea,** *Lour. Fl. Cochin Ch.* ii. 637; flowers 2–$2\frac{1}{2}$ in. diam., lateral sepals free, much larger than the dorsal, midlobe of lip ovate-lanceolate recurved. *Lindl. Gen. & Sp. Orchid.* 217; *Bot. Reg.* t. 1131; *Bot. Mag.* t. 2997–8; *Paxt. Mag.* t. 49; *Reichb. Fl. Exot.* t. 114; *Walp. Ann.* vi. 875.

TENASSERIM; at the Moscos Isds., opposite Tavoy, *Parish.*—DISTRIB. Cochin China.

Stem 1–3 ft., stout. *Leaves* 2–4 in., distant, oblong or shortly lorate. *Peduncle* 2–3 ft., erect; branches long, divaricate, lax-fld.; bracts very small, broad; lateral sepals scarlet, dorsal and petals linear, orange-red, spotted; lip yellow, tip of small spur and midlobe scarlet; strap of pollinia linear acute.

2. **R. elongata,** *Lindl. Gen. & Sp. Orchid.* 218; flowers $\frac{3}{4}$ in. diam., sepals subequal lateral free, midlobe of lip tongue-shaped revolute with 2

basal calli. *Reichb. f. Xen. Orchid.* i. 88; *Walp. Ann.* vi. 876. R. matutina, *Lindl. in Bot. Reg.* 1843, t. 41 (*not of Gen. & Sp.*); *Prescatorea*, i. t. 11. R. micrantha, *Blume Mus. Bot.* i. 60; *Reichb. f. l. c.* i. 87. Saccolabium reflexum, *Lindl. in Wall. Cat.* 7309; *Gen & Sp. Orchid.* 225.

SINGAPORE, *Wallich*. PERAK, *Scortechini*, &c. MALACCA, *Griffith* (*Kew Distrib.* 5242), *Maingay* (*K. d.* 1644).—DISTRIB. Malay Islands.

Habit and foliage of *R. coccinea*, but much more slender, bracts ovate reflexed, flowers much smaller and more numerous, orange yellow with red spots. *Lip* with the side lobes short, broad, margins revolute; spur large, cylindric, obtuse, somewhat recurved; strap of pollinia linear acuminate, gland small. *Capsule* 1 in., fusiform, angles acute.—King's collector describes the flowers as dark-red.

3. **R. angustifolia,** *Hook. f. Ic. Plant. ined.*; flowers 1½ in. diam., lateral sepals lanceolate abruptly clawed, at first connate, midlobe of lip minute acute recurved.

PERAK; on Gunong Bata Puteh, *Wray*.

Stem as thick as a goose-quill. *Leaves* 4–5 by ½–¾ in., linear, recurved. *Scape* long, sparingly branched; pedicel with ovary 1–1¼ in.; lateral sepals inserted by a point, and narrower dorsal acuminate; side lobes of lip very small, rounded; spur conico-cylindric; top of column hispid; pollen large, oblong, strap broad, gland large.

SPECIES UNKNOWN TO ME.

R. HISTRIONICA, *Reichb. f. in Gard. Chron.* 1878, ii. 74; low, leaves lanceolate acuminate, raceme laxly few-fld., sepals and petals cuneately ligulate obtusely acute, lip 3-fid, side lobes triangular, midlobe ligulate acute with two incumbent triangular or quadriate lamellæ at its base, spur short conic.—Singapore? or Malacca?, *Hort. Day*. Flowers yellow purple spotted and margined, lip white, side lobes spotted with purple, spur orange, column yellow and purple.—The first species with acuminate leaves.—Description from Reichb. l. c.

60. VANDA, *Br.*

Epiphytes; stem leafy. *Leaves* very coriaceous or fleshy, flat keeled or terete. *Flowers* usually large, highly coloured, in simple lax or dense racemes. *Sepals* and *petals* subequal, spreading or incurved, bases narrowed. *Lip* large, base usually saccate or spurred, side lobes large or small (rarely 0), placed on the sides of the sac or spur; midlobe various, fleshy, disk usually ridged or lamellate. *Column* short, stout; foot not or very shortly produced; anther 2-celled; rostellum obscure; pollinia 2, didymous, subglobose or obovoid, strap broad short or long geniculate, gland rather large (slender in § *Anotis* and gland small).—Species about 20, tropical Asiatic and Australian.

Sect. I. EUVANDA. *Sepals* and *petals* widely spreading (not incurved). *Lip* with erect side lobes. *Strap* of pollinia flat, geniculate, gland large.

* Leaves terete. Scape few-fld. See also *Ærides cylindricum*.

1. **V. teres,** *Lindl. in Wall. Cat.* 7324; *Gen. & Sp. Orchid.* 217; *Fol. Orchid.* 7; *in Bot. Reg.* t. 1809; midlobe of lip 2-fid., lobes hatchet-shaped, sac long conical. *Bot. Mag.* t. 4114; *Paxt. Mag.* v. t. 193; *Griff. Notul.* iii. 352; *Warn. Sel. Orchid. Ser.* iii. t. 2; *Reichenbachia*, i. t. 27; *Rev. Hortic.* 1856, t. 22. Dendrobium teres, *Roxb. Fl. Ind.* iii. 485.

LOWER BENGAL; at Seeb Sagur, *Clarke*. ASSAM, SILHET, the KHASIA HILLS, CHITTAGONG and UPPER BURMA, *Roxburgh, Wallich*, &c.

Stem many feet long, branched, and leaves as thick as a goose-quill. *Leaves* 6–8 in. *Peduncle* 6–12 in.; bracts short, ovate; flowers 3–6, 4 in. diam., white or

rose-cold.; sepals and petals undulate; lip hairy towards the base; side lobes broad, incurved, yellow within, crimson spotted; midlobe much larger, flabellately reniform purple or rose-cold., sac 1 in. long; column hairy in front. *Capsule* 1 in., clavate.

2. **V. Hookeriana,** *Reichb. f. in Bonpland.* 1856, 324; *in Gard. Chron.* 1882, ii. 488; midlobe of lip very large reniformly flabellate 3-lobed, sac very short. *Ill. Hortic.* 1883, t. 484; *Orchidoph.* 1886, t. 158; *Reichenbachia,* ii. t. 74. *Warner Orchid. Alb.* t. 73, 1882.

PERAK, *Scortechini*; in swamps, *Wray.* SINGAPORE, *Ridley (in litt.).*

Habit of *V. teres,* but leaves shorter, 2–3 in.; scape longer; flowers 3–5, 2 in. diam.; lateral sepals oblong or obovate-oblong, cream-cold; petals broader, lilac or carnation; lip towards the base and column hairy; side lobes purple; midlobe as large as the rest of the flowers, white or lilac, base 2-glandular; sac conical, obtuse. *Capsule* 4 in.

** *Leaves* flat or chanelled and keeled. *Scape* usually many-fld.

† *Flowers* ½–1½ in. diam. (See also *V. Bensoni.*)

3. **V. parviflora,** *Lindl. in Bot. Reg.* xxx. *Misc.* 45; peduncle and raceme strict erect, flowers ½–⅔ in. diam., sepals oblong and spathulate petals yellow, lip rather shorter than the sepals, midlobe cuneate-obovate with a dilated truncate 2-lobed tip, disk with fleshy blue ridges, spur slender conical half as long as the lip. *Wight Ic.* t. 1669; *Reichb. f. in Gard. Chron.* 1877, 166. Ærides Wightianum, *Lindl. in Wall. Cat.* 7320; *Gen. & Sp. Orchid.* 238; *in Journ. Linn. Soc.* iii. 40; *Bot. Mag.* t. 5138; *Wight Ic.* v. p. 8; *Dalz. & Gibs. Bomb. Fl.* 265.

WESTERN HIMALAYA; Kumaon, Ataikmunda river, alt. 3–4000 ft., *Edgeworth.* NEPAL, *Wallich.* ASSAM, *Mann.* BURMA, *Berkely.* WESTERN PENINSULA; from the Concan to Travancore. CEYLON, *Walker,* &c.

Stem 4–6 in. *Leaves* 4–8 by ½–¾ in., unequally obtusely 2-lobed. *Peduncle* and rachis stout; pedicel with ovary 1–1½ in.; side lobes of lip small, ovate. *Capsule* 1–1¼ in., long pedicelled, clavate.

Var. *testacea*; sepals and petals brown. V. testacea, *Reichb. f. in Gard. Chron.* 1877, 166. Ærides testaceum, *Lindl. Gen. & Sp. Orchid.* 238; *Paxt. Fl. Gard.* ii. t. 142; *Walp. Ann.* v. 897.—Ceylon.

Var. *albiflora*; sepals and petals white, lip white, ridges speckled with red, spur broader obtuse.—Moulmein (*Ic. Parish*).

4. **V. cœrulescens,** *Griff. Notul.* iii. 352; *Ic. Plant. Asiat.* t. 331; raceme drooping, flowers 1–1½ in. diam., sepals obovate and spathulate, petals pale blue, lip rather shorter than the sepals, midlobe cuneate-obovate with a dilated truncate 2-lobed tip, disk with fleshy dark blue ridges, spur slender conical half as long as the lip. *Lindl. Fol. Orchid.* 9; *Walp. Ann.* vi. 868; *Bot. Mag.* t. 5834 and 6328; *Warner Orchid. Alb.* t. 48; *Floral Mag. N. S.* t. 256; *Orchidoph.* 1863, t. 637; *Reichb. f. in Gard. Chron.* 1869, 498; 1870, 529, f. 97.

UPPER BURMA, *Griffith.* PEGU; on hills near Prome, alt. 1500 ft., *Benson.*

Stem 6 in. *Leaves* 6–10 by ⅔ in., much broader in cultivation, acutely 2-fid or 3-fid. *Peduncle* with racemes 1 ft. or less; pedicel with ovary 1–1½ in.; flowers variable in colour, from blue to nearly white (vars. *Boxallii,* R. f. and *Louriana,* R. f.); spur and column blue.

5. **V. spathulata,** *Spreng. Syst. Veg.* iii. 719; leaves short, peduncle very tall, raceme terminal few-fld., flowers 1¼ in. diam. golden yellow, sepals and petals spathulately oblong flat, lip clawed as long as the sepals, side lobes very small, midlobe suborbicular. *Lindl. Gen. & Sp. Orchid.* 216; *Fol. Orchid.* 9; *Wight Ic.* t. 915; *Walp. Ann.* vi. 869. Epidendrum

spathulatum, *Linn. Sp. Pl.* 1348. Limodorum spathulatum, *Willd. Sp. Pl.* iv. 125. Ærides maculatum, *Smith in Rees Cyclop. Suppl.—Rheede Hort. Mal.* xii. t. 3.

WESTERN PENINSULA; from Malabar to Travancore and CEYLON.

Stem 2 ft. *Leaves* 2–4 by ½–1¼ in., shortly obtusely 2-lobed. *Peduncle* 12–18 in., robust, few-fld. and at the tip only; bracts large, ovate, acute; pedicel and ovary 1–1½ in.; side lobes of lip broadly obovate, midlobe obscurely 3-fid; spur conical. *Capsule* 1½–2½ in., clavately fusiform.

†† *Flowers 2 in. diam. and upwards* (smaller in *V. Bensoni*).

6. **V. cœrulea,** *Griff. ex Lindl. in Bot. Reg.* 1847, *under* t. 30; *Fol. Orchid.* 8; peduncle elongate many-fld., flowers 3–4 in. diam. pale blue, lateral sepals obovate, petals clawed broadly obovate, lip much shorter than the sepals dark blue linear-oblong, side lobes small rounded, midlobe with 2 thickened ridges ending in a bigibbous tip. *Paxt. Fl. Gard.* t. 36; *Jard. Fleurist.* t. 102: *Fl. des Serres.* t. 609; *Reichb f. Xen. Orchid.* i. 8, t. 5; *Pescatorea*, i. t. 29; *Ill. Hort.* vii. t. 246; *Warner Sel. Orchid.* t. 18; *Jennings Orchid.* t. 34, *Reichenbachia*, ii. 19, t 57; *Lindenia*, iv. t. 160 V. cœrulescens, *Journ. Hort. Soc.* vi., *Proc.* vii. *with fig.* Vanda, *Griff. Itin. Notes*, 88, No. 1284.

KHASIA and JYNTEA MTS., on oaks, alt. 4000 ft., *Griffith*, &c.

Stem 3–6 in., very stout. *Leaves* 3–10 by ¾–1 in., keeled, 2-lobed or tip obliquely truncate and toothed. *Peduncle* with lax-fld. 6–20-fld. raceme 1–2 ft., perianth segments somewhat waved and obscurely tessellate; lip not one-third the length of the sepals; spur conical obtuse. *Capsule* 3 in., fusiform, long pedicelled.

7. **V. Denisoniana,** *Benson & Reichb. f. in Gard. Chron.* 1869, 528; 1885, 105, f. 21; peduncle very short, flowers 2 in. diam., white, sepals and petals waved and twisted, lateral sepals largest broadly obovate falcate deflexed, petals clawed spathulate, lip longer than the sepals, side lobes large subquadrate, midlobe panduriform with two orbicular diverging and recurved terminal lobes. *Bot. Mag.* t. 5811; *Ill. Hort. N. S.* t. 105; *Lindenia*, t. 21; *Warner Orchid. Alb.* t. 248.

TENASSERIM; at Moulmein, *Parish.* ARRACAN, *Benson.*

Stem short. *Leaves* 6–10 in., deeply unequally 2-lobed. *Peduncle* stout, with the raceme 6–10 in.; pedicels with ovary 2 in.; midlobe of lip with rounded sides, and a very acute terminal sinus; disk with 5 thick obtuse ridges; side lobes concave, with orange streaks; spur short, villous within. *Capsule* 3–5 in., clavately fusiform.

8. **V. Bensoni,** *Batem. in Bot. Mag.* t. 5611; leaves narrow, peduncle tall inclined many-fld., flowers 1½–2 in. diam., sepals and petals dull yellow-green spotted with red-brown, lateral sepals broadly obovate, petals spathulately obovate, lip nearly as long as the sepals blue, side lobes triangular-ovate, much smaller than the panduriform midlobe which has 2 broad recurved terminal lobes. *Reichb. f. Xen. Orchid.* ii. 138; *Gard. Chron.* 1867, 180; *Flore des Serres*, t. 2329.

PEGU; near Rangoon, *Benson.* TENASSERIM; at Moulmein, *Parish.*

Stem short. *Leaves* 4–6 in. obliquely truncate and toothed. *Peduncle* with the raceme 18 in.; midlobe of lip with 3 obtuse ridges; spur conical obtuse.—Very near *V. Denisoniana*, but flowers much smaller, quite different in colour, not so waved, midlobe of lip more contracted, the terminal lobes uncinate.—A form with brown flowers figured by Parish and called *tristis* may be this or *V. brunnea* (see end of genus).

9. **V. Parishii,** *Veitch & Reichb. in Gard. Chron.* 1867, 180, *with fig.*;

leaves broad obtusely 2-lobed, peduncle short stout erect, bracts large, flowers 2 in. diam., fleshy spotted mauve-brown or purple, lateral sepals broadly ovate-oblong and orbicular petals apiculate, lip half as long as the sepals, side lobes rounded, midlobe small cuneately flabelliform. *Reichb. f. Xen. Orchid.* ii. 138; *in Gard. Chron.* 1870, 890; *Warner Orchid. Alb.* t. 15, and 61 (var.).

TENASSERIM; at Moulmein, *Parish.*

Stem very short, stout. *Leaves* few, 8–10 by 2–3 in. *Peduncle* very short; raceme 6–8 in., drooping, 6–8-fld.; bracts acuminate; flowers variable in colour. The short stems and broad flat leaves are not those of *Vanda* proper, and more resemble *Stauropsis* or *Arachnanthe.* In var. *Marriottiana*, Reichb. f. in Gard. Chron. 1880, 743; 1881, 726, the sepals and petals are mauve, the side lobes of the lip white with mauve stripes and 2 yellow blotches below the column, and the midlobe is carmine. In var. *purpurea*, N. E. Br. in Gard. Chron. 1883, 307, the sepals and petals are mauve-purple with white bases, and the lip bright mauve.

10. **V. bicolor,** *Griff. Notul.* iii. 354; *It. Notes*, 122, No. 546; *Ic. Plant. Asiat.* t. 330; leaves præmorse, peduncle short erect 4–6-fld., flowers 2 in. diam. brownish-purple obscurely tessellate, waved, lateral sepals obovate deflexed, dorsal small, lip nearly as long as the sepals, purple side lobes large orbicular, midlobe small panduriform, tip contracted 2-lobed. *Lindl. Fol. Orchid.* 6; *Walp. Ann.* vi. 867; *Reichb. f. in Gard. Chron.* 1875, 620.

EASTERN TROPICAL HIMALAYA; Sikkim (*Ic. in Herb. Calcutt.*); Bhotan, alt. 2000 ft. *Griffith.* ASSAM (*Ic. in Herb. Calcutt.*).

Stem 2–3 ft. *Leaves* 6–10 in., sometimes unequally rather obtusely 2-lobed. *Scape* very stout; bracts ovate, acute; dorsal sepal much the smallest, dilated in the middle; petals clawed, spathulate; side lobes of lip margined with yellow. *Capsule* almost a span long.—Near *V. Roxburghii*, but at once distinguishable by the large orbicular side lobes of the lip. A little-known species.

11. **V. Roxburghii,** *Br. in Bot. Reg.* t. 506; leaves præmorse, raceme suberect, flowers 1½–2 in. diam. tesselated with brown, sepals and petals subequal clawed obovate waved, lip nearly as long as the sepals, side lobes small acute, midlobe panduriform violet tip dilated truncate 2-lobed. *Lindl. Gen. & Sp. Orchid.* 215; *Fol. Orchid.* 3; *Wight Ic.* t. 916; *Fl. des Serres*, ii. t. 11; *Paxt. Fl. Gard.* t. 42, f. 2; *Reichb. Fl. Exot.* t. 121; *Ill. Hort.* t 185 (var.). V. tesselloides, *Reichb. f. in Walp. Ann.* vi. 864. Cymbidium tesselloides, *Roxb. Fl. Ind.* iii. 463. C. tessellatum, *Swartz in Nov. Act. Upsal.* vi. 75; *Willd. Sp. Pl.* iv. 102; *Roxb. Fl. Ind. l. c.* C. Alagnata, *Herb. Ham.* Epidendrum tessellatum. *Roxb. Cor. Pl.* i. 34, t. 42. Ærides tessellatum, *Wight in Wall. Cat.* 7318; *Lindl. Gen. & Sp. Orchid.* 240.—Vanda, *Jones in Asiat. Res.* iv. 302.

BENGAL, BEHAR and westwards to GUZERAT and the CONCAN, and southwards to TRAVANCORE, TENASSERIM and CEYLON.

Stem 1–2 ft., climbing. *Leaves* 6–8 in., narrow, complicate. *Peduncle* 6–8 in., 6–10-fld.; sepals and petals yellowish-green or blueish except from the clathrate-brown nerves, margins white; lip half as long as the sepals or more, disk of midlobe convex with fleshy ridges and white margins and mesial lines; spur conical.—Reichenbach in Gard. Chron. 1883, i. 9, describes a var. *Wightiana*, with purple lip, the side lobes with more or less developed anterior teeth. The colouring in the Fl. des Serres, ii. t. 11, is unlike that of any form known to me. Roxburgh distinguishes his *C. tessellatum* from his *C. tesselloides*, by the former having the lip with the sides incurved into a tube, and the blade tapering entire acute; whilst in the latter the lip is channelled above, concave underneath, and the tip of 2 obtuse lobes. The latter (the typical *V. Roxburghii*) is the only form known to Indian

botanists, and I suspect that the form of the lip of *C. tessellatum* is due to withering. Var. *unicolor*, Bot. Mag. t. 3416 is I suspect the Chinese *V. concolor*, Blume.

Sect. II. ANOTA, *Lindl.* *Raceme* dense-fld. *Sepals* and *petals* widely spreading. *Lip* without side lobes. *Strap of pollinia* long, slender, straight.

The two species of this section (the following and *V. violacea*) have been referred to *Saccolabium*, *Vanda*, and one of them to *Rhynchostylis*. In whichever genus placed they are aberrant; the ridged lip is quite that of *Vanda*; but the lip and strap of the pollinia is as in *Rhynchostylis*; and the spur is hardly that of *Vanda*, but rather of *Saccolabium*.

12. **V. densiflora,** *Lindl. in Paxt. Fl. Gard. under* t. 42; *Fol. Orchid.* 2; leaves truncately excised, lip cuneate tip shortly obtusely 3-lobed, base with 2 pubescent ridges descending into the spur. *Fl. des Serres*, t. 1765; *Reichb. f. in Gard. Chron.* 1866, 1194. Saccolabium giganteum, *Lindl. in Wall. Cat.* 7306; *Gen. & Sp. Orchid.* 221; *Bot. Mag.* t. 5635. *Reichenbachic* t. 22; *Jennings Orchid.* t. 8; *Lindernia, f.* 683; *Orchidopl.* 1888, t. 163.

PEGU; at Prome, *Wallich.* RANGOON, *Benson.*

Stem short, as thick as a child's wrist; roots ½-¾ in. diam. *Leaves* imbricating at the base, 6–12 by 1½–2 in., very thick, channelled, lobes acute. *Peduncle* very short, stout; raceme 8–14 in., cylindric, very dense-fld.; flowers 1–1¼ in. diam., white with a few purple spots at the base of the petals; lip fleshy, white with bright purple shining terminal lobes; spur short, inflated, pointing backwards.

Sect. III. CRISTATÆ. *Racemes* shortly peduncled, few-fld.; pedicels decurved. *Sepals* and *petals* incurved. *Strap of pollinia* very short, gland large.—Inflorescence and flowers of *Luisia*, but habit and foliage of *Vanda*.

13. **V. cristata,** *Lindl. in Wall. Cat.* 7328; *Gen. & Sp. Orchid.* 216; *Sert. Orchid. Frontisp. f.* 10; *in Bot. Reg.* 1842, t. 48; *Fol. Orchid.* 10; sepals and petals narrow yellow or green, side lobes of lip erect triangular, midlobe subpanduriform golden striped with purple, tip with 2 divaricate spindle-shaped lobes and an intermediate depressed one, spur conical. *Bot. Mag* t. 4304; *Warner Orchid. Alb.* vii. t. 290; *Gartenfl.* t. 680; *Walp. Ann.* vi. 869. V. striata, *Reichb. f. Xen. Orchid.* ii. 137, t. 150. Ærides cristatum, *Wall. mss.* Ærides sp. *Griff. Itin. Notes*, 203, No. 1188.

TROPICAL HIMALAYA; from Kumaon to Bhotan, *Wallich*, &c. SILHET, *J. D. H. & T. T.*

Stem 3–6 in., very stout. *Leaves* 3–5 in., rigidly coriaceous, recurved, keeled, truncately 3-toothed. *Raceme* equalling or shorter than the leaves; bracts very short, broad; pedicels with ovary long, stout; flowers 1½–2 in. diam.; side lobes of lip acute truncate or toothed, midlobe as long as the sepals; spur short, obtuse. *Capsule* 2-2½ in., narrowly clavate.

14. **V. alpina,** *Lindl. Fol. Orchid.* 10; sepals and petals narrow yellowish, side lobes of lip rounded, midlobe concave ovate obtuse or retuse pale yellow streaked with purple, spur 0. V. Griffithii, *Lindl. in Paxt. Fl. Gard.* ii. 22, and *Fol. Orchid.* 10 (*excl. cilat. Griffith*). Luisia alpina, *Lindl. in Bot. Reg.* 1858, *Misc.* 56.

SUBTROPICAL HIMALAYA, alt. 3500–5000 ft., from Garwhal, *Thomson*, to Bhotan. KHASIA HILLS, alt. 4–5000 ft., *J. D. H. & T. T.*

Habit of *V. cristata*, but smaller, leaves rather shorter, racemes always much shorter than the leaves, flowers only 1 in. diam., lip very different. *Capsule* not seen.—Lindley's citation of Griffith's Itin. Notes, No. 526, from his *V. Griffithii*, is (as he states in Fol. Orchid.) an error. But he again errs in referring this same plant to *Vanda bicolor*. It is his *V. undulata* (*Stauropsis undulatus*, p. 27).

15. **V. pumila,** *Hook. f.*; sepals and petals narrow pale yellowish

or white, side lobes of lip rounded, midlobe broadly ovate concave obtuse pale streaked with purple, spur conical as long as the midlobe. V. cristata, var. *Lindl. Fol. Orchid.* 10.

SIKKIM and BHOTAN HIMALAYA, alt. 2000 ft. (*Ic. Cathcart & in Herb. Calcutt.*). A smaller species than either *cristata* or *alpina*, with the lip of the latter, but furnished with a long conical spur. In the Cathcart drawings the leaves are 5–6 in. and sepals and petals white; in that of the Calcutta Herb. the leaves are only 3 in. long, and the sepals and petals are yellow. The latter is ticketed as from Mongpo, in Sikkim.

SPECIES UNKNOWN TO ME.

V. BRUNNEA, *Reichb. f. Xen. Orchid.* ii. 139; leaves long narrowly ligulate emarginate, flowers as large as in *V. concolor* (of China) olive within, sepals and petals cuneately oblong obtusely acute, lip and column pale yellowish white, side lobes semi-rotund, midlobe ligulate 2-lobed retuse, spur acutely conical.—Moulmein, *Parish.*—There is a drawing at Kew, by Parish, of what may be this species named *V. tristis*, Par. mss., the perianth is brown on both surfaces, the lip and column pale brown. (See *V. Parishii*, p. 51.)

V. STANGEANA, *Reichb. f. in Bot. Zeit.* xvi. (1858) 351; allied to *V. fusco-viridis*, Lindl. (of Java), auricles of the lip semiovate divergent, blade gradually narrowed from a broad semicordate base, lip slightly 2-lobed, a pair of small calli before the mouth of the spur, dorsal sepal cuneate-ovate about equalling the petals, lateral sepals larger.—Sepals and petals golden green tesselated with beautiful chesnut brown; lip and column white; lip pale violet in front, with a streak of red dots on each side of the spur, and a furrow under the column between the auricles.—Assam (*Hort. Schiller*).

V. VIPANI, *Reichb. f. in Gard. Chron.* 1882, ii. 134, 29; leaves very narrowly linear decurved deeply unequally 2-toothed, raceme few-fld., sepals and rather smaller petals cuneate-oblong obtuse undulate gradually narrowed to the base pale olive-green or ochreous barred with short brown-purple lines, lip panduriform, side lobes semi-ovate golden yellow, midlobe olive-green 2-callous at the base, spur conical glabrous within.—Burma, *Vipan*

V. WIGHTII, *Reichb. f. in Walp. Ann.* vi. 932; allied to *V. Stangeana*, Reichb. f., leaves more than a foot long narrowly ligulate unequally acutely 2-lobed, scape few and lax-fld., side lobes of lip subquadrate, midlobe broadly ovate, lip contracted ligulate obtusely 2-lobed, disk with 2 thick ridges, pilose at the base of the ridges and side lobes, spur conical, column slender for the genus.—Nilghiris, *Wight.*

61. SACCOLABIUM, *Blum.*

62. SCHÆNORCHIS, Bl. 63 UNCIFERA, *Lindl.* 64 ACAMPE, *Lindl.*

Epiphytes; pseudobulbs 0. *Leaves* flat keeled or terete. *Peduncles* lateral; flowers usually small spicate racemed panicled or subcorymbose. *Sepals* and *petals* adnate to the base of the column, spreading, subsimilar, free. *Lip* sessile at the base of the column usually consisting of a large saccate or conic cylindric spur, small lateral lobes and a small midlobe; sac or spur not septate within and without a large scale or callus within under the column (except *S. longifolium*). *Column* short, broad, truncate, rarely beaked, foot 0; anther 1- or imperfectly 2-celled; pollinia 2, entire or 2-partite.—Species about 40, Eastern Asiatic.

Of the genera enumerated above, *Schænorchis* is not British Indian, a fact which I overlooked when drawing out the key to the genera, though it is noted in Gen. Plant. *Uncifera* I refer to *Saccolabium*; its character of the incurved spur is insufficient; and that of the pollinia stipitate on the strap, or rather on the geniculate apex of the strap, though curious, is, considering how variable this organ is in the genus and its allies, not a dependable one for generic purposes. For *Acampe* I can find no characters whatever, and it is difficult to retain it as a section; its lip is that of sect. *Calceolaria*, as is the subcorymbose or umbellate inflorescence of most of the species.

The following sections are, I think, natural, but are not clearly definable by words.

Sect. I. MICRANTHÆ. *Leaves* flat terete or channelled. *Flowers* small, often minute, in simple or panicled racemes or spikes. *Lip* various; spur long or short. (See also Sect. vi. *Uncifera*). (Sp 1–19).

Sect. II. CALCEOLARIA. *Leaves* lorate, flat, flaccid. *Flowers* subcorymbose on a short stout peduncle; bracts short, broad rounded. *Lip* a large hemispheric sac, with truncate or short side lobes and a short triangular or reniform adnate erose or fimbriate midlobe which is warted or echinate on the disk. *Column* very short; strap of globose pollinia linear. (Sp. 20-27).

Sect. III. ACAMPE. Stem usually long and very stout. *Leaves* keeled, thickly coriaceous. *Flowers* corymbose as in § *Calceolaria*, rarely in large spreading panicles. *Lip* as in § *Calceolaria*, but with a thicker warted reniform or ovate midlobe (spur cylindric in *S. ochraceum*). *Column* very short; strap of globose pollinia linear. (ACAMPE, *Lindl.*) (Sp. 28-34).

Sect. IV. PLATYRHIZON. *Stem* 0, or very short; roots very long, flattened. *Leaves* lorate, flaccid. *Flowers* racemed. *Lip* very small, spur saccate or conical, midlobe small reniform. *Column* very short; strap of globose pollinia linear, gland large. (MICROPERA, *Dalz.*) (Sp. 35-36).

Sect. V. DISTICHOPHYLLÆ. *Stem* tufted very slender pendulous, leafy throughout. *Leaves* uniform, distichous, lanceolate. *Flower* small, in very short racemes. *Lip* small, spur saccate. *Column* very short, strap of pollinia slender, gland sagittate. (Sp. 37-38).

Sect. VI. SPECIOSÆ. *Stem* very stout as are the long roots. *Leaves* linear rigid, keeled, often recurved. *Flowers* highly coloured, in dense racemes. *Lip* with a linguiform midlobe, small side lobes and a long cylindric spur. *Column* short or rather long; strap of globose pollinia slender.—Habit of *Ærides* sect. II.; but there is no foot to the column. (Sp. 39-41).

Sect. VII. UNCIFERÆ. *Stem* very short. *Leaves* distichous, coriaceous. *Flowers* in dense racemes. *Lip* with a large funnel-shaped incurved spur much longer than the sepals. *Column* decurved, rostellum elongate; anther long-beaked; pollinia globose, seated near the geniculately inflexed apex of a very long slender strap with recurved margins; gland large, linear, or sagittate. UNCIFERA, *Lindl.* (Sp. 42, 43.)

Sect. I. MICRANTHÆ. (See p. 54.)

* Stems elongate pendulous; leaves terete, filiform, or semiterete.

1. **S. geminatum,** *Lindl. in Bot. Reg.* 1838 *Misc.* 50; leaves strongly curved terete channelled 3-toothed, racemes slender panicled, sepals ovate-oblong 1-nerved about equalling the conic obtuse spur, petals smaller obovate 1-nerved, midlobe of lip cymbiform obtuse. *Walp. Ann.* vi. 885.

EASTERN HIMALAYA, alt. 3–5000 ft.; Bhotan *Griffith;* Sikkim *J. D. H.* KHASIA and JYNTEA HILLS, alt. 2–4000 ft., common.

Stem 6–12 in., curved, rooting at the base. *Leaves* 2–4 in., fleshy, $\frac{1}{8}$–$\frac{1}{4}$ in. diam. *Panicles* longer than the leaves, branches spreading; bracts small, acute, flowers $\frac{1}{8}$ in. long; sepals white, or purple with white tips; petals purple; lip variable, blade fleshy, sometimes laterally compressed, side lobes very small; column very short, anther ovate, strap of pollinia short, broad, gland very large. *Capsule* subsessile $\frac{1}{6}$–$\frac{1}{5}$ in. long, oblong, curved.

2. **S. niveum,** *Lindl. Gen. & Sp. Orchid.* 224; stem short, leaves recurved semiterete channelled notched, racemes slender panicled, sepals ovate-oblong 1-nerved about equalling the ovoid obtuse spur, petals cuneately oblong truncate 1-nerved, midlobe of lip spathulate fleshy concave. *Thwaites Enum.* 304.

CEYLON; in the Central Province, alt. 3–4000 ft., *Walker, Thwaites.*

Stem stout; 1–4 in., curved. *Leaves* 2–4 in., fleshy, $\frac{1}{8}$–$\frac{1}{4}$ in. diam. *Panicles* longer than the leaves, branches spreading; bracts minute, acute; flower $\frac{1}{4}$ in. long.

white; tips of lateral sepals fleshy at the back; lip with minute rounded side lobes; column very short; anther hemispheric; strap of pollinia very short, gland very large. *Capsule* ½ in., oblong.—Gardner (n. 872) has a form with much broader leaves, ½ in. diam. and stouter scapes.

3. **S. filiforme,** *Lindl. in Journ. Linn. Soc.* iii. 36; stem slender, leaves slender terete acuminate, racemes short stout simple, sepals linear, petals orbicular, shorter than the cylindric obtuse recurved spur, limb of lip ovate acute deflexed, side lobes large rounded. *Walp. Ann.* vi. 887. Sarcanthus filiformis & roseus. *Wight Ic.* t. 1684 (*excl. capsule*) 1685. Schœnorchis juncifolia, *Thwaites Enum.* 304 (*not of Blume.*).

MALABAR and TRAVANCORE; on the Nilghiri hills, at Neddawuttum and Pycara, *Wight;* Pulney and Anamallay hill, *Cotton*, &c. CEYLON; Central Province, alt. 4–6000 ft., *Walker*, &c.

Stem 6–10 in.; internodes ½–2 in. *Leaves* 2–6 in., as thick as a sparrow quill or more slender. *Racemes* 1½–2 in., stout, subsesile, often deflexed; bracts lanceolate; flowers ¼ in. long, red, or orange streaked with crimson; sepals 1-nerved, petals with 3 nerves rugose on the back; spur of lip inflated; anther hemispheric; strap of globose pollinia short, dilated upwards, gland very large. *Capsule* ½ in., pyriform, pedicelled.—Flowers rose coloured in Wight's plant, orange with red stripes in the Ceylon plants.

4. **S. perpusillum,** *Hook. f. Ic. Plant. ined.*; stem short curved, leaves terete recurved acute, racemes erect stout flowering to the base, bracts subulate persistent, flowers minute pubescent, sepals ovate-oblong, petals obovate-oblong obtuse, lip oblong slightly concave, tip with a fleshy acute subcordate appendage, spur short cylindric obtuse incurved.

SINGAPORE; at Sungei Buloh, *Ridley*.

Stem 3–5 in., as thick as a sparrow's-quill, rigid. *Leaves* 1–1½ in., subsecund. *Racemes* ½–¾ in.; rachis stout; flowers $\frac{1}{20}$ in. diam.; pedicel very short; sepals 1-nerved, lateral acuminate; petals as long, obtuse, glabrous, 1-nerved; lip as long as the sepals; spur large; fleshy appendage at the tip of the lip didymous on the upper face.—A remarkable little species, unlike any other.

5. **S.? inconspicuum,** *Hook.* f.; stem rather stout, leaves 2–3 in., nearly straight terete obtuse, flowers small shortly peduncled clusters, sepals and petals broadly oblong acute, hypochile of lip hemispheric margins entire (side lobes 0), epichile broadly ovate retuse inserted on the margin of the hypochile. Cymbidium inconspicuum, *Wall. mss.*

LOWER ASSAM, *Jenkins* (*Ic. in Herb. Calcutt.*)

Stems 6–8 in. long, interlaced, flexuous, as thick as a duck's-quill; internodes ½ in. *Leaves* rather more slender, slightly curved, but not falcate. *Flowers* ¼ in. diam., shortly pedicelled, pale green; sepals and petals subequal, spreading and recurved; lip about as long as the sepals; hypochile green suffused with purple, large for the size of the plant, margins everted, epichile as long as the hypochile, flat, smooth; column short, very stout, purple, rostellum not beaked; anther broader than long low, pollinia 2 globose, strap short, gland ovate.—The lip is like that of *sect. Calceolaria.* Described from the drawing in the Calcutta Herbarium.

** Stem short or long. Leaves flat or channelled.

† *Spur of lip longer than the sepals.* (*See also* 16, S. rostellatum)

6. **S. Pumilio,** *Reichb. f. in Walp. Ann.* vi. 886; *in Gard. Chron.* 1875, ii. 98; stem very short, leaves falcately oblanceolate obtuse notched or 2-fid, racemes about equalling the leaves laxly many-fld., lateral sepals broadly ovate obtuse, petals oblanceolate obtuse, side lobe of lip very short rounded, midlobe large flat triangular 3-nerved smooth, spur much longer than the sepals slender incurved. S. discolor, *Reichb. f. Ot. Hamb.*

42. S. pusillum, *Lindl. in Journ. Linn. Soc.* iii. 36 (*not of Blume*). Œceoclades pusilla, *Lindl. in Wall. Cat.* 7332: *Gen. & Sp. Orchid.* 237.

SILHET, *Wallich.*

Roots very many, slender, tortuous. *Leaves* 2–3 by $\frac{1}{8}$ in., fleshy, thin when dry. *Racemes* slender; bracts ovate, membranous; flowers $\frac{1}{8}$ in. broad, pedicelled membranous; dorsal sepal obovate; column rather long, beaked in front; anther low; strap of pyriform pollinia dilated above, gland small oblong. *Capsule* $\frac{3}{4}$ in., shortly pedicelled, narrow, 6-ribbed.—The citation of "Herb. Wight" under Wall. Cat. 7332 B, is doubtless an error.

7. **S. penangianum,** *Hook. f. Ic. Plant. ined.*; leaves narrowly linear-lanceolate acuminate with a lateral notch, raceme short very stout dense-fld. pubescent, sepals broadly ovate 1-nerved, not half the length of the conical angled abruptly incurved spur, petals oblong 1-nerved, limb of lip minute, disk fleshy terminal, side lobes rounded.

PENANG; on the Sonkey River, *Curtis.* PERAK, *Kunstler* (*Ic. in Herb. Calcutt.*)

Stem flexuous, internodes $\frac{1}{2}$ in. *Leaves* $2\frac{1}{2}$–3 by $\frac{1}{3}$ in. thick, nerve strong beneath. *Racemes* 1–$1\frac{1}{2}$ in., fruiting decurved; bracts subulate; flowers $\frac{1}{6}$ in., puberulous, white edged with yellow and a little pink; column short; strap of globose pollinia elongate, spathulate, gland small. *Capsules* $\frac{1}{4}$ in. long. oblong, sessile, crowded, reflexed.

8 **S. Helferi,** *Hook.* f. *Ic. Plant. ined.*; stem short, leaves loriform tip contracted notched, panicles shorter than the leaves, sepals orbicular-ovate 1-nerved shorter than the saccate broad spur, petals oblong, blade of lip reniform, half embracing the spur quite entire, lateral lobes narrow erect.

TENASSERIM, or ANDAMAN ISLANDS. *Helfer* (Kew Distrib. 5256). Moulmein, *Parish*; Mergui, *Griffith.*

Stem 1–3 in. *Leaves* few, close set, $2\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., sheaths short, black. *Panicle* about equalling the leaves, slender; bracts minute, acute; flowers $\frac{1}{18}$ in.; dorsal sepal much smaller than the lateral; blade of lip shorter than the spur; column very short; anther short, broad; pollinia globose, sessile on a large cuneate strap or gland.

9. **S. gracile,** *Lindl. Gen. & Sp. Orchid.* 225; in *Journ. Linn. Soc.* iii. 35; stem short slender, leaves elongate linear-lanceolate acuminate, racemes slender many-fld. longer than the leaves, sepals oblong obtuse 1-nerved, much shorter than the straight tubular acuminate spur, petals narrower oblong 1-nerved, blade of lip very small ovate acute, side lobes 0. *Thwaites Enum.* 304.

CEYLON; Central Province, alt. 3000 ft. *Macrae*, &c.

Stem 2–8 in., often zigzag, internodes $\frac{1}{4}$–$\frac{1}{2}$ in. *Leaves* $2\frac{1}{2}$–4 by $\frac{1}{4}$ in., straight or falcate, narrowed at base and tip, midrib obscure. *Racemes* 4–6 in., erect; bracts minute, subulate; flower $\frac{1}{4}$ in. long, white; mouth of spur very oblique; column short; anther short, broad, strap of globose pollinia very slender. *Capsule* globose, $\frac{1}{6}$ in. diam., pedicelled.

10. **S. brevifolium,** *Lindl. Gen. & Sp. Orchid.* 225, in *Journ. Linn. Soc.* iii. 35; stem rather stout scandent, leaves short linear-oblong unequally 2-lobed, racemes very short few-fld., sepals and petals subequal orbicular-ovate 1-nerved not half as long as the conico-cylindric straight obtuse spur, limb of lip very minute, side lobes 0. *Thwaites Enum.* 230. S. virescens, *Gardn. mss.*

CEYLON; Central Province common, *Macrae*, &c.

Stem 6–10 in., internodes $\frac{3}{4}$ in. or less. *Leaves* 1–$1\frac{1}{2}$ by $\frac{1}{3}$–$\frac{1}{2}$ in., fleshy, midrib obscure. *Racemes* 1 in., recurved; bracts very minute; flowers $\frac{1}{3}$ in. long, rose-

purple or greenish white; spur as long as the pedicel; column short; anther very broad, apiculate, strap of globose pollinia short, gland as long very large 2-fid. Benthamin Gen. Plant. iii. 579 errs in referring *Œc. tenera* to this; it is my *Cleisostoma tenerum.*

11. **S. roseum,** *Lindl. Gen. & Sp. Orchid.* 225; stem very slender, leaves fleshy flat narrowly linear unequally notched, racemes very short simple, sepals ovate-oblong obtuse 1-nerved, petals as large rounded 1-nerved, spur of lip longer than the sepals cylindric obtuse, lip minute ovate acute, side lobes rounded. *Thwaites Enum.* 304. Sarcanthus Walkerianus, *Wight Ic. t.* 1686 (*bad*). S. Walkerianum *Reichb. f. in Walp. Ann.* vi. 887.

CEYLON; Central Province, up to 5000 ft., common; *Macrae, &c.*

Stem curved, as thick as a pigeon's-quill. *Leaves* 2–3 by $\frac{1}{8}$–$\frac{1}{6}$ in. *Raceme* 1–1½ in., slender; bracts minute; flowers $\frac{1}{4}$ in long, rosy in Ic. Walker, lilac in Ic. Thwaites; column short; anther short broad, pollinia 2, strap short slender, gland large. *Capsule* $\frac{1}{2}$–$\frac{3}{4}$ in., pyriform, pedicelled.

12. **S. flavum,** *Hook. f. Ic. Plant. ined.*; stem short very stout, leaves close set loriform deeply unequally acutely 2-cleft, raceme lax-fld., sepals oblong obtuse, lip small, infundibular spur much longer than the sepals with small toothed side lobes and truncate mouth.

TENASSERIM; at Moulmein, *Parish.*

Stem 6 in., stout. *Leaves* 4–5 by $\frac{3}{4}$ in., dark green with darker nerves, apiculate between the lobes; sheaths $\frac{1}{2}$ in., deeply grooved. *Raceme* from the base of the stem, with the slender scape 4 in.; bracts small, recurved; flowers $\frac{1}{4}$ in. diam., pale yellow; column short, broad; rostellum large, 2-lobed, apparently fleshy.—A remarkable species with the pollinia approaching that of sect. *Uncifera* (and of *Sarcanthus mirabilis*, Reichb.), but having no trace of a midlobe to the lip. Described from a beautiful drawing by Parish, who observes that there is no apparent septum in the spur. Reichenbach has (on the drawing) named it *Saccolab. buccosum* (see No. 14), alluding to the cheek-like rostellum, but it is not the plant he has described under that name (*Gard. Chron.* 1871, 938). It closely resembles *Sarcanthus Parishii,* but the flowers are yellow. There is no midlobe of the lip and no septum in the spur.

13. **S. fragrans,** *Par. & Reichb. f. in Journ. Bot.* xii. (1874) 197; dwarf, stem very short, leaves crowded oblong obtuse very thick, raceme shortly peduncled decurved many- and dense-fld., flowers rose-red, lateral sepals orbicular-oblong, petals linear-oblong obtuse, lip large saccate, base suddenly contracted into a decurved spur longer than the sepals and with an inflated tip, limb rhomboidly subspathulate fleshy acute toothed towards the tip. *Reichb. f. Otia. Hamburg.* 41.

TENASSERIM; at Moulmein, *Parish.*

Stem ½ in. *Leaves* 5–8 by 1 in., bases closely imbricate, deeply channelled. *Raceme* as long as the leaves; flowers about $\frac{1}{10}$ in. long, odour of violets; lip twice as long as the sepals, with a callus at the insertion of the tumid straight blade; column very short, sides acute; anther with a recurved tip; pollinia globose, sessile on the broad end of the short strap, gland lanceolate much longer than the strap.—Described chiefly from a drawing by Parish.

†† *Spur of lip shorter than (rarely equalling) the sepals.*

14. **S. buccosum,** *Reichb. f. in Gard. Chron.* 1871, 938; stem scandent, leaves linear-oblong obtusely 2-lobed, raceme simple or branched much longer than the leaves, sepals broadly ovate much longer than the bottle-shaped spur, lip large, side lobes spreading rounded, midlobe narrowly oblong. S. parvulum, *Lindl. in Journ. Linn. Soc.* iii. 36 (*in note*). Œceoclades paniculata, *Lindl. in Wall. Cat.* 7334; *Gen. & Sp. Orchid.* 236. Cymbidium Satyrium, *Herb. Ham.*

BHOTAN HIMALAYA, *Lister*. ASSAM; at Goalpara, *Hamilton*. SYLHET, *Wallich*. TENASSERIM, *Parish*.

Stem stout, rigid, internodes ½ in. *Leaves* 3–5 by ½–¾ in., fleshy, 5-nerved. *Raceme* with long slender peduncle 5–6 in., laxly many-fld.; bracts subulate; flowers ⅛ in. diam., yellowish; sepals 5-nerved; petals much smaller, cuneately obovate, 3-nerved; lip yellow, mouth of spur a very narrow chink, neck contracted, base globose didymous; side lobes of elongate column broad, rounded, top recurved; anther long-pointed; strap of globose pollinia very slender arched, gland very minute.—Column and lip so different from the genus that Reichenbach l. c. suggests its separation. Lindley's name of *parvulum* is too misleading to be adopted.

15. **S. micranthum,** *Lindl in Wall. Cat.* 7300; *Gen. & Sp. Orchid.* 220; leaves lorate unequally obtusely 2-lobed, scape stout flowering to the base, racemes very many and dense-fld., sepals broadly ovate obtuse 3-nerved, petals oblong or lanceolate serrulate, spur of lip shorter than the sepals subtruncate, blade obovate-spathulate with 2 basal calli, lateral lobes broad obtuse. *Saunders' Refug. Bot.* t. 110.

TROPICAL HIMALAYA; from Garwhal and Kumaon, alt. 2–3000 ft., *Falconer, Duthie*; to Bhotan, *Griffith*. ASSAM, SILHET and the NAGA HILLS, *Prain*. TENASSERIM, *Griffith, Parish*.

Stem 6–10 in., curved, as thick as a goose-quill or less. *Leaves* 3–5 by ¾–1 in., narrowed to the base. *Raceme* equalling the leaves; bracts small, broad; flowers about ⅛ in. diam.; 3-nerved sepals and petals violet; lip rose-red; column very short; anther very broad, acuminate globose; pollinia strap very short broadly cordate, gland orbicular. *Capsules* ½ in., subfusiform.

16. **S. rostellatum,** *Hook. f. Ic. Plant. ined.*; stem very short, leaves 4–7 in. lorate flat unequally 2-fid, raceme much shorter than the leaves, bracts minute, sepals broadly ovate-oblong obtuse, lip infundidular narrowed below into a stout obtuse spur rather longer than the sepals, side lobes truncate, midlobe an incurved beak.

SIKKIM; at Darjeeling, alt. 7000 ft, *Gamble* (*in Herb. Calcutt.*).

Roots very many and long, tortuous, flat, appressed to the bark. *Leaves* ½–¾ in. diam., nearly straight. *Peduncle* with 8–10-fld. raceme 2 in., slender; flowers ⅛ in. long from the tip of the dorsal sepal to that of the spur; petals oblong, obtuse, smaller than the sepals; column very short; rostellum subulate; pollinia large, globose, cleft.

17. **S. minimiflorum,** *Hook. f. Ic. Plant. ined.*; stem very short, leaves elliptic-lanceolate narrowed at both ends acute, scape much longer than the leaves very slender very many-fld., bracts subulate equalling the very minute flowers, sepals and petals oblong obtuse, lip conico-sacciform, side lobes 0, midlobe an incurved beak with a globose tubercle at the mouth of the sac.

PERAK, *Scortechini*.

Roots slender, tufted. *Leaves* 1½–2 in., black when dry, thinly coriaceous, reddish beneath. *Scape* with raceme 2–6 in., with a few subulate empty bracts below; flowers greenish yellow mottled, about $\frac{1}{20}$ in. long or broad; lip larger than the rest of the perianth, its beak-like laterally compressed terminal lobe incurved over the mouth; column short; anther long-beaked.—A curious little plant. I have had difficulty in dissecting the few available flowers, and thereby confirming a description and rude drawing by Scortechini, who mentions "a something membranous whitish which I cannot make out whether it is a rostellum or stipes." This I presume to be a recurved elongate body which appears to be attached to the base of the column.

18. **S. Jerdonianum,** *Reichb. f. in Walp. Ann.* vi. 886; leaves linear subacute, racemes simple or branched slender, sepals ovate 1-nerved

longer than the small saccate or subglobose spur, petals linear 1-nerved, blade of lip oblong concave subtruncate, side lobes small rounded. Taeniophyllum Jerdonianum, *Wight Ic.* t. 1756.

MALABAR; on branches of trees, *Jerdon.*

Stem 1–3 in., tufted. *Leaves* 1–1½ by ⅖ in. *Racemes* much longer than the leaves; bracts ovate, acuminate; flowers $\frac{1}{16}$ in. long; column short; anther broad; pollinia with a short strap and large narrow gland.—Described chiefly from Wight.

19. **S. lanatum,** *Hook. f.*; stem short, leaves linear-oblong broadly 2-lobed, peduncle very stout longer than the leaves, spikes dense-fld. tomentose or woolly, sepals ovate tips keeled, side lobes of lip triangular, midlobe ovate bicuspidate, spur short saccate traversed by a pubescent ridge from the base of the column to that of the midlobe. Cleisostoma lanatum, *Lindl. in Journ. Hort. Soc.* iv. 264; *Walp. Ann.* 889.

TENASSERIM; at Moulmein, *Parish, Scott.*

Stem very stout. *Leaves* 3–4 by 1–1¼ in., thickly coriaceous, keeled. *Scape* with long appressed sheaths, simple or branched; spikes 4–7 in.; bracts ⅛ in., large, ovate, acuminate, spreading or reflexed; flowers ⅓ in. long; sepals dingy purple and green; petals obovate, ciliate, yellow and purple; side lobes of lip notched on the inner margin, ciliate; midlobe with a large pubescent gibbous compressed callus descending into the spur, mouth of spur contracted to a slit with a pubescent raised border; column stout, recurved, tumid below, shortly beaked; anther beaked; pollinia globose, sulcate, strap long slender dilated and forked above, each arm spathulate and with the globose pollinia immersed in their concave tips, gland small oblong.—A remarkable plant, put by Lindley into *Cleisostoma,* but I do not find the great gland in the spur under the column.

Sect. II. CALCEOLARIA. (See p. 54.)

The species of this section wants a thorough revision with much better material than is at my disposal.

20. **S. calceolare,** *Lindl. in Wall. Cat.* 7302; *Gen. & Sp. Orchid.* 223; *Sert. Orchid. Frontisp.* 6; *in Bot. Reg.* 1883; *Misc.* 139; *in Journ. Linn. Soc.* iii. 33 (*exc. syn.*); leaves acutely unequally 2-lobed or -cleft, blade of lip reniform erose disk echinate all over. *Griff. Notul.* iii. 356; *Itin. Notes* 170, No. 869; *Ic. Plant. Asiat.* t. 334; *Walp. Ann.* vi. 883. Aerides calceolare, *Smith in Rees Cyclop. Suppl.* Ae. leopardorum, *Wall. mss.* Gastrochilus calceolaria, *Don Prodr.* 32. Sarcochilus nepalensis, *Spr. Syst. Veg.* iii. 721. Epidendrum calceolare, *Ham. mss.*

TROPICAL HIMALAYA; from Garwhal to Bhotan, ASSAM, SILHET and the KHASIA HILLS. TENASSERIM, *Parish.* PERAK, *Carter.*—DISTRIB. ? Java.

A very common plant, and, if two species are not included, very variable. *Stem* very short. *Leaves* in Wallich's 7312 A from Nepal 6–12 by ½–¾ in., strongly falcate. His B from Silhet (which is the common form elsewhere) is a much smaller plant, with nearly straight leaves 4–5 by ⅓–⅔ in. *Peduncle* ½–1½ in.; pedicels ¼–1 in.; flowers ½–⅔ in. diam., yellow or greenish speckled barred or blotched with red brown; lip white or yellow, speckled with red. *Capsule* in 7342 A 2 in. long; in the ordinary form ¾–1 in.—Griffith's Tab. 334 represents a plant with the leaves of *intermedia* and lip of *calceolare,* but it is impossible to determine satisfactorily his Saccolab. No. 2, 3 and 4 of Notul. iii. 356, 357, and his Ic. Plant. Asiat. t. 333, 334.

21. **S. nilagiricum,** *Hook. f.*; leaves narrow deeply unequally 2-lobed, sepals and petals each with two series of large blotches, limb of lip fimbriately erose, disk smooth. Vanda pulchella, *Wight Ic.* t. 1671.

NILGHIRI HILLS; on the banks of the Kaitairy river and at Quelin, *Wight.*

Stem short. *Leaves* 5–10 by ½–⅝ in., flexuous, lobes very unequal, obtuse, often

divaricate, the longer sometimes 1 in. long. *Flowers* ½ in. diam.; perianth strongly incurved. *Capsule* ½–⅔ in.—United with *S. calceolare* by Lindley (in Journ. Linn. Soc.), but I think as different as any other of this section.

22. **S. acutifolium,** *Lindl. Gen. & Sp. Orchid.* 223; *Sert. Orchid. Frontisp.* No. 2; *in Journ. Linn. Soc.* iii. 33; stem elongate, leaves acute or acuminate, blade of lip erose, disk naked or very sparingly tubercled. *Reichb. f. Otia Hamburg* 42; *Walp. Ann.* vi. 883. S. denticulatum, *Paxt. Mag. Bot.* vii. t. 145; *Reichb. f. l. c.*; ? *Bot. Mag.* t. 4772. Aerides umbellatum, *Wall. mss.*

SIKKIM HIMILAYA, alt. 3–5000 ft. KHASIA MTS., *Gibson.*

Usually a larger plant than the small states of *S. calceolare*, with longer stems (4–8 in.) and larger leaves, 4–6 by ¾–1½ in. broad, never 2-fld., but very variable. *Perianth* whole-cold. and yellowish red, or more yellow or greenish and mottled with brown; lip white, centre yellow often speckled with red. *Capsule* in Sikkim sp. 3 in. long.—Paxton's *S. denticulatum* has greenish yellow flowers speckled with brown, and the lip is described as erose. Lindley refers it to *S. acutifolium*. The lip of the Bot. Mag. plant, apparently derived from the same source, is not erose, but with a broad thick white fringe of long papillæ.

23. **S. intermedium,** *Griff. mss. ex. Lindl. in Journ. Linn. Soc.* iii. 33; stem rather long, leaves very narrow acuminate or 2-toothed, blade of lip fimbriate, disk smooth. *Reichb. f. Otia Hamburg.* 42. S. calceolare, *Paxt. Mag. Bot.* vi. 97.—Saccolab, *Griff. Notul.* iii. 357; *Ic. Plant. Asiat.* t. 333.

BHOTAN HIMALAYA, *Griffith.* KHASIA HILLS, alt. 3–5000 ft., *Griffith, Gibson, J. D. H. & T. T.*

Perhaps a small form of *S. acutifolium*, but the stem is more slender, the leaves narrower, and the flowers and capsules (¾ in.) much smaller.

24. **S. bellinum,** *Reichb. f. in Gard. Chron.* 1844, i. 174; 187, i. 145; stem rather long, leaves deeply unequally cleft, bracts and flowers large, blade of lip erose disk echinate and with cushions of cilia at the base. *Warner Orchid. Alb.* t. 156; *Bot. Mag.* t. 7142.

BURMA, *Boxall.*

This resembles a large state of *S. calceolare*, the flowers are 1–1¼ in. diam., bright yellow with large purple blotches.

25. **S. obliquum,** *Lindl. in Wall. Cat.* 7304; *Gen. & Sp. Orchid.* 223; *in Journ. Linn. Soc.* iii. 33; stem very short stout, leaves broad and long unequally broadly 2-fid, bracts and flowers large, blade of lip fimbriate, disk papillose with a large 2-lobed callus. *Reichb. f. Otia Hamburg.* 42. Vanda obliqua, *Wall, mss.*

BURMA; at Taingdong, *Wallich.* ? KHASIA HILLS, *J. D. H. & T. T.*

Leaves 6–8 by 1–2 in.; flowers 1 in. diam.; sepals and petals narrow, whole-cold., all (in Ic. Wallich) pale yellow, with the lip white speckled with yellow. The Khasia specimens have the shorter leaves of *bigibbum*.

26. **S. bigibbum,** *Reichb. f. in Bot. Mag.* t. 5766; *Otia Hamburg.* 43; stem very short, leaves oblong or obovate-oblong 2-fid, bracts small, blade of lip fimbriate, disk smooth with a large 2-lobed callus.

RANGOON, *Benson, Gilbert.* PERAK, *Scortechini.*

Probably a small state of *S. obliquum*, but the leaves are shorter and broader, 3–4 by 1–1¼ in., and the large bracts seem to be wanting. *Flowers* whole-cold., pale straw-cold. in a drawing by Mr. Gilbert, bright yellow in Bot. Mag.

27. **S. acaule,** *Hook f.*; stem very short, leaves unequally 2-lobed, sepals obovate, limb of lip broadly ovate acute toothed and erose, disk rough

thickened. Cleisostoma acaulis, *Lindl. Gen. & Sp. Orchid.* 227. Vanda fimbriata, *Gardn. mss.*

CEYLON, *Macrae*; at Hantani, *Gardner.*

Leaves 5–6 by ⅓–½ in. *Peduncle* and *pedicels* very short, ½ in, stout; flowers ½ in. diam., apparently very fleshy.—Possibly a form of *S. nilagiricum*, but the leaves and lip appear to be very different. The specimens are very scanty and poor.

Sect. III. ACAMPE. (See p. 54.)

The species of this section are very difficult of discrimination in a dried state, and the following diagnoses and citation are not very reliable, owing to imperfection of specimens and vagueness of published descriptions. (See two species at the end of the genus.)

* *Peduncle rather slender; flowers in large panicles. Spur of lip cylindric; midlobe ovate.*

28. **S. ochraceum,** *Lindl. in Bot. Reg.* 1842, *Misc.* 2. S. lineolatum, *Thwaites Enum.* 304. Acampe dentata, *Lindl. Fol. Orchid.* 3; *Reichb. f. in Gard. Chron.* 1872, 1752; *Walp. Ann.* vi. 894. A. Wightiana *var.* longepedunculata, *Thwaites l. c.* 303.

EASTERN TROPICAL HIMALAYA; Sikkim, *J. D. H.*, Bhotan, *Griffith* (*Kew Distrib.* 5233). KHASIA MTS. and TENASSERIM, *Griffith*, &c. MALABAR, *Ic. Jerdon.* CEYLON, *Walker, &c.*

Stem 1–2 ft. *Leaves* 7–9 by 1–1½ in. *Panicle* longer or shorter than the leaves, branches distant lax-fld.; flowers ⅓–½ in. diam.; midlobe of lip ovate, crenate, 2-auricled and with fleshy teeth at the base; spur cylindric, as long as the limb, hairy within. *Capsule* 1–1½ in., fusiform.—Bentham in Gen. Plant. iii. 581, misled by a mixture of specimens of different species, errs in referring *S. lineolatum* to *Cleisostoma maculosum*; it is clearly this plant.

** *Peduncle very stout, simple or very sparingly branched. Lip a hemispheric or conic sac, midlobe reniform.*

29. **S. longifolium,** *Hook. f.*; leaves 6–16 in., peduncle 6–7 in., internodes long, flowers subcorymbose, midlobe of lip ovate obtuse, sac broad conical with an erect dorsal hairy plate in the cavity. Acampe ? longifolia, *Lindl. Fol Orchid.* 1. ? A. multiflora, *Lindl. l. c.* Vanda longifolia, *Lindl. in Wall. Cat.* 7322; *Gen. & Sp. Orchid* 215; *in Journ. Hort. Soc.* vii. 267; *Walp. Ann.* vi. 872. V. multiflora, *Lindl. Collect.* t. 38.

TROPICAL SIKKIM HIMALAYA (Ic. in Hort. Calcutt.). UPPER ASSAM, *Mann.* TENASSERIM, *Wallich*, &c.—DISTRIB. China. ?

Stem very stout. *Leaves* 1½–2 in. broad. *Peduncle* with racemes 6–7 in., as thick as a swan's quill, with often a few short lateral branches; bracts annular; flowers crowded, ¾ in. diam., golden yellow banded with red on both surfaces. The dorsal plate in the cavity of the lip recalls *Cleisostoma.*

30. **S. Wightianum,** *Hook. f.*; leaves 4–6 in., peduncle 1–3 in., internodes very close, midlobe of lip ovate keeled, sac rounded papillose within. S. papillosum, *Dalz. & Gibs. Bomb. Fl.* 264 (*excl. some syn.*). Acampe Wightiana, *Lindl. Fol. Orchid.* 2. Vanda Wightiana, *Lindl mss.* ? *in Wight Ic.* t. 1670; *Thwaites Enum.* 303; *Walp. Ann.* vi. 873. V. fasciata, *Gardn. mss.*—*Rheede Hort, Mal.* xii. t. 4.

WESTERN GHATS; from the Concan southward. CEYLON, *Gardner, &c.*

Stem 12–18 in. *Leaves* ⅔–1¼ in. broad. *Scape* very stout; bracts very broadly ovate, acute; flowers ⅔–1 in. diam., subcorymbose, yellow barred with crimson, not papillose. *Capsule* 2–2½ in., fusiform.

31. **S. præmorsum,** *Hook. f.*; leaves 5–7 in. narrow, scape 1–2 in.

very stout, internodes short, sheaths annular, bracts semicircular, flowers papillose, midlobe of lip broadly ovate or rounded, sac rounded tubercled and pubescent at the base within. Acampe excavata, *Lindl. Fol. Orchid.* 3; *Walp. Ann.* vi. 874. Cymbidium præmorsum, *Swartz in Nov. Act. Upsal.* vi. 75; *Willd. Sp. Pl.* iv. 103; *Roxb. Fl. Ind.* iii. 465. Epidendrum præmorsum, *Roxb. Cor. Pl.* i. 34, t. 43.—*Rheede Hort. Mal.* xii. t. 4. Aerides undulata, *Smith in Rees Cyclop.* xxxix.

WESTERN PENINSULA; in the Circars, *Roxburgh*; the Concan, *Law.*

Apparently near *S. Wightianum*, but more slender, leaves narrower, lip deeply lobed, very complicate, flowers small, papillose all over, ½–⅔ in. diam. *Capsule* 2½ in.

32. **S. papillosum,** *Lindl. in Bot. Reg.* t. 1552 (*excl. syn.*); *Gen. & Sp. Orchid.* 222; stem elongate branched scandent, leaves 3–4 in., scape 1–2 in., internodes close, bracts semicircular, midlobe of lip ovate, spur conical pubescent within. S. carinatum, *Griff. Notul.* iii. 354. Acampe papillosa, *Lindl. Fol. Orchid.* 2; *Walp. Ann.* vi. 873. Sarcochilus præmorsus, *Spreng. Syst. Pl.* iii. 721, *fid Steudel.*

BENGAL and the lower HIMALAYA MTS., from Sikkim eastwards. ASSAM, the GANGETIC DELTA, the CIRCARS and TENASSERIM.

Stem 2–3 ft., as thick as a goose-quill. *Leaves* obliquely notched. *Scape* closely scarred to the base; flowers ⅔ in. diam.; ovary very short. *Capsule* 1¼ in., fusiform.—The lip is broader in Lindley's figure than in Sylhet specimens, in which they are oblong-ovate.

33. **S. cephalotes,** *Hook. f.*; stem very short, leaves 3–5 in. narrow with a unilateral semicircular sinus at the tip, peduncle 1 in., midlobe of lip broadly ovate crenulate, sac conic hairy within. Acampe cephalotes *Lindl. Fol. Orchid.* 3; *Walp. Ann.* vi. 873.

SILHET; *H.f. & T.*

A small species, of which there are very few specimens; it appears to differ from *S. papilloseum* in the short stems, longer crowded leaves and small yellow green flowers barred with purple; lip pale rose with darker spots, disk fimbriate.

34. **S. congestum,** *Hook. f.*; stem short very stout, leaves 6–8 in., scape 1½–2 in., internodes very short, bracts broadly ovate acute, flowers crowded, limb of lip rhomboid acute-angled, spur shortly conical or saccate hairy within. S. papillosum, *Wight Ic.* t. 1672 (*not of Lindl.*). Acampe congesta, *Lindl. Fol. Orchid.* 3; *Walp. Ann.* vi. 873. Vanda congesta, *Lindl. in Bot. Reg.* 1839, *Misc.* 61.

MALABAR, *Wight.* CEYLON (*Hort. Loddiges*).

Lindley's *V. congesta* from Ceylon is described as having obliquely mucronulate leaves, yellow and brown flowers, lip with an excavate pubescent base, and column with mucronate angles (a single flower only is in Herb. Lindl.). Wight *S. papillosum*, is figured with deeply 2-lobed leaves and a curved spur; his specimens (*in Herb. Lindl.* 1019/1836) have curved leaves 8–10 by 1–1¼ in.

Sect. IV. PLATYRHIZON. (See p. 54).

35. **S. viridiflorum,** *Lindl. in Journ. Linn. Soc.* iii. 36; leaves 1–2½ in., racemes shorter than the leaves subcorymbose, spur acute glabrous within parallel to the blade of the lip. *Dalz. & Gibs. Bomb. Fl.* 263; *Walp. Ann.* vi. 885. Micropera viridiflora, *Dalz. in Hook. Journ. Bot.* iii. (1851), 282.

The SOUTHERN CONCAN; in the Western Ghats, *Law, Dalzell.* CEYLON, near Kandy (*Ic. in Herb. Kew*).

Leaves ⅓–½ in. broad. *Raceme* 3–5-fld.; bracts short, broad, obtuse; flowers

¼–½ in. diam., greenish white; lip clouded with rose-colour, blade situated at the mouth of the spur which it embraces, broadly deflexed flabelliform membranous outer margins crenulate or trifid, side lobes free rounded; spur very short, conical, incurved.

36. **S. maculatum,** *Hook. f.*; leaves 4–6 in., raceme elongate much longer than the leaves laxly many-fld., spur obtuse villous within. Micropera maculata. *Dalz. in Hook. Journ. Bot.* iii. (1851), 282; *Dalz. & Gibs. Bomb. Fl.* 263; *Lindl. in Journ. Linn. Soc.* iii. 38. Sarcochilus maculatus, *Benth. in Gen. Plant.* iii. 575.

The SOUTHERN CONCAN and CANARA; on the Western Ghats, *Dalzell, Stocks, Ritchie,* &c.

Leaves 1–2 in., broad, linear-oblong to cuneately oblong, 2-lobed. *Raceme* 8–12 in., very shortly peduncled; bracts short, broad; rachis stout; flowers ½ in. diam., subsessile; sepals and petals yellow with a central purple spot; lip white and rose-cold., blade situated below the mouth of the short saccate obtuse spur, which it overlaps, very coriaceous, entire; side lobes connate below, narrow, erect and recurved. *Capsule* 1½ in., fusiform, 6-ribbed.—Allied, I think, to *S. viridiflorum,* and not a *Sarcochilus,* to which Bentham has referred it.

Sect. V. DISTICHA. (See p. 54.)

37. **S. distichum,** *Lindl. in Journ. Linn. Soc.* iii. 36; leaves 1 in. lanceolate acuminate or 2–3-cuspidate, peduncle 2–3-fld., sepals and petals obovate-oblong, lip with a saccate subhemispheric spur, midlobe small semicircular fleshy entire with a didymous callus at the base. *Reichb.* f. *Otia Hambury,* 43.

SIKKIM HIMALAYA, alt. 6–8000 ft., *Griffith's Collectors.* KHASIA HILLS, alt. 5–6000 ft., *J. D. H. & T. T.* MUNNIPORE, alt. 6900 ft., *Watt.*

Stems 4–8 in., filiform. *Leaves* very fleshy. *Peduncle* rarely longer than the leaves; flowers racemose, ⅓–½ in. diam.; bracts small; sepals and petals green or yellowish spotted with purple; side lobes of lip 0; column very short. *Capsule* ⅜ in., fusiform.

38. **S. tenuicaule,** *Hook. f. Ic. Plant. ined.*; leaves 3–4 in. linear-lanceolate, flowers shortly pedicelled on a tubercle of the stem, sepals broadly obliquely ovate acute, petals smaller, side lobes of lip erect subacute nearly as long as the lanceolate incurved bicuspidate midlobe, spur short constricted above the saccate incurved base, villous within at the constriction.

PENANG; on West Hill, *Curtis.* PERAK, *Scortechini, Wray.*

Stem 8–12 in., as thick as a crow-quill, simple or branched, rooting at the base only, deeply grooved. *Leaves* ½–¾ in. broad, strict. *Flowers* ½ in. diam., pale green; sepals thin, nerves 3 faint; petals 1-nerved; column stout; midlobe of lip cymbiform smooth. *Column* short, anther membranous, almost flat, acuminate; rostellum projected, styliform; strap of small reniform pollinia broad, with a dilated subreniform apex, gland small.

Sect. VI. SPECIOSÆ. (See p. 54.)

39. **S. ampullaceum,** *Lindl. in Wall. Cat.* 7307; *Sert. Orchid.* t. 17; *in Journ. Linn. Soc.* iii. 35 (*excl. syn.*); leaves suberect acutely 2-fid. or truncate and toothed, raceme subsessile, shorter than the leaves, spur straight. *Paxt. Mag. Bot.* xiii. t. 49; *Bot. Mag.* t. 5595; *Warner Orchid. Alb.* t. 191. Ærides ampullaceum, *Roxb. Fl. Ind.* iii. 476.

TROPICAL HIMALAYA, alt. 1–3000 ft., from Nepal eastwards. SILHET, MUNNIPORE, BURMA, and TENASSERIM.

Stem short, stout. *Leaves* 2–6 in., deeply channelled. *Racemes* shorter than the leaves, cylindric; bracts minute; flowers ¾ in. diam., rose-red; sepals and petals broadly obovate, widely spreading; spur longer than the blade of the lip.

Capsule 1 in., subclavate, angles acute, pedicel ½ in.—Lindley in Journ. Linn. Soc. by oversight probably, refers his *S. rubrum* to this instead of to *curvifolium*.

40. **S. curvifolium,** *Lindl. Gen. & Sp. Orchid.* 222; leaves strongly recurved very narrow, racemes much shorter than the leaves, spur straight. *Lindl. Gen. & Sp. Orchid.* 222; *Ill. Hortic.* xii. t. 493; *Warner Orchid. Alb.* t. 107; *Puydt Orchid.* t. 38. S. rubrum, *Lindl. in Wall. Cat.* 7310; *Gen. & Sp. Orchid.* 222. S. miniatum, *Hook. Bot. Mag.* t. 5326 (*not of Lindl.*).

ASSAM; *Ic. in Hort. Calcutt.* BURMA, *Wallich, Griffith,* &c.—DISTRIB. Java.

Very closely allied to *S. ampullaceum*, but the leaves are twice as long, much narrowed and strongly recurved, the flowers more scarlet with a golden lip.—The strap of the pollen is figured in Bot. Mag. as broadly triangular, it should be very slender. Lindley's habitat of Ceylon is no doubt an error, or referable to a cultivated specimen; or an *Aerides* may have been intended.

41. **S. trichromum,** *Reichb. f. in Hamb. Gartenzeit,* 1859, 51; *Xen. Orchid.* 119, t. 139; leaves spreading obtusely 2-lobed, racemes much shorter than the leaves, flowers subsecund, spur incurved. S. pallens, *Lindl.* (*not Cathcart*) *in Journ. Linn. Soc.* iii. 35.

SIKKIM HIMALAYA (*Ic. Cathcart*). BHOTAN and ASSAM (*Ic. in Herb. Calcutt.*).

Stem 1–3 ft. *Leaves* ⅓–1 in. broad. *Racemes* 3–5 in., lax-fld., shortly pedunculed; pedicel with ovary ¾ in., sigmoid; sepals linear-oblong, acute and broader shorter petals yellowish-white with a rose-cold. midrib; lip yellowish or rose-cold., speckled with pink; spur ½–⅔ in. long, horn-like; limb short, acute, with a flattened hooked callus at the throat.

Sect. VI. UNCIFERA. (See p. 55.)

42. **S. obtusifolium,** *Hook. f. Ic. Plant. ined.*; leaves broadly lorate 2-lobed, raceme elongate, lip cymbiform subacute or bifid, spur incurved upon the side of the lip, tip thickened. Uncifera obtusifolia, *Lindl. in Journ. Linn. Soc.* iii. 40.

SIKKIM HIMALAYA. alt. 5000 ft., *Clarke.* BHOTAN; in the Gheet Valley, *Lister.* KHASIA HILLS; Churra, alt. 4000 ft., *J. D. H. & T. T.*

Stem 2–4 in., as thick as a goose-quill; roots very many and long. *Leaves* flat, 4–6 by ¾–1 in., very thick, lobes obtuse. *Peduncle* with *raceme* very stout, 2–3 in.; bracts rather large, ovate, persistent, at length reflexed; pedicel with ovary ½ in.; flowers ½–⅔ in. diam., pale lemon-coloured, at first greenish; limb of lip shorter than the obovate-oblong obscurely nerved sepals, tip of lip thickened, side lobes truncate; column very short, rostellum beaked; anther long-beaked; pollinia small on the face of the refracted end of the elongate spathulate strap, the margins of which are recurved, gland very long.

43. **S. acuminatum,** *Hook. f.*; *Ic. Plant. ined.*; leaves linear- or oblong-lanceolate obliquely acuminate, raceme short, lip cymbiform obtuse, spur arcuate, tip acute. Uncifera acuminata, *Lindl. in Journ. Linn. Soc.* iii. 40.

SIKKIM HIMALAYA, alt. 6–7000 ft., *Gamble.* KHASIA HILLS, *Griffith* (*Kew Distrib.* 5257), &c.

A much more slender plant than *S. obtusifolium*, with narrower shorter leaves and shorter racemes, a much less curved spur, flowers about the same size and colour,

but spur not so long or so much incurved, gland of the pollinia smaller. *Capsule* ¾–1 in., narrowly fusiform, shortly pedicelled.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

S. CLAVATUM, *Lindl. Gen. & Sp. Orchid.* 223. (Epidendrum clavatum, *Retz Obs.* vi. 50. Limodorum clavatum, *Willd. Sp. Pl.* iv. 126; caulescent, pendulous, leaves linear clavate 2-toothed, spikes leaf-opposed, lip inflated bearded.—East Indies, on trees.—It is impossible to say what this is; it had better be suppressed.

S. DASYPOGON, *Lindl. Gen. & Sp. Orchid.* 222. (Aerides dasypogon, *Smith in Rees Cyclop. Suppl.* Epidendrum umbellatum, *Ham. mss.*); stemless, leaves ovate-oblong acute obliquely 2-toothed, corymbs subumbellate, sepals and petals incurved linear-oblong green without blood-red within, lip white dotted with blood-red, limb dilated subcordate toothed.—Nepal, *Hamilton.*—(Probably *S. calceolare*).

S. PECHÉI, *Reichb. f. in Gard. Chron.* 1887, i. 447; leaves very broad 7 by 2 in. ligulate obtusely 2-lobed, raceme few-fld., flowers as in Sect. *Calceolaria*, as large as *S. bellinum*, sepals and petals cuneately oblong ochreous spotted with red, lip a cupular spur, side lobes retuse and angular over the transversely triangular midlobe, blade white and yellow base of the spur spotted with red.—Moulmein, *Peché.*—(I have seen only imperfect cultivated specimens in Herb. Kew. It appears to be a very distinct large-leaved species of Sect. *Calceolaria*, J. D. H.)

ACAMPE GRIFFITHII, *Reichb. f. in Flora*, 1872, 277; near *A. dentata*, spur cylindric hairy within, midlobe of lip triangular angled on each side at the base protruding, two intermarginal lamellæ ("lineatis apice lobosis"), disk warted all over.—The rest as in *A. dentata*, Lindl.—Bhotan, *Griffith.*

ACAMPE INTERMEDIA, *Reichb. f. in Otto. & Dietr. Algemein. Gartenzeit.* 1856, 217; near *A. multiflora*, Lindl.; flowers like those of *A papillosa*, Lindl., leaves shorter lovate lip equally 2-lobed, raceme short corymbose, lip ("labello aplectro"), canal between the lateral lobes hairy, midlobe oval acute tubercled.

65. **SARCANTHUS,** *Lindl.*

Characters of *Saccolabium*, but spur with a dorsal usually 2-lobed callus or an erect plate within, inserted under the column, and with the cavity more or less divided by a vertical septum.—Species about 20, Tropical Asiatic.

But for the inconvenience attending the substitution of a new generic name for the numerous species of this genus, I should unhesitatingly unite it to *Cleisostoma*, and both to *Saccolabium*. The only character whereby its species can be distinguished is the more or less septate cavity of the spur, often a very obscure one, and almost inappreciable when the septum is reduced to a mere ridge.

* Leaves elongate, filiform.

1. **S. filiformis,** *Lindl. in Bot. Reg.* 1842, *Misc.* 61; leaves 8–10 in., racemes long lax-fld., sepals oblong obtuse, petals smaller and narrower, lip broadly conically, saccate base 2-lobed, side lobes acute incurved, midlobe short broad toothed on each side at the base. *Bot. Mag.* t. 4639; *Jard. Fleur.* 266.

SIKKIM HIMALAYA, *Griffith's Collector.* KHASIA HILLS, *Lobb.* TENASSERIM, *Parish.*

Stem pendulous, as thick as a duck's quill, terete. *Leaves* distant, ⅛ in. diam., obtuse. *Racemes* 6–10 in., curved; bracts minute, ovate; pedicels very short; flowers ½ in. diam.; sepals and petals dark purple, margins and midrib green; lip fleshy, white, base broad yellow, midlobe white, sac with a narrow lamina from the base of the midlobe downwards, and a very large-lobed hispid callus below the very broad, thick, yellow column; strap of oblong pollinia rather broad, gland angular.

2. **S. Williamsoni,** *Reichb. f. in Hamb. Gartenzeit.* 1865, 333; *in Gard. Chron.* 1865, 674; leaves 4–5 in., racemes long laxly many-fld., sepals ovate-oblong, petals smaller oblong, side lobes of lip erect oblong obtuse subfalcate, midlobe incurved fleshy thickly clawed acuminate, spur globose.

TENASSERIM; at Moulmein, *Parish.* ANDAMAN ISLANDS, *Berkeley.*

Stem nearly as thick as a goose-quill. *Leaves* ⅛ in. diam., curved, obtuse. *Racemes* 6–8 in., slender, sometimes branched; bracts ovate-lanceolate; flowers ⅛ in. diam., pedicelled, amethystine; spur with a narrow lamella from the base of the lip downwards and a large lobed pubescent dorsal callus; anther short; pollinia very minute subglobose, strap broadly obcordate (short, slender in Ic. Parish).

3. **S. appendiculatus,** *Hook. f.*; leaves 3 in., racemes short few-fld., sepals oblong, petals smaller and narrower, side lobes of lip triangular acuminate, midlobe short incurved, column pubescent at the base in front, spur funnel-shaped slightly curved obtuse. S. teretifolius, *Reichb. f. in Trans. Linn. Soc.* XXX. 136 (*not of Lindl.*). Aerides appendiculatum, *Wall. Cat.* 7315; *Lindl. Gen. & Sp. Orchid.* 242.

TAVOY, *Wallich.* TENASSERIM; at Moulmein, *Griffith, Parish.*

Stem as thick as a duck's quill, rigid. *Leaves* ⅛ in. diam., obtuse. *Racemes* 1–2 in.; bracts minute; pedicels short; flowers ¼ in. diam.; petals and sepals reflexed, yellow-green; lip rose-pink, spur 2-celled below the middle by a lamina descending from the base of the midlobe; dorsal callus very large, lobed, pubescent at the base; anther short; pollinia very large, strap broadly triangular-ovate.—Very near *S. teretifolius* of China, but flowers very much smaller and spur longer.

** Leaves flat or channelled.

† *Stem elongate, scandent or pendulous.*

4. **S. secundus,** *Griff. Notul.* iii. 362; *Ic. Pl. Asiat.* t. 336; stem slender elongate, leaves 4–7 in. narrowly linear-lanceolate acuminate, racemes slender, flowers subsecund, sepals oblong obtuse, petals smaller, side lobes of lip tooth-like, midlobe small ovate acute concave, spur conico-infundibular obtuse gibbous dorsally. Micropera pallida, *Lindl. in Wall. Cat.* 7321 (*in part*), (*not of Gen. & Sp. Orchid.*).

SILHET, *Wallich.* UPPER ASSAM, *Griffith.*

Leaves ⅛–½ in. broad, rigid, 5-nerved; sheaths ⅜–1 in., deeply grooved when dry. *Racemes* shorter than the leaves, peduncle and rachis slender; bracts minute, pedicel with ovary ¼ in.; flowers ½ in. diam.; sepals and petals red with white or yellowish margins and central band; lip rose-cold., very fleshy, spur white with a longitudinal septum, dorsal callus 2-lobed; column stout, short, rostellum subulate; anther long-beaked, strap of globose pollinia slender, dilated above, gland minute. *Capsule* ½–¾ in., ellipsoid or oblong, ribs low.—Referred to under *S. peninsularis* as possibly that plant by Lindley (in Journ. Linn. Soc. iii. 39), but is very different. From a so-named drawing in Herb. Calcutt. this would seem to be the original *S. oxyphyllus,* of Wallich's mss.; and that Lindley inadvertently transferred that name to No. 16.

5. **S. peninsularis,** *Dalz. in Hook. Kew Journ.* iii. (1857), 243; racemes 1–6 in., flowers deflexed, sepals and smaller petals obovate-oblong obtuse, side lobes of lip short erect subacute, midlobe small incurved acute, spur conical subacute dilated above. *Lindl. in Journ. Linn. Soc.* iii. 39; *Walp. Ann.* vi. 891; *Dalz. & Gibs. Bomb. Fl.* 264. S. pauciflorus, *Wight Ic.* t. 1747 (*bad*). Saccolabium acuminatum, *Thwaites Enum.* 34.

The DECCAN PENINSULA; on the Ghats from the Concan to Travancore. CEYLON; in the Saffragam district.

Stem 10–12 in., as thick as a duck's quill, flexuous, pendulous. *Leaves* uniform, 6–8 by ¼–⅓ in., rigid, strict or curved, 3–5-nerved, acuminate, tip obtuse, sheaths ribbed. *Racemes* slender, bracts minute; flowers ¼ in. diam., greenish or yellow with pink margins and a violet lip; sepals and petals rather spreading; spur more or less perfectly 2-celled, dorsal callus small; column short; anther beaked, pollinia didymous, strap slender dilated upwards, gland small. *Capsule* ½–¾ in., deflexed, narrowly oblong.

6. **S. insectifer,** *Reichb. f. in Bot. Zeit.* 1857, 159; leaves many ½ by ⅛ in. oblong amplexicaul, spikes very short stout few-fld., sepals ovate-oblong obtuse, petals oblong, side lobes of lip rounded, midlobe large triangular-ovate fleshy, spur short broadly conical.

BEHAR; at Burkutta, *J. D. H.* CACHAR, *Mann.* CHITTAGONG (*Ic. in Hort. Calcutt.*). TENASSERIM, *Parish.*

Stem a foot and upwards, robust, scandent, thicker than a goose-quill. *Leaves* subimbricate, obliquely obtusely 2-lobed with sometimes an intermediate apiculus, thickly coriaceous. *Spikes* ½ in., sessile; bracts small, deciduous; flowers ¼ in. diam., greenish-yellow striped with red-brown; lip white and pink or purple, midlobe acute or acuminate, spur semiseptate mouth with a pubescent ridge, dorsal callus large; column very short, stout, tip reclinate and with uncinate recurved arms; anther truncate, pollinia globose didymous, strap short very broad, gland transverse.

7. **S. Scortechinii,** *Hook. f.*; leaves 3–5 by 1¼ in. subpetioled oblong-lanceolate acute flat, spike about equalling the leaves very stout many-fld., sepals oblong acute, petals half as broad, side lobes of lip obsolete, midlobe hastately deltoid, spur longer than the sepals conical obtuse curved.

PERAK, *Scortechini*; on rocks, *Wray.*

Stem elongate, robust, as thick as a goose-quill. *Leaves* very thick. *Spikes* 2–6 in., flowers ⅛ in. diam.; sepals and petals lurid purple with green midrib and margins; lip ⅛ in., yellowish, spur 2-celled, dorsal callus large; column short; anther obtusely beaked; pollinia 4, broadly oblong, strap linear. *Capsules* 1 in., linear-oblong, deflexed.—Described from fruiting specimens and a drawing by Scortechini.

8. **S. pallidus,** *Lindl. in Bot. Reg.* 1840, *Misc.* 78; *in Journ. Linn. Soc.* iii. 39; leaves 10–14 in. lorate flat, panicle very large copiously branched laxly many-fld., sepals and smaller petals oblong obtuse, side lobes of lip triangular acuminate, midlobe a small incurved ovate acute fleshy beak, spur a cylindric obtuse sac. S. racemifer, *Reichb. f. in Walp. Ann.* vi. 891. S. tricolor, *R. f. in Bonpland.* ii. 219. Saccolabium racemiferum, *Lindl. Gen. & Sp. Orchid.* 224. Aerides racemiferum, *Wall. mss.*

EAST NEPAL, alt. 4000 ft., *J. D. H.* BHOTAN and the KHASIA HILLS, alt. 4–6000 ft., *Wallich*, &c. BURMA, *Berkeley.*

Stem as thick as the thumb; roots very stout. *Leaves* very coriaceous, 2 in. broad, deeply obtusely 2-lobed. *Panicle* with the stout peduncle 2–3 ft., branches long, slender; bracts at the forks ovate-lanceolate, floral subulate, persistent; pedicel with ovary ⅛ in.; flowers ⅛ in. diam.; sepals and petals dark purple edged with yellow; lip white, spur thick-walled, about as long as the sepals, semiseptals longitudinally, dorsal callus 2-lobed; column short, stout, rostellum obscure; anther broad, acute, pollinia oblong, strap dilated above, gland small. *Capsule* ¾ in., ellipsoid or clavate.—The E. Nepal specimen has shorter leaves and an ellipsoid capsule.

†† *Stem short or* 0.

9. **S. erinaceus,** *Reichb. f. in Bot. Zeit.* 1864, 298; leaves linear-oblong subacute channelled, racemes longer than the leaves pendulous laxly many-fld. hirsute, sepals and smaller petals oblong-obovate white, side lobes of lip broad midlobe ovate-oblong obtuse, spur shorter than the sepals saccate. *Bot. Mag. t.* 5630. S. Stowellianus, *Batem. mss.*

TENASSERIM; at Moulmein, *Parish.*

Stem short, as thick as the little finger. *Leaves* close set, 2–3 by ¾ in., recurved, coriaceous. *Racemes* 4–6 in., rachis slender purple; bracts minute; flowers ¾ in. diam.; pedicel with ovary ½–¾ in.; side lobes of lip with acute outer angles, spur with a sinuous ridge at the mouth, and with a broad plate extending downwards from the base of the pink midlobe, dorsal callus didymous; column stout, recurved, beak decurved, base broad; anther long-beaked, strap of pollinia very slender, gland minute.

10. **S. laxus,** *Reichb. f. in Bot Zeit.* 1886, 378; *in Saunders Refug. Bot.* t. 109; leaves very short broad fleshy, raceme 6–8 in., sepals broadly oblong obtuse, petals obovate-oblong, side lobes of lip erect, midlobe very short obtuse concave, spur broadly conical obtuse.

TENASSERIM; at Moulmein, *Griffith, Parish.*

Stem 0. *Leaves* 2½–3 by 1–1½ in., linear-oblong, obtusely 2-lobed, clouded with purple beneath. *Peduncle* slender, branched at the base, very lax-fld.; bracts minute; pedicel with ovary horizontal, ¾ in. long; flowers yellow, resupinate; spur with a narrow longitudinal plate at the base within; dorsal callus 2-lobed, glabrous; column rather long rostellum elongate, deflexed; strap of globose pollinia very long, slender, gland minute.—Very near *S. erinaceus.* There are two specimens in Herb. Kew., both from the Royal Gardens; in one the sepals and petals are much broader than in the other, and the raceme much longer. A drawing of a flower of this species is in Herb. Lindl., marked "India (Griffith) Loddiges." The ridge within the spur hardly amounts to a septum, and the species is therefore intermediate between *Sarcanthus* and *Cleisostoma.*

11. **S. Parishii,** *Hook. Bot. Mag t.* 5217; leaves 4–6 in. lorate keeled unequally obtusely 2-fid, racemes or panicles elongate many and lax-fld., sepals ovate obtuse, petals smaller narrower oblong, side lobes of lip rounded, midlobe broadly ovate, straight or recurved, spur longer than the sepals narrowly conical curved.

TENASSERIM; at Moulmein, *Parish.*

Stem 1–2 in., roots very stout. *Leaves* few, divaricate, bases closely imbricating. *Racemes* 6–16 in.; bracts minute, ovate, acute; flowers ⅛ in. diam., golden yellow; sepals and petals striated with red; spur septate below the middle, dorsal callus large; column short; anther acuminate, pollinia didymous oblong shortly stipitate below the tip of the narrowly spathulate strap (as in sect. *Uncifera* of *Saccolabium*), gland minute.

12. **S. lorifolius,** *Parish mss.*; leaves very thick curved linear channelled keeled obtusely notched, scape flexuous and rachis of panicled dense-fld. spikes stout, bracts reflexed, lateral sepals broadly obovate, petals more oblong obtuse, side lobes of lip subulate, midlobe ovate concave, spur longer than the sepals. *Hook. f. Ic. Plant. ined.*

TENASSERIM; at Moulmein, *Parish.*

Stem 3–4 in., stout, few leaved. *Leaves* 4– by ½–¾ in., sheath very short. *Peduncle* 4 in., green, sheaths obtuse; spikes 3–4 in.; bracts ovate-subulate; sepals and petals yellow with red; spur white, half 2-celled by vertical lamella, dorsal callus didymous; column short; anther short, broad, pollinia didymous, strap not long

gland ovate.—Described from an excellent drawing by Parish. Habit, spike and bracts of *Cleisostoma spicatum*; but the flowers are smaller, yellow, and the spur distinctly septate within.

13. **S. oxyphyllus,** *Wall. ex Lindl. in Bot. Reg.* 1840, *Misc.* 58; leaves 6–12 by ½–⅔ in. rigid acuminate, racemes short dense-fld., sepals oblong obtuse, petals smaller obovate-oblong, side lobes of lip acuminate, midlobe small ovate incurved, spur much longer than the sepals subcylindric obtuse. ? Cleisostoma subulatum, *Blume Bijd.* 362. Angræcum pugioniforme, *Klotzsch in Cat. Sem. Hort. Berol.*

TENASSERIM; at Moulmein, *Parish.*

Stem short. *Leaves* thickly coriaceous, margins recurved, narrowed to both ends. *Raceme* 4–6 in.; bracts minute, acute; flowers ¼ in. diam., dull purple, with yellow disk and margins; spur large, obtuse, septate below the middle, dorsal callus large lobed; column rather long, rostellum minute; anther acuminate, pollinia didymous, strap very slender, gland minute.—Very near *S. pugioniformis*, Reichb. f. in Otto and Diet. Gartenzeit, 1856, 219, but the leaves in that are broader and racemes much longer. Lindley (Bot. Reg. l. c.) says that *oxyphyllus* is nothing but a narrow leaved var. of the Chinese *S. rostratus*, but as noted under *S. secundus* there has been a misapplication or transference of Wallich's name of *oxyphyllus* by Lindley or Wallich.

SPECIES UNKNOWN TO ME.

S. ARIETINUS, *Reichb. f. in Gard. Chron.* 1869, 416; stem 5 in., leaves 3 in. straight stout terete as thick as a quill, raceme small deflexed many fld., bracts triangular not half the length of the pedicelled ovary, flowers small greenish, lip rosy, sepals oblong, petals ligulate obtusely acute, lip 3-fid, side lobes obtuse-angled plaited in the middle, midlobe triangular acute yellowish, spur retrorse with an erect lamellate grooved callus under the column, column slender velvety at the angles of the lip near the fovea. Assam (*Hort. Day*). Stiff, as if made of tin.

S. ASPERSUS, *Reichb. f. in Hamb. Gartenzeit*, 1865, 297; near *S. Parishii*; leaves ligulate broadly 2-toothed, peduncle long slender, flowers racemed equalling *S. paniculatus*, sepals green, lip purple-spotted, sepals ovate apiculate, petals spur curved with a longitudinal septum, side lobes semi ovate involute auricled at the isthmus and at the base, midlobe sessile triangular.—Burma, *Hort. Soc.*

S. CHRYSOMELAS, *Reichb. f. in Gard. Chron.* 1869, 662; leaves broadly lorate unequally 2-lobed, panicle simple, bracts triangular much shorter than the pedicelled ovaries, flowers yellowish, disk of sepals and petals blackish-purple, sepals and subequal petals oblong, side lobes of lip triangular with an ascending awn, midlobe triangular, spur straight conical, septum running from the posticous base of the spur along the anticous and excurrent on the midlobes, callus under the column bicrural, column slender, base puberulous.—Tenasserim, at Moulmein, *Benson* (*Hort. Veitch.*) *S. paniculatus* has a 3-fid midlobe of the lip; *S. racemifer* (*Saccolab. racemiferum* and *Sarcanth. pallidus*, Lindl.), has a totally different column anther, callus, and different side lobes of lip.

S. MACRODON, *Reichb f. in Gard. Chron.* 1872, 1555; leaves short oblong-ligulate with 2 triangular forcipate teeth, raceme elongate laxly many-fid., bracts most minute, pedicelled ovary and cylindric spur equal, sepals and petals oblong straight ribbed on the back, lip 3-fid, side lobes subquadrate anticous angle folded inwards, midlobe triangular concave, column short with a styliform deflexed process on each side next to the elongate deflexed linear triangular rostellum.—Madras Presidency, *Benson* (*Hort. Veitch.*).

S. MIRABILIS, *Reichb. f. in Gard. Chron.* 1878, ii. 300; leaves 5½ by ⅔ in. ligulate 2-fid, lobes ligulate obtuse, panicle 1¼ in. elongate slender, branches distant erect ends racemose, bracts most minute, flowers small yellowish, spur purple, sepals oblong acute dorsal arched gibbous, petals ligulate, lip 3-fid, side lobes short erect oblong acute, midlobe triangular horizontal, spur cylindric semicurved grooved septate, dorsal callus forked, strap of pollinia oblong bent over the compressed androclinium, pollinia blue on a forked appendage of the strap.—Burma ? (*Hort. Hobart*).—Near *S.*

***Parishii*, with even more remarkable pollinia. [The strap of the stipitate pollinia must resemble that of *Saccolab.* sect. *Uncifera*, J. D. H.].**

CLEISOSTOMA, *Blume.*

Differs from *Sarcanthus* only in the spur not being septate, and from *Saccolabium* in having a dorsal scale or callus within the spur beneath the column.—Species (known) probably 15 or 20.

Under *Sarcanthus* I have given my reason for not bringing that genus under this; to which I may add that if both were brought under *Saccolabium*, the result would be perhaps more satisfactory still. There are no characters of habit or habitat whereby the three can be distinguished, and the structural are very minute and often obscure. In *Cleisostoma* and *Sarcanthus* the dorsal appendage within the spur is either a 2-lobed callus or a thin scale, suggesting the propriety of rearranging the species of both genera by this character, but it is one so difficult of accurate observation in dried specimens that I hesitate to adopt it.

* *Stem more or less elongate. Peduncle stout, usually longer than the leaves, branched, erect; flowers in short spikes or racemes terminating the branches, (as in* Sarcanthus pallidus).

1. **C. latifolium,** *Lindl. in Bot. Reg.* 1840, *Misc.* 60; stem very stout, leaves 2½–9 by 1½–2 in., from oblong to lorate, peduncle very stout, side lobes of lip short truncate, midlobe reniformly ovate caruncled towards the base, spur saccate. *Walp. Ann.* vi. 889. C. fuscum, *Lindl. in Journ. Hort. Soc.* 1850, 80; *Walp. l.c.*

PERAK, *Wray, (Ic. Scortechini)*; SINGAPORE and MALACCA, *Griffith.* (*Kew Distrib.* 9235), *Maingay*, (K.d. 1647).

Stem 6–10 in., as thick as the middle finger. *Leaves* thickly coriaceous, flat, obtusely broadly 2-lobed, base narrowed. *Peduncle* 12–18 in., rather flexuous; sheaths annular; branches 1–2 in.; rachis of spikes very stout, bracts minute, broad; flowers ⅓ in. diam.; sepals and petals obovate-oblong, greenish margined or spotted with red-brown; spur sometimes inflated below, dorsal scale truncate erose; column very short, rostellum inconspicuous; anther low, broad, strap of globose pollinia linear, gland small. *Capsule* 1 in., fusiform.—Of Lindley's *C. latifolium* there is no specimen in his Herbarium. It was described from a Singapore plant cultivated by Loddiges, and agrees in characters with *C. fuscum*, of which Lindley himself says it is probably only a form of *latifolium*.

2. **C. andamanicum,** *Hook. f.*; leaves 4–6 by ½–¾ in. lorate, peduncle equalling or exceeding the leaves, side lobes of lip short truncate, midlobe very short reniform, spur cylindric.

SOUTH ANDAMAN ISLANDS, *Kurz.*

Stem as thick as a goose-quill. *Leaves* very coriaceous, recurved, obtusely unequally 2-lobed. *Peduncle* 5–7 in.; sheaths annular and bracts and flowers as in *C. latifolium*; flowers ¼ in. diam., pale greenish-yellow with a purple band within the margin; lip yellow, spur spotted with red, dorsal callus retuse; column very short, rostellum large, prominent; anther ovate, acuminate, strap of globose pollinia slender, gland medium-sized.—Closely allied to *latifolium*, but much more slender, leaves smaller and narrower and spur cylindric.

3. **C. maculosum,** *Lindl. Gen. & Sp. Orchid.* 227; *in Bot. Reg.* 1840, *Misc.* 37; leaves 6–7 by ⅔–¾ in. narrowly lorate, peduncle stout shorter or about equalling the leaves, side lobes of lip short truncate, midlobe very short ovate papillose, spur saccate. *Walp. Ann.* vi. 888. C. galeatum, *Thwaites Enum.* 305. Saccolabium galeatum, *Gardn. mss.*

CEYLON; in the Central Province, *Macrae*, &c.

Stem as thick as a swan's quill. *Leaves* coriaceous, obtusely unequally 2-lobed. *Peduncle* with annular sheaths; bracts short, broad; flowers ½ in. diam., yellow spotted with red; spur much smaller than the obovate-oblong sepals, dorsal scale truncate; column very short, rostellum short; anther small, strap of globose pollinia linear, gland small. *Capsule* 1½ in., narrowly clavate.—Bentham (Gen. Plant. iii. 580) erroneously unites Thwaites' *Saccolabium lineolatum*, C.P. 2741 (*S. ochraceum*, Lindl.) with Lindley's *C. maculosum*.

4. **C. crassifolium,** *Lindl. in Paxt. Fl. Gard.* iii. 125, t. 99; leaves 8–10 in. obtuse keeled, peduncle long stout branched, spikes recurved, lip with a pubescent ridge at the mouth of the cylindric spur, side lobes rounded, midlobe broadly ovate, lateral angles acute recurved. *Jard. Fleur.* iv. t. 397; *Walp. Ann.* vi. 889; *Lindenia* iii. t. 139.

TENASSERIM? (*Hort. Veitch.*).

Stem as thick as the thumb *Leaves* recurved, very thick, channelled above. *Peduncle* equalling the leaves; flowers ¼ in. diam.; sepals oblong, obtuse, and petals green and spotted; lip rose-cold., mouth of spur closed by the thickened ridge, disk of midlobe thickened; dorsal callus compressed, decurved; column very short; anther acuminate, pollinia 4, subglobose, strap linear, gland small.

** *Stem short. Peduncle slender; flowers scattered on the slender branches of the panicle.*

5. **C. ramosum,** *Hook. f.*; stem short, leaves loriform obliquely 2-lobed, panicles broad, sepals obovate equalling the conical spur, side lobes of lip very small, midlobe triangular-ovate obtuse, disk at base and short spur within pubescent. Saccolabium ramosum, *Lindl. Gen. & Sp. Orchid.* 224. S. flexuosum, *Lindl in Journ. Linn Soc.* iii. 36. Œceoclades flexuosa, *Lindl. in Wall. Cat.* 7333; *Gen. & Sp. Orchid.* 236. Aerides ramosum, *Wall. mss.*

SIKKIM HIMALAYA; in hot valleys, *J. D. H.* LOWER BENGAL and the Sunderbunds, *Wallich, Clarke.* BURMA; on the Attran River, *Wallich*; Moulmein, *Parish.*

Stem 1–3 in. *Leaves* 3–5 by ½–½ in. *Panicle* erect; bracts minute; flowers ¼ in. diam., buff, or yellowish flushed or faintly blotched with red, or dull red with green margins; sepals and smaller obovate petals 3-nerved; lip white, flushed with pink or banded with yellow; dorsal scale in spur erect 2-fid. pubescent; column very short, broad; anther short very broad, pollinia (4, 2 very small, *Clarke*), strap dilated upwards and suddenly contracted at the tip. *Capsule* ½ in., fusiform.—Wallich's specimens from Burma have very narrow leaves.

*** *Stem usually elongate. Peduncle slender or stout rarely branched, usually shorter than the leaves.*

6. **C. spicatum,** *Lindl. in Bot. Reg.* 1847, *under* t. 32; leaves 4–8 by ½–2 in., spike stout simple dense-fld., bracts ovate-subulate deflexed, side lobes of lip broad rounded, midlobe small ovate fleshy, spur contracted above the inflated 4-lobulate base. Sarcanthus densiflorus, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 136. Saccolabium densiflorum, *Lindl. in Wall. Cat.* 7311; *Gen. & Sp. Orchid.* 220; *in Bot. Reg.* 1838, *Misc.* 56. Ærides densiflorum, *Wall. mss.*

TENASSERIM; at Moulmein, *Parish.* PENANG, *Wallich, Curtis.*—DISTRIB. Borneo.

Stem as thick as the middle finger in Penang, more slender in Moulmein. *Leaves* oblong or linear-oblong, broadly unequally 2-lobed. *Spike* decurved or pendulous; flowers ½ in. diam., glabrous or subfurfuraceous; sepals and petals broad,

dull red with a pale central band; lip yellowish flushed with red, midlobe incurved, spur sometimes transversely septate towards the base, dorsal callus forked; column very short, rostellum short; anther beaked, strap of globose pollinia slender, dilated upwards, gland small.—The spur is like that of *Saccolab. buccosum*.

7. **C. tenerum,** *Hook. f.*; stem scandent, leaves 1–2 in. oblong, base cordate, raceme few-fld on a short stout leaf-opposed peduncle, side lobes of lip large truncate crenulate, midlobe ovate obtusely 3-lobed fleshy, spur very short conical incurved. Œceoclades tenera, *Lindl. Gen. & Sp. Orchid.* 236; *Wight Ic.* t. 1680; *Thwaites Enum.* 306; *Walp. Ann.* vi. 895. Œonia ? alata, *A. Rich. in Ann. Sc. Nat. Ser.* 3, xv. 67, t. 7. Saccolabium ? tenerum, *Lindl. in Journ. Linn. Soc.* iii. 36.

NILGHIRI HILLS; in woods near Neddubetta, *Perrottet.* CEYLON; in the Central Province, alt. 3–5000 ft., *Macrae*, &c.

Stem 1–2 ft., as thick as a duck's quill. *Leaves* scattered, fleshy, tip rounded or notched. *Peduncle* ½–¾ in., woody; basal sheaths cupular; bracts cymbiform; flowers ⅔ in. diam., fleshy, yellow or greenish, nerves red; sepals and petals oblanceolate obtuse, lateral sepals decurved; midlobe of lip white, dorsal callus fleshy; column rather long; anther short broad acute, strap of globose pollinia slender, gland small. *Capsule* 1 in., turgid, elliptic-oblong or pyriform.—Erroneously referred to *Saccolab. brevifolium* in Gen. Plant. (iii. 579). I have seen no Nilghiri specimen.

8. **C. bipunctatum,** *Hook. f.*; stem slender scandent, leaves 4–6 by ½–⅔ in. subacute, peduncle very short, 1–2 fld. side lobes of lip small subfalcate, midlobe large ovate-lanceolate, spur very small incurved obtuse, saccate. Saccolabium bipunctatum, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 145.

TENASSERIM; at Moulmein, *Parish.*

Stem about as thick as a duck's quill. *Leaves* lorate, laterally notched towards the tip; costa stout beneath. *Flowers* about ¼ in. diam., yellow and purplish; bracts obscure; sepals oblong-lanceolate, acute, 3-nerved, and linear-oblong 1-nerved petals falcate; midlobe of lip longer than the sepals, white, 3-nerved with a basal callus, dorsal scale membranous toothed; column very short; anther short, very broad, strap of subglobose pollinia linear, gland small.—I have seen only a very small specimen. Reichenbach, though describing the scale in the spur, places this in *Saccolabium*.

9. **C. brevipes,** *Hook. f.*; stem elongate, leaves 4 in. distichous uniform linear-lanceolate acute fleshy, spike short sessile dense-fld., rachis very thick, bracts short, flowers ⅔ in. diam., sepals and petals subsimilar ovate-oblong obtuse orange-yellow with two purple bands, lip pale yellow, side lobes falcate acute, midlobe short hastate with a membranous 2-awned tip, disk thickened, spur a short sac tip rounded.

SIKKIM HIMALAYA, (*Ic. in Hort. Calcutt.*); alt. 5000 ft. *Gamble.* ASSAM, (*Hort. N. Campany*)

Stems tufted, 8–12 in., as thick as a goose-quill, internodes ½–¾ in., rugulose. *Leaves* erecto-patent, sessile, ⅔ in. diam., flat, hard, tip micronate. *Spike* 1–1½ in.; basal sheaths short, annular, and bracts brown; ovary ¼ in., green striped with dull purple; sac of lip shining, thickened disk extending backward to meet the thick callus at the base of the column, thus closing the orifice of the sac; column short, stout, pollinia subquadrate, strap compressed, gland large, 2-partite. *Capsule* 1–1½ in., fusiform, terete, fleshy, striate.—Described from fresh cultivated specimens sent to Kew.

******** *Stem very short. Leaves subradical. Peduncle and raceme or spike much shorter than the leaves.*

10. **C. undulatum,** *Reichb. f. in Flora*, 1872, 274; leaves 4–8 by ¾–1¼ in. lorate narrowed at both ends undulate, raceme many-fld., sepals oblong, side lobes of lip orbicular, midlobe suborbicular caruncled obscurely 3-lobed, spur short globose. Saccolabium undulatum, *Lindl. in Wall. Cat.* 7301; *Gen. & Sp. Orchid.* 222.

SILHET, *Wallich.* CHITTAGONG, hill tracts, *Gamble.*

Stem 1–1½ in., roots fascicled. *Leaves* unequally obtusely 2-lobed, often falcate, sheath very short, flattened, midrib beneath strong. *Raceme* ¾–1 in.; bracts minute; flowers ⅛ in. diam., yellow blotched with red; sepals faintly 3-nerved; petals spathulately obovate, obtuse, 1-nerved; spur contracted at the mouth, membranous, dorsal scale erect bifid; column very short, rostellum minute, deflexed; anther broad, membranous, 1-celled, strap of globose pollinia slender, gland minute. *Capsule* ¾ in. long, linear-oblong.

11. **C. uteriferum,** *Hook. f.*; stemless, leaves 6–8 by 1½ in. lorate tip broad rounded or retuse margins undulate, spike stoutly peduncled shorter than the leaves dense-fld., sepals obovate-oblong undulate tip rounded, petals smaller and narrower, side lobes of lip truncate, midlobe very small ovate fleshy, spur a large inflated subglobose sac sulcate in front, neck contracted.

PERAK, *Kunstler* (*Hort. Bot. Calc.*).

Leaves flat, base hardly contracted. *Spike* with peduncle 3 in.; rachis very stout, strict; bracts minute; ovary very short, ⅛ in.; flowers ¼ in. diam., thick, sepals and petals dirty yellow, dull red towards the base, nerves obscure; lip shorter, spur longer than the sepals, slightly incurved, grooved down the front, walls thin, dorsal scale large semicircular convex entire; column very short indeed, rostellum small, protruded; anther broad, truncate, 1-celled, pollinia globose, seated on the contracted capex of a rather broad lanceolate strap, gland oblong.—Near *C. undulatum* and *Wendlandorum*, but with a much larger inflated spur, smaller midlobe of lip, and broad strap of the pollinia. Described from an analysis of dried flowers and a fine drawing in the Calcutta Herbarium.

12. **C. Wendlandorum,** *Reichb. f. in Otto & Dietr. Allgemein. Gartenzeit.* 1856, 219; leaves 6–10 by 1–1½ in., broadly lorate, raceme simple or branched many-fld., sepals obovate-oblong, petals narrower, side lobes of lip obscure rounded, midlobe small orbicular fleshy, spur short inflated. C. callosum, *Reichb. f. in Bonpland (not of Blume.)* Pomatocalpa spicatum, *Kuhl & Hasselt. ex. R. f. in Otto & Dietr. Allgemein. Gartenzeit. l. c.*

CACHAR; *Keenan.* TENASSERIM, *Parish.* ANDAMAN ISLANDS, *Berkeley.*

Stem 1–1½ in., very stout, roots fascicled. *Leaves* coriaceous, 2-lobed, nerveless, midrib beneath slender. *Raceme* or *panicle* 4–6 in.; bracts obscure; flowers $\frac{1}{10}$ in. broad, yellow, papillose; spur very short broad truncate, dorsal scale semicircular erose; column very short, rostellum beaked; anther broad, strap of globose pollinia linear, gland small. *Capsule* (in Cachar) 1 in., linear-oblong.—A much larger plant than *C. undulatum*, named after the two Wendlands of Herrenhausen, father and son.

13. **C. Mannii,** *Reichb. f. in Flora*, 1872, 273; leaves lorate narrowed at both ends, raceme simple or branched many-fld., sepals and petals obovate, side lobes of lip truncate obtusely angled, midlobe orbicular-ovate, spur short inflated.

ASSAM, *Mann.* SIKKIM? (*Ic. in Herb. Calcutt.*)

I have seen but one specimen; it is as small as *C. undulatum*, from which it differs in the much longer stouter peduncle and raceme, and very small flowers about $\frac{1}{10}$ in. diam. (pale golden yellow flushed with red at the base of the sepals and petals, according to the Sikkim drawing). Dorsal scale of spur erect, 2-fid; column very short, anther broad, obtuse, pollinia subglobose, strap dilated upwards, rather long, gland small.

14. **C. decipiens,** *Lindl. in Bot. Reg.* 1884, *Misc.* 11; leaves 8–10 by 1 in. thick purple dotted beneath, peduncle simple or branched, spike many-fld., sepals and petals ovate or oblong-ovate, lip broader than long entire, spur short broad gibbous. C. maculosum, *Thwaites Enum.* 304 (C. P. 3885) (*not of Lindl.*) C. Thwaitesianum, *Trimen in Journ. Bot.* 1885, 244.

CEYLON; on trees in the low country, *Thwaites* (C.P. 3193).

A drawing of this plant from the Peridemya Herbarium represents the stem 1½ in. long, the leaves 5–6 by ¾–1 in., lorate, unequally obtusely 2-lobed, sheaths ½ in. long, and underside of leaf speckled with purple. *Flowering peduncle* stout, speckled with purple, with the dense-fld. spike 2 in., lengthening to 6 in. in fruit; bracts minute, subulate; flowers ⅛ in. diam., yellowish, more or less suffused with red. *Capsule* sessile, ¾ in., linear-oblong.—The specimen in Lindley's herbarium (from Hort. Loddiges) consists of an imperfect leaf 4 by ¾ in. and a few inches of a branched panicle, the flowers not ⅓ in. diam., are crowded in elongate spikes with a stout rachis. The sepals as drawn by Lindley are obovate-oblong, obtuse, reddish-brown, with a broad golden margin; side lobes of lip erect, truncate, midlobe white, spur yellowish; dorsal scale of spur broad erect; column and rostellum very short; strap of globose pollinia linear, with an apiculate tip.—Trimen rightly suspects his *Thwaitesianum* to be Lindley's *decipiens*.

15. **C. bicuspidatum,** *Hook. f.*; leaves 3–4 by ½–1 in. acutely 2-fid, raceme lax-fld. much shorter than the leaves, sepals orbicular-obovate obtuse, petals oblong-obovate, side lobes of lip plicate truncate, midlobe very stout ovate acute incurved, spur cylindric longer than the sepals obtuse.

SIKKIM HIMALAYA; near Darjeeling, *Anderson* (*in Herb. Calcutt.*). KHASIA HILLS; alt. 2000 ft., *Mann.* TENASSERIM, *Parish* (*Ic. in Hort. Calcutt.*).

Stem very short. *Leaves* flat, narrowed towards the base, lobes very acute, often unequal, the longer ¾ in. *Peduncle* with 5–6-fld. simple or branched raceme 2–5 in.; bracts small, ovate; flowers ½–¾ in. diam., spreading or reflexed; sepals and petals yellowish-green, with a median stripe; lip white, speckled or flushed with rose, spur longer than the sepals, mouth infundibular with a thickened ridge, dorsal callus 2-lobed; column very short, rostellum long decurved; anther beaked; strap of globose pollinia dilated upwards, tip rounded produced beyond the pollinia, margins recurved, gland minute.

SPECIES UNKNOWN TO ME.

C. DISCOLOR, *Lindl. in Bot. Reg.* 1845, *Misc.* 59; leaves oblong channelled obliquely truncate, peduncle long slender dull purple branched at the extremity, sepals orbicular-ovate 5-nerved, and petals elliptic, both dull yellow with a greenish tinge, lip 3-fid, side lobes plicate with a conical caruncle in the inner faces within, dorsal tooth undivided keeled, spur longer than the sepals obtuse nearly white.—India (*Hort. Loddiges*). In Lindley's fragment the leaf is 3½ by nearly 1 in., the very slender peduncle has some small ovate obtuse sheaths; bracts small, broad, membranous; fl. buds about ⅛ in. diam., membranous; spur cylindric, longer than the broad sepals, walls thin; side lobes of lip truncate, subcrenate; midlobe very short continuous with the side lobes, incurved, ovate, acute, concave, thin, without calli; callus below the column 2-lobed, puberulous; pollinia each didymous, strap clavate with recurved margins, gland very small.

C. LOBATUM, *Reichb. f. in Flora*, 1872, 273; stem short, leaves cuneately lorate obliquely acuminate, racemes stout strict, flowers small, bracts small triangular persistent, sepals and petals ligulate obtusely acute, side lobes of lip transverse retuse with a minute callus at each internal angle, spur short hemispheric, scale under column sharply 2-fid to the middle, limb ovate obtusely acute.—Assam.

ECHIOGLOSSUM STRIATUM, *Reichb. f. in Gard. Chron.* 1879, 390; stem erect strict branched, sheaths very rough (arpophyllaceous), leaves linear-ligulate unequally acute very coriaceous keeled towards the tip, racemes short drooping, flowers small dense yellow streaked with red, sepals and narrower petals oblong obtusely acute, lip obtusely conic, side lobes triangular erect, midlobe hastately triangular, tip acutely 2-toothed, callus below the column ligulate, strap of pollen linear, gland very large, hippocrepiform. Sikkim Himalaya (*Hort. Mackay*)—(*Echioglossum* is reduced to *Cleisostoma* in Gen. Plant.)

67. **ORNITHOCHILUS**, *Wall.*

Epiphytes: *Stem* very short, pseudobulb 0. *Leaves* few, broad, flat. *Scapes* lateral, slender; flowers small, racemed or panicled. *Sepals* spreading, subequal, lateral obliquely obovate. *Petals* linear. *Lip* much larger than the sepals, clawed, side lobes subquadrate, midlobe clawed inflexed lobulate and fimbriate, with a velvety flap over the mouth of the short incurved spur, which is distant from the base. *Column* short, foot 0, rostellum forcipate; anther low 2-celled, pollinia 2, subglobose or oblong, grooved, strap obcuneate.—Species 1 or 2, Indian and Chinese.

O. fuscus, *Wall. in Lindl. Gen. & Sp. Orchid.* 242. O. cublepharum, *Hance in Journ Bot.* xxii. (1884), 364. Aerides difforme, *Wall. in Lindl. l. c.* 242, *Sert. Orchid Frontisp.* f. 7; *Reichb. f. in Gard. Chron.* 1865, 698; *Lindl. in Journ. Linn. Soc.* iii. 41; *Walp. Ann.* vi. 899, A. Hystrix. *Lindl. in J. L. S.* 42 (*not of Gen. & Sp. Orchid.*).

TROPICAL HIMALAYA; from Garwhal? *Falconer*, to SIKKIM, and the KHASIA HILLS, alt. 4-5000 ft. TENASSERIM; at Moulmein, *Parish.*—DISTRIB. China.

Stem ½-¾ in., 2-3-leaved. *Leaves* 3-7 by 1-1½ in., obliquely elliptic-oblong, acute, many nerved, base narrowed. *Racemes* simple or sparingly branched, 6-12 in., lax-fld.; bracts small, subulate; flowers ½-¾ in. broad; sepals and petals yellow streaked with red; side lobes of lip striped with brown, midlobe variable in breadth, red, its lobules reflexed, the mid-one entire or fimbriate. *Capsule* 1 in., fusiform, pedicelled.

68. **TÆNIOPHYLLUM**, *Blume.*

Small stemless epiphytes, leafless when flowering, roots flattened, pseudobulbs 0. *Leaves* linear or few or 0. *Peduncle* very short, filiform, simple, flowers very minute, spicate. *Sepals* and *petals* subequal, free or connate at the base. *Lip* sessile, saccate or spurred; side lobes short, broad, midlobe small fleshy. *Column* short, broad, foot 0; anther 2-celled; pollinia 4, in superposed pairs, strap linear, gland small.—Species about 6, Indian, Malayan, Australian and Pacific.

There are several Perak plants in Scortechini collections that are probably *Tæniophylla;* but the species are obscure, minute, and very imperfectly known, and there are no doubt many to be discovered.

1. **T. Alwisii,** *Lindl. in Journ. Linn. Soc.* iii. 42; peduncle glabrous, sepals and petals connate, lip cymbiform. *Thwaites Enum.* 305. *Reichb. f. Xen. Orchid.* 67, t. 116.

CEYLON; in the Ambagamowa district, *De Alwis*.

Roots fleshy. *Peduncle* ¼ in.; bracts keeled; flowers most minute, pale green; sepals, petals and lip connate into an acutely 6-toothed perianth; margins of lip free; column short; anther square, sub-4-celled; pollinia 4, pyriform, sessile on the gland.—Descript. from Thwaites.

2. **T. scaberulum,** *Hook. f.*; peduncle ½ in. scaberulous, sepals petals and lip connate at the base, lip deeply saccate with a minute incurved midlobe.

TRAVANCORE; on teak branches, at Cottavam, *Johnson*.

Roots about $\frac{1}{20}$ in. diam., compressed. *Peduncle* 2–3-fld.; bracts broad; flowers sessile, $\frac{1}{12}$ in. diam.; sepals and petals oblong-lanceolate, obtuse, fleshy; sac or spur nearly as long as the limb of the lip, base rounded; column very short; anther truncate in front, pollinia pyriform. *Capsule* (young), ¼ in., slender, curved, scaberulous.

3. **T. serrula,** *Hook. f.*; leafless, spike sessile many-fld. appearing serrulate from the number and regularity of the very minute subdistichous bracts, sepals and petals free or nearly so, lip cymbiform, side lobes low rounded, midlobe very short thick, spur scrotiform.

PERAK; at Larut, *King's Collector*.

Roots stout, $\frac{1}{6}$ in. diam. *Spikes* ½–1 in.; bracts concave, obtuse; flowers about $\frac{1}{8}$ in. diam., reddish-yellow; sepals lanceolate, obtuse and narrower petals with one thick nerve; side lobes of lip incurved; column very short, papillose. *Capsule* ¾–1¼ in., trigonous.

69. MICROSACCUS, *Blume.*

Small densely tufted epiphytes; stems densely leafy. *Leaves* distichous, narrow or scalpelliform, fleshy. *Flowers* minute, subsessile or very shortly racemose. *Sepals* and *petals* subequal, widely spreading. *Lip* small, adnate to the base of the column, base broadly saccate; side lobes small or 0, midlobe broad subentire. *Column* very short, truncate; anther obtuse; pollinia 4, distinct, ellipsoid or globose, sessile on the slender strap, gland small or medium sized. *Capsule* small.—Species 3 or 4, Malayan.

1. **M. javensis,** *Blume Bijdr.* 367; leaves equitant scalpelliform, flowers subsolitary. *Lindl Gen. & Sp. Orchid.* 219. Saccolabium Griffithii, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 145.

TENASSERIM; at Mergui, *Griffith (Kew Distrib.* 5244), *Helfer (Kew Distrib.* 5384) *Parish*. PERAK, *Scortechini*.—DISTRIB. Malay Islands, Cambodia.

Stems 2–4 in., curved, ¼ in. diam. across the leaves. *Leaves* broadly ovate, obtuse, somewhat recurved, wrinkled when dry. *Flowers* $\frac{1}{16}$ in. diam., almost concealed by the leaves, cellular, white; bracts scarious, sheathing; sepals lanceolate; petals rather narrower; lip obtusely 3-lobed. *Capsule* ¼ in., sessile, ellipsoid.—Description of flower from a drawing by Griffith in Herb. Lindl. I have seen no authentic Javan specimen, but the Indian plant agrees well with Blume's description.

2. **M. virens,** *Hook. f.*; leaves linear-oblong trigonous, flowers in very short racemes. ? Adenoncos virens, *Blume Bijdr.* 381; *Lindl. Gen. & Sp. Orchid.* 235.

PERAK, *Scortechini*.—DISTRIB Java, Borneo.

Stems 4–8 in., very stout, strongly incurved. *Leaves* 1–1½ by ¼ in., very thick and fleshy, subacute. *Racemes* much shorter than the leaves, 3–6-fld.; bracts distichous, ovate, acute, very coriaceous and persistent; flowers coriaceous, about ¼ in.

diam.; sepals lanceolate, greenish; petals shorter and narrower; lip orbicular, apiculate, thick, greenish, base constricted into 2 obscure side lobes; pollinia 4, globose, gland rather large.—Described chiefly from a drawing and description by Scortechini. The Java and Bornean specimens are not in flower, but otherwise agrees with the Indian.

70. **DIPLOCENTRUM,** *Lindl.*

Epiphytes; stems short leafy, pseudobulbs 0. *Leaves* distichous, narrow, fleshy, subterete or complicate. *Peduncle* lateral, often branched; flowers small, in long subspiciform racemes. *Sepals* free, connivent, subequal or the lateral larger. *Petals* like the dorsal sepal. *Lip* sessile, jointed on the base of the column, spreading, entire, shortly 2-spurred, disk fleshy. *Column* very short, 2-auricled, truncate; anther 2-celled; pollinia 2, ovoid, sulcate or 2-partite, attached by a broad strap to a broad gland.—Species 2–3, Indian.

1. **D. recurvum,** *Lindl. in Bot. Reg. under* t. 1522; *in Wall. Cat.* 7331; *Gen. & Sp. Orchid.* 218; leaves 4–6 in. linear, panicle long-peduncled, branches spreading. *Wight Ic.* t. 1680, *and* D. longifolium, *Wight l. c.* t. 1681. Cymbidium alofolium, *Herb. Heyne.*

Nilghery and Travancore, *Wight*, &c. Ceylon, in the Central Province.

Stem 2–6 in., densely leafy. *Leaves* linear, keeled, $\frac{1}{4}$–$\frac{1}{3}$ in. broad, unequally obtusely 2-fid, recurved. *Panicle* with peduncle 5–8 in.; flowers $\frac{1}{4}$ in. diam., densely crowded towards the ends of the spreading branches; bracts minute, acute; sepals and petals deep pink or brownish tinged with pink; lip ovate-oblong, longer than the petals, entire, pinkish lilac or crimson spur much shorter than the blade of the lip, conical, incurved, obtuse; column very stout, auricles incurved, rostellum inconspicuous; anther truncate, cells basal, strap of pollinia narrowed from the broad base upwards. *Capsule* $\frac{1}{2}$ in., clavate.

2. **D. congestum,** *Wight Ic.* t. 1682; leaves 2-3 in. broadly oblong, spike very stout stoutly peduncled simple or shortly branched at the base.

Travancore; in the Iyamallay Hills, *Wight.*

Stem very short. *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ in. broad, deeply unequally 2-lobed, lobes obtuse. *Peduncle* with dense-fld. spike 4–6 in., rachis very stout; bracts minute, acute; flowers about $\frac{1}{3}$ in. diam.; colour, lip, spurs, column, anther and pollen much like *D. recurvum.*

70/2. **MYSTACIDIUM,** *Lindl.*

Epiphytes, pseudobulbs 0. *Leaves* few, distichous, linear, coriaceous. *Flowers* in axillary racemes, small. *Sepals* and *petals* subequal, free, spreading. *Lip* adnate to the base of the column, 3-lobed, spurred. *Column* very short, foot 0; anther hinged on to the top of the column; pollinia 2, globose, attached by separate straps to the gland.—Species about 20, tropical African and one Cingalese.

This genus should, I think, be reduced to *Angraecum.*

M. zeylanicum, *Trimen. Cat. Ceylon Pl.* 90. Angraecum zeylanicum, *Lindl. in Journ. Linn. Soc.* iii. 40; *Thwaites Enum.* 306.

Ceylon; near Galle, *Champion.*

Stem 3–4 in. *Leaves* 6–10 by $\frac{1}{3}$–$\frac{1}{2}$ in., flat, narrowed to the acuminate apex, rigid, many-nerved. *Scapes* many, shorter than the leaves, very slender, rigid,

lax-fld.; bracts minute, truncate, membranous; pedicel with ovary ⅛ in.; sepals as long, lanceolate, 5-nerved; petals narrower, 3-nerved; lip nearly as long as the sepals, broadly ovate, finely acuminate, cymbiform, quite entire; spur as long as the sepals, suberect, slightly clavate; anther firmly attached by a point to the column. *Capsule* ⅔ in., pedicelled, narrowly ellipsoid, ribs slender.—I have seen only indifferent specimens, from which the pollen was gone. Dr. Trimen informs me that it is found in several parts of Ceylon.

71. **ACRIOPSIS,** *Reinwdt.*

Epiphytes; pseudobulbs clustered, 1–3-leaved. *Leaves* flat, linear, not plaited. *Scape* from the base of the bulb, slender, simple or branched; raceme lax-fld.; bracts small acute. *Sepals* narrow, spathulately obovate, obtuse, dorsal arched, lateral connate placed under the lip. *Lip* adnate to the column above its middle, spreading, more or less 3-lobed, disk with 2 short erect lamellæ on the mesial line. *Column* incurved with 2 styliform horizontal or decurved processes on each side of the stigma, and a cucullate top concealing the anther; rostellum suberect, acute; anther membranous, 2-celled; pollinia 2 or 4 in 2 pairs, narrowly pyriform attached by a strap to a small gland.—Species 5 or 6, Indian and Malayan.

In Herb. Calcutta is a fine drawing of what may be a new species from Moulmein, with a large quadrate clawed pubescent lip; it may be intended for *A. javanica.*

1. **A. javanica,** *Reinwdt. in Flora Literat.* 1825, ii. 4; *in Syllog. Ratisb.* 1828; side lobes of lip broad rounded or subtriangular, midlobe very small clawed oblong concave, claw lamellate. *Blume Bijdr.* 377; *Lindl. Gen. & Sp. Orchid.* 140; *Walp. Ann.* vi. 492. A. picta, *Lindl. in Bot. Reg.* xxix., *Misc.* 105. A. Griffithii, *Reichb. f. in Bonpland.* ii. 92; *Walp. l. c.* A. crispa, *Griff. Notul.* iii. 333; *Ic. Plant. Asiat.* t. 318. ? Spathoglottis ? trivalvis, *Wall. Cat.* 3742; *Lindl. Gen. & Sp.* 120.

TENASSERIM, *Parish.* PERAK, *Scortechini,* and SINGAPORE, *Wallich,* &c. MALACCA, *Griffith, Maingay.*—DISTRIB. Java, Philippines.

Pseudobulbs ¾–1¼ in., oblong or ovoid. *Leaves* 4–6 by ⅓–½ in., 2-dentate. *Scape* 6–18 in., simple or branched; pedicels ⅛ in., capillary; sepals ¼–⅓ in., white with purple tip and central broad or narrow band; petals subsimilar; lip white with a purple band and lamella. *Capsule* ½ in., broadly ellipsoid.—It is difficult to reconcile Griffith's figure with the above description of the lip, but his habitat being that of Maingay's plant (Orchard trees, Malacca) seems to identify it.

2. **A. indica,** *Wight. Ic.* t. 1748 (*bad*); lip oblong subpanduriform tip rounded, lamellæ opposite the contraction. *Walp. Ann.* vi. 492.

TENASSERIM, *Griffith* (*in Herb. Lindl.*), *Parish.* PENANG, *Maingay.*

A much smaller plant than *A. javanica,* with more densely tufted pseudobulbs, very narrow leaves, scapes shorter, more branched, and smaller flowers; the sepals are ⅛ in. long and the very different lip is inserted higher up, just under the column.—Wight who had lost the locality of the species he figured probably received it from Griffith. In a drawing by Parish the flowers are yellow green faintly blotched with purple. Wight's figure of the lip is quite unlike that of the specimen he depicted, which is now in Herb. Kew.

3. **A. Ridleyi,** *Hook. f.*; lip with small oblong obtuse side lobes and a large orbicular or transversely oblong clawed smooth midlobe, lamellæ on the claw.

SINGAPORE; at Bukit Mandi, *Ridley*.

Pseudobulbs broadly ovoid, compressed. *Leaves* 3–4 in., linear, olive green. *Scape* simple (always?); raceme lax-fld.; flowers yellow, sparsely spotted with crimson; lip white, lamellæ crimson.

72. **PODOCHILUS,** *Blume.*

Stems tufted, erect or diffuse. *Leaves* many, uniform, distichous, flat or equitant and laterally compressed. *Peduncles* terminal or leaf-opposed; flowers minute, racemed or spicate; bracts persistent. *Lateral sepals* adnate with the prolonged foot of the column and together at the base, forming a mentum. *Petals* broad or narrow. *Lip* clawed, jointed to the foot of the column, mobile (always?) erect, with a basal appendage. *Column* very short; rostellum terminal, triangular, erect, bifid or bipartite; anther erect; pollinia 4, each pair half enclosed in a calyptriform stipe fixed by a gland to the top of the rostellum. *Capsule* very small, ellipsoid.—Species 12 or more, Indian and Malayan.

The flowers of all the species want careful examination on a living state. There are great differences in the columnar structure and pollinia that cannot be satisfactorily determined from dried specimens. These last are almost in all cases deficient in flowers, which are easily detached, and so minute as to escape the notice of collectors.

* Leaves equitant, laterally compressed, not articulate with the sheath. *Flowers* secund, on inclined or decurved lax-fld. racemes.

1. **P. cultratus,** *Lindl. in Wall. Cat.* 7336; *Gen. & Sp. Orchid.* 234; *in Journ. Linn. Soc.* iii. 37; leaves ensiform subfalcate acute, lip cuneately oblong truncate 5-nerved, base saccate.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, *J. D. H.* ASSAM, *Masters.* CACHAR, *Clarke.* TENASSERIM; the Attran River, *Parish.*

Stem 3–7 in., with the leaves ⅓–⅔ in. broad. *Leaves* ⅓–⅔ in., many nerved. *Peduncle* short, decurved; bracts ovate-lanceolate; flowers ⅛ in. long; dorsal sepal broad, 5-nerved, lateral subacute; petals broadly obovate, acute, 3-nerved; mentum saccate; base of lip broad. *Capsule* ¼ in.—The lip resembles that of an *Appendicula*; I doubt its being articulate and mobile.

2. **P. falcatus,** *Lindl. Gen. & Sp. Orchid.* 234: leaves ensiform obtuse, lip narrowly clawed oblanceolate 3-nerved, base with a short notched appendage. *Thwaites Enum.* 306.

CEYLON; Central Province, alt. 3–6000 ft., common.

Habit of *P. cultratus*, but stems longer, 6–12 in. *Rostellum* with an invol top, round which the capillary tails of the pollinia are curved, gland minute. A var. *angustata*, Thw. (C.P. 3889), the leaves are so closely appressed to one another, that not even the points are free, and the breadth of the stem across the leaves is only ⅓ in.

3. **P. malabaricus,** *Wight Ic.* t. 1748, fig. 2; leaves obtuse, spike many-fld. much longer than the leaves, mentum very short, lip linear-lanceolate obtuse contracted in the middle. *Walp. Ann.* vi. 893.

MALABAR, *Jerdon*; Wynaad jungles, *Drew.* TRAVANCORE, *Johnson.*

Stem 3–5 in., fleshy, ⅛ in. across the leaves. *Leaves* ⅛ in., straight. *Spike* 1–1½ in., inclined or horizontal, few-fld.; bracts broadly ovate; flowers white tipped with pink; petals lanceolate; lip constricted in the middle.—I have seen no flowers. Wight's expression of lip contracted in the middle probably implied that the basal appendage is as large as the blade. Probably not different from *P. falcatus.*

4. **P. saxatilis,** *Lindl. Gen. & Sp. Orchid.* 235; leaves short recurved obtuse, lip oblanceolate obtuse 3-nerved. *Thwaites Enum.* 307.

CEYLON; Hantani and Ambagamowa districts, *Macrae, Thwaites.*

Stems 2–3 in., fleshy. *Leaves* ¼–⅓ in. *Peduncle* terminal, ½ in., drooping, few-fld.; bracts ovate, smaller than the yellow flowers; lip red in the middle; lateral sepals obtuse; petal obovate-oblong, obtuse; mentum short.—Description of flowers from a drawing by Lindley.

** Leaves flat, not equitant or laterally compressed.

† *Leaves broad. Scapes lateral.*

5. **P. unciferus,** *Hook. f. Ic. Plant. ined.*; leaves ⅜–1¼ by ½–⅔ in. oblong, tip rounded, peduncles many very slender flowering at the tips, lip spathulate, basal appendage long slender uncinately recurved.

PERAK, *Scortechini.*—DISTRIB. Borneo, Philippines.

Stem erect, 18–24 in. *Leaves* ½-amplexicaul, shining, tip minutely mucronately toothed. *Peduncle* longer than the leaves, erecto-patent, flexuous, with scattered acicular sheaths; raceme terminal, capillary, 1–2-fld; bracts orbicular; flowers ⅛ in. long; dorsal sepal broad, 3-nerved, lateral acuminate; mentum cylindric; petals broad, acute, 3-nerved; claw of lip slender, jointed on the shortly free foot of the column; basal appendage grooved, truncate; column unarmed.

†† *Leaves very small, linear acicular or lanceolate. Scape terminal or nearly so.*

6. **P. microphyllus,** *Lindl. in Wall. Cat.* 7335 A; *Gen. & Sp. Orchid.* 234 *in part*; stems filiform diffuse, leaves 1/16–¼ in. elliptic-lanceolate awned, spike as long as the leaves capillary flexuous 3–4-fld., bracts most minute, lip ovate oblong or lanceolate 3-nerved, basal appendage quadrate.

TENASSERIM; at Mergui, *Parish.* MALAY PENINSULA, common.—DISTRIB. Borneo, Cambodia.

Stems 6–8 in., flexuous, rarely branched. *Leaves* articulate on the sheaths, 7–9-nerved. *Flowers* 1/10 in. long, white and purplish; mentum very variable, saccate, sometimes constricted at the top and 2-lobed at the base; dorsal sepal ovate, 1-nerved, lateral subacute; petals oblong, obtuse, 1-nerved; lip variable, obtuse or subacute; basal appendage erect, ¼–⅓ the length of the blade, concave or margins convolute; rostellum narrow; anther lanceolate, acute. *Capsule* ¼ in., ellipsoid.—Scortechini mss. describes hyaline wings of the column, which I have not detected. Blume's *P. similis* of Borneo is very near this.

7. **P. khasianus,** *Hook. f. Ic. Plant. ined.*; stems suberect slender, leaves ¼–½ in. linear acute, spike very short few-fld., bracts as long as the flowers ovate-lanceolate, lip narrowly oblong emarginate 3-nerved, base cordate. P. microphyllus, *Wall. Cat.* 7335 B; *Lindl. Gen. & Sp. Orchid.* 234 *in part*; *in Journ. Linn. Soc.* iii. 37.

SILHET, *Wallich.* KHASIA HILLS; at Amwee, *J. D. H. & T. T.*

Stems 4–6 in., simple, suberect. *Leaves* articulate on the sheath, rigid, often twisted. *Peduncle* shorter than the leaves; bracts rigid, strongly nerved; flowers 1/12 in. long; lateral sepals acute, nerve strong; mentum globose; petals obovate-oblong, obtuse, 1-nerved; claw of lip inserted I think at the base of the column (not of its foot), I failed to discover the appendage; column very short, winged, divided (after flowering) to the base into two long erect arms concave posteriorly, much longer than the shortly calyptrate pollinia, the stipe of which is very short; anther very short, 2-cuspidate.—This differs in every respect of foliage and habit from *microphyllus,* but especially in the structure of the column.

8. **P. lucescens,** *Blume Bijdr.* 295, t. 12; *Rumphia* iv. 43 (*in Obs.*); stem slender erect, leaves ⅓–½ in. elliptic- or linear-oblong obtuse or apiculate, spikes elongate many-fld., bracts spreading and incurved, lip obovate or oblong obtuse, base sagittate. *Lindl Gen. & Sp Orchid.* 234; *Reichb.f. in Bonpland.* v. (1857) 41; *Ot. Bot. Hamb.* 45; *in Trans. Linn. Soc.* xxx. 145.

TENASSERIM; at Mergui, *Helfer, Parish.*—DISTRIB. Sumatra, Java, Borneo.

Stems 4–8 in., rigid. *Leaves* black when dry, opaque, many-nerved. *Spike* ½–1 in., flexuous, flowering to the base; bracts $\frac{1}{20}$ in., strongly nerved; flowers $\frac{1}{10}$ in. diam.

9. **P. acicularis,** *Hook. f. Ic. Plant. ined.*; stems densely tufted filiform, leaves ⅛–¼ in. acicular, spike very short 3–4-fld, lip broadly oblong or obovate 3-nerved, base cordate with an incurved horn on each side.

PENANG, *Maingay* (*Kew Distrib.* 1653/2). PERAK, *Scortechini*, &c.

Stems 6–8 in., flexuous, diffuse. *Leaves* suberect, finely acuminate. *Flowers* $\frac{1}{12}$ in. long, white; bracts very minute; sepals obtuse or acute; petals linear, obtuse, 1-nerved; mentum short, rounded, sometimes globose and 2-lobed; columnar arms ensiform, obliquely truncate, tips at first cohering with the bidentate tip of the rostellum, and carrying away the pollinia; anther ovate-cordate, at length 2-fid; each pair of pollinia half enclosed in a calyptriform caudicle which is attached by a slender stipe to a linear gland.—Very near a Bornean species, with a cuneate 5-nerved lip truncate at the base, and shorter columnar wings.

73. APPENDICULA, *Blume.*

Stems tufted, leafy, often compressed. *Leaves* numerous, distichous, uniform, vertical, jointed on their sheaths. *Peduncles* terminal and leaf-opposed; flowers minute, racemed spicate or capitate; bracts persistent. *Sepals* connivent, lateral connate at the base and adnate to the produced foot of the column, forming a mentum. *Petals* various. *Lip* erect, inserted on the foot of the column or with its sides adnate to it. *Column* very short, rostellum erect 2-fid.; anther dorsal, erect; pollinia 8, 4 often imperfect, clavate, attached in fours to the tip of the rostellum by a point or gland. *Capsule* very small.—Species 20 or more, Tropical Asiatic, Australian, and Polynesian.

* Lip adnate below by a broad saccate claw to the sides and face of the foot of the column.

† *Limb of lip with a large callus on the disk.*

1. **A. bifaria,** *Lindl. in Hook. Kew Journ.* vii. (1855), 35; leaves 1–1½ by ½ in. oblong obtusely 2-toothed, racemes chiefly terminal very short, mentum saccate rounded, lip ovate-oblong base calceolar, sides of column produced into ensiform processes as long as the rostellum. *Benth. Fl. Hongk.* 358; *Walp. Rep.* vi. 893. A. reduplicata, *Reichb.f. in Ot. Bot. Hamb.* 45.

CACHAR, *Keenan.* TENASSERIM, *Helfer.* SINGAPORE, *Ridley.*—DISTRIB. China, Borneo?

Stem 10–24 in., simple. *Leaves* often apiculate between the obtuse apical teeth. *Racemes* terminal, rarely lateral or leaf-opposed, 6–8-fld.; bracts reflexed, oblong; flowers about ⅛ in. long; sepals obtuse; petals obovate-oblong, 3-nerved; lip calceolar at the base, that is having a horse-shoe membrane within the border, slightly constricted beyond the middle, callus on its disk globose or oblong, entire;

arms of column obliquely truncate or 2-lobed. *Capsule* ¼ in. long, turgidly ellipsoid.—Lindley in describing the Chinese plant assumed it to be the *Dendrobium bifarium* of Wall. Cat. 2002, which consists of two very distinct Penang plants, a *Dendrobium* (D. bifarium, *Lindl.*, see v. V. p. 732) and an *Appendicula* in fruit only, very like indeed the Chinese plant, but differing in the numerous lateral racemes. Specimens from Perak in flower exactly accord in foliage with Wallich's Penang in having many racemes, but differ in having a more 3-lobed lip, a broader margin to the base of the lip, and a 2-lobed callus. Assuming that the Perak and Wallich's Penang plant are the same, they may be either a different species from *bifaria*, or a variety. For the present it is safer to assume the latter and to call it:—

VAR. ? *Wallichiana*; racemes numerous lateral, lip with a broad rounded base surrounding the calceolar membrane, callus of disk 2-lobed in front. Dendrobium bifarium, *Lindl. in Wall. Cat.* 2002, *in part.*—Penang, *Wallich.* Perak, *Scortechini.*

†† *Lip without a median callus on the disk.*

2. **A. callosa,** *Blume Bijdr.* 303; leaves ½–1 by ⅛ in. oblong strongly 2-fid., sheaths 2-cuspidate, flowers in terminal bracteate heads, lip very shortly ovate with a large transverse basal appendage. *Lindl. Gen. & Sp. Orchid.* 230; *Griff. in Calc. Journ. Nat. Hist.* v. 362, t. 62; *Saunders Refug. Bot.* t. 45; *Reichb. f. Otia Bot. Hamb.* 45. A. stipulata, *Griff. Notul.* iii. 358; *Ic. Plant. Asiat.* t. 335, f. 2.

TENASSERIM, *Griffith, Parish.* PENANG, *Walker,* &c. PERAK, *Scortechini,* &c. —DISTRIB. Java, Borneo.

Stem 6–18 in., simple. *Leaves* close together, coriaceous, base truncate, tip not contracted. *Heads of flowers* sessile; bracts lanceolate, scarious, obtuse, many-nerved; flowers ⅛ in. long, erect, cream-cold.; mentum saccate; petals linear, obtuse; claw of lip as long as the foot of the column and adnate to it throughout its length; limb broadly ovate, narrower than the appendage, which has divergent lobes and is tubercled in the sinus; column with short truncate wings.—The leaves are often curiously pitted.

3. **A. Lewisii,** *Griff. in Calc. Journ. Nat. Hist.* iv. 378, t. 19; *Notul.* iii. 360; *Ic. Plant. Asiat.* t. 337; leaves 1–3 by ½–⅔ in. linear- or oblong-lanceolate 2-dentate, racemes very short leaf-opposed, mentum subglobose, lip ovate many-nerved, base calceolar. *Walp. Ann.* vi. 893. A. cyathifera, *Reichb. f. mss.* Metachilum cyathiferum, *Lindl. in Wall. Cat.* 2022; *Gen. & Sp. Orchid.* 74. Dendrobium vaginatum, *Wall. mss.*

PENANG, *Maingay* (*Kew Distrib.* 1616). *Curtis.* PERAK, *Scortechini, Wray.* SINGAPORE, *Wallich.*

Stem 6–18 in., unbranched, flattened, ⅓ in. broad. *Leaves* rather distant and membranous; sheaths 1 in. long. *Racemes* axillary and terminal, 1–1½ in., many-fld.; bracts small, ovate-lanceolate, reflexed; flowers about ⅛ in. long, yellow-green; sepals acute; petals elliptic, 1-nerved; claw of lip adnate throughout its length to the foot of the column; column without arms. *Capsule* ½ in., subcylindric.

** Lip attached by a short free claw to the apex only of the foot of the column.

4. **A. cordata,** *Hook. f. Ic. Plant. ined.*; leaves 1 by ⅓ in. oblong obtusely bidentate, spikes very short incurved few-fld., mentum obscure, foot of column very short, lip ovate-cordate 3-nerved with a semilunar ridge towards the base.

PERAK, *Scortechini.*

Stem (of the only specimen) 7 in., unbranched. *Leaves* rather membranous,

apiculate between the teeth, sheaths $\frac{1}{3}$–$\frac{1}{2}$ in. *Spikes* $\frac{1}{4}$ in., 3–4-fld.; bracts sheathing the rachis, erect during flowering, then reflexed, strongly nerved; flowers about $\frac{1}{10}$ in. long, dotted; sepals ovate, obtuse, 1-nerved, base of lateral gibbous; petals large, obovate, 1-nerved; column unarmed; rostellum very large, ovate.—The curious incurved spikes and spreading nearly symmetrical lateral sepals, and short foot of the column, are all unlike other species of the genus. The solitary specimen may not represent the plant fairly.

5. **A. Kœnigii,** *Hook. f. Ic. Plant. ined.*; leaves $\frac{3}{4}$ by $\frac{1}{6}$ in. oblong-lanceolate obtuse and minutely obtusely 2-fid., racemes minute leaf-opposed 2–3 fld., flowers most minute, mentum globose, lip ovate or oblong 5-nerved base calceolar. Epidendrum hexandrum, *Kœnig in Retz Obs.* vi. 45.

INDIA, *Herb. Rottler* (1779).

Stem densely tufted, 4–6 in., very slender. *Leaves* close set, membranous, base rounded; sheaths $\frac{1}{8}$ in. *Racemes* $\frac{1}{8}$–$\frac{1}{6}$ in., decurved; rachis slender, flexuous; bracts lanceolate, reflexed after flowering; flowers $\frac{1}{16}$ in. long; sepals ovate, acute, and elliptic petals 1-nerved; lip saccate at the base; column unarmed.—Of this very distinct species I have seen only one specimen in Rottler's Herbarium, now at Kew. In its slender tufted habit (upwards of twenty stems on a tuft) and minute racemes and flowers it is like no other; no locality is attached, to the specimen or to Kœnig's description, and as Rottler received (through Heyne) plants of both Indian Peninsulas, none can be assumed.

6. **A. torta,** *Blume Bijdr.* 303; leaves $\frac{1}{2}$ by $\frac{1}{4}$ in. oblong tip rounded emarginate, bracts of terminal sessile spike as long as the leaves densely equitantly imbricate acute falcately recurved complicate and enclosing the solitary flowers, mentum cylindric, lip narrowly panduriform twisted, margins incurved waved, narrow base calceolar suddenly dilated into a broad transversely oblong retuse serrulate concave terminal lobe. *Lindl. Gen. & Sp Orchid.* 230; *Reichb. f. Xen. Orchid.* ii. 117, t. 138

PERAK, *Scortechini.*—DISTRIB. Java, Borneo.

Stem 6–18 in., simple or branched, compressed, $\frac{1}{6}$ in. broad. *Leaves* close-set, shining, thin, base rounded; sheaths $\frac{1}{6}$–$\frac{1}{4}$ in. *Bracts* of spike membranous, forming a terminal flattened coloured crest as broad as the rest of the branch, and coterminous with it; flowers $\frac{1}{6}$ in. long, quite sessile; lateral sepals erect, aristately acuminate, midrib very stout; petals oblong-lanceolate, strongly 3-nerved; column unarmed, rostellum slender, deeply 2-fid.—Blume's description is very meagre, but I cannot doubt belongs to this plant, of which there is an unnamed specimen in Herb. Kew, collected in Borneo by *Lobb.*

7. **A. xytriophora,** *Reichb. f. in Seem. Fl. Viti* 299; leaves $\frac{3}{4}$–$1\frac{1}{4}$ by $\frac{1}{3}$–$\frac{1}{2}$ in. oblong- or elliptic-lanceolate obtuse apiculate, raceme elongate terminal slender laxly many-fld., mentum broad incurved, lip obovate subtruncate 5-nerved base narrowed calceolar.

PERAK, *Scortechini.*—DISTRIB. Philippine Islands.

Stem 12–18 in., simple, compressed. *Leaves* rather close-set, membranous; base $\frac{1}{4}$-amplexicaul. *Racemes* 2–5 in., suberect; bracts oblong-lanceolate, membranous, obtuse, 5-nerved; flowers $\frac{1}{8}$ in. long; sepals greenish tips purple; petals elliptic, obtuse, 3-nerved; lip concave, yellow and purple; column unarmed; anther short. *Capsule* $\frac{1}{4}$ in., slender.

8. **A. lancifolia,** *Hook. f. Ic. Plant. ined.*; tall, leaves 3–4 by $\frac{3}{8}$–$\frac{3}{4}$ in. lanceolate obtuse 2-dentate, racemes elongate simple or branched stout many- and dense-fld., mentum cylindric, lip obovate-oblong 3-lobed, side lobes small rounded, midlobe broadly ovate acute, base narrowly calceolar.

PERAK; on Gunong Batu Pateh, alt. 3–4000 ft., on rocks, *King's Collector.*

Stem 12–24 in., stout, terete. *Leaves* rather thin, base semi-amplexicaul; sheaths ½ in. *Racemes* 3–6 in., terminal and leaf-opposed, sessile or peduncled, erect; rachis stout; bracts ⅛ in., oblong, obtuse, coriaceous, recurved, strongly nerved; flowers ⅓ in. long, bright yellow with a red centre; lateral sepals recurved, acute; petals obovate-oblong, 3-nerved; column unarmed; anther as broad as long. *Capsule* ½ in., fusiform, strongly ribbed, claret-coloured.—Very like *A. cristata*, Blume, of Java, but the limb of the lip is not "rounded emarginate and crested on either side."

9. **A. Maingayi,** *Hook. f. Ic. Plant. ined.*; leaves 2–3 by ⅛–½ in. linear-lanceolate tip dilated apiculate, racemes terminal many and dense-fld., bracts spreading and incurved, mentum sub-cylindric or shorter, lip elliptic- or ovate-oblong 5-nerved, base calceolar, tip rounded.

PERAK, *Scortechini.* PENANG, *Maingay, (Kew Distrib.* 1617).

Stems 6–16 in., rather slender or stout, unbranched. *Leaves* suberect, narrowed at the base, tip minutely 2-fid or rounded. *Racemes* 1–2 in., simple or branched at the base, suberect, flexuous; bracts ⅛–⅓ in., deflexed, then incurved, coriaceous, subacute, 5-ribbed; flowers ⅒ in. long; lateral sepals broad, obtuse, nerve slender; petals linear- or obovate-oblong, 3-nerved; lip concave; column unarmed, rostellum short, triangular; anther ovate, acuminate. *Capsule* ½ in., fusiform.—The Perak specimens are more slender than the Penang, the mentum is longer and more cylindric, the petals narrower, 1-nerved. The species should be compared with *A. graminifolia*, Teysm. and Binnend.

IMPERFECTLY KNOWN SPECIES.

10. **A. echinocarpa,** *Hook. f. Ic. Plant. ined.*; leaves ¼–½ in. close set orbicular-oblong coriaceous margin thickened upper base reflexed, spike short terminal few-fld., bracts orbicular concave, capsule ellipsoid, valves densely clothed with soft bristles.

PERAK; lower camp in Gunong Batu Pateh, alt. 3400 ft., *Wray.*

Stem 4–6 in., slender but rigid; internode ⅛ in. *Leaves* semi-amplexicaul, pale, opaque, rather waved; tip rounded, obscurely 2-fid. with incumbent teeth; upper base usually reflexed, like an ear. *Capsule* ¼ in. long, turgid.—A very remarkable species.

A. LONGIFOLIA, *Blume Bijdr.* 304; *Lindl. Gen. & Sp. Orchid.* 230? *Thwaites Enum.* 806. CEYLON, Ambagamowa district, rare, *Thwaites* (C.P. 3208). Of the plant thus doubtfully referred by Thwaites to the Javan *A. longifolia*, this author says that the flowers are not in a sufficiently perfect state for analysis. Blume thus describes *longifolia*, "Stems simple compressed, leaves linear-lanceolate retuse, flowers densely capitate." Thwaites adds, "leaves 3–5 by ½ in., retuse, mucronate." Can the Ceylon plant be an *Agrostophyllum* or *Phreatia?*

A. TERES, *Griff. Notul.* iii. 359; *Ic. Plant. Asiat. t.* 332, is *Ceratostylis teres*, R. f. see v. v. p. 825.

A. SP., *Griff. Notul.* 359; *Ic. Plant. Asiat.* 335, fig. 1, analysis only, from Affghanistan, cannot (as Lindley in Hook. Kew Journ. vii. 36 observes) be an *Appendicula.*

74. THELASIS, *Blume.*

Epiphytes, with either small 1–2-leaved pseudobulbs, or with short compressed stems clothed with equitant leaf sheaths. *Leaves* oblong or linear-oblong flat, or loriform and jointed on the sheath. *Scape* from the base of the pseudobulb, or lateral on the stem, with 1–3 small sheaths; flowers very minute, spicate, cellular. *Sepals* connivent, dorsal flat, lateral concave keeled or winged. *Petals* narrow, membranous. *Lip* sessile at the

base of the column, erect, ovate or oblong. *Column* very short, sessile, foot 0; rostellum terminal, large, erect; anther elongate, dorsal, erect, base 2–4 celled; pollinia very minute, globose, attached by long threads to the tip of the rostellum, gland small. *Capsule* very small, turgidly ovoid. —Species about 10, tropical Asiatic and Pacific.

I am not well satisfied as to the character of lateral sepals in this genus, as to their being winged or not; the sepals are very soft, and their exact structure not very clear in specimens that have been dried, and again moistened.

Sect. I. EUTHELASIS. *Pseudobulbs* 1–2-leaved.

* *Lateral sepals distinctly strongly keeled or winged.*

1. **T. pygmæa,** *Lindl. in Journ. Linn. Soc.* iii. 63; scape 1–2 in. longer than the solitary linear leaf, spike very short lax-fld., lip ovate acute contracted towards the tip. *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 145; *Walp. Ann.* vi. 923; Euproboscis pygmæa *Griff. in Calc. Journ. Nat. Hist.* v. 371, t. 72; Wight Ic. t. 1732.

NEPAL (*Cult. in Hort. Bot. Calc. fid. Griffith.*) MALABAR, *Jerdan.* TENASSERIM, at Moulmein, *Parish.*

Pseudobulbs ½–⅔ in. diam. *Scape* very slender, curved; spikes ¼–½ in. long; bracts ovate, acuminate; flowers $\frac{1}{10}$ in. long; dorsal sepal ovate-lanceolate acute, lateral linear-oblong; lip 3-nerved, with rounded sides from the middle to the base; rostellum 2-fid.—The Malabar plant seems the same as the Tenasserim, but is in a Peloria state, triandrous, with the petals and lip similar, ovate-lanceolate, 1-nerved; ovary with imperfect ovules.

Var. *multiflora;* leaf larger 3–4 by ½ in., scape stouter 4–5 in., spike 1½–2 in. —Sikkim Himalaya, alt. 1000 ft., *Treutler.*

2. **T. ? capitata,** *Blume Bijdr.* 386; scape 4–6 in. stout longer than the solitary linear leaf, spike cylindric dense-fld., rachis pitted, lip oblong-ovate obtuse.

PERAK, *Scortechini* —DISTRIB. Sumatra, Java.

Pseudobulbs small, oblong, on a stout creeping rhizome. *Leaf* 3–4 in., obtuse or subacute. *Spike* 1 in.; bracts very close set, ovate, acute, recurved; flowers $\frac{1}{10}$ in. long; dorsal sepal ovate-lanceolate, lateral oblong concave thickly keeled or shortly winged; petals lanceolate, acuminate; rostellum elongate, subulate, entire.—Differs from the Sumatran *capitata* in the long spike, acuminate petals and entire rostellum. It more resembles the raceme of *P. triptera*, R.f. of Manilla, which has an ovate lip narrowed to the apex.

3. **T. elongata,** *Blume Orchid. Archip. Ind.* 23, *t.* 7, *f.* 2, and *t.* 5, fig. C; scape 4–6 in. longer or shorter than the solitary linear leaf, spike cylindric dense-fld., lip ovate acute or acuminate.

SINGAPORE; at Johore, &c., *Ridley.* LANGKAWI, *Curtis.*

Pseudobulb very various in form. *Leaves* and spike as in *T. capitata,* from which it differs in the form of the lip. Blume's figure is a very bad one, and does not show the strong keels on the lateral sepals and angles of the ovary.—The species of this section are very difficult of discrimination in a dried state, and possibly *capitata, elongata, triptera* and others are all forms of one.

** *Lateral sepals not strongly keeled or winged.*

4. **T. bifolia,** *Hook. f. Ic. Plant. ined.;* scape 8 in. much longer than the two opposite elliptic-lanceolate acuminate leaves, spike very lax-fld., lip broadly elliptic obtuse.

KHASIA MTS., *Lobb.*

Pseudobulb ⅜ in. diam. *Leaves* 3½ by 1¼ in., spreading, base contracted. *Spike* 2 in.; bracts broadly ovate, obtuse; flowers ⅛ in. long; sepals broad, obtuse; petals obovate-oblong, 1-nerved; lip obscurely 5-nerved, broadest in the middle; rostellum very long, acuminate, entire.

5. **T. khasiana,** *Hook. f. Ic. Plant. ined.;* scape with spike 3–5 in. about equalling the solitary petioled linear leaf, spike elongate lax-fld., lip elliptic-ovate subacute. T. pygmæa, *Lindl. in Journ. Linn. Soc.* iii. 62 (*in part*).

KHASIA MTS., alt. 3–4000 ft., *Lobb, J. D. H. & T. T.*

Pseudobulbs ¾-in., depressed-globose. *Leaves* 2–4 by ⅛–⅜ in. *Scape* and spike rather stout; bracts ovate-lanceolate; sepals ovate-lanceolate, obtuse; petals lanceolate, obtuse; lip 3-nerved, broadest rather nearer the base than tip; rostellum large, acute. —Very like *T. pygmæa*, but a much larger plant, without keel or wing on the sepals.

6. **T. longifolia,** *Hook. f. Ic. Plant. ined.;* scape stout with the spike 6–9 in. about equalling the solitary leaf, spike elongate lax-fld., lip elliptic-ovate acute.

KHASIA MTS. *J. D. H. & T. T.*

Differs from *T. khasiana* in being very much larger, and in the acute lip. *Pseudobulb* ¾–1¼ in. diam., depressed-globose. *Leaf* sometimes falcate, ¾–1¼ in. broad; *flowers* ⅛ in. long.

Sect. II. OXYANTHERA, *Brongn.* (Gen.). *Pseudobulb* 0; stem short, clothed with the equitant sheaths of the linear leaves which are jointed at the sheath. (Oxyanthera is a very natural group).

7. **T. elata,** *Hook. f. Ic. Plant. ined.;* leaves 10–14 by 1–1¼ in. tip rounded, scape equalling or exceeding the leaves, raceme long slender lax-fld.

PERAK, on decayed wood, *King's Collector.*

Rootstock as thick as the little finger. *Leaves* few, sheaths 2–2½ by ½ in., complicate, coriaceous. *Scape* very slender, flexuous; sheaths 3–4, ½ in. long, membranous, lanceolate; bracts ovate, acuminate, spreading and reflexed; flowers ¼ in., narrow, shortly pedicelled; sepals linear-oblong, acute, 1-nerved, venation distinct; petals lanceolate, acute; lip erect, claw short broad, limb linear subacute, margins waved, base broadly 2-auricled, auricles revolute; rostellum 2-partite, segments obtuse; pollinia 8, shortly obovoid.—Near *T. carinata*, Bl. (of which I have seen no flowers), but the leaves are very much longer, the scape very slender, raceme longer, and bracts acuminate.

8. **T. decurva,** *Hook. f. Ic. Plant. ined.;* leaves 4–6 in., tip narrow or rounded and obtusely notched or subacute, scape very slender, raceme very short decurved, bracts reflexed, lip dagger-shaped from a concave cuneate base terete and fleshy beyond the middle with the crisped margins inflexed and close to the mesial line.

SINGAPORE; at Krangi, *Ridley.* PENANG, or Government Hill, *Maingay.*

Leaves ⅓–⅔ in. broad. *Scape* shorter than the leaves, filiform, flexuous, sheaths 1–2 lanceolate; raceme ½ in.; pedicels ⅛ in., longer than the oblong bracts; flowers ⅛ in. long, pale fawn colour; sepals ovate-lanceolate acute and narrowly oblong obtuse petals 1-nerved.—This much resembles the figure of *O. micrantha* Brong., which is figured as having a stout broadly ovate obtuse lip narrowed into a broad short claw, base concave. The leaves of some specimens are narrow at the tip, others have 2 rounded lobes.

DOUBTFUL SPECIES.

T. carinata, *Reichb. f. in Trans. Linn. Soc.* xxx. 137; ? of *Blume Bijdr.* 385 & *Lindl. Gen. & Sp. Orchid.* 253. In the absence of flowers it is impossible to say what species this may be; it differs greatly from the figure of Blume's *T. carinata* (from Java) in its small size, slender scape, short decurved raceme, and bracts, in all which, as in foliage, it closely resembles *T. decurva*, and is nearer to the Moluccan *O. micrantha*, Brong. (*in Duperrey Voy. Bot.* 198, t. 37 B.) than to *T. carinata*.

Tribe III. **NEOTTIEÆ.** (See vol. v., p. 668.)

75. **GALEOLA,** *Lour.*

Leafless, rarely leafy, yellow or brown, climbing or erect herbs; stem or branches terminating in loosely panicled often drooping racemes or panicles; flowers rather large. *Sepals* subequal, concave, connivent or spreading. *Petals* as long, narrower or broader. *Lip* sessile at the base of and loosely embracing the column by its base, short, broad, concave; lateral lobes short or 0; midlobe broad. *Column* short or long, incurved, top dilated membranous; anther 2-celled; pollinia hippocrepiform, powdery or subwaxy. *Capsule* usually 2–4 valved, without septa; seeds winged or not.—Species 8 or 9, Indian, Malayan and Australian.

* Stem simple, erect.

1. **G. Lindleyana,** *Reichb. f. Xen. Orchid.* ii. 78; tall, very robust, sepals broadly ovate-oblong strongly ribbed dorsally, anther recurved clothed with long papillæ. Cyrtosia Lindleyana, *Hook. f. & Thoms. in Ill. Himal. Plant.* t. 22. Erythorchis Lindleyana, *Reichb. f. in Bonpland*, v. 37.

SIKKIM HIMALAYA, alt. 4–7000 ft., *J. D. H.*, &c. ?KHASIA HILLS, alt. 4000 ft., *J. D. H. & T. T.* NAGA HILLS, *Prain.*

Rootstock elongate, very stout, 1–1½ in. diam., tortuous, dark pink; roots very stout simple fibres. *Stem* 2–3 ft., glabrous, with short ½-amplexicaul obtuse sheaths below, brown purple. *Panicle* loosely branched, branches horizontal, and yellow flowers furfuraceously tomentose; bracts small; perianth subglobose, 1 in. diam.; petals broadly ovate, tip obtuse, crenate; lip nearly hemispheric, margins and short expanded rounded limb erosely fimbriate, glabrous without, almost bearded within. *Capsule* 5–6 by ⅔ in., fusiform, subacute, obtusely trigonous, red-brown, tardily dehiscing.

2. **G. Falconeri,** *Hook. f.*; tall, very robust, sepals broadly ovate dorsally nearly smooth, anther glabrous. Pogochilus, *Falc. in Hook. Journ. Bot.* iv. (1842), 73.

SUBTROPICAL HIMALAYA; from Garwhal, *Falconer*, to Sikkim, *Thomson*, &c. Habit and stature of *G. Lindleyana*, but differing in the larger flowers and the characters given above. The rootstock is sometimes as thick as the wrist. Possibly only a form of *Lindleyana*, but recognized as distinct by all collectors in Sikkim. I did not find it myself.

3. **G. javanica,** *Benth. in Gen. Plant.* iii. 590; dwarf, stem very stout glabrous below furfuraceous above, sepals oblong membranous, anther subhemispheric. Cyrtosia javanica, *Blume Bijdr.* 396, t. 6; *Rumph.* i. 199, t. 69; *Lindl. Gen. & Sp. Orchid.* 438; *Reichb. f. Xen. Orchid.* ii. 76, t. 120.

ASSAM, *Masters* (*Ic. in Hort. Calcutt.*).—DISTRIB. Java.

Stem a span high from branching tubers. *Flowers* ¾ in. diam.—The identification of the Assam drawing with Blume's figure and description is necessarily imperfect; but as far as it goes there is no reason to suppose that these represent two species.

4. **? G. pusilla,** *Hook. f.*; stem flexuous from a woody nodose rootstock, with several short tubular basal sheaths and two open ones higher up 3-fld., bracts lanceolate equalling the ovary, sepals broadly ovate-oblong subacute, petals as large obtuse, lip orbicular concave retuse with a very small obtuse apical lobe in the sinus, disk papillose with 3 central low ridges.

PEGU; on the Pookee ridges, *Kurz* (*in Herb. Calcutt.*).

Whole plant 5 in. high, white; rootstock tortuous, woody, as thick as a sparrow's quill, with woody roots as thick as the stock. *Stem* slender, basal sheaths ½-¾ in., truncate, funnel-shaped; bracts ½ in. long, membranous, flowers about ¾ in. diam.; sepals and petals 5–7-nerved; lip with a brown lunate band, apical lobe recurved; column long, semiterete; anther erect, oblong, 2-celled; pollinia hypocrepiform?; stigma below the clinandrium in front.—I have seen but one specimen of this curious little plant, as to the genus of which I am doubtful.

** *Stem branched, scandent.*

5. **G. altissima,** *Reichb. f. Xen. Orchid.* ii. 77; quite glabrous, stem very slender, spikes very many-flowered, sepals and petals linear-oblong, lip with a broad fleshy ridge and a 2-lobed woolly mass on the disk. Cyrtosia altissima, *Blume Bijdr.* 396; *Rumph.* i. t. 70; *Lindl. Gen. & Sp. Orchid.* 26. Erythorchis altissima, *Blume Rumph.* i. 200; *Lindl. l. c.* 438, *in part.* Hæmatorchis altissima, *Blume l. c.* iv. t. 200 B.

PENANG, *Curtis.* PERAK, *Scortechini.*—DISTRIB. Malay Islands.

Root of fleshy thick fibres. *Stem* 50–120 ft., excessively branched, flexuous, fleshy and hard, reddish, branches slender, internodes swollen; spikes 6–10 in., pendulous; flowers ½ in. long; sepals obtuse, 5-nerved, and narrower 3-nerved petals with rounded tips; lip cymbiform, tip rounded erosely waved, disk with a median broad fleshy puberulous disk reaching to the middle, beyond which is a 2-lobed woolly mass; sides of lip thin, transversely barred with purple, with slender nerves and impressed hairs; column rather long; anther mitriform. *Capsule* linear, 3–10 in. long, acuminate, valves membranous.

6. **G. Hydra,** *Reichb. f. Xen. Orchid.* ii. 77; furfuraceously puberulous, lateral sepals obliquely ovate, dorsal oblong, petals elliptic, lip cymbiform erose papillose within and with a compressed erect grooved callus towards the base. G. altissima?, *Reichb. f. in Trans. Linn. Soc.* xxx. 135. Vanilla pterosperma, *Lindl. in Wall. Cat.* 7402. ? V. rubiginosa, *Griff. Notul.* iii. 247. Erythorchis altissima, *Lindl. Gen. & Sp. Orchid.* 438, *in part* (*not of Blume*).

SIKKIM HIMALAYA; in the Rishap Valley, *King.* TENASSERIM; at Moulmein, *Parish.* PENANG, *Curtis.* PERAK, SINGAPORE, and MALACCA, *Wallich*, &c.—DISTRIB. Java, Sumatra.

A lofty climber; branches much stouter than in *G. altissima*; inflorescence loosely branched; flowers much larger, ¾ in. diam., sepals and petals broader, and lip without the flat ridge and tuft of wool.—Blume's specimens of *G. altissima* in Herb. Kew consists of fruit of that plant and flowering branches of this.

7. **G. Cathcartii,** *Hook. f.*; branches very robust, sepals and petals linear-oblong revolute, lip cymbiform acute, margins everted undulate and ciliate, disk naked.

SIKKIM HIMALAYA (*Ic. Cathcart*).

Mr. Cathcart's drawing represents a portion of a stem as thick as the little finger, bearing a branched panicle a foot long, which, as well as the flowers, is dull yellow and furfuraceous; the flowers are 1–1½ in. diam., the lip not nearly as concave as in *G. Hydra*, yellow with red veins.—A remarkable plant, very unlike its congeners, but the drawing of the habit, column, anther, and pollen leave no doubt as to its genus.

76. **VANILLA**, *Swartz.*

Climbing, rooting, branched, leafy or leafless shrubs; stems terete or angled. *Leaves* subsessile, coriaceous or fleshy. *Peduncles* short, axillary; flowers large. *Sepals* and petals subequal, spreading. *Lip* with the claw adnate to the column, which is embraced by its broad concave limb. *Column* elongate; anther incumbent, cells separate; pollen granular. *Capsule* long, fleshy, 1-celled, loculicidally 3-valved, without septa.—Species about 20, tropical.

The Indian species of this genus are most scantily represented in Herbaria, and imperfectly by drawings or descriptions.

* *Stem leafless.*

1. **V. Walkeriæ,** *Wight Ic.* t. 932; stem very stout, flowers 2 in. long, sepals oblanceolate, petals broader spathulately obovate acute margins undulate, epichile of lip ovate acute margins undulate, disk with two ridges below the middle. *Thwaites Enum.* 311.

TRAVANCORE and TREVANDRUM, *Wight.* CEYLON, *Walker.*

Stem as thick as the thumb. *Racemes* 5–6 in., many-fld.; flowers white; bracts ovate.

2. **V. Wightiana,** *Lindl. in Wight Cat.* 2091; flowers 1 in. long, sepals linear-oblong, petals lanceolate, epichile of lip ovate, its disk fringed with long hairs. V. aphylla, *Lindl. Gen. & Sp. Orchid.* 436, *in part (not of Blume).*

The DECCAN PENINSULA, *Wight.*

The specimens are very imperfect, and the description of the flowers is taken from a rude sketch by Lindley. The flowers are not half the size of those of *V. Walkeriæ.*

3. **V. Parishii,** *Reichb. f. Otia Bot. Hamb.* 39; flowers 1–1½ in. long, sepals linear-oblong, tips dilated cuspidate, petals broadly oblanceolate acuminate, lip trumpet-shaped, epichile small ovate or rounded crisped with a thick belt of long hairs down the centre and a dense brush at the base, side lobes with long scattered hairs within.

TENASSERIM, *Parish.*

This may prove the same as *V. Wightiana*, Lindl. It is very near the Javanese *V. aphylla*, Blume.

** *Stem leafy.*

4. **V. Moonii,** *Thwaites Enum.* 312; leaves elliptic- or linear-oblong often falcate obtusely acuminate, lip with a broad crenulate undulate apex, a thick pencil of excessively fine hairs on the disk, and beyond it towards the apex some loose flexuous bristles.

Leaves 5–7 in., many-nerved, subsessile. *Spikes* 1–3 in., very stout, many-fld.; bracts ovate, ½ in., obtuse; sepals about 1 in. long; pencil of hairs on the disk terminating below in a stout stipe, hairs of equal length forming a truncate brush.

5. **V. albida,** *Blume Bijdr.* 422, t. 34; *Rumph.* i. 197, t. 67; leaves ovate lanceolate elliptic or oblong cuspidate or acuminate, lip oblong subpanduriform margins undulate and serrate, disk of hypochile with a large globose woolly ball, epichile retuse or 2-lobed strongly echinately caruncled. *Lindl. Gen. & Sp. Orchid.* 435. V. Griffithii, *Reichb. f. in Bonpland.* ii. (1854), 88. Vanilla, sp. *Griff. Notul.* iii. 207; *Ic. Plant. Asiat.* t. 281. Vanilla, *Wall. Cat.* 7401.

PENANG, *Wallich, Curtis.* PERAK, SINGAPORE, and MALACCA, *Griffith,* &c.—DISTRIB. Java.

Climbing to 50 ft. *Leaves* very variable, 3–7 by 1½ 4 in., sessile or shortly petioled. *Spikes* 2–3 in., very many- and dense-fld.; bracts ½ in., oblong; flowers waxy white; sepals ⅔ in. long, concave, obovate, obtuse, very thick; petals as long, but thinner and many-nerved, with a thick dorsal grooved keel that abruptly ends below the apex; column rather long; anther appressed to the woolly ball of the lip.

DOUBTFUL SPECIES.

V. APHYLLA, *Blume?*, ex *Wight Ic.* t. 931; leafless, stem angular, peduncle elongate as thick as a swan's quill, racemes 3–4 in. very stout many-fld., bracts ovate acute, pedicel with ovary 2 in., sepals as long oblanceolate-oblong acute, petals very much broader obovate acute margins crenulate, hypochile of lip with rounded angles and two rows of bristles on the disk, epichile ovate acuminate crisped naked. —Travancore, near Trevandrum, *Wight.*—From Wight's remarks under it I suspect this to be a most rude representation of Lindley's *V. Wightiana*; if so, the flowers are greatly exaggerated, and the hairs of the epichile are transferred to the hypochile.

77. CORYMBIS, *Thouars.*

Tall, terrestrial, rigid, leafy herbs, roots fibrous. *Leaves* broad, plaited. *Flowers* in short axillary stiff sessile spreading panicles. *Sepals* and *petals* very narrow, linear, at first cohering in a tube with spreading tips, persistent. *Lip* erect from the base of the column, linear, channelled, tip dilated and recurved. *Column* usually as long as the petals, erect, terete, tip clavate and 2-lobed or -auricled; rostellum at length 2-fid.; stigma erect, transverse, saccate; anther narrow, erect, acuminate, 2-celled; pollinia clavate, attached by a subulate caudicle to a peltate gland. *Capsule* linear or fusiform.—Species 6–7, tropical.

1. **C. veratrifolia,** *Blume Orchid. Archip. Ind.* 125, t. 42 E, 43 f. 1 (Corymborchis); leaves elliptic-lanceolate caudate-acuminate, flowers 1–1¼ in. long, sepals and petals subsimilar narrowly oblanceolate, blade of lip lanceolate acuminate, ribs of capsule smooth. *C. disticha, Lindl. Fol. Orchid.* 1 (*in part*). Macrostylis disticha, *Breda Gen. & Sp. Orchid. Javan.* t. 2. Hysteria veratrifolia, *Reinw. in Bot. Zeit.* 1825, ii. 5; *Lindl. Gen. & Sp. Orchid.* 439. Rhyncanthera paniculata, *Blume Bijdr.* t. 78. Corymborchis assamica, *Blume Orchid. Archip. Ind.* 126, t. 43, f. 2 A.

SIKKIM HIMALAYA; in tropical ravines, *J. D. H.* ASSAM, *Griffith, Jenkins.* CHITTAGONG, *J. D. H. & T. T.* ANDAMAN ISLANDS, *King's Collector.* MALAY PENINSULA, *Maingay,* &c. MALABAR; the Nilghiri Hills and Courtallam, *Wight.* CEYLON; Matturatte, *Moon.*—DISTRIB. Java, Sumatra, Borneo.

Stem 4 ft. high, as thick as a swan's quill. *Leaves* 12–18 in., sessile on the sheaths, nerves very many and strong. *Panicles* 4–6 in. long and broad; bracts ⅓–½ in., ovate-lanceolate; flowers greenish white; column long. *Capsule,* in Ic. Blume, 2 in. long.—I am not sure that the plants from the above localities are all of one species. The Sikkim and Assam ones are in a young state only; the Perak and

Nilghiri in flower only. The ripe fruit of the Andaman species is 1 in. long. The Ceylon one has much shorter points to the leaves, but the fruit is as large as in Blume's figure. Blume distinguishes *C. assamica* by the column being as long as the capsule; which they are in typical *veratrifolia*.

2. **C. longiflora,** *Hook. f.*; leaves elliptic-lanceolate acuminate, flowers 1½–2 in. long, sepals very slender with very narrow blades, petals oblanceolate, blade of lip orbicular cuspidate.

PERAK, *Scortechini, King's Collector.* MALACCA, *Maingay* (*Kew Distrib.* 1661).

Stem 8–10 ft. high, as thick as the little finger; leaves much broader than in *C. veratrifolia*, and flowers twice as large, white. *Column* long. *Fruit* not seen.

3. **C. rhytidocarpa,** *Hook. f.*; leaves lanceolate acuminate, flowers 1 in. long, sepals narrowly oblanceolate, petals oblanceolate crenate, blade of lip triangular-ovate acuminate, ribs of fruit strong wrinkled.

PERAK, *Scortechini, King's Collector, Wray.*

Stem 4 ft. high and leaves as in *C. veratrifolia*, from which the broader petals, form of the lip, and deeply ridged fruit 1–1½ in. long with wrinkled ribs distinguish it. *Column* long.

4. **C. brevistylis,** *Hook. f.*; leaves 5–6 in. elliptic acuminate subpetioled, column ⅓ in. long.

PERAK; on limestone rocks, *King's Collector.*

Stem 1–2 ft., slender. *Leaves* 7-nerved, 2–3 in. broad. *Panicles* few-fld. Young *fruit* 1 in. long.—A very distinct species, probably the same as an undescribed Javan one.

78. TROPIDIA, *Lindl.*

Terrestrial, glabrous, leafy herbs. *Stem* often branched, roots rigid. *Leaves* sessile, membranous, subplicate; petiole sheathing. *Flowers* small, in axillary and terminal sessile or peduncled spikes; bracts coriaceous, often imbricate, strongly nerved. *Sepals* connivent, lateral more or less connate, dorsal free. *Petals* as long, or shorter, broad or narrow. *Lip* superior, sessile at the base of the column, cymbiform or produced into an obtuse spur, undivided, acute or with a reflexed tip, disk with short or long intramarginal ridges on lamellæ; column short or long; rostellum long, erect, at length 2-fid; stigma anticous; anther erect, acute or acuminate, cells contiguous; pollinia 2, clavate, 2-cleft, caudicle long or short, gland small. *Capsule* cylindric-oblong.—Species 6–8, Indian, Malayan, and Chinese.

Sect. I. CNEMIDIA. *Lip* spurred. *Spike* terminal, peduncled.

1. **T. angulosa,** *Blume Orchid. Archip. Ind.* 122; leaves elliptic or ovate acuminate 9–11-nerved, spike many-fld., bracts slender spreading, lip oblong. T. Govindovii & semilibera, *Blume l. c.* Decaisnea angulosa, *Lindl. in Wall. Cat.* 7388. Cnemidia angulosa & semilibera, *Lindl. Gen. & Sp. Orchid.* 463. Govindovia nervosa, *Wight Ic.* t. 2090.

SIKKIM HIMALAYA, alt. 1000 ft., *Clarke, King.* SILHET, *Wallich.* TENASSERIM, *Parish.* UPPER BURMA, *Griffith.* MALABAR and TRAVANCORE, *Wight*, &c.

Stem 8–12 in. *Leaves* 3–5 by 2–3 in., base rounded or cordate. *Peduncle* short; spike 1–2 in.; bracts ½–¾ in., as long as the flowers; sepals 3–5-nerved, lateral lanceolate, acuminate, connate nearly to the apex, dorsal linear-lanceolate, acute; petals rather narrower, ovate-lanceolate, obtuse, 3–5-nerved, midnerve very

stout; lip nearly as long as the petals, obtuse, lateral nerves narrowly lamellate below the middle; column with a long slender rostellum; anther narrowly lanceolate; pollinia clavate, grains lamelliform, caudicle long slender, gland minute.—I have examined Lindley's specimen of *T. semilibera*, and find that he was in error in supposing that the lateral sepals are free to below the middle; it does not differ from *T. angulosa*.

Sect. II. TROPIDIA PROPER. *Lip* cymbiform, not spurred.

* *Flowers in short sessile axillary or axillary and terminal spikes.*

2. **T. curculigoides,** *Lindl. in Wall. Cat.* 7386 A; *Gen. & Sp. Orchid.* 497; bracts ovate acuminate, lip with a reflexed tip a thickened midnerve and intramarginal ridges from beyond the middle to the base of the reflexed tip. T. assamica, *Blume Orchid. Archip. Ind.* 124, t. 41, f 2.

SIKKIM HIMALAYA, *King*. SILHET, ASSAM, and BURMA, *Wallich*, &c. ? PERAK, *Wray*.

Stem 1–2 ft. *Leaves* 6–10 by 1–1½ in., elliptic- or linear-lanceolate, caudate-acuminate, 5-nerved. *Spikes* ½–¾ in., erect or decurved; bracts imbricate, ¼ in., ovate-lanceolate, upper narrower; sepals ½ in. long, strongly 5-nerved, dorsal linear-lanceolate, lateral strongly recurved, lanceolate from an ovate base, taper-pointed; petals rather shorter, obliquely ovate-oblong, obtuse, 5-nerved; lip much shorter than the sepals. *Capsule* ¾ in. long.—Bentham in Flora of Hong Kong has referred Schauer's *Ptychochilus septemnervis* of China to this, but according to Schauer's figure it differs in the much smaller flowers with ovate acute sepals, and a lip without the reflexed tip. Wallich's 7386 B from Burma is a different species, but in too imperfect a state for analysis.

3. **T. graminea,** *Blume Orchid. Archip. Ind.* 124, t. 41; leaves lanceolate strongly 3–5-nerved, spikes very small and few-fld., lip obtuse with short intramarginal lamellæ towards the middle, tip shortly recurved. *Miquel Fl. Ind. Bat.* iii. 747.

MALAY PENINSULA; on Mount Ophir, *Griffith, Lobb.*—DISTRIB. Java.

Stem 18 in., slender. *Leaves* 6–8 by 1–1½ in., acuminate as in *C. circuligoides*. *Spikes* ⅛ in. long, 1–2-fld.; bracts ⅙ in., about equalling the ovary; flowers ⅛ in. long, strongly recurved; sepals lanceolate, acuminate, 3-nerved; petals falcately gibbously lanceolate, 1–2-nerved; lip ovate, subacute, margins undulate towards the apex tip recurved.—Described from a single specimen. Blume's figure represents the leaves shorter and broader, and the spikes as with rather more flowers and terminal only.

** *Flowers in peduncled spikes.*

4. **T. Maingayi,** *Hook. f.*; spikes terminal and axillary, bracts subulate, lip with a median and intramarginal lamellæ extending from the base nearly to the acute tip.

MALAY PENINSULA; on Mount Ophir, *Maingay*.

Stem 12–18 in. *Leaves* 4–6 by ¾–1 in., elliptic-lanceolate, acuminate, 5-nerved. *Peduncle* 1½–2 in., flexuous, sheathed; spike short; bracts very variable, lower 1½ in., upper smaller; flowers ¼ in. long; sepals oblong-ovate, subacute, lateral 5-nerved, dorsal narrow; petals obliquely oblong, 3-4-nerved; lip with no reflexed tip.—Very like *T. pedunculata*, Blume, of Sumatra, but the flowers are not furfuraceous, the sepals are 5-nerved, and the intramarginal lamellæ of the lip are continuous.

5. **T. Thwaitesii,** *Hook. f.*; spike terminal subcapitate, bracts

subulate, lip ovate intramarginal lamellæ continuous to the base of the reflexed apex. Cnemidia circuligoides, *Thwaites Enum.* 315 (*not of Lindl.*).

CEYLON; in hot dry places, *Macrae, Thwaites.*

Stem 6-12 in., slender. *Leaves* 3-6 by $\frac{1}{4}$-$\frac{2}{3}$ in., narrowly linear-lanceolate, acuminate, 3-5-nerved. *Peduncle* 1 in., naked; spike $\frac{1}{2}$ in.; bracts rather longer than the smooth ovaries; flowers $\frac{1}{6}$-$\frac{1}{4}$ in. long; sepals with very thick midnerves, dorsal oblong 3-nerved, lateral ovate-lanceolate acuminate 5-nerved; petals oblong, obtuse, 3-nerved; lip rather thick.

IMPERFECTLY KNOWN SPECIES.

CNEMIDIA BAMBUSÆFOLIA, *Thwaites Enum.* 314; stem 2-3 ft., leaves few 6-8 by $1\frac{1}{2}$-$2\frac{1}{2}$ in. elliptic-lanceolate caudate-acuminate 5-nerved, spike terminal sessile $\frac{3}{4}$ in. long, bracts crowded lanceolate lower narrower $\frac{1}{2}$ in. long.

CEYLON; Suffragan district, *Thwaites.*—Descript. from Thwaites.

TROPIDIA sp. (*T. curculigoides*, Kurz, from the Andaman Islands), a small slender species, with lanceolate subacute 3-nerved leaves 2-3 by $\frac{1}{2}$-$\frac{3}{5}$ in.

TROPIDIA sp.; from Sikkim, alt. 1500 ft. (*King in Herb. Calcutt.*).—Resembles *T. curculigoides*, but is much larger, with 7-9-nerved leaves 7-11 in. long by 2-$2\frac{1}{4}$ broad, and small fruit $\frac{1}{4}$ in. long.

79. **PHYSURUS,** *Richard.*

Terrestrial, leafy herbs; stem below creeping; roots fibrous. *Leaves* petioled, membranous, ovate or lanceolate. *Flowers* small, spicate. *Sepals* free, dorsal smaller forming a hood with the petals. *Lip* erect from the base of the column, spreading or recurved; spur exserted beyond the bases of the sepals. *Column* very short, not appendaged in front, rostellum 2-fid; stigma anticous, prominent; anther erect, 2-celled; pollinia 2, clavate.—Species about 20, Asiatic and American.

1. **P. Blumei,** *Lindl. in Wall. Cat.* 7397; *Gen. & Sp. Orchid.* 504; *in Journ. Linn. Soc.* i. 181; bracts equalling the ovary, lip short, terminal lobe transversely oblong entire, spur much shorter than the ovary 2-lobed. *Thwaites Enum.* 314. P. humilis, *Blume Orchid. Archip.* t. 27, f. 2.

SILHET, *Wallich.* CEYLON; in the Central Province, *Macrae,* &c.—DISTRIB. Java.

Stem 1-2 ft., slender, glabrous below. *Leaves* scattered, $2\frac{1}{2}$-3 in., petioled, obliquely ovate or subcordate, acute, 3-nerved. *Scape* pubescent; sheaths distant, finely acuminate; spike 2-5 in., villous; sepals $\frac{1}{6}$ in. long, brownish-red, obtuse, 1-nerved; petals spathulate, 1-nerved; lip white, contracted at the base of the terminal lobe, spur subcylindric or inflated, nerves strong hooked.

2. **P. hirsutus,** *Lindl. in Journ. Linn. Soc.* i. 180; tall, stout, villously hirsute, leaves ovate acuminate 7-nerved subglaucous beneath, base acute. Goodyera hirsuta, *Griff. Notul.* iii. 393; *Ic. Plant. Asiat.* t. 347.

ASSAM; on the Burmese frontier, *Griffith.*

Stem as thick as a goose quill. *Leaves* 4-5 in., oblique. *Sepals, petals,* and *lip* brownish, blade of the latter white.—A very imperfectly known plant, of which there are no specimens in Griffiths' Herbarium at Kew.

80. **ANÆCTOCHILUS,** *Blume.*

Terrestrial herbs; stem below creeping. *Leaves* petioled, ovate or lanceolate. *Flowers* in glandular-pubescent spikes. *Sepals* free, dorsal

smaller and forming a hood with the narrow acuminate petals, lateral spreading. *Lip* adnate to the base of the column, contracted into an entire toothed or pectinate claw beyond the saccate spurred base, and having two rarely four terminal wing-like lobes; spur exserted beyond the bases of the sepals, and with 2 calli within. *Column* short, appendaged in front, stigmatic lobes lateral; anther 2-celled; pollinia narrowed into short or long caudicles.—Species 8, Indian and Malayan.

* *Claw of lip deeply fimbriate.*

1. **A. regalis,** *Blume Orchid. Archip. Ind.* 46, t. 17 D; spur as long as the sepals, terminal lobes of the lip short quadrate much shorter than the claw. A. setaceus, *Lindl. in Bot. Reg.* t. 2010; *Gen. & Sp. Orchid.* 499; *Bot. Mag.* t. 5208; *Fl. des Serres,* ii. t. 15. Satyrium repens. *Linn. Sp. Pl.* 1339.

CEYLON; ascending to 3000 ft.

Stem 6–10 in. *Leaves* 1–1½ in., ovate-cordate, acute, usually dark velvety green and netted with golden nerves. *Scape* stout or slender, sheaths 2; spike 3–5-fld.; bracts lanceolate; sepals ⅓ in. long, ovate, subacute, green; petals broadly falcate, white; fimbriæ of white lip as long as the claw, spur inflated, tip subacute notched; column with 2 vertical lamellæ in front.—Without an examination of living plants it is impossible to say whether Blume is correct in separating the Ceylon from the original Javanese *A. setaceus.*—Var. *inornata,* Hook. Bot. Mag. t. 5208 is a variety with whole coloured coppery-purple leaves.

2. **A. Roxburghii,** *Lindl in Wall. Cat.* 7387; *Gen. & Sp. Orchid.* 499; spur as long as the sepals, terminal lobes of lip cuneately obovate as long as the claw. *Blume Orchid. Archip. Ind.* 50, t. 12 B, f. 2. Chrysobaphus Roxburghii, *Wall. Tent. Fl. Nep.* t. 27.

TROPICAL HIMALAYA; from Simla to Bhotan. ASSAM, SILHET, and MUNNIPORE.—DISTRIB. China.

Very near *A. regalis,* and leaves similarly netted with golden nerves, and has a variety (var. β. *Lobbiana,* Blume l. c.), with nearly whole-coloured leaves which have a rosy disk passing into yellowish-white.

3. **A. elatior,** *Lindl. in Journ. Linn. Soc.* i. 178; very tall, spur of lip as long as the sepals, base of claw hastate, terminal lobes of lip oblong shorter than the claw fringes very long.

NILGHIRI HILLS; near Walla Ghaut, *M'Ivor.*

Leaves 1½ in. diam., orbicular-ovate, shortly petioled. *Scape* 12 in.; spike 3–4 fld., bracts ½ in., broadly ovate-lanceolate; flowers much larger than in *A. Roxburghii*; lip ⅔ in. long, fimbriæ longer; spur inflated, tip subacute emarginate; column larger, with a didymous large hatchet-shaped appendage in front; rostellum long; anther large, lanceolate, acuminate.—The column differs a good deal from that of *regalis* and *Roxburghii.* Only one specimen seen.

4. **A. Reinwardtii,** *Blume Orchid. Archip. Ind.* 48, t. 12, f. 2; spur of lip nearly as long as the sepals, terminal lobes of lip falcately oblong, base of claw cordate, fringes very long.

PENANG; on Government Hill, *Curtis.* PERAK, *Scortechini;* on Maxwell's Hill, *Wray.*—DISTRIB. Sumatra.

Leaves 1½–2 in., orbicular- or elliptic-ovate, netted with golden nerves or not. *Scape* 4–6 in., often very stout; flowers as in *A. elatior*; column with a long process descending into the spur.

5. **A. brevilabris,** *Lindl. Gen. & Sp. Orchid.* 499; spur of lip saccate

much shorter than the sepals, terminal lobes obtusely hatchet-shaped, claw of lip very short, fringes few. A. albolineatus, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 141. Dossinia marmorata, *Lindl. in Journ. Linn. Soc.* i. 185 (*not of Morren*).

Sikkim Himalaya (*Ic. Cathcart & J. D. H.*). Khasia Hills, alt. 4–5000 ft., *Mack, &c.* Tenasserim, *Parish.*

Leaves ovate, green with a white mesial band and golden nerves, red beneath. *Spike* as in *A. Reinwardtii*; sepals and petals green tinged with pink; lip white; column very large with a forcipate appendage projecting from the base.

** *Claw of lip entire or nearly so.*

6. **A. Griffithii,** *Hook. f. Ic. Plant. incd.*; claw of lip entire or with a membranous toothed margin and a trapeziform base, terminal lobes hatchet-shaped lobulate or toothed.

Eastern Himalaya, *Griffith.* Naga Hills, in Upper Assam, *Prain.*

Leaves 1½ 1¾ in., orbicular-ovate, apiculate. *Scape* 4–6 in.; spike 10–20-fld.; lobes of lip equalling or longer than the claw; column short with a broad folded appendage in front and a flap over the mouth of the very short saccate 2-fid spur; anther short.—The margin of the claw of the lip is broader and more toothed in the only Naga specimen I have seen.

7. **A. tetrapterus,** *Hook. f. Ic. Plant. incd.*; claw of lip quite entire, terminal lobes each 2-partite.

Munnipore; at Kerung, alt. 2000 ft., *Clarke.*

Leaves 2 in., shortly petioled, ovate, caudate-acuminate. *Scape* 2 in., and few-fld. spike tomentose; sheaths and bracts large; claw of lip arched, narrow; lobules cuneate-obovate, terminal pair smallest; column with broad auricles in front that terminate in a 2-fid membrane overhanging the mouth of the very short conical obtuse spur; anther lanceolate, acuminate.

81. VRYDAGZYNEA, *Blume.*

Terrestrial, leafy herbs; stem below creeping, roots fibrous. *Leaves* petioled, ovate. *Flowers* small, spicate, suberect. *Sepals* subequal, free, dorsal smaller forming a hood with the petals. *Lip* included, sessile at the base of the column, membranous, concave, entire; spur large, inflated, exserted beyond the base of the sepals, with 2 stipitate calli within. *Column* short, inappendiculate; stigmatic lobes lateral; rostellum short; anther short, cells distant; pollinia 2, sessile on a large gland.—Species 8–10, Indian, Malayan and Pacific.

This genus is described as having two stipitate calli descending from the base of the column into the sac or spur of the lip; the stipites appear to me to be always more or less adnate to the walls of the sac, and represent two vascular bundles or nerves.—The name is variously spelled. All the species want revision and description from living plants.

1. **V. viridiflora,** *Hook. f.*; bracts ovate-lanceolate acuminate, lip orbicular-oblong tip truncate, disk with a high median ridge from the base to the middle, spur inflated. ? Physurus viridiflorus, *Lindl. in Journ. Linn. Soc.* i. 180 (*excl. Syn.* Neottia viridiflora, *Bl.*, *which is a* Goodyera).

Lower Bengal; Luckempore, on the Megua, *Clarke.*—Distrib. ? Java.

A span high. *Leaves* 1½–2 in., ovate to ovate-lanceolate, acute, membranous, shortly petioled. *Scape* 1–1½ in.; spike few-fld., rachis pubescent; bracts ⅓ in. and

sheaths membranous; flowers ⅛ in. long, pale yellow and pink; blade of lip as long as the oblong inflated spur, margins incurved.—Only one specimen seen.

2. **V. albida,** *Blume Orchid. Archip. Ind.* 75, t. 19, f. 2, 3; bracts oblong subacute, lip oblong retuse with a short obtuse tooth, disk with a low hispidulous ridge from the base to beyond the middle. Etæria albida, *Blume Bijdr.* 410; *Lindl. Gen. & Sp. Orchid.* 491.

PERAK; in the Padang Valley, *Wray.*—DISTRIB. Java.

Whole plant 8–10 in. high, glabrous. *Leaves* 1½–2 in. long, ovate or elliptic, subacute. *Scape* slender, 1–3 in.; sheaths broadly acuminate, membranous; spike very many-fld.; bracts ¼ in. long, exceeding the pale green flowers; sepals ⅛ in. long, obtuse; blade of lip as long as the inflated spur. *Capsule* ½ in. long.—The specimen as in fruit, but the withered flowers are well preserved. A drawing apparently of this by Scortechini represents the leaves as more lanceolate with waved margins.

3. **V. gracilis,** *Blume Orchid. Archip. Ind.* 72, t. 17, and t. 20, f. 1; bracts lanceolate acuminate, lip oblong, tip rounded apiculate, disk with a slender ridge from base to apex.

PERAK; at Horum, *Scortechini.*—DISTRIB. Sumatra.

Whole plant 3–8 in. high, simple or branched, glabrous. *Leaves* ¾–1 in., petioled, ovate or ovate-cordate, subacute. *Scape* very short; spike few fld., papillose; sepals ⅛ in. long, acute, agglutinate to the narrow petals; spur obtuse, nearly as long as the blade of the lip; anther with a membranous tip.

82. CYSTORCHIS, *Blume.*

Characters of *Vrydagzynea*, but lip clawed as in *Zeuxine*, and with a large exposed didymous sac.—Species 3 or 4, Malayan.

Ætheria fusca, Lindl., referred here by Bentham, is a true *Goodyera*, with the shallow sac of the lip partially exposed. It must be by oversight that its habit is described as altogether that of *Cystorchis*, from which it differs in its tufted roots, radical leaves, robust habit, and alpine habitat. Amongst Scortechini's drawings of Perak Orchids there are several probably referable to *Cystorchis*, but unaccompanied with specimens.

1. **C. javanica,** *Blume Orchid. Archip. Ind.* 87, t. 24, f. 1; leaves dark green with crenate pinkish margins, lip with a long straight claw and dilated tip. Etæria javanica, *Blume Bijdr.* 410; *Lindl. Gen. & Sp. Orchid.* 491 (*Ætheria*).

PERAK, *Scortechini.*—DISTRIB. Java.

Stem a span long, leafy above. *Leaves* ¾–1¼ in., petioled, ovate, obtuse or subacute, margins entire or crenulate. *Scape* and short raceme puberulous; sheaths lanceolate, acuminate; bracts equalling the ovary; flowers ¼ in. long; lateral sepals ovate-lanceolate, 1-nerved, puberulous; petals linear-oblong, obtuse, 1-nerved; sac of lip membranous, claw rigid grooved, the margins being inflexed; rostellum ovate; anther sessile, very convex, umbonate; gland of pollinia ovate, acute.—Specimen not good, but I think referable to Blume's plant, of which the leaves are described as undulate, dark purple above and pale flesh coloured beneath.

2. **C. variegata,** *Blume Orchid. Archip. Ind.* 89, t. 24, f. 3, and 36 C; leaves pale green with dark transverse bands, scape slender, raceme puberulous, beak of lip with incurved sides and a small dilated tip.

SINGAPORE, *Ridley.*—DISTRIB. Java.

Leaves 2–2½ in., ovate-oblong or -lanceolate acute; petiole ½ in. *Scape* with

raceme 4–6 in., glandular-pubescent; flowers about ¼ in. long; lateral sepals very gibbous at the base.—Named by Mr. Ridley. The flowers in the specimen he has kindly sent are far too young for analysis.

83. **HERPYSMA,** *Lindl.*

A terrestrial leafy herb; stem stout, erect. *Leaves* ovate-lanceolate, petioled, membranous; sheaths very large, hyaline. *Flowers* in a dense short sessile spike. *Sepals* subequal free; dorsal forming a hood with the oblong petals. *Lip* adnate to the sides of the column, spreading, spur elongate, straight, exposed, tip 2-fid. *Column* short, not appendaged in front; stigma anticous; rostellum short, erect, 2-fid; anther sessile, erect, linear-oblong, 2-celled; pollinia narrow, tipped with 2 hard lanceolate appendages or glands, pollen grains flattened.

H. longicaulis, *Lindl. in Wall. Cat.* 7389; *in Bot. Reg. under* t. 1618; *Gen. & Sp. Orchid.* 506; *in Journ. Linn. Soc.* i. 178, 190.

Eastern Himalaya; Nepal, *Wallich.* Sikkim, alt. 3–4000 ft., *J. D. H.*, &c. Khasia Mts., alt. 4500 ft., *Clarke.*

Stem 6–12 in., elongate and creeping below, then ascending, as thick as a swan's quill or less, clothed below with the white, truncate leaf sheaths ⅔–1 in. long. *Leaves* 2–3 in., membranous, shortly petioled. *Spike* 1–2 in., pubescent; bracts ½–¾ in., ovate-lanceolate; flowers with ovary rather longer, suberect, pale pink; sepals ⅜ in. long, 5-nerved, and shorter petals obtuse; lip shorter than the sepals, subpanduriform, reflexed from the middle, strongly 5-nerved, disk with 2 flattish calli about the middle, and a thick lamella extending to the rounded tip; spur longer than the blade, strongly nerved; base of white column contracted below the broad pulvinate stigma.—I do not find the two lamellæ in the spur, which is longitudinally grooved or infolded at the back.

84. **ODONTOCHILUS,** *Blume.*

Habit and character of *Anæctochilus*, but sac or small spur of the lip hidden between the more or less connate bases of the lateral sepals.—Species about 12, Indian, Malayan and Pacific.

The pollen varies greatly in structure in this genus. The species are most difficult of analysis and definition from dried specimens. *Myrmechis*, Blume, is only distinguishable by the fewer often erect flowers and stem with numerous small leaves.

* *Stem stout, leafy. Flowers solitary or very few.* (Myrmechis, *Bl.*)

1. **O. macranthus,** *Hook. f. Ic. Pl. ined.*; leaves ovate acuminate, flowers very large solitary erect, claw of lip entire, margins involute, limb small orbicular.

Perak, *Scortechini*; on Maxwell's Hill, *Wray.*

Stem 2–3 in., from a nodose procumbent base. *Leaves* ¾ in., shortly petioled. *Flower* white, nearly 1 in. long, with a sheathing bract on the very short peduncle; sepals erect, lateral linear-oblong from a gibbous base, 1-nerved; dorsal ovate-lanceolate, long-acuminate; petals falcately dimidiate-ovate, long-pointed; sac of lip subglobose, enclosed calli small; limb shortly exserted; column very short, frontal appendage erect lanceolate; rostellar arms very long, slender; anther linear-lanceolate; pollinia clavate, united caudicles long slender, gland elongate.—Resembles *Myrmechis glabra*, Blume of Java, but the narrower flowers, long anther, pollen and rostellar arms at once distinguish it.

2. **O. calcaratus,** *Hook. f. Ic. Plant. ined.*; leaves very small ovate acuminate, flowers 1–3, claw of lip crenate, lobes small quadrate or rounded, column with a linear process descending into the cylindric or incurved spur.

PERAK, *Scortechini*; alt. 3900 ft., *Wray.*

Stem 3–5 in., slender, flexuous, leafy. *Leaves* ¼–½ in., sessile or petioled, aristately acuminate. *Peduncle* very short, and bracts lanceolate, quite glabrous; flowers white; sepals linear, 1-nerved, lateral with the outer bases connate and enclosing the spur; petals linear-lanceolate, 1-nerved; lip ⅛ in. long, spur half as long as the sepals, with a columnar caruncle enclosed, tip straight or incurved; column short; rostellar arms long, slender; anther ovate-lanceolate; pollinia short, each attached to the gland by a long stout caudicle.—Wray describes the leaves as green dashed with crimson, veined with gold, and bordered with red, the flowers white. Scortechini says, leaves dark purple, sepals pale carnation, lip white. This is a *Myrmechis* with the claw of lip of *Odontochilus.*

3. **O. pumilus,** *Hook. f. Ic. Plant. ined.*; leaves ⅛–½ in. scattered petioled ovate, scape 1–3-fld., bracts oblong ciliate, lateral sepals ovate subacute, claw of lip crenulate, terminal lobes subquadrate. Cheirostylis pusilla, *in part*, *Lindl. in Journ. Linn. Soc.* i. 188 (*not of Gen. & Sp. Orchid*).

SIKKIM HIMALAYA, alt. 8–10,000 ft., *J. D. H., Thomson, King.*

Stem with scape 2–3 in., ascending from a prostrate base, stout for the size of the plant. *Leaves* acute, rather thick; nerves obscure; sheaths very short. *Scape* with one membranous ciliate sheath; flowers subglobose, ⅛ in. diam., white; dorsal sepal broadly ovate with an obtuse recurved tip, 1-nerved, lateral triangular-ovate, very oblique at the base, 1-nerved; sac of lip simple, internal calli very large; terminal lobes shortly exserted, thick.—So like *Cheirostylis pusilla* that it was confounded with it by Lindley. The specimens I have seen are very few, and the flowers very difficult of analysis.

** *Stem elongate. Leaves* 1 *in. or more long. Spikes few- or many-fld.* (ODONTOCHILUS, *Bl.*).

4. **O. crispus,** *Hook. f.*; leaves few ovate acute, bracts shorter than the glabrous ovary, claw of 2-winged lip quite entire, wings toothed much larger than the sepals. Anœctochilus crispus, *Lindl. in Journ. Linn. Soc.* i. 180.

SIKKIM HIMALAYA, alt. 5–6000 ft., *Ic. Cathcart, Clarke.* KHASIA HILLS; at Sururem, alt. 5000 ft., *Clarke.*

Stem slender, elongate below the 2–4 leaves. *Leaves* ¾ in., petiole ¼–1 in. *Spike* 4–8-fld., rachis and ovate-lanceolate bracts pubescent; lateral sepals ⅛ in. long, dorsal much smaller; petals dimidiate-ovate, falcate, acuminate; claw of lip exceeding the sepals, slender; 2-winged limb ⅛ in. diam., white; sac minute, didymous, enclosed caruncles large; column and rostellar arms very short indeed; anther very short, tip recurved; pollinia globose, sessile at the truncate end of the very large fleshy ? cuneiform caudicle; gland minute.—A Sikkim specimen of Clarke's very like this has pubescent sepals, and a few minute tubercles on the claw of the lip.

5. **O. pectinatus,** *Hook. f. Ic. Plant. ined.*; stem leafy, leaves ovate acute, spike few-fld. laxly villous, bracts as long as the ovary, claw of lip pectinate, limb lunate or broadly 2-winged, sac globose, rostellar arms long.

PERAK, alt. 3–4000 ft., *King's Collector*; Maxwell's Hill, *Wray.*

Stem 6–12 in. *Leaves* 1½–2½ in., light green, thick, fleshy, petiole ¼–½ in. *Spike*

6–8-fld.; bracts ½ in. long, pubescent, laxly villous, ovary glabrous; sepals ovate-lanceolate, 1-nerved, softly pubescent; petals lanceolate, unequal sided, long pointed; sac of lip with 2 large caruncles; column very short, with 2 ascending auricles in front; rostellar arms long and broad; anther lanceolate; pollinia obovoid, much shorter than their broad thick coherent caudicles.

6. **O. brevistylis,** *Hook. f. Ic. Plant. ined.*; leaves towards the top of the stem obliquely ovate-lanceolate acute, spike few-fld. pubescent, bracts as long as the ovary, claw of lip slender with few curved spinous teeth, sac globose, limb bipartite, segments semicircular, rostellar arms very short.

PERAK; on Gunong Batu Pateh, alt. 3400 ft., *Wray.*

A span high. *Leaves* 1½–2 in., pale green; petiole ½ in. *Spike* short; flowers white; ovary glabrous; sepals ¼ in. long, lateral broadly obliquely ovate, acute, hairy, dorsal much smaller; petals semicircular with long points; sac of lip with 2 large caruncles, claw narrow, limb larger than the sepals; column exceedingly short, frontal appendages obscure; rostellar arms triangular, subacute; anther short, ovate, obtuse; pollinia subglobose, sessile on the truncate base of the united caudicles which form a large fleshy triangular plate acute at the top, gland minute.—The pollinia and their caudicle are a good deal like those of *O. crispus.*

7. **O. Elwesii,** *Clarke mss.*; stem above and few-fld. spike hirsute, leaves ovate acute, flowers large, bracts as long as the hirsute ovary, sepals hairy, claw of lip broad irregularly toothed, sac scrotiform, lobes of limb subquadrate, rostellar arms subulate, pollen grains lamellate. *Hook. f. Ic. Plant. ined.*

SIKKIM HIMALAYA, alt. 4–6000 ft., *Clarke, King.* KHASIA HILLS; on Shillong, alt. 6100 ft., *Clarke.* MUNNIPORE; on Kohima, *Prain.*

Stem stout below, 6–8 in. high. *Leaves* 1½–2 in., rather crowded, dark green with 3 red nerves. *Spike* 2–4-fld.; lateral sepals ovate, acuminate, 1-nerved, green purple-tipped or white, dorsal much smaller; petals semicircular, with long or short points; sac of lip 2-lobed, claw dark purple, centre and subquadrate lobes white; column very short, frontal appendages triangular; anther short, apiculate, connective very thick; pollinia broadly elavate, grains flat, caudicles 0, gland linear.—This and *O. grandiflorus* have lamellate ecaudiculate pollen.

8. **O. grandiflorus,** *Benth. in Gen. Plant.* iii. 598; tall, leafy, leaves 3–5 in. obliquely elliptic acute, spike stout many-fld., rachis pubescent, bracts about equalling the glabrous ovary, sepals glabrous, spur of lip decurrent on the ovary, claw with 5–6 pair of long recurved spines, wings large cuneate, anther lanceolate, pollinia clavate, grains lamellate. Anœctochilus grandiflorus, *Lindl. in Journ. Linn. Soc.* i. 179.

SIKKIM HIMALAYA, alt. 4–6000 ft., *J. D. H.* KHASIA HILLS, alt. 4000 ft. *J. D. H. & T. T.*

Stem with spike 12–15 in., as thick as a goose-quill below. *Leaves* 2–2½ in. diam., base acute or rounded; petiole 1½–2 in. *Spike* 4–6 in.; bracts ½ in., pink, slightly pubescent; lateral sepals ½ in., falcately oblong-lanceolate, subacute, connate at the base and with the sac of the lip, and dorsal and petals mottled with pinkish white and green, dorsal much smaller, ovate; sac of lip rather long, calli within large crenate, limb ⅓–⅜ in. diam.; column longer than in its congeners, with 2 ascending frontal wings; rostellum very broad, 2-cuspidate; pollinia lamellate, without caudicles, narrowed upwards, the narrowed portion lamellate down to the small gland.

9. **O. Clarkei,** *Hook. f. Ic. Plant. ined.*; tall, leaves 2–2½ in. obliquely elliptic acute, spike subtomentose many-fld., bracts longer than the

pubescent ovary, sepals glabrous lateral free at the base, sac of lip small globose didymous, claw with broad round auricles at the base and 2–3 pair of spines, wings hatchet-shaped, anther elongate, pollinia subglobose with a long flexuous thick caudicle, grains cuneiform.

SIKKIM HIMALAYA; Mongpo, alt. 3000 ft., *Clarke.*

A foot high including the spike. *Leaves* as in *grandiflorus*, but much smaller. *Spike* 5 in., very many-fld.; bracts ¼ in., pink, pubescent; lateral sepals ¼ in., broadly ovate-oblong, pink, 1-nerved, dorsal and petals coherent in a small deeply cordate pink cuspidate hood; sac of lip with 2 caruncles, claw expanding just beyond the sac into an orbicular or obcordate plate, wings as large as the sepals; column with 2 ascending frontal appendages; rostellum broad, bifid; long caudicle of the pollinia rather stout golden, gland small.—The only species with a dilated base of the claw of the lip. The specimen is a solitary one.

10. **O. lanceolatus,** *Benth. in Gen. Plant.* iii. 598; leaves 2–3 in. ovate or ovate-lanceolate acute, spike many-fld., rachis pubescent, bracts as long or longer than the glabrous ovaries, flowers small glabrous, sac of lip globose didymous, claw with 3–4 pairs of recurved spines, wings subquadrate, anther very short, pollinia globose sessile on a broad fleshy triangular caudicle. O. flavus, (error for *luteus*), *Benth l. c.* Anœctochilus lanceolatus, *Lindl. Gen. & Sp. Orchid.* 499; *in Journ. Linn. Soc.* i. 179. A. luteus, *Lindl. in Journ. Linn. Soc. l. c.*

SIKKIM HIMALAYA, alt. 5–6000 ft., *Griffith's Collectors* (*Kew Distrib.* 5345, 5354), &c. KHASIA MTS., *Mack, Griffith* (*Kew Distrib.* 5352), &c.

Stem with the spike 6–8 in., few or many-leaved. *Leaves* green. *Spike* 2–3 in.; bracts ½–¾ in, usually broader and whiter than in other species, nearly glabrous; lateral sepals ¼ in., ovate, obtuse, green, 1-nerved; dorsal and petals connate in an obtuse hood broader than long; lip golden yellow, sac with a pair of curved spurs within, claw not dilated at the base, limb ⅛ in. diam.; column very short indeed, frontal appendages obscure; rostellum broad, 2-cuspidate; anther short, thick, with a recurved beak, grains of pollen cuneiform.—The pollen is like that of *O. brevistylis & crispus.* I cannot distinguish dried specimens of Lindley's *An. luteus* from his *lanceolatus.* According to native drawings *A. luteus* should have much the largest flowers.

85. HÆMARIA, *Lindl.*

Terrestrial herbs; caudex creeping. *Leaves* petioled. *Flowers* racemed. *Sepals* subequal, free; dorsal erect forming a hood with the petals; lateral broad, widely spreading. *Lip* adnate to the base and sides of the column, elongate with a small basal sac which is concealed by the sepals; sides winged or auricled, blade of two spreading lobes, sac with 2 large internal calli. *Column* very large, clavate, stigma anticous; anther large, subhorizontal, cells distinct; pollinia 2, clavate, sulcate, granular, attached by a fleshy gland to the forked rostellum.—Species 4, Malayan and Chinese.

H. discolor, *Lindl. Gen. & Sp. Orchid.* 490; *Miq. Choix. Pl.* t. 16. Ludisia discolor; *A. Rich. in Dict. Class. Hist. Nat.* vii. 457; *Blume Orchid. Archip. Ind.* 113, 114, t. 34, f. 2, 3, and t. 42. Goodyera discolor, *Ker in Bot. Reg.* t. 271; *Bot. Mag.* t. 2055; *Lodd. Bot. Cab.* t. 143. Myoda rufescens, *Lindl. in Wall. Cat.* 7390; *Gen. & Sp. Orchid.* 489.

MALAY PENINSULA; at Johore, *Ridley.* PENANG, *Wallich.*—DISTRIB. Hong Kong, Cochin China.

Caudex very short. *Stem* ascending from the base, 6–10 in., stout or slender, pubescent. *Leaves* subradical, 1–3 in., shortly petioled, elliptic or ovate, apiculate, fleshy, dark red beneath. *Racemes* many-fld.; rachis and ovary tomentose; bracts large, concave, membranous, acuminate, coloured; perianth ½–⅔ in. diam.; petals pinkish, broadly ovate, apiculate, 1-nerved, nerve with flexuous nervules; sepals linear, 1-nerved; lip longer than the sepals, recurved; sac small, 2-lobed; claw with dilated sides; lobes of limb divaricate, quadrately oblong.—Reichenbach's var. *Dawsoniana* from Moulmein (Trans. Linn. Soc. xxx. 142) consists of leaves only and is probably an *Anœctochilus*; it may or may not be his var. *Dawsonianus*, Gard. Chron. 1872, 321 (*Anectochilus Dawsonianus*, Low in Gard. Chron. 1868, 1038) with red reticulations on the leaves.

86. **DOSSINIA,** *Morr.*

A Bornean genus, not hitherto found in British India. The plant referred to it by Lindley is *Anœctochilus brevilabris* (see p. 95).

87. **SPIRANTHES,** *Rich.*

Terrestrial herbs, roots fibrous or tuberous; stem leafy, or the flowering leafless. *Leaves* various. *Flowers* small, secund, in often twisted spikes. *Sepals* subequal, free, or more or less cohering with the petals in an erect hood, lateral gibbous at the base. *Lip* sessile or clawed, erect, entire or 3-lobed, base concave, disk callous or lamellate. *Column* short, terete, base often decurrent on the ovary; stigma anticous, broad, rostellum erect obtuse or elongate and 2-fid; anther erect, 2-celled; pollinia pendulous from the gland of the rostellum.—Species about 80, temperate and tropical.

1. **S. australis,** *Lindl. in Bot. Reg.* t. 823; *Gen. & Sp. Orchid.* 464; *Journ. Linn. Soc.* i. 178; tall, pubescent, root of many fleshy fibres, leaves on the base of the flowering stem linear-lanceolate or linear obtuse or acute or oblanceolate, spikes slender, bracts ovate exceeding the ovary, lip oblong crisped, base saccate 2-glandular, tip dilated retuse or apiculate, disk hairy. *Dalz. & Gibs. Bomb. Fl.* 270; *Wight Ic.* t. 1724 (*middle and right-hand figs.*). S. longispicata, *A. Rich. in Ann Sc. Nat. Ser.* 2, xv. 78. S. flexuosa, & parviflora, *Lindl. in Bot. Reg.* under t. 823. S. pudica, *Lindl. Coll. Bot.* t. 30. S. amœna, *Bunge Enum. Pl. Chin.* 63. S. novæ Zelandicæ, *Hook. Fl. New Zeald.* i. 243. Neottia australis, *Br. Prodr.* 319; *Don Prodr.* 27. N. crispata, *Blume Bijdr.* 406. N. flexuosa & parviflora, *Smith in Rees Cyclop.* N. sinensis, *Pers. Syn.* ii. 511. N. amœna, *Bieb. Fl. Taur. Cauc.* iii. 606. Gyrostachys australis, *Blume Fl. Jav.* 107, t. 37, 38.—Spiranthes, *Griff. Notul.* iii. 384; *Ic. Plant. Asiat.* t. 348.

Throughout INDIA from the PANJAB and W. TIBET to UPPER ASSAM, and southwards to CEYLON and CHITTAGONG; ascending to 7500 ft. in the Sikkim Himalaya, and 7000 ft. in the Nilghiris.—DISTRIB. Affghanistan, N. Asia, China, Java, Australia, N. Zealand.

Plant 6–18 in. high, stout or slender, sometimes almost tuberous. *Leaves* 1–5 in., very variable, rarely oblong and sessile, often scattered and lower long-petioled; sheaths rather distant. *Spike* 3–6 in., twisted, glandular-pubescent; flowers secund, close-set; perianth $\frac{1}{10}$–$\frac{1}{8}$ in. long, horizontal, reddish or white; sepals obtuse, tips (and of truncate petals) recurved.—There is a great difference in the size of the flowers of this species, but the large and small fld. seem to inhabit the same areas.

VAR. *Wightiana*, Lindl. Gen. & Sp. 465; very stout, sheaths many almost

imbricating, flowers in a dense cylindric spike. S. Wightiana, *Lindl. in Wall. Cat.* 7378. S. densa, *A. Rich. in Ann. Sc. Nat.* Ser. 2, xv. 79: S. australis, *Wight Ic.* t. 1724 (*left-hand fig.*).—Nilghiri Mts.

2. **S. autumnalis,** *Rich. Orchid. Europ. Ann.* 57; glandular-pubescent, root of elongate stout tubers, leaves in a tuft at the side of the flowering stem ovate, bracts ovate-lanceolate acuminate exceeding the ovary, lip oblong-panduriform glabrous, base 2-glandular. *Lindl. Gen. & Sp. Orchid.* 469; *in Journ. Linn. Soc.* i. 277; *Boiss. Fl. Orient.* v. 90; *Reichb. Fl.* t. 47.

WESTERN HIMALAYA; at Lohoo Ghat, *Thomson* (Fl. May).—DISTRIB. Affghanistan, Caucasus to the Atlantic.

Root of 2 fleshy fusiform or subcylindric tubers ½–1½ in. long. *Leaves* 1–1½ in., on a very short lateral stem that flowers in the following year. *Scape* with the rather stout raceme 4–6 in.; spike twisted; flowers secund greenish white, variable in size, usually larger than in *S. australis.*—This common European species has not been recorded from any locality between the Caucasus and Affghanistan. Boissier errs in describing the tubers as napiform. In Europe it flowers in October to December; in India and Affghanistan in April and May.

88. NEOTTIA, *Linn.*

Terrestrial erect brown leafless herbs; rootstock with fibres, stem simple laxly sheathed. *Flowers* racemose. *Sepals* subequal, free, lanceolate, concave at length spreading, lateral falcate. *Petals* narrow. *Lip* pendulous from the base of the column, larger than the sepals, 2-fid, base flat or concave. *Column* erect or incurved, subterete; stigma transverse; anther erect or inclined forwards, cells contiguous; pollen in loosely connected masses, pendulous from the gland of the rostellum.—Species 3, temperate Europe and Asia.

NEOTTIA STRATEUMATICA, Br. Prodr. 319 (in note). In a note under *Neottia australis*, Brown refers the *Orchis strateumatica* of Linnæus (Flor. Zeylan. n. 319; Sp. Plant. 1. i. 943) to *Spiranthes*, on the faith of a specimen in Hermann's Herbarium; but Linnæus' character of "spur slender as long as the ovary" is quite opposed to this determination. I do not know what it is.

N. listeroides, *Lindl. in Royle Ill.* 368; *Gen. & Sp. Orchid.* 458; *in Journ. Linn. Soc.* i. 176. N. Lindleyana, *Done in Jacquem. Voy, Bot.* 163, t. 163.

TEMPERATE HIMALAYA; from Kashmir eastwards to Sikkim, alt. 5–10,000 ft. in Kumaon, and 10–11,000 ft. in Sikkim.

Stem with the raceme 8–14 in., high, stout or slender, stiff, flexuous; sheaths 3–4, lax. *Raceme* 6–12 in., lax-fld., laxly pubescent; bracts ⅛–¼ in., sheathing, membranous, as long as the erect pedicels; flowers ¼ in. long, red brown; sepals truncate, 1-nerved; petals much narrower, margins convolute; lip 2–3 times as long as the sepals, linear-oblong, cleft into two ovate or linear-subacute parallel lobes from a third of the way up, nearly flat with a dorsal ridge; ovary pubescent. *Capsule* ¼ in. long, ellipsoid, erect.

89. LISTERA. *Br.*

Terrestrial erect 2-leaved herbs, with fibrous roots from a short rootstock. *Leaves* broad, subopposite. *Flowers* rather small, racemed. *Sepals* and *petals* subequal, free, spreading or reflexed. *Lip* pendulous from the base of the column, usually longer than the sepals, narrow, entire or 2-fid.

Column stout; rostellum terminal; anther inclined forwards, cells 2 contiguous; pollinia 2, usually 2-partite, pendulous from the gland of the rostellum.—Species 10, N. temperate regions.

1. **L. ovata,** *Br. in Hort. Kew*, v. 201; leaves ovate, lip linear 2-fid. *Lindl. Gen. & Sp. Orchid.* 455; *Boiss. Fl. Orient.* iv. 92; *Ledeb. Fl. Ross.* iv. 80; *Reichb. Ic. Fl. Germ.* xiii. t. 479.

North-West Himalaya?, *Falconer.*—Distrib. Europe to the Ural and the Caucasus.

Whole plant 12–18 in. high. *Root* of fleshy fibres. *Stem* 2–4 in., naked. *Leaves* 2–4 in., sessile, subacute. *Scape* with raceme 6–10 in., with 1–2 small sheaths; raceme 3–6 in., pubescent; bracts broadly ovate, membranous; pedicel $\frac{1}{12}$–$\frac{1}{8}$ in.; flowers $\frac{1}{8}$ in. long, greenish; sepals ovate; petals linear; lip twice as long as the sepals, very narrow, 2-fid. *Capsule* $\frac{1}{6}$ in. long, globosely ellipsoid.—Falconer's is the only Indian Herbarium in which this plant occurs, and as it has not hitherto been found eastwards of Long. 80° E. the specimen may not be Indian, but have been inadvertently placed by him in his Indian Herbarium.

2. **L. tenuis,** *Lindl. in Journ. Linn. Soc.* i. 176; leaves ovate acute, lip cuneately obcordate.

Sikkim Himalaya; Lachen valley, alt. 11,500 ft., *J. D. H.*

Whole plant 4–5 in. high, very slender; leaves nearer the raceme than the root, $\frac{1}{2}$–1 in. long, sessile, 3–5-nerved. *Scape* almost filiform; raceme few-fld., puberulous; bracts ovate, acute, membranous; pedicels short; flowers $\frac{1}{8}$ inong; lip twice as long as the petals, lobes rounded; column short.

3. **L. pinetorum,** *Lindl. in Journ. Linn. Soc.* i. 175; leaves orbicular cordate acute, lip cuneately broadly obcordate from a narrow base, lobes broad.

Sikkim Himalaya; in pine woods of the Lachen valley, alt. 10–11,000 ft., *J. D. H*; Chumbi, *King's Collector.*

Whole plant 4–8 in. high, slender. *Leaves* 1–1$\frac{1}{2}$ in., much nearer the raceme than the root, about as broad as long, very shallowly cordate, 5–7-nerved. *Scape* rather stout, very short and few-fld.; raceme pubescent; bracts appressed to the scape, ovate, acuminate, herbaceous; flowers decurved, $\frac{1}{4}$ in. long, greenish brown; lip twice or thrice as long as the sepals, deeply 2-lobed, sinus obtuse; column long, incurved.

4. **L. micrantha,** *Lindl. in Journ. Linn. Soc.* i. 176; leaves subradical broadly ovate, lip 3-lobed short.

Sikkim Himalaya, Lachoong valley, alt. 10,000 ft., *J. D. H.*

Whole plant 3–5 in. *Leaves* $\frac{1}{2}$ in. *Scape* filiform, and lax-fld.; raceme pubescent; bracts minute, ovate, acute, shorter than the $\frac{1}{12}$ in. pedicels; flowers very minute, $\frac{1}{10}$ in long; lip very much smaller than the sepals, cuneate, truncately 3-lobed, lobes acute; column very short.—A remarkable little species.

90. CHEIROSTYLIS, *Blume.*

Terrestrial herbs. *Leaves* membranous. *Flowers* small, racemed. *Sepals* connate in a gibbous based tube to the middle. *Petals* narrow, *Lip* inserted at the base of the column, erect, narrow, base saccate, limb shortly clawed broadly dilated entire toothed or crenate. *Column* short with 2 appendages in front, rostellum 2-cleft; stigmatic lobes lateral; anther erect, cells short; pollinia 2, caudicle short, gland oblong.—Species about 8, Indian and Malayan.

* *Appendages of column as long as the rostellum.*

1. **C. pusilla,** *Lindl. Gen. & Sp. Orchid.* 489; *in Journ. Linn. Soc.* iii. 188 (*in part*); glabrous, leaves very small ovate, raceme 2–3-fld., limb of lip 2-lobed, lobes quadrate deeply toothed. Etæria pusilla, *Wall. Cat.* 7392. Zeuxine moniliformis, *Griff. Notul.* iii. 397; *Ic. Plant. Asiat.* t. 350.

KHASIA HILLS, alt. 4–5000 ft., *Wallich*, &c.

Stem 3–6 in., prostrate below, often moniliform from the swollen internodes. *Leaves* ½–¾ in., scattered, acute acuminate or aristate; petiole short. *Scape* 1–3 in.; sheaths and bracts oblong-lanceolate, ciliate; flowers inclined, ¼ in. long; sepals pink, obtuse; petals spathulate; lip white, base shortly saccate, nerves with a few fleshy setæ within, claw finely hairy towards the tip; columnar appendages fleshy, as long as the rostellar arms; anther lanceolate; pollinia pyriform, gland very long. —Closely resembles *Odontochilus pumilus*, and was confounded with it by Lindley.

2. **C. malleifera,** *Parish & Reichb. f. in Trans. Linn. Soc.* xxx. 141; glabrous, leaves very small ovate acute, raceme 3–5-fld., lobes of lip entire.

TENASSERIM; on Zwakabin, *Parish*.

Very like *C. pusilla*, but there is no appearance in the specimens of a moniliform stem, leaves rather larger, flowers not half the size, lip with a longer and shallower base, and quite entire somewhat hatchet-shaped lobes; anther with a dilated membranous apex.

3. **C. Griffithii,** *Lindl. in Journ. Linn. Soc.* i. 188; scape pubescent, flowers 1–3 large, limb of lip reniform laciniate, appendages of column linear. Goodyera No. 9, *Griff. Notul.* iii. 393.

KHASIA HILLS, alt. 4–5000 ft., *Griffith*, *Lobb*, *Clarke*. PEGU, *Kurz* (in Herb. Calcutt.). TENASSERIM; on Mt. Tungoo, *Parish*.

Stem below prostrate. *Leaves* 1 in., shortly petioled, ovate, acuminate; sheaths very large, cupular, hyaline. *Scape* 3–8 in., slender; sheaths and bracts large, loose, lanceolate; flowers nearly 1 in. long with the ovary, white with 2 green spots on the lip; sepals connate to the middle; petals narrowly spathulate; base of lip elongate, concave, with 2 series of glandular setæ within; claw short. *Capsule* ⅝ in., pedicelled, pyriform.

4. **C. parvifolia,** *Lindl. in Bot. Reg.* 1839, *Misc.* 19; *Gen. & Sp. Orchid.* 488; *in Journ. Linn. Soc.* i. 187; raceme puberulous lax-fld., flowers minute, limb of lip subquadrate 6–8-lobed, appendages of the column dilated upwards rather short. *Thwaites Enum.* 313.

CEYLON; Ambagamowa district rare, *Thwaites*.

A span high. *Leaves* 2–3 about the middle of the slender stem, ½–1¼ in., ovate-lanceolate, acuminate. *Scape* slender, puberulous; raceme 8–10-fld.; bracts as long as the short pedicels; sepals ¼ in. long, glabrous, pink; petals oblong-obovate, obtuse, white; lip with a subsaccate base containing 2 small forked calli, limb white; column very short, rostellar arms subulate; anther ovate-cordate; pollinia pyriform, caudicle very short, gland linear.—The specimens are very poor, and the species is perhaps better placed in the following section.

** *Appendages of column shorter than the short rostellum, rarely as long.*

5. **C. flabellata,** *Wight Ic.* v. 16; scape glandular-pubescent, flowers subcorymbose, limb of lip suborbicular deeply 2-cleft, lobes sub 5-fid,

appendages of column subspathulate; *Lindl. in Journ. Linn. Soc.* i. 187; *Thwaites Enum.* 313 (*excl. in both Syn. Zeuxine*); *Dalz. in Hook. Journ. Bot.* iv. (1852) 112; *Dalz. & Gibs. Bomb. Fl.* 271. Monochilus flabellatus, *Wight Ic.* t. 1727. Goodyera flabellata, *A. Rich in Ann. Sc. Nat. Ser.* 2, xv. 79, t. 12.

BHOTAN HIMALAYA, *Griffith.* TENASSERIM, *Parish.* The CONCAN, *Dalzel.* NILGHIRI HILLS, alt. 6000 ft., *Wight*, &c. CEYLON; Ambagamowa district, *Thwaites, Beckett.*

Stem sometimes moniliform below as in *C. pusilla*, but stouter. *Leaves* ½–⅔ in., petioled, ovate, acute. *Scape* 6–8 in.; sheaths and bracts loose, acuminate; flowers 2–10, white, glandular-pubescent, perianth hemispheric; petals linear-oblong, falcate; sac of lip cymbiform, with 2 calli within; base hairy, claw short with 2 green spots; column very short, appendages subterminal and rostellar arms both subspathulate; anther with a dilated membranous tip; pollinia pyriform, subsessile on the elongate lanceolate gland.

6. **C. pubescens,** *Parish & Reichb. f. in Trans. Linn. Soc.* xxx. 141; scape pubescent, limb of lip 2-lobed, lobes subquadrate crenate, appendages of the column cuneately obovate much shorter than the subspathulate arms of the rostellum.

TENASSERIM; at Moulmein, *Parish.*

Stem stout, ascending. *Leaves* 1½–3 in., ovate or ovate-lanceolate, acuminate; petiole slender. *Scape* 3–6 in.; sheaths and bracts lax, acuminate; raceme 3–10-fld.; perianth ⅓ in. long; sepals connate to the middle; lip with a small concave 3-nerved base, lateral nerves with one slender callus; claw rather broad; anther truncate. *Capsule* ½ in., pyriform, pedicelled.

91. ZEUXINE, *Lindl.*

Terrestrial herbs; stem creeping below. *Leaves* membranous. *Flowers* small, spicate. *Sepals* subequal, dorsal concave, cohering with the petals; lateral free. *Lip* inferior, adnate to the base of the column, cymbiform or saccate with a shortly-clawed or sessile entire 2-lobed or 2-winged terminal lobe; sac with 2 calli or spurs near the base within. *Column* very short, 2-keeled or -winged in front; stigmatic lobes 2, marginal, distant; anther membranous, cells contiguous; pollinia pyriform, attached by an oblong gland to the erect rostellum with often an intermediate appendage or a linear caudicle.—Species about 20, tropical Asia and Africa.

I refer to *Zeuxine* those species of *Hetæria* that have large terminal lobes to the lip. The appendage between the gland of the pollinia and the pollinia itself is a very curious organ, and its real nature has not been ascertained, whether rostellar or pollinar; it occurs only in some species, and in these under very various forms, so that it cannot be relied on as a generic character. It is further so difficult of analysis in dried specimens, that much allowance must be made for my description of it.

Sect. 1. EUZEUXINE, *Lindl.* *Leaves* sessile, linear-lanceolate.

1. **Z. sulcata,** *Lindl. Gen. & Sp. Orchid.* 485; *in Journ. Linn. Soc.* i. 186; *Griff. Notul.* iii. 396; *Ic. Plant. Asiat.* t. 349; *Blume Orchid. Archip. Ind.* 67; *Miquel Fl. Ind. Bat.* iii. 723. Z. bracteata, brevifolia, & robusta, *Wight Ic.* 1724 *bis*, 1725, 1726. Z. membranacea, *Lindl. Gen. & Sp.* 486; *in Journ. Linn. Soc. l. c.*; *Blume Orchid. Archip. Ind.* 68. Z. Tripleura, *Lindl. in Journ. Linn. Soc. l. c.* Z. integerrima, *Lindl. Gen. & Sp.* 486;

Blume Fl. Jav. 55, t. 19 and 23 C; *Orchid. Archip. Ind.* 67; *Miquel. l. c.* Z. emarginata, *Lindl. Gen. & Sp. l. c.* Z. procumbens, *Blume Fl. Jav.* 56, t. 22, f. 3 and t. 23 B; *Orchid. Archip. Ind.* 68. Tripleura pallida, *Lindl. in Wall. Cat.* 7391; *Gen. & Sp.* 452. Adenostylis emarginata & integerrima, *Blume Bijdr.* 414, t. 17. Pterygodium sulcatum, *Roxb. Fl. Ind.* iii. 452. Corycium? humile, *Herb. Ham.*

Throughout INDIA, in the plains and lower hills, from the Panjab and Scinde to ASSAM, CHITTAGONG, and southward to CEYLON.—DISTRIB. Affghanistan, Java, China, Philippines.

Stem 2–16 in., erect, glabrous, leafy to the top. *Leaves* few or many, 1–2 in., erect, acuminate, margins usually recurved. *Spike* ½–2 in., dense-fld., nearly glabrous; bracts ¼–½ in., erect, lanceolate, acuminate, hyaline, 1-nerved; flowers white, yellow, or very pale rose; sepals ⅛ in. long, oblong, obtuse, membranous; petals oblong, obtuse, hyaline; lip yellow, equalling the sepals, cymbiform, contracted into a short pubescent claw bearing a hammer-headed terminal lobe or 2 small lobes; column short, rostellum short; anther short, ovate; pollinia pyriform, attached within the tip of a linear appendage of the gland. *Capsule* ¼ in. long, ellipsoid.—The commonest Indian Orchid, very variable in size. The tall form, *Z. membranacea*, has large flowers, and may prove distinct, but there appears to be many intermediate forms.

Sect. 2. MONOCHILUS, *Wall.* (Gen.). *Leaves* ovate.—All scapigerous.

* Claw of terminal lobes short with involute margins.

† *Terminal lobe of lip very small, entire or subentire.*

2. **Z. goodyeroides,** *Lindl. Gen. & Sp. Orchid.* 486; leaves ovate green with a median pale stripe, spike nearly glabrous, lip cymbiform terminal lobe orbicular or oblong concave membranous. Monochilus galeatus, *Lindl. in Journ. Linn. Soc.* i. 187.

EASTERN HIMALAYA; from Sikkim, alt. 6–8000 ft., to Mishmi, *Griffith*, &c. PEGU, *Kurz in Herb. Calcutt.*

Stem 2–4 in. *Leaves* 1–1½ in., sessile or shortly petioled, obtuse acute or acuminate, sheaths short. *Scape* 3–6 in., slender; spike lax-fld.; bracts equalling the glabrous ovary; sepals ⅛ in. long, dorsal ovate, acute, lateral lanceolate 1-nerved; petals falcate, very obtuse; lip wholly included, coriaceous, with 2 short spurs within; rostellar arms small; stigmatic lobes distant; pollinia pyriform, attached by a slender caudicle to the oblong gland.

3. **Z. reniformis,** *Hook. f. Ic. Plant. ined.*; leaves approximate ovate-lanceolate acuminate, scape short pubescent, bracts longer than the pubescent ovary, sepals ovate 3-nerved subacute glabrous, lip included, sac hemispheric with 2 toothed calli within, terminal lobe reniform crenate.

PERAK, *Scortechini.*

Stem 6–10 in. below the leaves. *Leaves* 2–3½ in., membranous, base rounded; petiole ½ in., slender, sheath short inflated. *Scape* 2 in.; spike about as long; bracts ¼ in., lanceolate, hyaline; sepals ¼ in. long, membranous, ovate, obtuse, 3-nerved; petals ⅛ in., orbicular, long-beaked, 3-nerved; limb of lip with 2 small appendages at the base; column 2-winged in front; rostellar arms long, fleshy, trumpet-shaped; anther lanceolate; pollinia pyriform attached separately to the face of a large cuneately quadrate horny appendage which is continuous with the triangular gland, margin of gland and appendage recurved.

†† *Terminal lobe of lip 2-winged.*

4. **Z. longilabris,** *Benth. in Gen. Plant.* iii. 600; spike pubescent,

lip much longer than the sepals, wings of terminal lobe elongate toothed. Monochilus longilabre, *Lindl. Gen. & Sp. Orchid.* 487; *in Journ. Linn. Soc.* i. 186. M. affinis, *Wight Ic.* t. 1728 (*not of Lindl.*).

ASSAM, LOWER BENGAL and CHITTAGONG, *Clarke.* WESTERN GHATS; in the S. Concan, *Stocks*, and Travancore, *Wight.* CEYLON, in the drier parts of the island, *Macrae, Thwaites.*

Leaves 1–1½ in., near the base of the short stem, shortly petioled. *Scape* very slender and elongate, lax-fld.; spike glandular-pubescent; bracts about equalling the ovary; sepals ¼ in. long, broad, obtuse, green; lip twice as long, sac with 2 spurs within, wings toothed on the outer margin, variable in breadth; anther beaked; pollinia clavate, adnate for about two-thirds of their length to the linear appendage of the gland.

5. **Z. regia,** *Benth. in Gen. Plant.* iii. 600; leaves ovate-lanceolate with a median pale stripe acute, spike pubescent, sepals and petals with recurved tips, lip rather longer than the sepals, wings suborbicular or cuneiform. Monochilus regium, *Lindl. Gen. & Sp. Orchid.* 487.

CEYLON; damp woods in the Central Province, ascending to 4000 ft., *Macrae*, &c.

Stem slender, elongate. *Leaves* 1½–2½ in., dark green, variable in breadth; petiole and sheath short. *Scape* 3–5 in.; spike few-fld.; bracts as long as the ovary; sepals ⅓ in. long, very obtuse; lip with a short saccate base; anther broadly ovate, beaked; pollinia clavate, pendulous from the small oblong gland, appendages 0.

6. **Z. nervosa,** *Benth. in Gen. Plant.* iii. 600; leaves broadly ovate acute, sepals ovate obtuse tips straight, spike pubescent, lip rather longer than the sepals, wings cuneate. Monochilus nervosum, *Wall. in Lindl. Gen. & Sp. Orchid.* 487; *in Journ. Linn. Soc.* i. 187. Etæria nervosa, *Lindl. in Wall. Cat.* 7381.

SIKKIM HIMALAYA, alt. 2–4000 ft., *J. D. H.* SILHET, *Wallich.* CAHAR, *Keenan.* BENGAL; at Comilla, &c., *Clarke.*

Stem rather stout. *Leaves* 1–2 in. *Scape* 2–5 in., stout or slender; spike 1–8 in., lax or dense-fld.; bracts equalling the ovary; sepals ¼ in. or less, green or purplish; anther didymous, apiculate; pollinia and their appendages as in *Z. reniformis.*—The Ceylon habitat cited by Thwaites is an error.

7. **Z. flava,** *Benth. in Gen. Plant.* iii. 600; leaves ovate acute, spike glabrous or pubescent, flowers very small, lip shorter than the sepals, wings broadly obovate or hatchet-shaped. Monochilus flavum, *Wall. in Lindl. Gen. & Sp. Orchid.* 487; *in Journ. Linn. Soc.* i. 187. Etæria flava, *Lindl. in Wall. Cat.* 7380 A, B.

NEPAL, *Wallich.* ASSAM, *Griffith*; on the Naga hills, *Prain.* TENASSERIM, *Helfer, Griffith.* CEYLON; Central Province, alt. 3000 ft., *Thwaites.*—DISTRIB. Java, Borneo.

Stem usually elongate, slender. *Leaves* 1–1½ in., usually scattered, petioled or not; sheath usually much inflated, hyaline. *Scape* 3–6 in., very slender; spike 1–1½ in., lax-fld.; bracts usually exceeding the ovaries; sepals $\frac{1}{10}$ in., obtuse; lip included, sac with 2 long spurs within; anther ovate-lanceolate; pollinia subglobose, attached by a simple caudicle to the lanceolate gland.—Much the smallest fld. species. A drawing in Herb. Peradeniya represents the flowers as white with a red lip.

8. **Z. affinis,** *Benth. in Gen. Plant.* iii. 600; leaves ovate or ovate-lanceolate, spike and ovaries pubescent, lip longer than the sepals, wings

obovate-oblong or subcuneate. Monochilus affine, *Lindl. Gen. & Sp. Orchid.* 487 (*excl. hab. Courtallum*). Etæria affinis, *Lindl. in Wall. Cat.* 7383. E. flava, *Wall. Cat.* 7380 C. Ætheria mollis, *Lindl. in Journ. Linn. Soc.* i. 184.

SIKKIM HIMALAYA; in the Terai, *Gamble*. KHASIA HILLS, alt. 5000 ft., *Griffith*, &c. BURMA; at Taong Dong, *Wallich*. TENASSERIM; at Moulmein, *Lobb*, *Parish*. PENANG, *Maingay*.

Very like *Z. flava*, but the flowers are much larger, and much more numerous, the sepals ¼ in. long, and the pollinia are pyriform, attached by an elastic caudicle to the oblong gland.

9. **Z. abbreviata,** *Hook. f.*; leaves lanceolate acuminate, bracts ovate-lanceolate shorter than the slender erect glabrous ovaries, sac of lip with 2 lamellæ on the midrib and 2 large calli on each side, wings of terminal lobe obliquely ovate subacute entire. Etæria abbreviata, *Lindl. in Wall. Cat.* 7385; *Gen. & Sp. Orchid.* 491 (Ætheria). E. lanceolata, *Reichb. f. in Trans. Linn. Soc.* xxx. 142. Dossinia lanceolata, *Lindl. in Journ. Linn. Soc.* iii. 186.

NEPAL, *Wallich*. KHASIA HILLS, alt. 4–5000 ft., *J. D. H. & T. T.*

Whole plant 1 ft. *Leaves* 2½ in., many nerved; petiole ½–⅔ in. *Spike* puberulous; sepals pink, broadly ovate, acuminate; petals semi-orbicular or lunate; column with 2 membranous wings on the face; rostellum very short, 2-fid.; anther ovate, obtuse; pollinia elongate, clavate, lamellate down to the large gland.

** Claw of terminal lobe of lip slender, not margined.

10. **Z. moulmeinensis,** *Hook. f.*; slender, leaves elliptic, spike glandular-pubescent few-fld., bracts ovate-lanceolate shorter than the slender glabrous ovaries, sepals and petals aristately acuminate, sac of lip large globose didymous with 2 large calli within, claw straight rigid, lobes narrowly falcately cuneate lacerate. Etæria moulmeinensis, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 142.

TENASSERIM; at Moulmein, *Lobb*, *Parish*.

Stem slender, with the spike 12–18 in. *Leaves* 2–3 in., elliptic, acute or acuminate, membranous; petiole 1 in., slender. *Spike* 2–3 in., few-fld.; flowers not secund, spreading; ovary slender, ½ in. long; sepals membranous, 1-nerved, dorsal ovate, lateral much broader; petals broadly dimidiate ovate with recurved points; sac of lip with caruncled callous sides, sub- 4-celled by imperfect transverse and longitudinal septa, claw slender pubescent, lobes divaricate as long as the rest of the lip; column very short and stout with projecting cheeks on the anterior face; rostellum short, 2-fid; anther short, ovate, obtuse; pollinia pyriform, attached to the gland by very short caudicles.—Possibly a *Cystorchis*.

11. **Z. longifolia,** *Hook. f.*; tall, very robust, leaves large lanceolate acuminate, spike elongate laxly many-fld., rachis puberulous, bracts shorter than the long slender glabrous ovaries, sepals and petals aristately acuminate, lip very broad saccate, sac with trapeziform sides two caruncles within towards the base and a flattened uncinate one on the midrib, claw beyond the lobe narrow rigid, wings flabellate lacerate. Hetæria longifolia, *Benth. in Journ. Linn. Soc.* xviii. 346. Rhomboda longifolia, *Lindl. in Journ. Linn. Soc.* i. 181.

SIKKIM HIMALAYA; in lower valleys, *J. D. H.*

Stem procumbent at the base, as thick as a swan's quill, branched. *Leaves* 6–8 by 1½–2 in., many-nerved, midrib stout; petiole 1–1½ in.; sheaths short. *Spike* 7 in.; flowers very obliquely gibbous, not secund; bracts ovate-lanceolate; ovary

¼ in., very slender upwards; sepals 1-nerved, dorsal ovate, lateral triangular-lanceolate; petals semi-lunate with long points; lip when spread out subtriangular, truncate in front with the stout straight stiff claw projecting from between the lobes and bearing 2 wings; column very large, hollow, broadly truncate, almost cupular, with 2 cuneate ridges down the face, a very small rostellum, and a small stigmatic lobe on each side; anther sunk in the column, lanceolate; pollinia narrowly clavate.—A very singular plant.

92. **HYLOPHILA,** *Lindl.*

Terrestrial herbs; stem elongate, creeping. *Leaves* petioled, obliquely ovate-lanceolate. *Flowers* small, spicate, subglobose; perianth horizontal, connivent. *Sepals* acuminate, dorsal with the petals forming a hood; lateral very broadly ovate, concave. *Petals* falcate or subspathulate. *Lip* a subglobose sac contracted at the mouth, with a very small linear blade, and 2 glands within near the base. *Column* very short, appendages 0 or minute; stigma prominent, frontal under the very long forked rostellum; anther elongate, cells short; pollinia shortly caudicled.—Species 2, Malayan.

1. **H. mollis,** *Lindl. in Wall. Cat.* 7396; *Gen. & Sp. Orchid.* 490; leaves flat acuminate, bracts subulate, sepals ⅛ in. long pubescent. *Blume Orchid. Archip. Ind.* 115, t. 35, 36 F.

SINGAPORE, *Wallich.* MALACCA, *Griffith* (*Kew Distrib.* 5337). PERAK, *Scortechini.*—DISTRIB. Sumatra.

Caudex flexuous, roots very thick. *Leaves* 3–4 in., black when dry, base unequal, acute. *Scape* 8–12 in., very slender, sheaths ½ in., scattered, subulate; spike 4–6 in.; bracts ¼ in., equalling the flowers; sepals 3-nerved; petals falcately lanceolate, acute.

2. **H. lanceolata,** *Hook. f.*; leaves caudate-acuminate, margins waved, bracts lanceolate, sepals ¼ in. long nearly glabrous. Dicerostylis lanceolata, *Blume Orchid. Archip. Ind.* 116, t. 38, f. 1.

PERAK, *Scortechini.*—DISTRIB. Java.

A much stouter plant than *H. mollis*; leaves larger, 4–5 in., petiole 1 in., red brown when dry; scape in the only specimen seen much shorter and stouter, bracts broader and more concave, flowers twice as large, ovary twisted, sepals 5-nerved, petals dimidiately obovate, 3-nerved. *Column* with a minute subulate process on each side below the stigma.

93. **GOODYERA,** *Br.*

Terrestrial leafy herbs; stem short, or elongate and creeping below. *Leaves* subradical, petioled. *Flowers* small, in often twisted spikes. *Sepals* subequal, dorsal erect, concave, forming a hood with the narrow petals; lateral free, erect or spreading, covering the sac of the lip or not. *Lip* inferior, sessile at the base of the column, entire, cymbiform or subsaccate, usually acute, naked or setose within. *Column* various, top cupular; stigma broad, anticous; rostellum erect; anther-cells distinct; pollinia granular, caudicled or not, pendulous from the rostellar gland.—Species 25, temp. and trop. Europe, Asia, N. America, N. Caledonia, and the Mascarene Islands.

* *Stem* tall, stout, 18 in.–2 ft. *Leaves* large, suberect, petioled, lanceolate or elliptic lanceolate acuminate.—The species of this group are not allied *inter se*, agreeing only in stature.

1. **G. procera,** *Hook. Exot. Flor.* t. 39; spike dense-fld., flowers minute, lip saccate softly setose within and with 2 large calli within the obtuse recurved tip, column very short, anther obtuse. *Lindl. Gen. & Sp. Orchid.* 493; *in Journ. Linn. Soc.* i. 183; *Don Prodr.* 28; *Wight Ic.* t. 1729. G. carnea, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 80. Cionisaccus lanceolatus, *Breda Orch. Kuhl et Hassk. t.* 1. Cordylestylis foliosa, *Falconer in Hook. Journ. Bot.* iv. (1842) 75. Neottia procera, *Ker in Bot. Reg.* t. 639.—Leucostachys, *Hoffman Preisverz. Orch.* 1842, *ex Linnæa,* xvi., *Littlb.* 234.

TROPICAL HIMALAYA, alt. 1–3000 ft., from Garwhal to Upper Assam, the KHASIA and NAGA HILLS, and PEGU. NILGHIRI HILLS and MALABAR GHATS, *Wight.* CEYLON, ascending to 4000 ft.—DISTRIB. Java, China.

Root of thick tufted fibres. *Stem* 10–30 in., usually many-leaved. *Leaves* 4–8 by 1–2 in., thick, petiole very stout. *Spike* 3–8 in.; rachis glabrous or pubescent; bracts equalling the subglobose whitish fragrant flowers, which are ¼ in. diam.; sepals broadly ovate, obtuse, 1-nerved; petals spathulate; lip not longer than the column; pollinia broadly pyriform, sessile on the gland. *Capsule* ¼ in. fusiform.

2. **G. rubens,** *Blume Orchid. Archip. Ind.* t. 9 C, D; spike rather lax-fld., lip saccate beaked densely clothed within with soft tubercles or short setæ, column long slender, anther lanceolate, pollinia powdery narrowed into one slender caudicle.

PERAK; upper part of the Batang Padang Valley, alt. 2000 ft., *Wray.*—DISTRIB Java, Philippines.

Habit and foliage of *G. procera,* but leaves obliquely elliptic-lanceolate and petiole more slender. *Scape* sheathed; spike 4–5 in.; rachis bracts and buds pubescent; bracts lanceolate, longer than the brownish-pink flowers; sepals ¼ in. long, 1–3-nerved, dorsal oblong-lanceolate, lateral broader below, not covering the sac of the lip, which is shorter than the column; column keeled in front; rostellar arms large, erect, stigma at their base very large orbicular; caudicles of pollinia as long as the clavate body.—A remarkable plant, with the exposed sac of the lip of *Cystorchis,* but all other characters of *Goodyera* except the very long column.

3. **G. fumata,** *Thwaites Enum.* 314; spike rather lax.-fld., lip concave rhomboidly orbicular caudate-acuminate glandular within column clavate, anther ovate subacute.

CEYLON; in the Central Province, rare, *Thwaites.*

Three feet high and very stout. *Leaves* many, 6–10 by 3–4 in., obliquely elliptic-lanceolate; petiole 2–4 in., stout. *Scape* stout and spike glandular-pubescent; bracts shorter than or equalling the greenish-red flowers, lower sometimes elongate; sepals ¼–½ in. long, ovate, acute, 1-nerved; petals dimidiate lanceolate, acuminate, falcate; lip as broad as long, many-nerved, abruptly contracted into a revolute ligulate tail; column almost funnel-shaped, rostellar beaks short.

** *Stem* 4–8 in., rarely more. *Leaves* 1–2 in., usually rosulate, ovate-cordate or lanceolate.

† *Lip smooth channelled or lamellate within, but with no hairs or soft setæ.*

4. **G. repens,** *Brown in Hort. Kew, Ed.* 2, v. 198; leaves ovate acute shortly petioled, spike secund pubescent, bracts equalling or exceeding the flowers, lip ventricose shortly beaked channelled within, column very short ovate. *Lindl. Gen. & Sp. Orchid.* 492; *in Journ. Linn. Soc.* i. 183; *Reichb. Ic. Fl. Germ.* xiii. t. 482; *Ledeb. Fl. Ross.* iv. 86; *Boiss. Fl. Orient.*

v. 90. G. marginata, *Lindl. in Wall. Cat.* 7394; *Gen. & Sp. Orchid.* 493; *in Journ. Linn. Soc. l. c.* Satyrium repens, *Linn. Sp. Pl.* 1339.

TEMPERATE HIMALAYA, alt. 8–11,000 ft., from Simla eastwards to Sikkim.—DISTRIB. Europe, N. Asia, N. America.

Stem 4–8 in. *Leaves* dark grey or mottled with paler, ½–1 in. *Spike* 1–4 in., often twisted, sometimes almost glabrous; flowers whitish; lateral sepals ¼ in., ovate, acuminate, 1-nerved, dorsal narrow; petals linear, falcate; rostellar arms short; pollinia small, pyriform, sessile on the small gland.

5. **G. fusca,** *Hook. f. Ic. Pl. ined.*; very robust; leaves radical broadly ovate, spike secund pubescent, bracts exceeding the flowers, lip deeply saccate with a decurved beak strongly ridged within, column very short, anther very small stipitate didymous. Ætheria fusca, *Lindl. in Journ. Linn. Soc.* i. 184. Cystorchis fusca, *Benth. in Gen. Plant.* iii. 599.

SUBALPINE HIMALAYA; Harung, *Munro;* Garwhal, alt. 13,000 ft., *Duthie;* Sikkim, in the inner ranges, alt. 12–14,000 ft., *J. D. H.*

Roots densely tufted. *Stem* 6–12 in., often as thick as a swan's quill *Leaves* revolute, 1–1½ in., subacute, coriaceous; petiole very short and broad. *Spike* very many- and dense-fld.; sepals ¼ in., obtuse, dorsal narrow, 1-nerved, lateral ovate-oblong, sub-3-nerved; petals gibbously falcate; sac of lip protruding beyond the base of the sepals, 5–7-ridged within; column broad, rostellar arms subulate; anther apiculate.—Closely allied to *G. repens*, though much larger. Besides differing in habit and locality it wants the calli in the lip of *Cystorchis*, under which genus see observation.

6. **G. recurva,** *Lindl. in Journ. Linn. Soc.* i. 283; leaves linear-lanceolate acute, spike secund sharply deflexed glandular-pubescent, bracts filiform exceeding the small flowers, lip deeply saccate, beak nearly straight 5-ridged within, column with long slender rostellar arms, anther acuminate.

KHASIA HILLS, *Lobb*; at Moflong, alt. 6000 ft.. on mossy trunks, *J. D. H. & T. T.*

Stem 4–6 in., sheathed by the leaves, suddenly decurved at the top, so that the spike is pendulous. *Leaves* 2–3 by ½–¾ in., thick, acute, nerveless, not reticulate, narrowed into the broad petiole. *Spike* 3 in. long; flowers completely secund; sepals ¼ in. long, 1-nerved, acuminate, dorsal ovate-lanceolate, lateral broader, falcate; petals obliquely linear-lanceolate; lip rather longer than the column, tip obtuse. *Capsule* pedicelled, ellipsoid, ¼ in. long.

7. **G. Prainii,** *Hook. f. Ic. Pl. ined.*; leaves ovate acute, spike secund recurved glandular-pubescent, bracts lanceolate equalling the flowers, lip cymbiform obtuse lamellate within, column with long rostellar arms, anther acuminate.

NAGA HILLS in Upper Assam; on Pulinabadya, alt. 7200 ft., *Prain.*

Very near *G. recurva*, but the leaves are 1–1½ in., ovate and strongly reticulately nerved, the spike recurved, but not deflexed, the sepals are broader, the lateral not falcate, and the lip is less saccate.

8. **G. gracilis,** *Hook. f. Ic. Pl. ined.*; leaves few petioled elliptic-ovate, stem very slender nearly naked, spike short puberulous, bracts shorter than the flowers, lip straight oblong concave beaked below the emarginate tip, with two large calli at the base within, and a very thick channelled lamella on the disk, column short, rostellar arms slender.

PERAK, *Scortechini.*

Whole plant 8–10 in. high; stem slender, with 2–3 distant lanceolate sheaths.

Leaves 1–1½ in., obtuse or apiculate, nerves obscure, not reticulate, margins minutely crenulate. *Spike* ½–1 in., few-fld., twisted; flowers crowded; sepals ⅛ in. long, linear-oblong, obtuse, 1-nerved; petals linear, nearly as broad as the dorsal sepal; lip nearly as long as the sepals, narrow, margins incurved, very thick; rostellar arms slender; anther lanceolate, pollinia narrow, sessile on a long gland.—In a drawing of this by Scortechini corresponding to his specimens the leaves are represented as more ovate, acute and strongly crenate.

†† *Lip within setose and tubercled.*

9. **G. foliosa,** *Benth. in Herb. Kew*; stem with an elongate decumbent base leafy to the tip, leaves petioled ovate-lanceolate, spike glandular-pubescent, bracts much exceeding the flowers, sepals ¼–⅓ in. 3-nerved, lip saccate, beak rather dilated, base within copiously setose, column short, rostellar arms very long slender, anther lanceolate. Georchis foliosa, *Lindl. Gen. & Sp. Orchid.* 496. G. secundiflora, *Griff. Notul.* iii. 393 (*excl. Plate*).—Goodyera sp. *Griff. It. Notes*, 36, No. 591; *Notul.* iii. 396, No. 11; *Ic. Pl. Asiat.* 346, f. 1.

SIKKIM HIMALAYA, alt. 5–6000 ft., *J. D. H.*, &c. ASSAM, the KHASIA and NAGA hills, ascending to 5000 ft., common. BURMA, *Griffith.* PERAK, alt. 7000 ft., *Wray.*

Stem 6–12 in., rather slender. *Leaves* 1½–2½ in., oblique, acute, green, 3–5-nerved, not reticulate; petiole ½–⅔ in., sheath short. *Spike* 2–3 in.; bracts ½–⅔ in., nearly glabrous; flowers pink; sepals ovate-lanceolate, obtuse, 1-nerved; petals dimidiate-oblong, as broad as the dorsal sepal, 1-nerved; pollinia with slender united caudicles.—Distinguished from all others of this section by the elongate and leafy stem, except *G. vittata*, which has a glabrous spike.

10. **G. secundiflora,** *Lindl. in Journ. Linn. Soc.* i. 182 (*excl. cit. Griff. Notul. in part & Ic*); leaves few subradical ovate acute, mottled with white, spike glandular-pubescent lax-fld. secund, bracts shorter than the flowers, petals oblanceolate, lip saccate sparsely setose within, beak short lamellate in the disk, column short, rostellar arms slender, anther ovate acuminate. Goodyera *sp. No.* 6. *Griff. Notul.* iii. 392; *Ic. Plant. Asiat.*, t. 347, f. 2.

KHASIA HILLS, alt. 4–5000 ft. *Griffith*, &c. MUNNIPORE, alt. 9000 ft., *Watt.*—DISTRIB. China (*Herb. Lindl.*).

Stem strict, with spike 6–10 in., subtomentosely glandular above. *Leaves* 1½–2 in., rarely elliptic, acute, petiole ¼–½ in. *Spike* 2–3 in.; flowers all secund, pubescent, white; sepals 1-nerved, lateral ⅓–½ in. long, ovate, acute, dorsal much narrower; petals subfalcate, crenate on the outer edge, 1-nerved; lip setose on the 5-7 nerves within.

11. **G. robusta,** *Hook. f. Ic. Plant. ined.*; very robust, leaves subradical ovate-lanceolate acute, spike glandular-tomentose lax-fld., bracts shorter than the secund flowers, petals spathulate, lip saccate sparsely setose within, beak short lamellate in the disk, rostellar arms slender, anther lanceolate.

KHASIA HILLS, alt. 4000 ft. *J. D. H. & T. T.*

Closely allied to *G. secundiflora*, but three times the size, and very robust, 18 in. high, including the spike, which is 7 in. long; the leaves are 3–4 in. long, whole coloured, the lateral sepals ⅓–½ in. long, and the petals are clawed, gibbously spathulate and acute.—Named by Lindley *G. secundiflora;* but I think it quite different.

12. **G. vittata,** *Benth. in Herb. Kew*; quite glabrous, leaves subradical ovate acute dark green with white nerves, bracts about equalling

the flowers, lip saccate long-beaked setose within, beak 2-lamellate on the disk. *Hook. f. Ic Plant. ined.* Georchis vittata, *Lindl. in Journ. Linn. Soc.* i. 184.

SIKKIM HIMALAYA, alt. 6–9000 ft., *J. D. H.*

Stout, 4–6 in. high, leafy nearly up to the spike. *Leaves* 1½–3 in., fleshy, dark green above, purplish beneath. *Spike* 2–3 in.; flowers subsecund; sepals 3-nerved, white with pink tips, lateral ovate acuminate, dorsal oblong-lanceolate; petals oblanceolate, falcate, 3-nerved; lip 7-nerved, acuminate; columnar arms elongate, subulate; anther ovate-lanceolate; pollinia with short caudicles and a long gland.—The only perfectly glabrous Indian species of this group.

13. **G. hispida,** *Lindl. in Journ. Linn. Soc.* i. 183; leaves subsessile ovate-lanceolate acuminate, spike and flowers hispidly glandular, bracts shorter than the small flowers, lip saccate shortly obtusely beaked sparsely setose within. *Hook. f. Ic. Plant. ined.*

KHASIA HILLS, at Churra, alt. 4000 ft., *J. D. H. & T. T.*

Described from a solitary specimen, by Lindley, who observes its similarity to *G. repens*, except in the larger leaves, but who does not appear to have examined the lip, which differs from that of *repens* in the setose sac. It is nearer *G. secundiflora*. —Whole plant only 5 in. high. *Leaves* 2 in., whole-coloured, not reticulate; spike twisted; flowers white; sepals 1-nerved, lateral ¼ in. long, ovate-oblong, obtuse; petals oblong-lanceolate, nearly straight, 1-nerved; columnar arms subulate; anther lanceolate; pollinia narrow, with short caudicles and a large gland.

14. **G. cordata,** *Benth. in Herb. Kew;* leaves subradical ovate-cordate, spike puberulous few and lax-fld., bracts shorter than or equalling the large suberect flowers, lip rhomboid-ovate obtuse many-nerved setose at the subsaccate base within. *Hook. f. Ic. Plant. ined.* Georchis cordata, *Lindl. Gen. & Sp. Orchid.* 496 (*excl. habitat*); *Reichb. f. in Gard. Chron.* 1879, ii. 520.

KHASIA HILLS, alt. 3–4000 ft. *J. D. H. & T. T.* UPPER ASSAM; in the NAGA HILLS, *Prain.* ? PERAK, *Scortechini.*

Rather slender, 6–12 in. high. *Leaves* 1½–2½ in., variable in depth of basal sinus, acute; petiole ¼–½ in., slender. *Spike* 4–8-fld.; flowers pubescent; sepals ⅔ in. long, 3-nerved, subequal, ovate-lanceolate, obtuse; petals dimidiate-obovate, 2–3-nerved; column stout, with projecting cheeks; rostellar arms and anther very long and slender; pollinia slender, with long slender connate caudicles.—The largest flowered Indian species, except *G. biflora*. In the Perak specimen the front row of setæ within the lip are clavellate.

15. **G. biflora,** *Hook. f. Ic. Plant. ined.*; stem short stout leafy, leaves ovate, spike 2–4 fld. pubescent, bracts slender shorter than the very large secund flowers, sepals narrow, 3-nerved lateral cuneate at the base, lip saccate at the base with a long recurved beak, sac setose within. Georchis biflora, *Lindl. in Wall. Cat.* 7379; *Gen. & Sp. Orchid.* 496.

TEMPERATE WESTERN HIMALAYA, alt. 4–6000 ft. Nepal, *Wallich*; Garwhal, *Edgeworth*; Simla, *Gamble.*

Stem 2–3 in., leafy. *Leaves* 1–2 in., obtuse or subacute, petiole ¼–½ in. *Raceme* hardly exceeding the leaves, rachis stout; bracts 1 in.; sepals 1 in., dorsal narrowly lanceolate recurved, lateral nearly straight; petals linear, falcate, 3-nerved; lip with a setosely 5-nerved base, beak twice as long as the sac, margins membranous waved; column concave in front, rostellar arms and anther very long and slender. *Capsule* nearly 1 in. long.

94. HETÆRIA, *Blume.* (ETÆRIA).
ÆTHERIA, *Endl.*

Characters of *Goodyera*, but lip usually superior, and adnate to the

sides of the column, and stigma with 2 lateral lobes.—Species about 13, Indian.

1. **H. Gardneri,** *Benth. in Gen. Plant.* iii. 604; tall, slender, leaves elliptic acute, spike very long glandular pubescent, bracts equalling the very small flowers, petals linear-spathulate, lip saccate membranous with a few small calli on the nerves within. Rhamphidia Gardneri, *Thwaites, Enum.* 313.

CEYLON; in the Central Province, *Walker*, &c.

Stem 12–20 in., stout and leafy below. *Leaves* 2–4 by 1½–2 in., often oblique, 3-nerved, membranous; petiole ½–1 in., sheath large, short. *Spike* 4–10 in., very many-fld.; flowers hardly secund; bracts ¼ in.; sepals ⅛ in. long, obtuse, dorsal ovate 1-nerved, lateral oblong 3-nerved; petals linear-spathulate, 1-nerved; lip cymbiform; column very short, stigmatic lobes large, lateral; rostellar arms and anther short, pollinia subglobose, each caudicled.—Thwaites describes the lip as with a very few short hairs within.

2. **H. ovalifolia,** *Benth. in Gen. Plant.* iii. 164; slender, leaves elliptic acute, spikes elongate glandular-pubescent, bracts exceeding the very small flowers, petals obovate-oblong, lip saccate tip obtusely 3-toothed, nerves with tooth-like calli towards the base. Goodyera ovalifolia, *Wight. Ic.*, t. 1730. Rhamphidia ovalifolia, *Lindl. in Journ. Linn. Soc.* i. 181 (*excl. habitat*).

MALABAR; at Courtallam, *Wight.*

Very near to *H. Gardneri*, but smaller, 10–14 in. long, leaves the same, bracts rather longer. *Flowers* tinged with pink; dorsal sepal broadly ovate, obtuse, 1-nerved; lateral oblong, 3-nerved; column very short, stigmatic lobes marginal, very large; rostellar arms minute, pollinia as in *H. Gardneri*.—Lindley in Journ. Linn. Soc. whilst wrongly ascribing a Sikkim specimen of *H. rubens* to this, rightly describes the lip as 3-fid.

3. **H. rubens,** *Benth. in Gen. Plant.* iii. 164; tall, leaves elliptic acute, spike puberulous, bracts equalling or exceeding the flowers, petals hammer-shaped, lip subhemispheric with a small transverse terminal lobe and a jagged callus on each side towards the base within. *Hook. f. Ic. Plant. ined.* Rhamphidia rubens, *Lindl. in Journ. Linn. Soc.* i. 182. Cerochilus rubens, Lindl. in *Gard. Chron.* 1854, 87. Goodyera, No. 4, *Griff. Notul.* iii. 390.

SIKKIM HIMALAYA, alt. 1500–3000 ft., *J. D. H., Clarke.* ASSAM, *Mann.* UPPER BURMA, *Griffith* (*Kew Distrib.*, 5341 and 5342).

Rather stout, 10–18 in. high. *Leaves* 4–5 by 1¾–2 in., as in *ovalifolia*, reticulately nerved in the Sikkim specimen; flowers twice as large, greenish-purple; sepals 1-nerved, broadly ovate; petals clawed, very gibbous on one side; lip short, terminal lobe sometimes 2-fid; column very short indeed, with two small wings in front; anther ovate-cordate; pollinia pyriform, subsessile on the gland; stigmatic lobes large, rostellar arms very short.

4. **H. Helferi,** *Hook. f. Ic. Plant ined.*; slender, leaves elliptic, spike puberulous twisted, bracts shorter than the flowers, petals linear falcate, lip membranous cymbiform acuminate with a few fleshy cilia on each side towards the base within.

TENASSERIM; Misses Eider Islands, *Helfer.*

Stem 6–10 in. with the raceme. *Leaves* 3–4 in., acute, many-nerved, membranous. *Spike* 3–6 in.; bracts narrowly lanceolate; sepals ¼ in. long, subequal, ovate-oblong, obtuse, hairy, 1-nerved; lip small; column short with 2 membranous wings in front, and very short rostellar arms; anther ovate-cordate.

5. **H. elongata,** *Lindl. in Wall. Cat.* 7384 (Etæria); *Gen. & Sp. Orchid.* 494; tall, slender, leaves petioled oblong subacute, scape and elongate lax-fld. raceme and flowers laxly tomentose, bracts shorter than the erect ovary, sepals oblong obtuse, petals broadly obliquely obovate apiculate, lip cymbiform acute 5-nerved, nerves with 1-2 soft spines towards the base. *Hook. f. Ic. Plant. ined.* Goodyera? elongata, *Lindl. Gen. & Sp. Orchid.* 494.

MALAY PENINSULA, *Herb. Finlayson.*

Stem with scape and racemes 18 in., lower half leafy. *Leaves* 2-3 in., membranous, lower obtuse; petiole ½-¾ in., slender; lower sheaths hyaline, inflated. *Scape* with distant lanceolate sheaths; raceme 4 in.; bracts ¼ in., lanceolate; sepals ⅛ in. long; lip superior, membranous, adnate to the sides of the column; column short, flat, without wings or membranes in front, as long as the sepals; stigmatic lobes lateral; rostellar arms subulate; anther ovate-cordate; pollinia subglobose, caudicles as long slender, gland rather large, oblong.

6. **H. elata,** *Hook. f. Ic. Plant ined.*; spike dense-fld., flowers minute, lip minute hemispheric, base within with 2 large calli on each side and with a thickened incurved transverse fold towards the apex which is tipped with a small orbicular membranous appendage, column very short, anther obtuse.

PERAK, *Scortechini*; or Batang Padong, alt. 4900 ft., *Wray.*

Habit of *Goodyera procera*, but petioles more slender, flowers rather smaller, lateral sepals more acute, petals broader, denticulate, and lip very different; column very short and broad, with short distant subacute rostellar arms, and two marginal stigmatic lobes.—The structure of the fleshy lip which is only $\frac{1}{12}$ in. long is difficult to make out, it is no larger than the column.

DOUBTFUL SPECIES.

H. ANOMALA, *Lindl. in Journ. Linn. Soc.* i. 185; leaves ovate acute, spike few-fld. and flowers hispidly hairy, sepals ovate-oblong, petals linear-spathulate very narrow, sac of lip with 2-3 cellular flattened crenate calli, terminal lobe transverse white wings subquadrate. *Goodyera, Griff. Notul.* iii. 394.

UPPER ASSAM in the Tingree Tea forests, *Griffith.*

A foot and a half high. *Leaves* petioled, 5-nerved. *Buds* posticous; bracts ovate-lanceolate pubescent, longer than the ovary; sepals greenish-brown, with white tips, hispid with reflexed hairs; lip continuous with the base of the short column, which has a membranous tooth on each side, an anticous stigma, subulate rostellar arms, and with a crested cellular process in front towards the centre; anther ovate fleshy; pollinia narrow, slender, sectile, sessile on the lanceolate gland, grains elongate scale-like.—Description from Griffith, who adds a notice of deformities of the column, the stigma being posticous, i.e. facing the anther, &c.

95. APHYLLORCHIS, *Blume.*

Terrestrial leafless herbs, caudex tuberous (or of fascicled fibres?); stem simple, sheathed. *Flowers* small, racemed or subspicate. *Sepals* subequal, free, erect or spreading. *Petals* narrower. *Lip* sessile or shortly clawed, at the base of the column, as long as the sepals; base 2-auricled or not, blade oblong, entire or 3-lobed. *Column* rather long; stigma short, ovate, concave; anther shortly stipitate, cells contiguous; pollinia reniform.—Species 5? Indian and Malayan.

* *Flower buds straight.*

1. **A. montana,** *Reichb. f. in Linnæa*, xli. 57; sepals and petals linear-oblong obtuse, lip narrowly obovate-oblong contracted beyond the

middle, and side lobes rounded at the base, claw short broad with 2 linear-calli tip obtuse thickened. Apaturia montana, *Thwaites Enum.* 301 (*not of Lindl.*).

? KHASIA MTS., alt. 3500 ft., and SIKKIM HIMALAYA, *Griffith.* CEYLON; Ambagamowa district, rare, *Thwaites.*

Stem 2 ft., with 8–10 loose stout basal sheaths, and a few distant higher up; yellowish tinged with purple. *Raceme* 4–8 in., lax-fld.; bracts ¼–¾ in., lanceolate, acuminate; pedicel with ovary ⅔–1 in.; sepals ½–⅔ in., and petals straw-coloured, backs and tips purple; lip broader than the sepals, base contracted into the subsaccate short claw, nerves with diverging nervules; column very slender.—I find no sufficient character whereby to separate the Sikkim and Khasia specimens, but these latter are quite insufficient for identification.

2. **A. Prainii,** *Hook. f. Ic. Plant. ined.*; sepals and petals linear-oblong obtuse, lip ovate, claw saccate with two falcately ovate acute wing-like auricles.

NAGA HILLS; *Prain.*

Very like *A. montana* in size, habit, and inflorescence; distinguished by the winged claw of the lip. I have seen but one specimen.

3. **A. ? vaginata,** *Hook. f. Ic. Plant. ined.*; stem stout clothed with lax obtuse sheaths, lip sessile lanceolate acuminate.

KHASIA HILLS; at Mamloo, in woods, alt. 5000 ft., *J. D. H. & T. T.*

Stem 6 in., stout; sheaths ½ in., loose, membranous, obtuse. *Raceme* few-fld.; bracts large sheathing; flowers subsessile, erect, about ¼ in. across, dingy red; sepals broadly ovate, obtuse, 3-nerved; petals lanceolate, acuminate, 1-nerved; lip broader than the sepals, as long, with no vestige of claw or caruncle; column shorter than in the other species of the genn, acuminate.—I have seen but one specimen of this curious plant which differs from its congeners in the sessile lip and shorter column. The flowers are young, and too much confidence must not be placed in the diagnosis.

** *Flower buds decurved.*

4. **A. pallida,** *Blume Bijdr.* t. 77; *Orchid. Archip. Ind.* 52, t. 13, f. 1 & 17 D.; sepals and petals falcate, claw of lip with large oblique auricles, limb 3-lobed, base cordate, side lobes oblong, midlobe oblong obtuse caruncled.

PERAK, *Scortechini,* in rocky places, alt. 800–1000 ft., *King's Collector,* alt. 3900 ft., *Wray.*—DISTRIB. Java.

Root of long tomentose fibres. *Stem* 12–18 in., rather flexuous, slender, spotted with brown-pink; sheaths few, obtuse. *Racemes* 2–6 in., lax-fld.; bracts oblong, upper ovate; pedicel erecto-patent, with the ovary ½–¾ in; flowers ½ in. long, decurved, pale brownish-pink, spotted with dark brown; sepals linear-oblong, obtuse, concave; petals strongly falcate, 1-nerved; lip recurved; column subclavate; anther didymous; pollinia (*Ic. Scortechini*) pyriform (in *Ic. Blume,* reniform).

96. CRYPTOSTYLIS, *Br.*

Terrestrial herbs; caudex short, stout. *Leaves* basal, long petioled; membranous. *Scape* leafless. *Flowers* loosely racemed or subspicate. *Sepals* subequal, and petals very narrow, widely spreading *Lip* superior, erect, lanceolate from a broad base which embraces the column, contracted above it, entire. *Column* very short; stigma stout; rostellum broad, thick, erect, acuminate; anther obtuse or acuminate; pollinia

pyriform, free, or fixed to the rostellum.—Species 7, Indian, Malayan, and Australian.

C. Arachnites, *Blume Orchid. Archip. Ind.* 132, t. 45. Zosterostylis Arachnites, *Blume Bijdr.* 419, t. 32. Z. zeylanica, *Lindl. Gen. & Sp. Orchid.* 446; *Thwaites Enum.* 312. Z. Walkeræ, *Wight Ic.* t. 1748 f. 4.

KHASIA HILLS, *Griffith*; at Churra, alt. 4500 ft., *Clarke.* PERAK, *Scortechini*, &c. PENANG, *Hullett.* CEYLON, *Walker*, ascending to 4000 ft., *Thwaites.*—DISTRIB. Java.

Root of long fleshy tomentose fibres. *Leaves* 1–3, all radical, 3–6 in., elliptic or elliptic-lanceolate, acute, many-nerved and trabeculate, primary nerves 3 indistinct; petiole rather longer, embraced at the base by membranous sheaths. *Scape* 8–18, slender; sheaths acuminate. *Raceme* 4–8 in.; bracts convolute, acuminate, equalling the ovary; pedicel with ovary decurved; sepals ½–¾ in., greenish, acuminate, margins revolute; petals rather shorter, reflexed; lip as long as the petals, acuminate, purple, mottled. *Capsule* ½ in., ellipsoid.—There is some little difference in the breadth of the lip between the Ceylon and Malayan forms, broader in the former, but I do not find that organ to be pubescent in either, or in the Khasian.

97. CORYSANTHES, *Br.*

Very small, terrestrial, 1-leaved, 1-fld. herbs. *Leaf* suborbicular. *Flowers* large, red-purple. *Dorsal sepal* falcate; laterals and petals filiform, or petals 0. *Lip* large, erect, base tubular, dilating into a broad reflexed toothed or fimbriate limb. *Column* short, erect, 2-winged at the tip; stigma broad; anther erect; pollinia oblong, free or sessile on the rostellum. *Capsule* erect on an elongate pedicel.—Species about 15, Australian and Malayan.

1. **C. picta,** *Lindl. Gen. & Sp. Orchid.*, 394; lateral sepals and petals much longer than the dorsal sepal, limb of lip broadly obovate erose puberulous within. *Blume Orchid. Archip. Ind.* 174, t. 64 f. 1. Calcearia picta, *Blume Bijdr.* 417, t. 33 *right-hand figure.*

PERAK; near the top of Tambak Batak, *Scortechini.*—DISTRIB. Java.

Stem 1–2 in., base scaly. *Leaf* terminal, ovate, deeply cordate, acuminate, margins waved. *Flower* sessile, bracts ¾ in., subulate-lanceolate; dorsal sepal with a long claw, margined with white, and a broad deep violet cuneate emarginate hood; lip strongly recurved, claw embracing the column produced and 2-fid at the base, limb reflexed deep violet.

2. **C. fornicata,** *Lindl. Gen. & Sp. Orchid.* 394; lateral sepals and petals shorter than the dorsal sepal, limb of lip flabelliform with many rough short ridges. *Blume Orchid. Archip. Ind.* 175, t. 64, f. 2. Calcearia fornicata, *Blume Bijdr.* 417, t. 33, *left-hand figure.*

PERAK, Gunong Enar and Tambok Balak, *Scortechini.*—DISTRIB. Java.

Stem ½–2 in. *Leaf* ½–⅔ in., ovate-cordate, margin not waved. *Flower* sessile; bracts ½ in., subulate-lanceolate; claw of dorsal sepal ⅔ in., blade spathulate, 5-ribbed, rose-coloured; lip with a long erect convolute tube produced into two spurs at the base, and erose recurved glabrous ribbed limb marked with short blackish purple rugose concentric nerves that end abruptly at the same level towards the claw, and do not reach the margin.

98. POGONIA, *Griff.*, Sect. NERVILIA.

Terrestrial tuberous 1-leaved herbs, leafing after flowering. *Leaf* very

broadly cordate or orbicular, strongly plicate. *Flowers* solitary, few, or many, racemed, horizontal or pendulous. *Sepals* and *petals* subequal, narrow, connivent or widely spreading. *Lip* inferior, adnate to the base of the column, sessile or sub-clawed, usually narrow, entire or 2-fid or 3-lobed; spur a very short sac. *Column* elongate, tip clavate, stigma oblong or broader; rostellum short; anther substipitate; pollinia 2 or 4. *Capsule* erect or pendulous.—Species about 30; of Sect. *Nervilia* about 12.

The above characters apply exclusively to the section *Nervilia*, (genus of Gaudichaud), to which all the Old World species of *Pogonia* belong; and which all flower before leafing. All the other species, except one Japanese, are New World, and their flowering stems bear leaves.—The species are very difficult of analysis from Herbarium specimens, but I have been greatly aided by the drawings in Herb. Kew, and those of Herb. Calcutt., kindly lent by Dr. King. All want revision.

* *Stem* 1-3-*fld.*

1. **P. plicata,** *Lindl. Gen. & Sp. Orchid.* 415; leaf orbicular-cordate hairy, stem 1-3-fld., lip embracing the column, tip dilated 2-lobed. Epipactis plicata, *Roxb. Fl. Ind.* iii. 454. Arethusa plicata, *Andr. Bot. Rep.*, t. 321.

LOWER BENGAL, the CONCAN & MYSORE, *Roxburgh*, &c.

Tuber globose. *Leaf* 2–4 in. diam., very many-nerved; petiole 1–3 in., often rusty-purple or brown. *Flowering* stem 4–6 in.; bracts small; flowers 1½ in. diam.; sepals and petals widely spreading, narrowly oblanceolate, acuminate, greenish; lip embracing the column, sides convolute, whitish or rose-coloured, tip pink.—Roxburgh observes and figures the tuberiforous suckers propagated from the apex of the petiole under the surface of the soil.

2. **P. biflora,** *Wight. Ic.* 7399; leaf unknown, stem 2-fld., lip obovate obtusely 3-lobed about the middle, embracing the column.

MALABAR; in the Wynaad jungles, *Jerdon.*

Tuber globose. *Flowering stem* 2–4 in.; bracts slender; flowers 1½ in. diam.; sepals and petals narrowly oblanceolate, white; lip pink, contracted at the base, side lobes rounded, midlobe emarginate crisped.—Amongst Parish's drawings is one of a similar Moulmein plant in flower only, with red-brown stem, pink sepals and petals, and a more clavate column than in Wight's figure.

3. **P. juliana,** *Wall. Cat.* 7399; leaf ovate-cordate glabrous, stem 1-fld., lip with 2 narrow falcate side lobes near the base which embrace the column, and a longer rhombic-lanceolate acuminate midlobe which is hairy at its base. *Hook. f. Ic. Plant. ined.* Epipactis Juliana, *Roxb. Fl. Ind.* iii. 453.

ASSAM (*Ic. in Herb. Calcutt.*). SILHET, *Clarke.* LOWER BENGAL, *Roxburgh, Clarke.* CEYLON; in the Doombera district; *Thwaites.*

Tuber globose. *Leaf* 2–3 in., 5–7-nerved, green or purple beneath; petiole short. *Flowering stem* 3–6 in.; bracts ensiform; flower about 2½ in. diam.; sepals and petals narrowly oblanceolate, acuminate, green; side lobes of lip white, midlobe spreading, white mottled with pink.—Amongst Parish's drawings is one of a Moulmein plant (*P. cuprea*, Par. mss.) like *juliana*, but with purple-green sepals and petals, and the hypochile longer than the epichile; it is in flower only.

4. **P. velutina,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 142; leaf orbicular-cordate velvety on both surfaces, stem 2-fld., lip shorter than the sepals embracing the column oblong-ovate obtuse.

TENASSERIM; at Moulmein, *Parish.*

Leaf 5–6 in. diam., many-nerved, rust-coloured; petiole very short. *Flowering stem* 4–12 in.; bracts very small; sepals and petals 1½ in. long, narrowly lanceolate, dirty purple; lip ventricose towards the middle, flushed with pink, with two red purple branching nerves down the middle; column gibbously clavate.

5. **P. macroglossa,** *Hook. f. Ic. Plant. ined.*; leaf unknown, stem 1-fld., lip longer than the sepals embracing the column strap shaped obtuse.

SIKKIM HIMALAYA; in hot valleys, *J D.H.*; at Tumlong, alt. 6500 ft., *Clarke.*

Flowering stem 3–6 in.; bracts small, slender; sepals 1–1¼ in., linear-lanceolate, acuminate, white flushed with pink; lip 1½ by ¼ in., of the same breadth from the rounded base to the rounded apex, except across the very small side lobes that project beyond the middle, nerves very slender; there is an appearance of lines of roughness on each side of the midrib opposite the side lobes. *Column* very slender, tip clavate.—Near *relutina*, but very distinct in the rather broader sepals, and shape of the remarkable lip which exceeds the sepals.

6. **P. maculata,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 143; leaf orbicular-cordate glabrous, stem 2-fld., lip shortly spurred at the base embracing the column ovate-lanceolate 3-lobed about the middle woolly within. *Hook. f. Ic. Plant. ined.*

TENASSERIM; at Moulmein, *Parish.*

Leaf about 2 in. diam., about 13-nerved, green with a black-purple spot at the base of each fold beyond the middle; petiole 2–3 in. *Flowering stem* 5–6 in., slender; bracts minute; sepals and petals ¾ in., narrowly oblanceolate, green; lip equalling the sepals, yellow green with dark green veins; column rather slender; anther purple.

** *Flowers racemose. Bracts elongate, linear-lanceolate, reflexed.*

7. **P. Gammiena,** *Hook. f. Bot. Mag.* t. 6671; leaf orbicular- or ovate-cordate acuminate glabrous, margin waved, sepals and connivent petals spathulately oblanceolate acute, lip saccate at the base, hypochile narrow much longer than the orbicular waved hairy epichile.

TROPICAL HIMALAYA; from Garwhal, *Falconer*, &c., to Sikkim, *Gammie*, &c.

Leaf 6 in. broad and less, many-nerved, pitted between the folds; petiole 4–10 in., stout. *Flowering stem* 3–12 in., stout; bracts ⅝–¾ in., reflexed; sepals and petals 1 in. long, conniving, concave, pink; lip greenish-white or yellowish, as long as the sepals.

8. **P. Scottii,** *Reichb. f. in Flora,* 1872, 276; leaf large reniform many-nerved glabrous, flowering stem tall stout, sepals and petals connivent linear-lanceolate acuminate, lip subclawed, base saccate, 3-lobed about the middle, side lobes obtuse, midlobe suborbicular velvety. ? Pogonia, No. 2, *Griff. Notul.* iii. 377; *Ic. Pl. Asiat.* t. 345.

SIKKIM HIMALAYA; at Darjeeling (*ex Reichb.*). CHITTAGONG; at Seetakoond (*Ic. in Herb. Calcutt.*). ? BURMA, *Griffith.*

Leaf 8 in. diam., abruptly acuminate, green, margin subundulate; petiole 12 in., very stout. *Flowering stem* dark brown, with raceme 18 in.; bracts ¾ in., reflexed; flowers horizontal, almost geniculate with the decurved ovary; sepals and petals ¾ in., connivent, dull green with red nerves; lip as long, yellow-white with purple nerves; top of column hairy on the back.—Lindley refers Griffith's plant to *P. carinata*, but the saccate base of the lip, and flowers set on at an angle with the ovary, rather indicate *P. Scottii.* These characters are not, however, shown in Griffith's drawing.

9. **P. carinata,** *Lindl. Gen. & Sp. Orchid.* 414; *in Journ. Linn. Soc.* iii. 45 (*excl. syn. Griff.*); leaf orbicular or cordate 7–9-nerved glabrous, sepals and petals narrowly oblanceolate acuminate, lip 3-lobed about the middle pubescent, side lobes very short, midlobe broadly ovate acute crenate, nerves rectangular. ? *Dalz. & Gibs. Bomb. Fl.* 270. Epipactis carinata, *Roxb. Fl. Ind.* iii. 452.

PLAINS OF INDIA; from Rohilcund to Lower Bengal, and the DECCAN PENINSULA. PEGU, *Kurz.*

Leaf 1½–2½ in. diam., cuspidate, not waved; petiole 1–2 in. *Flowering stem* with raceme 6–12 in., green; bracts ½ in.; sepals and petals 1 in., green; lip not saccate at the base, white with red or purple veins.—I am unable to discriminate satisfactorily in Herbarium specimens of the flower (carefully moistened and laid out) between this and *flabelliformis.*

10. **P. flabelliformis,** *Lindl. in Wall. Cat.* 7400; *Gen. & Sp. Orchid.* 415; *in Journ. Linn. Soc.* iii. 45; leaf large orbicular-cordate many-nerved, lip 3-lobed about the middle, side lobes obtuse, midlobe ovate acute crisped and hairy. ? *Dalz. & Gibs. Bomb. Fl.* 270. P. Nervilia, *Blume Mus. Bot.* i. 32. P. carinata, *Wight Ic.* t. 1720. Nervilia Aragoana, *Gaud. in Freyc. Voy. Bot.* 422, t. 35.

TROPICAL HIMALAYA; from Garwhal, alt. 4–5000 ft., *Falconer*, &c., eastwards. ? TENASSERIM, *Parish.*—DISTRIB. Marianne Islands, Timor.

Leaf 4–10 in. diam., cuspidate, margin waved; petiole 4–8 in. *Flowering stem* stout, 6–12 in.; raceme lax-fld.; flowers pale green; sepals ⅜ in. long, linear-lanceolate, acute; petals rather narrower, obtuse; lip shorter than the sepals, like that of *P. carinata*, but white, and glabrous.—Differs from *carinata* in the many-nerved leaf; the flowers are not readily distinguishable in dried specimens. In a drawing by Parish the lip is represented as saccate at the base, truncate at the apex, with three green medial nerves meeting in the apex, and many red side nerves. In his specimen the tip of the lip varies to rounded, the side lobes are rounded, not acute as in *carinata*, and its nerves are not rectangular but ascending.

DOUBTFUL SPECIES.

POGONIA No. 1, *Griff. Notul.* iii. 376; stem 4 in. 1-fld., flower 1 in. long, sepals linear-lanceolate acuminate pale purplish-brown, petals narrower, lip white 3-lobed, side lobes rounded-oblong denticulate, midlobe obovate crisped pubescent white spotted and veined with purple and with 2 green veins and a yellow-green crest from the middle downwards, margins papillose.—Fields at Suddyah, in Upper Assam, smell of violets.

99. DIDYMOPLEXIS, *Griff.*

(LEUCORCHIS, *Blume.*)

Slender (parasitic?) leafless, tuberous herbs. *Scape* simple, flexuous; flowers few, small, racemed; pedicels greatly elongate in fruit. *Sepals* dorsal and petals connate forming a 3-fid upper lip, lateral connate into an entire or 2-fid lower lip, forming a small mentum with the foot of the column. *Lip* inserted on the short foot of the column, very short, broad, entire, included, base and disk with small calli. *Column* long, narrowly 2-winged above and 2-toothed; stigma broad; anther low, shortly stipitate; pollinia 2, reniform, bipartite, 4? *Capsules* very long pedicelled.—Species 2 or 3, Indian, Malayan and Pacific.

D. pallens, *Griff. in Calcutt. Journ. Nat. Hist.* iv. 383, t. 17; *Hemsl. in Journ. Linn. Soc.* xx. 311, t. 28; *Kurz in Seem. Journ. Bot.* 1866, 40 (*excl. Syn. Epiblema & Gastrodia*). Leucorchis sylvatica, *Blume Mus. Bot.* i. 31; *Orchid. Archip. Ind.* 147, *with woodcut.* Apetelon minutum, *Wight Ic.* t. 1758. Arethusa ecristata, *Griff. Notul.* iii. 378; *Ic. Plant. Asiat.* t. 343, 344. A. bengalensis, *Hort. Bot. Calc.* Epiphanes pallens, *Reichb. f. in Seem. Fl. Vit.* 296.

Lower Bengal; from the foot of the Sikkim Himalaya to Calcutta. Kurg; in bamboo jungles, *Jerdon.* Perak, *Scortechini, Wray.*

Root branching and tuberous; stem 4–6 in., sheaths loose. *Racemes* terminal, 4–8 fld.; bracts broadly ovate; flowers shortly pedicelled, dull yellow-white, perianth ⅓ in. diam. subcampanulate; dorsal sepal ovate, obtuse, hooded; petals shorter and broader than the dorsal sepal, truncate, 3-nerved; lateral sepals united to the middle, free portions obtuse; lip stipitate, transversely or obcuneately oblong, membranous, with 3-median nerves between which the disk is papillose. *Capsule* 1–1½ in., erect, fusiform, pedicel 3–8 in.—Ridley l. c. distinguishes his *D. pallens* from Blume's *sylvatica* by the entire lower lip of the latter, overlooking Blume's woodcut of the *sylvatica,* which represents it as 2-lobed.

100. GASTRODIA, *Br.*

Terrestrial leafless brownish tuberous herbs; stem erect, sheathed. *Flowers* in lax racemes. *Sepals* connate with the petals into a ventricose 5-lobed tube slit anteriorly. *Lip* short, base adnate to the foot of the column and to the perianth, blade entire. *Column* usually long, narrowly 2-winged, foot short or 0; rostellum small; stigma prominent; anther tumid; pollinia ecaudate, free.—Species 7, Asiatic, Malayan and Australasian.

1. **G. orobanchoides,** *Benth. in Gen. Plant.* iii. 617; lip adnate to the tube of the perianth with a short sessile ovate obtuse free plane blade. *Hook. f. Ic. Plant.* t. 1852. Gamoplexis *Falc. in Royle Ill.* 364; *Lindl. Gen. & Sp. Orchid.* 384; G. orobanchoides, *Falc. in Trans. Linn. Soc.* xx. 293, t. 13.

Temperate Himalaya, alt. 7–8000 ft., from Kashmir to Garwhal, *Falconer,* &c.

Root a large oblong or ellipsoid annulate tuber, parasitic by a small fibrous base to roots. *Stem* 10–24 in., usually very stout; sheaths short, loose, truncate. *Raceme* loosely many-fld.; bracts oblong, acute, variable in size; flowers suberect, pedicels short; ovary turgid; perianth ½–⅔ in. long, ventricose, base gibbous, lobes very short obtuse, sepaline rather longer than the petaline; lip longer still, sessile, ovate, obtuse, recurved. *Capsule* ¾ in., erect, turgid.

2. **G. elata,** *Blume Mus. Bot.* ii. 174; *Orchid. Archip. Ind.* 143, t. 53; claw of lip adnate to the perianth and furnished with a pair of large fleshy prominent calli, limb free ovate-oblong.

Chumbi; a Tibetan province east of Sikkim, *King's Collector.*—Distrib. China, Japan.

Habit, inflorescence and flowers of *G. orobanchoides,* but differing in the lip, the adnate claw of which has an almost reniform callus on each side, whereas in the first-named species the position of the claw on the perianth is marked by two thickened lines. The Chumbi specimen is a bad one, but having examined many flowers of it and of the Japan plant, I have no reason to doubt their identity.

3. **G. javanica,** *Endl. Gen. Plant.* 212; lip free from the tube of the perianth, blade broadly hastately cordate with two thickened ridges on the disk. *Lindl. Gen. & Sp. Orchid.* 384; *Thwaites Enum.* 311; *Blume, Orchid. Archip. Ind.* 145; *Mus. Bot.* ii. 175. Epiphanes javanica, *Blume Bijdr.* 421, t. 4.

CEYLON; near Ratnapoora, &c., *Thwaites.*

I have seen no specimen of the Ceylon plant, only the copy of a drawing in the Peradeniya Garden, kindly made for me by Thwaites, but it gives no analysis. This represents a slender plant with few flowers, an almost globose perianth divided to about the middle, and not representing a specimen of what may be the Javan plant in Herb. Kew collected by Lobb.

4. **G. ? Hasseltii,** *Blume Mus. Bot.* ii. 175; *Orchid. Archip. Ind.* 145, t. 52, f. 5–8; stem 6 in. rather slender, flowers few broadly campanulate ½ in. long, lip quite free, claw slender, limb suborbicular with a broad truncate tip.

PERAK, *Ic. Scortechini.*—DISTRIB. Java.

Without specimen either of Blume's or Scortechini's plants identification is impossible.

5. **G. exilis,** *Hook. f. Ic. Plant. ined.*; very slender, flowers minute, lip free sessile by a very small point ovate with 2 long wing-like lamellæ on the middle of the disk.

KHASIA MTS.; at Amwee in grassy places, alt. 3000 ft., *J. D. H. & T. T.*

Tuber ⅓–¾ in., oblong; stem 6–12 in., filiform. *Racemes* few and lax-fld.; bracts ovate; flowers (with ovary) ¼–⅓ in. long, erect, whitish; perianth cylindric, very shortly 5-lobed; sepaline lobes broad, obtuse; petaline much smaller, rounded, fimbriate (or glandular); lip as long as the column, membranous, faintly 5-nerved, base rounded; column acutely toothed at the truncate top. *Capsule* (unripe) ½ in. fusiform.—A very singular species; difficult of analysis after having been dried.

100/1. YOANIA, *Maxim.*

A low stout leafless herb; stem with cucullate sheaths. *Flowers* racemose, long and stoutly pedicelled. *Sepals* oblong, obtuse, fleshy. *Petals* broadly ovate. *Lip* sessile at the foot of the column, very shortly clawed, cymbiform, obtusely apiculate. *Column* short, broad, margined, mid-lobe triangular, side lobes erect; stigma concave, transverse; anther long-beaked, 2-celled; pollinia 4, pulpy, sectile, attached in pairs to a viscid gland.

Y. japonica, *Maxim. in Bull. Acad. St. Petersb.* xviii. 68; *Mel. Biol.* viii. 647; *Benth. in Hook. Ic. Pl.* t. 1364.

MUNNIPORE; crest of Bareil range (S. W. of Japoo), alt. about 7000 ft., and on Kohima, *Prain.*—DISTRIB. Japan.

Brownish-white, glabrous. *Rootstock* stout, branched. *Stem* 3–6 in., tortuous in the Munnipore plant, erect in the Japanese, as thick as a goose-quill; sheaths ⅛ in., shortly rounded; raceme short, 4–6 fld.; bracts like the sheaths; pedicel with ovary 1–1¾ in.; sepals ¾ in. long, and oblique obtuse petals many-nerved; lip very shortly clawed, almost hemispheric, with a thickened apex and axis, a small concavity within the lip and four strong flexuous nerves on each side. *Capsule* 2–2½ in. long, stoutly pedicelled, erect, narrowly fusiform, ribs very stout.—Except in that the stems are sometimes curved, and the margins of the lip appear to be abruptly

thickened towards the tip, I find nothing to distinguish this from the Japan plant; the column and anther are identical; I failed to find pollen. The flowers, black when dry, are so fragile that I had great difficulty in making out their structure.

101. **EPIPOGUM,** *Gmelin.*

Terrestrial leafless brownish herbs; root tuberous or coralloid; stem erect, sheathed. *Flowers* laxly racemed. *Sepals* and *petals* subequal, free, narrow, erect or spreading. *Lip* sessile at the base of the column, superior or inferior, ovate, entire or 3-lobed, spurred, base broad, disk with rows of papillæ. *Column* short, foot 0; stigma broad, prominent; anther thickened, dorsally 2-celled; pollinia 2, separately attached by a filiform strap to a small gland.—Species the following.

1. **E. aphyllum,** *Swartz Summ. Veg. Scand.* 1814; root branching, column cylindric, spur very large as long as the superior 3-lobed lip inflated incurved, *Palmstr. Svensk. Bot.* t. 512; *Boiss. Fl. Orient.* v. 93; *Reichb. Ic. Fl. Germ.* xiii. t. 468; *Nees Gen. Fl. Germ. Monocot.* iii. No. 23. E. Gmelini, *Richard Orchid. Europ. Annot.* 36; *Lindl. Gen. & Sp. Orchid.* 383; *in Journ. Linn. Soc.* i. 176; *Bot. Mag.* t. 4821. Satyrium Epipogium, *Linn. Syst. Veg.* 676; *Jacq. Fl. Austr.* t. 84.

WESTERN TEMPERATE HIMALAYA, alt. 6–8500 ft., Kashmir, *Clarke*; Simla, *Thomson*; Garwhal, *Duthie.*—DISTRIB. Europe, N. Asia.

Stem 4–8 in., often very stout and swollen at the base; sheaths 1–2, short, appressed, truncate or obtuse. *Racemes* 3–6-fld.; bracts large, membranous, oblong, obtuse or acute; flowers pale yellow or pinkish, spotted, ovary turgid; sepals ½–¾ in. long and subequal petals lanceolate, margins involute; lip oblong, whitish, with lines of red glandular warts, lateral lobes small, very variable in size; spur obtuse.

2. **E. nutans,** *Reichb. f. in Bonpland.* 1857, 36; root an oblong tuber, spur straight shorter than the inferior entire lip. *Lindl. in Journ. Linn. Soc.* i. 177; *Benth. Fl. Austral.* vi. 308; E. roseum, *Lindl. l. c.* Galera nutans, *Blume Bijdr.* 415, t. 3; *Mus. Bot.* ii. 187; *Orchid. Archip. Ind.* 139, t. 52 & 54 E; G. rosea, *Blume Mus. Bot.* 188, & *Orchid. Archip. Ind.* 139; Podanthera pallida, *Wight Ic.* t. 1759. Ceratopsis rosea, *Lindl. Gen. & Sp. Orchid.* 383. Limodorum roseum, *Don Prodr.* 30.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, in hot valleys, *J. D. H. Clarke.* KHASIA MTS., alt. 6000 ft., *Mann.* DECCAN PENINSULA, in the Wynaad, *Jerdon.* CEYLON, *Thwaites.*—DISTRIB. West Africa, Java, Australia.

Root like a small potato. *Stem* 4–8 in., stout or slender; sheaths several, short, inflated, truncate. *Racemes* few or many-fld.; bracts large, membranous, oblong, acute; flowers pale yellow or pinkish white, speckled or stained with pink; sepals and petals narrowly lanceolate, ½–⅔ in. long; lip entire, disk with 2 or 3 glandular ridges.

102. **CEPHALANTHERA,** *Richard.*

Terrestrial herbs, leafless and tuberous rooted, or with leafy stem and fibrous roots. *Leaves* sessile, plicate. *Flowers* suberect, spiked or racemed. *Sepals* and *petals* subsimilar, free, conniving. *Lip* included, erect from the base of the column, hypochile concave or saccate embracing the column, epichile short. *Column* semi-terete, rostellum short or obsolete; stigma anticous; anther erect; pollinia 2, 2-partite. *Capsule* erect. —Species about 10, north temperate regions.

C. ensifolia, *Richard Orchid. Annot.* 29; leaves ovate or lanceolate, bracts of the upper flowers much smaller than the almost glabrous ovaries, epichile triangular obtuse 5-ridged. *Lindl. Gen. & Sp. Orchid.* 112; *in Journ. Linn. Soc.* i. 172, 175; *Boiss. Fl. Orient.* v. 85. C. Xyphophyllum, *Reichb. Ic. Fl. Germ.* xiii. t. 470. C. acuminata, *Lindl. in Wall Cat.* 7405; *Gen. & Sp. Orchid. l. c.*; *Wight Ic.* t. 1721; *Dene. in Jacquem. Voy. Bot.* 164, t. 164.

TEMPERATE HIMALAYA; alt. 6–12,000 ft., from Kashmir to Bhotan.—DISTRIB. Europe, Western Siberia, and from Afghanistan to Northern Africa.

Rootstock creeping; stem 6–18 in. *Leaves* lower lanceolate or oblong, acute or obtuse, upper linear. *Raceme* laxly 6–20-fld., glabrous; bracts ovate, acute; flowers ½–¾ in. long, white or lip spotted with yellow; sepals lanceolate, acute; petals elliptic, obtuse; ridges of lip crested.

SPECIES UNKNOWN TO ME.

C. THOMSONI, *Reichb.f. in Linnæa*, xli. 54; a span high, leaves (of *C. grandiflora*) oblong acute, upper linear-lanceolate, bracts linear-lanceolate, lower much longer than the flowers, sepals oblong-ligulate acute, petals narrower, lip expanded at the base into a very short conical sac trifid, side lobes broadly ligulate crenulate, midlobe oval transverse with a deflexed apiculus, keels two in the entire base lamellate, with many small papillæ between the posticous laciniæ.—Sikkim, *T. Thomson.*, 1857.—*C. cucullata*, Boiss. Held. differs in the shorter hypochile with short quite entire laciniæ, in the median nerves of the epichile keeled to the tip, in the keels not lamelliform, and in the conico-cylindric spur being thrice as long.—(The above is from Reichenbach. I have examined no *Cephalanthera* answering to the description, nor, as I am informed by King, is there any in the Calcutta Herbarium, whence Reichenbach's specimens must have been sent to him.)

103. EPIPACTIS, *Br.*

Terrestrial leafy erect herbs. *Leaves* sessile, plaited. *Flowers* racemose, pendulous; bracts long, leafy. *Sepals* and *petals* broad, acuminate, strongly-nerved. *Lip* sessile on the base of the column; hypochile concave or saccate, epichile contracted at the base, entire. *Column* short; stigma anticous; rostellum broad, prominent; anther erect, obtuse, cells contiguous; pollinia 2, 2-partite, gland globose.—Species 8 or 10, of the temperate N. hemisphere.

Lindley (*in Journ. Linn. Soc.* i. 172) is disposed to refer all the Himalayan species to states of *E. latifolia*, in which I do not concur.

1. **E. latifolia,** *Swartz in Act. Holm.* 1800, 232; flowers subsecund glabrous or nearly so, lip short, hypochile subglobose, epichile as long or shorter ovate-cordate, base with 2 calli. *Lindl. Gen. & Sp.. Orchid.* 461; *Boiss. Fl. Orient.* v. 87; *Reichb. Ic. Fl. Germ.* xiii. t. 134–136. E. macrostachya, *Lindl. in Wall. Cat.* 7404; E. consimilis, *Don Prodr.* 28. E. Dalhousiæ, *Wight Ic.* t. 1723.

TEMPERATE HIMALAYA, from Kashmir, alt. 6500–10,000 ft., to Sikkim, alt. 10–11,000 ft.—DISTRIB. Europe, N. Africa, N. Asia to Japan.

Stem 1–3 ft., stout, puberulous above. *Leaves* 3–5 by 2–3 in., usually from orbicular to ovate-lanceolate rarely lanceolate, often with ciliolate margins, flowers ½–⅔ in. diam, in often crowded bractate racemes, green variegated with yellow white or purple. *Column* very short.

Var. *herbacea*; smaller, leaves elliptic acute, raceme dense-fld., flowers ¼ in. diam. glabrous pale greenish white. E. herbacea, *Lindl. in Royle Ill.* 368; *Gen. & Sp. Orchid.* 462.—Western Himalaya.

Var. *Thomsoni*; small, slender, leaves lanceolate recurved margins quite glabrous, raceme lax-fld., flowers ½ in. diam. quite glabrous. E. macrostachya, *Wight Ic.* t. 1722 (*not of Lindl.*)—Western Tibet, alt. 10–11,000 ft., *Thomson.*—Wight does not know the origin of his specimen, which is a very bad one.

Var. *intrusa*; very slender, leaves few small, flowers few very distant, epichile without calli. E. intrusa, *Lindl. in Journ. Linn. Soc.* i. 175.—Sikkim, alt. 11,000 ft., *J. D. H.* This is hardly more than a starved state of *E. latifolia*, with which it grew.

2. **E. consimilis,** *Wall. Cat.* 7403 (*not of Don*); raceme lax-fld., flowers large pubescent or tomentose, lip nearly as long as the sepals, hypochile narrow oblong, epichile longer lanceolate inflexed at the base then recurved. E. veratrifolia, *Boiss. & Hohen. Diagn. Ser.* 1, xiii. 11; *Boiss. Fl. Orient.* v. 87. *Lindl. in Journ. Linn. Soc.* i. 174. E. amœna, *Herb. Ham.*

WESTERN TEMPERATE HIMALAYA; from Peshawur and Kashmir to Nepal.—DISTRIB. westward to Syria.

Stem 1–2 ft., rather slender, pubescent above. *Leaves* 4–7 in., lanceolate, acuminate. *Raceme* lax-fld.; bracts long, rarely short; flowers 1–1½ in. diam., distant, long-pedicelled, pubescent or ovary-tomentose, greenish; column much longer than in *E. latifolia*.—Lindley is no doubt right in referring Don's *E. consimilis* to *E. latifolia*. A drawing by Jerdon of a plant grown on limestone rocks, overhanging water at Saugor in Malwah closely resembles this.

3. **E. Royleana,** *Lindl. in Royle Ill.* 368; *Gen. & Sp. Orchid.* 461; *in Journ. Linn. Soc.* i. 174; raceme lax-fld. puberulous, hypochile large saccate very much broader than the ovate or ovate-lanceolate epichile. ? E. americana, *Lindl. in Ann. Sc. Nat.* iv. 385; *Gen & Sp. Orchid.* 462. E. gigantea, *Dougl. mss. in Hook. Fl. Bot. Am.* ii. 220, t. 202. Cephalanthera Royleana, *Regel in Act. Hort. Petrop.* vi. 490; *Boiss. Fl. Orient.* v. 85.

TEMPERATE HIMALAYA; from Kashmir, alt. 7000 ft. to Sikkim, alt. 8–12,000 ft.—DISTRIB. Samarcand? N. America.

Stem 1–2 ft. *Leaves* from lanceolate to orbicular, 4–7 by 1–1½ in., margins ciliolate. *Raceme* 6–10 in.; flowers distant, 1 in. diam., green with a yellowish (or reddish?) lip; bracts long, lanceolate.—The very broad strongly many-nerved hypochile, broader than long, with rounded erect sides, are unlike any other species but *E. americana*, which I suspect is the same, and if so, the latter is the earliest name. Lindley's description is taken from a very bad specimen, in which the epichile is constricted in the middle, probably by accident, as this organ contracts much in drying. Regel cites Lindley's *Epip. Royleana* for his *Ceph. Royleana*, and gives Samarcand as a locality.

Tribe IV. OPHRYDEÆ. (See Vol. v. p. 673.)

104. ORCHIS, *Linn.*

Terrestrial erect leafy herbs, with entire oblong or palmately lobed tubers. *Leaves* sheathing, not plicate. *Flowers* racemed or spicate. *Sepals* free, subequal, lateral spreading, or conniving in a hood with the petals and dorsal. *Petals* usually smaller. *Lip* shortly adnate to the column, spreading or pendulous, spurred, entire or 3-lobed. *Column* very short, rostellum cupular or saccate; anther adnate to the face of the column, cells parallel or converging below; pollinia 2, caudicles adnate to 1 or 2 glands, which are concealed in one pouch formed by the rostellum.—Species about 80, of north temperate regions, and the Mascarene Islands.

With the exception of *O. latifolia*, I do not feel confident that the species here

below referred to *Orchis* are referable to that genus. This is owing to my inability to determine satisfactorily in specimens that have been pressed, the structure of the minute rostellum, and its relation to the glands of the pollinia. Moreover, as stated under *Habenaria*, I have in various minute flowered species of that genus been unable to determine whether the glands are hidden between folds of the rostellum, or are covered by pouches or a flap of that organ. Careful drawings of the column and anther, and a comparative study of the extra Indian species are wanted, in order to describe them with accuracy.

1. **O. latifolia,** *Linn. Sp. Pl.* 1334; tubers palmate, leaves erect oblong linear-oblong or lanceolate, spike cylindric dense-fld., bracts green acuminate usually much exceeding the flowers, lateral sepals ovate reflexed, lip oblong or rhomboid crenate entire or very obtusely 3-lobed sides deflexed, spur stout equalling or shorter than the ovary pendulous. *Boiss. Fl. Orient.* v. 71; *Reichb. Ic. Fl Germ.* xiii. t. 50. O. latifolia, *β* indica, *Lindl. Gen. & Sp. Orchid.* 260. O. Hatagirea, *Don. Prodr.* 23; *Wall. Cat.* 7062.

WESTERN TEMPERATE HIMALAYA; from Nepal to Kashmir, and in WESTERN TIBET, alt. 8–12,000 ft. (16,000 ft., *Heyde.*)—DISTRIB. Westward from Afghanistan to N. Africa and the Atlantic, N. Asia.

Stem 1–3 ft., usually fistular, leafy upward. *Leaves* many, 2–6 in., often spotted in Europe, tip flat or concave. *Spike* 1–6 in.; flowers about ⅔ in. from dorsal sepal to tip of lip, dull purple; sepals and petals acute or obtuse; lip spotted with darker purple, midlobe small or obsolete; spur straight or curved.—The Himalayan specimens have, as far as I can make out from dried specimens, the leaves unspotted and tips concave, and are therefore referable to the European var. *incarnata* (*O. incarnata, Linn.*). Lindley's var. *indica* is characterized as having larger flowers, a rounded sub-lobed lip shorter than the spur, which is as long as the ovary. Lindley is disposed to refer some of the specimens from N.-W. India to *O. maculata*, but the lip in these is not lobed as in the European plant. *O. latifolia* is as variable in India as in Europe, from slender to very robust, with a lax or dense-fld. spike, and bracts equalling to or much longer than the flowers.

2. **O. Chusua,** *Don. Prodr.* 23; leaves few linear or linear-lanceolate acute, spike very short, bracts longer than the ovaries green, lateral sepals reflexed, dorsal much smaller orbicular, lip longer than the sepals broadly obovate 3-lobed, spur as long as the ovary stout cylindric obtuse. Gymnaderia Chusua, *Lindl. in Wall Cat.* 7058; *Gen. & Sp. Orchid.* 280. G. puberula, *Lindl. in Wall. Cat.* 7059.

ALPINE HIMALAYA; alt. 10–13,000 ft., Kumaon, *Duthie*; Nepal, *Wallich*, SIKKIM, *J. D. H.*, &c.

Very variable in height and stoutness, 3–18 in., flexuous. *Tubers* oblong, entire. *Leaves* 1–3, rarely more, 3–6 by ¼–¾ in., almost filiform in very alpine forms. *Spike* 2–4 in., 2–many-fld.; bracts ½–¾ in., lanceolate, acuminate; flowers ⅓–⅔ in. diam., white or purple; lateral sepals oblong-lanceolate, suberect; petals shorter, spreading, oblong, obtuse; lip variable in breadth, often broader than long, lobes spreading, broad, rounded, erose or crenate, rarely oblong with the midlobe retuse; spur thin-walled, slightly incurved, tip sometimes clavate; anther-cells parallel.

3. **O. spathulata,** *Reichb. f. mss.*; leaf solitary radical elliptic, spike few-fld., bracts much larger than the flower, sheaths leafy, sepals subequal lateral suberect, lip obovate not longer than the sepals entire or obscurely 3-lobed, spur shorter than the ovary stout. *Hook. f. Ic. Plant. ined.* Gymnadenia spathulata, *Lindl. Gen. & Sp. Orchid.* 280.

ALPINE HIMALAYA; alt. 11–13,000 ft.; Kumaon and Garwhal, *Royle, Duthie,* SIKKIM, *J. D. H.*

Stem very short, sheathed; root elongate, stout, branching into thick fibres. *Leaf* 1–3 in, sessile or petioled, obtuse, fleshy, base narrowed. *Scape* 2–5 in., very stout, flexuous; flowers 2–4, dark purple, ½ in. diam.; bracts ½–1 in., ovate, obtuse; dorsal sepal ovate, obtuse, lateral oblong, subacute; petals ascending, elliptic, obtuse; lip variable in breadth, from elliptic to cuneate-obovate, crenulate, spur variable in length, stout, obtuse; anther-cells parallel.

4. **O. Strachеyi,** *Hook. f. Ic. Pl. ined.*; leaf solitary radical elliptic or obovate, spike few-fld., bracts longer than the flowers leafy, sepals subequal lateral suberect, lip longer than the sepals broadly cuneate 3-lobed to the middle, lobes obtuse, spur as long as the ovary stout incurved obtuse.

WESTERN HIMALAYA; Garwhal, near Rogile, alt. 11,000 ft., *Strachey* and *Winterbottom* (No. 35 Gymnad. puberula.)

This has the solitary leaf of *O. spathulata*, and the flowers of *O. Chusua*, can it be a hybrid?

105. HERMINIUM, *Linn.*

Terrestrial small erect tuberous herbs; tubers oblong, undivided. *Leaves* solitary or few. *Flowers* small, spicate. *Sepals* subequal, 1-nerved, free or conniving in a hood, the lateral spreading. *Petals* smaller or nearly as large, often thick and fleshy. *Lip* continuous with the base of the column, shorter or longer than the sepals, broad or narrow, spreading or pendulous, entire or 2–3-fid, base flat concave or very shortly saccate. *Column* very short; stigma 2-lobed or with 2 globose or clavate processes; rostellum short; anther adnate to the face of the column, cells parallel or slightly diverging below; pollinia 2, caudicles very short, glands naked, small or large, or with each gland and its caudicle sheathed by a conical naked coriaceous extinguisher-like shiny brown appendage.—Species 6 or 8, European and N. Asiatic.

There is no character by which *Herminium* can be distinguished from *Habenaria*, except that the lip has never a spur, only a gibbous sac. *H. fallax & Duthiei*, and some other species appear to me to be referable to either genus, but these from habit and locality I retain here. The glands of the pollinia vary extraordinarily in the several species, from small and orbicular, to extinguisher-like bodies, truncate, hollow, coriaceous, brown, shining, and sometimes split down one side. The caudicle appears to be inserted at the bottom of this organ, which is a development of the gland itself; it is exposed at the base of the anther-cell, and like the ordinary gland, is removable with the pollinium. The Indian *Herminia* are all mountain or alpine, and attain the greatest elevation of any orchids.

* *Lip* 3-*lobed.*

1. **H. Monorchis,** *Br. in Hort. Kew. Ed.* 2, v. 191; leaves 2 rarely 3 linear-oblong, flowers decurved, bracts equalling the ovary or shorter, petals ovate hardly longer than the sepals, lip hardly longer than the sepals 3-fid, lobes narrow. *Lindl. Gen. & Sp. Orchid.* 305; *Boiss. Fl. Orient.* v. 82. *Reichb. Ic. Fl. Germ.* xiii. t. 415. Ophrys Monorchis, *Linn. Sp. Pl.* 1342.

ALPINE HIMALAYA and WESTERN TIBET, alt. 10–13,000 ft., from Kashmir to Sikkim.—DISTRIB. Europe, N. Asia.

Four to ten in. high; root ellipsoid. *Leaves* 1–4 in. *Scape* naked, rarely 2-leaved or 1 sheathed; spike 1–2 in.; flowers subsecund, ⅛ in. diam., yellow-green;

musky at night; sepals and petals subconnivent; sepals oblong, obtuse; petals unequal-sided towards the base, tips fleshy; lobes and lip narrow, base concave; rostellum prominent between the base of the anther-cells.

2. **H. angustifolium,** *Benth. mss.*; tall, leaves elongate linear, spike very long slender many-fld., bracts equalling the ovary or shorter, flowers decurved, petals linear very narrow 1-nerved, lip linear equalling the sepals in length or longer narrow trifid beyond the middle, side lobes filiform, midlobe very short. Accras angustifolia, *Lindl. in Wall. Cat.* 7061; *Gen. & Sp. Orchid.* 232; *Bot. Reg. under* t. 1525; *in Journ. Linn. Soc.* iii. 43; *Royle Ill.* t. 87; *Wight Ic.* t. 1691. H. longicruris, *Wright in Mem. Acad. Philad. Ser.* 2, vi. 411.—Thisbe, *Falc. in Lindl. Veg. Kingd.* 183, c (name only).

TEMPERATE HIMALAYA, from 4–8000 ft. in the North West, and 6–15,000 ft. (*Clarke*) in Sikkim. KHASIA HILLS, alt. 5–6000 ft. UPPER ASSAM, in the Naga Hills, alt. 7000 ft., *Clarke, Prain.* TENASSERIM *Parish.*—DISTRIB. China, Manchuria, Japan.

Stout or slender, 1–3 ft. high, 1 or several leaved. *Leaves* scattered, 2–8 in., acute, rarely ½ in. broad. *Spike* 2–10 in.; flowers often very many, subsecund; perianth connivent, $\frac{1}{10}$–$\frac{1}{8}$ in. diam., green; sepals oblong, obtuse; petals membranous, acute; lip from as long to twice as long as the sepals or more, base not concave, lateral lobes very slender. Anther-cells parallel, pollinia clavate, glands large, staminodes large spreading; stigmatic lobes obscure or 0; rostellum minute, 2-lobed. *Capsule* ¼ in., erect, oblong, turgid.—Has in Sikkim an extraordinary range in altitude.

3. **H. fallax,** *Hook. f. Ic. Plant. ined.*; slender, leaves 1–2 towards the middle of stem linear or linear-lanceolate, spikes many-fld subsecund, bracts longer than the short decurved ovaries, sepals spreading oblong- or ovate-lanceolate broader than the erect narrow falcate petals, lip shorter than the sepals obtusely 3-lobed, sac incurved subdidymous subglobose or clavellate with an inflated tip. Peristylus fallax, *Lindl. Gen. & Sp. Orchid.* 298. Herminum fallax, *Lindl. in Wall. Cat.* 7412. Cybele, *Falc. in Lindl. Veg. Kingd.* 193, c. C. alpina, *Falc. mss.*

ALPINE and SUB-ALPINE HIMALAYA, alt. 7–12,000 ft., from Garwhal to Sikkim.

Very variable in height, from 4–18 in.; stem with long tubular sheaths at the base, and one or two lanceolate sheaths above the leaf. *Leaves* usually solitary about the middle of the stem, 2–5 by ½–1 in., acute, sometimes two subopposite towards the base of the stem. *Scape* naked; spike 2–5 in., lax or dense fld.; lower bracts ⅔ in. or less, lanceolate; ovary $\frac{1}{6}$–¼ in., shortly beaked; sepals $\frac{1}{6}$ in., 1-nerved, and petals variable in absolute and relative breadth; lip short and fleshy or narrower, thin, and with distinct nerves, base of limb truncate at the short broad concave claw; anther very small, cells parallel, tubes 0; pollinia ovoid, of few very large grains, sessile in the large solid shining glands which are exposed, one on side of the inconspicuous rostellum; stigmatic processes very short, subglobose.

** *Lip entire. Bracts short in all but* H. gramineum.

4. **H. Josephi,** *Reichb. f. in Flora* lv. (1872) 276; stout, leaves 2 rarely 3 lanceolate or oblanceolate, bracts minute, flowers large ⅓ in. diam. suberect, sepals and petals erect, lip broadly ovate acute. H. grandiflorum, *Lindl. in Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 11–14,000 ft., *J. D. H.*

Plant, 5–12 in. high. *Leaves* 3–5 by ¼–1 in., obtuse acute or acuminate. *Spike* 1–4 in.; flowers ⅓ in. diam., not secund; bracts much shorter than the gibbous ovary; sepals 3-nerved, lateral falcately ovate, base rounded; petals as long, ovate, tips narrowed thickened obtuse; lip larger than the sepals, flat, with a thickened

midrib and point; anther-cells spreading at the base, pollinia clavate, terminating in horn-shaped or conical rigid truncate pouches, which embrace the caudicle gland and base of the pollinium; stigmatic processes obscure; rostellum small.—I do not find the single lanceolate sheath under the spike described by Reichenbach.

5. **H. Duthiei,** *Hook. f. Ic. Plant. ined.*; leaves 2 towards the middle or base of the stem linear or oblanceolate, spike many-fld. subsecund, bracts much shorter than the short ovaries, sepals obtuse, dorsal broadly oblong, lateral smaller, subfalcate petals ovate-lanceolate fleshy, lip as long triangular or orbicular-ovate entire subacute or obtuse, sac globose.

WESTERN HIMALAYA; Garwhal, near the Khasi Pass, alt 11-12,000 ft., *Duthie.*

Whole plant, with the spike, 4–6 in. *Leaves* shorter than the scape, acuminate. *Scape* stout, curved, naked; spike 2–4 in.; ovaries $\frac{1}{6}$ in., turgid, curved, almost beaked; perianth $\frac{1}{8}$ in diam.; lip variable in form, as large as the sepals, sometimes orbicular with a contracted point, base with a narrow chink opening into the spur; anther oblong, cells parallel, pollinia clavate sessile on the conical truncate horny glands or caps of the glands; staminodes large, spreading; stigmatic processes clavate, large; rostellum subulate, erect.

6. **H. congestum,** *Lindl. in Wall. Cat.* 7068; *Gen. & Sp. Orchid.* 305; *in Journ. Linn. Soc.* iii. 43; leaves 1–3 oblanceolate, scape elongate, spike many-fld., bracts minute, flowers minute decurved, sepals obtuse, dorsal broadly ovate, lateral oblong, petals rather longer acute, lip ovate or triangular-ovate fleshy acute, base saccate. H. unalaschcense, *Reichb. f. Ic. Fl. Germ.* xiii. 107, t. 418. Habenaria Schischmareffiana. *Chamiss. in Linnæa*, iii. 29. Platanthera Schischmareffiana, *Lindl Gen. et Sp. Orchid.* 286. Neottia macrophylla, *Don Prodr.* 27. Spiranthes macrophylla & unalaschcensis, *Spreng. Syst.* iii. 708.

ALPINE HIMALAYA; NEPAL, *Wallich*; Sikkim, alt. 11-16,000 ft., *J. D. H.* DISTRIB. Aleutian Islds.

Stem 6–18 in., leafy towards the base or upwards. *Leaves* 3–6 by $\frac{1}{3}$–$\frac{2}{3}$ in. *Scape* rather stout, naked above; spike 2–4 in.; ovary short, gibbous, longer than the ovate bracts; flowers $\frac{1}{3}$–$\frac{1}{2}$ in. diam.; dorsal sepal orbicular, lateral broadly oblong; petals ovate, equalling the sepals, fleshy; lip fleshy, variable in breadth; sides sometimes almost dilated into lobes, base very distinctly saccate; anther-cells parallel, pollinia subglobose, caudicles short inserted in large spur-like corneous body split on one side; stigma obscure; rostellum minute, erect. *Capsule* $\frac{1}{4}$ in. erect, twisted.

7. **H. pugioniforme,** *Lindl. mss.*; leaf solitary elongate-spathulate obtuse, spike few-fld., bracts minute orbicular, flowers minute suberect, petals oblong-ovate, lip dagger-shaped, base dilated.

ALPINE HIMALAYA; Kashmir, alt. 12,000 ft., *Aitchison*; Garwhal, alt. 14–15,000 ft., *Duthie*; Sikkim, alt. 15-16,000 ft., *J. D. H.*

Plant 2–5 in. high. *Leaf* shorter than the scape, $\frac{1}{3}$–$\frac{2}{3}$ in. broad. *Scape* rather stout; bracts very small; flowers minute, $\frac{1}{12}$ in. diam.; dorsal sepal orbicular, lateral very broad obtuse; petals smaller; lip hardly longer than the sepals.—Very near *congestum*, but I think different, the flowers appear to be nearly erect.

8. **H. orbiculare,** *Hook. f. Ic. Plant. ined.*; stem very slender 1–2-leaved and with minute subulate sheaths, bracts minute, flowers very minute secund, sepals orbicular-oblong obtuse dorsal smaller, petals broadly oblong, lip orbicular fleshy with a pit towards the centre and gibbous beneath.

SIKKIM HIMALAYA; Rungboo in the Chumbi Valley, *King's Collector.*

Stem with spike 4–6 in. *Leaves* 2, towards the base of the stem, 1–1½ in. long, oblanceolate; bracts much shorter than the ovaries which are ½ in. long, curved; flowers $\frac{1}{16}$ in. diam.; sepals and petals 1-nerved, all membranous; anther-cells rather divergent, pollinia clavate, gland orbicular translucent; stigmatic processes obscure; rostellum minute.—A very distinct little species, but the flowers are so minute that I cannot satisfactorily analyze the column.

9. **H. gramineum,** *Lindl. in Wall. Cat.* 7413; *Gen. & Sp. Orchid.* 305; very slender, 1-leaved, spike lax-fld., flowers minute secund suberect, bracts subulate equalling the ovary, petals erect linear subfalcate, lip ovate acuminate equalling or shorter than the sepals. *Royle Ill.* t. 87. Neottia monophylla, *Don Prodr.* 27. Spiranthes monophylla, *Spreng. Syst. Veg.* iii. 709.

WESTERN and CENTRAL HIMALAYA; Nepal, *Wallich*; Kumaon and Garwhal, alt. 5–8000 ft.

Plant 2–6 in. *Leaf* linear, acute, as long as the scape or longer. *Spike* 1–3½ in.; rachis striated with rough ridges; perianth $\frac{1}{10}$–$\frac{1}{8}$ in. diam.; dorsal sepal oblong or broadly ovate, lateral ovate obtuse spreading; petals as long as the sepals, obtuse, thick; lip flat, with a concave base, variable in breadth, slightly saccate beneath; anther-cells parallel, pollinia subglobose, caudicles short, glands large shining coriaceous brown; stigmatic processes low; rostellum very large, as long as the anther, recurved, retuse, fleshy.

106. HABENARIA, *Willd.*

Terrestrial leafy herbs with undivided or lobed tubers, and fleshy radical fibres. *Leaves* not plaited, bases sheathing. *Flowers* spicate or racemed. *Sepals* subequal or the dorsal shortest, lateral ascending spreading reflexed or deflexed. *Petals* smaller or larger, simple or cleft (sect. *Ate*). *Lip* continuous with the base of the column, entire 3-lobed or 3-partite, base spurred. *Anther* adnate to the very short column, cells parallel or divergent below, bases often produced into a long or short tube; pollinia clavate or pyriform; caudicle long, short, or 0, sometimes winged, glands exposed, rarely overlapped by the rostellum; staminodes granular surfaces on the side of the anther, rarely elongate; stigma a single or double viscid area on the column below the anther, or two globose or clavate processes; rostellum usually small and erect between the cells of the anther, rarely wholly obsolete.—Species about 100, temperate and tropical.

After devoting many months to the examination of the Indian species of *Habenaria*, I propose the following grouping of them into sections as tentative only. I accept Bentham's view, that the genera which he has brought under it (in Gen. Plant.) cannot be separated from one another by natural or artificial characters. To these *Herminium* should be added, were it not for the consequent disturbance of much nomenclature and the multiplication of synonyms; and so should also be *Diplomeris* and *Hemipilia*, which, though they have recognizable differential characters, these are of less importance than those of the four last sections here adopted.

Of all the floral organs of the genus, that of the rostellum is the most difficult of analysis; and in the minute flowered species especially, of definition also. In respect of its relation to the glands of the pollinia it is often in moistened herbarium specimens impossible to determine whether the rostellum nearly overlaps these, or holds them exposed between its folds, or forms pouches beneath them, or a flap over them. By means alone of careful drawings of the rostellum of all the species made from living plants, can its modifications of form be understood; but I doubt whether even this will help much towards the classification of the species, for I think its value in this respect has been greatly overrated in both *Ophrydeæ* and *Vandeæ*.

The structure of the stigma has been compendiously described by Bentham in the Journal of the Linnæan Society (xviii. 356), and I agree with him in thinking that to found genera on the modifications or even in the presence or absence of processes, would lead to a violation of affinities.

For observations on the Indian species referred to *Orchis*, see that genus.

The characters which I have taken for the primary groups, marked A and B, of lateral sepals reflexed spreading or deflexed, and erect or ascending, are in most cases obvious; but in dried specimens of some species placed in Sect. V. it is difficult to say whether the lateral sepals are reflexed naturally or accidentally, or whether, though erect in early flowering, they afterwards spread. The root and its tubers require investigation throughout the genus.

The staminodes present great variety; in most species they are mere warts on the sides of the anther, but in several not otherwise allied they are linear or styliform processes, attached either to the anther or base of the column, as in *Diphylax* and *Dithrix*.

At the end of the genus I have placed four monotypic sections founded on plants differing remarkably in habit from any of their congeners; some of these will, I expect, eventually be regarded (and rightly) as monotypic genera, but in my present imperfect knowledge of any but the Indian species of this very large genus, I prefer keeping them as sections, awaiting their confirmation as genera under the authority of a monographer of the whole tribe of *Ophrydeæ*.

Key to the Sections.

A. *Lateral sepals spreading deflexed or reflexed.*

In some small-flowered species of Sect. v. *Peristylus*, the lateral sepals appear to be spreading or deflexed during or after flowering, and might hence be placed in Sect. iii.

Sect. I. Ate. *Petals* truncate 2-fid or 2-partite. *Lip* 3-lobed or -partite. (Sp. 1–14.)

Sect. II. Platyglossa. *Petals* entire. *Lip* 3-lobed or -partite, side lobes broad (narrow in *H. platyphylla*) petaloid, mid-lobe narrow. (Sp. 15–34.)

Sect. III. Trimeroglossa. *Petals* entire. *Lip* 3-partite, side lobes very narrow, entire, usually filiform (lip entire in *Peloria* forms of *H. Mandersii* and *reniformis*). (Sp. 35–66.)

Sect. IV. Hologlossa. *Petals* entire. *Lip* entire, linear. (Sp. 37–66.)

B. *Lateral sepals erect, or ascending parallel to the dorsal and petals, or forming a hood with these, rarely at length spreading or deflexed.*

Sect. V. Peristylus. *Petals* entire. *Lip* usually 3-fid or 3-partite (entire in *H. breviloba*).—*Flowers* usually very small, and *petals* broader than the lateral sepals and often fleshy; spur rarely exceeding the ovary, usually very short or saccate. (Sp. 67–99.)

Sect. VI. Phyllostachya. *Petals* entire. *Lip* broad, entire, petaloid; spur conico-infundibular. *Flowers* large, in the axils of sheathing leaves; stigmatic processes 0; rostellum obscure. (See also 32. *H. triflora*.) (Sp. 100–102.)

Aberrant species (or genera?) of group B.

VII. Plectoglossa. *Flowers* large, in the axils of imbricating leaves. *Lip* coriaceous, clawed, 3-fid, longitudinally 3-plicate in bud, spur long slender. *Stigmatic processes* large, rhomboid; rostellum broad, triangular. (Sp. 103.)

VIII. DIPHYLAX. *Flowers* small, secund; lip entire; spur short, fusiform. *Anther* with a setiform staminode on each side as long as itself. (Sp. 104.)

IX. DIPYLA. *Flowers* small, secund. *Lip* 3-fid, spur inflated. *Pollinia* sessile on a single large obcordate gland seated in a sinus of the broad 2-lobed rostellum. *Stigmatic processes* small. (Sp. 105.)

X. DITHRIX. *Flowers* small, secund, tubular; sepals petals and lip coherent at the base. *Lip* oblong, 3-fid, base saccate. *Staminodes* 2, filiform, capitate, inserted on the back of the anther. *Stigma* a transverse cushion; rostellum a transverse plate below the anther. (Sp. 106.)

Sect. 1. ATE. See p. 132.

* Petals truncate or 2-fid.

1. **H. lucida,** *Wall. in Lindl. Gen. & Sp. Orchid.* 314; leaves fascicled towards the base of the tall scape, sepals cymbiform, petals subpanduriform truncate. Platanthera lucida, *Lindl. in Wall. Cat.* 7047.

PEGU; at Rangoon, *Wallich.* TENASSERIM, at Moulmein, *Parish.*—DISTRIB. Siam.

Leaves 4–8 by 2–2½ in., petioled, obovate or oblanceolate. *Scape* with the very lax-fld. raceme 12–20 in.; bracts broadly ovate, half as long as the slender pedicelled beaked ovary, or longer, tips subulate; flowers ⅓ in. diam., greenish; lateral sepals reflexed, obtuse; petals smaller and narrower, contracted below the truncate end; lip subequally 3-partite, midlobe narrow 3-nerved thick, rather longer than the sepals, lateral as long spreading and incurved; spur slender, curved, nearly as long as the ovary or longer, mouth with a short ligule; anther-cells short, erect, approximate, tubes short upcurved; pollinia pyriform, gland long narrow; stigmatic processes short, clavate; rostellum minute.

2. **H. barbata,** *Wight in Wall. Cat.* 7034; stem leafy, petals 2-fid pubescent. Ate virens, *Lindl. Gen. & Sp. Orchid.* 327; *Wight Ic.* t. 928; *Thwaites Enum.* 309.

TRAVANCORE; in the Pulney and Dindyghal Mts., *Wight.* CEYLON; in the Maturatta district.

Stem 10–12 in. *Leaves* 3–5 in., erect, lanceolate, acuminate. *Racemes* few-fld.; bracts large, sheathing, as long as the flowers, or longer; flowers ¾ in. diam., green; lateral sepals narrowly falcate, acuminate; petals much broader, base rounded, upper lobe much the longest, tips filiform, lower broad acuminate, sinus rounded; lip longer than the sepals, scabrid, limb linear, trifurcate at the end, the segments subulate; spur as long as the ovary, mouth with a very long recurved ligule; anther-cells parallel, tubes as long as the cells upcurved, pollinia clavate, caudicles very long, glands small; stigmatic processes very long spreading; rostellum minute. *Capsule* ¾ in. long, linear-oblong.

3. **H. acuminata,** *Thwaites in Trim. Cat. Ceyl. Pl.* 91; stem leafy, petals 2-fid glabrous. Ate acuminata, *Thwaites Enum.* 309.

CEYLON; in the central province, *Walker, Thwaites.*

Stem 1–2 ft. *Leaves* 2–4 in., erect, lanceolate, and as well as the large cymbiform bracts setaceously acuminate. *Racemes* elongate, lax-fld.; flowers subsecund, ½ in. diam., green; lateral sepals broadly ovate, obtuse; upper lobe of petals slender exceeding the dorsal sepal and about twice as long as the subulate lower; lip as long as the sepals, broadly 3-lobed, dark purple, lobes broad fleshy obtuse very variable in length; anther-cells spreading below, tubes recurved, pollinia clavate, as long as their caudicles, glands minute; stigmatic processes large, globose; rostellum small, triangular.

** Petals 2-partite.

† Stem leafy upwards. Racemes many-fld.

◊ *Sepals with filiform tips.*

4. **H. stenopetala,** *Lindl. Gen. & Sp. Orchid.* 319 (*not* 324); tall, leaves oblong or ovate-lanceolate base narrowed or broad and amplexicaul, raceme dense-fld., bracts as long as the ovaries, segments of petals slender equal or the lower shorter, segments of tripartite lip filiform, spur long slender equalling the ovary.

NORTH WEST INDIA; road to Kashmir, *Royle.* SIKKIM HIMALAYA, alt. 3–6000 ft., *J. D. H.* &c. UPPER ASSAM; the Naga hills, *Griffith, Prain.* LOWER BENGAL; at Mymensing, *Clarke.* ORISSA; at Singboom, *Clarke.* The CONCAN; *Stocks,* &c.

Stem 1–2 ft., stout. *Leaves,* 6–8 in., base contracted into a broad petiole or sessile. *Raceme* short, 4–6 in.; bracts membranous; flowers very variable in size, greenish; sepals oblong-lanceolate, ¼–½ in. long, membranous, 3-nerved, filiform tips as long as the blade or shorter; lower segment of the petals sometimes obsolete; segments of lip very variable, the lateral sometimes as long or longer than the middle one, at others they are much shorter and subulate; spur equalling the ovary; anther-cells narrow, parallel, tubes nearly as long as the cells; caudicles of pollinia slender, glands small; stigmatic processes elongate, clavate; rostellum large, triangular, erect. *Capsule* ½–⅔ in., linear-oblong.—A very variable plant; the flowers of the Orissa and Bengal specimens are remarkably small; of some Sikkim ones also very small.

5. **H. macrostachya,** *Lindl. Gen. & Sp. Orchid.* 307; leaves large crowded above the middle of the robust stem, raceme lax-fld., bracts equalling the ovary, segments of petals subequal filiform, segments of 3-partite lip subequal filiform, spur shorter than the ovary. *Thwaites Enum.* 309.

TRAVANCORE; on the Anamallay hills, *Beddome* (in *Herb. Calcutt.*). CEYLON, *Macrae,* alt. 4000 ft., *Thwaites.*

Stem 2 ft. *Leaves* 5–7 in., obovate or oblanceolate, acute, broadly petioled. *Raceme* 6–8 in.; bracts and ovary very narrow; sepals ¾ in. long; petals and lip spotted with red; lip longer than the sepals, spur very slender, thickened downwards; anther-tubes as long as the parallel cells, suberect, pollinia pyriform, glands minute; stigmatic processes long, slender, adnate to the mouth of the lip; rostellum small.—The spur is stoutest in the Travancore specimen.

6. **H. andamanica,** *Hook. f. Ic. Plant. ined.*; leaves crowded towards the middle of the stout stem, raceme lax-fld, bracts rather shorter than the ovary, upper segment of petals very slender, lower broader divided above the middle into 3 filiform laciniæ, side lobes of lip palmately multifid, midlobe linear 3-fid, spur shorter than the ovary.

ANDAMAN ISLANDS; *Parish.*

Stem 12–18 in. *Leaves* 3–4 in., ovate-lanceolate, acute. *Raceme* 6–8 in.; bracts lanceolate; ovary 1¼ in., very slender; sepals ¼ in. long; laciniæ of midlobe of lip filiform; anther-cells parallel, tubes rather shorter than the cells; glands of pollinia minute; stigmatic processes subcylindric, elongate; rostellum erect.

§§ *Sepals without filiform tips.*

7. **H. digitata,** *Lindl. Gen. & Sp. Orchid.* 307; leaves ovate or ovate-oblong, raceme laxly many-fld., lateral sepals ovate acute, dorsal suborbicular, petals bipartite, segments subequal or the upper broader, lip tripartite segments linear, spur equalling the ovary. *Dalz. & Gibs. Bomb.*

Fl. 267. H. trinervia, *Wight Ic.* t. 1701. Bonatea punduana, *Lindl. in Wall. Cat.* 7063. B. benghalensis, *Griff. in Calc. Journ. Nat. Hist.* iv. 382. B. herbacea, *Wall. mss.*

KASHMIR, *Falconer.* ASSAM, *Simmons.* SILHET, *Wallich.* BENGAL, *Griffith.* TENASSERIM, *Parish.* The WESTERN GHATS, from the Concan southwards.

Stem 1–2 ft., leafy. *Leaves* 2–5 in., very variable, acute or acuminate, rarely narrowed into a petiole, from orbicular to lanceolate. *Raceme* 3–5 in.; bracts large, lanceolate, often almost foliaceous and exceeding the flowers; pedicels very short; flowers ½–¾ in. broad, green; segments of petals variable in length, sinus between the segments narrow or rounded; midlobe of lip shorter or longer than the side lobes; spur subclavate, sometimes inflated, with an erect ligule at the mouth; anther-cells parallel, tubes short upcurved; glands of pollinia minute; stigmatic processes clavate; rostellum erect, triangular. *Capsule* shortly pedicelled, ½ in., fusiform, ribs thick.

Var. *foliosa*; smaller, 6–12 in. high, leaves shorter broader imbricating, raceme dense-fld., bracts shorter, segments of lip filiform. H. foliosa, *A. Rich. in Ann. Sc. Nat. Ser.* 2. xv. 71; *Wight Ic.* t. 1700; *Dalz. & Gibs. Bomb. Fl.* 267. H. laciniata, *Dalz. in Hook. Journ. Bot.* ii. (1850) 261. Platanthera marginata, *Wall. Cat.* 7038 B. Orchis mysorensis, *Herb. Heyne*—Nilghiri Mts., alt. 6–8000 ft. Bombay, at Salsette, *Dalzell.*—I have not seen the Salsette plant (*H. laciniata*) of Dalzell, which he describes as having the posticous segment of the petals spirally twisted, and the mid segment of the lip broader than the others; he refers it to *H. foliosa* quoting Wight's plate, and adds that it is allied to *H. lancifolia*, A. Rich.

8. **H. travancorica,** *Hook. f.*; leaves scattered ovate-oblong amplexicaul, raceme lax-fld., lateral sepals ovate acute pubescent within, petals bipartite, segments narrow lower shortest, lip tripartite, segments subequal filiform, spur shorter than the ovary. H. Lindleyana, *Wight Ic.* t. 922 (*not of Steudel*).

TRAVANCORE; on the Pulney Hills, *Wight.*

Stem slender, 12–18 in. *Leaves* 1–2 in. *Raceme* 3–5 in.; bracts as long as the beaked ovary or longer; flowers ½–½ in. diam.; dorsal sepal orbicular; lip longer than the sepals.—The pubescent sepals (not observed by Wight) and habit distinguish this from all forms of *H. digitata*, of which however it may prove to be a variety. The leaves and flowers are much smaller, and the ligule at the mouth of the spur very short.

9. **H. Gibsoni,** *Hook. f. Ic. Plant. incd.*; very stout, leafy, leaves linear-oblong, raceme few-fld., bracts equalling or exceeding the ovary, flowers 1 in. diam., petals bipartite, segments narrow subequal, lip tripartite segments linear-subulate subequal fleshy, mouth of clavate spur broad without a ligule.

The CONCAN; near Kyreswur and at Kandalla, *Gibson.*

Stem 8–12 in. *Leaves* 4–6 in., base sheathing. *Raceme* short, 6–8-fld.; bracts 1–1½ in., membranous, broadly lanceolate, the lower exceeding the flowers; flowers white? as in *H. digitata*, but twice as large; upper segment of petals broadest, fleshy, and anther broad, stigmatic processes adnate to the back of the broad mouth of the spur; rostellum small, triangular, exposed.—Much like a gigantic state of *H. digitata*, but very robust, with much longer leaves, narrower for their length, and few very large flowers, and no ligule at the very broad mouth of the spur.

10. **H. dolichostachya,** *Thwaites Enum.* 309; stem leafy upwards, leaves oblong-lanceolate amplexicaul, raceme lax-fld., bracts as long as the flowers, lateral sepals ovate-lanceolate acute, petals bipartite, lower segment short subulate, lip tripartite, segments filiform the middle longest, spur as long as the ovary slender.

CEYLON; in the Central Province, alt. 5000 ft., *Gardner, Thwaites.*

Stem 2–3 ft., leafless below, slender. *Leaves* 2–3 in. *Raceme* 1 ft.; flowers subsessile, about ½ in. broad; dorsal sepal orbicular, mucronate; lip longer than the sepals, side segments spreading; spur as long as the hardly beaked ovary, mouth with a short ligule; anther broad, cells parallel, tubes long upcurved, glands of pollinia small; stigmatic processes clavate, incurved round the mouth of the spur; rostellum short, triangular.—Nearly allied to *H. digitata*, but the flowers are smaller and the base of the leaves amplexicaul.

11. **H. corymbosa,** *Parish & Reichb. f. in Trans. Linn. Soc.* xxx. 141; very stout, leaves lanceolate, raceme dense-fld., bracts longer than the long-pedicelled beaked ovary, sepals broad acute, petals bipartite, segments slender lower subulate half the length of the upper, lip 3-partite, segments subulate subequal or lateral smaller.

TENASSERIM; at Moulmein, *Parish.*

Stem 2–3 ft., leafy upwards, but naked below, and with only sheaths for the upper half. *Leaves* 3–6 in., base contracted. *Raceme* 3–4 in., very dense-fld.; pedicels filiform; bracts ½–1 in., lanceolate; flowers ¼ in. diam.; sepals 3-nerved; lip not longer than the sepals, spur equalling the ovary, tip clavate; anther-cells divaricate below, tubes as long as the cells; pollinia narrow, glands minute; stigmatic processes elongate, clavate; rostellum triangular, acute.

12. **H. dichopetala,** *Thwaites Enum.* 309; leaves crowded about the middle of the stem ovate or ovate-lanceolate, lateral sepals ovate acute, dorsal orbicular, petals bipartite, segments divaricate elongate lowest narrowest and longest, lip tripartite, segments equal elongate setaceous, spur as long as the ovary slender pendulous.

CEYLON; Bintenne district, *Thwaites (in Herb. Lindl.).*

Stem 1–1½ ft. *Leaves* dark green with a red midrib, petioled. *Raceme* lax-fld.; bracts lanceolate; flowers greenish about ½ in. diam.—The above description is from "Thwaites' Enum." There are two specimens from Thwaites in Lindley's Herbarium which differ somewhat from that description, the leaves are linear-oblong erect and sheath the stem all the way up, the bracts ½–⅔, ovary with pedicel ⅔–1 in., segments of petals subequal on the lower rather than longest, mid segment of lip the shortest, anther-cells distant, stigmatic processes globose; rostellum short.

†† Stem leafy at or near the base only.

13. **H. grandiflora,** *Lindl. in Wall. Cat.* 7032; leaf solitary radical orbicular- or ovate-cordate, flowers few long-pedicelled, petals bipartite upper segment obliquely ovate acuminate lower longer filiform, lip tripartite lateral segments filiform terminal linear or elongate lanceolate, spur longer than the ovary. *Dalz. & Gibs. Bomb. Fl.* 267. H. rotundifolia, *Lindl. Gen. & Sp. Orchid.* 306. Orchis grandiflora, *Herb. Heyne.*

The CONCAN; on the Ghats at Belgaum, Mahabuleshwar, &c., *Heyne,* &c.

Leaf 1–2 in. *Scape* 3–6 in., naked or with 1–2 sheaths, 2- or more-fld.; bracts sheathing, shorter than the pedicel, which with ovary is 1–1½ in.; flowers ½–1 in. broad, white; sepals broad; petals rather smaller; margins of mid-segment of lip recurved, spur obtuse or thickened at the tip, mouth with a caruncled callus; anther 3-cuspidate, cells parallel, tubes rather short broad spreading, glands of pollinia large orbicular; stigmatic processes large, clavate; rostellum elongate, erect.

14. **H. rariflora,** *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 70, t. 2; leaves radical or subradical linear-oblong or lanceolate acute, flowers few long-pedicelled, upper segment of petals ovate acuminate lower usually much longer filiform, lip tripartite, lateral segments filiform, median

linear, spur very long and stout. *Wight Ic.* t. 924; *Dalz. & Gibs. Bomb. Fl.* 269. H. uniflora, *Dalz. in Hook. Journ. Bot.* iii. (1857) 344.

The DECCAN PENINSULA; on the Ghats, ascending to 6000 ft., from Canara to Travancore.

Leaves very variable, in small specimens 2–3 by $\frac{1}{4}$-$\frac{1}{2}$ in. and linear, in others 3–4 by 1 in. and elliptic-oblong, in some cauline 3–5 by $\frac{1}{2}$–$\frac{3}{4}$ in., or ovate complicate and recurved. *Scape* 2–10 in., with 1–2 sheaths; bracts shorter than the stiff erect pedicels, which are as long as the ovary, together 1–2 in.; flowers very variable in size and length of lip, white; dorsal sepal $\frac{1}{8}$-$\frac{1}{3}$ in. broad, lateral 5-nerved; upper segment of petals 3–4-nerved; spur 1–3 in., upcurved; anther large, apiculate, cells parallel, tubes short upcurved, glands of pollinia orbicular; stigmatic processes clavate; rostellum erect slender.—In Dalzell's *H. unijlora* the segments of the petals are described as subequal.

Sect. II. PLATYGLOSSA. (See p. 132.)

* Side lobes of the lip lacerate to the middle or inner margin, midlobe linear.

15. **H. Susannæ,** *Br. Prodr.* 312; tall, robust, leaves ovate-oblong upper sheathing, flowers few very large, lateral sepals subquadrately oblong ascending, petals linear acute, lip not longer than the sepals, side lobes very broad pectinate, spur twice as long as the ovary. *Blume Bijdr.* 402. H. gigantea, *Don Prodr.* 24; *Bot. Mag.* t. 3374; *Grah. Cat. Bomb. Pl.* 201. Plantanthera Susannæ, *Lindl. Gen. & Sp. Orchid.* 295; *Wight Ic.* t. 920; *Dalz. & Gibs. Bomb. Fl.* 269. P. gigantea, *Lindl. in Wall. Cat.* 7052. P. robusta, *Lindl. in Wall. Cat.* 7036; *Gen. & Sp. Orchid.* 295. Orchis Susannæ, *Linn. Sp. Pl.* No. 939. O. gigantea, *Sm. Exot. Bot.* t. 100. O. altissima, *Herb. Ham.*

TROPICAL HIMALAYA, from Garwhal eastwards; the KHASIA, NAGA and MUNNIPORE HILLS, BURMA and the DECCAN PENINSULA to TRAVANCORE.—DISTRIB. China, Malay Islands.

Stem 2–4 ft.; tubers 3–4 in. long. *Leaves* 2–6 in., imbricating up to the flowers, upper cucullate. *Raceme* 3–5-fld.; bracts leafy; flowers 3–4 in. diam., subsessile, white, fragrant; sepals spreading, lateral obtuse, dorsal very broad rhomboid spreading; petals small; side lobes of lip truncate; midlobe linear, or dilated downwards; anther very broad and large, cells slightly divergent, tubes adnate to the sides of the column; pollinia linear, about as long as their caudicle; stigmatic surfaces obscure; rostellum confluent with the face of the column.—This is a true *Platanthera,* in wanting the produced stigmatic processes, and the obscure rostellum, which is marked by a triangular line only.

16. **H. pectinata,** *Don Prodr.* 24; leaves ovate-lanceolate, spike dense-fld., bracts leafy, flowers large, dorsal sepal lanceolate, lateral ovate-lanceolate, petals linear falcate glabrous, lip not longer than the sepals, spur rather longer than the ovary. *Wall. Cat.* 7029 A, and B *in part.* H. Gerardiana, *Wall. Cat.* 7031. H. ensifolia, *Lindl. Gen. & Sp. Orchid.* 321. Orchis pectinata, *Smith Exot. Bot.* t. 99.

TEMPERATE HIMALAYA, from Simla, alt. 5–8000 ft., eastwards, ascending to 9000 ft. in Sikkim. KHASIA HILLS.

Stem 1–2 ft., robust, very leafy. *Leaves* 4–6 in., strongly 3-nerved, upper or all sheathing, rarely linear-lanceolate. *Spike* 3–8 in.; bracts equalling or exceeding the flowers which are 1–2 in. diam. white or greenish; sepals 5-nerved, dorsal erect; petals obtuse, variable in breadth, somewhat dilated on the outer margin, 3–5-nerved; lip as long as the sepals, spur $\frac{1}{2}$–$\frac{2}{3}$ in., tip subclavate; anther very broad and large,

cells rather divergent, tubes short, glands of pollinia small; stigmatic processes elongate, tips often falcate dilated and upcurved; rostellum obscure. *Capsule* ¾ in., sessile, fusiform, ribs thick.—Black when dry.

17. **H. arietina,** *Hook, f.*; habit and foliage of *H. pectinata,* but petals pubescent broader than the dorsal sepals gibbously dilated on the outer (lower) margin, spur rather longer than the ovary. H. pectinata, *Lindl. Gen. & Sp. Orchid.* 341; *Wall. Cat.* 7029 B *in part,* and C.

TEMPERATE HIMALAYA; from Simla eastwards, alt. 5–8000 ft. and to 10,000 ft. in Sikkim. KHASIA HILLS, alt. 5–6000 ft.

So similar in a dried state to *H. pectinata* as to be with difficulty distinguishable, and though separated by Lindley, perhaps only a variety. Unfortunately Lindley in describing both species gave Don's name to the wrong plant, as I have proved by examining Smith's original specimen of *O. pectinata* in his Herbarium at the Linnean Society, which is of a very small state.—Black when dry.

18. **H. intermedia,** *Don. Prodr.* 24; leaves ovate or oblong acuminate, flowers few very large, dorsal sepal recurved, lateral reflexed narrower than the dimidiate obovate falcate glabrous petals, lip longer than the sepals, spur twice as long as the ovary. *Lindl. Gen. & Sp. Orchid.* 322; *Wall. Cat.* 7030; *Reichb. f. in Gard. Chron.* 1879, 136.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 5–7000 ft.

Stem 8-10 in. *Leaves* 2–4 in., scattered, 5-7-nerved, base rounded or cordate. *Racemes* few-fld.; bracts broad, equalling the ovary; flowers 2 in. diam., white or greenish; lateral sepals falcately lanceolate, acuminate, reflexed, 5-nerved; petals strongly 5-nerved; spur very stout; anther-cells with long erect filiform tubes, glands of pollinia small; stigmatic processes long, slender, incurved; rostellum adnate to the face of the column between the anther-cells. *Capsule* 1½–2 in., pedicelled, fusiform, beaked, terete.

19. **H. trichosantha,** *Wall. Cat.* 7028; leaves ovate-oblong or lanceolate, spike lax-fld., bracts shorter than the long-decurved narrow ovary, lateral sepals ovate-oblong or -lanceolate acuminate puberulous, petals linear falcate acuminate, lip longer than the sepals, side lobes capillaceo-multifid, spur longer than the ovary.

BURMA, at Taongdong, *Wallich*; Moulmein, *Parish*; Attran, *Brandis* (*in Herb. Calcutt.*).

Stem 8–18 in. *Leaves* few, 3–6 in., 5–7-nerved. *Raceme* 4–10-fld.; ovary 1 in, sessile; lateral sepals ½ in., deflexed; petals dilated upwards, entire or serrulate, 1-nerved; spur 1½ in.; anther-cells short, with short free tubes, pollinia much shorter than their caudicles, glands small; stigmatic processes short, globose; rostellum an obscure plate between the anther-cells. *Capsule* 1 in., fusiform, shortly beaked, deeply channelled.

** Side lobes of lip petaloid, outer margins entire, toothed, or fimbriate, midlobe narrow.

† *Lip deeply 3-lobed or -partite, not or hardly longer than the lateral sepals.*

20. **H. geniculata,** *Don Prodr.* 25; stem tall leafy with many slender sheaths above, lateral sepals acute, petals linear-oblong, lip suborbicular, side lobes cuneate or rounded fimbriate or crenate, spur longer than the beaked ovary geniculate. Platanthera geniculata, *Lindl. in Wall. Cat.* 7042.—Habenaria, *Griff. Notul.* iii. 406; *Itin. notes,* 31, No. 494; *Ic. Plant. Asiat.* t. 340.

SUBTROPICAL HIMALAYA; from Nepal eastwards. KHASIA and NAGA HILLS, alt. 2–5000 ft. BURMA, *Wallich.*

Stem 1–2 ft., stout. *Leaves* 2–6 in., sessile, oblong-lanceolate. *Spike* 4–20-fld.; bracts as long as the ovary; flowers ¾–1 in long, white; lateral sepals ½ in.; lip often ¾ in. broad; spur subclavate below the knee; anther-cells broad, divaricate, tubes elongate, upcurved, glands of pollinia small; stigmatic processes, clavate, incurved, margining the mouth of the spur; rostellum low, broad. *Capsule* 1 in., shortly pedicelled, beaked, deeply grooved and thickly ribbed.

21. **H. Richardiana,** *Wight Ic.* t. 1713; stem rather slender sheathed above, leaves oblong-lanceolate, spike few- and lax-fld., sepals ovate acuminate glabrous, petals gibbously triangular subacute, lip cuneate strongly nerved, side lobes narrow deeply toothed, spur stout twice as long as the beaked ovary.

NILGHIRI and TRAVANCORE HILLS, alt. 6–8000 ft., *Wight*, &c.

Stem 6–8 in. *Leaves* often subradical, 4–6 in., cauline much smaller, or reduced to sheaths. *Spike* 8–10-fld.; bracts large, lanceolate, shorter than the curved ovaries, which are ⅔ in. long; flowers obscurely puberulous, about ⅔ in. diam.; dorsal sepal smaller than the 5-nerved lateral; side lobes of lip recurved, acuminate, longer or shorter than the linear 3-nerved midlobe, spur 1½ in., slightly thickened downwards; anther-cells distant, tubes short upcurved, glands of pollinia cupular; stigmatic processes large, clavate; rostellum triangular.

22. **H. cephalotes,** *Lindl. Gen & Sp Orchid.* 322; stem short stout closely sheathed above, leaves short broad, spike dense-fld., lateral sepals obliquely ovate and shorter broad gibbous petals and lip scurfily pubescent within, lip cuneately obovate, side lobes fimbriate, spur shorter than the beaked ovary. *Wight Ic.* t. 1711.

NILGHIRI and TRAVANCORE HILLS, alt. 7–8000 ft., *Wight.*

Habit and foliage of *H. Richardiana*, but stouter, stem more densely sheathed, and flowers smaller, crowded in a cylindric or oblong spike; dorsal sepal very broad, obtuse; petals in Wight's figure with a deep sinus on the lower margin; midlobe of lip rather longer than the side lobes; anther-cells broad, nearly parallel, tubes rather long upcurved, glands of pollinia minute; stigmatic processes long clavate; rostellum short broad.

23. **H. polyodon,** *Hook. f*; stem short stout sheathed above, leaves ovate-lanceolate, spike many-fld., bracts sheathing as long as the ovary, sepals obtuse glabrous, petals triangular-ovate obtuse, lip broadly obcordate, side lobes erose or pectinately fimbriate, spur very stout exceeding the stout curved ovary. H. fimbriata, *Wight Ic.* t. 1712.

NILGHIRI HILLS, *Wight*, &c.

Stem 8–10 in., leafy to the top; tubers large. *Leaves* 2–3 in., sheathing, upper cymbiform. *Spike* 3–4 in., lax- or dense-fld.; flowers ⅔ in. diam.; bracts cymbiform; sepals broadly ovate, obtuse, dorsal smallest; petals smaller, triangular, fleshy; midlobe of lip short, oblong, spur clavate; anther broad, cells subparallel, tubes short ascending, pollinia longer than their caudicles, gland minute; stigmatic processes very large, short, stout; rostellum very short, broad.

24. **H. longicornu,** *Lindl. in Wall. Cat.* 7027; *Gen. & Sp. Orchid.* 322 (longicornis); leaves subradical linear-oblong or lanceolate acuminate, spike lax-fld., bracts shorter than the ovary, lateral sepals ovate acute glabrous, petals lanceolate or linear-oblong, lip tripartite, side lobes recurved cuneate fimbriate or crenate, spur stout twice as long as the very long-beaked ovary. H. montana, *A. Rich. in Ann. Sc. Nat. Ser.* ii. xv. 73; *Wight Ic.* t. 925 and t. 1714, *centre figure* and *lower right-hand flower.* Orchis longicornu, *Herb. Heyne.*

NILGHIRI and TRAVANCORE MTS., *Heyne*, &c.

Stem 6–12 in. *Leaves* 2–5 in., usually linear-oblong, rarely (*as figured by Wight*) shorter and broader. *Spike* 3–6-fld.; upper half of ovary almost filiform; flowers nearly 1 in. long; side lobes of lip longer than the linear midlobe; mouth of spur caruncled; anther-cells broad, parallel, tubes rather long spreading, pollinia as long as their caudicles; stigmatic processes short, clavate; rostellum low, broad.

25. **H. platyphylla,** *Spreng. Syst. Veg.* iii. 690; scapigerous, leaves sessile orbicular or elliptic, spike short dense-fld., bracts shorter than the long-beaked ovary, sepals broadly oblong obtuse, petals linear narrow, lip 3-lobed, side lobes small rounded, midlobe lanceolate, spur longer than the ovary slender. *Lindl. Gen. & Sp. Orchid.* 323; *Grah. Cat. Bomb. Pl.* 201; *Wight Ic.* t. 1709. Orchis platyphyllos, *Willd. Sp. Pl.* iv. 10; O. plantaginea, *Roxb. Cor. Pl.* 32, t. 37; *Fl. Ind.* iii. 450. O. Roxburghii, *Pers. Syn.* ii. 503.

The DECCAN PENINSULA; from the Concan and the Circars to Travancore.

Leaves 3–6, appressed to the earth, fleshy, 3–5 in. long, and as broad or narrower. *Scape* 6–18 in.; stout, strict; sheaths many, erect, narrowly subulate; spike 2–4 in., round-topped, flowers white, sweet-scented; sepals concave; ovary 1 in., beak slender, as long as the body; lip much less deeply lobed than in others of this group, margins erose, spur sometimes twice as long as the ovary, mouth funnel-shaped, with a short tooth; anther-cells divergent, tubes long, polliniar glands small; stigmatic processes subglobose; rostellum short triangular.

26. **H. Lindleyana,** *Steud. Nomencl. Ed.* 2, 716; leaves subradical large ovate-oblong acute, scape tall with a few lanceolate sheaths at the tip, raceme few-fld., flowers large, bracts narrowly lanceolate shorter than the very long ovary, dorsal sepal much smaller than the large oblong acute entire lateral, petals small falcate, side lobes of lip narrow linear much shorter and narrower than the linear-oblong obtuse midlobe, spur filiform longer than the ovary. H. latifolia, *Lindl. Gen. & Sp. Orchid* 323.

MALAY PENINSULA (*Ic. Finlayson in Herb. Kew*).

Leaves 5–6 by 2–2½ in., membranous, almost petioled, many-nerved. *Scape* 12 in.; bracts ⅔ in., linear-lanceolate, membranous; ovary 1¼ in.; flowers white, spur green; dorsal sepal broadly ovate, acuminate, reflexed, lateral ⅔ in. long, subfalcate, 5–7-nerved; petals much smaller, acuminate; lip 1 in., rather longer than the sepals, midlobe 3-nerved; tube of anther-cells long, slender; stigmatic processes elongate.—A noble species. Lindley gives "Ceylon, Macrae" as its origin, but as a fine drawing by Finlayson (who collected only in the borders of Siam) is in Herb. Kew, and Thwaites never saw the plant in Ceylon, this is, no doubt, one of several plants in Herb. Lindley wrongly attributed to Ceylon. It is evidently nearly allied to *H. platyphylla.*

27. **H. suaveolens,** *Dalz. in Hook. Journ. Bot.* ii. (1850) 263; leaves subradical linear or linear-oblong acuminate, scape slender, spike few-fld., flowers secund, bracts longer than the ovary narrowly cymbiform acuminate, sepals subequal, petals as long but broader, lip cuneately flabellate, side lobes broad, midlobe as long narrow, spur as long as the curved beaked ovary, tip subclavate. *Dalz. & Gibs. Bomb. Fl.* 268 (*excl. syn.*).

The CONCAN; between Vignorla and Malwan, rare, *Dalzell.*

Leaves 4–6 by ½–¾ in., rather thick. *Scape* 6–12 in., often flexuous; sheaths 1–3 in.; bracts ⅔ in. long, finely acuminate, herbaceous; flowers 3–6, ½ in. broad, white, jasmine-scented; dorsal sepal orbicular-ovate, obtuse, lateral subfalcate, ovate-oblong, acute; petals triangular-ovate, subacute; lip as long as the lateral sepals, as broad as long, side lobes toothed or entire; anther narrow, erect, apiculate, cells contiguous narrow, tubes 0; pollinia clavate, as long as their stout caudicles;

glands large orbicular, lying close together on each side of the erect acute rostellum; (stigmatic processes short, truncate, *Dalzell*).—A very anomalous species of this section.

†† *Lip deeply 3-lobed or -partite, much longer than the lateral sepals.*

28. **H. longifolia,** *Ham. in Lindl. Gen & Sp. Orchid.* 324; stem tall slender leafy, leaves very narrow, spike few- and lax-fld., bracts slender longer than the slender beaked ovaries, sepals small, petals gibbously ovate, lip flabelliform, side lobes semi-circular quite entire, spur slender twice as long as the ovary. Gymnadenia longifolia, *Lindl. in Wall. Cat.* 7060.

WESTERN HIMALAYA; Kumaon, *Royle*; Nepal, at Nathpur, *Hamilton*.

Stem 10–18 in. *Leaves* 3–5 in., scattered, erect, linear, acuminate. *Spike* 2–3 in.; bracts ¾–1 in.; ovary ½–¾ in., curved; flowers white; lateral sepals ⅛ in., oblong-lanceolate, 3-nerved, dorsal smaller; petals 3-nerved, as long as the dorsal; lip ¼–⅜ in. long and broad, twice or thrice as long as the lateral sepals, midlobe linear, shorter than the side lobes; anther beaked, cells parallel, tubes upcurved; stigmatic processes short, clavate, incurved, surrounding the mouth of the spur; rostellum long, subulate, erect.

29. **H. plantaginea,** *Lindl. Gen. & Sp. Orchid.* 323; scapigerous, leaves narrowly oblong, scape slender, spike lax-fld., bracts half as long as the beaked ovary, sepals small, petals linear-lanceolate, lip flabelliform, side lobes semi-ovate entire or toothed, midlobe as long linear, spur as long as the ovary very slender. *Wight Ic.* t. 1710. Gymnadenia platyphylla, *Lindl. in Wall. Cat.* 7053. Orchis platyphyllos, *Roxb. Fl. Ind.* iii. 609. O. tenuis, *Herb. Rottl.*

SUBTROPICAL HIMALAYA, alt. 3–7000 ft., from Garwhal to Sikkim. BEHAR, CENTRAL INDIA, and the DECCAN PENINSULA, from the Concan southwards, *Heyne*, &c. CEYLON, in the hot drier parts of the Island.

Leaves 3–6 in., radical, horizontal, acute or obtuse, membranous. *Scape* 8–12 in., slender; sheaths small, acuminate; spike 2–3 in.; flowers subsecund, white; bracts setaceous or lanceolate; ovary ¾ in., curved; sepals ⅛ in. long, subequal, acute, 3-nerved, dorsal ovate-oblong, lateral falcately oblong; lip ⅛ ⅛ in. broad, twice as long as the lateral sepals, puberulous, spur 1–1½ in. green; anther rather broad, cells divergent, tubes short upcurved, pollinia as long as their caudicles, glands elongate; stigmatic processes large, clavate; rostellum triangular, broad. *Capsule* ¾ in., turgidly fusiform, curved, beak short slender.—In this species the caudicles of the pollinia are at first inserted in the hollow of a single concave 2-lipped or incurved gland of a lanceolate form, which afterwards splits longitudinally, each pollinia carrying away one half.

30. **H. longicalcarata,** *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 71, t. 3; subscapigerous, leaves linear-oblong or lanceolate, flowers 1–4, bracts long convolute much shorter than the long-pedicelled beaked ovaries, sepals broad obtuse, petals oblong-lanceolate acuminate, side lobes of lip dimidiate-ovate acuminate fimbriate or toothed, spur several times longer than the long narrow ovary. *Wight Ic.* t. 925; *Dalz. & Gibs. Bomb. Fl.* 268. H. decipiens, *Wight. Ic.* v. Pt. i. 14. H. montana, *Wight Ic.* t. 1714 (*upper right and left hand figures*) (*not of A. Richard.*) H. longicorniculata, *Grah. Cat. Bomb. Pl.* 202. H. macroceratitis, *Herb. Rottl.*

The DECCAN PENINSULA; on the Western Ghats, from the Concan to Travancore, ascending to 6000 ft.

Stem or *scape* 10–18 in.; sheaths few, distant. *Leaves* 2–4 in. *Flowers* white, asmine-scented; bracts ¾–1 in.; ovary 1 in., suberect, its pedicel sometimes as long; sepals ¼ in. long, 3-nerved; lip ¾–1 in. long, spur thickened from below the middle to

the tip; anther very broad, tubes as long as the cells, pollinia narrowly pyriform shorter than their slender caudicles, which are narrowly winged on one side, glands very small; stigmatic processes surrounding the mouth of the spur; rostellum obscure. —Allied to *H. longicornu*, but much more slender, leaves longer, flowers much larger, lip longer than the sepals, its side lobes broader, and spur very much longer.

31. **H. crinifera,** *Lindl. Gen. & Sp. Orchid.* 323; scapigerous, leaves oblong or lanceolate, raceme lax-fld., bracts much shorter than the pedicelled ovary, sepals broad obtuse, petals linear acuminate, lip clawed sub 4-partite, side lobes cuneate or dimidiate-ovate crenate caudate, midlobe 2-lobuled, spur very slender incurved much longer than the filiform beaked ovary. *Wight Ic.* t. 926; *Dalz & Gibs Bomb. Fl.* 269. H. schizochilus, *Grah. Cat Bomb. Pl.* 282. Symmeria schizochilus, *Grah. l. c. on last (unnumbered) page.*

The DECCAN PENINSULA, from the Concan to Travancore. CEYLON.

Leaves 1–6 in., very variable in breadth. *Scape* 1–18 in., very slender; sheaths scattered, subulate: bracts lanceolate; flowers white, ¾–1½ in. long; dorsal sepal orbicular, subacute, lateral broadly ovate; lip much longer than the sepals, as it were 4-lobed, the lobes tailed; spur with a long erect ligule at the mouth; anther tubes long, straight; caudicles of pollinia winged as in *H. longicalcarata*, glands minute; stigmatic processes clavate, adnate to the mouth of the spur; rostellum very short, obtuse.

32. **H. triflora,** *Don Prodr.* 25; stem leafy 1–2-fld., leaves short sheathing, bracts long embracing the ovaries of the large erect flowers, dorsal sepal oblong-ovate, lateral oblong-lanceolate, petals small linear-subulate, lip very large, side lobes semi-oblong hatchet-shaped crenulate, midlobe shorter linear, spur very slender as long as ovary straight. Platanthera candida, *Lindl in Wall. Cat.* 7035; *Gen. & Sp. Orchid.* 295.

WESTERN HIMALAYA; Kumaon, alt 5000 ft, *Strachey & Winterbottom*; Nepal, *Wallich.* LOWER BENGAL; at Mymensingh, *Clarke.*

Stem 8–12 in., rather slender. *Leaves* 1–3 in., oblong, acute, sometimes all imbricating, or the lower larger and spreading, upper acuminate. Flowers shortly pedicelled; bracts and slender ovary 1–1½ in. long; sepals ½ in. long, suberect; petals 1-nerved; lip 1–1½ in. broad, sessile on the mouth of the spur, and there bigibbous; spur slightly thickened at the tip, mouth funnel-shaped; anther very broad, quadrate, truncate, cells marginal, tubes short free, glands of pollinia minute; staminodes prominent; stigmatic surface inconspicuous; rostellum broad obscure.—The suberect lateral sepals, and sheathed stem recall the species of the *Phyllostachya* section.

*** *Lip short, 3-lobed at the broad apex.*

33. **H. Orchidis,** *Hook. f.*; stem stout leafy, leaves oblong or linear-oblong erect acute, spike short cylindric very dense-fld., bracts longer than the short curved ovaries, flowers small, sepals puberulous, dorsal elliptic, lateral oblong, petals shorter rhombic-orbicular, lip cuneately obovate, spur as long as the ovary slender incurved. Gymnadenia cylindrostachya, *Lindl. in Wall. Cat.* 7056; *Gen. & Sp Orchid.* 278. G. Orchidis, and violacea, *Lindl. Gen. & Sp. l. c.* Platanthera Orchidis, *Lindl. in Wall. Cat.* 7029 A.

TEMPERATE HIMALAYA; Garwhal, alt. 8 9000 ft., *Duthie*; Kumaon, *Wallich*; Sikkim, alt. 8–1000 ft., *J. D. H.*

Stem 1–2-ft. *Leaves* 2–6 in., broad or narrow, sheathing, sometimes short and imbricating. *Spike* 2–5 in; bracts lanceolate, herbaceous; ovary ½ in. long, incurved, subrostrate; flowers ¼–⅓ in diam., pink, odoriferous, perianth spreading;

dorsal sepal oblong; lobes of strongly nerved lip very short, obtuse, equal or the midlobe longest and broadest; anther short, broad, cells parallel contiguous, tubes 0, pollinia clavate almost sessile on the large oblong gland, grains very large and loose; stigmatic processes very large, globose, placed close under the anther, and swelling up after fertilization so as almost to cover it; rostellum minute. *Capsule* small, sessile, ⅛ in. long, broadly ellipsoid or subglobose.—A very anomalous member of the section.

34. **H. monophylla,** *Collett & Hemsl. in Journ. Linn. Soc. ined.*; leaf solitary subradical, stem and many-fld. raceme scurfily pubescent, bracts as long as the ovary or shorter, sepals and petals subequal oblong obtuse glabrous, lip much larger than the sepals clawed cuneately obovate 3-lobed, lateral lobes broad erose, midlobe smaller ovate obtuse, spur as long as the lip incurved obtuse.

UPPER BURMA, *Collett.*

A foot high, rather slender. *Leaf* 2 in., oblong, obtuse, sheathing the base of the stem. *Stem* flexuous; sheaths 2–3, ½ in., and bracts lanceolate, acuminate. *Raceme* 2 in., rather dense-fld.; bracts ¼ in.; flowers about as broad as long; side lobes of lip as broad as long, diverging, disk puberulous, speckled; anther ovoid or globose, cells parallel contiguous, tubes 0, glands of pollinia contiguous orbicular.—Closely allied to *H. Orchidis.* Described from a single indifferent specimen.

Sect. III. TRIMEROGLOSSA. (See p. 132.)

* Tubes of the anther-cells long.

† *Perianth membranous; lateral sepals with deeply looped or arched nerves.*

35. **H. commelinifolia,** *Wall. in Lindl. Gen. & Sp. Orchid.* 325; tall, robust, leaves oblong to oblong-lanceolate, bracts longer than the long-beaked ovary slender, dorsal sepal orbicular much smaller than the gibbously hatchet-shaped beaked lateral, petals oblong, lip with a linear blade dividing into 3 very long filiform segments, spur very long. *Griff. Notul.* iii. 372; *Ic. Plant. Asiat.* t. 339 Platanthera commelinifolia, *Lindl. in Wall. Cat.* 7037. Orchis commelinifolia, *Roxb. Fl. Ind.* iii. 451; *Grah. Cat. Bomb. Pl.* 201. O. stylosanthes, *Herb. Ham.*

TROPICAL WESTERN HIMALAYA; Kumaon, alt. 3500 ft., *Royle, Strachey & Winterbottom.* The CONCAN and CANARA, *Stocks, Law,* &c.

Stem 2–3 ft.; tubers ellipsoid (2–9 in. long, *Roxb.*). *Leaves* 3–6 in., upper or sheaths lanceolate. *Spike* 4–8 in.; ovary 1–1½ in., upper two-thirds filiform; flowers ½–¾ in. diam., white, incdorous; mid segment of lip deflexed, scaberulous, lateral widely spreading; spur 1–2½ in., incurved, green, mouth funnel-shaped; anther reflexed, tubes long straight erect; staminodes seated on the long arms of the column; stigmatic processes large, clavate, incurved; rostellum short, triangular. *Capsule* ½ in., sessile, fusiform, beak twice as long as the body.

36. **H. malleifera,** *Hook. f.*; tall, stout, leaves clustered large oblanceolate acute, spike long many-fld. furfuraceous, dorsal sepal orbicular cucullate much smaller than the large deformed lateral, petals very small, lip longer than the sepals tripartite to the base, segments filiform subequal or central longest, spur half as long as the long-beaked ovary, tip involute globose or clavate.

SIKKIM HIMALAYA; at Senadah, alt. 6000 ft., *King* (*Herb. Calcutt.*). KHASIA HILLS, *Lobb*; at Myrung, alt. 5000 ft., *J. D. H. & T. T.*

Stem with raceme 12–18 in.; hairs cellular, scattered. *Leaves* clustered below the middle of the stem, 5–8 by 1½–2½ in. *Raceme* 4–6 in., lax-fld.; sheaths large, ovate, finely acuminate; bracts ¾–1 in., shorter than the ovary, ovate-lanceolate; flowers greenish, about ½ in. diam.; ovary ¾–1 in., beak very slender; dorsal sepal embracing the anther, lateral reflexed triangular-oblong in outline but with the lower margin so gibbous as to form an obtuse false apex to the 5-nerved sepal, the true apex in which the looped nerves end being close to the base of the sepal; petals gibbously triangular; staminodes adnate to the sides of the anther; anther recumbent, tubes very long decurved; pollinia clavate, caudicle very long, glands minute; stigmatic processes very long; rostellum obscure.

37. **H. Murtoni,** *Hook. f.*; leaves petioled crowded towards the base of the stem oblanceolate, spike puberulous, dorsal sepal orbicular hooded much smaller than the deformed lateral, petals small triangular, lip much longer than the sepals tripartite to the base, segments filiform subequal or lateral shorter, spur longer than the long-beaked ovary slender.

MALAY PENINSULA; Perak, on limestone rocks, *Scortechini, Kunstler.* SINGAPORE, *Murton.*

Stem 2–3 ft., with rather close-set ovate-lanceolate leafy sheaths, 1–2 in. long above the leaves. *Leaves* 6–10 by 2–3 in., narrowed into a broad petiole. *Spike* lax-fld.; bracts ovate-lanceolate, equalling the decurved ovary; flowers ½–¾ in. diam.; upper margin of lateral sepals very short straight, tip lateral, nerves forming deep loops; anther-cells very much as in *H. malleifera,* tubes very long; pollinia shorter than their long caudicles, glands minute; stigmatic processes globose; rostellum obscure.

38. **H. Kingii,** *Hook. f.*; robust, leaves large crowded towards the base of the stem petioled, spike puberulous, dorsal sepal obovate cucullate as long as the cultriform beaked strongly falcate lateral, petals linear-lanceolate obtuse, lip much longer than the sepals tripartite to the base, segments very slender subequal, spur as long as the slender long-beaked ovary.

PERAK; on limestone rocks, *King's Collector.*

Stem 1–2½ ft. *Leaves* 5–10 in., acute or acuminate. *Spike* lax-fld.; bracts ovate-lanceolate, as long as the ovaries; flowers pale silvery green; sepals about ⅓ in. long, acuminate, 5-nerved; petals shorter than the dorsal sepal, 1-nerved; spur slightly thickened downwards; anther closely embraced by the hooded dorsal sepal, tubes very long stigmatic processes and rostellum as in *H. Murtoni.*—Differs from *H. Murtoni* in the form of the lateral sepals, the long dorsal, and in the petals and spur. Both these and *H. furfuracea* are near *H. ciliolaris,* Kranzlein of China, and *H. muricata,* Vidal, of the Philippine Islands.

39. **H. furfuracea,** *Hook. f.*; tall, leaves large obovate or oblanceolate clustered, spike lax-fld. furfuraceous with short cellular hairs, dorsal sepal broadly ovate acuminate hooded as long as the cultriform strongly curved lateral, lip subequally tripartite to the base, spur shorter than the long-beaked ovary tip fusiform.

KHASIA HILLS; at Nunklow, alt. 3–4000 ft., *J. D. H. & T. T.*

Closely allied to *H. Kingii,* but more slender, with a furfuraceous spike and a shorter spur with a fusiform tip. The anthers stigmatic apparatus, &c., are nearly the same in both. This and *Kingii* differ remarkably from *H. malleifera* & *Murtoni* in the less deformed lateral sepals.

40. **H. pubescens,** *Lindl. Gen. & Sp. Orchid.* 322; stem leafy towards the base and elongate many-fld. raceme pubescent, leaves elliptic-lanceolate base narrowed, dorsal sepal hemispheric nearly as long as the dimidiate-ovate obtuse lateral, petals linear, lip much longer than the

sepals tripartite, segments linear obtuse central broadest, spur slender as long as the curved beaked ovary tip acuminate.

WESTERN HIMALAYA; Kumaon or Garwhal, *Royle, Falconer.*

Stem 12–18 in., stout; upper sheaths free, ovate-lanceolate. *Leaves* 4–6 by 1–1½ in., not margined. *Spike* 8–10 in.; bracts ovate-lanceolate, ciliolate, shorter than the ovary which is curved, ½ in., pubescent, beak slender; lateral sepals ½–¾ in. long; tubes of anther-cells long, straight; staminodes large; stigmatic processes globose.—Much the smallest flowered of its subdivision.

41. **H. spatulæfolia,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 140; leaves 2–3 subradical obovate-spathulate, scape slender 2-fld., sheath and bracts large broad cymbiform, dorsal sepal hemispheric as long as the hatchet-shaped lateral, petals linear-oblong falcate, lip tripartite to the base, segments filiform side ones short central very long incurved, spur longer than the ovary tip clavate.

TENASSERIM; at Mergui, *Parish.*

Leaves 4–5 by 1–1½ in., not margined, subpetioled. *Scape* as long; sheath subsolitary; bracts much shorter than the filiform straight beaked pedicelled ovary which is 1¼ in. long; sepals ½ in. long; tubes of anther-cells very long, slender; stigmatic processes short.—Habit of *Diplomeris.*

†† *Lateral sepals curved or nearly straight, nerves straight or moderately arched.*

42. **H. pterocarpa,** *Thwaites Enum.* 309; stem leafy, leaves long linear-lanceolate, bracts equalling the ovary, flowers few very large, dorsal sepal ovate-oblong rather shorter than the falcate oblong-lanceolate acuminate lateral, petals linear-oblong falcate, lip twice as long as the sepals 3-cleft to above the middle, side lobes subulate-lanceolate falcately recurved longer than the straight midlobe, spur very large thrice as long as the beaked ovary thickened from below the middle.

CEYLON; at Kandy, *Walker*; at Ramboddi, alt. 3000 ft., *Thwaites.*

Stem 6–18 in. *Leaves* 4–10 in., base contracted. *Spike* 3–10-fld.; bracts large, ovate-lanceolate; ovary narrowly winged, shortly pedicelled; flowers 1½–2 in. diam., white; ovary 1½ in. long; lateral sepals spreading or deflexed, dorsal rather shorter acute as long as the petals; spur 3½ in., green, narrowly clavate, mouth with a tooth; midlobe with deflexed sides; anther-cells divaricate; caudicles of pollinia exactly as in *H. longicalcarata*; stigmatic processes elongate, clavate; rostellum triangular.

43. **H. rhynchocarpa,** *Hook. f.*; stem leafy, leaves lanceolate, spike short dense-fld., dorsal sepal cymbiform half as long as the broadly ovate-oblong lateral, petals linear, lip as long as the sepals 3-lobed to the middle, lobes linear-lanceolate acute mid one longest, spur much longer than the long slender beaked ovary. ? H. stenopetala, *Lindl Gen. & Sp. Orchid.* 324 (*not of* p. 319). Platanthera rhynchocarpa, *Thwaites Enum.* 310.

CEYLON; above Galagama, alt. 4000 ft., *Thwaites.*

Stem 1–2 ft., leafy below the middle. *Leaves* 2–6 in., sessile. *Spike* 2–3 in., dense-fld.; bracts slender, equalling the ovary or longer; flowers white, ½–⅔ in. diam.; lateral sepals deflexed, subacute; spur 1–1¼ in., cylindric, green, obtuse; anther-cells divaricate, tubes straight; glands of pollinia minute; stigmatic processes elongate, incurved, adnate to the mouth of the lip; rostellum minute.—Lindley's *H. stenopetala* of p. 324 (not of p. 319) is I think a starved specimen of *rhynchocarpa.*

44. **H. vidua,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 140, t. 27, f. 2; leaves subbasal elliptic-lanceolate acute, scape above and flowers puberulous, raceme lax-fld., bracts much shorter than the ovary, dorsal sepal orbicular pubescent rather smaller than the oblong subacute lateral, petals hatchet-shaped, lip tripartite, segments filiform subequal longer than the sepals side ones recurved over the flower, midlobe deflexed, spur longer than the long-beaked ovary acute.

TENASSERIM; at Moulmein, *Parish.*

Stem short, stout, with 1–2 spreading sheaths above the leaves. *Leaves* 3–5 by ½–1½ in. *Raceme* 4–6 in.; bracts ovate, acuminate; flowers ½ in. diam., green and white, sweet scented; pedicel with ovary ¾–1 in., nearly straight; lateral sepals reflexed, margins revolute; spur thickened below; tubes of anther-cells divaricate; pollinia much shorter than their slender caudicles, glands small; stigmatic processes short, clavate, adnate to the mouth of the spur; rostellum short, broad. *Capsule* ¾ in., shortly pedicelled, straight, fusiform, beak short.

45. **H. Mandersii,** *Hemsl. & Collett in Journ. Linn Soc. ined.*; tall, lower leaves linear-oblong upper narrow lanceolate, raceme glabrous, bracts as long as the slender pedicelled long-beaked ovaries, dorsal sepal ovate obtuse as long as the oblong obtuse lateral, petals as long as the sepals linear-oblong obtuse, lip as long as the sepals entire or tripartite nearly to the base lateral segments 0 or shorter than the linear midlobe and recurved, spur twice as long as the ovary geniculate tip clavate.

BURMA; at Mandalay, *Anderson (in Herb. Calcutt.), Collett.*

Stem with raceme 18 in. *Leaves* (imperfect) 3 in., upper narrow ones erect, 1–1½ in. *Raceme* 4 in.; bracts 1 in., ciliolate, lanceolate; ovary narrowly winged; sepals ½ in., 3-nerved, lateral subfalcate; petals usually straight, 3-nerved; margins of midlobe of lip revolute, spur 1–2 in., mouth with a large obtuse ligule with revolute sides, the convex face (towards the mouth) has 2 short conical spurs side by side and a median tooth above them; anther very large, tubes long erect; pollinia much shorter than their long narrowly winged caudicle; glands ovate; stigmatic processes clavate.—The organ at the mouth of the spur is very curious.

46. **H. rostrata,** *Wall. in Lindl. Gen. & Sp. Orchid.* 325; leaves lanceolate acuminate, upper passing into many slender erect sheaths, spike many- and lax-fld., dorsal sepal cymbiform much shorter than the broadly ovate falcate lateral, petals broadly oblong obtuse, lip much longer than the sepals segments very long filiform, spur shorter than the very long-beaked ovary, tip pyriform. Platanthera rostrata, *Lindl. in Wall. Cat.* 7051 A.

PEGU and TENASSERIM, *Wallich.*

Stem 6–12 in. *Leaves* 4–6 by ½–⅔ in. *Spike* 2–4 in.; bracts very slender, ciliolate, longer than the ovary; flowers yellow spotted with brown, about ⅓–½ in. diam.; sepals coriaceous lateral dimidiate oblong, deflexed, 5-nerved, tips turned up; petals oblong, pubescent, falcate, shorter than the sepals; tubes of anther-cells elongate, caudicles of pollinia long, glands linear; stigmatic processes forming a ring round the mouth of the ovary; rostellum very short, triangular. *Young fruit* with the beak as long as the body.

47. **H. acuifera,** *Wall. in Lindl. Gen. & Sp. Orchid.* 325; slender, leaves scattered linear-lanceolate acuminate upper setaceous, spike short, bracts longer than the beaked ovary, sepals obtuse, dorsal broadly oblong shorter than the concave oblong lateral, petals much smaller linear-oblong, lip as long as the sepals, side lobes short subulate, midlobe linear, spur half as long as the ovary. H. linguella, *Lindl. l. c.* 325 (*excl. hab. Ceylon*).

Platanthera acuifera, *Lindl. in Wall. Cat.* 7045. P. rostrata, *Lindl. in Wall. Cat.* 7051 B.

KHASIA HILLS, alt. 4–5000 ft., common. NAGA HILLS, *Prain.* TAVOY, *Wallich.*—DISTRIB. China.

Stem 10–18 in., flexuous. *Leaves* 2–4 by ⅓–½ in., erect, base sheathing, upper and linear lanceolate ciliolate bracts very finely acuminate, ovary ½–⅔ in., rugose, beaked for half its length; flowers golden, ⅔ in. diam.; dorsal sepal strongly 3- lateral 5-nerved; petals 1-nerved; margins of midlobe of lip revolute, spur slightly clavate; anther large, apiculate, tubes long erect, caudicles of pollinia long very slender, glands minute; stigmatic processes clavate, incurved.—Lindley errs in describing the leaves as all radical, and in giving Ceylon as a habitat.

48. **H. chlorina,** *Reichb. f. in Trans. Linn. Soc.* XXX. 140; habit and character of *H. acuifera,* but rather stouter, leaves broader, spike longer, sepals and petals 3-nerved, side lobes of lip large and spur incurved below the middle with a large clavate ellipsoid tip.

TENASSERIM; at Moulmein, *Lobb, Parish.* SHAN STATES, alt. 4400 ft., *Collett.*

Leaves ½–⅔ in. broad. *Spike* 2–3 in. long; flowers at first yellow-green, then spotted with brown, at last brown.—Probably a form of *H. acuifera,* but besides the above difference the flowers are smaller.

** Tubes of anther-cells short.

† Stem leafy upwards.

§ *Bracts lanceolate, acuminate. Flowers not or hardly secund.*

49. **H. elliptica,** *Wight Ic.* t. 1706; leaves all linear-oblong or lanceolate acuminate narrowly margined, spike many-fld., bracts longer than or equalling the ovaries, dorsal sepal shorter than the broadly oblong obtuse lateral, petals triangular-ovate ciliolate, lip as long as the sepals trifid beyond the middle lobes oblong obtuse, spur stout equalling the shortly beaked incurved ovary.

TRAVANCORE; on the Pulney Mts., *Wight.*

Stem 12–18 in., rather stout. *Leaves* 2–3 by ½–¾ in., upper short sheathing, erect or incurved. *Spike* 2–4 in., cylindric; bracts finely acuminate; flowers greenish-white, about ⅛ in. diam.; perianth thick subpuberulous; sepals 3-nerved, dorsal ciliolate almost orbicular, lateral ovate-oblong; petals ⅓ shorter, fleshy; lobes of lip parallel; anther broad, cells distant divaricate, tubes short; pollinia longer than their stout caudicles, glands small; stigmatic processes large, clavate; rostellum broad, triangular.

50. **H. fusifera,** *Hook. f.*; leaves oblong acute narrowly margined, spike many-fld., bracts longer than the ovary, dorsal sepal suborbicular nearly as long as but broader than the oblong obtuse lateral, petals larger than the sepals triangular-ovate, lip larger than the sepals 3-partite to the base, side segments filiform longer than the linear mid segment, spur shorter than the curved ovary fusiform with a short narrow neck.

TRAVANCORE; on the Annamallay Hills, *Beddome (in Herb. Calcutt.).*

Habit of *H. elliptica,* but very different in the shorter not beaked ovary, larger dorsal sepal, and petals, 3-partite lip, and spur; flowers yellow; anther broad, cells divaricate, tubes short; pollinia clavate, caudicles short, glands small; stigmatic processes clavate, incurved, adnate to the mouth of the spur.—I have seen only one specimen.

51. **H. trifurcata,** *Hook. f.*; leaves petioled elliptic-lanceolate acuminate, spike many-fld., bracts equalling the ovary, sepals subequal ovate-lanceolate acute, petals narrowly linear, lip as long as the sepals 3-partite to near the base segments subulate, spur as long as the ovary or longer slender.

KHASIA HILLS; at Nowgong (*Herb. Calcutt.*).

Stem 10–12 in., rather slender, leafless below. *Leaves* 3–4 in., alternate, membranous, not margined, upper or sheaths lanceolate. *Spike* many-fld.; bracts slender, lanceolate; ovary ½–¾ in., slightly curved; sepals ¼ in. long, membranous, 3-nerved; petals as long, 1-nerved; anther oblong, cells contiguous, tubes short divaricate; stigmatic processes elongate, clavate, adnate to the sides of the lip; rostellum narrow, erect.—The petioled scattered leaves and petals distinguish this at once from *H. furcifera*, and the petals and spurs from *fusifera*.

52. **H. avana,** *Hook. f.*; leaves linear-lanceolate acuminate, spike many-fld., bracts longer than the flowers, dorsal sepal very broad, lateral oblong acute, petals as long triangular, lip longer than the sepals tripartite from beyond the base, segments linear-subulate lateral incurved, spur as long as the short not beaked ovary.

BURMA; at AVA, *Mrs. Burney* (*Herb. Calcutt.*).

Stem 6–10 in. *Leaves*, lower 2 in., with long tubular sheaths, upper many erect very narrow. *Spike* dense-fld.; lower bracts ¾ in.; ovary ½ in., curved; sepals rather shorter, dorsal broadly ovate obtuse 5-nerved, lateral deflexed 3-nerved; petals 2-nerved; lip hardly twice as long as the sepals, linear before forking; anther short, rather broad, tips of cells recurved hardly tubular; caudicles of pollinia very short, glands large; stigmatic processes long, clavate, adnate to the lip; rostellum broad, acute, flat.—The specimens are indifferent.

§§ *Bracts large, cucullate. Flowers secund.*

53. **H. Heyneana,** *Lindl. Gen. & Sp. Orchid.* 320; stem stout, leaves subimbricate short sheathing acute, bracts cymbiform acuminate sheathing the flowers, sepals subequal obtuse, petals as long narrow, lip equalling the sepals 3-partite side lobes linear obtuse midlobe longer and broader, spur as long as the ovary or shorter straight subclavate. *Wight Ic.* t. 923, 1703–4; *Dalz. & Gibs. Bomb. Fl.* 268. H. glabra, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 75, t. 5 A. Platanthera Heyneana, *Lindl. in Wall. Cat.* 7044.

The DECCAN PENINSULA; on the Ghats, from the Concan southwards, ascending to 7500 ft. on the Nilghiris.

Stem 6–10 in. *Leaves* 1–1½ in., ovate, erect or recurved, rarely scattered and narrower. *Spike* 2–4 in.; bracts imbricating, lower 1 in. long; ovary ½ in., not beaked; flowers greenish-yellow; sepals ⅛–¼ in., thick, nerves obscure, dorsal ovate-oblong, lateral narrower; petals linear-oblong; lip thick, variable, midlobe oblong or ovate-lanceolate; anther short, cells rather spreading, tubes 0; caudicles of pollinia very short stout, glands very close together, large, orbicular; stigmatic processes very large, spreading, clavate; rostellum short, triangular, acute.—Turns black in drying.

54. **H. subpubens,** *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 75, t. 4 C; leaves linear or linear-oblong scattered, bracts narrowly boat-shaped acuminate, sepals subequal, petals as long falcate, lip spathulate clawed 3-fid, as long as the sepals, side lobes linear midlobe broader, spur as long as the ovary acute. H. candida, *Dalz. in Hook. Journ. Bot.* ii. (1850), 262; *Dalz. & Gibs. Bomb. Fl.* 267.

The SOUTHERN CONCAN, *Perrottet, Jacquemont, Dalzell,* and NILGHIRI HILLS, &c.

Very near *H. Heyneana*, and perhaps only a form of it, but more slender, leaves scattered linear 2–2½ in., bases narrowed, bracts narrower, flowers white, lip very different, spur more slender, anther apiculate, glands of the pollinia approximate and even cohering oblong with recurved sides, stigmatic processes longer, adnate to the claw of the lip.—Does not turn black in drying.

†† Leaves more than three, clustered towards the middle or base of the stem.

55. **H. furcifera,** *Lindl. Gen. & Sp. Orchid.* 319; leaves elliptic, spike long many-fld., bracts as long as the ovary, sepals subequal dorsal ovate-oblong obtuse, lateral falcately oblong-lanceolate subacute, petals as long oblong retuse, lip longer than the sepals trifurcate, side segments filiform longer than the linear mid segment, spur longer than the ovary very slender involute. H. hamigera, *Griff in Calc. Journ. Nat. Hist.* iv. 380, t. 20. H. tennicornis, *Wall. mss.*

TROPICAL HIMALAYA; Garwhal, alt. 2–3000 ft., *Royle, Edgeworth.* BHOTAN, *King.* ASSAM, *Wallich.* ORISSA, *Clarke.* EAST BENGAL, *Griffith.*

Stem 10–18 in., stout, with distant small sheaths above the leaves. *Leaves* 4–6 by 1½–2 in., acute or acuminate, base contracted, not petioled. *Spike* 5–7 in., narrow; bracts ovate-lanceolate; ovary ½ in., curved, hardly beaked; sepals ¼ in. long, 3-nerved, lateral reflexed; petals as long, membranous, 2-nerved; anther rather small, tubes upcurved; stigmatic processes short. *Capsule* ½ in., fusiform, turgid, decurved, ribs thick, beak ¼ as long as the body.

56. **H. affinis,** *Wight Ic.* t. 1707; leaves large elliptic-lanceolate acuminate, spike elongate cylindric, bracts equalling or exceeding the curved beaked ovary, sepals subequal or dorsal longest ovate-oblong obtuse, petals as long linear- or oblong-lanceolate obtuse, lip longer than the sepals 3-partite, side segments narrow longer than the linear obtuse mid segment, spur half as long as the ovary slender incurved.

CENTRAL INDIA; at Singboom, *Clarke.* The CONCAN and CANARA, *Law, Ritchie,* &c. TRAVANCORE; on the Anamallay Hills, *Beddome* (*in Herb. Calcutt.*)

Stem stout, 1–2 ft.; clothed above the leaves with many erect lanceolate sheaths. *Leaves* 4–6 by 2–2½ in., hardly petioled, not margined. *Spike* 4–10 in., rachis stout; bracts ½–⅔ in.; flowers green; ovary ½ in., beak short; sepals ¼ in., 3-nerved; lip twice as long as the sepals; anther broad, cells parallel, tubes shortly upcurved, glands of pollinia small; stigmatic processes large, clavate.—The Travancore specimen has broader segments of the lip than the northern ones.

57. **H. ovalifolia,** *Wight Ic.* t. 1706; subscapigerous, leaves elliptic-lanceolate acute, scape tall, raceme elongate slender lax-fld., bracts as long or half as long as the ovary, dorsal sepal orbicular as long as the ovate obtuse lateral, petals as large as the lateral obtuse, lip as long as the sepals 3-partite side lobes linear-oblong obtuse incurved shorter than the ovate fleshy midlobe, spur slender rather longer than the slender beaked ovary incurved tip thickened acute.

DECCAN PENINSULA; on the Ghats, from the Concan to the Nilghiris.

Tall, 1–2 ft. *Leaves* 2–3, 6–8 by 2–4½ in., sessile or subpetioled, acute or acuminate. *Scape* with a leafy sheath below and slender ones above the leaves; spike 10 in. and under; flowers distant, ¼ in. diam, greenish; bracts lanceolate; nerves of sepals and petals obscure; spur straight, pendulous; anther short, cells diverging, tubes short upcurved, caudicles of pollinia short, glands small; stigmatic processes clavate; rostellum short, broad.

58. **H. marginata,** *Coleb. in Hook. Fl. Exot.* t. 136; subscapigerous, leaves few subradical sessile oblong or linear-oblong margins yellow, spikes many-fld., bracts equalling the ovary, dorsal sepal broadly ovate as long as the oblong-lanceolate lateral, petals ovate falcate, lip longer than the sepals tripartite side segments slender longer than the linear obtuse central, spur stout equalling the curved ovary or shorter inflated below. *Lindl. Gen. & Sp. Orchid.* 320; *Dalz. & Gibs. Bomb. Fl.* 268; *Griff. Notul.* iii. 371; *Ic. Plant. Asiat.* t. 341; *in Calcutt. Journ. Nat. Hist.* iv. 382. Platanthera marginata, *Lindl. in Wall. Cat.* 7038. H. promensis, *Wall. Cat.* 7033; *Lindl. Gen. & Sp. Orchid.* 320. Orchis mysorensis and clavata, *Herb. Heyne.*

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 5–7000 ft. BEHAR and BENGAL (*wild in Bot. Gard. Calc.*). BURMA, *Wallich.* The DECCAN PENINSULA, common on the Western Ghats.

Leaves ½–5 in. *Scape* 1–10 in.; sheaths many, erect, lanceolate, broad or narrow. *Spike* 2–6 in., cylindric; bracts ciliolate; flowers ½ in diam., yellow-green; lateral sepals 3-5-nerved, deflexed; petals as long, 2-nerved; spur clavate or fusiform below the middle; anther-cells distant, tubes short spreading funnel-shaped; caudicles of pollinia short, glands large; stigmatic processes long, adnate to the lip; rostellum triangular, acute. *Capsule* ½ in., fusiform, turgid, curved, obscurely beaked.

59. **H. flavescens,** *Hook. f.*; scape slender, leaves few radical linear-oblong yellowish when dry margined with yellow, scape slender few-fld., bracts equalling the ovary, dorsal sepal broadly ovate, lateral oblong-lanceolate acute, petals larger than the sepals ovate-oblong, lip rather longer than the sepals 3-partite side-segments slender, mid-segment linear-oblong margins recurved, spur shorter than the ovary tip clavate.

The CONCAN, *Law*, &c.

A much more slender plant than *H. marginata*, turning yellow when dry, with fewer smaller flowers, and a more distinctly beaked ovary; but perhaps only a form of that plant.

60. **H. viridiflora,** *Br. Prodr.* 312; scapigerous, leaves shorter than the scape linear-lanceolate not margined, raceme many-fld., bracts much shorter than the beaked ovaries, dorsal sepal orbicular-ovate much shorter than the broadly oblong lateral, petals broadly obliquely ovate as long as the dorsal sepal, lip longer than the sepals 3-partite, segments slender, spur as long as the beaked ovary thickened below. *Lindl. Gen. & Sp. Orchid.* 319; *Wight Ic.* t. 1705. H. graminea, *A. Rich in Ann. Sc. Nat. Ser.* 2, xv. 73 (*not of Lindl.*). H. tenuis, *Griff. in Calc. Journ. Nat. Hist.* iv. 379, t. 20; *Notul.* iii. 369; *Ic. Plant. Asiat.* t. 342. Orchis viridiflora, *Swartz. in Act. Holm.* 1800, 206; *Willd. Sp. Pl.* iv. 13.

LOWER BENGAL, *Griffith, Clarke.* The DECCAN PENINSULA; in rice fields, *Heyne*, &c. CEYLON, alt. 5–7000 ft., *Walker*, &c.

Tubers ovoid, ¾–1 in. long. *Leaves* many, 2–4 by ⅓–½ in., acuminate, nerves obscure. *Scape* 4–14 in., slender, sheaths many and bracts lanceolate; raceme rather close-fld.; flowers ¼ in. diam., greenish-yellow; sepals 3-nerved, lateral reflexed; segments of lip variable in length; ovary ¾ in. long; anther-cells short, divaricate, tubes short upcurved, caudicles rather shorter than their pollinia; stigmatic processes clavate; rostellum short, broad. *Capsule* ¾ in., fusiform, straight or curved, beak short, pedicel ¼ in.

Var. *Dalzellii*; leaves radical linear 3–5 in., scape very slender wiry, flower rather smaller, spur longer than the ovary slender incurved. Cæloglossum luteum

Dalz. in Hook. Journ. Bot. ii. (1850), 263; *Dalz. & Gibs. Bomb. Fl.* 269 (*excl. syn.*).—The Deccan Peninsula; Malwan, *Dalzell*, &c.

61. **H. khasiana,** *Hook. f.*; scapigerous, leaves linear not margined, scape slender, raceme elongate, bracts much shorter than the ovary, sepals 3-nerved, dorsal nearly as long as the rather narrower lateral, petals as long ovate-lanceolate, lip much longer than the sepals, side segments much the longest filiform, spur as long as the beaked ovary rather stout slightly incurved. H. graminea, *Lindl. Gen. & Sp. Orchid.* 318 (*not of Sprengel*). Platanthera linifolia, *Lindl. in Wall. Cat.* 7041 (*the Silhet plant*).

KHASIA HILLS; in grassy places, alt. 4–5000 ft., common.

Leaves 3–4 by $\frac{1}{6}$–$\frac{1}{4}$ in., acute or acuminate. *Scape* with elongate raceme 8–12 in.; sheaths very few and bracts lanceolate; ovaries $\frac{1}{2}$–$\frac{2}{3}$ in., suberect, curved, shortly pedicelled and beaked; flowers sweet-scented, yellow, narrow; the strictly deflexed lateral sepals and erect dorsal sepal are in one line, $\frac{1}{2}$ in. long; anther broad, cells subparallel, tubes short; caudicles of pollinia short stout, gland rather large; stigmatic processes clavate, adnate to the mouth of the spur, rostellum very short, broad. *Capsule* $\frac{1}{3}$ in., subsessile, fusiform, not beaked.—Very near *H. viridiflora*, from which the narrower leaves, shorter pedicels, subequal sepals, of which the dorsal is narrower and erect, and stout spur distinguish this.

62. **H. ditricha,** *Hook. f.*; scapigerous, leaves linear acute not margined, spike few-fld., bracts as long as the ovary, sepals 1-nerved dorsal broadly ovate as long as the lanceolate acute lateral, petals as long ovate-lanceolate acute, lip much longer than the sepals 3-partite, side segments capillary, spur longer than the beaked curved ovary slender incurved.

TENASSERIM; at Moulmein, *Lobb.*

Leaves as in *H. khasiana*. *Scape* with few-fld. raceme 2–4 in.; sheaths few, membranous; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., ovate-lanceolate; flowers few, $\frac{1}{4}$ in. broad; ovary $\frac{1}{4}$ in., sessile, curved; dorsal sepal obtuse, obscurely 5-nerved; mid segment of lip shorter than the lateral; spur hardly thickened at the tip; anther-cells divaricate, tubes short; pollinia and stigmatic processes as in *H. khasiana*.—Very near *H. khasiana*, but the scape is very short, the bracts different, the ovary shorter, and the flowers smaller. Lobb's specimens have all short scapes.

††† Leaves 2, rarely 3, radical or opposite on the stem, sessile, broadly ovate-cordate or oblong.

63. **H. crassifolia,** *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 72, t. 3 C; leaves radical orbicular or broadly ovate-cordate margined fleshy, raceme many-fld., bracts large exceeding the ovary, sepals and petals short broad, lip subequally 3-fid hardly longer than the sepals, lobes linear-oblong obtuse, spur equalling the beaked ovary. H. brachyphylla, *Reichb. f. in Trans. Linn. Soc. Ser.* 2, iii. 113. Platanthera brachyphylla, *Lindl. Gen. & Sp. Orchid.* 293; *Wight Ic.* t. 1694; *Dalz. & Gibs. Bomb. Fl.* 269.

The DECCAN PENINSULA; from the Concan to the Nilghiris, common.

Leaves 2–3, 1–1½ in. diam. *Scape* 6–12 in., stout; sheaths many, finely acuminate. *Spike* 6–8 in., narrow; bracts ovate-lanceolate, sheathing; flowers ¼ in. diam., greenish-white, rather fleshy; sepals 3-nerved; petals 1-nerved; side lobes of lip hardly spreading; bases of anther-cells distant, tubes very short spreading; stigmatic processes short; rostellum small, erect.—The Khasian habitat taken by Reichenbach from Lindley's Herbarium is an error.

64. **H. diphylla,** *Dalz. in Hook. Journ. Bot.* ii. (1850) 262; leaves radical orbicular cordate margined, raceme many-fld., bracts much shorter

than the ovary, sepals ovate-oblong subequal, petals as long linear, lip much longer than the sepals 3-partite, segments filiform lateral longest, spur about equalling the ovary inflated acute. *Dalz. & Gibs. Bomb. Fl.* 268. H. Jerdoniana, *Wight Ic.* t. 1715. H. Sutleri, *Reichb. f. in Linnæa* xxv. 229. Platanthera canarensis, *Lindl. in Plant. Hohenack exsicc.*, No. 142. Liparis diphyllos, *Nimmo in Grah. Cat. Bomb. Pl.* 252.

Western Himalaya; Garwhal, *Falconer*. Eastern Bengal; Dacca, *Clarke*. The Deccan Peninsula; from the Concan to Malabar.

Leaves 1–2 in. diam., thinly fleshy. *Scape* 4–10 in., slender; sheaths many, small. *Spike* 2–4 in., narrow; bracts ¼ in., acute; flowers about ½ in. diam.; ovary ½ in., hardly beaked; dorsal sepal ovate, lateral oblong, acute, 3-nerved; anther broad, cells diverging, tubes very short; stigmatic processes elongate, clavate, adnate to the mouth of the spur; rostellum obscure.

65. **H. Aitchisoni,** *Reichb. f. in Trans. Linn. Soc. Ser.* 2, *Bot.* iii. 113; leaves opposite orbicular cuspidate, scape tall, spike elongate, flowers subsecund erect, bracts half as long as the ovary, sepals subequal oblong-ovate obtuse, petals as long ovate-lanceolate, lip as long as the sepals 3-partite above the base, side segments longest spreading and recurved, spur shorter than the short curved ovary clavate. H. brachyphylla, *Aitch. & Hemsl. in Journ. Linn. Soc.* xix. 118.

Temperate Himalaya; Kashmir, alt. 7000 ft., *Falconer*, &c.; Kumaon, alt. 9–12,000 ft., *Duthie*; Sikkim, alt. 10–11,000 ft., *J. D. H.*—Distrib. Affghanistan.

Very variable in size and stoutness, 10–18 in. high. *Leaves* inserted above the base of the stem, 1–3 in. broad, not margined. *Scape* sometimes as thick as a goose-quill; sheaths few, small; spike rather dense-fld.; bracts ¼ in., acute or acuminate; flowers ¼ in. diam., greenish; sepals 3-nerved, lateral spreading, dorsal erect; petals 1-nerved; mid-segment of lip straight; anther short, broad, cells parallel, tubes very short upcurved; stigmatic processes large, clavate; rostellum minute.

Var. *Josephi*; smaller, 2–4 in. high, leaves 1–1½ in., spike few-fld. H. Josephi, *Reichb. f. l. c.* 111.—Kumaon, alt. 10–11,000 ft., *Duthie*; Sikkim, alt. 12–14,000 ft., *J. D. H.*, *King's Collector*.

66. **H. reniformis,** *Hook. f.*; leaves 1–2 radical orbicular or oblong, scape slender few-fld., bracts much shorter than the ovary, sepals and petals subequal ovate or ovate-lanceolate acute, lip longer than the sepals entire or 3-partite with slender segments, spur shorter than the ovary or 0.—Herminium reniforme, *Lindl. in Wall. Cat.* 7067. Aopla reniformis, *Lindl. in Bot. Reg. under* t. 1701; *Gen. & Sp. Orchid.* 304, 457; *Benth. Fl. Hongk.* 363. Listera reniformis, *Don Prodr.* 28.

Nepal, *Wallich*. Khasia Hills, alt. 4–5000 ft., *Lobb*, &c.—Distrib. China.

Leaves ½–¾ in. long, fleshy, very variable in form, sessile, obtuse. *Scape* with 4–6-fld. spike 3–6 in., wiry; sheaths few, small; bracts lanceolate; flowers about ¼ in. diam., green; sepals 3-nerved, lateral deflexed; lip (in the Peloria state) entire and linear-oblong, or with two small basal teeth; in the perfect state with three very narrow often tortuous divaricate segments longer than the sepals; spur usually wholly absent, if present slender, nearly as long as the ovary, slightly incurved; anther-cells nearly parallel, tubes very short; caudicles of pollinia short, glands large?; stigmatic processes large, subcylindric or clavate; rostellum short, triangular, acute.—A puzzling little plant, which in the Khasia usually and in Nepal has been collected only in the *Peloria* form, without spur, and with an entire lip. Bentham (in Gen. Plant.) retains it in *Herminium* from which it differs in being normally spurred. It is obviously allied to *H. Aitchisoni*.

Sect. IV. HOLOGLOSSA (see p. 132). See also *H. Mandersii* and *reniformis*.

* Stigmatic processes large.

† *Stem leafy upwards.*

67. **H. latilabris,** *Hook. f.*; leaves sessile ovate or oblong acuminate, spike many-fld., bracts green longer than the ovary, dorsal sepal broadest, lateral broadly ovate, petals dimidiate-ovate or broadly ovate, lip linear or lanceolate, spur flexuous longer than the curved beaked ovary. Platanthera acuminata, *Lindl. in Wall. Cat.* 7040; *Gen. & Sp Orchid.* 289. P. latilabris, *Lindl. Gen. & Sp. l. c.* P. orchidis, *Wall. Cat.* 7039 B.

TEMPERATE HIMALAYA; from Kashmir, alt. 5 10,000 ft., to Sikkim, alt. 7–12,000 ft. CENTRAL INDIA, *Hope* (*Herb. Clarke*).

Stem 6–18 in., stout or slender, leafy. *Leaves* 3–5 in., usually sheathing. *Spike* 3–10 in., lax-fld.; bracts ovate-lanceolate, lower leafy; ovary ½–½ in., curved; flowers yellow-green, ⅓–½ in. diam. or more; sepals 3–5-nerved, glabrous or ciliolate, lateral spreading or deflexed, dorsal orbicular concave; petals as long as the lateral sepals, variable in shape, fleshy, lower base gibbous; spur stout or slender, often involute and upcurved; anther-cells contiguous, tubes 0; caudicles of pollinia very short, glands small; stigmatic processes large, subglobose; rostellum short, triangular, obtuse. *Capsule* ½ in., sessile, fusiform, shortly beaked, more or less curved or twisted.—A very common and variable species in the Himalaya.

68. **H. stenantha,** *Hook. f.*; leaves many sessile oblong, spike many-fld., bracts green much longer than the flowers, dorsal sepal oblong, lateral linear deflexed, petals erect as long as the sepals linear, lip linear obtuse, spur flexuous longer than the straight obtuse ovary.

TEMPERATE HIMALAYA; Sikkim, alt. 8 12,000 ft, *J. D. H., Clarke.*

Very near to *H. latilabris*, differing in the form of the lateral sepals and petals, which are very narrow, and straight; and the former being sharply deflexed, whilst the latter are erect; the flower hence looks as if laterally compressed. The lip also is very narrow, but more so than in forms of *acuminata*, with which *stenantha* agrees in the column, anthers, pollinia, stigma and rostellum.

69. **H. densa,** *Wall. in Lindl. Gen. & Sp. Orchid.* 326; tall, stout, leaves many ovate or oblong acuminate base sheathing, spike very long narrow stout, bracts sheathing and exceeding the very short ovaries, flowers very small, sepals obtuse puberulous, lip linear obtuse as long as the sepals, spur clavate shorter than the ovary. Platanthera densa, *Lindl. in Wall. Cat.* 7046. P. clavigera, *Lindl. Gen. & Sp. Orchid.* 289.

TEMPERATE HIMALAYA; from Simla to Sikkim, alt. 5–9000 ft.

Stem 1–3 ft. usually much stouter than in any form of *H. acuminata* or its allies. *Leaves* 3–5 by 1–2 in. *Spike* 8–14 in., rather dense-fld.; rachis stout; bracts ½–⅔ in., finely acuminate; ovary ⅓ in., stout, curved, shortly beaked; flowers erect, ¼ in. diam.; sepals subequal, thick, 3-nerved; petals nearly as long, obliquely ovate or narrower, obtuse, fleshy; lip with a tooth at the mouth of the spur; anther short, broad, cells parallel, tubes 0; pollinia subglobose, almost sessile on the large orbicular gland; stigmatic processes large, shortly clavate; rostellum small, erect.—Varies greatly in size; a Wallichian specimen from Nepal is 3 ft. high, with leaves 6 by 2 in., and a fruiting spike nearly 18 in. long. The most distinct species of its group.

†† *Leaf solitary at or below the middle of the stem (rarely 2). Flowers subsecund. Rootstock or root branching (I think in all).*

70. **H. oligantha,** *Hook. f.*; stem slender naked above the usually solitary oblong leaf, bracts lanceolate herbaceous much longer than the flower usually divaricate, sepals and petals subequal, spur stout about as long as the shortly beaked ovary incurved clavate.

SIKKIM HIMALAYA; in the interior valleys, alt. 10–12,000 ft., *J. D. H.*

Stem 5–10 in. *Leaf* sessile, 2–4 by ¾–1½ in., obtuse or subacute. *Spike* 1½–4 in., lax-fld.; bracts spreading, lower ¾–1 in., green, upper gradually smaller, uppermost hardly exceeding the short sessile curved ovary; sepals ¼ in. long, oblong or oblong-lanceolate, subacute, obscurely 3-nerved, subciliolate; petals as long, triangular-lanceolate, base of lower margin gibbous; lip linear-lanceolate, fleshy; anther-cells parallel, tubes 0; pollinia pyriform, caudicles short, glands minute; stigmatic processes short; rostellum fleshy, triangular, obtuse.

71. **H. leptocaulon,** *Hook. f.*: stem slender, with 2-3 narrow distant sheaths above the linear-oblong acute leaf, spike slender few-fld., bracts equalling the erect curved ovary, sepals and petals subequal, spur slender as long as the ovary incurved.

SIKKIM HIMALAYA; Lachen Valley, alt. 10–11,000 ft., *J. D. H.*

Stem 8–12 in. *Leaf* below the middle of the stem, 1½–4 by ⅔ in.; sheaths above the leaves 1–1½ in., linear-lanceolate, erect. *Spike* 3–8-fld., 1–2 in., rachis slender; bracts ⅓–½ in., erect, slender; sepals ¼ in. long, 1-nerved, lanceolate, acute; petals broader than the sepals, triangular-lanceolate from a broad gibbous base, fleshy; anthers as in *H. oligantha*, but rostellum shorter, and glands of pollinia large, oblong, resting on the sides of the rostellum; stigmatic processes short.—Near *H. oligantha*, but distinguished by the narrow leaves, the sheaths above them, small bracts, and long slender spur.

72. **H. pachycaulon,** *Hook. f.*; stem short very stout with 2 or 3 large herbaceous sheaths above the solitary oblong leaf, spike short dense-fld., bracts herbaceous much longer than the flowers, sepals and petals subequal, lip ovate-lanceolate, spur equalling the ovary incurved clavate.

SIKKIM HIMALAYA; Lachen Valley, alt. 12,000 ft., *J. D. H.*; Nattong, *King's Collector.*

Rootstock branched; roots thick, fleshy. *Stem* 4–6 in., as thick as a goose-quill or less. *Leaf* 2½–3½ by ¾–1½ in., thick, obtuse; sheaths 1–1½ in., lanceolate. *Spike* 1½–2 in.; bracts ¾–1 in., many-nerved; flowers purple; ovary ½ in., hardly beaked; sepals thick, linear-oblong, 1-nerved, ciliolate, petals shorter, ovate-oblong, fleshy; lip fleshy, subacute; anther-cells parallel; glands of pollinia oblong resting on the sides of the short acute rostellum; stigmatic processes obscure.

73. **H. nematocaulon,** *Hook. f.*; stem very slender naked or with one or two sheaths above the small oblong subacute leaf, spike very slender lax-fld., bracts half the length of the erect ovary, flowers minute, sepals erect and petals subequal, lip oblong-lanceolate, spur very short clavate.

SIKKIM HIMALAYA; alt. 10–12,000 ft. *J. D. H., Clarke.*

Stem 3–8 in. *Leaf* towards the base of the stem, 1–1½ in.; sheaths usually very small, rarely green and leaf-like. *Spike* 2–4 in. long; bracts membranous; ovary ½–⅔ in., hardly beaked; flowers ⅓ in. long; sepals ovate-lanceolate, acute, 1-nerved; petals as broad as the dorsal sepal, triangular-ovate, acute, 1-nerved; lip not fleshy, 5-nerved, obtuse; spur not half the length of the sepals, neck contracted; anther short, broad, cells parallel, glands of pollinia rather large, resting on the sides of the erect fleshy rostellum; stigmatic processes globose. *Capsule* ½ in. long, sessile, erect, fusiform, beaked.—The erect lateral sepals, minute flowers and short spur, are those

of *Sect. Peristylus*, to which this species is perhaps referable, but the branched rootstock, habit, and habitat induce me to refer it here.

** No stigmatic processes.

74. **H. arcuata,** *Hook. f.*; stem very robust leafy, leaves oblong or lanceolate, bracts herbaceous narrow longer than the large flowers, dorsal sepal beaked, petals small linear membranous, lip twice as long as the sepals linear, spur many times longer than the ovary. Platanthera arcuata, *Lindl. Gen. & Sp. Orchid.* 289.

WESTERN HIMALAYA; *Royle*; Naini Tal, *Davidson*.

Stem as thick as the little finger. *Leaves* 3 4 in., oblong, subacute, upper lanceolate, bases sheathing. *Spike* many-fld.; lower bracts 1–1½ in., linear-lanceolate; ovary 1½ in., hardly beaked, curved; sepals ¼ in. long, dorsal cucullate, lateral larger, oblong, obtuse, 3-nerved, deflexed; petals very narrow, 1-nerved; lip large, linear, with rounded shoulders at the base, puberulous, sides reflexed, spur 2–2½ in., incurved, acute; anther large, broad, cells divergent, tubes erect; pollinia with stout, short caudicles, glands very large, ovate; rostellum broad, flat, acute.—A very remarkable species, with the lip of *Hologlossa*, but anther of the larger *Trimeroglossæ*. I have seen but one specimen from Col. Davidson, and a rude tracing in Herb. Lindl., of Royle's plant.

75. **H. sikkimensis,** *Hook. f.*; stem stout leafy, spike elongate laxfld., bracts herbaceous longer than the large flowers, petals as large as the sepals triangular-lanceolate, lip as long as the sepals linear, spur rather onger than the ovary very stout obtuse strongly incurved.

SIKKIM HIMALAYA; on Sinchal, alt. 8 9000 ft., *Thomson*.

Stem with spike 10–12 in. *Leaves* 3–4 in., narrowly oblong. *Spike* 3 4 in.; bracts lanceolate, acute, lower 1¼ in., spreading and reflexed; ovary ¾ in., strongly curved, hardly beaked; sepals 3-nerved, green, dorsal broadly ovate obtuse rather shorter than the oblong-lanceolate acuminate spreading lateral; lip linear; anther broad, cells narrow, distant, tubes short; pollinia rather shorter than their stout caudicles, glands small; rostellum obscure, very broadly triangular.—Closely allied to *H. acuminata*, but flowers much larger, and there are no stigmatic processes or rostellum. The broad anthers and its cells are those of *H. arcuata*. Only one specimen seen.

76. **H. concinna,** *Hook f. Ic. Plant. ined*; small, stem many-leaved, leaves small sessile erect ovate or oblong, spike many-fld., bracts longer than the small flowers herbaceous, lateral sepals linear longer and much narrower than the dorsal and petals, lip linear from a broad base as long as the sepals, spur as long as the ovary slender incurved acute.

KHASIA HILLS; at Kala-pane, alt. 5000 ft., *J. D. H. & T. T.*; *Clarke*

Root of thick tuberous fibres. *Stem* with spike 4 8 in. *Leaves* almost imbricating, amplexicaul, lower 1–1½ in. obtuse, upper gradually smaller acute; spike 2 4 in., rather dense-fld.; bracts ⅓ in., ovate-lanceolate, acute; ovary ¼ in., suberect; dorsal sepals 3-nerved, ovate, obtuse; lateral ⅛ in. long, reflexed, obtuse, 1-nerved; petals as long as the dorsal sepal, 1–3-nerved; lip narrow; anther large, cells distant, bases slightly divergent, tubes 0; pollinia as long as their caudicles, glands small, rostellum triangular.—The habit is that of *Sect. Peristylus*.

77. **H. zosterostyloides,** *Hook. f.*; radical leaves long-petioled elliptic acute, cauline sessile ovate-cordate amplexicaul, racemes long sparse-fld., bracts as long as the ovary, lateral sepals linear-oblong obtuse rather longer than the rounded ovate dorsal, petals as large as the dorsal sepal triangular-ovate, lip linear as long as the sepals, spur as long as the ovary slender acute.

MALAYAN PENINSULA; on Mt. Ophir, *Griffith* (*Kew Distrib.*, 5359), *Lobb*, PERAK, *Scortechini*, alt. 7000 ft., *Wray*.

Root of thick tomentose fibres spreading from the crown, which gives off one or more long-petioled leaves and a tall rather slender scape. *Radical leaf* 4–6 in. *Scape* with the raceme 12–18 inches high, with membranous basal sheaths, and bearing one or more sessile or oblong leaves about the middle, and with 2–3 small distant ovate herbaceous sheaths above them. *Spike* 4–6 in.; flowers distant; bracts ½ in. long, lanceolate, acuminate; sepals dorsal, 3-nerved, nearly orbicular, lateral ¼ in. subacute, reflexed; lip elongate, linguiform, obtuse; anther broad, cells distant divergent, tubes hardly any; pollinia shorter than their stout caudicles, glands large orbicular; stigmatic processes 0; rostellum very obscure. *Capsule* (immature) sessile, curved.—A remarkable species, in habit unlike any other. The solitary long-petioled radical leaf, sometimes distant from the flowering stem, is very peculiar, and closely resembles that of *Cryptostylis* (Zosterostylis, *Blume*), *zeylanica*.

Sect. VI. PERISTYLUS. (See p. 132.)

* Spur as long the sepals, or longer, or shorter in *H. aristata*.

† *Leaves scattered along the stem, or radical.* (*See also* 83. H. Gardneri.)

78. **H. bicornuta,** *Hook. f.*; leaves lanceolate or ovate-lanceolate, spike long many-fld., bracts equalling or exceeding the ovary, lateral sepals linear obtuse, petals as long elliptic, lip tripartite, segments filiform, lateral longer than the sepals recurved over the flower, mid-segment shorter, spur longer than the sepals clavate or fusiform incurved. Peristylus Richardianus, *Wight Ic.* t. 1097.

The WESTERN GHATS; on the Nilghiri and Pulney hills, ascending to 6500 ft.

Stem 1 2 ft., rather stout. *Leaves* 2 3 in., sessile, acute or acuminate, 5–7-nerved. *Spike* 6 10 in., rather dense-fld.; bracts herbaceous, lanceolate, acuminate, lower ½ ¾ in.; sepals ¼ in. long, dorsal oblong obtuse sub 5-nerved, lateral erect at length spreading; petals 1-nerved; lip with a large concave claw, mid-segment variable in length from triangular to linear, straight, obtuse; spur stout; anther minute, cells parallel, tubes 0, pollinia clavate, caudicles short; stigmatic processes long, lying in the claw of the lip; rostellum truncate, plicate, concealing the base of the cells and pollen glands ?—Blackens when dry. Differs from *stenostachya* in the larger flowers, long side lobes of the lip, and spur.

79. **H. stenostachya,** *Benth. Fl. Hongk.* 362; leaves lanceolate acuminate, spike narrow lax- or dense-fld., flowers small, bracts equalling or exceeding the ovary, lateral sepals linear obtuse, petals larger than the sepals triangular-ovate or oblong fleshy, lip as long as the sepals 3-fid, side lobes subulate, midlobe usually shorter broader and obtuse, spur straight about as long as the ovary. H. peristyloides, *Wight Ic.* t. 1702. Platanthera stenostachya, *Lindl. in Hook. Journ. Bot.* VII. (1855) 37. Gymnadenia ? tenuis, *Lindl. in Wall. Cat.* 7057. Cœloglossum densum, *Lindl. Gen. & Sp. Orchid.* 302. C. peristyloides, *Reichb. f. in Bonpland.* 1856, 321. C. cernuum, *Rf. l. c.* 1855, 250.

SIKKIM HIMALAYA, *King* (*Herb. Calcutt*), the KHASIA HILLS, TENASSERIM, and the DECCAN PENINSULA, from the Concan Southward.—DISTRIB. China.

Stem with the spike 6–30 in., usually slender, with many small sheaths above the leaves. *Leaves* 1–4 in., sometimes all subradical, erect, bases sheathing, 5–7-nerved. *Spike* 3 5 in.; flowers small, erect, greenish yellow or white, about ⅓ in. diam.; bracts ¼–⅓ in., broadly ovate-lanceolate, finely acuminate; ovary ¼ in.; sepals ⅛ in. long, subequal, concave, lateral suberect, at length spreading, nerve very thick, produced into a point under the apex of the sepal; lip with a large excavate base, very variable in the length of the lobes, lateral spreading or recurved; anther

minute, cells parallel, tubes 0; pollinia short, grains large, caudicle and gland obscure; stigmatic processes clavate; rostellum erect, truncate, toothed, plicate, concealing the glands of the pollinia.—Habit of *H. viridiflora*. In the Khasia specimens the midlobe of the lip is much longer than in the Peninsular. I have had difficulty in choosing a specific name, for Bentham, in adopting *stenostachya*, overlooked the older published one of *tenuis*. That of *peristyloides* may be objected to from the plant being sectionally a *Peristylus*, though Wight did not recognize it as such, and it is preoccupied by A. Richard for an Abyssinian species.

80. **H. cubitalis,** *Br. Prodr.* 312; tall, slender, leaves scattered or subradical, linear oblong or lanceolate acute, spike long narrow, flowers minute, bracts as long as the curved ovary or shorter, sepals linear-oblong concave keeled, petals larger ovate-oblong, lip not exceeding the sepals 3-fid, side lobes spreading and recurved, midlobe shorter broad obtuse, spur straight as long as the sepals nearly cylindric. Platanthera cubitalis, *Lindl. Gen. & Sp. Orchid.* 292; *Thwaites Enum.* 310. Orchis cubitalis, *Linn. Fl. Zeyl.* 320.

The KHASIA MTS., TENASSERIM, *Parish*, &c. CEYLON; *Hermann*, at Pasdoon Corle, *Thwaites*.

Stem with the slender spike 1–3 ft. *Leaves* 2–6 in., sessile, flat, nerves obscure. *Spike* 8–12 in.; bracts ovate-lanceolate, acuminate, lower ½ in.; ovary ¼ in., erect, tip decurved; sepals $\frac{1}{12}$ in., obtuse, 1-nerved, nerve produced beneath the tip, dorsal longest and broadest; petals obliquely oblong, obtuse; lip with a short concave claw, lateral lobes shorter than or equalling the sepals; anther minute, cells parallel, tubes 0, pollinia short granular, caudicles and glands obscure; stigmatic processes clavate; rostellum erect, truncate, toothed, plicate, concealing the glands of the pollinia.—Near *H. stenostachya*, but flowers much smaller. There are two forms in Ceylon, one with leaves scattered along the stem, and another also found in Tenasserim with radical leaves; the latter is,—

Var. *brevifolia*; leaves very short 1–1½ in. radical linear-oblong. Cœloglossum brevifolium, *Lindl. Gen. & Sp Orchid.* 302 (*excl. hab. Nepal*).—Tavoy, *Wallich*. Ceylon, *Walker & Gardn.* Wallich's specimen in Herb. Linn. Soc. are not numbered by him, but are ticketed, "Tavoy, Dec. 16, 1827." The number 7041 which has been put on the sheet by another hand, Wallich gave only to the Khasian plant, his *linifolia* (*H. khasiana*, p. 151). To var. *brevifolia* he gave the mss. name of *commelinifolia* (not *micrantha*, as Lindley states in his Herbarium).

†† *Leaves clustered round the middle of the stem* (*sometimes scattered in* H. Gardneri.) *Slender species, spike long, lax-fld.*

81. **H. tipulifera,** *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 139; leaves 4–6 linear-lanceolate acuminate, bracts very slender equalling the slender ovaries, lateral sepals linear obtuse, petals broader ovate-oblong obtuse membranous, lateral segments of lip many times longer than the sepals capillary, mid one short subulate, spur clavate as long as the sepals. ? Peristylus gracilis, *Blume Bijdr.* 406.

TENASSERIM; at Moulmein, *Parish*.

Stem 1–2 ft., with appressed sheaths below the leaves, and 1–2 lanceolate ones above them. *Leaves* 5–8 by ¾–1 in., clustered about the middle of the stem, membranous, sessile. *Spike* 6–10 in.; flowers erect, small, distant; bracts ½–¾ in.; ovaries as long, straight; sepals ¼ in. long, 1-nerved, dorsal ovate-oblong broad or narrow, lateral erect; lip divided close to the narrow concave claw; anther minute, cells parallel, tubes 0, pollinia clavate, caudicles very short, glands oblong; stigmatic processes margining the claw of the lip; rostellum broad, plicate, concealing the bases of the anther-cells and glands. *Capsule* ½ in., very slender, straight, erect.—Very near *H. aristata*, differing in the long narrow leaves, and much longer very slender ovary.

82. **H. aristata,** *Hook. f.*; very slender, leaves 3–5 elliptic-lanceolate membranous, spike very slender lax-fld., bracts shorter than the shortly beaked ovaries, sepals subequal linear obtuse, petals broader oblong membranous, lip longer than the sepals 3-partite lateral segments longest filiform or capillary, spur clavate or fusiform equalling or shorter than the sepals. Peristylus aristatus, *Lindl. Gen. & Sp. Orchid* 300; *Thwaites Enum.* 310 (*in part excl. syn.*). P. exilis, *Wight Ic.* t. 1698.

KHASIA HILLS, alt. 4-5000 ft. *J. D. H. & T. T.* TRAVANCORE; on the Pulney Mts., *Wight.* CEYLON; at Newera Ella, *Thwaites.*

Stem with spike 18–20 in. *Leaves* 2–3 in., clustered around the middle of the stem, sessile or subpetioled. *Scape* with a few narrow sheaths; bracts ⅓ in., ovate-lanceolate; flowers distant, ¼ in. diam., greenish; ovary ⅓ in., erect; sepals and petals membranous, 1-nerved, ⅛ in. long; lip with a retrose spur over the concave claw, lateral segments broad at the base sometimes very long and circinnate, spur variable; anther minute, cells parallel, tubes 0, pollinia minute of few grains, caudicles and glands obscure; stigmatic processes clavate; rostellum obscure. *Capsule* ½ in., fusiform.—The very minute column is so distorted by pressure that I have failed to detect the relations of the rostellum to the gland of the pollinia.

83. **H. Gardneri,** *Hook. f.*; tall, leaves oblong-lanceolate acute, spike narrow many-fld., bracts as long as the ovary, lateral sepals linear-oblong falcate obtuse, petals larger broadly oblong obtuse, lip rather longer than the sepals 3-partite lateral segments subulate recurved mid-segment shorter obtuse, spur as long as the sepals incurved tip globose didymous. Peristylus aristatus, *Thwaites Enum.* 310 (*in part*).

CEYLON, *Gardner, Walker*; Adam's Peak, *Thwaites* (C.P. 3081. *Ic. in Herb. Peradeniya*, 2373 *in Herb. Lindl.*).

Stem with spike 14–30 in., stout or slender, naked below and above except for a few sheaths. *Leaves* 2–3 in., usually clustered towards the middle of the stem, spreading or suberect, strongly 5–7-nerved beneath, bases sheathing. *Spike* 6–14 in., rather stout; lower bracts ½ in., ovate-lanceolate, acuminate; ovary erect, ½–⅔ in.; sepals ¼ in. long and petals spreading, lateral sepals falcate linear obtuse; lip thick, claw concave; anther small, cells parallel, tubes 0, pollinia pyriform grains large, caudicles and glands obscure; stigmatic processes clavate; rostellum erect, truncate, toothed, plicate, concealing the glands of the pollinia. *Capsule* ½ in., erect, fusiform, hardly beaked, very shortly pedicelled.—Differs from *H. aristata* in the large size, robust habit, less membranous leaves with strong nerves, larger flowers and longer ovary and capsule. Near *H. stenostachya*, but the spike and ovaries are much longer, the stem naked below for several inches, and the spur shorter.

84. **H. Stocksii,** *Hook. f.*; rather stout, leaves obovate or elliptic obtuse acute or acuminate, spike strict twisted, flowers secund, bracts longer than the ovaries, lateral sepals linear-oblong, dorsal elliptic, petals larger ovate obtuse fleshy, lip shorter than the sepals obtusely 3-fid, spur as long as the sepals straight or incurved subclavate.

The CONCAN and MYSORE, *Stocks, Ritchie,* &c.

Stem with spike 6–18 in. *Leaves* more or less clustered towards the middle of the stem, 4–6 in. long, usually petioled. *Spike* 3–6 in.; lower bracts often ¾ in. long, finely acuminate; ovary ⅓–½ in., curved; flowers ⅛ in. diam., yellowish; lateral sepals at length reflexed; lateral lobes of lip incurved, claw broad concave; anther minute, cells parallel, pollen clavate; stigmatic lobes clavate; rostellum minute, erect, 2-fid.—Very like *H. Lawii*, but spur quite different.

** Spur much shorter than the sepals, globose or ellipsoid.

† *Stem leafy, leaves scattered or subimbricate.*

85. **H. breviloba,** *Hook. f.*; slender, leaves oblong-lanceolate acuminate, spike short dense-fld., bracts about equalling the ovary, lateral sepals lanceolate, petals broadly oblong, lip as long as the sepals obcordate subflabellform, spur minute inflated incurved. Peristylus brevilobus, *Thwaites Enum.* 311.

CEYLON; near Ratnapoora, *Thwaites.*

Stem with spike 10–18 in., naked below. *Leaves* 2–3 by ½–¾ in., bases sheathing, nerves very slender. *Spike* (young) 1 in.; bracts lanceolate, finely acuminate; ovary ¼ in.; lateral sepals linear-lanceolate, subacute, 1-nerved; petals oblong, obtuse, 3-nerved; lip sessile at the base of the column; anther oblong, truncate, cells parallel, tubes 0; stigmatic processes 0; rostellum 3-fid, concealing the small pelliniar glands.—A very anomalous species, the flowers are too young for satisfactory analysis. Thwaites describes the lip as having a minute midlobe.

86. **H. malabarica,** *Hook. f.*; stem leafy, leaves many ovate or lanceolate acuminate upper passing into bracts longer than the flowers, spikes many-fld., ovary very short, lateral sepals linear, petals obliquely ovate-oblong obtuse, lip as long as the sepals deeply trifid, lateral segments subulate recurved, mid one straight, spur a small globose didymous or ellipsoid sac. Peristylus brachyphyllus, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 70, t. 2 A.

NILGHIRI, and Bababudan Hills in CANARA, *Heyne, Perrottet, Stocks.*

Stem rather stout, 6–12 in. *Leaves* 1–2½ in., bases sheathing, nerves very slender. *Spike* 2–4 in., rather dense-fld.; bracts herbaceous, lower ½–¾ in. or longer, often twice as long as the flowers, ovate-lanceolate, acuminate, sheathing; ovary ¼ in.; lateral sepals as long, erect or spreading, 1-nerved, apiculate below the tip, dorsal elliptic obtuse faintly 3-nerved; base of lip 3-lobed above the concave claw, contracted at the base of the segments; spur incurved or not; anther-cells parallel, glands of pollinia concealed by the 3-fid rostellum; stigmatic processes clavate.—Habit of *H. peristyloides* & *concinna.*

87. **H. torta,** *Hook. f.*; small, slender, subbasal leaves linear-lanceolate upper passing into narrow sheaths, spike very slender lax-fld. twisted, bracts longer than the very small secund flowers, lateral sepals linear obtuse, petals linear-oblong, lip equalling the sepals 3-cleft beyond the middle, lobes short obtuse lateral spreading or incurved midlobe straight, spur a minute sac. Peristylus spiralis, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 69, t. 2 B; *Wight Ic.* t. 1696.

On the WESTERN GHATS; from the Concan to Travancore, *Wight, &c.* CEYLON, in the Central Province, alt. 4–7000 ft.

Stem with the spike 6–18 in., often flexuous. *Leaves* 1–2½ in., obtuse acute or acuminate, nerveless, passing into the sheaths of the scape. *Spike* 2–4 in., rachis often flexuous; bracts ¼–⅓ in., lanceolate, acuminate; flowers decurved, greenish white; lateral sepals reflexed, $\frac{1}{10}$–⅛ in. long, dorsal linear-oblong obtuse; lip very variable, fleshy, broader or narrower than long, base truncate above the short concave claw; anther minute, cells parallel; stigmatic processes clavate; rostellum between the cells, 3-fid.—The Ceylon plant has larger flowers than the Peninsular.

88. **H. Prainii,** *Hook. f.*; stem slender naked above or with one or two sheaths, leaves few oblong or ovate-oblong acute, spike many-fld., bracts as long or longer than the ovary, lateral sepals linear-oblong obtuse, petals

broadly ovate fleshy obtuse or apiculate, lip shorter than the sepals broad obtusely 3-lobed at the apex, spur a minute globose sac.

NAGA HILLS in UPPER ASSAM; on Kohima, *Prain*. UPPER BURMA (*in Herb. Calcutt.*).

Stem 12–18 in., naked below, and above except for a few lanceolate sheaths. *Leaves* 1½–2 in., obtuse or acute, sessile, nerves obscure. *Spike* 2–3 in., rather dense-fld.; bracts subulate-lanceolate, acuminate, not herbaceous, lower ½ in.; ovary ¾–⅞ in.; flowers nearly horizontal; sepals ⅛ ⅙ in. long, apiculate behind the tip, 1 nerved; lip with a broad concave claw; anther small short broad, cells parallel; stigmatic processes rather long; rostellum minute, 3-fid.

89. **H. robustior,** *Hook. f.*; stem tall slender naked below, leaves close set ovate-lanceolate acuminate passing into foliaceous imbricating bracts much longer than the flowers, spike many-fld., flowers erect, lateral sepals linear acute, petals oblong obtuse, lip longer than the sepals 3-partite lateral segments elongate subulate recurved over the flower, mid one shorter straight obtuse, spur very small ellipsoid or fusiform. Peristylus lancifolius, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 69, t. 2 C. P. robustior, *Wight Ic.* t. 1699. Gymnadenia secunda, *Lindl. in Wall. Cat.* 7054. Cœloglossum secundum, *Lindl Gen. & Sp. Orchid.* 303. Satyrum foliosum, *Herb. Heyne.*

MALABAR; in the Bababudan Hills, *Heyne*. NILGHIRI HILLS, *Perrottet, Lobb*. TRAVANCORE; in the Pulney Hills, *Wight*.

Stem 1–2 ft., sometimes naked for a foot, then leafy, the leaves gradually diminishing upwards. *Leaves* 2–3 in., suberect or spreading, bases sheathing, nerves obscure. *Spike* 2–6 in.; bracts twice as long as the flowers, lower ¾–1 in. long, green; ovaries ⅓ in. long, nearly straight; lateral sepals ¼ in., 1-nerved, reflexed; petals nearly as long, 2–3-nerved, lip 2-auricled at the small concave claw; anther-cells parallel; stigmatic processes long; rostellum 3-fid, between the cells. *Capsule* ½ in., oblong, erect.—Wight's figure of *P. robustior* has the flowers large, bracts shorter and side segments of lip much larger and more slender than in his specimens, which bear the mss. name of *P. persimilis.*

90. **H. Hamiltoniana,** *Hook. f.*; stem tall slender naked below, leaves linear-lanceolate acuminate, spike dense-fld., bracts filiform much longer than the minute flowers, lateral sepals linear-oblong obtuse, petals broadly oblong, lip shorter than the sepals broad shortly obtusely 3-lobed, spur globose. Herminium Hamiltonianum, *Lindl. in Wall Cat.* 7069. Peristylis Hamiltonianus, *Lindl. Gen. & Sp. Orchid.* 299. Orchis micrauthema, *Herb. Ham.*

NEPAL; in the Morung, *Hamilton*. SIKKIM HIMALAYA, *Griffith's Collectors* (*Kew Distrib.* 5356). KHASIA MTS.; on Shillong, *Clarke*.

Stem 6–12 in., stout or slender, elongate and sheathed below the leaves, and with one or two filiform sheaths above them. *Leaves* 4–6 by ½–⅔ in., or broader, sometimes overtopping the spike, nerves obscure. *Spike* 3–6 in.; bracts ½–¾ in., often tortuous (when dry); ovary ¼–½ in., slender, suberect; sepals ⅛ in., 1-nerved, nerve strong, excurrent below the tip, dorsal oblong; lip broadly cuneate, base broad, concave, lobes variable; spur large for the size of the flower, bladdery; anther-cells parallel, glands of pollinia exposed on each side of the minute rostellum; stigmatic processes large, clavate.—Habit of *H. robustior*, but the flowers are much smaller, the lateral sepals obtuse, and the spur globose.

†† *Leaves clustered about the middle of the stem.*

91. **H. gigas,** *Hook. f.*; stem very stout and tall, leaves elliptic acuminate, spike very many and dense-fld., bracts membranous longer

than the flowers, lateral sepals ⅓ in. long lanceolate acuminate, petals as long gibbously ovate obtusely acuminate, lip as long as the sepals obtusely trifid lobes subparallel, spur very shortly oblong.

PERAK; in the Batong Padang Valley, *Wray*.

Stem 4–5 ft., hollow at the base, nearly an inch diam., nearly 3 ft. before leafing; sheaths above the leaves few. *Leaves* 8–10 by 3–4 in., narrowed into a petiole. *Spike* 8 in., cylindric, lax-fld. below; bracts ¼ in., lanceolate; ovaries ½ in.; flowers pale green; sepals 1-nerved, ½ in. long, dorsal linear-oblong, obtuse; petals with fleshy tips; lip rather oblong, lobes subequal; spur an incurved sac; anther orbicular, cells parallel, tubes upcurved, pollinia clavate subsessile on the large oblong glands which have recurved sides; stigmatic processes large, clavate, adnate to the sides of the lip; rostellum small. *Capsule* ¾ in., sessile, linear-oblong, obtuse, not twisted.—Resembles a huge *H. goodyeroides*, but leaves petioled, flowers smaller, lip shorter, capsule much longer.

92. **H. goodyeroides,** *Don Prodr.* 25; stem 1–2 ft. stout, leaves elliptic-oblong or -lanceolate acute, spike elongate dense-fld., flowers subsecund, bracts equalling or exceeding the ovary, lateral sepals ¼ in. linear- or ovate-oblong obtuse, petals gibbously ovate, lip as long as the sepals trifid, spur minute. Peristylus goodyeroides, *Lindl. Gen. & Sp. Orchid.* 299; *Dalz. & Gibs. Bomb. Fl.* 270: *Royle Ill.* t. 87, f. 2. P. grandis, *Blume Bijdr.* 405. Herminium goodyeroides, *Lindl. in Wall. Cat.* 7066.

SUBTROPICAL HIMALAYA; from Kumaon to Bhotan, alt. 2–5000 ft. The KHASIA MTS. and SILHET, MUNNIPORE, TENASSERIM and the ANDAMAN ISLANDS. The DECCAN PENINSULA, from Behar (on Parusnath) and the Concan to Travancore. —DISTRIB. Java, Philippine Islands.

Stem 1–2 ft., stout. *Leaves* 6–10 by 2–3 ft., base contracted, hardly petioled. *Spike* 4–12 in.; bracts lanceolate, membranous; flowers about ¼ in. diam., very variable in size, yellowish green; sepals ⅛–⅙ in.; lip recurved, sessile, lobes very variable, spur subglobose fusiform or clavate; anther small, tubes very short, pollinia clavate, caudicles hardly any; glands small; stigmatic processes short clavate; rostellum erect, toothed. *Capsule* ½ in., sessile, fusiform, acute.—The Ceylon habitat given by Thwaites no doubt refers to *H. Wightii*, which has been confounded with this.

93. **H. constricta,** *Hook. f.*; stem stout tall, leaves elliptic acute or acuminate, spike dense-fld. cylindric, bracts as long or longer than the flowers, lateral sepals linear-lanceolate, petals larger ovate-oblong gibbous on the lower side, lip rather longer than the sepals 3-fid to the middle side lobes slender longer than the midlobe, spur globose. Platanthera constricta, *Lindl. in Wall. Cat.* 7043. Herminium constrictum, *Lindl. in Bot. Reg. under* t. 1449. Peristylus constrictus, *Lindl. Gen. & Sp. Orchid.* 300. Orchis leucantha, *Herb. Ham.*

SUBTROPICAL SIKKIM, *J. D. H.* KHASIA HILLS, alt. 2–4000 ft., *J. D. H. & T. T.*, &c. TENASSERIM; at Moulmein, *Helfer* (*Kew Distrib.* 5357), &c.

Stem with spike 2–3 ft. *Leaves* 4–6 by 2½–4 in., narrowed at the base or broadly petioled. *Spike* 4–8 in.; bracts large; flowers yellowish; sepals ½–⅔ in., dorsal lanceolate; lobes of lip very variable, claw hardly any; anther minute, cells parallel, tubes short; pollinia clavate, caudicles short, glands large; stigmatic processes clavate; rostellum 2-fid, erect.

94. **H. Parishii,** *Hook. f.*; stem short stout, leaves sessile ovate-oblong, spike narrow elongate, bracts linear-lanceolate longer than the small flowers both erect, lateral sepals linear-oblong obtuse, petals broader ovate-oblong, lip as long as the sepals shortly 3-lobed beyond the middle,

spur very short fusiform. Peristylus Parishii, *Reichb. f. in Trans. Linn. Soc.* xxx. 139.

TENASSERIM; at Moulmein, *Parish.*

Stem below the leaves very stout, 3–4 in., laxly sheathed, above the stem 3–6 in., with 2–3 lanceolate sheaths. *Leaves* 3–5 by 1½–2 in., acute or acuminate. *Spike* 4–6 in.; bracts ½–¾ in. with filiform tips and flowers appressed to the rachis; ovary ½ in.; sepals ⅓ in.; petals ovate-cordate, obtuse; lip very variable in form, broad or narrow, lobes short obtuse, or the middle one narrower and longer.—Turns black in drying. The specimens are not good. Perhaps a form of *goodyeroides.*

95. **H. Wightii,** *Trimen Cat. Ceyl. Pl.* 91; tall, leaves oblong-lanceolate acuminate, spike elongate narrow dense-fld., bracts longer than the ovary, flowers small, lateral sepals oblong obtuse dorsal shorter orbicular or very broadly ovate, petals very broad obliquely orbicular nerves branched, lip shorter than the sepals broad entire or shortly 3-lobed, spur small scrotiform. H. goodyeroides, *Hook. Bot. Mag.* t. 3397 (*not of Lindl.*). Peristylus plantagineus, *Lindl. Gen. & Sp. Orchid.* 300; *Wight Ic.* t. 921; *Thwaites Enum.* 310. P. elatus, *Dalz. in Hook. Journ. Bot.* iii. (185) 344.

The CONCAN, *Nimmo*; Malwan, *Dalzell*, &c. TRAVANCORE; at Paul Ghat, *Wight.* CEYLON, *Macrae.*

Stem 1–2 ft., rather stout, loosely sheathed below the leaves and with lanceolate sheaths above them. *Leaves* 5–7 by 2½–3 in., acute or acuminate. *Spike* 4–8 in.; bracts ⅓ in., lanceolate; ovary ¼–⅓ in.; flowers greenish white; sepals 1-nerved, lateral ⅓ in., apiculate below the lip, dorsal ¼ in. shorter; lip contracted beyond the very short broad concave base; anther rounded, cells parallel with short recurved tubes; pollinia clavate, caudicles very short, glands small solid; stigmatic processes short; rostellum short, acute.—Dalzell describes the petals as longer than the sepals. I do not find the erect long narrow processes on each side of the anther figured in Bot. Mag.—The Travancore plant figured by Wight precisely resembles the Concan one.

96. **H. Lawii,** *Hook. f.*; stem slender not tall, leaves few elliptic or lanceolate, spike slender, flowers few or many distant very small, bracts longer than the ovary, sepals obtuse, dorsal elliptic, lateral linear-oblong, sepals very broad obtuse, lip as long as the sepals broadly obtusely 3-fid, spur small globose or clavate. Peristylus Lawii, *Wight Ic.* t. 1695; *Dalz. & Gibs. Bomb. Fl.* 270.

BEHAR; on Parusnath, alt. 4200 ft., *Clarke.* The CONCAN and MAISOR, *Law*, &c.

Stem 6–10 in., loosely sheathed below the leaves. *Leaves* 3–5, membranous, 3–4 by 1–2 in., subpetioled, acute. *Spike* narrow, strict, 2–3 in., lax-fld.; bracts ¼–½ in., ovate-lanceolate, membranous; ovary ¼ in., straight or curved, almost beaked; flowers ¼ in. diam., yellow; sepals ⅛–⅙ in., 1-nerved, at length spreading; petals thick; lip broad with a concave claw; anther-cells parallel, tubes 0, pollinia clavate, caudicle 0, glands small, stigmatic processes clavate; rostellum short, acute.—Wight's figure is of a very indifferent few-fld. specimen.

97. **H. Brandisii,** *Hook. f.*; very slender, leaves scattered towards the middle of the stem linear- or oblong-lanceolate acute, spike very long laxly many-fld., bracts nearly as long as the erect not beaked ovary, lateral sepals linear obtuse, petals broader ovate-oblong, lip clawed 3-partite, segments much longer than the sepals, lateral segments capillary, midlobe short, spur very short globose.

PEGU, *Brandis* (*Herb. Hort. Calcutt.*).

Stem with spike 20 in. *Leaves* 3–5 in., membranous, upper smaller. *Spike* 8 in., very slender; bracts ¼ in., ovate-lanceolate; flowers ⅓ in. diam.; sepals and petals membranous, 1-nerved, lateral sepals deflexed; long segments of lip 1 in.; spur sub 2-lobed, with a very short contracted neck; ovary small, with a thick dorsal ridge and terminal beak, cells parallel (tubes short upcurved ?); pollen grains few, large, glands not seen; stigmatic processes clavate; rostellum erect between the cells.—Closely allied to *H. aristata*, though with so different a spur.

††† *Leaves few radical, or solitary and cauline.*

98. **H. lacertifera,** *Benth. Fl. Hongk.* 362, stem or scape stout or slender with few or many erect sheaths, leaves usually radical ovate or oblong, spike elongate few- or many-fld., bracts narrow longer than the erect very small flowers, lateral sepals linear-oblong obtuse, lip equalling or longer than the sepals trifid tripartite or obtusely 3-toothed, lobes or segments short subequal or the lateral long, spur minute ovoid or globose. Cœloglossum lacertiferum & acuminatum, *Lindl. Gen. & Sp. Orchid.* 302. Peristylus chloranthus, *Lindl. in Kew Journ. Bot.* vii. (1855) 37. Gymnadenia ? tenuiflora, *Lindl. in Wall. Cat.* 7055. Chæradoplectron Spiranthes, *Schauer in Pl. Meyen.* 436, t. 13 C.

KHASIA, NAGA and MUNNIPORE HILLS, alt. 2–4500 ft., TENASSERIM, TAVOY and PENANG, *Wallich.*—DISTRIB. Hong Kong.

Stem 6-10 in.; sheaths ½–1 in., lanceolate. *Leaves* few, 1–2 in., spreading, acute or obtuse. *Spike* 3–10 in., slender, lax- or dense-fld.; lower bracts often ⅔ in.; ovary ⅓–½ in., slender, erect, not beaked; sepals ⅛–⅙ in., 1-nerved, dorsal ovate-oblong, obtuse; petals variable, rather thick; lip very variable in length, and in length of lobes or segments, limb with a short spur over the short broad claw; anther minute, cells nearly parallel, tubes 0; pollinia ovoid, grains large, glands obscure; stigmatic processes small; rostellum a plicate-membrane stretched across the base of the anther but not ? concealing the glands. *Capsule* ⅔ in., sessile, oblong, obtuse.—Both this and the following var. are found in Penang. Lindley errs in giving "Nepal, *Wallich*," as a habitat. I suspect that Lindley's *Glossula tentaculata* (Bot. Reg. t. 862), of Hong Kong, is only a form of this with elongate filiform side lobes of the lip.

Var. *robusta*; very stout, 12–18 in., leaves 3–5 by ¾–1 in., spike very long many-fld., lateral segments of lip slender exserted much longer than the middle one.—Penang, *Wallich, Maingay* (*Kew Distrib.* 1662, *Spiranthes*), *Curtis.*

99. **H. gracillima,** *Hook. f.*; stem long filiform, leaves subradical narrowly linear, spike elongate, flowers few minute distant, bracts shorter than the curved ovaries, lateral sepals linear-oblong, petals broader ovate obtuse fleshy, lip very short fleshy trifid lobes obtuse, spur very short inflated 2-lobed. Cœloglossum Mannii, *Reichb. f. in Linnæa* xli. 54.

KHASIA HILLS, alt. 4–5000 ft., on grassy hills, common. MUNNIPORE, *Clarke.*

Stem 6–16 in., with a few subulate sheaths. *Leaves* 1–3 by ⅛–¼ in., alternate, acuminate. *Spike* 2–6 in.; flowers ½ in. apart; bracts ⅛ in.; ovary ¼ in.; sepals ⅛ in., 1-nerved; lip shorter than the sepals, claw as broad as and hardly shorter than the blade, midlobe rather the longest; pollinia most minute, broadly pyriform, subsessile on one large flat ovate (2-fid ?) gland, grains large.

Sect. VI. PHYLLOSTACHYA. (See p. 132.)

100. **H. galeandra,** *Benth. Fl. Hongk.* 263; leaves oblong obtuse or subacute base contracted, bracts ovate, flowers ½ in. diam., lip broadly cuneiformly obovate or obcordate, spur a short conical sac. Platanthera obcordata, *Lindl. in Wall. Cat.* 7050; *Gen. & Sp. Orchid.* 290. P. gale-

andra, *Reichb. f. in Linnæa*, xxv. 226. P. Championi, *Lindl. in Hook. Journ. Bot.* vii. (1855) 38. Gymnadenia obcordata & galeandra, *Reichb. f. Ot. Hamb.* 32, 33. Orchis obcordata, *Don Prodr.* 230. O. Susannæ, *Herb. Heyne.*

WESTERN HIMALAYA; Nepal, *Wallich*; Kumaon, *Blinkworth*, alt. 7000 ft, *Strachey & Winterbottom.* CENTRAL INDIA; Hawalbagh, *Clarke.*—DISTRIB. China.

Tubers small, globose or oblong. *Stem* 6–8 in., rather slender, glabrous or puberulous. *Leaves* 1–2 in., rarely subacute; bases not sheathing. *Spike* 2–4 in.; bracts oblong-ovate or lanceolate, lower twice as long as the pale purple flowers, upper shorter; ovaries $\frac{1}{3}$ in. long, glabrous or puberulous; dorsal sepal ovate, lateral falcately lanceolate; petals rather narrower, obtuse; lip shortly clawed, base puberulous; anther-cells approximate; rostellum very minute.—I do not find the difference between the spurs of the Indian and Chinese plant that Lindley indicates.

VAR. *nilagirica*; leaves broader acute, bases sheathing. Platanthera affinis, *Wight Ic.* t. 1693.—Travancore, on the Pulney Mts., *Ileyne, Wight.*

VAR. *major*; stem 12–18 in., leaves and larger flowers more remote.—Khasia Hills; at Myrung, alt. 5000 ft., *J. D. H. & T. T.*

101. **H. jantha,** *Benth. in Gen. Plant.* iii. 626; leaves imbricate ovate or lanceolate amplexicaul acuminate, flowers $\frac{3}{4}$ in. diam., lip broadly flabelliform or orbicular-obovate retuse crenulate, spur very short conical obtuse. Platanthera jantha, *Wight Ic.* v. 11 (? t. 1692).

MALABAR and TRAVANCORE; on the Nilghiri and Pulney Mts., *Wight.*

Except in being more robust and having much larger flowers, this hardly differs from *H. obcordata.* Wight gives the larger flowers as a character, but in his figure t. 1692 they are represented as even smaller. In his specimen the lip is $\frac{3}{4}$ in. diam.; he describes the flowers as deep lilac, and the leaves as of the same colour and streaked with a darker shade.—Probably a large state *H. obcordata.*

102. **H. Helferi,** *Hook. f.*; stem pubescent, leaves and bracts linear- or oblong-lanceolate acuminate, flowers 1–1½ in. diam., lip very large orbicular cucullate, spur infundibular acute. Gymnadenia Helferi, *Reichb. f. in Flora* 1872, 276; *in Trans. Linn. Soc.* xxx. 139.

ASSAM (*Herb. Wight*) KHASIA MTS., *Simons.* TENASSERIM, at Moulmein, *Lobb. Helfer, Parish.*

Stem 12–18 in., rather stout; tubers oblong. *Leaves* 4–8 in., sessile, acuminate, base narrowed. *Flowers* shortly pedicelled; sepals falcately-lanceolate, acuminate, nearly 1 in. long, green, lateral at length recurved; petals ovate-lanceolate, acuminate, green; lip twice as large as the sepals, very concave with recurved edges, folded down the centre, purple; anther obtusely apiculate, cells narrow parallel, tubes very short, pollinia clavate, as long as their broadly winged caudicles, glands approximate, rather large; stigmatic processes obscure; rostellum small, fleshy, 3-lobed, erect between the gland. *Capsule* $\frac{2}{3}$ in., linear-oblong, sessile, erect, ribs thick.—Reichenbach describes the lip as broad or narrow.

Sect. VII. PLECTOGLOSSA. (See p. 132.)

103. **H. Perrottetiana,** *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 74, t. 4 B. Platanthera lutea, *Wight Ic.* t. 919. H. lutea, *Benth. in Journ. Linn. Soc.* xviii. 354; *Gen. Plant.* iii. 626.

TRAVANCORE; as the Pulney Mts. amongst long grass, *Wight.* Nilghiri Hills, *Perrottet.*

Stem 1–2 ft., very stout; clothed with short imbricating amplexicaul sheathing acuminate leaves 2–3 in. long that pass upward into the bracts. *Spike* 6–8 in.;

bracts foliaceous, broadly ovate, 1½–2 in. long, cymbiform, acuminate; ovary ⅔ in. long, erect, slender, beaked, narrowly winged; sepals erect, ⅝ in., ovate-oblong, obtuse, concave; petals erect, as long, linear, obtuse; lip as long as the sepals, very coriaceous, triplicate in bud, being folded longitudinally down the middle, with the side lobes appressed to the midlobe, and each also folded down the middle with the concavity inwards, long clawed, cuneately obovate, obtuse, claw geniculate; side lobes linear-oblong, obtuse, incurved, shorter than the triangular ovate midlobe; spur pendulous, subclavate; anther broad, bases of cells shortly upcurved; pollinia large, pyriform, grains large, caudicles short, glands small orbicular.—The stigmatic processes differ from those of any other Indian *Habenaria*, A. Richard figures them as clavate as in most *Habenariæ*, but I have never found them so, though I have examined many flowers. The rostellum? forms a broad triangular acute plate extending across the column, and reaching to the bases of the anther-cells.

Sect. VIII. DIPHYLAX. (See p. 133.)

104. **H. urceolata,** *Clarke in Journ. Linn. Soc.* XXV. 73, t. 30. Diphylax urceolata, *Hook. f. Ic. Plant.* t. 1865.

SIKKIM HIMALAYA; Yakla, alt. 10,000 ft., and NAGA HILLS, alt. 9000 ft., *Clarke.*

Root unknown. *Stem* very slender, recurved, with the raceme 4–6 in. high. *Leaves* one large (2–4 in.) subradical, elliptic-lanceolate, acute, and several small scattered ones alternate higher up, all membranous, 5–7-nerved. *Racemes* 2–3 in., decurved; flowers secund, ⅓–½ in. diam., very shortly pedicelled; bracts ovate or lanceolate, as long as the short ovary; sepals white and rosy; petals 1-nerved; lip recurved, lanceolate, terminal half solid terete acuminate green, spur inflated, nearly as long as the sepals; anther beaked, cells contiguous, parallel, pollinia oblong, grains large, caudicles very short.

Sect. IX. DIPYLA. (See p. 133.)

105. **H. secundiflora,** *Hook. f. Ic. Plant. ined.*

SUB-ALPINE HIMALAYA; Kumaon, alt. 9–10,000 ft., *Duthie.* Sikkim, alt. 14,000 ft., *J. D. H.*; in Chumbi, *King's Collector.*

Tubers globose, small. *Stem* 3–5 in., erect or recurved. *Leaves* 2–5 in., linear, acuminate, sides complicate, bases sheathing. *Spike* 1–2 in., more or less recurved, dense-fld.; flowers secund, pink; bracts linear-lanceolate, lower ½–¾ in. longer than the flowers; ovary ⅓ in., curved; sepals lanceolate, 1-nerved; petals much narrower, acuminate; lip as long as the sepals, sessile, linear-oblong, trifid to about the middle, puberulous, strongly-nerved, lobes parallel, lanceolate, acuminate; spur nearly as long as the sepals, conoidal, slightly contracted at the base, inflated, apex subacute; anther membranous; pollinia clavate, grains very large, caudicles short, glands large, cordate, membranous.—The resemblance to *H. urceolata* is remarkable; lobes of the rostellum inflected over the glands of the pollinia like two flaps or doors, whence the name.

Sect. X. DITHRIX. (See p. 133.)

106. **H.** (Dithrix) **decipiens,** *Hook. f., Ic. Plant. ined.*—Herminium, *Griff. Notul* iii. 270; *Ic. Plant. Asiat.* t. 285 f. 1.

NORTH-WEST INDIA; *Edgeworth*, alt. 3000 ft.; Lahul, alt. 4–5000 ft., *Thomson.*—DISTRIB. Afghanistan, *Griffith*, (*Kew Distrib.*, 5326.) Kurrum Valley, *Aitchison* No. 322.

Tubers small, oblong. *Stem* 5–8 in., rather slender, erect or flexuous, laxly leafy. *Leaves* 1–2½ in., lower larger, elliptic- or linear-oblong, acute or obtuse, membranous, lower subpetiolate, upper sessile, bases sheathing. *Spike* 1–2 in.; flowers close-set, decurved; bracts ovate-lanceolate, longer than the ovary, membranous; ovary ⅛–⅙ in., curved, and sepals about as long, soft, 1-nerved; dorsal ovate-lanceolate, obtuse, lateral linear-oblong, tip rounded, petals as long, narrowly lanceolate, sub

3-nerved; lip as long as the sepals, obscurely 3-nerved, narrowed from the base upwards, terminal teeth acute, middle one longest.—The analysis of the dried flowers has been very difficult, and repeated many times; the capillary staminodia long escaped detection. Resembles a small *Spiranthes* of the *S. æstivalis* type, with which it was confounded in Griffith's Herbarium.

IMPERFECTLY KNOWN SPECIES.

H. AFFINIS, *Don Prodr.* 25; *Lindl. Gen & Sp. Orchid* is a small state of *H. goodyeroides.*

H. CARANJENSIS, *Dalz. in Hook. Journ. Bot.* ii. (1850) 262; *Dalz. & Gibs. Bomb.* Pl. 267; lower leaves somewhat rounded, upper oblong-lanceolate 3-nerved, bracts shorter than the ovary 3-nerved, flowers small, yellow, dorsal sepal rounded, petals half ovate obtuse, lip tripartite, midsegment oblong rather obtuse, lateral shorter cuneate truncate, spur clavate shorter than the ovary.—The Concan; Island of Caranjah, *Dalzell.*

H. GRACILIS, *Coleb. in Hook. Exot. Fl.* t. 135, a Silhet plant, figured and described by Colebrooke (*in Hook. Exot. Fl.*), and to which he attributes an articulated fibrous root. I know of no plant in this least like the figure. Lindley (*Gen. & Sp. Orchid.* 302) suggests its being possibly his *Cæloglossum brevifolium* (H. cubitalis, β). It is possibly a bad drawing of *H. peristyloides.*

H. LOBBII, *Reichb. f. in Linnæa*, xli. 50; leaf cuneately oblong ligulate acuminate, raceme 2 ft. lax-fld, bracts half as long as the pedicelled ovary oblong acuminate, dorsal sepal ovate apiculate cucullate 3-nerved, lateral triangular retrorse 3-nerved, petals linear falcate 1-nerved, lip tripartite, lateral segments linear retrorse, midsegments twice as long linear obtusely acute, spur filiform shorter than the pedicelled ovary tip clavate, anther erect emarginate, tubes ascending, staminodes triangular.—E. Indies, *T. Lobb.* Flowers rather larger than those of *H. leptoceras, Hook. Bot. Mag.*, t. 2726 (a Brazilian species).

H. LONGIBRACTEATA; *Hook. f.*; stem stout leafy 2–3 ft., leaves 6 by ¾–1 in. linear-oblong acute margins thickened, bracts 2–3 in. narrowly linear-lanceolate finely acuminate, lip 3-partite, segments linear lateral shorter, spur short obtuse. Platanthera longibracteata, *Lindl. in Wall. Cat.* 7048; *Gen & Sp. Orchid.* 293.—BURMA, on the banks of the Irawaddy at Seendya, *Wallich.* Wallich's specimens are in very young bud only, and the description of the flowers taken from Lindley cannot be depended on. It is a noble species, and should be sought for in Burma.

H. MODESTA, *Dalz. in Hook. Journ. Bot.* ii. (1850) 262; *Dalz. & Gibs. Bomb. Fl.* 267; stem leafy at the base, naked above, bracts half as long as the ovary, flowers greenish white, lip 3-fid, lateral divisions linear lanceolate free spreading, mid one shorter ovate obtuse cohering with the tips of the petals and upper sepal and concealing the column, spur filiform hardly clavate a little longer than the ovary.—The Concan, at Salsette, *Dalzell.* Description from Dalzell, who does not appear to have seen leaves; it is, perhaps, *H. stenostachya.*

H. PELORIOIDES, *Par. & Reichb. f. in Trans. Linn. Soc.* xxx. 139, t. 27, f. A; tall, robust, leaves ovate or oblong-lanceolate passing into copious sheaths, spike many-fld., bracts large equalling the ovary ciliolate, sepals subequal lanceolate acuminate, lip linear, spur 0. TENASSERIM; Amherst by the seaside, *Parish.* *Stem* a foot high. *Leaves* 2–3 in., largest subradical; upper sheaths slender, passing into the bracts the lower of which are 1½ in. long. *Spike* 2–3 in., many-fld.; sepals ⅜ in. long, membranous; petals as long as the sepals, lanceolate, 1-nerved; lip very narrow; anther-cells elongate, with very long erect tubes, stigmatic processes long. *Capsule* ¾ in., sessile, fusiform.—An anomalous plant, clearly a *Peloria* form. I have seen but one indifferent specimen.

H. UNIFLORA, *Don Prodr.* 25. Platanthera uniflora, *Lindl. Gen. & Sp. Orchid.* 2957 is probaby a state of *H. triflora.*

107. **DIPLOMERIS**, *Don.*

Terrestrial small 2-fld. and 1–2-leaved. *Leaves* ensiform or oblong.

Flowers large. *Sepals* subequal, free, lanceolate, spreading. *Petals* longer and broader. *Lip* sessile at the base of the column, spreading, very broad, entire, spurred. *Column* very short; rostellum broadly dilated, membranous, beneath which is a broad oblong lamina from the column; anther-cells thick, parallel, tubes very long incurved ascending; caudicles of pollinia very long slender, glands small naked; stigmatic processes 0; rostellum prominent between the anther-cells.

1. **D. pulchella,** *Don Prodr.* 26 (excl. hab.); glabrous, leaves ensiform, lip broadly obcordate. *Lindl. Gen. & Sp. Orchid.* 330; *in Journ. Linn. Soc.* iii. 44. Diplochilos longifolium, *Lindl. in Wall. Cat.* 7064; *in Bot. Reg. under* t. 1499. Orchis uniflora, *Roxb. Fl. Ind.* iii. 452; *Griff. Notul.* iii. 368. Habenaria uniflora, *Griff. Ic. Plant. Asiat.* t. 338, f. 2. Paragnathis pulchella, *Spreng. Syst. Veg.* iii. 694.

KHASIA HILLS, alt. 4–5000 ft., *Roxburgh, Wallich, &c.*

Rootstock creeping, subtuberous and fibrous; stem short. *Leaves* usually 2, erect, 3–4 by ⅓–½ in., acute. *Scape* about equalling the leaves, naked, 1-fld.; bract cymbiform, green, acuminate; flower 1–1½ in. diam., white; sepals ovate-lanceolate, acute; petals much larger, broadly obovate rounded or ovate-oblong; lip ⅔ in. diam., sinus cuspidate; spur 1½ in., incurved or upcurved, thickened beyond the middle, tip acute.—Don gives "Nepal, *Wallich*," as the habitat, but Wallich's specimens are from the Silhet Mts. (Khasia hills). Don's generic description is unintelligible, and he erroneously describes the flowers as rose purple.

2. **D. hirsuta,** *Lindl. Gen. & Sp. Orchid.* 331; hirsute, leaf oblong, lip cuneately orbicular. Diplochilos hirsutum, *Lindl. in Wall. Cat.* 7065; *in Bot. Reg. under* t. 1499.

TROPICAL HIMALAYA; Nepal, *Wallich*; Western Bhotan, alt. 1500 ft., *Gammie.*

Tubers globose. *Leaf* 2–2½ in., radical, with sometimes a small second. *Scape* 1–1½ in.; flowers 1½ in. diam.; bract oblong, sheathing; sepals 5-nerved, ovate-oblong, subacute; petals very much larger, orbicular; lip with a short slender claw, apex retuse or rounded, apiculate or not; spur 1½ in., very slender, incurved and ascending.

108. HEMIPILIA, *Lindl.*

Terrestrial 1-leaved tuberous herbs. *Leaf* radical, broad. *Flowers* laxly racemose. *Sepals* equal in length, lateral spreading. *Petals* broadly ovate, entire. *Lip* continuous with the column, broad, obscurely 3-lobed, spreading; spur trumpet-shaped. *Column* very short; rostellum broad projecting from between the anther cells, complicate; stigmatic processes 0; anther-cells subdivergent, tips produced into grooves of the rostellum; pollinia 2, caudicles long, glands distant exposed.

1. **H. cordifolia,** *Lindl. Gen. & Sp. Orchid.* 296; leaf ovate-cordate, lip obovate-oblong, spur longer than the sepals. Platanthera cordifolia *Lindl. in Wall. Cat.* 7049; *Gen. & Sp. Orchid.* 296.

WESTERN TEMPERATE HIMALAYA; alt. 4–500–7000 ft., from Nepal, *Wallich*, to Simla, *Gamble.*

Tubers oblong. *Leaf* 2–4 in., amplexicaul, acute, many-nerved. *Scape* with few or many-fld. racemes, 4–10 in.; bracts shorter than the ovary; flowers ½–⅔ in. diam.; dorsal sepal oblong obtuse, lateral falcately oblong; petals subacute; lip with low rounded side lobes and a broad subcrenate midlobe, spur recurved; anther sessile, cells nearly parallel, pollinia clavate, caudicles short, glands rather distant.

2. **H. calophylla,** *Par. & Reichb. f. in Journ. Bot.* xii. (1874) 197;

leaf ovate or oblong, lip obcordate, spur shorter than the sepals, *Reichb. f. in Ot. Hamb.* 38; *Bot. Mag.* t. 6920.

TENASSERIM; on limestone rocks at Moulmein, *Gilbert, Parish.*

Leaf 3–5 in., from almost orbicular-ovate to linear-oblong acute, and slender scape and bracts dark green mottled with brown. *Scape* with few-fld. racemes 6–8 in.; flowers distant, ⅔ in. diam.; bracts shorter than the ovary; dorsal sepal oblong, and lateral and petals white; lip purple, side lobes low, rounded, midlobe broad, 2-lobed; pollinia small, oblong, adnate to the elongate spathulate caudicles.

109. **SATYRIUM,** *Swartz.*

Terrestrial leafy erect herbs, tubers undivided. *Leaves* broad or narrow. *Flowers* in dense spikes. *Sepals* and *petals* subsimilar, free, spreading or deflexed. *Lip* superior, sessile at the base of the column, erect, broad, hooded, 2-spurred or -saccate behind. *Column* erect, terete; stigma terminal, broad, concave, (or forming with the rostellum a 2-lipped body; anther dorsal, cells subparallel; pollinia 2, caudicles recurved, glands large naked sometimes connate.—Species 50, African and Indian.

S. nepalense, *Don Prodr* 26; *Lindl. Gen. & Sp. Orchid.* 340; *in Journ. Linn. Soc.* iii. 44; *Wight Ic.* t. 929; *Bot. Mag.* t. 6625; *Wall. Cat.* 7025. S. Perrottetianum, *A. Rich. in Ann. Sc. Nat. Ser.* 2, xv. 76, t. 53; *Wight Ic.* t. 1716. S. albiflorum, *A. Rich. l. c.*; *Wight Ic.* t. 1717. S. pallidum, *A. Rich. l. c.*

TEMPERATE HIMALAYA, from Kashmir, alt. 4–6000 ft., eastwards, ascending to 14,000 ft. in Sikkim. KHASIA HILLS, alt. 4–6000 ft. The DECCAN PENINSULA, from Concan to Travancore. CEYLON, alt. 4–6000 ft. ?BURMA; Shan states, alt. 4000 ft, *Manders.*

Stem with *spike* 6–30 in., usually very stout, sheathed above. *Leaves* few, from oblong to linear-oblong, 4–10 by 2–4 in., rather fleshy, sessile, base sheathing. *Spike* 1–6 in., dense-fld.; bracts much larger than the flowers, oblong or lanceolate, erect spreading or recurved; ovary turgid, ¼ in. long; flowers from dark pink to white, fragrant; sepals linear-oblong, obtuse, spreading and recurved; petals rather narrower; lip superior, broadly oblong, concave, strongly keeled on the back, spurs variable in length and stoutness, about as long as the ovary; column contracted and terete at the base; anther broad, cells turgid, tubes short, pollinia clavate, caudicles short, glands orbicular; stigma large, concave.—A very common and variable plant. The Burmese specimen has orbicular leaves at the very base of the stem.

Var. *Wightiana*; radical leaves few broad, spike short dense-fld. S. Wightianum, *Lindl. Gen. & Sp. Orchid.* 340; *in Journ. Linn. Soc. l. c.*; *Wight Ic.* t. 1718. —Nilghiri Mts.

Var. *ciliata*, Lindl. l. l. c.; a small plant with spurs hardly longer than the sepals.—Sikkim, alt. 7–12,000 ft., *J. D. H.* Bhotan, alt. 10,000 ft., *Griffith.*

110. **DISPERIS,** *Swartz.*

Terrestrial leafy herbs; tubers entire. *Leaves* 2 or more, scattered, sessile, cordate. *Flowers* solitary or few. *Dorsal sepal* very narrow, coherent with the broad petals into a subglobose hood; lateral spreading or deflexed, free or bases connate, disk with a depression within answering to a cone without. *Lip* confluent with the column to above the anther, appearing as if it surmounted the column. *Column* short in the Indian species, terete below, stigmas on a transverse hyaline membrane, the ends of which form twisted tubular processes that sheath the caudicles and glands of the

pollinia; anther oblong, obtuse, completely 2-celled; grains of pollinia 3–4-seriate, secund on the rachis, cuneiform, caudicles rather long, twisted, glands large naked. *Capsule* fusiform.—Species 20, Africa and the following.

The above description applies to the two Indian species of this highly interesting genus, the fertilization of which deserves a careful study. The analysis of dried specimens is so difficult that I advance the description of the membrane of the column and its appendages (which differs from that of others) with hesitation.

1. **D. zeylanica,** *Trimen Cat. Pl. Ceyl.* 91; lateral sepals concave not waved, petals semilunate obtuse. D. tripetaloides, *Lindl. Gen. & Sp. Orchid.* 371 (*in part*); *Thwaites Enum.* 311; *Wight Ic.* t. 930 & v. 15.

CEYLON; in the Central Provinces alt. 3–5000 ft., *Walker*, &c, The MALABAR & CANARA Ghats, &c., *Wight*, &c.

Stem 6–10 in. erect from the subglobose tubers, 1–3-leaved. *Leaves* ¾–1 in., distant, amplexicaul, acute. *Flowers* ½ in. diam., subcorymbosely, spicate; bracts leafy; ovary ½ in., straight; lip included under the hood, erect from the top of the column, 2-partite from a narrow cuneate base, arms falcately recurved, papillose; a pendulous linear appendage, with a rounded dilated papillose apex bearing a central cone, is inserted on the cuneate base of the lip. *Capsule* ½ in.

2. **D. neilgherrensis,** *Wight Ic.* t. 1719; lateral sepals strongly waved, petals lunate cuspidately acuminate.

NILGHIRI HILLS, *Wight.*

Larger and stouter than *D. zeylanica*, with larger reddish white flowers spotted with crimson; the lateral sepals are free or connate, and pubescent at the base.—Perhaps a form of *D. zeylanica*.

Tribe V. CYPRIPEDIEÆ. (See vol. v. p. 668.)

111. CYPRIPEDIUM, *Linn.*

Terrestrial herbs, with a leafy stem, plaited leaves, and terminal flowers, or stemless with distichous radical coriaceous often tessellately coloured leaves and 1–∞-fld. scapes. *Flowers* large, solitary or few. *Sepals* spreading, free on the lateral connate and placed under the lip. *Petals* free, very various. *Lip* sessile, side lobes small, spreading or inflexed, midlobe very large saccate, inflated oblong or helmet-shaped. *Column* short, terete; anthers 2, globose, together with the disciform deflexed stigma hidden under a large disciform staminode; ovary 1 celled.—Species about 40, Europe, temp. and trop. Asia and America.

In describing the Scapigerous species I have largely availed myself of published plates and the description in Veitch's excellent Manual, made from living plants. I have made no attempt to enumerate even the multitude of named hybrid forms that have been produced by crossing the Indian species with one another. They are well systematized in Veitch's Manual, where nearly 50 are assigned to their parents. *C. barbatum* alone has been crossed with upwards of 15 other species.

* Leaves 2, opposite on the stem, plicate.

1. **C. elegans,** *Reichb. f. in Flora*, 1886, 560; villous with cellular hairs, leaves orbicular-ovate or oblong, flowers solitary.

SIKKIM HIMALAYA, alt. 1000 ft., *Pantling.* EASTERN TIBET; North of Phari, *King's Collector.*

Stem 1–2 ft. high below the leaves. *Leaves* 1–2 in. broad. *Scape* shorter than the leaves; bract elliptic; flower about 1 in. diam.—A very interesting plant, the nearest ally of which is *C. japonicum.* I have seen only a single small specimen.

* Leaves several, alternate, plaited.

2. **C. cordigerum,** *Don Prodr.* 37; sepals and narrower petals spreading ovate-lanceolate acuminate green or white, lip oblong white, staminode ovate- or oblong-cordate. *Lindl. Gen. & Sp. Orchid.* 527; *Dene in Jacquem. Voy. Bot.* 165, t. 166.

TEMPERATE HIMALAYA; from Kashmir, alt. 9-11,000 ft., *Clarke,* to Kumaon, alt. 7-9000 ft., *Royle.*

Stem 10-24 in., robust or slender, and ovary puberulous. *Leaves* 3-6 by 2-4 in., approximate or scattered, from nearly orbicular to lanceolate, acute or acuminate. *Flower* solitary; bract 1-4 in., leafy; sepals 1½-2 in., longer than the lip, the connate lateral entire or split at the apex; column yellow. *Capsule* 1½ in., erect, clavate. —As Lindley observes, this is not distinguishable except by colour from the European *C. calceolus,* which extends from Britain to Dahuria. It would be well to compare living specimens before uniting them.

3. **C. macranthon,** *Swartz in Act. Holm.* 1800, 251; dorsal sepal from linear- to ovate-oblong acute, connate lateral narrower, lip subglobose much inflated purple, staminode ovate-oblong. *Lindl. Gen. & Sp. Orchid.* 528; *in Bot. Reg.* t. 1534; *Bot. Mag.* t. 2938; *Reichb. Fl. Exot.* ii. t. 16, No. 99; *Ic. Fl. Germ.* xiii. t. 498; *Fl. des Serres,* t. 1118; *Ill. Hortic.* 1857, t. 147; *Belg. Hortic.* vii. 353, t. 61; *Gartenfl.* 1863, t. 409; *Trans. Russ. Hort. Soc.* 1863, t. 135; *Orchidoph.* 1887, t. 75, f. 1; *Ledeb. Fl. Ross.* iv. 87.

ALPINE HIMALAYA; from Garwhal to Sikkim, alt. 11,500-14,000 ft.—DISTRIB. Northern and Subarctic Europe and Asia to Japan.

Stem 1-1½ ft., usually very stout, pubescent. *Leaves* 3-6 by 2-4 in., ovate or oblong, acute, puberulous. *Flowers* 1-2, 1½-2 in. diam; sepals and petals very variable in length and breadth, longer or shorter than the lip, yellowish or greenish with dark purple stains, or all purple; combined lateral acute or bidentate; lip inflated, light or dark purple, mouth small crenate, sides often grooved concentrically. —In Sikkim specimens gathered by myself, the dorsal sepal is broadly oblong 1 in. long, and the petals as long but narrower and lanceolate, both yellow-green and striped with dark red.

VAR. *ventricosa; Carrière in Rev. Hortic.* 1877, 310; dorsal sepal broader, and petals usually much longer, often 2 in. long, lip very large 1-1½ in. diam. C. ventricosum, *Swartz in Act. Holm.* 1800, 251; *Lindl. Gen. & Sp. Orchid.* 529; *Sweet Fl. Gard.* iv. t. 1; *Reichb. Ic. Fl. Germ.* xiii. t. 497.—Chumbi, in Tibet, N.E. of Sikkim, *King's Collector.*—Distrib. Siberia.—In King's Tibetan specimen, of which he has lent me a drawing, the dorsal sepal is broadly ovate, 1¼ by ¾ in., the petals 2 by ¾ in., oblong-lanceolate, both white striped with red.

** Leaves radical, distichous, oblong or lorate, coriaceous, not plaited. Scape 1-3-fld., pubescent or villous.

a. Petals as broad as the dorsal sepal, short, sessile, broadly oblong, margins not undulate nor warted.

4. **C. concolor,** *Batem. in Bot Mag.* t. 5513; leaves oblong or linear-oblong tessellated, scape short 1-2-fld., sepals suborbicular and elliptic-oblong petals yellow ciliate, sac of lip subcylindric, staminode subrhomboidly ovate apiculate. *Ill. Hort.* 1865, t. 444; *Gartenfl.* 1874, t. 803; *Fl. des Serres,* t. 2321; *Williams Orchid. Alb.* t. 302; *Reichb. f. in Gard. Chron.* 1865, 626; 1883, i. 19, fig. 3, *Veitch Man.* 17, *with fig.*

TENASSERIM; near Moulmein, *Parish.* UPPER BURMA; in the Shan hills, *Prayer.*—DISTRIB. Cambodia.

Leaves 3-5 in., crowded, obtuse, pale green above, fascicled with undulate bands of dark green, purple or purple spotted beneath. *Scapes* 1-2 in. and cymbiform bract dark purple; flowers 2-3 in. diam., pale yellow, sparsely dotted with purple; petals hardly longer than the sepals; lip small, mouth slightly dilated.—Reichb. f. describes (Gard. Chron. 1886, 294) a var. *chlorophylla* with an interrupted line of purple spots along the midribs of the sepals and petals, and var. *sulphurina* (l. c. 1888, ii. 261) with unspotted sulphur coloured flowers. Other vars. are *tonkinensis*, Lindenia, ii. t. 77, and *Regneri*, Orchidoph. 1886, 226.—The *C. dodefroyi* of Siam is very closely allied, but has dorsal sepals and petals broader than long, copiously spotted, and a 3-toothed staminode.

5. **C. niveum,** *Reichb. f. in Gard. Chron.* 1869, 1038; *Xen. Orchid.* ii. 155; leaves linear-oblong tessellated, scape elongate 1-2-fld., sepals orbicular and broadly oblong petals ciliate, sac of lip ovoid mouth contracted, staminode large transversely oblong. *Bot. Mag.* t. 5922; *Ill. Hort.* 1871, t. 83; *Flor Mag.* 1871, t. 513, *Jennings Orchid.* t. 28; *Reichenbachia*, i. t. 34; *Gard. Chron.* 1883, ii.; fig 1. *Veitch Man.* 39, *with fig.*; C. concolor, *var.* nivea, *Reichb. f. in Gard. Chron. l. c.*

STRAITS OF MALACCA; Langkawi Islands, south of Penang.—DISTRIB. Tambilan Island, between Singapore and Borneo, and W. coast of Siam.

Leaves 4-6 in., green above with darker blotches, lurid purple beneath. *Scape* 1-2-fld.; bracts very short; flowers 3 in. diam., pure white more or less dotted with purple; dorsal sepal very broad, stained with purple on the back; petals rather longer, variable in size and breadth; staminode closing the mouth of the lip.

β. Petals as broad as the dorsal sepal or nearly so, spathulate, clawed, margins not warted.

6. **C. villosum,** *Lindl. in Gard. Chron.* 1854, 125; leaves loriform, not tessellate, scape elongate, villous bract nearly as long as the ovary, dorsal sepal suberect obovate-oblong with the lower margins revolute and spathulate petals ciliate, lip helmet-shaped, staminode obovate base cordate. *Ill. Hort.* iv. t. 126; *Pescator.* t. 48; *Fl. des Serres*, t. 1475. *Lindenia*, iii. t. 132; *Warner Sel. Orchid.* ii. t. 30. *Veitch Man.* 54, *with fig.* C. Boxalli, *Reichb. f. in Gard. Chron.* 1877, i. 367; *Ill. Hort.* xxvi. 345.

TENASSERIM; Moulmein, alt. 4-5000 ft., *Lobb, Parish.*

Leaves 10-18 in., green above, paler beneath. *Scape* 1-fld.; bract spathaceous and ovary villous; flowers 5-6 in. diam., glossy; dorsal sepal green with brown-purple base and white margins, keel hirsute; petals hirsute towards the base, and lip brownish yellow, mouth and staminode tawny yellow.—*C. Boxalli* is a var. with black spots on the dorsal sepal and more tessellated petals. Var., *aurea* (Gard. Chron. 1883, i. 374) has a bright yellow-green dorsal sepal margined with white and golden yellow petals and lip.

7. **C. hirsutissimum,** *Lindl. in Bot. Mag.* t. 4990; leaves lorate acute not tessellate, bract small and flower hirsute, dorsal sepal erect orbicular-ovate obtuse, petals horizontal spathulate claw crisped or undulate, lip helmet-shaped, staminode quadrate angles rounded. *Warner Sel. Orchid.* i. t. 15; *Belg. Hortic.* vii. 353, t. 61; *Ill. Hort.* iv., *Misc.* 67; *Xen. Orchid.* ii. 107, t. 132; *Rev. Hortic.* 1859, 182; *Fl. des Serres*, t. 1430; *Veitch Man.* 29, *with fig.*

KHASIA HILLS; on the Assam face, *Simons.*

Leaves 9-12 in., green. *Scape* 12 in., green, hairs of bracts and flowers dark purple; flowers 4 in. diam.; dorsal sepal green with a dull purplish spotted disk; petals nearly as broad as the dorsal sepal, violet-purple, the lower half with green sides and midrib and copious dark spots, and hairs; lip green flushed with dark purple, minutely warted, mouth green within; staminode green, base white.

γ. Petals narrower but not much longer than the dorsal sepal, sometimes warted on the surface, but not on the margins, which are glabrous.

8. **C. Druri,** *Beddome Ic. Plant. Ind. Or.* 23, t. 112; leaves ligulate glabrous not tessellated, scape tall 1-fld. pubescent, bract much shorter than the ovary, dorsal sepal broadly ovate ciliolate arched, petals linear-oblong obtuse surface warted and hirsute towards the base, lip helmet-shaped mouth open, staminode subquadrate. *Reichb. f. in Gard. Chron.* 1876, 68; *Xen. Orchid.* ii. 223; *Ill. Hort.* 1877, t. 265; *Lindenia,* i. t. 6; *Flor. Mag. N. S.* t. 425; *Veitch Man.* 22, *with fig.*

Travancore Mts., alt. 5–6000 ft., *Drury.*

Leaves 7–10 in., bright green. *Scape* 9–12 in. and small obtuse bracts and ovary pubescent; flowers 3 in. diam.; dorsal sepal greenish yellow with a broad dark median band and a dorsal keel with black hairs; lower connate sepals smaller; petals incurved tips rounded, bright ochreous yellow, with a dark median band, warts and hairs blackish; staminode much smaller than the mouth of the lip, which is bright yellow dotted with purple within, and with acute margins.

9. **C. insigne,** *Wall. mss. in Lindl. Coll. Bot.* t. 32; leaves ligulate glabrous not tessellated, scapes elongate 1–2-fld., bract equalling the ovary, dorsal sepal large arched orbicular-ovate margins subrecurved, petals linear-oblong glabrous margin undulate, lip broadly helmet-shaped, staminode subquadrate. *Lindl. Gen. & Sp. Orchid.* 530; *Hook. Fl. Exot.* t. 34; *Lodd. Bot. Cab.* t. 1321; *Bot. Mag.* t. 3412; *Williams Orchid. Alb.* iv. t. 155; *Griff. Notul.* 344; *Ic. Pl. Asiat.* t. 322; *Veitch Man.* 32; *Flore des Serres,* 1564.

Khasia Hills, alt. 4–5000 ft., *Wallich, &c.*

Leaves 8–12 in., acute, pale green. *Scape* 12 in., 1–2-fld. and large oblong compressed bracts and ovary pubescent; flowers 4–5 in. diam., glossy; dorsal sepal apple-green, purple-spotted, tip white, lateral smaller, paler; petals rather longer than the sepals, margins subcordate, green with white tips and purple veins; lip broad yellow or green suffused with purple, tawny yellow within; staminode pubescent with a central callus.—The above description is of the wild form; cultivated specimens vary greatly in colour, and have numberless synonyms, the principal given by Veitch are

Var. *Chantinii,* Rafar. in Rev. Hort. 1866, 249; 1878, 130, with fig.; dorsal sepal margined with white purple spotted, lower combined sepals longer more acute, petal veined with amber, lip chesnut brown. *Fl. des Serres,* xxi. 72; *Orchidoph.* 1885, 36; *Williams Orchid. Alb.* vi. t. 278; *Gard. Chron.* 1882, ii. 717, *fig.* 127.

Var. *Maulei,* Moore in Flor. Mag. 1861, t. 57; flowers larger, margins of dorsal sepal revolute towards the base white at the tip, petals paler, lip longer narrower paler. *Fl. des Serres,* xv. t. 1564; *Gard. Chron.* 1882, ii. 716, *fig.* 126.

Var. *Sanderæ*; flowers primrose yellow, except the white margins.

Other vars. are *aspera*; *aurea,* Fl & Pomol. 1882, 75, and *albo-marginata,* Williams Orchid. Alb. v. t. 232, 178. For figures of the flowers of many varieties see *Gard. Chron.* 1882, ii. 716, f. 126.

10. **C. Spicerianum,** *Reichb. f. in Gard. Chron.* 1880, i. 40, 74, fig. 7; leaves ligulate subacute not tessellated, scape tall 1–2-fld., bracts much shorter than the ovary, dorsal sepal very large erect rhombic-obovate hirsute sides strongly recurved below, petals shorter deflexed ligulate margins undulate and crisped, lip helmet-shaped mouth dilated, staminode orbicular. *Bot. Mag.* t. 6490; *Ill. Hort.* 1883, t. 473; *the Garden,* 1883, t. 378; *Williams Orchid. Alb.* iii. t. 119; *Belg. Hortic.* 1883, 289, t. 18; *Orchidoph.* 1890, 415; *Gard. Chron.* 1880, i. 41, f. 7; *Veitch Man.* 46, *with fig.*

ASSAM (*Low's* and *Sander's Collectors*).

Leaves 6–9 in., dark green, margins more or less waved, beneath purple-spotted near the base. *Scape* 9–12 in., slender, pubescent; bract narrow; flowers about 3 in. diam.; dorsal sepal horizontal, sides at the base so stoutly reflexed as to appear clawed, white base purple dotted on a green ground, midline purple; petals shorter than the lip, obtuse, yellow- or olive-green with a red median band and spots; lip brown, tinged with crimson; staminode red, edged with white, base contracted into auricle-like folds.

δ. *Petals narrower than the dorsal sepal, very long in* C. Parishii, *margins bearded or hirsute and warted.*

11. **C. venustum,** *Wall. in Bot. Mag.* t. 2129; *Cat.* 7023; leaves elliptic-oblong or loriform tessellate, scape 1–2-fld., bracts half as long as the ovary, dorsal sepal broadly ovate or cordate, petals linear-oblong bearded sparsely warted, lip subcylindric reticulate, staminode semi-lunate. *Lindl. Gen. & Sp. Orchid.* 530; *Hook. Exot. Flor.* t. 35; *Bot. Mag.* t. 2129; *Bot. Reg.* t. 788; *Reichb. Fl. Exot.* 100; *Lodd. Bot. Cal.* 585; *Warner Sel. Orchid.* ii. t. 24; *Veitch Man.* 53. C. pardinum, *Reichb. f. in Gard. Chron.* 1869, 554, and 1887, i. 382, fig. 76 (pardinum var.); *Flor. Mag. N. S.* t. 51.

TROPICAL SIKKIM HIMALAYA, alt. 3–4000 ft., *J. D. H., Clarke.* SILHET and ASSAM, *Wallich, Griffith,* &c.

Leaves 4–10 in., dark green, marbled with pale green above and dull purple beneath. *Scape* 6–9 in., pubescent; flowers 2–2½ in. diam.; dorsal sepal white with dark stripes; petals spreading, subspathulate, green and purplish, warts blackish; lip yellow green, flushed with pink, and with green reticulations, inflexed lobes yellow nearly closing the mouth.—The var. *pardinum* has larger flowers, whiter sepals, and larger and more scattered wart on the petals.

12. **C. Fairieanum,** *Lindl. in Gard. Chron.* 1857, 740; leaves linear-oblong or loriform not tessellate, scape slender 1-fld., bracts half as long as the glandular hairy ovary, dorsal sepal large erect suborbicular obtuse, petals linear-lanceolate falcately upcurved margins crisped bearded and with black tubercles, lip slipper-formed pubescent, staminode orbicular with a deep notch and included spur in front. *Bot Mag.* t. 5024; *Fl. des Serres,* t. 1244; *Xen. Orchid.* ii. 108, t. 133; *Orchid. Alb.* ii. t. 70; *Veitch Man.* 24, *with fig.*

ASSAM, *Tronson* (*Ic. in Hort. Calcutt.*).

Leaves 4–6 in., acute, bright green. *Scape* 4–6 in., green; bract green; ovary purple; flower 2½–3 in. diam.; dorsal sepal greenish white with broad purple reticulated nerves, ciliate, margin waved, keel hairy; petals yellow- or greenish-white with purple nerves and margins; lip green with purple veins and spots; staminode deeply notched and 3-fid in front, side lobes acute incurved, midlobe as long, straight acute.

13. **C. superbiens,** *Reichb. f in Bonpland.* 1855, 227; *in Algem. Gartenzeit,* 1856, 323; *Xen. Orchid.* ii. 9, t. 103; leaves elliptic-oblong tessellate, scape 1-fld., bract much shorter than the ovary, dorsal sepal orbicular-ovate acute, petals broadly linear deflexed fringed with black hairs and warted, lip helmet-shaped, staminode suborbicular notched in front, base 2-lobed. *Gartenfl.* 1863, 49; *Warner Sel. Orchid.* ii. t. 12; *Fl. des Serres,* t. 1996; *Veitch Man.* 51, *with fig.*; *Gard. Chron.* 1886, ii. 405, f. 83, 84. C. Veitchianum, *Ill. Hort.* xii. t. 429; *De Puydt, Les Orchid. frontisp.* p. 267; *Rev. Hortic.* 1871, 595, *fig.* 78, 79. C. barbatum Veitchii, *Fl. des Serres,* t. 1453. C. barbatum superbum, *Belg. Hortic.* 1883, 97.

MALAY PENINSULA; Mt. Ophir, *Lobb.*

Leaves 5–7 in., pale or dark green with dull blotches. *Scape* 9–12 in., 1-fld.; flowers ciliolate, 4 in. diam.; dorsal sepal white striped with green; petals longer than the dorsal sepal, white veined with green; lip brownish purple, inflexed, lobes crimson, warted.

14. **C. barbatum,** *Lindl. in Bot. Reg.* 1841, *Misc.* 53; 1842, t. 17; leaves oblong to linear-oblong acute tessellate, scape 1–2-fld. pubescent, bract much shorter than the ovary, dorsal sepal broadly ovate or orbicular acute or obtuse, petals longer linear-oblong spreading and decurved ciliate and with a few black warts along the upper or both margins, lip helmet-shaped mouth dilated, staminode hypocrepiform. *Bot. Mag.* 4234; *Fl. des Serres*, iii t. 190, and xviii. t. 1879 (var. grandiflorum); *Belgique Hortic.* xxxiii. 96, t. 7; *Warner Sel. Orchid. Ser.* 3, t. 11 (var. *Warneri*); *Veitch Man.* 12. *Gard. Chron.* 1886, ii. 308, f. 63. C. purpuratum, *Wight Ic.* t. 1760 (*not of Lindl.*). C. Warnerianum, *Reichb. f. in Gart. Zeit.* 1883, *fasc.* ix. C. orbum, *Reichb. f. in Gard. Chron.* 1887, ii. 778. C. Crossii, *Belg. Hortic.* xv. 227; *Veitch Man.* 12, *with fig.*

PENANG, *Maingay.* MALACCA; on Mt. Ophir, *Griffith*, &c.—DISTRIB. W. Siam.

Leaves 4–8 in., pale green above with darker oblong spots. *Scape* 10–12 in.; flowers 2–3 in. diam.; dorsal sepal folded in the middle, white with purple veins and greenish base, lower connate sepals much narrower; petals greenish brown towards the base, purple towards the tip; lip dark purple. Variable in the size and colour of the flowers. Veitch retains two varieties, 1, *Crossii*, leaves paler with more scattered deep green spots, under which are *C. Warneriana* and *orba*, and 2, *Obrieni*, with leaves paler, spots smaller, petals and lip deeper coloured.—*C. orbum* is described as a hybrid by Reichenbach, but Veitch regards it as a synonym of var. *Crossii.*

15. **C. Parishii,** *Reichb. f. in Flora*, 1869, 322; *in Gard. Chron.* 1869, 814, *with fig.*; leaves ligulate 2-fid not tessellated, scape stout 4–7-fld., bracts spathaceous, dorsal sepal suberect broadly elliptic-ovate with the basal margins revolute, petals very long linear pendulous twisted margin sparsely warted below, lip helmet-shaped, staminode obovate-oblong obtusely 2-fid, base spurred. *Bot. Mag.* t. 5791; *Williams Orchid. Alb.* ii. t. 86; *De Puydt. Orchid.* 188; *Orchidoph.* 1887, t. 91. *Ill. Hort.* 1875, t. 214; *Gard. Chron.* 1869, 814; *Veitch Man.* 41. Selenipedium Parishii, *Rev. Hort.* 1885, 132.

TENASSERIM; at Moulmein, *Parish.*

Leaves 9–15 by 1½–2½ in., glossy green. *Scape* 12–18 in., palo green, hairy; bracts and hirsute ovary green; flowers 3–4 in. diam.; dorsal sepal arched, keeled, pale yellow green; petals 4–6 in. long, spreading, at length pendulous, basal half green with pale undulate margin and a few bristly marginal tubercles, the other half dark purple, tip obtuse pubescent; lip green or stained with purple, mouth green within; staminode greenish yellow, margins white.

112. APOSTASIA, *Blume.*

Terrestrial herbs, with a short caudex and leafy rigid stems. *Leaves* narrow, strongly nerved. *Flowers* small, in terminal or axillary simple or panicled often decurved or deflexed spikes. *Sepals, petals* and *lip* all equal and alike, free, spreading or recurved. *Ovary* very slender, 3-celled. *Column* short; anthers 2, at the sides of the rostellum, shortly stipitate, narrow, erect, 2-celled, cells parallel; staminode erect, behind the stigma,

or 0; stigma terminal long erect, tip discoid.—Species 6, Indian, Malayan and Australian.

1. **A. Wallichii,** *Br. in Wall. Cat.* 4448; *in Pl. As. Rar.* i. 75, t. 84 (A. odorata); leaves linear-lanceolate 5–7-nerved, spikes panicled, peduncle naked below, anthers versatile cell bases unequal, staminode adnate to the style. *Blume in Ann. Sc. Nat. Ser.* 2, ii. 93; *Miquel Fl. Ind. Bat.* iii. 748; *Thwaites Enum.* 315; *Rolfe in Journ. Linn. Soc.* xxv. 237, t. 48, f. 22–24. Mesodactylus deflexa, *Wall., ex. Pl. As. Rar. l. c.* 74.

TROPICAL NEPAL, *Wallich.* KHASIA HILLS, *J. D. H. & T. T.* ASSAM, *Griffith.* PENANG, *Curtis.* PERAK, *Scortechini, King's Collector,* CEYLON; in the Suffragan district, *Thwaites.*—DISTRIB. Sumatra, Java, N. Guinea.

Stem 1–2 ft. *Leaves* 4–8 in. *Panicle* decurved, 4–10 in.; bracts subulate; flowers subsecund, ¼ in. diam., yellow; ovary ½–¾ in. *Capsule* ½–⅔ in.

2. **A. nuda,** *Br. in Wall. Cat.* 4449; *in Wall. Pl. As. Rar.* i. 76, t. 85; leaves narrowly linear-lanceolate finely acuminate 3–5-nerved, spikes panicled many-bracteate at the base, anthers erect cell-bases equal, staminode 0. *Blume in Ann. Sc. Nat. Ser.* 2, ii. 93; *Miquel Fl. Ind. Bat.* iii. 748; *Rolfe in Journ Linn. Soc.* xxv. 239, t. 48, f. 20, 21. A. Brunonis, *Griff. Notul.* iii. 243; *Ic. Pl. Asiat.* t. 282.

KHASIA HILLS and CHITTAGONG, *J. D. H. & T. T.* TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 5604). MALACCA, *Maingay,* top of Mt. Ophir, *Hullett.* SINGAPORE, *Lobb.* PERAK, *Wray.*—DISTRIB, Sumatra, Java.

Stem 10–12 in. *Leaves* 4–10 in. *Panicle* decurved, much shorter than in *A. Wallichii,* as are the ovaries.

3. **A. latifolia,** *Rolfe in Journ Linn. Soc.* xxv. 242; leaves petioled elliptic-lanceolate finely acuminate very many nerved, spikes panicled, peduncle naked at the base, anther erect bases equal staminode 0.

PERAK, *Scortechini, Wray.*

Stem 3 ft. *Leaves* 4–6 by 1–1½ in., nerves very close; petiole 1–1½ in. *Panicle* stouter than in *nuda* and *Wallichii,* bracts broader, ovaries ¼ in., curved; flowers very small.

113. NEUWIEDIA, *Blume.*

Terrestrial herbs, with a short caudex and leafy stiff stems. *Leaves* elongate, petioled, strongly nerved. *Flowers* small, in a terminal simple erect dense raceme, clothed with long bracts. *Sepals* and *petals* equal and similar, free, or the latter rather broader. *Lip* subspathulate. *Column* short; stigma terminal, long, erect, tip discoid; anthers 3, erect, narrow, stipitate, one on each side of the stigma, and one dorsal, cells parallel. *Ovary* 3-celled.—Species 6, Malayan.

1. **N. Lindleyi,** *Rolfe in Journ. Linn. Soc.* xxv. 232, t. 48, f. 10–12; peduncle elongate, raceme elongate many and dense-fld. and flowers puberulous, bracts 1–1½ in. membranous, erect and recurved.

PENANG, *Curtis.*—DISTRIB. Borneo.

Stem very short, stout. *Leaves* many, 1–2 ft. by 2–3 in., oblanceolate, membranous, many-nerved, stoutly petioled. *Raceme* 1–2 ft., stout, erect, rachis stout; bracts much longer than the flowers, narrowly lanceolate; flowers 1 in. long, horizontal, pedicelled; ovary ½ in.

2. **N. Curtisii,** *Rolfe in Journ. Linn. Soc.* xxv. 233, t. 48, f. 13, 14;

peduncle short, raceme short many-fld. and flowers pubescent, bracts ½–¾ in. erect.

PENANG; on West Hill, alt. 2000 ft., *Curtis*.—DISTRIB. Sumatra.

Leaves as in *N. Lindleyi*, but peduncle and raceme very short, and bracts glandular-pubescent.

3. **N. Griffithii,** *Reichb. f. Xen. Orchid.* ii. 215; peduncle short, spike short many-fld. and flowers subhispidly pubescent, bracts ½–¾ in

MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1682). PERAK, *King's Collector*.

Stem very short. *Leaves* 4–10 in., elliptic-lanceolate, finely acuminate, many-nerved, petioled. *Raceme* 2–3 in.; flowers white, very shortly pedicelled, ½ in. long, decurved. *Capsule* ⅓ in. long, turgid, trigonous.

SUPPLEMENT TO **ORCHIDEÆ**, WITH ADDITIONS AND CORRECTIONS.

During the elaboration of the *Orchideæ* for this Flora, very large collections of species, from many parts of India, were being received at intervals by the Herbarium of the Royal Gardens, Kew, especially from the rich stores of the Royal Gardens of Calcutta, together with the loan of a magnificent series of original drawings of Orchids from the same source. The most important of these collections were Malayan, abounding in novelties, from Penang, Perak, Singapore and Malacca, made by the late Father Scortechini (presented, together with the loan of the Rev. father's pencil drawings of many species, by the Government of Perak), by Kunstler, a collector sent from the Calcutta Bot. Gardens by Dr. King, by Curtis, Hullett, Wray and Ridley. Important collections were also sent by Mann, from Assam, Bhotan, and the Khasia hills; by Gamble (on loan) from various parts of India; by Duthie from Garwhal; by Clarke from Sikkim, the Khasia hills, and Bengal, together with a few from Central India; and (on loan) by Dr. Trimen from Ceylon. These successive arrivals necessitated many consecutive revisions and emendations of the work already prepared, some printed, some in the press, and some in mss., besides adding many species and some genera to the Indian Flora.

Vol. v. p. 667. KEY TO THE TRIBES AND SUBTRIBES.

The Key to the Indian Genera Subtribes and Tribes was extracted, with a few modifications, from that prepared by Bentham for the Genera Plantarum; which, whether as regards the difficulties that attend the analysis of the plants of this most complicated Order, or the chaotic state into which the family had fallen since Lindley's days, is a masterpiece of research and scientific taxonomy. As may be supposed, the detailed examination of so many Indian genera and species as are contained in this Flora (about 1400), and of a large proportion of which Bentham had no knowledge, or only a superficial one, has suggested a few emendations in his classification, but these are very slight, and I shall notice them in their order, in the following pages.

Sub-order MALAXEÆ. I have departed from Bentham, in including LIPARIEÆ and MALAXEÆ under one sub-order. The essential character of *Liparieæ*, the incumbent anther, fails in a great measure when *Oberonia* is placed in it, for the pollinia of this genus are as Griffith points out (Notul. iii. 273) in *O. anthropophora* and *trilobata* (*ensiformis*, Lindl.) at first accumbent; and in these and others he describes them as "accumbenti-incumbentia." Added to this the habit of *Microstylis*, which is placed in *Malaxeæ*, is that of *Liparis*; and of *Oberonia*, which is placed in *Liparieæ*, is that of *Malaxis*. The clinandrium is so minute in *Oberonia* and *Microstylis*, that I have little confidence in my own results obtained by softening these parts in dried specimens, but my impression is that in *Microstylis* the anther will be found to both accumbent and incumbent, very much as in *Oberonia*. Lastly the pollinia of *Obcronia* are variously described and figured as 2 or 4. I think

that 4 is the rule, but one of each pair is often much smaller, and I suspect sometimes suppressed.

In line 3 of the character of subtribe *Malaxeæ* for not incumbent, read accumbent or incumbent.

P. 667. Subtribe ERIEÆ. The inflorescence is often subterminal in *Eria*, and appears to be truly terminal in the anomalous genus 10/2 *Claderia*. (See p. 810.)

P. 668. The Subtribe CYRTOPODIEÆ of Bentham, is here included as far as the Indian genera are concerned in *Eulophieæ*, though by oversight, it is introduced at p. 671. *Eulophieæ* are described in the "Genera" as pseudobulbous, and having a spurred lip, but very few indeed of the Indian species are pseudobulbous, many have a mere sac to represent the spur, in many the so-called spur is a true mentum, and Bolus "Orchid of Cape Peninsula" describes species that have neither a spurred nor saccate lip. The only character given for *Cyrtopodieæ*, as distinctive from *Eulophieæ*, is that of the column being produced into a foot; but this is invalidated by my having to follow Blume, Bolus and others in replacing *Cyrtopera*, which in the "Genera" is referred to *Cyrtopodium*, in *Eulophia*; and as I find no character by which *Plocoglottis*, the only other Indian genus of Bentham's *Cyrtopodieæ*, can be excluded *Eulophieæ*, I propose as a character—

Subtribe EULOPHIEÆ. Terrestrial, never epiphytic. Stem rarely pseudobulbous. Lip usually spurred saccate or forming with the lateral sepals a mentum.

39. EULOPHIA. Lip free from the sides of the column, adnate to its base or foot.

48. PLOCOGLOTTIS. Lip adnate by a membrane to the sides of the column.

Suborder CYMBIDIEÆ. Terrestrial or epiphytic. Lip neither spurred nor conspicuously saccate; adnate to the base of the column.—Genera as at p. 671, including *Cremastra*, which has to be added.

Suborder VANILLEÆ. The free often hippocrepiform pollinia, without caudicle or gland, distinguish the Indian species from *Corymbeæ* and *Spiranthee*.

Subtribe CORYMBEÆ, differs from all other Indian NEOTTIEÆ in the hard almost woody stem, and rigid leaves, in which respect the species resemble *Apostasia*.

Tribe OPHRYDEÆ. In 4th line insert "long or" before short.

Subtribe EUOPHRYDEÆ. If I am correct in my analyses of the rostellum in some of the smaller *Habenariæ*, it may prove difficult to separate this subtribe from *Habenarieæ*. Under any circumstances the modifications of the rostellum are so great in both, that I doubt its forming a subtribal character.

After Subtribe DISEÆ should follow (as at p. 675)—

Subtribe CORYCIEÆ, to include 110 DISPERIS. This genus and *Satyrium* are the solitary Indian representatives of the extensive S. African Subtribes *Diseæ* and *Coryciеæ*, which are distinguished from one another by Bentham, and more recently by Bolus (the Orchids of the Cape Peninsula) by the former having the sepals and petals all free, and the lip at the base of the column, whilst in the latter the dorsal sepal and petals cohere, and the lip is adnate to the column nearly to its tip.

Tribe CYPRIPEDIEÆ. This tribe I think includes two subtribes, if not two tribes; namely—

CYPRIPEDIEÆ. Flowers very irregular. Lip inflated. Anthers 2, one on each side of a large dilated rostellum. Staminode very large.

APOSTASIEÆ. Flowers regular. Lip like the sepals and petals. Anthers 2 or 3 on the sides of a small erect rostellum; staminode very small or 0.

KEY TO THE GENERA.

P. 669. After 9. BULBOPHYLLUM, insert—

9/1. HENOSIS, see Vol. v. p. 771, and for amended characters p. 189 of this volume.

P. 670. After 18. CHRYSOGLOSSUM, insert—

18/2. COLLABIUM. *Scape* tall, raceme long. *Lip* jointed on to the trumpet-shaped foot of the column. *Pollinia* 2, 2-cleft, united by a viscus. (See Vol. v. p. 784.)

After 19. ERIA, insert—

19/1. CLADERIA. Terrestrial, subscandent. Leaves plicate. Inflorescence terminal. Lip sessile at the base of the long sigmoid column. Pollinia 2?

21. PACHYSTOMA, add to description. Flowers small; and insert after it—

21/1. IPSEA. *Scape* leafless. Flowers large. Sepals spreading. Column elongate, foot 0. Pseudobulb 1-2-leaved.

28. For JOSEPHA read JOSEPHIA.

29. GLOMERA. Cancel this genus. (See Vol. v. p. 823.)

P. 671. EULOPHIA. See remarks under Subtribes EULOPHIEÆ, at p. 177 of this volume. The character of "petals like the dorsal sepal," is subject to many exceptions.

41. CYPERORCHIS, though removed in "Gen. Plant." from proximity to *Cymbidium*, should stand next to it. The two genera are hardly separable. After it insert—

41/1. CREMASTRA. Sepals and petals and lip very narrow and conniving in a tube. Leaf solitary on a tuberous rhizome. Scape leafless, sheathed; flowers racemose, secund.

Subtribe 3. CYRTOPODIEÆ and 48. *Plocoglottis*. For remarks on these see Subtribe *Eulophieæ*, at p. 177 of this volume.

Subtribe 4. SARCANTHEÆ. The classification of the genera of this subtribe presents great difficulties. In so far as the Indian genera are concerned I have not been able to improve upon Bentham's arrangement; though I find numerous exceptions to the characters given under the three subdivisions marked by stars.

49. LUISIA. The *Cristaria* section of *Vanda* unites that genus with this. The incurved sepals and petals of Sect. *Cristaria* are those of *Luisia*, but the foliage and habit are those of most *Vandæ*. The lip of one species of Sect. *Cristaria* is spurred or saccate as in *Vanda*, of another it is flat as in *Luisia*, without spur or sac.

50. COTTONIA. Replace the character by,—Sepals and narrower petals spreading. Lip sessile, not jointed at the base of the column, flat. Stipes of pollinia long, narrow. Raceme very long-peduncled,—and follow it with—

50/1. DIPLOPRORA. Sepals and broader petals spreading. Lip with the sides adnate to the sides of the column, cymbiform, with a compressed bicaudate tip. Stipes of pollinia short, narrow. Raceme very shortly peduncled.

P. 672. 53. PHALÆNOPSIS. Add to character of lip, disk with a forked callus or plate, and after foot short, add—or long or 0.

54. DORITIS. In this genus the foot of the column forms a conical mentum with the lateral sepals.

55. RHYNCHOSTYLIS is placed by Bentham in a division of *Sarcantheæ* with a foot to the column and a mentum, but appears to me to have these characters very obscurely if at all. The lip and spur are exactly those of *Saccolabium*.

56. SARCHOCHILUS is inconstant as regards the presence or absence of a foot to the column, and in having a mentum or spur or neither. It is a truly polymorphous genus, incapable of precise definition.

58. ÆRIDES. I do not find the lip to be truly articulate with the foot of the column as described in "Gen. Plant." The species of the first section with terete leaves closely approach the terete leaved *Vandæ*, and those of Section II. ** resemble *Saccolabia*. The stipes of the pollinia is sometimes short and broad.

60. VANDA. See above under 58 *Ærides*, and 49 *Luisia* for remarks. The Sect. *Anota* (*V. densiflora*) has so short a foot to the column that it might well be placed in *Saccolabium*. The stipes of the pollinia varies greatly in length and breadth.

61. SACCOLABIUM. The sepals and petals are often incurved. To the character should be added—Spur without a callus *under the column* within, or a septum.

62. SCHŒNORCHIS. As stated at p. 54 of this volume this genus was inserted by oversight, *Saccolabium filiforme* having been mistaken for it by Thwaites.

63. UNCIFERA and 64 ACAMPE I have been obliged to include under SACCOLABIUM. See remarks under the latter genus in this volume, p. 54.

65. SARCANTHUS and 66. CLEISOSTOMA, are separated from *Saccolabium*, and from one another, by characters so minute and trivial, that they might well rank as sections of that genus, to which 67. *Ornithochilus* might be added.

P. 673. Subtribe 3. SPIRANTHEÆ. The Indian genera of this subtribe are most difficult of classification. The following attempt which may aid the student, requires critical revision with living specimens; the characters of the minute fleshy column and stigma being extremely difficult of accurate analysis in herbarium specimens, however carefully their organs may be moistened or laid out.

KEY TO THE INDIAN GENERA OF SPIRANTHEÆ.

* Spur or sac of the lip exposed beyond the base of the lateral sepals. (See also a few species of *Goodyera*.)

79. PHYSURUS. Lip not clawed beyond the spur, limb broad abruptly contracted at the base; spur eglandular within; column not appendaged in front; stigma anticous.

80. ANÆCTOCHILUS. Lip clawed beyond the spur, limb 2-winged; spur 2-glandular within; column appendaged in front; stigmatic lobes lateral.

81. VRYDAGZYNEA. Lip not clawed, limb oblong membranous entire; spur 2-glandular within; column not appendaged in front; stigmatic lobes lateral.

82. CYSTORCHIS. Lip saccate, contracted into a beak with a small dilated tip; sac 2-glandular within (or not ?); column not appendaged in front; stigma anticous.

83. HERPYSMA. Lip adnate to the sides of the column, limb spreading; spur long, naked within; column not appendaged in front; stigma anticous.

** Lip if spurred, with the spur or sac covered by the bases of the lateral sepals (except in a few *Goodyeræ*).

† *Lip clawed beyond the spur or sac.*

84. ODONTOCHILUS. Lateral sepals connate at the base; claw of lip crenate toothed or fimbriate, limb usually 2-winged; sac 2-glandular within; column appendaged in front; stigmatic lobes lateral.

85. HÆMARIA. Sepals free; lip adnate to the base and sides of the column, claw winged, limb 2-winged; sac 2-glandular within; column large, clavate; stigma anticous.

90. CHEIROSTYLIS. Sepals connate to the middle in a tube; lip with a saccate or cymbiform base and 2-lobed toothed or pectinate limb, sac 2- or multi-glandular within; columnar appendages long, fleshy; stigmatic lobes lateral.

91. ZEUXINE. Sepals free; lip with a cymbiform or saccate base, a short broad entire toothed or crenate claw, and broadly dilated limb; sac 2-glandular within; column with two linear appendages in front; stigmatic lobes lateral.

†† *Lip saccate or spurred, not clawed beyond the sac or spur.*

92. HYLOPHILA. Lip a large globose sac with a narrow linear inflexed blade; sac 2-glandular within; column minutely appendaged in front; stigma anticous.

93. GOODYERA. Lip cymbiform or subsaccate, naked or setose within; column not appendaged in front; stigma anticous.

94. HETÆRIA. Sepals free at the base or connate, lip adnate to the sides of the column, limb entire or 2-lobed; sac 2-glandular or setose within; column winged or not in front; stigmatic lobes lateral.

††† *Lip flat, neither clawed spurred or saccate.* (*Subsaccate in* Spiranthes, *and see also some* Goodyeræ.)

87. SPIRANTHIS. Leaves several.

88. NEOTTIA. Leafless herbs.

89. LISTERA. Two-leaved herbs.

P. 674. After 100. GASTRODIA, insert—

100/1. YOANIA. Sepals and petals free. Lip shortly clawed, cymbiform. Column 3-lobed. A stout leafless herb.

P. 675. 105. HERMINIUM. The Herminia will with a saccate base of the lip differ in no way from HABENARIA.

P. 675. 1. O. IRIDIFOLIA, Lindl. is not the *iridifolia* of Bot. Mag. t. 4517, which is *O. tahitensis*.

P. 676. After 4. O. GRIFFITHIANA, insert—

4/1. INSECTIFERA, *Hook. f. Ic. Plant.* t. 2004; stem 0, leaves 2–4 in. ensiform straight narrowed from the base to the tip, scape very short, spike about equalling the leaves, flowers subwhorled sessile, sepals ovate subacute and linear petals reflexed, lip much longer than the sepals, side lobes 2–3-partite segments elongate, midlobe with 2 long slender tails.

PERAK; at Larut, *King's Collector*.

Leaves ⅓ in. broad, coriaceous, acute, shortly sheathing. *Scape* minutely bracteate; bracts with subulate tips, minutely erose; flowers about $\frac{1}{10}$ in. from the tip of the dorsal sepal to that of the lip; sepals hyaline, obscurely 3-nerved; petals 1-nerved; lip papillose, like a minute 2-tailed insect, the 3-partite side lobes representing its legs. *Capsule* very shortly pedicelled.—The flowers closely resemble those of *O. Griffithiana*, from which this differs in the absence of stem, short scape, ensiform leaves narrowed from the base to the tip, and longer lip.

4/2. O. LUNATA, *Lindl. Gen. & Sp. Orchid.* 17; stemless, leaves ensiform erect straight or falcate acuminate, scape and spike stout nearly as long as the leaves, bracts broadly ovate, flowers in crowded whorls sessile, sepals ovate acuminate nerveless, petals linear-lanceolate, lip semilunar erosely fimbriate. Malaxis lunata, *Blume Bijdr.* 394.

SINGAPORE; at Selitan, *Ridley*.—DISTRIB. Java.

Leaves 3–5 by ⅓–½ in., not very fleshy, broadest about the middle. *Peduncle* 1–1½ in., with many subulate bract-like scales; spike 2–3 in., straight or decurved; flowers $\frac{1}{10}$ in. diam., whitish, sepals and petals membranous; lip with the broad sides or lateral lobes sometimes drawn up into large auricles (like a *Microstylis* of Sect. *), tip notched or retuse, smooth. *Capsule* (young), sessile, tripterous.

P. 678. 12. O. FALCONERI. After *Hook. f.* insert—*Ic. Plant.* t. 1780.

P. 680. After 19. O. RECURVA, add—

19/1. O. ROSEA, *Hook. f. Ic. Plant.* t. 2005; stem short, leaves narrowly ensiform, scape very short, spike as long as the leaves or shorter, bracts lanceolate, flowers sessile, petals elliptic erose, lip hardly longer than the sepals, side lobes quadrate, midlobe cuneiform retuse.

MALAY PENINSULA, *Norris*. PERAK; Gunong Batu Pateh, *Wray*; Larut, alt. 3–4000 ft., *King's Collector*.

Stem sometimes flexuous. *Leaves* 2–3½ by ⅛–⅓ in., slightly curved, acuminate. *Scape* rather stout, naked; flowers about $\frac{1}{30}$ in. diam., pink; sepals rounded-ovate, obtuse, nerveless; petals as long; side lobes of lip incurved or spreading. *Capsules* subsessile.

19/2. O. MANNII, *Hook. f. Ic. Plant.* t. 2003; stem elongate, leaves linear-ensiform subacute recurved, spike very slender, flowers very minute subfascicled, bracts ovate erose, petals ovate-oblong erose, lip longer than the sepals quadrately oblong, side lobes small subulate-lanceolate divaricate, tip bifid with a minute lobule in the sinus, segments subulate.

JYNTEA HILLS, north of Silhet, alt. 3000 ft., *Mann.*

Stem 3–4 in. *Leaves* alternate, 1 in. long, ⅛ in. at the base. *Spike* 2 in.; flowers $\frac{1}{30}$ in. broad, green; sepals rounded-ovate, obtuse; petals obtuse, nerveless; side lobes of lip decurved, terminal segments diverging or dependent. *Capsules* minute, shortly pedicelled.—Habit of *O. angustifolia*, which has more obtuse shorter leaves, an obcordate midlobe and linear-oblong side lobes of the lip. It would be better to transfer *angustifolia* and place it with *Mannii*, in the broad petaled division with a 3-lobed lip.

P. 681. 23. O. PACHYRACHIS, add to habitats—Khasia Hills, alt. 4–5000 ft., *Mann.*

P. 682. 29. O. CAULESCENS, may be easily confounded with 36. *O. angustifolia* from which the many straight acuminate leaves narrowed to the base, and pedicelled ovaries, at once distinguish it.

P. 684. 36. O. ANGUSTIFOLIA, add to collectors' names in the Khasia—*Griffith*, —As mentioned under *O. Mannii*, *O. angustifolia* had better be referred to the division + δ at p. 680, and placed next to that plant.

P. 686. After 40 insert—

41/1. O. CILIOLATA, *Hook. f.*; caulescent, leaves broadly equitant short broadly ensiform obtuse, spike dense-fld., bracts minute lanceolate, sepals ovate acute nerveless and narrow petals ciliate with long hairs, lip quadrately oblong truncate pectinately irregularly toothed.

SINGAPORE; at Krangi, *Ridley.*

Stem 1½–3 in., ⅝ in. broad across the base of the leaves. *Leaves* erecto-patent, 1–1½ by ¼–½ in., straight, rather broadest at the base, not very coriaceous. *Scape* shorter than the leaves; spike 2–3 in.; flowers hardly whorled, $\frac{1}{30}$ in. diam., shortly pedicelled, sparsely hairy externally, as are the bracts and young fruit. *Capsules* pedicelled, $\frac{1}{10}$ in. long, turgid, thickly 3-winged.

After * Sides of the lip produced upwards into large auricles, add—(CREPIDIUM, *Blume*).

2. M. KHASIANA, after *Hook. f.* insert—*Ic. Plant.* t. 1831.

P. 687. 6. M. SCOTTII, add—*Ic. Plant.* t. 2001.

P. 688. 8. M. POLYODON, add—*Ic. Plant.* t. 2002.

P. 689. Under synonyms of 15. MICROSTYLIS CONGESTA, enter—Neottia plantaginea, *Don Prodr.* 26, *fid. Lindl. Gen. & Sp. Orchad.* 458; and under habitats, enter—PENANG, SINGAPORE, and MALACCA, *Ridley in litt.*

P. 691. 22. MICROSTYLIS CRENULATA, Mr. Ridley informs me that the lip is much more rounded than in any other species, that it is a much smaller plant than *M. Rheedii*, and that it may be a curious form of *M. versicolor.*

P. 692. 3. L. THWAITESII, add—*Ic. Plant.* t. 2006.

P. 696. 20. L. ACUMINATA, add—*Ic. Plant.* t. 2007.

21/1, L. WRAYII, *Hook. f*; leaves 3–4 large elliptic,acuminate, scape shorter than the leaves, bracts minute, sepals subequal linear-oblong 3-nerved, lip deflexed from above the 2-tubercled base cuneately flabelliform beyond the contracted middle truncately 2-lobed, lobes fimbriately toothed.

UPPER PERAK, alt. 300 ft., *Wray* (*in Herb. Calcutt.*).

Stem stout, 3–5 in., base swollen; roots stout. *Leaves* 4–6 in., sessile or contracted into a broad petiole. *Scape* rather stout; raceme 2–4 in., glabrous; pedicels ⅛–½ in.; flowers ⅓ in. diam., pale green with 2 claret-coloured stripes on the lip; sepals flat, at length revolute; petals very narrow, margins revolute; lip as long as the sepals; column stout, incurved, not winged.

P. 697. 24. L. DEFLEXA, after *Hook. f.* insert—*Ic. Plant.* t. 2008.

26. L. PARADOXA. Mr. Ridley, who finds this species at Singapore, informs me that there are two forms, one with pure yellow flowers, the other with the sepals and petals deep blackish-purple, and the lip green with a purple centre, which latter is

the L. nervosa, *Lindl. Gen. & Sp. Orchid.* 24; *Benth. Fl. Hongk.* vi. 352; *Franch. et Sav. Enum. Fl. Jap.* ii. 21; *Ridley in Journ. Linn. Soc.* xxii. 262 Ophrys nervosa, *Thunb. Fl. Jap.* 27; *Ic. Pl. Jap.* t. 10. Malaxis nervosa, *Swartz in Act. Holm.* 1800, 235. Sturmia nervosa, *Reichb. f. in Bonpland.* iii. 250.—DISTRIB. China, Japan.

P. 698. E. PARADOXA, var. *Parishii.* Additional specimens of this collected in Upper Burma (Herb. Calcutt.), appear to prove this to be a distinct species, which may be characterized as follows:—

26/1. L. PARISHII, *Hook. f.*; leaves 2–3 narrowed to the base or broadly petioled lanceolate acuminate, flowers fleshy, bracts small ovate acuminate, sepals oblong obtuse 5-nerved, lip recurved obovate retuse, base with 2 teeth, sides flat, column suberect not winged. L. paradoxa, *var.* Parishii, *Hook. f. l. c.*

TENASSERIM, *Lobb, Parish.* UPPER BURMA, *Herb. Calcutt.*

Leaves 2–3 in. *Scape* 6–8 in., naked, few-fld.; bracts $\frac{1}{8}$ in.; pedicels $\frac{1}{3}$ in.; ribs of ovary not wrinkled; flowers $\frac{1}{2}$ in. diam.; sepals spreading, dorsal longest; petals deflexed, margins revolute; lip thick, minutely erose beyond the middle; basal teeth united by a curved ridge, nerves faint subconcentric.—Very near *L. paradoxa* but pedicels longer, bracts smaller and sides of lip not erect.

P. 701. After 37. L. OBSCURA, insert—

37/1. L. LATIFOLIA, *Lindl. Gen. & Sp. Orchid.* 30. L. Scortechinii, *Hook. Fl. Brit. Ind.* v. 703, *Ic. Plant.* t. 2009. L. robusta, *Hook. f. Ic. Plant.* t. 2012. Malaxis latifolia, *Blume Bijdr.* 393.—I have now little doubt but that the two species which I proposed as *L. Scortechinii & robusta* are forms of the Javanese *L. latifolia*; the former of which was taken from a drawing of a specimen in an advanced state of flowering. *L. latifolia* should be referred to the subsection of *Coriifolia*, with single-leaved pseudobulbs and 3-nerved sepals. *L. robusta* is a native of Maxwell's Hill, PERAK (*Wray*).

P. 701. After 41. L. OBSCURA, insert the two following:—

41/1. L. TORTA, *Hook. f. Ic. Plant.* t. 2014; pseudodulbs small, leaf sessile elliptic-lanceolate acute 9-nerved, scape terete, bracts half as long as the long decurved pedicels, sepals linear-oblong obtuse 1-nerved revolute, margins recurved, lip shorter than the sepals cuneate-obovate angles rounded, tip rounded obscurely crenulate, callus basal 2-lobed.

KHASIA HILLS, alt. 3000 ft., *Mann.*

Pseudobulbs $\frac{3}{4}$ in., conical-ovoid. *Leaf* 4–5 by $1\frac{1}{4}$–$1\frac{1}{2}$ in., thinly coriaceous. *Scape* rather stout, with few lanceolate bracts, sometimes flexuous; bracts $\frac{1}{4}$–$\frac{1}{3}$ in., lanceolate, membranous, spreading; pedicel with ovary $\frac{2}{3}$ in.; sepals $\frac{1}{3}$ in.; lip $\frac{1}{6}$ in. broad.—A very distinct species, perhaps nearest to *L. bootanensis*, but differing in the 1-nerved sepals and the wings of the column not being hooked.

41/2. L. TENUIFOLIA, *Hook. f. Ic. Plant.* t. 2013; pseudobulbs small narrow, leaf elongate very narrowly linear-oblanceolate, scape naked with the elongate raceme as long as the leaf, bracts setaceous equalling the short capillary pedicels, flowers minute, sepals deflexed flat 1-nerved, lip with a suberect sessile lunate hypochile and a rhomboidly orbicular convex puberulous deflexed epichile, calli 0, column not winged.

UPPER ASSAM; on the Mikir Hills, alt. 1000 ft., *Mann.*

Pseudobulbs $\frac{1}{2}$–$\frac{3}{4}$ in., narrowly pyriform. *Leaf* 6–8 by $\frac{1}{4}$–$\frac{1}{3}$ in. at the broadest part, narrowed downwards, 1-nerved. *Scape* and *raceme* very slender; bracts $\frac{1}{8}$ in., as long as the pedicel and ovary; flowers pale, $\frac{1}{6}$ in. diam.; sepals linear-oblong, obtuse, margins slightly recurved, nerve faint; lip rather shorter than the sepals, lobes of the hypochile incurved, subacute, half as long as the epichile; column rather slender.—A very distinct species.

P. 703. 45. L. SCORTECHINII, see *L. latifolia*, above.

After 46. L. FLACCIDA, insert—

46/1. L. GRACILIS, *Hook. f. Ic. Plant.* t. 2011; pseudobulbs narrow, leaves 2 oblanceolate, scape long slender terete, raceme long lax-fld., bracts as long as the

very short pedicels, sepals linear-oblong obtuse revolute 3-nerved, lip sharply reflexed from above the middle subclawed quadrately oblong nerveless truncate shortly bifid and toothed with a minute entire obtuse interposed tooth, calli obscure or 0.

PERAK; on Waterfall Hill, *Wray*.

Pseudobulbs 1 in., sheathed. *Leaves* 3–7 in., acute, rather thin, 5-nerved. *Scape* with raceme much longer than the leaves; bracts ⅛ in.; flowers distant, about ⅓ in. diam., pale green; margins of sepals not recurved; lip shorter than the sepals, concave towards the base with thickened involute margins, blade smooth red, no calli, but an obscure thickened ridge at the very base; column obscurely winged above.—A very distinct species.

P. 704. After 49. L. DISTANS, insert—

49/1. L. DOLABELLA, *Hook. f. Ic. Pl.* t. 2010; pseudobulbs narrow, leaves 2 narrowly oblanceolate, scape narrowly winged, raceme erect lax-fld., bracts small subulate, flowers small, sepals oblong obtuse spreading 1-nerved, margins not recurved, lip axe-shaped reflexed from a short broad claw anterior margin crenulate, disk with a depressed 3-carinate ridge which is truncate posteriorly and vanishes beyond the middle of the lip and a branched nerve on each side.

KHASIA HILLS, alt. 4000 ft, *Mann*.

Pseudobulbs 1–2 in. *Leaves* 6–14 by ¾–1 in., acute, subpetioled, 5–7-nerved. *Scape* with raceme shorter than the leaves; pedicels ½ in., longer than the bracts; flowers ⅓ in. diam.; lip broader than long, exactly the shape of an axe or chopper, anterior margin slightly rounded; column incurved, slender, not winged.

P. 705. 53. L. RESUPINATA. Mr. Ridley informs me that the Nilghiri habitat is no doubt an error, taken up from the late N. B. Ward's Herbarium (at the British Museum). The specimen was collected by Griffith, and no doubt in the Khasia.

P. 707. LIPARIS DECURSIVA. Mr. Ridley informs me that this is absolutely identical with *L. reflexa*, Lindl., an Australian species.

P. 708. LIPARIS ZEYLANICA. Mr. Ridley informs me that he cannot guess what Loddiges' *Liparis* from Ceylon is, and that the additional name of *zeylanica* is a misprint in his monograph.

In generic character of PLATYCLINIS, after *sepals* and *petals*, add subequal.

1. P. GRACILIS, in fourth line of character, for linear-oblong read ovate-lanceolate; and after tip rounded, add or acute. Add at end, *Ic. Plant.* t. 2016.

2. P. KINGII; after *Hook. f.*, insert *Ic. Plant.* t. 2015.

P. 709. OBEORCHIS INDICA; at end of character dele (*not of Dene*).

P. 710. In character of Sect. 1. SARCOPODIUM after "*Leaves 2*" insert in brackets (Leaf solitary in *D. longicolle*).

P. 711. Line 6, after *Aporum* add, and *Strongyle*.

P. 712. 5. DENDROBIUM LONGICOLLE. Mr. Ridley informs me that this species occurs in New Guinea, and that Reichenbach's *D. inauditum* Reichb. f. (Lindenia ii. 66) is a synonym of it; as also that the pseudobulbs are constantly 1-leaved, in which respect it differs from all other Indian *Sarcopodia*, and approaches *Bulbophyllum*.

6. D. PERAKENSE, after *Hook. f.* insert, *Ic. Plant.* t. 2019.

P. 713. 7. D. MACROPODUM, add *Ic. Plant.* t. 2020; and for "pedicels very short" read "pedicels with ovary very long."

8. D. GEMINATUM, for "*Lindl. mss.*," read *Lindl. Gen. & Sp. Orchid.* 77, and add as synonym Desmotrichum geminatum, *Blume Bijdr.* 332.

9. D. LONGIPES, add *Ic. Plant.* t. 2017, and in line 2 add, pedicel with ovary very long.—A fine suite of specimens from Mr. Wray offers great variations; a small form from the top of Gunong Batu Pateh, alt. 6700 ft., has close-set polished pseudobulbs ½ in. long, and leaves only ½–⅓ in., scape 1½ in.; another has a 3-leaved pseudobulb nearly 1 in. long, and petioled leaves 3 in., the flowers of these are white tinged with

yellow in the centre, veined with red brown; a third form has 3 sessile elliptic leaves 2–2½ in. long, and a very stout 3–4-fld. scape, the flowers are straw coloured, finely lined with dull pink; a fourth form from a lower elevation has leaves 1–2½ in., and a slender 2-fld. scape, the flowers are large white. The breadth of the midlobe of the lip in this species varies from almost orbicular-ovate to dagger-shaped. The sheaths of the rhizome and pseudobulb are very membranous, red-brown.

10. D. PUMILUM. "Common at Singapore, with flowers yellow or cream coloured; lip with a dark spot at the tip, or veined with red. The two forms look totally different, but I can find no structural difference. I never saw so many flowers in a head as in *D. quadrangulare*." *Ridley in litt.*

P. 714. 12. D. MACRAEI, in line 2, for peduncled read pedicelled.

13. D. LONCHOPHYLLUM, add *Ic. Plant.* t. 2018.

14. D. KUNSTLERI, add *Ic. Plant.* t. 2023, and in line 1 for leaves read leaf. "Common in mangrove swamps at Singapore, flower very fugacious, lip superior." *Ridley in litt.*

P. 723. 49. D. LEONIS. After the habitats insert, DISTRIB. Java. "Flowers exquisitely scented of Vanilla." *Ridley in litt.*

P. 724. 51. D. GRANDE. Add *Ic. Plant.* t. 2024.

P. 724. 52. D. ATROPURPUREUM. "I think that the yellow fld. *D. carnosum* is distinct. *D. atropurpureum* is smaller, shabbier-looking, and the flowers dark claret-coloured as in Blume's drawing." *Ridley in litt.*

P. 725. After Sect. VII. STRONGYLE. Dele "*Flowers terminal.*"

59. D. KENTROPHYLLUM. Add *Ic. Plant.* t. 2021, and in line 2 for flowers terminal, read "terminal or lateral."

P. 726. 62. D. SUBULATUM, for *Hook. f.* read *Lindl. Gen. & Sp. Orchid.* 91, and add as synonym Onychium subulatum, *Blume Bijdr.* 328.

63. D. ACEROSUM. Add to Syns., D. subteres, *Lindl. in Journ. Linn. Soc.* iii. 4. "Flowers all white or veined with red, leaves curiously grooved on each side." *Ridley in litt.*

P. 727. 68. D. CATHCARTII. After *Hook. f.* insert *Ic. Plant.* t. 2022.

P. 728. 72. D. LOBBII, add Syn. D. Teysmanni, *Miquel Fl. Ind. Bot.* iii. 610.

73. D. TUBERIFERUM. After *Hook. f.* insert *Ic. Plant.* t. 2025, and in the habitats, for Singapore read "Perak." The Singapore and Chittagong plants are probably different species.

74. D. PODAGRARIA. After *Hook. f.* insert *Ic. Plant.* t. 2026.

75. D. CLAVIPES, *Ic. Plant.* t. 2027.

P. 729. After 76. D. CRUMENATUM, insert—

76/1. D. TENUICAULE, *Hook. f.*; stem tall very slender above, basal internode minute globose, 2nd and 3rd slender, 4th and 6th thickened elongate conical, 5th stout 1 in. thickened cylindric ribbed, leaves 3–4 in. very narrowly linear, flowers few terminating the leafless stems, dorsal sepal oblong 7-nerved, petals oblong with one branched nerve, mentum twice as long as the obtuse lateral sepals straight, lip cuneate side lobes short rounded as broad as the sessile orbicular midlobe, disk pubescent.

ANDAMAN ISLANDS (*Ic. in Hort. Bot. Calc.*).

Stems 10–12 in., sheathed at the upper nodes. *Leaves* $\frac{1}{10}$ in. broad, acute. *Bracts* minute, pedicel with ovary slender ½ in.; flowers ½–⅔ in. long, pure white; petals as long as the dorsal sepal; mentum trumpet-shaped tip acute yellowish; lip sessile at the base of the mentum, membranous, delicately veined; column very short, 3-toothed; anther hemispheric.—Described from a drawing (that will be published in King's Annals of the Calcutta Garden) and dried flowers.

78. D. BOLBOFLORUM. To end of specific character add *Ic. Plant.* t. 2028. The spurs at the base of the column, figd. and observed by Mr. Clarke, are not apparent in dried specimens.

P. 730. 79. D. ADUNCUM. Dele *Bot. Mag.* t. 6784.—Two very closely allied species are confounded under this name. D. ADUNCUM and D. HERCOGLOSSUM, agreeing in habit, foliage, inflorescence, and very nearly in flowers, but distinguished by the lip, which in *aduncum* has a glabrous area on the disk, its flowers too are paler, the sepals less acuminate, and the arms of the column more notched. Until quite recently the native country of *aduncum* was unknown, and it was supposed to be specifically the same as a Chinese plant which Reichenbach described as *hercoglossum*, and which in Veitch's "Manual" is cited as a synonym. The lip in both is very shortly clawed. Lindley regarded *D. aduncum* as closely related to *D. moschatum*, but to me it seems widely different.

The following are the characters of the two species:—

79. D. ADUNCUM; flowers pale pink, lip with a broad naked area on the pubescent disk.—Sikkim and Bhotan Himalaya, Assam.

79/1. D. HERCOGLOSSUM, *Reichb. f. in Hamb. Gartenzeit.* xliii. 558, *in Gard. Chron.* 1886, ii. 487; flowers bright rose-red, disk of lip villous all over D. aduncum, *Hook. f. Bot. Mag.* t. 6784.

SINGAPORE, *Ridley in litt.* China.

79/2. D. FLAVIDULUM, *Ridley mss.*; stems slender pendulous, leaves linear-lanceolate, racemes on the leafless stems short, bracts subacute, dorsal sepal ovate-oblong obtuse, tip thickened, lateral ovate acute deeply keeled from the middle to the tip, petals oblong obtuse 5-nerved, mentum large obtuse shorter than the lateral sepals, lip ovate-oblong 3 fid beyond the middle, lobes ciliate, midlobe thickened.

SINGAPORE; at Kranji, in Mangrove swamps, common, *Ridley*.

Stems 12-18 in., rather flexuous, soft, internodes about 1 in. *Leaves* 2½-3 in., acuminate with a notch on one side, membranous. *Raceme* with the slender peduncle ½-2 in.; bracts ⅛ in.; flowers ¼ in. long; sepals and petals rigid; lip 7-nerved, lobes ovate-oblong obtuse.—A very distinct species. Mr. Ridley informs me that there are 2 forms of it, one with flowers all yellow, the other with white sepals and petals.

81. D. CORNUTUM. Insert after *Ic. Plant.* t. 2029.

P. 731. 82. D. CUMULATUM. I have examined specimens preserved in spirits sent by Dr. King (collected by Mr. Lister in Bhotan). The claw of the lip is not short, but may be traced down the spur, and is as long as the blade; and what appeared as a small tubercle in the dried specimen is an elongated grooved callus much raised towards base of the claw, the mentum is more or less laterally compressed, sometimes longer than the sepals. The Perak plant doubtfully referred to *D. cumulatum* is very different, but not in a state for description.

P. 731. 81/1. D. CROCATUM, *Hook. f.*; stems terete, leaves 4 by 1 in. lanceolate acuminate, racemes on leafless stems slender few-fld., dorsal sepal and petals broadly oblong subacute 7-nerved, mentum twice as long as the ovate-oblong subacute lateral sepals slender spur-like acute, lip large spathulate, claw as long as the obovate entire crenulate limb, with an obtuse oblong reversed callus at the base.

PERAK; at Larut (*Ic. in Hort. Calcutt.*).

Stems 2-3 ft., narrowed to the base, which is not tuberous, internodes 1 in., ¼ in. diam. *Leaves* bright green, many-nerved. *Raceme* 1 in.; bracts small, ovate; pedicel with ovary slender, ½-⅝ in.; flowers 1¼ in. long, bright orange yellow with red specks on each side of the lip towards the base of the limb; mentum nearly straight.—Described from dried flowers and a drawing that will be published in King's Annals of the Calcutta Garden.

84. D. KENTROCHILUM, after *Hook. f.* insert *Ic. Plant.* t. 2030.

85. D. MEGACERAS, after *Hook f.* insert *Ic. Plant.* t. 2031.

P. 732. 87. D. HYMENANTHUM, after *Hook. f.* insert *Ic. Plant.* t. 2032. There being an earlier *D. hymenanthum* (Lindl. Gen. & Sp. Orchid. 86), I have named this species HYMENOPTERUM in the "Icones Plantarum."

After 89, D. PERULA, insert—

89/1. D. PANDURIFERUM, *Hook. f.*; stems elongate cylindric grooved, leaves (on young stems only) lanceolate, racemes short 6–8-fld., dorsal sepal broadly ovate obtuse, petals orbicular crenate, mentum many times longer than the broadly ovate subacute lateral sepals tip swollen, claw very long and slender, limb small deeply constricted in the middle forming lateral auricle-like side lobes and an obcordate midlobe, disk with a large transverse lamella between the side lobes.

PEGU; at Rangoon, *Gilbert* (*Ic. in Herb. Calcutt.*).

Stems 2–3 ft., narrowed at the base; internodes 1–1½ by ¼ in., nodes often rooting; sheaths membranous, white, young green and speckled. *Leaves* few, 1–1½ in., acuminate. *Racemes* 1–2 in.; bracts small; pedicel with ovary ½ in.; flowers 1 in. long; sepals and petals green with streaks of red dots along the numerous nerves; mentum incurved, thickened towards the rounded tip, straight or slightly curved, green streaked with red; claw of lip 3–4 times as long as the dull yellow limb, margins incurved above, below united to the walls of the mentum; anther stipitate on the top of the column.—Nearly allied to *D. tropæoliflorum*. Also near 88, *D. ionopus*, R.f., but the flowers are not yellow with red blotches, nor is the claw of the lip thick and keeled. This will be figured in King's Annals of the Calcutta Garden.

Var. *serpens*. In the Calcutta Garden collection of drawings is one of a variety of *panduriferum*, or of a very closely allied species, marked as from Perak (*Kunstler*), with longer flexuous stems tuberous at the base, yellow sepals, and petals streaked rather than dotted with red along the nerves, and a mentum as long but not thickened towards the tip; the limb of the lip is less constricted in the middle. This may be Reichenbach's *D. ionopus*.

89/2. D. TROPÆOLIFLORUM, *Hook. f.*; stem flexuous thickened upwards deeply grooved, leaves linear-oblong, raceme slender 6-fld., dorsal sepal ovate acute, petals very broad, mentum straight cylindric many times longer than the triangular-ovate acute lateral sepals, lip with a very long slender claw and small panduriform limb disk with a large semilunar callus.

PERAK; at Larut, *Kunstler* (*Ic. in Herb. Calcutt.*).

Stem a foot long, incurved, internodes ⅔–1 in., the thickest ¼ in. diam. *Leaf* 2½ by ⅔ in., acute. *Raceme* 2 in., rachis pink; bracts minute; pedicel with ovary ⅔ in., green; flowers 1 in. long; sepals and petals ¼–⅓ in. long, dark red-purple; mentum ⅔ in., yellow-green, tip rounded; limb of lip with a rounded retuse apiculate tip.—A remarkable species, described from a drawing, which will be published in King's Annals of the Calcutta Garden. According to a note by Mr. Brace which accompanies the drawing, the sides of the claw of the lip adhere to the sides of the mentum (as in *panduriferum* and probably other species of Sect. *Pedilonum*). The flowers very much resemble in form those of *Tropæolum pentaphyllum*, Lamk.

P. 732. 91. D. BIFARIUM; after *Wall. Cat.* 2002, add (*in part*), for one of the specimens is a var. of *Appendicula bifaria*. (See p. 83.)

P. 737. 108. D. SPHEGIDOGLOSSUM. D. STUPOSUM being the earlier name should be adopted.

P. 741. 124. D. PENDULUM. Dele Syn. D. Wardianum (see No. 127). *D. melananthum* is considered to be a hybrid with *D. Wardianum*.

P. 743. 130. D. DEVONIANUM; under Syns., after "*not of Lodd.*," add, *nor of Roxb., or of Bot. Mag.*

131. D. DALHOUSIEANUM, must take the name of PULCHELLUM, *Roxb. in Lindl. Gen. & Sp. Orchid.* 82; *Fl. Ind.* iii. 486, a species, which, misled by Lindley's reference to it of *D. Devonianum*, I had hitherto failed to recognize. Reverting to it for this supplement, I find nothing in Roxburgh's description and drawing to distinguish it from *Dalhousieanum* (also a native of Silhet) except the drawing of the lip, which is too obcordate, and does not represent the villous tip, or the pectinate lobes on the disk which are so conspicuous in the latter plant. On the other hand, Roxburgh describes the lip as "beautifully marked, ciliate and *ramentaceous*," characters that apply to *Dalhousieanum* and to no other species at all like it.

In short, as with *Cœlogyne nitida & Geodorum recurvum*, the faulty drawings, all by the same native artist, of the lips (probably in a withered state) have retarded the recognition of otherwise well marked and described species. In this view Mr. Rolfe is disposed to agree with me.

With regard to Loddige's *pulchellum*, (Bot. Cab. t. 1935, & Bot. Mag. t. 5037), Rolfe (Gard. Chron. 1887, ii. 155) has shown that it is a Chinese plant (*D. Loddigesii*, Rolfe), and neither Roxburgh's *pulchellum* nor *Devonianum*.

P. 745. 137. D. BRYMERIANUM. Dr. Trimen has sent me a fine drawing from the Peradeniya Herbarium of a cultivated specimen of *D. criniferum*, showing that has no affinity with *D. Brymerianum*, but belongs to the Sect. *Cadetia*. It is probably a Philippine species.

P. 746. D. MOULMEINENSE, is perhaps only a state of *D. dixanthum*. At the end of the specific character add *Ic. Plant.* t. 2033.

P. 748. 146. D. CHRYSEUM, as stated at vol. v. p. 751, this name must give place to *D. auriantiacum*, R.f.

P. 752. D. HUGHII. Dele, said to be a form of *D. crumenatum*; and add to SPECIES UNKNOWN TO ME—

D. ANDERSONII, *Scott in Journ. Agric. Soc. Ind.* iii. (1872) 117, from Burma, collected by Dr. J. Anderson in 1868, and described from a plant that flowered in the Calcutta Bot. Gardens. It resembles, according to its author, a dwarfed form of *D. formosum*, from which species the description does not enable me to distinguish it. It is stated to be highly aromatic.

P. 753. 2. B. CLANDESTINUM. Common at Singapore, *Ridley in litt.*

3. B. MACRANTHUM, in last line after "lip" add "strongly recurved," and to citations, *Ridley in Ann. Bot.* iv. (1890), 335, t. 22, f. 1–6. The flowers smell of cloves, *Ridley*.

P. 754. After 4. B. MEGALANTHUM, add—

4/1. B. PATENS, *King mss.*; scape very short 1-fld., pedicel longer than the pseudobulb of the elliptic-oblong leaf, flower 1½ in. diam., petals linear-lanceolate and broader lateral sepals widely spreading and falcately decurved, lip shortly stipitate linear-oblong quite straight, column truncate without apical teeth.

PERAK, *Kunstler* (*Ic. in Herb. Calcutt.*)

Rhizome stout, crinite at the nodes; pseudobulbs 1–1½ in., ellipsoid. *Leaf* 6–8 in. by 2–2½ in., acute, narrowed into a short petiole. *Scape* ½–¾ in., close to the pseudobulb, clothed with short imbricate scales; pedicel 1½–2 in., yellowish speckled with red; sepals and petals yellowish, closely mottled with red-purple, ⅔–1 in. long, dorsal erect and incurved, linear-lanceolate, lateral ovate-lanceolate; lip ⅓ in. long, obtuse, base truncate; column very short.—Described from the drawing in Herb. Calcutt., and dried flowers. The straight lip is remarkable in the genus, and distinguishes it from *B. macranthum*.

P. 755. 9. B. LOBBII, add to habitats, Chittagong hills, (*Ic. in Herb. Calcutt.*)

P. 756. 17. B. MEMBRANIFOLIUM. After *Ic. Plant.* insert t. 2034.

P. 757. 19. B. MEDUSÆ. Mr. Ridley informs me that there are two forms of this; a Bornean with pale hardly spotted flowers, and a Singaporean with much larger thickly spotted flowers.

21. B. CONFERTUM. After *Ic. Plant.* insert 2035.

P. 758. 24. B. CAULIFLORUM „ „ „ 2036.

25. B. PROTRACTUM „ „ „ 2037.

P. 759. 29. B. MODESTUM „ „ „ 2038 B.

29/1. B. CONCINNUM, *Hook f. Ic. Plant.* t. 2038 A; scape shorter than the oblong leaf slender few-fld., flowers very small, sepals ovate-lanceolate acute 3-nerved cellular, 3 times as long as the linear-oblong obtuse 1-nerved petals, mentum rounded, lip minute recurved, columnar spurs slender.

SINGAPORE, at Chang Chu Rang. *Ridley.*

Rhizome very slender, sheathed; pseudobulbs ½–⅔ in., narrow terete curved.

Leaf ½–1 in., acute or obtuse, coriaceous. *Scape* ½–1 in., 3–5-fld., sheaths few small, bracts lanceolate nearly as long as the ovary or shorter, flowers orange-yellow; sepals about ¼ in. long, dorsal rather the shortest; lip tongue-shaped.

30. B. LEPTANTHUM. After *Ic. Plant.* insert 2039 A, and in line 4 for 3-nerved sepals read 1-nerved petals.—Var. ? *Gamblei.* After a further comparison of specimens with *B. leptanthum*, I am convinced of the specific distinctness of this variety, which I have figured in the "Icones Plantarum" as *B. Gamblei* t. 2039 B.

P. 760. 3. B. KINGII. *After Ic. Plant.* insert t. 2053 *ined.*

P. 761. Under 37. B. CUPREUM. Dele the synon. *var.* stenopetala. Two very closely allied species are here confounded, both natives of Tenasserim; one is the true *cupreum* var. *stenopetalum*, which, as Mr. Rolfe has pointed out to me is also that author's *B. ruftnum*, a plant referred by me by oversight to 58. B. CONCHIFERUM (which has no pseudobulb and no auricles to the lip). The following are the characters of the two species:—

37. B. CUPREUM, *Lindl. l.c.*; pseudobulb 1 in. subglobose, scape slender inclined slightly curved, sheaths small distant, raceme 1–2 in., flowers uniformly coppery yellow, bracts ovate-oblong much shorter than the ovary, lateral sepals ovate-lanceolate acute, petals triangular-ovate acuminate, lip narrow obtuse auricles large, columnar spurs short slender. TENASSERIM, *Parish.*—Very like *B. Careyanum*, but the rhizome and scape are much more slender, the flowers fewer and less dense, and the petals are not aristate. Lindley's description is wholly insufficient. In his specimen the petals and auricles of the lip are serrulate, in others that flowered at Kew they are entire. The Manilla habitat is no doubt an error.

37/1. B. RUFINUM, *Reichb. f Xen. Orchid.* iii. 45 t. 219; pseudobulb 2 in. oblong, scape long stout decurved, sheaths large, raceme 6 10 in. lax-fld., bracts lanceolate about as long as the flowers, flowers dirty-yellow with red streaks on the sepals, lateral sepals and small petals narrowly lanceolate acuminate, lip narrow obtuse, auricles small entire, columnar spurs slender. B. cupreum *var.* stenopetalum, *Reichb. f. in Trans. Linn. Soc.* XXX. 152.—TENASSERIM, *Parish.*—The large pseudobulb, stout large scape, long raceme and bracts, narrow sepals, and colour of the flowers readily distinguish this from *cupreum* and *Careyanum.*

P. 764. 32. B. GYMNOPUS. After *Ic. Plant.* insert t. 2040.
53. B. THOMSONI ,, ,, ,, t. 2041.
54. B. SECUNDUM ,, ,, ,, t. 2042.

P. 766. 58. B. CONCHIFERUM, dele B. rufinum, &c. See above, No. 37/1.
61. B. APODUM. After *Ic. Plant.* insert t. 2043.
62. B. WRAYI ,, ,, t. 2044.

P. 767. 63. B. LEPTOSEPALUM ,, ,, t. 2045.
64. B. HYMENANTHUM ,, ,, t. 2046, and after it place—

64/1. B. ADENOPETALUM, *Lindl. in Bot. Reg.* 1842, *Misc.* 85; pseudobulbs obsolete, leaves petioled oblong obtuse base scarcely pseudobulbous, spike rather longer than the leaf many-sheathed below many-fld., sepals acuminate, petals spathulate acute glandular within, lip narrowly ovate obtuse ciliate base channelled. *Walp. Ann.* vi. 255.

SINGAPORE; *Hort. Loddiges.*

Flowers yellowish, slightly sweet-scented.—Described from Lindley; there is no specimen in his Herbarium, only a sketch of the flower, in which the ovate sepals are narrowed into long capillary points.—Two different Philippine species in Herb. Hook. and in Herb. Lindley, both labelled by that author *B. adenopetalum*, led me to suppose that the latter had been erroneously attributed to Singapore, whence my exclusion of it from the Flora.

64/2. B. VERMICULARE, *Hook. f. Ic. Plant.* t. 2054; rhizome very slender tortuous, leaves small linear-oblong obtuse base narrowed, scape short slender few-fld., sepals 1-nerved dorsal linear, lateral ovate-lanceolate uncinately falcate, petals narrowly linear 1-nerved, lip linear-oblong obtuse 3-nerved hairy.

SINGAPORE; at Kranji, *Ridley*.

Rhizome as thick as a sparrow's quill; pseudobulb 0. *Leaf* 1½–1¾ in., narrowed into a short petiole. *Scape* with the spike shorter than the leaves, 2-sheathed; bracts half as long as the flower; ovary very short; flowers ⅛ in. long; lateral sepals finely acuminate, decurved; petals half as long, obtuse; lip thin, sessile, almost as long as the petals, hairs long flexuous; column with short spurs.—Near *B. adenopetalum*, differing in the petals not being spathulate or glandular within, and in the sepals not having long filiform apices, and in the linear 3-nerved lip.

66. B. GLOBULUS. After *Ic. Plant.* insert t. 2047.

P. 768. 71. B. MICRANTHUM „ „ „ t. 2048.

P. 769. 75. B. CIRRHATUM „ „ „ t. 2049.

P. 770. 79. B. CANDIDUM „ „ „ t. 2050.

P. 770. B. ADENOPETALUM. See above, No. 64/1.

P. 771. B. SILLENIANUM, should be SILLEMIANUM.

After B. SILLEMIANUM, add—

B. STRIATELLUM, *Ridley in Ann. Bot.* iv. (1890) 335 (*excl.* fig.); very small, rhizome filiform, pseudobulbs conic curved, leaf lanceolate acute, scape very short filiform 1-fld. sepals subequal oblong or oblong-lanceolate caudate, petals ovate-oblong obtuse, lip very short narrow recurved pubescent beneath, columnar arms obtuse.

SINGAPORE, on trees, Char Chu Raang, *Ridley*.

Pseudobulbs hardly ¼ in. long. *Leaf* erect, 2 by ⅓ in. *Scape* hardly longer than the pseudobulb, 1–2-sheathed at the base; pedicel 1 in., red; perianth closed; sepals ½ in. long and petals yellow with 3 red keels; petals 1-nerved; lip yellow, tip dotted with red and with 2 red dots at the base; column short.—I have seen no specimen. Description from Ridley, who describes the arms of the column as short and obtuse. The petals he describes as being rather shorter than the body of the sepals (that is without the tails). The figure which he gives (t. 22 f. 7, 8, 9) must belong to a different species, for the columnar arms are represented as very slender. I do not know where to place this curious 1-flowered species which certainly does not naturally belong to the 1-fld. section. It may be a depauperated state of a plant of either the racemose or capitate section.

9/1. HENOSIS. I have erred in the description of this remarkable plant. The real petals, which form a minute broad low wing on each side of (what is not a column with adnate petals but) the enormous 2-winged column, along the naked foot of which they extend as a membranous boarder to the insertion of the lateral sepals, they are perfectly hyaline, and were so appressed to the sides of the very base of the column that (though they are indicated in a rude sketch by Lindley), I overlooked them, and I am indebted to my artist, Miss Smith, for pointing them out to me; they are not triangular-ligulate, as described by Reichenbach, but low and very broad.—It may be a question whether this plant should not be restored to *Bulbophyllum*, in which Reichenbach placed it; if it is to be retained it must be on account of the remarkable very large 2-winged column, like none other in the genus known to me; the long pedicels too are quite peculiar. If referred to *Bulbophyllum* it should be to the racemose section with pseudobulbs and glabrous eciliate sepals and petals, though very unlike any member of that group. It might with 52. *B. gymnopus* and 62. *B. Wrayi*, form a group distinguished from all others by the lateral sepals being inserted at the apex of the naked foot of the column.

H. LONGIPES, after *Ic. Plant.* insert t. 2051 *ined.*

P. 773, after 3. C. VAGINATUM, insert—

3/1. C. LONGESCAPUM, *Teysm. & Binn. in Batav. Natur. Tijdsch.* xxiv. (1862) 311; pseudobulbs subovate obtuse 4-angled 2-leaved, leaves oblong obtuse emarginate coriaceous glabrous, scapes long cylindric, flowers capitate densely crowded horizontal, bracts short, lateral sepals subserrulate, dorsal smaller linear-lanceolate erect, petals obtuse ciliate with long hairs 5-nerved, lip tongue-shaped obtuse reflexed channelled base cordate. PENANG, *Lobb*.

Pseudobulb 2 by 1½ in. *Leaves* 6 by 1½ in. *Scape* 15 in.; flowers 20–25, brown.—Description from the authors. I know nothing like it. The 2-leaved pseudobulbs are remarkable.

P. 774. 9. C. ROXBURGHII. After *Ic. Plant.* 2057 A. insert—From a drawing lately received from Calcutta, I suspect that *C. Andersonii* should be referred to *C. Roxburghii*.

9/1. C. CONCINNUM, *Hook. f. Ic. Plant.* t. 2060 B.; very small, rhizome slender, pseudobulbs conico-ovoid, lateral sepals ¼ in. linear-oblong acute nearly flat, twice as long as the ovate caudate long-ciliate dorsal, petals as long as the dorsal sepal ovate-lanceolate caudate acuminate long ciliate, lip fleshy strongly recurved, column winged shortly 2-toothed.

SINGAPORE; *Ridley*.

Pseudobulbs ½ in.; close set, curved. *Leaf* 1–1½ in., oblanceolate, obtuse, coriaceous, hardly petioled. *Scape* from the base of the pseudobulb, with membranous sheaths at the base, very slender, shorter than the leaf; flowers 6–8, whorled; bracts minute; pedicels very short; sepals 5-nerved; petals 3-nerved.

P. 775. 15. CIRRHOPETALUM ELATUM, after *Ic. Plant.* insert—t. 2052
P. 777. 20. C. ANDERSONI, „ „ „ t. 2055
21. C. BREVIPES, „ „ „ t. 2056
22. C. AUREUM, „ „ „ t. 2057 B
P. 778. 26. C. GAMBLEI, „ „ „ t. 2058
27. C. THOMSONI, „ „ „ t. 2059
29. C. PARVULUM, „ „ „ t. 2060 A
P. 779. 32. C. VIRIDIFLORUM, „ „ „ t. 2061

P. 780. 33. C. BLEPHARISTES. In a fine drawing of this lately received from the Calcutta Gardens, the leaves are often 2-nate, the scape long and decurved, and the sepals and petals 7–9-nerved.

34. C. MACRAEI. Under Synonyms, for Bulb. Walkerianum, read Macraei.

P. 782. 32. DENDROCHILUM LINEARIFOLIUM, after *Ic. Plant.* add t. 1859 *ined.*; and, confer D. fuscum, *Teijsm. & Binn. Bat. Natur. Tijdsch.* xxix. (1867) 242.

P. 784. 2. CHRYSOGLOSSUM ERRATICUM, after *Ic. Plant.* insert—t. 2062
3. „ ASSAMICUM, „ „ „ t. 2063
4. „ MACULATUM, t. 2064, and add Syn. Tainia maculata, p. 821.
COLLABIUM WRAYI, After *Ic. Plant.* insert— t. 2065
P. 788. 11. ERIA EXILIS, „ „ „ t. 2074 A

P. 789. 15. E. MUSCICOLA. The Ceylon form referred to at the end of the description is var. *oblonga*, Trim. *Cat. Ceyl. Pl.* 88.

P. 790. 18. „ KINGII, After *Ic. Plant.* insert—t. 2066
19. „ IRIDIFOLIA, „ „ „ t. 2067
20. „ LONGIFOLIA, „ „ „ t. 2068
P. 795. 38. „ ANDERSONI, „ „ „ t. 2069
P. 797. 46. „ RECURVATA, „ „ „ t. 2070
48. „ SACCIFERA, „ „ „ t. 2071
P. 798. 50. „ MAINGAYI, „ „ „ t. 2072
P. 801. 63. „ ANDAMANICA, „ „ „ t. 2073

64. E. PULCHELLA. I have lately received more specimens, and from Calcutta drawings of this plant, from which I conclude that Lindley was right in distinguishing *E. discolor* from *E. pulchella*, though he assigns no good reasons for doing so. The chief differences are the very large stout articulate pseudobulbs of *E. discolor*, its much stouter rhizome, and stouter more glabrous scape with more numerous cochleate coriaceous bracts.

E. pulchella is a Malayan species, from Tenasserim to Java. *E. discolor* has been found only in Sikkim. Both have nearly orbicular lips articulate with the pulvinate purple shining foot of the column by a very narrow short claw.

P. 803. 71. E. THWAITESII. For *Hook. f.*, read *Trimen Cat. Ceyl. Pl.* 88.

P. 804. After 72. E. PANNEA, insert—

73/1. E. CALAMIFOLIA, *Hook. f.*; stems very short from a creeping rootstock 3–4-leaved, leaves linear terete acuminate, scape terminal 3–4-fld. and flowers densely woolly, bracts large ovate acuminate, mentum short obtuse, petals linear-oblong puberulous, lip ovate-oblong obtuse very thick concave about the middle, quite smooth and naked.

UPPER ASSAM; Makum forest, *Mann.*

Rhizome as thick as a crow-quill, and short leaf sheaths sparingly woolly; pseudobulbs 0. *Leaves* 3–6 in., about ⅛ in. diam., obscurely channelled above when dry, acuminate, quite smooth, glabrous. *Scape* terminal, much shorter than the leaves, slender, densely white, silkily woolly as are the backs of the bracts and sepals; bracts ⅓ in.; sepals ½ in. long, dorsal oblong, lateral triangular-ovate acute; petals much smaller; lip straight, jointed on the broad foot of the column, which is short broad puberulous with an ovate subacute apex and incurved sides; anther mitriform, obtuse.—Probably the Sikkim & Khasian *E. pannea.*

P. 804. 75. ERIA PYGMÆA, After *Ic. Plant.* insert—t. 2074 B
76. ,, LANCIFOLIA, ,, ,, ,, t. 2075
P. 805. 78. ,, CRASSICAULIS, ,, ,, ,, t. 2076
79. ,, LEPTOCARPA, ,, ,, ,, t. 2077
P. 806. 83. ,, GRACILIS, ,, ,, ,, t. 2078
P. 807. 84. ,, OLIGANTHA, ,, ,, ,, t. 2079
87. ,, TUBEROSA, ,, ,, ,, t. 2080
P. 808. 89. ,, APORINA, ,, ,, ,, t. 2081
P. 809. 93. ,, SCORTECHINII, ,, ,, ,, t. 2082
P. 810. CLADERIA VIRIDIFLORA, ,, ,, ,, t. 2083
P. 811. 4. PHREATIA NANA, ,, ,, ,, t. 2084

P. 813. 2. SPATHOGLOTTIS AUREA, after *Walp. Ann.* vi. 455, insert *Reichb. f.* in *Gard. Chron.* 1888, 92, with fig.; *Veitch. Man. Orchid.* Pt. vi. 6. S. Kimballiana, *Hort.*

3. S. WRAYI, after *Ic. Plant.* insert t. 2086.

P. 814. 4. S. BENSONI, ,, ,, ,, t. 2087.

5. S. LOBBII, at end of description add in *Veitch Man. Orchid.* Pt. vi. 7 this species is described as a native of Borneo. Reichenbach gives E. Indies, ? Khasia. The specimens in Kew Herbarium are from Tenasserim, on rocks at Akyab, *Parish.*

6. S. PUBESCENS, var. *Berkeleyi*, specimen of this in Herb. Calcutt. from Upper Burma have leaves 1 in. broad, the scape 18 in., and flower as in *Fortuni*, except that the midlobe of the lip is very thick, and its wings cuneately oblong and truncate.

P. 816. 1. PHAJUS WALLICHII. Add after *Walp. Ann.* vi. 459, *Bot. Mag.* t. 7023, and after *de Vriese Illust.* t. 8, add *Regel Gartenfl.* 1865, t. 404.—Veitch (*Man.* Pt. vi. 15) describes *P. bicolor* as a var. of *Wallichii*, with small knobby rhizomes, and smaller flowers having a tawny yellow spur and tube of the lip, and white midlobe bordered with rose. It is a native of Ceylon. He retains *P. grandifolius* as a different species, including *Blumei* as a var. of it. The only tangible characters, except colour, by which he distinguishes *grandifolius* from *Wallichii* are, that in the former the sepals and petals are oblong-lanceolate, and the lip broadly obovate; whilst in the latter the sepals and petals are linear-lanceolate and the lip broadly oval. He gives the Himalayas as habitat for both. His var. *Blumei* differs from the type (*grandifolius*) in the broader deep buff yellow petals and sepals faintly mottled with red. As habitats of *grandifolius* he gives, besides the original one of China, the Himalaya, Cochin China and Australia; thus following Bentham (*Fl. Austral.* vii. 304), who includes *P. australis, leucophæus* and *Carronii*, of F. Muell) under that species.

2. P. VERATRIFOLIUS. **Add. Syn. Dendrobium veratrifolium, *Roxb. Hort. Beng.* 63.**

P. 817. 3. P. MACULATUS. After *Mus. Bot.* ii. 180 insert *Williams Orchid. Alb.* t. 381, and place *Blum. Orchid. Archip. Ind.* 9, after *Reichb. Fl. Exot.* t. 63.

3/1. P. NANUS, *Hook. f. Ic. Plant.* t. 2088 *ined.*; leaves 4–5 in., scape very short closely sheathed, raceme dense-fld., sepals and petals lanceolate acuminate, lip as broad as long puberulous within, side lobes rounded, midlobe short broad undulate, spur 0.

BENGAL; in the Buxa Doar, *Gamble* (in *Herb. Calcutt.*).

Pseudobulbs 0. *Roots* tufted; rootstock stout, with grass-like sheaths sometimes much longer than the leaf. *Leaf* elliptic, acute; petiole 2 in., stout. *Scape* from the base of the leaf and shorter than it is, sheaths subacute; bracts cymbiform, acuminate; sepals 1½ in. long; column short, stout, puberulous.—A very singular species, of which I have seen but two specimens, kindly lent from the Calcutta Herbarium by Dr. King. The long grass-like sheaths or primordial leaves are singular.

P. 818. 7. P. ALBUS. Var. *Bensoniæ*, after description insert Phajus Bensoniæ, *Hemsl. in Gard. Chron.* 1882, 565; and after *Jenning's Orchid.* add *Williams Orchid. Alb.* ii. t. 67.—Veitch (*Man. Orchid.* Pt. vi. 19) does not regard *Bensoniæ*, *alba* and *Marshalliana* as specifically distinct; he distinguishes *Bensoniæ* from *alba* by the larger differently-coloured flowers, with the midlobe of the lip larger in proportion to the whole lip, and more oblong, and by the wings of the column being toothed. He keeps *Marshalliana* as a form from being usually more tall and robust, the lip shorter, the hairs on the crests of the lip more numerous and longer, the column shorter and stouter with the apical wings more dilated; and as a subvar. of this he maintains Reichenbach's var. *ionophlebia* (*Gard. Chron.* 1885, 70), with the centre of the lip pale yellow, the sides streaked with purple.

25. NEPHELAPHYLLUM, *Blume.*

In the generic description in the 2nd line after leaf, add, or elongate and exserted; and after 3. N. TENUIFLORUM, add—

4. N. NUDUM, *Hook. f.*; leaves ovate acuminate, scape slender much longer than the leaves few-fld., bracts slender, lip elongate narrowly subpanduriform, side lobes small acute, midlobe transversely oblong retuse with a short broad semicircular lamella on the midrib towards the tip.

SIKKIM HIMALAYA; *King.*

Stem stout, 4 in., ascending. *Leaves* distant, 1–2 in., lower petioled, upper sessile; sheath short, membranous. *Scape* 6 in., with a basal and median tubular appressed sheath nearly 1 in. long; bracts ⅓ in., as long as the pedicel and ovary, deflexed; sepals and petals spreading, subequal, linear, subacute, 3-nerved; lip nearly 1 in. long from the base of the stout truncate spur to the tip of the dorsal sepal, membranous, 3-nerved with branching side nerves, gradually dilated upwards to the tooth-like side lobes, midlobe broader than the rest of the lip, margins undulate.—Near *N. tenuiflorum*, which has also a tall scape.

5. N. GRANDIFLORUM, *Hook. f.*; leaves ovate deeply cordate acuminate, scape longer than the leaves 2-fld., flowers 1 in. diam., lip oblong, side lobes small obtuse, midlobe ovate tip rounded, disk with 3 keels from base to apex.

PERAK (*Ic. Scortechini*). MALAYA, *Kunstler* (*Ic. in Herb. Calcutt.*).

Leaves 3–5 by 2½–3½ in., strongly nerved, basal lobes rounded, sinus narrow; petiole 3–4 in., stout. *Scape* with raceme 8–10 in., pubescent, sheaths tubular, appressed, membranous; bracts small, lanceolate; flowers greenish flushed with red, lip purple; sepals lanceolate, acute; petals rather broader, elliptic; lip decurved, white externally, mentum truncate; column white, purple at the base.—Described from a fine drawing in Herb. Calcutt., perhaps (as usual with native artists) exaggerated in dimensions.

P. 820. 2. TAINIA PENANGIANA, after *Hook. f.* insert *Ic. Plant.* t. 2089 *ined.*

5. T. LATIFOLIA, add Syn. Cymbid., *Griff. Notul.* iii. 343; *Ic. Plant. Asiat.* t. 319.

7. T. KHASIANA, after *Ic. Plant.* insert t. 2090
8. T. MINOR, „ „ t. 2091
9. T. HASTATA, „ „ t. 2092
10. T. MACULATA to be cancelled; it is *Chrysoglossum maculatum*, p. 784.
11. T. LATILINGUA, after *Ic. Plant.* insert t. 2093
14. T. MAINGAYI, after „ „ t. 2094 and add—

15. T. CORDATA, *Hook. f.*; leaf-blade longer than the stout petiole base cordate, scape tall many-fld. slender, sepals linear subacute and lanceolate petals 1-nerved, mentum very short, side lobes of lip short acute, midlobe suborbicular, disk with 2 lamellæ reaching nearly to the apex.

SIKKIM HIMALAYA (*Ic. in Hort. Calcutt.*).

Rhizome as stout as the middle finger or stouter and pseudobulb and petiole dark purple. *Leaf* about 12 by 4½ in., 7-nerved, base oblique. *Scape* with raceme 2 ft.; raceme laxly many-fld.; bracts ½ in., lanceolate, shorter than the ovaries; sepals and petals ⅔ in., dark green and red; lip yellow, midlobe entire; anther with two purple nobs.—Described from an excellent drawing made in the Calcutta Bot. Gardens, where there is also an outline drawing, by Simons, of an Assam allied species, with no pseudobulb, a petiole as thick as the little finger, a suborbicular-cordate acuminate 9-nerved leaf 7½ by 6 in., a scape much shorter than the leaf few-fld., sepals lanceolate 5-nerved, petals ovate-oblong acute 5-nerved, and a cuneiform lip with small midlobe, mentum large conical.

P. 824. 3. AGROSTOPHYLLUM GLUMACEUM, after *Ic. Plant.* insert t. 2095
4. A. MAJUS „ „ „ t. 2096
5. A. PAUCIFLORUM „ „ „ t. 2097
P. 825. 2. CERASTOSTYLIS MALACCENSIS „ „ „ t. 2098
3. C. CLATHRATA „ „ „ t. 2099
P. 826. 4. C. PENDULA „ „ „ t. 2100
5. C. HIMALAICA „ „ „ t. 2101
6. C. LANCIFOLIA „ „ „ t. 2102
P. 827. 7. C. ROBUSTA „ „ „ t. 2103.
33. TRICHOSMA SUAVIS, for 1841 *Misc.* 83, read 1842, t. 21.

P. 828. 34. CŒLOGYNE. After the publication of Vol. V. of this work, Veitch's Manual Pt. vi. appeared, containing the cultivated species of *Cœlogyne* with good descriptions, and with figures of several British Indian ones, which are cited below.

1. CŒLOGYNE GARDNERIANA, after *Paxt. Mag.* vi. t. 73 insert *Williams Orchid. Alb.* iv. t. 153.

P. 829. 4. C. CRISTATA, after *Coll. Bot.* t. 32 insert *Gen. & Sp. Orchid.* 39 (*excl. Syn.* Cymbid. strictum, *Don*); and add to citations, *Wall. Cat.* 1958; *Gard. Chron.* 1877, 597, *with fig.*; 1888, i. 488, *fig.* 68; *Veitch Man. Orchid.* Pt. vi. 34, *with fig.*

P. 830. 6. C. TOMENTOSA, add *Veitch Man. Orchid.* Pt. vi. 57, *with fig.*
7. C. MASSANGEANA, add „ „ „ 43, *with fig.*

P. 831. After 9. C. LENTIGINOSA, insert—

9/1. C. ROSSIANA, *Reichb. f. in Gard. Chron.* 1884, ii. 808; pseudobulbs large 8–10-grooved, leaves elliptic-lanceolate petioled, scape very stout decurved then suddenly upcurved 3–4-fld. closely clothed with short densely imbricate sheaths, lateral sepals narrowly linear-oblong acute and very narrow petals white, lip narrow side lobes with rounded angles and brown sides, midlobe ovate entire revolute yellow, disk with 2 crenate lamellæ from base to apex and a slender median one. *Veitch Man.* Pt. vi. 48; *Rolfe in Gard. Chron.* 1889, 650; *Bot. Mag.* t. 7172.

BURMA (*Hort. Ross*).

Pseudobulbs 2–3 in., oblong or subpyriform; sheaths 0. *Leaves* 8–12 by 2–3 in., strongly 3-nerved, petiole 1-1½ in. *Scape* from the base of the pseudobulb, 2–3 in. long along its curvature, narrowed from the stout base upwards; sheaths coriaceous, green, tips rounded; raceme erect, 2–3 in., slender, lax-fld.; bracts

¼ in. long, as long as the pedicel and ovary, lanceolate, concave, caducous; flowers 1½-2 in. diam.; sepals ½ in. broad; midlobe of lip not contracted at the base; column white.—The strong decurvature of the scape is not mentioned by Reichenbach or Veitch.

P. 831. 11. C. CORYMBOSA, after *Gard. Chron.* 1876, insert, 88.

P. 832. 16. C. OCCULTATA, insert after *Ic. Plant.* 2104.

P. 834. After 21. C. CYNOCHES, insert—

21/1. C. LONGIBRACTATA, *Hook. f.*; pseudobulbs small, leaves petioled lanceolate, scape very long stout strict erect, raceme erect few-fld. bracts 2 in. persistent, flowers white, sepals lanceolate acuminate, petals narrowly linear-oblong, side lobes of lip short rounded, midlobe orbicular, disk with 3 crenate yellow ridges.

PERAK, *Kunstler.*

Rhizome very stout; pseudobulbs 1½-2 in., obovoid, deeply grooved. *Leaves* 6-7 by 1-1½ in. *Scape* lateral, 6 in., clothed with cylindric green tubular truncate sheaths 1½-2 in. long, and with 2 leaves emerging from the upper sheath; bracts very narrow, at length deflexed; flowers nearly 2 in. diam.; midlobe of lip yellowish towards the centre, margins at the base crisped. In many respects allied to *C. Maingayi.*

22. C. SPECIOSA. Veitch (*Man. Orchid.* Pt. vi. 50) gives as a synonym *C. salmonicolor*, Reichb. f. in Gard. Chron. 1883, 328, and describes a Var. *albicans*, with larger flowers, sepals and petals light yellowish-green, lip 3 in. long, white, side lobes freckled with red-brown, midlobe brown.

24. C. SCHILLERIANA, insert after the description, TENASSERIM, at Moulmein, *Lobb.*

P. 835. 28. C. PANDURATA, in line 1 for 78 read 791, and add to citations, *Veitch. Man. Orchid.* Pt. vi. 47, *with fig.*

29. C. ASPERATA. Veitch (*Man. Orchid.* Pt. vi. 31) says of this, "Widely distributed over the Malay Archipelago, from Sumatra to New Guinea."

P. 836. 33. C. MICRANTHUM should be MICRANTHA.

P. 837. 34. C. TREUTLERI, after *Ic. Plant.* insert t. 2105.

36. C. NITIDA, under Syn. C. OCELLATA, add *Veitch Man. Orchid.* Pt. vi. 45.

37. C. STENOCHILA, after *Ic. Plant.* insert t. 2106.

P. 838. 38. C. CARNEA, after *Ic. Plant.* insert t. 2107.

39. C. ELATA. This is said to inhabit higher regions than the Tropical, up to 9000 ft. (*Veitch Man. Orchid.* Pt. vi. 37).

41. C. GRIFFITHII. After *Ic. Plant.* insert t. 2108.

P. 839. 42. C. BABBATA, add *Veitch Man. Orchid.* Pt. vi. 32, *with fig.*

P. 840. 47. C. ANCEPS. After *Ic. Plant.* insert t. 2109.

48. C. PRÆCOX. In line 1, before *Fol. Orchid.* insert *Gen. & Sp. Orchid.* 43, and to syns. add Cymbidium præcox, *Smith in Rees Cyclop. Veitch* (*Man. Orchid.* Pt. vi. 58) distinguishes his Var. *Wallichiana*, by its deeper colour, more strongly-marked veins, the midlobe of the lip toothed rather than fringed, and the shorter teeth of the crests; he includes *C. birmaniæ* under it, and gives a figure of the flower.

49. C. HUMILIS. Veitch (*Man. Orchid.* Pt. vi. 55) gives an excellent figure and description of this.

P. 841. 50. C. MACULATA, add VAR. Arthuriana, *Veitch Man. Orchid.* Pt. vi. 57; pseudobulbs smaller angular, flowers smaller, petals with purple lines, midlobe of lip margined with a purple band. C. Arthuriana, *Reichb. f. in Gard. Chron.* 1881, i. 40.—Rangoon.

51. C. LAGENARIA, Veitch (*Man. Orchid.* Pt. vi. 57) gives a good figure of the flowers, and adds that it was introduced by Lobb from the Khasia Hills.

52. C. REICHENBACHIANA, Veitch gives 6-7000 ft. as the elevation at which this species was found.

P. 842. 53. C. HOOKERIANA. Veitch (*Man. Orchid.* Pt. vi. 53) cites a var. *brachyglossa, Reichb. f. in Gard. Chron.* 1887, i. 833, with a shorter and more open

lip, white with a light yellow disk spotted with brown, and pale rose sepals and petals. It is a native of Sikkim at a higher elevation than the type. C. HOOKERIANA is, as stated at p. 828, the only species in which the leaves persist after flowering.

55. C. ? PURPURASCENS, after *Ic. Plant.* insert 2109.

P. 843. C. ROSSIANA. See ante p. 192.

1. O. ALBA. After *Wall. mss.* add Dipodium, *Griff. Ic. Pl. Asiat.* t. 329 (*not of Notul.* iii. 406).

P. 847. 11. PHOLIDOTA, for MICRANTHA, read PARVIFLORA.

1. CALANTHE TRICARINATA. Add to citations *Veitch Man. Orchid.* Pt. vi. 69; *Franch. & Savat. Enum. Pl. Jap.* ii. 26; and after habitat add, DISTRIB. Japan.—I have not compared the Japanese with the Indian plant.

P. 849. 5. C. DIPLOXIPHION. After *Ic. Plant.* insert t. 2111.

P. 850. 10. C. MANNII, after *Hook. f.* insert *Ic. Plant.* t. 2113.
11. C. WRAYI „ „ „ t. 2114.

P. 851. 15. C. VERATRIFOLIA. To the synonyms of this species add Veitch *Man. Orchid.* Pt. vi. 88 and C. Petri, *Reichb. f. in Gard. Chron.* 1880, 326. C. colorans, *Rf. l. c.* 1885, 360; *Williams Orchid. Alb.* v. t. 218. C. australis, *Hort.* It is well figured at p. 69.

P. 852. 16. C. VESTITA. Under *Bot. Zeit.* for xvi. 128 read 1853, 493. Veitch (*Man. Orchid. Pt.* vi. 70) enumerates several subvars.; as gigantea, *Williams Orchid. Alb.* v. t. 211, (Syns. grandiflora, *Hort. Belg.* 1889, 121, and rubro-oculata, *Paxt. Mag.* xvi. 129; *Regel Gartenfl.* 1873, 751); also Var. Regnieri, *C. Regnieri, Reichb. f. in Gard. Chron.* 1883, 274, with its Subvars. Sanderii and Stevenii, *Williams Orchid. Alb.* iii. t. 134; also a Var. Turneri, with the elongated pseudobulbs of *Regnieri* and the flowers of *rubro-oculata*.

16/1. C. RUBENS, *Rudley in Gard. Chron.* 1890, i. 576; pseudobulbs 6 by 1½ in. conical silvery, scape 2 ft. woolly, sheaths about 5, raceme 14-fld. flowers pink smaller than in *C. vestita*, bracts 1 in., pedicel with ovary 2 in., sepals subsimilar dorsal ¾ in. slender lanceolate mucronate, lateral longer-mucronate, petals shorter more spathulate, lip rose-pink darker at the base adnate to the base of the column erect 4-lobed, side lobes oblong erect appressed to the column, midlobe deeply divided segments rounded with an interposed tooth, spur ½ in. filiform curved, column as in *C. vestita*.

Langkawi Island, north of Penang, *Curtis*.—I have seen no specimen.

P. 854. 27. C. ANGUSTIFOLIA. To Syn. *C. phajoides* add *Ic. Plant.* t. 1864.

P. 855. After 31. C. GRACILIS, add—

31/1. C. LONGIPES, *Hook. f.*; stems tall, scape axillary very long stout, raceme very short and flowers pubescent, lateral lobes of lip rounded crenate, midlobe flabelliform margins undulate and crenate, disk with a membranous lamella on each side from the base to that of the midlobe, spur 0.

SIKKIM HIMALAYA, *King*.

Stem as thick as the little finger. *Leaves* not seen. *Scape* 10–12 in., with 2–3 inflated sheaths; raceme 8–10-fld.; flowers ¾ in. diam.; sepals 5-nerved and 3-nerved petals subequal, elliptic, acuminate; lip as long as the sepals, adnate to the base of the column.—I have seen but one flowering specimen of this plant, which is leafless; its habit is that of *C. tubifera*, but the flowers are very much smaller, the sepals broader.

P. 856. 33. C. LABROSA, for *Hook. f.* substitute *Reichb. f. in Gard. Chron.* 1883, 44.

P. 858. 7. ARUNDINA CANTLEYI, after *Ic. Plant.* insert t. 2112.

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P. 1. Under 1. E. VIRENS, for Ærobrium, read Ærobrion.

P. 5. 14. E. DECIPIENS, in line 1, for *Griff.* read *Kurz*.

P. 3. 8. E. EXPLANATA; at end of diagnosis insert *Hook. Ic. Plant.* t. 1882.

P. 6. After E. SQUALIDA, insert—

29/1. E. HOLOCHILA, *Coll. & Hemsl. in Journ. Linn. Soc.* xxviii. 132; raceme lax-fld., flowers large, bracts about equalling the ovary, scape robust, sepals oblong obtuse, petals obovate-oblong tips rounded, lip orbicular entire or very obscurely broadly 3-lobed, disk smooth. *Hook. f. Ic. Plant.* 2116 *ined.*

BURMA; on the Shan Hills, alt. 4000 ft., *Collett.*

Leaves very young at flowering time. *Scape* 12 in., as thick as a swan's quill, with two oblong ventricose obtuse sheaths below the middle; raceme 6 in.; bracts slender, membranous; pedicel with ovary ¾ in.; flowers 1½–2 in., broad; sepals 7-nerved, lateral adnate to the sides of the spur; petals 5-nerved, the outer pair branching outwards; lip about as long as the sepals, nerves very many parallel, mentum spur-like.—Only one specimen seen by me.

P. 8. 25. E. SANGUINEA. Add Syn. C. rufa, *Thw. Enum.* 302, and to the habitats, CEYLON, at Hantani, alt. 3000 ft., *Thwaites.*

CYRTOPERA RUFA, *Thwaites.* This plant was unknown to me till I was shown a living specimen that was sent by Dr. Trimen from Ceylon, and which flowered in the Royal Gardens, Kew. It is identical with 25, *Eulophia sanguinea*, as figured in Bot. Mag. t. 6161. The colour of the flowers varies.

EULOPHIA Sp., *Trimen Cat. Pl. Ceyl.* 89 (C.P. 3958). Dr. Trimen has kindly lent me the Herb. Peradeniya species of this; it is *E. graminea*, L.

To the species of *Eulophia* "UNKNOWN TO ME" add ? BLETIA BICALLOSA, *Don Prodr.* 30 (Limodorum bicallosum, *Ham. mss.*), from Nepal, thus described by Don. —Scape 1½ ft. erect terete scaly, raceme 6–8-fld., flowers pale, lip 3-lobed subunguiculate anfractuously articulate and saccate at the claw, lobes rounded, midlobe largest crisped glabrous, sepals and petals elliptic mucronulate, lateral sepals adnate to the unguiform process; pollinia 4, parallel, waxy.—Don adds that it is hardly a *Bletia*, under which genus he includes an *Arundina*, a *Calanthe* and a *Eulophia*.

P. 32. After 2. DORITIS WIGHTII insert—

3. D. BRACEANA, *Hook.f.*; scape stout elongate, mentum spur-like acute, side lobes of lip ovate-lanceolate, midlobe spathulately obovate.

SIKKIM HIMALAYA, *Gamble.*

Roots very many, broad, flat. *Stem* very short. *Leaves* oblong, very dark green. *Scape* much longer than the leaves, as thick as a crow-quill or thicker, very dark green, speckled with brown; raceme 6–10-fld.; bracts minute, triangular; peduncle with ovary ⅔–1 in., decurved; flowers 1 in. diam.; sepals obovate-oblong, obtuse, and narrower petals fleshy yellow with pinkish midrib; lip membranous, violet-purple, tips of the forked appendage straight. *Column* very large, fleshy; pollinia 4 subglobose.—Described from a drawing and notes by Mr. Brace. Much nearer to *D. tænialis* than to *Wightiana*, differing in the many-fld. long remarkable stout scape and much larger flowers with yellow sepals and petals and a longer spur-like mentum.

P. 40. After 26. SARCOCHILUS MERGUENSIS, insert—

26/1. S. (Fornicaria) PUGIONIFOLIA, *Hook.f. Ic. Plant. ined.*; stemless, peduncle about equalling the few elongate-subulate recurved deeply channelled leaves, bracts suberect, lip sessile on the foot of the column saccate truncately 3-lobed ciliate.

CEYLON; at Varuniya, in the N. Central Province, *Trimen.*

Leaves 2–3 by ⅛ in. at the thickest part, fleshy, more than semi-terete with a rounded back and very deep channel in front. *Peduncle* glabrous; bracts ovate-oblong, obtuse. *Flowers* ½ in. diam., pale primrose; lip with a few purplish markings; sepals ovate-oblong obtuse, lateral gibbous on the lower margin; petals oblong obtuse; lip ciliate on the lobes and disk towards the broad 3-lobed apex, side lobes rounded, midlobe not longer orbicular; a small caruncle at the base of the midlobe; column short, white.—I have to thank Dr. Trimen for a specimen and a drawing.

P 40. On last line of description of SARCOCHILUS FILIFORMIS, for *S. Trimeni* read *S. viridiflorus.* I had proposed the former name for the latter plant before discovering (whilst the description was passing through the press) that it was *Ærides viridiflorum*, Thw.

P. 44. To habitats of 3. Æ. CYLINDRACEUM, add CEYLON.

P. 55. For 1. S. GEMINATUM read GEMMATUM.

P. 60. Under the citations for 20, S. CALCEOLARE; in line 2, for Bot. Reg. 1883, Misc. 130, read 1838, Misc. 75.

P. 62. To syns. of 29. S. LONGIFOLIUM add Ærides rigidum, *Smith in Rees. Cyclop.*

30 S. WIGHTIANUM, under the syns. place *Thwaites Enum.* 303. after *Lindl. Fol. Orchid* 2.

P. 88. 3. G. JAVANICA, add to habitats, CEYLON, on roots of coffee trees in the Central Province, *Thwaites.*

P. 107. 1. Z. SULCATA, add to syns. Orchis strateumatica, *Linn. Sp. Pl.* 903.

P. 116. 5. H. ELONGATA, add to syns. Rhamphidia elongata, *Thwaites Enum.* 313; and to habitats, CEYLON, alt. 4000 ft., *Thwaites.*

P. 141. 30. *Habenaria longecalcarata.* Two species are confounded here, having been mixed up in Wight's descriptions, Icones and Herbarium; they are—

30. H. LONGECALCARATA, *A. Rich.* (*Wight Ic.* t. 925, *Dalz. & Gibs. l.c.*) with few (2-3) very large flowers, large cucullate sheathing bracts much shorter than the long-pedicelled ovary, lip twice as long as the sepals.

30/1. H. DECIPIENS, *Wight Ic. vol. v. pt. i. p.* 14, with several (4-8) smaller flowers, very short pedicels, lanceolate bracts nearly as long as the ovary, lip rather longer than the sepals. H. montana, *Wight* (*not of A. Rich.*) *Ic.* t. 827, and 1714 the upper right and the left hand figures only.—This much resembles H. *longicornu* Lindl. (*montana*, A. Rich.) but has a longer lip and much longer spur. Wight has given it both names in his Herbarium, and says there that it is intermediate between *longicornu* and *longecalcarata.*

P. 147. 48. H. CHLORINA, insert *Par. &* before *Reichb. f.*

P. 151. 63. H. CRASSIFOLIA, add to syns. P. canarensis, *Lindl. Plant. Hohenack. Exsicc.* n. 142.

P. 165. 106. H. DECIPIENS. This name being confirmed for Wight's plant (see above) must be replaced by H. GRIFFITHII.

INDIAN ORCHIDEÆ OF UNDETERMINED AFFINITY.

In the above revision of the Indian Orchids I have doubtless overlooked some species that have been published in one or other of the multitude of works I have had to ransack, and in others that have escaped my notice; and for which I must beg indulgence. There are further some published ones, of which from the incompleteness of the descriptions in respect especially of the pollinia, I have been unable to determine the genera. The chief of these are Kœnig's Indian species, referred to *Epidendrum* (a genus now known to be peculiar to the New World,) and published in the 6th Part (p. 43 et seq.) of Retz's Observationes (in 1791). Of these few have been taken up by subsequent authors. They are for the most part Peninsular and probably all communicated by Heyne, who included a few Malaccan species from his correspondents. The descriptions are so full and good in all but the pollinia, &c., that local botanists may in time recognize many of them. It is unfortunate that Kœnig should not have identified any of them with Rheede's plates.

Epidendrum bidentatum, Kœn. in Retz. Obs. Pt. vi. 54 = Limodorum bidentatum, *Willd. Sp. Pl.* iv. 124.

,,	calceolaria	,,	,,	,, 45
,,	Calceolaria terrestre	,,	,,	,, 63 Malacca.
,,	clavatum	,,	,,	,, 50 = ? Saccolabium clavatum, Lindl Gen. & Sp. 223.
,,	complanatum	,,	,,	,, 50 = Sarcochilus complanatus, Hook. f. ante p. 41.
,,	Flabellum Veneris	,,	,,	,, 57
,,	Flor æris v. Saaronicum	,,	,,	,, 58 = Renanthera Arachnites, *ex. Lindl. Gen. & Sp.* 217.
,,	Flos æris ?	,,	,,	,, 64

Epidendrum hexandrum, Kœn. in Retz. Obs. Pt. vi. 45 = Appendicula Kœnigii, *H. f.* ante p. 84.
„ liliiflorum „ „ „ 61 = Limodorum liliiflorum, *Willd.*
„ longiflorum „ „ „ 55
„ lycopodioides „ „ „ 55 Malacca, on Mangostin bark.
„ nudum „ „ „ 52
„ ophrydis „ „ „ 46
„ orchideum „ „ „ 48 = ? Ceratochilus orchideus, *ex. Lindl. Gen. & Sp. Orchid.* 232.
„ plantaginifolium „ „ 60 Malacca, near Tsing, on top branches of loftiest trees.
„ pusillum „ „ „ 49 = Sarcochilus Wightii, *H. f.*; ante p. 37.
„ sessile „ „ „ 60 = Bulbophyllum clandestium, *L. ante* v. p. 753.
„ spathulatum „ „ „ 43 = Vanda spathulata, Spr. ante p. 50.
„ subulatum „ „ „ 51 = ? Ærides cylindricum, L., *ex. Lindl. Gen. & Sp.* 240.
„ Supplex minima „ „ 47 = Dendrobium atropurpureum, Miq. ante v. p. 724.
„ tomentosum „ „ „ 53 = Eria tomentosa, Lindl. ante v. p. 803.
„ variegatum „ „ „ 44
Serapias Epidendræa „ „ „ 65 = Eulophia virens, Bl. ante p. 1.

Order CXLIX. **SCITAMINEÆ.** (By J. G. Baker, F.R.S.)

Herbs, often large, rarely with a woody caudex. *Leaves* cauline or radical, usually membranous, closely pinnately nerved from a midrib. *Flowers* bracteate and often bracteolate, solitary or spicate, rarely paniculate, irregular, hermaphrodite (except *Musa*). *Calyx* superior; sepals free and imbricate, or connate into an entire toothed or spathaceous tube. *Corolla-tube* long or short, free or adnate to the petaloid staminodes; limb 3-partite, segments free or connate. *Stamens* either 5 subequal with a 6th imperfect, or one perfect with the rest forming petaloid staminodes; anthers linear, 2-celled, or of one cell on the margin of a petaloid connective. *Ovary* 3-, rarely 1- or 2-celled; style usually slender, with 2 very short stylodes crowning the ovary; stigma entire or subentire; ovules many, rarely few, axile, rarely parietal, anatropous. *Fruit* usually crowned with the remains of the perianth, loculicidally 3-valved, or fleshy or membranous and indehiscent. *Seeds* various, albumen flowery; embryo small.—Genera about 40, species 4–500, chiefly tropical.

The Traveller's tree, *Ravenala madagascariensis*, Sonnerat (Urania speciosa, *Wall. Cat.* 5765), is frequently planted, especially near Singapore. It has much the leaves of a *Musa* but they are distichous.

Tribe I. **Zingibereæ.** *Calyx* tubular or spathaceous. *Stamen* 1; anther 2-celled; lateral staminodes filiform or petaloid, or small, or 0. *Style* slender, embraced below the stigma by the anther. *Embryo* central, straight.

* Ovary 1-celled; placentas 3, parietal.

1. MANTISIA. Scape leafless; corolla-tube long; lateral staminodes filiform or spathulate, in the middle of the elongate filament, opposite, spreading.

2. GLOBBA. Stem leafy; corolla-tube long; lateral staminodes petal-like; filament slender.

3. HEMIORCHIS. Corolla-tube short; lateral staminodes petal-like; filament short.

** Ovary 3-celled; placentas axile.

† Lateral staminodes broad.

§ *Connective spurred at the base.*

4. ROSCOEA. Flowering stem leafy; bracts 1-fid.; filament long; capsule subdehiscent.—Flowers purple or white.

5. CAUTLEYA. Flowering stem leafy; bracts 1-fid.; filament long; capsule dehiscent with recurved valves.—Flowers yellow.

6. CURCUMA. Flowering stem leafy or not; bracts cucullate, several-fid., forming a cone-like spike; filament petaloid; capsule subdehiscent.

§§ *Connective very broad or crested, not spurred.*

7. GASTROCHILUS. Flowering stem short or erect; filament short; connective broad not crested.

8. KÆMPFERIA. Flowering stem leafy or not; filament very short; connective crested.

9. HITCHENIA. Flowering stem leafy; filament long, complicate; connective broad not crested.—Inflor. as in *Curcuma*.

§§§ *Connective very narrow, neither spurred nor crested.*

10. HEDYCHIUM. Flowering stem leafy; filament long, slender.

†† Lateral staminodes small or 0, rarely narrow and adnate to the lip.

§ *Flowers in a dense-fld. cone-like spike.*

11. AMOMUM. Flowering scapes usually leafless; filament short; anther-cells diverging above; connective dilated crested or 2-lobed, rarely simple.

12. ZINGIBER. Spikes terminating leafy stems or leafless scapes; filament short, anther-cells parallel, connective usually produced into a long appendage.

13. COSTUS. Spikes terminating leafy stems or leafless scapes; filament petaloid, anther adnate to its middle, cells parallel.

§§ *Flowers in lax-fld. spikes or panicles.*

14. CYPHOSTIGMA. Scape leafless, panicle loosely flowering from the base upwards; filament short, connective with a 3-lobed crest.

15. ELETTARIA. Scape leafless, panicle loosely flowering from the base upwards; filament very short; anther-cells parallel, connective not dilated.

16. ELETTARIOPSIS. Scape leafless; spike simple; bracts small; filament short, anther petaloid.

17. SCAPHOCHLAMYS. Scape leafless; spike simple; bracts large, persistent; filament short, connective petaloid.

18. ALPINIA. Spike or panicle terminating a tall leafy stem; filament long, connective shorter than the anther or longer and dilated.

19. RHYNCANTHUS. Spike terminating a leafy stem; filament long, connective not dilated.

Tribe II. **Maranteæ.** *Calyx* of free sepals, rarely loosely cohering. *Stamen* 1; anther 1-celled, laterally adnate to a lobe of the perianth; staminodes petaloid, connate into a 5–6-lobed inner perianth, of which 1 or 2 lobes are lateral, 1 (the lip) anticous; of the 2 or 3 dorsal one or two are hooded and another bears the anther. *Ovary* 1–3-celled, cells 1-ovuled; style excentric incurved or involute. *Embryo* curved.

20. CLINOGYNE. Stem leafy with terminal panicled scattered flowers; panicle with convolute deciduous sheaths at the forks; bracts deciduous.

21. PHRYNIUM. Stem with one broad leaf, and a lateral head or spike of flowers, or spike radical; bracts and bracteoles persistent.

Tribe III. **Canneæ.** *Sepals* free. *Stamen* 1; anther 1-celled, adnate to lateral petaloid filament; staminodes 4. *Ovary* 3-celled, cells many-ovuled; style flattened; stigma terminal. *Embryo* straight.

22. CANNA.

Tribe IV. **Museæ.** *Sepals* free or connate in a split spathe. *Stamens* 5, free; anthers linear, 2-celled; staminode 1 or 0. *Style* central; stigma 2–3-fid. *Embryo* short.

23. MUSA. Stem subarboreous, stout, simple; flowers in a stout terminal spike; calyx tube short.

24. LOWIA. Stem slender, dichotomously branched; flowers clustered at the base of a petiole; calyx tube very long.

1. **MANTISIA,** *Sims.*

Rhizome short, creeping; leafy stem short. *Scape* short, sheathed below. *Leaves* oblong-lanceolate, caudate. *Panicle* laxly-fld.; bracts at the forks membranous, coloured. *Calyx* short, campanulate, obtusely 3-lobed. *Corolla*-tube slender, lobes subequal, ovate; dorsal erect, concave. Lateral *staminodes* at or below the middle of the exserted incurved filament, slender, spathulate; lip deflexed, 2-fid; filament long, curved; anther-cells linear-oblong, broadly winged. *Ovary* 1-celled; ovules 3, parietal; style filiform, placed in a groove of the filament; stigma turbinate. *Capsule* globose, dehiscing at the apex. *Seeds* many, minute, oblong.—Species the following.

1. **M. saltatoria,** *Sims in Bot. Mag.* t. 1320, staminodes linear-subulate. *Horan. Prodr.* 19. Globba saltatoria, *Rosc. Scitam.* t. 112. G. purpurea, *Andr. Bot. Rep.* t. 615. G. radicalis, *Roxb. in Asiat. Res.* xi. 359; *Corom. Pl.* t. 230. G. subulata, *Roxb. Hort. Beng.* 2; *Fl. Ind.* i. 81.

CHITTAGONG, *Roxburgh, Lister.*

Rootstock perennial. *Stems* annual, 1–2 ft. *Leaves* 4–6 in.; sheath 1–2 in.; bract-leaves sheathing, oblong. *Panicle* lax, 3–6 in.; branches simple, usually short and ascending; flowers few, crowded towards the tips of the branches; bracts ovate, lilac, ¼–½ in., lower flowerless. *Calyx* campanulate, lilac, ¼ in.; lobes suborbicular. *Corolla*-tube twice as long as the calyx; segments ovate, lilac, ½ in., central rather larger and clasping the filament. *Staminodes* ⅛ in.; lip yellow, cuneate, deeply lobed; wings of anther suborbicular. *Capsule* purple, the size of a small cherry.

2. **M. spathulata,** *Schult. Mant.* i. 49; staminodes with a narrow claw and flattened petaloid blade. *Horan. Prodr.* 19. Globba spathulata. *Roxb. Hort. Beng.* 2; *Fl. Ind.* i. 83.

SILHET, *Roxburgh*; CHITTAGONG, *Lister.*

Habit and foliage of *M. saltatoria*, but panicle larger, branches more numerous, bracts oblong, uppermost about as long as the calyx, corolla-segments narrower, lip less deeply bifid, staminodes much shorter, and placed lower down on the filament.

2. GLOBBA, *Linn.*

Rhizome short, creeping; stem erect. *Leaves* oblong or oblong-lanceolate. *Flowers* in terminal panicles, rarely spikes; bracts usually deciduous, buds often replaced by bulbils. *Calyx* funnel-shaped, 3-lobed. *Corolla*-tube longer than the calyx; lobes ovate, subequal. *Lateral staminodes* petaloid, contiguous to the corolla-segments; lip deflexed; filament with 2 dorsal appendages, long, incurved; anther oblong, connective simple, winged or spurred, produced beyond the cells. *Ovary* 1-celled; placentas 3, parietal; style filiform, placed in a groove of the filament; stigma turbinate. *Capsule* globose, finally dehiscent. *Seeds* small, ovoid; aril small, white, lacerate.—Species about 25, Indian, Chinese, and Malayan.

SECT. I. **Aplanthera,** *Horan.* Anther neither winged nor spurred.

* *Leaves glabrous beneath (or slightly pubescent in* G. racemosa).

1. **G. racemosa,** *Smith Exot. Bot.* ii. 115 t. 117; leaves slightly hairy or quite glabrous beneath, panicle long narrow, lower branches 2–3-fld. at the tip, bulbils 0, bracts small deciduous, corolla-segments and staminodes ovate equal in length, lip longer shortly bifid, capsule smooth. G. orixensis, *Wall. Cat.* 6535 B, G, H., *not of Roxb.*

CENTRAL and EASTERN HIMALAYA, ascending to 6000–7000 feet in Kumaon.

Leafy stems 1½–2 ft. *Leaves* 6–9 in., oblong or oblong-lanceolate, subcaudate, sometimes slightly hairy beneath on the ribs towards the base. *Panicle* ½–1 ft.; rachis glabrous; branch-bracts and flower-bracts caducous. *Calyx* ¼ in., yellowish, shortly lobed. *Corolla* bright yellow; tube 2–3 times the length of the calyx; segments ¼ in., reflexed; filament 2–3 times the length of the segments. *Capsule* ½ in. —The name *racemosa* is a misleading one.

2. **G. orixensis,** *Roxb. in Asiat. Res.* xi. 358; *Hort. Beng.* 2; *Corom. Pl.* t. 229; *Fl. Ind.* i. 78; leaves glabrous beneath, panicle long narrow, lower branches 2–3-fld. at the tip, bulbils 0, bracts small deciduous, corolla-segments staminodes and lip equal in length, capsule warted. *Horan. Prodr.* 19.

SIKKIM HIMALAYA, at a low level, *Hook. f. et Thoms.* (*Herb. Ind. Or. No.* 15). NORTHERN CIRCARS, *Roxburgh.*

Nearly allied to *G. racemosa*, but flowers smaller, deep orange, with a shorter corolla-tube; lip spotted with red-brown at the throat; capsules smaller.

3. **G. Clarkei,** *Baker*; leaves glabrous beneath, panicle long narrow, lower branches 2–3-fld. at the tip, bulbils many, bracts small deciduous, corolla-segments and staminodes ovate equal in length, lip longer shortly 2-lobed, capsule smooth.

SIKKIM HIMALAYA; alt. 3000–7500 ft. (*Herb. Ind. Or. H.f. & T.*, No. 9); KHASIA HILLS, *J. D. H.* alt. 3000–5700 ft.; MUNNIPORE, *Watt.*

Nearly allied to *G. racemosa*, but racemes longer and laxer, with most of the upper flowers changed into bulbils, calyx less corolline, usually brownish, corolla yellow, tinged with brown.

4. **G. Wallichii,** *Baker*; leaves small glabrous beneath, panicle very long lax-fld., branches 1–2-fld., bracts small deciduous, bulbils few or 0, corolla-segments ovate, staminodes lanceolate rather longer, lip small placed a little above the segments, capsule small smooth. G. pendula, *Wall. Cat.* 6533, *not of Roxb.*

PENANG, *Wallich, Curtis.*

Much weaker in habit than other species of the section. *Leaves* 3–4 in., caudate, pale beneath. *Panicle* sometimes 1 ft.; rachis and slender patent branches glabrous. *Calyx* green, $\frac{1}{12}$ in. *Corolla* pale yellow; tube 2–3 times the length of the calyx; segments reflexed, $\frac{1}{4}$ in., upper concave; filament yellow, $\frac{3}{4}$ in., bearing the small lip a short distance above its base. *Capsule* $\frac{1}{3}$ in. diam.

** *Leaves more or less pubescent beneath.*

5. **G. Hookeri,** *Clarke mss.*; leaves very hairy on the midrib beneath, panicle long narrow, lower branches 2–3-fld. at the tip, bulbils sometimes present, bracts small deciduous, corolla-segments and staminodes ovate and equal in length, lip longer shortly bifid, capsule smooth.

NEPAL, *Wallich*; SIKKIM HIMALAYA, alt. 3000–5000 ft., *J. D. H.* (*Herb. Ind. Or.* No. 10). NAGA HILLS, alt. 4500 ft., *Clarke.*

Doubtfully distinct from *G. racemosa*, but more robust and floriferous, with broader leaves. *Flowers* bright yellow; lip not spotted.

6. **G. ophioglossa,** *Wight Ic.* t. 2002; leaves finely pubescent beneath, panicle narrow, lower branches 4–6-fld., bracts small deciduous, lower nodes with a few bulbils, corolla-segments ovate, staminodes longer lanceolate, lip longer deeply bifid, capsule smooth. *Horan. Prodr.* 19. G. orixensis, *Wall. Cat.* 6535 A, C, D, I, *not of Roxb.* Alpinia? Missionis, *Wall. Cat.* 6580.

TRAVANCORE *Heyne*; Anamallay hills, &c., *Wight, Jerdon.* COCHIN, *Gamble.* BEHAR, on Parasnath, alt. 2500 ft., *Vicary, Clarke.*

Leaf conspicuously caudate, 6–9 in. *Panicle* 4–6 in., rachis and branchlets glabrous; flowers not crowded at their tips; bulbils ovoid, deflexed. *Calyx* $\frac{1}{4}$ in., broadly funnel-shaped, pale green; teeth broad, ovate. *Corolla* pale yellow; tube 3 times the length of the calyx; segments $\frac{1}{3}$ in., ovate; lip twice the length of the segments, lobes longer and narrower than in others of the section. *Capsule* $\frac{1}{3}$ in., globose.

7. **G. multiflora,** *Wall. Cat.* 6537 A; leaves pubescent beneath, panicle long narrow, lower branches 4–6-fld., bracts small deciduous, lower nodes with bulbils, segments of corolla and staminodes ovate and equal in length, lip not longer shortly bifid, capsule smooth. G. velutina, *Wall. in Voigt Hort. Sub. Calc.* 573 (*name only*).

SIKKIM HIMALAYA, ASSAM, SILHET, the KHASIA HILLS, and MUNNIPORE.

Leaves conspicuously caudate, $\frac{1}{2}$–1 ft. *Panicle* $\frac{1}{2}$–1 ft., rachis and branchlets very hairy; branchlets more crowded than in the foregoing species, and flowers not crowded at their tips. *Calyx* $\frac{1}{8}$ in. *Corolla*-tube 3 times the length of the calyx; segments and lip $\frac{1}{3}$ in.; filament $\frac{1}{3}$ in.; anther $\frac{1}{8}$ in., sometimes obscurely margined.

8. **G. substrigosa,** *King mss.*; leaves very pubescent on both surfaces, panicle lax cernuous, branches few-fld., bulbils 0, bracts large foliaceous persistent, corolla-segments ovate, capsule pubescent.

TENASSERIM, *Gallatly.*

Whole plant not more than 6–8 in. *Leaves* few, oblong-caudate, the largest 3–4 in. *Panicle* 1$\frac{1}{2}$–2 in.; branches few, short, lower spreading or reflexed; bracts oblanceolate-oblong, pubescent. *Calyx*-tube $\frac{1}{8}$ in. *Corolla* yellow, gland-dotted. *Capsule* blackish, the size of a pea.

9. **G. Andersoni,** *Clarke, mss.*; leaves slightly pubescent beneath,

panicle lax, flowers crowded at the tips of the branches surrounded by a whorl of large bracts, corolla-segments and staminodes equal in length, lip longer deeply bifid, capsule warted.

SIKKIM HIMALAYA, alt. 1500–2500 ft. (*Hk. fil. & Thoms. Herb. Ind. Or.* 12), *Clarke, Gamble, King.*

Habit and leaves of *G. racemosa*. *Leaves* sometimes 1 ft., caudate. *Panicle* 3–4 in., erect or spreading, rachis very hairy, branchlets short, spreading; bracts ½ in., dark, ovate, membranous. *Calyx* green, tubular. *Corolla* bright yellow; tube 2–3 times the length of the calyx; segments ⅛ in.; filament nearly 1 in.

10. **G. arracanensis,** *Kurz in Journ. Asiat. Soc. Beng.* xxxix. pt. ii. 83; leaves slightly pubescent beneath, panicle short, flowers crowded at the tips of the short branches surrounded by a whorl of large bracts, corolla-segments ovate lilac, lip deeply bifid, capsule smooth.

ARRACAN; forests of the low sandstone hills, *Kurz.*

Habit of *G. racemosa*. *Leaves* 6–9 in., caudate. *Panicle* 3–4 in., subsessile, rather spreading, bracts ½ in., much imbricate, broadly ovate, obtuse, membranous, lilac. *Calyx* ⅛ in. *Corolla*-tube short, whitish; lip yellow or tinged with lilac, segments obovate-oblong; filament long, lilac.

SECT. II. **Careyella,** *Horan.* Anther with a narrow entire border.

11. **G. sessiliflora,** *Sims in Bot. Mag.* t. 1428; raceme narrow or subspicate, bulbils many on lower nodes, corolla-segments ovate, staminodes longer lanceolate, lip long deeply bifid. *Horan. Prodr.* 19. G. Careyana, *Roxb. Hort. Beng.* 2; *Fl. Ind.* i. 80; *Rosc. Scit.* t. 110; *Lodd. Bot. Cat.* t. 691; *Wall Cat.* 6534; *Horan. Prodr.* 19. G. orixensis, *Wall. Cat.* 6535 F. Scitaminea Finlaysoniana, *Wall. Cat.* 6623.

PEGU, *Carey*, &c.

Leafy stem 1–1½ ft. *Leaves* 6 in., oblong, acuminate, pale and finely pubescent beneath. *Raceme* short, erect or drooping; upper half bearing flowers on the rachis or on short branches; lower half with crowded bulbils sessile in the axils of small ovate scariose spreading or ascending bracts. *Calyx* ⅛–⅓ in., narrowly funnel-shaped. *Corolla* yellow; tube 2–3 times the length of the calyx; segments ⅓ in.; filament yellow, ½–¾ in.; anther cuspidate, margin very narrow. *Capsule* globose, warted, the size of a large pea.

12. **G. floribunda,** *Baker;* panicle long lax, branches many-fld., bulbils 0, staminodes scarcely longer than corolla-segments, lip long not bifid.

MALAY PENINSULA; Johore, *King.*

Habit of *G. multiflora*, 2 ft. high. *Leaves* oblong, caudate, nearly 1 ft., pubescent. *Panicle* erect, 6–8 in.; rachis very hairy; branches 1–1½ in., many, ascending, 6–8-fld.; bracts small, deciduous. *Calyx* $\frac{1}{12}$ in. *Corolla* pale yellow; segments oblong, ⅛ in.; anther narrowly margined at the sides and base; lip inserted above the base of the filament. *Ovary* glabrous.

13. **G. uliginosa,** *Miquel Fl. Ind. Bat. Suppl.* 613? panicle long very lax narrow, lower branches 1–2-fld., upper flowers sometimes replaced by bulbils, corolla-segments and staminodes ovate and equal in length, lip small. G. elongata, *King mss.*

PENANG, *King.* MALACCA, *Cuming, Griffith* (*Kew Distrib.* 5652), &c.—DISTRIB. Malay isles.

Stem very weak. *Leaves* small, membranous. *Panicle* sometimes 6–9 in.; bracts small, deciduous. *Calyx* funnel-shaped, $\frac{1}{12}$ in. *Corolla* yellow; tube ¼ in.; segments ⅛–⅙ in.; filament ⅓ in.; lip placed a little above its base; anther obscurely margined. *Capsule* smooth.—I doubt whether Bentham's Sect. *Careyella* should be

separated from *Aplanthera*. Neither Miquel's description, nor his type specimen, indicate the structure of the anther in the Malay *G. uliginosa*.

SECT. III. **Ceratanthera,** *Lestib.* (gen.) Anther with a membranous spur from the base or side of each cell.

14. **G. Kingii,** *Baker*; panicle narrow subspicate, bracts small deciduous, bulbils 0, corolla-segments oblong, staminodes linear-oblong, lip small inserted above the base of the filament.

SINGAPORE, *King*.

Leafy stem a foot long. *Leaves* oblong-caudate, subglabrous, 3–4 in. long. *Peduncle* erect, longer than the panicle; panicle very lax, erect, 4–5 in. long; branches very short, 1–2-fld. *Calyx* ⅛ in. long. *Corolla*-segments orange-yellow, ⅛ in. long. *Spurs* as long as the anther-cells. *Ovary* glabrous.

15. **G. stenothyrsa,** *Baker*; panicle erect subspicate, lower nodes bearing bulbils, bracts deciduous, corolla-segments oblong, staminodes linear-oblong, lip small emarginate inserted above the base of the filament.

TENASSERIM; Moulmein, *Parish*.

Stem 1 ft. or more. *Leaves* 6–8 in., oblong, caudate. *Panicle* peduncled, 8–9 in., lower half with small sessile bulbils in the axils of small bracts; flowering branches short, ascending, 1–2-fld. *Calyx* funnel-shaped, $\frac{1}{12}$ in. *Corolla* bright yellow, tube ¼ in., segments ⅓ in.; staminodes scarcely longer; filament nearly 1 in.; spurs membranous, as long as the anther-cells.

Var.? *Cumingii*; bulbils 0, anther spur shorter. Malacca, *Cuming* (No. 2370.)

16. **G. pallidiflora,** *Baker*; panicle lax erect, branches few-fld., bulbils 0, bracts small deciduous, staminodes longer than the whitish corolla-segments, lip inserted above the base of the filament.

MALAY PENINSULA; Johore, *King*, 716, 717.

Stem 1½ ft. *Leaves* 8–9 in., oblong, caudate, pubescent beneath. *Panicle* 2–3 in.; peduncle short; branches less than 1 in., ascending or spreading, 2–3-fld. towards the tip. *Calyx* $\frac{1}{12}$ in. *Corolla*-segments suborbicular, $\frac{1}{12}$ in., tube ¼ in.; filament 1 in.; lip with a spreading base; anther spurs subulate. *Ovary* glabrous.

17. **G. bracteolata,** *Wall. ex Voigt Hort. Sub. Calc.* 573 (*name only*) panicle short dense drooping, bracts oblong or obovate yellow subpersistent, bulbils 0, corolla-segments oblong, staminodes longer linear-oblong, lip small emarginate. G. expansa, *Wall. Cat.* 6536 D.

TAVOY, *Wallich*; TENASSERIM, *Griffith, Helfer*; UPPER BURMA, up to 4000 ft., *King*.

Stem ½–1 ft. *Leaves* oblong, acuminate, 3–4 in., tinged with purple beneath; sheaths broader than in the other species. *Panicle* oblong, 3–4 in.; lower branches spreading, about 1 in., 3–4-fld.; branch-bracts obovate; flower-bracts oblong, ½–⅔ in. *Calyx* funnel shaped, $\frac{1}{12}$ in. *Corolla* bright yellow; tube ½ in.; segments reflexed, ⅓ in.; lip with a red spot at the throat; filament yellow, ½–⅔ in.; anther-spurs large curved. *Ovary* smooth.

18. **G. subscaposa,** *Coll. et Hemsl. in Journ. Linn. Soc.* xxviii. 135; panicle sparse erect, bracts small deciduous, bulbils 0, corolla segments oblong, staminodes longer lanceolate, lip long deeply bifid inserted at the base of the filament.

UPPER BURMA; Shan hills, 4000–5000 ft., *Collett*.

Stem including panicle not above 1 ft. Produced *leaves* few and small. *Raceme* short, lax; lower branches 1 in., spreading, 3–4-fld. *Calyx* funnel-shaped, $\frac{1}{12}$ in.

Corolla greenish-yellow; segments ⅛ in.; lip pale yellow, ¼ in.; filament above ½ in.; anther-spurs from the sides of the cells.

19. **G. pendula,** *Roxb. in Asiat. Res.* xi. 359; *Fl. Ind.* i. 79; *Coromand. Pl.* t. 228; panicle lax drooping, bracts deciduous, bulbils rarely produced, corolla-segments oblong, staminodes rather longer, lip small attached above the base of the filament. *Horan. Prodr.* 20. G. multiflora, *Wall. Cat.* 6537 B.

TAVOY, TENASSERIM and PENANG, *Roxburgh*, &c.

Stem 1–2 ft. *Leaves* 5–6 in., oblong, acuminate. *Racemes* sometimes 1 ft.; lower branches spreading, 2–3-fld.; bracts greenish, lanceolate or ovate, not longer than the buds. *Calyx* funnel-shaped, 1½ in. *Corolla* greenish-yellow; tube 3 times the length of the calyx; segments ⅛ in. *Staminodes* linear-oblong; lip not longer than the corolla-segments; anther oblong, spurs linear-subulate, longer than the cells. *Ovary* globose, smooth.—I doubt the specific distinctness of the Javan *G. maculata*, Blume, Enum. i. 63.

SECT. IV. **Marantella,** *Horan.* *Anther* winged on each side by a bifid quadrate membranous process.

20. **G. cernua,** *Baker*; panicle very lax few-fld. cernuous, bracts minute deciduous, bulbils 0, staminodes longer than the corolla-segments, lip placed a little above the base of the filament, anther-wings spreading.

MALAY PENINSULA; Goping, *King's Collector*, 737.

Stem 9–12 in. *Leaves* oblong, caudate, 2–3 in. long, finely pubescent beneath. *Panicle* 1–1½ in.; branches ascending, 1–2-fld. *Calyx* ½ in. *Corolla* pale yellow; segments oblong, ⅛ in.; lip with two spreading lobes at the base. *Ovary* glabrous.

21. **G. pauciflora,** *King mss.*; panicle very lax few-fld., bracts minute deciduous, bulbils 0, corolla-segments oblong, staminodes not longer than the corolla-segments, lip placed a little above the segments, anther-wings spreading.

ANDAMAN ISLANDS, *King's Collector*, 376.

Whole plant ½–1 ft. *Leaves* oblong, caudate, 2–3 in., minutely pubescent beneath. *Panicle* short, erect; lower branches 1 in., ascending, 1–2-fld. *Calyx* glabrous, ⅛ in. *Corolla* pale yellow; segments ⅛ in. *Capsule* glabrous.

22. **G. versicolor,** *Smith Exot. Bot.* t. 117 A, B, C; panicle broad very lax, bracts small deciduous, corolla-segments oblong, staminodes longer lanceolate, lip small placed a little above the segments, anther-wings deflexed. *Horan. Prodr.* 20. G. Hura, *Roxb. in Asiat. Res.* xi. 359; *Fl. Ind.* i. 79. G. expansa, *Wall. Cat.* 6536. Hura siamensium, *Koenig in Retz. Obs.* iii. 49.

MALAY PENINSULA, *Roxburgh*. From PEGU to SINGAPORE, *Roxburgh*, and PENANG. SOUTH ANDAMANS, *Kurz*.

Stem 1–1½ ft. *Leaves* 4–8 in., oblong, caudate. *Panicle* 3–6 in.; rachis and branches very slender, lower 2–3 in., flowering only in the upper half. *Calyx* green, ⅛ in. *Corolla* yellow or tinged with lilac; tube ¼ in.; segments half as long as the tube; filament yellow, ⅛–¼ in.; anther-wings 1, deeply bifid, yellow, quadrate, deflexed. *Capsule* smooth, ¼ in.

23. **G. brachycarpa,** *Baker*; panicle lax, bracts small leafy persistent, lower with solitary bulbils in their axils, staminodes longer than the oblong corolla-segments, lip placed at the base of the filament, anther-wings spreading.

PERAK, alt. 2–3000 ft., *King's Collector*, 2414.

Stem 1 ft. *Leaves* about 5, oblong-caudate, 4–5 in., finely pubescent beneath. *Panicle* ½ ft.; main bracts ¼–½ in.; lower 4–5 bulbilliferous; branches spreading, 5–6-fld. *Calyx* ⅛ in. *Corolla* segments pale yellow; staminodes ⅛ in. *Ovary* rugose.—Very near *G. Schomburgkii*, Hook. f. in Bot. Mag. t. 6298, of Siam.

24. **G. bulbifera**, *Roxb. in Asiat. Res.* xi. 358; *Fl. Ind.* i. 78; spike lax, bracts ovate ascending persistent, lower nodes bearing bulbils, corolla-segments ovate, staminodes rather longer oblong, lip small deeply bifid, anther-wings spreading. *Thw. Enum.* 315. G. marantina, *Wall. Cat.* 6532; *Dalz. & Gibs. Bomb. Fl.* 272; *Blume Enum.* i. 62. G. bracteata, *Herb. Heyne.* G. bracteosa, *Horan. Prodr.* 20. G. marantinoides, *Wight Ic.* sub t. 2001. G. strobilifera, *Zoll. & Moritz. Syst. Verz.* 84; *Miq. Fl. Ind. Bat.* iii. 591.

EASTERN HIMALAYA and TROPICAL INDIA; MALABAR, the MALAY PENINSULA and CEYLON.—DISTRIB. Malay Islands, Timor.

Stem not so stout as in *G. marantina*; leaves smaller and sheaths not so broad. *Spike* 3–4 in.; bracts ½–1 in., green, not touching one another, many of the lower enclosing ovoid bulbils. *Flower* and *stamens* as in *G. marantina*; in both the quadrate yellow deeply bifid anther-wings spread horizontally from the sides of the cells.

25. **G. marantina**, *Linn. Mant.* ii. 170; spike dense, bracts imbricate persistent, lower nodes bulbilliferous, staminodes oblong rather longer than the corolla-segments, lip small deeply bifid, anther-wings spreading. *Rosc. in Trans. Linn. Soc.* viii. 356; *Scit.* t. 111; *Smith Exot. Bot.* ii. 85, t. 103; *Roxb. in Asiat. Res.* xi. 358; *Fl. Ind.* i. 77; *Miq. Fl. Ind. Bat.* iii. 591. Colebrookia bulbifera, *Roxb. in Donn Hort. Cant.* edit. 1.

KHASIA HILLS, *Griffith.*—DISTRIB. Malay Islands, Philippines.

Stem 1 ft. *Leaves* 5–6 in., oblong, acuminate, sheaths broader than in the other species. *Spike* oblong, strobiliform, 1½–2 in.; bracts ½–1 in. broad, ovate, green, bulbils ovoid. *Calyx* short, green, teeth ovate. *Corolla* yellow; tube 3 times the length of the calyx; segments ½ in.; lip as long as the segments; filament ½–¾ in. *Ovary* smooth.

SPECIES IMPERFECTLY KNOWN. (Anthers not seen.)

26. G. CANARENSIS, *Baker*; leaves small thin caudate, panicle narrow erect very few- and lax-fld., most of the flowers replaced by long narrow acuminate bulbils, calyx green narrowly funnel-shaped ⅛ in., corolla-tube more than twice as long as the calyx, corolla-segments oblong ⅛ in.—Canara, *Law.*

27. G. PLATYSTACHYA, *Baker*; leaves large and thin, panicle short lax and very broad, lower branches 2–4 in. ending in a bulbil and bearing numerous close flowers shortly pedicelled towards the end each subtended by a small persistent ovate acutely-keeled bract, calyx green broadly funnel-shaped 1½ in., corolla-tube 3 times the length of the calyx, segments oblong yellow ½–⅝ in.—Canara, *Law.* (Hk. f. & Thoms. Herb. Ind. Or. 14.)

3. HEMIORCHIS, *Kurz.*

Rhizome stout, creeping. *Leafy stem* distinct from the flowering, produced after it. *Flowers* spicate; bracts membranous, deciduous. *Calyx* short, deeply 3-lobed. *Corolla-tube* shorter than the calyx, 3-lobed, lateral lobes oblong, midlobe rather longer, ovate. *Lateral staminodes* like the corolla-lobes, obovate with a short basal spur; lip orbicular, concave; filament short; anther-cells contiguous, connective narrow not produced.

Ovary 1-celled; placentas 3, parietal; style filiform; stigma small, subglobose. *Capsule* small, 1-celled, 3-valved. *Seeds* conical, aril white.

H. burmanica, *Kurz in Journ. Asiat. Soc. Beng.* xlii. pt. ii. 108, t. 8; *Baker in Bot. Mag.* t. 7120.

KHASIA HILLS, *Mann.* PEGU, MARTABAN and TENASSERIM, *Kurz.*

Habit of *Gastrochilus.* *Rhizome* white, hypogœous. *Leaves* few, oblong, acute. *Peduncle* with spike ½–1 ft., very pubescent, as are the rachis and calyx. *Spike* dense upwards; bracts small, lanceolate, deciduous. *Calyx* funnel-shaped, reddish-brown, ¼ in., cleft below the middle. *Corolla-lobes* reddish-brown; staminodes about ½ in., greenish-white; lip whitish, minutely dotted with red-brown; stamen half as long as the corolla-segments. *Capsule* globose, 10-grooved, crowned by the persistent acute calyx-lobes.

4. ROSCOEA, *Smith.*

Root fibres thick, fleshy, fascicled; rootstock 0. *Leaves* lanceolate or oblong. *Flowers* in terminal spikes; bracts persistent, 1-fld. *Calyx* long, tubular, slit down one side. *Corolla-tube* slender, as long as or longer than the calyx; lateral segments spreading; upper broad, cucullate, erect, hiding the staminodes and stamen. *Lateral staminodes* oblanceolate, petaloid, erect; lip large, cuneate, deflexed, 2-fid or emarginate; filament short, erect; anther-cells linear, contiguous, connective produced at the base into a forked appendage. *Ovary* 3-celled, cylindric or oblong; ovules very numerous, superposed; style erect; stigma turbinate, margins ciliate. *Capsule* cylindric or clavate, membranous, tardily 3-valved. *Seeds* ovoid, minute, arillate.—One species in Cochin China, and the following.

1. **R. alpina,** *Royle, Ill.* 361, t 89; stem short, produced leaves 2–3 sessile oblong-lanceolate, spike sessile 1–2-fld., corolla-tube much longer than the calyx, limb dark purple, upper segment orbicular, lip broad deeply bifid. *Wight Ic.* t. 2013; *Horan. Prodr.* 20. R. purpurea, *Royle l. c.* t. 89, f. 3. R. purpurea *var.* minor, *Wall. Cat.* 6528 D, E.

TEMPERATE CENTRAL and WESTERN HIMALAYAS; from KASHMIR to NEPAL, ascending to 11,000 ft.

Whole plant 4–6 in. high. *Leaves* 3–4 in., under and not fully developed at the flowering time. *Calyx-tube* green, 1 in. or more, slit nearly to the base. *Corolla-tube* white, 1 in., longer than the calyx; upper segment orbicular-cuspidate, erect, ½–¾ in. long and broad; lateral ½ in., linear-oblong, deflexed. *Staminode* oblong-spathulate, half as long as the upper segment; fertile stamen as long as the staminode; lip obovate-cuneate, ½–¾ in., bifid about one-third of its length.

2. **R. purpurea,** *Smith Exot. Bot.* ii. 97, t. 108; leafy stem elongate, produced leaves 5–6 lanceolate, flowers few in a sessile spike, corolla-tube not longer than the calyx, limb purple rarely pale lilac or white, upper segment obovate-cuneate, lip broad deeply bifid. *Hook. Exot. Fl.* t. 144; *Bot. Mag.* t. 4630; *Rosc. Scit.* t. 64; *Lodd. Bot. Cal.* t. 1404; *Horan. Prodr.* 20; *Wall. Cat.* 6528 A, B.

CENTRAL and EASTERN HIMALAYA; from Kumaon to Sikkim, ascending to 10,000 ft. ASSAM, the KHASIA HILLS, and BURMA.

Leafy *stem* ½–1 ft. long. *Leaves* 6 by ½–1 in. at flowering time; sheaths broad, imbricated. *Bracts* oblong, hidden in the sheaths of the upper leaves. *Calyx* green, 1½ in., slit deeply down one side as the flower expands. *Corolla-tube* rather dilated upwards; upper segment about 1 in., very cucullate; lower lanceolate, decurved, about as long. *Staminode* oblanceolate unguiculate, half as long as the upper

segment; fertile stamen as long as the staminode; anther-tails ⅛ in.; lip 1–1½ in., deflexed. *Capsule* cylindric, 1–1½ in.—Varies greatly in robustness, breadth of leaves and colour and size of flowers. Var. *R. exilis*, "Smith;" Horan. Prodr. 21, is probably a dwarf narrow-leaved variety.

Var. R PROCERA, *Wall. Pl. As. Rar.* t. 242; *Wall. Cat.* 6528 C.; taller, more robust, with broader leaf-sheaths and larger flowers. R. purpurea, *Lindl. in Bot. Reg.* xxvi. t. 61.—Kumaon, Nepal and Sikkim.

Var. R. BRANDISII, King mss.; leaf-sheaths narrower and perianth-tube longer than in the type.—Khasia Hills.

3. **R. capitata,** *Smith in Trans. Linn. Soc.* xiii. 461; stem elongated, leaves many linear, flowers many in a dense oblong peduncled spike, corolla-tube not longer than the calyx, limb pale blue, upper segment oblong-cuneate, lip narrow emarginate. *Wall. Pl. As. Rar.* t. 255; *Cat.* 6529; *Horan. Prodr.* 20.

NEPAL, *Wallich, Scully.*

Stem ½–1 ft. or longer. *Leaves* erecto-patent, ½–1 ft. by ½ in. *Peduncle* erect, 3–6 in. *Spike* 1½–2 in.; bracts green, lanceolate, 1–1½ in. *Calyx* 1 in., green, minutely 2-toothed, slit deeply down one side. Upper *corolla-segment* ¾ in., arcuate, very concave; lower rather longer, oblanceolate deflexed. *Staminode* nearly as long as the upper segment; lip 1 by ¼ in., oblong-spathulate. *Capsule* 1 in., clavate.

IMPERFECTLY-KNOWN SPECIES.

4. R. LONGIFOLIA, *Baker*; stem short, produced leaves about 6 outer oblong inner 12 in. linear or lanceolate, flowers 1–3 in a sessile spike, calyx-tube slender cylindric 1¼ in., corolla-tube twice as long, limb not seen, capsule shortly pedicelled clavate above an inch long.—SIMLA, on Fagu, *Thomson.*

5. CAUTLEYA, *Royle.*

Characters of *Roscoea*, but flowers yellow, dorsal lobe of the corolla narrow, and capsule dehiscing to the base with recurved lobes exposing the seeds in a columnar mass.—Species, the following.

1. **C. lutea,** *Royle Ill.* 361; spike lax few-fld., leaves sessile lanceolate or oblong-lanceolate, bracts oblong green much shorter than the calyx, seeds black angular exarillate. *Hook. f in Bot. Mag.* t. 6991. Roscoea gracilis, *Smith in Trans. Linn. Soc.* xiii. 460; *Horan. Prodr. Scit.* 21. R. elatior, *Smith l c.*; *Wall. Cat.* 6531 A, B. R. lutea, *Royle Ill.* 361, t. 89, f. 2; *Wight Ic.* t. 2013.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, ascending to 7–8000 ft. KHASIA HILLS, *J. D. H. & T. T.*

Stem 12–18 in., slender. *Leaves* 6–9 by 1–1½ in. at flowering time, usually purple beneath. *Flowers* 6–12 in a lax peduncled spike, rachis red flexuose; bracts ⅓–½ in. *Calyx* red, above ½ in., minutely toothed, slit deeply down one side. *Corolla-tube* slightly exserted; limb bright yellow; upper segment ½–¾ in., lower as long, oblong-cuneate, deflexed. *Staminode* nearly as long as the upper segment, bases minutely spurred on the inner side; lip ¾ in., 2-lobed to below the middle, lobes oblong. *Capsule* ½ in., bright red, globose; valves ovate, reflexed, red inside. *Seeds* black, angled, top flat.

2. **C. Cathcarti,** *Baker*; spike dense many-fld., leaves sessile lanceolate or oblong-lanceolate, bracts green oblong shorter than the calyx, seeds black angular exarillate.

SIKKIM HIMALAYA, alt. 7–8000 ft., *Griffith's Collectors, &c.*

Very near *C. lutea*, but more robust, flowers twice or thrice as many, bracts

larger, calyx longer and lip broader, with crisped margins; capsule and seeds quite similar.

3. **C. spicata,** *Baker*; spike dense many-fld., leaves oblong acuminate sessile or shortly petioled, bracts red as long as the calyx, seeds not angled completely enclosed in a white scariose aril. Roscoea spicata, *Smith in Trans. Linn. Soc.* xiii. 461; *Wall. Cat.* 6530; *Horan. Prodr.* 21.

CENTRAL and EASTERN HIMALAYAS, from Kumaon to Sikkim, ascending to 8500 ft.

Stem 1–2 ft. *Leaves* sometimes 3–4 in. broad, not purple beneath. *Spike* shortly peduncled, 6–9 in.; bracts oblong, bright red, lower 1–1½ in. *Calyx* 1 in., tubular, red; minutely obtusely toothed, finally slit deeply down one side. *Corolla-tube* as long as the calyx, upper segment about 1 in.; lip bright yellow. *Staminodes* nearly as long as the upper segment of the corolla, oblanceolate-oblong. *Capsule* small, red, globose. *Seeds* ⅛ in., black, ovoid or flattened by pressure.

4. **C. robusta,** *Baker*; spike dense many-fld., leaves sessile oblong acute, bracts linear-oblong reddish as long as the calyx, seeds pink not angled enclosed in a red or yellow arillus.

SIKKIM HIMALAYA, alt. 5500–6500 ft., *Clarke.*

Leaves 1 ft. or less by 3 in. or more. *Spikes* peduncled, 6–9 in.; bracts 1 in. *Corolla* not seen. *Capsule* depressed-globose, ½ in. diam. *Seeds* ovoid or compressed, forming a dense mass ½ in. diam., entirely enveloped in the scarious aril.

5. **C. petiolata,** *Baker*; spike dense many-fld., leaves petioled oblong-lanceolate caudate, bracts oblong reddish shorter than the calyx. Roscoea petiolata, *Royle mss.*

GARWHAL HIMALAYA; between Dehra and Landour, alt. 7000 ft., *Royle.*

Stem 1 ft. or more. *Leaves* 6 by 1½–2½ in., shortly petioled, erecto-patent. *Spike* 3–4 in., nearly sessile; bracts oblong, reddish, nearly 1 in. *Calyx* 1 in., reddish, obscurely bidentate, slit deeply down one side. Upper *coralla-segment* and lip pale sulphur-yellow, under 1 in. *Staminode* and stamen nearly as long as the upper segment.—Known only from an unpublished figure of Royle's artist.

6. CURCUMA, *Linn.*

Rootstock tuberous, bearing sessile and long stipitate tubers; stem none. *Leaves* usually oblong, often very large. *Flowers* in dense compound spikes (except in *C. Kunstleri*) crowned by a coma of coloured enlarged bracts; lower bracts ovate, membranous, enclosing several bracteolate fugitive flowers which open in succession. *Calyx* short, cylindric, minutely toothed. *Corolla-tube* funnel-shaped; segments usually ovate or oblong, upper longer and more concave. *Lateral staminodes* oblong, petaloid, connate with the short filament; anther not crested, cells contiguous, spurred at the base; lip orbicular, tip deflexed. *Ovary* 3-celled, many-ovuled; style filiform; stigma 2-lipped, lips ciliate. *Capsule* globose, membranous, finally 3-valved. *Seeds* ovoid or oblong, usually arillate.—India, Siam, Malay Islands and N. Australia.

The species of this genus are very difficult of determination and the characters are taken almost without exception from published or unpublished drawings.—Many of Sect. I. are probably varieties, but this can be determined only by a comparison of living specimens. I have failed in my endeavours to subdivide the species of the several sections.

Sect. I. **Exantha,** *Horan.* *Flower-spike* vernal or æstival, distinct

from the leaves, and usually developed before they appear; peduncle sheathed by scariose bract-leaves.

1. **C. angustifolia,** *Roxb. in Asiat. Res.* xi. 338, t. 3; *Hort. Beng.* 1 *Fl. Ind.* i. 31; dwarf, rootstock small globose, leaves lanceolate plain green shortly petioled, bracts of the coma pink, lobes of the corolla pale yellow. *Royle, Ill.* 357, 359; *Horan. Prodr.* 22. C. longa, *Wall. Cat.* 6605 E, F, G.

Tropical Himalaya; from Kumaon to Nepal, alt. 3–4000 ft. North Oudh.

Rootstock small; tubers many, oblong, at the end of long fibres. *Leaves* with petiole 1–1½ ft.; blade lanceolate, plain green, ½–1 ft. by 2–3 in. *Spike* with peduncle æstival, ½–1 ft., 3–6 by 2 in. diam.; flower-bracts 1 in., green, ovate; pink; bracts of coma few or many. *Corolla-tube* ½ in.; upper segment ovate, lateral shorter, oblong. *Staminode* and lip bright yellow, the latter orbicular-cuneate, emarginate.—Similar plants in flower and not distinguishable in a dried state are found in Upper Burma, alt. 4000 ft., *Collett, Prain,* and in Munnipore, alt. 5000 ft. *Watt.*

2. **C. neilgherrensis,** *Wight Ic.* t. 2006; dwarf, rootstock small, white inside, leaves lanceolate pale green shortly petioled, bracts of coma pink, lobes of corolla pale ovate. *Horan. Prodr.* 22. C. longa, *Wall. Cat.* 6605 C. C. angustifolia, *Dalz. & Gibs. Bomb. Fl.* 274, *not of Roxb.*

Concan; at Ramghaut. Malabar; abundant on the S.W. slope of the Nilghiris, alt. 4500–6000 ft.

Very near *C. angustifolia. Leaf* and petiole together 12 in. or more; blade glabrous beneath, narrowed gradually from the middle to both ends. *Spikes* vernal, 2–4 by 1½–2 in. diam.; flowering bracts pale yellowish green, 1–1½ in. *Flowers* 1 in., bright yellow; lip orbicular, deflexed, emarginate.

3. **C. aromatica,** *Salisb. Parad.* t. 96; *in Trans. Hort. Soc.* i. 285; rootstock large, tubers sessile yellow and aromatic inside, petiole long green, leaves large oblong pubescent beneath, bracts of the coma pink, lobes of corolla pinkish white *Rosc. Scit.* t. 103; *Wight Ic.* t. 2005; *Thw. Enum.* 316; *Horan Prodr.* 23. C. Zedoaria, *Roxb. in Asiat. Res.* 333; *Hort. Beng.* 1; *Fl. Ind.* i. 23; *Wall. Cat.* 6601 A; *Dalz. & Gibs. Bomb. Fl.* 274; *Bot. Mag.* t. 1546; *Grah. Cat. Bomb. Pl.* 209.

Throughout India from the Eastern Himalaya to Ceylon, wild and frequently cultivated.

Rootstock tuberous, biennial, 1 in. diam. *Leaves* 3–4 ft.; petiole as long as the blade, which is 1–2 ft. by 4–8 in., caudate, base deltoid, plain green above or variegated with lighter and darker green, clothed beneath with fine persistent pubescence. *Spike* with peduncle 1 ft., produced from April to June with or before the leaves, the later half as long, 3–4 in. diam.; flower-bracts ovate, pale green, 1½–2 in.; those of the coma larger and more or less tinged with pink. *Flowers* shorter than the bracts. *Corolla-tube* 1 in., upper half funnel-shaped; lateral segments oblong, upper longer ovate, concave. *Staminode* obtuse, as long as the corolla-segments; lip deflexed, orbicular, yellow, obscurely 3-lobed. *Stigma* obscurely 2-lobed.

4. **C. Zedoaria,** *Rosc Scit.* t. 109; rootstock large, sessile tubers pale yellow or whitish inside, petiole long green, leaves large oblong glabrous beneath clouded with purple down the middle, bracts of the coma bright red, lobes of corolla whitish. *Wall. Cat.* 6601 B; *Horan. Prodr.* 23. C. Zerumbet, *Roxb. in Asiat. Res.* xi. 333; *Hort. Beng.* 1; *Fl. Ind.* i. 20; *Coromand. Pl.* t. 101; *Wall. Cat.* 6600 A, B; *Grah. Cat. Pl. Bomb.* 209;

Royle Ill. 859; *Thw. Enum.* 316. C. officinalis, *Salisb. in Trans. Hort. Soc.* i. 285. C. speciosa, *Link Enum.* ii. 3. Amomum Zedoaria, *Berg. Mat. Med.* 41; *Willd. Sp. Plant.* i. 7. A. Zerumbeth, *Kœnig in Retz. Obs.* iii. 55. A. latifolium, *Lamk. Ency.* i. 134.—*Rumph. Amboin.* v. 108; *Rheede. Hort. Malab.* xi. t. 7.

EASTERN HIMALAYA, wild; cultivated throughout India.—DISTRIB. Malay Islands.

Rootstock ovoid, tubers many, some 1 in. diam., sessile, cylindric, and many oblong terminating long fibres. *Leaves* 1–2 ft., oblong, acuminate, narrowed to the base; petiole longer than the blade. *Spikes* vernal, ½ ft. by 3 in. broad; flowering bracts 1½ in., ovate, green, often slightly tinged with red; bracts of the coma many, spreading, bright red. *Flowers* pale yellow, rather shorter than the bracts. *Calyx* whitish, obtusely toothed, scarcely half as long as the corolla-tube. *Corolla-tube* funnel-shaped; lateral segments oblong, upper rather longer, ovate, convex. *Lip* ½ in. broad, orbicular, deflexed, obscurely 3-lobed emarginate. *Capsule* ovoid-trigonous, smooth, dehiscing irregularly. *Seeds* oblong, aril lanceolate white.

5. **C. elata,** *Roxb. Hort. Beng.* 1; *Fl. Ind.* i. 25; rootstock large, sessile tubers pale yellow inside, petiole long green, leaves large oblong plain-green pubescent beneath, bracts of coma bright red, lobes of corolla whitish. *Rosc. Scit.* t. 104; *Wall. Cat.* 6610; *Horan. Prodr.* 23.

BURMA, *Carey.*

Rootstock and numerous sessile tubers large. *Leafy tuft* 6–8 ft.; blade 2–3 by 1 ft. *Spike* vernal, ½ ft. by 3 in. diam.; flowering bracts 1½ in., ovate, green; those of the coma ovate-oblong, larger, spreading. *Flowers* pale yellow, shorter than the bracts; lip obscurely 3-lobed, midlobe broad, emarginate.—Very near *C. Zedoaria.*

6. **C. comosa,** *Roxb. in Asiat. Res.* xi. 336; *Hort. Beng.* 1; *Fl. Ind.* i. 29; rootstock large, sessile tubers few pale yellow inside, petiole long green, leaves large oblong plain green glabrous beneath, bracts of coma bright red, lobes of the corolla pinkish white. *Wall. Cat.* 6609 A; *Horan. Prodr.* 23.

PEGU, *Carey.*

Leafy tuft 5–6 ft.; blade 2–3 ft., plain green except in the earliest leaves, which are clouded with faint brown down the centre. *Spike* vernal, denser and thicker than in *C. Zedoaria*; flower-bracts pinkish white; those of the coma many, bright red, 2–3 in., spreading. *Flowers* pale yellow.—Very near *C. Zedoaria.*

7. **C. ornata,** *Wall. mss. ex Voigt Hort. Suburb. Calc.* 564 (name only); rootstock large, sessile tubers 0, leaves ovate clouded in the centre when young, bracts all white tipped with mauve-purple, lobes of the corolla tinged with red.

PEGU, *Wallich.*

Stalked *tubers* very numerous. *Leafy stem* produced after the flowers. *Leaves* young only seen, perhaps oblong when developed. *Spike* under 1 ft. long, 3–4 in. diam.; bracts all whitish tipped with mauve-purple, the upper more so, 2 in. *Flowers* as long as the bracts; expanded limb ½ in. diam., white tinged with yellow. —Closely allied to *C. comosa.*

8. **C. latifolia,** *Rosc. Scit.* t. 108; very tall, rootstock large, sessile tubers pale yellow inside, petiole long green, leaves large oblong clouded down the middle with purple pubescent beneath, bracts of the coma bright red, lobes of the corolla whitish. *Horan. Prodr.* 23.

BENGAL?, *Carey.*

Very near *C. Zedoaria & aromatica*. *Leafy tuft* 8–12 ft.; blade 3–4 by 1 ft. or more. *Spike* produced vernal, 6–8 in., 3 in. diam.; flower-bracts green, ovate, 1½ in., of the coma many, longer and more oblong. *Flowers* pale yellow, rather shorter than the bracts; lip obscurely emarginate.—Sent by *Carey* from Serampore to the Liverpool Botanical Garden; origin unknown.

9. **C. leucorhiza,** *Roxb. in Asiat. Res.* xi. 337; *Hort. Beng.* 1; *Fl. Ind.* i. 30; rootstock large, sessile tubers nearly white inside, petiole long green, leaves large oblong plain green glabrous beneath, bracts of the coma pink, lobes of the corolla nearly white. *Rosc. Scit.* t. 102; *Wall. Cat.* 6607; *Horan. Prodr.* 22.

BEHAR; jungles south of Bhagulpore, *Glass.*

Very near *C. Zedoaria & aromatica*. *Rootstock* large, ovoid; sessile tubers cylindric, sometimes nearly 1 ft. *Leafy tuft* 3–4 ft.; blade 1–2 ft. by 5–6 in., broad at the middle, plain green and glabrous on both sides. *Spike* vernal; coma nearly as long as the fertile portion; flower-bracts green, obtuse, 1½ in.; bracts of the coma longer, more oblong. *Flowers* pale yellow, rather shorter than the bracts; central lobe of the lip distinctly emarginate.

10. **C. cæsia,** *Roxb. in Asiat. Res.* xi. 334; *Hort. Beng.* 1; *Fl. Ind.* i. 26; rootstock large, sessile tubers pale grey inside, petiole long green, leaves large oblong with a broad purple-brown cloud down the middle, bracts of the coma and corolla-limb red. *Wall. Cat.* 6613; *Horan. Prodr.* 22.

BENGAL, *Roxburgh.*

Rootstock ovoid; sessile tubers longer and not so thick as in *C. æruginosa*. *Leafy tuft* about 3 ft.; blade 1–1½ ft. by 5–6 in., glabrous beneath. *Spike* produced, dense, 5–6 by 2½–3 in. diam.; flower-bracts green, ovate, very obtuse, 1½ in.; bracts of the coma rather longer, many, bright red. *Flowers* pale yellow, rather shorter than the bracts; lip ½ in., broad, obscurely 3-lobed, midlobe emarginate.—"Resembles *C. Zerumbet*, Roxb. (*Zedoaria* supra p. 210), but differs widely in the colour of the root," Roxb.

11. **C. æruginosa,** *Roxb. in Asiat. Res.* xi. 335; *Hort. Beng.* 1; *Fl. Ind.* i. 27; rootstock large, sessile tubers palmate verdigris-green inside, petiole long green, leaves large oblong green faintly tinged with red-brown down the middle, bracts of the coma pink, lobes of the corolla pale red. *Rosc. Scit.* t. 106; *Salisb. in Trans. Hort. Soc.* i. 285; *Wall. Cat.* 6606; *Horan. Prodr.* 22.

BURMA, *Carey.*

Very near *C. Zedoaria*. *Rootstock* ovoid; sessile tubers short, above 1 in. thick, stipitate tubers purely white within. *Leafy tuft* 4–6 ft.; petiole and blade each 2–3 ft., the latter 6–9 in. broad. *Spike* vernal, 6–8 by 2½–3 in. diam.; flower-bracts green, ovate, obtuse, 2 in.; many upper longer oblong, pink. *Flowers* pale yellow, shorter than the bracts; corolla-tube an inch long; lip deflexed, ½ in. broad.

12. **C. amarissima,** *Rosc. Scit. Pl.* t. 101; rootstock large, sessile tubers yellow and very bitter inside, petiole long red-brown, leaves large oblong plain green, bracts of the coma whitish tipped with pink, lobes of the corolla red. *Horan. Prodr.* 23.

BENGAL?, *Carey.*

Rootstock very large, yellow in the centre, æruginose towards the outside. *Leafy tuft* 3 ft.; blade 1–1½ ft. by 5–6 in. *Spike, bracts* and *flowers* as in *C. Zedoaria*.—Sent by *Carey* in 1824 from Serampore to the Liverpool Botanic Garden, probably a native of Bengal.

13. **C. ferruginea,** *Roxb. in Asiat. Res.* xi. 336; *Hort. Beng.* 1; *Fl. Ind.* i. 27; rootstock large, sessile tubers pale yellow and very fragrant inside, petiole long red-brown, leaves large oblong with a faint red-brown cloud down the centre, bracts of the coma bright red, lobes of the corolla red. *Rosc. Scit.* t. 105; *Horan. Prodr.* 23.

BENGAL, *Roxburgh.*

Rootstock ovoid; sessile tubers very stout. *Tuft of leaves* 4–5 ft.; blade 1–1½ by 5–6 in. *Spike* vernal; flowers few, large; fertile bracts tinged with red-brown, those of the coma few bright red; lip above ½ in. diam., obscurely emarginate.

14. **C. rubescens,** *Roxb. in Asiat. Res.* xi. 336; *Hort. Beng.* 1; *Fl. Ind.* i. 28; rootstock large, sessile tubers white inside, petiole long red-brown, leaves large oblong green with a red-brown midrib, bracts of the coma few pale red, limb of the corolla reddish. *Rosc. Scit.* t. 107; *Horan. Prodr.* 23. C. erubescens, *Wall. Cat.* 6608. C. longiflora, *Salisb. in Trans. Hort. Soc.* i. 286. C. rubricaulis, *Link. Enum.* i. 3.

BENGAL, *Roxburgh.*

Rootstock ovoid-cylindric; tubers sessile and many on long fibres. *Leafy tuft* 4–5 ft.; blade dark green, 1–2 ft. by 5–6 in. *Spikes* vernal, produced apart from the leaves, and sometimes also from the centre of the leaves in September, 5–6 in., under 2 in. diam; flower-bracts pale green, 1½ in.; those of the coma few, ovate, pale red. *Flowers* pale yellow, protruding beyond the bracts; lip ½ in. diam., emarginate.

SECT. II. **Mesantha,** *Horan. Flower-spike* autumnal, in the centre of the tuft of leaves; bracts not recurved at the tip.

15. **C. attenuata,** *Wall. Cat.* 6602; rootstock small, petiole long slender, leaves lanceolate, flower bracts small, those of the coma oblong tinged with red, flowers ?

BURMA; banks of the Irrawaddy, *Wallich.*

Rootstock globose; sessile tubers oblong. *Leafy tuft* 2½–3 ft.; petiole as long as the blade, which is firmer in texture than is usual in the genus, quite glabrous, 1–1½ ft. by 1 in., tapering gradually to the base and a long point. *Peduncle* 1 ft., slender, erect; spike dense, 3–4 in. by 1 in. diam.; flower-bracts under 1 in., membranous, very obtuse; bracts of the coma few, 1 in., bright coloured. *Flowers,* withered only seen.

16. **C. plicata,** *Wall. Cat.* 6611; rootstock small, petiole slender long or shorter, leaves firm oblong-lanceolate, flower-bracts green, those of the coma much tinged with red, flowers small pale yellow.

BURMA and PEGU, *Wallich, J. Anderson.*

Rootstock globose; fibres bearing small tubers. *Leafy tuft* 9–18 in.; petiole as long as the blade, which is 6–8 in. by 1½–3 in., firm, tapering gradually to both ends, bright green, with a brown dorsal cloud the centre. *Peduncle* slender, 2–4 in. *Spike* 3–4 in. by 1½ in. diam.; flower-bracts 1 in., pale green, very obtuse; those of the coma few, rather longer and more oblong. *Flowers* rather longer than the bracts. *Corolla* whitish, ½ in. diam.; upper lobe ovate; lip obscurely 3-lobed, midlobe emarginate.

17. **C. Amada,** *Roxb. in Asiat. Res.* xi. 341; *Hort. Beng.* 1; *Fl. Ind.* i. 33; rootstock large, sessile tubers pale yellow inside, petiole long, leaves large oblong-lanceolate, flower-bracts pale green, those of the coma pinkish, flowers pale yellow. *Rosc. Scit.* t. 99; *Royle Ill.* 359; *Grah. Cat. Pl. Bomb.* 209; *Dalz. & Gibs. Bomb. Fl.* 275; *Horan. Prodr.* 23.

BENGAL and the CONCANS; native and widely cultivated, under the name of Mango Ginger.

Rootstock ovoid; sessile tubers thick, cylindric. *Leafy tuft* 2–3 ft.; petiole as long as the blade, which reaches 1–1½ ft. by 6 in. or more in breadth, plain green, tapering gradually to the base and apex. *Peduncle* ½ ft. or more, hidden by the sheathing bases of the leaves. *Spike* autumnal, 3–6 in. by 1½ in. diam.; flower-bracts about 1 in, those of the coma tinged with pink. *Flowers* about as long as the bracts. *Corolla* whitish, lip pale yellow.—Not distinguishable in Herbarium specimens from *C. longa.*

18. **C. longa,** *Linn. Sp. Plant.* 2; rootstock large, sessile tubers bright yellow inside, petiole long, leaves large oblong narrowed to the base, flower-bracts pale green, those of the coma tinged with pink, flowers pale yellow. *Kœnig in Retz. Obs.* iii. 71; *Roxb. in Asiat. Res.* xi. 340; *Hort. Beng.* 1; *Fl. Ind.* i. 32; *Royle Ill.* 358; *Wall. Cat.* 6605 D; *Grah. Cat. Pl. Bomb.* 209; *Lindl. in Bot. Reg.* t. 886; *Bentl. & Trim. Med. Pl.* t. 269; *Horan. Prodr.* 23. Amomum Curcuma, *Jacq. Hort. Vind.* iii. t. 4.—*Rheede Hort. Mal.* xi. t. 11. *Rumph. Amboin.* v. t. 67.

Widely cultivated in BENGAL and other parts of INDIA. Clarke considers it to be indigenous on Parasnath, in Behar, alt. 4–5000 ft., *Clarke.*—DISTRIB. Cultivated through the Tropics.

Rootstock ovoid; sessile tubers thick, cylindric. *Leafy tuft* 4–5 ft.; petiole as long as the plain green blade, which is 1–1½ ft. by 4–8 in. broad. *Peduncle* ½ ft. or more, hidden by the sheathing petiole. *Spikes* autumnal, 4–6 in. by 2 in. diam.; flower-bracts pale green, ovate, 1½ in.; those of the coma pale pink. *Flowers* as long as the bracts, like those of *C. Zedoaria & aromatica* in structure.

19. **C. montana,** *Rosc. in Trans. Linn. Soc.* viii. 355; rootstock large, sessile tubers pale yellow inside, petiole long, leaves oblong narrowed to the base, flower-bracts pale green, those of the coma pink, flowers pale yellow. *Roxb. in Asiat. Res.* xi. 342; *Hort. Beng.* 1; *Corom. Pl.* t. 151; *Fl. Ind.* i. 35; *Griff. Notul.* iii. 415; *Ic. Plant. Asiat.* t. 352, fig. 1; *Horan. Prodr.* 23. C. pseudo-montana, *Grah. Cat. Pl. Bomb.* 210; *Dalz. & Gibs. Bomb. Fl.* 275; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* ii. 144.

CONCAN and the CIRCARS, *Roxburgh,* &c.

Rootstock ovoid, perennial. *Leafy tuft* 2–3 ft.; blade 1 ft. or more by 6–8 in., plain green, narrowed to the base; petiole green, deeply channelled, as long as the blade. *Peduncle* shorter than the petiole. *Spike* autumnal, ½ ft. by 2 in. diam.; flower-bracts ovate, 1½ in. *Flowers* about as long as the bracts. *Corolla*-segments subequal, lip longer, deflexed, obscurely 3-lobed.—C. Kuchoor, *Royle Ill.* 359 (name only), which is cultivated on the hills above the Dehra Doon, is said to be nearly allied. A flowerless specimen from Mussoorie, sent by Mr. Duthie, furnishes no distinctive characters.

20. **C. Kuntsleri,** *Baker*; petiole long, leaves oblong narrowed to the base, bracts very broad all pale green, coma 0, flowers yellow.

PEGU, *Kunstler* (*Hort. Calcutt.* 1882).

Rootstock not seen. *Leaf-blade* under 1 ft., 4–6 in. broad, acute, green above, tinged with purple beneath, petiole 5–6 in., robust, deeply channelled. *Peduncle* very short; spike short, 2 in. diam., without any coma of coloured bracts; flower-bracts 1½ in. long and broad. *Corolla*-tube as long as the bract; segments lanceolate, ½ in.; lip obovate-cuneate, rather longer than the corolla-segments, yellow throughout, emarginate.—Near *C. montana.*

21. **C. reclinata,** *Roxb. in Asiat. Res.* xi. 342; *Hort. Beng.* 1; *Fl. Ind.* i. 36; rootstock small, sessile tubers 0, petiole short, leaves thin oblong

obtuse, flower-bracts green tinged with red, those of the coma reddish, flowers reddish-yellow. *Horan. Prodr.* 24.

CENTRAL INDIA, *Colebrooke.*

Rootstock oblong, bearing many subglobose tubers at the end of fibres. *Leaves* plain green, obtuse, rounded at base, 6–8 by 3–4 in.; petiole shorter than the blade. *Peduncle* very short. *Spike* autumnal, oblong, 3–4 by 2 in. diam.; bracts 1 in.; those of the coma oblong, ascending, similar to flower-bracts in colour. *Flowers* small, dull red, except the yellow orbicular emarginate lip.

22. **C. decipiens,** *Dalz. in Kew Journ.* ii. (1850), 144; rootstock small, sessile tubers 0, petiole short, leaves thin cordate-ovate cuspidate, bracts and flowers purple. *Dalz. & Gibs. Bomb. Fl.* 274; *Horan. Prodr.* 23.

The CONCAN, *Dalzell, Law.*

Rootstock bearing numerous small almond-like tubers at the end of fibres. *Leaves* thin, 6–8 in. by 3–4., base rounded tip, deltoid with a small cusp; petiole as long as the blade. *Spikes* æstival, earlier lateral, later central, 4–6 by 1½–2 in.; peduncle short; lower bracts ovate, 1 in.; many upper sterile, longer, oblong; flower shorter than the bract; lip bifid, margins curled.

23. **C. albiflora,** *Thw. Enum.* 316; rootstock small, sessile tubers 0, petiole short, leaves small oblong rounded at the base, flower-bracts green all fertile, flowers white with a yellow spot on the lip. *Hook. f. in Bot. Mag.* t. 5909.

CEYLON; Maskellia, in the Ambagamowa district, at a low elevation.

Rootstock bearing a few small tubers at the end of fibres. *Leaves* bright green, 6–8 by 2½–3 in., acute, base rounded or cordate; petiole deeply channelled, as long as or rather longer than the blade. *Peduncle* very short; spike oblong, 3–4 in.; lower bracts 2 in., oblong-lanceolate, acuminate, upper shorter, ovate. *Flowers* 1 in. long. *Corolla*-lobes oblong. *Staminode* broad; lip ¾ in. broad, shallow, emarginate, pure white, with a yellow spot at the throat.

24. **C. oligantha,** *Trimen in Journ. Bot.* 1885, 245; rootstock small, sessile tubers 0, petiole short, leaves small ovate narrowed to the base, flower-bracts green all fertile, flowers white with a yellow spot on the lip.

CEYLON; Central Province, near the Mahaweli river, *Trimen.*

Near *C. albiflora. Leaves* 5–7 in., thin, bright light transparent green, with distinct veins and transverse veinlets. *Peduncle* short, slender; spike 4–6 in.; bracts green, appressed, acuminate; flowers few, erect, large for the genus. *Corolla*-tube 1 in.; segments long, pinkish. *Staminode* subacute, crisped, pure white; lip broad, deeply bifid, with a yellow stain at the throat. *Seeds* oblong, grey, shining, exarillate.

SECT. III. **Hitcheniopsis,** *Baker.* *Spike* autumnal, from the centre of the tuft of leaves; bracts very obtuse, adnate at the sides and spreading at the tip.

25. **C. parviflora,** *Wall. Pl. Asiat. Rar.* i. 47, t. 57; rootstock small, leaves small oblong rounded to the base, fertile bracts green, those of the coma greenish-white, lip violet. *Horan. Prodr.* 24.

BURMA; banks of the Irrawaddy, near Prome, *Wallich.*

Rootstock oblong, fibres bearing a few small fusiform tubers. *Leaves* about six to a tuft; petiole 4–8 in.; blade green, cuspidate, ½ ft. by 2–3 in., veins darker green. *Peduncle* short, slender, hidden by the clasping petioles; spike oblong, 2 in. by 1 in. diam.; flower-bracts ¾–1 in., very obtuse, tips spreading. *Flowers*

as long as the bracts. *Corolla*-segments small, ovate; staminodia oblong, white, as long as the corolla-segments; lip longer, obovate-cuneate, obscurely emarginate.

26. **C. strobilifera,** *Wall. Cat.* 6599; rootstock small, leaves small oblong, bracts all green, flowers pale yellow. C. strobilina, *Wall. mss.*; *Grah. Cat. Pl. Bomb.* 210.

Pegu; near Rangoon, *Wallich.*

Rootstock bearing a few globose sessile tubers. *Leaves* about six to a tuft; petiole green, deeply channelled, 6–8 in.; leaves 6–8 by 2½–3 in., bright green, acute, base rather rounded, darker green along the veins. *Peduncle* much shorter than the petioles; spike oblong, 3–4 in. by 2 in. diam.; bracts all similar, green, very obtuse, spreading at the tip. *Flowers* about as long as the bracts. *Corolla*-segments small, whitish; lip short, deflexed, orbicular, distinctly emarginate.

27. **C. grandiflora,** *Wall. ex Voigt Hort. Suburb. Calc.* 565 (*name only*); rootstock small, leaves small oblong acute, bracts all pale green, flowers pale yellow.

Malay Peninsula, *Wallich.*

Rootstock oblong; fibres not bearing tubers. *Leaves* 6–8 to a tuft; petiole deeply channelled, 6–10 in.; blade 6–8 by 3–4 in., cuspidate, base rounded, darker green along the veins. *Peduncle* much shorter than the petioles. *Spike* oblong, 3–4 in.; bracts all similar, very obtuse, spreading at the tip. *Flowers* rather longer than the bracts. *Corolla-segments* ovate or oblong; staminode short and broad; lip ¾ in., broad, obscurely emarginate, both primrose-yellow.

28. **C. petiolata,** *Roxb. Fl. Ind.* i. 37; rootstock small, leaves oblong base rounded, flower-bracts green, those of the coma purple or lilac, flowers yellowish-white. *Rosc. Scit.* t. 100; *Horan. Prodr.* 23; *Hook. f. in Bot. Mag.* t. 5821. C. cordata, *Wall Pl. Asiat. Rar.* i. 8, t. 10; *Cat.* 6598; *Horan. Prodr.* 23; *Hook. Bot. Mag.* t. 4435. C. cordifolia, *Roxb. Hort. Beng.* 1.

Burma, Pegu, and Tenasserim, *Roxburgh*, &c.

Rootstock with a few sessile tubers, pale yellow inside, and many at the end of fusiform fibres. *Leaves* 4–6 to a tuft; petiole ½–1 ft.; blade 6–9 in., thin, cuspidate. *Peduncle* much shorter than the petioles; spike ½ ft. by 2 in. diam.; flower-bracts 1½ in, very obtuse, spreading at the tip; those of the coma similar in size and shape, but brightly coloured. *Flowers* nearly as long as the bracts. *Corolla*-tube nearly an inch long; upper segment convex, cuspidate; lip suborbicular, deflexed, emarginate.

29. **C. Roscoeana,** *Wall. Pl. Asiat. Rar.* i. 8, t. 9; *Cat.* 6597; rootstock small, leaves oblong rounded at the base, bracts of the flowers and coma both bright red, flowers yellowish white. *Hook. in Bot. Mag.* t. 4667; *Lem. Jard. Fleur.* t. 327; *Horan. Prodr.* 24. C. coccinea, *Wall. mss.* Hitchenia Roscoeana, *Benth. in Gen. Plant.* iii. 643.

Burma and Pegu, *Wallich.*

Roostock without sessile tubers, but with many small ones at the end of the fibres. *Leaves* 6–8 to a tuft; petioles ½–1½ ft.; blade 6–12 in., cuspidate, bright green, darker along the veins. *Peduncle* short, hidden by the sheathing petioles; spike 6–8 in., by 2–3 in. diam.; bracts very obtuse, adnate at the sides and spreading at the tip; those of the coma similar in size, shape and colour to the lower ones. *Flowers* about as long as the bracts. *Corolla* ½ in. diam., segments oblong, subequal; limb ½ in. diam.; staminodes oblong; lip orbicular, entire.

IMPERFECTLY KNOWN SPECIES.

C. Kurzii, *King mss.*; nearly allied to *C. petiolata*, but leaves larger, petioles longer, scape longer, bracts more imbricating, and their tips less spreading.—S. Andaman Islds.

7. GASTROCHILUS, *Wall.*

Perennial, rarely annual; rootstock 0 or creeping; root-fibres cylindric or slender. *Leafy stem* absent or present. *Leaves* oblong, acute. *Flowers* solitary or spicate, often secund. *Calyx* short, spathaceous. *Corolla*-tube slender; segments equal, connivent, linear-oblong, ascending; lateral staminodes petaloid, broader than the corolla lobes, oblanceolate-oblong; filament very short; anther-cells parallel, connective neither crested nor spurred; lip oblong, longer than the corolla-segments, entire. *Ovary* oblong, 3-celled; ovules few, or many, superposed; style filiform; stigma subglobose. *Capsule* oblong. *Seeds* ovoid, aril small basal.—India and one other species from China.

1. **G. longiflora,** *Wall. Plant. Asiat. Rar.* i. 22, t. 25; *Cat.* 6589; perennial, stemless, leaves large long-petioled often cordate, flowers 1–2 in radical spikes, corolla-tube much longer than the bracts, staminodes white rather longer than the white corolla-segments. *Hook. in Bot. Mag.* t. 4010; *Horan. Prodr* 22. Alpinia Hamiltoniana, *Wall. Cat.* 6579. Banglium sulphureum, *Ham. mss.*

SIKKIM HIMALAYA, KHASIA HILLS, ASSAM, and from PEGU and UPPER BURMA to MALACCA.

Root-fibres tufted, cylindric. *Leaves* about 4 in a tuft; petiole long, erect, channelled; blade ½–1 ft. or more, base cordate or cuneate, often tinged purple beneath. *Scape* radical; bracts about 2 in., many, imbricate, scarious, oblong-lanceolate. *Calyx* much shorter than the bract. *Corolla*-tube 2–3 in., very slender; segments ½–1 in. *Stamen* rather shorter than the corolla-segments; lip half as long again as the corolla-segments, oblong-cuneate, sometimes 1 in. broad, more or less tinged with red and crisped on the incurved margins.—Perhaps more than one species is included. The Bot. Mag. plant is *G. Jenkinsii*, Wall. mss. and has larger flowers than that figured by Wallich, of a purer white, the lip tipped with bright red. *G. speciosa*, Kurz mss. has still larger flowers of a dull sulphur yellow, with the sides of the lip clouded with purple.

2. **G. minor,** *King mss.*; perennial, stemless, leaves oblanceolate-oblong long-petioled, corolla-tube not longer than the bract, staminodes and lip scarcely longer than the corolla-segments.

PERAK, *King's Collector.*

Rootstock slender, widely creeping. *Leaves* 1–4 in a tuft; petiole 3–4 in.; blade 4–5 in., glabrous, moderately firm, narrowed to the base. *Flowers* several in a sessile spike; bracts 2 in., lanceolate, membranous. *Corolla*-tube slender to the apex; segments 1 in., oblong, whitish; lip oblong, marked with red and yellow, with a decurved tip and incurved margins.

3. **G. pulcherrima,** *Wall. Pl. Asiat. Rar.* i. 22, t. 24; perennial, leafy stem usually produced, leaves sessile or shortly petioled, flowers many in terminal spikes with imbricate bracts, corolla-tube not longer than the bract, staminodes white not longer than the white corolla-segments. *Paxt. Mag. Bot.* vii. 75, *with fig.*; *Bot. Mag.* t. 3930; *Horan. Prodr.* 22.

PEGU, *Wallich*; TAVOY, *Gomez*; TENASSERIM, *Helfer, Lobb, Parish*; PENANG, *Maingay.*

Rootstock creeping; root-fibres thick, fleshy. *Stem* 6–12 in., rarely 0. *Leaves* 4–6 in., oblong, caudate. *Spike* sessile, 2–3 in.; bracts oblong-lanceolate, green, about 1½ in. *Calyx* spathaceous, rather shorter than the bract. *Corolla*-segments linear-oblong, ½ in. *Stamen* shorter than the corolla-segments; lip 1 in., obovate-cuneate, white tinged with pink.

4. **G. tillandsioides,** *Baker*; perennial, stem 0, leaves distinctly petioled, flowers many in a long subsessile spike with imbricate bracts, staminodes linear-oblong not longer than the corolla-segments.

?Perak; *Kunstler.*

Leaves 6–8 in., oblong, subacute, base rounded, green above, purplish beneath, petiole nearly or quite as long as the blade. *Spike* 6 in.; bracts 20–30, oblong, about 1 in. *Staminodes* ½–⅔ in., whitish, similar to the corolla-segments in shape and size; lip orbicular-cuneate, ⅓ in. long and broad, pure white with a faint yellow spot at the throat; stamen half as long as the lip; filament as long as the anther.—Described from a specimen cultivated *in Hort. Calcutt.*

5. **G. rubrolutea,** *Baker*; perennial, leafy stem produced, leaves oblong caudate sessile or shortly petioled, flowers many, spike very narrow terminal on the stem or on a radical scape, corolla-tube not longer than the bract, staminodes yellow rather longer than the red corolla-segments.

Khasia Hills; *J. D. H. & T. T., Clarke.*

Leafy stem ½–1 ft. or more. *Leaves* 6–8 in. narrowed to the base. *Spike* 2–3 in., as long as its peduncle or scape, much narrower and fewer flowered than in *G. pulcherrima*; bracts few, small, closely sheathing the scape. *Corolla*-segments 1 in.; staminodes yellow, ½ in. broad; stamen nearly as long as the staminodes; lip oblong-cuneate, panduriform, upper half red, lower yellow.

6. **G. parvula,** *Wall. Cat.* 6590; annual, stem short, leaves small shortly petioled oblong, flowers solitary from the centre of the leaves, corolla-tube not longer than the bract, staminodes longer than the corolla-segments.

Tavoy, *Gomez.*

A dwarf annual, with 3–4 acute membranous leaves 1½–2 in. long at the top of a short stem. *Root-fibres* all slender. *Bract* green, under 1 in., wrapped tightly round the corolla-tube, its base hidden by the sheath of the uppermost leaf. *Corolla*-segments linear-oblong, greenish, ¼ in.; lip ½ in., obovate-cuneate; stamen arcuate half as long as the lip. Habit of a *Kæmpferia* of the *Sincorus* section.

IMPERFECTLY KNOWN AND UNDESCRIBED SPECIES.

G. ? tiliæfolia, *Baker*; annual, root-fibres slender fascicled, leafy stem short, leaves 4–5 by 3 in. distinctly petioled ovate cuspidate, base oblique, spike 4–5 in., terminal, sessile dense-fld., bracts 1–1½ in., oblong-lanceolate scariose imbricate, corolla-tube as long as the bract, segments lanceolate under an inch, staminodes not longer than the segments, lip oblong-cuneate 1½ in.—Khasia Hills, tropical region, *Hk. f. & Thomson* (Monolophus 6, *Herb. Ind. Or.*). I have not been able to make out the structure of the anther.

G. affinis, *Wall. mss. ex. Voigt Hort. Suburb. Calcutt.* 372; *Horan. Prodr.* 22).—Assam.

G. Jenkinsii, *Wall. mss. l. c.*—Assam. (See under *G. longiflora.*)

8. KÆMPFERIA, *Linn.*

Rootstock often tuberous, fibres various. *Stem* short or 0. *Leaves* few. *Flowers* spicate, on radical scapes, or terminating a leafy stem. *Calyx* short, cylindric, splitting down one side. *Corolla*-tube long, slender; segments equal, usually spreading. *Staminodes* broad, petaloid; stamen short, arcuate; anther-cells separated on a broad connective, which is produced above into a petaloid crest, not spurred below; lip broad, usually bifid. *Ovary* 3-celled; style long, filiform; stigma turbinate. *Capsule* oblong; pericarp thin. *Seeds* subglobose, aril small lacerate.—Tropics of the Old World.

SUBGEN. I. **Sincorus,** *Horan.* Stemless. *Leaves* contemporary with the flowers. *Spikes* central, radical. *Lip* usually bifid.

* *Anther crest 2-lobed, 2-fid, or toothed.*

1. **K. Galanga,** *Linn. Sp. Pl.* 3; *Hort. Cliff.* t. 3; leaves suborbicular subsessile, corolla-segments lanceolate, staminodes obovate-cuneate white, lip white with a lilac throat deeply bifid, anther-crest quadrate, lobes two rounded. *Rosc. in Trans. Linn. Soc.* viii. 351; *Scit. Pl.* t. 92; *Roxb. in Asiat. Res.* xi. 327; *Hort. Beng.* 1; *Fl. Ind.* i. 15; *Wall. Cat.* 6581; *Wight. Ic.* t. 899; *Grah. Cat. Pl. Bomb.* 208; *Dalz. & Gibs. Bomb. Fl.* 274; *Horan. Prodr.* 21. K. sessilis, *Kœnig in Retz. Obs.* iii. 67. K. humilis, *Salisb. Prodr.* 6. K. plantaginifolia, *Salisb. in Trans. Hort. Soc.* i. 286. Alpinia sessilis, *Kœnig in Retz. Obs.* iii. 62.—*Rumph. Amboin.* v. t. 69, fig. 2. *Rheede Malab.* xi. t. 41.

In the plains throughout BRITISH INDIA.—DISTRIB. Malay isles.

Rootstock tuberous; root-fibres cylindric. *Leaves* 3–6 in. long, spreading flat on the ground, tip deltoid, thin, deep green, 10–12-ribbed, margin not thickened nor coloured; petiole short, channelled. *Flowers* 6–12, fugitive, sweet-scented, opening successively; bracts lanceolate, green, small. *Calyx* as long as the bract. *Corolla*-tube 1 in.; segments ½ in.; staminodes ½ in. long and broad; lip 1 in. broad, bifid below the middle, lobes obtuse; anther-crest small, with two shallow obtuse lobes.

Var. K. LATIFOLIA, *Donn. Hort. Cant.* ed. vi. p. 3; lip spotted at the throat with brown. K. Galanga, *Willd., Enum.* i. 3; *Bot. Mag.* t. 850.

2. **K. marginata,** *Carey in Rosc. Scit. Pl.* t. 93; leaves orbicular subsessile edged with brown, corolla-segments lanceolate, staminodes lilac obovate, lip lilac cut deeply into two orbicular lobes, anther crest bifid. *Horan. Prodr.* 21.

BURMA, *Carey*; TENASSERIM, *Parish.*

Root-fibres oblong. *Leaves* spread flat on the ground, 4–6 in. long and broad, firmer in texture than in *K. Galanga*, tinged reddish-brown beneath, and with a distinct brown margin. *Flowers* few in a sessile central cluster; bracts and calyx under 1 in. *Corolla*-tube 1 in.; segments as long, white. *Staminodes* as long as the corolla-segments; lip 1 in., lobes ½ in. broad, overlapping; anther-crest deeply bifid, lobes bidentate.—Nearly allied to *K. Galanga*. An allied plant with purple flowers sent by Dr. King from Quedah in the Malay Peninsula, is probably a distinct species.

3. **K. angustifolia,** *Roscoe in Trans. Linn. Soc.* viii. 351; *Scit. Pl.* t. 94; leaves ascending lanceolate, corolla-segments long linear, staminodes oblong white, lip lilac deeply cut into two obovate lobes, anther-crest bifid. *Roxb. in Asiat. Res.* xi. 328; *Hort. Beng.* 1; *Fl. Ind.* i. 17; *Red. Lil.* t. 389; *Horan. Prodr.* 21. K. Roxburghiana, *Schult. Mant.* i. 33. K. undulata, *Link.*; *Teysm.* and *Binnen. in Miq. Fl. Ind. Bat.* iii. 598.

Foot of the EASTERN HIMALAYAS. BENGAL, *Roxburgh.*—DISTRIB. Malay isles.

Rootstock tuberous; root-fibres slender or cylindric. *Leaves* many, 6–8 by 1 in. or less, sessile, ascending, lanceolate. *Flowers* few in a central sessile spike; bracts small. *Calyx* 1 in. *Corolla*-tube white, twice as long as the calyx; segments 1 in., very narrow, white, reflexing; staminodes erect, ½–¾ in.; lip reflexed, ½ by ¾ in., bifid about halfway down; lobes suborbicular; anther-crest quadrate, shallowly bifid.

4. **K. ovalifolia,** *Roxb. Hort. Beng.* 1; *Fl. Ind.* i. 19; *Corom. Pl.* t. 278; leaves oblong distinctly petioled, spike sessile, corolla-segments

large linear, staminodes oblong white, lip lilac deeply cut into two obovate emarginate lobes, anther-crest 3–4-dentate, *Rosc. Scit. Pl.* t. 95; *Wall. Cat.* 6583; *Horan. Prodr.* 21. K. diversifolia, *Link. in Dietr. Sp. Plant.* i. 57; *Horan. Prodr.* l. c. K. Parishii, *Hook. f. in Bot. Mag.* t. 5763.—Trilophus, *Lestib. in Ann. Sc. Nat.* ser. ii. xv. 341.

TENASSERIM, *Parish*; MALACCA, *Farquhar.*—DISTRIB. Siam.

Rootstock tuberous; root-fibres cylindric or oblong at the tip. *Leaves* 6 by 4 in., spreading, thin, pale green, acute; channelled petiole in the wild plant 2–3 in., sometimes 6 in. in the cultivated. *Spike* few-fld., sometimes produced before the leaves; bracts imbricate, 1–2 in., pale green striped with brown. *Corolla*-tube 1½–2 in. long; segments narrow, 1½ in.; staminodes erect, 1 by ½ in.; lobes of lip short and broad, imbricate, bright lilac; anther-crest large, quadrate, usually trifid.—Connects the sections *Sincorus* and *Protanthium*, and is included by Horaninov in both, under different names.

5. **K. speciosa,** *Baker*; leaves suborbicular erect shortly petioled, flowers in a sessile head large pure white, corolla-tube very long, segments ovate, staminodes large obovate, lip patent broader than long bifid.

BURMA (*Ic. in Hort. Calcut.*)

Petiole 2–3 in.; blade 5–6 in. long and broad, plain green or variegated deeper and paler green. *Corolla*-tube 3 in.; segments nearly 1 in.; staminodes and lip 1 in., the expanded limb being 2 in. diam.

6. **K. pandurata,** *Roxb. in Asiat. Res.* xi. 328, t. 2; *Hort. Beng.* 1; *Fl. Ind.* i. 18; leaves oblong petioled large erect, corolla-segments ascending, staminodes oblong as long as the corolla-segments white, lip oblong-cuneate twice as long as the staminodes entire, anther-crest quadrate bifid. *Rosc. Scit. Pl.* t. 96; *Bot. Reg.* t. 173; *Wall. Cat.* 6586; *Grah. Cat. Pl. Bomb.* 208; *Dalz. & Gibs. Bomb. Fl. Suppl.* 87; *Thw. Enum.* 316; *Horan. Prodr.* 21. K. ovata, *Rosc. in Trans. Linn. Soc.* viii. 351. Curcuma rotunda, *Linn. Sp.* 2.—*Rheede, Hort. Mal.* xi. t. 10; *Rumph. Amboin.* v. t. 69, fig. 2.

CONCAN and GUZERAT, *Graham.* SOUTH ANDAMAN ISLD., *Kurz.* TENASSERIM, *Helfer.* CEYLON, *Thwaites.*—DISTRIB. Malay Islds.

Rootstock perennial, tuberous, bright yellow; root-fibres cylindric. *Leaves* 9–12 in., acute, narrowed to the base; petiole long, channelled. *Spike* peduncled, hidden in the dilated bases of the petioles; bracts oblong or lanceolate, moderately firm, 1½–2 in. *Calyx* shorter than the bracts. *Corolla*-tube 2–2½ in.; segments whitish, above ½ in.; lip 1 in., white, tinged with red, margins incurved; anther-crest small.—Resembles *Gastrochilus* in the shape of the flower, especially *G. longiflora*, but the anther is crested. Cultivated for its ginger-like rootstock.

7. **K. Prainiana,** *King mss.*; leaves oblong-lanceolate erect, petiole as long as the blade, corolla-segments oblong ascending, lip oblong-cuneate much longer than the corolla-segments.

MALAY PENINSULA; Goping, *King's Collector.*

Rootstock small. *Leaves* about 4 in a tuft; petiole 6 in.; blade 8–9 by 2–2½ in., moderately firm, glabrous, narrowed to the base. *Flowers* in a sessile cylindric spike 6 in. long; bracts many, oblong, imbricate, membranous. *Corolla* whitish; tube 1 in., slender, segments under ½ in., lip the same, but much smaller.—Nearly allied to *K. pandurata.*

** *Anther-crest entire.*

8. **K. Roscoeana,** *Wall. in Bot. Reg.* t. 1212; leaves orbicular subsessile variegated black and green; flower entirely white; corolla-segments

short lanceolate; staminodes obovate, lip deeply cut into two obovate lobes, anther-crest ovate entire. *Hook. in Bot. Mag.* t. 5600; *Horan. Prodr.* 21. K. Roscoei, *Wall. Cat.* 6584.

BURMA, *Wallich* (not NEPAL, as stated by Horaninov).

Root-fibres many, fascicled, cylindric. *Leaves* 2, spreading flat on the ground, obscurely cuspidate, 4–5 in., firmer in texture than in *K. Galanga*, margins pale, obscurely crisped. *Flowers* few, in a sessile central tuft; bracts and calyx under 1 in. *Corolla*-tube 1–1½ in.; segments ½ in.; staminodes ½ in. long and nearly as broad; lobes of the lip similar in shape and size; crest of the anther small and not at all lobed.—Nearly allied to *K. Galanga*.

9. **K. parviflora,** *Wall. Cat.* 6587; leaves subsessile ovate, corolla-segments short linear-oblong, staminodes narrow, lip lilac obovate-cuneate emarginate, anther-crest orbicular entire.

BURMA; banks of the River Attran, *Wallich*.

Root-fibres slender. *Leaves* thin, ovate, 3–4 in. long, rounded at the base, plain green; petiole short, channelled. *Flowers* few in a sessile central tuft; bracts 1 in., lanceolate, green. *Calyx* not longer than the bract, *Corolla*-tube 1¼ in.; segments greenish, ½ in., upper ascending, rather concave. *Lip* ½ by ½ in., subemarginate; anther-crest obtuse, as broad as long.—The flower resembles that of a *Gastrochilus*, but the anther is crested.

10. **K. involucrata,** *King mss.*; leaves oblanceolate-oblong long-petioled erect, flowers several in a head surrounded by large oblong green bracts, corolla-segments ascending, staminodes rather longer than the corolla-segments, lip orbicular bifid twice as long as the corolla-segments, anther-crest orbicular entire.

SIKKIM HIMALAYA, *Jaffray*. ASSAM, *Jenkins*.

Stemless. *Petiole* 5–6 in.; blade 6–7 by 1½–2 in., green, membranous, narrowed gradually to the base. *Peduncle* 1–4 in.; outer bracts membranous, 1½–2 in., inner small lanceolate. *Corolla*-tube 1½ in.; segments small, oblong, whitish. *Staminodes* crested, oblong, white, ⅓–½ in.; lip ½ in. long and broad, white with a yellow blotch in the centre.

11. **K. Andersoni,** *Baker*; leaves oblong acute shortly petioled ascending, flowers several in a head surrounded by large oblong green bracts, staminodes small obovate, lip orbicular emarginate, anther-crest orbicular entire.

BURMA, *T. Anderson* (*in Hort. Bot. Calc.*).

Petiole 1–2 in.; blade 3–4 in., light green, not mottled, narrowed to the base. *Peduncle* 0; bracts 1½–2 in. *Corolla*-tube shorter than the bracts; segments small, ovate; lip above ½ in. long and broad, pure white with a yellow spot at the throat.—Nearly allied to *K. involucrata*.

12. **K. concinna,** *Baker*; leaves oblong-lanceolate long-petioled ascending, spikes oblong shortly peduncled, corolla-tube rather longer than the bract, flower white blotched with red, lip oblong margins incurved, anther-crest small entire.

PERAK, alt. 4–600 ft., *King's Collector*.

Rootstock very slender. *Leaf-blade* subcoriaceous, glabrous, 6–8 by 2 in.; petiole slender, 9–12 in. *Spikes* many-fld.; bracts 1 in., ovate-lanceolate, reddish. *Calyx* very short. *Corolla*-tube very slender, gradually dilated to the throat; segments oblong, ½ in.—Habit of *K. pandurata*.

Subgen. II. **Protanthium,** *Horan.* Stemless. *Leaves* not produced till after the flowers. *Spikes* radical. *Lip* and *anther-crest* bifid.

13. **K. rotunda,** *Linn. Sp.* 3; leaves oblong erect petioled, corolla-segments long linear, staminodes oblong acute white, lip lilac or reddish deeply cut into two suborbicular lobes, anther-crest deeply bifid. *Roxb. in Asiat. Res.* xi. 327; *Hort. Beng.* 1; *Fl. Ind.* i. 16; *Rosc. Scit. Pl.* t. 97; *Bot. Mag.* t. 920 and 6054; *Wight Ic.* t. 2029; *Grah. Cat. Pl. Bomb.* 208; *Dalz. & Gibs. Bomb. Fl., Suppl.* 86; *Thw. Enum.* 316. K. longa, *Jacq. Hort. Schoenb.* t. 317; *Red. Lil.* t. 49. K. versicolor, *Salisb. in Trans. Hort. Soc.* i. 286.—*Rheede Hort. Mal.* xi. t. 9.

Throughout INDIA from the HIMALAYAS to CEYLON and the MALAY PENINSULA, often cultivated.—DISTRIB. Malay Islands.

Rootstock tuberous; root-fibres many, very thick. *Leaves* erect, petiole short channelled; blade 12 by 3–4 in., usually variegated with darker and lighter green above and tinged purple beneath. *Spikes* 4–6-fld., produced in March and April before the leaves; bracts oblong, acute, outer short, the inner 2–3 in. long. *Calyx* nearly as long as the corolla-tube, minutely toothed, slit down one side. *Corolla*-tube 2–3 in., segments spreading, nearly as long as the tube. *Staminodes* 1½–2 in.; lip rather shorter, reflexed, 2-lobed to below the middle lobes ¾–1 in. broad, deeply tinged with lilac or red-purple; anther-crest cut half way down into two lanceolate lobes, with often a small tooth between them.

14. **K. candida,** *Wall. Pl. Asiat. Rar.* i. 47, t. 56; *Cat.* 6585; flowers white, corolla-segments lanceolate, staminodes obovate obtuse, lip orbicular-cuneate shallowly bifid, anther-crest bifid.

BURMA, *Wallich*, &c; Shan Hills, 3000 ft., *Collett.*

Rootstock tuberous; root-fibres slender, with large tubers at the end. *Leaves* not known. *Spikes* 6–8-fld.; bracts broader than in *K. rotunda*, inner 2–3 in. long. *Calyx* 1 in., minutely toothed. *Corolla*-tube twice as long as the calyx; segments 1 in. or less; staminodes 1½ by 1 in., erect, pure white; lip reflexed, 1½ in. long and broad, tinged yellow in the centre; anther-crest much smaller than in *K. rotunda.*

Subgen. III. **Monolophus,** *Wall.* (gen). *Leafy stem* usually produced. *Leaves* contemporary with the flowers. *Spikes* terminal on the leafy stem. *Lip* bifid or entire. *Anther-crest* entire.

15. **K. siphonantha,** *King mss.*; leafy stem none, leaves oblong oblique at the base, petiole longer than the blade, flower lilac, staminodes oblong, lip broad deeply bifid.

ANDAMAN ISLANDS, *King's Collector.*

Annual, stemless; root-fibres slender. *Leaves* 3 in a tuft; petiole 6 in.; blade 4–5 in., oblong, acute, membranous, glabrous, base unequal-sided, sides rounded. *Flowers* solitary at the end of a long very slender spike; bracts few, narrow, membranous. *Corolla*-tube much exserted from the upper bract; segments ½ in., oblong-lanceolate, greenish.

16. **K. elegans,** *Wall. Cat.* 6593; leafy stem short or none, leaves oblong, petiole rather shorter than the blade, flowers bright lilac, staminodes obovate-cuneate, lip cut nearly to the base into two obovate lobes. K. Crawfurdii, *Wall. ined.* Monolophus elegans, *Wall. Pl. Asiat. Rar.* i. 24, t. 27; *Horan. Prodr.* 22.

PEGU, MARTABAN, TAVOY, and TENASSERIM.

Annual, root-fibres slender. *Leaves* 2–4 to a tuft, 5–6 by 2–3 in., acute, thin, green above, much paler beneath, base rounded; petiole channelled, nearly as long as the blade. *Cluster* of flowers shortly peduncled; outer bracts 2 in., oblong-lanceolate, green. *Calyx* about 1 in. *Corolla*-tube slender, twice as long as the

calyx; segments less than 1 in., green, lanceolate; staminodes spreading, ½ in.; lip ¾–1 in. long and broad, bifid nearly to the base; anther-crest large, suborbicular.

17. **K. macrochlamys,** *Baker*; stemless, leaves lanceolate petioled, flowers white, staminodes orbicular-cuneate, lip broad cut deeply into two orbicular lobes.

TENASSERIM, *Parish.*

Leaves 4-5 by 1 in., acute, narrowed gradually into a channelled petiole 2–3 in. long. *Cluster* of flowers shortly peduncled; outer bracts 2 in., oblong, purplish-brown. *Corolla*-segments ½ in.; staminodes a little longer than the corolla-segments; lip 1 in. broad, bifid half way down, yellow and pilose below; anther-crest ovate, entire.—Described from a sketch and notes made by Prof. Oliver of a plant that flowered in Kew in May, 1871.

18. **K. linearis,** *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey,* i. 20; leafy stem elongate, leaves sessile lanceolate acuminate, flowers white, corolla-tube half as long again as the bracts, corolla-segments linear-oblong whitish, staminodes oblong-cuneate, lip broad cuneate entire or slightly emarginate. Monolophus linearis, *Wall. Cat.* 6592; *Horan. Prodr.* 22.

EASTERN HIMALAYA, ASSAM, SILHET and the KHASIA HILLS, alt. 2–3500 ft.

Annual, root-fibres slender. *Stem* simple; slender, erect, 4–10 in. *Leaves* ascending, membranous, green, 3–4 by ¼–½ in. *Spikes* 1–2, sessile or shortly peduncled, 1–2-fld.; outer bract 1–1½ in., lanceolate, acuminate, green. *Corolla*-tube 1½–2 in.; segments ½–¾ in.; staminodes as long as the corolla-segments; lip about ¾ in. long and broad, tinged with yellow at the throat; anther-crest large, orbicular.

19. **K. sikkimensis,** *King mss.*; leafy stem elongate, leaves sessile lanceolate-acuminate, corolla-tube twice as long as the bract, segments linear-oblong dark lilac, staminodes white orbicular cuneate, lip suborbicular white entire.

SIKKIM and BHOTAN HIMALAYA, *King, Elwes.*

Stems slender, 2–4 in. long. *Leaves* reaching 2–3 in. long, ½–1 in. broad. *Spike* solitary; 1-flowered, its base hidden in the sheath of the uppermost leaf; bract green, ½ in. long. *Corolla*-tube slender, an inch long; segments ½ in. long.—Very near *K. linearis.*

20. **K. secunda,** *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey,* i. 19; leafy stem produced, leaves sessile oblong acute, flowers white or red, corolla-segments linear-oblong, staminodes oblong-cuneate, lip broad cuneate slightly emarginate. *Bot. Mag.* t. 6999. Monolophus secundus, *Wall. Cat.* 6591; *Horan. Prodr.* 22.

SIKKIM HIMALAYA, ASSAM, SILHET, the KHASIA HILLS and TENASSERIM, ascending to 4000 ft.

Annual. *Leafy stem* 6–9 in., slender, simple. *Leaves* 3–4 by 1 in. (or more), membranous, green, ascending, acuminate. *Spikes* 1–4; outer-bract 1–1½ in., oblong-lanceolate, green, moderately firm. *Calyx* much shorter than the bract. *Corolla*-tube 1½–2 in.; segments ⅜–½ in., greenish, membranous; staminodes scarcely longer than the corolla-segments; lip 1 in. or more broad; anther-crest large, ovate.

21. **K. parvula,** *King. mss.*; leafy stem produced, leaves petioled oblong acute, flowers small white solitary in the axil of a large folded oblong firm green bract.

MALAY PENINSULA; Goping, *King's Collector.*

Habit of *K. secunda*. *Leafy stem* 3–4 in., bearing 3–7 distinctly-petioled oblique oblong acute moderately firm glabrous leaves 1–2 in. long. *Bract* 1 in., terminal, solitary, shortly peduncled. *Corolla*-tube very slender, much shorter than the bract.

Subgen. IV. **Stachyanthesis,** *Benth.* *Leafy stem* produced. *Flowers* many in a terminal spike. *Lip* bifid; anther-crest quadrate entire.

22. **K. scaposa,** *Benth. in Gen. Plant.* iii. 642. Hedychium scaposum *Nimmo in Grah. Cat. Pl. Bomb.* 205; *Wall. in Kew Journ. Bot.* v. (1853), 375. Monolophus scaposus, *Dalz. in Kew Journ. Bot.* ii. (1850), 143; *Dalz. & Gibs. Bomb. Fl.* 273; *Wight Ic.* t. 2030; *Horan. Prodr.* 22.

Concan; on the banks of rivulets, *Graham*, &c.

Rootstock tuberous, oblique; root-fibres long, slender. *Leaves* 12 by 2–3 in., oblong-lanceolate, acute, green above, paler and pubescent beneath, narrowed into a deeply channelled petiole. *Spike* 3–6 in., moderately dense; peduncle long, slender, naked; bracts 1–1½ in., oblong-lanceolate, persistent, green. *Calyx* loosely sheathing the corolla-tube, above 1 in., minutely toothed. *Corolla*-tube slender, 2–3 in., segments short, lanceolate; staminodes oblong, white, as long as the corolla segments, shorter than the broad bifid lip, which is above an inch long. *Capsule* obovoid, red, pubescent, the size of a sparrow's egg.

9. HITCHENIA, *Wall.*

Habit and inflorescence of *Curcuma*, but bracts subcoriaceous. *Calyx* short, minutely toothed. *Corolla*-tube slender, much longer than the calyx; segments oblong or lanceolate, subequal. Lateral *staminodes* petaloid, free from the filiform filament; lip orbicular or cuneate; filament narrow as long as the lip; anther-cells marginal on the broad connective, not crested. *Ovary* 3-celled; ovules many, superposed; style filiform, stigma turbinate. *Capsule* oblong-trigonous, finally dehiscing. *Seeds* ovoid, arillate.—All Indian.

1. **H. glauca,** *Wall. in Trans. Med. Phys. Soc. Calcutt.* vii. 215; bracts all with flowers, corolla-tube twice the length of the bract, segments oblong, staminodes as long as the corolla-segments, lip ovate, filament short. *Horan. Prodr.* 24. Curcuma glaucophylla, *Wall. Cat.* 6594; *Grah. Cat. Pl. Bomb.* 210.

Burma, *Wallich.*

Rootstock bearing only small tubers at the end of long slender fibres. *Stem* 3–4 ft. *Leaves* oblanceolate-oblong, 1 ft. or more by 4–5 in., narrowed gradually from the middle to the base. *Spike* 5–6 in.; bracts crowded, orbicular-cuneate, 1–1½ in., upper third spreading. *Flowers* white; corolla-tube 2 in.; segments small, oblong, concave; expanded flower 1 in. diam. *Staminodes* as long as the corolla-segments; lip ovate, not clawed, acute, obscurely emarginate; stamen as long as the corolla-segments.

2. **H. caulina,** *Baker*; upper bracts empty and enlarged, corolla-tube half as long again as the bract, segments ovate, staminodes as long as the corolla-segments, lip orbicular, filament very short. Curcuma caulina, *Grah. in Cat. Pl. Bomb.* 210; *Dalz. & Gibs. Bomb. Fl.* 275; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* ii. 140, with fig.

The Concan; abundant on the table-land of Mahableshwur.

Rootstock ovoid, white inside, bearing large oblong tubers at the end of long

fibres. Leafy *stem* 3–4 ft. *Leaves* oblong, 1–1½ ft. by 5–6 in., narrowed to the base, often tinged red-brown. *Spike* ½ ft.; bracts 1 in., green, obovate-cuneate, spreading in the upper third, those of the coma longer, whitish. *Flowers* yellow; corolla-tube slender, 1½ in.; expanded limb 1 in. diam.; staminodes oblong, ½ in.; lip ½ in. diam., deeply bifid; stamen shorter than the corolla-segments.

3. **H. Careyana,** *Benth. in Gen. Plant.* iii. 643; bracts all flowering, corolla-tube little longer than the bract, segments linear, staminodes minute, lip cuneate with a long claw, filament long. Curcuma Careyana, *Wall. Cat.* 6595.

EASTERN HIMALAYA, subtropical region. KHASIA HILLS, ASSAM, CACHAR, SILHET and MANIPUR.

Stem 4 ft. *Leaves* oblong, 1–2 ft. by 4–5 in., narrowed gradually from the middle to the base. *Spike* 6–8 in.; bracts 1–1½ in., closely imbricate, obovate-cuneate, squarrose; bracteoles 1 in., lanceolate. *Flowers* purple; corolla-segments ½ in.; staminodes minute, obovate-cuneate, emarginate; lip ¾ in., cuneate, with a long claw and a small bifid cusp; filiform filament ½ in. *Capsule* small, green, oblong-trigonous.—Resembles *H. glauca* in habit, but differs so much in structure that probably it should form a different genus.

IMPERFECTLY KNOWN SPECIES.

4. H. MUSACEA, *Baker*; stemless, leaves like Musa in texture, 1½ ft. by 6–8 in., oblong, base rounded, petiole as long as the blade, spike central, peduncle ½ ft. long, bracts 1½ 1½ in. orbicular coriaceous slightly squarrose each several-fld., flowers withered and imperfect. Curcuma musacea, *Wall. Cat.* 6596.—Singapore, *Wallich.* Malacca, *Griffith, Maingay.*

10. **HEDYCHIUM,** *Kœnig.*

Rootstock horizontal, tuberous; root-fibres not much thickened. *Stem* elongate, leafy. *Leaves* distichous, oblong or lanceolate. *Flowers* sub-solitary or in terminal spikes; bracts oblong, subcoriaceous, one- or more-fld. *Calyx* tubular, 3 dentate. *Corolla*-tube long, slender; segments linear, equal, spreading. Lateral *staminodes* linear or oblong-cuneate; filament narrow; anther-cells contiguous, connective not produced; lip large, bifid. *Ovary* 3-celled; ovules many, superposed; style long, filiform, stigma subglobose. *Capsule* globose, 3-valved. *Seeds* many, small, aril lacerated. —India and Malay Islands.

SECT. I. **Gandasulium,** *Horan.* *Stamen* never much longer than the lip.

* *Leaves more or less pubescent beneath.*

1. **H. coronarium,** *Kœnig in Retz Obs.* iii. 73; leaves oblong or oblong-lanceolate, spike dense-fld., bracts large oblong imbricate 3–4-fld., flowers white or tinged with yellow, staminodes oblong or oblong-lanceolate, lip broad shallowly bifid distinctly clawed, stamen as long as or rather longer than the lip. *Roxb. in Asiat. Res.* xi. 325; *Hort. Beng.* 1; *Fl. Ind.* i. 10; *Ed. Wall. & Carey,* i. 9; *Rosc. in Trans. Linn. Soc.* viii. 343, t. 20, f. 6; *Scit. Pl.* t. 51; *Bot. Mag.* t. 708; *Smith Exot. Fl.* ii. t. 107; *Blume Enum. Fl. Jav.* i. 56; *Wight Ic.* t. 2010; *Wall. Cat.* 6539, in *Kew Journ.* v. (1853), 325; *Thw. Enum.* 319. H. spicatum, *Lodd. Bot. Cat.* t. 653, not of *Hamilt.* H. Gandasulium, Prophetæ and album, *Herb. Hamilt.*—Hedychium, *Griff. Notul.* iii. 419 (the 2nd species.)—*Rumph. Amboin.* t. 69, fig. 3.

Throughout India from the HIMALAYAS to CEYLON and MALACCA, ascending to 4000 ft. in the Khasia Hills, and 6000 ft. in Ceylon.—DISTRIB.—Malay Islands.

Rootstock 1 in. thick. *Stem* 4–6 ft. *Leaves* often above a foot by 3–5 in., usually pubescent beneath. *Spike* ½–1 ft.; outer bracts 1½–2 by 1 in., at first green, brown in age. *Calyx* green, cylindric, shorter than the bract. *Flowers* fragrant, in the type pure white or tinged with yellow. *Corolla*-tube 3 in.; segments linear, reflexing, half as long as the tube; lateral staminodes 1½–2 in. by about ½ in.; lip 1½–2 in. broad, narrowed suddenly to a short claw, short lobes rounded; filament red; anther about ½ in. *Capsule* oblong, glabrous, orange inside. *Seeds* with a crimson aril.

Var. II. CHRYSOLEUCUM, *Hook. Bot. Mag.* t. 4516 (sp.); lip white with a large yellow patch in the centre. *Lindl. & Paxt. Fl. Gard.* i. 110, t. 77.

Var. H. MAXIMUM, *Rosc. Scit. Pl.* t. 52 (sp.); *leafy stem* taller than in the type, flowers pure white larger, staminodes ¾–1 in. broad, lip 2–2½ in. broad. *Lindl. in Bot. Reg.* t. 1022; *Horan. Prodr.* 24.

Var. H. FLAVESCENS, *Carey in Rosc. Scit. Pl.* t. 50 (sp.); stature of the type, flowers sulphur yellow. *Wight Ic.* t. 2008–9; H. flavum, *Bot. Mag.* t. 2378 (not of t. 3039). H. sulphureum, *Wall. mss.*

Var. H. UROPHYLLUM, *Lodd. Bot. Cat.* t. 1785 (sp.); stature of the type, flowers bright yellow. *Horan. Prodr.* 24.

Var. H. FLAVUM, *Roxb. Hort. Beng.* 1; *Fl. Ind.* i. 12 (sp.); dwarfer than the type, flowers smaller bright yellow. *Rosc. Scit. Pl.* t. 49; *Bot. Mag.* t. 3039; *Lodd. Bot. Cat* t. 604; *Wall. Cat.* 6542; *Kew Journ. Bot.* v. (1853), 326; *Horan. Prodr* 24.

2. **H. Elwesii,** *Baker*; leaves oblong nearly glabrous beneath, spike dense-fld., bracts large oblong 4–5-fld., calyx shorter than the bract, flowers bright yellow, staminodes lip linear, broad shallowly bifid, stamen as long as the lip.

KHASIA HILLS; Bishop's fall, near Shillong, alt. 4000 ft., *Elwes.*

Leaves 1 ft. or more, by 3 in. *Spike* ½ ft; bracts green, subcoriaceous, 2–2½ in., rather diverging, not so closely imbricate as in *H. coronarium.* *Corolla*-tube 2½ in.; segments above 1 in.; staminodes resembling the segments in size and shape; lip 1½ in. broad, narrowed suddenly to a broad claw; filament bright red; anther linear, ½ in.—May be an extreme form of *H. coronarium.*

3. **H. marginatum,** *Clarke in Journ. Linn. Soc.* XXV. 75, t. 31; leaves oblong-lanceolate very hairy beneath, spike short dense-fld., bracts oblong imbricated 1-fld., flowers yellow, staminodes linear, lip small cuneate distinctly clawed shallowly bifid, stamen rather longer than the lip.

NAGA HILLS; Kohima, alt. 4500 ft. *Clarke*; *Griffith* (5680), without locality.

Leaves 1 ft. by 1½–2 in., pale beneath. *Spike* 3–4 in.; bracts 1½–2 in., not so firm as in *H. coronarium*, glabrous, with a pale horny margin and a tuft of hairs at the tip. *Calyx* 1 in. *Corolla*-tube twice as long as the calyx; segments 1 in., staminodes resembling the corolla-segments in size and shape; lip 1 in. long, claw long, blade ½–¾ in. broad.

4. **H. venustum,** *Wight Ic.* t. 2012; leaves oblong-lanceolate nearly glabrous beneath, spike lax-fld. often cernuous, bracts small 1-fld., flowers whitish, calyx exceeding the bract, staminodes linear, lip narrow cuneate deeply bifid distinctly clawed, stamen shorter than the lip. *Wall. in Kew Journ. Bot.* v. (1853), 328. H. cernuum, *Wight Ic.* t. 2011.

NILGHIRI HILLS, *Wight.*

Leaves 1 ft. by 3–4 in., obscurely pubescent beneath. *Spike* 6–9 in., cernuous

or erect; bract thin, at most 1 in., glabrous, rolled round the calyx. *Calyx* 1½ in. long. *Corolla*-tube 2 in.; segments 1½ in.; staminodes as long as the corolla-segments; lip rather longer than the staminodes, cut down below the middle into two acute segments; anther linear. *Capsule* subglobose, pubescent.

** *Leaves quite glabrous beneath.*

5. **H. spicatum,** *Hamilt. ex Smith in Rees Cyclop.* xvii. No. 3; leaves oblong or oblong-lanceolate, spike dense-fld., bracts large oblong 1-fld., calyx shorter than the bract, flowers white, staminodes lanceolate, lip cuneate deeply bifid, stamen rather shorter than the lip. *Rosc. Scit. Pl.* t. 48; *Hook. Exot. Flora*, t. 46; *Bot. Mag.* t. 2300; *Royle Ill.* 357; *Wall. Cat.* 6553; *in Kew Journ.* v. (1853), 328; *Horan. Prodr.* 24.

SUBTROPICAL HIMALAYA; NEPAL, *Wallich.* KUMAON, alt. 5000–7000 ft., *Royle, Strachey & Winterbottom.*

Leaves reaching 1 ft. or more, very variable in breadth, glabrous. *Spike* sometimes 1 ft.; bracts oblong, obtuse, green, 1–1½ in. by ¾ in. broad, flowers ascending and closely imbricate in the type. *Corolla*-tube 2–2½ in.; segments 1 in., linear; staminodes 1 in., lanceolate; lip ½–¾ in. broad, not at all clawed, lobes 2 rounded; filament pale red; anther linear, ¼–½ in. *Capsule* glabrous, globose.

Var. TRILOBUM, *Wall. in Kew Journ.* v. (1853) 328; spike laxer, bracts narrower convolute round the calyx, corolla-segments staminodes and lip longer, the latter with a small tooth between the two lobes. H. trilobum, *Wall. Cat.* 6554.—Nepal, *Wallich.*

Var. ACUMINATUM, *Wall. in Kew Journ. l. c.*; leaves glabrous beneath, spike laxer and flowers fewer, bracts convolute round the calyx, flowers white or pale yellow, tube, corolla-segments staminodes and clawed lip longer than in the type, stamen about half as long as the lip. H. acuminatum, *Rosc. Scit. Pl.* t. 47; *Bot. Mag.* t. 2969; *Lodd. Bot. Cat.* t. 1795.—Kumaon to Sikkim, ascending to 7000 ft.

Var. KHASIANUM, *Clarke*; like the last, but leaves pubescent beneath.—Khasia Hills, *Clarke.*

H. flavescens, Lodd. Bot. Cat. t. 723 (*not of Carey*) and *H. Sieboldii*, Wall. in Kew Journ. v. 371 (*H. flavescens*, Lindl. in Hort. Soc. Journ. vii. 281, & Paxt. Flow. Gard. iii. 164, fig. 311. *H. Roxburghii*, Siebold in Hort. Soc. Journ. l. c.) are probably varieties of this species.

H. bicornutum, Wall. mss., is a monstrous form, with two stamens, each with a large erect spur at the base of the anther.

6. **H. densiflorum,** *Wall. Cat.* 6552; *Kew Journ.* (1853) v. 368; leaves oblong, spike long moderately dense-fld, bracts small oblong 1-fld., calyx longer than the bract, flowers small bright yellow, staminodes lanceolate, lip cuneate deeply bifid, stamen as long as the lip. *Horan. Prodr.* 25.

TEMPERATE HIMALAYA; NEPAL, *Wallich*; SIKKIM, alt. 6000–8000 ft. *Griffiths' Collectors*; *J. D. H.*

Leaves 1 ft. by 4–5 in., glabrous beneath. *Spike* sessile, sometimes 1 ft.; bracts oblong, ½–1 in., rolled tightly round the calyx. *Calyx* cylindric, about 1 in. *Corolla*-tube 1–1½ in.; segments linear, reflexing, under 1 in.; staminodes lanceolate, under 1 in.; lip about ½ in., not clawed; stamen just exceeding the staminodes; filament yellow, anther linear.

SECT. II. **Macrostemium,** *Horan.* Stamen much longer than the lip (rather longer in *H. Griffithianum*).

* Lip narow 2-fid or 2-partite, lobes or segments narrow (lip emarginate in *H. ellipticum.*)

† *Leaves glabrous beneath.*

7. **H. crassifolium,** *Baker*; leaves oblong-lanceolate subcoriaceous, bracts short oblong 1-fld., calyx twice as long as the bract, flowers bright yellow, calyx-segments very long, staminodes lanceolate half as long as the corolla-segments, lip narrow long clawed bipartite segments narrow, stamen twice as long as the lip.

Perak, in dense jungle, on trees, *King's Collector.*

Epiphytic; *leafy stem* 15–20 in. *Leaves* under 1 ft. 1½–2 in. broad, glabrous, firmer in texture than in any other species, narrowed gradually from the middle to the base. *Bracts* green, glabrous, ½ in. rolled tightly round the calyx. *Corolla*-tube ¾-in. longer than the calyx; segments linear-convolute, 2 in. long; staminodes and lip about 1 in.; filament bright red, 2 in.; anther large, linear.

8. **H. longicornutum,** *Griff. mss.*; leaves oblong-lanceolate, spike short dense-fld. oblong, bracts oblong hairy imbricate 1-fld., calyx longer than the bract, corolla-segments much longer than the oblanceolate staminodes, lip bipartite, segments narrow, stamen twice as long as the lip.

Malacca, *Griffith, Maingay.*

Epiphytic. *Stem* slender, 1–1½ ft. *Leaves* 1 ft. by 2–2½ in., thin, narrowed gradually to the base and apex. *Spike* 1½–2 in.; lower bracts 1 in. *Calyx* protruded, ½–½ in. beyond the bract. *Corolla*-tube protruded ¾ in. beyond the calyx; segments bright red, 1½–2 in.; staminodes half as long as the corolla-segments; lip a little shorter than the staminodes; stamens as long as the corolla-segments; anther linear.

9. **H. Gomezianum,** *Wall. Cat.* 6543, *in Kew Journ.* v. (1853) 368; leaves long lanceolate, spike dense-fld. curved, bracts 1-fld. cylindric, calyx longer than the bract, flowers white, staminodes linear, lip narrow clawed bipartite, segments narrow, stamen much longer than the lip. *Horan. Prodr.* 25. Hedychium, *Griff. Notul.* iii. 419, *first species.*

Tavoy, *Gomez*; Tenasserim, *Griffith.*

Epiphytic, gland-dotted. *Leafy stem* 1 ft. or more. *Leaves* sometimes above 1 ft., 2–3 in. broad, narrowed gradually from the middle to the base. *Spike* cernuous, 3–4 in.; bracts glabrous, rolled tightly round the calyx. *Calyx* twice as long as the bract. *Corolla*-tube a little longer than the calyx; segments linear, 1 in. white; staminodes rather shorter than the corolla-segments; lip white; filament 1½ in.; anther linear, orange yellow.

10. **H. ellipticum,** *Hamilt. ex Smith in Rees, Cyclop.* xvii. No. 2; leaves oblong, spike short dense-fld., bracts oblong imbricate 1-fld., calyx as long as the bract, flowers white, staminodes linear, lip narrow unguiculate faintly bifid, stamen twice as long as the lip. *Rosc. Scit. Pl.* t. 55; *Bot. Cat.* t. 1881; *Wall. in Kew Journ.* v. (1853) 327; *Horan. Prodr.* 25. H. fastigiatum, *Wall. Cat.* 6340.

Tropical Himalaya, from Garwhal, Sikkim, and Khasia Hills, alt. 2000–5000 ft.

Leaves ½–1 ft. by 3–5 in. *Spike* very dense, 3–4 in.; bracts bright green, about 1 in. *Corolla*-tube twice as long as the bract; segments 1 in., linear; staminodes rather shorter and broader than the corolla-segments; lip oblong, distinctly clawed, shorter than the staminodes, only emarginate at the apex; filament 1½–2 in.; anther linear, orange yellow.

11. **H. villosum,** *Wall. in Roxb. Fl. Ind.* i. 12; *in Kew Journ.* v.

(1853) 329; *Cat.* 6515 A, B; leaves oblong or oblong-lanceolate, spike long dense-fld., bracts oblong very hairy often 2-3-fld., calyx longer than the bract, flowers white, staminodes linear, lip narrow clawed bipartite segments narrow, stamen twice as long as the lip, anther small sagittate. *Rosc Scit. Pl.* t. 54; *Horan. Prodr.* 25.

NEPAL, SILHET, ASSAM, KHASIA HILLS, MUNIPUR, alt. 4000–6000 ft.

Leaves sometimes 1 ft. 2–4 in. broad, glabrous beneath. *Spike* ½-1 ft.; rachis very stout and hairy; bracts pale green, ½-1 in. *Calyx* about 1½ in. *Corolla*-tube longer than the calyx; segments linear, 1–1¼ in.; staminodes like the corolla-segments; lip 1 in. or more; filament 1½–2 in., bright red; anther much shorter than in any other species.

Var. TENUIFLORUM, *Wall. Cat.* 6516 C.; flowers much smaller than in the type, corolla-segments staminodes and lip ½ in.—Assam, Silhet and Khasia.

†† *Leaves more or less pubescent beneath.*

12. **H. aureum,** *Clarke & Mann mss.*; dwarf, leaves small thin lanceolate, spike short dense-fld. oblong, bracts 1-fld. wrapped tightly round the calyx, calyx as long as the bract, flowers very small golden yellow, staminodes linear, lip narrow cuneate deeply bifid segments narrow, stamen half as long again as the lip.

NORTHERN KHASIA HILLS; alt. 5000–6000 ft., *Clarke, Mann.*

Epiphytic; leafy stem short, slender. *Leaves* 6–8 by 1 1½ in., slightly pubescent beneath, tapering gradually to a long point. *Spike* 1½-2 in.; bracts cylindric, green, glabrous, ½ in. *Calyx* about as long as the bract. *Corolla*-tube ½ ¾ in.; segments linear, ⅓–½ in.; staminodes as long as the corolla-segments; lip ⅓-½ in. long, narrowed gradually to a short claw; filament as long as the lip; anther linear, ⅛ in. *Capsule* globose, glabrous, the size of a pea.

13. **H. gracile,** *Roxb. Hort. Beng.; Fl. Ind.* i. 14; *Cor. Pl.* iii. 48, t. 251; leaves oblong-lanceolate, spike long moderately dense-fld., bracts 1-fld. wrapped tightly round the calyx, calyx longer than the bract, flowers small greenish white, staminodes linear, lip oblong-cuneate 2-partite, segments narrow, stamen half as long again as the lip. *Wall. Cat.* 5546 B. *in Kew Journ.* v. (1853) 367, *in part.*

KHASIA HILLS and CHITTAGONG, *Roxburgh, Wallich.*

Leafy stem 2-3 ft. *Leaves* 5–6 by 1½–2 in., thin, caudate, finely pubescent beneath. *Spike* 2–4 in.; bracts ½ in., green, cylindric, thin, glabrous. *Calyx* a little longer than the bract. *Corolla*-tube 1 in., very slender; segments linear, nearly as long as the tube; staminodes very narrow, shorter than the corolla-segments; lip ½ in., distinctly clawed; filament 1 in., bright red; anther linear. *Capsule* globose, glabrous, the size of a pea.

Var. H. GLAUCUM, *Rosc. Scit. Pl.* t. 53 (sp.) More robust and larger in all its parts; leaves glabrous and glaucous beneath; spike often 6–9 in.; bracts ¾ in.; parts of the flower half as long again as in the type. H. gracile, *Wall. Cat.* 6516 A, *in Kew Journ.* v. 367, in part; *Hook. f. in Bot. Mag.* t. 6638.—Khasia Hills, Bhotan, and Sikkim, alt. 3000–6000 ft.

14. **H. Griffithianum,** *Wall. in Kew Journ.* v. (1853), 369; leaves lanceolate, spike lax-fld., bracts 1-fld. cylindric, calyx longer than or equalling the bract, flowers white or pale yellow, staminodes linear, lip long narrow clawed bipartite, segments narrow, stamen rather longer than the lip. *Horan. Prodr.* 25.

KHASIA HILLS, alt. 4–5000 ft., *Griffith, Hook. f. & Thoms.*

Leaves sometimes above 1 ft., 2–3 in. broad, marked above with glandular lines,

finely pilose beneath. *Spike* 6–9 in.; bracts 1–1½ in., rolled tightly round the calyx, calyx and corolla glandular. *Corolla*-tube 2–3 in.; segments 1 in., linear. *Staminodes* nearly as long as the corolla-segments; lip 1 in. long; filament bright red, 1–1½ in.; anther large, linear. *Capsule* globose, glabrous, ½ in. diam.—Nearly allied to *H. spicatum*.

Var. *glanduligerum*, Clarke. *Leaves* glabrous beneath. Whole plant especially the flower very glandular.—Khasia Hills.

15. **H. thyrsiforme,** *Hamilt. ex. Smith in Rees Cyclop.* xiii. No. 4; leaves oblong or oblong-lanceolate, spike dense-fld. oblong, bracts cylindric 1-fld., calyx not longer than the bract, flowers white, staminodes linear, lip narrow clawed 2-partite, segments narrow, stamen twice as long as the lip. *Wall. Cat.* 6541; *in Kew Journ.* v. (1853), 327; *Rosc. Scit. Pl.* t. 56; *Horan. Prodr.* 25. H. heteromallum, *Lindl. in Bot. Reg.* t. 767. H. Tocucho, *Herb. Hamilt.*

Tropical Himalaya; from Kumaon to Sikkim, alt. 2–4000 ft., and Chittagong.

Leaf sometimes 1 ft., 3–4 in. broad, finely pilose beneath. *Spike* very dense, 3–6 in.; lower empty bracts ovate; flower-bracts cylindric, green, 1½ in. *Corolla-tube* not much longer than the bract; segments 1 in., linear; staminodes as long as the corolla-segments; lip as long, distinctly clawed, usually cut about half way down into two linear-oblong segments; filament whitish, 1½–2 in.; anther linear.

** Lip cuneate or obovate.

16. **H. Hookeri,** *Clarke mss.*; dwarf, leaves short oblong, spike short oblong, bracts oblong imbricate 1-fld., calyx shorter than the bract, flowers very small sulphur-yellow, staminodes oblong-cuneate, lip obovate-clawed bifid, stamen twice as long as the lip.

Khasia Hills, alt. 4–5000 ft., *Hook. f. & Thomson.* Assam, *Griffith.*

Leafy stem slender, 1–1½ ft. *Leaves* 5–6 by 2 in., thin, glabrous, caudate, base cuneate. *Spike* 1–2 in., resembling that of *Globba bulbifera*, few-fld.; bracts ½ in., oblong, laxly imbricate, green, glabrous. *Calyx* ¼ in. *Corolla*-tube a little longer than the calyx; segments linear, ⅓ in.; staminodes as long as the corolla-segments; lip nearly as long, distinctly clawed; filament ⅓–½ in.; anther ⅛ in. *Capsule* globose, glabrous, ⅓ in. diam.

17. **H. Gardnerianum,** *Rosc. Scit. Pl.* t. 62; tall, leaves oblong white pulverulent beneath, spike long moderately dense-fld., bracts large oblong 1–2-fld., calyx not longer than the bract, flowers bright lemon-yellow, staminodes oblanceolate, lip obovate-cuneate, tip 2-fid or 2–3-toothed, stamen twice as long as the lip. *Wall. in Kew Journ.* v. (1853), 369 (*excl. syns. & vars.*); *Bot. Reg.* t. 774; *Hook. f. in Bot. Mag.* t. 6913 (*excl. syns.*); *Horan. Prodr.* 25; *Reichb. Exot.* t. 183; *Gard. Chron.* 1875, i. 461, figs. 92, 93; *Mart. Fl. Bras.* iii. p. 3, t. 9.

Eastern Himalaya; Nepal, Sikkim, and the Khasia Hills, alt. 4–8000 ft.

Leafy stem 5–6 ft. *Leaves* 1–1½ ft. by 4–6 in., white pulverulent beneath, as are the young bracts and rachis of the spike. *Spike* 1–1½ ft.; bracts 1½–2 in., rolled tightly round the flowers, glabrous. *Corolla*-tube a little longer than the bract; segments greenish, reflexing, 1–1¼ in. *Staminodes* above 1 in. by ⅓–¾ in. broad; lip 1 in. or more, ½–¾ in. broad, narrowed gradually to a short claw; filament bright red, 2–2½ in.; anther linear, ⅓–½ in. *Capsule-valves* ovate, orange-red within, persistent, ¾ in. *Seeds* brownish-crimson.

Var. H. pallidum, *Regel in Trans. Russ. Hort. Soc.* 1864, t. 153 (sp.). *Lip* narrower, more distinctly clawed and distinctly bifid. *Horan. Prodr.* 25.—Khasia, *J. D. H.*

18. **H. speciosum,** *Wall. in Roxb. Fl. Ind Ed. Carey & Wall.* i. 13; *Cat.* 6550; *Pl. As Rar.* iii. 51, t. 285; leaves oblong-lanceolate, spike long moderately dense-fld. bracts large oblong 1–2-fld., flowers pale sulphur-yellow, staminodes linear, lip oblong-cuneate entire, stamen twice the length of the lip. H. Gardnerianum, *Wall. in Kew Journ.* v. (1853) 369, *in part.* Gamochilus, *Lestid. in Ann. Sc. Nat. Ser.* 2, xv. 341.

SILHET, *Gomez.*

Leaves above 1 ft., 3–4 in. broad, glabrous beneath. *Spike* ½–1 ft.; lower bracts 1¼ in., ¾ in. broad. *Calyx* cylindric, about as long as the bract. *Corolla*-tube 2 in.; segments linear, 1 in.; staminodes longer than the segments; lip not clawed, 1 in. by ⅓ in. broad; filament bright red, twice as long as the lip; anther linear, yellow, ½–⅔ in.

19. **H. stenopetalum,** *Lodd. Bot. Cab.* t. 1902; very tall, leaves oblong very hairy beneath, spike long lax or moderately dense-fld., bracts large oblong often 2-fld., flowers pure white, staminodes oblanceolate, lip oblong-cuneate bifid, stamen twice as long as the lip. H. barbatum, *Wall. Cat.* 6544. H. coccineum β, in part, *Wall. in Kew Journ.* v. (1853), 373. H. elatum, *Clarke in Journ. Linn. Soc.* xxv. 75. H. elatum *var.* orgyale, *Horan. Prodr.* 25.

ASSAM, KHASIA, the NAGA HILLS, and NORTH BURMA, alt. 1500–3000 ft.

The tallest species. *Leaves* sometimes 2 ft. by 5–6 in., very hairy all over beneath. *Spike* 1 ft. or more, rachis very stout; bracts rigid, often 2 in. by 1 in. *Calyx* shorter than and corolla-tube scarcely longer than the bract. *Corolla*-segments linear, 1½ in.; staminodes shorter than the corolla-segments; lip pure white, 1 in., narrowed gradually into a short claw; filament pale, 1½–2 in.; anther linear, yellow, ½ in.

*** Lip orbicular.

20. **H. coccineum,** *Hamilt. ex Smith in Rees Cyclop.* xvii. 5; leaves lanceolate, spike long moderately dense-fld., bracts oblong 1–2-fld., calyx not longer than the bract, flowers small bright crimson, staminodes lanceolate, lip orbicular distinctly clawed deeply bifid, stamen more than twice as long as the lip. *Wall. in Kew Journ.* v. (1853), 372, *ex parte*; *Rosc. Scit. Pl.* t. 58; *Wall. Cat.* 6548; *Reichb. Ic. Exot.* t. 184; *Royle Ill.* 357; *Roxb. Fl. Ind. edit. Wall. & Carey,* i. 82, in note.

CENTRAL and EASTERN HIMALAYA, common (under one or other form). CEYLON (native ?).

Leaves 1 ft. or more, 1½ in. broad, base rather rounded, narrowed gradually from the middle to the point. *Spike* 1 ft.; bracts green, 1–1¼ in. *Corolla*-tube scarcely longer than the bract; segments 1 in., linear, reflexing; staminodes under 1 in., ⅛–⅙ in. broad; lip above ½ in. and broad; filament 1½ in.; anther linear, ¼–⅓ in.—The type was described and drawn from a plant in the Calcutta Garden.

Var. H. ROSCOEI, *Wall. mss.* (sp.). Staminodes bright red; lip dull brick red. H. coccineum, *Lindl. in Bot. Reg.* t. 1209.

Var. H. SQUARROSUM, *Buch. Hamilt. mss.* (sp.); less robust with smaller bright crimson flowers and very long glabrous leaves often not above 1 in. broad. H. angustifolium, *Wall. Cat.* 6547; *in Kew. Journ.* v. (1853) 371, in greater part, *non Roxb.*—Common in the Eastern Himalaya, Khasia, and Upper Burma, alt. 8–9000 ft. Ceylon.

Var. H. LONGIFOLIUM, *Rosc. Scit. Pl.* t. 59 (sp.); flowers bright crimson, leaves very narrow pubescent beneath.—Same range as the last variety.

Var. H. ANGUSTIFOLIUM, *Roxb. Hort. Beng.* 1; *Cor. Pl.* iii. 248, t. 251; *Fl. Ind*

i. 13; leaves not so long and narrow as in the two last, spike shorter, flowers dull brick red or salmon-red often 3–4 in a fascicle, lip obovate-cuneate less deeply bifid under ½ in. and broad. *Rosc. Scit. Pl.* t. 60; *Bot. Mag.* t. 2078; *Kern. Hort.* t. 807.—Chittagong and Silhet, always at low levels.

Var. II. CARNEUM, *Rosc. Scit. Pl.* t. 57 (sp.); leaves 1½–2 in., flowers white tinged with pale red, lip orbicular ½–¾ in. long and broad, filament pale red 1½–2 in. *Bot. Mag.* t. 2637; *Lodd. Bot. Cab.* t. 693.

21. **H. aurantiacum,** *Wall. Cat.* 6551; leaves long lanceolate, spike long moderately dense-fld., bracts oblong often 2–3-fld., calyx not longer than the bract, flowers bright orange-yellow, staminodes lanceolate, lip orbicular distinctly clawed deeply bifid, stamen more than twice as long as the lip. *Rosc. Scit. Pl.* t. 39. H. Gardnerianum, *var.* γ, *Wall. in Kew Journ.* v. (1853), 369; *Savi Fl. Ital.* iii. t. 112. H. angustifolium, *Bot. Reg.* t. 157.

KUMAON and NEPAL, alt. 5000 ft. or more.

Leaves 1–1½ ft. by 2–3 in., narrowed gradually to the base, glabrous beneath. *Spike* ½–1 ft.; bracts oblong, green, glabrous, 1–1¼ in. *Corolla*-tube not much longer than the bract; segments linear, 1 in. or more; staminodes as long as the corolla segments; lip shorter than the staminodes, about as broad as long; filament pale bright red; anther linear, yellow, ¼ in.—The affinity is stronger with some forms of *coccineum* than with *Gardnerianum.*

22. **H. luteum,** *Herb. Calcut.*; leaves oblong-lanceolate, spike short dense-fld., bracts oblong closely imbricate, flowers lemon-yellow, corolla-tube twice as long as the bract, staminodes lanceolate, lip orbicular bifid distinctly clawed, stamen half as long again as the lip.

ASSAM, *Oldham.*

Intermediate between *H. flavum* & *aurantiacum.* *Stem* slender. *Leaves* under 1 ft. Bracts broad, green, 1 in. *Corolla*-tube 2 in.; segments linear, pale yellow, above 1 in.; lip under 1 in. broad, uniform yellow throughout, narrowed suddenly to a short claw.—Described from a drawing in the Calcutta collection.

23. **H. gratum,** *Wall.* ex *Voigt. Hort. Suburb. Calcutt.* 570 (name only); leaves long lanceolate, spike dense-fld., bracts large oblong, corolla-tube much longer than the bract, flowers whitish, staminodes oblong, lip orbicular clawed deeply emarginate, stamen a little longer than the lip.

KHASIA HILLS, *Wallich.*

Leafy stem long and stout. *Leaves* above 1 ft., 3 in. broad. *Spike* ½ ft.; bracts 2–3 in. *Corolla-segments* linear, 1½ in.; staminodes 1 in., narrowed to the base; lip 1 in. broad, narrowed suddenly to a short claw.—Differs from *coccineum* by its whitish flowers and shorter stamens. Described from a drawing in the Calcutta collection.

24. **H. elatum,** *Br. in Bot. Reg.* t. 526; leaves large oblong, spike long moderately dense-fld., bracts oblong 1–2-fld. moderately large, calyx as long as the bract, flower white tinged with red, staminodes oblanceolate, lip orbicular clawed bifid, stamen twice as long as the lip. *Rosc. Scit. Pl.* t. 63; *Wall. Cat.* 6549 A, B; *Lodd. Bot. Cab.* t. 856; *Reichb. Fl. Exot.* t. 270; *Horan. Prodr.* 26. H. coccineum, var. β, *Wall. in Kew Journ.* v. (1853), 373, *in part.*

SUBTROPICAL HIMALAYA; from KUMAON to SIKKIM, alt. about 5000 ft.

Leaf above 1 ft., 3–4 in. broad, glabrous beneath. *Spike* 1 ft. or more, rachis very stout; bracts oblong, 1–1¼ in., ¾ in. broad. *Calyx* cylindric, 1–1¼ in. *Corolla*-tube a little longer than the bract; segments linear, 1¼ in.; staminodes 1–1¼ in.,

distinctly clawed; lip rounded at the base to a distinct claw, ¾-1 in. broad, white, with a patch of dull red in the centre; filament pale red, 2 in. or more; anther ½-¾ in.—This and *H. aurantiacum* are so difficult to distinguish when dried from some of the forms of *coccineum*, that I have purposely abstained from citing several of Wallich's numbers.

11. **AMOMUM,** *Linn.*

Rootstock perennial, widely creeping. *Leafy stem* elongate. *Leaves* usually oblong-lanceolate. *Spikes* dense-fld., except in § *Cenolophus* produced direct from the rootstock; bracts imbricate. *Calyx* cylindric, 3-dentate. *Corolla*-tube cylindric; segments oblong or linear-oblong, upper often broader and more convex. *Lateral staminodes* 0 or minute teeth; lip broad or lingulate; filament short, arcuate; anther-cells divaricate, sometimes hairy, often furnished with a petaloid crest. *Ovary* 3-celled; ovules many, superposed; style filiform, stigma small and subglobose or larger and gibbous on the back. *Fruit* indehiscent or dehiscing irregularly, sometimes beaked, winged or echinate. *Seeds* globose or truncate. Species about 150, in the tropics of the Old World.

SECT. I. **Geanthus,** *Reinw.* (gen.). *Spike* radical. *Lip* broad. *Anther* not crested. (Sp. 1—4.)

1. **A. gramineum,** *Wall. Cat.* 6558; leaves small thin lanceolate pubescent beneath, spike small globose, peduncle very short, outer bracts lanceolate, lip small.

TAVOY, *Gomez.*

Stem slender, 2–3 ft. *Leaves* 6 by 1 in. *Spike* 1 in.; bracts ½-¾ in. *Calyx* ¼ in. *Corolla*-tube rather longer than the calyx; segments ¼ in. linear-oblong; lip rather longer than the corolla-segments. *Anther*-cells short, glabrous.

2. **A. floribundum,** *Benth. in Gen. Plant.* iii. 644; leaves oblong-lanceolate glabrous beneath, spike globose, peduncle long erect, outer bracts large orbicular, lip small obovate. Elettaria floribunda, *Thw. Enum.* 319.

CEYLON; forests in the Ambagamowa district.

Leafy stem 3–6 ft. or more. *Leaves* subcoriaceous, 18–24 by 3–5 in. petioled. *Peduncle* 1–1½ ft.; bract-leaves sheathing, obtuse. *Spike* 2–3 in. long and broad; flowers very numerous; bracts dark red, outer 1½ in. long and broad. *Flowers* pale ochraceous yellow. *Corolla* tube ¾ in.; segments and lip much shorter than the tube. *Fruit* small, oblong, smooth.

3. **A. nemorale,** *Benth. in Gen. Plant.* iii. 644; leaves oblong-lanceolate glabrous beneath, spike small globose, peduncle very short, outer bracts ovate obtuse, lip small orbicular 3-lobed. Elettaria nemoralis, *Thw. Enum.* 319.

CEYLON; forests in the Reigam and Pasdoon Corles.

Rootstock slender. *Leafy stem* 2–4 ft. *Leaves* firm, 6–15 by 1½-2 in. *Spike* 1-1½ in.; peduncle decumbent, shorter than the spike; bracts glabrous, outer ½-¾ in., inner lanceolate. *Corolla*-tube under 1 in., segments short, oblong, obtuse. *Lip* yellow, copiously veined with purple; midlobe smaller, bifid. *Capsule* globose, ½ in. shortly beaked.

4. **A. involucratum,** *Benth. in Gen. Plant.* iii. 644; leaves large oblong-lanceolate glabrous beneath, spike globose, peduncle long erect, outer bracts very large obovate overtopping the flowers, lip small obovate equally 3-lobed. Elettaria involucrata, *Thw. Enum.* 319.

CEYLON; damp forests of the central province, alt. 4000–6000 ft.
Leafy stem 6–10 ft. or more. *Leaves* thin, 1½–3 ft. by 4–7 in. *Spike* 2–3 in. long and broad; flowers very numerous; bracts bright red, outer 3 in.; inner lanceolate, 1½ in. *Corolla*-tube as long as the inner bracts; segments oblong, obtuse. *Lip* pale ochraceous yellow. *Capsule* 1½ in., ovoid-trigonous, smooth.

Sect. II. **Achasma,** *Griff.* (gen.). *Spike* radical. *Lip* narrow, margins incurved. *Anther* not crested.

* Lip not, or hardly longer than the corolla-segments.

5. **A. Fenzlii,** *Kurz in Journ. Beng. As. Soc.* xlv. pt. ii. 154, t. 12; leaves lanceolate glabrous beneath, spike globose, peduncle short erect, bracts ovate densely ciliated, lip not longer than the corolla-segments.

NICOBAR ISLANDS, *Kurz.*
Leafy stem 6–7 ft. *Leaves* thin, 2–3 ft. by 2½–3 in., green and glabrous on both surfaces. *Spike* very dense-fld., 2 in. diam.; peduncle 6 in., its bract-leaves large, oblong; outer bracts very large, ovate; inner 1 in., pale red, back glabrous, margin densely-matted with whitish tomentum. *Corolla*-tube ½ in.; segments 1 in. linear, pale red. *Lip* 1 in., red, with white inflexed margins. *Fruit* obovoid, 1 in. *Seeds* obovoid, black; aril white.

6. **A. araneosum,** *Baker*; spike oblong, peduncle very short, bract ovate densely matted on the edge, lip rather longer than the corolla-segments.

TENASSERIM, *Griffith, Helfer* (Hook. f. & Thoms. Herb. Ind. Or. 4.).
Leaves unknown. *Spike* oblong, 2 in.; peduncle 2–3 in., bract-leaves large, crowded, ovate; outer bracts large, ovate, backs glabrous, margins densely matted with whitish cottony tomentum; inner lingulate, 1½ in. *Corolla* as long as the inner bracts. *Anther*-cells glabrous.—Nearly allied to *A. Fenzlii.*

7. **A. stenoglossum,** *Baker*; leaves lanceolate glabrous beneath, spike globose, peduncle longer than spike, outer bracts large oblong acute glabrous, lip not much longer than the corolla segments.

PERAK, alt. 500-1000 ft., *King's Collector.*
Leafy stem 8–12 ft. *Leaves* 2 ft. or more, by 2 in. *Spike* globose, 3 in.; central bracts 1½–2 in.; peduncle 4–5 in., bract-leaves 1 in., rigid, oblong, obtuse. *Corolla*-tube 1½ in.; segments shorter. *Anther*-cells ½ in. glabrous, linear.

** Lip much longer than the corolla-segments.

† *Spike globose.*

8. **A. sphærocephalum,** *Baker*; leaves large oblong-lanceolate glabrous beneath, spike globose shortly peduncled, outer bracts oblong-lanceolate glabrous, lip much longer than the corolla-segments.

PENANG, *Maingay* (*Kew Distrib.* 1581).
Leafy stem long, robust. *Leaves* subcoriaceous, 1½–2 ft., by 3–4 in. *Spikes* 1½–2 in. long and broad; outer bracts 1½ in., inner 1 in., lingulate, glabrous. *Calyx* cylindric, shortly 3-toothed, bearded at the apex. *Corolla*-tube 1 in.; segments oblong, obtuse. *Lip* deep crimson, ½ in., bifid ⅓ of its length, incurved margin white. *Anther* truncate.

9. **A. metriocheilos,** *Baker*; leaves lanceolate glabrous beneath, spike globose shortly peduncled, outer bracts oblong-lanceolate glabrous, lip twice as long as the corolla-segments. Achasma metriocheilos, *Griff. Notul.* iii. 427; *Ic. Plant. Asiat.* t. 356.

MALACCA, *Griffith* (*Kew Distrib.*, 5758). PENANG, on Government Hill, *Curtis*, 1530.

Leaves 1–1½ ft. by 1½ in., bright green. *Spike* 2 in. long and broad; peduncle arcuate, as long as the spike; outer bracts bright red, 1½ in.; inner as long, lingulate. *Calyx* 1 in., spathaceous, cylindric; teeth minute, densely pilose. *Corolla*-tube as long as the calyx; segments 1 in. oblong, glabrous. *Lip* scarlet, with a small obovate tip, and margins incurved more than half way up. *Anther*-cells glabrous.—A closely-allied plant from Perak (*King's Collector*, 2933) has stems 12–15 ft. and leaves 3 ft. by 4–5 in.

10. **A. Maingayi,** *Baker*; leaves lanceolate glabrous beneath, spike globose, peduncle long erect, bracts glabrous outer orbicular, lip twice as long as the corolla-segments.

MALACCA, *Maingay* (*Kew Distrib.* 1586).

Rootstock slender, woody. *Leaves* thin, 12 or more by 2 in., narrowed very gradually to the base. *Spike* many-fld., 1½–2 in. long and broad; peduncle 12 in.; bract-leaves several distant obtuse small; outer bracts 1 in. orbicular; inner lingulate. *Calyx* 1 in.; segments linear-lanceolate, as long as the tube. *Lip* 1 in., narrowed to an obtuse tip. *Filament* connate with the lip nearly to the top; anther-cells hairy. *Fruit* bright red, neither ribbed nor echinate.

†† *Spike oblong.*

11. **A. macrocheilos,** *Baker*; spike oblong shortly peduncled, outer bracts large oblong acute glabrous, lip more than twice as long as the corolla-segments bifid, margins of the lower third incurved. Achasma macrocheilos, *Griff. Notul.* iii. 429; *Ic. Plant. Asiat.* t. 357.

MALACCA, *Griffith.*

Leaves unknown. *Spike* 3 in.; peduncle 2 in., bract-leaves small, ovate, imbricate; outer bracts brownish, 2–2½ in. *Calyx* cylindric, spathaceous, as long as the corolla-tube. *Corolla*-segments linear-oblong, above 1 in.; upper broader. *Flower* greenish red. *Lip* 2½ in.; upper half linear, deeply bifid. *Anther* glabrous, deeply emarginate.

12. **A. costatum,** *Benth. in Gen. Plant.* iii. 644; leaves oblong-lanceolate pubescent beneath, spike oblong shortly peduncled, outer bracts oblong-lanceolate glabrous, lip twice as long as the corolla-segments. Alpinia costata, *Roxb. Corom. Pl.* t. 252. A. Cardamomum medium, *Roxb. Fl. Ind.* i. 74. E. costata, *Horan. Prodr.* 31. Elettaria media, *Link ex Horan.* Cardamomum medium, *Schult. Mant.* i. 244.

EASTERN TROPICAL HIMALAYAS; Silhet, *Roxburgh.*

Rootstock ½ in. diam. *Leafy stem* stout, 5–6 ft. *Leaves* 2–3 ft. by 3–4 in. *Spikes* 2–3 in.; peduncle as long as the spike; outer bracts pink, 1½ in. *Corolla*-tube 2 in., cylindric; segments obtuse, half as long as the tube. *Lip* 2 in., deflexed, lingulate, red-yellow, tip entire, flat in the upper half, margins below the middle slightly incurved. *Fruit* ½ in., ovoid, strongly ribbed, smooth. *Seeds* many, obovoid, truncate acrid, aromatic, brownish.

13. **A. linguiforme,** *Benth. in Gen. Plant.* iii. 644; leaves oblong-lanceolate glabrous beneath, spike oblong few-fld. shortly peduncled, outer bracts ovate whitish glabrous, lip more than twice as long as the corolla-segments. Alpinia linguiforme, *Roxb. Fl. Ind.* i. 75; *Pl. Coromand.* t. 276. Elettaria linguiformis, *Schult. Mant.* i. 24; *Horan. Prodr.* 31.

EASTERN HIMALAYA, Tropical region, Sikkim, *J. D. H.* KHASIA HILLS (*Hook. f. & Thoms. Herb. Ind. Or.*, 10), *King.* BENGAL, *Roxburgh.*

Rhizome stout, copiously stoloniferous. *Leafy stem* 4–6 ft. *Leaves* thin,

1–1½ ft. by 3–5 in. *Spikes* about 3 in.; peduncle as long or shorter; inner bracts lanceolate, pink, 2–2½ in. *Corolla*-tube cylindric, 2 in.; segments oblong, bright red, half as long as the tube. *Lip* bright yellow, deflexed, above 2 in. long, bifid, margins below the middle incurved. *Stamen* shorter than the corolla-segments. *Ovary* hairy.

14. **A. gomphocheilos,** *Baker*; leaves large lanceolate glabrous beneath, spike oblong shortly-peduncled, outer bracts oblong-lanceolate large glabrous, lip twice as long as the corolla-segments, tip cuneate.

Perak, *King's Collector*, 1897.

Leafy stem 12 ft. *Leaves* 2–3 ft. by 3 in. *Spike* 3 in.; outer bracts 2 in. *Corolla*-tube 2 in.; segments linear-oblong, under 1 in. *Lip* twice as long as the corolla-segments, with a cuneate-clawed tip, margins incurved to the tip of the corolla-segments. *Anther* emarginate; cells glabrous, tips much divaricated.

15. **A. megalocheilos,** *Baker*; leaves oblong-lanceolate, spike oblong very shortly peduncled, outer bracts ovate glabrous, lip more than twice as long as the corolla-segments tip obovate. Achasma megalocheilos, *Griff. Notul.* iii. 426; *Ic. Plant. Asiat.* t. 355.

Malacca; foot of Mount Ophir, *Griffith.*

Leafy stem stout, 12–16 ft. *Spike* 3–4 in.; outer bracts 1½–2 in. *Calyx* spathaceous, cylindric, above 2 in. long; teeth small, lanceolate. *Corolla*-tube as long as the calyx; segments 1 in., linear-oblong. *Lip* 3 in., bright red; margins of the lower half incurved, yellow. *Anther*-cells glabrous, tip emarginate.

Sect. III. **Hornstedtia,** *Retz.* (gen.) (*Donacodes*, Blume; *Stenochasma*, Griff.). *Spike* radical. *Lip* narrow, margins incurved. *Anther* crested.

16. **A. macrodus,** *Scortech. in Nuov. Giorn. Bot. Ital.* xviii. 309, t. 12; leaves oblong-lanceolate, spike small subglobose shortly peduncled, bracts small ovate-lanceolate, lip not longer than the corolla-segments oblong margins involute, anther-crest small truncate.

Malay Peninsula; Kinta, *Scortechini.*

Leafy stem slender, 2 ft. *Leaves* caudate, 6–8 by 2–3 in. *Spike* 1 in. diam.; bracts red, glabrous, ½ in. *Calyx* spathaceous, ½ in. *Corolla*-tube half as long again as the calyx; segments oblong, ¼ in. *Lip* bifid, tip yellow, purple inside towards the base; small staminodes developed; anther-crest entire; cells parallel, glabrous.

17. **A. rubro-luteum,** *Baker*; leaves lanceolate glabrous beneath, spike globose sessile, outer bracts ovate glabrous, lip much longer than the corolla-segments.

Malacca, *Maingay* (*Kew Distrib.*, 1588).

Leaves about 1 ft. by 2 in. *Spike* 2 in.; outer bracts 1½ in., pink ½ upwards. *Corolla*-tube 1½ in.; segments linear-oblong, subequal. *Lip* lingulate, deeply cleft at the tip, bright crimson, incurved margins yellow. *Filament* shortly produced beyond the anther.

18. **A. Leonurus,** *Kœnig in Retz. Obs.* iii. 69; leaves oblong-lanceolate glabrous beneath, spike cylindric subsessile, outer bracts large ovate pubescent, lip not longer than the corolla-segments. Hornstedtia Leonurus, *Retz. Obs.* vi. 18. Stenochasma convoluta, *Griff. Notul.* iii. 433; *Ic. Pl. Asiat.* t. 359.

MALACCA, *Kœnig*; dense woods at Rhim, *Griffith*.

Leafy stem 6 ft. or more. *Leaves* above 1 ft. *Spike* 3–4 in., 1 in. diam.; outer bracts 1½ in., ovate, acute, rigid, reddish-green. *Corolla*-tube 3 in.; segments linear, red, half as long as the tube. *Lip* with an obtuse rigid point and sides, involute in the lower third. *Anther*-cells hispid; crest small, emarginate. *Capsule* large, oblong-trigonous.

19. **A. scyphiferum,** *Kœnig in Retz. Obs.* iii. 68; leaves oblong-lanceolate pubescent beneath, spike oblong shortly peduncled, outer bracts large suborbicular rigid reticulated, lip as long as the corolla-segments. Hornstedtia Scyphus, *Retz. Obs.* vi. 18. Stenochasma urceolare, *Griff. Notul.* iii. 431; *Ic. Plant. Asiat.* t. 358.

MALACCA, *Kœnig*, *Griffith*, *Maingay* (*Kew Distrib.*, 1582). SINGAPORE, *Ridley*.

Leafy stem 10–12 ft. *Leaves* 1½–3 ft. by 4–6 in. *Spike* 4 in., 2 in diam.; central bracts 2 in., rigid, tip rounded, vertical ribs raised and connected by tomentose cross veinlets. *Corolla*-tube 2 in.; segments shorter, linear-oblong. *Lip* bright red, concave to the tip, base auriculate. *Anther*-cells pilose; crest orbicular-oblong. *Capsule* 1 in., oblong-trigonous.

20. **A. triorgyale,** *Baker*; leaves oblong-lanceolate pubescent beneath, spike oblong subsessile, outer bracts large suborbicular not reticulated, lip as long as the corolla-segments.

PERAK, *King's Collector*.

Nearly allied to *A. scyphiferum* *Leafy stem* 20 ft. *Leaves* above 2 ft. by 6 in., distinctly petioled. *Spike* like that of *A. scyphiferum*, but the bracts less rigid and the close vertical ribs not connected by raised pubescent cross-veinlets. *Corolla*-tube 2 in.; segments and lip shorter than the tube.

Sect. IV. **Euamomum,** *Benth.* *Spike* radical. *Lip* broad. *Anther* crested.

* Anther-crest entire or crenate.

† *Anther-crest lunate.*

21. **A. Kœnigii,** *Baker*; leaves oblong, spike ovate-oblong shortly peduncled, outer bracts obtuse, lip 3-lobed bifid longer than the corolla-segments, anther-crest semilunar. Amomum, No. 57, *Kœnig in Retz. Obs.* iii. 54. Meistera, *Giseke Præl. Linn.* 205.

Coast of TENASSERIM; island of Junk Seylan, *Kœnig*.

Leafy stem 6–7 ft. Outer *bracts* ciliate, cymbiform, as long as the corolla-tube. *Corolla*-segments obovate, subequal, white. *Lip* white, broader than the corolla-segments; central lobe small; anther-crest white.—I have seen no specimen.

22. **A. acuminatum,** *Thw. Enum.* 317; leaves oblong-lanceolate caudate glabrous beneath, spike globose shortly peduncled, bracts small oblong acute, lip broad 3-lobed longer than the corolla-segments, anther-crest semilunar.

CEYLON; Ratnapoora, at a low elevation.

Rootstock wide-creeping. *Leafy stem* 2–4 ft. *Leaves* 5–6 by 1½ in., shortly petioled. *Spike* 1–1½ in.; bracts under 1 in. *Lip* yellow tinged with red; central lobe emarginate; anther-cells ciliate; crest crenulate.

23. **A. fulviceps,** *Thw. Enum.* 317; leaves oblong-lanceolate glabrous beneath, spike globose, peduncle moderately long, bracts oblong pubescent, lip 3-lobed not longer than the corolla-segments, anther-crest semilunar.

CEYLON; Raxawa, in the central province, *Thwaites*, *Walker*. (*Hook. f. & Thoms. Herb. Ind. Or.* 11.)

Leafy stem 6–8 ft. and more. *Leaves* subcoriaceous, 1–2 ft. by 2½–3 in. *Spike* very dense, 2½–3 in. diam.; bracts dark red, 1–1½ in., persistently pubescent. *Corolla*-tube 1½ in.; segments oblong, a third the length of the tube. *Lip* pale yellow. *Anther-cells* pilose.

24. **A. masticatorium,** *Thw. Enum.* 317; leaves lanceolate glabrous beneath, spike globose shortly peduncled, bracts small obovate pubescent, lip broad 3-lobed, anther-crest semilunar, capsule small globose echinate.

CEYLON; common in the forests of the central province up to 4000 ft.

Rootstock slender. *Leafy stem* 6–8 ft. *Leaves* sessile, 1 ft. or more by 1–1½ in. *Spikes* 1½ in. long and broad; peduncle 2–3 in; bract-leaves many, small, scariose oblong; bracts under 1 in., ciliate. *Corolla*-tube hairy, as long as the bract; segments oblong, obtuse. *Lip* orbicular, dotted with red, bidentate at the base. *Capsule* ¾ in. diam., greenish-black.—Rootstock a native condiment.

†† *Anther-crest orbicular or transversely oblong.*

25. **A. pauciflorum,** *Baker*; spike sessile 1–2 fld., bracts oblong-lanceolate, lip orbicular-clawed longer than the corolla-segments, anther-crest small transversely oblong entire.

KHASIA HILLS; near Nunklow, *Hook. f. & Thoms.* (Herb. Ind. Or. 1).

Rootstock slender. *Leafy stem* unknown. *Spikes* several from one rootstock; bracts 1–1½ in., several, pinkish, membranous. *Corolla*-tube 1½ in.; segments 1 in. oblong, obtuse, white. *Lip* 1½–2 in., blade crisped orbicular, narrowed suddenly to a broad claw, with a yellowish middle, and radiating red veins; anther-cells glabrous, parallel.

26. **A. corynostachyum,** *Wall. Pl. Asiat. Rar.* i. 48 t. 58; *Cat.* 6561; leaves oblong-lanceolate glabrous beneath, spike globose, peduncle moderately long, outer bracts oblong, lip small broad obscurely 3-lobed, anther-crest orbicular.

SIKKIM HIMALAYA, *Kurz*. MARTABAN, *Wallich*. PEGU, *Kurz*.

Leafy stem 3–4 ft. *Leaves* 1–1½ ft. by 2–3 in. *Spike* 1½ in diam.; peduncle ½–1 ft., bract-leaves obtuse and imbricate; outer bracts 1 in. oblong navicular, pale brown; inner oblanceolate, obtuse. *Corolla*-tube under 1 in.; segments oblong, shorter than the tube. *Lip* under 1 in. suborbicular, white, tinged with yellow in the middle; filament very short; anther-cells glabrous; crest white, entire, petaloid.

27. **A. graminifolium,** *Thw. Enum.* 430; leaves linear glabrous beneath, spike globose shortly peduncled, outer bracts oblong glabrous, lip obovate truncate longer than the corolla-segments, anther-crest large orbicular entire.

CEYLON; abundant in the Singherajah forest.

Rootstock slender. *Leafy stem* 3–4 ft. or more. *Leaves* about 12 in. under 1 in. broad, firm, linear, very acuminate. *Spike* few-fld.; peduncle 1–2 in., bract-leaves many, small, oblong, scariose, brown; bracts 1 in. *Corolla*-tube as long as the bracts; segments obtuse, half as long as the tube. *Lip* 1 in.; anther-cells glabrous, ⅛ in.; crest as long as the cells.

28. **A. ciliatum,** *Baker*; leaves lanceolate pubescent beneath, spike oblong shortly peduncled, bracts oblong pubescent densely ciliate, lip short broad, anther crest transversely oblong. A. fulviceps β, *Thw. Enum.* 317.

CEYLON; Reigam Corle, *Thwaites*, 3704.

Leaves 12 by 1½–2 in., sessile, caudate. *Spike* 1½–2 in. diam.; peduncle 3–4 in.;

bracts 1 in., dark coloured, back pubescent and densely ciliated with whitish hairs. *Corolla*-tube much shorter than in *A. fulviceps*; segments ½ in. oblong.

29. **A. microstephanum,** *Baker*; leaves large lanceolate or oblong-lanceolate pubescent beneath, spike globose shortly peduncled, outer bracts oblong glabrous, lip obovate longer than the corolla-segments, anther-crest small orbicular, capsule 9-costate.

CONCAN, *Stocks*; near Chandwar (planted), *Ritchie*. (*Hook. f. & Thoms. Herb. Ind. Or.* 4).

Leafy stem 4 ft. *Leaves* 1½–2 ft. by 2–4 in., densely softly pubescent beneath. *Spike* 2 in.; outer bracts 1–1½ in. *Corolla*-tube 1 in.; segments linear-oblong, half as long as the tube. *Flower* white. *Lip* 1 in.; anther-cells glabrous, ½ in.

30. **A. xanthioides,** *Wall. Cat.* 6557; leaves lanceolate glabrous, spike globose shortly peduncled, outer bracts small oblong, lip cochleariform bifid longer than the corolla-segments, anther-crest short broad entire, capsule echinate.

TAVOY, *Gomez*. TENASSERIM, *Parish*.

Leafy stem 5–6 ft. *Leaves* 1–1½ ft. by 1½–3 in., firm, bright green. *Spike* 1 in., few-fld.; peduncle arcuate, slender, 2–3 in.; outer bracts ½–¾ in., acute, glabrous. *Corolla*-tube under 1 in.; segments oblong, ½–⅔ in. *Lip* with an orbicular blade ½–¾ in. broad, narrowed suddenly to a broad claw; anther-crest auricled on each side. *Capsule* rigid, oblong-trigonous, pale brown, under 1 in. long.—A nearly allied plant from Perak (*King's Collector*, 1839) with robust leafy stems 12 ft. long and much longer leaves, is doubtless a distinct species, but the materials are too scanty for description.

††† *Anther-crest subquadrate or truncate.*

31. **A. littorale,** *Kœnig in Retz Obs.* iii. 52; leaves oblong, spike globose, peduncle very short, outer bracts orbicular, lip broad emarginate, anther-crest truncate emarginate.

COAST OF TENASSERIM; island of Yunk Seylan, *Kœnig*.

Leafy stem taller than a man *Leaves* 1 ft. Outer *bracts* orbicular-cordate; inner linear-lanceolate, white; tip ciliate. *Corolla*-segments unequal; upper erect, oblong; lower lanceolate, approximate *Lip* cordate, bright orange; margins crisped; recurved lip bidentate; stamen half as long as the lip. *Capsule* oblong-trigonous.—I have seen no specimens.

32. **A. dealbatum,** *Roxb. Fl. Ind.* i. 43; leaves large oblong-lanceolate pale and pubescent beneath, spike globose short-peduncled, outer bracts ovate, lip large obovate emarginate, anther-crest small subquadrate entire, capsule-ribs winged. *Wall. Cat.* 6556; *Horan. Prodr.* 30.

EASTERN HIMALAYAS; SIKKIM, KHASIA HILLS, SILHET, EASTERN BENGAL and CHITTAGONG. (*Hk. f. & Thoms. Herb. Ind. Or.* 5.) *Roxburgh*, &c.

Leafy stem 4–5 ft. *Leaves* 2–3 ft. by 4–6 in., bright green above, whitish beneath. *Spike* 2 in. diam.; peduncle very short; outer bracts 1 in., reddish. *Corolla*-tube 1 in; segments oblong, obtuse, white, as long as the tube. *Lip* obovate-cuneate, 1½ in., white with a yellow line down the centre and radiating red veins. *Anther*-crest small, subquadrate. *Capsule* globose, reddish, 1 in. diam., with 9 winged crenulate vertical ribs.—Nearly allied to the Malayan *A. maximum*, *Roxb.*

Var. A. SERICEUM, *Roxb. Fl. Ind.* i. 46 (sp.); leaves silvery white beneath, anther-crest larger, capsule ovoid.—Sikkim, Khasia and Cachar. (Hk. f. & Thoms. Herb. Ind. Or. 6.).

33. **A. hypoleucum,** *Thw. Enum.* 318; leaves large oblong-lanceolate silvery beneath, spike 1–3-fld., peduncle very short, bracts oblong membranous, lip broad longer than the corolla-segments, anther-crest subquadrate crenate, capsule 9-ribbed.

CEYLON; damp forests of the central province, up to 4000 ft.

Rootstock slender. *Leafy stem* stout, 4–5 ft. *Leaves* 1½–2 ft. by 3–5 in., persistently silky beneath, petiole 3 in. *Spikes* many to a rootstock; bracts 1½–2 in. *Corolla*-tube as long as the bracts; segments 1 in., oblong, white, subequal; lip orbicular-cuneate, 1½ in., entire, white with a yellow disk tinged with red. *Capsule* 1 in. globose, red.

34. **A. cannæcarpum,** *Benth. in Gen. Plant.* iii. 644; leaves oblong-lanceolate glabrous, spike oblong nearly sessile, outer bracts oblong-lanceolate, lip broad not longer than the corolla-segments, anther-crest short truncate, capsule globose echinate. Elettaria cannæcarpa, *Wight Ic.* t. 2007.

NILGHIRI HILLS; *Wight, Gardner.*

Leafy stem 4–6 ft. *Leaf* 12 by 2½ in. *Spike* 3 in.; outer bracts 1–1½ in., tips deep pink, paler below. *Corolla*-tube 1½ in.; segments oblong, half as long, the upper broader; lip obovate, yellow, emarginate; filament short; anther-cells parallel, glabrous; crest very small, entire. *Capsule* rigid, 1 in. diam. *Seeds* angled.—Wight's description and figure do not agree with one another, and neither is quite accurate.

35. **A. subulatum,** *Roxb. Cor. Pl.* t. 277; *Fl. Ind.* i. 44; leaves oblong-lanceolate glabrous beneath, spike globose shortly peduncled, outer bracts obtuse with a horny cusp, lip obovate-cuneate emarginate, anther-crest small truncate, capsule echinate. *Horan. Prodr.* 29.

EASTERN HIMALAYAS; *Roxburgh.*

Leafy stem 3–4 ft. *Leaves* 1–2 ft. by 3–4 in. green, glabrous on both surfaces. *Spike* very dense, shortly peduncled, 2–3 in.; bracts red-brown, outer 1 in., ovate, inner shorter and obtuse. *Calyx* and corolla-tube 1 in.; segments sobtuse, shorter than the tube; upper cuspidate. *Lip* yellowish white, rather longer than the corolla-segments. *Filament* very short; anther-crest entire. *Capsule* 1 in., globose, red-brown, densely echinate.

** Anther-crest 3–4-lobed.

† *Spike* 2–3-*fld.*

36. **A. biflorum,** *Jack in Mal. Misc.* i. 2; leaves oblong-lanceolate glabrous except the midrib, spike 2-fld. peduncled, bracts lanceolate, lip obovate white with a yellow centre, anther-crest 3-lobed. *Hook. Bot. Misc.* i. 274.

PENANG, *Jack.*

Rootstock not thicker than a goose-quill. *Leafy stem* 3 ft. *Peduncle* enveloped in bracteal sheaths; bracts reddish; bracteole half as long as the calyx. *Corolla* white, segments subequal. *Lip* white, tip rounded.—Not seen.

37. **A. elatterioides,** *Baker*; leaves oblong-lanceolate softly pubescent beneath, spike sessile 2-fld., bracts lanceolate, corolla-tube long slender, lip broad longer than the corolla-segments, anther-crest 3-lobed.—Amomum sp. *Griff. Notul.* iii. 417.

MALACCA, *Griffith, Kew Distrib.* 5753, *Maingay* (K. d. 1573.)

Rootstock slender. *Leafy stem* 2–2½ ft. *Leaves* 9–12 by 1½–2 in. *Spikes* many

to a rootstock; bracts 1 in., reddish, membranous. *Corolla*-tube 2 in., very slender; segments ½ in., linear-oblong, membranous. *Lip* white, subcochleate, twice as long as the corolla-segments, with a broad yellow central band with a reddish border; anther-crest large, petaloid.

†† *Spike many-fld., oblong.*

38. **A. Kingii,** *Baker*; leaves oblong-lanceolate, spike oblong peduncled, bracts ovate, lip small broad emarginate, anther-crest obscurely 3-lobed, fruit neither costate nor echinate.

Sikkim Himalaya; *King.*

Leafy stem stout. *Leaves* above a foot long, 3–4 in. broad. *Spike* 4–5 in.; bracts pale brown, 1–1½ in.; peduncle as long as the spike. *Corolla*-tube 1 in.; segments oblong, obtuse, nearly as long as the tube. *Lip* ½ in. broad, white tinged with yellow, obscurely 3-lobed, narrowed suddenly to a broad claw; stamen shorter than the lip. *Capsule* globose, 1 in. diam.

39. **A. uliginosum,** *Kœnig in Retz Obs.* iii. 56; leaves oblong glabrous, spike peduncled, outer bracts oblong, lip broad emarginate margins rounded ascending, anther-crest 4-lobed, capsule globose echinate. Wurfbainia, *Giseke Prael. Linn.* 206.

Malay Peninsula; Raput Nok, *Kœnig.*

Rootstock filiform. *Leafy stem* 3–4 ft. *Leaves* scarcely 1 ft. *Spike* distant from the leaves; bracts oblong, membranous, subrigid, white. *Corolla*-segments white; upper oblong, obtuse; lateral lanceolate. *Lip* with a rigid claw and a recurvato-ascending cymbiform blade.—*Descript. from Kœnig, l. c.*

††† *Spike globose.*

40. **A. xanthophlebium,** *Baker*; leaves lanceolate glabrous, spike globose shortly peduncled, outer bracts large oblong glabrous, lip broad 3-lobed longer than the corolla-segments, anther-crest trifid.

Malacca, *Maingay* (*Kew Distrib.* 1585).

Leafy stem long, robust. *Leaves* above 1 ft. *Spikes* 2–2½ in. and broad; peduncle about as long; outer bracts reddish, 1½ in. *Corolla*-tube as long as the bract; lower segments oblong, upper broader ovate. *Lip* dull red, paler towards the margin, with radiating yellow veins. *Anther*-crest broad; lateral lobes decurved.

41. **A. aromaticum,** *Roxb. Fl. Ind.* i. 45; leaves oblong-lanceolate glabrous beneath, spike globose shortly peduncled, outer bracts small ovate, lip large obovate-cuneate, anther-crest trifid, fruit neither costate nor echinate. *Wall. Cat.* 6559; *Horan. Prodr.* 29 ? Renealmia fasciculata, *Rosc. Scit. Pl.* t. 109. Geocallis fasciculata, *Horan. Prodr.* 33.

Eastern Himalayas, tropical region; Nepal, *Wallich*; Sikkim, Khasia Hills, Silhet, & Northern Bengal; *Roxburgh*, &c.

Leafy stem 3–4 ft. *Leaves* ½–1 ft. by 2–4 in., and glabrous on both sides. *Spike* small, globose; peduncle generally short, rarely longer and decumbent; outer bracts 1 in., ovate, pale brown. *Corolla*-tube 1 in.; segments obtuse, nearly as long as the tube, white, tinged with brown. *Lip* pale yellow, twice as long as the corolla-segments, outer half deflexed. *Anther*-crest large, petaloid, lobes rounded. *Capsule* 1 in., oblong, trigonous.

Renealmia fasciculata is founded on a rough drawing, probably of this species.

42. **A. pterocarpum,** *Thw. Enum.* 317; leaves large oblong-lanceolate glabrous beneath, spike globose shortly peduncled, outer bracts

oblong glabrous, lip short broad, anther-crest short 3-lobed, capsule ovoid 9-ribbed.

CEYLON; forests of the central province, up to 4000 ft.

Leafy stem 3–6 ft. or more. *Leaves* thin, 1–2 ft. by 2–6 in., narrowed gradually to the base. Flowering spike globose; bracts 1½ in., deciduous and fruiting pedicels elongating. *Lip* round, white, shortly bidentate at the base; disk yellow, tinged with red. *Capsule* 1 in.; ribs crenulate.

43. **A. Benthamianum,** *Trimen Cat. Ceyl. Pl.* 92; leaves lanceolate glabrous beneath, spike small globose shortly peduncled, bracts oblong acute glabrous, lip short broad, anther-crest broad 3-lobed, capsule small echinate.

CEYLON; Reigam Corle, *Thwaites.*

Rootstock slender. *Leafy stem* short and slender. *Leaves* 6–8 by 1–1½ in., shortly petioled. *Spike* 1 in. diam.; outer bracts greenish, 1 in.; peduncle rather longer than the spike. *Corolla*-tube 1 in.; segments oblong obtuse. *Anther*-crest with 3 shallow orbicular lobes. *Capsule* ½ in diam.

44. **A. aculeatum,** *Roxb. in Asiat. Res.* xi. 344, t. 6; *Fl. Ind.* i. 40; leaves oblong-lanceolate glabrous beneath, spike globose shortly peduncled, outer bracts ovate, lip broad rather longer than the corolla-segments, anther-crest broad 3-lobed, capsule echinate, *Horan. Prodr.* 30.

SOUTH ANDAMAN ISLANDS, *Kurz.*—DISTRIB. Malay isles.

Rootstock tuberous. *Leafy stem* 5–10 ft. *Leaves* sessile, 1–1½ ft. by 2–4 in. *Spike* 2 in. diam.; bracts brown, acute, 1–1½ in. *Corolla*-tube 1 in.; segments oblong, half as long as the tube. *Lip* suborbicular, pale yellow, tinged with red in the centre. *Anther*-crest short, broad, equally 3-lobed. *Capsule* brown, rigid, densely echinate, 1 in. under.

45. **A. echinatum,** *Willd. Sp. Plant.* i. 8; leaves lanceolate glabrous beneath, spike globose, peduncle moderately long, bracts small oblong, lip broad rather longer than the corolla-segments, anther-crest transversely oblong 3-lobed, capsule globose echinate. *Thw. Enum.* 316; *Horan. Prodr.* 30.

CEYLON; forests of central province, up to 4000 ft.

Leafy stem 6–12 ft. *Leaves* 1–2 ft. by 2–3 in.; caudate or acuminate, sessile. *Spike* 1½–2 in. diam.; peduncle stout, ½ ft. bright red in the lower part, its bract-leaves very obtuse and imbricate; bracts 1 in., faintly pubescent, brown-black, convex. *Corolla*-tube 1 in.; segments oblong, obtuse. *Lip* yellow, with many fine red veins. *Anther*-crest short and broad, with three subequal orbicular lobes. *Capsule* 1 in., purplish-black, with copious curved spines.

SUBGEN. V. **Cenolophon,** *Horan.* (gen.). *Spike* terminal on the leafy stem. (Sect. 46–48.)

46. **A. rufescens,** *Benth. in Gen. Plant.* iii. 645; leaves oblong-lanceolate, spike dense-fld. globose, lip broad 3-lobed as long as the corolla-segments. Elettaria rufescens, *Thw. Enum.* 430.

CEYLON; Ambagomowa district, alt. 3000 ft.

Leafy stem 1½–2 ft. *Leaves* ½–1 ft. by 1–2 in. moderately firm, green and glabrous on both surfaces. *Spike* small, globose, terminal, enveloped at first in a large green orbicular cuspidate bract; flower-bracts obtuse, under 1 in. *Corolla*-segments oblong, obtuse; lip as long as the corolla-segments, midlobe retuse.

47. **A. vitellinum,** *Lindl. in Journ. Hort. Soc.* ii. 245; *Bot. Reg.*

1847, t. 52; leaves oblong, spike dense-fld. globose lip orbicular twice as long as the corolla-segments. Cenolophon vitellinum, *Horan. Prodr.* 36.

CEYLON? Hort. Chiswick.

Leafy stem slender, 2 ft. *Leaves* 6–8 by 3–4 in., bright green, glabrous. *Spike* small, shortly peduncled; bracts green, oblong, ½ in. *Calyx* and corolla-tube about as long as the bract; corolla-segments linear-oblong, as long as the tube. *Lip* 1 in., base spurred, bright yellow, with red veins. *Anthers* with a large trifid crest; cells glabrous, tips diverging.

48. **A. macrostephanum,** *Baker*; leaves lanceolate base cordate, spike elongate, bracts deciduous, lip obovate-cuneate much longer than the corolla-segments.

PERAK; alt. 500–1000 ft., *King's Collector.*

Leafy stem very slender, 4–8 ft. *Leaves* 1–1½ ft. by 2–3 in. thin, glabrous, caudate, narrowed from the middle to the cordate base. *Spike* 3–4 in.; peduncle long, erect, enveloped in the sheath of the topmost leaf; bracts caducous. *Ovary* densely villous. *Calyx* loosely tubular, ¼ in. *Corolla*-tube rather longer than the calyx; segments linear-oblong. *Lip* 1 in. *Filament* half as long; anther glabrous; crest large, leafy, crisped, lacerate.

12. ZINGIBER, *Adans.*

Rootstock horizontal, tuberous. *Leafy stem* elongated. *Leaves* oblong-lanceolate, clasping the stem by their long sheaths. *Spikes* usually radical, rarely lateral or terminal on the leafy stem; peduncle short or long; bracts persistent, usually single-fld. *Calyx* cylindric, shortly 3-lobed. *Corolla*-tube cylindric; segments lanceolate, upper concave. Lateral *staminodes* 0 or adnate to the obovate-cuneate lip; filament short; anther-cells contiguous, crest narrow, as long as the cells. *Ovary* 3-celled; ovules many, superposed; style filiform; stigma small, subglobose. *Capsule* oblong, finally dehiscing. *Seeds* large, globose, arillate.—Species 30, Tropics of Old World.

Sect. I. **Cryptanthium,** *Horan. Spikes* produced direct from the rootstock, very short and dense; peduncle very short.—(Sp. 1–11.)

* *Leaves more or less pubescent beneath.*

1. **Z. chrysanthum,** *Rosc. Scit. Pl.* t. 86; leaves pubescent beneath, bracts green outer ovate inner lanceolate with a hairy cusp, corolla-segments bright red, lip bright yellow deeply 3-lobed, midlobe orbicular, lateral ovate. *Horan. Prodr.* 27. Z. ligulatum, *Wall. Cat.* 6566, *non Roxb.*

TROPICAL HIMALAYA, from KUMAON, ascending to 5500 ft., to SIKKIM and ASSAM.

Leafy stem 6–8 ft. *Leaves* 12 by 2–3 in., oblong-lanceolate. *Spike* very dense, globose or oblong; peduncle very short; inner bracts 1½–2 in. broad. *Corolla*-tube 1½–2 in.; segments 1 in., lanceolate. *Lip* 1 in., unspotted; basal auricles largest of any species, hence the lip is as broad as long. *Stamen* shorter than the lip. *Capsule* oblong. *Seeds* brown, nearly as large as a pea, wrapped to the top in a white membranous aril.—Z. FLAVESCENS, *Link.*; *Dietr. Sp.* i. 54, is probably a form of this, but the description is very incomplete.

2. **Z. rubens,** *Roxb. in Asiat. Res.* xi. 348; *Hort. Beng.* 1; *Fl. Ind.* i. 53; leaves pubescent beneath, bracts bright red outer ovate inner

lanceolate, corolla-segments red, lip oblong much spotted and streaked with red on a pale ground, basal auricles small rounded. *Rosc. Scit.* t. 88; *Horan. Prodr.* 28.

KHASIA HILLS, *H. f. & T.* (*Herb. Ind. Or.* 10), *Clarke.* BENGAL; Rungpore, *Hamilton.*

Leafy stem stout, 6–8 ft. *Leaves* 12 by 4–5 in. or more. *Spike* very dense, globose; peduncle 1–4 in.; inner bracts 1½ in. *Corolla*-tube as long as the bracts; segments 1 in, lanceolate, subequal, bright red. *Lip* nearly as long as the corolla-segments, yellowish-white, copiously spotted and streaked with minute dots and lines of red-purple. *Stamen* as long as the lip, beak of the anther bright red.

3. **Z. roseum,** *Rosc. in Trans. Linn. Soc.* viii. 348; *Scit. Pl.* t. 87; leaves pubescent beneath, bracts pale red outer ovate inner lanceolate, corolla-segments pale red, lip oblong-cuneate whitish unspotted, basal auricles very small yellow rounded. *Roxb. in Asiat. Res.* xi., 347, *Fl. Ind.* i. 50; *Wall. Cat.* 6570; *Horan. Prodr.* 28. Amomum roseum, *Roxb. Coromand. Pl.* t. 126.

NORTHERN CIRCARS, *Roxburgh.*

Leafy stem 3–4 ft. *Leaves* 8–12 by 3–4 in. *Spike* very dense, oblong; peduncle very short; inner bracts 1½–2 in. *Corolla*-tube whitish, 2 in.; segments 1 in, lanceolate, subequal. *Lip* shorter than the corolla-segments; margins recurved, crisped. *Stamens* arching over the lip and equalling it in length; beak as long as the anther, as in the other species.

4. **Z. Nimmonii,** *Dalz in Hook. Kew Journ. Bot.* iv.(1852) 341; leaves pubescent beneath, bracts red-striped linear-oblong or lanceolate, corolla-segments reddish-yellow, lip yellow emarginate, basal auricles small rounded. *Dalz & Gibs. Bomb. Fl.* 273; *Horan. Prodr.* 28. Alpinia Nimmonii, *Grah. Cat. Pl. Bomb.* 206.

CONCANS; common in the mountains, *Nimmo, Dalzell.*

Leaf stem 4–5 ft. *Leaves* 1–1½ ft, 6–12 by 2–3 in. broad. *Spikes* subglobose; peduncle very short; bracts glabrous, 1–1½ in. *Corolla*-tube as long as the bracts; segments lanceolate. *Lip* obovate-cuneate, faintly emarginate. *Capsule* the size of a pigeon's egg.—Nearly allied to *Z. panduratum.*

5. **Z. Wightianum,** *Thw. Enum.* 315; leaves pubescent beneath, bracts green outer ovate inner lanceolate, corolla-segments pale, lip obovate-cuneate pale yellow veined and spotted with purple, basal auricles small ovate. *Z.* squarrosum, *Wight Ic.* t. 2004, non *Roxb.*

TRAVANCORE; abundant in the Anamallay forests, &c. CEYLON; common in the forests up to 4000 ft.

Leafy stem 4–6 ft. *Leaves* 12–18 by 3–4 in., oblong-lanceolate. *Spikes* oblong or subglobose; peduncle very short; flower-bracts 1½ in., pubescent. *Corolla*-tube as long as the bract; segments subequal, under 1 in. *Lip* nearly as long as the corolla-segments, emarginate. *Stamen* shorter than the lip, arching over it, as in the other species. *Capsule* 1 in.—In a specimen from Thwaites the spike is terminal on the leafy stem, thus connecting sections *Cryptanthium* and *Dymczewiczia.*

6. **Z. barbatum,** *Wall. Pl. Asiat. Rar.* t. 55; *Cat.* 6567; leaves pubescent beneath, bracts reddish-green ovate cuspidate, corolla-segments whitish, lip obovate-cuneate white emarginate, basal auricles very small. *Horan. Prodr.* 28.

BURMA, *Wallich.* PEGU, *McClelland.*

Leafy stem 2–3 ft. *Leaves* oblong, 6–8 by 1½–2 in. *Spike* 1½–2 in. very dense, ovoid; peduncle very short; bracts 1 in., ovate with a large green cusp, hairy all

over. *Corolla*-tube ¾–1 in.; upper segment larger than the two side ones, concave. *Lip* ½ in. *Stamen* as long as the lip.

7. **Z. squarrosum,** *Roxb. in Asiat. Res.* xi. 348; *Hort. Beng.* 1; *Fl. Ind.* i. 54; leaves pubescent beneath, bracts green lanceolate, tips hooked, corolla-segments pink, lip ovate emarginate yellowish-white tipped with lilac, basal auricles small spreading rounded. *Wall. Cat.* 6568; *Horan. Prodr.* 28.

BURMA, *Roxburgh*; Prome, *Wallich*. PEGU, *F. Carey*.

Leafy stem 2–3 ft. *Leaves* 12 by 3–4 in. *Spike* globose, very dense; peduncle very short; outer bracts short, ovate; inner about 1 in., pale green, tip distinctly hooked. *Corolla*-tube 1 in.; segments lanceolate, subequal, about as long as the tube. *Lip* shorter than the corolla-segments, distinctly emarginate, margins deflexed. *Stamen* nearly as long as the lip.

** *Leaves glabrous beneath.*

8. **Z. ligulatum,** *Roxb. in Asiat. Res.* xi. 348; *Hort. Beng.* 1; *Fl. Ind.* i. 51; *Coromand. Pl.* t. 253; leaves glabrous beneath, bracts pink outer ovate inner lanceolate, corolla-segments pink, lip obovate-cuneate yellowish-white unspotted, basal auricles small ovate. *Horan. Prodr.* 28.

COROMANDEL, *Roxburgh*.

Leafy stem about 2 ft. *Leaves* 12 by 2–3 in., oblong-lanceolate. *Spike* dense, subglobose; peduncle 2–3 in.; bracts about 1 in. *Corolla*-tube as long as the bract; segments subequal, ¾ in.; lip as long as the corolla-segments, margin crisped, not distinctly emarginate; basal auricles more or less acute. *Stamen* yellow, shorter than the lip. *Capsule* oblong, 1 in. and more, bright red inside. *Seeds* blackish-brown, with a nearly complete white aril.—Very near *Z. roseum*.

9. **Z. cernuum,** *Dalz. in Hook. Kew Journ Bot.* iv. (1852) 342; leaves glabrous beneath, bracts yellowish-green ovate or oblong obtuse, corolla-segments buff-yellow, lip deeply bifid variegated pink and white, basal auricles small red and yellow. *Dalz. & Gibs. Bomb. Fl.* 273; *Horan. Prodr.* 28.

CONCAN; at Ram Ghat, *Dalzell*.

Leafy stem curved, bright light green. *Leaves* oblong-lanceolate, acuminate. *Spikes* ovoid; peduncle very short. *Lip* beautifully coloured. *Capsule* smooth, yellowish-white. *Seeds* red, striated, aril membranous.

10. **Z. panduratum,** *Roxb. Hort. Beng.* 2; *Fl. Ind.* i. 55; leaves glabrous beneath, bracts red outer ovate inner lanceolate, corolla-segments bright red, lip obovate yellowish-white unspotted, basal auricles small rounded. *Wall. Cat.* 6569; *Horan. Prodr.* 28.

PEGU, *F. Carey*. TAVOY, *Gomez*.

Leafy stem 3 ft. *Leaves* 6–12 by 3–4 in.; ligule very large. *Spike* 2 in., very dense, oblong; peduncle very short; inner bracts 1½ in., tip not hooked. *Corolla*-tube 1½ in.; segments 1 in., subequal. *Lip* shorter than the corolla-segments, unspotted, not emarginate. *Stamen* as long as the lip.—Nearly allied to *Z. roseum* & *ligulatum*.

11. **Z. pardocheilum,** *Wall. ex Voigt Hort. Suburb. Calcut.* 562 (name only); leaves glabrous beneath, bracts obovate-cuneate red-brown truncate, corolla-segments reddish, lip deeply 3-lobed tesselated with dark lilac on a yellowish-white ground.

BURMA, *Wallich*.

Leafy stem stout. *Leaves* 12 by 3–4 in., oblong-lanceolate, acute. *Spikes* 2–3 in.

long and broad, very dense, globose, subsessile; bracts much imbricate, outer 1 in. *Corolla*-tube as long as the bract; segments ovate-lanceolate, a little shorter than the tube. *Lip* a little shorter than the corolla-segments; midlobe obovate-cuneate, lateral orbicular. *Stamen* as long as the lip.

SECT. II. **Lampuzium,** *Horan.* *Spikes* produced from the root-stock on more or less elongated peduncles with sheathing scariose bract-leaves.—Species 12–21.

* *Leaves glabrous beneath.*

12. **Z. intermedium,** *Baker*; spikes globose, bracts lanceolate, corolla-segments pale red, lip orbicular reddish-black finely spotted, basal auricles oblong.

North KHASIA HILLS; at Bhorlasa, alt. 3500 ft., *Clarke.*

Peduncle slender, 2–6 in.; bract-leaves several, small, sheathing, obtuse. *Spike* very dense, globose, 1½–2 in.; bracts membranous, convolute, 1½ in. *Corolla*-tube as long as the bract; segments 1 in., lanceolate. *Lip* as long as the corolla-segments. *Anther* with a dark red beak.—Spike and bracts as in sect. *Cryptanthium*, with a produced peduncle. A plant from Silhet in Herb. Wallich under *Z. Cassumunar* may be this species. An allied plant collected by Pram in the Naga hills has oblanceolate-oblong leaves above a foot long, a slender erect peduncle as long, and bracts rather longer than in Clarke's plant.

13. **Z. officinale,** *Rosc. in Trans. Linn. Soc.* viii. 348; *Scit. Pl.* t. 83; leaves lanceolate glabrous beneath, spike oblong-cylindric, bracts greenish suborbicular cuspidate, corolla-segments greenish, lip small purplish-black, mid-lobe orbicular, lateral ovate. *Roxb. in Asiat. Res.* xi. 345; *Hort. Beng.* 1; *Fl. Ind.* i. 47; *Wall. Cat.* 6564; *Grah. Cat. Pl. Bomb.* 207; *Horan. Prodr.* 27; *Bentl. & Trim. Med. Pl.* t. 270. Z. Missionis, *Wall. Cat.* 6565. Amomum Zingiber, *Linn. Sp.* 1; *Jacq. Hort. Vind.* i. t. 75. Curcuma longifolia, *Wall. Cat.* 6612, *in part*—*Rheede Hort. Mal.* xi. 21, t. 12; *Rumph. Amboin.* v. t. 66, fig. 1.

Widely cultivated in TROPICAL ASIA; native locality unknown.

Rootstock biennial, bearing many sessile tubers. *Leafy stem* 3–4 ft. *Leaves* 6–13 by 1 in., tapering gradually to the point. *Spike* 2–3 by 1 in. diam.; peduncle ½–1 ft.; bracts about 1 in. *Corolla*-segments lanceolate, subequal, under an inch long. *Lip* shorter than the corolla-segments. *Stamen* dark purple, as long as the lip.—"Very rarely flowers, and have never seen seeds," *Roxburgh.*

14. **Z. Griffithii,** *Baker*; leaves oblong glabrous beneath, spikes cylindric shortly peduncled, bracts ovate obtuse bright red, lip yellowish-white 3-lobed.

MALACCA, *Griffith* (*Kew Distrib.* 5731), *Maingay.* (K. d. 1564.)

Leafy stem 2–3 ft. *Leaves* 6–8 by 2–3 in. *Spike* 4–6 in., 1 in. diam.; peduncle very short; bracts 1 in., lower orbicular, 1 in. broad. *Corolla*-tube as long as the bract; segments obtuse, under 1 in.

15. **Z. gracile,** *Jack. in Malay Misc.* i. 1; leaves oblong-lanceolate glabrous beneath, spike oblong-cylindric, bracts ovate acute red, flowers yellowish-white, lip 3-lobed, midlobe bifid. *Horan. Prodr.* 27; *Hook. Bot. Misc.* i. 273.

PENANG, *Jack.*

Leaves 6–7 in., bright green. *Scape* a foot. *Corolla*-segments longer than the lip.—No authentic specimens of Jack's plant exist, but King's 7954 and 1027 S. from Perak, and Hullet's 854 from Mount Ophir are probably the same species. They

have a spike 6–9 in., 1 in. diam., peduncle about as long, leafy stem 2–3 ft., and a pink capsule.

16. **Z. Zerumbet,** *Smith Exot. Bot.* ii. 105, t. 112; leaves oblong-lanceolate glabrous beneath, spike oblong very dense, bracts orbicular green, corolla-segments whitish, lip sulphur-yellow unspotted, midlobe orbicular emarginate, basal lobes large orbicular. *Rosc. in Trans. Linn. Soc.* viii. 348; *Scit. Pl.* t. 84; *Roxb. in Asiat. Res.* xi. 346; *Hort. Beng.* 1; *Fl. Ind.* i. 48; *Horan. Prodr.* 27; *Grah. Cat. Pl. Bomb.* 207; *Bot. Mag.* t. 2000; *Wall. Cat* 6562; *Wight Ic.* t. 2003; *Dalz. & Gibs. Bomb. Fl.* 272. Z. spurium, *Kœnig in Retz. Obs.* iii. 60. Zingiber sp., *Griff. Notul.* iii. 412; *Ic.* t. 351. Amomum Zerumbet, *Linn. Sp.* i. 1; *Jacq. Hort. Vind.* iii. t. 54. A. spurium, *Gmel. Syst.* i. 6. A. sylvestre, *Poir. Ency. Suppl.* v. 548. Zerumbet Zingiber, *Lestib. in Ann. Sc. Nat.* ser. 2, xx. 329.—*Rheede Hort. Mal.* xi. 27, t. 13; *Rumph. Amboin.* v. 148, t. 64, fig. 1.

From the HIMALAYAS to CEYLON and the MALAY PENINSULA.—DISTRIB. Widely cultivated in tropics of Old World.

Rootstock tuberous, biennial, pale yellow inside. *Leafy stem* 3–4 ft. *Leaves* 12 by 2–3 in. *Spikes* 3–4 in., 1½ in. diam.; peduncle ½–1 ft.; bracts 1–1½ in. long and broad, very obtuse, green with a paler edge. *Corolla*-tube as long as the bract; segments 1 in., upper broader. *Lip* with a midlobe ¾ in. broad. *Stamen* pale, as long as the lip. *Capsule* oblong, above 1 in.—I cannot from the description distinguish *Z. amaricans*, Blume; Miq. Fl. Ind. Bat. iii. 593.

** *Leaves more or less pubescent beneath.*

17. **Z. cylindricum,** *Moon Cat. Ceyl. Pl.* 1; leaves oblong-lanceolate pubescent beneath, spikes oblong-cylindric, bracts ovate pale or reddish, corolla-segments green, lip yellowish-white unspotted obovate, basal auricles small obtuse. *Thwaites Enum.* 315.

CEYLON; in forests of the central province.

Leafy stem 3–6 ft. and more. *Leaves* 6–8 by 1–2 in. *Spike* 3–4 in., 1½ in. diam.; peduncle 3–9 in.; bract-leaves obtuse, imbricate; bracts about 1 in., closely imbricate, upper subacute, lowest obtuse. *Corolla*-tube as long as the bract; segments lanceolate. *Capsule* subglobose red. *Seeds* black, aril white.

18. **Z. macrostachyum,** *Dalz. in Hook. Kew Journ. Bot.* iv. (1852) 342; leaves oblong lanceolate pubescent beneath, spike cylindric, bracts ovate reddish, corolla-segments greenish-white, lip obovate yellowish-white marked with purple lines, basal auricles small. *Dalz. & Gibs. Bomb. Fl.* 273; *Horan. Prodr.* 27. Alpinia Neesana (Mesuana), *Grah. Cat. Pl. Bomb.* 207.

Hills of the CONCAN, *Graham*, &c.

Stems reddish, pubescent. *Leaves* dark green, 12–18 by 1½–3 in. *Spike* ½–1 ft., 1½ in. diam.; peduncle elongate, with large obtuse sheathing scariose bract-leaves; bracts 1–1½ in. *Corolla*-tube as long as the bract; segments lanceolate, nearly 1 in. *Capsule* red, pubescent, the size and shape of a sparrow's egg.

19. **Z. spectabile,** *Griff. Notul.* iii. 413; leaves oblong-lanceolate pubescent beneath, spike dense oblong-cylindric, bracts orbicular subcoriaceous reddish with a pale margin, corolla-segments yellowish-white, lip orbicular blackish-purple, basal auricles short obtuse.

MALACCA, *Griffith* (*Kew Distrib.* 5762), *Maingay* (*K. d.* 1567). PERAK; Larut, *King's Collector.*

Leafy stem long and stout. *Leaves* 9–12 by 2–3 in. *Spike* ½–1 ft., 2½ in. diam.; bracts 1–1½ in. long and broad, more coriaceous and more spreading than in the

other species, resembling those of *Hitchenia glauca*; peduncle sometimes 1 ft. *Corolla*-tube 1½ in.; upper segment broader than the two others. *Lip* emarginate. *Stamen* nearly as long as the lip. *Capsule* oblong. *Seeds* shining, black, and 3–5 partite, large, white.

20. **Z. Casumunar,** *Roxb. in Asiat. Res.* xi. 347, t. 5; *Hort. Beng.* 2; *Fl. Ind.* i. 49; leaves oblong-lanceolate pubescent beneath, spikes oblong, bracts ovate reddish, corolla-segments whitish, lip yellowish-white with a deeply bifid midlobe, basal auricles large oblong obtuse. *Rosc. Scit.* t. 85; *Bot. Mag.* t. 1426; *Grah. Cat. Pl. Bomb.* 207; *Dalz. & Gibs. Bomb. Fl.* 272; *Horan. Prodr.* 27. *Z.* purpureum, *Rosc. in Trans. Linn. Soc.* viii. 348. *Z.* Cliffordiæ, *Andr. Bot. Rep.* t. 555. *Z.* montanum, *Link. in Dietr. Sp.* i. 52. Amomum montanum, *Kœnig in Retz. Obs.* iii. 51. Casumunar Roxburghii, *Colla Nov. Gen. Scit. in Comm. Taur.* 1830.—*Rumph. Hort. Amboin.* v. 154, tab. 65, fig. 2.

From the HIMALAYAS to CEYLON and MALAY PENINSULA.—DISTRIB. Widely cultivated only in tropical Asia.

Rootstock perennial, bright yellow inside. *Leafy stem* 4–6 ft. *Leaves* 12–18 by 2–3 in. *Spike* oblong, 4–6 in., 1½–2 in. diam.; peduncle 3–12 in.; bracts 1–1½ in. and nearly as broad, bright red or greenish-red. *Corolla*-tube as long as the bract; segments 1 in., upper broader and more concave. *Lip* with an orbicular unspotted midlobe ¾ in. long and broad. *Stamen* yellowish-white, shorter than the lip. *Capsule* small, globose.—*Z. Casumunar*, Wall. Cat. 6563, includes three species, none of them the true one and not in a state for description.

21. **Z. Parishii,** *Hook. f. in. Bot. Mag.* t. 6019; leaves oblong-lanceolate pubescent beneath, spikes oblong, bracts orbicular usually cuspidate pale green with a red edge, corolla-segments yellowish-white, lip obovate sulphur-yellow marked with brown spots and lines, basal auricles short obtuse.

TENASSERIM, *Griffith, Parish.*

Leafy stem 3 ft. *Leaves* 4–6 by 1–1½ in., thin, bright green. *Spike* 2–4 in., 1½ in. diam.; peduncle 3–4 in., with obtuse oblong sheathing bract-leaves; bracts densely imbricate, about 1 in. broad. *Corolla*-segments as long as the tube, about 1 in. *Lip* shorter than the corolla-segments, faintly emarginate; basal auricles broad, truncate. *Stamen* pale yellow, as long as the lip; beak as long as the anther.

SECT. III. **Pleuranthesis,** Benth. *Spike* peduncled arising from the side of the leafy stem. (Sp. 22.)

22. **Z. Clarkei,** *King, mss. ex. Benth. Gen. Plant.* iii. 646.

SIKKIM HIMALAYA; alt. 3000–5000 ft., *Hook. f. Thoms.* (*Herb. Ind. Or.* 3), *Clarke, King.*

Leafy stem 5–6 ft. *Leaves* oblong or oblong-lanceolate, 12–18 by 2–4 in., finely pubescent beneath. *Spike* lateral, oblong-cylindric, 3–4 in., cernuous; peduncle 3–6 in.; main bracts 1 in., oblong, obtuse, green, finally reddish, 2–4-fld. *Corolla*-tube as long as the bract; segments 1 in., pale yellow, upper one broadest. *Lip* as long as the corolla-segments, oblong, yellow flushed with purplish-brown. *Stamen* pale yellow, nearly as long as the lip. *Capsule* subglobose, membranous, shorter than the bract. *Seeds* as large as a pea, brown; aril small, white.

SECT. IV. **Dymczewiezia,** *Horan.* (gen.). *Spikes* terminal on the leafy stem. (Sp. 23, 24.)

23. **Z. capitatum,** *Roxb. in Asiat. Res.* xi. 348; *Fl. Ind.* i. 55; leaves

linear ascending, bracts ovate. *Rosc. Scit. Pl.* t. 90; *Wall. Cat.* 6560. Dymczewiezia capitata, *Horan. Prodr.* 26.

CENTRAL and EASTERN HIMALAYAS, from KUMAON to SIKKIM the KHASIA HILLS & SILHET.

Leafy stem 3-4 ft. *Leaves* 12-18 by 1-1½ in., tapering gradually to the point, erecto-portent, usually pubescent beneath. *Spike* sessile at the end of the leafy stem, dense-fld., erect, oblong or oblong-cylindrical, 3-6 in., 1½-2 in. diam.; bracts closely imbricate, subcoriaceous, 1½ in., green with a narrow brown edge. *Corolla*-tube as long as the bract; segments 1 in., pale yellow. *Lip* pale yellow, unspotted, midlobe orbicular emarginate ¾ in. broad, basal auricles large, oblong, obtuse, bright red. *Capsule* bright red, the size of a small olive; valves ovate. *Seeds* black, shining, aril large lacerated white.

Var. Z. ELATUM, *Roxb. Fl. Ind.* i. 57 (sp.). A more tropical form, with taller stems, stouter spikes and larger flowers. *Rosc. Scit. Pl.* t. 91. Dymczewiezia elata, *Horan. Prodr.* 26.

24. **Z. marginatum,** *Roxb. in Asiat. Res.* xi. 349; *Fl. Ind.* i. 57? leaves oblong-lanceolate spreading, bracts oblong obtuse. Dymczewiezia marginata, *Horan. Prodr.* 26?

KHASIA HILLS; Umwai, alt. 3000 ft., *Clarke.*

Leafy stem 3-4 ft. *Leaves* 1 6 by 1 in.; ligule, very large, lanceolate, brown. *Spike* terminal, sessile, 1-2 in., under ½ in. diam.; rachis very hairy; bracts ½ in., closely imbricate, hairy, brown when dried, obtuse, 1-fld. *Corolla* and lip not seen. —Roxburgh's description is very brief, and he gives no locality. Blume and Miquel give the species as Javan, and cite for it *Lampuzium minus*, Rumph. Hort. Amboin. v. 148 tab. 64, fig. 2.

IMPERFECTLY KNOWN SPECIES.

22. Z. (Lampuzium) near ODORIFERUM, *Blume Enum.* i. 14 *Leafy stem* stout several feet long, leaves 6-8 in. oblong-lanceolate, peduncle 6-8 in. erect, spike 5-6 in. long 2 in. diam. dense-fld., bracts closely imbricate ovate subacute glabrous lower 1½ in., bracteole 1 in. complicate, flower not seen.—Andamans, on Mount Haniot, *Prain* 59.

23. Z. (Lampuzium) near COROLLINUM, *Hance in Journ. Bot.* 1880, 301. Leafy stem long, leaves 10-12 by 1½-2 in. lanceolate glabrous, spike dense-fld. a foot long 3 in. diam., bracts 1½-2 in. subcoriaceous oblong obtuse glabrous, bracteoles 1 in., complicate; flower not seen.—Great Cocos island, Andaman group, *Prain* 713.

13. COSTUS, *Linn.*

Rootstock tuberous, horizontal. *Leafy stem* long. *Leaves* oblong; sheaths broad. *Spike* dense-fld., globose or ovoid, usually terminal, rarely produced direct from the rootstock on a short peduncle. *Calyx*-tube short, infundibular; teeth ovate. *Corolla*-tube not longer than the calyx; segments large, oblong, subequal. *Lateral staminodes* 0 or minute. *Lip* large, obovate, margins incurved. *Filament* forming with the connective an oblong petaloid process, in the middle of which are placed the contiguous linear anther-cells. *Ovary* 3-celled; ovules many, superposed; style filiform; stigma with a semilunar foveole, ciliated round the margin. *Capsule* globose or ovoid, finally dehiscing on one side between the ribs. *Seeds* obovoid or subglobose, aril short.—Species 25; tropics of both hemispheres.

1. **C. speciosus,** *Smith in Trans. Linn. Soc.* i. 219; spike ovoid or oblong terminal on the leafy stem. *Roxb. in Asiat. Res.* xi. 349; *Hort.*

Beng.?; *Fl. Ind.* i. 58; *Wall. Cat.* 6555; *Wight Ic.* t. 2014; *Grah. Cat. Pl. Bomb.* 208; *Dalz. & Gibs. Bomb. Fl.* 274; *Thwaites Enum.* 320. *Reichb. Ic. Exot.* t. 69; *Paxt. Mag.* iv. t. 245. C. arabicus, *Jacq. Ic* t. 1. Hellenia grandiflora, *Retz. Obs.* vi. 68. Banksia speciosa, *Kœnig in Retz. Obs.* iii. 75.—*Rheede Hort. Mal.* xi. t. 8; *Rumph. Amboin.* vi. t. 64, fig. 2.

Throughout India from the CENTRAL and EASTERN HIMALAYAS, ascending to 4000 ft. to CEYLON and MALACCA.—DISTRIB. Malay islands.

Leafy stem 6–9 ft. stout. *Leaves* ½–1 ft. or more, oblong, acute, thinly silky beneath. *Spike* very dense-fld. 2–4 in.; bracts ovate, bright red, 1–1½ in. *Calyx* 1 in.; segments 3, ovate cuspidate. *Corolla*-segments white, oblong 1–1½ in. *Lip* white, suborbicular, 2–3 in., the margins incurved and meeting. *Filament* 1½–2 in. including the oblong petaloid connective. *Capsule* 1 in., globose, red, crowned with the persistent calyx.

Var. C. NIPALENSIS, *Rosc. Scit. Pl.* t. 80 (sp.) leafy stem shorter, leaves narrower lanceolate, spike globose. *Wall. Cat.* 6555 p. C. speciosus. Var. angustifolius, *Ker in Bot. Reg.* t. 665—Central Himalayas.

Var. ARGYROPHYLLUS, *Wall. Cat* 6555 G, H.; leaves more densely silky and paler beneath, spikes globose, bracts pubescent.—Pegu and Penang.

2. **C. globosus,** *Blume Enum. Pl. Jav.* 62 ? leaves glabrous beneath, peduncle produced direct from the rootstock, bract-leaves very short small ovate, corolla-segments glabrous. *Miq. Fl. Ind. Bat.* iii. 610 ? *Horan. Prodr.* 36 ?

MALACCA, *Maingay* (*Kew Distrib.* 1578).—DISTRIB. Java.

Leaves 6–8 by 2½–3 oblanceolate-oblong, narrowed gradually from the middle to the base. *Peduncle* about 2 in. curved; bract-leaves ¼ in., ovate, densely imbricate. *Spike* 1½ in. globose; outer bracts ovate; inner 1 in., oblong, back scabrous towards the tip. *Calyx* 1 in. *Corolla*-segments 1 in., ovate or oblong. *Lip* and stamen *C. speciosus.*

3. **C. Kingii,** *Baker*; leaves pubescent beneath, peduncle longer produced direct from the rootstock, bract-leaves larger oblong, corolla-segments villose.

PERAK; Larut, *King's Collector*, 2104.

Leaves 6–8 by 3–3½ in., oblanceolate-oblong, subcoriaceous, broadest above the middle, narrowed gradually to the base. *Peduncle* 4–5 in. stout; bracts 1 in., densely imbricate, oblong, scariose. *Spike* 2½–3 in., very dense, globose; outer bracts above 1 in., ovate; inner lanceolate. *Calyx*-tube 1 in., villous; segments ovate, sharply cuspidate. *Corolla*-segments 1 in., hairy. *Lip* suborbicular, 2 in. long and broad.

14. CYPHOSTIGMA, *Benth.*

Rootstock thick, horizontal, perennial. *Leafy stem* short. *Leaves* oblong-lanceolate. *Inflorescence* a panicle distinct from the leafy stem, lax, decumbent; flowers 1–2 to a bract, bracteolate. *Calyx* cylindric, minutely 3-toothed, slit down one side. *Corolla*-tube cylindric; segments linear-oblong, subequal. *Lateral staminodes* obsolete; lip orbicular-reniform, emarginate; filament short; anther-cells distant, crest very large petaloid. *Ovary* 3-celled; ovules many, superposed; style filiform; stigma large, cylindric, gibbous at the base, stigma cup-shaped. *Capsule* and *seeds* unknown.

C. pulchellum, *Benth. Gen. Plant.* iii. 645; *Hook. Ic. Pl.* t. 1380. Amomum pulchellum, *Thwaites Enum.* 318.

CEYLON; forests of the central province, alt. 3000 ft.

Leafy tuft 1½–2 ft. *Leafy stem* formed from the connate bases of the petioles. *Leaves* 1–2 ft. by 3–5 in. broad at the middle, narrowed to the base; petiole ½–1 ft. *Panicles* like those of *Elettaria*, decumbent, sometimes a foot long; bracts oblong, obtuse, clasping the slender rachis. *Calyx* under 1 in. *Corolla*-tube rather longer than the calyx; segments under an inch long. *Lip* 1 in. broad, red and yellow; anther-crest orbicular, crenulate, rose-purple, nearly as broad as the lip.

15. ELETTARIA, *Maton.*

Rootstock thick, horizontal, perennial. *Leafy stem* long. *Leaves* oblong-lanceolate. *Panicle* produced direct from the rootstock, long, flexuous, decumbent; bracts 2–3-fld.; flowers shortly pedicelled, bracteolate. *Calyx* cylindric, membranous, shortly lobed. *Corolla*-tube cylindric; mid-segment oblong, convex; lateral narrower. Lateral *staminodes* minute teeth; lip obovate-cuneate; filament very short; anther-cells contiguous, not crested. *Ovary* 3-celled; ovules many; style filiform; stigma small, turbinate. *Capsule* globose or oblong, coriaceous, indehiscent. *Seeds* small, angled by pressure.

E. Cardamomum, *Maton in Trans. Linn. Soc.* x. 254; *Bentl. & Trim. Med. Pl.* t. 267; *Thw. Enum.* 318; *Horan. Prodr.* 30. Alpinia Cardamomum, *Roxb. in Asiat. Res.* xi. 355; *Hort. Beng.* 1; *Coromand. Pl.* t. 226; *Fl. Ind.* i. 70; *Grah. Cat. Pl. Bomb.* 206; *Dalz. & Gibs. Flor. Suppl.* 86. Amomum Cardamomum, *Linn. Sp.* 1; *White in Trans. Linn. Soc.* x. 220, t. 4–5. A. repens, *Willd. Sp. Plant.* i. 9; *Woodv. Med. Bot.* t. 131. A. racemosum, *Lam. Encyc.* i. 134. Cardamomum officinale, *Salisb. in Trans. Linn. Soc.* i. 232 —*Rheede Hort. Mal.* xi. 9, t. 4–5.

MALABAR; on the Western Ghats, from Kurg southwards (wild or cultivated). CEYLON (cult.).

Leafy stem 6–9 ft. *Leaves* 1–2 ft by 3 in., pubescent beneath. *Panicles* several to one leafy stem, 1–2 ft.; bracts linear-oblong, persistent, 1½–2 in. *Calyx* ½ in. *Corolla*-tube shortly exserted; segments ½ in. *Lip* longer than the corolla-segments, white sheathed with violet. *Capsule* subglobose or oblong, marked with many fine vertical ribs.

VAR. MAJOR, *Thw. Enum.* 318; more robust, leaves broader, capsule 1 in. oblong-fusiform. E. major, *Smith in Rees. Cyclop.*; *Horan. Prodr.* 31.—Ceylon, up to 3000 ft. (indigenous).

16. ELETTARIOPSIS, *Baker.*

Rootstock slender, wide-creeping. *Leaves* 1–2-nate direct from the rootstock, long petioled. *Spike* radical lax-fld.; bracts small, membranous. *Calyx*-limb spathaceous, clasping the flower-bud. *Corolla*-tube slender, cylindric; segments linear-oblong or lanceolate. Lateral *staminodes* 0; lip obovate-cuneate; filament shorter; anther with a small orbicular petaloid crest. *Ovary* oblong, 3-celled; ovules many, superposed; style filiform; stigma small, globose. *Fruit* and *seeds* unknown.—A Bornean species and the following:—

1. **E. exserta,** *Baker*; spike erect, corolla-segments lanceolate, tube very long. Cyphostigma exsertum, *Scortech. in Nuov. Gior. Bot. Ital.* xviii. 310, t. 13.

MALAY PENINSULA; Perak, *Scortechini*, 1947.

Leaves usually solitary, erect; blade oblong-lanceolate, 2½–3 ft., narrowed to the base; petiole much shorter. *Spike* 6 in.; lower internodes ½ in.; bracts lanceolate. *Calyx* 1 in. *Corolla*-tube 2½–3 in., cylindric, rather dilated towards the top; segments ¾ in. *Lip* 1 in., yellow, with two red streaks.

2. **E. Curtisii,** *Baker*; spike decumbent, corolla-segments linear-oblong, tube very long.

PENANG; West hill, alt. 2500 ft., *Curtis*, 1578.

Rootstock sheathed with imbricated obtuse scale-leaves. *Leaves* solitary, erect; petiole ½ ft.; blade 8–9 by 2 in., oblong-lanceolate, coriaceous. *Spike* 1½–2 in.; rachis very slender; bracts lanceolate, ½ in. *Calyx* ½ in. *Corolla*-tube ¾ in., very slender; segments ½ in. *Lip* deflexed, twice as long as the corolla-segments.

3. **E. serpentina,** *Baker*; spike decumbent secund, corolla-segments linear-oblong, tube twice as long as the calyx-limb.

PENANG, alt. 1000–1500 ft., *King's Collector*.

Rhizome very slender, sheathed by oblong imbricated scale-leaves. *Leaves* less than 12 in. by 2 in., geminate, erect, lanceolate, subcoriaceous, glabrous; petiole slender, 8–9 in. *Spike* 2–3 in., shortly peduncled; bracts small, lanceolate, membranous. *Calyx*-tube ½ in. *Corolla*-tube 1 in.; segments half as long as the tube. *Lip* white, marked with red-brown and yellow in the centre.

17. SCAPHOCHLAMYS, *Baker.*

Rootstock wide-creeping, not tuberous *Stem* 0. *Leaves* erect, oblong-lanceolate; petiole as long as the blade. *Spike* lax-fld.; bracts several-fld., large, lingulate, persistent. *Calyx* oblique, spathaceous. *Corolla*-tube slender, cylindric, longer than the calyx; lip obovate-cuneate, emarginate; filament short; anther-cells slightly divergent, with a small petaloid-crest. *Ovary* 3-celled?; ovules few in a cell; style filiform; stigma small, globose. *Capsule* subglobose, membranous. *Seeds* ovoid, with a large white aril cut down to the base into subulate processes.

S. malaccana, *Baker.*

MALACCA; Mount Ophir, *Cuming*, *Griffith* (*K. d.* 5761), *Maingay* (*Kew Distrib.* 1579), *Hullett*.

Leaf-blade firm, glabrous, 6–8 by 2–3 in. *Spike* of about 6 nodes; peduncle short, slender; bracts 1–1½ in., green, lingulate, erecto-patent, obtuse, involute in the lower half. *Calyx* ½ in. *Flowers* white. *Corolla*-tube under 1 in., slender, cylindric; segments shorter than the tube. *Lip* under 1 in. *Stamen* porrect, shorter than the lip. *Capsule* ½ in., 3-seeded.

18. ALPINIA, *Linn.*

Rootstock horizontal. *Leafy stem* elongated. *Leaves* oblong or lanceolate. *Panicle* or *raceme* terminal (except in sp. 16–17); bracteoles sometimes enveloping the bud *Calyx* laxly tubular, shortly 3-toothed. *Corolla*-tube cylindric, usually not longer than the calyx; segments linear-oblong or oblong, upper usually broader and more convex. Lateral *staminodes* 0 or very small; lip patent, often orbicular with incurved margins, sometimes with 2 subulate processes at the base of the claw; filament flattened; anther-cells divergent at the apex, furnished rarely with an orbicular crest. *Ovary* 3-celled, ovules few or many in a cell; style filiform; stigma subglobose. *Fruit* globose, dry or fleshy, usually

indehiscent. *Seeds* globose or angled by pressure.—Species 30, in the Tropics of the Old World.

Sect. I. **Ethanium,** *Horan.* *Anther* not crested. *Bud* not enclosed in large bracteoles. *Panicle* terminal—(Sp. 1–9.).

1. **A. conchigera,** *Griff. Notul.* iii. 424; *Ic. Plant. Asiat.* t. 354; leaves oblong-lanceolate glabrous beneath, panicle long narrow, flowers small, corolla-segments oblong greenish, lip orbicular yellowish with red lines and dots with two small teeth at the base. A. Galanga, *Wall. Cat.* 6572 E, F. Strobidia conchigera, *Kuntze inedit.*

CHITTAGONG and the Malay Peninsula to MALACCA.—DISTRIB. Siam, Cambodia.

Leafy stem 3–4 ft. *Leaves* ½–1 ft. by 2–3 in. *Panicle* 6–9 in.; rachis pubescent; lower branch often elongate, the others short ascending; bracts small, brown, scariose, ovate. *Calyx* ⅛–¼ in.; mouth oblique, obscurely 3-dentate. *Corolla*-tube scarcely longer than the calyx; segments ⅛ in. *Lip* with incurved margins, not longer than the corolla-segments, not clawed. *Ovules* 2 in each cell.—I do not regard *Strobidia* as generically distinct from *Alpinia.*

2. **A. Manii,** *King MSS.* (under *Strobidia*); leaves oblong-lanceolate glabrous beneath, panicle long narrow subracemose, flowers small, corolla-segments oblong, lip narrow cuneate.

ANDAMAN ISLANDS, *King's Collector.*

Leafy stem elongate. *Leaves* shortly petioled, 12 in. or more by 3–4 in., bright green, with more prominent ribs than in its allies. *Panicle* 6–9 in.; rachis pubescent; branches short, erecto-patent, usually 1-fld.; bracts minute, *Calyx* ⅛ in., minutely 3-dentate. *Corolla*-tube twice as long as the calyx; segments ¼ in. *Lip* scarcely longer than the corolla-segments. *Capsule* globose, ¼ in. diam., 1–2 seeded.

3. **A. Galanga,** *Sw. Obs. Bot.* 8; leaves oblong-lanceolate glabrous beneath, panicle copiously compound, flowers small, corolla-segments linear-oblong greenish-white, lip obovate-clawed emarginate white veined with lilac, with a pair of subulate glands at the base of the claw. *Roxb. Hort. Beng.* 2; *Asiat. Res.* xi. 352; *Fl. Ind.* i. 59; *Rosc. in Trans. Linn. Soc* viii. 345; *Wall. Cat.* 6572, ex parte; *Grah. Cat. Pl. Bomb.* 206; *Dalz. & Gibs Bomb. Fl.* 274, *Thw. Enum.* 319. A. viridiflora, *Griff. Notul.* iii. 423; *Ic. Pl. Asiat.* t. 353. Maranta Galanga, *Linn. Sp. Plant.* 2. Galanga, *Salisb. in Trans. Hort. Soc.* i. 281.—*Rumph. Amboin.* v. t. 63.

Throughout INDIA from the foot of the Himalayas to CEYLON and MALACCA.—DISTRIB. Malay islands and widely cultivated.

Rootstock perennial, tuberous, slightly aromatic. *Leafy stem* 6–7 ft. *Leaves* 1–2 ft. by 4–6 in., green and glossy on both sides. *Panicle* dense-fld., ½–1 ft., rachis densely pubescent, branches numerous short; pedicels ⅛—⅛ in.; bracts small, ovate, *Calyx* greenish-white, ¼ in. oblique at the throat. *Corolla*-segments ½–¾ in. *Lip* distinctly clawed, ¾ in., basal glands ascending, reddish, linear-subulate. *Stamen* arcuate, shorter than the lip. *Ovules* 1–2 in a cell. *Fruit* orange-red, the size of a small cherry.—Probably *A. alba,* Rosc. in Trans. Linn. Soc. viii. 346 (*Hellenia alba,* Willd. Sp. Plant. i. 5. *Languas vulgare,* Kœnig in Retz. Obs. iii. 64; *Heritiera. alba,* Retz. Obs. vi. 18), *A. carnea, Griff. Notul.* iii. 420, and *A. zingiberina,* Hook. f. in Bot. Mag. t. 6944 are forms The drawing of *Costus arabicus,* Linn. in Hermann's Ceylon Herbarium belongs here.

4. **A. Allughas,** *Rosc. in Trans. Linn. Soc.* viii. 346; *Scit. Pl.* t. 67; leaves oblong-lanceolate glabrous beneath, panicle narrow copiously com-

pound, flowers small, corolla-segments linear-oblong greenish-white, lip cuneate pink distinctly emarginate with two small linear-subulate glands at the base. *Roxb. in Asiat. Res.* vi. 353; *Hort. Beng.* 2; *Fl. Ind.* i. 61; *Wall. Cat.* 6571; *Griff. Notul.* iii. 432; *Grah. Cat. Pl. Bomb.*206; *Dalz. & Gibs. Bomb. Fl.* 273; *Thw. Enum.* 320; *Horan. Prodr.* 33. A. Rheedii, *Wight Ic.* t. 2026, Hellenia Allughas, *Willd. Sp. Plant.* i. 4; *Andr. Rot. Rep.* t. 501; *Salisb. in Trans. Hort. Soc.* i. 281. Heritiera Allughas, *Retz. Obs.* vi. 17, t. 1. Zingiber nigrum, *Gaertn. Fruct.* t. 12.—*Rheede Hort. Mal.* xi. t. 14.

From the HIMALAYAS to CEYLON and MALACCA.—DISTRIB. Malay isles and widely cultivated.

Rootstock tuberous, biennial or perennial. *Leafy stem* 3–6 ft. *Leaves* 1–1½ ft. by 3—6 in., smooth and glossy on both surfaces. *Panicle* erect, ½–1 ft.; branches pubescent, fewer and more ascending than in *A. Galanga*; flowers crowded, shortly pedicelled; bracts small, ovate-amplexicaul. *Calyx* pubescent, ½–¾ in.; mouth oblique. *Corolla*-tube as long as the calyx; segments as long as the tube. *Lip* clawed. *Stamen* arcuate, shorter than the lip. *Capsule* globose, black, ½ in. diam.

5. **A. calcarata,** *Rosc. in Trans. Linn. Soc.* viii. 347; *Scit. Pl.* t. 68; leaves lanceolate glabrous beneath, panicle short, slightly compound flowers middle-sized, corolla-segments oblong greenish-white, lip oblong striped and spotted with red and yellow on a pale ground with edges slightly incurved, base spurred. *Roxb. in Asiat. Res.* xi. 355; *Hort. Beng.* 2; *Fl. Ind.* i. 69; *Bot. Reg.* t. 141; *Wall. Cat.* 6577; *Grah. Cat. Pl. Bomb.* 206; *Wight Ic* t. 2028; *Dalz. & Gibs. Bomb. Fl.* 274; *Thw. Enum.* 320. A. bracteata, *Rosc. in Trans. Linn. Soc.* xi. 381; *Scit.* t. 70, non *Roxb.*, A. cernua, *Sims in Bot. Mag.* t. 1900. Renealmia calcarata, *Haw. in Andr. Bot. Rep.* t. 421; *Salisb. in Trans. Hort. Soc.* i. 231. Globba erecta, *Red. Lil.* t. 174.

SOUTHERN MALAY PENINSULA, the CONCAN, and CEYLON.—DISTRIB. China, and widely cultivated.

Rootstock perennial, not tuberous. *Leafy stem* slender, 2–4 ft. *Leaves* 6–12 by 1–2 in. acuminate, green and glossy on both surfaces. *Panicle* dense-fld., 3–4 in.; rachis pubescent; lower branches short, bearing 3–4 crowded flowers; bracts small, ovate. *Calyx*-tube funnel-shaped, ¼–½ in.; ovary densely pubescent. *Corolla*-segments ½ in. *Lip* 1–1¼ in., beautifully variegated with red and yellow, emarginate. *Anther*-cells minutely margined. *Ovules* many in a cell. *Capsule* globose, red.

6. **A. Wrayi,** *King MSS.*; leaves lanceolate glabrous beneath, peduncle scarcely leafy, panicle short slightly compound, flowers middle-sized, corolla-segments oblanceolate, lip dark yellow obovate-cuneate.

PENANG, alt. 2–3000 ft., *King's Collector.*

Leafy stem elongate. *Leaves* 12 by 2 in. or more, acute, moderately firm. *Peduncle* from the rootstock, slender, erect, under a foot long, with several sheathing bract-leaves, only the uppermost produced into a small lanceolate blade. *Panicle* 3–4 in., dense-fld., erect; bracts small, deciduous. *Ovary* very hairy. *Calyx* ½ in., narrowly funnel-shaped. *Corolla*-tube as long as the calyx; segments ¾ in. *Lip* 1 in.—May be an abnormal form of *A. calcarata.*

7. **A. mutica,** *Roxb. in Asiat. Res* xi. 354; *Hort. Beng.* 2; *Fl. Ind.* i. 67; leaves oblong-lanceolate glabrous beneath, panicle slightly compound, flowers large, corolla segments oblong white, lip suborbicular variegated red and yellow, base not spurred, margins much incurved. *Rosc.*

Scit. Pl. t. 69; *Hook. f. in Bot. Mag.* t. 6908; *Horan. Prodr.* 34. Renealmia mutica, *Salisb. in Trans. Hort. Soc.* i. 280.

PENANG, *Roxburgh*. MALAY PENINSULA.—DISTRIB. Malay isles.

Rootstock perennial, not tuberous. *Leafy stem* 4–6 ft. *Leaves* 1–2 ft. by 2–4 in. *Panicle* 6–9 in.; rachis stout, very pubescent; lower branches short, 2–3; bracts oblong. *Calyx*-tube ½ in., funnel-shaped, white bordered with pink. *Corolla*-segments 1 in. *Lip* 1½ in., nearly as broad, beautifully variegated with red and yellow. *Capsule* globose, 1 in. diam., bright yellow. *Seeds* many in a cell.

8. **A. petiolata,** *Baker*; leaves oblong-lanceolate petioled glabrous beneath, raceme simple, bracts large, flowers large, lip obovate-cuneate.

PERAK, alt. 2500–4000 ft., *Kunstler*.

Leafy stem 2–3 ft. *Leaves* 1–1½ ft. by 3–4 in., subcoriaceous, dark glossy green, petiole 3–4 in. *Spike* moderately dense-fld., erect, 3–4 in.; rachis slender, pubescent; bracts 1 in., green membranous. *Ovary* densely villose. *Calyx* 1 in. *Lip* half as long again as the calyx, bright yellow; filament 1 in.

9. **A. Rafflesiana,** *Wall. Cat.* 6575; leaves lanceolate finely pubescent beneath, panicle dense subglobose, flowers middle-sized, corolla-segments oblong reddish-yellow, lip suborbicular margins much incurved. *Hook. Ic.* t. 1063. A. aurantiaca, *Wall. mss.*

PENANG, SINGAPORE and MALACCA.

Rootstock perennial, not tuberous. *Leafy stem* 4–6 ft. *Leaves* 1–1½ ft. by 2–3 in. *Panicle* sessile at the end of the leafy stems, congested into a globose head 2 in. long, subtended by a large ovate green bract; pedicels very short; flower-bracts small, persistent, orbicular, subcoriaceous. *Calyx* funnel-shaped, bright red, ¼–½ in. *Corolla-segments* concave, ½–½ in. *Lip* ¾–1 in. long and broad, beautifully striped with red on a yellow ground. *Capsule* globose, small.—*Alpinia vittata* of gardens appears to be a form of this very distinct species with leaves variegated with white.

Subgen. II. **Catumbium,** *Juss. Anther* not crested. *Bud* enclosed in large membranous bracteoles. *Raceme* or *panicle* terminal.—Species 10–13.

10. **A. bracteata,** *Roxb. Hort. Beng.* 2; *Fl. Ind.* i. 63; raceme simple, bracteoles green. *Wall. Cat.* 6578, non *Roscoe*. A. Roxburghii, *Sweet Hort. Brit.* edit. 2, 493; *Horan. Prodr.* 34.

EAST HIMALAYAS, BENGAL, ASSAM, CACHAR, BURMA, the SHAN STATES and MALACCA.

Leafy stem 3–6 ft. *Leaves* oblong-lanceolate, 1–1½ ft. by 2–4 in., pubescent beneath. *Raceme* dense-fld., 6–9 in.; rachis densely pubescent; pedicels very short. *Buds* not so short and more acute than in *A. malaccensis*; bracteoles 1 in., oblong-navicular. *Corolla*-segments 1 in., oblong, pure white. *Lip* ovate, half as long again as the corolla-segments, emarginate, edge white, centre variegated red and yellow, margins incurved; base with two ascending horn-like processes. *Capsule* large, globose. *Seeds* many in a cell.

11. **A. malaccensis,** *Rosc. in Trans. Linn. Soc.* viii. 345; raceme simple, bracteoles white. *Roxb. in Asiat. Res.* xi. 353; *Hort. Beng.* 2; *Fl. Ind.* i. 64; *Bot. Reg.* t. 328; *Wall. Cat.* 6573 A. *Horan. Prodr.* 34. Maranta malaccensis, *Burm. Fl. Ind.* 2; *Willd. Sp. Plant.* i. 14. Costus malaccensis, *Kœnig in Retz. Obs.* iii. 71.—*Rumph, Amboin.* v. t. 71, fig. 1.

EASTERN HIMALAYAS, ASSAM, KHASIA HILLS and CHITTAGONG, ascending to 5000 ft. MALABAR, *Law*.

Rootstock perennial. *Leafy stem* 6–10 ft. *Leaves* 2–3 ft., oblong-lanceolate, pubescent beneath. *Raceme* erect, ½–1 ft.; rachis very stout, densely pubescent; pedicels all very short. *Buds* oblong, obtuse; bracteoles oblong-navicular, 1 in. *Corolla*-segments white, oblong, 1 in. *Lip* ovate, emarginate, 1½–2 in., margin pale; centre beautifully variegated red and yellow; edges much incurved. *Capsule* globose, yellow, 1 in. diam. *Seeds* many, ovoid.

12. **A. nutans,** *Rosc. in Trans. Linn. Soc.* viii. 346; *Scit.* t. 73; panicle cernuous slightly compound, bracts deciduous, peduncles short, bracteoles white tipped with pink. *Smith Exot. Bot.* ii. t. 106; *Roxb. in Asiat. Res.* xi. 354; *Hort. Beng.* 2; *Fl. Ind.* i. 65; *Bot. Mag.* t. 1903; *Wall. Cat.* 6574 ex parte; *Grah. Cat Pl. Bomb.* 206; *Wight Ic.* t. 2027; *Thw. Enum.* 320. A. malaccensis, *Wall. Cat.* 6573 B, C. A. cristata, *Griff. Notul.* iii. 421. Globba nutans, *Linn. Mant.* 170; *Red. Lil.* t. 60. Renealmia nutans, *Andr. Bot. Rep.* t. 360; *Salisb. in Trans. Hort. Soc.* i. 279. Zerumbet speciosum, *Jacq. Fragm.* t. 68; *Wendl. Sert. Han.* t. 19.

Eastern Himalayas and Malay Peninsula.—Distrib. Malay islands.

Rootstock perennial. *Leafy stem* 8–10 ft. *Leaves* 1–2 ft. by 3–6 in., oblong-lanceolate, finely pubescent beneath. *Panicle* ½–1 ft.; rachis very hairy; lower branches bearing 2–3 crowded flowers. *Bracteoles* 1 in. or more, broad, oblong-navicular. *Corolla*-segments oblong, 1 in., white tipped with pink. *Lip* ovate, 1½ in. long and broad, base spurred, margins pale, centre beautifully variegated with red and yellow, margins much incurved. *Capsule* red, globose. *Seeds* many in a cell.

Var. . Asericea, *Moon Cat. Ceyl.* 1 (sp.); panicle shorter, flowers smaller, bracteoles and corolla-segments not tipped with pink.—Ceylon.

13. **A. involucrata,** *Griff. Notul.* iii. 422; panicle cernuous slightly compound, bracts persistent cupular, bracteoles white.

Malacca, *Griffith* (*Kew Distrib.* 5697), *Maingay* (*K. d.* 1574). Perak, *King's Collector.*

Nearly allied to *A. nutans*, of which it may be only a variety. *Leafy stem* 10–15 ft. Lower branches of the *panicle* elongated, with 2–3 flowers crowded at the lip, enveloped by persistent scariose bracts. *Capsule* globose, 1 in. diam.

Sect. III. **Hellenia,** *Willd. Anther* furnished with a small petioled crest. *Panicle* terminal. (Sp. 14–17.)

14. **A. aquatica,** *Rosc. in Trans. Linn. Soc.* viii. 346; leaves oblong not scabrous, anther with a semi-orbicular crest, lip obcordate. Hellenia aquatica, *Horan. Prodr.* 35. Heritiera aquatica, *Retz. Obs.* v. 18. Languas aquaticum vel sylvestre, *Kœnig in Retz. Obs.* iii. 65.

The Deccan Peninsula, in swamps, *Kœnig.*

Leafy stem 4 ft. and more. *Leaves* coriaceous, bright green, denticulate, glabrous beneath. *Panicle* narrow, oblong, peduncled, with 2–3 membranous white bracts at the base. *Calyx*-limb tubulose-campanulate, glabrous, tridentate. *Corolla*-segments whitish; upper ovate-oblong; two lower acute, approximate. *Lip* shorter than the corolla-segments, with an oblong gland on each side at the base. *Anther* with a coloured crest. *Capsule* black. *Seeds* about 5, trietrous.—Known only from Kœnig's description.

15. **A. scabra,** *Benth. in Gen. Plant.* iii. 648; leaves lanceolate very scabrous above, anther with an obscure truncate crest, lip narrow bilobed. Hellenia scabra, *Blume Enum.* i. 60; *Miq. Fl. Ind. Bat.* iii. 603; *Horan. Prodr.* 35.

PERAK, alt. 2-3000 ft., *King's Collector*.—DISTRIB. Java.

Leafy stem 6–8 ft. *Leaves* above 1 ft., 2½–3 in. broad, very scabrous. *Panicle* 1 ft., erect, with a few short spreading compound branches at the base; branchlets about 1 in., bearing several pedicelled waxy white flowers; bracts minute. *Calyx* ¼ in.; teeth minute. *Corolla*-tube as long as the calyx; segments oblong, ½ in. *Lip* not longer than the corolla-segments. *Anther-cells* divaricate upwards, the truncate connective scarcely overtopping them. *Capsule* globose, ½ in. diam.

Subgen. IV. **Geostachys,** *Baker*. *Anther* not crested. *Buds* enclosed in large bracteoles. *Spike* radical.

16. **A.? decurvata,** *Baker*; leaves lanceolate, racemes not secund.

PERAK; Larut, alt. 3–4000 ft., *King's Collector*.

Leafy stem 4–5 ft. *Leaves* 12–15 by 1–1½ in., narrowed to a petiole 1 in. long. *Racemes* 6 in., lax, decurved; peduncle short, slender, erect, hidden by the large imbricate green bract-leaves; pedicels deflexed, ½ in.; bracteoles 1½ in., green, oblong-navicular, acute, persistent. *Ovary* oblong, shortly pedunculed within the bracteole. *Calyx* ½ in., spathaceous. *Corolla*-tube as long as the calyx; segments linear-oblong, ½ in. *Lip* obovate, longer than the corolla-segments. "*Flowers* bright yellow, tinged with red. *Fruit* glossy, dark red."

17. **A.? secunda,** *Baker*; leaves oblong-lanceolate, racemes secund.

PERAK, alt. 3–4000 ft., *King's Collector*, 8047.

Nearly allied to *A.? decurvata*, with which it entirely agrees in habit and in the flower being enclosed in large persistent oblong-navicular green bracteoles. *Leaves* 6–8 by 2 in.; petiole short. *Raceme* simple, lax-fld., secund, deflexed; pedicels cernuous, ½ in.; bracteoles under 1 in. *Calyx* cylindric, spathaceous, ½ in. "*Flower* light yellow. *Fruit* deep red."

19. RHYNCHANTHUS, *Hook. f.*

Rootstock tuberous; fibres stout, hairy. *Stem* leafy. *Leaves* oblong-lanceolate. *Spike* terminal. *Calyx* cylindric, minutely toothed. *Corolla*-tube long, subcylindric; segments ovate-lanceolate, acuminate. Lateral *staminodes* obsolete; lip nearly obsolete; filament long linear, margins incurved, tip filiform; anther-cells contiguous, not crested. *Ovary* 3-celled: ovules many, superposed; style filiform; stigma small, turbinate. *Capsule* and *seeds* not seen.

R. longiflorus, *Hook. f. in Bot. Mag.* t. 6861.

BURMA (*Hort. Low*).

Rootstock ovoid, green, 1–1½ in. diam. *Leafy stem* 1½–2 ft. *Leaves* 6–8 by 1½–2 in. *Spike* 4–6 in., sessile at the end of the stem; bracts 2 to each flower, linear, green, 1–1½ in., wrapped round the calyx-tube. *Corolla*-tube 1½–2 in.; segments 1 in. *Stamen* as long as the corolla-tube.

20. CLINOGYNE, *Salisb.*

Rootstock tuberous or sublignose. *Stems* leafy, copiously dichotomously branched. *Leaves* oblong or oblong-lanceolate. *Panicle* lax-fld. terminal; flowers in pairs; bracts long, narrow, firm. *Sepals* short, free. *Petals* narrow, connivent. *Staminal tube* cylindric; segments obovate, petaloid, unequal; anther 1-celled, adnate to the margin of one segment. *Ovary* 3-celled; cells 1-ovuled; style adnate below to the staminal tube, above free, hooked; stigma capitate. *Fruit* indehiscent,

1–3-seeded. *Seeds* subglobose, aril lacerate; embryo curved.—Species 7–8; tropics of Old World.

1. **C. dichotoma,** *Salish. in Trans. Hort. Soc.* i. 276; leaves broadly rounded at the base, branches of panicle few short, staminal tube elongate, fruit 2–3-lobed 2–3-seeded. *Benth. in Gen. Plant.* iii. 651. Phrynium dichotomum, *Roxb. in Asiat. Res.* xi. 324; *Hort. Beng.* 1; *Fl. Ind.* i. 2; *Horan. Prodr.* 11, *in part.* Maranta dichotoma, *Wall. Cat.* 6614. M. ramosissima, *Wall. Cat.* 6615; *Pl. Asiat. Rar.* t. 286; *Grah. Cat. Pl. Bomb.* 212. Donax Arundinastrum, *Lour. Fl. Coch.* 15. Thalia cannæformis, *Willd. Sp. Plant.* i. 16.—*Rumph. Amboin.* iv. 22, t. 7.

EASTERN BENGAL and the MALAY PENINSULA.—DISTRIB. Malay islds.

Shrub 15 ft.; stem short, woody; branches slender. Upper *leaves* ovate-oblong, 3–6 in. by 1½–2 in. Branches of *panicle* at most 3–4 in.; outer bracts lanceolate, 1½ in. *Flowers* white, 1 in. *Sepals* lanceolate. *Petals* oblanceolate, spreading in the upper half. *Staminal tube* as long as the largest lobes; lip flat. *Fruit* ½ in. diam.

2. **C. grandis,** *Benth. in Gen Plant.* iii. 651; leaves broadly rounded at the base, branches of the panicle many and moderately long, staminal tube elongated, fruit globose smooth 1-seeded. Maranta grandis, *Miq. Fl. Ind. Bat. Suppl.* 616. Phrynium dichotomum, *Korn. in Mem. Mosc.* xi. t. 89; *Horan. Prodr.* 11, in part, not *Roxb.*

TENASSERIM, MALACCA, PERAK, SINGAPORE, and the ANDAMAN ISLDS.—DISTRIB. Malay islds.

Habit of *C. dichotoma.* Upper *leaves* ½–1 ft. by 3–6 in. Branches of the *panicle* sometimes 6–9 in.; outer bracts 1½ in. *Flowers* as in *C. dichotoma.* *Fruit* glossy, ⅓–½ in. diam.

3. **C. virgata,** *Benth. in Gen. Plant.* iii. 651; leaves slightly rounded at the base, branches of the panicle many and long, staminal tube short, fruit 2–3-lobed 2–3-seeded, Maranta virgata, *Wall. Cat.* 6616; *Wight Ic.* t. 2015; *Thw. Enum.* 320. Phrynium virgatum, *Roxb. in Asiat. Res.* xi. 324; *Hort. Beng.* 1; *Fl. Ind.* i. 4.

The DECCAN PENINSULA and CEYLON.

Stems 6–8 ft. Upper *leaves* 4–6 by 1–1½ in.; lower 1–1½ ft. *Panicle* 1 ft. or more; branches very slender, flexuose; outer bracts about 1 in. *Flowers* white, inodorous, much smaller than in *C. dichotoma.* *Fruit* the size of a large pea.

21. PHRYNIUM, *Willd.*

Rootstock creeping. *Leaves* large, oblong, radical; petiole long, sheathing. *Spike* compound, produced from the side of the petiole or direct from the rootstock; main bracts 2–∞-fld. *Sepals* 3, narrow. *Corolla*-tube cylindric; segments 3, linear-oblong, subequal, spreading. *Staminal tube* longer than the corolla-tube; segments unequal, petaloid, one bearing the 1-celled anther on its margin. *Ovary* 3-celled; cells 1-ovuled, rarely 2 cells empty; style adnate in the lower part to the staminal tube; free portion hooked; stigma capitate. *Fruit* globose, indehiscent or finally dehiscent. *Seeds* 1–3 erect; aril short, fleshy; embryo curved.—Species 20; tropics of Old World.

1. **P. capitatum,** *Willd. Sp. Plant.* i. 17; spike globose from the

side of the petiole rarely terminal, main bracts oblong with an incurved scarious tip which breaks up into bristles, corolla-segments longer than the tube, fruit usually 3 seeded. *Roxb. in Asiat. Res.* xi. 325, t. 1; *Hort. Beng.* 1; *Fl. Ind.* i. 8; *Wall. Cat.* 6619; *Wight Ic.* t. 2016; *Thw. Enum.* 320. Phyllodes Placentaria, *Lour. Fl. Cochin.* ch. 17. Maranta Placentaria, *A. Dietr. Sp.* i. 30.—*Rheede Hort. Mal.* xi. t. 34.

EASTERN HIMALAYAS, MALAY PENINSULA, MALABAR, TRAVANCORE, CEYLON. DISTRIB. Malay isles.

Rootstock perennial, tuberous. *Leaves* oblong, 1–1½ ft. by 6–8 in.; petiole longer than the blade, that which bears the spike 2–3 ft. or more. *Spike* sessile. 1½–2 in. diam.; subtended by 2–3 large rigid ovate bracts; inner main bracts 1 by ½ in., firm, oblong, several-fid. *Sepals* large, linear. *Corolla*-segments linear-oblong purple. *Capsule* turbinate, 3-lobed, the size of a gooseberry, smooth, 3-valved.

2. **P. parviflorum,** *Roxb. Hort. Beng.* 1; *Fl. Ind.* i. 7; spike globose from the side of the petiole, bracts lanceolate, corolla-segments white shorter than the tube, fruit usually 1-seeded. *Rosc. Scit. Pl.* t. 34; *Wall. Cat.* 6620; *Horan. Prodr.* 11. Maranta parviflora, *A. Dietr. Sp.* i. 30.

EASTERN HIMALAYAS and MALAY PENINSULA, and the CONCAN.

Rootstock tuberous, perennial. *Leaves* oblong-cuspidate, 1–1½ ft. by 6–8 in.; petiole longer than the blade, the one that bears the spike 2–2½ ft. *Spike* sessile, 1–2 in. diam.; bracts 1 in., pale green, acute, 2–3-fid. *Corolla*-tube as long as the bract; segments linear-oblong. *Staminal* lobes small, orbicular, white tipped with yellow.

3. **P. imbricatum,** *Roxb. Hort. Beng.* 1; *Fl. Ind.* i. 6; spike oblong from the side of the petiole, main bracts oblong obtuse, corolla-segments shorter than the tube, fruit usually 3-seeded. *Horan. Prodr.* 11. Maranta imbricata, *A. Dietr. Sp.* i. 30.

CHITTAGONG, *Roxburgh.*

Habit of *P. capitatum* and *parviflorum.* *Leaves* 1½–2 ft.; oblong, acute, petiole longer than the blade. *Spike* 3–4 in.; main bracts 1–1½ in. long, minutely toothed at the obtuse tip. *Calyx* and *corolla* of *P. parviflorum.* *Staminal lobes* small, white. *Capsule* rugose, oblong, the size of a large field bean.

A flowerless specimen with similar but terminal spikes and bracts, much smaller leaves and more slender petiole, collected at Rangoon by McClelland, probably represents a distinct species.

4. **P. macrostachyum,** *Wall. Cat.* 6612 A, B; spike long lax from the side of the petiole, main bracts lanceolate complicate, fruit 1-seeded.

PEGU, *Wallich.* TAVOY, *Gomez.* TENASSERIM, *Helfer.*

Rootstock short, with copious slender fibres. *Leaves* nearly 4 by 3–4 in., thin oblong, caudate; petiole twice as long as the blade. *Spike* sessile, 9–12 in.; main bracts 2–4 in., spaced out on the rachis, ascending; finally scarious. *Fruit* small, smooth, oblong, crowned with the small green lanceolate sepals.—*P. musaceum, Wall. Cat.* 6612 C, from the Trogla hills, known in leaf only, is probably a different species.

5. **P. spicatum,** *Roxb. Hort. Beng.* 1; *Fl. Ind.* i. 5; spike radical shortly-peduncled, main bracts ovate imbricate, corolla-segments shorter than the tube, fruit usually 3-seeded. *Wall. Cat.* 6617; *Horan. Prodr.* 11. Maranta caespitosa, *A. Dietr. Sp.* i. 30.

PEGU, *Carey, Wallich, R. Scott.* The CONCAN, *Law.*

Rootstock wide-creeping, perennial, not tuberous. *Leaf* oblong, 6–10 by 2–3 in.; petiole slender, longer than the blade. *Spike* 1–2 in.; bracts not 1 in., ovate, green, several-fld. *Corolla*-segments white, linear-oblong, much shorter than the cylindric tube. Larger *staminal lobes* obovate, as long as the corolla-segments. *Seeds* ¼ in., dull brown, triquetrous on the inner face.—An allied plant, with subequal crowded lanceolate bracts 1½–2 in., collected by Griffith and Helfer in Tenasserim, is no doubt a distinct species, but all the specimens are very incomplete. *P. sumatranum*, Miquel, appears to be specifically distinct from *P. spicatum*.

6. **P. Griffithii,** *Baker*; spike radical long-peduncled, bracts bifarious with tips rounded recurved, corolla-segments unequal, upper erect oblong, lateral reflexed. P. spicatum, *Griff. Notul.* iii. 418, *non Roxb.*

MALACCA, in wet jungles at Ching, *Griffith.*

Leafy stem many-leaved; petiole 3–4 ft.; blade oblong, 2 ft. *Peduncle* 1 ft. *Calyx*-segments linear, white, shorter than the tube. *Ovary* 3-celled.

7. **P. zeylanicum,** *Benth. in Gen. Plant.* iii. 653; spike shortly-peduncled radical, main bracts ovate imbricate, corolla-segments shorter than the tube, fruit 1-seeded. *Trimen Cat. Ceyl. Pl.* 92. Maranta spicata, *Thw. Enum.* 320, *excl. syn. Roxb.*

CEYLON; in the central province, rare; *Thwaites.*

Habit exactly of *P. spicatum*. *Leaves* oblong, caudate, ½ ft.; petiole slender, twice as long as the blade. *Spike* 1½ in.; main bracts few, green, not 1 in. *Fruit* small, smooth, oblong, crowned by the small green linear sepals.

8. **P. Cadellianum,** *King mss.*; spike shortly peduncled radical, main bracts ovate-lanceolate, fruit 1-seeded.

ANDAMAN ISLDS., *King's Collector.*

Rootstock short-creeping, perennial, slender. *Leaf* oblong, 9–10 in. by 3–4 in., base deltoid; petiole slender, 2–2½ ft. *Spike* 1½ in.; bracts 1 1½ in., few, closely imbricate, thin, glabrous. *Flower* not seen. *Fruit* oblong, smooth, ¼ in., crowned with the short sepals.

22. CANNA, *Linn.*

Rootstock perennial. *Stem* simple, leafy. *Leaves* large, oblong, acute. *Flowers* a lax terminal simple or branched raceme; bracts small, ovate. *Sepals* 3, small, oblong, or lanceolate. *Corolla*-tube cylindric, segments 3, lanceolate, equal. *Staminal tube* cylindric; segments petaloid, unequal, with the 1-celled anther adnate to the margin of one of the smaller ones. *Ovary* 3-celled; cells many-ovuled; style adnate at the base to the staminal tube, free above; stigma capitate. *Fruit* globose, echinate, indehiscent. *Seeds* large, globose; embryo straight.—Species 20–30 tropical American and the following:—

C. indica, *Linn.* var. C. ORIENTALIS, *Rosc. Scit. Pl.* t. 12; *corolla*-tube much shorter than the segments, petaloid staminal segments of the outer row 3 oblanceolate emarginate bright red, lip reflexed emarginate at the truncate apex. *Horan. Prodr.* 16. C. indica, *Linn. Sp. Plant.* 1, *in part*; *Roxb. in Asiat. Res.* xi. 322; *Fl. Ind.* i. 1; *Wall. Cat.* 6621; *Dalz. & Gibs. Bomb. Fl.* 687; *Thw. Enum.* 320. C. chinensis, *Willd. Enum. Berol.* i. 2 ?—*Rheede Hort. Malab.* xi. t. 48; *Rumph. Hort. Amboin.* v. t. 71, fig. 2.

Throughout INDIA from the HIMALAYAS to CEYLON and MALACCA.—DISTRIB. Malay isles, &c.

Rootstock tuberous, with many fibres. *Stem* 3–4 ft. *Leaves* oblong, acute, lower 1 ft. or more. *Bracts* ½ in., ovate, green. *Sepals* small, lanceolate. *Corolla*-tube ¼–⅓ in.; lobes 1 in., lanceolate, greenish. Outer *staminal segments* 3, bright red, oblanceolate, 1½ in. by ⅛–¼ in.; lip rather shorter; anther ¼ in. *Capsule* globose, ½–¾ in. *Seeds* black, the size of a pea.

Var. FLAVA, *Rosc. Scit. Pl.* t. 13; stature of the type, staminal segments plain bright yellow. C. flavescens, *Link*; *Horan. Prodr.* 41.

Var. C. NEPALENSIS, *Wall. Cat.* 6622 (sp.); stem much taller, leaves larger, corolla-segments 1½ in., outer staminal segments usually 3 bright red not emarginate, capsule above 1 in. *Bouché in Linnæa*, viii. 158; *Horan. Prodr.* 15.—Nepal, *Wallich.*

Var. C. SPECIOSA, *Rosc. Scit. Pl.* t. 17 (sp.); much taller than the type, leaves larger, outer staminal segments 2 acute bright red with a channelled yellow claw, lip variegated with red and yellow. *Herb. in Bot. Mag.* t. 2317; *Wall. in Bot. Reg.* t. 1276; *Horan. Prodr.* 16.—Nepal and Kumaon.

Another Indian form, unknown to me, is C. exigua, *Bouché*; *Horan. Prodr.* 16. The American form to which Roscoe and Horanmow restrict the name INDICA is figured Rosc. Scit. Pl. t. 1; Bot. Reg. t. 776.

23. **MUSA,** *Linn.*

Stem subarborescent, of convolute leaf sheaths. *Leaves* very large, oblong. *Flowers* in an erect or decurved spike, subunisexual, lower female, upper male; bracts large, spathaceous ovate or orbicular. *Calyx* slit down one side to the base, 3–5-lobed. *Corolla* as long as the calyx or shorter, wrapped round the stamens and style. Perfect *stamens* 5, sixth rudimentary or 0; filaments stout, filiform; anthers linear, erect, 2-celled. *Ovary* 3-celled; ovules many, superposed; style filiform from a thickened base; stigma subglobose 6-lobed. *Fruit* fleshy, indehiscent, oblong or fusiform, trigonous. *Seeds* subglobose or angled by pressure.—Species about 20; tropics of the Old World.

* Not stoloniferous, dying after flowering. *Bracts* many-fld. *Fruit* not pulpy and edible.

1. **M. superba,** *Roxb. Hort. Beng.* 19; *Corom. Pl.* t. 223; *Fl. Ind.* i. 667; stem short stout ovoid, leaves sessile on the sheath, bracts large orbicular many-fld. dull red, calyx 3-cleft, petal shorter than the calyx obcordate with a large mucro, fruit oblong subcoriaceous. *Wall. Cat.* 5166; *Wight Ic.* t. 2017; *Grah. in Bot. Mag.* t. 3849–3850; *Dalz. & Gibs. Bomb. Fl.* 272; *Horan. Prodr.* 41. M. textilis, *Grah. Cat. Pl. Bomb.* 213, non *Née.*

WESTERN GHATS.

Whole plant 10–12 ft. *Stem* covered with the persistent sheaths of the leaves. *Leaves* 8–10 ft., narrowed to the base. *Spike* drooping; lower bracts nearly a foot long and broad; upper crowded, persistent; flowers biseriate, 20–30 or more to a bract. *Calyx* 1–1½ in.; lobes three, linear, loosely cohering. *Corolla* ½ in. *Fruit* trigonous, 3 by 1½ in. *Seeds* ⅓–½ in. diam. smooth, brown, subglobose.

2. **M. nepalensis,** *Wall. in Roxb. Fl. Ind. ed. Wall. & Carey,* ii. 492; stem short stout ovoid, leaves sessile on the sheath, bracts large ovate many-fld. dull purple, calyx 3-cleft, petal obcordate with a large mucro shorter than the calyx, fruit oblong subcoriaceous. *Horan. Prodr.* 41.

Lower hills of NEPAL, *Wallich.*

Habit of *M. superba*. *Trunk* 5–6 ft., 2 ft. diam at the base. *Leaves* as in *superba*, but smaller and rather glaucous, upper passing gradually into the bracts. *Spike* short, drooping; lower floriferous bracts 6 in.; flowers 2-seriate, 7–8 to a bract. *Calyx* and *corolla* yellowish-white. *Fruit* and *seeds* as in *M. superba*.

3. **M. glauca,** *Roxb. Hort. Beng.* 19; *Corom. Pl.* t. 300; *Fl. Ind.* i. 669; trunk cylindric, leaves shortly petioled, bracts ovate greenish many-fld., calyx 3-cleft, petal obcordate with a large mucro shorter than the calyx, fruit obovoid-oblong subcoriaceous. *Horan. Prodr.* 41.

Pegu; *Carey*.

Trunk 10–12 ft. below the leaves, 8 in. diam. *Leaves* 4–5 ft., oblong-lanceolate, acute. *Spike* drooping from the base; bracts numerous, imbricate, the lower not ½ ft.; flowers 10–20 to bract. *Calyx* pale, about 1 in.; segments 3, loosely coherent, linear. *Corolla* not half as long as the calyx. *Fruit* 4–5 in., 1½ in. diam. *Seeds* smooth, globose, nearly black, ½ in. diam.

** Stoloniferous. *Bracts* many-fld. *Fruit* pulpy, edible.

4. **M. sapientum,** *Linn. Sp. Plant.* 1477; stoloniferous, stem tall cylindrical, leaves petioled, spike drooping, bracts ovate many-fld. usually deciduous, calyx 5-toothed at the tip, petal shorter than the calyx, fruit pulpy. *Roxb. Hort. Beng.* 18; *Corom. Pl.* t. 275; *Fl. Ind.* i. 663; *Grah. Cat. Pl. Bomb.* 212; *Dalz. & Gibs. Bomb. Fl. Suppl.* 88.; *Thw. Enum.* 321; *Horan. Prodr.* 42—*Rheede Hort. Malab.* i. 17, t. 12–14; *Rumph. Amboin.* v. 130, t. 60; *Trew Ehret.* t. 21–23.

Indigenous in Behar and the Eastern Himalayas, ascending to 4000 ft. Ceylon, *Thwaites*; cultivated throughout India and the tropics.—Distrib. Malay isles, &c.

Stem 8–12 ft. *Leaves* 4–5 ft. oblong, bright green above, paler beneath. *Inflorescence* about as long as the leaves; bracts ovate, more or less pruinose, lower 6–8 in., upper much shorter, falling before the fruit matures. *Calyx* yellowish-white, 1–1½ in. *Petal* oblong, about half as long. *Fruit* oblong, trigonous, 2–3 in. in the wild form, and full of seed (seedless in the cult. forms) tapering to the base and apex, yellowish green when ripe. *Seeds* angled by pressure, brownish-black, rugose, ½ in. diam. The principal varieties and subspecies wild and cultivated in India are—

M. Dacca, *Horan. Prodr.* 41; differs from typical *sapientum* by leaves paler green above white-pruinose beneath, pruinose stem, broad red border of the petiole and pale yellow fruit about 4 in. long with a very thick skin.

M. Champa, *Hort.*; stem and midrib of the leaf red, fruit pale straw-coloured about 6 in. long.

M. sikkimensis, *Kurz in Journ. Agric. Hort. Soc. Ind.* n.s.v. 164; differs from *sapientum* by its duller purple spathes and angled tubercled seeds 4–5 lin. diam.—Wild in Sikkim. *Hook. f. & Thoms.* (*Herb. Ind. Or.* 5.)

M. paradisiaca, *Linn. Sp. Plant.* 1477; stem reaching a length of 20 ft., leaf-blade of 5–6 ft. and petiole of 2 ft., fruit larger than in *sapientum*, ½–1 ft. long, with firmer pulp, not fit to eat till cooked, bracts and male flowers more persistent. *Roxb. Hort. Beng.* 19; *Trew Ehret.* t. 18–20. M. Cliffortiana, *Linn. Hort. Cliff.* i. t. 1.—Commonly cultivated; wild in Ceylon, according to Moon.

M. simiarum, *Kurz in. Journ. Agric. Hort. Soc. Ind.* xiv. 297; bracts violet, only one opening at a time, those of the male flowers convolute, fruit very small.—Andamans and Malacca, *Kurz*.

M. troglodytarum, *Linn.*; *Kurz in Journ. Agric. Hort. Soc. Ind.* n. s. v. 166; leaves narrow oblong, flower-spike erect, bracts greenish imbricated, fruit 3 in. long dark yellow or reddish brown.—Wild in Ceylon, according to Moon.

M. CORNICULATA, (*Rumph.*) *Kurz in Journ. Agric. Hort. Soc. Ind.* n.s. v. 166, t. 2–3; flower larger than in any other form, only 2–3 rarely 4 whorls of flowers produced, fruit as large as in *paradisiaca*.

M. TEXTILIS, *Née in Cav. Ann. Ciénc. Nat.* iv. 123; leaves firmer in texture than in *sapientum*, yielding a useful fibre, bracts polished, seeds very small and scarcely at all angled.—Native of the Philippines, cult. in India.

M. ARAKANENSIS, *Ripley in Proc. Agric. Hort. Soc. Ind.* x. 51; a fibre-yielding form from Arrakan.

M. ZEBRINA, *Flore des Serres*, t. 1061–2 and M. VITTATA, *Bot. Mag.* t. 3402, are handsome forms with variegated leaves. Other forms are mentioned by Kurz in Journ. Agric. Hort. Beng. n.s. v. (1878), 112–168; and Sagot in Journ. Soc. Nat. Horticult. France, 1887, 238, 285.

*** Stoloniferous. *Stem* slender, cylindric. *Bracts* few-fld., bright coloured. *Fruit* not edible.

5. **M. rosacea**, *Jacq. Fragm.* t. 132, fig. 4; *Hort. Schoen.* t. 445; stoloniferous, leaves petioled, flower-spike drooping or erect, bracts ovate lilac or pale red, lower usually 3-fld., calyx yellowish-white 5-toothed, petal as long as the calyx, fruit oblong-trigonous pulpy. *Bot. Reg.* t. 706. *Lodd. Bot. Cab.* t. 615. M. ornata, *Roxb. Hort. Beng.* 19; *Fl. Ind.* i. 666; *Dalz. & Gibs. Bomb. Fl.* 272.

EASTERN HIMALAYA and the CONCAN.—DISTRIB. Java.

Stem cylindric, slender, 3–5 ft. *Leaves* linear-oblong, firmer in texture than in *M. sapientum*. *Spike* about ½ ft., drooping in the cultivated form; bracts oblong, about ½ ft., crowded; male fl. 5–6 in a cluster. *Calyx* about 1 in. *Fruit* and *seeds* as in typical *sapientum*.

6. **M. sanguinea**, *Hook. f. in Bot. Mag.* t. 5975; stoloniferous, leaves petioled, spike erect or finally drooping, bracts ovate-lanceolate bright red, lower usually 3-fld., rachis pubescent, calyx bright yellow 5-toothed, petal as long as the calyx, fruit oblong-trigonous pulpy.

ASSAM, *Mann.*

Stem 4–5 ft., very slender. *Leaves* 2 ft., thin, bright green; petiole 1 ft. or more. *Spike* ½ ft.; bracts crowded, imbricate, 3–6 in. *Calyx* 1½ in. *Fruit* 2–3 in., pale yellowish green, variegated with red. *Seeds* irregularly cubical, black, tubercled.

IMPERFECTLY KNOWN SPECIES ALLIED TO M. SANGUINEA.

M. ASSAMICA, *Cat. Hort. Bull.* 1871, 6; leaves about 1 ft. very unequal-sided bright green.—Assam.

M. AURANTIACA, *Mann. mss.*, from Assam. I cannot by dried specimen of inflorescence distinguish this from *M. sanguinea*.

M. DASYCARPA, *Kurz in Journ. Agric. Hort. Soc. Ind.* xiv. 301 (s.p.); fruit hairy.—Assam.

M. MANNII, *Wendl. mss.*; differs from *M. sanguinea* in the shorter stem and longer leaves.—Assam.

M. URANOSCOPOS, *Lour. Fl. Coch.* 645 (M. coccinea, *Andr. Bot. Rep.* t. 47), Java, China, Cochin China.—Cultivated in India.

M. VELUTINA, *Wendl. and Drude in Regel Gartenfl.* xxiv. 65, t. 823, bracts densely pubescent externally, male fl. 6–9 in a cluster.—Assam, *Mann.*

24. LOWIA, *Scortechini.*

Stemless, herbaceous. *Stem* dichotomously branched. *Flowers* in a cluster from the base of the petiole, pedicelled, with a large persistent

lingulate bract folded round the calyx tube and others from the pedicel. *Calyx*-tube long, very slender; segments 3, lanceolate, reflexed. *Corolla* of 3 petals; two upper small, lanceolate; lower large, oblong, clawed. Fertile *stamens* 5; filaments short, cylindric; anthers linear, acuminate, 2-celled. *Ovary* 3-celled; ovules many, superposed; style long, slender, trifurcate at the stigmatose apex. *Fruit* and *seeds* unknown. Orchidantha, *N. E. Br. in Gard. Chron.* n. s. xxvi. (1886) 519.—Also Borneo.

L. longiflora, *Scortech. in Nuov. Giorn. Ital.* xviii. 308, t. 11.

PERAK, in the province of Kinta, *Scortechini, Kunstler.*

Whole plant 3–4 ft.; flower-bearing *petiole* 1½ ft., flowerless much shorter; blade oblong, 2–3 ft. *Calyx*-tube 4–5 in.; segments rather shorter, ¾ in. broad. Upper *petals* equal, as long as the stamens; lower with a white oblong blade 2 in. long, narrowed suddenly to a rather shorter purple claw. *Style* an inch longer than the calyx-tube; branches of stigma channelled, margins toothed.

Order CL. HÆMODORACEÆ.

Perennial herbs. *Leaves* usually radical, distichous, narrow, nerve parallel. *Flowers* bisexual, in terminal spikes racemes in panicles regular. *Perianth* corolline, persistent; lobes 6, biseriate, imbricate or induplicate-valvate. *Stamens* 6, opposite the perianth-lobes or fewer; anthers erect or versatile, 2-celled, rarely opening by pores. *Ovary* inferior or subinferior; 3-celled; stigma simple or 3-notched; ovules 1–many, on the inner angles of the cells, anatropous or semianatropous. *Fruit* superior or inferior, dehiscent or not. *Seeds* various; embryo small, partially enclosed in the fleshy albumen.

TRIBE I. **Conostyleæ.** *Ovary-cells* many-ovuled.

Flowers in a long simple spike or raceme	1. ALETRIS.

TRIBE II. **Ophiopogoneæ.** *Ovary-cells* 1–2-ovuled.

Filaments connate in a ring closing the mouth of the perianth	2. PELIOSANTHES.
Filaments short, free. Perianth short superior . . .	3 OPHIOPOGON.
Filaments filiform. Perianth inferior tube slender . .	4. SANSEVIERA.

1. ALETRIS, *Linn.*

Leaves radical, narrow. *Scape* leafless; flowers small, short, spicate, or racemed; bracts 1-fid. *Perianth-tube* short, subcampanulate, lobes sub-valvate. *Stamens* 6, on the bases of the lobes, filaments very short; anthers ovate or subglobose. *Ovary* half-inferior, top conic, 3-celled; style 3-partible, or 3-fid; ovules many, 2-seriate or elongate placentas. *Capsule* half superior, loculicidally 3-valved. *Seeds* minute, oblong.—Species 8, N. American and Asiatic.

Aletris litoralis, Kœn.; Wall. Cat. 5082, in *Aloe vera,* L. (*A. perfoliata,* Willd.).

1. **A. nepalensis,** *Hook. f.*; leaves 5–7-nerved, flowers glabrous, anthers subglobose, ovary glabrous, style very short, capsule globosely ovoid. Tofieldia nepalensis, *Wall. Cat.* 5097; *Royle Ill.* 385. Stachyopogon pauciflorus & spicatus, *Klotzsch in Bot. Reise Pr. Wald.* 49, t. 94.

TEMPERATE and ALPINE HIMALAYA, from KASHMIR to BHOTAN, alt. 10–15,000 ft.—DISTRIB. China.

Leaves grass-like, 3–8 in. long, strongly nerved, rarely $\frac{1}{4}$ in. diam. *Scape* 4–12 in., nearly naked, glandular-pubescent or woolly above. *Spike* or raceme few or many-fld., 1–4 in.; tomentose flowers $\frac{1}{5}$ in. long, greenish, sessile or pedicelled; bracts 1–2, close under the flower, linear, green, longer or shorter than the flowers, lower sometimes $\frac{3}{4}$ in. long; perianth-lobes oblong, obtuse, recurved, 3-nerved.—Bureau and Franchet (in Morot, Journ. de Bot. V. 155,) observe that *Tofieldia nepalensis*, Herb. Strachey & Winterb. No. 1 appears to belong to their *A. lanuginosa*; adding that Wallich's plant should be called *A. nepalensis*.

2. **A. sikkimensis,** *Hook. f.*; leaves 7–9-nerved ensiform, scape tall, spike very long, flowers glabrous, ovary glabrous, capsule globosely ovoid.

SIKKIM HIMALAYA; Lachen valley, alt. 9-12,000 ft. *J. D. H.*

A much larger plant than *A. nepalensis*, with short narrowed leaves $\frac{1}{2}$-$\frac{3}{4}$ in. broad, and a leafy scape with the raceme 1–2 ft. high, and with linear smaller and much narrower seeds.

3. **A. khasiana,** *Hook. f.*; leaves many-nerved, flowers glandular-pubescent, anthers oblong, ovary puberulous, capsule ovoid-lanceolate.

KHASIA HILLS, alt. 4 6000 ft., common, *Griffith*, &c.

Leaves grass-like, 4–12 in., rarely $\frac{1}{2}$ in. broad, closely striately nerved. *Scape* 6–12 in., glandular-pubescent above. *Flowers* usually sessile, $\frac{1}{4}$ in. long, yellowish-red, pinkish or purplish; bracts as in *A. nepalensis*. *Seeds* very minute, reniform.

2. PELIOSANTHES, *Andr.*

Scapigerous herbs; rootstock horizontal. *Leaves* narrow, linear or lanceolate, subplicately nerved. *Scape* erect; flowers small, racemed, bracts scarious. *Perianth* superior, tube short, broadly campanulate; lobes 6, subequal, spreading. *Stamens* 6, filaments very short connate in a ring almost closing the mouth of the perianth; anthers subsessile, slits introrse. *Ovary* inferior, top free conical, 3-celled; stigma subsessile, 3-lobed; ovules 2 or more, erect basal in each cell, anatropous. *Fruit* indehiscent. *Seeds* few, bursting through the pericarp during ripening, and resting on the base of the withered perianth, tube fleshy or succulent; embryo in the base of the hard fleshy albumen.—Species about 8, Indian and Malayan.

The species of this genus are far from well defined. Better characters than those hitherto employed for distinguishing them may perhaps be found in the number of ovules, and form of the staminal tube and anthers.

* *Bracts many-fld.*

1. **P. Teta,** *Andr Bot. Rep.* t. 605; leaves long petioled 12-24 by $1\frac{1}{2}$–3 in., nerves 10–20, scape stout shorter than the leaves, raceme many-fld., *Brown in Trans. Linn. Soc.* 1817, 8; *Kunth Enum* v. 307; *Bot. Mag.* t. 1302; *Redouté Liliac.* t. 415, *Reichb. Mag.* t 14; *Baker in Journ. Linn. Soc.* xvii. 505. P. violacea, *Wall. Cat.* 5084 (in part?) Teta viridiflora, *Roxb. Fl. Ind.* ii. 165.

SIKKIM HIMALAYA, the KHASIA HILLS, ASSAM, CHITTAGONG and BURMA. PENANG, *Curtis*.

Leaves 2–7; petiole variable in length; cross-nervules distinct when dry. *Scape* naked or with a few scales above and large membranous sheaths at the base; raceme 6–12 in.; bracts 1–3 to every fascicle of flowers, variable in length; pedicels short; flowers $\frac{1}{4}$-$\frac{1}{3}$ in. diam., purplish or bluish-green. *Seeds* as large as a pea, olive-blue.

2. **P. Griffithii,** *Baker in Journ. Linn. Soc.* xvii. 506; leaves long-petioled 6–8 by 1¾–2¼ in. strongly 5-nerved, scape very short.

SIKKIM HIMALAYA, *Griffith's Collectors;* alt. 1500 ft. *Clarke.*

Leaves 5–6, with 5-distant nerves much stronger than the numerous others; petiole 8–10 in., very slender. *Raceme* many-fld.; pedicels short, stout; bracts long; flowers not seen. *Seeds* globose, about ¼ in. diam.

** Bracts 1- rarely 2-fld. Flowers cernuous.

3. **P. violacea,** *Wall. Cat.* 5084; leaves 6–12 by 1½–3 in., long-petioled, nerves very many, racemes usually shorter than the petiole many-fld., flowers violet-blue. *Baker in Journ. Linn. Soc.* xvii. 502. P. Teta, *Wall. Cat.* 5083 A *in part.* P. campanulata, *Wall. mss.*

EASTERN HIMALAYA, the KHASIA HILLS, and BURMA.

Habit of *P. Teta* and with flowers of the same size and colour, but solitary in the bracts. *Seeds* ¾ in. long, oblong.—Baker has three varieties. 1. *minor*, with smaller fewer 5–7-nerved leaves and smaller green flowers; 2. *Clarkei*, with more conspicuous transverse nervules and a darker purple flower; 3. *Princeps*, more robust, leaves broader, 4–4½ in. diam., racemes longer, flowers greenish.—Moulmein, *Lobb.*

4. **P. macrophylla,** *Wall. mss.*; *Baker in Journ. Linn. Soc.* xvii. 505; leaves petioled 10–18 by 3–4½ in. elliptic-lanceolate nerves 13–15 strong, scape long or short, raceme many-fld., flowers greenish or purple.

EASTERN HIMALAYA; Sikkim alt. 3–600 ft., *J. D. H.*; *Clarke*; Mishmi Hills, *Griffith.*

The largest and stoutest Indian species, but I suspect only a further development of *P. violacea* var. *Princeps.* *Seeds* globose or obturbinate.

5. **P. neilgherriensis,** *Wight. Ic.* t. 2052; leaves long-petioled 4–8 by ¾–1½ in. with 5–10 stronger nerves, scape about equalling the leaves, bracts short, flowers small. *Baker in Journ. Linn. Soc.* xvii. 503. P. longifolia, *Steudel Pl. Canara Exsicc.* n. 1306.

MALABAR and CANARA; in the Ghats, *Wight., &c.*

Leaves few, membranous, transverse nervules conspicuous; petiole 6–9 in., very slender. *Scape* 4–6 in.; raceme as long; lower bracts many, ¼ in., upper very short; perianth dark purple, ¼ in. diam. *Seeds* obturbinately ovoid.

6. **P. courtallensis,** *Wight. Ic.* t. 2057; leaves long-petioled 8–12 by 1½–2 in. with 5 strong nerves, scape much shorter than the leaves, bracts longer than the flowers. *Baker in Journ. Linn. Soc.* xvii. 504. P. Teta, Wall. Cat. 5083 B.

TRAVANCORE; at Courtallum, *Wight., &c.*

A much larger plant than *P. neilgherriensis*, with leaves twice as long as the scape and raceme, and long lanceolate bracts much exceeding the flowers.—In a coloured drawing of this by Jerdon, the flowers are blue-purple, ½ in diam.

7. **P. humilis,** *Andrews Bot. Repos.* t. 634 (*not of Baker*); dwarf, leaves sessile or very shortly petioled elliptic-lanceolate 5-nerved, scape short stout, raceme short, bracts ovate about equalling the small crowded very shortly pedicelled flowers. *Bot. Mag.* t. 1532; *Kunth Enum.* v. 307.

PENANG, *Maingay.*

Leaves about 3 in. long; petiole shorter than the blade or 0. *Flowers* about ¼ in. diam.; segments of perianth green margined with white, obtuse and emargi-

nate in Andrews' drawing, acute in that of the "Botanical Magazine."—A very little-known plant. Maingay's specimens accord with the figures but they are flowerless.

8. **P. Bakeri,** *Hook. f.*; dwarf, leaves elliptic-lanceolate 5–7-nerved, petiole slender, scape very short, raceme short, bracts subulate-lanceolate all or the lower much longer than the small pedicelled flowers. P. humilis, *Baker in Journ. Linn. Soc.* xvii. 505 (*excl. Penang*).

EASTERN HIMALAYA, alt. 1–6000 ft., *J. D. H.*; *Clarke*; Mishmi Hills, *Griffith.* KHASIA HILLS, alt. 3–5000 ft., *J. D. H. & T. T.*

Leaves 4–7 by 1–2 in., thin, subcaudately acuminate; petiole as long. *Raceme* hardly exceeding the petiole; pedicels sometimes ¼ in. long, and lower bracts nearly ½ in.; perianth ⅛ in. diam., green or lurid purple (*Clarke*). *Seeds* small, oblong.—There are cultivated specimens in Wallich's Herbarium from the Calcutta Botanical Garden under No. 5083 D.

9. **P. albida,** *Baker in Bot. Mag.* t. 7110; leaves stoutly petioled 5–8-nerved, scape very short, raceme very long many-fld., bracts subulate-lanceolate longer than the small white shortly pedicelled flowers.

PENANG; *Curtis.*

Leaves 12 by 1½–2 in., elliptic-lanceolate, caudate-acuminate, nerves strong; petiole about half as long as the blade. *Raceme* longer than the petiole, stout, strict, white; lower bracts ½ in. long, narrow; flowers deflexed; perianth ¼–⅓ in. diam.; outer segments broadly ovate, inner orbicular-obovate; anthers very small within the much contracted mouth of the low truncate staminal tube. *Ovarian cells* about 5-ovuled. *Style* short, columnar, stigma 3-lobed.

3. OPHIOPOGON, *Ker.*

Scapigerous herbs. Stem short from a short rootstock or elongate subscandent. *Leaves* linear or lanceolate parallel-nerved. *Scape* leafy or leafless, flowers racemed; bracts scarious, usually many-fld. *Perianth* superior, segments spreading. *Stamens* 6, on the bases of the segments, filaments short, erect; anthers basifixed. *Ovary* inferior, 3-celled, crown flat or depressed; style columnar, stigma 3-toothed; ovules 2 in each cell, collateral, erect, anatropous. *Fruit* indehiscent. *Seeds* few, as in *Peliosanthes*, testa fleshy or succulent.—Species 8 or 10, East Asiatic.

Ophiopogon was established in 1807 by Ker-Gawler (Bot. Mag. t. 1063) on the figure of a plant supposed to be the *Convallaria japonica β minor* of Thunberg (Fl. Jap. 140), and to which Gawler gave the name of *O. japonicus*, referring to it the *C. japonica* of Decandolle in Redouté's Liliac. ii. t. 80 (Gawler's description is, however, that of a third plant). Judging from the figures, Gawler's and Decandolle's are not of the same species. Gawler's has blue flowers, linear-oblong perianth segments, and linear-oblong obtuse anthers; Redouté's has much smaller white flowers, ovate perianth-segments, and longer acute anthers. Both differ from any Indian species (except, perhaps, that mentioned at the end of the genus of which there are no flowers) in their small size, very short scape, and above all in the very short fusiform 6-grooved style, which was observed by Don (Prodr. 48) but overlooked by subsequent authors. Specimens of both are in Kew Herb.; that of Gawler, from Japan, is *O. japonicus* Gawl. *genuinus* of Maximovicz; the other is a continental garden specimen from Herb. Gay of what is clearly the plant figured in Redouté, and which is also figured in Schrader's Neues Journ. t. 1 as *Fluggea japonica*, Rich.

O. japonicus hence disappears from the Flora of British India; all the Indian species having slender styles; but I am not prepared to say whether or no any other Indian species may be identical with Japanese. They are extremely variable and

difficult of definition, and I am not satisfied that all the species here proposed will prove distinct from one another.

* *Stem creeping and rooting; roots not tuberiferous.*

1. **O. dracænoides,** *Hook.f.*; stem stout, leaves oblanceolate acuminate very many-nerved, petiole slender, racemes about equalling the leaves. *Fluggea dracænoides, Baker in Trimen Journ. Bot.* 1874, 174; in *Journ. Linn. Soc.* xvii. 502.

SIKKIM HIMALAYA, and the KHASIA HILLS, alt. 4–6000 ft., *J. D. H.*

Stems prostrate, as thick as a goose-quill, closely jointed, clothed at first with green sheaths that have broad scarious margins, rooting and with short tufts of leaves and flowery scapes. *Leaves* 3–6 in., including the petiole, ¾–1½ in. broad. *Racemes* 2–3 in.; bracts shorter than the flower, which are solitary or fascicled, white or pale lilac, ½–½ in. diam. *Perianth* segments ovate-oblong; anthers lanceolate, filaments very short; style filiform. *Seeds* oblong.

2. **O. Clarkei,** *Hook. f.*; stem prostrate with a terminal tuft of secundly curved linear leaves which are 8–12 by ⅛ in., scape short few-fld., flowers ⅔ in. diam., filaments one-third the length of the lanceolate anther.

SIKKIM HIMALAYA, *J. D. H.*; at Rungbee, alt. 6000 ft., *Clarke.*

Stems 8–10 in. long, rigid, as thick as a crow-quill or thicker, bearing one rather slender terminal tuft of very long slender leaves, which are faintly rough beneath. *Scape* with the 3–5-fld. raceme curved, 3–4 in. long; bracts ovate-lanceolate, about equalling the pedicels, which are jointed at or near the base.—In this species the stem is a long runner bearing a solitary tuft of leaves and scape.

3. **O. reptans,** *Hook. f.*; stem prostrate with distant tufts of linear leaves which are 6–8 by ½–⅛ in., scape very short slender few-fld.

KHASIA HILLS, at Nurtiung, alt. 4–6000 ft. *J. D. H.* GARROW HILLS, alt. 4000 ft., *Clarke.*

Stems 2–3 ft., prostrate, rather stouter than in *O. Clarkei*, rigid. *Leaves* quite smooth. *Scape* with fruiting raceme 2–3 in. *Seeds* ¼–⅓ in. diam., subglobose. —Very different from *O. Clarkei* in habit, the numerous tufts of very narrow shorter leaves, and the very short slender scapes. It closely resembles a Tonkin plant (Balansa n. 4155 bis.).

** *Stems tufted. Roots often tuberiferous.*

4. **O. Wallichianus,** *Hook. f*; rootstock short very stout, leaves 6–24 in. by ⅙–⅓ in., scape stout usually much shorter than the leaves, flowers usually fascicled ½–¾ in. diam., anthers lanceolate, filaments very short broad. O. japonicus, *Wall. Cat.* 5139 A. O. japonicus, *var.* Wallichianus, *Maxim. in Bull. Acad. N. S. St. Petersb.*; *Mel. biol.* vii. 321. O. longifolius, *Decne in Fl. des Serres*, xvii. 182 (*ex. Maxim.* l. c.). Fluggea Wallichiana, *Kunth Enum.* v. 303. F. japonica, *var.* Wallichiana, *Baker in Journ. Linn. Soc.* xvii. 501 (*excl. syn. Blume & Royle*).

TEMPERATE and SUBTROPICAL HIMALAYA; from Kumaon eastward, alt. 6–9000 ft. KHASIA HILLS, alt. 4–6000 ft.

Distinguished from the following by the rootstock, usually as thick as the thumb, sometimes 4–6 in. long, the stout scape longer or shorter than the leaves, and the large flowers. *Roots* of long cylindric tubes. *Leaves* often distichous and recurved, nearly quite smooth. *Raceme* lax or dense-fld., sometimes cylindric, with flowers nearly 1 in. diam.; bracts usually shorter than the flowers; pedicels

jointed about the middle; perianth white or pale lilac, segments variable in breadth, obtuse; anthers oblong-lanceolate, filament short and broad; style slender. *Seeds* ⅓–½ in. long, oblong.—Kunth's observation that the raceme is flexuous makes me suspect that the Wallichian plant which he describes (distributed as 5139 of Herb. Wallich.) is a Nepal specimen of 5139 A

Var. *pauciflora*; more slender, leaves narrower, flowers few not fascicled.—Khasia Hills, alt. 4–6000 ft. Intermediate between *O. Wallichianus* & *intermedius*.

5. **O. intermedius,** *Don Prodr.* 48; rootstock short not very stout, leaves 6–24 by ⅛–½ in., margins minutely erose, scape slender as long as the leaves or shorter, flowers solitary or fascicled ⅓–⅓ in. diam. white, anthers linear-oblong, filaments very short or 0. *Royle Ill.* 382, t. 96, f. 1. O. japonicus, *Wall. Cat.* 5139 C. O. japonicus, var. intermedius, *Maxim. Mel. Biol.* vii. 321. O. indicus, *R. W., Rottl.*?; *Wight Ic.* t. 2050. Fluggea Jacquemontiana, *Kunth Enum.* v. 304. F. japonica, var. intermedia, *Schultes f. in Roem. & Sch. Syst.* vii. 310. F. intermedia, *Kunth l. c.* 306.

TEMPERATE HIMALAYA; from Kashmir eastwards, alt. 5–9000 ft. KHASIA and MUNNIPORE hills, alt. 5–7000 ft. Ghats of MALABAR, MYSORE, &c., *Wight.* CEYLON.

Except by the usually much smaller flowers and always narrow leaves, and more oblong anthers, this cannot be distinguished from small states of *O. Wallichianus* (however widely different the extreme states of each are). The following are the most marked forms selected from some hundreds of specimens. They pass into one another, and I fear into *O. Wallichianus*. The bracts are so variable that I have omitted describing them.

Var. 1. *occidentalis*; raceme suberect many-fld., flowers white about ⅛ in. diam., pedicels often ¼–⅓ in.—Western Himalaya, Khasia hills and Munnipore.

Var. 2. *macrantha*; scape stout, raceme erect many-fld., flowers ⅓–⅔ in. diam. white.—Western Himalaya.

Var. 3. *parviflora*; leaves very narrow secundly curved, scape very slender decurved, flowers ¼–⅓ in. diam. white or pale purplish, pedicels very short.—Sikkim Himalaya, Khasia, and Munnipore hills.

Var. 4. *pauciflora*; leaves long ⅛ ¼ in. broad not secund, scape usually very long, raceme short decurved few-fld., pedicels short, flowers ¼ ⅓ in. diam. (Wall. Cat. 5139 C).—Khasia hills, Munnipore, Western Ghats and Ceylon.

Var. 5. *gracilipes*; leaves long very slender ⅛ ⅛ in. broad narrowed into almost filiform petioles, scape slender, raceme few-fld. cernuous, flowers ⅓–½ in. diam. white.

6. **O. Malcolmsoni,** *Royle Ill.* 382 (*name only*); leaves 6–14 by ⅓ in. flaccid petioled tip obtuse, scape erect and raceme very slender, flowers ½ in. diam. solitary or in distant pairs, pedicels very short, filaments distinct, anthers lanceolate acute. O. japonicus, *Wall. Cat.* 5139 G.

PEGU; at Rangoon, *M'Clelland, Kurz.* ATTRAN, *Wallich.*

The flaccid elongate linear-lanceolate obtuse leaves and long slender racemes seem to distinguish this.—*Rootstock* stout; roots fascicled, fleshy; bracts usually longer than the flowers; pedicels jointed below the middle; perianth rather membranous, white?, style very slender. *Seeds* ⅓ in. long, ellipsoid.—I assume this to be Royle's *O. Malcolmsoni*, a native of Rangoon, of which, however, I have seen no authentic specimen.

7. **O. micranthus,** *Hook. f.*; leaves 10–20 by ⅓–½ in. flaccid petioled, tip obtuse, scape rather stout long or short, raceme suberect elongate, flowers subsolitary ¼ in. diam., anthers sessile oblong obtuse.

ASSAM; *Mrs. Mack.*

In foliage this resembles *O. Malcolmsoni*, but the flowers are minute, with much shorter perianth-segments, and very different anthers, the seeds also are smaller and globose.

8. **O. Griffithii,** *Hook. f.*; leaves very narrowly elliptic-lanceolate 6–10 by ½–¾ in. many-nerved narrowed into a very slender petiole, tips obtuse, scape stout compressed, raceme lax-fld, pedicels very short. Fluggea Griffithii, *Baker in Journ. Linn. Soc.* xvii. 502.

UPPER ASSAM; on the Patkoye hills, alt. 4500 ft., *Griffith.*

A very distinct-looking species, from the elliptic petioled leaves but not in flower. Baker describes the seeds as solitary oblong ¼ in. long, blue.

9. **O. prolifera,** *Lindl. in Journ. Hort. Soc.* 1 (1846), 76; rootstock climbing and rooting, leaves ⅛ in. broad ensiform decurved bright green, scape bright purple, flowers subsessile clustered obovate between fleshy and spongy, stamens united by a short fleshy ring, ovary thin-skinned adherent but not growing to the ovary 3-celled, ovules 2 erect in each cell, style pyramidal, stigmas 3 point-like. *Maxim. Mel. Bot.* vii. 129. Fluggea? prolifera, *Baker in Journ. Linn. Soc.* xvii. 502.

PENANG. *T. Lewis* (Cult. in Hort. Soc. Gardens, 1845).

I have seen no specimen.—A sketch of that in the Lindley Herbarium (now at Cambridge) represents fragments of two strongly striated leaves 6–10 in. long, without apices and a stout scape, with clusters of flowers about ¼ in. diam. subtended by broad ovate bracts. It a good deal resembles *Liriope.*

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

O. INDICUS, *Royle mss. Ill.* 382 (name only).

O. MINOR, *Royle mss. l.c.* (name only), from Turanda in Kumaon, is probably *intermedia*, var. *pauciflora.*

O. MOLLIS, *Royle mss. l.c.* (name only), "common in the Himalaya from the Ganges to the Sutlej," is probably *Theropogon pallidus.*

O.? PALLIDUS, *Wall. Cat.* 5138, is *Theropogon pallidus.*

O. SPICATUS, *Ker-Gawl.*; said by Don (*Prodr.* 47) to be from Nepal, *Wallich*, is *Liriope spicata*, a native of Japan and China, not hitherto found in India.

OPHIOPOGON, sp.? Munnipore, *Watt*, a small species not in flower, possibly the Japanese *O. japonicus.*

4. SANSEVIERIA, *Thurle.*

Stout herbs with a short often stoloniferous rootstock. *Leaves* narrow, cartilaginous or fleshy flat or terete, nerves immersed. *Scape* stout; flowers racemose. *Perianth-tube* long, slender, lobes narrow. *Stamens* 6, on the leaves of the lobes; filaments filiform; anthers dorsifixed. *Ovary* superior, attached by a broad base, 3-celled; style filiform, stigma simple; ovules solitary, erect in each cell. *Fruit* membranous, indehiscent. *Seeds* 1–3 ripening outside the pericarp globose, all large, or 1–2 imperfect; testa long, fleshy or succulent.—Species 10, Indian and African.

1. **S. zeylanica,** *Willd. Sp. Pl.* ii. 159; leaves 1–2 ft. ensiform semiterete attenuate from the base to the acuminate lip, deeply channelled above, barred with green and edged with red, raceme short, flowers 1½ in. long. Redouté Liliac, t. 290; *Bot. Reg.* t. 160; *Kunth Enum. Pl.* v. 18; *Baker in Journ. Linn. Soc.* xiv. 548. Aletris zeylanica, *Mill. dict.* No. 4. A. hyacinthoides, var. zeylanica, *Linn. Sp. Pl.* i. 456. Aloe zeylanica, *Jacq. Enum. Stirp. Agu. Vindot.* 310.

? CEYLON.—DISTRIB. ? Tropical Africa.

Leaves 1–1½ in. broad at the base, very thickly fleshy and hard, margins scarious. *Scape* 1–2 ft., with distant scarious sheaths; bracts ¼ in. long; pedicels short; perianth 1½ in. diam.—The above description accords with Baker's, and with the plant figured in The Botanical Register, of which the origin is uncertain, but which has long been cultivated as a native of Ceylon. It is stated to inhabit also Tropical and South Africa; which is more probably its native country.

2. **S. Roxburghiana,** *Schult. fil. Syst.* vii. 357; leaves 1–2 ft. narrowly linear-ensiform narrowed towards the base semiterete channelled above green faintly clouded with black, scape slender, raceme elongate, flowers ½ in. long. *Kunth Enum.* v. 18; *Baker. in Journ. Linn. Soc.* xiv. 549. S. zeylanica, *Roxb. Pl. Cor.* ii. 45, t. 184; *Fl. Ind.* ii. 161.—? *Rheede Hort. Mal.* xi. t. 42.—Moorva, *As. Res.* iv. 271.

COROMANDEL COAST, *Roxburgh.*

According to Roxburgh's drawing (at Kew) this is a very different species from *S. zeylanica*, with fewer very much longer and much narrower leaves reaching 4 ft. in length, 1 in. broad, narrower at the base and not nearly so deeply channelled; the scape is more slender with few narrowly lanceolate sheaths, the raceme much longer and the flowers smaller.—Whether it is Rheede's xi. t. 42, which grows in sandy places on the Malabar coast, is doubtful. Roxburgh describes it as cultivated for its fibre. I suspect that it is the only species indigenous to India and is confined to the Western Peninsula and Ceylon, wild or cultivated.

Order CLI. IRIDEÆ.

Perennial herbs; rootstock various, *Leaves* narrow, often distichous and equitant. *Flowers* 2-bracteate. *Perianth* superior, petaloid, segments 6-biseriate, imbricating. *Stamens* 3, epigynous, or adnate to the outer perianth-segments; anthers often narrow, extrorse. *Ovary* 3-celled; style simple; stigmas 3, simple or petaloid or variously cleft; ovules many, 2-seriate in the inner angles of the cells, anatropous. *Capsule* trigonous, 3-celled, loculicidal. *Seeds* many, testa thin or coriaceous; embryo immersed in the albumen, short, cylindric.—Genera 57, species about 700, chiefly temperate.

Tribe I. MOREÆ. Stamens opposite to and shorter than the petaloid style-arms.

Stigmatic surface on the back of the petaloid style-arms . . . . 1. IRIS.

Tribe II. SISYRINCHIEÆ. Stamens alternating with the style-arms.

Rootstock a tunicate corm; stem 0; perianth-tube long slender . . . . . 1. CROCUS.

Rootstock creeping; stem erect; perianth-tube very short . 2. BELAMCANDA.

1. IRIS, *Linn.*

Rootstock bulbous or creeping. *Leaves* equitant, ensiform. *Perianth-tube* long or short, segments large, outer (sepals) largest, stipitate, reflexed, inner (petals) usually smaller, suberect or reflexed. *Stamens* inserted at the base of the outer segments; anthers linear, basifixed. *Ovary* 3-gonous; style stout; stigmas petaloid, arching over the stamens, 2-fid and with a transverse dorsal crest, stigmatic surface a point below the crest. *Capsule* coriaceous, 3- or 6-ribbed. *Seeds* flat or globose, testa coriaceous or fleshy.—Species about 100, North temperate regions.

The Himalayan species of *Iris* are very imperfectly known; good specimens and drawings are much wanted, with descriptions from the living plants. The common *I. Xiphion* of Europe and the East advances into Affghanistan, but has not been collected in British India, and Prof. Foster informs me that he suspects that the European and Eastern *I. Sisyrinchium*, L., a species with the filaments united below, occurs in the Punjab. It is a native of Affghanistan. The character of bearded and crested sepals is artificial and inconstant in this genus.

* *Rootstock* a coated bulb or corm (Xiphion).

1. **I. Aitchisoni,** *Boiss. Fl. Orient.* v. 123; leaves slender subterete, spathes 1-fld., sepals shortly clawed obovate, petals linear spreading, stamens adherent to the style-arms. Xiphion Aitchisoni, *Baker in Gard. Chron.* 1876, i. 723; *in Trim. Journ. Bot.* xiii. (1873) 108; *in Journ. Linn. Soc.* xvi. 124.

The PANJAB; Salt range, alt. 3000 ft., *Vicary, Aitchison.*—DISTRIB. Affghanistan.

Corm 2 in. long, ovoid; coats brown, shining. *Stem* ½-1½ ft., slender, 1-3-fld. *Leaves* as long, ¼ in. broad. *Spathes* 2-2½ in., lanceolate, green. *Perianth* lilac or yellow; tube 1-1½ in.; blade ½ in.; petals much shorter, spreading, limb small 3-cuspidate. *I. Stocksii*, Boiss. Fl. Orient. v. 123, of Beluchistan, is closely allied to *I. Aitchisoni*, but is a dwarf species with lanceolate plicate leaves.

Var. *chrysantha*, Baker, has the stem 2 ft., and much stouter and flowers yellow.

** Rootstock stout, prostrate and creeping.

§ Sepals neither crested nor bearded.

2. **I. ensata,** *Thunb. in Trans. Linn. Soc.* ii. 328; leaves linear rigid grooved glaucous, sheaths shorter than the fusiform ovary, flowers lilac, perianth-tube 0, blade of sepals rhomboidly ovate obtuse entire shorter than the claw, petals oblanceolate erect, style-arms linear tip acutely 2-fid. *Boiss. Fl. Orient.* v. 129; *Baker in Journ. Linn. Soc.* xvi. 139; *in Gard. Chron.* 1876, ii. 323; *Regel Gartenfl.* t. 1011. I. biglumis, *Vahl Enum.* ii. 149; *Sweet Brit. Fl. Gard. Ser.* ii. t. 187. I. triflora, *Balbis Misc. Bot.* vii. t. 1; *Redouté Lil.* t. 481. I. Doniana, *Spach. Hist. Veg.* xiii. 34. I. Pallasii, *Fisch.*; *Reichb. Ic. Fl. Germ.* t. 469; *Bot. Mag.* t 2331. I. fragrans, *Lindl. in Bot. Reg.* xxvi. t. 1. I. longispatha, *Fisch. in Bot. Mag.* t. 2528. I. Moorcroftiana, *Wall. Cat.* 5021; *Don. in Trans. Linn. Soc.* xviii. 315. I. pabulina, *Naud in Rev. Hortic* 1888. 338 (name). Xiphion Donianum, *Alefeld in Bot. Zeit.* (1863) 297. Ioniris Doniana, fragrans, triflora & Pallasii, *Klatt in Bot. Zeit.* 1872, 502.

WESTERN HIMALAYA and WESTERN TIBET, alt. 5-9000 ft., *Royle*, &c.—DISTRIB. Temp. Asia.

Stems tufted, short, or 1½-2 ft., stout or slender, sheaths fibrous. *Leaves* 1½ ft. by ¼-½ in. *Spathes* 3-4 in., 1-3-fld.; valves lanceolate, green. *Flowers* pedicelled; ovary 1 in., cylindric; blade of sepals 1½-2 by ½-¾ in., claw rather longer; petals ¼ in. broad; style-arms 1 in., crests large, deltoid. *Capsule* 1½-3 in., by ½-⅝ in., 6-ribbed, beaked, ribs rounded.

3. **I. spuria,** *Linn. Sp. Pl.* 58; leaves 1-3 ft. ensiform coriaceous strongly striate, spathes 2-3-fld., flowers lilac, perianth-tube long, blade of sepals orbicular half as long as the claw, petals oblanceolate, style-arms deflexed. *Bot. Mag.* t 58, 1131, 1314-5; *Jacq. Fl. Austr.* t. 4; *Reichb. f. Fl. Germ.* ix. t. 345. I. Notha, *M. Bieb. Cent. Pl. Ross.* t. 77; *Reichb. Ic. crit.* x. t. 915. I. halophila, *Bot. Mag.* t. 875 (*not of Pallas*); *Boiss. Fl. Orient.* v. 128. Xyridion Nothum and spurium, *Klatt in Bot. Zeit.* 1872, 499.

KASHMIR, alt. 6000 ft., *Clarke*.—DISTRIB. Westward to Russia.

Stem 2–3 ft., sheathed. *Leaves* ¼–1½ in. broad. *Spathes* 2–3 in., linear-oblong, firm, green. *Flowers* 2–3 in. diam., bright lilac; sepals ½ in. broad, claw keeled; petals ½–⅝ in. broad; style-arms 1 in. long, crests small, deltoid. *Capsule* 1–2 in., 6-ribbed, long-beaked.—A very common Oriental plant. Baker refers the Kashmir specimens to *I. Notha* as a variety with very stout stems, broad leaves and large flowers.

4. **I. aurea,** *Lindl. in Bot. Reg.* xxxiii. t. 59; tall, stout, leaves ensiform, spathes 2–3-fld., flowers long-pedicelled yellow, ovary as long as the perianth-tube, blade of crisped and crenulate sepals oblong as long as the claw, petals shorter oblanceolate, style-arms with entire broad incurved lobes. *Baker in Gard. Chron.* 1876, ii. 584. I. crocea, *Jacquem. mss.* Xyridion aureum, *Klatt in Bot. Zeit.* 1872, 501.

WESTERN HIMALAYA; Kashmir, *Royle, Jacquemont*.

Stem 3–3½ ft., stout, terete, with leafy sheaths. *Leaves* 1½–2 ft. by ¾–1 in. *Spathes* 3–4 in.; valves lanceolate, green. *Flowers* bright yellow; sepals 2½–3½ in., blade 1 in. broad; style-arms 1¼–1½ in. long, crests deltoid. *Capsule* 1½ in. long, oblong, 6-angled, beaked.—Differs from *I. spuria*, chiefly in the yellow flowers.

5. **I. Wattii,** *Baker mss.*; tall, stout, leaves broadly ensiform, flower-heads racemose on stout long peduncles, spathes 2–3-fld., perianth-tube short infundibular, sepals obovate-spathulate, blade as long as the claw, petals rather shorter obovate-oblong, style-arms with 2-fid laciniate tips.

MUNNIPORE; summit of Kongui, alt. 6000 ft., *Watt*.

Stem with 5–6 flower-heads on erecto-patent peduncles. *Leaves* thin, 18 by 1½–2 in., as long as the stem. *Spathes* with the outer valve 1–1½ in., lanceolate, thin, green; inner much shorter, oblong, obtuse; pedicels short, jointed with the ovary. *Flowers* pale lavender blue, tube ½ in.; blade of sepals ¾ in. broad, striped and spotted with purple, throat yellow; petals ½ in. broad; style-arms ½ in. long, crest deltoid laciniate. *Capsule* small, oblong, obtusely trigonous.—Baker, from whose description much of the above is taken, says of the sepals, "apparently not crested."—Bhotan specimens from Griffith of this or an allied species have stout compressed grooved stems and firmer spathe-valves.

§§ Sepals crested.

6. **I. Milesii,** *M. Foster in Gard. Chron.* 1883, i. 231; tall, stout, leaves very broadly ensiform, flower-heads branched, spathes many-fld., perianth-tube rather short, sepals spreading, blade as long as the claw obovate, crests sharply toothed, petals as large spreading oblong undulate, style-arms with a large fimbriate crest. *Baker in Bot. Mag.* t. 6889.

WESTERN HIMALAYA; Kullu and Parbutta valleys, alt. 4000 ft., *Brandis*.

Stem 3 ft., as thick as the little finger, leafy upwards; sheaths at the forks 4–6 in. *Leaves* 1½–2 ft. by 1–2 in. broad, pale green, firm, strongly curved. *Spathes* 1–1½ in., valves oblong, obtuse; pedicels short, jointed at the tip; flowers 2–4 in. diam., large; ovary clavate; perianth-tube ½ in.; blade of sepals 1¼–2 in., disk whitish with dark radiating purple blotches, margins purple, crest yellow; style-arms 1 in., blue-purple, crest square.—Possibly this is the tall *Iris* mentioned by Stewart (Panjab Plants, 241) as found in the Beas valley, alt. 5–12,000 ft., and used for thatching.

7. **I. nepalensis,** *Don Prodr.* 54 (not of Wall.); stem slender, leaves linear, spathes 1–3-fld., flowers shortly pedicelled, perianth-tube slender, blade of sepals oblong as long as the claw, crests narrow, petals oblong,

crests of style-arms large toothed, capsule 3-gonous with broad flat sides and a long slender beak. *Sweet Brit. Fl. Gard. Ser.* ii. t. 11; *Baker in Journ. Linn. Soc.* xvi. 143; *in Gard. Chron.* 1876, ii. 37. I. decora, *Wall. Pl. As. Rar.* i. 77, t. 86; *Don in Trans. Linn. Soc.* xviii. 313; *Royle Ill.* 372. I. sulcata, *Wall. Cat.* 5049. Neubeckia decora and sulcata, *Klatt in Linnæa*, xxxiv. 588, 590.

TEMPERATE HIMALAYA; from the Panjab and Western Tibet eastwards, alt. 5–10,000 ft. KHASIA HILLS, alt. 5–8000 ft.

Rootstock with densely fibrous sheaths, and copious fleshy finger-like roots; stem ½–1 ft.; flower heads 1–2. *Leaves* 6 in. long at flowering time, elongating to 24 by ¼ in., streaked with purple lines and dots. *Spathes* 1½–2 in. long, outer valves thin, green, persistent; pedicels very short. *Perianth-tube* 1½ in., limb 1–1½ in., pale lilac; blade of sepals ½ in. broad, crest yellow; petals ⅛ in. broad; style-arms 1 in. and less. *Capsule* oblong, trigonous, 1–1½ in., enclosed in the persistent spathes. —Prof. Foster informs me that the roots are characteristic, resembling those of a *Hemerocallis*. Hemsley (Journ. Linn. Soc. xxviii. 136) mentions a starved form of this, 3–4 in. high, as having been collected in the Shan hills by General Collett at 4000 ft. elevation.

§§§ Sepals bearded.

† *Dwarf species*; *stems* 12 *in. or less.*

8. **I. gilgitensis,** *Baker mss.*; dwarf, leaves linear, flower-heads solitary, spathe 2-fld., pedicels short, perianth-tube long, blade of sepals small narrow oblong much shorter than the strongly bearded claw, petals oblong.

WESTERN TIBET; at Gilgit, alt. 12,000 ft., *Giles.*

Stems tufted, 4–6 in., basal sheaths entire. *Leaves* flaccid, 6–9 by ⅛–⅙ in. *Spathe* 1½–2 in., valves lanceolate green, margins pale. *Perianth-tube* less than 1 in., limb 1½ in., bright lilac; blade of sepals ½ in. broad; petals clawed; style branches ¾ in., crests small, deltoid.—Differs from *I. kumaonensis* by the small blade of the sepals. A single specimen only seen.

9. **I. kumaonensis,** *Wall. Cat.* 5052; dwarf, leaves linear, flower-head solitary, spathes 1-fld, pedicels very short, perianth-tube very long, blade of sepals spreading cuneate obovate as long as the bearded claw, petals erect, blade oblong, capsule ellipsoid or subglobose beaked. *Don in Trans. Linn. Soc.* xviii. 311; *Royle Ill.* 372; *Baker in Gard. Chron.* 1876, ii. 709. I. Kingiana, *M. Foster in Gard. Chron.* 1887, i. 611; *Baker in Bot. Mag.* t. 6957. I. tigrina, *Jacquem. mss.*

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 8–12,000 ft.

Stems 2–12 in., crowded; outer basal sheaths fibrous. *Leaves* 12–14 by ⅛ in. *Spathes* 2–3 in., valves lanceolate, ventricose. *Perianth-tube* 2–2½ in.; limb 1½–2 in., bright lilac; blade of sepals ¾ in. broad, blotched with darker lilac, beard of claw of yellow-tipped hairs on a white crest, blade of petals ½ in. broad; style-arms ¾ in. long, crests deltoid acute. *Capsule* 1–2 in., narrowed at both ends, trigonous, angles obtuse.—Don describes the sepals as blood-red with black-purple spots.

10. **I. goniocarpa,** *Baker in Gard. Chron.* 1876, ii. 710; *in Journ. Linn. Soc.* xvi. 145; dwarf, slender, leaves narrow linear, flower-heads solitary, spathes 1-2-fld., flowers subsessile, perianth-tube long, sepals cuneately-oblong, keel strongly bearded, petals erect, blade oblong, capsule trigonous with broad flat sides and a long slender beak.

SIKKIM HIMALAYA, alt. 10–13,000 ft., *J. D. H.*

Stem 6 in., 1-leaved, sheaths fibrous. *Leaves* 6–8 by $\frac{1}{12}$ in. *Spathes* 1 in. long, valves lanceolate persistent. *Perianth-tube* ½–¾ in.; blade of lilac ? sepals ¼ in. broad;

style-arms ½ in.; crests large, deltoid, acute. *Capsule* exactly as in *I. nepalensis*, of which this may be a variety, but the sepals are strongly bearded.

11. **I. Duthieii,** *Foster in Gard. Chron.* 1887, i. 611; dwarf, leaves linear, flower-heads solitary, spathes 1-fld., perianth-tube very long, blade of spreading sepals cuneate-obovate gradually narrowing into the bearded claw, petals oblong obovate red lilac.

WESTERN HIMALAYA; Kumaon, *Duthie* (*Hort. Foster*).

Seems to differ from *I. kumaonensis*, of which it is probably a variety, in the reddish lilac flowers, with darker veins. *Capsule* 1¼ by 1 in., trigonous. As in *kumaonensis* the flowering precedes the mature leafing.

12. **I. Hookeriana,** *Foster in Gard. Chron.* 1887, i. 611; dwarf, leaves linear, flower-head solitary, spathes three 2-fld., persistent perianth-tube short, blade of sepals obovate-cuneate gradually narrowing into the thickly bearded claw, blade of erect petals narrowly obovate, capsule small trigonous beaked.

WESTERN HIMALAYA; Lahul (*Hort. Foster*).

Stem 5–6 in., sheaths torn. *Leaves* immature at the flowering season, at length 24 by ½–¾ in., pale green. *Spathes* about 5 in. long; valves lanceolate, ventricose. *Perianth-tube* ½ in., limb 1½–2 in.; blade of sepals cuneate-obovate, ¾ in. broad, purplish blue blotched with darker; claw white with violet veins, hairs of beard white yellow-tipped; blade of petals ½ in. broad, suddenly narrowed into the channelled claw; style-arms very convex dorsally, crests revolute deltoid, coarsely serrulate. *Capsule* oblong.

†† *Stem* 1 *ft. or more.*

13. **I. Clarkei,** *Baker mss.*; stem tall stout, leaves linear or ensiform strongly striate, flower-heads 1–2, spathes 1–2-fld., valves green to the tips, pedicels nearly equalling the spathe, perianth-tube short infundibular, blade of sepals oblong-cuneate with a bearded erect claw, blade of petals small oblong, claw long, capsule oblong obtuse at both ends.

SIKKIM HIMALAYA, alt. 10–11,500 ft., *J. D. H., Clarke.*

Rootstock very stout, creeping, sheaths long, fibrous. *Stem* 10–24 in., fruiting very stout, 2-leaved. *Leaves* not membranous at the tips, at length 1½–2 ft. by ⅓–½ in. *Spathes* 2½–3 in., valves lanceolate, persistent. *Perianth* bright lilac blotched with violet, throat yellow; tube ½ in.; limb 2 in.; blade of sepals ¾ in. broad, style-arms 1 in. long, bright lilac, crests square. *Capsule* 1½–2 in., oblong, trigonous, valves thick, rigid, keeled at the back.—The leaves are very variable, linear and ¼ in. broad in small fld. specimens.

DOUBTFUL SPECIES.

Of the following, except *I. longifolia*, all are supposed to be either garden plants or originally garden escapes, and probably identical with Persian species. The attention of Indian botanists should be given to them.

I. DEFLEXA, *Knowles and Westc. Flor. Cab.* ii. 19, t. 57 (*Lindl. Bot. Reg.* 1840, *Misc.* 25, 34; *Baker in Gard. Chron.* 1876, ii. 774 (in part). I. germanica, var. nepalensis, *Herb. in Bot. Reg.* l. c. 34. Baker, who characterizes the plant of the Floral Cabinet by the scarious tips of the spathes and deflexed stem, considers it to be intermediate between *germanica* and *pallida*, but as he has included under it the *nepalensis* of Royle & Wallich, some of which are certainly different, his view is perhaps not correct. Herbert, who cultivated authentic specimens, says that the deflexed stem was due to its being grown in heat, and that it is a var. of *germanica*, and is *I. nepalensis*, *Wall. in Bot. Reg.* t. 818.

I. KASHMIRIANA, *Baker in Gard. Chron.* 1877, ii. 744 (Kashmir to Kumaon). Differs, according to Baker, from *I. florentina*, in the sweet-scented pure white flowers with the spathe-valves scarious at the tips only, and the pure milk white stigmas two-thirds as long as the perianth with large crests.

I. LONGIFOLIA, *Royle Ill.* 372, t. 91, f. 2; Baker is disposed to regard this as a long-leaved form of *I. nepalensis*, Don Prodr. (not of Trans. Linn. Soc.). Prof. Foster thinks it is an entirely different plant, apparently allied to *I. ruthenica.*

I. NEPALENSIS, *Wall. Cat.* 5050 *in part*, a native of Nepal and Kumaon. There are two plants under this number in Herb. Wall., one a solitary specimen, with spathes scarious throughout, the others with them green throughout. Of this latter there is an excellent drawing by Wallich's article made in Nepal. Except in the very pale flowers it may be a *I. germanica;* but Royle (Ill. Him. Pl. p. 372) says that he perceived a distinct smell of Orris-root (as of *I. florentina*) in Wallich's specimen, which is against its being *germanica.* The specimen with scarious valves looks more *I. florentina*, but it has no roots.

I. NEPALENSIS, *Wall. mss. in Lindl. Bot. Reg.* t. 818 (from Nepal, *Wallich*). This has the dark blue flowers of *I. germanica*, very unlike the Wallichian drawing of *I. nepalensis*, it may or may not agree in colour with some of his specimens. Herbert makes it a var. of *germanica*, but gives no varietal character. Baker cites it under *deflexa.*

I. NEPALENSIS, *Wall. ex I. Don.*; in *Trans. Linn. Soc.* xviii. 310. This is a mixture of Wallich's, Royle's and the Bot. Reg. *nepalensis;* in consequence of which the root is described as fragrant, as in *I. florentina*, and used for similar purposes. Don distinguishes it from *germanica* by the shorter scarious ventricose spathes (while they are not in Wallich's plant!) entire sepals, longer slenderer tube, and more coarsely serrated stigmatic lobes. Don has a variety with the scape undivided, sub 2-fld. shorter than the leaves, but these are characters of Wallich's drawing of his type.

I. NEPALENSIS, *Wall. ex Royle Ill.* 372, t. 90, f. 2. I have seen no specimens of this, which is a native of Garwhal, on the ascent to Surkunda. It has a pale flower and "orris" scented roots.

CROCUS, *Linn.*

Rootstock a sheathed corm; stem 0. *Leaves* radical, narrowly linear, channelled, margins recurved. *Flowers* solitary or fascicled, subsessile; basal spathes 1–3 or 0 hyaline, floral embracing the ovary and sometimes a narrow hyaline bract. *Perianth* funnel-shaped, tube very slender; limb subequally 6-lobed in two series. *Stamens* on the throat of the perianth, filaments short, anthers longer, basifixed. *Ovary* 3-celled; style filiform, arms slender subentire lobed or laciniate; tips stigmatic. *Capsule* oblong, membranous, loculicidal. *Seeds* subglobose.—Species about 70, European and E. Asian.

C. sativus, *Linn. Sp. Pl.* 36; sheaths of corm closely reticulate, basal spathes embracing the scape 2-valved, flowers violet autumnal appearing with the leaves, throat of perianth bearded, anthers yellow, style-arms exserted orange-red subclavate tips entire or lobulate. *Maw Gen. Croc.* t. 20. C. sativus *var.* kashmeriana, Royle Ill. 374, t. 91, f. 1; *Stewart, Panjab Pl.* 239; *Boiss. Fl. Orient. V.* 100; *Reichb. Ic. Fl. Germ.* t. 360; *Benth. & Trim. Med. Bot.* 274.

KASHMIR, cultivated only. Native of South Europe.

The Kashmir saffron is regarded by Royle as a variety of that cultivated in England, distinguished by the very dark violet blue flowers, yellow anthers and brick-red stigmas, but this accords exactly with the common form figured by Bentley and Trimen.

BELAMCAUDA, *Adams.*

Rootstock creeping; stem erect, leafy. *Leaves* ensiform, equitant. *Inflorescence* branched, sheaths membranous; spathes several-fld, subscarious; bracts scarious; flowers pedicelled. *Perianth-tube* very short;

segments oblong, spreading, subequal. *Stamens* inserted at the base of the perianth, filaments filiform, anthers linear basifixed. *Ovary* obovoid; style filiform arms elongate, tips reniform stigmatic. *Capsule* obovoid, membranous, loculicidal, valves reflexed, leaving the seed-bearing axis persistent and free. *Seeds* subglobose, testa lax shining fleshy within.

1. **B. chinensis,** *Leman in Red. Lil.* t. 121; *Baker in Journ. Linn. Soc.* xvi. 113. B. punctata, *Moench Meth.* 529. Pardanthus chinensis, *Ker in Kœnig & Sims Ann. Bot.* i. 246; *Miquel Fl. Ind. Bat.* iii. 579; *Royle Ill.* 371; *Lodd. Bot. Cab.* t. 1874; *Flore des Serres* t. 1632. P. nepalensis, *Sweet Brit. Fl. Gard. Ser.* ii. 498. Ixia chinensis, *Linn. Sp. Pl.* 36; *Gærtn. Fruct.* t. 13; *Bot. Mag.* t. 171. Moræa chinensis, *Murr. Syst. Veg.* 93; *Roxb. Fl. Ind.* i. 170.—*Rheede Hort. Mal.* xi. t. 37.

Very doubtfully wild in the HIMALAYA, ascending to 6000 ft. Cultivated all over INDIA; a native of China.

Order CLII. AMARYLLIDEÆ.

Rootstock bulbous tuberous or a corm. *Leaves* radical. *Scape* naked (in the Indian genera). *Perianth*-superior, regular or irregular, tube long short or 0, limb 6-lobed or -partite, with sometimes a crown at the mouth, *Stamens* 6, on the bases of the segments, rarely epigynous, filaments free or connate; anthers erect or versatile. *Ovary* 3-celled; style stout or slender, stigma simple or cleft; ovules many, 2-seriate in the inner angle of the cells, anatropous. *Fruit* usually capsular, loculicidal, rarely fleshy and bursting irregularly. *Seeds* few or many, albumen fleshy enclosing the small embryo.—Genera 64, species about 650.

The American Aloe, *Agave americana*, Linn. (*A. cantula*, Roxb. Fl. Ind. ii. 167) is planted as a hedge in the Panjab (Stewart, Panjab Plants, 232) and introduced elsewhere in India. *A. vivipara*, Linn. (Wight Ic. t. 2024) is naturalized in the Deccan. *Zeyhyranthes tubispatha*, Herb. a Peruvian plant, resembling a small *Pancratium*, but without a corona, is cultivated in gardens and found as an escape far from habitations.

Tribe I. HYPOXIDEÆ. Rootstock tuberous. Flowers spicate or racemose.

Ovary not produced above the crown into a stipes	1. HYPOXIS.
Ovary produced into a short or long stipes above the crown	2. CURCULIGO.

Tribe II. AMARYLLEÆ. Rootstock bulbous. Flowers umbelled.

Filaments free	3. CRINUM.
Filaments united by a membrane	4. PANCRATIUM.

1. HYPOXIS, *Linn.*

Rootstock tuberous, or a coated corm. *Leaves* radical, narrow, strongly nerved. *Flowers* solitary, racemed, or umbellate. *Perianth* rotate, 6-partite, sessile on the top of the ovary, persistent. *Stamens* 6 on the base of the segments; filaments short; anthers erect, dorsifixed. *Ovary* 3-celled; style short, columnar, stigmas 3, erect, stout, distinct or connate; ovules 2-seriate. *Capsule* circumsciss below the top or 3-valved. *Seeds* subglobose, testa crustaceous shining beaked at the hilum.—Species about 50, widely diffused but rare in Asia, many S. African.

1. **H. aurea,** *Lour. Fl. Cochin.* 200; villous or hairy, leaves narrowly linear, scape slender 1-2-fld., ovary and perianth lobes externally hairy,

anthers sagittate. *Baker in Journ. Linn. Soc.* xvii. 108; *Kurz in Miq. Ann. Mus. Lugd. Bat.* iv. 178. H. minor, *Don Prodr.* 53; *Royle Ill.* t. 91, f. 3. H. Franquevillei, *Miquel Fl. Ind. Bat.* iii. 586. H. curculigoides, *Wall. Cat.* 5164. Curculigo graminifolia, *Nimmo in Grah. Cat. Bomb. Pl.* 215; *Dalz. & Gibs. Bomb. Fl.* 276.

SUBTROPICAL HIMALAYA; from Kashmir eastwards, ascending to 7000 ft. in Sikkim. KHASIA HILLS, BENGAL, BEHAR and BURMA, and in the Western Ghats from the Concan southward. (Not in Ceylon).—DISTRIB. Java, China, Japan.

Dioecious. *Rootstock* globose, or elongate and erect, crowned with fibrous remains of old leaves. *Leaves* 4–14 by $\frac{1}{12}$–$\frac{1}{6}$ in., subcoriaceous, keeled. *Scape* 1–4 in., filiform, hairy; bracts setaceous. *Ovary* clavate. *Perianth-lobes* $\frac{1}{4}$–$\frac{1}{2}$ in., elliptic-lanceolate, yellow, outer green on the back. *Capsule* $\frac{1}{4}$–$\frac{1}{3}$ in., clavate, at length 3-valved, crowned with the erect perianth-lobes, walls thin. *Seeds* black, tuberculate.

2. CURCULIGO, *Gærtn.*

Root tock tuberous, or a coated corm. *Leaves* lanceolate and plaited, or linear and flat. *Scape* short or long; flowers often unisexual, spicate or racemed or subcapitate. *Perianth* usually produced above the ovary as a solid stipes, bearing the rotate limb. *Stamens* ovary and seeds of *Hypoxis*. *Fruit* indehiscent, usually more or less beaked.—Species about 12, tropical.

Sect I. MOLINIERA. Perianth limb sessile or very shortly stipitate above the ovary.

1. **C. recurvata,** *Dryand. in Ait. Hort. Kew* Ed. 2, ii. 253; leaves long-petioled lanceolate plicate glabrous or with the nerves beneath hairy, scapes many flattened villous, flowers in a decurved subcapitate raceme, ovary turbinate, berry globose hairy. *Bot. Reg.* t. 770; *Roxb. Fl. Ind.* ii. 145; *Benth. Fl. Austral.* vi. 448; *Miquel Fl. Ind. Bat.* iii. 585; *Wall. Cat.* 5159. C. villosa, *Wall. Cat.* 5163 B. Moliniera recurvata, *Herbert Amaryllid.* 84; *Baker in Journ. Linn. Soc.* xvii. 120; *Kurz in Ann. Mus. Lugd. Bat.* iv. 175. M. plicata, *Colla, Hort. Ripp. App.* ii. 333, t. 18. M. capitulata, *Herbert l. c.* Leucojum capitulatum, *Lour. Fl. Cochin.* 199. Hypoxis Saarpata, *Herb. Ham.*

TROPICAL HIMALAYA; from Nepal eastwards. BENGAL, CHITTAGONG and BURMA. CEYLON; at Saffragam.—DISTRIB. Malay Islands, S. China, Australia.

Rootstock tuberous. *Leaves* very variable, 2–3 ft. by 3–6 in., recurved, narrowed into a channelled petiole 1–2 ft., villous below, glabrous above. *Scapes* 3–9 in., stout or slender, bracts spathaceous, lanceolate, villous; heads of flowers 2–4 in. diam., villous; flowers pedicelled. *Ovary* $\frac{1}{4}$–$\frac{1}{3}$ in., villous; bracts 1–1½ in.; cells about 10-ovuled. *Perianth* about ¾ in. diam., outer segments villous on the back. *Filaments* very short; anthers cohering. *Berry* $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Stigmas* sub 3-lobed, shining. *Seeds* black, testa deeply closely grooved.

2. **C. gracilis,** *Wall. Cat.* 5760; leaves long-petioled lanceolate plicate glabrous, scapes many flattened tomentose, flowers in a decurved dense elongate raceme, ovary oblong tip narrowed, berry oblong ?. Moliniera gracilis, *Kurz in Ann. Mus. Lugd. Bat.* iv. 177; *Baker in Journ. Linn. Soc.* xvii. 120.

TROPICAL HIMALAYA; from Nepal, *Wallich*, eastwards.

Habit, &c., of *C. recurvata*, of which it is probably a form, but more slender, with the ovary oblong and the inflorescence elongate. Wallich's specimens have leaves 8–12 by ½–1 in., short woolly scapes, few-fld. loose racemes, and flowers ¼ in. diam. Sikkim specimens have stoutly petioled leaves 2½ ft. by 4½ in., and a robust scape 6–12 in. The var. *Jamesoni*, Baker l. c. 121; with leaves rigidly coriaceous flowers subsessile in a dense globose head I should refer to *recurvata*.

3. **C. crassifolia,** *Hook. f.*; leaves long-petioled elliptic-lanceolate thickly and rigidly coriaceous plicate glabrous above beneath white-tomentose, scape flattened stout densely tomentose, flowers in a very large dense oblong raceme, bracts glabrous or woolly, ovary oblong top silky, berry oblong. Moliniera crassifolia, *Baker in Journ. Linn. Soc.* xvii. 121.

SIKKIM HIMALAYA, *J. D. H.* KHASIA MTS., alt. 5–5000 ft., *J. D. H. & T. T., Mann, Clarke.*

Leaves 2–3 ft. by 3–6 in., strongly closely plicate; petiole 1 ft. stout. *Scape* 2–8 in.; raceme 3–4 in.; bracts 1–1½ in., very variable; lower flowers pedicelled. *Perianth* segments ½ in., outer hairy or villous externally. *Berry* ½ in. long. *Seeds* globose, black, granulate.

4. **C. Finlaysoniana,** *Wall. Cat.* 5162; leaves petioled elliptic-lanceolate plicate glabrous, scape very short villous, flowers in a lax erect or inclined few or many fld. raceme, bracts linear, ovary fusiform or clavate villous, berry oblong. ? C. pauciflora, *Moon Cat. Pl. Ceyl.* Hypoxis trichocarpa, *Wight Ic.* t. 2045; *Thwaites Enum.* 323; *Kurz in Ann. Mus. Lugd. Bat.* iv. 178. H. latifolia, leptostachya, pauciflora and brachystachya, *Wight Ic.* t. 2044—2046. Moliniera Finlaysoniana, *Baker in Journ. Linn. Soc.* xvii. 121.

TRAVANCORE and MALABAR, *Wight, &c.* CEYLON; central province, ascending to 5000 ft.

Leaves 12–24 by 1–1½ in., thin, 5-nerved, finely acuminate, sometimes sparsely hairy, petiole very slender. *Scape* short, slender; pedicels 1–1½ in., capillary; bracts filiform. *Racemes* with the upper flowers male. *Perianth* segments ½ in. long, of males shorter. *Fruit* ½–¾ in., curved, few seeded, walls thin. *Seeds* ovoid-oblong, finely deeply striate, black, shining.

Var. linearifolia, *Thwaites l. c.*, has narrow almost linear leaves.

Sect. II. CURCULIGO PROPER. Ovary narrowed into a long beak or stipes supporting the perianth-limb.

5. **C. orchioides,** *Gærtn. Fruct.* i. 63, t. 13; polygamous, leaves long- or short-petioled or subsessile lanceolate membranous plicate glabrous, scape very short subterranean, flowers subsessile, bracts lanceolate membranous, ovary small amongst the leaf bases, stipes of the perianth long filiform, stigmas 3 erect separate, capsule oblong. *Baker in Journ. Linn. Soc.* xvii. 124; *Roxb. Cor. Pl.* i. 14, t. 13; *Fl. Ind.* ii. 144; *Thwaites Enum.* 324; *Grah. Cat. Bomb. Pl.* 215; *Bot. Mag.* t. 1076; *Wall. Cat.* 5158; *Miquel Fl. Ind. Bat.* iii. 585. C. malabarica, *Wight Ic.* t. 2043; *Dalz. & Gibs. Bomb. Fl.* 276. C. brevifolia, *Dryand. in Ait. Hort. Kew* Ed. 2, ii. 253; *Wight Ic.* t. 2043; *Grah. Cat. Bomb. Pl.* 215; *Dalz. & Gibs. l. c.* Hypoxis dulcis, *Steud. Pl. Hohenack.* No. 135. Gethyllis fusiformis, *Herb. Ham.* Franquevillea major, *Zoll. ex. Kurz in Journ. As. Soc. Beng.* 1870, ii. 84.—*Rheede Hort. Mal.* xii. t. 59.

SUBTROPICAL HIMALAYA; from Kumaon eastwards, ascending to 6000 ft. The KHASIA HILLS, MUNNIPORE; and the WESTERN GHATS from the Concan southward. —DISTRIB. Java.

Rootstock tuberous or elongate, sometimes 1 ft. long and stout in proportion. *Leaves* 6–18 by ½–1 in., tips viviparous on reaching the ground; petiole 6 in. or less. *Scape* 1 in., clavate, flattened, hidden by the leaf-sheaths; flowers distichous, lowest 2-sexual, the rest all male; bracts lanceolate; perianth segments ½–⅔ in. *Ovary* villous, the stipes and perianth alone epigæous; stigma 3-cleft; cells 6–8 ovuled. *Capsule* ½ in., oblong, hypogeous, 1–4 seeded, beak slender; septa spongy. *Seeds* ⅛ in. long, oblong, deeply grooved in wavy lines, black, shining. *Male fl.* with no ovary, style or stigma.

6. **C. latifolia,** *Dryand. in Ait. Hort. Kew,* Ed. 2, ii. 253; polygamous, leaves long-petioled lanceolate membranous plicate glabrous or sparsely hairy beneath, scape very short villous or 0, flowers sessile in an hypogeous oblong or globose head with the filiform stipes of the perianth epigæal, bracts ovate-lanceolate acuminate hairy, style filiform, stigmas 3 small. *Baker in Journ. Linn. Soc.* xvii. 125; *Bot. Mag.* t. 2034; *Bot. Reg.* t. 754; *Miquel Fl. Ind. Bat.* iii. 585. C. sumatrana, *Roxb. Fl. Ind.* ii. 146; *Lodd. Bot. Cab.* t. 443; *Wight Ic.* t. 2042. Moliniera sumatrana, *Herb. Amaryllid.* 84. M. latifolia & plicata, *Kurz in Ann. Mus. Lugd. Bat.* iv. 176.

BURMA, the MALAY PENINSULA and ANDAMAN ISLANDS.—DISTRIB. Malay Islands.

Rootstock hardly any; base of stem stoloniferous. *Leaves* 1–2 ft. by 1½–2½ in.; petiole 1 ft. or less. *Ovary* oblong or globose; stipes of male fl. much longer than of the bisexual and more slender. *Fruit* 1 in. long, clavate or pyriform, hairy. *Seeds* black, shining (granular in Wight's figure).

There are four principal forms:—1. Leaves 1½–2 ft. by 4–5 in. sparsely villous beneath, petiole slender, flowers small in a dense ovoid head (Singapore, Java).—2. Leaves 1–1½ ft. by 1–1½ in. sparsely villous beneath, petiole slender, heads small, flowers larger ½ in. diam. (Wight Ic. t. 2042 and Andaman Islands).—3. Leaves 1–1½ ft. by 1½–2 in. glabrous beneath, petiole slender, heads small few-fld. (Penang, Malacca).—4. Leaves 8–12 by 2–3 in., quite glabrous, longer than their petioles, heads dense-fld. (Burma, Malacca, Borneo).

Var. *villosa,* Baker l. c.; leaves coriaceous cobwebby beneath, petiole very stout, heads dense-fld., bracts oblong obtuse and nearly glabrous. C. villosa, *Wall. Cat.* 5763 A; *Kurz. l. c.* Singapore, Malay Islands.—Perhaps a distinct species.

3. CRINUM, *Linn.*

Rootstock bulbous. *Leaves* elongate, lorate or ensiform. *Scape* solid. *Flowers* large, umbelled; spathes 2; bracts linear. *Perianth* funnel- or salver-shaped, tube straight or upcurved, lobes linear-to oblong. *Stamens* on the throat of the perianth, erect spreading or declinate; anthers linear, dorsifixed. *Style* filiform, stigma minute; ovules few or many. *Fruit* subglobose, membranous or coriaceous, bursting irregularly. *Seeds* few, large, rounded, testa thick; albumen very copious.—Species about 60, tropical Asiatic, African, Australian and American.

The identification by herbarium specimens of this genus is impossible, and I have little confidence in the following attempt to systematize the Indian ones, in which I have been guided by Herbert and Baker.

Sect. I. STENASTER. *Perianth* erect, salver-shaped, lobes linear. *Stamens* very long, spreading.

1. **C. asiaticum,** *Linn. Sp. Pl.* 419 (*in part*); leaves very many 3–4 ft. by 5–7 in. flat, scape 1½–2 ft. compressed, spathes 3–4 in., umbels 10–50-fld., pedicels ¼–1 in., perianth-tube 3–4 in., lobes as long much longer than the filaments. *Kunth Enum.* v. 547; *Baker Handb. of Amaryllid.* 75; *Herb. Amaryllid.* 243; *Dalz. & Gibs. Bomb. Fl.* 275; *Bot. Mag.* t. 1073; *Wall. Cat.* 8969 A, in part, E, F. C. toxicarium, *Roxb. Fl. Ind.* ii. 134; *Wight Ic.* t. 2021–2; *Lodd. Bot. Cab.* t. 669. Amaryllis carnosa, *Herb. Ham.*

Throughout TROPICAL INDIA, wild or cultivated. CEYLON; common on the coast, *Thwaites.*

Bulb very large, neck 4–5 in. *Leaves* thin, edges smooth. *Scape* often 1 in. diam.; sheaths thick. *Flowers* white, fragrant at night, tube greenish; lobes revo-

lute. *Stamens* often reddish; anthers ½–¾ in. *Fruit* subglobose, usually 1-seeded. —Much the largest Indian species.

Var. *procera*, Baker l. c.; leaves 5 ft. by 6 in., perianth-tube and lobes each 5 in., the latter tinged with red C. procerum, *Carey ex Herb. in Bot. Mag.* t. 2684.

2. **C. defixum,** *Ker in Quart. Journ. Sci.* iii. (1817), 105; leaves few 2–3 ft. by ¾–1 in. erect linear obtuse concave, scape 1½–2 ft. stout, umbels 6–15-fld., spathes 1½–2 in. ovate-lanceolate, perianth white, tube 2½–3 in., lobes nearly as long narrowly linear-lanceolate much longer than the stamens. *Herb. Amaryllid.* 255; *Kunth Enum.* v. 562; *Bot. Mag.* t. 2208; *Lodd. Bot. Cab.* t. 362; *Baker Handb. Amaryllid.* 76. C. asiaticum, *Roxb. Fl. Ind.* ii. 127; *Wall. Cat.* 8969, *G, H, I in part.* C. asiaticum var. angustifolium, *Wall. Cat.* 8969 G, H. Amaryllis vivipara, *Lamk. Encyc.* i. 123. A. cœnosa, *Herb. Ham.*

Swampy river banks throughout INDIA. ? CEYLON; in the hotter drier regions, *Thwaites.*

Bulb with a fusiform stoloniferous base, neck cylindric. *Flowers* sessile, fragrant at night, tinged with red. *Filaments* bright red; anthers ½ in. *Fruit* subglobose, 1 in. diam., 1–2-seeded.

3. **C. ensifolium,** *Roxb. Fl. Ind.* ii. 129; leaves erect 12–18 by 1–1½ in. ensiform tapering to the acuminate tip concave, scape rather slender, umbels 10–12-fld., spathes 1½–2 in., perianth white tube 3½ in. rather longer than the linear lobes which are about as long as the stamens. *Herb. Amaryllid.* 255; *Bot. Mag.* t. 2301; *Kunth Enum.* v. 563. C. defixum, var. ensifolium, *Baker Handb. of Amaryllid.* 76. C. Roxburghii, *Grah. Cat. Bomb. Pl.* 215; *Dalz. & Gibs. Bomb. Fl.* 275.—*Rheede Hort. Malab.* xi. t. 38.

Banks of the DECCAN rivers. PEGU, *Carey.*

I follow Roxburgh and Herbert in keeping this distinct from *defixum* on account of the gradually acuminate leaves, as well represented by Rheede. Roxburgh's drawing named *C. asiaticum* (No. 1395) is clearly this and not his *asiaticum* (*defixum*). Herbert suggests the union of the two under the name of "Ditch crinum," both being marsh plants, with fusiform stoloniferous caudices, forming prolongations of the base of the bulb.

4. **C. Wattii,** *Baker Handb. of Amaryllid.* 76; leaves 18 by 1–1½ in. flaccid, scape 1½ ft. rather stout, umbel 6–8-fld., spathes deltoidly lanceolate, pedicels very short, perianth-tube 3 in. very slender, lobes half as long, stamens equalling the lobes.

MUNNIPORE, alt. 4000 ft.; in grassy places, *Watt.*

Bulb ovoid, 2 in. diam., neck very short. *Anthers* ½ in.—A very obscure species; it is difficult in dried specimens to determine whether the corolla lobes are linear as in Sect. *Stenaster*, or lanceolate as in Sect. *Platygaster.*

5. **C. stenophyllum,** *Baker in Gard. Chron.* 1881, 786; *Handb. of Amaryllid.* 75; leaves 3 ft. by ¼–½ in. linear flaccid, scape very slender 2-edged, umbel 4–6-fld., spathes 2 in. lanceolate, pedicels ¼ in., perianth-tube 3–4 in. very slender, lobes half as long or longer. Crinum sp. *Wall. Cat.* 8970.

BURMA; at Tavoy, *Gomez.*

Known only from Wallich's specimen, but Clarke has very similar plants from Silhet, Chota Nagpur and Bengal, except in that their perianth-lobes are decidedly lanceolate; as indeed I should be dispcsed to consider the perianth-lobes of Wallich's to be, rather than linear.

6. **C. pusillum,** *Herb. Amaryllid.* 255, t. 32, f. 3; leaves few less than 12 in. long ¼–⅓ in. broad erect, linear acute, umbels few-fld., pedicels upwards of 1 in., perianth-tube 3 in., lobes nearly as long an inch longer than the stamens. *Baker Handb. of Amaryllid.* 77.

NICOBAR ISLANDS.

A very little-known plant, assumed by Herbert to be stoloniferous, like *C. defixum.* The bulb is described as 4 by ⅔ in., columnar, cylindric.

Sect. II. PLATYASTER. *Perianth* erect, salver-shaped, lobes lanceolate. *Stamens* very long, spreading.

7. **C. humile,** *Herb. in Bot. Mag.* t. 2636; *Amaryllid.* 256; leaves about 12 in. linear pitted on the surface, margin smooth, scape about as long subcylindric, umbels 6–9-fld., spathes 2–3 in. lanceolate, pedicels short, perianth-tube 3 in., lobes linear-lanceolate rather longer than the stamens. *Kunth Enum.* v. 563; *Baker Handb. of Amaryllid.* 81.

TROPICAL ASIA.

Bulb globose, green, neck short. *Leaves* spreading, nearly flat, acute. *Perianth-tube* green, lobes narrow white acute; filaments very slender, purplish, anthers ⅓ in. long.—The Bot. Mag. plate and description are the only authority for this species, which may not be Indian. It was brought from the East by a Capt. Cragie to Mr. Milne, of Fulham Nursery. Baker doubtfully refers to it a plant collected by Stocks, which is *C. brachynema,* Herb.

8. **C. amœnum,** *Roxb. Hort. Beng.* 23; *Fl. Ind.* ii. 127; leaves 1½–2 ft. by 1–1½ in suberect ensiform acuminate margin subscabrous, scape 1–2 ft. rather slender subcylindric, umbels 6–12-fld., spathes 2 in. lanceolate, flowers subsessile, perianth-tube 3–4 in., lobes 2–3 in. linear-lanceolate rather longer than the red filaments. *Kunth Enum.* v. 562; *Herb. Amaryllid.* 255; *Baker Handb. of Amaryllid.* 81; *Wall. Cat.* 8971.

TROPICAL HIMALAYA; from Nepal eastwards, ascending to 6000 ft. in Sikkim. The KHASIA HILLS, SILHET and BURMA, *Roxburgh,* &c.

Bulb globose, 2–3 in. diam. *Leaves* 10–12, tapering from the base to the acuminate tip, bright green. *Perianth* white, tube green; anthers ⅓ in. *Ovary-cells* 4–5-ovuled.—Herbert describes 2 vars.; namely *caudicea,* from Ceylon, with smooth margins of the leaves and a cylindric neck of the bulb; and *verecunda,* from Rangoon, with more obtuse humifuse lacunose leaves.

9. **C. Strachеyi,** *Baker in Gard. Chron.* 1881, ii. 72; *Handb. of Amaryllid.* 81; leaves 2 ft. by 1½–2 in. lorate thin acute margin subdenticulate, scape 1½–2 ft. stout, umbels 12–15-fld., spathes lanceolate, pedicels ½–1 in., perianth-tube 3–3½ in., lobes 2–2½ in. hardly longer than the filaments.

KUMAON, in gardens. *Strachey* and *Winterbottom.*

Known imperfectly, and only as a garden plant.

10. **C. pratense,** *Herb. Amaryllid.* 256; leaves 1½–3 ft. by 1½–2 in. linear channelled margins entire, scape 12 in. or more decumbent compressed, umbels 6–12-fld., spathes 2–3 in. deltoid-lanceolate, flowers subsessile, perianth-tube 3–4 in., lobes about as long rather longer than the stamens. *Kunth Enum.* v. 563; *Baker Handb. of Amaryllid.* 82. C. longifolium, *Roxb. Hort. Beng.* 23; *Fl. Ind.* ii. 130; *Ker-Gawl. in Quart. Journ. Sc. & Arts,* iii. (1817) 107.

Plains of INDIA and BURMA.

Bulb 4–5 in. diam., ovoid or spherical, neck 2–2½ in. *Leaves* 6–8, suberect or

declinate. *Flowers* fragrant, white; filaments red. *Ovarian cells* 3–4-ovuled.—Roxburgh's figure of *longifolium* represents a plant with a bulb 4½ in. diam. having a neck 2–2½ in., leaves obtuse concave ciliolate, scape very stout, flowers sessile, perianth-tube 3½–4 in., stout, green, lobes 3 in. by ½ in., linear, obtuse, greenish externally, filaments as long, red, anthers ¾ in., yellow.—Herbert and Baker include under *C. pratense*, the *C. lorifolium*, Roxb. Fl. Ind. ii. 131, from Pegu, with weak spreading leaves 4–5 ft. long; *C. elegans*, Carey (Bot. Mag. t. 2592), with a narrower long-necked bulb and the perianth lobes an inch shorter than the tube (in the Bot. Mag. drawing the leaves are acute and the perianth lobes longer than the tube); *C. venustum*, Carey, from Silhet, with 30-fld. umbels; *C. canalifolium*, Carey, with leaves an inch broad, more channelled, rather glaucous, and about 10 flowers pale reddish externally.

Sect. III. CODONOCRINUM. *Perianth* funnel-shaped, tube upcurved, lobes oblong or lanceolate. *Stamens* very long, declinate.

11. **C. latifolium,** *Linn. Sp. Pl.* 291; leaves many 2–3 ft. by 3–4 in. lorate thin margin subscabrid, scape 2–3 ft. stout, umbels 10–20-fld., spathes 3–4 in. lanceolate, pedicels very short, perianth-tube 3–6 in., lobes as long or shorter elliptic-oblong or -lanceolate much longer than the stamens. *Ker-Gawl. in Quart. Journ. Sci. & Arts* iii. 114; *Roxb. Fl. Ind.* ii. 137; *Lindl. in Bot. Reg.* t. 1297; *Wight Ic.* t. 2019, 2020; *Baker Handb. of Amaryllid.* 87; *Andr. Bot. Rep.* t. 478. C. zeylanicum, *Linn. Syst. Veg.* 263; *Kunth l. c.* 573; *Roxb. l. c.* 138; *Bury Herand. Pl.* t. 29; *Baker l. c.* 87; *Wall. Cat.* 8972. C. ornatum, *Herb. Amaryll.* 262; *Bot. Mag.* t. 1171; *Bury l. c.* t. 18; *Bot. Reg.* t. 579, and 1297; *Thw. Enum.* 324. C. speciosum, *Herb. in Bot. Mag.* t. 2217. C. ornatum, *vars.* latifolium, zeylanicum and Herbertianum, *Herb. Amaryll.* 262, 263; *Kunth Enum.* v. 574. C. speciocissimum, *Herb. in Bot. Mag. sub* t. 2121. C. Herbertianum, *Wall. Pl. As. Rar.* ii. 39, t. 145. C. insigne, *Schultes Syst.* vii. 859. C. Wallichianum, *Roem.* C. Linnæi, *Roem.* C. Careyanum, *Herb. in Bot. Mag.* t. 2466. C. moluccanum, *Roxb. Fl. Ind.* ii. 140; *Bot. Mag.* t. 2292. C. asiaticum, *Wall. Cat.* 8969 B *in part*, C, I, *in part.* Amaryllis zeylanica, *Linn. Sp. Pl.* 293. A. insignis, *Ker-Gawl. in Bot. Reg.* t. 579. A. latifolia, *L. Herit. Sert. Angl.* 14; *Willd. Sp. Pl.* ii. 57; *Ker.-Gawl. in Quarl. Journ. Sci. & Arts*, iii. 114.—*Rheede Hort. Mal.* xi. t. 39.

Throughout INDIA, BURMA and CEYLON, wild or cultivated.—DISTRIB. Tropical Asia, Malaya and Africa.

Bulb 5–6 in. diam., globose, neck short. *Leaves* bright green, keeled and waved. *Scape* and spathes green reddish or purple. *Flowers* very variable in size, fragrant, white more or less streaked or tinged with red towards the centre or red purple sometimes nearly all over the backs of the lobes. *Filaments* 2½–3 in., anthers ½–¾ in. *Ovarian cells* 5–6-ovuled. *Fruit* subglobose, 1½–2 in. diam.—I am quite unable to find any characters whereby *C. latifolium* and *zeylanicum* are to be distinguished, and Mr. Baker gives none. The name *C. ornatum* seems to be applied to forms of either or to include both, and so of the other forms cited above, if they or any of them have specific characters, they remain to be indicated. Herbert's accounts of them (and of the species generally) in the Quarterly Journal of Arts and Sciences, in his enumeration of the species in Bot. Mag. under t. 2121, and in his work on Amaryllids, are all singularly unclear. Of all the figured forms that of *C. latifolium*, in the Botanical Register, t. 1297, differs most from the others in its much smaller size, nearly white undulate perianth lobes faintly suffused with pink, long perianth-tube, and style twice as long as the stamens. It is included by Herbert under *C. ornatum* as *longistylum*.—Roxburgh describes both *latifolium* and *zeylanicum* as natives of Bengal, and thus distinguishes them. *C. latifolium*, Linn. (Am. ornata, *Bot. Mag.* t. 923); bulb spherical, leaves 3–5 in. broad lanceolate obtuse margins scabrous, scape 12–24 in. compressed green 10–20-fld., flowers almost white, anthers

yellowish grey. *C. zeylanicum*, Linn. (Am. ornata, *Bot. Mag.* t. 1171. A. lineata, *Lamk.*), bulb smaller ovoid abounding more with cobweb-like fibres, leaves much narrower linear-lanceolate keeled, midrib much more prominent, margins much more waved perfectly smooth, scape longer 10–12-fld., flowers smaller colours very bright, anthers brown.

Sect. IV. BRACHYNEMA. *Perianth* nodding, funnel-shaped, lobes oblong. *Stamens* erect, filaments shorter than the anthers.

12. **C. brachynema,** *Herb. in Bot. Reg.* 1842, *Misc.* 36; leaves 1½–2 ft. by 3–4 in. broadly lorate margins smooth, scape 12 in., umbels 15–20-fld., spathes lanceolate, flowers pedicelled, perianth-tube 1½–2 in., lobes 2 by ¾ in. many times longer than the stamens. *Bot. Mag. t.* 5937; *Flore des Serres.* t. 2303; *Baker Handb. of Amaryllid.* 88.

The CONCAN; *Woodrow, Stocks.*

Bulb as large as the fist, ovoid, neck very short. *Leaves* produced long after flowering, concave, not keeled. *Scape* 8–12 in.; spathes greenish. *Flowers* fragrant, white; anthers yellow; style short, included in the tube.

DOUBTFUL SPECIES.

C. BREVIFOLIUM, var. *a*, Hort. Beng.; *C. bracteatum*, Bot. Reg. t. 179; Herb. in Bot. Mag. under t. 2121, f. 4. "From Sundeep near Chittagong."—Roxburgh's *C. brevifolium* (Fl. Ind. ii. 129, introduced into the Calcutta Gardens from the Mauritius) is a native of the Seychelles according to Baker, and referable to *C. bracteatum*, Willd., and to *asiaticum*, var. *bracteatum*, Herb., it is a *Stenaster* with lorate leaves 1–1½ ft. by 3–4 in. broad with crisped margins, scape much compressed 10–20-fld., perianth-tube slender 2½–3 in., lobes white; cells of ovary 1-ovuled. Specimens of any Sundeep *Crinum* should be procured for the determination of this plant.

C. CANALIFOLIUM, *Herb. in Bot. Mag. under* t. 2121; *Amaryllid.* 258 (C. canaliculatum, *Carey, non Roxb.*), is altogether doubtful. (See under 10 *pratense.*)

C. ERYTHROPHYLLUM, *Carey mss. ex Herb. in Bot. Mag. sub* t. 2121; *Amaryllid.* 259), from Rangoon, with deep blood-red leaves, is mentioned by Herbert as having been cultivated in Calcutta by Carey, but lost before flowering.

C. MACROCARPUM, *Carey mss. ex Herb. in Bot. Mag. l. c.*, from Rangoon, is doubtfully referred by Herbert and Baker (Handb. of Amaryllid. 75) to *C. sumatranum*, Roxb. (Bot. Reg. t. 1049), a species of sect. *Stenaster*, with long narrow rigid leaves, the fruit as large as a man's fist, and seeds 2 in. broad.

C. (Stenaster) PEDUNCULATUM, *Br. Prodr.* 297; *Bot. Reg.* t. 52; *Bury Hexand. Pl.* t. ii.; *Herb. Amaryllid.* 246; *Baker Handb. of Amaryllid.* 77. This Australian species probably occurs in the Malay Islands and Peninsula. A leafless *Crinum* from Penang (Curtis, No. 1274) and Wallich's *C. asiaticum*, 8969 D, from Finlayson (Siam ?) strongly resemble it. It differs from *C. asiaticum* only in the long pedicelled flowers, and according to the Bot. Reg. in the elongated rootstock. Bentham (Fl. Austral. vi. 455) doubts the Bot. Reg. plant being the true *pedunculatum*, and suspects that the true is only *C. asiaticum* (as do I).

C. (Platyaster) STRICTUM, *Herb. in Bot. Mag. l. c.* and t. 2365; *Amaryllid.* 253, 401; *Baker l. c.* 86 (C. Herbertianum, *Schult. Syst.* vii. 871); bulb small ovoid, leaves 12 by 2–2½ in. suberect lorate obtuse margins smooth, scape twice as long as the leaves, umbels about 4-fld., spathes 3–4 in., perianth-tube about 5 in. green, lobes 3–4 by ½ in. white an inch longer than the red filaments.—Ceylon, *Hort. Herbert.*—Baker considers it to be allied to the American *Platyasters*; it may therefore have been imported into Ceylon.

C. UMBELLATUM, *Carey ex Herb. in Bot. Mag. l. c.*—Of this Herbert says that it is perhaps a small var. of *C. brevifolium.*

4. **PANCRATIUM,** *Linn.*

Rootstock bulbous. *Leaves* often bifarious, linear or lanceolate. *Scape* solid. *Flowers* large, umbelled or solitary; spathes 1-2, membranous; bracts few, linear, hyaline. *Perianth* funnel-shaped; tube long or short; lobes narrow. *Stamens* on the throat of the perianth, filaments united by a toothed or lobed membrane forming a cup; anthers dorsifixed. *Style* filiform, stigma small; ovules many superposed in each cell. *Capsule* large, subglobosely 3-angled, loculicidal. *Seeds* angled, testa lax black.—Species about 12, S. European, Indian and African.

* *Perianth-tube* 1½–2 in. *Staminal cup small.—Bulb without a neck.*

1. **P. triflorum,** *Roxb. Fl. Ind.* ii. 126; scape 4–8-fld., perianth-tube longer than the linear lobes, filaments short. *Kunth Enum.* v. 661. *Baker Handb. of Amaryllid.* 128. P. malabathricum, *Herb. Amaryllid.* 206. Crinum pauciflorum, *Miquel Plant exsicc. Hohenacker.—Rheede Hort. Mal.* xi. t. 40.

BENGAL, *Roxburgh.* DECCAN PENINSULA, Canara. CEYLON, *Thwaites.*

Bulb globose, 1½–2 in. diam., neck 0. *Leaves* not bifarious, 8–12 by ½–¾ in., lanceolate, acute. *Scape* 6–9 in., slender; spathe single, ovate, acute, pedicels very short. *Flowers* fragrant; tube 1½–2 in., throat dilated, lobes ¾-1 in.; staminal cup ¼ in. diam., with 2-fid teeth between the short filaments.

2. **P. zeylanicum,** *Linn. Sp. Pl.* 290; scape 1-fld., perianth-tube as long as the lanceolate lobes or shorter, throat broadly funnel-shaped, filaments much longer than the broad shallow 12-toothed cup. *Kunth Enum.* v. 662; *Roxb. Fl. Ind.* ii. 124; *Thwaites Enum.* 324; *Wall. Cat.* 8973 A; *Baker Handb. of Amaryllid.* 118; *Bot. Reg.* t. 479; *Bot. Mag.* t. 2538. P tiaraeflorum, *Salisb. Par. Lond.* t. 86.

TROPICAL ASIA and CEYLON.—DISTRIB. Malay Archipelago.

Bulb globose, 1½–2 in. diam.; neck 0. *Leaves* 8–12, bifarious, 6–11 in., linear-lanceolate acuminate. *Scape* shorter than the leaves; spathes as long as the corolla-tube. *Flowers* sessile, white, fragrant, 2–3 in. diam.; cup broad, subequally 12-toothed, teeth large; filaments 1–1¼ in. longer than the cup; anthers ¼ in.

** *Perianth-tube* 3–4 in. *Staminal cup broad.—Bulb with a long neck.*

3. **P. verecundum,** *Ait. Hort. Kew,* i. 412; scape stout about equalling the oblanceolate leaves or longer 2–6-fld., spathes 2, filaments much longer than the teeth of the cup. *Kunth Enum.* v. 661; *Bot. Reg.* t. 413; *Herb. Amaryllid.* 206; *Baker Handb. of Amaryllid.* 119 (*excl. syn. Wight.*)

Foot of the HIMALAYA, from the Panjab eastwards to Sikkim.

Bulb globose, 2 in. diam.; neck cylindric. *Leaves* thin, 1–1½ by ½–¾ in., acuminate. *Scape* 12 in., compressed; spathes lanceolate; pedicels short. *Perianth-tube* 3–4 in., throat obconic; lobes 1½ in., linear; staminal cup obconic, ¾–1 in. long, with a bifid tooth between the filaments; style longer than the stamens.—The above description is from Baker.

4. **P. biflorum,** *Roxb. Fl. Ind.* ii. 125; scape 2–3-fld., perianth-tube slender trigonous as long as the linear lobes, throat not dilated, filaments about as long as the funnel-shaped erose cup. ? P. longiflorum, *Herb. Amaryllid.* 208, t. 42, f. 2.

INDIA, rare, *Roxburgh.*

Leaves 4–8, bifarious, 12–16 in., erect, narrowed from the obtuse point to the base. *Scape* shorter than the leaves; spathes 3–4, unequal in length. *Perianth-tube* 3–4 in., slender, green, not at all inflated at the insertion of the linear lobes; cup 1½ in. long; filaments 1½–2 in., anthers ½ in. long.—A well marked species by its long 3-gonous perianth-tube not at all inflated above, erose (not 12-toothed) broad cup, and long stamens.—Herbert's figure of *longiflorum* almost exactly accords with Roxburgh's excellent description and figure of *biflorum*, except that the leaves are acute and that he gives the habitat (according to the Banksian Herbarium) as the Moluccas; with *P. verecundum* it has nothing in common.

5. **P. longiflorum,** *Roxb. Fl. Ind.* ii. 125; scape much shorter than the narrowly lanceolate leaves usually 1-fld., spathe single, filaments longer than the teeth of the cup. *Kunth Enum.*v. 663; *Herb. Amaryllid.* 208, t. 42, f 2; *Baker Handb o Amaryllid.* 119. P. cambayense, *Herb. l.c.* 208, t. 42, f. 1.

CENTRAL INDIA and the DECCAN PENINSULA, *Rottler.*—DISTRIB. Moluccas.

Bulb globose, 1½-2 in. diam., neck long cylindric. *Leaves* 12 by ½–1 in. *Scape* compressed, spathes very acuminate. *Perianth-tube* 5–6 in., green, throat obconic; lobes 2 in., lanceolate; staminal cup above 1 in. long with large bifid teeth between the filaments.—Roxburgh describes this species as received from the Moluccas and as having the scape even shorter than the perianth-tube and the filaments very little longer than the lobes of the cup.

6. **P. parvum,** *Dalz. in Hook. Journ. Bot.* ii. (1850) 144; scape very slender compressed about equalling the linear or lanceolate strict leaves 2–4-fld., spathe solitary, filaments hardly longer than the teeth of the cup and much shorter than the anthers. *Dalz. & Gibs. Bomb. Fl.* 276; *Baker Handb. of Amaryllid.* 119.

The CONCAN; on Mt. Dronoghiri, *Dalzell.*

Bulb globose; neck long, cylindric. *Leaves* 12 in. or less, linear, striate, nearly flat, thin. *Scape* 6–12 in.; spathe sometimes deeply bifid. *Perianth-tube* 3–5 in., lobes 1 in.; staminal cup half as long as the perianth lobes, equally 12-toothed, filaments hardly longer than the teeth, two-thirds shorter than the anthers; ovarian cells many-ovuled. *Capsule* ovoid, 3-lobed; cells few seeded.

DOUBTFUL SPECIES.

P. VERECUNDUM, *Wight Ic.* t. 2023, from Travancore (Coimbatore). This which is referred to by Baker as the *P. verecundum* of Aiton, appears from the figure to be a very different plant, having no neck to the bulb, a very short 8-fld. scape, a large solitary spathe, a perianth-tube much shorter than the lobes, and the bifid lobes of the cup have a small tooth in the sinus, the filaments are twice as long as the lobes of the cup. The figure is a rude one; in that of the whole plant the perianth lobes are narrowly linear, in the separate flower they are elliptic-lanceolate and clawed.

P. MALABARICUM, *Thwaites Enum.* 324 (*C. P.* 2339). *Baker* (*Handb.* p. 184) cannot distinguish this from *Hymenocallis tenuiflora*, Herb., a New Grenadan plant. The genus *Hymenocallis*, which is exclusively S. American, differs from *Pancratium* in the ovules being 2 collateral and basal in each cell. Thwaites says that his *malabaricum* is a native of river-banks in Ceylon at 1–2000 ft. and gives it a native name (Deya-mānil.)

ORDER CLIII. TACCACEÆ.

Rootstock tuberous or creeping. *Leaves* radical, simple lobed or laciniate, costate and penninerved. *Scape* leafless, flowers umbelled, greenish-

brown or lurid; involucre of 2–6 spathes; bracts very long, filiform, like pedicels. *Perianth* superior, urceolate or subcampanulate, 6-lobed in 2 series. *Stamens* 6, at the base of the lobes, filaments very short, base dilated or appendaged on each side, above it dilated into an inflexed hood, with 2-ribs or horns on the inner surface; anthers sessile within the hood. *Ovary* 1-celled; style short, included, stigmas 3 broad or petaloid and reflexed like an umbrella over the style; ovules many, on 3 parietal placentas, anatropous or subamphitropous. *Fruit* indehiscent baccate or at length 3-valved, 3–6-ribbed. *Seeds* numerous, ovoid, testa appressed striate; albumen hard; embryo minute.—Species about 10, tropical.

1. **TACCA,** *Forst.*

CHARACTER OF THE ORDER.

1. **T. pinnatifida,** *Forst. Plant. Esculent.* No. 28; *Char. Gen.* 69, t. 35; leaves tripartite segments 2–3-fid or irregularly pinnatifid or pinnate at the base, petiole and scape long smooth, invol. leaves 4–12 or more subequal oblong acuminate, perianth lobes conniving subequal. *Roxb. Fl. Ind.* ii. 172; *Grah. Cat. Bomb. Pl.* 230; *Dalz. & Gibs. Bomb. Fl.* 276; *Benth. Fl. Austral.* vi. 458; *Miquel Fl. Ind. Bat.* iii. 566; *Kunth Enum.* v. 458; *Lodd. Bot. Cat.* t. 692. *Regel Gartenfl.* t. 582; *Lamk. Encycl.* t. 232; *Treviran. Symbol.* t. 54, 55; *Griff. Notul.* 238; *Ic. Pl. As.* t. 272A. T. pinnatifolia, *Gærtn. Fruct.* i. 43 t. 14.

The CONCANS, and CENTRAL INDIA; Hazarebagh, *Vicary*; Chota Nagpore, *Clarke*. MALAYAN PENINSULA; Malacca and CEYLON, Trincomalee.—DISTRIB. Australia, Malayan and Pacific Islds.

Rootstock globose, 1 ft. diam. under cultivation. *Leaves* 2–3 ft. diam.; petiole 1–3 ft. *Scape* tapering, longer than the petiole, striped dark and light green, 10–40-fid.; flowers drooping; invol. leaves lanceolate, recurved, striped with purple; filiform bracts very numerous. *Perianth* greenish, subglobose, ⅔ in. diam., fleshy, lobes margined with purple. *Fruit* size of a pigeon's egg, 6-ribbed, yellow.

2. **T. cristata,** *Jack. in Mal. Misc.* I. No. v. 23; leaves either oblong or elliptic-lanceolate, petiole and tall scape smooth, 2 inner involucral spathes very large foliaceous erect with stout flat petioles, 2 outer much smaller sessile ovate acuminate cuneate, flowers dark purple, perianth-lobes spreading and recurved, 3 inner much the largest, orbicular. *Miquel Fl. Ind. Bat.* iii. 578. T. Rafflesiana, *Jack. in Wall. Cat.* 5172. Atacca cristata, *Kunth Enum.* v. 466; *Bot. Mag.* t. 4587. *Lemaire Jard. Fleur.* t. 186, 187. *Flore des Serres,* t. 860, 861.

MALAY PENINSULA; Malacca, Penang and Singapore.

Rootstock conic. *Leaves* 1–2 ft., dark greenish-purple; petiole very stout, brown-purple. *Scape* as long as the leaves, stout, dirty green, grooved; outer invol. spathes 3–4 in., revolute, brown-purple, inner 6 in., elliptic, obtuse, strongly plicately nerved, green, narrowed into a very stout compressed brown-purple petiole; flowers drooping, pedicels stout filiform; bracts 6–8 in., pendulous, pale. *Perianth* 1½ in. diam.; outer lobes oblong, acute, inner rounded broader than long, all at length reflexed; throat with a thickened crenate ring. *Ovary* turbinate, 6-ribbed. *Stigmatic lobes* ciliate.

3. **T. integrifolia.** *Ker.-Gawl. in Bot. Mag.* t. 1488; leaves entire elliptic-ovate, petiole and short stout scape rough, 2 inner invol. leaves very large, spreading foliaceous petioles slender, 2 outer smaller sessile ovate acuminate, flowers pale, perianth lobes spreading and reflexed, 3

inner largest broadly oblong. *Roxb. Cor. Pl.* t. 257. T. aspera, *Roxb. Fl. Ind.* ii. 169. Atacca integrifolia, *Presl Rel. Hæk.* 149 ; *Flore des Serres*, t. 860, 861.

SILHET, CHITTAGONG and TENASSERIM.

Rootstock oblong, curved. *Leaves* 8–16 by 4–8 in., acuminate, strongly nerved and bullate ; petiole shorter than the blade, and scape maroon-brown. *Scape* about as long as the petiole, stout, recurved or bent to one side, few-fld.; invol. spathes unequal, twisted, dirty green with purple nerves ; outer 2–3 in., finely acuminate ; inner longer, petioled, often vaulted over the at length drooping flowers. *Perianth* greenish-purple and yellow, or dirty lilac ; outer lobes subacute, rather shorter than the obtuse inner ; mouth obscurely thickened and ridged, all at length reflexed. *Ovary* turbinate, deeply grooved. *Berry* 1½ in., oblong, fleshy.

4. **T. lævis,** *Roxb. Fl. Ind.* ii. 171 ; leaves entire elliptic-ovate petiole and short recurved scape smooth, invol. leaves 4 subequal sessile ovate acuminate, perianth-lobes spreading acute 3 inner largest and broadest. *Grah. Cat. Bomb. Pl.* 230. *Kunth Enum.* v. 466. T. integrifolia, *Herb. Ham.*

BHOTAN HIMALAYA, *Griffith.* SILHET, *Roxburgh*, CHITTAGONG, MUNNIPORE, and TENASSERIM, S. CONCAN, *Nimmo.*—DISTRIB. Tonkin, Java.

Rootstock subcylindric. *Leaves* 12–16 by 5–6 in., acuminate ; petiole as long as the blade. *Scape* shorter than the petiole, greenish-purple, more or less recurved, 6–12-fld.; invol. leaves 2 by 1 in., finely acuminate, many-nerved ; bracts numerous filiform. *Flowers* pedicelled, blueish, greenish-grey or violet ; perianth ¾–1 in. diam.; outer lobes acute.

ORDER CLIV. DIOSCOREACEÆ.

Rootstock various. *Stem* climbing, branched, rarely short erect. *Leaves* entire lobed or digitately 3–5-foliolate, costate and reticulate, petiole often angular and twisted at the base. *Flowers* small or minute, panicled racemose or spicate, rarely bisexual. *Perianth* superior, 6-cleft. *Male* fl. tubular or urceolate, lobes short, spreading. *Stamens* inserted at the base of the perianth, or on its lobes 3, 6, or 3 perfect and 3 staminodes, filaments incurved or recurved, anthers small, globose, oblong or didymous, or with the cells on branches of the filament. *Pistillode* various or 0. *Fem. fl. Perianth* of the male, but smaller. *Staminodes* 3, 6 or 0. *Ovary* 3-quetrous, 3-celled ; styles 3, very short, stigmas entire or 2-fid recurved ; ovules 2 superposed in each cell, pendulous, anatropous or subamphitropous. *Fruit* a berry or 3-valved capsule. *Seeds* flat or globose ; embryo small, included in the hard albumen.—Genera 8, species about 160.

Climbers, flowers unisexual, capsule 3-winged . . .	1. DIOSCOREA.
Stem erect, 1-leaved, flowers bisexual, fruit indehiscent .	2. TRICHOPUS.

1. DIOSCOREA, *Linn.*

Fruit capsular.—Species 150, tropical and subtropical.

The species of *Dioscorea* are in a state of indescribable confusion, and I cannot hope to have escaped errors in the determination and delimitation of the Indian ones, to which I have devoted much labour. The Roxburghian food-yielding species are for the most part indeterminable, and except through a knowledge of them as cultivated in India they cannot be understood. No doubt some of the species described

by me may have other earlier names in Malayan Flora than I have given; but the Malayan species are even more loosely described than the Indian. The Wallichian collection is very complete, but the species are often mixed.

A. Leaves 3–5-foliolate. Capsule in all oblong. Seeds winged at the top.

SECT. I. *Stamens* 6, all antheriferous. *Pistillode* low, broad.

1. **D. dæmona,** *Roxb. Fl. Ind.* iii. 805; *Wight. Ic.* t. 811. D. virosa, *Wall. Cat.* 5099; *Kunth Enum.* v. 413. D. triphylla *Herb. Ham.* D. altissima, *Herb. Roxb.* D. trinervia, *Roxb. ex Wall. Cat.* 5099. D. amœna, *Roxb. ex Wight.* (*error*, for dæmona,) D. hirsuta, *Dennst. Schluess. Hort. Mal.* 33. Helmia? dæmona, *Kunth l. c.* 439. Smilax? narcotica & virosa, *Herb. Ham. ex Wall. Cat.*—*Rheede Hort. Mal.* vii. t. 51, 52.

Tropical forests throughout INDIA, BURMA, and the MALAY PENINSULA.—DISTRIB. Malay Islands, Tonkin.

Root tuberous, lobed, biennial. *Stem* stout, terete, more or less prickly. *Leaves* 3-foliolate, long-petioled; leaflets 3–12 in., glabrous or finely pubescent beneath, all petiolulate, broadly cuneate-obovate, cuspidately caudate-acuminate, sometimes strongly reticulate, lateral very oblique 5–6-nerved, central 3-5-nerved; petiole 6–12 in., smooth or prickly. *Male racemes* 6–18 in., pubescent or woolly; spikes ½–¾ in., shortly peduncled, cylindric, dense-fld.; bracts shorter than the flowers; sepals orbicular-ovate, membranous, shorter than the coriaceous incurved petals; anthers subsessile. *Fem. spikes* solitary, flowers distant, perianth of the male. *Capsule* 2–2½ by 1–1½ in., base and top truncately rounded. *Seeds* with the oblong wing broader than the nucleus.—Roxburgh is undoubtedly right in referring Rumph's "Ubium sylvestre" to this, but by oversight cites t. 127 for 128.

Var. *reticulata*; leaves finely reticulate beneath, male racemes much branched, capsule tomentose. D. macrocarpa, *Wall. Cat.* 5100.

SECT. II. *Stamens* 3 antheriferous, alternating with 3 staminodes. *Pistillode* columnar.

2. **D. tomentosa,** *Heyne in Roth Nov. Pl. Sp.* 371; leaves 3–5-foliolate softly tomentose beneath, bracts shorter than the flower. *Roxb. Fl. Ind.* iii. 805; *Wall. Cat.* 5001. D. triphylla, *Herb. Russ.* Helmia? tomentosa, *Kunth Enum.* v. 431.

The DECCAN PENINSULA, from Canara southwards. CEYLON.

Root (of long tuberous fibres, 1–2 ft. *Ic. Thwaites*). *Stem* slender, prickly towards the base. *Leaves* usually snow-white beneath; leaflets very variable, 2–4 in. long, broad or narrow, acuminate or cuspidate, shortly petiolulate, lateral often gibbously oblique. *Male spikes* ½–1 in., ternate on the branches of a very slender exuous tomentose panicle; flowers $\frac{1}{16}$ in diam., sessile or pedicelled; perianth segments subequal; staminodes equalling the stamens, nearly as long as the sepals, tips dilated. *Capsules* 1 in., cuneately oblong, downy.

3. **D. pentaphylla,** *Linn. Sp. Pl.* 1032; leaves 3–5-foliolate glabrous or sparsely pubescent beneath, bracts shorter than the flowers. *Roxb. Fl. Ind.* iii. 806; *Wight. Ic.* t. 814; *Wall. Cat.* 5098; *Thwaites Enum.* 325; *Kunth Enum.* 396; *Dalz. & Gibs. Bomb. Fl.* 247. D. triphylla, *Linn. l. c.*; *Wall. Cat.* 5702; *Dalz. & Gibs. l. c.*; *Jacq. Ic.* t. 627; *Coll.* ii. 365; *Kunth l. c.* 394. D. Kleiniana, *Kunth l. c.* 394. D. lunata, *Roth Nov. Pl. Sp.* 370. D. digitata, *Mill Gard. Dict.* No. 6. Botryosicyos pentaphyllus, *Hochst. in Flora* 1844 *Beil.* 3. Hamatris triphylla, *Salisb. Gen. Pl. Fragm.* 12. —*Rheede Hort. Mal.* vii. t. 34, 35.

Throughout tropical India, from Kumaon in the N.W. HIMALAYA eastward to BURMA, and southward to CEYLON and MALACCA. DISTRIB. Malay Hills, Afr. trop.

Tubers oblong (5–6 ft., *Ic. Thwaites*). *Stem* slender, prickly at the base, rarely above, often bulbiferous. *Leaves* as in *D. tomentosa*, but never softly tomentose, obovate, acuminate or cuspidate. *Male panicles* and flowers glabrous hispidly pubescent or villous, spikes lax or dense-fld.; flowers sessile or pedicelled, $\frac{1}{16}$–$\frac{1}{12}$ in. diam. fragrant; filaments and staminodes very short. *Capsule* $\frac{3}{4}$–1 in., rounded at both ends or base cordate and tip apiculate, glabrous or pubescent. *Seeds* $\frac{1}{3}$–$\frac{1}{2}$ in., wing broader than the nucleus.—I cannot separate the glabrous tomentose and villous-flowered plants, or the sessile- from the pedicelled-flowered. A fruiting Bombay specimen from Ritchie has almost woolly capsules cordate at the base, and with a strong short beak at the retuse apex.

4. **D. kumaonensis,** *Kunth Enum.* v. 395; leaves 3–5-foliolate nearly glabrous or sparsely hairy beneath, bracts long-acuminate longer than the flowers. D. pentaphylla, *Wall. Cat.* 5098 E. D. triphylla, *Wall. Cat.* 5702 B. F. Vitis, *Wall. Cat.* 9032.

TEMPERATE HIMALAYA, alt. 4–6000 ft. from Kashmir to Sikkim. The KHASIA and MUNNEPORE HILLS, alt. 5–6000 ft.

Very near *D. pentaphylla*, but a plant of temperate regions, and more slender, with pisiform bulbils, more membranous narrower leaflets with long setaceous points, larger longer more pointed bracts, larger flowers $\frac{1}{12}$–$\frac{1}{10}$ in. diam., longer staminodes and pistillode; but there are Garwhal specimens from Edgeworth with bracts as short and flowers as small as in *pentaphylla*. *Capsule* $\frac{3}{4}$ in. oblong, rounded at both ends.—A state occurs in both the Himalaya and Khasia with a much-branched panicle bearing imperfect long-pedicelled flowers with very narrow quite glabrous sepals and petals, abortive anthers, and sometimes a large imperfect stigma; the bracts in this are at the base of the pedicel which is an imperfect ovary.

5. **D. Jacquemontii,** *Hook. f.*; leaves 3–5-foliolate, leaflets finely acuminate glabrous, flowers much larger than in *D. pentaphylla* glabrous and short bracts both streaked with brown.

The CONCAN, between Poona and Carli, *Jacquemont*; Belgaum, *Ritchie*.

Closely allied to *D. pentaphylla*, but besides the above differences, the stamens, staminodes and pistillodes are all much longer.

B. Leaves simple.

SECT. III. *Sepals* broadly oblong or orbicular. *Stamens* 3, antheriferous, anther-cells remote on the arms of a forked connective.

6. **D. Collettii,** *Hook. f.*—Diosc. sp. indescript., *Collett & Hemsl. in Journ. Linn. Soc.* xxviii. 137.

BURMA; Shan Hills, alt. 4000 ft., *Collett*.

Quite glabrous. *Branches* slender, terete, unarmed. *Leaves*, largest 4–5 by 3–3½ in., broadly ovate-cordate, acuminate, 7–9-nerved from the deeply 2-lobed base, membranous, reticulate, basal lobes rounded; petiole slender. *Male spikes* axillary, solitary, longer than the leaves, very slender; flowers $\frac{1}{12}$ in. diam., in distant clusters; bracts very broad, membranous; sepals orbicular-ovate and broadly elliptic petals flat, with rounded tips; stamens inserted on the base of the sepals, distant from the minute 3-toothed staminode; filaments very short; anther-cells minute, globose.—Fries black. The only Asiatic species with forked filaments and separated anther-cells.

SECT. IV. *Sepals* broadly oblong or orbicular. *Stamens* 6, antheri-

ferous (except *D. decipiens*); anther-cells combined. *Capsule* (where known) broader than long. *Seeds* orbicular, broadly winged all round.

* Male flowers in long simple or nearly simple axillary spikes, distant, or in distant clusters.

7. **D. spinosa,** *Roxb. ex Wall. Cat.* 5703 A, B, C, E, F; glabrous or tomentose, leaves orbicular- or reniform-cordate, perianth subrotate, pistillode large. D. aculeata, *Roxb. Fl. Ind.* iii. 800 (*not of Linn.*). D. sativa, *Linn. Sp. Pl.* 1033 *partly*; *Kunth Enum.* v. 341 (excl. β). *Thwaites Enum.* 326 in note. D. tiliæfolia, *Kunth l. c.* 401. D. cymosula, *Hemsl. Biol. Centr. Amer. Bot.* iii. 355, v. t. 90. D. aculeata, Cerubulium and echinata, *Herb. Ham.* D. lanata, *Balf. Bot. Socot.* v. 289.—*Rheede Hort. Mal.* viii. t. 52.—*Rumph. Amb.* v. t. 126.

TROPICAL INDIA, CEYLON, BURMA and the MALAY PENINSULA, *cultivated.*—DISTRIB. Trop. America.

Tubers very large; base of stem with long woody rigid fibres bearing spines half an inch long. *Stem* terete, very spinous at the base. *Leaves* attaining 8 in. long and broad, acuminate or cuspidate, 5–7-nerved, rather membranous, basal lobes rounded. *Male spikes* 6–18 in.; flowers ¼ in. diam., often in very dense cymules, sessile or shortly pedicelled; bracteoles very broad; perianth segments remote from the large oblong pistillode; anthers large. *Fem. raceme* rather short. *Capsule* 1 in. diam., broadly obcordate.—I cannot adopt Roxburgh's name of *aculeata* for this, for it is not Linnæus's plant of that name, which is Rheede's Katter Kalengra, and which has panicled male spikes. Nor can I, as Kunth and Thwaites have, take Linnæus' name of *sativa*, though Rheede's figure of it is cited by Linnæus under his *sativa*, because the plant figured in "Hortus Cliffortianus" must be accepted as *sativa* Linn., it being cited by himself as his type.

8. **D. deltoidea,** *Wall. Cat.* 5110; nearly glabrous, leaves hastately or subdeltoidly-cordate acuminate 7–9-nerved, perianth sub-rotate, pistillode minute. *Kunth Enum.* v. 340.

TEMPERATE HIMALAYA; from Kashmir to Bhotan alt. 6–1000 ft. KHASIA HILLS, alt. 4–5000 ft.—DISTRIB. Affghanistan.

Branches very slender, terete, unarmed. *Leaves* attaining 7 by 5 in., membranous, reticulate beneath, very variable in breadth and depth of lobing, lobes rounded or subangular, sometimes dilated outward; petiole 2–5 in., very slender. *Male spikes* very slender, rarely branched; flowers 1/12 in. diam., solitary or clustered; perianth-segments nearly flat; stamens very short, anthers didymous. *Capsule* very variable, orbicular, deltoid or obtusely quadrate, rarely broadly obcordate, base rounded truncate or broadly cuneate; valves very thin. *Seeds* very variable in form, winged all round or on one side.—I hesitate to unite with this the Burmese plant referred to it by Hemsley and Collett (Journ. Linn. Soc. xxviii. 137) which is too imperfect for determination.

9. **D. Wightii,** *Hook. f.*; quite glabrous, leaves ovate-cordate acuminate 7-nerved, perianth-segments erect, pistillode minute.

TRAVANCORE; Courtallam, *Wight.*

In habit and foliage very like *D. deltoidea*, but the flowers are always solitary, sessile by a broad base, the filaments much longer, and the anthers large and oblong. —Only one specimen seen.

10. **D. spicata,** *Roth Pl. Nov.* 571; quite glabrous, leaves alternate shortly petioled linear-oblong or lanceolate 3-rarely 5-nerved finely reticulate beneath, flowers globose, pistillode large conical. *Kunth Enum.* vi. 399; *Thwaites Enum.* 326.

INDIA, *Heyne.* CEYLON, *Walker, &c.*

Branches very slender, terete, unarmed. *Leaves* 2–4 by ½–2 in., obtusely acuminate, thin, obscurely margined, base cuneate or rounded rarely subcordate. *Male spikes* 3–8 in., rarely branched; bracts ovate; flowers $\frac{1}{12}$ in. diam., solitary, sessile; segments erect, concave, elliptic, obtuse; filaments rather slender, anthers didymous. *Capsule* 1½ in. diam., subquadrate, retuse at top and bottom, glabrous, shining. *Seeds* winged all round.—I follow Thwaites in referring the Ceylon plant to Roth's very insufficiently described *D. spicata*, of which I have seen no specimens. Thwaites' specimens of *D. oppositifolia* (C.P. 2302) in Herb. Kew are certainly this; but as *oppositifolia* is a Ceylon plant, the error probably arises from a misplacement of tickets.

** Male spikes whorled in axillary and terminal panicles.

† Leaves cuneate or rounded at the base, rarely retuse never deeply cordate.

§ *Leaves more or less pubescent beneath, or glabrous in* D. oppositifolia.

11. **D. pyrifolia,** *Kunth Enum.* v. 384; leaves mostly opposite orbicular or broadly oblong 5-nerved coriaceous more or less finely (not stellately) pubescent beneath, male spikes 1–1½ in. spreading, anthers subsessile, pistillode minute.

TENASSERIM, *Helfer* (*Kew distrib.* 5538). SINGAPORE, *Wallich.* MALACCA, (not Philippine Islands), *Cuming* (No. 2314), *Griffith* (*K. d.* 5562), *Maingay* (*K. d.* 1705), *Hervey.*

Branches terete, glabrous or puberulous. *Leaves* 2–4 by 1½–3 in., acuminate or cuspidate, base rounded or retuse, reticulate beneath; petiole ½–1 in. *Spikes* glabrous; flowers $\frac{1}{16}$–$\frac{1}{12}$ in. diam., globose; sepals orbicular-oblong; petals cuneate-obovate; anthers very small. *Capsule* broader than long, cordate at base and top. *Seeds* ½–1 in. diam.—Kunth erred in assuming this to be one of Cuming's Philippine plants.

12. **D. orbiculata,** *Hook. in Herb.*; leaves mostly opposite orbicular 5-nerved stellately pubescent towards the base beneath, male spikes 1½–2 in. spreading, flowers very minute, anthers subsessile, pistillode minute. D. sativa, *Wall. Cat.* 5108 C.

PENANG; *Philipp*; on Govt. Hill, *Curtis.*

Very near *D. pyrifolia*, but the leaves are smaller, not coriaceous, and at once distinguished by the stellate hairs beneath, the petals also are elliptic.—Fem. fl. and fruit unknown.

13. **D. oppositifolia,** *Linn. Sp. Pl.* 1033; glabrous or sparsely pubescent, or panicles tomentose, leaves mostly opposite from lanceolate to elliptic-oblong ovate or orbicular strongly 3–5-nerved coriaceous with a cartilaginous margin, male spikes short rarely 1 in. spreading, anther large, pistillode minute. *Kunth Enum.* 390; *Wall. Cat.* 5104; *Roxb. Fl. Ind.* iii. 804; *Wight Ic.* t. 813; *Dalz. & Gibs. Bomb. Fl.* 247. D. glabra, *Wall. Cat.* 5105 D, E. D. trinervia, *Roxb. mss.* D. lanceolata, *Herb. Heyne.* D. coriacea, *Herb. Wight.*

Tropical India, from ASSAM, SILHET and CHITTAGONG, southwards to CEYLON.

A large climber, branches terete, unarmed. *Leaves* 3–5 by 1–3 in., with a well-defined cartilaginous margin; petiole ¼–1 in., stout. *Male spikes* rather stout, usually dense-fld.; flowers rather large, $\frac{1}{10}$ in. diam., but variable in size, sessile, globose; sepals orbicular; petals obovate; filaments rather long. *Capsule* 1¼–2¼ in. diam., retuse or almost 2-lobed at the top, coriaceous, glabrous. *Seeds* ¾–1¼ in. diam., wing very broad.

14. **D. decipiens,** *Hook. f.*; leaves opposite ovate-lanceolate to orbicular finely pubescent beneath strongly 3–5-nerved, margin cartilaginous, male spikes short as in *D. oppositifolia,* but triandrous with 3 staminodes on the petals. D. glabra, *Wall. Cat.* 5105 G, H.

BURMA; at Prome and Taongdong, *Wallich;* Upper Burma, *Collett.*

Resembles *D. oppositifolia* so closely that an examination of very many flowers of both species was necessary to determine me to regard it as a species; it has also hitherto occurred in a different geographical area, being confined to Burma where *D. oppositifolia* has not been collected.

§§ *Leaves perfectly glabrous on both surfaces* (*see also* 13. oppositifolia).

15. **D. laurifolia,** *Wall. Cat.* 5111; very slender, leaves linear or narrowly oblong-lanceolate obtusely acuminate 3-nerved strongly reticulate beneath, male spikes very slender deflexed, flowers very minute, pistillode minute. D. glabra, *Wall. Cat.* 5105 B.

PENANG, *Porter, Maingay* (*Kew distrib.* 1701), *Hullett.*

Leaves 3–4½ by ¾–1½ in., opposite and alternate, rather stiff; base rounded or cuneate; petiole ½–1 in., very slender. *Male spikes* 1½–2½ in. long elongate unilateral panicles, solitary or 2–4-nate, pendulous; flowers $\frac{1}{16}$ in. diam., scattered; sepals broadly oblong; petals smaller, oblong; anthers rather large, filaments short. Fruit unknown.

Var. ? More robust, leaves shorter elliptic more coriaceous, male spikes stouter very densely whorled in stiffer panicles, flowers larger gibbous at the base. Fem. fl. in large branched green glabrous panicles.—Malacca, *Griffith* (*Kew distrib.* 5556).

16. **D. deflexa,** *Hook. f.*; leaves chiefly opposite ovate-oblong acuminate 5-nerved, base rounded or obscurely cordate, male spikes 1–1½ in. stout deflexed, anthers large, pistillode large.

SINGAPORE and MALACCA, *Maingay* (*Kew distrib.* 1705, 1706).

Branches rather stout, terete. *Leaves* 4–5 by 1½–3 in., strongly coriaceous, margin not thickened or cartilaginous; petiole 1–1½ in. *Male spikes* deflexed from the base; flowers globose, about $\frac{1}{12}$ in. diam.; sepals broadly ovate; petals oblong. *Fem. fl.* in long much branched lax-fld. perfectly glabrous panicles. *Capsule* 2 in. broad, retuse at the top and base. *Seeds* nearly 1 in. diam., wing very broad.—Distinguished from *oppositifolia* by the deflexed male spikes and margin of leaf not thickenened, and the large pistillode.

17. **D. obcuneata,** *Hook. f.*; very slender, leaves opposite cuneately obovate cuspidate 3-nerved membranous, petiole short very slender, male spikes ½–1 in. very slender in very slender axillary panicles, flowers very minute, pistillode obscure.

CEYLON.

Branches terete. *Leaves* 2 by 1–1½ in., very thin and pale when dry, very slender, nervules indistinct, base narrow exactly cuneate; petiole ¼ in. *Male spikes* spreading horizontally, rachis almost capillary, flowers scattered, globose, sessile, $\frac{1}{16}$ in. diam.—I have seen but one specimen, in the Hookerian Herbarium, marked as from Ceylon by Sir W. Hooker, but with no other locality or collector's name; I have searched throughout the genus for any species at all resembling it in the obcuneate leaves with very short slender petioles.

†† Leaves cordate hastate or broadly truncate at the base.

18. **D. anguina,** *Roxb. Fl. Ind.* iii. 803; softly tomentose, leaves opposite and alternate large long-petioled broadly ovate- or orbicular-

cordate 7-nerved margin cartilaginous, male spikes short dense-fld. spreading, pistillode large globose. D. spinosa, *Wall. Cat.* 5103 G, H.

TROPICAL HIMALAYA; from Nepal, *Wallich*, to Bhotan (*Kew distrib.* 5548). ASSAM, SILHET, CACHAR, BENGAL, CHOTA NAGPORE.

Tubers columnar (*Roxb.*). *Leaves* 3–5 by 2–5 in., rather thick, nerves strong beneath, nervules transverse; petiole 1½–3 in. *Male panicles* stout; spikes crowded, densely tomentose; flowers $\frac{1}{10}$ in. diam.; sepals and petals very broad; anthers large. *Capsule* ¾–1½ in. diam., cordate at the top and base. *Seed* orbicular.

19. **D. polyclades,** *Hook. f.*; stems slender and leaves beneath and inflorescence tomentosely pubescent, leaves opposite and alternate orbicular-or ovate-cordate apiculate 5-costate, male spikes ½–1 in. 5–6 nately whorled in long panicles, flowers minute crowded. D. nummularia, *Kunth Enum.* vi. 386 (*excl. syn.*); *Moritz Syst. Verz. Zolling. Pflanz.* 92 (*not of Lamk.*).

SINGAPORE, *Ridley.*—DISTRIB. Java.

Stem terete. *Leaves* 3–4 by 2 2½ in., orbicular-cordate in the Singapore plant, ovate-cordate in the Javan, opaque above, brown when dry, softly finely tomentose and laxly reticulate beneath; petiole 1–1½ in., slender. *Male panicles* 6–10 in., terminal compound; whorls of spikes very numerous, sessile or shortly pedicelled; flower-buds $\frac{1}{10}$ in. diam.; sepals orbicular; petals ovate.—A very distinct species, referred to *D. nummularia*, Lamk., by Moritz, but clearly not the plant figured by Rumph., on which Lamk. founded that species, and which is described as having intensely green glabrous shining leaves, and by Blume (Enum. Plant. Jav. 22) as having leaves glaucous beneath. The Singapore plant is I think certainly Zollinger's No. 283 from Java, though the leaves are more rounded.

20. **D. glabra,** *Roxb. Fl. Ind.* iii. 804; quite glabrous, leaves opposite long-petioled orbicular ovate-oblong or hastate strongly 7–9-nerved and reticulate margins not cartilaginous, sub-glaucous beneath, base cordate or deeply 2-lobed, male spikes short spreading, sepals ovate-oblong, petals cuneately obovate, pistillode minute. *Kunth Enum.* v. 383; *Wall. Cat.* 5105 A, F, I, K. D. sagittata, *Royle mss.* (*not of Poiret*). D. crepitans, *Herb. Ham.*

SUBTROPICAL HIMALAYA, alt. 3–5000 ft., from Simla to Sikkim, and southwards to BENGAL, BEHAR, the CONCAN, BURMA and the MALAY PENINSULA.

Stems stout, somewhat flattened (*Roxb.*). *Leaves* extremely variable, 3–8 by 1–4½ in., caudate-acuminate, youngest acute at the base, older truncate, or deeply cordate, lobes sometimes 1 in. incurved and overlapping; margin not thickened or cartilaginous; petiole 1–3½ in. *Male spikes* 1 in., rarely more; flowers scattered, rather large, globosely 8-lobed, often coarsely dotted. *Capsule* 1½ in. diam., very variable in shape, subquadrate broadly obcuneate or obcordate, retuse at the tip and base, valves very thin. *Seeds* irregularly orbicular.

21. **D. gibbiflora,** *Hook. f.*; quite glabrous, very slender, leaves opposite, ovate or oblong acuminate 5-nerved, base cordate or sub-hastate, male spikes very short slender spreading in very slender panicles, flowers minute gibbous at the base, stamens very short, pistillode obscure. D. glabra, *Wall. Cat.* 5105 B, *in part.*

PENANG, *Wallich.*

Branches terete. *Leaves* 3–4 by 1½–2 in., not margined, nervules indistinct; petiole ½–1 in. *Male spikes* ½ in., rachis very slender; flowers $\frac{1}{16}$ in. diam., sessile, with a boss at the broad base on the side opposite to the bracts.

22. **D. Wallichii,** *Hook. f.*; quite glabrous, leaves opposite long-petioled ovate or orbicular-cordate 7-nerved, male spikes 1 in. in short axillary and terminal spreading panicles, flowers globosely 3-lobed, stamens short, pistillode large globose. D. sativa, *Herb. Madr. in Wall. Cat.* 5708, A, B, F, D. ? D. nummularia, *Willd. ex Roxb. Fl. Ind.* iii. 803.

SILHET, CACHAR, MUNNEPORE and BURMA, common. CHOTA NAGPORE, *Clarke.* TRAVANCORE, *Herb. Madr.* (Cult. ?).

Branches stout, terete. *Leaves* 3–6 in., as broad, always broadly cordate with rounded sides and a broad sinus, very finely reticulate beneath; petiole 3–5 in. *Flowers* about $\frac{1}{12}$ in. diam.; sepals and petals suborbicular; stamens inserted under the pistillode; anthers small. *Capsule* 1½ in. diam., emarginate at the tip. *Seeds* orbicular, broadly winged.—The very broad rounded long-petioled glabrous leaves and large pistillode are good characters.

Sect. V. *Sepals* orbicular. *Stamen* 6 antheriferous; anther cells combined. *Capsule* longer than broad. *Seeds* laterally winged.

23. **D. Hamiltoni,** *Hook f.*; quite glabrous, stem angled or slightly winged, leaves cordately or subhastately ovate or lanceolate 7–9-nerved, male spikes ½ in. rachis very slender zigzag, stamens very short, pistillode obscure. D. sativa, *Wall. Cat.* 5108. D. aculeata, *Wight Ic.* t. 2060. D. alata, *Griseb. Fl. Brit. W. Ind.* 587. D. incrassata and ovata, *Herb. Ham.*

SIKKIM, ASSAM, CACHAR, BEHAR, CHOTA NAGPORE, MALABAR and BURMA; in all ? cultivated.—DISTRIB. St. Domingo (cult.).

Branches slender. *Leaves* opposite and alternate, undistinguishable from those of *D. glabra*; petiole 1–2½ in. *Male spikes* whorled on the branches of very slender elongate axillary and terminal panicles; flowers globose, $\frac{1}{16}$ in. diam.; sepals broad; petals cuneate-obovate. *Capsule* 1–1½ in. long, membranous, sides parallel, tip acute, base cordate.—The slender zigzag rachis of the male spikes, well represented by Wight, is quite peculiar to this species. I regret having to reject both Hamilton's names from being unable to comprehend their significance in respect of this plant.

Sect. VI. *Sepals* narrow, subvalvate, linear or linear-lanceolate. *Capsule* oblong. *Seeds*, winged laterally.

24. **D. sativa,** *Linn. Sp. Pl.* 1033 (*excl. syn. Rheede*); *Hort. Cliff.* t. 28; quite glabrous, stem terete bulbiferous, leaves broadly ovate-cordate acuminate cuspidate or caudate 7–9-costate, male spikes slender panicled. *Benth. Fl. Hong.* 368; *Fl. Austral.* vi. 460. D. bulbifera, *Br. Prodr.* 294. ? *Wight Ic.* t. 878. D. Cliffortiana, *Lam. Encycl.* iii. 232 (not of Ill. t. 818). D. versicola, *Herb. Ham.*; *Wall. Cat.* 5106. D. pulchella and heterophyla, *Roxb. Fl. Ind.* iii. 801–804. D. decemangularis *and* D. Tunga, *Herb. Ham.* Helmia bulbifera, *Kunth Enum.* v. 435.

Tubers large, variable in form. *Stem* slender, green or purple. *Leaves* opposite and alternate, very variable in size, attaining 14 in. in length and breadth, membranous, dark green, usually very deeply cordate but sometimes with only a shallow broad sinus; petiole 2–6 in. *Male spikes* almost capillary, 1–4 in.; flowers crowded or scattered, very variable in size, green or purplish; sepals $\frac{1}{10}$–$\frac{1}{4}$ in. long, fleshy; petals rather narrower; filaments much shorter than the perianth; anthers minute, didymous. *Fem. spikes* 4–10 in. long, pendulous; flowers ⅛–¼ in. long; sepals as in the male. *Capsule* ⅔–1 by ⅓–½ in., membranous. *Seeds* with a broad basal wing.—I follow Bentham in regarding this as Linnæus's *sativa*; an inspection of the plate in "Hortus Cliffortianus," which is Linnæus's authority for the species, confirming this

view. In Sp. Plant. he cites for *sativa* also Rheede's plate of *D. aculeata*, to which Kunth and others have confined the name. Lamk. Encycl. iii. 232, gives the name *D. Cliffortiana* to Linnæus's plant, but figures (Ill. t. 818) a very different one for it, rejecting the name *sativa* because he does not consider it to be the cultivated "igname." The difference in the size of the male flowers of *sativa* are so great that I have suspected that two species may be included, but I have failed to define them.

Sect. VII. *Sepals* narrowly oblong or lanceolate sub-valvate. *Capsule* broader than long, carpels rounded. *Seed* winged all round.

25. **D. alata,** *Linn. Sp. Pl.* 1033; quite glabrous, stem acutely angled or winged, leaves subhastately or deeply cordate orbicular or ovate 5–7-nerved, male fl. in slender fascicled spikes. *Kunth Enum.* v. 387; *Roxb. Fl. Ind.* iii. 797, *Wight Ic.* t. 810. D. japonica, *Hb. Madr. in Wall. Cat.* 5107 (*not of Thunb.*). D. acutangula, *Ham. in Wall. Cat.* 5109. D. octangularis, Devipata, & Bisantaca, and Hurchusia, *Herb. Ham.* D. odoratissima, *Wall. mss.* (*Ic. in Herb. Kew*). D. anguliflora, *Steud Pl. Hohenack. exsicc.* No. 699 A. D. bulbifera, *Russ. ex. Wall. Cat.*

TROPICAL INDIA (cult. ?).

Roots very large. *Stem* stout (spinous towards the base in *D. Devipata*), often tuberiferous, variously angled or winged. *Leaves* as in *D. sativa*, almost all opposite; from orbicular to hastately ovate; petiole stout, often winged. *Male spikes* and flowers as in *D. sativa*; fem. in much stiffer spikes, and capsule entirely different, broader than long, 1–1½ in. diam., very broadly obcordate, coriaceous. *Seed* orbicular, broadly winged all round.—Of Steudel's *anguliflora* from Canara I have seen young fruit only.

IMPERFECTLY KNOWN AND UNDETERMINABLE SPECIES.

D. ACULEATA, *Linn. Sp. Pl.* 1033. The authority for this is Rheede's Katter Kelengu, vii. 71, t. 37, which is unrecognizable. A knowledge of the Malabar languages might reveal it.

D. ANGULATA, *Roxb. in Steud. Nomencl.* Ed. ii. i. 511. I have found no other reference to this species.

D. ATROPURPUREA, *Roxb. Fl. Ind.* iii. 800; tubers subrotund purple throughout, branches 4–7 winged, wings coloured and curled, leaves deeply cordate 5–7-nerved, petioles winged bases much enlarged and stem clasping.—Cultivated in Malacca, Pegu and the Eastern Islands.

D. BULBIFERA, *Linn. Sp. Pl.* 1033, is in same category as *D. aculeata*; it is Rheede's Katu-Katsjit, vii. 69, t. 36.

D. CRISPATA, *Roxb. Fl. Ind.* iii. 802; tubers rounded, stem unarmed terete 10–15 winged, wings curled, leaves alternate broad cordate 7–11-nerved, petiole with curled wings, male spikes panicled, fem. pendulous, perianth segments linear white.—Interior of Bengal.

D. CYLINDRICA, *Vitm. Summ. Pl.* v. 426. For this plant the author cites Rheede Hort. Mal. vii. t. 50 which is a Cucurbit.

D. FASCICULATA, *Roxb. Fl. Ind.* iii. 801; tubers pendulous size of an egg attached by slender filaments white, stem very slender, terete, prickles stipulary, leaves alternate round cordate 3–7-nerved slightly villous.—Cultivated near Calcutta.

D. GLOBOSA, *Roxb. l. c.* 797; tubers large round white, stems 6-winged prickly towards the root, leaves opposite and alternate sagittate-cordate ensiform waved 5–7-nerved, petiole 5-winged nearly as long as the leaf, male spikes compound long pendulous verticilled, fem. axillary simple erect, flowers few very remote fragrant.—Cultivated by Hindoos, the most esteemed yam by Europeans.

D. INTERMEDIA, *Thwaites Enum.* 326; glabrous, unarmed, stem terete, leaves 3 by ½–1½ in., opposite and alternate elliptic or oblong acuminate mucronate 3-nerved, petiole ½–1 in., fem. spikes 1 in. or rather more solitary simple, male shorter than the leaves fascicled or in long panicles flowers hexandrous,—Hotter parts of Ceylon. —The specimens I have seen are too imperfect for further description. It is very near *D. spicata*, but has shorter spikes.

D. NEPALENSIS, *Sweet Hort. Brit. Ed.* ii. 522. No description.

D. PELTATA, Jufs. in Pers. Syn. ii. 621; Kunth Enum. vi. 413; from Ceylon, is probably a *Cocculus*.

D. PURPUREA, Roxb. Fl. Ind. iii. 799; tubers oblong reddish throughout, stems 6-, or more-winged prickly, leaves opposite and alternate cordate 5–7-nerved, petiole long winged stem-clasping. Male and fem. spikes as in *D. rubella*.—Cultivated in Bengal.

D. RUBELLA, *Roxb. l. c.* 798; tubers oblong red-skinned, stem 6-winged, leaves opposite sagittate-cordate 3–7-nerved, male spikes axillary simple and compound, if simple shorter than the leaves, fem. spikes axillary generally simple longer than the leaves, flowers very fragrant, staminodes large almost like the male stamens.—Cultivated about Calcutta.

D. SPICATA, Roth; var. *β*. Thwaites Enum. 326 (C. P. 2872); a very slender plant with ovate caudate-acuminate leaves, and a short panicle of large broad orbicular cuspidate thin walled capsules, is something I think entirely different from *D. spicata*. *Capsules* 1–1¼ in. diam., valves semicircular. *Seed* orbicular, ¼ in. diam., broadly winged all round.

2. TRICHOPUS, *Gærtn.*

A small erect rigid, perennial herb. *Stem* short. *Leaf* terminal, petioled, linear-lanceolate, ovate or triangular, 3–7-costate. *Flowers* small, fascicled at the base of the leaf, panicles filiform, bisexual. *Perianth* campanulate, subequally 6-fid. *Stamens* 6 on the bases of the perianth lobes; anthers subsessile, short, broad, connective produced. *Ovary* 3-celled; style very short; stigmas 3, short, reflexed, 2-fid; ovules 2, superposed in each cell, anatropous. *Fruit* ovoid, triquetrous, indehiscent. *Seeds* oblong, rugose, grooved dorsally, testa thin embryo minute in a cartilaginous albumen.

1. **T. zeylanicus,** *Gærtn. fruct.* 1, 44, t. 14; *Beccari in Nuov. Giorn. Bot. Ital.* ii. 13; *Beddome Ic. Pl. Ind. Or.* t. 290. Trichopodium cordatum intermedium and augustifolium, *Lindl. Bot. Reg. sub* t. 1543. T. zeylanicum, *Thwaites Enum.* 291, 443. Podianthus arifolius, *Schnitzl. in Bot. Zeit.* 1843, 739.

TRAVANCORE, *Beddome.* CEYLON common.

Stem 1–3 in. *Leaves* 2–8 in. long, petiole 1–8 in. *Pedicels* 1–3 in. long. *Flowers* minute, dark brown; perianth lobes lanceolate, acute. *Fruit* ¼ in. long, pedicel thickened at the top.

ORDER CLV. ROXBURGHIACEÆ.

Rootstock tuberous or creeping; stem erect or climbing. *Leaves* alternate or opposite, petioled, 3 or more-costate, cross nervules parallel. *Flowers* in axillary peduncles, regular, bisexual. *Perianth* superior or half-superior, 2-seriately 4-cleft. *Stamens* 4 at the base of the perianth-lobes or subhypogynous; anthers dorsifixed. *Ovary* 1-celled; stigma subsessile, or stigmas 3; ovules 2 or more, erect from the base or pendulous from the top of the cell, anatropous. *Capsule* 2-valved (fruit unknown in

Stichoneuron). *Seeds* oblong, testa coriaceous; embryo long, in the axis of hard albumen.—Genera 3, species about 8.

Flowers large; ovula erect	1. STEMONA.
Flowers minute; ovules pendulous	2. STICHONEURON.

1. **STEMONA**, *Lour.*

Root of fleshy tubers. *Leaves* opposite, alternate or whorled, ovate 3–9-costate. *Flowers* solitary, or few and subracemose. *Perianth* segments 4, lanceolate, many-nerved. *Stamens* subhypogynous, filaments very short, more or less connate in a ring; anthers linear, erect, connective produced in a very long linear-lanceolate erect appendage. *Ovary* free, compressed; stigma small, sessile, pointed; ovules 2 or more, erect, funicles long or short. *Capsule* ovoid or oblong, compressed, few-seeded. *Seeds* erect, ovoid or oblong, terete, grooved, beaked; funicle bearded; testa thick.—Species 4 or 5, Malayan and Australian.

1. **S. tuberosa**, *Lour. Fl. Coch.* 490; stem twining leafing and flowering at the same time, leaves opposite or whorled rarely alternate, perianth 1½–2 in. long. S. gloriosoides, *Voigt Hort. Suburb. Calcutt.* 650. Roxburghia gloriosoides, *Jones in Roxb. Cor. Pl.* 1. 26, t. 32; *Fl. Ind.* ii. 234; *Wall. Cat.* 5156; *Fl. des Serres*, ii. t. 22. R. Gloriosa, *Peers. Syn.* 1. 412. *Bot. Mag.* t. 1500. R. Stemona, *Steud. Nom.* ii. 475. R. viridiflora, *Smith Exot. Bot.* i. 111, t. 57; *Wall. Pl. As. Rar.* iii. 49, t. 282; *Griff. Notul.* i. 29, 31; *Ic. Pl. Asiat.* t. 12–16, 62, f. 2.

BENGAL, SILHET, CHITTAGONG, ASSAM, and the NORTHERN CIRCARS.—DISTRIB. China.

Root of cylindric tubers 6–12 in.; stem woody below, branches terete. *Leaves* 4–10 in., broadly ovate-cordate, acuminate membranous, shining; petiole 1½–2 in. *Peduncle* 1–2 in., usually 2-fld.; bracts small, lanceolate; flowers erect, fetid. *Perianth* spreading and revolute; segments lanceolate, acuminate, greenish with many purplish nerves. *Stamens* very large, erect; filaments stout, red, deeply grooved in front with crenulate margins; connective linear-lanceolate, green; anthers linear, adnate to the face of the connective at its base; endothecium becoming free and produced beyond the cells into a subulate point, pollen between waxy and flowery. *Capsule* 1½ in., ovoid-oblong, 5–8-seeded.

2. **S. minor**, *Hook. f.*; stem twining leafing and flowering at the same time, leaves 1½–3 in. alternate, perianth ¾–1 in. long. Roxburghia gloriosoides *var.* minor; *Thwaites Enum.* 432. R. gloriosoides, *Wight Ic.* t. 2061.

MALABAR; on the Pulicat Hills (?Paulghat) *Wight*. CEYLON; at Trincomalee, *Glenie*.

Smaller in all its parts than *S. tuberosa*, the leaves 1½–3 in. long, and much broader at the base; capsule ½ in. long.

3. **S. Curtisii**, *Hook. f.*; stem twining leafing and flowering at the same time, leaves 4–5 in. alternate, flowers unisexual? perianth about ¾ in. long.

PENANG; near the Waterfall, *Curtis*.

In habit and forms of leaf this resembles *S. tuberosa*, but the leaves are alternate, the petiole very long and slender, and the small flowers appear to be unisexual.

Of these I have examined three; one is male with the four stamens sessile on a short narrow androphore, the other female, with apparently imperfect stamens.

4. **S. Griffithiana,** *Kurz in Journ. As. Soc. Beng.* xlii. pt. ii. (1873), 109, t. 10; stem erect flowering before leafing. *Gen. Nov. Griff. Journ.* 149.

BURMA; Ava, Martaban and Pegu; *Griffith, Kurz.*

Rootstock stout, hypogæous. *Leaves* (of *R. tuberosa*), 3–5 in., ovate; petiole 3–5 in. *Stem* 3–6 in. *Flowers* greenish or dull purple; bracts ¼–½ in., lanceolate; pedicels 1 in., strict; perianth-segments 1 in., linear-lanceolate, acute. *Stamens* 4, filaments broad, purple; anthers yellow, cuspidate. *Ovary* 1-celled, ovules 6. *Capsule* ½ in., 2-valved, 3–4-seeded, seeds furrowed, aril small white.—I have seen four flowers only.

2. STICHONEURON, *Hook. f.*

An erect rigid glabrous or minutely hairy herb; rootstock creeping; roots fibrous; stem erect, angular, sparingly branched. *Leaves* subsessile, subdistichous, linear-oblong, pinnately 3–5-nerved. *Peduncles* axillary, filiform, rigid, lying close on the midrib of the leaf, bearing a subracemose cluster of very minute pedicelled greenish flowers, bracts setaceous. *Perianth*-campanulate 4-fid; lobes ovate, subequal, valvate. *Stamens* 4, united to the bases of the lobes; anther-cells short, diverging. *Ovary* half inferior, top convex; ovules numerous, pendulous from the top of the cell, funicles very short. *Fruit* unknown.

S. membranaceum, *Hook. f. in Herb. Ind. Or.* Colpopodeum, Wall. mss. in Herb. Griffith.—Indeterminata, *Wall. Cat.* 9110.

KHASIA MTS.; alt. 4–5000 ft. WALLICH, GRIFFITH, &c. Bengal, at LUCKIPORE, *J. D. H & T. T.*

Stem 1–2 ft. *Leaves* 3–6 by 1½–2½ in., membranous, caudate-acuminate; nervules transverse, parallel; petiole of flower ¼ in. *Peduncles* ¾–1 in., stiff; pedicels ¼ in.; flowers $\frac{1}{16}$ in., yellow.—I follow Bentham in placing this curious plant in *Roxburghiaceæ*, from which it differs in the nervation of the leaves. Until its fruit is known its position is doubtful. The order itself is heterogeneous, *Stemona* and *Croomia* being sectionally different, and both might well rank as sections of the composite Order *Liliaceæ*.

ORDER CLVI. LILIACEÆ.

Herbs rarely shrubby or subarboreous, with fibrous roots, or creeping rootstocks, bulbs, or corms. *Leaves* various. *Flowers* bisexual, rarely unisexual. *Perianth* herbaceous or petaloid, 6-merous in 2 series, rarely 4–8 or 10-merous, imbricate rarely valvate in bud. *Stamens* 6, rarely 3 or fewer, filaments free or connate; anthers oblong or linear, often versatile. *Ovary* 3-celled, style 1 often long, rarely 0 or 3; ovules 2 or more in the inner angles of the cells, anatropous, rarely orthotropous. *Fruit* a 3-rarely 1-celled 1-or more seeded capsule or berry. Seeds globose or flattened; testa various; embryo small, terete, surrounded by the horny or fleshy albumen.—Genera 187, species about 2500; in all climates and countries.

Muscari bootanense, Griff. Itin. Notes, 242; *Notul.* iii. 242; & Ic. Pl. Asiat. t. 280; (Baker in Journ. Linn. Soc. xi. 414), is an Affghan plant, as stated in the

Notulæ, and no doubt *bootanense* is a misprint for *boolanense*, the plant being found near the Boolan pass.

Series A. *Rootstock* not bulbous. *Anthers* bursting inwards. *Fruit* a berry.

Tribe I. SMILACEÆ. Shrubs. *Stem* climbing. *Leaves* 3–5-nerved and reticulately-nervuled, petiole often cirrhiferous. *Flowers* small, in umbels. *Anthers* after dehiscence 1-celled. *Ovules* few, orthotropous or ½-anatropous.

Perianth 6-partite . . . . . 1. SMILAX.
Perianth ovoid or tubular, mouth very minute . . . . 2. HETEROSMILAX.

Tribe II. ASPARAGEÆ. *Stem* erect or climbing. *Leaves* replaced by usually linear or acicular cladodes. *Flowers* small, solitary, fascicled or racemed. *Anthers* distinctly 2-celled. *Ovules* few, orthotropous or ½-anatropous. 3. ASPARAGUS.

Tribe III. POLYGONATEÆ. *Stem* herbaceous; unbranched, leafy. *Flowers* axillary or in terminal racemes or panicles.

Flowers axillary; perianth cylindric, lobes short . . . 4. POLYGONATUM.
Flowers axillary; perianth rotate . . . . . 5. STREPTOPUS.
Flowers in terminal racemes or panicles; perianth 6-partite . 6. SMILACINA.

Tribe IV. CONVALLARIEÆ. Scapigerous herbs. *Leaves* radical. *Scape* lateral, naked, bearing a unilateral raceme or spike. *Stigma* small.

Perianth subglobose, 6-partite . . . . . 7. THEROPOGON.

Tribe V. ASPIDISTREÆ. *Rootstock* very stout, creeping, stem very short. *Leaves* radical, coriaceous. *Scape* very short, axillary. *Flowers* solitary or spicate. *Perianth* subglobose fleshy. *Fruit* a berry.

Stigma large, peltate; spike many-fld. . . . . 8. TUPISTRA.
Stigma small, 3-lobed; spike erect, many-fld. . . . . 9. GONIOSCYPHA.
Stigma large, peltate, flower solitary . . . . . 10. ASPIDISTRA.

Series B. *Rootstock* stout or a bulb. *Leaves* radical or cauline. *Anthers* dorsi- or basi-fixed. *Ovules* anatropous. *Fruit* usually loculicidal.

Tribe VI. HEMEROCALLEÆ. *Leaves* linear, radical. *Flowers* large, panicled racemed or spicate. *Perianth* cylindric or funnel-shaped. *Filaments* inserted in a dorsal pit of the anther. *Ovules* numerous.

Flowers panicled, erect; perianth funnel-shaped . . . 10*. HEMEROCALLIS.

Tribe VII. DRACÆNEÆ. *Leaves* radical or on an erect woody caudex. *Perianth* cylindric funnel-shaped or campanulate. *Anthers* basifixed or dorsifixed, filaments not inserted in a pit. *Fruit* a berry.

Ovary with the cells 1-ovuled . . . . . 11. DRACÆNA.
Ovary with the cells many-ovuled . . . . . 12. CORDYLINE.

Tribe VIII. ASPHODELÆ. *Rootstock* short, or a bulb. *Flowers* racemed or panicled. *Perianth* segments distinct. *Capsule* loculicidal (berried in *Dianella*).

Flowers racemed. Ovarian cells 2-ovuled; capsule 3-angled 13. ASPHODELUS.
Flowers racemed. Ovarian cells 4–6-ovuled; capsule 3-winged 14. EREMURUS.
Flowers racemed. Ovarian cells 4–6-ovuled; capsule 3-winged 15. CHLOROPHYTUM.
Flowers in panicled cymes. Fruit a berry . . . . 16. DIANELLA.

Tribe IX. ALLIEÆ. *Rootstock* in the Indian genus a bulb. *Scape* simple; flowers umbellate or capitate, at first enclosed in a spathaceous involucre. *Capsule* loculicidal.

Strong-scented herbs. Perianth rotate . . . . . 17. ALLIUM.

Tribe X. SCILLEÆ. *Rootstock* a bulb. *Scape* simple, naked; flowers racemose not involucrate; bracts at the base of the pedicels small.

Perianth 6-lobed, tubes cylindric, outer lobes spreading, inner erect 18. DIPCADI.
Perianth campanulate, 6-partite; ovules many; seeds flattened 19. URGINEA.
Perianth 6-partite. Seeds subglobose . . . . . 20. SCILLA.

Tribe XI. TULIPEÆ. *Rootstock* a bulb. *Stem* erect with one or more leaves. *Flowers* few, large, solitary or racemed. *Perianth* segments distinct. *Capsule* loculicidal (in the Indian species).

Flowers large, nodding or pendulous; anthers versatile . . 21. LILIUM.
Flowers large, nodding or pendulous; anthers basifixed erect . 22. FRITILLARIA.
Flowers 1–2, small, suberect, anthers basifixed . . . 23. LLOYDIA.
Flowers large, solitary or few, erect or suberect . . . 24. TULIPA.
Flowers small, subumbellate, suberect . . . . . 25. GAGEA.

Series C. *Rootstock* a corm or bulb, or short. *Leaves* radical or radical and cauline. *Anthers* dehiscing extrorsely or introrsely. *Ovules* anatropous. *Capsule* usually septicidal.

Tribe XII. COLCHICEÆ. *Rootstock* a tunicate corm. *Leaves* all radical. *Scape* very short, hypogæous, flowers 1–3. *Perianth*-tube very long. *Anthers* dorsifixed, narrow, dehiscence introrse.

Perianth-tube entire; styles 3 . . . . . 26. COLCHICUM.
Perianth-tube of the twining claws of the segments; styles 3 . 27. MERENDERA.

Tribe XIII. ANGUILLARIEÆ. *Rootstock* a tunicate corm. *Stem* 1-or more leaved. *Anthers* dehiscing extrorsely. *Styles* 3 . 28. IPHIGENIA.

Tribe XIV. NARTHECIEÆ. *Rootstock* short, creeping. *Stem* usually leafy. *Leaves* often distichous. *Perianth* persistent. *Anthers* subbasifixed, dehiscence sublateral. 29. TOFIELDIA.

Tribe XV. UVULARIEÆ. *Rootstock* tuberous or creeping. *Stem* leafy. *Leaves* not sheathing. *Flowers* axillary. *Anthers* dehiscing extrorsely.

Stem twining. Leaves cirrhose. Capsule loculicidal . . . 30. GLORIOSA.
Stem erect. Capsule septicidal . . . . . 31. TRICYRTIS.
Stem erect. Fruit a berry . . . . . 32. DISPORUM.

Tribe XVI. MEDEOLEÆ. *Rootstock* short or creeping. *Stem* simple.

Leaves radical or whorled. *Flowers* solitary or umbelled. *Anthers* dehiscing extrorsely.

Leaves radical or subradical; flowers solitary or umbelled . .	33. CLINTONIA.
Leaves 3 in a whorl; flowers solitary	34. TRILLIUM.
Leaves 4 or more in a whorl	35. PARIS.

1. SMILAX, *Linn.*

Climbing shrubs (rarely erect herbs). *Leaves* alternate, rarely opposite, persistent, 3–5-nerved and reticulate; petiole usually 2-cirriferous above the base. *Flowers* dioecious,s mall, umbelled. *Perianth* segments 6, free, incurved or recurved. MALE FL. *Stamens* 6, or more, at the base of the perianth, free; anthers didymous, oblong, or the cells separated by a forking of the filament. FEM. FL. *Staminodes* 3 or 6. *Ovary* 3-gonous, 3-celled; style 0, or short, stigmas 3, stout, recurved; ovules 1 or 2 in each cell, orthotropous, pendulous. *Fruit* a globose berry. *Seeds* solitary, or more often 2 hemispheric, rarely 3; albumen horny; embryo small.—Species about 180, temperate and tropical.

The only authoritative nomenclature for most of the Indian species of *Smilax* is the great Herbarium of Wallich, in which these are copiously represented, but in several cases almost inextricably mixed. When to this is added the wide differences between the foliage and inflorescence of different parts of the same specimen, and the frequent difficulty of matching males with females and flowering with fruiting specimens, it is obvious that much confusion must attend any attempt to systematize the species upon any but very complete materials, and such do not exist in any Herbarium. Unfortunately Kunth, when monographing the genus for his "Enumeratio Plantarum," and M. A. De Candolle for his monograph, had not access to Wallich's Herbarium,and had recourse to duplicates distributed from it to various European Herbaria, which were invariably fragmentary and often wrongly numbered. A study of the Wallichian types has hence obliged me to set aside various determinations of these excellent botanists. Nor can I follow M. De Candolle in his primary and other divisions of the genus. These are founded on the one- or two-ovuled cells of the ovary, and on the inflorescence. That of the ovarian cells is very difficult of observation, is unavailable in the absence of fem. fl., it does not tally with habit or other characters, and I doubt its constancy. That of the inflorescence wants precision, and, as it appears to me, also confirmation by a study of the whole plant, and that it cannot be established on fragments. I am far, however, from regarding it as valueless because I have been unable to understand and apply it. The arrangement I have adopted is, I think, natural, though far from satisfactory. I have restricted the citations of authors to such as I feel pretty sure of; and, as with so many other Indian genera, I find that any attempt to determine the identity of the species with the insufficient descriptions of the authors of the Malayan Floras is hopeless.

Sect. I. COILANTHUS. *Buds* globose. *Sepals* incurved in flower. *Stamens* much shorter than the perianth. *Ovules* (when known) solitary in the ovarian-cells.

1. **S. glabra,** *Roxb. Fl. Ind.* iii. 792; leaves 3–6 by 1¼–2¼ in. elliptic- or ovate-lanceolate acuminate 3-costate, petiole ½–⅔ in., sheath ½–⅔ in. long axillary, umbels sub-sessile. *Wall. Cat.* 5114; *Benth. Fl. Hongk.* 369; *Seem. Bot. Herald. Voy.* 420, t. 100; *A.DC. Monogr. Smilax,* 60. S. Hookeri, *Kunth Enum.* v. 162 (*excl. syn. Burm. & Lour.*).

ASSAM, SILHET and the lower KHASIA HILLS, *Wallich,* &c. TENASSERIM, *Gallatly.*—DISTRIB. China.

Branchlets slender, terete, smooth, unarmed. *Leaves* rather thin, 3-costate to the rounded or cuneate base; petiole narrowly sheathing, unarmed, cirrhi very slender. *Umbels* many-fld.; peduncle ebracteate; pedicels ¼–½ in.; bracteoles subulate; flowers very small, white; buds depressed-globose, deeply 6-lobed from the groove on the back of the obovate cucullate coriaceous sepals; petals minute; stamens very short; staminodes in fem. fl. 3.—There is an excellent figure of this in Roxburgh's collection of drawings. That author describes the leaves as white beneath, but this is not obvious in herbarium specimens. The roots are nodose, as in the "China-root."

2. **S. calophylla,** *Wall. Cat.* 5131; leaves 4–6 by ¾–1½ in. oblong-lanceolate acuminate 3-costate glaucous beneath base acute, petiole ¼–½ in., sheath obscure, umbels few-fld. sessile on an axillary rachis, pedicels decurved. *A.DC. Monogr. Smilax*, 60.

SINGAPORE and PERAK, *Wallich, Cantley, Wray, King's Collector*; summit of Mt. Ophir, *Hullett.*

Branchlets strict, terete, or slightly grooved, unarmed. *Leaves* opaque, costa stout, reticulations faint; petiole jointed about the middle. *Flowering branches* 1–4 in., erect, slender, with a lanceolate bract above the base; umbels 3–4, 1 in. or more apart; pedicels $\frac{1}{10}$–¼ in., unequal; male fl. globose, about $\frac{1}{6}$ in. diam.; sepals deltoid, fleshy, concave, deeply grooved down the back; petals small, flat; anthers sessile round a circular disk, deltoidly ovate, cuspidate. *Berries* ⅓ in. diam., red. Fem. fl. not seen.

3. **S. peguana,** *A.DC. Monogr. Smilax*, 62; leaves 1½–3 by ⅝–1⅛ in. elliptic oblong or ovate-oblong 5–7-costate white beneath, base acute or cuneate, petiole ⅛–⅜ in., sheath very obscure, male umbels axillary very shortly peduncled many-fld., pedicels very short, anthers subsessile.

BURMA, *Griffith* (*Kew Distrib.* 5424); Taipo hills, *Brandis*; Moolyet, alt. 5000 ft., *Gallatly.*

Branchlets slender, terete, unarmed. *Leaves* shining above, laxly reticulate on both surfaces; petiole twisted, terete. *Peduncle* rarely longer than the petiole; bracteoles minute, broadly ovate; pedicels ⅛ in.; flowers $\frac{1}{16}$ in. diam.; male sepals ovate, concave, coriaceous, not channelled on the back; petals very small, oblong, obtuse; anthers broad; filaments very short.—The specimens are few and not in good state. Griffiths No. 5424, referred by A.DC. to *hypoglauca*, is certainly *peguana.*

4. **S. myosotiflora,** *A.DC. Monogr. Smilax*, 65; branches slender terete, leaves oblong-ovate caudate-acuminate 3-costate, petiole short, sheath very narrow, peduncles short axillary solitary compressed, male fl. subsessile, anthers minute sessile. S. extensa, *Wall. Cat.* 5126 A.

PENANG, *Porter.* PERAK, *Wray, King's Collector.*—DISTRIB. Java.

Branches very smoth, unarmed. *Leaves* 5–7 by 2–2¾ in., thin when dry, translucent when fresh, nervules very delicately closely reticulate, base cuneate rounded or subcordate; petiole ½ in., cirrhi slender. *Male* peduncle ¼ in.; flowers ⅛ in. diam., subcapitate, rather fleshy; sepals broadly oblong, incurved; petals narrow; anthers ovoid. *Berries* ¼ in. diam., 1-seeded; fruiting peduncles ½–1 in.; pedicels ¼–⅓ in.—The male flowers of Javan specimens are a good deal larger than the Indian. Fem. fl. not seen. Wallich's *S. extensa* being a mixture I have retained De Candolle's name for this; his specimen of this had neither flower nor fruit.

Sect. II. EUSMILAX. *Buds* oblong or clavate. *Sepals* and *petals* recurved in flower. *Ovules* one or two in the ovarian cells.

* *Flowers* very small or minute. *Sepals* $\frac{1}{10}$–⅛ in. long. *Stamens* much shorter than the sepals; staminodes 1–3.

† *Branches and branchlets acutely angled.*

5. **S. rigida,** *Wall. Cat.* 5120; leaves ½–1¼ by ⅓–¾ in. subsessile orbicular-ovate or ovate-cordate faintly 3-costate, umbels 1–4-fld., sepals elliptic oblong, petals rather narrower 4–5 times longer than the stamens. *Kunth Enum.* v. 164; *A.DC. Monogr. Smilax*, 105. S. Wallichii, *Steud. Nomencl.* (*not of Kunth*).

EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 7–10,000 ft.; Bhotan, *Griffith.*

A small erect much branched shrub with small coriaceous leaves, dwarf and densely leafy at high elevations, branches acutely angled, prickles few small; branchlets slender, distichous. *Leaves* obtuse acute or apiculate base, rounded or cordate, rarely acute; petiole decurrent on the branchlets, with 2 minute deciduous setæ (cirrhi ?), jointed at the top. *Peduncle* short, ⅛–½ in.; bracts lanceolate, taper-pointed, persistent, laciniate or ciliate; pedicels unequal; perianth cupular; male flowers very small; sepals and petals membranous; anthers minute didymous; fem. fl. rather larger, staminodes 3; ovary subglobose, stigmas sessile. *Berries* ⅓–¼ in. diam., black.—Closely allied to *S. myrtillus*, and next to which A.DC. places it though regarding it as most nearly allied to *S. ferox.*

6. **S. Myrtillus,** *A.DC. Monogr. Smilax*, 106; leaves 1–1½ in. ovate acuminate membranous faintly 3-costate base acute or rounded, petiole $\frac{1}{10}$–⅛ in., articulate above the thickened broad base, peduncle few-fld. and pedicels very slender, sepals and petals subequal oblong three or four times as long as the stamens.

KHASIA HILLS, *Griffith*, alt. 4–6000 ft., *J. D. H. & T. T.* NAGA HILLS, alt. 7000 ft., *Clarke.*

Closely allied to *S. rigida*, which it represents in the Khasia, but a more slender plant, with larger more ovate acuminate leaves, more slender short or long peduncled pedicels, and longer but still very short petioles that have a setiform process on each side as in that plant. *Berries* ¼–⅓ in. diam., black, 2–3, seeded, on slender pedicels.—The Bhotan plant referred here by De Candolle is, I think, certainly *S. rigida*, which is a more alpine species, unknown in the Khasia.—The staminode was solitary in several flowers that I examined.

†† *Branches and branchlets terete or nearly so.*

7. **S. parvifolia,** *Wall. Cat.* 5118; leaves 1–3 in. ovate or ovate-cordate or lanceolate acute or acuminate 3–5-costate often glaucous beneath, base rounded or cordate, petiole $\frac{1}{12}$–⅛ in. very slender sheathing half way up or more, male umbels few-fld., peduncles and pedicels very slender, bracteoles minute, sepals linear-oblong, petals much narrower, filaments very short. *Kunth Enum.* v. 163. S. elegans, *A.DC. Monogr. Smilax*, 107; *Wall. Cat.* 5117 B. S. glaucophylla, *Klotzsch in Reise Pr. Wald. Bot.* 45, t. 91.

TEMPERATE HIMALAYA, alt. 5–8000 ft., from Kashmir eastwards. The KHASIA HILLS, alt. 6000 ft.

Branches very slender, stiff, terete, smooth, unarmed; branchlets sometimes furrowed, often zigzag. *Leaves* very variable in size and shape, acuminate, thin, highly reticulate; petiole very short, jointed at the top; sheath often cirrhose. *Peduncles* and *pedicels* ⅛–¼ in., capillary, the former often thickened and flat in fruit. *Umbels* few- or many-fld.; bracteoles lanceolate, very short; flowers minute; sepals and petals ovate-lanceolate; filaments very short; anthers didymous; ovary ovoid, 1–3-celled, staminodes 1–3. *Berries* ¼–⅓ in. diam.—A very common and variable Himalayan plant.—The name *parvifolia* though appropriate for Wallich's and other specimens is for others delusive.

8. **S. vaginata,** *Decne. in Jaquem. Voy. Bot.* 169, t. 169; leaves ⅔–1¼ in. elliptic-ovate or cordate obtuse acute or mucronate 5–7-nerved, petiole ⅓–¾ in. very slender narrowly sheathing for ¼ to ½ its length, sepals and petals subsimilar oblong much longer than the stamens. *A.DC. Monogr. Smilax*, 109.

WESTERN HIMALAYAS; from Kashmir to Kumaon, alt. 6–9000 ft., *Falconer, Jacquemont, Thomson.* UPPER ASSAM; Naga hills, alt. 9000 ft., *Clarke.*

A slender diffuse unarmed shrub, branches white, smooth, terete. *Leaves* membranous, cuneate or subcordate at the base; petiole jointed below the top. *Peduncles* and *pedicels* very slender; male umbel many-fld., fem. 1-fld.; flowers purplish; bracteoles 0.—De Candolle says of this manifestly allied to *S. parvifolia* (his *S. elegans*), differing in the petiole articulate below the limb without cirrhi, and stami-nodes 6. The habitats he gives of Hyderabad, alt. 4000 to 6500 ft., cannot apply to the city of that name in the Deccan.

9. **S. longebracteolata,** *Hook. f.*; stems slender, branches terete, leaves 2½–3½ in. ovate-cordate acuminate 5-costate, petiole 1 in. narrowly sheathing for half its length, tips of sheaths acute, umbels long peduncled, bracteoles subulate rigid ½–¾ as long as the pedicels, sepals and rather narrower petals of male linear oblong, stamens very short. S. elegans, *var.* major, *A.DC. Monogr. Smilax*, 107.

KHASIA HILLS; at Myrung, alt. 5–6000 ft., *J. D. H. & T. T.*

Branches terete, quite smooth, rather slender. *Leaves* thin, finely reticulated; petiole articulate at the top ?, sheathing portion coriaceous, margins recurved, tips cuspidate, recurved, cirrhi inserted above the cusps. *Male umbels* small, few-fld., shortly peduncled, pedicels ⅛ in.; bracteoles shorter than in the fem., subulate; sepals $\frac{1}{10}$ in.; fem. peduncles naked at the base, inserted a little above the axil of the leaf; pedicels ¼–½ in.; sepals lanceolate, acuminate; petals narrower; stigmas very short.—The larger leaves and long rigid bracteoles of the fem. umbels distinguish this from *S. parvifolia* and *minutiflora.*

10. **S. minutiflora,** *A.DC. Monogr. Smilax*, 109; branches slender terete or grooved, leaves 2½–4½ by ⅔–1¼ in. ovate-lanceolate or linear-oblong acuminate membranous 3–5-costate base obtuse rounded or subacute, petiole ½–⅔ in., sheath oblong ⅓ of its length narrowed upwards, male umbels many-fld., sepals and petals subequal lanceolate 3–4 times longer than the stamens, fem. umbels very few-fld., peduncle very long slender.

SIKKIM HIMALAYA, alt. 6–9000 ft., *J. D. H.* KHASIA HILLS, *Griffith.*

Branches strict, woody, unarmed, smooth; scales at the base of the flowering branches ¼–½ in. long. *Leaves* pale beneath, nervules laxly reticulate; petiole articulate below the limb, cirrhi 0. *Peduncle* of male umbel slender; pedicels ¼–½ in.; buds globose. *Berries* ¼ in. diam., black.—"Differs from *S. vaginata* in the more acute or acuminate leaves, and shorter petiole; from *S. parvifolia* in the nerves of the leaf descending into the petiole before reaching the joint," *A.DC.*; I doubt its being anything but *parvifolia.*

11. **S. elegans,** *Wall. Cat.* 5117 A; branches slender terete, leaves 2–3 in. ovate or ovate-cordate acute or acuminate thin 5-costate, petiole ⅓–½ in. sheathing half way up or more, male and fem. peduncles and pedicels capillary, umbels few-fld., sepals ovate-oblong, petals obovate, anthers subsessile, ovary globose. S. menispermoidea, *A.DC. Monogr. Smilax*, 108.

TEMPERATE HIMALAYA; Kumaon and Nepal, *Wallich*; Sikkim, alt. 7–11,000 ft., *J. D. H., Clarke.*

A small shrub; branches and branchlets quite smooth, unarmed. *Leaves* variable

in breadth ; sheath of petioles of old leaves ½–1 in., axillary branches with a recurved basal scale, cirrhi slender. *Peduncles* 1–1½ in. long ; male flowers 4–6, ¼–⅓ in. diam. ; bracteoles minute, subulate ; fruiting peduncles strict, slender, 1–1½ in. ; receptacle minute, pedicels ¼–¾ in, ; ovary with 2 (? 2-3) stigmas recurved from the base. *Berries* ¼ in. diam., blue-black ; seeds 2–3, small, obtusely angled.—The broad thin leaves and long sheaths of the petioles best distinguish this from *parvifolia*.

** Flowers large or small ; sepals rarely less than ⅛ in. long. Stamens equalling or longer than the sepals ; rarely ¼ shorter.

† Umbels many spicate on an axillary peduncle.

12. **S. aspera,** *Linn. Sp. Pl.* 1028 ; leaves 1½–6 in. ovate deltoid or lanceolate base hastate or cordate, sepals linear-oblong, petals rather narrower, anthers linear shorter than the filaments. *Reichb. Ic. Fl. Germ.* x. t. 428 ; *A.DC. Monogr. Smilax*, 163 (*vars.* genuina, Perrottetiana and maculata). S. maculata, *Roxb. Fl. Ind.* iii. 796 ; *Wall Cat.* 5113 ; *Royle Ill.* 384 ; *Kunth Enum.* v. 218 ; *Wight Ic.* t. 2059 ; *Thwaites Enum.* 338 (*excl. syn. Villandia*). *Boiss. Fl. Orient.* v. 343. S. fulgens, *Wall. Cat.* 5122. S. nilagarensis, *Steud. Pl. Exsicc. Hohen. n.* 952.

Throughout India, from KASHMIR, alt. 4–7000 ft., to the KHASIA HILLS, and southward to TRAVANCORE, alt. 4–7000 ft., and CEYLON ; ascending to 5000 ft.—DISTRIB. Syria, S. Europe, N. Africa.

A large shrub, branches armed or not. *Leaves* usually blotched with white, 5–9-nerved, acute or acuminate, basal lobes rounded or oblong ; petiole ½–⅔ in. and nerves beneath often prickly ; cirrhi usually long. *Spikes* 2–6 in. ; rachis slender smooth, umbels many-fld., bracteoles minute ; flowers white, sweet scented, buds longer than the pedicels ; male sepals ⅛ in. long, fem. rather smaller ; staminodes 6 ; stigmas oblong, recurved. *Berries* ¼–⅓ in., blueish, usually 3-seeded.

†† Umbels solitary binate or panicled on a common peduncle.

§ Branches rough hispid or granulate.

13. **S. aspericaulis,** *Wall. Cat.* 5129 ; branches terete scabrid, leaves 2–8 by 2–3 in. oblong or linear-oblong thin 3-costate from above the base tip rounded or clawed, petiole ½–1 in. narrowly sheathing below the middle, male sepals ¼ in. linear-oblong, petals very narrow, stamens as long as the sepals. *A.DC. Monogr. Smilax*, 195. S. Roxburghiana, *Wall. Cat.* 5115, *in part.* ? S. odoratissima, *Blume.*

SIKKIM HIMALAYA, alt. 1–3000 ft., *J. D. H.* (6000 ft., *King*). The KHASIA HILLS and BURMA, *Wallich*, &c. ANDAMAN ISLANDS, *Kurz.* PERAK, *King's Collector.*

Branches unarmed or aculeate, sometimes closely. *Leaves* rounded or cuneate at the bases. *Umbels* many-fld., solitary or 2–3 on a common peduncle ¼ in. long, partial peduncle as long ; buds clavate ¼ in. long ; bracteoles obsolete ; fem. recept. globose ; pedicels ¼ in. ; fem. fl. not seen. *Berries* nearly ¼ in. diam.—If this is Blume's *S. odoratissima* that is the earliest name.

14. **S. barbata,** *Wall. Cat.* 5125 ; branches very stout terete densely bristly, leaves 6–10 in. long and broad elliptic or orbicular-cordate coriaceous cuspidate 7-costate from above the base, petiole very stout, base sheathing and bristly, umbels very long-peduncled. *A.DC. Monogr. Smilax*, 196. S. setosa, *Miq. Fl. Ind. Bat. Suppl.* 610.

SINGAPORE, *Wallich, Hullett.*—DISTRIB. Banca.

Leaves coarsely reticulate, white beneath ; petiole 1–1½ in. ; male umbels very

many-fld., solitary and bracteate towards the base or two on a long common peduncle, special peduncles 2–3 in., very slender; pedicels ⅜ in.; bracteoles small, ovate; male fl. ¼ in. diam., sepals oblong-lanceolate, obtuse; petals very narrow; staminodes of fem. fl. 6; ovary oblong; stigmas very long, free to the base, revolute; ovules solitary (or 1–2 in one cell solitary in the others?).

15. **S. Kingii,** *Hook. f.*; branches very stout granulate, leaves 5–10 in. orbicular-ovate or elliptic and very large cymbiform petiolar sheaths thickly coriaceous 5–7-costate from the base, petiole 2–3 in.; umbels 1–3 on a very short common peduncle, partial peduncles 1–3 in., pedicels 1½–2 in., sepals ⅓ in. long.

MALAYAN PENINSULA; Perak, *King's Collector.*

Stem 40 ft.; branches angular, lower as thick as the little finger with many conical spines ¼ in. long. *Leaves* very smooth on both surfaces; nerves obscure, immersed; petiole as thick as a goosequill; sheath cymbiform of lower leaves with sometimes large spines; cirrhi very stout. *Fem. fl.* sepals broadly oblong-lanceolate, obtuse; petals very narrow; staminodes 3; ovary oblong; style one-third as long, stigma much longer than the style. *Berry* 1 in. diam. Male fl. not seen.

16. **S. pallescens,** *A.DC. Monogr. Smilax*, 198; branches terete granulate, leaves 5–10 by 2–3½ in. narrowly oblong tip rounded and broadly caudate thin pale 5-costate from the rounded or subacute base, petiole ⅔ in. obscurely sheathing articulate at the middle.

UPPER ASSAM; in the Mishmi hills, *Griffith.*

The solitary specimen of this fine species consists of a branch with leaves and male racemes with a solitary flower. The branch is unarmed, not scabrid like *aspericaulis*, and hardly warted as described by De Candolle, but granulate; the racemes are very slender, 2–5 in. long, white, the umbels 1–3-nate, peduncles ¼–⅔ in. divaricate, the bracts are all gone.—I have seen no flowers. Griffith describes them as greenish-brown spotted with red, and with white anthers.

§ Branches smooth, usually aculeate.

a. Umbels solitary rarely 2-nate; peduncle bracteate or not below the middle.

17. **S. ferox,** *Wall. Cat.* 5119; branches stout aculeate, leaves 2½–3½ by 1–2 in. elliptic or ovate- or obovate-oblong acute or mucronate rigid 3–5-costate base cuneate or rounded, petiole ¼ in. broad coriaceous sheathing tumidly for half its length, sepals and petals oblong subequal, stamens 6–9 one-third shorter than the sepals. *A.DC. Monogr. Smilax*, 103. S. China, *Maxim. Dec.* v. 172 (*the Indian plant*). S. Thomsoniana, *A.DC. l. c.* 104.

EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim alt. 5–8000 ft. *J. D. H.* BENGAL, *Griffith* (*Kew distrib.* 5440). MUNNIPORE, Watt.—DISTRIB. Tonkin.

A stout shrub; branches strongly prickly, terete, branchlets unarmed, angled. *Leaves* epunctate and elmeolate, marginal nerves very slender, nervules faint; petiole jointed at the sheath. *Umbels* from the young shoots only, of which the leaves are membranous subglaucous beneath; peduncles rather stout, solitary, rarely 2-nate, ¼–¾ in. long or shorter; bracteoles ovate, acuminate sepals ⅛–⅙ in. long, ovate-oblong; petals similar; staminodes 3; ovary oblong, short styles, stout. *Berries* ⅓ in. diam., 1–2-seeded.—The stamens are certainly sometimes 9 in Sikkim specimens. De Candolle remarks on the close affinity of this with the "China," *Sm. China*, which he refers to sect. *Nemexia*, having 2-ovuled cells of the ovary; he further distinguishes *S. ferox* by the leaves not cuneate at the base, which, however, they sometimes are. I find no characters whereby to distinguish *S. Thomsoniana* as a variety.

18. **S. lævis,** *Wall. Cat.* 5116; unarmed, leaves 4–6 by 1–2 in. lanceolate or ovate-lanceolate acuminate 3–5-costate from or above the acuminate or cuspidate base, petiole ½–⅔ in. shortly sheathing, umbels solitary; peduncle bracteate below the middle much longer than the petiole. *A.DC. Monogr. Smilax*, 56. S. oxyphylla, *Kunth Enum.* v. 239 (*the Penang plant of Wallich*).

PENANG, *Wallich, Curtis,* &c. MALACCA; Mt. Ophir, *Griffith,* PERAK, alt. 3–4000 ft., *King's Collector.*—DISTRIB. China.

Branches slender, terete, smooth. *Leaves* jointed suddenly at the narrowed base, finely reticulate. *Peduncle* ¾–1 in.; pedicels of male fl. very short; bracteoles obsolete; flowers ⅛ in. diam.; sepals linear-oblong; petals very narrow; stamens nearly as long as the sepals; staminodes 3; stigmas large recurved. *Berries* small, ¼ in. diam., fruiting pedicels ½ in., very slender.—The Mt. Ophir specimens (var. *ophirense,* A.DC.) have very strongly reticulated leaves.

19. **S. lanceæfolia,** *Roxb. Fl. Ind.* iii. 792; leaves 4–6 by 1½–3 in. orbicular- oblong- or oblong-lanceolate acuminate 3-costate base acute, petiole ½–¾ in., sheath obscure, male umbels subsessile very many-fld., peduncles naked shorter than the petioles. *Wall. Cat.* 5132; *A.DC. Monogr. Smilax*, 57. S. micropoda, *A.DC. l. c.* 58.

SIKKIM HIMALAYA, alt. 4–7000 ft. The KHASIA, NAGA and MUNNIPORE HILLS, *Clarke, &c.* BURMA, in the Shan States.—DISTRIB. China.

Branches slender, subterete, prickles few or 0. *Leaves* membranous, subcaudate, intra-marginal nerves very slender, punctulate and lineolate. *Male umbel* 15–25-fld., pedicels ⅛ in., filiform, bracteoles ovate, acute; flowers ¼ in. diam.; sepals and petals linear, subequal; anthers oblong, much shorter than the filaments. Fem. umbels subsimilar; peduncle stout, flattened; bracteoles very minute, subulate or 0; staminodes 3, ovary short, obtusely trigonous; stigmas short, obtuse, recurved. *Berry* about ¼ in. diam.—The Chinese plant (var. *opaca,* A.DC.) has more rigid epunctate leaves. The leaves are subcordate in the Burmese specimens. A specimen, apparently of this from the Duphla hills has leaves 5–6 by 3½–4 in., broadly ovate deeply cordate, and fruiting peduncle 1½ in., with pedicels 1 in.

20. **S. oxyphylla,** *Wall. Cat.* 5128; branches very slender, leaves 2½–5 by ⅔–1½ in. narrowly oblong-lanceolate acuminate 3-costate base acuminate, petiole ¼–⅓ in., sheath obscure, peduncle of male umbel equalling or rather longer than the petiole ebracteate very slender naked, pedicels capillary. *Kunth Enum.* v. 238 (*excl. syn.*); *A.DC. Monogr. Smilax*, 59.

SILHET, the KHASIA HILLS, and CHITTAGONG, *Wallich, Griffith,* &c.

Branches terete, with a very few short prickles or 0. *Leaves* membranous, sometimes caudate, very finely reticulate, lineolate, hardly punctulate, intramarginal nerves very slender. *Male umbel* 15–30-fld., bracteoles very minute; sepals and petals obovate-oblong, rather longer than the stamens; anthers oblong, much shorter than the very slender filaments.—Hardly distinguishable from narrow-leaved specimens of *S. lanceæfolia.* I have seen no fem. fl.

β. Umbels 2–3 on a common peduncle. Staminodes 3. Except in *S. zeylanica.*

† *Costæ of leaves free from the base, or connate* in S. quadrata.

21. **S. quadrata,** *A.DC. Monogr. Smilax*, 183; branches 4-angled zigzag, leaves 4–6 by 1½–2½ in. oblong or elliptic-oblong broadly cuspidate membranous 3-costate from the rounded base or above it, petiole ⅓–½ in. narrowly sheathing for half its length, fem. umbels solitary or 2–3 on a

short common peduncle very many-fld., pedicels rigid, flowers small, sepals linear-oblong, petals narrowly linear. S. zeylanica, *Wall. Cat.* 5130 D. E.

KHASIA HILLS, *Griffith*; alt. 4–6000 ft. *J. D. H. & T. T.* MUNNIPORE, alt. 5500 ft., *Clarke.* BURMA; Tavoy and Prome, *Wallich.*

A very remarkable species, at once recognized by the square unarmed almost 4-winged sparsely prickly zigzag branches, and oblong thin leaves with callous-tipped cusps; the peduncles ½ in. long are very rigid, as are the pedicels which radiate forming a globe 1 in. diam. or less. *Fem. fl.* very small, ¼ in. diam.; staminodes 1–3; ovary contracted into a stout style with suberect stigmas. *Male fl.* peduncle slender; pedicels capillary, shorter than the buds; sepals ⅓ in long; petals very narrow; filaments very slender.—I found only 1–3 staminodes, A.DC. in a solitary imperfect flower though there were probably 6.

22. **S. Helferi,** *A.DC. Monogr. Smilax*, 176; branches slender sparingly prickly, leaves 3–5 by 1–3 in. oblong rounded at both ends 3-costate from the base membranous tip clawed, petiole $\frac{1}{6}$–$\frac{1}{4}$ in. sheathing to above its middle, male umbels many-fld., sepals linear-oblong, petals much narrower, costa thick, stamens nearly as long as the sepals. ? S. luzonensis, *Presl Rel. Hænk.* i. 131.

PEGU, *McLelland*, TENASSERIM, *Helfer*, *Falconer*; MALACCA, *Griffith*, *Maingay*. —DISTRIB. ?Philippines.

Branches as thick as a crow-quill, terete, grooved; prickles small, nearly straight. *Leaves* retuse, or tipped with a fleshy nail-like process, rarely acuminate; cortæ slender; cirrhi 0 or short. *Male umbels* usually solitary, peduncle ½–1 in., bracteate about the middle or lower; fruiting peduncles stout; receptacle globose, pitted; bracteoles minute, ovate; pedicels ⅓ in., slender; staminodes 3. *Berries* very small, about ⅓ in. diam.; seeds small.—De Candolle makes of Maingay's plant a variety with the costæ hardly separate above the base, and immature berries smaller, but I fail to find these differences. I have seen no specimens of Helfer's and Falconer's plants, nor other berries than Maingay's. Ritchie has collected a very similar plant in flowerless state at Kasarlch in Canara.

23. **S. extensa,** *Wall. Cat.* 5126 B; branches terete, leaves 3–6 by 1–2 in. elliptic or oblong-lanceolate acute or cuspidate coriaceous 3-costate from the cuneate or acuminate base, petiole ½–⅔ in. narrowly sheathing to the middle, male umbels solitary or 2–3 on a short bracteate common peduncle many-fld., pedicels very short, sepals linear obtuse, petals much narrower, stamens as long as the sepals. *A.DC. Monogr. Smilax*, 179.

PENANG, *Wallich*, *Curtis*, 1244.

Branches striate, unarmed, ribs slender. *Leaves* shining, not margined, very much narrowed at the base into the stout petiole; some of the largest are rounded at the tip with a broad cusp; cirrhi stout. *Peduncle* of umbels bracteate at the base; bracteoles minute, ovate; pedicels ⅛ in.; sepals ¼ in.; staminodes 3.—*S. extensa*, Wall. 5126, A. is *S. myosotiflora* of A. De Candolle.

†† *Costæ of leaves more or less connate at the base* (*see also* S. quadrata.

24. **S. zeylanica,** *Linn. Sp. Pl.* 1029; branches slender more or less 4-angled, leaves 5–7 by 2½–4 in. elliptic or broadly oblong or ovate-oblong cuspidate 3–5-costate from above the base, petiole ½–1 in. very shortly sheathing at the base, umbels solitary or 2–3 on a common peduncle

small many-fld., special peduncle and pedicels short, sepals ⅛–¼ in. linear, petals much narrower, stamens as long as the sepals. *A.DC. Monogr. Smilax*, 190; *Thwaites Enum.* 338; *Wall. Cat.* 5130 A. S. indica, *Vitm. Summa*, v. 422; *A.DC. l. c.* 187. S. laurifolia, *Hohen. Pl. Exsicc. n.* 122. S. Hohenackeri, *Kunth Enum.* v. 240. S. umbellata & pseudo-China, *Herb. Madr.—Burm. Fl. Zeyl.* 217 *excl. syn.—Rheede Hort. Mal.* vii. t. 31.

Throughout the hilly tropical districts of India, from the EASTERN HIMALAYA and BURMA to the MALAY PENINSULA, and from the CONCAN to CEYLON.—DISTRIB. Java.

Branches unarmed or with a few prickles; branchlets often zigzag. *Leaves* more uniform than in most species, base rounded or subcordate, or in the terminal leaves often acute; petiole jointed in the middle, at length cirrhose. *Peduncle* bracteate at the base, umbels 20–30-fld., male pedicels ¼ in., fem. ½ in.; staminodes in few-fl. *Berries* ½ in. diam., usually 2 plano-convex. The var. *sisparensis* A.DC. (*S. laurifolia*, Hohen.) is the common Deccan form, and not distinguishable from the Ceylon.

25. **S. macrophylla,** *Roxb. Hort. Beng.* 72; *Fl. Ind.* iii. 793 (not of Willd.); branches stout terete, leaves 6–18 in., as broad or narrower orbicular or broadly oblong cuspidate 5–7-costate from the rounded subcordate or suddenly cuneate base, petiole 1–1½ in. very stout narrowly sheathing below the middle, umbels 2–3 on a short common peduncle, male partial peduncle slender, sepals ¼ in. linear, stamens as long as the sepals. *A DC. Monogr. Smilax*, 193 (*excl. var. cacharensis*). S. ovalifolia, *Roxb. Fl. Ind.* iii. 794; *Wight, Ic.* t. 809; *Dalz. & Gibs. Bomb. Fl.* 246; *Kunth Enum.* v. 248. S. Roxburghii, *Kunth l. c.* 852. S. retusa, *Roxb. l. c.* 793. S. prolifera, *Wall. Cat.* 5724 C. D. F. S. prolifera & ovalifolia, *Herb. Ind. Or. Hook. f. & T.* S. grandis, *Wall. ex Voigt Hort. Sub. Calc.* 648. S. grandifolia, *Voigt. l. c.*

TROPICAL HIMALAYA, from KUMAON (*Herb. Strach. & Winterb.* 8) Eastwards, ASSAM, BENGAL, CHITTAGONG, BURMA, the CENTRAL PROVINCES and CONCAN.

Stem stout, scandent, prickly, as thick as the thumb below. *Leaves* glossy above; cirrhi long. *Male peduncles* ½–1½ in., slender; umbels many-fld.; pedicels ⅛–¼ in., shorter than the buds; staminodes of fem. fl. 3. *Ovary* oblong; stigmas 3 sessile. *Berries* ½–1½ in. diam., 1–2-seeded; pedicels short, stout. *Seeds* biconvex.—This is, I think, undoubtedly Roxburgh's *ovalifolia* as well as his *macrophylla*. It is best distinguished from *prolifera*, by the narrow sheath of the petiole, but both are so variable in foliage, that young shoots of *prolifera* with undeveloped sheaths may be mistaken for *macrophylla*. De Candolle unites Roxburgh's *ovalifolia* with *prolifera*, but cites Wight's t. 809 under *macrophylla*, overlooking the fact that Wight's figure is an acknowledged copy of Roxburgh's drawing of *ovalifolia* and bears that name, as also that of "Kunda gurvatiga," which Roxburgh also gives. De Candolle's *S. ovalifolia* must therefore take the name of *S. prolifera*.

26. **S. Wightii,** *A.DC. Monogr. Smilax*, 174; branches robust, leaves 3–4½ in. coriaceous orbicular or broadly ovate or elliptic subcordate 5–7-costate from above the base, petiole very stout sheathing for about half its length, umbels solitary or 2–3 on a common peduncle many-fld., sepals of male ⅛ in. long and petals subequal linear hardly longer than the stamens. S. zeylanica, *Wight, Ic.* t. 2057–8.

NILGHIRI HILLS, alt. 4–6000 ft., *Wight*, &c.

A lofty climber; branches terete, sparsely prickly. *Leaves* shining, acute or cuspidate, or young acuminate, base rounded or cordate, margins of petiolar sheath incurved. *Common peduncle* 1–1½ in., stout, bracteate at the base; bracteoles subulate; pedicels ⅛–¼ in.; male fl. largest, filaments very slender; fem. with narrower petals; staminodes 3; ovary broadly ovoid; stigmas sessile. *Berries* ½ in. diam.—Wight's figure is inaccurate in representing the costæ of the leaf as free to the base, and peduncles and pedicles as far too slender.—De Candolle gives Khasia hills, Kurz, as a habitat, but I have seen no specimens, and suspect some error.

27. **S. polyacantha,** *Wall. Cat.* 5127; branches slender closely prickly, leaves 4–6 by 1½–2 in. coriaceous elliptic-lanceolate acuminate at both ends 3–5-costate from above the base, petiole stout narrowly sheathing below the middle, umbels solitary or 2 on a very short common peduncle many-fld., fem. sepals ⅓ in. long. *Kunth Enum.* v. 239; *A.DC. Monogr. Smilax*, 176.

PENANG, *Porter.*

Branches terete, as thick as a crow-quill, prickles short, straight. *Leaves* narrowed into the petiole, which is ¼–1 in., strongly 3-costate with slender submarginal nerves; cirrhi slender. *Common peduncle* very stout, partial (fruiting) ½–1 in., stout; receptacle ovoid; bracteoles minute, ovate; fem. fl. very small. *Ovary* with short recurved styles.

28. **S. Roxburghiana,** *Wall. Cat.* 5115; branches terete, branchlets 4-angled, leaves 5–8 in. polymorphous oblong ovate or ovate-lanceolate base rounded cordate or cuneate 3–5-costate from above the base, petiole with very large broad 2-auricled sheaths below the middle, umbels solitary or 2–3 on a common peduncle many-fld., sepals ¼ in. long, linear-oblong, stamens as long as the sepals. S. ocreata and orthoptera, *A.DC. Monogr. Smilax*, 193; S. macrophylla, *var.* cacharensis, *A.DC. l. c.* 194. S. prolifera, *Wall. Cat.* 5124 B, D, *in part.* S. laurifolia, *Roxb. in Wall. l. c.*

TROPICAL HIMALAYA from Garwhal Eastwards, SILHET, CACHAR, the KHASIA HILLS and BEHAR (on Parus-nath).

Stems more or less prickly; branches smooth. *Leaves* on young shoots 6 by 1½–2 in., thin, lanceolate base acute, petiole ½–1 in.; in older 8 by 3½ in., ovate or ovate-lanceolate, obtusely acuminate, on still older 5-7 by 2½–4 in. oblong or broadly ovate coriaceous 5-costate, base rounded cordate or truncate; costæ in all united above the base; auricles in old leaves 1–1½ in. produced behind into rounded lobes embracing the branch. *Umbels* 1–3; peduncles very variable in length and position, common peduncle 1–3 in., bracteate at the base; receptacle globose; fem. umbels 12–15-fld., pedicels ½ in., slender; staminodes 3; stigmas long, recurved. *Berries* ⅓ in. diam., pedicels as long or longer. *Seeds* 2, hemispheric or solitary and globose, less than ¼ in. diam.

29. **S. megacarpa,** *A.DC. Monogr. Smilax*, 186; branches terete smooth unarmed, leaves 3–7 in. elliptic ovate or oblong 3-costate from above the base, petiole ¾–1½ in., sheath short narrow, umbels many-fld., pedicels ¼ in. slender, sepals ⅓ in. long ligulate, petals very narrow, filaments very long slender, berry the size of a cherry 3-seeded, seeds lenticular.

The KHASIA HILLS, *Griffith.* MALACCA, *Maingay.* PERAK; Larut, *Kunstler.* —DISTRIB. Tonkin.

There are two forms (or species) included here, differing greatly in foliage, a Khasian and Malayan, but agreeing in their remarkable fruit and seeds. Both have fruiting branches rather thicker than a crow-quill, very rigid, unarmed. In the Khasian the leaves are elliptic or ovate 3–4 by 1- nearly 2 in., obtusely acuminate

margined, contracted at the base near to which the slender costæ unite, they are thin shining with finely reticulate nervules; the petiole is ⅜ in. long, sheathing about ¼ way up, and articulate at the tip. In the Maingay specimen the leaves are detached, 6 by 3 in., broadly oblong rounded at the tip, very coriaceous; the costæ are much stouter, they match well the older leaves of Griffith's specimen. In both the umbels are numerous along the rigid branches. *Umbels* 1–3 on a stout common peduncle as long as the petiole or longer; peduncles ½–1 in. stiff; pedicels 3–5, also stiff. *Berries* nearly 1 in. diam.; seeds 3, orbicular, ⅛ in. diam., biconvex. —Were it not that Griffith's specimen is labelled Khasia by his own hand, I should have suspected some error in the habitat. In the Perak specimens the male fl. branches are elongate, leafy upwards, and the upper umbels axillary, the lower arise from leafless scales; peduncles ½–1 in., pedicels ¼ in.; bracteoles minute.

γ Umbels more than three alternate or whorled over the rachis of a common peduncle.

30. **S. prolifera,** *Roxb. Fl. Ind.* iii. 795; branches stout terete prickly, leaves 4–8 by 1½–6 in. from ovate acuminate to orbicular-ovate or oblong cuspidate 3–7-costate from above the rounded or subcordate base, petiole 1–2 in. sheathing portion usually forming two large basal amplexicaul erect or reflexed auricles, racemes elongate, umbels 10–20 3-nate or whorled many-fld. *Wall. Cat.* 5124, A, B, D (in part) E, G, H; *Kunth Enum.* v. 247 (*excl. syn.* ovalifolia). S. laurifolia, *Roxb. l. c.* 793. S. laurina, *Kunth l. c.* 248. S. ovalifolia, *A.DC. Monogr. Smilax,* 199 (*not of Roxb.*). ? S. macrophylla, *Dalz. & Gibs. Bomb. Fl.* 246. S. macrophylla, var. polycephala, *A.DC. l. c.* 194. S. umbellata, *Herb. Heyne.*

TROPICAL WESTERN HIMALAYA; Kumaon, *Strachey & Winterbottom* (*Smilax* Nos. 6, 7). NEPAL, *Wallich.* SILHET, BENGAL, BEHAR, BURMA, the DECCAN PENINSULA and CEYLON.

Stem stout, more or less strongly armed, climbing. *Leaves* extremely variable in form and size; costæ 3–7, the three inner united above the base; sheath of petiole very variable, sometimes exactly as in *S. Roxburghiana,* at others very narrow. *Umbels* 30–40-fld.; peduncles ¾–1½ in., pedicels ½ in.; bracteoles minute; flowers very small; sepals ⅛ in., oblong-lanceolate; petals as long, very narrow, both often breaking off above the base in the fem. fl.; stamens as long as the sepals; filaments slender; staminodes of fem. fl. 3; ovary oblong; stigmas large, long, erect, very deciduous. *Berries* red, the size of a pea. *Seeds* small, biconvex.—De Candolle certainly errs in referring this to *S. ovalifolia,* Roxburgh's drawings and descriptions are very precise. The *ovalifolia* var. *nervulosa,* A.DC. l. c. 200 from Ceylon (*Walker,* a solitary male specimen) is possibly a different species; the leaves are 3½ by 1½–2 in., elliptic, oblong, apiculate, with 3 costæ meeting at the base, the petiolar sheaths form tumid auricles nearly ¼ in. long and at basal the racemes are shorter, the flowers rather larger, and pedicels shorter than in true *prolifera.* Var. *parviglobα,* A.DC. l. c. 200 (a solitary male specimen) resembles *nervulosa* in foliage, but has smaller petiolar sheaths, small panicles of minute flowers with sepals and narrow petals $\frac{1}{10}$ in. long; it is, I think, a very different species; its habitat is doubtful, being in a miscellaneous collection of Griffith's, supposed to be from E. Bengal (numbered 545, *Kew Distrib.*), but bearing also a ticket inscribed "Smilax stipulacea," which much resembles a Calcutta Bot. Gard. one. Of var. *polystemon* A.DC. from Burma *Kurz.* (n. 2636) with 8–9 stamens I know nothing; *S. ferox* is the only polystemonous Indian species that I have examined.

31. **S. leucophylla,** *Blume Enum.* 18 A, C; branches terete, leaves 6–8 by 2–4½ in. ovate or oblong 3–5-costate from above the cuneate rounded or subcordate base coriaceous glaucous beneath, petiole 1–1½ in. with two

large obtuse incurved auricles, male umbels very-many-fld., pedicels hardly longer than the sepals. *A.DC. Monogr. Smilax*, 200.

PENANG; *Griffith, Curtis*; PERAK, *King's Collector*.—DISTRIB. Malaya, Cochin-china.

Branches stout, quite smooth, more or less prickly. *Leaves* retuse acute or acuminate, nervules obscure. *Inflorescence* irregularly branched; peduncles of umbels ½–3 in., bracteoles obscure; buds ¼ in. long, clavate; pedicels slender, about as long; sepals linear; filaments slender, anthers linear.

32. **S. Blumei,** *A.DC. Monogr. Smilax*, 202; branches stout terete, leaves 8–24 in. orbicular-ovate acute or obtuse tomentose beneath stoutly 5–7-costate from above the base, petiole 2 in. very stout, sheathing base 1 in. with inflexed sides and acute tips, fruiting umbels on a short stout common peduncle, receptacle large globose deeply pitted, pedicels 1–1¼ in. S. perfoliata, *Blume Enum.* 18 (*not of Lour.*).

MALACCA, *Maingay*, at Ulu Bubong, *King's Collector*.—DISTRIB. Java.

Branches prickly. *Leaves* coriaceous, costæ and transverse nervules deeply sunk above, highly raised beneath. *Umbels* on a common peduncle 1–3 inches long and as thick as a crow-quill. "Ovules solitary, berries trigonous at the apex (*Maingay* mss.)."—Resembles *S. leucophylla*, but the leaves are tomentose and not glaucous beneath.

33. **S. Griffithii,** *A.DC. Monogr. Smilax*, 198; branches obtusely angled smooth, leaves 7–10 by 2½–4¼ in. ovate acuminate 5–7-costate from the cuneate base coriaceous, petiole 1 in. articulate in the middle, base sheathing with two rounded auricles, male panicles 7-umbelled buds clavate.

UPPER ASSAM, or UPPER BURMA, *Griffith*.

Branch (young) with a very few minute prickles. *Leaves* red brown when dry. *Panicle* 4 in. long. *Umbels* 2–4-nate; peduncles ½ in.; pedicels ¼ in.; sepals ⅛ in., narrowly obovate-oblong; petals narrowly linear; stamens shorter than the sepals. —This noble species was collected by Griffith in his journey from Assam to Burma; it is in male fl. only, and the ticket bears no precise habitat beyond that it was gathered on the 15th of some month, at an elevation of 5000 ft. probably either on the Patkoy hills, where he was on March 15th, 1837, on Laim-Planj, or in the Mishmi hills, where he was in Nov. 15th, 1836. The sepals are described as herbaceous and coloured with brown.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

S. COLLINA, *Kunth Enum.* v. 261, founded on *S. pseudo-China*, Roxb. Fl. Ind. iii. 792 from the Garrow hills, is unrecognizable. It may be *S. zeylanica*.

S. DECIPIENS, *Spreng. Pugill.* ii. 91. Undeterminable.

S. OBLIQUA, *Spreng. Pugill.* ii. 91. De Candolle (Monogr. 207) doubts this being a Smilax, the stem is described as pubescent, the leaves oblong oblique acutely 5-nerved and the spikes elongate compound.—E. Indies.

S. SINGAPORENSIS, *A.DC. Monogr. Smilax*, 177; S. calophylla, *Wall. Cat.* 5131 *in Herb. Richard.* De Candolle describes this as differing from *S. Helferi* in its few prickles, short sheaths of the petiole, the obtuse base of the more cuspidate leaves, basal scale of the raceme, larger female flowers and longer less papillose stigmas. He further remarks that three species have been distributed under Wallich's *S. calophylla*. No doubt this is so, but the confusion of certain species in the type collection of Wallich is so great that except the duplicate specimens (which are in most cases mere fragments) were brought together, it is impossible to arrive at any satisfactory identification of them.

S. WALLICHII, *Kunth Enum.* v. 246; A.DC. Monogr. Smilax, 178. S. prolifera,

Wall. Cat. 5124 B, D, in part. The specimens are quite insufficient for determination. They may belong to *S. zeylanica* or *Roxburghiana*.

S. VILLANDIA, *Ham. in Wall. Cat.* 5123; *Royle Ill.* 384, t. 94.—*Rheede Hort. Mal.* vi. t. 31. Detached leaves alone exist in Wallich's and Hamilton's Herbaria (from the Nepal Morung), and may belong to any one of several species. Royle's plant is only known from the figure the inflorescence of which represents nothing known to me. Rheede's plant is undeterminable.

2. **HETEROSMILAX**, *Kunth.*

Characters of *Smilax*, but perianth tubular, mouth contracted, 2–5-toothed, and stamens 3 with more or less connate filaments.—Species 5, Indian, Malayan, Chinese and Japanese.

H. indica, *A.DC. Monogr. Smilax*, 43; leaves ovate- or oblong-lanceolate acuminate, filaments connate to about the middle, anthers obtuse.

ASSAM and the KHASIA HILLS, alt. 1–4000 ft.

Stem very slender. *Leaves* 4–8 by 2–3½ in., 5-nerved, rather thin, base rounded; petiole ½–1 in., subterete, sheathing base very short, cirrhose. *Pedunculs* solitary, axillary, 1½–2½ in., flattened; umbels many-fld.; bracteoles minute, ovate, acuminate; pedicels ½–1½ in.; flowers very many, obovoid, male ¼ in. long. *Fruit* ½–⅔ in. diam., globose. *Seeds* 2, hemispheric.—Very near *H. japonica*, Maxim., but differing by the filaments being united only half way up, and the anthers obtuse.

3. **ASPARAGUS**, *Linn.*

Rootstock stout, creeping. *Stem* erect straggling or climbing, terete grooved or angled. *Leaves* minute scales, often spinescent, bearing in their axils tufts of needle-like or flattened branchlets (cladodes). *Flowers* small or minute, axillary, rarely uni-sexual, solitary fascicled or racemed, pendulous; pedicel jointed. *Perianth* campanulate, 6-partite. *Stamen* on the bases of the segments; anthers oblong. *Ovary* 3-gonous; style 1, stigmas 3; cells 2- or more- ovuled. *Berry* globose. *Seeds* 2–6; testa, black, brittle; embryo dorsal.—Species about 100, Europe and Temp. and Trop. Asia and Africa.

* Flowers axillary, solitary clustered or umbelled, not racemed.

† *Leaves not or rarely spinescent. Cladodes short straight or falcate.*

1. **A. filicinus**, *Ham. in Don Prodr.* 49; tall, erect, cladodes 2–5-nate falcate flat acuminate costate, pedicels solitary or 2-nate, flowers polygamous. *Kunth Enum.* v. 73; *Baker in Journ. Linn. Soc.* xiv. 605.

TEMPERATE and TROPICAL HIMALAYA, from Kashmir 4–7000 ft. eastwards, alt. 6-9000 ft., to Bhotan (except Sikkim). The KHASIA HILLS alt. 5–6000 ft. ASSAM and BURMA.—DISTRIB. China.

Stems flexuous, fistular, much branched, smooth, unarmed, lower branches spreading; upper internodes short. *Cladodes* $\frac{1}{10}$–¼ in. *Pedicels* 0 or ¼–½ in., jointed about the middle. *Perianth* $\frac{1}{12}$–$\frac{1}{10}$ in., subcampanulate. *Stamens* short; anthers minute. *Berry* ¼–⅓ in. diam.—The following are marked forms.

A. FILICINUS proper; cladodes ½–⅔ in., pedicels very slender ½–¾ in.—Central and Western Himalaya.

Var. BREVIPES, Baker l. c.; cladodes ¼–⅓ by $\frac{1}{10}$ in., pedicels very short.—Assam and Khasia hills.

Var. BREVIFOLIA, Baker l. c.; internodes very short, cladodes $\frac{1}{3}$–$\frac{1}{2}$ in.—Khasia hills, at Syong, *J. D. H. & T. T.*

Var. LYCOPODINEA, Baker l. c.; cladodes solitary or 3-nate $\frac{1}{2}$–$\frac{1}{3}$ in., $\frac{1}{10}$–$\frac{1}{8}$ in. broad. A lycopodineus, *Wall. mss.* A. Curillus, *Wall. Cat.* 5155 E. (*not of Roxb.*) —Mishmi, *Griffith.* Burma, *Wallich, Parish.*—In Chinese specimens the pedicels are nearly 1 in.

Var. MICROCLADA; cladodes very small $\frac{1}{8}$–$\frac{1}{16}$ in. subulate tapering to the acicular points.—Assam, *Masters*; Munnipore, *Watt*; Shan hills, *Collett.*

2. **A. gracilis,** *Royle Ill.* i. 393; tall, much branched, lower leaves subspinescent, cladodes 3–6-nate or lower 8-nate acicular or setaceous strict, pedicels axillary or subterminal 2–4-nate, perianth segments spreading. *Baker in Journ. Linn. Soc.* xiv. 607.

The PUNJAB; at Rotas, *Vicary*; Rawul Pindi, *Aitchison.*—DISTRIB. Beluchistan.

A slender undershrub, branches divaricate, lower rigid striate deflexed. *Cladodes* $\frac{1}{12}$–$\frac{1}{3}$ in., terete, erect, ascending, cuspidate. *Pedicels* in subcapitate clusters $\frac{1}{12}$–$\frac{1}{10}$ in., jointed below the middle. *Perianth* $\frac{1}{6}$ in. *Stamens* half its length; anther very minute.

3. **A. capitatus,** *Baker in Journ. Linn. Soc.* xiv. 607; slender, much branched, subscandent; branches smooth, leaves subspinescent, cladodes solitary or 2–3-nate acicular or setaceous firm, flowers terminating short branchlets, pedicels very short, perianth segments spreading.

Foot of the WESTERN HIMALAYA, alt. 1–3000 ft.; Black Mt., *Duthie.* NILGHIRI HILLS; *Wight.*

A tall undershrub, branches slender, terete, smooth, lower divaricate or deflexed, upper internodes very short. *Cladodes* $\frac{1}{4}$–$\frac{3}{4}$ in., cuspidate. *Pedicels* $\frac{1}{12}$–$\frac{1}{6}$ in., jointed about or below the middle. *Perianth* $\frac{1}{12}$ in. long. *Anthers* very minute, oblong.—A variety? from Lahore (Thomson) has softer capillary cladodes $\frac{1}{2}$–$\frac{2}{3}$ in. long. "Possibly a form of *A. gracilis*" (Baker).

4. **A. dumosus,** *Baker in Journ. Linn. Soc.* xiv. 609; stem woody below strongly grooved, branches stout rigid, young leaves spinescent, cladodes $\frac{1}{3}$–$\frac{1}{2}$ in. 3–8-nate linear stout mucronate channelled, flowers axillary and terminal 1–4-nate, perianth-segments oblanceolate.

SCINDE; at Kurrachee, *Stocks, Dalzell.*

An excessively branched undershrub, 2 ft. high; branches pale, flexuous, divaricate or reflexed, ridges scaberulous; upper internodes $\frac{1}{3}$ in. *Leaves* deltoidly cuspidate. *Pedicels* $\frac{1}{10}$ in., jointed below the middle. *Perianth* funnel-shaped. *Anthers* very minute, subglobose. *Berry* $\frac{1}{6}$ in diam.

5. **A. Rottleri,** *Baker in Journ. Linn. Soc.* xiv. 611; tall, branches scaberulous furrowed, leaves not spinescent, cladodes 3–6-nate $\frac{3}{4}$–$1\frac{3}{4}$ in. slender ascending curved channelled, pedicels densely umbelled. A floribundus, *Herb. Rottler.*

DECCAN PENINSULA; *Rottler.*

Tall, shrubby branches, terete, branchlets decurved; upper internodes $\frac{1}{4}$–$\frac{1}{3}$ in. *Cladodes* variable in length. *Pedicels* $\frac{1}{6}$ in., jointed below the middle. *Perianth* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., spreading; anthers much shorter than the filaments.—The specimens of this very distinct species are fragmentary.

†† *Leaves strongly spinescent.*

6. **A. subulatus,** *Steudel in Hohen. Pl. Nilgiri exsicc.*, No. 1303; erect or subscandent, branches grooved smooth, spines long straight, cladodes 6–12-nate $\frac{1}{8}$–$\frac{1}{3}$ in. acicular triquetrous acuminate, pedicels solitary

or 2-nate very short, perianth segments reflexed. *Baker in Journ. Linn. Soc.* xiv. 614. A. asiaticus, *Wight, Ic.* t. 2053 (*not of Linn.*). A Curillus, *Wall. Cat.* 5155, B.

NILGHIRI HILLS, *Wight, Schmidt.*

A small erect or tall and variable bush, densely branched; branches flexuous; upper internodes very short. *Spines* ½–¾ in. *Cladodes* ascending, spreading and curved, rather stout, variable in breadth. *Pedicels* jointed above the middle. *Perianth* segments oblong-lanceolate; anthers oblong. *Berries* ¼ in. diam.

7. **A. Jacquemontii,** *Baker in Journ. Linn. Soc.* xiv. 615; stem terete smooth, branches angled ribbed and grooved, leaves spinescent, cladodes 2–5-nate ½ in. slender 3-gonous curved acuminate, flowers solitary or in axillary pairs on a short peduncle, pedicels very short jointed under the minute perianth.

The CONCAN; between Poona and Carli, *Jacquemont.*

Tall, much branched, branches spreading and decurved; spines ¼–1½ in. conical. *Cladodes* much longer than the internodes. *Flowers* ⅛ in. diam., pedicels many times shorter than the cladodes.

8. **A. asiaticus,** *Linn. Sp. Pl.* 409; stem scandent terete smooth, branches grooved, cladodes 6–∞-nate ⅛–¼ in. very slender acicular terete acuminate, flowers axillary solitary or umbelled, pedicels almost equalling the cladodes, jointed in the middle.

DECCAN PENINSULA; *Herb. Rottler*; Bellary *Beddome.*—DISTRIB. Afr. trop.

Stem slender, branches deflexed. *Flowers* $\frac{1}{10}$ in. diam.

** Flowers racemed.

† *Cladodes subulate, terete or triquetrous, somewhat flattened in* A. Curillus.

9. **A. nepalensis,** *Baker in Journ. Linn. Soc.* xiv. 622; subscandent, stem robust smooth, branches angled not grooved, spines stout recurved, cladodes 3–6-nate ½ in. acicular spreading or ascending triquetrous acute, racemes short 1–3-nate sometimes branched below, perianth campanulate. A. Curillus, *Wall. Cat.* 5155, C.

NEPAL, *Wallich.*

An excessively branched undershrub. *Spines* ¼–½ in., conical. *Cladodes* nearly straight. *Racemes* ½ in.; bracts minute, lanceolate; pedicels jointed above the middle. *Perianth* ⅛ in. diam.; anthers very minute, oblong, purple. *Fruit* ¼ in. diam.

10. **A. racemosus,** *Willd. Sp. Pl.* ii. 152; stem scandent woody terete, branches triquetrous striate, lower spines long, cladodes 2–6-nate ¾–1 in. slender finely acuminate falcate divaricate, racemes solitary or fascicled simple or branched, pedicels very slender, bracts minute, perianth-segments spreading. *Baker in Journ. Linn. Soc.* xiv. 623; *Roxb. Fl. Ind.* ii. 151; *Wall. Cat.* 5153; *Wight Ic.* t. 2056; *Thwaites Enum.* 337. A. volubilis, *Ham. in Wall. Cat.* 5754 (excl. D, K) A. acerosus, *Wall. Cat.* 5152 A, B, F (*not of Roxb.*). A. sarmentosus, *Heyne in Wall. Cat.* 5154, 2 (*not of Linn.*) A. fasciculatus, *Br. Prodr.* (*in part*). A. dubius, *Decne in Nov. Ann. Mus.* iii. 363. Asparagopsis Hohenackeri, abyssinica and Brownei (*in part*), *Kunth Enum.* v. 100, 101. A. Decaisnei and floribunda, *Kunth l. c.* 98, 103; *Miquel Fl. Ind. Bat.* iii. 560, 562.

Throughout TROPICAL and SUBTROPICAL INDIA and CEYLON ascending the

Himalaya to 4000 ft. from Kashmir eastwards.—DISTRIB. Tropical Africa, Java and Australia.

A tall climbing excessively branched undershrub; roots tuberous. *Spines* ¼–½ in., straight or subrecurved. *Cladodes* 1 in., channelled beneath. *Racemes* 1–2 in.; pedicels ⅛ in., jointed in the middle. *Perianth* $\frac{1}{12}$–⅛ in. diam.; anthers minute, oblong, purplish. *Ovules* 6–8 in each cell *Berry* ⅛–¼ in. diam.—Thwaites observes that the leaves are wide on specimens growing on the hills. Baker has the following varieties :—

Var. *javanica*, Baker l. c. 624; cladodes ½–1 in., very slender erect flexuous, racemes narrow with terminal tufts of cladodes, perianth segments narrower. Asparagopsis javanica, *Miquel Fl. Ind. Bat.* iii. 562. A. sarmentosa, *Dalz. & Gibs. Bomb. Fl.* 246 (*not of Kunth*).—Deccan Peninsula, Java.

Var. *subacerosa*, Baker l. c.; cladodes strict ½–¾ in. stout, racemes small few-fld., rachis and pedicels capillary.—Sikkim, alt. 1–4000 ft., *J. D. H.*—A form approaching *A. acerosus*.

11. **A. zeylanicus,** *Hook. f.*; stem stout smooth obscurely angled, branches acutely angled, cladodes 3–5-nate ½ in. stout falcate triquetrous narrowed to both ends tips subspinescent, racemes 3–5 in. very stout, bracts lanceolate, flowers large, anthers large. A. acerosus, *var.* zeylanicus, *Baker in Journ. Linn. Soc.* xiv. 623.

CEYLON, alt. 6000 ft., *Walker*; at Newera Elia, *Gardner*, *Thwaites* (Cp. 2299).

The stout triquetrous cladodes thickened in the middle, stout racemes, large flowers ¼ in. diam., and large anthers seem to distinguish this from *A. racemosus*.

12. **A. lævissimus,** *Steud. in Hohen. Pl. exsicc. Nilgh.* Nos. 1304, 1305; stem subscandent terete smooth, branches very slender triquetrous, spines short strong, cladodes 3–6-nate ¼ in. spreading stout triquetrous acuminate, racemes dense-fld., pedicels very short, bracts large cymbiform, perianth-segments widely spreading, anthers minute. *Baker in Journ. Linn. Soc.* xiv. 623. A. volubilis, *Wall. Cat.* 5154 K.

WESTERN GHATS, from the Concan southwards.

Differs from *A. racemosus*, of which Baker says it is little more than a variety, chiefly in the longer cladodes, and large bracts, which sometimes exceed the pedicels.

13. **A. acerosus,** *Roxb. Fl. Ind.* ii. 150; stem tall subscandent smooth, branchlets very slender stiff ascending angled, spines short recurved, cladodes 3–6-nate 1–2½ in. suberect strict triquetrous acuminate, racemes short solitary or 2-nate, bracts lanceolate concave, perianth-segments widely spreading. *Baker in Journ. Linn. Soc.* xiv. 624; *Wall. Cat.* 5152 C, D, E. A. fasciculatus, *Br. Prodr.* 281 (*in part*). Asparagopsis acerosa *and* Brownei (*in part*), *Kunth Enum.* v. 102, 103.

BENGAL, *Roxburgh*, *Clarke*, &c. CHITTAGONG (cult.), *J. D. H. & T. T.* PEGU, *McLelland.* BURMA, *Wallich*, &c.—DISTRIB. N. Australia.

An excessively branched under-shrub; roots tuberous, branchlets grooved. *Spines* ⅛–¼ in., slightly curved. *Cladodes* shining, persistent. *Racemes* 1–1½ in.; pedicels ⅛–¼ in., jointed in the middle. *Flowers* pure white, fragrant; anthers minute, subglobose. *Ovules* many in each cell. *Berry* ⅛–¼ in. diam., 1-seeded.

14. **A. adscendens,** *Roxb. Fl. Ind.* ii. 153; stem tall stout suberect terete smooth white, branchlets grooved ascending angled, angles minutely scabrid, spines long, cladodes 6–20-nate ½–¾ in. slender filiform terete suberect or curved, racemes many-fld., bracts minute, perianth-segments

spreading, anthers medium-sized. A. volubilis, *Wall. Cat.* 5154 D (*in part*). Asparagopsis adscendens, *Kunth Enum.* v. 102.

ROHILKUND, the WESTERN HIMALAYA, and the PANJAB, from Murree eastwards to Kumaon; ascending to 5300 ft.—DISTRIB. Affghanistan.

Stem excessively branched, flexuous, and primary branches ashy white; internodes very short. *Spines* ½–¾ in., stout, straight. *Cladodes* densely crowded, soft. *Racemes* copious, 1–2 in., often branched at the top and bearing cladodes; pedicels $\frac{1}{12}$–¼ in., jointed above or below the middle; flowers ⅛ in. diam. *Ovules* many in each cell. *Berry* ¼–⅓ in. diam., 1-seeded.

15. **A. Curillus,** *Ham. in Roxb. Fl. Ind.* ii. 152; stem tall smooth subscandent and branches angled, spines long straight, cladodes very small 3–6-nate ⅛–¼ in. spreading or ascending linear flattened or subtriquetrous acute, racemes corymbiform, bracts minute, perianth-segments spreading. *Baker in Journ. Linn. Soc.* XIV. 627; *Wall. Cat.* 5155 D. A. volubilis, *Wall. Cat.* 5154 D (*in part*). Asparagopsis Curilla, *Kunth Enum.* v. 102.

SUBTROPICAL HIMALAYA, alt. 2–4000 ft., from Kumaon to Nepal, *Hamilton*, &c.

An excessively branched undershrub; branches spreading, angles obscurely scaberulous. *Spines* ¼–½ in., pungent curved. *Cladodes* obtusely 3-gonous, *Racemes* ½–1½ in., few-fld.; pedicels ⅛ in, jointed below the middle; bracts lanceolate; flowers ½ in. diam. *Berry* 3-lobed (*Roxb.*).

†† *Cladodes linear, flattened.*

16. **A. falcatus,** *Linn. Sp. Pl.* 313; stem subscandent and branches terete smooth, spines short, cladodes solitary and 3–6-nate 4–6 in. long linear-ensiform falcate flat acuminate costate, racemes very short laxly few-fld., bracts cymbiform, perianth-segments reflexed. *Baker in Journ. Linn. Soc.* xiv. 626; *Kunth Enum* v. 71; *Bresl. Diss. Asparag.* No 2; *Burm. Fl. Zeyl.* 36, t. 13, f. 2 (bad); *Thwaites Enum.* 337. A. æthiopicus, *var.* ternifolia, *Baker in Saunders Refug. Bot.* t. 261, *and in Gard. Chron.* 1872, 1587, *with woodcut.* ? A. sarmentosus, *Thwaites Enum.* 337 (*not of Linn.*).

CEYLON; common in the warmer parts.—DISTRIB. Trop. and S. Africa.

Stem tall; branchlets very slender, flexuous. *Spines* $\frac{1}{6}$–¼ in. *Cladodes* $\frac{1}{12}$–$\frac{1}{6}$ in. broad, narrowed at the spinescent tip. *Racemes* ½–¾ in.; pedicels $\frac{1}{6}$–¼ in., jointed below the middle. *Flowers* ⅛ in. diam., white, sweet scented. *Anthers* minute, subglobose. *Berry* ¼ in. diam., 1-seeded.

17. **A. gonoclados,** *Baker in Journ. Linn. Soc.* xiv. 627; stem subscandent terete smooth, branches green curved angled 3-quetrous, spines short, cladodes 2–6-nate ⅜–1 in. ensiform flat falcate subcostate, racemes elongate lax-fld., bracts short cymbiform, perianth-segments spreading. A. Curillus, *Wall. Cat.* 5155 A.

The DECCAN PENINSULA; from the Concan southwards. CEYLON, *Thwaites* (Cp. 737).

An excessively branched undershrub; branchlets curved, green, strongly angled. *Spines* ¼–½ in. *Cladodes* ⅛ in. diam., narrowed to the acuminate tip, green. *Racemes* 1–3 in., often fascicled, sometimes connate; pedicels $\frac{1}{20}$–$\frac{1}{12}$ in., jointed below the middle; flowers $\frac{1}{12}$ in. diam.; anthers small.

IMPERFECTLY KNOWN SPECIES.

A. RUBRICAULIS, *Baker in Journ. Linn. Soc.* XIV. 616; subscandent, branches flexuous smooth purplish, spines conical, cladodes densely fascicled setaceous terete

much longer than the internodes, pedicels solitary, anthers oblong. Asparagopsis rubricaulis, *Kunth Enum.* v. 87.—Ind. Or., *Heyne.*

A. SARMENTOSUS, *Linn. Sp. Pl.* 314. Ceylon.—Trimen in Journ. Linn. Soc. xxiv. 138, doubtfully refers this to *A. gonocladus.*

4. POLYGONATUM, *Tourn.*

Rootstock creeping. *Stem* leafy above. *Leaves* alternate opposite or whorled. *Flowers* in axillary 1- or more-fld. curved peduncles, drooping, white green or purplish; pedicels jointed at the top; perianth tubular, mouth 6-cleft, outer lobes subvalvate. *Anthers* subsessile on or above the middle of the tube, included, dorsifixed. *Ovary* 3-gonous, style straight, stigmas 3; cells 2- or more-ovuled. *Berry* globose or ellipsoid, few- or many-seeded. *Seeds* subglobose, testa thin.—Species about 24, N. temp. regions.

The species are difficult of limitation, the leaves varying opposite alternate and even whorled in the same species, the flowers in number, size and colour, and the seeds in size.—*P. officinale* was by error given by Baker (Journ. Linn. Soc. xiv. 554) as Himalayan.

* *Leaves usually all alternate.*

1. **P. multiflorum,** *Allioni Fl. Pedem.* i. 131; stem terete, leaves subbifarious or secund oblong sessile, peduncles 1–5-fld., perianth constricted in the middle, filaments puberulous, berry globose. *Baker in Journ. Linn. Soc* xiv. 555; *Desf. in Ann. Mus.* ix. 50; *Redouté Lil.* t. 229. P. Govanianum, *Royle Ill.* 380. Convallaria multiflora, *Linn. Sp. Pl.* 315. *Reichb. Ic. Fl. Germ.* t. 961, 962. C. Govaniana, *Wall. Cat.* 5137.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 6–9000 ft. —DISTRIB. Europe, N. Asia, Japan.

Stem 2–3 ft., arched. *Leaves* many, 3–6 in., narrowed at the base, glaucous beneath, subacute. *Peduncles* ½–⅔ in., rarely 1-fld. *Perianth* ½–¾ in., white with green lobes; nerves within hairy. *Stamens* inserted above the middle of the tube. *Berry* ½ in. diam., blue-black. *Seeds* few.

2. **P. brevistylum,** *Baker in Journ. Linn. Soc.* xiv. 556; stem grooved, leaves shortly petioled oblong acute subcoriaceous, peduncles 2–4-fld., perianth cylindric, berry ellipsoid, style very short.

SIKKIM HIMALAYA, alt. 7–8000 ft., *J. D. H., Clarke.*

Stem 12–18 in., green spotted with purple. *Leaves* many, 2–4 in., strongly nerved, glaucous beneath, cross nervules obscure. *Peduncles* and *pedicels* stout, ¼–½ in. *Perianth* ¾ in., yellow, lobes green. *Berry* broadly ellipsoid, ⅓ in. long, many-seeded. *Seeds* $\frac{1}{16}$ in., ellipsoid or ovoid.

3. **P. nervulosum,** *Baker in Journ. Linn. Soc.* xiv. 557; stem flexuous, leaves 4–8 in. elliptic caudate-acuminate, nerves strong, peduncles long slender, berries globose 2–4-seeded.

SIKKIM and BHOTAN HIMALAYA, alt. 9–10,000 ft., *Griffith, J. D. H.*

Stem 3–5 ft., slender. Caudate tip of *leaves* nearly 1 in. long. *Peduncles* 1–3 in. fld. *Seeds* globose, ⅛ in. diam.

** *Leaves most or all opposite.*

4. **P. graminifolium,** *Hook. Ic. Pl.* t. 833; dwarf, leaves crowded membranous linear obtuse, peduncles 2-fld., perianth cylindric, anthers inserted near the mouth of the corolla. *Baker in Journ. Linn. Soc.* xiv. 557.

WESTERN HIMALAYA; Barung, alt. 11,000 ft., *Munro.*

Rootstock fleshy, constricted at the internodes. *Stem* 6 in. *Leaves* 1½–2 in., 1-nerved. *Flowers* violet; peduncle and pedicels about half as long as the leaves. *Perianth* ¼ in. long; lobes oblong, about equalling the tube.—I have seen no specimen.

5. **P. Hookeri,** *Baker in Journ. Linn. Soc.* xiv. 558; dwarf, leaves opposite or the lower alternate sessile linear obtuse glaucous beneath, flowers solitary, perianth-tube cylindric, stamens inserted about the middle of the corolla.

TEMPERATE HIMALAYA, alt. 10–12,000 ft., Garwhal, *Duthie*; Sikkim, at Lachen, *J. D. H.*

Stem 1–2 in. *Leaves* crowded, ¾–3½ in., nerves slender. *Flowers* suberect, violet; pedicels ⅛–⅓ in. *Perianth* ¼–1 in. long, lobes variable in length, much shorter than the tube. *Style* short.—Probably a state of *P. verticillatum*; except from the insertion of the anthers I should be disposed to include it under *P. graminifolium.*

6. **P. geminiflorum,** *Decne in Jacquem. Voy. Bot.* 170, t. 170; stem tall puberulous above terete, leaves many opposite or ternately whorled membranous oblong or linear-oblong subacute glaucous and nerves ciliolate beneath, peduncles 2-fld., perianth-tube cylindric. *Baker in Journ. Linn. Soc.* xiv. 558. *Kunth Enum.* v. 852. ? P. ciliatum, *Royle Ill.* 389. P. verticillatum, *var.* gracile, *Baker*, l.c. xviii. 103.

WESTERN HIMALAYA, alt. 7–11,000 ft., from Kashmir to Kumaon.—DISTRIB. Affghanistan.

Stem 12–18 in., flexuous. *Leaves* 2–4 in., rarely solitary, acute, base cuneate, nerves beneath puberulous. *Peduncles* and *pedicels* ¼–½ in., bracteoles minute, caducous. *Perianth* ¼ in., ⅔ in. long, white, lobes much shorter than the tube, green. *Anthers* inserted above the middle of the tube, filaments very short glabrous. *Style* as long as the ovary,—Probably a form of *P. verticillatum.*

7. **P. Griffithii,** *Baker in Journ. Linn. Soc.* xiv. 558; stem tall glabrous terete, leaves opposite sessile membranous linear-lanceolate acute or acuminate 3-nerved, peduncles 2-fld., perianth-tube constricted above the ovary.

EASTERN HIMALAYA; Mishmi hills, on Laim-planj-thaga, alt. 6000 ft., *Griffith.*

Stem 3 ft., slender. *Leaves* distant, 3–5 in., green above, subglaucous beneath. *Peduncles* and *pedicels* ½–¾ in. *Perianth* white, ¾ in., lobes very short, deltoid, green. *Stamens* inserted at the mouth of the tube, filaments very short, naked; anthers minute. *Style* filiform, 2–3 times as long as the ovary.

8. **P. Cathcartii,** *Baker in Journ. Linn. Soc.* xiv. 559; stem tall glabrous terete, leaves all opposite subpetioled ovate-oblong or -lanceolate acuminate 3–7-nerved, peduncle 2–4-fld., perianth short broad slightly contracted in the middle.

SIKKIM HIMALAYA; woods at Lachen, alt. 8–10,000 ft., *J. D. H.*, *Clarke.* NAGA HILLS, alt. 9000 ft., *Clarke.*

Stem 2–3 ft., spotted with purple. *Leaves* 2–4 in., spreading, green above, glaucous beneath. *Peduncles* 1–3 in. *Pedicels* ½–1½ in. *Perianth* ¾ in., green or yellowish; tube constricted in the middle, lobes short, deltoid, green. *Anthers* inserted about the middle of the tube. *Style* as long as the ovary. *Berry* ¼–½ in. diam. *Seeds* few or many, globose.—I have described the perianth from a drawing in the Cathcart collection.

9. **P. oppositifolium,** *Royle Ill.* i. 380; stem tall furrowed,

glabrous, leaves opposite or a few alternate shortly petioled coriaceous oblong acuminate, shining above, flowers many, peduncles usually many-fld., perianth-tube cylindric. *Baker in Journ. Linn. Soc.* xiv. 559; *Kunth Enum.* v. 141. Convallaria oppositifolia, *Wall. in Asiat. Research.* xiii. 380 with a figure; *Cat.* 5134; *Don Prodr.* 47; *Lodd. Bot. Cat.* t. 640; *Hook. Exot. Fl.* t. 125; *Bot. Mag.* t. 3529.

TEMPERATE CENTRAL and WESTERN HIMALAYA, from Nepal eastwards. KHASIA HILLS, alt. 4–6000 ft. MUNNIPORE, alt. 3500 ft. *Clarke.* Patkoye hills, in UPPER ASSAM, *Griffith.*

Stem 2–4 ft.; rhizome of green tubers. *Leaves* many, spreading, 3–6 in., bright green above, 7–9-nerved, pale beneath with reddish ribs. *Peduncle* many-fld. and pedicels ½–¾ in. *Perianth* ½–¾ in., all white, or tube with deltoid lobes greenish. *Stamens* inserted above the middle of the tube; filaments papillose; tips of anthers exserted. *Style* twice as long as the ovary. *Berry* ¼ in. diam., broadly ovoid or ellipsoid, scarlet. *Seeds* many, globose.

Var. *decipiens*, Baker l. c.; leaves shortly petioled lower alternate lanceolate very acuminate 3-4 in. broadest above the middle. *Wall. Cat.* 5134 B. Sikkim, alt. 7–11,000 ft. *J. D. H.* Khasia hills, alt. 4–5000 ft.—Approaches *P. Cathcartii.*

10. **P. punctatum,** *Royle Ill.* 380; stem angled and grooved glabrous, leaves petioled or subsessile opposite rarely alternate coriaceous oblong-lanceolate obtuse or obtusely acuminate, rather shining above 5–7-nerved, peduncles 2-many-fld., perianth urceolate mouth contracted. *Kunth Enum.* v. 142; *Baker in Journ. Linn. Soc.* xiv. 559; *Bot. Mag.* t. 5061. Convallaria punctata, *Wall. Cat.* 5133. Convallaria sp. *Griff. Notul.* 243; *Ic. Pl. Asiat.* t. 274.

TEMPERATE HIMALAYA, alt. 5–8000 ft. from Nepal, *Wallich*, to Bhotan, *Griffith.* Munnipore, alt. 7000 ft., *Watt.*

Stem 1–2 ft. *Leaves* many, 2–3 in., broadest in the middle, base cuneate, pale beneath with many slender nerves. *Peduncle* and *pedicels* ⅛–½ in. *Perianth* ¼–½ in. *Flowers* white, spotted with lilac, lobes deltoid, green. *Stamens* inserted above the middle of the tube, filaments very short, glabrous. *Style* as long as the ovary. *Berry* as in *P. oppositifolium*, from which this in its typical state differs in its more robust habit more coriaceous obtuse leaves and smaller flowers.

*** *Leaves usually whorled.*

11. **P. verticillatum,** *Allioni Fl. Pedem.* i. 131; stem tall angled and grooved glabrous, leaves 4–8-nately whorled sessile linear or linear-lanceolate acuminate membranous, peduncles 2–3-fld. whorled, perianth constricted at the middle. *Kunth Enum.* v. 142; *Baker in Journ. Linn. Soc.* xiv. 560; *Def. in Ann. Mus.* ix. 49; *Redouté Lil.* t. 244; *Maximov. Diagn.* xi. 852. P. leptophyllum, *Royle Ill.* 380. P. Jacquemontianum, *Kunth Enum. l. c.* 143. P. roseum *Bot. Mag.* t. 5049 (and Kunth?) Convallaria verticillata, *Linn. Sp. Pl.* 315; *Reichb Ic. Fl. Germ.* t. 966. C. leptophylla, *Don Prodr* 47.

TEMPERATE HIMALAYA, from Kashmir, alt. 6–11,000 ft to Sikkim, alt. 8–12,000 ft. Tibet (N. of Kumaon), alt. 13,500 ft., *Strachey & Winterbottom.*—DISTRIB. Europe, N. Asia, Affghanistan.

Stem 2–4 ft., very slender, or stout, sometimes as thick as the middle finger. *Leaves* 3–6 by ½–1 in., green above, glaucous beneath, often ciliolate on the margins and nerves. *Peduncles* and pedicels ½–¾ in. *Perianth* very variable in size,

¼–½ in., greenish or lilac; tube slender. *Stamens* inserted above the middle of the tube, anthers subsessile. *Style* as long as the ovary. *Berry* ¼ in. diam., 6–10-seeded. *Seeds* globose.—There is a tendency in the leaves of some specimens to become circinate at the *tip*, thus passing into the following.

12. **P. cirrifolium,** *Royle Ill.* 380; stem flexuous often climbing by the tips of the leaves terete puberulous or glabrous, leaves 3–6-nately whorled sessile membranous with slender circinate tips, peduncles 2–4-fld. whorled, perianth subcylindric. *Kunth Enum.* v. 145. *Maxim. Diagnos.* xi. 854. P. sibiricum, *Baker in Journ. Linn. Soc.* xiv. 501 *in part.* Convallaria cirrifolia, *Wall. in Asiat. Research.* xiii. 382 with a figure; *Cat.* 5136; *Don Prodr.* 47.

TEMPERATE HIMALAYA, from Simla eastward to Bhotan, alt. 5–11,000 ft. MUNNIPORE, alt. 4000 ft.—DISTRIB. Northern Asia.

Stem 2–4 ft., very weak; flexuous. *Leaves* 3–5 in., gradually narrowed into the slender revolute tips, glaucous and costate beneath. *Flowers* white green or purplish. *Stamens* inserted above the middle of the tube, filaments ciliolate. *Style* as long as the ovary. *Berry* ¼–½ in. diam., excessively variable in size and in the number of seeds; in some specimens from Simla, the seeds are ¼ in. diam. Baker has included this under *P. sibiricum,* probably rightly, but Maximovicz does not.

13. **P. Kingianum,** *Collett & Hemsl. in Journ. Linn. Soc.* xxviii. 1381, t. 21; very robust, leaves 5-nately whorled or 2–3-nate sessile coriaceous linear-lanceolate with a thick circinate apex, peduncles 1–3-fld., perianth subcylindric.

BURMA; in the Shan hills, alt. 4000 ft., *Collett.*

A much stouter plant than *P. cirrifolium,* with thick leaves, and flowers three-fourths of an inch long; perianth lobes very short; anthers large inserted above the middle of the tube, filaments very short.—Only one specimen seen.

UNDESCRIBED SPECIES.

P. INGLESII, Royle Ill. 380, from Raldung.

5. STREPTOPUS, *Michaux.*

Rootstock creeping. *Stem* leafy. *Leaves* alternate, sessile or amplexicaul. *Flowers* axillary. *Perianth* campanulate or open, segments deciduous. *Stamens* hypogynous or 3 inner adnate to the bases of the segments; filaments broad at the base, tip acute; anthers erect, basifixed between the lobes, connective sometimes produced. *Ovary* sessile; style-arms 3 stigmatose within; cells many-ovuled. *Berry* subglobose. *Seeds* many, oblong, curved, striate; testa thin adnate; embryo cylindric.—Species 4, N. temp. regions.

S. simplex, *Don Prodr.* 48, and *in Trans. Linn. Soc.* xviii. 530; leaves amplexicaul ovate-cordate glaucous beneath, flowers solitary or 2-nate. *Baker in Journ. Linn. Soc.* xiv. 591. S. candidus, *Wall. Cat.* 5572. Hekorima candida, *Kunth Enum.* iv. 204.

TEMPERATE HIMALAYA, from Kumaon eastwards to Sikkim, alt. 8–12,000 ft.

Rootstock small. *Stem* 2–3 ft., flexuous, forked. *Leaves* 2–4 in., membranous, many-nerved. *Flowers* in most of the axils, 1 in. diam., white; pedicels 2–3 in., filiform; segments erecto-patent, oblong. *Stamens* much shorter than the perianth; anthers oblong, twice as long as the deltoid filaments. *Style* short. *Berry* ¼ in. diam., 5–6-seeded.

6. SMILACINA, *Desf.*

Rootstock short, or creeping. *Stem* simple, leafy above. *Leaves* alternate, subsessile, rarely petioled, ovate-lanceolate. *Flowers* in terminal racemes or panicles, small, shortly pedicelled. *Perianth* spreading; segments subequal, usually deciduous. *Stamens* hypogynous or adnate to the bases of the segments, filaments long or short; anthers minute, globose, dorsifixed. *Ovary* subglobose, 3-celled; style long or short, stigma entire or 3-fid; cells 2-ovuled. *Berry* globose. Seeds 1 or few, globose; testa thin, adnate; embryo about half the length of the seed.—Species about 20, Europe, temp. Asia and America.

* *Flowers racemose.*

1. **S. oligophylla,** *Hook. f.*; stem and leaves beneath and rachis of raceme puberulous, leaves 3 in., pedicels solitary, perianth-segments pale purple oblong-lanceolate. Tovaria oligophylla, *Baker in Journ. Linn. Soc.* xiv. 565.

SIKKIM HIMALAYA; woods at Lachen, alt. 10–13,000 ft. *J. D. H.*

Rootstock stout, creeping. *Stem* ½–1 ft., flexuous above, slender. *Leaves* 3–5 in., oblong, acute, or acuminate, membranous, pale and costate beneath, with many slender nerves. *Raceme* 10–20-fld., 2–3 in., shortly peduncled; pedicels ⅛–¼ in.; bracts deltoid. *Perianth* ⅛ in. long. *Style* very short.

2. **S. pallida,** *Royle Ill.* i. 380; stem stout, leaves beneath and rachis of raceme densely pubescent leaves, 4–6 in., pedicels solitary or 2-nate, perianth segments white oblong. S. purpurea, *Wall. Cat.* 4201; *Plant. As. Rar.* ii. 38, t. 144. S. albiflora, *Wall. Pl. As. Rar.* ii. 38. Tovaria pallida, *and* purpurea, *Baker in Journ Linn. Soc.* xiv. 566. Jocaste purpurea, *and* albiflora, *Kunth Enum.* v. 155.

TEMPERATE HIMALAYA, alt. 8–11,000 ft., from Garwhal eastwards to Sikkim.

Stem 2–3 ft., very stout, naked below, flexuous above. *Leaves* 8–12, oblong, 4–6 in., acute, pale beneath, with 7–9 principal nerves. *Raceme* 3–6 in., rachis suberect; pedicels ⅛–¼ in.; bracts deltoid. *Perianth* ⅛ in. long, purple or white. *Filaments* deltoid. *Style* very short.

** *Flowers in thyrsiform panicles.*

3. **S. fusca,** *Wall. Pl. As. Rar.* iii. 37, t. 257; nearly glabrous, leaves petioled ovate-cordate acuminate, panicle deltoid, perianth brown-purple segments oblanceolate obtuse. S. divaricata, *Wall. Cat.* 4202. S. bootanensis, *Griff. Notul.* 178; *Ic. Pl. Asiat.* t. 279. Tovaria fusca, *Baker in Journ. Linn. Soc.* xiv. 568. Medora divaricata, *Kunth Enum.* v. 156.

TEMPERATE HIMALAYA, alt. 6–8000 ft. from Nepal, *Wallich*, to Sikkim and Bhotan. KHASIA HILLS, alt. 5–6000 ft.

Stem 1–2 ft., slender. *Leaves* 3–6 in., membranous, glabrous or sparsely pilose beneath; petiole ½–1½ in., nerves 5–7. *Panicle* 3–6 in.; peduncle short, branches flexuous, lax-fld.; pedicels ¼–½ in. solitary, bracts minute. *Perianth* ⅛ in. diam. *Filaments* deltoid. *Style* very short. *Berry* ¼–½ in., 1–3-seeded.

4. **S. oleracea,** *Hook.f. & Thoms. Herb. Ind. Or.*; stem leaves beneath and panicle pubescent, leaves subsessile oblong-lanceolate acuminate, panicle oblong or deltoid, perianth white, segments oblong obtuse. *Bot. Mag.* t. 6313. Tovaria oleracea, *Baker in Journ. Linn Soc.* xiv. 569.

SIKKIM HIMALAYA; in woods alt. 9–11,000 ft., *J. D. H.*, &c.

Rootstock short. *Stem* 2–5 ft., stout, flexuous. *Leaves* 3–8 in., pale beneath and 6–9-nerved. *Panicle* 3–12 in., oblong or deltoid, many-fld., branches flexuous, pedicels ¼–½ in. *Perianth* ⅓–½ in. diam., segments serrulate. *Filaments* deltoid. *Style* very short, 3-cuspidate. *Berry* ⅛ in. diam.—A favourite pot-herb with the Lepchas of Sikkim.

7. THEROPOGON, *Maxim.*

Rootstock branched with thick root fibres. *Leaves* radical, linear, bases enclosed in sheaths, costate. *Scape* axillary from the lower leaves, naked. *Flowers* in a terminal raceme, small, rose-cold., nodding. *Perianth* globosely campanulate; segments subequal, broadly ovate, broadly imbricate. *Stamens* inserted at the base of the segments, included; filaments short, broadly obovoid, fleshy, incurved; anthers basifixed between the lobes, ovoid, acute, cells spreading over the top of the filament, erect. *Ovary* sessile; style filiform, acute, stigma minute; cells 6–10-ovuled. *Berry* subglobose. *Seeds* few or several, subglobose, testa thin adnate; embryo straight or curved.

1. **T. pallidus,** *Maxim. in Bull. Acad. Petersb.* xv. 89; *Baker in Journ. Linn. Soc.* xiv. 562; *Bot. Mag.* t. 6154. Ophiopogon? pallidus, *Wall. Cat.* 5138; *Kunth Enum.* v. 200. O. brevifolius, *Royle mss.*? O. mollis, *Royle Ill.* 382 (name).

TEMPERATE HIMALAYA, from Kumaon, alt. 6000 ft. to Sikkim, alt. 6–10,000 ft. KHASIA HILLS, alt. 5–6000 ft.

Habit of an *Ophiopogon*. *Leaves* 6–10 in., erect and recurved, grassy, acuminate, persistent, costa stout, green above, glaucous beneath. *Scape* shorter than the leaves, acutely angled. *Raceme* 2–3 in.; pedicels ¼–½ in., solitary, jointed under the perianth; bracts green, subulate. *Flowers* ¼ in. diam., drooping, white suffused with pink. *Berries* ¼ in. diam.—Maximovicz describes the foliage as annual.

8. TUPISTRA, *Ker.*

Rootstock tuberous or creeping. *Leaves* radical, petioled, oblanceolate, costate, strongly nerved. *Scape* short or long; flowers spicate, lurid. *Perianth* campanulate, tube broad; lobes 6 or 8, short. *Stamens* 6 or 8, inserted in the middle of the tube, included; filament very short, inflexed; anthers dorsifixed, incurved. *Ovary* small, sessile, subglobose, 3–4 celled; style very short, stigma peltate or capitate, entire or 3–6-lobed; cells 2-ovuled. *Berry* globose, usually 1-seeded. *Seeds* large, testa thin adnate; albumen fleshy.—Species 7 or 8, tropical Himalayan and Burmese.

* *Bracts shorter than the flowers.*

1. **T. nutans,** *Wall. in Bot. Reg.* t. 1223; *Cat.* 5793; spike pendulous densely many-fld., flowers dull brown and purple, perianth lobes broadly ovate, mouth closed by the large hemispheric stigma. *Bot. Mag.* t. 3054; *Kunth Enum.* v. 318. T. squalida, *Baker in Journ. Linn. Soc.* xiv. 580 (*in part*).

SIKKIM HIMALAYA, alt. 1–5000 ft, *J. D. H.* KHASIA HILLS, alt. 2–4000 ft., *Wallich*, &c.

Rootstock as thick as the little finger. *Leaves* 2–3 ft. by 2–2½ in., narrowly oblanceolate, acuminate, coriaceous, shining; petiole as long as the blade or shorter. *Peduncle* 1½–4 in. stout, decurved; spike 3–6 in.; bracts deltoid, scarious. *Flowers* ½–⅝ in. diam., tube hemispheric longer than the lobes. *Berry* ¾–1 in. diam.

2. **T. macrostigma,** *Baker in Bot. Mag.* t. 6280; spike pendulous or decurved few- and lax-fld., flowers vinous purple, perianth lobes broadly ovate, mouth closed by the large hemispheric stigma. Macrostigma tupistroides, *Kunth Enum.* v. 319; *Schnitzl. in Regel Gartenfl.* 1857, 130, t. 192. —?Tupistra, *Griff. Notul.* iii. 157; *Ic. Pl. Asiat.* t. 165.

KHASIA HILLS, 3–4000 ft.; *Griffith*, &c.

Except by the characters given above I cannot separate this from *nutans*, and in the dried state they are undistinguishable.—Griffiths' is a much exaggerated drawing.

3. **T. Clarkei,** *Hook. f.*; spike decurved or pendulous dense-fld., perianth lobes oblong, mouth not closed by the stigma, style long.

SIKKIM HIMALAYA, alt. 2–5000 ft., *J. D. H., Clarke, Treutler.*

Apparently a much larger plant than the above, with leaves 4–5 by 2–3½ in., and larger flowers of a pale greenish yellow or purplish colour.

4. **T. Stoliczkana,** *Kurz in Journ. As. Soc. Beng.* 1875, ii. 199; spike elongate erect, perianth-lobes linear-lanceolate, style very short stout, stigma large scabrid.

BURMA; Moulmein, *Stoliczka.*

Leaves 2½–3 ft. by 4–5 in.; petiole 1–1½ ft. *Spike* 1 ft., robust; peduncle 4 in. *Flowers* ½–¾ in. diam.

** *Bracts longer than the flowers.*

5. **T. aurantiaca,** *Wall. Cat.* 5194; leaves sessile narrowly oblanceolate, spike subsessile. Campylandra aurantiaca, *Baker in Journ. Linn. Soc.* XIV. 582, t. 20.

SUBTROPICAL HIMALAYA; from Nepal, *Wallich*, &c., eastward to Mishmi, alt. 4–6000 ft. KHASIA and NAGA HILLS, alt. 4–8000 ft., *Griffith*, &c.

Rootstock as thick as the little finger, roots very long and stout. *Leaves* 12–18 by 1–1½ in., flaccidly coriaceous. *Peduncle* very short and stout. *Spike* erect, 1–1½ in. long, oblong, dense-fld.; bracts 1 in., lanceolate, spreading. *Flowers* ½ in. diam., yellow; perianth-tube hemispheric, lobes short nearly orbicular; style short, stigma large, 3-nd. *Berry* ¾ in. diam., globose.

6. **T. Wattii,** *Hook. f.*; leaves petioled elliptic-lanceolate or -ovate acuminate, spikes subsessile. Campylandra Wattii, *Baker in Journ. Linn. Soc.* XXV. 78, t. 32.

BHOTAN HIMALAYA, *Griffith.* MUNNIPORE, alt. 6–7000 ft., *Watt, Clarke.*

Stem stout, fleshy, 6–10 in., from a long fleshy prostrate rhizome. *Leaves* 4–12 by 1½–3 in. *Peduncle* very short, stout. *Spike* 1–3 in., dense-fld.; bracts linear-lanceolate; flowers yellow. *Berry* 1½ in. diam., 1-seeded.

7. **T. singapureana,** *Wall. Cat.* 5195; leaves petioled elliptic-lanceolate acuminate membranous, spike sessile elongate stout erect, bracts much longer than the globose fruit. *Baker in Journ. Linn. Soc.* xiv. 581.

SINGAPORE, *Wallich.*

Stem short, erect, as thick as the finger. *Leaves* 10–16 by 2–2½ in., erect; petiole 3–6 in., stout, ribbed. *Spike* 3 in.; bracts ½ in., lanceolate, membranous. *Berries* globose, ½ in. diam.—Wallich's solitary specimen is in fruit only. Kurz (Journ. Beng. As. Soc. 1875, ii. 199), who had not seen the plant, thinks it may be a *Hypoxidea* or *Apostasia*, but I see no reason to doubt its being a *Tupistra.*

9. **ASPIDISTRA,** *Ker.*

Characters of *Tupistra*, but scape very short, 1-fld.; flowers tetramerous, embraced by concave sheathing bracteoles inserted at the base of the perianth.—Species 3 or 4, Himalayan, Japanese and Chinese.

A. longifolia, *Hook. f.*; leaves 2–3 ft. by 1–2 in. narrowly linear-oblanceolate, bracts 2–3 hemispheric strongly nerved. A. lurida, *Baker in Journ. Linn. Soc.* xiv. 579, *not of Ker.*

Upper Assam; in the Mishmi hills, *Griffith.*

Rootstock stout, creeping. *Leaves* tufted, rather thin, contracted into a rigid deeply grooved petiole that is produced into a trigonous keel extending half way up the leaf more or less, nerves close set slender. *Peduncle* ½–¾ in., stout, with a boat-shaped bract at the top. *Flower* (bud ?) very shortly pedicelled; bracts scarious, rounded at the apex; perianth ½ in. diam., fleshy, subglobose contracted at the mouth; lobes very small. *Anthers* sessile, recurved. *Stigma* very large.—A very different plant from the *A. lurida*, Ker of China.

10. **GONIOSCYPHA,** *Baker.*

Leaves radical, petioled, oblong-lanceolate, acuminate, costate and strongly nerved. *Scape* radical, bracts elongate-subulate much exceeding the flowers; spike erect, cylindric, crowned with a tuft of flowerless persistent bracts. *Perianth-tube* cylindric; lobes 6, short, broadly ovate, spreading. *Stamens* 6, inserted in the throat of the perianth, filaments very short; anthers erect, linear-oblong. *Ovary* subglobose, 3-celled; style columnar; stigma small, 3-lobed; cells 2-ovuled.

G. eucomoides, *Baker in Journ. Linn. Soc.* xiv. 581, t. 19; *N.E. Br. in Gard. Chron.* 1886, ii. 744.

Bhotan Himalaya; in the Duphla hills, alt. 4500 ft., *Booth, Lister.*

Rootstock long, fleshy. *Leaves* 1–2 ft. by 6–8 in., narrowed into a petiole 4 in. long, subpinnately 10–12-nerved. *Scape* 8–9 in., stout, strict, terete, with basal scarious sheaths; spikes 3 in., dense-fld., cylindric; bracts setaceous, persistent; flowers at length deflexed, nearly ½ in. long, dark green. *Berry* ovoid, ½–¾ in. long, fleshy, 1-seeded.

10* Hemerocallis, *Linn.*

Rootstock very short, with fleshy root-fibres. *Leaves* elongate, narrowly linear, costate and many-nerved. *Scape* elongate, terete, naked, bearing a few-fld. panicle; bracts deciduous. *Flowers* large, suberect, orange-yellow. *Perianth* funnel-shaped, 6-partite, segments connate at the base in a tube, then recurved, outer smaller. *Stamens* 6, inserted at the mouth of the tube, exserted, filaments filiform, declinate, inserted in a dorsal pit of the linear-oblong versatile anther. *Ovary* 3-celled; style filiform, declinate, stigma capitate; cells many-ovuled. *Capsule* triquetrous, coriaceous, loculicidal. *Seeds* angled; testa thin, black, shining; embryo cylindric.—Species 5, Europe, temp. Asia and Japan.

H. fulva, *Linn. Sp. Pl.* Ed. ii. 462; inner perianth-segments much larger and broader than the outer, margins undulate with reticulate nerves. *Kunth Enum.* iv. 588; *Baker in Journ. Linn. Soc.* xi. 359; *Boiss. Fl. Orient.* v. 312; *Bot. Mag.* t. 64; *Redouté Lil.* t. 16; *Reichb. Ic. Fl. Germ.* t. 1113; *Wall. Cat.* 8975. H. disticha, *Don in Sweet Brit. Fl. Gard.* t. 28.

The HIMALAYA and KHASIA HILLS; possibly indigenous; cultivated throughout INDIA.—DISTRIB. S. Europe, the Caucasus and N. Asia to Japan.

Leaves 12–24 by 1–1½ in., erecto-patent, acute, subglaucous beneath. *Scape* 2–3 ft., panicle 6–12-fid.; pedicels short; bracts small, membranous. *Flowers* nodorous, 1–2 in. diam.; tube yellow-red; outer segments orange yellow, oblong, acute, inner very much broader.

Var. *angustifolia*, Baker l. c.; much smaller, leaves 12–18 by ⅛–¼ in., perianth-segments narrower more acute. *Boiss. l. c.* H. longituba, *Miquel Ann. Mus. Lugd. Bat.* iii. 152.

11. DRACÆNA, *Linn.*

Shrubs or trees. *Leaves* alternate or crowded and subterminal, sessile or petioled, costate or not and many-nerved. *Flowers* in terminal racemes panicles or heads; bracts small. *Perianth* tubular, campanulate or funnel-shaped, 6-cleft, lobes narrow. *Stamens* 6, inserted at the base of the tube, filaments filiform or flattened; anthers versatile. *Ovary* 3-celled; style filiform, stigma capitate; ovules 1, erect in each cell. *Berry* globose didymous or 3-lobed. *Seeds* globose or angled, testa thickish, albumen horny; embryo small.—Species about 35, in warm regions of the Old World.

This genus wants a thorough revision on living plants. The following attempt to delimit the Indian species has been a work of much labour and the result is provisional only.

* Leaves linear or ensiform, sessile.

1. **D. angustifolia,** *Roxb. Fl. Ind.* ii. 155; stem erect, leaves 8–20 by ¾–1 in. costate waved, panicle very large decurved spreading, flowers ½–1 in., pedicels ⅛–¼ in., fruit ½–⅔ in. diam. fleshy. *Wall. Cat.* 5141; *Kunth Enum.* v. 4; *Regel Revis. Drac.* 36; *Baker in Trim. Journ. Bot.* 1873, 262; *in Journ. Linn. Soc.* xiv. 526; *Kurz For. Fl.* ii. 543. D. ensifolia, *Wall. Cat.* 5143; *Kunth Enum.* 5; *Kurz l. c* Terminalia angustifolia, *Rumph. Amb.* iv. t. 35. Sanseviera fruticosa, *Blume Enum.* i. 11.

SILHET, *Wallich*, &c. KHASIA and NAGA HILLS, common. BURMA, ANDAMAN ISLANDS, *Kurz.*—DISTRIB. Malaya, Australia.

Stem 8–10 ft., as thick as a stout cane, simple or forked. *Leaves* sessile by a broad sheathing base, spreading and recurved. *Flowers* white or tipped with pink. *Fruit* orange-cold.—Kurz distinguishes his *ensifolia* by the panicle nodding longer than the leaves, bracts acute almost wholly scarious, filaments orange, pedicels ½ in.; and *angustifolia* by the erect stiff panicle shorter than the leaves, bracts with a scarious border, filaments white.

2. **D. graminifolia,** *Wall. Cat.* 5149; leaves 8–12 by ⅛–⅓ in., obscurely costate, raceme erect simple or branched at the base quite smooth; flowers ¾ in. long. D. Finlaysoni, *Baker in Trim. Journ. Bot.* 1873, 261; *in Journ. Linn. Soc.* xiv. 525.

STRAITS of MALACCA, Dinding Island, *Finlayson.*—DISTRIB. Borneo ?.

Wallich's specimens are very insufficient, and I hesitate to regard the Bornean plant, from which Baker's description is in part taken, as specifically the same.

3. **D. granulata,** *Hook. f.*; arboreous, leaves 6–10 by ½ in. sessile, panicle erect pyramidal, rachis and branches finely granulate when dry, fruit ¾–1¼ in. diam. shortly pedicelled fleshy.

MALAY PENINSULA; Perak, *King's Collector.*

Stem 50–60 ft. by 18–20 in. diam.

4. **D. brachyphylla,** *Kurz. For. Flor.* ii. 544; a low shrub, leaves ½–1 ft. costate, panicle erect stiff quite smooth shorter than the leaves, flowers ⅔ in., filaments white. D. atropurpurea, *var.* Kurzii, *Baker in Journ. Linn. Soc.* xiv. 533.

ANDAMAN ISLANDS, frequent, *Kurz.*

I have seen only very imperfect specimens. Kurz describes the stem as thick as a goose-quill or twice as thick.

5. **D. brachystachys,** *Hook. f.*; leaves 3 ft. by 2 in. ensiform coriaceous costa beneath very stout, branches of panicle scabrulous spreading, flowers shortly pedicelled ternately fascicled.

PENANG; Monisti road, *Curtis*, 2302.

Stem 10–12 ft., 2–3 in. diam. *Leaves* fascicled. *Panicle* apparently very large with rather distant horizontal strict branches, bracts very small. *Flowers* in rather remote fascicles ⅓ in. long white, pedicel ⅛ in.—Described from one leaf and a portion of a panicle.

** Leaves elliptic-lanceolate or -oblanceolate (very narrowly in D. Porteri).

† Flowers in spiciform racemes that are simple or branched at the base only.

6. **D. Porteri,** *Baker in Trimen Journ. Bot.* 1873, 262; *in Journ. Linn. Soc.* xiv. 529; shrubby, leaves 8–10 by 1–1¾ in. sessile narrowly lanceolate or oblanceolate costate towards the base, raceme shortly peduncled erect, flowers ⅔ in. long, pedicels very short, fruit pisiform. D. maculata, *Wall. Cat* 5748 (*not of Roxb.*).

PENANG, *Porter, King's Collector*; SINGAPORE, *Wallich.* MALACCA, *Griffith* (*Kew Distrib.* 5874), *Maingay* (*K. d.* 1687).—DISTRIB. Siam.

Shrub 4–6 ft. (*King's Coll.*).—Apparently very near *D. spicata*, but with narrower leaves. Wallich's 5148 A has spotted leaves; his B from Singapore may be different, it is more slender with a more contracted leaf-base.

7. **D. spicata,** *Roxb. Fl. Ind.* ii. 157; arboreous, leaves 6–18 by 1½–2 in. very broadly petioled elliptic or broadly oblanceolate finely acuminate, raceme long or short simple or branched at the base, flowers fascicled very shortly pedicelled, fruit pisiform ¼ in. diam., or 3-lobed and ¾ in. fleshy. *Kunth Enum.* v. 10; *Wall. Cat.* 5146; *Regel Revis. Drac.* 44; D. Wallichii, *Kunth in Act. Acad. Berol.* 1842, 26.

SILHET, *Wallich*, CHITTAGONG, *Roxburgh*, SOUTH ANDAMAN ISLANDS, *Kurz.*

I am unable to unravel the synonymy and habitats of this species and *D. terniflora*, which however, according to Roxburgh and Kurz are very different plants. Baker (*Journ. Bot.* 1873, 263, and *Journ. Linn. Soc.* xiv. 532) unites them (as *D. spicata*), together with *D. aurantiaca*, Wall., and gives its distribution as from the eastern Himalaya to the Nilghiris, Malacca, and the Congo River in Western Africa. Of these the Himalayan (for which Griffith, Wallich, and I are cited), is an error, as none of us collected it there. On the other hand it is probably a Malayan species. Roxburgh describes the flower as numerous, and sessile in fascicles, pale greenish, cleft about half way down, and the ripe berries as deep reddish orange. Kurz says the flowers are in twos or threes, an inch long, greenish yellow and the berries glossy crimson.

8. **D. terniflora,** *Roxb. Fl. Ind.* ii. 159; a low decumbent slender shrub, leaves 6–12 in. by 1–2 in. elliptic or oblanceolate finely acuminate, petiole 1–6 in., flowers 2–3-nate pedicelled, fruit pisiform or 3-lobed. *Regel Revis. Drac.* 16; D. ternifolia (*error for terniflora*), *Kurz For. Fl.* ii. 545.

SILHET, CACHAR, the KHASIA HILLS, MUNNIPORE, CHITTAGONG, and the DECCAN PENINSULA, *Roxburgh*, and ? MALAY PENINSULA.

According to Roxburgh and Kurz, this is distinguished from *D. spicata* by size and habit, and the petioled leaves, and according to Kurz, by the perianth 6-cleft to the middle, that of *D. spicata* being 6-cleft half-way down. Roxburgh describes the fruit as of the size and appearance of a fine red cherry; but Kurz as orange red. In both species the perianth becomes twisted in age, and in both the thinly coriaceous leaves may be blotched with white.

Var. *Heyneana*; spike or panicle much shorter than the leaves. D. Heyneana, *Wall. Cat.* 5754. D. terminalis, *Wight Ic. t.* 2054.—Western Ghats, from the Concan southwards, *Heyne*, &c.

Var ? *Thwaitesii*; spike or panicle very short, flowers smaller ¼ in. long. D. Thwaitesii, *Regel Revis. Drac.* 44; *Baker ll. cc.* D. elliptica, *Thunb. & Dallm. Diss.* 3 (the Ceylon plant); *Thwaites Enum.* 338.—Ceylon, ascending to 4000 ft.

Var. ? *Curtisii*; stem short, leaves 4–6 in. elliptic sessile squarrosely spreading and recurved elliptic-lanceolate caudate-acuminate, raceme much longer than the leaves slender long-peduncled, flowers 1 in. long very slender.—Penang, at Polo Boolong, *Curtis*.

9. **D. pachyphylla,** *Kurz For. Fl.* ii. 546; shrubby 1–2 ft., leaves 4–6 by 1½–2½ in. coriaceous subulate-acuminate costate, lower long-petioled, raceme subsessile very short or elongate, flowers very shortly pedicelled, berries pisiform or 3-lobed.

ANDAMAN ISLANDS, *Kurz*. PERAK, *King's Collector*. MALACCA, on Mt. Ophir, *Hullett*.—DISTRIB. Borneo.

Resembles a dwarf *D. spicata*. "*Stem* sometimes as thick as the little finger; leaves often blotched; flowers ¾ in. long, white, 6-cleft almost to the base; lobes conniving not recurved except the tips; tube not twisted; berries red," *Kurz*.

†† Flowers in spreading panicles.

§ *Panicle large, rachis and branches very stout.*

10. **D. aurantiaca,** *Wall. Cat.* 5744; stem very stout, leaves 12–18 by 2–4 in. oblanceolate acuminate narrowed into a very broad almost flat petiole, costa broad obscure, panicle 12–18 in., peduncle very short stout, pedicels ¼–⅓ in., flowers densely clustered ¾ in. D. spicata, *var.* aurantiaca (in part), *Baker in Trim. Journ. Bot.* 1873, 263, and *in Journ. Linn. Soc.* xiv. 532. ? D. marmorata, *Baker in Bot. Mag.* t. 7078.

SINGAPORE, *Wallich, Cantley*. MALACCA, *Maingay* (*K. d.* 1683).

Apparently arboreous. I doubtfully refer Baker's *D. marmorata* to Wallich's *aurantiaca*. Wallich's name may imply that either the flowers or fruit of his plant are orange yellow. The flowers of *D. marmorata* are white, and the leaves mottled with white. I have seen fruit of neither.

11. **D. Maingayi,** *Hook. f.*; stem tall stout, leaves 8–12 by 1–2 in. narrowly elliptic-lanceolate caudate-acuminate costate below the middle, panicle erect peduncled very stout, pedicels ½ in., flowers 1 in., berries 1–1½ in. diam. fleshy. D. spicata, *var.* aurantiaca, in part, *Baker in Trim. Journ. Bot.* 1873, 263, and *Journ. Linn. Soc.* xiv. 263.

MALACCA; at Pulo Bissom, *Griffith* (*Kew Distrib.* 5873), *Maingay* (*K. d.* 1685). PERAK, on low hills, *King's Collector*.

"Tree 30–40 ft.; stem 1½–2 ft. diam.; fruit waxy yellow," *King's Collector*. "Fruit scarlet," *Griffith*. The very narrow long-petioled leaves distinguish this from *D. aurantiaca*, and the large stout pyramidal panicle and large berries from *D. spicata*.

§§ *Panicle large or small, rachis and branches slender.*

12. **D. elliptica,** *Thunb. Diss. Bot. Dracæn.* 6; stem slender decumbent or ascending, leaves 4–8 by 1½–2½ in. scattered or crowded acuminate or caudate narrowed into a short rather slender petiole costate at the base, flowers solitary or 2–4-nate in decurved lax-fld. panicles, pedicels ¼–⅓ in. slender, perianth 6-lobed to the middle, lobes erect, berries pisiform ½ in. diam., or 2–3-lobed. *Kunth Enum.* v. 14; *Baker in Trim. Journ. Bot.* 1873, 263; *in Journ. Linn. Soc.* xiv. 532; *Kurz For. Fl.* ii. 544. D. Wallichii, *Kunth l. c.* 11. D. terniflora, *Wall. Cat.* 5147 A.; *Kunth l. c.* 11. D. maculata, *Roxb. Fl. Ind.* ii. 157. D. elliptica, *var.* maculata, *Hook. Bot. Mag.* t. 4787 (*excl. some syns.*). D. atro-purpurea, *Roxb. Fl. Ind.* ii. 160; *Kunth Enum.* v. 12; *Baker in Journ. Linn. Soc.* xiv. 533. D. elliptica, *var.* atropurpurea. *Kurz l. c.* 544. D. javanica, *Kunth Enum.* v. 14; *Regel Revis. Dracæn.* 45. D. maculata, *Planch. l. c.* t. 569. Cordyline terniflora, *Planch. in Fl. des Serres*, vi. 136.

SILHET, the KHASIA HILLS, *Wallich*, &c, BURMA, the ANDAMAN and NICOBAR ISLANDS, *Kurz.*—DISTRIB. Java.

Stems low, 1–2 ft., as thick as a goose-quill, simple or branched, ascending, rooting at the base. *Leaves* thickly coriaceous, green or blotched with white or black or all purple. *Panicle* often lying flat on the uppermost leaves, subsessile, branches slender curved; bracteoles ovate, scarious. *Flower* ⅔ in. long, slender, 6-cleft to the middle, white purple or greenish; filament white. *Berries* orange red.—The short rather slender petioles of this and the following species are very characteristic, of upper leaves at any rate; but I collected in the Khasia the lower purple leaves of what I supposed was the same species 12–14 by 2–3 in., oblanceolate, narrowed into a long broad petiole.—There may be more than one species under this name. Roxburgh's drawing of *atropurpurea* represents the panicle as erect.

13. **D. gracilis,** *Wall. Cat.* 5150; slender, much branched, leaves scattered 3–7 by ¾–1½ in.. elliptic-lanceolate acuminate narrowed into a very short narrow petiole, panicle short very slender few and sparse-fld. decurved, flowers ⅔ in. subsolitary pedicels slender, bracts scarious, berries pisiform. D. atropurpurea, *var.* gracilis, *Baker in Trim. Journ. Bot.* (1873) 264; *in Journ. Linn. Soc.* xiv. 534.

PENANG, *Porter*; alt. 2500 ft., *Curtis*. PERAK, alt. 3500–4500 ft., *Wray, King's Collector*. MALACCA, Mount Ophir, *Hullett.*—DISTRIB. Siam, Sumatra, Borneo.

Perhaps, as Baker supposed, a small state of *D. elliptica*, the petiolation of the leaves being of the same character; if so, it is a mountain form of that plant.

14. **D. Helferiana,** *Wall. ex Kurz in Journ. As. Soc. Beng.* xlii. (1873) ii. 248; *Kurz For. Fl.* ii. 545; a small decumbent shrub, leaves 12–18 by 1½–2 in. oblanceolate acuminate narrowed into a longer or shorter petiole costate, panicle large loosely branched lax-fld., bracteoles minute, flowers 1 in. white or greenish, pedicels slender, perianth 6-cleft nearly to the base, segments erect, berries pisiform or 3-lobed. D. Griffithii, *Regel Revis. Dracæn.* 47. D. terniflora, *Wall. Cat.* 5147 B, *in part.* D. atro-purpurea, *var.* Griffithii, *Baker in Trim. Journ. Bot.* (1873) 264; *in Journ. Linn. Soc.* xiv. 533.

BURMA; Moulmein and Attran, *Wallich*; Pegu, *Scott*; Mergui, *Griffith* (*Kew Distrib.* 5869, 5877).

Habit of *D. elliptica*, but according to Kurz only 1–2 ft. high, and differing in the broad petioles, much larger panicle, minute bracteoles and the perianth-cleft nearly to the base.

15. **D. petiolata,** *Hook. f.*; leaves 10–14 by 4 in. elliptic caudate-acuminate ecostate suddenly narrowed into a slender petiole 3–4½ in., panicle long-peduncled narrow, branches slender erect, bracteoles longer than the short pedicels, flowers ¾ in., lobes as long as the tube, fruit pisiform, pericarp very thin wrinkled when dry. D. spicata, *var.* aurantiaca, in part, *Baker in Trim. Journ. Bot.* 1873, 263; *in Journ. Linn. Soc.* xiv. 532.

UPPER ASSAM; near Kujoo, and at the Brama Khoond, *Griffith.*

Apparently a very distinct species from the broad very long-petioled leaves and long-peduncled panicles.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

D. JACKIANA, *Wall. Cat.* 5145 A, B. (D. spicata, *var.* aurantiaca, *Baker in Trim. Journ. Bot.* 1873, 263; *in Journ. Linn. Soc.* xiv. 532.) A very robust plant, from Penang, like a large *D. spicata*, the tall raceme, having short basal branches. I find no specimen of his 5145 C (Penang, *Porter*) in Wallich's Herbarium.

D. LINEARIFOLIA, *Kurz For.* ii. 542, in Clavis of species, but not taken up in the following descriptions. It has the habit of *P. angustifolia*, but has narrower leaves and the lobes of the fruit as large as a cherry or small plum. A Javanese species in Herb. Kew responds to this description.

D. CANTLEYI, *Baker in Journ. Bot.* 1881, 326. Singapore, *Cantley.* There is little in the description of this plant, of which a specimen flowered at Kew, to distinguish it from *D. marmorata* (*aurantiaca*). Unfortunately flowers were not preserved for the Herbarium. The live plant at Kew has now a stem 4 in. long, with lanceolate leaves 15 by 4½ in., suddenly narrowed into a petiole 1–1½ in. broad.

12. CORDYLINE, *Commers.*

Characters of *Dracæna*, but ovarian cells 4–16-ovuled, testa black shining, and embryo nearly as long as the albumen.—Species about 10, Malayan, Australasian, Pacific, and one Brazilian.

1. **C. terminalis,** *Kunth Enum.* v. 25; shrubby, erect, leaves 12–36 by 2–5 in. oblong-lanceolate broadly petioled, flowers white or purplish subspicate or racemed on the branches of a large erect simply branched panicle, perianth ½ in. cleft to the swollen base, segments recurved. *Kurz For. Fl.* ii. 546; *Baker in Journ. Linn. Soc.* xiv. 539.

TROPICAL INDIA, from BENGAL and ASSAM eastward and southward to MALACCA.—DISTRIB. Eastwards to the Pacific Islds.

An erect, glabrous shrub, 8–10 ft., stems as thick as the finger or wrist. *Leaves* distichous, green or purplish, acuminate at both ends; petiole complicate, base dilated and amplexicaul. *Panicle* 1–2 ft. high; lower bracts linear-lanceolate; bracteoles small, 3-nate; flowers ½ in. long, subsessile, or very shortly pedicelled, white or purplish. *Berry* ½ in. diam., usually 1-seeded.—Kurz (for Fl. l. c.) makes two varieties in Burma; *terminalis proper* with larger subsessile flowers, which is only cultivated; and *ferrea*, with smaller flowers, pedicels shorter or slightly longer than the bracteoles. Baker (in Journ. Linn. Soc. l. c.) has the following varieties:—

Var. 1, *ferrea*; leaves narrower more oblanceolate dull purple or variegated 2–2½ in broad, petioles shorter, flowers usually smaller tinged with red. D. ferrea, *Linn. Syst.* 275; *Roxb. Fl. Ind.* ii. 156; *Bot. Mag.* t. 2053. D. terminalis, *Jacq. Ic.* t. 448; *Roxb.* l. c.; *Redouté Lil.* t. 91; *Lodd. Bot. Cat.* t. 1224. Cordyline Jacquinii, *Kunth l. c.* 23.

Var. 2. *Sieberi*; leaves oblanceolate 12–18 by 2–3 in., racemes 1 in. broad, pedicels longer, flowers larger. Cordyline Sieberi, *Kunth Enum.* v. 23.—Malacca, *Griffith, Maingay.*

13. ASPHODELUS, *Linn.*

Annual, or perennial, root-fibres slender or fleshy. *Leaves* radical, linear, triquetrous, or terete and fistular. *Flowers* racemed, solitary in the bracts. *Perianth* white, marcescent, 6-partite, segments conniving in a tube below. *Stamens* 6, hypogynous; filaments dilated at the base and embracing the ovary, inserted in a pit of the dorsifixed versatile anther. *Ovary* 3-celled; style filiform, stigma sub-3-lobed; ovules 2 collateral in each cell. *Capsule* usually 1-seeded, loculicidal. *Seeds* 3-quetrous, testa black appressed; embryo nearly as long as the cartilaginous albumen.—Species 6 or 7, S. Europe and eastward to India.

1. **A. tenuifolius,** *Cavan. in Anal. Cienc. Nat.* iii. 46, t. 27; and *Icon.* t. 587, f. 2; annual, leaves slender semi-terete fistular and scape smooth or papillosely scaberulous, pedicels jointed below the middle, perianth-segments white with a brownish costa, filaments fusiform towards the tip. *Kunth Enum.* iv. 558. A. æstivus, *Reichb. Ic. Crit.* t. 451. A. microcarpus, *Reichb. Ic. Fl. Germ.* t 513. A. clavatus, *Roxb. Fl. Ind.* ii. 148; *Wall. Cat.* 5058; *Kunth* l. c. 559. A. parviflorus, *Wight Ic.* t. 2062 (bad. pauciflorus, *in text* vi. p. 27.). A. fistulosus, var. tenuifolius, *Baker in Journ. Linn. Soc.* xv. 272. A. tenuifolius, var. micranthus, *Boiss. Fl. Or.* v. 314.

Plains of INDIA, in fields, from Bengal westwards to Guzerat and the Punjab. —DISTRIB. Westward to the Canary Isles.

Leaves 6–12 in., erect, about $\frac{1}{12}$ in. diam., acuminate. *Scape* 1½–3 ft., terete, often excessively scopariously branched. *Racemes* lax-fld.; pedicels ⅛–¼ in. *Perianth*-segments ¼ in. long. *Capsule* globose, ⅛ in. diam., valves deeply wrinkled. *Seeds* trigonous, with 3–4 dorsal ridges and as many lateral pits.—Probably as Baker considers it, a form of the European *A. fistulosus*, but always much smaller, especially the flowers, and with the pedicel jointed below the middle. Wight's figure is very incorrect as regards the filaments, he is unable to give any locality for the specimen figured, which he supposes is from the sandy soils of the East Coast of the Deccan.

2. **A. comosus,** *Baker in Gard. Chron.* 1887, i. 799; leaves ensiform 18 by 1½ in., peduncle very stout, racemes panicled dense-fld.

LAHUL, in the Rolang Pass, *Jaeschke.*

Habit of *A. albus* and *ramosus*. *Leaves* rather thick. *Peduncle* 2 ft.; panicle 1 ft., pedicels ⅛–¼ in., ascending, jointed below the middle; bracts ½ in., much longer, scarious. *Flowers* 1–1¼ in. diam.; segments linear-oblong, white with a green keel. *Stamens* ⅓ in. longer than the perianth; style as long.

14. EREMURUS, *Bieberst.*

Stately herbs, with the characters of *Asphodelus*, from which the genus differs only in the usually more numerous ovules.—Species about 20, oriental and Northern Asian.

1. **E. himalaicus,** *Baker in Journ. Linn. Soc.* xv. 283; glabrous, bracts subulate-lanceolate equalling the pedicels, flowers white, filaments as long as the perianth, capsule rugose, seeds not winged.

TEMPERATE WESTERN HIMALAYA, in the drier regions, from the Sutlej westwards, alt. 7–10,000 ft.—DISTRIB. Eastern Turkestan.

Leaves 1–3 ft. by ¼–3 in. *Scape* and *raceme* very stout, 2–3 ft.; pedicels ¾ in., bracts subulate filiform. *Flowers* 1 in. diam.; segments oblong, 1-nerved, about equalling the filament. *Capsule* ½ in. diam. *Seeds* triquetrous.

2. **E. persicus,** *Boiss. Diagn.* vii. 119; *Fl. Orient.* v. 326; puberulous, bracts ovate-lanceolate shorter than the pedicels, flowers white, filaments shorter than the perianth, capsule smooth small broadly winged. *Baker in Journ. Linn. Soc.* xv. 284. Asphodelus persicus, *Jaub. & Spach Ill. Pl. Or.* t. 102.

NORTH-WEST INDIA; Salt range, Mt. Sikesa, alt. 4–5000 ft., *Aitchison.*—DISTRIB. Affghan., Persia, Syria.

Leaves 6–12 by ⅛–½ in. *Scape* 10–24 in., simple, stout. *Raceme* 6–12 in.; bracts ½ in., scarious; pedicels 1 in., fruiting 2½ in. horizontal. *Flowers* ¾ in. diam., segments white with a brown central band. *Capsule* 1 in. broad. *Seeds* black, broadly 3-winged.—Very variable in stature and in length and breadth of the leaves.

15. CHLOROPHYTUM, *Ker.*

Characters of *Anthericum*, but capsule trigonous, deeply laterally 3-lobed with flattened lobes.—Species about 40, tropical and subtropical.

The species are most difficult of circumscription owing to the great variability in the leaves and length and robustness of the scapes, and racemes.

* Flowers in simple or shortly branched dense-fld. racemes.

† *Leaves lanceolate or oblanceolate, if fully developed.*

1. **C. Heyneanum,** *Wall. Cat.* 5060; scape stout shorter than the leaves naked, racemes short dense-fld., anthers shorter than the filaments, cells of the oblong capsule 8–10-seeded. C. Heynei, *Baker in Journ. Linn. Soc.* xv. 322. C. breviscapum, *Thw. Enum.* 339.

The DECCAN PENINSULA, *Heyne*, &c.; Nilghiri hills, alt. 6000 ft. *Clarke.* CEYLON, common in the central province.

Root-fibres tuberous. *Leaves* 12–18 by 1–1¾ in., oblanceolate; petiole 2–4 in. *Scape* ½–1 in.; bracts longer than the small flowers, pedicels ⅛–¼ in., jointed near the tip. *Perianth-segments* ¼ in., narrowly lanceolate. *Capsule* ¼ in long. *Seeds* black, shining.

2. **C. breviscapum,** *Dalz. in Hook. Kew Journ. Bot.* ii. 141; scape naked shorter than the leaves, raceme dense-fld., anthers as long as the filaments, cells of the orbicular or obcordate capsule 1-3-seeded. *Dalz. & Gibs. Bomb. Fl.* 252.

SIKKIM HIMALAYA, at the foot of the hills (fl. only), *Clarke.* The CONCAN, at Malwan, *Dalzel.*

Root-fibres tuberous. *Leaves* 12 by ½–1¼ in., linear-lanceolate, broadly petioled, margins often crispulate. *Scape* stout, 3–6 in., rarely branched; raceme 3–5 in., bracts shorter than the flowers; pedicels ¼–½ in., jointed above the middle. *Perianth-segments* ⅛–¼ in., linear-oblong. *Capsule* ¼ in. broad, seeds subglobose, black, opaque.—Differs from *C. attenuatum* in the broader leaves and short scape.

3. **C. arundinaceum,** *Baker in Journ. Linn. Soc.* xv. 323; *in Gard. Chron.* 1876, 260; scape usually tall naked, raceme elongate simple or shortly branched, anthers longer than the filaments, cells of the small orbicular capsule 3–4-seeded. Phalangium alatum, *Herb. Ham. in Wall.*

Cat. 5056. Anthericum tuberosum, *Herb. Heyne.* Ornithogalum *indicum, Kœnig mss.*

EASTERN HIMALAYA, Sikkim, alt. 1–4000 ft. *J. D. H.* Bhotan, *Griffith.* ASSAM, *Hamilton.* BEHAR at Monghir, *Wallich*, on Parusnath, *J. D. H.* BURMA, at Prome, *Wallich.*

Root-fibres cylindric. *Leaves* 6–18 by 1½–2 in., oblanceolate, obtuse acute or acuminate, usually narrowed into a broad petiole. *Scape* 6–20 in. stout; raceme 3–8 in.; bracts ¾–½ in. or lower longer pedicels ¼–½ in. jointed in the middle. *Perianth-segments* ⅛–½ in. lanceolate, white. *Capsule* ⅛ in. broad 2-lobed at the tip and base. *Seeds* ⅛ in. diam., suborbicular, flat, black.—In small specimens the leaves are narrower and broadest at the base.

4. **C. glaucum,** *Dalz. in Hook. Kew Journ. Bot.* ii. 142; leaves glaucous, scape longer than the leaves 2–3-sheathed, racemes long stout dense-fld., bracts longer than the flowers erect bases cymbiform, filaments longer than the anthers, cells of the suborbicular capsule 2–4-seeded. *Dalz. & Gibs. Bomb. Fl.* 252; *Baker in Journ. Linn. Soc.* xv. 324.

The CONCAN; on the Ghats, rare, Dalzell, &c.

Root-fibres cylindric. *Leaves* 12–18 by 1–2 in., usually recurved, narrowly oblanceolate. *Scape* 1–2 ft., simple, sheaths narrowly lanceolate; raceme 6–12 in., unbranched; bracts green; pedicels ¼ in., jointed above the middle. *Perianth-segments* ¼–⅓ in., white; filaments papillose; anthers twisted after flowering. *Capsule* ¼–⅓ in. broad, top 2-lobed. *Seeds* ⅛–⅕ in. broad, flat, orbicular, opaque.

†† *Leaves linear or ensiform not or hardly contracted into a petiole.*

5. **C. tuberosum,** *Baker in Journ. Linn. Soc.* xv. 332; leaves sessile usually ensiform falcately recurved, scape short or tall, flowers large, anthers as long as the papillose filaments recurved finally revolute, cells of the oblong rarely orbicular retuse capsule 4–6-seeded. C. anthericoideum, *Dalz. in Hook. Kew Journ. Bot.* ii. (1850) 141: *Dalz. & Gibs. Bomb. Fl.* 251. Phalangium tuberosum, *Wight Ic.* t. 2036; *Kunth Enum.* iv. 598 (*in part.*) P. ornithogaloides, *Schweinf. Biltr.* P. alatum, *Wall. Cat.* 5056.C. Anthericum tuberosum, *Roxb. Fl. Ind.* ii. 149, *et Ic. in Herb. Kew*; *Cor. Pl.* ii. 20 (*not* t. 138). A. ornithogaloides, *Hochst. in A. Rich. Tent. Fl. Abyss.* ii. 232.

The DECCAN PENINSULA and CENTRAL INDIA, common from the Northern Circars, and the Concan to Travancore. BURMA; at Prome, *Wallich.*—DISTRIB. Abyssinia.

Root-fibres cylindric and tuberous. *Leaves* 8 in. to 2 ft. by ⅛–¾ in. (to 4 in. *Roxb.*), margins crisped. *Scape* 6 in. to 3 ft. with a small sheath; raceme short, simple or shortly branched; bracts ½–⅝ in., white; pedicels ½ in., stout, jointed below the middle; perianth-segments ½–⅝ in. long, oblong; stamens much shorter than the perianth. *Capsule* ½–⅔ in. long. *Seeds* irregularly orbicular, opaque.—The largest flowered Indian species and clearly the plant described by Roxburgh as having flowers as large as a snowdrop, but not that figured in the Cor. Pl., which is *C. attenuatum*; his drawings of both are at Kew, and both named *tuberosum.*

6. **C. khasianum,** *Hook. f.*; scape tall naked simple or branched, racemes rather dense-fld., bracts shorter than the flowers, anthers elongate straight longer than the filaments, cells of large oblong 2-lobed capsule 4–6-seeded. C. nepalensis, *Baker in Journ. Linn. Soc.* xv. 330 (*in part*).

KHASIA HILLS, alt. 3–6000 ft. *Griffith*, &c.

Leaves 10–24 by ¼–½ in., linear, flat. *Scape* 2–3 ft., sometimes ½ in. diam., smooth, branches short; racemes 6–10 in., pedicels ¼–½ in., erect, jointed above the middle.

Perianth white, segments ¼ in. linear-oblong; anthers not recurved or revolute after flowering. *Capsule* ½–¾ in. long. *Seeds* ¼ in. diam., orbicular, flat, black opaque.—Distinguished from *C. undulatum* by the short erect branches of the scape, crowded flowers, and large 4–6-seeded capsule.

7. **C. attenuatum,** *Baker in Journ. Linn. Soc.* xv. 332; leaves linear, scape erect naked, raceme rarely forked lax or dense-fld., anthers straight longer than the papillose filaments, cells of the small broadly obcordate capsule 3–4-seeded. Phalangium attenuatum, *Wight Ic.* t. 2037. P. indicum, *Kunth Enum.* iv. 198. Asphodelopsis arungadenensis, *Steud. in Hohenack. Pl. exsc. Ind. Or.* n. 1317. Anthericum tuberosum, *Roxb. Fl. Cor. Pl.* t. 13 (*not* p. 20, *nor of Fl. Ind.*). Ornithogalum indicum, *Roem. f. Syst.* vii. 535.

The WESTERN GHATS; from Canara southwards to Coimbatore.

Root-fibres cylindric, often tuberous. *Leaves* 10–18 by ¼–1 in., slightly narrowed at the base. *Scape* as long, erect, raceme 3–4 in.; bracts ovate, acuminate; flowers suberect, pedicels jointed about the middle. *Perianth* white, segments ⅛–¼ in. *Capsule* ⅛ in. broad.—Very small flowers with segments not ⅛ in. long occur amongst the others. That this is Roemer's *Ornith. indicum* is proved by a specimen from Heyne in Herb. Rottler (now at Kew) marked as from Condapilly, which is the authority for the name (misspelt Cardapilly) and collector given by Heyne. This specimen and those of Wight precisely accord with Roxburgh's figure of *Anth. tuberosum* in Cor. Pl., but not with his description in that work, or in Fl. Ind.

8. **C. malabaricum,** *Baker in Journ. Linn. Soc.* xv. 331; leaves usually recurved, scape simple short naked, raceme short or long, anthers straight shorter than the filaments, cells of the very small broadly obcordate capsule 1–2-seeded? Phalangium tuberosum, *Dalz. & Gibs. Bomb. Fl.* 251 (*not of Kunth*).

WESTERN GHATS, from Canara southwards.

Root-fibres cylindric, fleshy. *Leaves* 6–12 by ⅛–1 in., usually narrowed from the sheathing base to the apex. *Scape* 3–4 in., curved, stout, raceme as long or shorter, bracts about as long as the flowers membranous, pedicels jointed above the middle. *Perianth* white, segments ¼ in. long. *Capsule* ¼ in. broad, tip deeply 2-lobed. *Seeds* $\frac{1}{10}$ in. diam., flat, opaque.—Dalzell's description of *Phalangium tuberosum*, as having small white flowers, and resembling his *Chlorophytum anthericoideum*, probably applies to *C. malabaricum*.

** Raceme simple or branched, with the flowers remotely scattered, solitary or in pairs.

9. **C. undulatum,** *Wall. Cat.* 5059; scape naked paniculately branched, branches long spreading, flowers drooping, bracts shorter than the pedicels, anthers twice as long as the filaments, cells of the broad 3-dymous small capsule 2–3-seeded. C. nepalensis, *Baker in Journ. Linn. Soc.* xv. 320 (*in part*). Phalangium nepalense, *Lindl. in Trans. Hort. Soc.* vi. 277; *Bot. Reg.* t. 998; *Kunth Enum.* iv. 597. Anthericum nepalense, *Spreng. Syst. Cur. Post.* 135.

SUBTROPICAL HIMALAYA, from Nepal, *Wallich*, to Sikkim, alt. 3–7000 ft.

Root-fibres cylindric. *Leaves* 6–18 by ¼–¾ in., linear, often narrowed to the base. *Scape* 1–3 ft., branches ascending with long sheathing bracts at the base; floral bracts ovate, acuminate; flowers solitary or in clusters ½–1 in. apart; pedicels ½–¾ in., jointed at or below the middle. *Perianth* white, segments ¼ in. long; anthers straight after flowering. *Capsule* ¼–½ in. broad, top 3-lobed. *Seeds* $\frac{1}{10}$ in. broad, angular, black.—Very variable in size, small specimens have simple scapes.

10. **C. orchidastrum,** *Lindl. in Bot. Reg.* t. 813; *in Trans. Hort. Soc.* vi. 79; scape tall naked paniculately branched, branches spreading, bracts small, flowers in distant pairs, cells of the broad small capsule 1-seeded. *Kunth Enum.* iv. 603; *Baker in Journ. Linn. Soc.* xv. 325. C. Nimmonii, *Dalz. in Hook. Kew Journ. Bot.* ii. 142; *Dalz. & Gibs. Bomb. Fl.* 252. Anthericum Nimmonii, *Grah. Cat. Bomb. Pl.* 220. Hartwegia Nimmonii, *Dalz. mss.* Phalangium oligospermum, *Wight Ic.* t. 2038.

The DECCAN PENINSULA, from the Concan southward to Travancore.—DISTRIB. Tonkin, Trop. Africa.

Root-fibres tuberous. *Leaves* 12-24 by 1½–4 in., elliptic-lanceolate. *Scape* 1–3 ft., branches long ascending bracteate at the base; bracts ovate; flowers geminate drooping; pedicels ½–¾ in. jointed about the middle. *Perianth-segments* ½ in., white. *Capsule* ⅓ in. diam., broader than long, 2-lobed at the tip. *Seeds* solitary, orbicular or oblong, flat, opaque.

11. **C. laxum,** *Br. Prodr.* 277; leaves subdistichous usually strongly recurved, scape filiform flexuous, flowers minute, anthers didymous many times shorter than the filaments, cells of broadly obcordate capsule 1–4-seeded. *Kunth Enum.* iv. 603. C. laxiflorum, *Baker in Journ. Linn. Soc.* xv. 328; *Benth. Fl. Austral.* vii. 60. C. falcatum, *Baker in Saund. Refug. Bot.* t. 333. C. parviflorum, *Dalz. in Hook. Kew Journ.* ii. 141; *Dalz. & Gibs. Bomb. Fl.* 251; *Thw. Enum.* 339. C. abyssinicum, *Kotschy & Peyr. Pl. Tinn.* 46. Phalangium falcatum, *Wall. Cat.* 5057; *Kunth l. c.* 600. P.? parviflorum, *Wight Ic.* t. 2309. Anthericum parviflorum, *Benth. Fl. Hongk.* 373. Ornithogalum falcatum, *Herb. Wight.* Nolina? javanica, *Hassk. Hort. Bogor.* 27; *Miquel Fl. Ind. Bat.* iii. 554.

The DECCAN PENINSULA; from the Concan southward, common, and in CEYLON. —DISTRIB. Borneo, China, Trop. Africa and Austral.

Root-fibres tuberous. *Leaves* 6–12 by ¼–¾ in., grass-like or conduplicate or flat, rather rigid. *Scape* 1–12 in., suberect or arched; flowers ½–1 in. apart; bracts lanceolate, equalling the pedicels which are jointed in the middle. *Perianth* white, segments ⅛–¼ in.; anthers green. *Capsule* ¼ in. diam. *Seeds* angular, $\frac{1}{10}$ in. diam.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

12. C. ACAULE, *Baker in Journ. Linn. Soc.* xv. 327; root fibres smaller, leaves 6–9 by ¼–⅓ in. narrowly linear, flowers 2–5 in a sessile corymb at the bases of the leaves, fruiting pedicels erect ¼–½ jointed, capsule ⅓ in. oblong emarginate, cells turgid 3–5 seeded, seeds rather tumid black opaque.—India, *Jerdon.*—The only specimen is flowerless. It is perhaps a state of *C. laxum.*

PHALANGIUM NIVEUM, *Poiret Encycl.* 248; *Kunth Enum.* iv. 599. Anthericum niveum, *Schult. f. Syst.* vii. 480, from India, *Sonnerat,* with long very dense-fld. spikes, snow-white bracts as long as the flowers and a scape 12–15 in.; may be *attenuatum.*

16. DIANELLA, *Lamk.*

Roostock usually branched, and stoloniferous. *Leaves* rigid, distichous, linear, bases often equitant. *Flowers* in cymose panicles, nodding; pedicels jointed at the top. *Perianth* marcescent; segment 6, distinct, spreading. *Stamens* 6, hypogynous, or the 3 inner on the bases of the segments, filaments much thickened; anthers basifixed between the lobes, reflexed, opening by terminal pores or short slits. *Ovary* 3-celled; style filiform, stigma minute; cells 4–8-ovuled. *Berry* blue. *Seeds* few, ovoid

or compressed; testa black, shining; albumen fleshy.—Species 7 or 8; tropical Asiatic, Mascarene, Australia and Polynesia.

D. ensifolia, *Redouté Lil.* t. 1; stem leafy, sheaths acutely keeled, filament greatly thickened at the very top. *Kunth Enum.* v. 50; *Baker in Journ. Linn. Soc.* xiv. 576; *Benth. Fl. Austral.* vii. 16; *Bot. Mag.* t. 1404; *Miquel Fl. Ind. Bat.* iii. 560; D. odorata, *Blume Enum.* i. 13; *Kunth.* l. c. 51; D. nemorosa, *Lamk. Encycl.* ii. 276; *Jacq. Hort. Schoenb.* i. 49, t. 94, *Wall. Cat.* 5169; *Miquel l. c.*; *Roxb. Fl. Ind.* ii. 164. D. javanica, *Kunth l. c.* 52; *Miquel l. c.* 561. D. sandvicensis, *Hook. & Arn. Bot. Beech. Voy.* 97. Rhuacophila javanica, *Blume l. c.* 14. Antherium Adenanthera, *Forst. Prodr.* No. 149. Phalangium Adenanthera, *Poir. Encycl.* v. 252.

TROPICAL HIMALAYA, from Nepal eastwards, alt. 2–5000 ft., the KHASIA HILLS, MUNNIPORE, and BURMA. CEYLON ascending to 4000 ft.—DISTRIB. Eastwards to Australia and the Pacific, Mascarene Islds.

Stem 3–6 ft., rigid. *Leaves* lower 1–2 ft. by ¾–1½ in., linear-lanceolate, keel and margins smooth or scabrid; sheaths long. *Panicle* 1–2 ft., cuneiform, pedicels short, rigid, slender; bracts spathaceous; flowers inodorous. *Perianth* white greenish or bluish, segments ½–⅔ in.; 3 inner reflexed. *Anthers* linear, 2-porose. *Berry* dark purple, or blue, ¼ in. diam., cells 1–3- or- more seeded. *Seeds* ovoid, subacute.

17. ALLIUM, *Linn.*

Fœtid scapigerous herbs; bulbs coated. *Leaves* usually narrow, often fistular. *Flowers* capitate or umbelled, all at first enclosed in 1–3 membranous spathes, stellate or campanulate; sepals 6, free or connate below. *Stamens* hypogynous or inserted on the perianth; filaments free or connate below, anthers oblong. *Ovary* 3-gonous, 3-celled: style filiform, stigma minute, cells few-ovuled. *Capsule* small, loculicidal. *Seeds* few, compressed, testa black.—Species about 250, in all N. temp. regions.

In the following account of the Indian *Allia* I have been much aided by Regel's "Alliorum Monographia" and Baker's paper in the Journal of Botany, but I am far from satisfied as to the limitation of the sections, and the disposal of the species in them. Further, I expect that more complete Indian and Central Asiatic collections may modify the results given below. The following species are extensively cultivated in India:—

A. ASCALONICUM, *Linn.*; *Roxb. Fl. Ind.* ii. 142. A. Sulvia, *Ham. in Don Prodr.* 53. A. fragrans β nepalensis, *Bot. Reg.* t. 898. Nothoscordium? Sulvia, *Kunth Enum.* iv. 402; leaves basal and scape stout fistular, head globose very many-fld., pedicels very short, perianth white stellate, inner filaments 2-toothed.—The Shallot.

A. AMPELOPORASUM, *Linn.* A. Porrum, *Linn Roxb. l. c.* ii. 141; *Wall. Cat.* 5074; stem leafy, leaves linear flat keeled shorter than the tall terete scape, head globose very many- and dense-fld., pedicels longer than the campanulate white flowers, inner filaments 2-toothed.—The Leek.

A. CEPA, *Linn.*; *Roxb. l. c.* 142; *Wall. Cat.* 5072. A. Cumaria, *Herb. Ham.*; leaves subdistichous fistular shorter than the inflated scape, head bearing flowers and bulbils, pedicels shorter than the stellate flowers, sepals linear-oblong, filaments exserted simple or the inner 2-toothed at the base.—The Onion.

A. SATIVUM, *Linn.*; *Roxb. l. c.* 142; leaves flat, scape slender, spathes long-beaked, heads bearing bulbils and flowers, sepals lanceolate acuminate, inner filaments 2-toothed.—The Garlic.

Sect. I. SCHŒNOPRASUM. *Bulbs* free or clustered, not seated on a root-stock. *Leaves* and scape fistular or filiform. *Stamens* inserted usually much above the base of the perianth; filaments dilated and connate at the base.

* *Leaves fistular.*

1. **A. Semenovii,** *Regel Enum. Pl. Semenoff*, 126; *All. Monogr.* 85; leaves 2–3 stout about equalling the stout scape, sheaths very long, head subglobose dense-fld., pedicels shorter than the campanulate pale yellow flowers, sepals oblong-lanceolate acuminate, filaments included outer cuspidate inner 2-toothed. *Baker in Journ. Bot.* 1874, 293.

WESTERN HIMALAYA, alt. 8–14,000 ft., from Kashmir to Garwhal.—DISTRIB. Alatau and Thian-chan Mts.

Bulbs tufted, cylindric, scales membranous. *Leaves* ½–½ in. diam., acute. *Heads* 1½ in. broad; spathes persistent. *Sepals* ½–¾ in.

2. **A. Schœnoprasum,** *Linn. Sp. Pl.* 301; leaves 1–2 slender, heads subglobose dense-fld., pedicels equalling or shorter than the campanulate pink or pale purple flowers, sepals linear or lanceolate, filaments included all simple filiform dilated at the base. *Regel All. Monogr.* 77; *Baker in Journ. Bot.* 1872, 292; *Boiss. Fl. Orient.* v. 250; *Reichb. Ic. Fl. Germ.* t. 1085. A. sibiricum, *Linn. Mant.* 562.

WESTERN HIMALAYA, alt. 8–11,000 ft.; from Kashmir to Kumaon.—DISTRIB. Westwards to the Atlantic, N. America.

Bulbs clustered, narrow; scales membranous. *Leaves* 4–10 in., terete or grooved above, smooth or scaberulous; sheaths elongate. *Scape* 6–14 in., stout or slender. *Sepals* ⅛–⅜ in., bearing the stamens near their bases. *Capsule* small, globose, cells 2-seeded.—Chives.

3. **A. atrosanguineum,** *Schrenk in Bull. Acad. Petersb.* x. 355; leaves 1–2 stout as long as the scape, head subglobose dense-fld., pedicels about equalling the campanulate dark red flowers, sepals oblong obtuse or subacute, filaments short triangular-subulate connate at the base. *Ledeb. Fl. Ross.* iv. 168; *Kunth Enum.* iv. 684; *Regel All. Monogr.* 83.

WESTERN HIMALAYA; Kashmir at Gilgit, *Tanner.*—DISTRIB. Turkestan.

Bulb narrow, coats membranous at length fibrous. *Leaves* fistular, 8–12 by ⅛–¼ in., linear, obtuse; sheaths very long. *Scape* stout, fistular. *Head* ¾–1 in. diam.; spathes persistent. *Perianth* ¼–⅓ in. long; segments united below; filaments subequal, inserted at ⅓ distance from their base, about ½ as long as the perianth. *Ovary* globose; style short.—The Gilgit specimens have rather smaller flowers with more obtuse segments than the Turkestan.

4. **A. Fedschenkoanum,** *Regel All. Monogr.* 82; leaves 1–2 much shorter than tall stout scape, head globose dense-fld., pedicels about equalling the campanulate pale yellow flowers, sepals oblong-lanceolate acuminate, filaments very short inner with a dilated 2-toothed base outer simple.

WESTERN HIMALAYA; Kashmir, at Barzil, alt. 12,000 ft., *Clarke.*—DISTRIB. Turkestan.

Bulb 0. *Leaves* 3–5 by ⅛ in., fistular, obtuse; sheath very long. *Scape* 2–3 ft. by ⅛–⅛ in. diam. *Head* ¾–1 in. diam.; spathes persistent; pedicels stout. *Perianth*-segments ¼–⅓ in., united below; filaments united at ⅓ distance from the base, connate, not ¼ the length of the perianth. *Capsule* globose, style very short.—The dilated bases of the inner stamens are certainly 2-toothed.

** *Leaves filiform.*

5. **A. rubellum,** *M. Bieb. Fl. Taur. Cauc.* i. 264; leaves ½-terete or flattish, head subglobose, pedicels much longer than the very small campanulate rosy flowers, sepals oblong- or elliptic-oblong acuminate, filaments included cohering at the very base all simple linear-lanceolate from a broad cuneate base inner broadest. *Regel All. Monogr.* 106; *Fl. Turkest.* t. 10, f. 9; *G. Don Monogr. All.* 36; *Kunth Enum.* iv. 399; *Boiss. Fl. Orient.* v. 253; *Baker in Journ. Bot.* 1874, 290. A. rubellum and grandiflorum, *Ledeb. Fl. Ross.* iv. 171. A. leptophyllum, *Wall. Cat.* 5073 A; *Kunth. l. c.* 456. A. Jacquemontii, *Kunth l. c.* 399. A. longisepalum, *Bert. in Nov. Comm. Acad. Bonon.* v. 429. A. tenue, *G. Don Monogr. All.* 34; *Koch in Linnæa,* xxii. 238.

The PANJAB and WESTERN HIMALAYA, alt. 1500–8000 ft.; from Kashmir to Kumaon.—DISTRIB. Westwards to the Ural and Caucasus, and in Siberia.

Bulb small, ovoid-oblong, outer coats striate, inner membranous. *Leaves* 4–6, longer than the scapes, margins erose; sheaths elongate. *Head* ⅔–1 in. diam., spathe entire or 2–4-fid at length circumciss. *Sepals* ⅛–⅙ in., twice as long as the stamens, which are subbasal on the sepals. *Style* short.—I have followed Boissier in the limitation of this species and its varieties. Regel refers Don's *tenue* to *A. Pallasi, Bunge.*, which is described as having a long style; he retains as a species Boissier's *A. Griffithianum,* which the latter author has reduced to a variety of *rubellum.*

VAR. β. grandiflora, *Boiss. Fl. Orient.* v. 253; pedicels longer, flowers larger, sepals ¼–⅓ in. long subacute, filaments much shorter and broader. A. Griffithianum, *Boiss. Diagn. Ser.* 2, iv. 117; *Regel All. Monogr.* 108; *Baker l. c.* 290. A. vulcanicum, *Boiss. in Plant. Kotsch. Pers. Bot.* No. 49.—Kashmir, alt. 5–7000 ft. Westward to Persia.

VAR. γ. parviflora, *Ledeb. Fl. Ross.* iv. 171; flowers smaller, sepals ⅛ in. long. A. syntamanthum, *C. Koch in Linnæa,* 22, 239; *Regel All. Monogr.* 110.—Western Himalaya. Westward to S. Russia.

6. **A. lilacinum,** *Royle mss.*; leaves terete or channelled longer or shorter than the scape, head hemispheric, pedicels twice as long as or longer than the campanulate small pale red flowers, sepals ovate or ovate-lanceolate acute or obtuse, filaments exserted inner 2-toothed at the very base. *Regel All. Monogr.* 89. A. rubens, *Baker in Journ. Bot.* 1874, 293 (not of Schrad.).

WESTERN HIMALAYA, alt. 6–7000 ft.; from Garwhal westwards.

Bulb ovoid; coats scarious, red-brown. *Leaves* 2–3. *Scape* 8–10 in., fistular. *Head* 1–1½ in. diam.; spathes 2, acuminate; pedicels ½–⅔ in. *Sepals* ¼ in. long, with the filaments inserted near their bases; anthers large.

Sect. II. RHIZIRIDIUM. *Bulbs* solitary or clustered upon an erect or creeping rootstock. *Leaves* flat.

A. Scales of bulb membranous, not of reticulated fibres.

* *Stamens longer than the perianth.*

7. **A. blandum,** *Wall. Pl. As. Rar.* iii. 38, t. 260; tall, stout, leaves flat broadly linear obtuse shorter than the tall scape, head globose very dense-fld., pedicels shorter than the campanulate pale pink flowers, sepals oblong obtuse, filaments simple subulate much exserted. *Kunth Enum.* iv. 396; *Baker in Journ. Bot.* 1874, 295. A. obtusifolium, *Klotzsch & Garcke, Bot. Reise Pr. Wald.* 51, t. 95.

WESTERN HIMALAYA, alt. 13–17,000 ft.; in the interior ranges, and in WESTERN TIBET, from Kumaon to West Nepal.

Bulb large, oblong, often 5 by 1½ in.; scales coriaceous, entire. *Leaves* 5–10 by ½–¾ in., ensiform, recurved, tip rounded. *Scape* 1–2 ft., terete, leafy below the middle. *Head* 1–1½ in. diam.; spathes ovate, obtuse. *Sepals* ¼ in. long. *Filaments* much longer than the sepals, inserted near their bases, rather longer than the style.

8. **A. Stracheyi,** *Baker in Journ. Bot. N. S.* iii. (1874) 293; slender, leaves narrowly linear obtuse, scape slender compressed above, head globose or hemispheric dense-fld., pedicels shorter than the campanulate rosy or pale yellow flowers, sepals oblong obtuse, filaments simple free much exserted. *Regel All. Monogr.* 135. A. longistamineum, *Royle Ill.* 392 (*name only*).

WESTERN HIMALAYA; from Kashmir, alt. 9000 ft., *Clarke,* to Kumaon, alt. 10–12,000 ft., *Strachey & Winterbottom, Edgeworth.*

Bulbs small, clustered, narrowly ovoid, outer scales fibrous, produced into a long neck. *Leaves* 3–4, 12 by $\frac{1}{12}$–$\frac{1}{8}$ in., tips rounded. *Head* 1 in. diam.; spathes small, deltoid; pedicels $\frac{1}{12}$–¼ in., about as long as the sepals. *Filaments* filiform, inserted on the bases of the sepals. *Ovary* globosely trigonous, cells 2-ovuled.—The Kashmir specimens have very pale yellow flowers.

9. **A. consanguineum,** *Kunth Enum.* iv. 431; leaves slender narrowly linear obtuse flat keeled, head hemispheric, pedicels equalling or rather longer than the campanulate golden yellow flowers, filaments simple filiform much longer than the oblong obtuse sepals. *Regel All. Monogr.* 131; *Baker in Journ. Bot.* 1874, 293.

WESTERN HIMALAYA; Kashmir, alt. 8–10,000 ft., *Jacquemont, Thomson,* &c.

Habit and characters of *A. Stracheyi,* but larger, flowers golden yellow, with longer pedicels, and larger longer bulbs with fibrous sheaths. *Filaments* inserted on the bases of the sepals. *Style* slender, far exserted.

10. **A. platyspathum,** *Schrenk Enum. Pl. Nov.* i. 7, ii. 8; leaves radical linear obtuse about equalling the tall scape, head subglobose, pedicels about equalling the rosy flowers, sepals oblong-lanceolate obtuse or subacute, filaments simple, bases dilated. *Kunth Enum.* iv. 453; *Regel Monogr. All.* 135; *Ledeb. Fl. Ross.* iv. 184 (*excl.* var. β).

WESTERN TIBET; (Var. β., only), *Herb. Calcut.* (Regel).—DISTRIB. Kansu.

Bulb solitary or clustered, on a short perpendicular rootstock, scales hyaline, quite entire, outer dark. *Leaves* flat, sheaths hypogeous.—I have seen no specimen of this variety, which Regel suggests may be a different species.—The type inhabits Soongaria and Turkestan.

VAR. β. falcata, *Regel l. c.*; leaves ligulate glaucous falcate, head globose dense-fld., flowers rose-lilac.

11. **A. Thomsoni,** *Baker in Journ. Bot.* 1874, 294; leaves rather stout linear fleshy obtuse shorter or longer than the scape, head globose, pedicels equalling or shorter than the red-purple campanulate flowers, sepals oblong-lanceolate acute, filaments simple filiform much exserted, anthers minute. *Regel All. Monogr.* 141.

KASHMIR; alt. 12,000 ft., *Thomson.*

Bulbs tufted, narrowly ovoid; outer scales hard, chestnut-brown, entire. *Leaves* 4–5, 6–9 by ⅛–¼ in., sheathing the lower third of the stout terete scape, which is 1–2 ft. long, tip rounded. *Head* 1–1½ in. diam.; spathes short, deltoid. *Sepals* ¼ in. long, with the filaments on their bases. *Ovary* globose, cells 2-ovuled, style

much exserted.—Baker observes that this is closely allied to *A. blandum*, differing in the slender habit, narrower leaves, and longer more acute sepals.

12. **A. Bakeri,** *Regel All. Monogr.* 141; leaves basal narrowly linear, scape tall slender, head lax-fld., pedicels much longer than the campanulate red-purple flowers, sepals orbicular or oblong obtuse, filaments simple linear-subulate inner dilated and 2-toothed at the base, anthers minute. A. splendens, *Miq. Ann. Mus. Bot. Lugd. Bat.* iii. 154. A. exsertum, *Baker in Journ. Bot.* 1874, 294 (*not of Don*). ? Caloscordon exsertum, *Herbert in Bot. Reg.* xxxiii. *under* t. 5.

KHASIA HILLS; alt. 4–5500 ft.—DISTRIB. China, Japan.

Bulbs clustered, 1 in. long, ovoid-oblong; scales white, membranous. *Leaves* 2–4, 6–9 by $\frac{1}{12}$ in., shorter than the slender terete scape. *Head* few- or many-fld.; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. *Sepals* $\frac{1}{3}$–$\frac{1}{2}$ in. long, with the filaments on their bases. *Ovary* subglobose, style far exserted.

** *Stamens equalling or shorter than the perianth.*

13. **A. Wallichii,** *Kunth Enum.* iv. 443; tall, leaves long linear or ensiform flat longer than the stout triquetrous scape, head lax-fld., pedicels much longer than the stellate purple flowers, sepals linear narrow reflexed longer than the simple filaments elongate-subulate. *Regel All. Monogr.* 142; *Baker in Journ. Bot.* 1874, 291. A. caeruleum, *Wall. Cat.* 5076 (*not of Pallas*). A. violaceum, *Wall. mss.*

TEMPERATE HIMALAYA, alt. 8–13,000 ft. from Kumaon to Sikkim. Gilgit, *Tanner.*

Bulbs hardly developed, clustered, base of stem thickened, clothed with membranous entire and torn sheaths. *Leaves* basal, 2–3 ft. by $\frac{1}{3}$–$\frac{2}{3}$ in., margins erose, narrowed to an acute point. *Scape* 1–2½ ft. *Head* 2–3 in. diam.; pedicels 1–1½ in.; spathes caducous, as long as the pedicels. *Sepals* ½ in., obtuse; filaments inserted on their bases. *Capsule* turbinate.

14. **A. Hookeri,** *Thwaites Enum.* 339; slender, leaves basal linear membranous shorter than the tall subtrigonous scape 1-nerved, head globose laxly many-fld., pedicels much longer than the stellate white flowers, sepals linear acuminate about equalling the filiform filaments. A. Wallichii, *var. Regel All. Monogr.* 143.

KHASIA HILLS; at Kala Pana, alt. 5000 ft., *J. D. H. & T. T.* CEYLON; Newera Elia, alt. 7000 ft., *Thwaites.*

Bulb hardly any; base of stem clothed with long narrow membranous sheaths. *Leaves* 12–18 by $\frac{1}{4}$–$\frac{1}{3}$ in., acute. *Scape* 1–2 ft.; heads 1½ in. diam.; spathe with a long tail; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in., capillary. *Sepals* ¼ in.; filaments inserted on their bases. *Capsule* obcordate; cells usually 1-seeded.

15. **A. sikkimense,** *Baker in Journ. Bot.* 1874, 292; leaves basal narrowly linear channelled shorter than the slender flexuous scape, head dense-fld., pedicels unequal longer or shorter than the campanulate lilac-purple flowers, filaments broadly subulate much shorter than the oblong subacute or obtuse sepals. *Regel All. Monogr.* 146.

SIKKIM HIMALAYA; in the inner ranges, alt. 11–14,000 ft., *J. D. H., Elwes.*

Bulbs tufted, slender, cylindric; outer scales of long parallel fibres. *Leaves* 2–3, 3–4 by $\frac{1}{12}$–$\frac{1}{4}$ in. subacute. *Scape* 4–12 in. *Head* 6–15-fld.; pedicels $\frac{1}{12}$–$\frac{1}{4}$ in.; spathe solitary, broadly ovate. *Sepals* ¼ to nearly ½ in.; inner filaments with a broad triangular base adnate to the bases of the sepals; outer narrower free. *Capsule* 3-lobed. *Ovary* subglobose; style included, cells 2-ovuled.—Baker regards

this species as intermediate between the smaller vars. of *A. angulosum* and *Schœnoprasum.*

B. Outer scales of the bulb of reticulated fibres, obscurely so in *tuberosum.*

* *Stamens longer than the perianth.*

16. **A. Jacquemontii,** *Regel All. Monogr.* 162; leaves basal filiform subterete shorter or equalling the slender strict scape, head globose or subglobose, pedicels shorter or longer than the lilac campanulate flowers, sepals oblong-lanceolate obtuse or subacute, filaments exserted subulate inner with a dilated 2-toothed base. A. junceum, *Jacquem. mss.*; *Baker in Journ. Bot.* 1874, 295 (*not of Smith*). A. leptophyllum, *Wall. Cat.* 5073 B.

WESTERN TIBET, alt. 12–14,000 ft., *Jacquemont, Thomson*; north of Kumaon, alt. 16,500 ft., *Strachey & Winterbottom.*

Bulbs tufted, cylindric, elongate; fibrous coats very finely reticulate, rusty brown. *Leaves* 3–6, 4–6 by $\frac{1}{12}$ in. *Scape* 3–9 in. *Head* 1–1½ in. diam.; spathes 2, membranous; pedicels $\frac{1}{8}$–$\frac{1}{4}$ in. *Filaments* inserted much above the bases of the sepals, shortly exserted, inner obscurely toothed at the base. *Capsule* globosely ovoid; style very long.—Much eaten in Western Tibet. Baker regards it as possibly a variety of the Siberian *A. lineare*, which has broader leaves and much broader inner filaments.

17. **A. auriculatum,** *Kunth Enum.* iv. 418; leaves narrowly linear flat obtuse stout shorter than the terete striate scapes, head globose very dense-fld., pedicels about equalling the very small campanulate purplish flowers, filaments as long as the oblong obtuse sepals, outer broadly subulate inner auricled at the base, stigma penicillate, *Baker in Journ. Bot.* 1874, 295.

WESTERN HIMALAYA; Kumaon, *Jacquemont.*

Bulb elongate, narrow, seated on an oblique rootstock; scales brown, reticulate, exactly as in *A. Jacquemontii.* *Leaves* 6–9 by $\frac{1}{6}$–$\frac{1}{4}$ in., margins erose. *Scape* 12–18 in., strict. *Head* ½ in. diam.; spathes 2–3, short, acuminate; pedicels ¼ in. *Sepals* ⅛ in. long; filaments on the base of the sepals, outer rather shorter than the inner. *Ovary* subglobose.

18. **A. victorialis,** *Linn. Sp. Pl.* 295; leaves petioled elliptic- to oblong-lanceolate obtuse or acute shorter than the terete scape, head drooping in bud then erect lax-fld., pedicels much longer than the stellate greenish white or yellowish flowers, filaments simple longer than the oblong subacute sepals gradually dilated from the middle to the base. *Kunth Enum.* iv. 432; *Don. Monogr. All.* 96; *Regel All. Monogr.* 170; *Baker in Journ. Bot.* 1874, 291; *Boiss. Flor. Orient.* v. 245; *Jacq. Fl. Austr.* iii. t. 216; *Reichb. Ic. Fl. Germ.* x. t. 508; *Redouté Lil.* v. t. 265; *Bot. Mag.* t. 1222. A. ellipticum, *Wall. Cat.* 5069; *Kunth l. c.* 456.

TEMPERATE HIMALAYA, alt. 7–13,000 ft., from Kashmir eastwards to Sikkim.—DISTRIB. Europe, N. Asia to Japan; N.-W. America.

Bulbs 2–3 in. long, clustered on an oblique rootstock, subconic or cylindric, outer scales fibrous, reticulate. *Stem* leafy. *Leaves* from below the middle of the scape, 6–10 by 1–3½ in., glaucous, rarely acuminate, narrowed into the petiole. *Scape* terete below, angled above. *Head* 1–1½ in. diam., spathes 2, shorter or longer than the flowers, pedicels ½–1 in. *Sepals* ¼–½ in., spreading and reflexed; filaments inserted on the bases of the sepals, outer narrowly subulate, inner

lanceolate. *Ovary* broadly obcordate, style exserted. *Capsule* ¼ in. diam. cuneately obcordate.

Var. *angustifolia*; leaves ½–1½ in. broad, flowers pale pink.—Interior of Sikkim, alt. 10–12,000 ft. West Nepal, *Duthie.*

19. **A. Schrenki,** *Regel All. Monogr.* 172; leaves linear flat shorter than the terete striate scape, head globose, pedicels shorter than the purplish campanulate perianth, filaments simple shortly exserted.

HIMALAYA MTS., *Hort. Calcutt.* (Regel.).—DISTRIB. Siberia.

Bulbs subcylindric, inserted on a stout cylindric rootstock; outer scales densely fibrous, reticulate, brown. *Leaves* 3–4 below the middle of the scape, $\frac{1}{10}$–$\frac{1}{8}$ in. broad. *Scape* 8–16 in., striate and grooved towards the top, strict or flexuous. *Head* many-fld.; spathes scarious, white, shorter than the head; flowering pedicels $\frac{1}{10}$ in., shorter than the perianth, at length ¼ in. *Filaments* unequal, outer linear-subulate, inner subulate from a lanceolate base. *Ovary* ovoid, 3-gonous; style at length very long, stigma capitate.—I have seen no Himalayan specimen. Regel says it differs from the widely diffused *A. strictum*, Schrad. in the capitate stigma.

** *Stamens shorter than the perianth.*

20. **A. odorum,** *Linn. Mant.* 62; leaves many basal very narrowly linear flattish keeled shorter than the terete slender scape, head many or few-fld., pedicels much or rather longer than the small white campanulate perianth, filaments shorter than and adnate below to the obovate-oblong mucronate or subacute sepals triangular-lanceolate, style included. *Kunth Enum.* iv. 185; *Regel All. Monogr.* 175; (*excl. Syn. tuberosum*, &c.) *Baker in Journ. Bot.* 1874, 291; *Redouté Lil.* t. 98; *Bot. Mag.* t. 1142. A. tataricum, *Ait. Hort. Kew ed.* 2, ii. 233.

WESTERN TIBET; alt. 10–14,000 ft., *Thomson.* WESTERN NEPAL, alt. 13,000 ft., *Duthie.*—DISTRIB. N. Asia, Japan.

Bulb 1–4 in. clustered on an oblique jointed rootstock, subcylindric or conic; scales finely reticulate, white brown or blackish. *Leaves* many, 6–24 by $\frac{1}{10}$–¼ in., subacute. *Scape* terete or angled at the tip. *Head* 1–1½ in. diam.; spathes short, mucronate; pedicels short, filiform, angled, flowering ½ in, fruiting 1½ in. *Sepals* ¼ in., with usually a strong nerve. *Filaments* subequal, outer dilated at the base, inner ovate with a subulate tip. *Ovary* subglobose, trigonous. *Capsule* subglobose.

21. **A. tuberosum,** *Roxb. Hort. Beng.* 24; *Fl. Ind.* ii. 141; leaves 4–5 basal erect narrow-linear flat tall compressed or trigonous above, head lax-fld. pedicels much longer than the small white or pink stellate flowers, sepals oblong-lanceolate, filaments simple linear included connate below and perigynous, style short. *Baker in Journ. Bot.* 1874, 292; *Kunth Enum.* iv. 454; *Wall. Cat.* 5068. A. Roxburghii, *G. Don. Monogr. All.* 91; *Kunth l. c.* 454. A. uliginosum, *G. Don. l. c.* 60; *Kunth l. c.* 422. A. senescens, *Miq. Ann. Mus. Bot. Lugd. Bat.* iii. 154.

WESTERN HIMALAYA, *Royle.* KHASIA MTS., alt. 5–6000 ft. (apparently wild). *Griffith.* &c. Cultivated in BENGAL, *Roxburgh.*—DISTRIB. China, Siam, Japan.

Bulbs elongate, cylindric, with white fleshy root-fibres: scales grey, fibrous. *Leaves* 6–12 by $\frac{1}{12}$–$\frac{1}{6}$ in.; sometimes concave and twisted. *Scape* 1–1½ ft. *Head* 20–40-fld., hemispheric, 1–1½ in. diam., spathes 1–2 small; pedicels ascending, ½–1½ in. *Sepals* ⅓–½ in.; acute or obtuse, at length reflexed, filaments inserted on the bases of the sepals, gradually dilated from below the middle to the base, outer shorter, broader. *Ovary* globosely obovoid, deeply 3-lobed; stigma obscurely 3-toothed; cells 3-ovuled. *Capsule* obcordate.—Regel cites this as a synonym of *A. odorum*, and it is possible that it may be the cultivated form of that plant. Wallich's specimens are from the Mission Garden, Tranquebar.

22. **A. Govanianum,** *Wall. Cat.* 5071; leaves many basal subdistichous linear flat obtuse about equalling the acutely angled scape, tip rounded, head many-fld., pedicels equalling or exceeding the white stellate flowers, sepals narrow at length reflexed, filaments very short perigynous subulate included bases dilated connate. *Baker in Journ. Bot.* 1874, 293; *Regel All. Monogr.* 177. A. humile, *Kunth Enum.* iv. 443; *Regel l.c.* A. nivale, *Jacquem. mss.*

TEMPERATE HIMALAYA; from Kumaon westwards, alt. 8–12,000 ft.

Bulbs and foliage as in *A. odorum,* from which it differs in the acutely angled scape, in the larger flowers with narrower sepals ½ in. long, and much shorter stamens.—The name *humile* being quite inappropriate, except for a very dwarfed state, I follow Baker in retaining Wallich's, which commemorates the discoverer of the species.

23. **A. oreoprasum,** *Schrenk in Bull. Imp. Acad. Petersb.* x. 354; *Enum. Pl. Nov.* ii. 6; leaves basal narrowly linear flattish shorter than the striate scape, head few- or many-fld., pedicels longer than the rosy campanulate flowers, sepals oblong obovate with a recurved mucro, filaments simple connate below the middle included, *Ledeb. Fl. Ross.* iv. 185; *Regel. All. Monogr.* 180.

WESTERN TIBET; Zalung-Karpo Pass, alt. 10–17,000 ft., *Stoliczka* (Regel).—DISTRIB. Soongaria, Eastern Turkestan.

Bulb tufted, cylindric or elongate conic; outer scales rigid, appressed fibres strongly coarsely reticulated. *Leaves* 8–12 by ⅛–⅙ in., often minutely serrulate. *Scape* terete or somewhat 2-edged above. *Head* 1–1½ in. diam., hemispheric, 6–12-fld., spathes 2, nearly as long as the pedicels which are ½–⅔ in., tips thickened. *Sepals* ¼–⅓ in. long, midrib dark. *Filaments* inserted much above the bases of the sepals, ¼ shorter than these, all connate at the base, outer narrowly subulate, inner broadly subulate-lanceolate. *Ovary* globose, trigonous; style short, stigma capitate.—Described from Turkestan specimens, I have seen no Indian.

24. **A. Clarkei,** *Hook. f.*; leaves very many subbasal erect very narrowly linear or filiform shorter than the slender scape, head lax-fld., pedicels much longer than the stellate white flowers, filaments hardly as long as the linear-oblong acuminate sepals, inner broadly oblong obtusely-toothed below the middle.

KASHMIR at Skardo, alt. 7–11,000 ft., *Clarke.*

Bulb small, ovoid, 1 in., outer scales closely finely reticulated, pale. *Leaves* 4–8, 6–12 by $\frac{1}{10}$–⅙ in., obtuse, flat. *Scape* 12–18 in., terete; head 1–1½ in. diam.; spathes 2 one or both as long as the pedicels or shorter; pedicels ½–⅔ in. *Sepals* ⅛ in., acuminate; filaments inserted near their bases, anthers large. *Ovary* subglobose; style included. *Capsule* broadly obcordate, ⅓ in. diam.—Habit of *A. tuberosum.*

SECT. III. MOLIUM. *Bulbs* not seated on a rootstock. *Leaves* flat or keeled. *Spathes* shorter than the head.

25. **A. atropurpureum,** *Waldst. & Kit. Pl. Rar. Hung.* i. 16, t. 17; leaves 2–3 basal narrowly linear-oblong or lanceolate shorter than the tall erect terete fistular scape, head large very many and dense-fld., pedicels much longer than the rose-purple stellate flowers, filaments subulate about equalling the linear-oblong or- lanceolate sepals, base of ovary 3-foveolate. *Regel All. Monogr.* 247. *Don Monogr. All.* 90; *Kunth*

Enum. iv. 448; *Boiss. Fl. Orient.* v. 757; *Reichb. Ic. Fl. Germ.* x. t. 505. A. robustum, *Karel. & Kiril. Enum. Pl. Alt.* n. 855; *Kunth l. c.* 446; *Ledeb. Fl. Ross.* iv. 187; *Baker in Journ. Bot.* 1874, 289.

WESTERN HIMALAYA; from Kashmir, *Falconer*, to Kishtwar, alt. 8–10,000 ft., *Thomson.*—DISTRIB. Westwards to Hungary, Turkestan, Siberia.

Bulb subglobosely ovoid, scales entire. *Leaves* 2–4, margins smooth, 1–2 ft. by 1–2 in., sheaths sometimes hirtellous. *Scape* 2–2½ ft., striate. *Head* usually hemispheric, 2–2½ in. diam., spathes 2–4, apiculate; pedicels ½–1 in., elongate in fruit. *Sepals* linear-oblong, subacute, pale or dark-purple, filaments inserted at their bases connate at the base, inner triangular below the middle, outer at the base only. *Ovary* subglobose or depressed; style short; stigma simple. *Capsule* globose.—Affghan specimens have leaves 2½ in. broad.

26. **A. loratum,** *Baker in Journ. Bot.* 1874, 290; leaves 3–5 linear-lanceolate flat flaccid ciliolate longer than the slender terete scape, head many and dense-fld., pedicels short but longer than the campanulate white perianth, filaments equalling the lanceolate acute sepals inner subulate outer linear with subulate tips.

WESTERN HIMALAYA and TIBET; Kishtwar and Banahal, alt. 10–14,000 ft., *Thomson.*

Bulb small, ovoid, outer scales membranous, grey. *Leaves* 2–5, 6–9 by ½–1 in., narrowed from above the base. *Scape* 3–6 in. *Head* 30–50-fld.; spathes 2, navicular, acute; pedicels ½–½ in., tip thickened. *Sepals* ⅕–½ in.; midrib brown; filaments inserted on their bases. *Ovary* globosely triquetrous; style very short. —Baker says that this, judging from the very imperfect specimens, closely resembles *A. narcissifolium*, Linn., the handsomest of European species. Near *A. atropurpureum*, but the leaves are broader, and the head globose, with much shorter pedicels and paler flowers.

27. **A. macranthum,** *Baker in Journ. Bot.* 1874, 293; leaves many linear gradually acuminate keeled, scapes many grooved and ribbed, head lax-fld., pedicels much longer than the large campanulate dark purple flowers, filaments filiform equalling the oblong obtuse sepals. *Regel All. Monogr.* 182; *Bot. Mag.* t. 6789.

SIKKIM HIMALAYA; in the inner ranges alt. 12–13,000 ft., *J. D. H.*; *Elwes.*

Bulb narrow, coats membranous. *Leaves* 6–9, 18 by ¼–¾ in. *Scape* robust, 1–2 ft., pedicels 1–2 in., stout. *Sepals* ½–½ in.; filaments inserted on their bases, dilated at the very base; anthers large. *Ovary* deeply 3-lobed, stigma capitellate.—A very beautiful species, resembling *A. narcissiflorum*, Vill. Regel cites it in Sect. *Rhiziridium*, but it is not known to have a rootstock.

18. DIPCADI, *Medic.*

Tuberous scapigerous herbs. *Flowers* racemed. *Perianth* cylindric, of 6 erect segments, the outer recurved from about the middle, the inner at the tips only. *Stamens* included. *Capsule* short, broad, tridymous, loculicidal, many-seeded. *Seeds* flat; testa black, membranous.—Species about 20, S. European, W. Asiatic and African.

The Indian species want a thorough re-examination, with far better materials than I have access to.

* *Ovary stipitate.*

1. **D. montanum,** *Baker in Journ. Linn. Soc.* xi. 398; raceme many-fld., bracts lanceolate acuminate about equalling the pedicels, perianth ½–⅔ in. lobes of outer subequal as long as the tube ligulate. Uropetalum montanum, *Dalz. in Hook. Kew Journ. Bot.* ii. 152; *Dalz. & Gibs. Bomb. Fl.* 250.

Rohilkund; at Delhi, *Vicary.* The Concan and Western Deccan, *Dalzell.*

Bulb small. *Leaves* 4–6 in., subfleshy, filiform, semiterete, deeply grooved above. *Scape* 6–9 in., terete; raceme 6–12-fld.; pedicels ½–¾ in., longer or shorter than the lanceolate bracts. *Perianth* white or greenish, ¾ in., tubular-campanulate, lobes glandular at the tips. *Capsule* stipitate, ¼ in. diam. *Seeds* ellipsoid, ⅛ in. long, flat.

2. **D. minor,** *Hook. f.*; racemes many-fld., bracts much shorter than the pedicels, perianth ⅓–½ in. lobes of outer as long as the tube

The Concan; rocky places in Malwan, *Dalzell.*

The specimens are very indifferent and leafless; but the small size of the flowers at once distinguishes the species.

3. **D. concanense,** *Dalzell in Hook. Lond. Journ. Bot.* ii. 142; raceme few-fld., bracts triangular acuminate shorter than the pedicels, perianth 1½ in. long, lobes much shorter than the tube subequal, outer ligulate. Uropetalum concanense, *Baker in Journ. Linn. Soc.* xi. 399; *Dalz. & Gibs. Bomb. Fl.* 250.

The Concan; Hewra Plain, rare, *Dalzell.*

Bulb small. *Leaves* few, 6–9 in., fleshy, filiform, semiterete, deeply grooved above. *Scape* 6–12 in., terete; raceme 2–6-fld.; pedicels ½–¾ in. *Perianth* 1½ in., white; lobes linear-oblong, obtuse, outer spreading, inner united to the middle, all glandular and papillose at the tip. *Capsule* stipitate, didymous, ¼ in. diam. *Seeds* ¼ in. long, oblong.

** *Ovary sessile or subsessile.*

4. **D. serotinum,** *Medic. in Act. Palatin.* vi. 431; leaves 6–18 in., scape 10–14 in., raceme elongate many-fld., bracts lanceolate about equalling the pedicels or longer, perianth ⅓ in. long brown, lobes subequal three outer about equalling the tube, ovary sessile. *Baker in Journ. Linn. Soc.* xi. 397. Uropetalum serotinum, *Bot. Reg. under* t. 156; *Reichb. Ic. Fl. Germ.* x. 459; *Kunth Enum.* iv. 378. Hyacinthus serotinus, *Linn. Sp. Pl.* 317; *Cavan. Ic.* t. 30: *Redouté Lil.* t. 202. Scilla serotina, *Bot. Mag.* t. 859. Urginea coromandeliana, *Wight Ic.* t. 2064.

The Panjab; Salt range, Mt. Tilla, *Aitchison.* Kumaon, in the Kali valley, alt. 7–8000 ft., *Duthie.*—Distrib. Europe.

Bulb ovoid. *Leaves* 6–12 by ⅛–¼ in., acuminate. *Raceme* 4–6 in.; bracts about as long as the white or very pale pink flowers. *Flowers* ½–⅔ in. long, outer lobes of perianth revolute, inner erect with spreading tips. *Capsule* very variable, ¼–⅓ in. diam., quadrate.—In a drawing from Herb. Falconer it appears that in this plant the flowers are very pale brown. In Wight's figure of *Urg. coromandeliana,* the flowers are those of an *Urginea,* but the foliage, capsule, &c., of *D. serotinum.*

5. **D. unicolor,** *Baker in Journ. Linn. Soc.* xi. 397; leaves 4–6 in., scape as long as very stout, bracts lanceolate about equalling the pedicel,

racemes few-fld., perianth ¾ in. long green lobes subequal, three outer about equalling the tube, capsule ½–⅔ in. broad.

SCINDE; on the lower hills, *Stocks*.

A much smaller and stouter plant than *D. serotinum* with green flowers. *Capsule* quadrate, retuse above and below. *Seeds* ¼–½ in. diam., orbicular.—Possibly a state of *D. serotinum*, but a very different-looking plant.

6. **D. hydsuricum,** *Baker in Journ. Linn. Soc.* xi. 397; leaves 4–6 in., scape tall, raceme elongate, bracts much shorter than the pedicels, perianth ⅔ in. long green or pale pink. Uropetalum hydsuricum, *Edgew. in Trans. Linn. Soc.* xx. 88.

The PANJAB, at Loodiana, *Edgeworth*.

The short bracts are the best character of this species, which closely resembles *D. serotinum* in habit. In a drawing of what I take to be this, in Falconer's collection, the tube of the corolla is pale green, the lobes very pale pink.

19. URGINEA, *Steinh.*

Bulbous, scapigerous herbs. *Flowers* racemed. *Perianth* campanulate of 6 subequal segments. *Stamens* included. *Capsule* oblong, triquetrous, loculicidal, many-seeded. *Seeds* flat, testa black, membranous.—Species about 24, S. European, W. Asiatic, and African.

* *Flowers appearing before the leaves.*

1. **U. indica,** *Kunth Enum.* iv. 333; leaves ½–1 in. broad, flowers distant long-pedicelled drooping, bracts evanescent, perianth segments 3-nerved in the middle, capsule oblong. *Baker in Journ. Linn. Soc.* xiii. 222; *Dalz. & Gibs. Bomb. Fl.* 250. U. senegalensis, *Kunth l. c.* 334. Scilla indica, *Roxb. Fl. Ind.* ii. 147; *Grah. Cat. Bomb. Pl.* 220. S. Cundria and S. denudata, *Ham. in Wall. Cat.* 5062, A, B, C, E, H.

WESTERN HIMALAYA; Garwhal, Kumaon and the Salt Range, ascending to 6000 ft. BEHAR, the CONCAN and COROMANDEL coasts. BURMA, *Wallich.*—DISTRIB. Trop. Africa.

Bulb the size of an apple, bitter, nauseous. *Leaves* 6–18 in., subbifarious, linear, flat, acute. *Scape* erect, 12–18 in., brittle; raceme 6–12 in., erect; flowers very distant; pedicels 1–1½ in., spreading or decurved. *Perianth* ½–¾ in. diam., greenish white, nerves green, tips rounded; filaments flattened below; style narrowly oboonic. *Capsule* ½–¾ in, subacute, cells 6–9-seeded. *Seeds* ¼ in. diam.

2. **U. coromandeliana,** *Hook.f.* (*not of Wight*), leaves very narrow, flowers long-pedicelled drooping, bracts minute ovate acute persistent, sepals 1-nerved, inner bearded at the tips, style very short obconic. Scilla coromandeliana, *Roxb. Fl. Ind.* ii. 147.

COROMANDEL coast; on sand hills, *Roxburgh*.

Bulb globose, 1½ in. diam. *Leaves* 6–8 by ½–½ in., subacute. *Scape* 12–18 in.; pedicels 1–1¼ in.; bracts ¼ in. *Flowers* dull green and purplish; sepals ¼ in. long, tips rounded; filaments clavate; style shorter than the ovary, narrowly obconic.—Described from Roxburgh's excellent drawing, and the characters given in his Flora Indica. *U. coromandeliana*, Wight is *Dipcade serotinum* (as his Herbarium proves) with the perianth and stamens very incorrectly represented.

3. **U. Wightiana,** *Hook.f.*; flowers long-pedicelled on the decurved or suberect raceme, bracts evanescent, sepals 1-nerved all bearded at the

tips, filaments dilated in the middle, style elongate. U. indica, *Wight Ic.* t. 2063 (sepals very incorrect) *excl. Syn. Kunth.* Melanthium nudum, *Herb. Heyne in Wall. Herb.* (misspelt *indicum* in Cat. 5062 D).

South Deccan, *Heyne*; sand hills at Tuticorin and Coimbatore, *Wight.*

Very near *U. coromandeliana*, but differing as above. Wight's figure is good, except that he has made the sepals acuminate, and anthers too slender, very different from his specimens. His character is taken confessedly from Roxburgh's of *Scilla indica*, from which his figure and specimens differ totally.

** *Leaves and flowers appearing together.*

4. **U. congesta,** *Wight Ic.* t. 2064 (*left-hand figure*); leaves appearing with the flowers, raceme many and dense-fld., flowers small suberect, bracts minute deltoid, perianth segments 1-nerved, capsule subglobose. *Baker in Journ. Linn. Soc.* xiii. 218.

Deccan Peninsula; on the sea coast, *Wight.* Ceylon; Dambulla, *Trimen.*

Bulb about 1 in. diam. *Leaves* 5–6 in., filiform, grooved above. *Scape* 6 in., flexuous; raceme 2–3 in.; pedicels $\frac{1}{12}$–$\frac{1}{8}$ in., suberect. *Perianth* $\frac{1}{8}$ in. long, white and purplish; filaments flattened below broadly subulate, not longer than the linear oblong large anthers. *Capsule* $\frac{1}{4}$ in. broad; cells 3–4-seeded.—Wight's plate is very incorrect in respect of the perianth and stamens, Trimen's var. *rupicola*, (Journ. Bot. 1889, 167) differs in the laxer inflorescence.

5. **U. polyphylla,** *Hook. f.*; leaves filiform, flowers suberect, bracts longer than the very short pedicels subulate with broad membranous auricles; sepals all thickened at the tips 5-nerved in the middle, filaments slender, style elongate. Ornithogalum polyphyllum, *Herb. Heyne in Wall. Cat.* 5062 F.

Deccan Peninsula? *Heyne.*

Bulb not seen. *Leaves* 8–10 by $\frac{1}{16}$ in., margins involute. *Scape* longer than the leaves, very slender; raceme terminal, 6–fld.; bracts $\frac{1}{6}$ in., persistent; sepals $\frac{1}{4}$ in. long, oblong-lanceolate, obtuse; filaments nearly as long as the sepals, style as long.—There is but one specimen in Herb. Wall., without bulb, it resembles the Cape and European species, and is fastened down with *Urginea Wightiana* and *Dipcade serotina.*

20. SCILLA, *Linn.*

Bulbous, scapigerous herbs. *Flowers* racemed. *Perianth* persistent stellate or campanulate, segments recurved. *Capsule* globose, 3-lobed or tridymous, loculicidal, cells 1–2-seeded. *Seeds* obovoid or subglobose; testa thin, black.—Species about 80, Europe, As. temp.

1. **S. indica,** *Baker in Saund. Refug. Bot.* iii. *App.* 12; *in Journ. Linn. Soc.* xiii. 250; leaves oblong or lanceolate, raceme very many-fld., perianth $\frac{1}{4}$ in. diam. S. maculata, *Baker in Journ. Linn. Soc. l. c.* Ledebouria hyacinthina, *Roth Nov. Sp.* 195; *Kunth Enum.* iv. 336; *Wight Ic.* t. 2040; *Wall. Cat.* 5170; *Grah. Cat. Bomb. Pl.* 220; *Dalz. & Gibs. Bomb. Fl.* 251; *Bot. Mag.* t. 3226; *Dene. in Jacquem. Voy. Bot.* t. 171. L. maculata, *Dalz. in Hook. Kew Journ.* ii. 143; *Dalz. & Gibs. l. c.* Barnardia indica, *Wight Ic.* t. 2041. Melanthium hyacinthoides & Erythronium indicum, *Herb. Madr.*

The Deccan Peninsula and Central India, from the Concan and Nagpore

southwards, especially near the sea. CEYLON, at Trincomalee, *Glenie.*—DISTRIB. Abyssinia.

Bulb 1–2 in. diam. *Leaves* 3–6 in., very variable in breadth, petioled or not, often recurved, tips after reaching the ground bulbiferous, green or blotched with black. *Scape* 2–6 in.; raceme cylindric, 30–60 fld., pedicels ½–¼ in.; bracts minute. *Flowers* greenish purple; filaments purple; ovary stipitate.—I can find no characters of *L. maculata.*

2. **S. Hohenackeri,** *Fisch. & Mey. in Bull. Soc. Nat. Mosc.* 1838, i. 256; leaves linear, raceme few or many-fld., perianth ¾ in. diam. *Baker in Journ. Linn. Soc.* xiii. 244; *Boiss. Fl. Orient.* v. 227. S. cernua var. pluriflora, *Ledeb. Fl. Ross.* iv. 157. Hyacinthus purpureus, *Griff. Notul.* 242; *Ic. Pl. Asiat.* t. 275.

The PANJAB; *Ic. Falconer*; Rawul Pindee, at Hussan, *Aitchison.*—DISTRIB. Affghanistan, Persia.

Bulb ovoid, ½–1 in. diam. *Leaves* 4–6, flaccid, 8–12 by ⅛–¼ in. *Scape* 4–8 in., 6–12-fld.; bracts membranous. *Flowers* bright blue, scattered; sepals linear, obtuse, recurved from near the base, filaments narrowly lanceolate; anthers blue; cells of ovary 3–4-ovuled.

21. LILIUM, *Linn.*

Tall, bulbous, leafy, unbranched, usually very large fld. herbs. *Flowers* axillary or in terminal racemes. *Perianth* infundibular, segments 6, usually narrowly nectariferous at the base. *Stamens* hypogynous, anthers large dorsifixed versatile. *Style* long, stigma globose (rarely 3-fid as in *Fritillaria*). *Capsule* erect, coriaceous, loculicidal, very many-seeded. *Seeds* vertically compressed; testa pale, membranous, appressed.—Species about 50, N. temperate.

SECT. I. *Bulb* of narrow fleshy imbricating scales, without any outer coats. *Stamens* not diverging. *Stigma* capitate, obscurely 3-lobed. Eulirion.

* Leaves petioled, broadly cordate.

1. **L. giganteum,** *Wall. Tent. Fl. Nep.* 21, t. 12, 13 (*excl. syn.*); *Cat.* 5075; very tall, raceme many-fld., pedicels short, perianth white narrowly funnel-shaped. *Kunth Enum.* iv. 268; *Bot. Mag.* t. 4673; *copied in Fl. des Serres*, t. 771–2; *and in Belg. Hortic.* iii. t. 21; *Duchart. Obs. Gen. Lis.* passim. *Baker in Journ. Linn. Soc.* xiv. 227; *Gard. Chron.* 1880, ii. fig. 18; *Elwes Monogr. Lil.* t. 11. L. cordifolium, *Don. Prodr.* 52.

TEMPERATE HIMALAYA; from Garwhal to Sikkim, alt. 5–10,000 ft. KHASIA HILLS, alt. 5–6000 ft.

Bulbs tufted, 3–4 in. diam.; scales subequal. *Stem* 6–12 ft., 2 in. diam. at base, fistular. *Leaves* 12–18 in. long and broad, penninerved; petiole of lower 9–12 in. *Raceme* 1–2 ft., bracts large; flowers 5–7 in. fragrant, drooping, tube purplish within; segments oblanceolate, tips rounded recurved. *Stamens* and style included, filaments decurved at the tip; anthers ½ in., yellow. *Capsule* 2–3 in., obtusely angled; carpels retuse, septa pectinate. *Seeds* ½–⅔ in. broad, very thin.

** Leaves sessile, linear or lanceolate.

† *Flowers white or greenish white.*

2. **L. Wallichianum,** *Schultes f. Syst. Pl.* vii. 1689; leaves narrowly

linear, nerves 3–5 faint, perianth 6–10 in. narrowly tubular below then infundibular with the upper third recurved, stamens much shorter than the perianth, anthers 1 in. orange yellow. *Kunth Enum.* iv. 267; *Wall. Cat.* 5076; *Bot. Mag.* t. 4561; *Duchart. Obs. Gen. Lis.* 71; *Lindl. & Paxt. Fl. Gard.* 1850, 120, *with woodcut*; *Lemaire, Jard. Fleur.* t. 105–6; *Fl. des Serres*, t. 612; *Elwes Monogr. Lil.* iv. 267; *Baker in Journ. Linn. Soc.* xiv. 227. L. longiflorum, *Wall. Teut. Fl. Nep.* 40, t. 29. L. Batisua, *Ham. mss.*

WESTERN HIMALAYA; Nepal and Kumaon, alt. 3-4000 ft.

Bulbs small, on a creeping rootstock; scales many, short, ovate, acuminate. *Stem* 4–6 ft., base ascending, few-fld. *Leaves* 6–12 by ¼–¾ in. *Flowers* subsolitary, horizontal, sweet-scented, pedicel long; tube greenish outside; segments subequal, oblanceolate, 2 in. broad; style recurved at the top; stigma conoidal. *Capsule* 1½–2 in.

3. **L. neilgherrense,** *Wight Ic.* t. 2031; leaves elliptic-lanceolate strongly nerved, perianth 8–12 in. narrowly tubular below then infundibular with the upper third recurved, stamens much shorter than the perianth, anthers ¾ in.; *Duchart Obs. Gen. Lis.*, 71; *Baker in Journ. Linn. Soc.* xiv. 230; *Elwes Monogr. Lil.* t. vi. L. neilgherricum, *Lemaire Ill. Hort.* x. t. 353. L. tubiflorum and Wallichianum, *Wight, l. c.* t. 2033–4, 2035. L. Metzii, *Steud. in Hohenack. Pl. Exsicc. Ind. Or. No.* 954.

SOUTHERN DECCAN; Nilghiri and Pulney Mts., alt. 5–8000 ft., *Wight, &c.*

Very closely allied to *L. Wallichianum*, but the leaves are much shorter and broader, 3–5 by ¾–1 in., and the perianth tube even longer.

4. **L. Lowii,** *Baker in Bot. Mag.* t. 7232; leaves numerous short linear sessile, flowers corymbose or umbelled, perianth 3–4 in. broadly funnel-shaped recurved from about the middle, stamens shorter than the perianth, anthers in brown. L. nepalense, *Collett & Hemsl. in Journ. Linn. Soc.* xxvii. 133.

BURMA; in the Shan hills. *Collett.*

Bulb globose 2 in. diam., scales lanceolate. *Stem* 3–4 ft. *Leaves* 2–3 in. *Flowers* coriaceous, 3 in. diam., pedicels long; perianth segments nearly similar, 1 in. broad, white, or greenish externally, speckled with claret-brown in their lower halves; style as long as the stamens.—I have taken the characters from a ms. of Mr. Baker's drawn up from specimens that flowered in the nurseries of Messrs. Low & Co.

5. **L. Bakerianum,** *Hemsl. & Collett in Journ. Linn. Soc.* xxviii. 138, t. xxii.; leaves short linear or lanceolate, flowers few long-pedicelled, perianth 3–4 in. campanulate, segments acute spreading from above the middle inner much the broadest, stamens much shorter than the perianth-anthers ⅓ in. long.

BURMA; on the Shan hills, *Collett.*

Stem 2–4 ft., puberulous, 2-fld. *Leaves* 2 in., nerves obscure, costa and margins lepidote. *Flowers* erect; perianth segment spotted on the broad base, outer narrowly-lanceolate long-acuminate, inner oblanceolate tip rounded apiculate, margins furfuraceously puberulous.—Description from a single specimen as given by Hemsley l. c.

†† *Flowers yellow.*

6. **L. nepalense,** *D. Don in Mem. Wern. Soc.* iii. 412; *Prodr. Fl. Nep.* 52; leaves lanceolate, perianth 4–5 in. broadly funnel-shaped from

the base recurved from beyond the middle, stamens exserted anthers 1 in. yellow. *Kunth Enum.* iv. 267; *Duchart. Obs. Gen. Lis.*, 64; *Wall. Pl. As. Rar.* iii. 67, t. 291; *Cat.* 5078; *Baker in Journ. Linn. Soc.* xiv. 231; *Elwes Monogr. Lil.* t. v.; *Bot. Mag.* t. 7053; *Gard. Chron.* 1880, ii. 77, f. 19. L. ochroleucum, *Wall. mss.*

WESTERN HIMALAYA, from Nepal to Simla, alt. 7–8000 ft.

Bulb unknown. *Stem* 2–3 ft., slender. *Leaves* 3–4 by ⅛–1½ in., 5–7-nerved. *Flowers* solitary or few and racemed or subumbelled, drooping, sweet-scented, tube greenish outside with a stout rounded keel, segment orange-yellow with purple dots or spots on the lower half of the recurved portion within, outer segments oblanceolate subacute, inner much broader, tips rounded; filaments bright red, rather spreading; style exserted.—The colours of the flower probably vary. A supposed variety with deep crimson green-tipped sepals is figured in Gard. Chron. 1888, ii. 412; but its flowers are much shorter than in the type form.

7. **L. primulinum,** *Baker in Bot. Mag.* t. 7227; leaves lanceolate, flowers corymbose or umbelled long-pedicelled, perianth 5–6 in. funnel-shaped segments subequal, the upper half revolute, stamens exserted rather shorter than the perianth, anthers ¾ in. brown, style much longer than the stamens. L. neilgherrense, *Hemsl. & Collett in Journ. Linn. Soc.* xxviii. 138. L. claptonense, *Hort. Low.*

BURMA; in the Shan States, *Collett.*

Bulb large, globose, scales lanceolate. *Stem* 3–4 ft., erect, glabrous. *Leaves* 3–4 in. *Flowers* about 3 in a corymb or umbel, pedicel with a large leaf-like bract. *Flower* pale yellow, unspotted; perianth segments subequal, oblanceolate-oblong.—Described from Mr. Baker's account of a specimen that flowered with Messrs. Low & Co.

8. **L. sulphureum,** *Baker in Bot. Mag. ined.*; leaves linear 1-nerved upper bulbiferous, perianth 7–8 in. broadly funnel-shaped recurved in the upper half, inner segments much broader than the outer, stamens rather shorter than the perianth, anthers 1 in. brown. L. Wallichianum, *var.* superbum, *Hort. Low.*; *Baker in Gard. Chron.* 1891, ii. 480.

UPPER BURMA, *Hort. Low.*

Bulb large, globose. *Stem* 6–7 ft. *Leaves* very many, 3–4 by ½ in.; bulbils in upper large. *Flowers* pendant on long pedicels fragrant, pale sulphur-yellow, suffused with claret-colour outside; outer segments 1 in. broad, inner nearly 2 in.; filaments straight, yellow; style curved, rather longer than the anthers.—Described from Mr. Baker's notes.

SECT. II. *Bulb* and *stigma* of Sect. I., but stamens diverging (MARTAGON).

9. **L. polyphyllum,** *Don in Royle Ill.* 388; leaves linear or oblanceolate, flowers whorled, perianth broadly infundibular segments revolute from the middle, stamens exserted, anthers ½ in. long. *Kunth Enum.* iv. 677; *Klotzsch in Bot. Reis. Pr. Waldem.* 53; *Baker in Journ. Linn. Soc.* iv. 246; *Elwes Monogr. Lil.* t. 48. L. punctatum, *Jacquem. mss. ex Duchart. Obs. Gen. Lis.*, 77. L. stylosum, *Klotzsch mss.*

WESTERN TEMPERATE HIMALAYA; alt. 6–12,000 ft., from Kumaon to Kashmir, *Royle*, &c.—DISTRIB. Affghanistan.

Bulb narrow, of few long narrow subequal fleshy scales. *Stem* 3–4 ft., slender. *Leaves* 4–5 in., many-nerved, lower sometimes whorled, margins papillose. *Raceme* raised on the naked top of the stem, 4–10-fld.; bracts whorled; pedicels elongate, cernuous; flowers pendulous, 2 in. diam., fragrant, dull yellowish or greenish out-

side, white within speckled with long purple streaks; segments oblanceolate, ¾ in. broad; style very declinate.

Sect. III. *Bulb* with dark brown scarious coats. *Leaves* linear. *Stamens* not spreading. *Stigmas* 3-fid, lobes short, narrow, recurved. NOTHOLIRION.

10. **L. Thomsonianum,** *Royle Ill.* t. 92; stem 2–4 ft. very many-fld. *Duchart. Obs. Gen. Lis.* 68. L. roseum, *Wall. Cat.* 5077 B; *Belgic. Hortic.* 1854, 129, *cum Ic.*; *Berlin Gartenz.* 1884, 414, f. 125; *Gard. Chron.* 1884, i. 772, fig. 145. L. longifolium, *Griff. Itin. Notes*, 345; *Notul.* 241; *Ic. Pl. Asiat.* t. 277. Fritillaria, Thomsoniana, *Don in Royle Ill.* 388; *Kunth Enum.* iv. 672. Notholirion macrophyllum, *Boiss. Fl. Or.* v. 191, *excl. syn.*

WESTERN HIMALAYA, alt. 5–7000 ft.; from Kumaon to Kashmir.—DISTRIB. Affghanistan.

Bulb 2–2½ in., formed of lanceolate fleshy inner scales (bulbils) covered by dark brown loose scarious longitudinally undulate scales. *Stem* very stout. *Leaves* 8–12 by ¼–½ in., flaccid, narrowed to very fine points. *Raceme* dense-fld., 1–2 ft. long; bracts lanceolate; pedicels short, stout. *Flowers* 2–2½ in. long, sweet-scented, pale rose or rose-purple, segments narrowly spathulate, nectary 0. *Filaments* long; style much longer than the ovary, tip upcurved. *Capsule* 1 in.

11. **L. roseum,** *Wall. Cat.* 5077 A.; stem 12–20 in. few-fld. *Duchart. Obs. Gen. Lis.* 68; *Bot. Mag.* t. 4725. L. Thomsonianum, *Lindl. Bot. Reg.* 1845, t. 1. L. Hookeri, *Baker in Gard. Chron.* 1871, 201. Fritillaria Hookeri, *Baker in Journ. Linn. Soc.* xiv. 269; *in Bot. Mag.* t. 6385. ? F. macrophylla, *Don Prodr.* 51. Notholirion roseum, *Wall. mss. in Bot. Mag.* under t. 4725.

TEMPERATE HIMALAYA; Garwhal, at Mussoori (Bot. Reg.); Nepal, *Wallich*; Sikkim, alt. 9-10,000 ft., *J. D. H.*

A much smaller plant than *L. Thomsonianum*, with the bulb 1½ in. long, the stem 1–2 ft., and the flowers varying from rose pink to pale lilac; but Wallich was probably right in thinking them varieties of one. *Notholirion* was taken up as a genus by Boissier and rightly attributed by him to Wallich, whose mention of it as a genus (not a section) was overlooked in Gen. Plant. Don's *F. macrophylla*, from Nepal, Wallich, with 3–4 flowers and a trifid stigma, must be meant for this plant, though he describes the flowers as yellow.

DOUBTFUL SPECIES.

L. NANUM, *Klotzsch Bot. Reis. Ergeb. Waldem*, 53; leaves linear grassy subobtuse strict erect 5-nerved, flowers small drooping campanulate white, perianth segments sessile oblong obtuse, stigma thickened trigonous puberulous, filaments subulate, anthers oblong obtuse base obtusely 2-fid.—Western Himalaya, *Hoffmeister.* (Translated from Klotzsch, l.c. I cannot imagine what it is.)

22. FRITILLARIA, *Linn.*

Characters of *Lilium*, but perianth campanulate or with segments spreading from near the naked or bearded base, nectaries usually broad, stigmas 3-fid with short spreading truncate divisions (as in Sect. III. of *Lilium*), rarely capitate and 3-lobed.—Species about 50, N. temp. regions.

* *Flowers solitary. Perianth segments spreading from near the base; stigma capitate, 3-lobed.*

1. **F. oxypetala,** *Royle Ill.* 388; leaves elliptic-lanceolate, perianth-

segments elliptic ovate acute, bearded above the nectary. Lilium oxypetalum, *Baker in Journ. Linn. Soc.* xiv. 234; *Elwes Monog. Lil.* t. 4, *left-hand fig.* ? F. tricèps, *Klotzsch Bot. Reis. Pr. Wald.* 53, t. 93.

WESTERN HIMALAYA; Kunawar, *Royle*; Kumaon, alt. 12,500 ft., *Strachey & Winterbottom*; Garwhal and W. Nepal, alt. 10–11,000 ft., *Duthie*.

Bulb 2 in. long; scales few, subequal, lanceolate, acuminate, outer membranous, inner fleshy. *Stem* 12–18 in., stout. *Leaves* 1½–3 by ¾ in. *Flowers* purple. *Segments* 1½–2 in., long. *Style* shorter than the ovary, stigma capitate, 3-lobed. *Capsule* 1 in., broadly oblong.—The flowers of *F. triceps* are described as white.

2. **F. Stracheyi,** *Hook. f.*; leaves narrowly linear, flowers solitary, perianth-segments elliptic-ovate acute bearded above the nectary. F. oxypetala, *Hook. Bot. Mag.* t. 4731; *Lemaire Jard. Fleur.* t. 422.

TEMPERATE HIMALAYA; Kumaon, *Strachey* (*Hort. Kew*); West Nepal, alt. 12–13,000 ft., *Duthie*; Sikkim, alt. 9–10,000 ft., *J. D. H.*

Bulb as in *F. oxypetala*, but much smaller. *Stem* 6–12 in., slender. *Leaves* 4–6 by ⅛–¼ in.; radical linear-lanceolate, long-petioled, obtuse. *Flowers* pale purple speckled within below the middle; segments 1 in. long. *Style* as long as the ovary.

3. **F. Gardneriana,** *Wall. Cat.* 5080; leaves narrowly linear, flowers solitary, perianth-segments obovate-spathulate obtuse naked above the nectary. *Baker in Journ. Linn. Soc.* xiv. 265.

TEMPERATE HIMALAYA; Central Nepal, *Wallich*; Western Nepal, alt. 12–13,000 ft., *Duthie*.

Bulbs as in *F. Stracheyi*. *Stem* slender. *Leaves* 2–6 by ⅛–⅛ in. *Flowers* more infundibular than in the preceding species, with narrower segments, which are obtuse and only ¾ in. long. *Style* rather longer than the ovary.

** *Flowers few or many. Perianth broadly campanulate. Stigma trifid, lobes spreading truncate.*

4. **F. Roylei,** *Hook. Ic. Pl.* t. 860; leaves whorled or opposite linear-lanceolate acuminate straight, flowers solitary or few nodding tessellate, nectary broad naked. *Baker in Journ. Linn. Soc.* xiv. 257. F. verticillata, *Wall. Cat.* 5079 B, C, D (*not of Willd.*); *Royle Ill.* 387, t. 92, f. 2. F. Gulielmi-Waldemarii, *Klotzsch Bot. Reis. Pr. Wald.* 52, t. 92.

WESTERN TEMPERATE HIMALAYA; from Kumaon to Kashmir, alt. 8–12,000 ft. WESTERN TIBET, *Thomson*.

Bulb depressed, scales membranous. *Stem* 1–2 ft., naked below. *Leaves* 2–4 by ½–1½ in., opposite or 3–6 in a whorl, suberect. *Flowers* 1½–2 in. long, campanulate, yellow green, tessellated with dull purple, segments ½–¾ in. broad. *Stamens* half the length of the perianth. *Capsule*, obovoid, obtusely angled.

5. **F. cirrhosa,** *Don Prodr.* 51; lower leaves opposite, upper whorled uppermost with cirrhose tips, flowers 1–2 tessellate, nectary broad naked. *Kunth Enum.* iv. 253; *Baker in Journ. Linn. Soc.* xiv. 257. F. verticillata, *Wall. Cat.* 5079 A (*not of Willd.*).

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 11–16,000 ft., *J. D. H.*

Very nearly allied to *F. Roylei*, and perhaps, as Wallich believed, a variety of that plant, the leaves are however larger and narrower and the uppermost have cirrhose tips.

6. **F. imperialis,** *Linn. Sp. Pl.* 303; leaves crowded lanceolate lower

opposite upper longer whorled, flowers umbelled yellow or brick-red not tessellate, nectary large rounded. *Baker in Journ. Linn. Soc.* xiv. 274; *Boiss. Fl. Orient.* v. 189; *Bot. Mag.* t. 194 and 1215; *Redouté Lil.* t. 131. F. Corona-imperialis, *Gærtn. Fruct.* i. 64, t. 17, f. 1. Petilium imperiale, *J. St. Hil. Fam. Nat.* i 120; *Kunth Enum* iv. 246.

WESTERN HIMALAYA; Kashmir, alt. 7–9000 ft., *Thomson*, *Clarke*.—DISTRIB. Westward to Kurdistan.

Bulb large, globose, of broad obtuse gibbous fleshy yellowish scales, strong-smelling. *Stem* 3–4 ft., robust, naked below. *Leaves* crowded, 6–10 by 1–2 in., lower obtuse, upper acute, often 10 in a whorl. *Flowers* 5–8; bracts leafy, whorled, erect, linear. *Perianth* 2–2½ in. long; segments ¾–1½ in. broad. *Filaments* flattened below. *Capsule* 2 in. long, obovoid, almost 6-winged, umbonate.—Crown Imperial.

23. **LLOYDIA,** *Salisb.*

Small slender bulbous herbs. *Leaves* filiform. *Flowers* few or solitary, small, white or yellow. *Perianth* funnel-shaped, suberect; segments 6, persistent, straight, 3–5-nerved, with an obscure basal fold or nectary. *Stamens* 6, subhypogynous, filaments erect, filiform; anthers basifixed. *Ovary* triquetrous; style columnar, sigma capitate, obscurely 3-lobed; cells many-ovuled. *Capsule* loculicidal. *Seeds* compressed and angled, testa appressed, brown or white.—Species 2 or 3, Northern.

L. serotina, *Reichb. Fl. Germ. Excurs.* 102; *Ic. Fl. Germ.* x. t. 440; *Kunth Enum.* iv. 244; *Baker in Journ. Linn. Soc.* xiv. 300; *Boiss. Fl. Orient.* v. 202. L. alpina, *Salisb. in Trans. Hort. Soc.* i. 328. L. himalensis. *Royle Ill.* 388, t. 93, f. 2; *Kunth l. c.* 672. L. longiscapa, *Hook. Ic. Pl.* t. 834. Anthericum serotinum, *Linn. Sp. Pl. Ed.* ii. 444. Gagea ? pulchella, *Wall. Cat.* 5064. Nectarobothrium striatum, *Ledeb. Fl. Alt.* ii. 36.

ALPINE HIMALAYA and TIBET; from Kashmir to Sikkim, alt. 12–17,000 ft.—DISTRIB. Alps of Europe, Asia and America.

Bulb elongate, ½–1 in., base rhizomatous, neck very long, coats membranous. *Leaves* 2–8 in., wiry, convolute. *Stem* 4–12 in., with 1–2 small leaves, rarely forked. *Flowers* suberect, white with violet veins or yellow, purple at the base; segments ⅜–⅝ in., oblanceolate or spathulate, broad or narrow; nectary very small, green. *Stamens* ½–⅔ shorter than the perianth; filaments glabrous pubescent or villous; anthers minute, very variable in shape. *Style* as long as the ovary. *Capsule* ¼–⅓ in., obovoid or obcordate. *Seeds* triquetrous, foveolate.—I am unable to find any character whereby to distinguish the yellow from the white fld. states, and, what is more remarkable, the specimens with hairy filaments (*L. longiscapa*, Hook., *Gagea ? pulchella*, Wall.) pass into these with glabrous filaments and grow intermixed with them. A very minute tufted state, under an inch long, occurs at 13–14,000 ft. elevation in Sikkim with sepals only ⅛–¼ in. long. In a drawing which I made of the ordinary Sikkim form, the nectary is represented as a drop of fluid on the naked surface above the base of the sepal.

24. **TULIPA,** *Linn.*

Bulb coated. *Leaves* few, linear or oblong. *Scape* naked above, or 1–2-leaved, 1–3-fld. *Flowers* large, usually erect. *Perianth* campanulate; segments 6, quite free; nectary 0. *Stamens* 6, hypogynous; anthers basifixed, erect. *Ovary* oblong; stigmas 3, subsessile, recurved; cells 3, many-ovuled. *Capsule* loculicidal. *Seeds* flattened, testa membranous, pale, appressed.—Species about 50, temp. Europe, N. Africa and N. Asia.

1. **T. chrysantha,** *Boiss. in Kotsch. Pl. Pers. Bor. Exsicc.* 1846, *No.* 78; *Fl. Orient.* v. 193; bulb-scales woolly within, leaves linear or lanceolate undulate margins cartilaginous, perianth yellow within, without suffused with red, outer segments oblong acuminate, inner obovate obtuse or mucronate. *Baker in Journ. Linn. Soc.* xiv. 279. T. Lehmanniana, *Merckl. in Bunge Rel. Lehm.* 337. T. undulata, *Jacquem. mss.* Liliacea, *Griff. Ic. Pl. Asiat.* t. 278, f. 1.

The PANJAB, *Jacquemont*; Salt Range, *Fleming*.—DISTRIB. Affghanistan, Central Asia and N. Persia.

Bulb ¾–1 in. diam. *Stem* 3–4 in. *Leaves* 4–5, glabrous, glaucous, lower 4–6 in., recurved, lanceolate, channelled, upper narrower. *Perianth* 1–1½ in. long; claws of the segments brown. *Anthers* longer than the glabrous filaments. *Ovary* with a narrow neck, stigmas small.—Bulbs eaten in Beluchistan.

2. **T. stellata,** *Hook. Bot. Mag.* t. 2762; bulb-scales woolly within, leaves narrowly linear channelled not undulate, perianth white within, base yellow, rosy or greenish without, segments all alike obtuse or subacute. *Kunth Enum.* iv. 223; *Baker in Journ. Linn. Soc.* xiv. 281 (*excl. syn. Kotschy, No.* 99). T. Clusiana, *var.* stellata, *Regel Enum. Tulip.* 54. ? Anthericum uniflorum, *Roxb. Fl. Ind.* ii. 149.

TEMPERATE WESTERN HIMALAYA, alt. 5–8000 ft.; from Kumaon westwards.

Bulb ¾–1 in. diam. *Stem* 12–18 in., slender, naked below. *Leaves* 4–6, 9–12 in., glabrous, glaucous, channelled. *Peduncle* 6–9 in. *Perianth* 1½–2 in. long, segments spreading, subspathulately oblanceolate. *Anthers* about as long as the very short glabrous filaments. *Ovary* with a narrow neck, stigmas small.—Roxburgh's drawing of *Anthericum uniflorum*, from Rohilkund, made from a specimen that flowered in the Calcutta Bot. Gardens, resembles nothing except this *Tulipa*, from which it differs in the long points to the anthers and in some roots from the base of the bulb being transformed into pedicelled tubers.

25. GAGEA, *Salisb.*

Small bulbiferous herbs, with a solitary leaf from the base of the bulb, and a short naked stem bearing more or less umbelliform leafy cymes or corymbs of flowers. *Perianth* stellate, usually yellow, nectary 0. *Anthers* erect, basifixed. *Capsule* membranous, loculicidal. *Seeds* many, flat or angled, testa membranous —Species about 20, north temp. regions.

1. **G. lutea,** *Schultz f. Syst.* vii. 538; radical leaf linear or lanceolate, cauline 2 subopposite, flowers 3–6 subumbellate, sepals ½–⅔ in. long, capsule very small, seeds subterete curved. *Kunth Enum.* iv. 235; *Boiss Fl. Orient.* v. 207; *Reichb. Ic. Fl. Germ.* x. t. 477; *Bot. Mag.* t. 1200. G. Moorcrottiana, and elegans, *Wall. Cat.* 5063–5065.

WESTERN HIMALAYA; from Kumaon westwards, alt. 6–13,000 ft.—DISTRIB. Westward to the Atlantic, N. Asia.

Bulb solitary in the coats, about as large as a hazel-nut. *Radical-leaf* 3–8 by ⅛–½ in.; cauline subsimilar. *Stem* 2–5 in., glabrous or laxly villous. *Flowers* yellow; perianth segments linear-oblong, obtuse or acute; filaments about half as long; anthers oblong. *Capsule* not half as long as the perianth, broader than long.

2. **G. persica,** *Boiss. Diagn. Ser.* i. vii. 108; *Fl. Orient.* v. 210; radical leaf linear or linear-lanceolate, cauline very narrow, flowers many in unilateral dichotomous cymes, sepals ¼ in. long obtuse, capsule nearly as long

as the perianth, seeds compressed not angled or winged. G. amblyopetala, *var.* bulbifera, *Boiss.*; *Regel Fl. Turkest.* 112, t. 17 (non Boiss.). G. stipitata, *Merkl. in Bunge Rel. Haenk.* 512. Bulbillaria gageoides, *Zucc. in Abhandl. Akad. Wiss. Bay.* iii. 230, t. 2, f. 1. Lloydia kunawarensis, *Royle Ill.* 388, t. 93, f. 3.

WESTERN HIMALAYA; from Kunawur to Kashmir, alt. 5–8000 ft., *Royle*, &c. —DISTRIB. Westwards to Persia, Turkestan.

Bulb solitary in the coats. *Radical leaf* 4–6 by ¼–⅓ in. *Stem* 4–6 in., glabrous, very slender. *Cymes* 1–2 in., often with bulbils in the axils of the short very slender pedicels. *Sepals* linear, obtuse; filaments nearly as long, anthers subdidymous. *Capsule* nearly as long as the perianth. *Seeds* compressed, not angled or winged.

3. **G. reticulata,** *Schultes f. Syst.* vii. 542; leaves all very long filiform recurved cauline numerous subverticillate, flowers many subumbellate, sepals ½–¾ in. long acute or finely acuminate, capsule as long as the perianth, seeds flat angular. *Boiss. Fl. Orient.* v. 208; *Reichb. Fl. Germ.* x. t. 481; *Regel Fl. Turkest.* 110, t. 19, f. 1–4; *Expl. Alger.* t. 45 bis, f. 1. G. taurica, *Stev. Taur.* 335 (*ex Boiss.*) G. commutata, sarmentosa, and triphylla, *C. Koch in Linnæa,* xxii. 227–230. G. pedunculata, *Wall. Cat.* 5066.

The PANJAB PLAINS; ascending the Western Himalaya, Salt Range, &c., to 5500 ft.—DISTRIB. Westwards to Greece and N. Africa, Turkestan.

Bulb densely fibrilliferous. *Stem* 2–3 in., stout or slender. *Leaves* 4–8 in., cauline usually very many, and long, rarely few and short. *Flowers* numerous, very variable in size, green with a white border. *Anthers* linear-oblong.

26. COLCHICUM, *Linn.*

Corm coated. *Leaves* radical, linear or lanceolate. *Scape* very short, sessile amongst the leaf-sheaths, 1–3-fld. *Flowers* large, erect. *Perianth* funnel-shaped; tube very long and slender; lobes 6, subequal, suberect. *Stamens* 6, inserted in the bases of the segments, included; anthers dorsifixed, versatile, introrse. *Ovary* sessile, 3-celled; styles 3, long, filiform; cells many-ovuled. *Capsule* chartaceous, septicidal. *Seeds* subglobose; testa appressed brown.—Species about 30, Europe, N. Africa and temp. Asia.

C. luteum, *Baker in Gard. Chron.* (1874) 33; *Journ. Linn. Soc.* xvii. 434; leaves appearing with the flowers linear-oblong or oblanceolate obtuse, perianth golden yellow, tube 3–4 in., segments oblong or oblanceolate obtuse many-nerved. *Bot. Mag.* t. 6153. Melanthaceæ, *Griff. Notul.* iii. 241; *Ic. Pl. Asiat.* t. 278, f. 2.

WESTERN TEMPERATE HIMALAYA; Kashmir, alt. 4–7000 ft., *Thomson*, &c., Chamba, *Ellis*, &c.—DISTRIB. Affghanistan, Turkestan.

Corm gibbously ovoid, coats dark brown. *Leaves* few, lorate, short at the flowering time, at fruiting 6–12 by ⅓–½ in., tip rounded. *Flowers* 1–2 (in spring), 1–1½ in. diam. when expanded. *Stamens* shorter than the perianth; filaments very much shorter than the long yellow anthers. *Style* filiform, much longer than the perianth. *Capsule* 1–1½ in.; valves with long recurved beaks.

27. MERENDERA, *Ramond.*

Habit and characters of *Colchicum*, but with the perianth-segments free to their base, their long slender claws forming a tube, and the anthers

either basifixed or dorsifixed.—Species about 10, S. Europe, N. Africa and Oriental.

M. persica, *Boiss. & Kotsch. Diagn.* xiii. 37; *Fl. Orient.* v. 169; leaves appearing with the flowers linear acute, scape 1–4-fld., perianth pale lilac, segments lanceolate subacute, blade ½ shorter than the slender claw, anthers basifixed. *Baker in Journ. Linn. Soc.* xvii. 440. M. Aitchisoni, *Hook. f. in Bot. Mag.* t. 6012; *Boiss. l. c.* 169.

The PANJAB; on the Salt Range, and near the Jhelum, *Vicary, Aitchison.*—DISTRIB. Affghanistan, N. Persia.

Bulb gibbously ovoid, long-necked, coats bright red-brown. *Leaves* 1–2 in. in the flowering state, 6–8 in the fruiting, dark green. *Flowers* 1½–2 in. diam.; segments with a reddish dorsal keel. *Filaments* subulate, equalling the anthers.—Boissier keeps *Aitchisoni* distinct from *persica*, on account of the paler corms, and shorter green anthers. Baker unites them.

28. IPHIGENIA, *Kunth.*

Corm coated. *Stem* erect, leafy. *Leaves* few, scattered, linear, upper bractiform. *Flowers* small, erect, solitary or corymbose. *Perianth* 6-partite, stellate, deciduous; segments equal, narrow, clawed, spreading. *Stamens* 6, hypogynous, filaments short, flat; anthers oblong, introrsely attached, versatile. *Ovary* sessile, 3-celled; styles minute, united at the base, linear, recurved, introrsely stigmatose; cells many-ovuled. *Capsule* loculicidal. *Seeds* subglobose; testa thin, brown, appressed.—Species 4, Indian, African and Australasian.

1. **I. indica,** *Kunth Enum.* iv. 213; perianth purplish, segments linear-subulate. *Baker in Journ. Linn. Soc.* xvii. 450; *Benth. Fl. Austral.* vii. 31. I. racemosa, and I. caricina, *Kunth l. c.* Anguillaria indica, *Br. Prodr.* 273; *Wall. Pl. As. Rar.* iii. 37, t. 259; *Cat.* 5085. A. Heyneana, *Wall. Cat.* 5086. Melanthium indicum, *Linn. Mant.* 226. M. racemosum and caricinum, *Roth Nov. Sp.* 199. Hypoxidopsis pumila, *Steud. Pl. Ind. Or. Hohenack.* No. 1313.

Throughout INDIA, from the N. W. frontier to BURMA; ascending the KHASIA HILLS to 4–5000 ft., and the HIMALAYA to 7000 ft. CEYLON; Trincomalee, *Glenie.*—DISTRIB. Australia, Philippines.

Corm globose, ½ in. diam., neck 1–2 in., sheaths brown. *Stem* 3–10 in., flexuous. *Leaves* few, 6–8 by ⅛–½ in., upper smaller. *Flowers* few or many, reddish or purplish; bracts linear, leafy; pedicels 1–2 in. *Perianth* ¼–½ in. long; segments clawed, spreading and reflexed. *Capsule* ½ in., obovoid or oblong, most variable in size.—A sportive plant. Prome specimens are nearly 1 ft. high, very robust and broadish leaved.

2. **I. pallida,** *Baker in Journ. Linn. Soc.* xvii. 451; perianth white, segments oblanceolate acute many-nerved. ? A. indica, *Grah. Cat. Bomb. Pl.* 222.

The CONCAN; *Ritchie, &c.*, on the Ghats at Mahableshwar, and Belgaum.

Probably a var. of *indica*, with smaller narrower leaves and bracts, white flowers with much broader segments and shorter pedicels.

29. TOFIELDIA, *Huds.*

Rootstock creeping. *Leaves* radical, equitant, ensiform. *Scape* slender; flowers small green or white, spicate or racemed; bracts minute. *Perianth*

persistent; segments 6, spreading. *Stamens* 6, on the base of the segments, filaments filiform; anthers short, dorsifixed, versatile, introrse. *Carpels* 3, many-ovuled; styles short, persistent, stigmas obtuse. *Follicles* 3, membranous, acute. *Seeds* many, minute, cymbiform or slender, testa thin, pale.—Species about 14, Arctic and Alpine.

T. himalaica, *Baker in Journ. Linn. Soc.* xvii. 489; leaves narrowly linear 3–5-nerved margins scabrid, fruiting pedicels ascending bracteate at the base calyculate at the apex.

Sikkim Himalaya; alt. 10–12,000 ft., *J. D. H., Clarke.*

Stem 8–18 in., glabrous. *Leaves* 2–4 by $\frac{1}{12}$–$\frac{1}{6}$ in. *Fruiting* raceme 4–8 in.; lower pedicels $\frac{1}{4}$–$\frac{3}{4}$ in. *Perianth* $\frac{1}{8}$ in. long, greenish white; segments narrowly oblanceolate, 1-nerved. *Capsule* $\frac{1}{6}$–$\frac{1}{4}$ in., obovoid; styles very slender, $\frac{1}{3}$ the length of the cells. *Seeds* slender, terets, acute at both ends.

30. GLORIOSA, *Linn.*

Rootstock tuberous, naked. *Stem* climbing, leafy. *Leaves* scattered, opposite or 3-nately whorled, lanceolate, costate, tip elongate spiral. *Flowers* large, axillary, solitary; pedicels reflexed. *Perianth* persistent; segments 6, subequal, narrow, spreading or reflexed, often waved or crisped. *Stamens* 6, hypogynous, filaments filiform; anthers linear, dorsifixed, versatile, extrorse. *Ovary* 3-celled; style filiform, deflexed, 3-fid, arms subulate, introrsely stigmatose; cells many-ovuled. *Capsule* large, coriaceous, septicidal. *Seeds* subglobose, testa spongy; embryo cylindric.—Species 3, tropical Asiatic and African.

G. superba, *Linn. Sp. Pl.* 305; perianth-segments crisply waved. *Baker in Journ. Linn. Soc.* xvii. 457; *Roxb. Fl. Ind.* ii. 143; *Grah. Cat. Bomb. Pl.* 221; *Wight Ic.* t. 2047; *Bot. Reg.* t. 77; *Andr. Bot. Rep.* t. 139; *Reichb. Ic. Exot.* t. 51. G. simplex, *Don Prodr.* 51. G. Doniana, *Schultes f. Syst.* vii. 366. Methonica superba, *Lamk. Encycl.* iv 133; *Kunth Enum.* iv. 276; *Redouté Lil.* t. 26; *Dalz. & Gibs. Bomb. Fl.* 250. M. Doniana, *Kunth l. c.* Eugona superba, *Salisb. Prodr.* 238.—*Rheede Hort. Mal.* vii. t. 57.

Throughout Tropical India; from the N. W. Himalaya to Assam, Burma, Malacca and Ceylon, ascending to 5000 ft.—Distrib. Trop. Africa, Malacca, Cochin China.

Rootstock a chain of fleshy arched tubers, budding from the convexity above. *Stem* 10–20 ft., terete, herbaceous. *Leaves* 6–8 in., sessile or shortly petioled, variable in breadth, many nerved. *Flowers* solitary or subcorymbose towards the ends of the branches from the nearness of the leaves; pedicels 4–6 in., tip deflexed. *Perianth* 3–4 in. diam., segments linear-lanceolate, bright red above the lower third, golden yellow below it as are the margins and midrib. *Filaments* stout, golden yellow; connective green. *Capsule* 2 in. long.

31. TRICYRTIS, *Wall.*

Rootstock creeping. *Stem* dichotomously branched above, leafy. *Leaves* alternate, subsessile or amplexicaul, strongly nerved. *Flowers* subcorymbose or racemose, white spotted with purple. *Perianth* campanulate, deciduous; segments 6, lanceolate, 3 outer saccate or 2-gibbous at the base, inner gibbous or flat. *Stamens* 6, subhypogynous, filaments cohering or conniving in a tube below, spreading above; anthers dorsi-

fixed, extrorse. *Ovary* 3-celled; style 3-fid, arms 2-fid; cells many-ovuled. *Capsule* coriaceous, linear, triquetrous, septicidal. *Seeds* 1-seriate, minute, flat; testa lax, brown, reticulate.—Species 5, Himalayan, Chinese and Japanese.

T. pilosa, *Wall. Tent. Fl. Nep.* 61, t. 46; glandular-pubescent, leaves cordately amplexicaul, flowers loosely corymbose white spotted with purple. *Kunth Enum.* iv. 279; *Baker in Journ. Linn. Soc.* xvii. 464; *Bot. Mag.* t. 4955; *Flore des Serres*, t. 1219. T. elegans, *Wall. l. c.* 62; *Cat.* 600. Compsoa maculata, *Don Prodr.* 51. Compsanthus maculatus, *Spreng. Syst. Veg Cur. Post.* 137.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 5–8000 ft.. *J. D. H.*, &c. Bhotan, *Griff.* The KHASIA HILLS, alt. 5–6000 ft.

Stem 2–4 ft., slender. *Leaves* 4–6 by 1½ 3 in., acuminate, subpinnately 6–9-nerved. *Flowers* 1½ in diam., pedicels stout strict; bracts small, lower ovate-cordate, upper linear or 0. *Perianth segments* lanceolate, recurved from just above the bigibbous nectariferous base, subacute, sparsely glandular without, yellowish white with purple spots. *Filaments* stout, terete, erect, then stellately spreading; anthers lilac. *Style* short, clavate, arms recurved, stout, obtuse. *Capsule* 1–1½ in.

32. DISPORUM, *Salisb.*

Rootstock creeping. *Stem* erect, angular, leafy. *Leaves* sessile or subsessile, strongly-nerved. *Flowers* in terminal or axillary few-fld. umbels; pedicels decurved. *Perianth* campanulate, deciduous; segments 6, erect, base saccate or spurred. *Stamens* 6, hypogynous; anthers dorsifixed, extrorse. *Ovary* 3-celled; style long or short, stigmas 3 short; cells 2–6-ovuled. *Berry* pisiform, fleshy, black. *Seeds* subglobose, testa appressed, brown.—Species about 12, Asiatic and N. American.

The study of a very large series of specimens and drawings of the Indian *Dispora* has satisfied me that no specific limits can be assigned to their forms, greatly though they differ, and Mr. Clarke has arrived at the same conclusion. The leaves afford no characters; the umbels are sessile or peduncled in the same form and even specimen, and vary in the number of flowers they bear; the flowers are white, greenish, or dark purple, and the perianth tubular with spreading tips of the narrow segments in the large flowered forms; but in others broadly campanulate with the broader segments spreading from shortly above the base. The filaments are shorter than the anthers in some forms, three to four times as long in others. The length of the style is usually proportionate to that of the perianth, but it is sometimes far exserted (indicating dimorphic conditions). The fruit is the same in all forms, a purple-black, pea-shaped berry. It remains for the resident botanists in the Himalaya to study all the forms, each in his own province, with the view of classifying them, which latter I have been unable to do satisfactorily; after which a review of all the results thus obtained would lead to a better knowledge of the genus.

1. **D. calcaratum,** *Don in Trans. Linn. Soc.* xviii. 516; perianth-segments lanceolate acute base spurred. *Kunth Enum.* iv. 207; *Baker in Journ. Linn. Soc.* xiv. 588. D. Wallichii and Hamiltonianum, *Don & Kunth ll. cc.* D. latipetalum, *Coll. & Hemsl. in Journ. Linn. Soc.* xxviii. 139. Uvularia calcarata, *Wall. Cat.* 5087. U. Hamiltoniana, *Wall. Cat.* 5088 in part. U. Betua, *Ham. mss.*

TEMPERATE HIMALAYA; from Nepal, *Wallich*, eastwards, alt. 5–8000 ft. KHASIA MTS., MUNNIPORE and BURMA, alt. 3–6000 ft.

Stem 1–2 ft. *Leaves* 2–3 in., oblong-lanceolate, acuminate. *Flowers* ½–¾ in. long, usually narrow, white greenish or purplish; spurs very variable, in short flowered specimens ¼ in. long, equalling the blade of the sepal in length. *Styles* slender, rarely exserted.

Don gives the following characters to the species united above:—*calcaratum*, sepals lanceolate acuminate long-spurred, filaments thrice as long as the anthers. *Wallichii*, sepals lanceolate acuminate, spur short straight, filaments five times as long as the anthers. *Hamiltonianum*, sepals lanceolate acute, spur short recurved, anthers as long as the filaments. An original drawing of the latter (Hamilton's "Betua," spelled *Betiya*) has acuminate narrow purple sepals with very short spurs; it is not distinguishable from a drawing by Horsfield of the Javanese *multiflorum* (*Horsfieldii*). The Burmese *D. latipetalum* has broader sepals and in this respect approaches the Chinese *D. uniflorum*, berry intermediate.

2. **D. pullum,** *Salisb. in Trans. Hort. Soc.* i. 330; perianth-segments spathulate or lanceolate acute or acuminate base saccate or subsaccate. *Don Prodr.* 50; *in Trans. Linn. Soc.* xviii. 521; *Kunth Enum.* iv. 208; *Baker in Journ. Linn. Soc.* xiv. 589. D. Pitsutum, *Don ll. cc.* 50 and 519; *Kunth l. c.* 207. D. fulvum (*error for pullum*), *Don Prodr.* 50. D. multiflorum, *Don in Proc. Linn. Soc.* v. 45; *in Trans. Linn. Soc. l. c.* 518; *Kunth l. c.* 207; *Miquel Fl. Ind. Bat.* iii. 552. D. parviflorum, *Don ll. cc.* 50 and 520; *Kunth l. c.* 208. D. Horsfieldii, *Don in Proc. Linn. Soc. Nov.* 1839. Uvularia chinensis, *Gawl. in Bot. Mag.* t. 916. U. parviflora and umbellata, *Wall. in Asiat. Research.* xiii. 379; *Plant. As. Rar.* iii. 43, t. 269; *Cat.* 5090. U. multiflora, *Reinw. in Blume Cat. Hort. Buitenz.* 62. U. parviflora, *Wall. in As. Res.* xiii. 378; *Cat.* 5091 *in part.* U. Hamiltoniana, *Wall. Cat.* 5088 C *in part*, D. Streptopus chinensis and pedunculatis, *Smith in Rees Cyclop. under* Uvularia. Drapiezia multiflora, *Blume Enum.* i. 8.

TEMPERATE HIMALAYA; from Garwhal eastwards, alt. 4–8000 ft. KHASIA and MUNNIPORE HILLS. BEHAR, on Parusnath.—DISTRIB. Sumatra, Java, China.

Stem 2–4 ft., sometimes robust, or branched. *Leaves* 2–6 in., ovate-oblong or lanceolate, acute or acuminate. *Flowers* white or dull purple, in sessile or peduncled many- or few-fld. umbels; pedicels ½–1 in.

The type of this species is the Chinese *uvularia chinensis* of the Botanical Magazine, a purple flowered plant hardly distinguishable from shortly spurred specimens of *calcaratum*. The flowers are narrow, nearly an inch long, with lanceolate acute sepals and filaments twice as long as the anthers. *D. multiflorum* has numerous very small white flowers, with subspathulate mucronate sepals and filaments twice as long as the anthers. *D. Pitsutum* has short cuneately lanceolate subacute white sepals, spreading from near the saccate base, and filaments longer or shorter than the anthers, it passes into *Leschenaultianum*. I have found it single-flowered in Sikkim where it is identified with Baker's Chinese *D. uniflorum*. *D. parviflorum* has white flowers only ½–¾ in. long, with narrow lanceolate acuminate sepals, and filaments about twice as long as the anthers.

3. **D. Leschenaultianum,** *Don in Trans. Linn. Soc.* xviii. 518; perianth-segments broadly oblong acute or acuminate base saccate. *Kunth Enum.* iv. 207; *Baker in Journ. Linn. Soc.* xiv. 590; *Thwaites Enum.* 338; *Wight Ic.* t. 2048; *Bot. Mag.* t. 6935. D. ceylanicum and mysorense. *Wight Ic.* t. 2049. Uvularia Leschenaultiana, *Wall. Cat.* 5089.

The WESTERN GHATS; from Canara southwards. CEYLON, alt. 4–7000 ft.

Stem 1–2 ft., branched above. *Leaves* mostly shortly petioled, 2–4 in., and broadly ovate or oblong-ovate, acuminate, but very variable in breadth. *Flowers* quite white, in 3–5-fld. umbels. *Perianth* ¾ in. long; segments obtuse, obscurely

ciliate. *Filaments* about as long as the anthers or longer.—Wight figures the perianth segments of his three species as acute or acuminate. His *ceylanicum* is intermediate between his other two, but has the smaller flowers of *mysorense*. His figure of *Leschenaultianum* resembles a broad-leaved *pullum*. The Bot. Mag. plate of *Leschenaultianum* has the broad sepals of Wight's *mysorense*, but the large flowers of the type. Royle's figure of the Kumaon plant referred to *Leschenaultianum* is so bad that I refrain from citing it.

33. **CLINTONIA,** *Rafin.*

Rootstock creeping. *Leaves* subradical, narrow, costate. *Scape* naked or 1-leaved. *Flowers* in terminal umbels or racemes, rarely solitary; bracts linear or 0. *Perianth* funnel-shaped, deciduous; segments 6, subequal. *Stamens* 6, inserted on the base of the segments, filaments filiform; anthers dorsifixed, subextrorse. *Ovary* 3-celled; style columnar, stigma thickened; cells 2- or more-ovuled. *Berry* fleshy, at length loculicidal. *Seeds* 2 or more, ovoid or obtusely angled; testa appressed, brown or pale; albumen hard; embryo minute.—Species 8, Temperate Asiatic and N. American.

C. alpina, *Kunth Enum.* v. 159; leaves obovate to oblanceolate cuspidate or acuminate, scape leafless and pedicels pubescent, perianth-segments oblanceolate 5–7-nerved. *Baker in Journ. Linn. Soc.* xiv. 585. Smilacina alpina, *Royle Ill.* 380.

TEMPERATE HIMALAYA, alt. 8–11,000 ft.; from Garwhal to Sikkim, alt. 12,000 ft., and Bhotan.

Leaves few, 4–9 by 2–4 in., suberect, glabrous; nerves many, slender. *Scape* 6–24 in., slender; flowers loosely racemose or the upper umbellate; pedicels ½–1 in., straight, fruiting elongate curved; bracts caducous. *Perianth* ¼–⅓ in. long, white. *Stamens* included, anthers small. *Ovary* ovoid; style short, 3-toothed. *Berry* ¼–⅓ in. diam., many-seeded; fruiting pedicels ¾–1½ in., distant, upcurved.—The Chinese *C. udensis*, F. & M., hardly differs.

34. **TRILLIUM,** *Linn.*

Rootstock creeping, annulate. *Stem* simple, erect, base sheathed. *Leaves* 3, whorled at or above the middle of the stem, 3–5-nerved and reticulate. *Flower* solitary, sessile or pedicelled. *Perianth* persistent; segments 6. free, spreading. *Stamens* 6, inserted on the base of the segments, filaments short; anthers basifixed, cells bordering the connective, slits lateral. *Ovary* ovoid or subglobose, 3-celled; style 3-fid or 3-partite, arms recurved stigmatose within; cells many-ovuled. *Berry* fleshy. *Seeds* ovoid, with a lateral pulpy strophiole, albumen fleshy; embryo minute.—Species 12, a few Himalayan, Chinese and Japanese, the rest N. American.

1. **T. Govanianum,** *Wall. Cat.* 812; leaves shortly petioled ovate or ovate-cordate acute, sepals subequal narrowly linear. *Royle Ill.* 384, t. 93. Trillidium Govanianum, *Kunth Enum.* v. 120.

TEMPERATE HIMALAYA; from Kashmir, alt. 8–10,000 ft., to Sikkim, alt. 9–11,000 ft.

2. **T. Tschonoskii,** *Maxim. in Bull. Acad. Petersb.* xxix. (1884) 218; leaves sessile broadly subrhomboidally ovate or orbicular cuspidately acuminate, sepals green oblong-lanceolate, petals similar dull purple.

SIKKIM HIMALAYA, alt. 10–11,000 ft., *J. D. H., Clarke.* BHOTAN and the Mishmi Hills, *Griffith.*—DISTRIB. Japan.

Stem 8–12 in. *Leaves* 2–3 in. broad and long or narrower. *Peduncle* ½–¾ in. *Flowers* ¾–1 in. diam.; filaments flat, rather longer than the linear anther. *Style* very short.—This, which differs from the American and Japanese *T. erectum* chiefly in the longer filaments, will (with others) prove, I expect, a form of that variable species.

35. **PARIS,** *Linn.*

Characters of *Trillium*, but leaves 4–9 in a whorl, and flowers 8–12-merous. Species 5 or 6, Europe, Temp. Asia.

3. **P. polyphylla,** *Smith in Rees Cyclop.*; leaves 4–9 petioled oblong or oblanceolate acuminate, sepals 4–6 ovate-lanceolate acuminate, petals as long or longer filiform, fruit 3–6-valved, testa pulpy. *Don Prodr.* 49; *Kunth Enum.* v. 118; *Wall. Pl. As. Rar.* ii. 24, t. 126; *Cat.* 3710; *Hook. f. Ic. Cathcart*, t. 24. P. Daisua, *Herb. Ham.* P. imperialis, *Jacquem. mss.* Euthyra, *Salisb. Gen. Pl. Fragm.* 61.

Temperate Himalaya; from Simla to Bhotan, alt. 6–10,000 ft.—Distrib. W. China.

Rootstock annulate, sometimes as large as a small potato. *Stem* 3 in. to 3 ft. *Leaves* 3–6 in., dark green, base rounded or acute; petiole ½ in. or less. *Sepals* 1–4 in., green, 3-nerved. *Petals* sometimes twice as long, yellow. *Anthers* longer than the filament, very narrow, connective very shortly produced or not. *Ovary* subglobose, septa nearly reaching the axis. *Fruit* green, smooth, 2½ in. diam., or less, coriaceous, loculicidal. *Seeds* ⅛ in. long, or less, ovoid, scarlet.—Extremely variable in the number and size of all parts.

Order CLVII. **PONTEDERIACEÆ.**

Fresh-water and marsh herbs. *Leaves* erect or floating, nerves parallel. *Flowers*, bisexual, in spikes or racemes from the sheath of the uppermost leaf; bracts sheathing irregular. *Perianth* unequally 6-partite, white or blue, marcescent. *Stamens* 1–6, inserted at the base of the lobes; anthers erect or versatile, one usually longer than the others. *Ovary* free, 3-celled, or 1-celled with 3 parietal placentas; placentas one or more-ovuled; style slender, stigma subentire or lobed; ovules anatropous. *Capsule* membranous, loculicidally 3-valved. *Seeds* small, albumen horny or floury; embryo cylindric.—Genera 5, species about 36.

MONOCHORIA, *Presl.*

Rootstock short or creeping. *Leaves* radical and solitary at the top of the emerged stem or branches. *Perianth* campanulate, 6-partite. *Stamens* 6, one usually largest, with the filament toothed on one side; anthers basifixed, slit terminal at length elongating. *Ovary* 3-celled, many-ovuled. —Species about 6, in the tropics of the old world.

1. **M. hastæfolia,** *Presl Rel. Hænk.* ii. 128; rootstock creeping, leaves long-petioled sagittate hastate or cordate, flowers racemed or subumbellate long-pedicelled. *Kunth Enum.* iv. 133; *Miquel Fl. Ind. Bat.* iii. i. 548. M. hastata, *Solms Laub. in A.DC. Monog. Phanerog.* iv. 523. M. dilatata & sagittata, *Kunth l. c.* 134. Pontederia hastata, *Linn. Fl. Zeyl.* 129; *Mant.* 363; *Roxb. Fl. Ind.* ii. 121; *Cor. Pl.* ii. 6, t. 63; *Wall. Cat.* 5092; *Dalz. & Gibs. Bomb. Fl.* 249; *Raspail in Ann. Mus.* xiv. t. 169, f. 7–9

P. saggitata, *Roxb. Fl. Ind.* ii. 124; *Wall. Cat.* 5093. P. dilatata, *Andrews Bot. Rep.* vii. t. 490; *Buch. Ham. in Syme's Embass.* 475 *with plate*; *Roxb. l. c.* 123; *Wall. Cat.* 4094. P. sagittifolia, *Herb. Heyne.*

Common throughout INDIA and CEYLON.—DISTRIB. Malay Islands, China.

Rootstock spongy; flowering stems short. *Leaves* 6–7 by 5–6 in., obtuse or acute, many-nerved; petiole of the floral leaf tumid above and embracing the short scape, of the radical 18–24 in., broad and sheathing at the base. *Inflorescence* centrifugal; flowers long-pedicelled, ¾–1 in. diam., violet-blue dotted with red; pedicels 1 in. or less; larger sepal obovate, smaller oblong. *Filament* spurred. Large *anther* blue, the others yellow. *Capsule* ½ in. diam., subglobose or oblong.

2. **M. vaginalis,** *Presl Reliq. Hænk.* ii. 128; rootstock short, leaves long-petioled, from linear to ovate and ovate-cordate, flowers short-pedicelled subspicate. *Kunth Enum.* iv. 134; *Solms Laub. in A.DC. Monogr. Phanerog.* iv. 524; *Miquel Fl. Ind. Bat.* iii. 548. Pontederia vaginalis, *Linn. Mant.* 228; *Roxb. Fl. Ind.* ii. 121; *Cor. Pl.* ii t. 110; *Wall. Cat.* 5095; *Dalz. & Gibs. Bomb. Fl.* 243.—*Rheede Hort. Mal.* ii. t. 44.

Throughout INDIA; from Kashmir eastwards to Assam and southwards to Travancore and Singapore. CEYLON common.—DISTRIB. Malay Islands, China, Japan, Trop. Africa.

Rootstock suberect (creeping, *Roxburgh*). *Leaves* much as in *M. hastæfolia*, but few-nerved. *Inflorescence* centripetal, few- or many-fld.; flowers blue, sprinkled with red, very variable in size, pedicels shorter than the perianth. *Filaments* and *anthers* as in M. *hastæfolia*.—A most variable plant.

Var. *plantaginea*, Solms Laub. l. c.; smaller, leaves often narrow, raceme few-fld. M. pauciflora, *Kunth & Miquel ll. cc.* M. linearis, *Miq. l. c.* Pontederia plantaginea, *Roxb. l c.* 123; *Wall. Cat.* 5096. P. pauciflora, *Blume Enum. Fl. Jav.* i. 32. P. racemosa, *Herb. Ham.*—India, Java.

ORDER CLVIII. PHILYDRACEÆ.

Erect herbs. *Leaves* narrowly linear. *Flowers* small, in bracteate spikes or panicles, bisexual, irregular. *Perianth* inferior, 2-partite; segments antero-posterior, petaloid, persistent. *Stamen* 1, inserted on the base of the anterior segment, filament flattened; anther straight or twisted; staminodes 2, alternate with the sepals, small, petaloid. *Ovary* free, 3-celled, or 1-celled with 3 projecting parietal many-ovuled placentas; style terminal, stigma entire; ovules anatropous. *Capsule* loculicidal, 3-valved. *Seeds* many, small, albumen fleshy, embryo minute.—Genera 3, species 4, Asiatic, Australian and Pacific.

PHILYDRUM, *Banks.*

Spike simple. *Anthers* at length twisted. *Ovary* 1-celled.

P. lanuginosum, *Banks in Gærtn. Fruct.* i. 62, t. 16, f. 10; *Kunth Enum.* iii. 380; *Bot. Mag.* t. 783; *Roscoe in Trans. Linn. Soc.* viii. 342, t. 20; *Miquel Fl. Ind. Bat.* iii. 250; *Guillem. Ic. Pl. Austral.* t. 5; *Benth. Fl. Austral.* vii. 74; *Caruel in A.DC. Monogr. Phanerog.* iii. 2; *Schleid. & Vog. in Nov. Act. Acad. Nat. Cur.* xix. 40, f. 1; *Griff. Notul.* iii. 231; *Ic. Pl. Asiat.* t. 269, 270. Garciana cochinchinensis, *Lour. Fl. Cochin.* i. 15.

BURMA, the ANDAMAN ISLANDS and the MALAY PENINSULA.—DISTRIB. China, Malay Islands, Australia.

A tall stout herb, 2–3 ft., more or less woolly; stem simple or nearly so. *Leaves* 1–2 ft., distichous and equitant at the base, ensiform, upper passing into lanceolate bracts. *Spike* 1–2 ft., simple or branched, woolly; bracts 1–2-fld.; flowers sessile, yellow, ½ in. diam. *Sepals* hairy, many-nerved, margins subinvolute in bud. *Stamen* as long as the sepals, filament flattened, acute; anther transverse; staminodes subconnate with the filament. *Ovary* 1-celled, placentas broadly 2-lobed, ovules very many; stigma broad, 3-angled. *Capsule* oblong. *Seeds* narrowly oblong, striate and tuberculate, chalaza black, funicle short pale.

Order CLIX. **XYRIDEÆ.**

Tufted rigid herbs. *Leaves* radical, linear or subulate. *Scape* simple, naked. *Flowers* sessile in the rigid dark brown imbricating bracts of a terminal head or spike, bisexual. *Bracteoles* (sepals?) 3, deciduous, scarious, embracing the claws of the petals, 2 lateral, 1 broader dorsal often hooded. *Petals* 3, clawed, claw erect spreading, limb golden yellow, marcescent. *Stamens* 3, inserted at the bases of the petals, included; anthers sagittate; staminodes 3, alternating with the inner segments, filiform, bearded or antheriferous, sometimes 0. *Ovary* free, imperfectly 3-celled; placentas 3, many-ovuled, basal and confluent or parietal; style trifid, stigmas capitate or dilated; ovules anatropous. *Capsule* loculicidally 3-valved, or with the top circumsciss. *Seeds* numerous, linear, albumen flowery, embryo minute.—Genera 2, species about 50, one (*Xyris*) found in all warm regions; the other American.

XYRIS, *Linn.*

Characters of the Order.

* *Leaves distinctly flat.*

1. **X. indica,** *Linn. Sp. Pl.* 62; robust, leaves loriform ¼–⅓ in. broad, scape stout deeply grooved, spike ovoid or globose, bracts orbicular or cuneately obovate. *Vahl Enum.* ii. 204; *Roxb. Fl. Ind.* i 179; *Mart. in Wall. Pl. As. Rar.* iii. 30; *Kunth Enum.* iv. 20; *Wall. Cat.* 6086 B, C.; *Dalz. & Gibs. Bomb. Fl.* 259; *Miq. Fl. Ind. Bat.* iii. 528; *Steud. Syn. Pl. Cyp.* 288,—*Rheede Hort. Mal.* ix. t. 7.

Bengal, in low marshes, at the foot of the Sikkim, Assam and Khasia Hills, southward to Malacca and from the South Concan (in salt marshes) to Ceylon.—Distrib. Malay Islands.

Leaves 1–2 ft., spongy, obtuse. *Scape* as long, acutely angled. *Spike* ½–¾ in.; bracts ¼ in. broad, few or many, dark red brown, shining, broader than long, margins scarious; bracteoles linear-spathulate, smooth. *Petals* orbicular, erose.

2. **X. robusta,** *Mart. in Wall. Pl. As. Rar.* ii. 30; leaves scape and spike of *X. indica*, but bracts broadly ovate-oblong longer than broad. *Wall. Cat.* 6087. *Kunth Enum.* iv. 19; *Steud. Syn. Pl. Cyp.* 287.

Silhet; *Wallich.*

Apparently distinct from *X. indica* in the form of the bracts; probably also in other characters that are not available in the few dried specimens at my disposal.

3. **X. anceps,** *Lamk. Ill.* i. 132; leaves narrowly linear ⅒–⅙ in. broad rigid twisted much shorter than the flattened or 2-edged grooved

scape, margins smooth or scaberulous, spike ovoid-oblong, bracts orbicular pale. *Vahl Enum.* ii. 205; *Kunth Enum.* iv. 17; *Miquel Fl. Ind. Bat.* iii. 529; *Steud. Syn. Pl. Cyp.* 287. X. Walkeri, *Arn. in Wight Cat.* 2373; *Kunth l. c.* 19; *Miquel l. c. Suppl.* 608. X. indica altera. *Vahl Symb.* iii. 7. X. malaccensis, *Steud. l. c.* 287.—Xyris No. 2, *Griff. Notul.* iii. 123.

Sandy places, often near the sea. BURMA, *Griffith.* SINGAPORE and MALACCA, *Maingay.* SOUTH DECCAN PENINSULA and CEYLON, *Wight*, &c.—DISTRIB. Borneo, &c.

Densely tufted. *Leaves* 6–12 by $\frac{1}{10}$–$\frac{1}{8}$ in., very rigid, pungent, strongly grooved on both faces, pale green. *Scape* 1–2½ ft., slender, rigid. *Spike* ½–¾ in., rarely globose; lateral bracteoles ovate-lanceolate, acuminate, tip lacerate, keel spinulose. *Petals* toothed.

4. **X. Wallichii,** *Kunth Enum.* iv. 16; dwarf, leaves gladiate 3–6 by ¼–⅜ in. broad acuminate flaccid as long as the slender compressed scape, spike very small, bracts few obovate-oblong obtuse. *Steud. Syn. Pl. Cyp.* 287.—Xyris, No. 1, *Griff. Notul.* iii. 123; *Ic. Pl. Asiat.* t. 161 C.—*Wall. Cat.* 6083 C.

KHASIA HILLS, alt. 4–6000 ft., *Wallich*, &c. BURMA, at Moulmein, *Lobb.*

A slender flaccid loosely tufted species. *Leaves* few, often falcate, bright pale green, faintly striate. *Scape* usually filiform, rarely stout. *Spike* ¼–½ in.; bracts rich brown with pale midrib and margins; bracteoles subequal, red-brown, with green midrib and pale margins; lateral spathulately oblanceolate, obtuse, quite glabrous. *Petals* oblong, subcrenate. *Style* very long.

** *Leaves usually less than* ⅛ *in. broad, not distinctly flattened* (*except in forms of* X. pauciflora).

5. **X. schœnoides,** *Mart. in Wall. Pl. As. Rar.* iii. 30; leaves narrowly linear acuminate much shorter than the very slender striate compressed scape, spike globose or ovoid, bracts broadly oblong obtuse outer nearly as long as the inner. *Wall. Cat.* 6084, and 6083 *in part*; *Kunth Enum.* iv. 16; *Miq. Fl. Ind. Bat.* iii. 529; *Steud. Syn. Pl. Cyp.* 287. X. nilagarensis, *Steud. Plant. Exsicc. Nilg. Hohenack.* No. 956.

NEPAL, *Wallich.* KHASIA and NILGHIRI HILLS, alt. 4–6000 ft., common. CEYLON, ascending to 6000 ft.,—DISTRIB. China.

Leaves 2–10 in., slender, $\frac{1}{10}$–$\frac{1}{6}$ in. broad, tapering from the base to the tip. *Scape* 1–2 ft., stout. *Spike* ¼–½ in. diam.; bracts almost rounded, back brown, keeled towards the rounded tip; lateral bracteoles oblanceolate, acuminate, dorsal ovate-lanceolate.

6. **X. pauciflora,** *Willd. Phytogr.* i. 2, t. 1, f. 1; *Sp. Pl.* i. 255; leaves narrowly linear rigid acute smooth or scaberulous equalling or shorter than the striate subterete or compressed and 2-edged scape, spike ovoid or globose, bracts orbicular-obovate pale thin with often a green tip. *Vahl Enum.* ii. 207; *Br. Prodr.* 256; *Mart. in Wall. Pl. As. Rar.* iii. 29; *Cat.* 6083 A, B (C & D, *in part*), and 6086 B; *Miq. Fl. Ind. Bat.* iii. 529; *Steud. Syn. Pl. Cyp.* 287. X. oryzetorum, *Miq. in Herb. Hohenack.* n. 369; *Steud. l. c.* 286.

Foot of the HIMALAYA, in marshes, from Nepal eastwards to BENGAL and BURMA, and southwards to MALACCA and CEYLON.—DISTRIB. Malaya, China and Australia.

Leaves 3-8 in., rarely ⅛ in. broad, strongly nerved, scaberulous on the surface or margin or neither. *Spike* ¼–½ in. long and broad, rarely ovoid. *Lateral* bractoles oblanceolate, acuminate, keeled, hyaline, quite glabrous.—Part of Wallich's 608 D is *Fimbristylis tetragona*, Br. Small specimens with small spikes resemble *X. bancana*, and there are Mergui specimens collected by Griffith and Lobb with leaves 6–10 by ⅛–¼ in. and scape 6–24 in.

7. **X. bancana,** *Miq. Fl. Ind. Bat. Suppl.* 608; dwarf, leaves 1–2 in. filiform smooth flexuous rigid much shorter than the filiform flexuous smooth compressed scape, spike very small ovoid, bracts few obovate obtuse.

MALACCA, in sandy places near the sea, *Griffith, Maingay*; Pahang, *Ridley*.—DISTRIB. Banca.

Resembles a small form of *X. pauciflora*, but much more slender and rigid, with filiform scape. *Leaves* $\frac{1}{16}$ in. broad, grooved. *Spike* ⅓–¼ in.; bracts pale, inner hardly exceeding the outer. *Lateral bracteoles* linear-lanceolate, strongly ciliate, keel toothed.

DOUBTFUL SPECIES.

8. X. LAPPACEA, *Herb. Heyne ex Mart. in Wall. Pl. As. Rar.* iii. 30; *Wall. Cat.* 6085; *Kunth Enum.* iv. 16; *Steud. Syn. Pl. Cyp.* 287.—There is no specimen in Wallich's Herbarium, only the empty sheet, with his number and a ticket of Heyne's inscribed "Xyris capensis, Rottler. 28," across which Wallich has written "Return."—The inference is that the specimen was lent to Martius with the others of the genus and possibly never returned. The reference to *capensis* makes me suspect that it is *X. anceps*, which strongly resembles and may be the same as a Cape species.

ORDER CLX. COMMELINACEÆ.

Herbs, rarely climbing or undershrubs. *Leaves* costate, bases sheathing, nerves parallel. *Inflorescence* various. *Flowers* usually bisexual, more or less irregular. *Perianth* inferior, 6-partite; 3 outer segments herbaceous often persistent, 3 inner petaloid, free or united in a tube below, marcescent, spreading. *Stamens* 6, inserted on the base of the segments, all antheriferous or 2 or more reduced to staminodes, filaments often bearded with jointed hairs; anthers oblong or globose, often dissimilar. *Ovary* free, 2–3-celled; style terminal, stigma small; ovules 1 or few in the inner angle of the cells, orthotropous. *Capsule* loculicidal or indehiscent. *Seeds* angled, testa smooth or rugose, albumen floury; embryo minute, far from the hilum.—Genera 25, species about 300, tropical and subtropical.

The specific characters, synonyms, &c, are drawn up, with permission, from C. B. Clarke's careful and exhaustive "Monograph of this Order" in Vol. III. of A. de Candolle's Monographs (p. 113 and seq.), 1881. I have added to the diagnoses a few subsidiary characters that may aid in the recognition of the species.

Tribe I. POLLIEÆ. *Fruit* indehiscent, crustaceous.

Panicle terminal, of scorpioid cymes . . . . . 1. POLLIA.

Tribe II. COMMELINEÆ. *Capsule* loculicidal. *Stamens* 3 perfect, with 1–3 staminodes.

Cymes solitary, included in a spathe. Ovary 3-celled, cells 1–2-ovuled . . . . . 2. COMMELINA.
Cymes naked, panicled, rarely in a spathe . . . . . 3. ANEILEMA.

Tribe III. TRADECANTIEÆ. *Capsule* loculicidal. *Stamens* 6 perfect.

Cymes capitate. Petals free . . . . . 4. FORRESTIA.
Cymes from imbricating bracts, scorpioid or 1-few-fld. Corolla tubular below . . . . . 5. CYANOTIS.
Cymes scorpioid, panicled or spicate. Stem twining . . . 6. STREPTOLIRION.
Flowers panicled. Stem erect . . . . . 7. FLOSCOPA.

1. **POLLIA,** *Thumb.*

Large herbs. *Leaves* lanceolate. *Cymes* in a terminal panicle. *Sepals* 3. *Petals* smaller, subequal, obovate. *Stamens* 6, or 3 with 3 staminodes, filaments naked; anther-cells parallel. *Ovary* 3-celled; cells 2–∞-ovuled. *Fruit* globose or ovoid, fragile, blue. *Seeds* smooth.—Species about 14, E. Asiatic and Australian.

1. **P. Aclisia,** *Hassk. Commel. Ind.* 55; tall, robust, panicle erect lax-fld., stamens 6 perfect, fruit subglobose, cells many-seeded. *Clarke Monogr.* 123; *Comm. & Cyrt. Beng.* t. 32. P. indica β, *Clarke in Journ. Linn. Soc. Bot.* xi. 451. Aclisia No. 2, *Herb. Ind. Or. H. f. & T.*

TROPICAL EASTERN HIMALAYA; Nepal and Sikkim, alt. 2–3000 ft.; Bhotan, *Griffith.* KHASIA MTS., SILHET, ASSAM, BURMA.—DISTRIB. Java, Tonkin.

Stem stout, erect. *Leaves* 8–12 by 2½–3½ in., narrowed into a broad petiole, lanceolate or oblanceolate, caudate-acuminate, glabrous or scaberulous, margins crisped. *Peduncle* short, stout, villous; panicle rigid, pubescent; bracts oblong; bracteoles acute, amplexicaul. *Sepals* membranous and petals white. *Seeds* brown, flattened and angled. *Fruit* ⅛ in. diam., bright blue, shining.

2. **P. thyrsiflora,** *Endl. Gen.* 1029; panicle short dense-fld., stamens 6 perfect, fruit ellipsoid, cells many-seeded. *Hassk. in Plant. Jungh.* 150, *& Comm. Ind.* 57; *Clarke Comm. & Cyrt. Beng.* t. 33; *Monogr.* 124. P. glaucescens, *Teysm. & Binnend. in Nat. Tijd. Ned. Ind.* xxiv. 305. Tradescantia thyrsiflora, *Blume Enum.* i. 6. Lamprocarpus thyrsiflorus, *Blume ex Schultes f. Syst.* vii., *Addend.* 1726.

SOUTH ANDAMAN ISLANDS, *Kurz.*—DISTRIB. Malay Islands.

Stem stout, erect, creeping below; sheaths pubescent. *Leaves* 10–12 by 2½–3½ in., oblanceolate, narrowed into a 1–2 in. petiole, glabrous, margins crisped. *Peduncle* stout and ovoid panicle pubescent; bracts ovate; branches closely scarred; flowers crowded. *Fruit* yellow-brown or blue, smooth, dorsally compressed.

3. **P. sorzogonensis,** *Endl. Gen.* 1029; leaves lanceolate, panicle ovoid peduncled, branches alternate, stamens 3 perfect, fruit globose, cells many-seeded. *Miquel Fl. Ind. Bat.* iii. 541; *Clarke Monogr.* 126. Aclisia sorzogonensis, *E. Meyer in Presl Rel. Haenk.* i. 138, t. 25; *Hask. Comm. Ind.* 48.

EASTERN HIMALAYA; Sikkim and Bhotan, and southward to BURMA, MALACCA and CEYLON.—DISTRIB. Malay Islands, China, New Caledonia.

Stem stout, erect, viscid. *Leaves* 6–10 by 2–3 in., subsessile or shortly-petioled,

glabrous or scaberulous above. *Peduncle* villous with deflexed hairs; panicle viscidly pubescent; bracts oblong, persistent. *Sepals* elliptic, glabrous or puberulous. *Petals* white or pale pink. *Fruit* as in *P. Aclisia*.—The Indian forms occur under two varieties.

Var. *indica*; leaves subsessile caudate-acuminate glabrous or puberulous beneath, pedicels viscid, sepals persistent, the posterior pendulous. P. indica, *Thwaites Enum.* 323. Aclisia indica, *Wight Ic.* t. 2068; *Hassk. Commelin. Ind.* 41. A. elegans, *Hassk. Pl Jungh.* 49; *Comm. Ind.* 50. Commelina secundiflora, *Blume Enum.* 3. Aneilema secundiflorum, *Kunth Enum.* iv. 69.—The Deccan Peninsula and Ceylon. —Java.

Var. *gigantea*; panicle corymbosely-dichotomous, branches panicled at the tips, 1–2 lower branches elongate. P. indica, *var.* A, *Clarke in Journ. Linn. Soc. Bot.* xi. 451. P. japonica, *Hance in Trimen Journ. Bot.* 1878, 233 (*not of Thunb.*). Aclisia gigantea, *Hassk. Commelin. Ind.* 46. A. indica, *Herb. Wt.*; *Clarke Comm. & Cyrt. Beng.* t. 29. Aneilema didymum, *Wall. Cat.* 5202.—From Sikkim eastwards and southwards.—China.

4. **P. subumbellata,** *Clarke in Journ. Linn. Soc. Bot.* xi. 451; *Monogr.* 129; panicle sessile depressed, branches subumbellately decurved, stamens 3 perfect, capsule globose, cells many-seeded. Aclisia umbellata, *Clarke Comm. & Cyrt. Beng.* t. 30. Aneilema reniforme, *Ham. in Wall. Cat.* 5205. Aneilema, *sp. Wall. Cat.* 9070. A. sp. 3, *Herb. Ind. Or. H. f. & T.* Dictyospermum Wightii, *var.* robustum, *Hassk. Commelin. Ind.* 19.

EASTERN HIMALAYA; Sikkim, the Bhotan and Mishmi hills, ascending to 6000 ft. ASSAM, SILHET, CACHAR and MUNNIPORE.

Stem creeping and rooting below, then suberect. *Leaves* 3–4 by 1–2 in., petioled, elliptic-lanceolate, caudate-acuminate, scaberulous on both surfaces. *Panicle* puberulous; bracts small; bracteoles amplexicaul, persistent, glabrous. *Sepals* rounded, glabrous, enclosing the globose blue fruit which is $\frac{1}{6}$–$\frac{1}{4}$ in. diam. *Petals* white. *Seeds* trapezoid, dorsally much flattened, brown, smooth.

5. **P. pentasperma,** *Clarke Monogr.* 129; panicle peduncled ovate-lanceolate, stamens 3 perfect, fruit ovoid narrowed into a long beak acute, cells 1–2-seeded.

KHASIA HILLS; at Shillong, alt. 4000 ft., *Clarke*. MUNNIPORE; on Kohima, alt. 6000 ft., *Clarke*.

Stem erect; sheaths long, pubescent. *Leaves* 3–6 by $1\frac{1}{2}$–$2\frac{1}{4}$ in., shortly-petioled, caudate-acuminate, elliptic, acute at both ends, slightly scaberulous above and pubescent beneath. *Peduncle* pubescent with deflexed hairs, subumbellate; bracts oblong; bracteoles imbricate, ochreate, persistent. *Sepals* puberulous, accrescent. *Fruit* $\frac{1}{4}$ in. long including the beak, which is as long as the body, hard, smooth, brown, shining. *Seeds* much compressed, rugulose.

2. COMMELINA, *Linn.*

Herbs, usually slender and creeping below. *Flowers* in usually 2-fid cymes, emerging one at a time from a terminal complicate or funnel-shaped or cucullate spathe, flowers of upper branch of cyme small, deciduous, of lower fertile; fruiting pedicel and capsule retracted within the spathe. *Sepals* 3, membranous, 2 inner often connate at the base. *Petals* longer, one larger and often clawed. *Stamens* 3 perfect, and 2–3 imperfect; anthers oblong, one usually largest. *Ovary* 3-rarely 2-celled, 2 cells 1–2-ovuled, third cell if present 1-ovuled or empty. *Capsule* loculicidal, the posticous cell sometimes indehiscent or 0, or the 2 anticous cells empty connate in-

dehiscent and forming a persistent ligulate body, from which the posticous falls away. *Seeds* ellipsoid or angled, reticulate pitted or rugose.—Species about 90, all tropical and subtropical.

C. cælestis, Willd., a handsome robust pubescent or tomentose large-fld. species, a native of Mexico, is cultivated in gardens, and occurs as an escape at Darjiling and probably elsewhere.

Subgen. 1. **Didymoon,** *Clarke.* Two anticous cells of the ovary 2-ovuled, posticous 1-ovuled or obsolete.

Sect. I. EUCOMMELINA. *Capsule* 3-celled, two anticous cells loculicidal, each usually 2-seeded; the posticous keeled, deciduous, at length dehiscent, 1-seeded; seeds free in the cells. *Petals* blue.

* *Spathes complicate, margin free or connate at the very base only.*

1. **C. nudiflora,** *Linn. Sp. Pl.* 41 (not of others); leaves lanceolate, spathes peduncled ovate-lanceolate complicate, seeds cylindric reticulate black. C. communis, *Walt. Fl. Carol.* 68; *Wall. Cat.* 8978, D, E, C; *Kunth Enum.* iv. 36 (*Excl. Syn.*); *Clarke Comm. & Cyrt. Beng.* t. i.; *Monogr.* 144, t. i. f. 5, 6. C. cæspitosa, *Roxb. Fl. Ind.* i. 174, *Ed. Wall. & Carey*, i. 178. C. diffusa, *Burm. Fl. Ind.* 18, t. 7, f. 2. C. agraria, *Kunth l. c.* 38; *Hassk. Commelin. Ind.* 26; *Webb & Berthel. Phyt. Canar.* iii. 356, t. 238; *Seub. in Mart. Fl. Bras.* iii. i. 261, t. 36, f. 3. C. salicifolia, *Bojer Hort. Maurit.* 360; *Thwaites Enum.* 321 (*in part*). C. longicaulis, *Jacq. Coll.* iii. 234, t. 294. C. deficiens, *Flor. des Serres*, t. 1824 (*not of Hook.*).

Throughout the hotter parts of INDIA from the PANJAB to CEYLON and SINGAPORE.—DISTRIB. tropics and subtropics.

Stem creeping and rooting at the nodes or subscandent. *Leaves* 1½–3 by ½–¾ in., glabrous scaberulous or puberulous, ciliate. *Spathes* ⅔–1 in., acute, base rounded or cordate, glabrous or pubescent, striate; peduncle ½–¾ in., cymes 2, branches 1–3-fld. *Smaller petals* blue, outer pale or white.

2. **C. sikkimensis,** *Clarke Comm. & Cyrt. Beng.* t. 6; *Monogr.* 147; leaves lanceolate, spathes peduncled ovate-lanceolate complicate, seeds pyramidal rugose.

SIKKIM HIMALAYA, alt. 2–4000 ft. *J. D. H.* and KHASIA HILLS, alt. 3–4000 ft., *Griffith.*

Stem slender, widely creeping and rooting. *Leaves* 2–3 by ½–¾ in., base unequal usually rounded. *Spathes* 1½–2 in., glabrous or nearly so, acuminate, base cordate; peduncles ¼–1 in.; cymes 2-fld upper branch 6–12-fld. *Petals* blue. *Capsules* 4–8. *Seeds* puberulous, brown black.

3. **C. subulata,** *Roth Nov. Sp.* 23; slender, leaves linear, spathes very small subsessile ovate-lanceolate falcate complicate, seeds pyramidal rugose, *Clarke Monogr.* 148; *Wall. Cat.* 8979. C. striata, & C. subauriculata, *Hochst. mss.*; *Kunth Enum.* iv. 44 & 658. C. linearifolia, *Kunth l. c.* 43. Tradescantia triflora, *Heyne in Herb. Rottl.*: *Schultes f. Syst.* vii. 1176.

The DECCAN PENINSULA, *Heyne, Wight, &c.*—DISTRIB. Trop. Africa.

Stem erect from a fibrous root, simple or branched. *Leaves* 1–3 by $\frac{1}{10}$–¼ in., acuminate, tips often hooked, nearly glabrous; sheaths very short, glabrous or villously ciliate. *Spathes* ¼ in. long, scattered or clustered, acute, pubescent, base

cordate. *Flowers* small, orange-purple or violet. *Capsules* 2 on each raceme, small, 3–5-seeded, dorsal valve at length 2-partite. *Seeds* puberulous, deeply transversely grooved.

4. **C. salicifolia,** *Roxb. Fl. Ind.* i. 172, *Ed. Carey & Wall.* i. 176; leaves linear-lanceolate, spathes peduncled lanceolate complicate, seeds globose smooth truncate appendiculate. *Clarke Comm. & Cyrt. Beng.* t. 2 (*not of Bojer*); *Monogr.* 157 ? *Hassk. Commelin. Ind.* 27. C. pedunculosa, *Link Jahrb.* iii. 74 (*in part*). C. communis, *Wall. Cat.* 8978 C, D, F, G, I (*in part, not of Linn.*).

From ASSAM and BENGAL, southward and westward to the CONCAN and COROMANDEL.—DISTRIB. Java ? Hong Kong.

Stem slender, diffuse, with long internodes. *Leaves* 3–6 by ⅛–½ in., nearly glabrous, sheaths ciliolate. *Spathes* 1½–2 in., axillary, solitary, acute or acuminate, base rounded; branches of cyme 1–2-fld. *Flowers* small, dark blue. *Seeds* black, powdered with white.

5. **C. Hasskarlii,** *Clarke Comm. & Cyrt. Beng.* t. 5; *Monogr.* 157; stem much branched glabrous or pubescent, leaves narrowly lanceolate subacute, spathes peduncled cordate glabrous scabrid or hispid complicate, seeds cylindric-conic smooth not appendaged. C. salicifolia, *var.* brevifolia, *Herb. Ind. Or. Hf. & T.* C. communis, *Wall. Cat.* 8978 F. (*in part*).

The UPPER GANGETIC PLAIN; Kumaon and from Delhi eastward to Assam and Bengal, and southward to the DECCAN PENINSULA. MALWA, on Mt. Aboo, *Duthie.*

Stem much branched, scabrid or glabrate. *Leaves* 1–3 by ½–⅔ in., subacute or obtuse, sheaths short, glabrous or sparsely ciliate. *Spathes* ½–1 in., axillary, scattered, base rounded, longer than their peduncle; cymes pubescent, upper branch 2–4, lower 1–2-fld. *Seeds* truncate at one end, subacute at the other.

** *Spathe funnel-shaped or hooded.*

6. **C. benghalensis,** *Linn. Sp. Pl.* 41; stem glabrous or pubescent, leaves elliptic-ovate obtuse, or tip rounded, spathes 1–3 together turbinate base auricled on one side, capsule 5-seeded, seeds rugose. *Clarke Comm. & Cyrt. Beng.* t. 4; *Monogr.* 159; *Wall. Cat.* 8980 A, C, D, E, F, G (*in part*); *Hassk. Comm. Ind.* 28, 29; *Miq. Fl. Ind. Bat.* iii. 533. *Wight Ic.* t. 2065. C. nervosa, *Burm. Fl. Ind.* 18, t. 7, f. 3. C. cucullata, *Linn. Mant.* 176. C. mollis, *Jacq. Collect.* iii. 235; *Ic. Rar.* t. 293. C. canescens, *Vahl Enum.* ii. 173; *Webb & Berth. Plyt. Canar* iii. 358, t. 239. C. turbinata, *Vahl l. c.* 171. C. procurrens, *Schlecht. in Linnæa* xxiv. 656, xxv. 183; *Regel Gartenfl.* iii. t. 104, iv. 44; *Seub. in Mart. Fl. Bras.* iii. i. 266. C. prostrata, *Regel l. c.* 1868, 289, t. 592, f. 1 (*not of H, B, K*). C. delicatula, *Schlecht. in Regel l. c.* iii. 349, t. 104.

Throughout INDIA; ascending to 6000 ft. in the Himalaya.—DISTRIB. trop. Asia and Africa.

Stem creeping and rooting below. *Leaves* 1–3 by ½–1½ in., sessile or petioled, base suddenly contracted or rounded; sheaths pubescent or villous, often bearded or ciliate. *Spathes* ½–¾ in. long and broad, pubescent or hirsute; upper branch of cymes 2–3-fld., lower 1–2-fld. or suppressed. *Flowers* blue. *Capsule* membranous, shining, dorsal value striolate. *Seeds* closely pitted.

Sect. 2. HETEROCARPUS, *Clarke.* *Capsule* 3-celled, lateral cells 0–2-seeded, dehiscent, dorsal not keeled, 1-seeded, indehiscent, deciduous; seed free or adnate to the cell. *Petals* yellow, or blue.

7. **C. hirsuta,** *Clarke Monogr.* 163; dwarf, hirsute or glabrate, leaves linear-lanceolate, spathes long-peduncled ovate-cordate or lanceolate complicate, capsule with the lateral cells empty, dorsal adnate to the ellipsoid smooth seed. C. nilagirica, *Steud. in Hohenack Pl. Exsicc.* p. 1316 (*in part*). Heterocarpus hirsutus, *Wight Ic.* t. 2067.

The DECCAN PENINSULA; Belgaum, *Ritchie;* Nilghiri hills ascending to 6000 ft. *Wight, &c.*

Stem 6–12 in., erect, branched from the base. *Leaves* 2–3 by ¼–½ in., acute or acuminate, more or less hirsute on both surfaces. *Spathes* ⅔–1 in., hirsute or villous, acuminate, base cordate, peduncle 1–2 in. *Flowers* yellow, drying blue. *Capsule* with the lateral valves linear, dorsal ellipsoid, subrugose.

8. **C. glabra,** *Clarke Monogr.* 163; nearly glabrous, leaves small sessile narrowly oblong obtuse, spathes peduncled ovate-lanceolate complicate, capsule with the lateral cells linear empty, dorsal globose membranous, seed free globose. Heterocarpus glaber, *Wight Ic.* t. 2067.

The SOUTHERN DECCAN PENINSULA; on low hills, *Wight, &c.*

Stem rooting at the lower nodes, branched, slender, pubescent on one side. *Leaves* 1½–2 by ½–¾ in., glabrous, margins of the sheaths villous. *Spathes* ½–1 in., longer than their peduncle, glabrous pubescent or ciliate, acuminate, base deeply cordate; peduncle scaberulous. *Flowers* small, orange-yellow.

9. **C. Forskalæi,** *Vahl Enum.* ii. 172; glabrate, leaves sessile narrowly oblong obtuse, spathes ovate or orbicular shortly peduncled complicate or hooded acute, capsule with the lateral cells 0–1-seeded, dorsal striate, seeds subglobose smooth. *Clarke Monogr.* 168; *Hassk. in Schweinf. Beitr. Fl. Æthiop.* 208. C. falcata, *Hassk. in Peter's Mossamb. Bot.* 527.

The DECCAN PENINSULA; in the Concan, *Jacquemont,* &c.—DISTRIB. Afric. trop.

Stem diffuse, rooting at the nodes. *Leaves* 1–2 by ⅛–¼ in., narrowed at the base, margins often undulate. *Spathes* ½ in., broader than long, often hispid, base cuneate, or broadly truncate. *Petals* blue. *Seeds* lead-colrd., appendage 0.—Leafless suckers bear deformed capsules that ripen underground.

Sect. III. DISSECOCARPUS, *Clarke.* *Capsule* 2-celled, rarely with a dorsal cell which is empty or contains an imperfect seed; lateral cells 1–2-seeded. Flowers blue or white.

10. **C. clavata,** *Clarke Comm. & Cyrt. Beng.* t. 5, *Monogr.* 171, t. 2, f. 2; glabrous or puberulous, leaves ovate or lanceolate, spathes peduncled ovate-lanceolate acuminate complicate, seeds terete faintly reticulate. C. salicifolia, *Thwaites Enum.* 321 (*in part*). C. nilagirica, *Steud. Pl. Hohenack.* No. 1316 (*in part*). C. nov. sp. *Miquel Plant. Exsicc. Hohenack.* No. 66. C. communis, *Wall. Cat.* 8978 L. (*in part*).

DECCAN PENINSULA, from the Concan southwards, ascending to 6000 ft. in the Nilghiris. CEYLON common.—DISTRIB. Java.

Stem 1–3 ft., sparingly branched. *Leaves* ½–3 by ½–⅔ in., acuminate, base narrowed. *Spathes* 1–1½ in., glabrous or pubescent, shorter than their peduncle base rounded; cymes on long capillary pedicels. *Petals* lilac. *Capsules* usually 2, oblong-quadrate, constricted in the middle. *Seeds* 4, nearly black, two lowe, often imperfect.—Possibly a variety of *C. nudiflora,* differing in the absent or empty dorsal cells of the capsule.

Var. β. *Hohenackeri,* Clarke l. c.; leaves oblong subacute, spathes smaller tip acuminate—Nilghiris (*Hohenack.* No. 1066).

11. **C. persicariæfolia,** *Wight in Wall. Cat.* 8984 (*not of DC*); nearly glabrous, leaves large petioled ovate-cordate or lanceolate, spathes broadly ovate-cordate peduncled complicate, seeds oblong terete smooth or obscurely rugose. *Clarke Monogr.* 171. C. paludosa, *Burm. Thes. Zeyl.* 69 t. 20, f. 2; *Moon Cat. Pl. Ceyl.* 5 (*not of Blume*). C. benghalensis, *Wall. Cat.* 8980 H.

Deccan Peninsula, *Rottler.* Dindygul, *Wight.* Ceylon, *Regnaud.*

Stems diffuse. *Leaves* 3–5 by 1–2 in., acuminate, glabrous or puberulous, base rounded. *Spathes* 1 in., base truncate, peduncle as long. *Capsule* oblong, obtuse.

Var. β. *geniculata,* Clarke l. c. leaves narrowly oblong-lanceolate.—C. communis *var.* geniculata, *Wall. Cat.,* 8978 N. Burma, at Segain.—Mixed in Wallich's distribution with *obliqua* and *Kurzii.*

12. **C. attenuata,** *Kœn. mss. in Vahl Enum.* ii. 168; glabrous or hirsute, leaves small sessile linear or lanceolate, spathes peduncled oblong- or ovate-lanceolate deeply cordate, capsule 1-celled, with 2 superposed seeds truncate and appendaged at both ends, or 1 subglobose seed. *Clarke Monogr.* 172. C. rajmahalensis, *Clarke in Journ. Linn. Soc. Bot.* xi. 444, *Comm. & Cyrt. Beng.* t. 7; *Monogr.* 172. C. repens, *Roxb. in Heyne mss.* C. communis, *Wall. Cat.* 8978 B (*in part*).

Behar, Central India, and the Deccan Peninsula in dry places common. Ceylon, *Walker.*

Stems 12–18 in., tufted, much branched, rather slender. *Leaves* 1–2 by ¼–½ in., obtuse or subacute, often complicate and usually recurved. *Spathes* ⅝–1½ in., acute or caudate-acuminate, longer than their peduncles, base auricled, deeply cordate. *Flowers* small, blue. *Capsule* oblong-subquadrate, not constricted in the middle, either 1-celled with 2 superposed seeds, or with one subglobose seed. *Seeds* straw-colrd., or ashy.

Subgen. II. **Monoon,** *Clarke.* All the cells of the ovary 1-ovuled.

Sect. 4. Trithyrocarpus. *Capsule* 3-celled, subequally 3-valved. *Seeds* free in the cells.

13. **C. obliqua,** *Ham. in Don Prodr.* 45 (*not of Vahl*); stem stout, leaves lanceolate, spathes subsessile solitary or crowded funnel-shaped, capsule trigonous obovoid, seeds ellipsoid compressed. *Clarke Comm. & Cyrt. Beng.* t. 9, 10, 11; *Monogr.* 178, t. 2, f. 3. C. polyspatha, *Wight Ic.* t. 2066 C. maculata, & C. strata, *Edgew. in Trans. Linn Soc.* xx. 89; *Wall. Cat.* 8983 & 8981 (*in part*) C. semi-ovata, *Ham. in Wall. Cat.* 8985. C. communis, *Roxb. Fl. Ind.* i. 171; *Ed. Wall. & Carey* i. 175 (*not of Linn.*). C. Donii, *Dietr. Sp. Pl.* ii. 395. C. paludosa, *Blume Enum.* i. 2. Heterocarpus? obliquus, *Hassk. Commelin. Ind.* 7.

Throughout India, from the base of the Himalaya to 6000 ft.; the Western Ghats and Singapore. Ceylon, not common.—Distrib. Malay Islds.

Stem tall, 2–3 ft., branched. *Leaves* very variable, 4–7 by 1–2 in., sessile or petioled, acute or caudate-acuminate, glabrous pubescent or villous beneath; sheaths ¾ in., margins often bearded. *Spathes* ¾–1¼ in. long and broad, sessile or peduncled, usually in terminal heads, acute, glabrous scabrid villous or glandular-hirsute with red hairs; raceme usually simple (no lower branch). *Petals* blue. *Seeds* lead-coloured, margins often marbled.—*C. maculata* is a smaller more slender very viscidly villous form. A small state from Darjeeling, alt. 5–7000 ft. (Clarke) has leaves only 1–1½ by ⅓–⅔ in.

14. **C. paleata,** *Hassk. Pl. Jungh.* 139; stem stout, leaves elliptic or broadly lanceolate, spathes shortly peduncled scattered broadly ovate

cucullate, seeds broadly ellipsoid smooth. *Clarke Monogr.* 178. Commelina, sp. No. 6. *Herb. Ind. or Hf. & T.* Trithyrocarpus paleatus & T. oligospathus, *Hassk. Commel. Ind.* 25.

The DECCAN PENINSULA; the Concan and Malabar, *Law, Stocks,* &c.—DISTRIB. Java.

Stem branched, glabrous. *Leaves* 3–6 by 1–2 in., glabrous or scaberulous, acuminate, base rounded or cuneate. *Spathes* ½ in., crowded or not, scaberulous or finely pubescent, striate, base broad, rhomboid. *Petals* blue. *Seeds* dark brown, sometimes margined with white, broader and less compressed than in *C. obliqua,* of which it is perhaps a var. with peduncled spathes.

15. **C. undulata,** *Br. Prodr.* 270; stem stout, leaves lanceolate waved, spathes subsessile ovate hooded acute, seeds shortly ellipsoid smooth. *Clarke Monogr.* 179. C. ensifolia, F. *Muell. Fragm. Phyt.* viii. 60; *Benth. Fl. Austral.* vii. 83 (*in part*) (*not of Br.*). C. setosa, *Wight in Wall. Cat.* 8981 D.

The DECCAN PENINSULA; in the southern provinces, *Wight.*—DISTRIB. Australia China, Philippine Islds., &c.

No doubt a slight variety of *C. obliqua.* Clarke refers the only Indian specimen (Wight's) to a variety (β. setosa) with elongate leaves 4–5 by ½-¾ in. The locality given, "Nopaloy," is meant for Nopalry, cultivated Opuntia fields in which Wight found many weeds. J. D. H.

Sect. 5. HETEROPYXIS. *Capsule* 3-celled, 2-valved, the dorsal cell indehiscent, deciduous, often scabrid. *Seed* adnate to the cell.

16. **C. albescens,** *Hassk. in Schweinf. Beitr. Fl. Æthiop.* 210; leaves linear or linear-lanceolate, spathes subsessile strongly recurved hooded auricled on one side falcately hooked on the other, seeds ellipsoid compressed smooth. *Clarke Monogr.* 184. C. striata, *Wall. Cat.* 8981 (*in part, not of others*). C. Schimperiana and multicaulis, *Hochst. in Schimp. Herb.* No. 1242 and No. 2268. Commelina, Sp. 3, *Herb. Ind. Or. Hf & T.*

SCIND, *Stocks,* &c.—DISTRIB. Beluchistan, Arabia, trop. Africa.

Stem 1–2 ft., thickened at the base, glabrous. *Leaves* 2–3 by ¼-½ in., margins white, often waved. *Spathes* ½ in. long and broad as folded, glabrous or sparsely hispid; raceme usually simple. *Petals* blue. *Seeds* black, spotted with dull yellow.

17. **C. Kurzii,** *Clarke in Journ. Linn. Soc. Bot.* xi 144; *Comm. & Cyrt. Beng.* t. 8; *Monogr.* 185, t. 2, f. 4; stem stout, leaves subsessile narrowly lanceolate acuminate scaberulous puberulous or hirsute, spathes sessile usually capitate cucullate or broadly cordate and complicate acute, seeds in the lateral cells broadly ellipsoid compressed smooth, in the dorsal hemispheric. C. longifolia, *Thwaites Enum.* 322 (*not of Lamk.*). C. communis, *and* C. striata, *Wall. Cat.* 8978 C, D (*in part*) and 8981 C (*in part*). C. augustifolia, *Hassk. as to Thwaites C. P.* 3224. Commelina, *Sp. Wall. Cat.* 8982.

The SOUTHERN DECCAN PENINSULA, Malabar and the Nilghiris, *Rottler,* &c. CEYLON, common.

Stem 1–2 ft., hairy or glabrate. *Leaves* 2–6 by ½-¾ in., acuminate, sheaths ciliate. *Spathes* recurved, solitary or clustered, ¾ in. long and broad, raceme simple. *Petals* blue. *Capsule* with the dorsal cell scabrid.—Hardly distinguishable from the common American *C. virginica,* L., except by its country and slightly

by its hairyness. A variety (*β. glochidea* Kœn. mss. *Wall. Cat.* 8981 *B.* (*in part*) has elliptic-lanceolate scabrous or nearly glabrous leaves.

18. **C. appendiculata,** *Clarke Comm. & Cyrt. Beng.* 13; *Monogr.* 186; leaves sessile linear or linear-lanceolate, spathes very long-peduncled lanceolate deeply cordate complicate, seeds oblong smooth appendaged at both ends, or in the dorsal cell smaller or 0. C. communis *var.* acuminata, *Wall. Cat.* 8978 K. C. alba, *Ham. mss.*—Commelina, sp. 4, *Herb. Ind. Or. Hf. & T.*

NORTHERN BENGAL, *Hamilton*; MYMENSINGH, *Clarke*. SIKKIM HIMALAYA; foot of the hills, *J. D. H.*, *Clarke*. SILHET, *Clarke*. CEYLON, *Macrae, &c.*

Diffusely branched, 1–3 ft. high. *Leaves* 4–6 by $\frac{1}{6}$–$\frac{2}{3}$ in., narrowed at both ends, nearly glabrous. *Spathes* 2–3 in., glabrous without, hairy within, striate, caudate-acuminate, base cordate; raceme 2-fid. *Petals* blue or white. *Capsule* 2- or 3-celled (the dorsal often 0). *Seeds* somewhat flattened, nearly black, appendages conical.

Sect. 6. SPATHODITHYROS. *Capsule* 2-celled. (See also *C. appendiculata.*)

19. **C. suffruticosa,** *Blume Enum.* 3; stem stout, leaves large sessile lanceolate scabridly pubescent, spathes small shortly peduncled broadly ovate-cordate between cucullate and complicate, seeds ellipsoid rugose. *Clarke Comm. & Cyrt. Beng.* 12; *Monogr.* 188, t. 2, f. 5. C. semiovata, *Wall. Cat.* 8985 C, E. C. Simsoni & C. rugulosa, *Clarke in Journ. Linn. Soc. Bot.* xi. 446. Spathodithyros suffruticosus, *Hassk. Comm. Ind.* 11.

Tropical INDIA from Nepal, Sikkim and Bengal to Central India and the Malay Peninsula.—DISTRIB. Malay Islds.

Stem branched, nearly glabrous. *Leaves* 3–14 by $\frac{3}{4}$–2 in., acuminate; sheaths auricled. *Spathes* $\frac{1}{3}$–$\frac{1}{2}$ in. long and broad, longer than their peduncle, panicled or clustered, acute or obtuse, villous; raceme simple, 6–12-fid. *Petals* white or blue. *Seeds* straw-colrd., puberulous.

20. **C. ensifolia,** *Br. Prodr.* 269; leaves linear-lanceolate, spathes very shortly peduncled broadly ovate acute cucullate, seeds ellipsoid smooth. *Clarke Monogr.* 188; *Benth. Fl. Austral.* vii. 83 (*in part*). C. striata, *Wall. Cat.* 8981 (*in part*). C. lunata, *Heyne mss.* Commelina sp. striatæ affinis, *Edgw. in Trans. Linn. Soc.* xx. 90.

DECCAN PENINSULA, *Rottler*, &c. CEYLON, *Walker*, &c.—DISTRIB. Australia.

Stem 12–18 in., slender. *Leaves* 2–4 by $\frac{1}{6}$–$\frac{1}{3}$ in., glabrous, or with deciduous hairs, or villous. *Spathes* $\frac{1}{3}$–$\frac{2}{3}$ in., glabrous or hairy, base truncate on one margin, hooked at the other; raceme simple.

DOUBTFUL AND INDETERMINABLE SPECIES.

C. AVENÆFOLIA, *Grah. Cat. Bomb. Pl.* 224; leaves sparsely hairy, sheaths hairy, spathes truncate.—Bombay, near Kandalla.

C. NIMMONIANA, *Grah.* l. c.; small, leaves linear acuminate discoloured.—Bombay, on Malabar hill and near Rosa and Ellora.

C. ZEYLANICA, *Falkenb. in Just. Jahresb.*, iv. 406, 408, name only.

C. COMMUNIS, Linn. and C. BENGALENSIS, Linn., of Dalzell & Gibson Bomb. Flor. are undeterminable from the descriptions.

3. ANEILEMA, *Br.*

Simple or branched, often tuberous rooted herbs. *Flowers* in axillary and terminal panicles, bracteate and bracteolate; bracts not spathaceous.

Sepals 3, free, membranous. *Petals* 3, obovate, equal. *Stamens* 2 or 3, filaments naked or bearded; anthers oblong, one usually smaller or larger than the others: staminodes 2–4, rarely with minute polliniferous anthers. *Ovary* sessile, 2–3-celled, cells 1–2, many ovuled. *Capsule* loculicidal, cells 1 or more seeded. *Seeds* with a thick hard rugose or pitted testa.—Species about 60, tropical and subtropical, chiefly Asiatic.

Subgen. I. **Tricarpellaria**; *Clarke*. *Capsule* 3-celled 3-valved.

Sect. 1. EUANEILEMA. Cells of ovary 2–∞-ovuled. *Seeds* 1-seriate in each cell.

* Cells of ovary 3–∞-ovuled, of capsule 1- 3- or more-seeded (see also *A. nudiflorum*).

a. *Flowers panicled on a radical or subradical rarely leafy scape.*

1. **A. glaucum,** *Thwaites mss. in Clarke Monogr.* 200; leaves large rosulate broadly ensiform, scape erect, branched from the base, panicle spreading lax-fld., bracts small not sheathing, capsule triquetrous, seeds 5–8-superposed in each cell.

TRAVANCORE; on the Tinnevelly hills, *Beddome*. CEYLON, *Thwaites* (C. P. 3977).

Root fibrous. *Leaves* 3–6 by 1–1½ in., acuminate, margin crisped scabrid. *Scape* and broad panicle 8–12 in.; bracteoles small; panicle widely spreading, branches very slender. *Stamens* 3, anthers subsimilar; staminodes 2. *Capsule* ⅓ in., oblanceolate, acute. *Seeds* straw-colrd., with a white minutely reticulate epidermis.

2. **A. scapiflorum,** *Wight Ic.* t. 2073; leaves narrowly ensiform, scape erect, panicle strict elongate, bracts large sheathing, capsule ellipsoid trigonous, seeds 3–6-superposed in each cell. *Clarke Comm. & Cyrt. Beng.* 14; *Monogr.* 200 t. 4, t. i. A. tuberosum, *Ham. in Wall. Cat.* 5207; *Dalz. & Gibs. Bomb. Fl.* 255. A. serotinum, *Don mss.* Commelina scapiflora, *Roxb. Fl. Ind.* i. 175. Murdannia tuberosa, *Royle Ill.* 403, t. 95. Tradescantia aphylla, *Heyne mss.*

TEMPERATE and TROPICAL HIMALAYA; from the upper Gangetic plain eastwards to Bhotan, and westwards to TRAVANCORE and TENASSERIM, CEYLON and the Shan hills.

Roots of elongated tubers. *Leaves* 4–10 in., all radical, erect, finely acuminate. *Scape* with the narrow panicle 8–18 in.; lower bracts long, upper small amplexicaul. *Flowers* small. *Capsule* ¼ in., mucronate. *Seeds* in a triangular column, angled, straw-colrd., with a white minutely reticulate and glandular epidermis.

3. **A. Loureirii,** *Hance in Seem. Journ. Bot.* 1868, 250; leaves ensiform, scape radical 1–2-leaved, panicle narrow, flowers fascicled in the sheathing bracts, sepals glandular-pubescent, capsule elliptic-oblong trigonous, seeds 3–5-superposed in each cell. *Clarke Monogr.* 201. A. spectabile, *Kurz in Journ. As. Soc. Beng.* 1871, ii. 77; *Clarke Comm. & Cyrt. Beng.* t. 20. A. spicatum, *Wall. Cat.* 5217. Commelina tuberosa, *Lour. Fl. Cochin Ed. Willd.* i. 50.

TENASSERIM, *Wallich, Helfer* (*Kew Distrib.* 5528), &c.—DISTRIB. Siam, Malay Islds., China.

Root of fascicled elongated tubers. *Leaves* all radical, 6–16 by ½–1 in., suberect, margins smooth or ciliate only. *Scape* stout and *panicle* longer than the

leaves; upper bracts truncate, pedicels viscid. *Petals* blue. *Stamens* 2 fertile; staminodes 4, all bearded. *Capsule* ¼ in. acuminate. *Seeds* yellow brown, pitted.

b. *Flowering stem leafy, flowers corymbose or panicled.*

4. **A. Thomsoni,** *Clarke in Journ. Linn. Soc. Bot.* xv. 121; *Monogr.* 202, t. 4, f. 2; stout, leaves petioled broadly lanceolate or ensiform caudate-acuminate with large bearded sheaths, upper bracts lanceolate caducous, capsule elongate narrowly oblong acuminate and beaked, cells 5–9-seeded, seeds smooth. Aclisia? Thomsoni, *Clarke Comm. & Cyrt. Beng.* t. 31. Dichoespermum giganteum, *Hassk. Commelin. Ind.* 42.—Aneilema, sp. 11, *Herb. Ind. Or. Hf. & T.*

EASTERN HIMALAYA; Sikkim, alt. 5–8000, *J. D. H.*, &c. Bhotan, *Griffith.* NAGA HILLS, alt. 7000 ft., *Clarke.*

Stem 1-2 ft., erect. *Leaves* 6–10 by 2-3 in., glabrous or scaberulous, penni-nerved above the base. *Panicle* 3–6 in., glabrous, branches spreading widely in fruit, bracts caudate. *Sepals* glabrous. *Petals* purple. *Stamens* 3 fertile, unilateral; staminodes 3, sometimes polleniferous, filaments naked. *Capsule* ¾–1 in. *Seeds* shortly cylindric, black, with white powder.

5. **A. divergens,** *Clarke Comm. & Cyrt. Beng.* t. 16; *Monogr.* 203; stem tall, leaves ensiform, sheaths bearded, panicle erect, upper branches opposite or subwhorled, bracts ovate persistent, capsule ellipsoid acute at both ends, cells 3–5-seeded. A. herbaceum β. divergens, *Clarke in Journ. Linn. Soc.* xi. 448. A. longifolium, *Wall. Cat.* 5213 A, B. A. scapiflorum, *Herb. Ind. Or. Hf. & T.*

TROPICAL and SUB-TROPICAL HIMALAYA; from Chamba, alt. 6000 ft., *Clarke.*, eastwards to Sikkim. KHASIA HILLS, alt. 4–5000 ft. UPPER BURMA, *Anderson.*

Root of elongate tubers. *Stem* 2–3 ft., leafy. *Leaves* 6–12 by ½–¾ in., erect, upper gradually smaller, acuminate. *Panicle* erect, narrow, bracts ovate, persistent. *Petals* blue. *Stamens* 3 fertile, staminodes 3, filaments all bearded. *Capsule* nearly ½ in., subtrigonous. *Seeds* yellow.

6. **A. Hookeri,** *Clarke Comm. & Cyrt. Beng.* t. 171; *Monogr.* 204; stem tall stout, leaves ensiform base broad or subcordate, sheaths bearded, panicle erect branches slender spreading repeatedly dichotomous.

KHASIA HILLS, alt. 5–6000 ft., *J. D. H.* and *T. T.*

Distinguished from *A. divergens* by the broader leaf bases and spreading panicle. *Stem* 6–12 in., leafy to the top.

7. **A. zeylanicum,** *Clarke Monogr.* 204; leaves narrrowly oblong narrowed at both ends glabrous or pubescent, branches of panicle spreading alternate, branches flexuous, bracts minute, capsule subglobose, cells 3–5-seeded, seeds slightly pitted. A. montanum, & protensum, *Thwaites Enum.* 322. A. dimorphum, *Thw. l. c. non Dalz.*

CEYLON, common up to 3000 ft.

Roots fibrous. *Stem* 6–12 in., often branched from the base, branches leafy. *Leaves* 1–3 by ⅓–1 in., sheaths bearded at the mouth. *Panicle* glabrous, bracts glabrous, hardly sheathing, persistent. *Stamens* 3 fertile; staminodes 2–3. *Capsule* ¼–½ in., obtuse, concave, mucronate. *Seeds* brown, with white powder.—Var. β. *longiscapa,* Clarke, l. c.; capsule ½ in.—Courtalam, *Wight.*

8. **A. lineolatum,** *Kunth Enum.* iv. 69; stem stout, leaves large narrowly oblong or ensiform acuminate, margins white, panicle glabrous

effuse, bracts marcescent, capsule ellipsoid or subglobosely trigonous, cells 3–4-seeded, seeds smooth. *Hassk. Pl. Jung.* 146. *Commelin. Ind.* 36; *Clarke Comm. & Cyrt. Beng.* t. 15. A. elatum, *Kunth l. c.* 70; *Dalz. in Hook. Journ. Bot.* 1857, 137; *Dalz. & Gibs. Bomb. Fl.* 254. A. latifolium, *Wight Ic.* t. 2072. A. herbaceum, *Wall. Cat.* 5223; *Clarke Monogr.* 204; *in Journ. Linn. Soc. Bot.* xi. 448 (var. *a*). Commelina herbacea, *Roxb. Fl. Ind.* i. 175, *Ed. Wall. & Carey* i. 179. C. lineolata, *Blume Enum.* i. 3. C. elata, *Vahl Enum.* ii. 178. Tinantia? lineolata, *Hassk. Pl. Jav.* 98. Prionostachys herbacea, *Hassk. mss.*

TROPICAL INDIA; from Sikkim, Bhotan and the Khasia hills, alt. 2–4000 ft., to BURMA. Western Ghats from the Concan to Travancore.—DISTRIB. Malay Islands.

Root of slender tubers. *Stem* erect, stout. *Leaves* 4–12 by 1–1½ in., margins scabrous or smooth often crisped, base cuneate rounded or cordate, upper ovate-lanceolate. *Panicle* stout, glabrous, branches spreading and ascending; bracts marcescent in fruit. *Petals* blue. *Stamens* 2–3 with 2 or 3 staminodes, filaments all bearded. *Capsule* ¼ in. diam., mucronate. *Seeds* reticulate, glandular-puberulous.

9. **A. esculentum,** *Wall. Cat.* 5208; root tuberous, stem subsolitary, leaves linear complicate, panicle glabrous spreading, bracts oblong or the lower 1–2 foliaceous, capsule ellipsoid, cells 3–5-seeded. *Clarke Monogr.* 206. ? A. melanostictum, *Hance in Seem. Journ. Bot.* 1869, 167. Commelina esculenta, *Heyne mss.*

MADRAS; in rice fields, *Heyne, Wight.* CEYLON, *Walker.*—DISTRIB. Australia, China.

Root of clavate tubers, crown with imbricating scarious scales. *Stem* with prostrate suckers. *Leaves* 3–4 in., recurved, obtuse, almost glabrous. *Panicle* with alternate branches; bracts oblong, persistent. *Stamens* 3 fertile, staminodes 3, filaments bearded. *Capsule* ¼ in. *Seeds* dark brown, obscurely scabrid or pitted.—Probably the same as the Australian *A. gramineum,* Br.

10. **A. dimorphum,** *Dalz. in Hook. Journ. Bot.* 1851, 138; root fibrous, stems many, leaves linear-oblong flat, bracts ovate, panicle very short and broad, capsule ellipsoid or oblong, cells 3–5-seeded, seeds smooth. *Dalz. & Gibs. Bomb. Fl.* 254; *Clarke Monogr.* 206. A. paniculatum, *Wight Ic.* t. 2075. A. scapiflorum, *β, Thwaites Enum.* 322 (*not of Wight*). A. nudiflorum, *Miq. in Pl. Hohenack. Exsicc.* No. 144 (*not of Br.*).—Aneilema, sp. *Miq. l. c.* n. 134.

The DECCAN PENINSULA; from the Concan southward, *Wight,* &c. CEYLON, alt. 5000 ft., *Thwaites.*

Stem slender, branched at the base, 6–12 in. *Leaves* 1–2½ by ⅛–½ in., from oblong to ovate-lanceolate, base rounded or cordate, mouth of sheath ciliate. *Panicle* sparingly dichotomously branched, few-fld.; bracts small, cucullate, persistent. *Petals* blue. *Stamens* 3, fertile, filaments bearded; staminodes 3, filaments naked. *Capsule* ⅛ in., triquetrous, acute. *Seeds* black, with brown furfuraceous lines.—Wight figures all the filaments bearded, but describes them as above.

11. **A. spiratum,** *Br. Prodr.* 271 (*in note*); root fibrous, stem branched decumbent, leaves small sessile flat oblong, base obtuse or cordate or auricled, panicle small leafy below, bracts ovate, capsule oblong or subglobose, cells 3–7-seeded, seeds smooth or minutely scaberulous. *Clarke Monogr.* 207. A. nanum, *Kunth Enum. v.* iv. 65; *Wight Ic.* t. 2077; *Hassk. in Pl. Jungh.* i. 141; *Thwaites Enum.* 322; *Clarke Comm. & Cyrt. Beng.* t.

18. A. canaliculatum, *Dalz. in Hook. Journ. Bot.* 1851, 137; *Dalz. & Gibs. Bomb. Fl.* 254. A. nummularium, *Miq. Fl. Ind. Bat.* iii. 535. Commelina spirata, *Linn. Mant.* 176. C. bracteolata, *Lamk. Encycl.* ii. 69. C. nana, *Roxb. Fl. Ind.* i. 173; *ed. Wall. & Carey*, i. 176. C. pumila, *Herb. Royle.* Dichæspermum repens, *Hassk.* (*not of Wight*).

Throughout INDIA, in pastures, &c., from the Upper Gangetic plain to Chittagong and TRAVANCORE. CEYLON, common.—DISTRIB. Malay Islands, China.

Dwarf, tufted, prostrate, branches ascending 6–10 in. *Leaves* glabrous puberulous or ciliate, from oblong to ovate-lanceolate, subacute or acuminate; base amplexicaul. *Cymes* terminal and axillary; branches short, divaricate, few-fld.; bracts ovate, persistent. *Flowers* blue. *Stamens* 3, staminodes 3; filaments of both naked or bearded. *Capsule* ⅛ in., acutely trigonous. *Seeds* straw-colrd.

c. *Stem leafy. Cymes* 1–3-*fld. axillary.*

12. **A. pauciflorum,** *Wight, Ic.* t. 2077; slender, diffuse, creeping, leaves small flat ovate, peduncles 1–3-fld. axillary, capsule lanceolate, pedicel decurved, cells 4–6-seeded, seeds cubical nearly smooth. *Clarke Monogr.* 207. Dichæspermum aurantiacum, *Hassk. in Herb. Zoll.* No. 3312.

MALABAR and TRAVANCORE, *Wight* (*Kew distrib.* 1179).—DISTRIB. Macassar.

Tufted; stems 4–6 in. *Leaves* ⅝–1 by ⅛–⅜ in., sessile, acuminate, glabrous or sparsely hairy, base rounded or cordate. *Peduncles* and *pedicels* slender. *Sepals* linear. *Stamens* 3, staminodes 3, filaments all naked. *Capsule* ¼ in., obtusely 3-gonous. *Seeds* black, farinose.

13. **A. versicolor,** *Dalz. in Hook. Journ. Bot.* 1851, 136; stem slender branched hispid, leaves flat oblong-lanceolate-acuminate, peduncle short 1-fld., pedicel capillary, capsule oblong or lanceolate acute erect, cells 5–7-seeded, seeds cubical. *Dalz. & Gibs. Bomb. Fl.* 253; *Clarke Monogr.* 208.

The CONCAN and MALWAN, *Stocks, Dalzell, Ritchie.*

Root fibrous; stem 6–10 in. *Leaves* 1–2 by ⅛–½ in., rather distant, base rounded or cuneate, upper spathe-like, complicate and recurved. *Peduncles* with the pedicel ⅛–⅜ in. *Petals* ochreous yellow, blueish in withering. *Stamens* 3, filaments faintly bearded; staminodes 3. *Capsule* ⅛–¼ in., obtusely 3-angled. *Seeds* yellowish brown.

14. **A. triquetrum,** *Wall. Cat.* 5220; stem slender elongate, leaves linear-lanceolate flat, peduncle 1-fld., pedicel rather stout, capsule oblong acute, cells 3–5-seeded, seeds smooth farinose. *Clarke Monogr.* 208.

SILHET, *Wallich.*—DISTRIB. China.

Stem 12–18 in. *Leaves* 1–2 in., rather thick, spreading and recurved, base obtuse. *Petals* blue?. *Stamens* 3, filaments strongly bearded; staminodes 3. *Capsule* ¼ in. *Seeds* truncate at each end.

** Cells of ovary 2-ovuled, of capsule 2-seeded (3-seeded in *A. nudiflorum*, var. *compressa*).

15. **A. nudiflorum,** *Br. Prodr.* 271 (*in note*); branches decumbent rooting, leaves linear or lanceolate, sheath bearded, panicle subterminal short, cymes at the ends of the branches few-fld., capsule broadly oblong or subglobose, seeds rugose and pitted. *Clarke Comm. & Cyrt Beng.* t. 21; *Monogr.* 210; *Dalz. & Gibs. Bomb. Fl.* 253; *Wall. Cat.* 5224 (*excl.* A); *Hassk. Commelin. Ind.* 29. A. radicans, *Don Prodr.* 45 (*in part*). A.

diandrum, *Ham.*, and A. debile, *Wall.*, *Wall. Cat.* 5210, 5215. A. nudicaule and A. minutum, *Kunth Enum.* iv. 67, 661. A. foliosum, *Hassk. in Pl. Jungh.* 144, *Commelin. Ind.* 32. A. diversifolium, *Hassk. l. c.* 142. A. Junghuhnianum, *Miquel Fl. Ind. Bat.* 112, 538, Suppl. 609. A. lancifolia, *Griff. Notul.* iii. 236. A. trichocolea, *Schauer Pl. Meyer*, 448. Commelina nudiflora, *Linn. Mant.* 177 (*not of Sp. Pl.*); *Roxb. Fl. Ind.* i. 173; *Reichb. Ic. Exot.* t. 136. C. nudicaulis, *Burm. Fl. Ind.* 17, t. 8. C. diandra, *Kœn. mss.* C. radicans, *Spreng. Syst. Cur. post.* 25. ? C. minuta, *Blume Enum.* 34. Tradescantia malabarica, *Linn. Mant.* 362.—*Rheede Hort. Mal.* ix. t. 63, x. t. 19.

Throughout INDIA; from the N.W. Himalaya ascending to 6000 ft. eastwards and southwards to the Khasia hills, Burma, the Deccan, Travancore and CEYLON.—DISTRIB. China, Malay Islands.

Stem and branches slender, diffuse, complicate or not. *Leaves* 2–5 by ½–¼ in., glabrous or hairy, or subvillous. *Panicles* rarely axillary, branches elongate, scarred; flowers pedicelled, clustered; bracts deciduous. *Petals* small, blue or purplish. *Stamens* 3 fertile, 3 sterile, filaments of fertile or all bearded. *Capsule* ⅛ in., acute at both ends.

Var. *compressa*, Clarke l. c. 211; petals rosy, cells of capsule often 3-seeded. A. compressum, *Dalz. in Hook. Journ. Bot.* 1851, 138; *Dalz. & Gibs. Bomb. Fl.* 253 (*excl. Syn.*).—The Concan, *Dalzell.*

Var. *terminalis*, Clarke l. c.; stem stouter, leaves broader, sometimes 6 by ¾ in., cymes more elongate, capsules larger, seeds less rugose or almost smooth. A. nudiflorum, *var.* rigidior, *Benth. Fl. Hongk.* 377. A. terminale, *Wight Ic.* t. 2076. A. loriforme, *Hassk. in Pl. Jungh.* 143. Prionostachys terminalis, *Hassk. mss.*—Khasia hills, Malabar, Ceylon, China. Wight's figure represents the capsule as globose.

16. **A. sinicum,** *Lindl. Bot. Reg.* t. 659; stem elongate diffusely branched, internodes long, leaves linear elongate, branches of terminal panicle short, stamens 2 perfect, filaments bearded, staminodes 3 naked, capsule subglobose, seeds obscurely rugose. *Clarke Monogr.* 212. A. scundum, *Wight Ic.* t. 2075. A. esculentum, *Wall. Cat.* 5208 C. Commelina sinica, *Rœm. & Sch. Syst.* i.; *Mant.* i. *addend.* 376.

The DECCAN PENINSULA; from the Concan southward, and CEYLON, *Wight*, &c. —DISTRIB. China, Malay Islands, Africa.

Roots of elongate tubers. *Stem* 1–2 ft. *Leaves* 6–12 by ½–¾ in., cauline and tufted at the base of the ascending leafy flowering stem, glabrous or puberulous. *Panicle* lax; bracts large, caducous, branches scarred. *Petals* blue. *Capsule* ¼ in. diam. *Seeds* brown.

17. **A. giganteum,** *Br. Prodr.* 271; stem tall erect, internodes long, leaves linear elongate, branches of the terminal panicle short stout, stamens 3, filaments bearded, capsule ellipsoid acute, seeds compressed nearly smooth. *Clarke Monogr.* 212. A. longifolium, *Hook. Exot. Fl.* t. 204; *Wall. Cat.* 5213 D, F (*in part*). A. ensifolium, *Wight Ic.* t. 2074; *Clarke Comm. & Cyrt. Beng.* t. 22 (*excl. Syn. F. Muell.*). Commelina gigantea, *Vahl Enum.* ii. 177. C. longifolia, *Spreng. Syst. Cur. post.* 25. C. Hookerii, *Dietr. Sp. Pl.* ii. 404. Prionostachys ensifolia, *Hassk. mss.*

ASSAM and the KHASIA HILLS, ascending to 4000 ft. TENASSERIM, the DECCAN PENINSULA, CEYLON and the NICOBAR ISLANDS.—DISTRIB. Malay Islands, China, Australia, Africa.

Root fibrous. *Stem* 1–3 ft. *Leaves* 6–12 by ½–¼ in., glabrous or nearly so. *Panicles* sparingly branched; branches very closely scarred; bracts caducous.

Petals blue. *Staminodes* with glabrous or bearded filaments. *Capsule* ⅛ in. long, mucronate, valves hard polished.

Sect. II. DICHÆSPERMUM. *Cells* of ovary 4–20-ovuled. *Seeds* 2-seriate in each cell.

* *Flowers axillary, solitary or clustered, pedicels jointed in the middle.*

18. **A. Hamiltonianum,** *Wall. Cat.* 5222; stem creeping rooting, leaves linear-oblong flat glabrate, pedicels axillary and terminal fruiting hardly exserted, capsule linear-oblong, seeds scabrid or flocculent biseriate. *Clarke Monogr.* 213 Dichæspermum Blumei, *Hassk. Comm. Ind.* 41.; *Clarke Comm. & Cyrt. Beng.* t. 27. Tradescantia terminalis, *Blume Enum.* i. 6. Callisia orientalis, *Herb. Ham.*

UPPER GANGETIC PLAIN to ASSAM, in marshes; Chota Nagpore, *Clarke.*—DISTRIB. Java.

Stem 6–12 in., stout, sparingly branched. *Leaves* 1½–2 in., sessile, acute or subacute, base cuneate. *Peduncle* ⅛–¼ in., rigid. *Petals* white or rosy. *Filaments* all naked. *Capsule* ¼–⅓ in., acute. *Seeds* about 16 in each cell.

Var. *minor*, Clarke l. c. 214; stems shorter, seeds about 30 in each cell, nearly smooth.—Dichæspermum repens, *Clarke Comm. & Cyrt. Beng.* t. 28 (*not of Wight*). —Assam, *Hamilton.*

19. **A. ochraceum,** *Dalz. in Hook. Journ. Bot.* 1851, 135; stem short erect or decumbent, leaves small flat oblong or ovate-oblong obtuse or acute, base cordate, pedicels axillary fruiting exserted, capsule broadly oblong, seeds angular rugose biseriate. *Dalz. & Gibs. Bomb. Fl.* 253; *Clarke Monogr.* 214, t. 4, f. 3. Dichæspermum repens, *Wight Ic.* t. 2078 (*not of Hassk.*). D. ochraceum, *Hassk. Commelin. Ind.* 41.

The DECCAN PENINSULA; from the Concan southwards. TENASSERIM, *Griffith, Helfer.*

Stem 4–8 in., rooting at the lower nodes. *Leaves* ¾–½ by ⅛–⅓ in., glabrous or nearly so, bases subamplexicaul. *Pedicels* ¼–½ in., slender. *Sepals* narrow. *Petals* yellow. *Stamens* and *staminodes* 3 each, filaments naked. *Capsule* ⅛ in. long. *Seeds* 7–8 in each cell, pale yellow.—Dalzell describes the filaments as bearded in the Journal of Botany, but not in the Bombay Flora.

Var. *crocea*, Clarke Monogr. 214; aquatic, leaves ovate subacute, pedicels solitary or 2-nate, sepals densely pubescent, capsule narrower. A. croceum, *Griff. Notul.* iii. 235. A. pilosum, *Wall. Cat.* 5219. A. ochraceum, *var.* Griffithii, *Kurz in Journ. As. Soc.* 1870, ii. 85.—Arracan, Burma and the Andaman Islands.

20. **A. lanuginosum,** *Wall. Cat.* 5221; hirsute or glabrate, stem suberect, leaves linear-oblong or lanceolate acuminate, pedicels exserted, flowers large, filaments bearded, capsule oblong acute many-seeded, seeds nearly smooth. *Clarke Monogr.* 214. Commelina lanuginosa, *Heyne mss.*

The DECCAN PENINSULA; from the Concan southwards, in hilly districts, ascending the Nilghiris to 6000 ft.

Roots of thickened fibres. *Stem* 6–16 in., stout, branched. *Leaves* 1½–2½ in., rigid, deeply grooved when dry, acuminate, strongly striate, usually complicate and recurved, base broad, margins waved. *Pedicels* bracteolate at the joint. *Sepals* straw-colrd. *Petals* yellow, blue when dry. *Capsule* ¼ in., or more. *Seeds* angular.

** *Flowers panicled.*

21. **A. Kœnigii,** *Wall. Cat.* 5214; stem short much branched glabrous, leaves ovate- or linear-lanceolate obtuse or acute, branches of panicle slender, filaments all bearded, capsule linear-oblong, seeds very numerous biseriate minutely tessellate. *Clarke Monogr.* 215. A. nudiflorum, *Miq. Pl. Exsicc. Hohenack.* 144, c. Dichæspermum lanceolatum, *Wight Ic.* t. 2078. D. Kœnigii, *Hassk. mss.*

The DECCAN PENINSULA; from the Concan and Canara southwards.

Root fibrous. *Stem* 6–10 in., and branches slender. *Leaves* 1–2 in., sessile, base rounded or cordate. *Panicle* large for the size of the plant, much dichotomously branched; branches flexuous, slender; bracts ovate, acute, persistent. *Flowers* small, blue. *Capsule* $\frac{1}{6}$ in., pale yellow. *Seeds* 15–16 in each cell, small, yellow, neither rugulose nor reticulate.

22. **A. paniculatum,** *Wall. Cat.* 5216; stem short slender branched, leaves grass-like filiform or narrowly linear or subulate semiterete glabrous, branches of few-fld. panicle slender spreading, filaments all naked, capsule shortly oblong or subglobose, seeds nearly smooth biseriate. *Clarke Monogr.* 215. A. semiteres, *Dalz. in Hook. Journ. Bot.* 1851, 138; *Dalz. & Gibs. Bomb. Fl.* 254. Dichæspermum juncoides, *Wight Ic.* t. 2078. D. semiteres, *Hassk. Commelin. Ind.* 41. D. paniculatum, *Herb. Ind. Or. H. f. & T.*

The DECCAN PENINSULA; from the Concan southwards in hilly places.

Roots fibrous. *Stems* densely tufted, tuberous and sheathed at the base. *Leaves* 2–4 by $\frac{1}{16}$–$\frac{1}{12}$ in., acuminate, erect and recurved, fleshy according to Dalzell. *Branches* capillary. *Bracts* ochreate, truncate, persistent. *Petals* small, blue. *Filaments* according to Dalzell all connate at the base. *Capsule* $\frac{1}{8}$ in. long. *Seeds* about 6–8 in each cell, pale yellow.—Habit of a *Juncus*.

Sect. III. DICTYOSPERMUM. Cells of *ovary* 1-ovuled, of *capsule* 1-seeded or empty.

* *Capsule glabrous.*

23. **A. vaginatum,** *Br. Prodr.* 271 (*in note*); stem long slender, leaves long linear flat, pedicels 1–3 in the axils of distant lanceolate erect bracts pubescent, filaments naked or bearded, capsule subglobose glabrous, cells 1-seeded, seeds hemispheric rugose. *Wight Ic.* t. 2076; *Wall. Cat.* 5212; *Clarke Comm. & Cyrt. Beng* t. 23, *Monogr.* 216; *Hassk. Commelin. Ind.* 34. A. filiforme, *Ham. &* nudiflorum, *Wall. Cat.* 5209, and 5224 A. A. pauciflorum, *Dalz. in Hook. Journ. Bot.* 1851, 136; *Dalz & Gibs. Bomb. Fl.* 253. Commelina vaginata, *Linn. Mant.* 177. Tradescantia gangetica, *Linn. mss.*

Throughout TROPICAL INDIA; Bengal, Assam and the Deccan Peninsula. CEYLON; in rice fields and wet places.—DISTRIB. China.

Roots fibrous. *Stems* 6–18 in., decumbent and rooting at the lower nodes, branches suberect. *Leaves* 3–6 by $\frac{1}{3}$–$\frac{1}{2}$ in., acuminate, sheaths short open, upper reduced to bracts equalling the $\frac{1}{2}$–$\frac{2}{3}$ in. pedicels. *Flowers* 1–3, pedicels twice jointed in the middle. *Sepals* pubescent. *Petals* blue. *Stamens* 2-fertile, staminodes 3–4. *Capsule* $\frac{1}{4}$–$\frac{1}{6}$ in. diam., cuspidate. *Seeds* black.—Wight figures and describes all the filaments as naked.

24. **A. montanum,** *Wight in Wall. Cat.* 5203; stem erect, leaves large petioled elliptic-lanceolate glabrous or scaberulous, panicle terminal, branches long lax few-fld. pubescent, stamens 3 perfect, filaments naked, staminodes 0, capsule globose, glabrous pedicels suberect, cells 1-seeded,

seeds hemispheric rugose. *Clarke Monogr.* 217. Dictyospermum montanum, *Wight Ic.* t. 2069; *Hassk. Commelin. Ind.* 23. Tradescantia montana, *Heyne mss.* T. paniculata, *Roth Nov. Sp.* 188; ? *Kunth Enum.* iv. 100.

UPPER ASSAM; in the Naga hills, *Clarke.* MUNNIPORE, *Watt.* NILGHIRI and TRAVANCORE HILLS, *Heyne, Wight, &c.*

Stem creeping and rooting below. *Leaves* 4–6 by 1½–2 in., ciliate, acuminate, sheaths pubescent. *Flowers* small, few at the ends of the long filiform branches of the panicle; bracts small. *Petals* blue. *Capsule* ⅛ in. diam. *Seeds* floury.

25. **A. conspicuum,** *Kunth Enum.* iv. 69; stem suberect, leaves lanceolate, panicle short subsessile, branches horizontal, or decurved, stamens 3 perfect, capsule globose glabrous, pedicels reflexed, cells 1-seeded, seeds hemispheric rugose. *Clarke Monogr.* 218. Dictyospermum conspicuum, *Hassk. Commelin. Ind.* 22. Floscopa paniculata, *Hassk. in Plant. Jungh.* 151 (*in part*). Commelina conspicua, *Blume Enum.* i. 4.

ASSAM; Patkoye Mts., *Griffith.* PENANG, *Curtis.* MALACCA, *Griffith.*—DISTRIB. Malay Islands.

Stem 1–2 ft., creeping and rooting below. *Leaves* as in *A. montanum,* from which *conspicuum* differs in the pyramidal many-fld. panicle.

26. **A. ovatum,** *Wall. Cat.* 5206; stem suberect, leaves petioled elliptic acuminate, panicle very short sessile or subsessile, branches long slender depressed or horizontal pubescent, stamens 2 perfect, capsule globose glabrous, pedicel suberect, cells 1-seeded, seeds hemispheric rugose. *Clarke Comm. & Cyrt. Beng.* t. 25; *Monogr.* 218. Dictyospermum ovatum, *Hassk. Commelin. Ind.* 24.

PEGU and TAVOY, *Wallich,* &c. The ANDAMAN ISLANDS, *Kurz.*—DISTRIB. Siam, Malay Islands.

Stem 6–10 in., branched. *Leaves* 2–4 by 1–2 in., terminal on the branches; petiole ½–1 in. *Panicle* with the rachis so short, that the branches appear axillary amongst the uppermost leaves. *Capsule* ⅛ in. diam.

27. **A. ovalifolium,** *Hook. f. in Clarke Monogr.* 218; stem erect, leaves shortly petioled elliptic-lanceolate acuminate pubescent, panicle short subsessile pyramidal, branches ascending pubescent, stamens 2 perfect, filaments glabrous, capsule globose glabrous, pedicel decurved, cells 1-seeded, seeds large reticulate. Dictyospermum ovalifolium, *Wight Ic.* t. 2070. D. Wightii, *Hassk. Comm. Ind.* 19 (*excl. var.*).—Aneilema Sp. 10, *Herb. Ind. Or. H. f. & T.*

NILGHIRI HILLS; on the western slopes, *Wight,* &c.

Stem stout, rooting at the base only. *Leaves* 3–6 by 1½–2 in.; sheaths pubescent. *Panicle* pubescent; branches slender.—Differs from *A. conspicuum* in the stouter naked large leaves, and larger capsule ¼ in. diam., and the 2 stamens (Wight figures 3).

28. **A. scaberrimum,** *Kunth Enum.* iv. 69; tall, erect, slender, leaves distant lanceolate or oblong-lanceolate acuminate hispid above, panicle with long slender peduncle and branches, bracts funnel-shaped acuminate persistent, stamens 2–3 perfect, filaments naked, capsule globose pubescent, cells 1-seeded, seeds rugose. A. protensum, *Wall. Cat.* 5218; *Clarke Comm. & Cyrt. Beng.* t. 24, *Monogr.* 219, t. 4, f. 4. A. herbaceum, *Wall. Cat.* 8223. Commelina scaberrima, *Blume Enum.* i. 4. Dictyospermum protensum, *Wight Ic.* t. 2071. Lamprodithyros protensus, *Hassk.*

in Peters. Mossamb. Bot. ii. 529, *Flora*, 1863, 389. Piletocarpus protensus, *Hassk. Comm. Ind.* 15.

The TROPICAL EASTERN HIMALAYA and the KHASIA HILLS.; from Nepal to Bhotan. TRAVANCORE, *Wight*. CEYLON, *Walker*, &c.—DISTRIB. Malay Islands.

Subfruticose 2–3 ft. high. *Leaves* 3–6 by ¾–1¾ in., sessile, sheaths loose, viscid or hispid; base narrowed or rounded. *Panicle* very lax and spreading with few flowers at the tips of the branches; bracts sheathing obliquely truncate; flowers small white. *Sepals* reflexed in fruit. *Capsule* ¼ in. diam., style long, persistent. *Seeds* plano-convex, glaucous, black.

EXCLUDED SPECIES.

A. ÆQUINOCTIALE, *Kunth Enum.* iv. 72; *Clarke Monog.* 221. Amelina Wallichii, *Clarke Comm. & Cyrt. Beng.* 6, 26, is an African species of which the locality was not determined when it was included in "Comm. & Cyrt. Beng."

4. FORRESTIA, *A. Rich.*

Erect herbs; stem simple, creeping and rooting below. *Leaves* broad, sheaths tubular persistent after the fall of the blade. *Flowers* bracteate, sessile, in crowded subsessile axillary panicles. *Sepals* subequal. *Petals* subequal. *Stamens* 6, all perfect, filaments bearded; anthers ovoid. *Ovary* 3-celled, cells 2-ovuled or the dorsal 1-ovuled. *Capsule* subglobose, or ellipsoid, or oblong, 3-valved, loculicidal. *Seeds* 1–2 superposed in each cell, oblong, rugose.—Species 7, East Asiatic and New Guinea, and one African.

The first three species may prove to be forms of the *F. hispida*, A. Rich (Sert. Astrolab. ii. t. 1), a native of New Guinea and Formosa, J. D. H.

1. **F. mollis,** *Hassk. in Flora*, 1864, 68; *Commel. Ind.* 84; hirsute, leaves oblanceolate sparsely hairy above villous beneath, capsule oblong or ellipsoid about equalling the rusty hispidly villous sepals. *Clarke Monogr.* 236. Campelia mollissima, *Blume Enum.* i. 7. Amischotolype mollissima, *Hassk. in Flora*, 1863, 392.

MALABAR, *J. Anderson*. SINGAPORE, *Walker*. MALACCA, *Griffith* (*Kew distrib.* 5485), *Maingay* (*K. d.* 1712).—DISTRIB. Sumatra, Java.

Stem 3–4 ft., as thick as the thumb, glabrous hairy or shaggily hispid. *Leaves* 6–18 by 2–3 in., subpetioled, acute, base acute; sheaths glabrous or hirsute. *Panicle* a sessile dense-fld. globose head, 2–3 in. diam. *Capsule* ⅛ in. long, rusty villous. *Seeds* subellipsoid, obscurely rugose.

2. **F. Griffithii,** *Clarke Monogr.* 236; leaves oblong-lanceolate fulvously hairy on both surfaces, capsule elliptic-oblong subacute fulvously hairy much longer than the sepals.

MALACCA, *Griffith, Maingay, Hullett*.

Stem stout, glabrate. *Leaves* 7 by 2½ in., shortly acuminate; petiole shaggy; sheath glabrous, mouth villous. *Sepals* ⅕ in., oblong, sparsely hairy. *Capsule* $\frac{4}{10}$ in. long.

3. **F. marginata,** *Hassk. in Flora*, 1864, 630; *Commelin. Ind.* 90; leaves obovate- or elliptic-lanceolate glabrous or margins villously ciliate, capsule ellipsoid longer than the sepals. *Clarke Monogr.* 237. F. hispida, *Bot. Mag.* t. 5425 (*not of A. Rich*). Campelia marginata, *Blume Enum.* i. 7; *Wall. Cat.* 8977 A, B. Amischotolypa marginata, *Hassk. in Flora*, 1863, 392.—Tradescantia sp., *Griff. Notul.* iii. 235. Pollia purpurea, *Hort.*

SINGAPORE and PENANG, *Wallich, Walker.* MALACCA, *Maingay* (*Kew distrib.* 2974).—DISTRIB. Sumatra, Java.

Stem 2–3 ft., as thick as the thumb. *Leaves* 10–30 by 1½–3 in., subcaudately acuminate; sheaths puberulous, glabrous or hirsute. *Flower heads* 1½–2 in. diam. *Sepals* ⅛ in. long.

Var. *rostrata*, Clarke l. c.; leaves narrower more caudate-acuminate, flowers fewer. F. rostrata, *Hassk in Flora*, 1864, 631; *Commelin. Ind.* 94.—Mishmi hills, *Griffith* (*Kew distrib.* 5486), Java.

4. **F. Hookeri,** *Hassk. in Flora*, 1864, 629; *Commelin. Ind.* 89; leaves petioled oblanceolate glabrous above, nerves beneath hairy, head of flowers small, capsule oblong-lanceolate much longer than the nearly glabrous sepals. *Clarke Commel. & Cyrt. Beng.* t. 41; *Monogr.* 237. Campelia marginata, *Wall. Cat.* 8977 (*in part*).

EASTERN HIMALAYA, SIKKIM and CHITTAGONG, *J. D. H.* BHOTAN, ASSAM, the KHASIA and NAGA HILLS, *Griffith, Clarke.*

Differs from *F. marginata* in the glabrous leaves, smaller few-fld. heads, and the beaked capsules ⅓–⅔ in. long, much exceeding the sepals.

5. **F. glabrata,** *Hassk. in Flora*, 1864, 360; *Commel. Ind.* 92; leaves lanceolate glabrous or margins pubescent, capsule ellipsoid much shorter than narrow sepals. *Clarke Commel. & Cyrt. Beng.* t. 42; *Monogr.* 238. Campelia glabrata, *Hassk. Pl. Jungh.* 154 (*not of Kunth*). C. marginata, β, *Blume Enum.* i. 7 (*fid Hassk.*). Amischotolypa glabrata, *Hassk. in Flora*, 1863, 392.

TROPICAL SIKKIM HIMALAYA, MUNNIPORE, BENGAL, ASSAM and TENASSERIM. —DISTRIB.—Sumatra, Java, Tonkin.

Differs from *F. Hookeri* in the short narrow capsule ⅕ in. long.

5. CYANOTIS, *Don.*

Herbs, usually prostrate or creeping. *Leaves* small. *Flowers* in axillary and terminal scorpioid cymes, formed of large imbricating biseriate secund foliaceous falcate bracteoles, the petals and stamens alone exserted, rarely with the corolla-tube exserted; flowers sometimes in exposed racemes, or fascicled in the ochrea. *Sepals* subequal, free or connate below. *Petals* subequal often united in a tube below, limb orbicular. *Stamens* 6, all perfect subequal, hypogynous or epipetalous, filaments usually bearded often inflated towards the apex, anthers oblong. *Ovary* 3-celled; ovules 2 collateral in each cell one erect the other pendulous. *Capsule* 3-celled, loculicidal, cells usually 2-seeded. *Seeds* superposed, cubical or pyramidal, usually rugose.

Many of the following species may probably have to be reduced.

Sect. I. ENCYANOTIS. *Cymes* enclosed in biseriate falcate imbricating bracteoles.

* *Valves of the capsule separating from a free central columnar* 3-*toothed axis.*

1. **C. papilionacea,** *Schultes, f. Syst.* vii. 1151; hirsute with spreading hairs creeping and rooting, leaves linear-oblong or lanceolate, bracteoles subreniformly falcate acute ciliate, capsule oblong, seeds smooth or obscurely pitted. *Clarke Monogr.* 246; *Wight Ic.* t. 2089; *Wall. Cat.*

8987; *Hassk. Commelin. Ind.* 158. C. hispida, *Dalz. in Hook. Journ. Bot.* 1851, 139; *Dalz. & Gibs. Bomb. Fl.* 253 (*excl. Syn.*). C. hirtella, *Miquel. Plant. Exsicc. Hohenack.* No. 130; *Hassk l. c.* 112. Tradescantia papilionacea, *Linn. Mant.* 513; *Vahl Symb.* i. 27 (*excl. Syn.*). T. cristata, *Heyne mss.* T. rupestris, *Law in Grah. Cat. Bomb. Pl.* 222.—? Commelina cristata, *Blume Fl. Ind.* t. 7, f. 4.

The DECCAN PENINSULA; from the Concan southwards, in rocky places.

Annual. *Stem* 4–6 in., branched from the base. *Leaves* 1-1½ by ¼–½ in., sessile, acute, acuminate, or obtuse and apiculate, base rounded; sheaths very short. *Peduncles* long, slender; bracts shortly exceeding the cymes. *Sepals* lanceolate. *Petals* blue. *Filaments* filiform, bearded. *Seeds* yellow-brown.

Var. *Burmanniana*, Clarke l. c.; leaves shorter broader. C. Burmanniana, *Wight Ic.* t. 2089.—Malabar.

2. **C. vaginata,** *Wight Ic.* t. 2088; softly hairy, erect or ascending, leaves ovate or oblong-lanceolate, sheaths short inflated, bracteoles ovate falcate acute ciliate, capsule oblong, seeds rugose dark brown. *Hassk Commel. Ind.* 98; *Clarke Monogr.* 247.

MALABAR, *Wight.*

Annual; stem 4–6 in., lower part with inflated leafless sheaths. *Leaves* falcate. *Peduncles* slender; bracteoles glabrous, striate and cross-striolate. *Sepals* lanceolate. *Petals* blue. *Filaments* filiform, bearded. *Seeds* conic.

** *Capsule with no free central column after dehiscence.*

3. **C. cristata,** *Schultes, f. Syst.* vii. 1150; stem creeping below, branches erect or ascending glabrous or with spreading hairs, leaves ovate-oblong subacute, seeds striate and pitted. *Wight Ic.* t. 3082; *Clarke Commel. & Cyrt. Beng.* t. 36; *Monogr.* 247; *Dalz. & Gibs. Bomb. Fl.* 256; *Wall. Cat.* 8986; *Hassk. Commelin. Ind.* 120. C. racemosa, *Clarke Commel. & Cyrt. Beng.* t. 38. C. Hugelii, *Hassk. l. c.* 128. C. cristata, *Linn. Sp. Pl.* 42. Tradescantia cristata, *Jacq. Hort. Vind.* ii. 64, t. 137; *Bot. Mag.* t. 1435. T. imbricata, *Roxb. Fl. Ind.* ii. 120. T. umbellata, *Heyne mss.*—Cyanotis sp., *Wall. Cat.* 8989.—*Rheede Hort. Mal.* vii. t. 58.

Throughout TROPICAL INDIA in hilly districts. BURMA, MALACCA, CEYLON. DISTRIB. Malay Islands, Mauritius, trop. Africa.

Stem 6–18 in., slender, branched. *Leaves* rather distant, 2–4 by ½–¾ in., sessile, obtuse or acute, glabrous or hirsute, ciliate or not. *Bracts* twice as long as the cyme. *Bracteoles* ½ in., ovate, falcate, acute, striate and striolate. *Sepals* lanceolate. *Petals* blue. *Filaments* simple, bearded. *Style* thickened at the tip. *Capsule* ¼ in., obtuse.

Var. *Griffithii*, Clarke l. c. 248; seeds smaller not pitted.—Mergui, *Griffith* (*Kew distrib.* 5506, 5517).

4. **C. barbata,** *Don Prodr.* 46; creeping and rooting, glabrous or cobwebby, leaves oblong or linear-lanceolate, cymes subsessile axillary and terminal, bracteoles oblong falcate acute, filaments bearded, seeds reticulated. *Clarke Commel. & Cyrt. Beng.* t. 37 (*excl. Syn. Roxb.*); *Monogr.* 248; *Wall. Cat.* 8993; *Hassk. Commelin. Ind.* 143. C. nodiflora, *Clarke in Journ. Linn. Soc.* xi. 453 (*not of Kunth*). C. nobilis, *Hassk. l. c.* 148 (*excl. Syn. Wight*); *Clarke Commel. & Cyrt. Ind.* 6, 39. C. glaberrima, *Hassk. l. c.* 156. C. fasciculata, *Wall. Cat.* 8990. Tradescantia barbata, *Spreng. Syst. Cur. post.* 138. T. radicans, *Royle Ill.* 403.—Cyanotis sp. *Wall. Cat.* 8988, 8994.

SUBTROPICAL HIMALAYA; from Kashmir eastwards, ascending to 8000 ft. KHASIA MTS., alt. 4600 ft. BURMA & PENANG, *Wallich.*—DISTRIB. China.

Stems slender, branched, tufted, sometimes bulbiferous. *Leaves* 1–2 by $\frac{1}{6}$–$\frac{1}{3}$ in., falcate or straight, sessile, acute or acuminate, ciliate, cobwebby beneath. *Bracts* much longer than the cyme. *Bracteoles* falcately ovate, acuminate. *Ovary* tipped with hairs. *Capsule* quadrate. *Seeds* brown.—*C. nobilis* and *glaberrima* are very large stout forms 1–2 ft. high, with leaves sometimes 6 in. long, common in the Khasia hills.

5. **C. tuberosa,** *Schultes, f. Syst.* vii. 1153; suberect or prostrate, tall, stout, glabrous or villous, root of cylindric tubers, radical leaves ensiform cauline narrowly oblong, cymes in the axil of a short leafy bract, terminal often corymbose, bracteoles villous ovate falcate, filaments bearded, tip tumid, style bearded thickened at the tip, seeds obscurely rugose. *Clarke Monogr.* 249; *Wall. Cat.* 8991; *Dalz. & Gibs. Bomb. Fl.* 256; *Hassk. Commelin. Ind.* 100. C. concanensis, Thomsonii & Stocksii, *Hassk. l. c.* 144, 133, 118. Tradescantia tuberosa, *Roxb. Cor. Pl.* ii. t. 108; *Fl. Ind.* ii. 19.—Cyanotis sp., No. 8, 9, *Herb. Ind. Or. Hf. & T.*

The DECCAN PENINSULA; on the west side, from the Concan to Travancore.

Stem 6 in.–3 ft., suberect or prostrate, hirsute at the base. *Leaves*, radical and lower cauline, 6–10 by $\frac{1}{3}$–1 in., sessile, often purple beneath, scaberulous. *Cymes* villous, or densely hirsute; bracts ovate or lanceolate, falcate, shorter than the cyme; bracteoles $\frac{1}{4}$–$\frac{3}{4}$ in. *Petals* blue-purple. *Capsule* hairy above.—A large coarse species.

Var. *adscendens*, Clarke l. c.; smaller, more glabrous, branches rooting and proliferous at the nodes. C. adscendens, *Dalz. in Hook. Journ. Bot.* 1852, 343; *Dalz. & Gibs. Bomb. Fl.* 255; *Hassk. Commelin Ind.* 102. C. sarmentosa, *Wight Ic.* t. 2087; *Hassk. l. c.* 154.—With the type; and at Agra, *Jacquemont*, Chota Nagpore, *Clarke.*

6. **C. Wightii,** *Clarke Monogr.* 250; tall, very stout, suberect, sparsely hirsute, leaves very long ensiform, cymes axillary and subcorymbose, bracteoles falcately ovate acuminate ciliate, filaments bearded, style thickened below the tip, seeds oblong dotted. C. longifolia, *Wight Ic.* t. 2084.

SOUTH DECCAN PENINSULA; Nilghiri and Travancore hills, *Wight.*

Stem branched, 2–3 ft. high. *Leaves* attaining 6–18 by $\frac{1}{3}$–$1\frac{1}{2}$ in., but usually much smaller, narrowed from the base to the tip, ciliate; sheaths short loose. *Bract* usually much longer and larger than the cyme; bracteoles $\frac{1}{2}$ in., ciliate. *Capsule* oblong, not half so long as the sepals.

7. **C. arachnoidea,** *Clarke Monogr.* 250; suberect, cottony or cobwebby, leaves very variable linear-oblong or lanceolate rather obtuse, cymes subsessile terminal and axillary, bracteoles falcately lanceolate, filaments bearded, style bearded and thickened below the tip, capsule oblong, seeds elongate conical obscurely pitted. C. fasciculata, *Wall. Cat.*, 8990 (*for the most part*). C. pilosa, *Wight Herb.* (*not Ic.* t. 2083). ?C. sericea, *Hassk. Commelin. Ind.* 152.—Cyanotis sp., 5, *Herb. Ind. Or. H. f. & T.* Tradescantia lanata and incana, *Heyne mss.*

The DECCAN PENINSULA; Nilghiri hills, *Wight* (*Kew distrib.* 2839). CEYLON; Haragam, *Trimen.*

Differs from *C. Wightii* in the soft shining silky or cobwebby pubescence. Trimen's specimens are very robust, with radical leaves 12 by $1\frac{1}{2}$–2 in., exactly as in the large states of *C. Wightii*; but those of the Deccan specimens are much smaller and narrower.

8. **C. pilosa,** *Schultes, f. Syst.* vii. 1155; more or less clothed with long spreading hairs or nearly glabrous, leaves linear or linear-lanceolate, cymes subsessile terminal and axillary, bracteoles oblong falcate acute, filaments bearded, style bearded and thickened below the tip, capsule quadrate, seeds shortly conic obscurely pitted. *Wight Ic.* t. 2083; *Clarke Monogr.* 251; *Hassk. Commelin. Ind.* 99; *Wall. Cat.* 8992; Cyanotis sp. 11, *Herb. Ind. Or. H.f. & T.* Tradescantia pilosa, *Heyne mss.*

The DECCAN PENINSULA; Nilghiri hills, *Heyne, Wight,* &c. CEYLON; in the higher parts of the island.

Habit of *C. arachnoidea,* from which it differs in the hairyness and quadrate capsule and seeds. The Ceylon are the only good specimens, and they are nearly glabrous.

9. **C. villosa,** *Schultes, f. Syst.* vii. 1155; silky or villous with spreading hairs, leaves narrowly lanceolate or ovate or oblong-lanceolate, cymes axillary and terminal, bracteoles small lanceolate falcate or nearly straight, filaments filiform, style fusiform below the tip, capsule oblong, seeds conical corrugated. *Clarke Monogr.* 251; *Hassk. Commelin. Ind.* 99; *Wall. Cat.* 8995. C. lanceolata, *Wight Ic.* t. 2085; *Hassk. l. c.* 125. Commelina, sp. 10, *Herb. Ind. Or. H.f. & T.* Tradescantia villosa, *Spreng. Syst.* ii. 116. T. ? cyanotidea, *Hassk. l. c.* 65.

The DECCAN PENINSULA; on the E. slope of the Nilghiris, *Wight,* &c. CEYLON, Central province, ascending to 6000 ft.

Stems 3–4 ft., erect from a procumbent base, succulent, often rooting and proliferous at the nodes. *Leaves* 3–5 by ½–¼ in., sessile, shining, green, silkily ciliate. *Bract* twice as long as the cyme; bracteoles ⅔ in. long. *Capsule* obtuse.

10. **C. zeylanica,** *Hassk. Commel. Ind.* 145; stem elongate glabrous except a line of hairs, leaves narrowly lanceolate puberulous pilose beneath, cymes small terminal subsessile, bracteoles dimidiate-ovate, capsule subquadrate, seeds striate and obscurely pitted. *Clarke Monogr.* 253. C. lanceolata, Wight, *var.* subglabra, *Thwaites Enum.* 323.

CEYLON; Central province, up to 6000 ft., *Thwaites.*

Differs from *C. villosa* in the short capsule and striate seeds, glabrous stem and smaller leaves narrowed at the base. The bracts also are much shorter, hardly exceeding the cyme.

11. **C. vaga,** *Schultes, f. Syst.* vii. 1153; softly hairy, stems elongate procumbent, leaves oblong-lanceolate, cymes small axillary and terminal sessile, bracteoles obscurely 2-seriate lanceolate nearly straight, capsule small subquadrately oblong, seeds closely reticulate and 1–2-foveolate. *Clarke Monogr.* 252. Tradescantia vaga, *Blume Enum.* i. 5. ? *Lour. Fl. Cochinch.* i. 239, and *Hassk. Commelin. Ind.* 62 (*not of Zollinger*).

TENASSERIM, *Helfer.*—DISTRIB. Java, China.

Stems 10–20 in., slender. *Leaves* 1½–2 by ½–⅔ in. *Bract* large. *Capsule* obtuse. *Seeds* with two deep clefts or pits. The obscurely biseriate bracts ally it to the section *Dalzellia.*

12. **C. fasciculata,** *Schultes, f. Syst.* vii. 1152; annual, dwarf, decumbent, floccosely silky or hairy, leaves linear or lanceolate, cymes bracteate axillary and terminal sessile and peduncled, bracteoles falcately lanceolate, capsule oblong, seeds subrugose. *Clarke Monogr.* 253; *Hassk. Com. Ind.* 122; *Wight Ic.* t. 2086; *Dalz. & Gibs. Bomb. Fl.* 255; *Wall. Cat.* 8990 (*in part*). C. dichotricha, *Stocks in Wight Ic.* t. 2087; *Hassk. l. c.* 130. C. Lawiana and decumbens, *Wight Ic.* t. 2086 and 2088; *Hassk.*

l. c. 100. C. rosea, *Wight Ic.* t. 2086. C. eriantha and C. disrumpens (*in part*), and C. Thwaitesii, *Hassk. l. c.* 62, 138, 105, 136. Tradescantia fasciculata, *Heyne in Roth Nov. Sp.* 189. T. rupestris ?, *Law in Grah. Cat. Bomb. Pl.* 223.

The DECCAN PENINSULA; common in rocky places from the Concan southwards. CEYLON; abundant in the Central province.

Annual; roots fibrous. *Stem* 4-18 in. *Leaves* 1-2 by $\frac{1}{8}$-$\frac{1}{3}$ in. *Bracts* about twice as long as the small cyme, silky or cobwebby. *Petals* rose-purple. *Filaments* bearded.

A very variable plant, of which there are the three following varieties:—*β glabrescens* (from Belgaum) with linear glabrous leaves, glabrous bracts and woolly bracteoles; *γ rosea* (C. rosea, *Wight*) (from the Bolamputty hills in Travancore) (of which no specimens exist in Wight's Herbarium) with sessile ovate-cordate obtuse leaves according to the description, but linear leaves in the plate; and *δ Thwaitesii* (from Belgaum, Courtallam and Ceylon), with dense divaricate branches, to which belongs *Tradescantia rupestris*, Law, and which appears to be intermediate between *C. arachnoidea* and *fasciculata*. Wight describes *rosea*, *Lawiana* and *dichotricha* as all of them succulent, as does Dalzell his *hispida*. Of *Lawiana* Wight describes the style as simple (not thickened) but figures it as fusiform above.

Sect. II. DALZELLIA. *Flowers* solitary or in terminal or subterminal few-fld. cymules, bracts and bracteoles small not imbricate in 2 series.

13. **C. kewensis,** *Clarke Monogr.* 243, *Tab.* 5, f. 6; villous, stem stout prostrate densely leafy, leaves bifariously imbricate sessile ovate-cordate acute bright red beneath, sheaths very short, flowers few terminal shortly pedicelled, filaments bearded. Belosynapsis kewensis, *Hassk. in Flora*, 1871, 259. Erythrotis Beddomei, *Hook. f. Bot. Mag.* t. 6150.

TRAVANCORE; on the Myhendra Mts., alt. 3-4000 ft., *Beddome.*

Stem and *branches* 6-10 in., pendulous, with ascending tips, rooting below. *Leaves* 1-1½ in., rather fleshy, green and convex above, hairs rufous when dry, sheaths ¼ in., ribbed, ciliate. *Flowers* 1-2 together in the uppermost axils; pedicel and 3 ovate sepals hispid; petals free, rose-purple; filaments bearded with blue hairs, anthers yellow; ovary hispid, style filiform naked. *Capsule* oblong, obtuse, tip villous. *Seeds* short, obscurely 2-pitted on the inner face.

14. **C. vivipara,** *Dalz. in Hook. Journ. Bot.* 1851, 226; epiphytic, subscapigerous, radical leaves ensiform, flowering stems numerous very slender flexuous pendulous with small distant leaves and few very small flowers. *Dalz. & Gibs. Bomb. Fl.* 255; *Clarke Monogr.* 244, t. 5, f. 5. Dalzellia vivipara, *Hassk. in Flora*, 1865, 594; *Commelin. Ind.* 161.

The CONCAN; in the Syhadri hills, on trees, *Law, Dalzell.*

Rootstock small with tufts of pilose radical leaves 3-5 by ¼-⅓ in. *Scapes* several, rooting and viviparous at the nodes, almost filiform; cauline leaves very small, sheaths very short. *Flowers* 2-3 on a subterminal peduncle; bracts small, oblong, acute; pedicels and sepals villous. *Petals* white, connate to the middle; style filiform, naked. *Capsule* $\frac{1}{10}$ in. long, oblanceolate. *Seeds* cylindric, smooth.

Sect. III. OCHREÆFLORA. *Flowers* axillary in the sheaths of the leaves; bracteoles small slender not imbricating. (See also *C. villosa.*)

15. **C. axillaris,** *Roem. & Sch. Syst.* vii. 1154; stem elongate glabrous or sparsely hairy, leaves elongate linear or linear-lanceolate, flowers clustered in the short inflated sheaths, filaments bearded, style glabrous filiform, capsule acute, seeds subcylindric punctate. *Clarke Monogr.* 244;

Comm. & Cyrt. Beng. t. 35; *Dalz. & Gibs. Bomb. Fl.* 256; *Benth. Fl. Austral.* vii. 82; *Hassk. in Pl. Jungh.* i. 154; *Commel. Ind.* 107; *Wall. Cat.* 8996. C. disrumpens, *Hassk. l. c.* 105 (*in part*). Commelina axillaris, *Linn. Sp. Pl.* 42. Tradescantia axillaris, *Linn. Mant.* 321; *Roxb. Cor. Pl.* 5, t. 107; *Fl. Ind.* ii. 118. Zygomenes axillaris, *Salisb. in Trans. Hort. Soc.* i. 271.—*Rheede Hort. Mal.* x. t. 13.

Throughout INDIA; in the plains from the upper Gangetic valley to ASSAM and southwards to CEYLON.—DISTRIB. E. Asia, trop. Australia.

Stem 6–18 in., annual, stout or slender, branched. *Leaves* 2–6 by ¼–¼ in., acuminate, sheaths ciliate, base broad or narrowed. *Petals* long-clawed, blue. *Ovary* glabrous; style ovoid below the tip. *Capsule* ⅛ in. long, glabrous; valves 2-fid.

16. **C. cucullata,** *Kunth Enum.* iv. 107; glabrous or sparsely hairy, leaves linear, flowers clustered in the sheaths, filaments nearly naked, capsule depressed in the centre with 3 horns, seeds subquadrate pitted. *Roth Nov. Sp.* 189; *Clarke Monogr.* 245, t. 5, f. 7.

The DECCAN PENINSULA; from Canara to Malabar.

Habit and characters of *D. axillaris*, but differing in the glabrous filaments and broader capsule and shorter broader seeds.

DOUBTFUL SPECIES.

C. NILAGIRICA, *Hassk. Commelin. Ind.* 127; differing according to Hasskarl from *C. arachnoidea* in its glabrousness, obtuser leaves, denser spikes, and larger flowers.

C. KARLIANA, *Hassk. l. c.* 146; "stems creeping 8–12 in. glabrous, leaves ½–2 by ⅒–⅛ in. linear-lanceolate, sheaths purple, cymes 1–3-nate axillary or terminal small cobwebby-puberulous, bracteoles few, seeds longitudinally cracked not scrobiculate, style glabrous tip thickened."—Poonah, *Hugel.*

C. INCERTA, *Hassk. l. c.* 165; "brown-villous, peduncles 5-nate," (cymes?) "umbellately crowded at the top of a common peduncle, bracts" (bracteoles?) 7–20 falcate lanceolate acuminate, flowers woolly-villous, style hairy thickened below the tip.—Asia, *Hugel.*

6. STREPTOLIRION, *Edgew.*

A twining flaccid herb. *Leaves* long-petioled, ovate-cordate, acuminate. *Flowers* few, in axillary and terminal scorpioid cymes. *Sepals* oblong, free. *Petals* linear, free. *Stamens* 6, filaments bearded, anthers transverse, cells margining the 2-lobed connective. *Ovary* 3-celled; style filiform, stigma obconic ciliate; ovules 2 superposed in each cell. *Capsule* oblong trigonous beaked loculicidal. *Seeds* angular, rugose.

S. volubile, *Edgew. in Trans. Linn. Soc.* xx. 90, t. 2; *Wight Ic.* t. 2081; *Hassk. Commel. Ind.* 6; *Clarke Comm. & Cyrt. Beng.* 40; *Monogr.* 261. S. Griffithii, *Kurz.* Tradescantia cordifolia, *Griff. Journ.* 208.

TEMPERATE HIMALAYA; from Garwhal to Bhotan, alt. 5–9000 ft. UPPER ASSAM, on the Patkoy hills, and MUNNIPORE.—DISTRIB. China.

Stem 6 or more ft., glabrous or sparsely hairy, climbing over bushes, terete, branched, often rooting at the nodes. *Leaves* 4–6 in. diam., base often deeply 2-lobed nerves many from the base, concentric; petiole 2–5 in., glabrous or puberulous; sheath short, mouth ciliate. *Flowers* ½ in. diam., white, upper often barren. *Filaments* with yellow hairs. *Capsule* ⅛ in. long, glabrous or pubescent.—The Khasian specimens (var. *khasiana*, Clarke) are more hairy than the Himalayan with villous capsules and a penicillate stigma.

7. FLOSCOPA, *Lour.*

Erect or subscandent herbs. *Leaves* lanceolate. *Flowers* in terminal or axillary thyrsoid panicles, bracteate; cymes secund-flowered (not scorpioid). *Sepals* 3, oblong, free. *Petals* free, obovate. *Stamens* 6, perfect (or one imperfect); filaments glabrous. *Ovary* 2-celled; cells 1-ovuled; style simple. *Capsule* 2-celled, crustaceous, loculicidal. *Seeds* hemispheric.—Species about 11, tropical.

1. **F. scandens,** *Lour. Fl. Coch.* 193; glabrous or pubescent, stems prostrate, branches suberect, leaves subpetioled acuminate, cymes panicled villous or hirsute. *Clarke Monogr.* 265. F. paniculata, *Hassk. Pl. Jungh.* 157; *Commel. Ind.* 167. F. Hamiltonii, undulata petiolata and Meyenianas, *Hassk. Commel. Ind.* 166, 167. Dithyrocarpus paniculatus, *Kunth Enum.* iv. 70; *Clarke Comm. & Cyrt. Beng.* 34; *Dalz. & Gibs. Bomb. Fl.* 256. D. Meyenianus and rufus, *Kunth l. c.* 78, 79. D. petiolatus, Rothii, and undulatus, *Wight Ic.* t. 2079, 2080. Tradescantia paniculata, *Roxb. Cor. Pl.* ii. t. 109; *Fl. Ind.* ii. 119; *Roth Nov. Sp.* 188. T. rufa, *Presl Rel. Haenk.* i. 138. Commelina cymosa and densiflora, *Blume Enum.* i. 4. C. hispida, *Ham. mss.*, and C. Hamiltonii, *Spreng. Syst* iv., and *Cur. post.* 25 and v. 186. Aneilema hispidum, *Don Prodr* 45; *Wall. Cat.* 5204. A cymosum and densiflorum, *Kunth Enum.* iv. 69. Lamprodithyros paniculatus, *Hassk. in Flora*, 1863, 389.

Throughout tropical INDIA, in swamps from E. Nepal, Sikkim and the KHASIA HILLS to TRAVANCORE, MALACCA and CEYLON.—DISTRIB. Eastern Asia and tropical Australia.

Stem stout, erect, creeping below. *Leaves* 2–6 by ½–1½ in., sessile or petioled; sheaths lax, short, glabrous or hirsute; mouth ciliate. *Panicles* shortly peduncled, pyramidal, with long erect or ascending many-fld. branches. *Flowers* small, subglobose, racemose, lower bracteate upper ebracteate; sepals villous; petals white, lilac or rosy. *Capsule* ⅛ in. long, orbicular, or ellipsoid, acute, compressed, shining. *Seeds* glaucous.

ORDER CLXI. FLAGELLARIEÆ.

Stem tall, leafy, erect or scandent. *Leaves* many-nerved or plaited, petiole sheathing. *Flowers* small, in terminal panicles, uni- or bi-sexual. *Sepals* 6, persistent, imbricate. *Stamens* 6, hypogynous, filaments free; anthers basifixed, erect. *Ovary* superior, 3-celled; style short, 3-cleft, or styles 3; ovules solitary in the cells, anatropous. *Fruit* a small berry, or a drupe with 1–3 pyrenes. *Seeds* laterally attached, testa membranous or thick, albumen flowery; embryo lenticular.—Genera 3, species 7–8, of the Old World and Pacific.

Stem scandent. Flowers 2-sexual. Drupe 1–2-seeded	1.	FLAGELLARIA.
Stem erect. Flowers diœcious. Berry 1–3-seeded	2.	SUSUM.

1. FLAGELLARIA, *Linn.*

Stem climbing by the cirrhose leaf-tips. *Flowers* bisexual. *Sepals* subpetaloid. *Style arms* 3, entire or 2-partite. *Drupe* with a thin succulent exocarp and bony 1–2-seeded endocarp.—Species 2, a Fijian and the following:—

F. indica, *Linn. Sp. Pl.* 333; leaves sessile lanceolate with sheathing bases. *Kunth Enum.* iii. 370; *Roxb. Fl. Ind.* ii. 154; *Dalz. & Gibs. Bomb. Fl.* 256; *Wall. Cat.* 5198; *Benth. Fl. Austral.* vii. 10; *Miquel Fl. Ind. Bat.* iii. 249; *Redouté Lil.* v. t. 257; *Gaertn. Fruct.* i. 16, t. 16.—*Rheede Hort. Mal.* vii. t. 53.

Throughout INDIA, chiefly near the coast, from the SUNDERBUNDS and CHITTAGONG, to CEYLON and SINGAPORE.—DISTRIB. Trop. Asia and Africa.

Glabrous, climbing lofty trees; stem thick as the thumb below; branches clothed with the closed leaf-sheaths. *Leaves* 6–10 in., variable in breadth, lanceolate, tip a slender spiral tendril, many-nerved, not plaited; sheath 2-auricled. *Panicle* 6–18 in. broad and irregularly branched; flowers clustered, sessile; bracts scale-like. *Sepals* about $\frac{1}{12}$ in. long, white, subscarious. *Stamens* exserted; anthers as long as the filaments, deeply 2-fid at the base; ovary narrow, trigonous. *Fruit* pisiform, red.

Var. *minor*; stem very slender, leaves 3–5 by ¼–½ in., panicle 1–3 in. broad. F. minor, *Blume in Roem. & Sch. Syst.* vi. 1493; *Miq. Fl. Ind. Bat.* iii. 249, *& Suppl.* 598. F. angustifolia, *Wall. Cat.* 5199.—Malay Peninsula.

2. SUSUM, *Blume.*

Stem stout, erect, simple or branched above. *Leaves* very long, sessile or petioled, many-nerved. *Flowers* dicœcious, in broad panicles, sessile; bracts minute or 0. *Sepals* unequal, orbicular, concave, inner petaloid. MALE FL. *Stamens* 6, adnate to the base of the sepals. *Pistillode* 3–6-angled or 3-lobed. FL. FEM. *Staminodes* small or 0, stigmas 3, connate in a 3-lobed disk. *Berry* pisiform, succulent, 1–3-seeded; stigmas persistent, lateral or excentric.—Species 2, Indian and Malayan.

1. **S. anthelminticum,** *Blume in Schultes. f. Syst.* vii. 1493; panicle broad spreading irregularly branched. *Kunth Enum.* iii. 371; *Miquel Fl. Ind. Bat.* iii. 247; *Thwaites Enum.* 340. Hanguana, *Blume Enum. Pl. Jav.* 15.

MALAY PENINSULA and PENANG, common. CEYLON, in marshes.—DISTRIB. Malay Islands.

Glabrous, or young leaves and panicle sparsely clothed with short cottony pubescence. *Stem* 3–5 ft. high, stout, leafy at the tip, or throughout. *Leaves* 3–8 ft. long, long petioled, lanceolate, acuminate, coriaceous, many- and closely nerved, with conspicuous (when dry) cross nervules; petiole 1–3 ft., base sheathing. *Panicle* erect, shortly stoutly peduncled, decompound, rachis and branches stout. *Flowers* about ⅛ in. broad, rather remotely sessile on the branches of the panicle, yellowish; perianth segments orbicular, concave; filaments short, dilated below, anthers oblong. *Berry* usually 1-seeded.

2. **S. malayanum,** *Planch. mss.*; more or less pubescent with scattered white hairs, panicle narrow, branches whorled. Veratronia malayana, *Miquel Fl. Ind. Bat.* iii. 553. Veratrum? malayanum, *Jack in Mal. Misc.* i. v. 25 (*Hook. Bot. Misc.* ii. 74); *Wall. Cat.* 3717. T. anthelminticum, *Maury in Rev. Hort.* 1889, 77, f. 23.

PENANG, PERAK, SINGAPORE and MALACCA.—DISTRIB. Malaya.

Described by Jack as with the leaves all radical and 3–4 ft. long; but I suspect his description is taken from a young plant.—It may be doubted from Blume's description (in Willdenow) whether this or *S. anthelminticum* is the plant intended, but I assume that Miquel must have had access to the specimens of that author, or he would not have described *S. malayanum* as a different genus. If really different the two species are very closely allied.

Order CLXII. **JUNCACEÆ.**

Erect, rarely annual herbs; stems tufted or with a creeping rootstock. *Leaves* flat, terete, or reduced to sheaths. *Flowers* in axillary or terminal cymes, 2 sexual, bracteate, green, or whitish and membranous, or brown and coriaceous. *Perianth* inferior, segments 6 in two series, persistent, imbricate. *Stamens* 6, rarely 3, hypogynous or on the bases of the segments; anthers basifixed. *Ovary* 1- or 3-celled, style filiform or short, or 0, stigmas 3, filiform; ovules 3 basilar in the 1-celled ovary, or many in the inner angles of the 3-celled, anatropous. *Capsule* 1–3-celled, loculicidally 3-valved. *Seeds* erect, testa membranous, often produced at each end; albumen dense; embryo small, next the hilum.—Genera 14; species about 200.

Ovary many-ovuled . . . . . 1. Juncus.
Ovary 1-celled 3-ovuled . . . . . 2. Luzula.

1. **JUNCUS,** *Linn.*

Glabrous herbs. *Perianth* with the 3 outer segments keeled or the midrib thickened. *Stamens* 6, rarely 3. *Ovary* 3- rarely 1-celled, ovules many.—Species about 150, temperate and arctic, rarely tropical.

Sect. I. Annual. *Stem* copiously branched. *Leaves* not septate. *Cymes* scattered, few-fld.

1. **J. bufonius,** *Linn. Sp. Pl.* 466; slender much dichotomously branched from the base upwards, cymes numerous, flowers pale green solitary or clustered, sepals and petals unequal. *Kunth Enum.* iii. 353; *Reichb. Ic. Fl. Germ.* t. 395; *Royle Ill.* 401; *Wall. Cat.* 8997; *Boiss. Fl. Orient.* v. 361; *Buchen. in Engl. Bot. Jahrb.* xii. 174.

Northern India; from the plains to 13,000 ft. in the Himalaya, but local.—Distrib. N. temp. regions.

Densely clustered, 1–12 in. high, erect or ascending, pale green. *Leaves* few, setaceous, channelled above, sheaths pale. *Cymes* scattered on the stem, branches short or long, often flexuous; bracts scarious; flowers $\frac{1}{6}$–$\frac{1}{4}$ in. long, lateral open 6-androus, terminal closed 3-androus; sepals and petals lanceolate, long acuminate and with broad membranous margins. *Stamens* half as long as the sepals. *Capsule* shorter than and closely embraced by the perianth, obovoid, obtuse, mucronate, pale. *Seeds* very minute, finely reticulate, tips nearly rounded.

Sect. II. Perennial. *Rhizome* stout, tufted and creeping. *Stems* tall, terete, produced beyond the decompound cyme and then erect and pungent; bases closed with rigid leafless sheaths. *Leaves* 0, or terete like the stem. *Flowers* usually distinctly pedicelled.

2. **J. effusus,** *Linn. Sp. Pl.* 326; stems soft, pith continuous, sepals lanceolate exceeding the obovoid retuse capsule, stamens usually 3, seeds not tailed at the ends. *Reichb. Ic. Fl. Germ.* t. 920; *Boiss. Fl. Orient.* v. 352; *Buchen. in Engl. Bot. Jahrb.* vi. 199; xii. 228. J. communis, *E. Mey. Junc.* 12; *Kunth Enum.* iii. 320.

Sikkim Himalaya, alt. 6–10,000 ft. Khasia Hills, alt. 5–5500 ft.—Distrib. Europe, N. Asia, Africa, America, and Australia.

Usually forming circular densely matted tufts of pale green finely striate stems, 1–3 ft. high, and $\frac{1}{12}$–$\frac{1}{8}$ in. diam.; spathes all leafless. *Cymes* most variable, effuse lax and pendulous with slender branches and distant flowers, or globose sessile and

with densely packed flowers. *Sepals* $\frac{1}{10}$–$\frac{1}{8}$ in. *Stamens* 3, rarely 6, shorter than the sepals. *Capsule* obtuse or mucronate. *Seeds* very obtuse at each end, minute. —A graceful form with effuse nodding or decurved very lax-flowered cymes 3–5 in. long, long-pedicelled triandrous flowers and more or less interrupted pith, is common in the Sikkim woods at 5–8000 ft. elevation.

3. **J. glaucus,** *Ehrh. Beitr.* vi. 83; stems rigid glaucous deeply striate, pith interrupted, sepals lanceolate about equalling the ovoid mucronate capsule, stamens 6, seeds obtuse at either end. *Kunth Enum.* iii. 316; *Thwaites Enum.* 340; *Wall. Cat. Boiss. Fl. Orient.* v. 353; *Buchen. in Engl. Bot. Jahrb.* vi. 199; xii. 243; *Reichb. Ic. Fl. Germ.* t. 412. J. effusus, *Steud. Pl. Hohenack.*

WESTERN HIMALAYA, alt. 6–9000 ft., from Kashmir to Nepal; the NILGHIRI HILLS and CEYLON.—DISTRIB. Europe, N. Asia, N. Africa.

Habit of *T. effusus*, but usually stiffer and darker green with deeper striated stems. I have great difficulty in referring some of the Himalayan dried specimens whether to *glaucus* or to *effusus*.

4. **J. maritimus,** *Lamk. Encycl.* iii. 264; stem terete, basal sheaths short pale, leaves few terete pungent, cyme decompound, branches erect, sepals lanceolate acute, petals shorter oblong obtuse rather shorter than the ovoid or conic 3-celled capsule, seeds shortly tailed at each end. *Kunth Enum.* iii. 322: *Buchen. in Engl. Bot. Jahrb.* xii. 256; *Reichb. Ic. Fl. Germ.* ix. t. 402; *Boiss. Fl. Orient.* v. 354.

Sandy shores of SINDH, *Stocks*, &c.—DISTRIB. Affghanistan and westward to the Atlantic, N. and S. America, Australia.

Stems 2–4 ft., striate, pith solid; basal sheaths narrow, obtuse, pungent or produced into a solid terete pungent leaf. *Cyme* 1–2 in. long; floral bracts ovate, mucronate, margins broadly membranous; sepals $\frac{1}{8}$–$\frac{1}{6}$ in. long, pale green, margins membranous; stamens 6, filaments dilated and connate at the base, anthers linear. *Capsule* sometimes half as long again as the sepals, obtuse, mucronate, shining. *Seeds* oblong or obovoid.

Sect. III. Perennial. *Stems* simple, slender, leafy. *Leaves* filiform, not septate. *Cymes* terminal. *Stamens* 6, included. *Capsule* shorter or longer than the perianth.

5. **J. tenuis,** *Willd. Sp. Pl.* ii. 214; stem very slender tufted curved 1–2-leaved, leaves very slender flat or involute, cyme terminal rather effuse, flowers small distant or sparingly clustered, sepals lanceolate acuminate much longer than the 6 stamens, anthers shorter than their filaments; capsule hardly exserted subglobosely trigonous. *Kunth Enum.* iii. 348; *Buchen. in Engl. Bot. Jahrb.* xii. 193; *Reichb. Ic. Fl. Germ.* ix. t. 398; *Kunth Enum.* iii. 348, 349.

ASSAM, *Griffith.*—DISTRIB. Europe, As., Am., N. Zealand.

Stem 9–18 in. and leaves wiry. *Leaves* rarely exceeding the stem, deeply striate; sheath membranous, 2-auricled. *Cyme* narrow or broad, compound, rarely dense-fld., lower bract or bracts filiform, usually exceeding the cyme; floral membranous; flowers green; sepals spreading, $\frac{1}{6}$ in. long; anthers shorter than their filaments; style very short. *Capsule* mucronate. *Seeds* obovoid or oblong, apiculate.—Possibly introduced into Assam, as the species is spreading out of Europe.

6. **J. compressus,** *Jacq. En. Sirtp. Vind.* 60, 235; stems slender 1–2-leaved, leaves slender channelled, cyme terminal, branches spreading, flowers subsolitary, sepals linear-oblong obtuse about equalling the broadly

ovoid obtuse capsule, stamens much shorter than the sepals, anthers longer than their filaments. *Kunth Enum.* iii. 351; *Buchen. in Engl. Bot. Jahrb.* xii. 185; *Reichb. Ic. Fl. Germ.* ix. t. 399.

WESTERN HIMALAYA; Kashmir, *Jacquemont*; alt. 7000 ft., *Clarke*.—DISTRIB. Westward to the Atlantic, N. Asia.

Rootstock creeping; stems, 6–24 in., tufted, rigid, fistular, subcompressed, striate. *Leaves* shorter than the stem, nearly flat, or channelled above, tip subulate; sheath auricled. *Cymes* shorter than the filiform lower bracts, compound, lax-fld.; flowers subsolitary; sepals 1½ in. long, with green or brown narrowly scarious margins. *Capsule* 3-celled, shining, apiculate. *Seeds* very minute, apiculate, strongly ribbed. —The capsule is shorter than in the usual form of *J. compressus*, and as short as in *J. Gerardi*, which is a salt marsh species (or variety of *compressus*), not uncommon in Europe and N. Asia.

7. **J. ochraceus,** *Buchen. in Abh. Nat. Ver. Brem.* iii. 292; in *Engl. Bot. Jahrb.* vi. 207, t. 2; xii. 415; stems slender, leaves filiform channelled above, cyme compound in small heads usually transformed into crowded plumose clusters of long shining yellow glumes, flowers small pale green, sepals narrow membranous subequal longer than the stamens, anthers longer than the filaments, capsule exserted narrowly ovoid triquetrous cuspidate, style long slender.

SIKKIM HIMALAYA, alt. 5–9000 ft., abundant. BHOTAN, *Griffith*.

Stem densely tufted, 8–12 in. high, grooved. *Leaves* equalling the stem, or shorter, 2-tubular, wiry; sheaths long-auricled. *Cyme* polymorphous, loosely branched, invariably more or less reduced to feathery tufts of golden yellow shining bracts and glumes-like subulate lanceolate sepals with very rarely a few intermixed perfect flowers dispersed in small peduncled pale green heads or clusters, very shortly pedicelled; lower bract filiform, usually short, floral hyaline; sepals ⅛ in. long, membranous, linear-lanceolate, 1-nerved; sepals more oblong, 3-nerved, apiculate; anthers at length strongly twisted; ovary with the very slender style nearly twice as long as the sepals. *Capsule* ¼ in. long. *Seeds* not seen.—A remarkable plant, quite unlike any other, doubtfully referred to this section by Buchenau; perhaps better placed with *J. filiformis*.

Sect. IV. Perennial. *Stem* usually leafy upwards. *Leaves* terete or compressed, septate within, the septa more or less prominent externally. *Cymes* terminal; flowers densely clustered in small heads.

* *Seeds long-tailed at both ends. Stamens exserted.*

8. **J. Grisebachii,** *Buchen. in Abhandl. Nat. Verein. Bremen,* iii. 295; *in Engl. Bot. Jahrb.* vi. 202; xii. 265; stoloniferous, stem tall stout, cymes of several many-fld. pale yellow globose heads, sepals membranous equalling the ovoid long-beaked capsule, stamens exserted.

SUBALPINE HIMALAYA; Kumaon, alt. 11,000 ft., *Duthie*; Sikkim, alt. 10–14,000 ft., *J. D. H., Clarke*. BHOTAN, *Griffith*.

Stems 8–18 in., soft, terete. *Leaves* as long as the stem, terete, channelled, strongly septate. *Cymes* with spreading branches; lower bracts 1–3, very long, leafy, erect; floral ovate to lanceolate, acuminate, membranous; flowers ¼–½ in. long, sessile or shortly pedicelled; sepals and petals subequal, acute; anthers slender as long as their filaments; style slender. *Capsule* subterete, shining, almost 3-celled. *Seeds* very pale, fusiform, testa lax, tails as long as the nucleus.

9. **J. chrysocarpus,** *Buchen. in Engl. Bot. Jahrb.* vi. 201; xii. 266; stems tufted very slender 1–2-leaved, leaves filiform, cyme a solitary

many-fld. pale yellow globose or hemispheric head, sepals membranous shorter than the long-beaked capsule.

SIKKIM HIMALAYA, alt. 10–12,000 ft., *J. D. H.*; *Clarke*.

Stem as thick as packthread. *Leaves* equalling or exceeding the stem, strongly or faintly (sometimes externally obscurely) septate. *Cymes* ½–¾ in. diam.; lower bracts produced and filiform or not; flowers sessile; sepals ¼ in. long, ovate-lanceolate acuminate and petals almost hyaline; stamens, style and seeds as in *J. Grisebachii*.—Differs from *Grisebachii* in its small size, slender habit, solitary head and smaller flowers. With difficulty distinguished from *J. membranaceus*, to which this and *Grisebachii* are most closely allied.

** *Seeds not tailed. Stamens included.*

10. **J. punctorius,** *Linn. f. Suppl.* 208; tall, stout, leaves cylindric or compressed multitubular with a central hollow, cyme terminal erect umbellately compound, heads many and many-fld., sepals oblong-lanceolate acute, petals broader subacute, stamens 6, capsule equalling the sepals ovoid mucronate 3-celled, seeds ovoid very minute. *Kunth Enum.* iii. 332; *Buchen. in Abh. Nat. Verein. Bremen*, iv. 424; *in Engl. Bot. Jahrb.* xii. 277; *Boiss. Fl. Orient.* v. 357.

SINDH, *Stocks*.—DISTRIB. Westwards to Persia, Arabia and N. and S. Africa.

Pale green, 2 ft. high; rootstock stout creeping; stems soft often as thick as a goose-quill. *Leaves* as long as the stem, and nearly as stout, acuminate, irregularly septate. *Cyme* decompound; branches divaricate; bracts short, pungent, floral hyaline acuminate; flowers brownish, sessile or shortly pedicelled; sepals ⅛–¼ in. long, glumaceous; stamens about ¼ shorter than the sepals, filaments rather longer than the anthers; style long. *Capsule* prismatic, apiculate. *Seeds* costate and reticulate.

11. **J. lampocarpus,** *Ehr. Calam. n.* 126; stems erect or ascending terete or compressed leafy, leaves linear-subulate unitubular strongly septate, cymes subumbellately compound with divaricate branches bearing small 2–5-fld. heads of sessile small flowers, stamens 6 much shorter than the lanceolate subacute or obtuse sepals, capsule pyramidal mucronate 1-celled, tip exserted, seeds obovoid. *Kunth Enum.* iii. 325; *Boiss. Fl. Orient.* v. 358; *Buchen. in Engl. Bot. Jahrb.* xii. 376; *Reichb. Ic. Fl. Germ.* ix. t. 405. J. articulatus, *Linn. Sp. Pl.* i. 327.

NORTH WEST INDIA; Lahore, *Thomson*; Jhelum river, *Jacquemont*. HIMALAYA and WESTERN TIBET, alt. 7–14,000 ft.; very common from Kashmir to Kundwur.—DISTRIB. North temp. regions.

Rootstock horizontal; stems densely tufted, 4–10 in., rather stout, soft, at length hollow. *Leaves* terete or compressed, acute. *Cyme* with stout strict divaricate branches ½–1 in. long, bearing small heads at the forks and tips; lower bracts leafy, floral ovate-lanceolate, mucronate; heads ⅓–½ in. diam.; hemispheric; sepals ¼ in. long, green or brown, margins membranous; anthers about equalling the filaments; style short. *Capsule* green or brown. *Seeds* reticulate, testa appressed.

12. **J. prismatocarpus,** *Br. Prodr. Fl. N. Holl.* 259; stem erect terete or compressed, leaves filiform or broader soft compressed or terete 1- or many-tubular indistinctly externally distantly septate, cymes irregularly compound, heads densely 6–10-fld., sepals subulate or linear-lanceolate, stamens 3 much shorter than the sepals, style very short, capsule prismatic or conical rather longer than the sepals, seeds obovoid or ellipsoid. *Kunth Enum. Pl.* iii. 33; *Buchen. in Engl. Bot. Jahrb.* xii. 311; *Miquel, Fl. Ind. Bat.* iii. 246. J. Leschenaultii, *J. Gay in La Harpe*

Monogr. Junc. 137, 139; *Kunth Enum.* iii. 336; *Thw. Enum.* 340. J. Wallichianus, *La Harpe l. c.* 139; *Kunth l. c.* 338. J. indicus, *Royle ex Don in Trans. Linn. Soc.* xviii. 323; *Wall. Cat.* 8999. J. monticola, *Steud. Syn. Pl. Glum.* ii. 301. Rostkovia ensiformis, *Herb. Ham.*—Juncus, *Wall. Cat.* 9000.

Plains of BENGAL and the PANJAB; ascending the Himalaya to 10,000 ft. The KHASIA HILLS, and DECCAN Ghats; BURMA; CEYLON.—DISTRIB. Eastern Asia, Australia.

Very variable, cæspitose, rootstock very short. *Stems* 18–24 in., sometimes decumbent and rooting at the nodes, leafy, not septate. *Leaves* 2–10 by $\frac{1}{16}$–$\frac{1}{8}$ in., always shorter than the stem, acute. *Cymes* erect, branches erect or spreading; lower bract leafy, erect, shorter than the cyme; floral hyaline, lanceolate, long-acuminate; heads hemispheric; flowers green or brown, sessile; sepals $\frac{1}{6}$–$\frac{1}{4}$ in. long, glumaceous; stamens very short, anthers oblong; style very short, stigmas long. *Capsule* usually much exceeding the perianth. *Seeds* very minute, apiculate, testa appressed, reticulate.—The commonest rush in wet meadows in Sikkim.

Var. *sinensis*; very slender, flaccid, prostrate and creeping, leaves filiform unitubular, cymes depauperate, heads few-fld. J. sinensis, *J. Gay in La Harpe Monogr. Junc.* 137; *Kunth Enum.* iii. 336; *Buchen. l. c.* vi. 203; xii. 313. J. indicus, *var.* nanus, *Royle Ill. Pl. Himal.* 137. J. unibracteatus, *Griff. Notul.* iii. 232.—Bengal, Nepal, and the Khasia hills, in very wet places.

13. **J. leptospermus,** *Buchen. in Engl. Bot. Jahrb.* vi. 203; xii. 339; stems tall, leaves cylindric unitubular, cymes decompound erect, heads crowded sub 5-fld., sepals subulate lanceolate shorter than the narrow lanceolate beaked prismatic capsule, stamens 3 much shorter than the sepals, seeds linear-oblong.

KHASIA HILLS, alt. 4–5000 ft., *Griffith, Clarke.*

Stem 2–3 ft., as thick as a crow-quill, terete or subterete, smooth, leafy above, at length fistular. *Leaves* shorter than the stem, septate, acuminate. *Cyme branches* erect, stiff; lower bract leafy, floral hyaline, awned; flowers reddish, prismatic; sepals $\frac{1}{8}$–$\frac{1}{6}$ in. long, very narrow, rigid, acuminate, margins narrowly membranous; filaments rather longer than the anthers. *Capsule* 1-celled. *Seeds* fusiform, pointed at one end, testa close.—A taller plant than *J. prismatocarpus*, less leafy, with a much shorter cyme the branches of which are more erect, and with narrower seeds.

Sect. V. *Leaves* narrow, channelled, terete or filiform, 1- many-tubular, septa very indistinct or 0. *Cymes* consisting of solitary or a few globose or subglobose heads; flowers usually large, white yellowish or chesnut-brown. *Stamens* 6. *Seeds* scobiform or tailed at each end.

* Cyme a solitary sessile head. Leaves solitary or few, all at or near the base of the stem. Anthers included, or exserted.

14. **J. triglumis,** *Linn. Sp. Pl.* 328; stem slender stiff naked, leaves short subulate, cyme terminal 3–4-fld. dark brown, bracts short, sepals oblong-lanceolate acute glumaceous, stamens included, filaments equalling or longer than the small anthers, capsule exserted obtuse or mucronate, seeds with long tails. *Kunth Enum.* iii. 358; *Buchen. in Engl. Bot. Jahrb.* vi. 213; xii. 388; *Boiss. Fl. Orient.* v. 355; *Reichb. Ic. Fl. Germ.* ix. t. 392.

ALPINE HIMALAYA and WESTERN TIBET, alt. 12–15,000 ft., from Kashmir to Sikkim.—DISTRIB Alpine and Arctic regions of the N. hemisphere.

Stems 2–6 in., tufted, not stoloniferous. *Leaves* stiff, 2-tubular. *Cymes* $\frac{1}{2}$–$\frac{1}{4}$ in.

diam., outer bracts dark brown, spreading, usually shorter than the sessile flowers; sepals ⅛–¼ in.; inner rather broader, tips membranous; style and stigmas short. *Seeds* $\frac{1}{10}$ in. long, including the long white tails.

15. **J. leucomelas,** *Royle ex Don in Trans Linn. Soc.* xviii. 320; stem filiform naked, leaves 1–2 filiform very short, cyme a 3–8-fld. white head, bracts brown lower usually produced, sepals linear-oblong obtuse membranous, anthers very long exserted, capsule ovoid-oblong shortly exserted, seeds long-tailed. *Buchen. in Engl. Bot. Jahrb.* vi. 211; xii. 391. J. Thomsoni, *Buchen. in Bot. Zeit.* xxv. (1867) 148; *in Engl. Bot. Jahrb.* xii. 390.

WESTERN HIMALAYA and WESTERN TIBET; from Kashmir to Sikkim, alt. 12–16,000 ft.—DISTRIB. Mongolia.

Stems tufted, 2–6 in., not stoloniferous, hollow. *Leaves* 1–2-tubular. *Cyme* solitary; upper bracts pale, membranous; sepals subequal, ⅛–¼ in. long; inner with membranous margins; anthers rather shorter than the filaments; style and stigmas short. *Capsule* 1-celled. *Seeds* $\frac{1}{15}$ in. long.—I cannot distinguish *J. Thomsoni* except by its dark chesnut colrd. flowers, a very variable character.

16. **J. bracteatus,** *Buchen. in Engl. Bot. Jahrb.* vi. 220; xii. 397; stem very slender (rarely 1-leaved?), leaves few short filiform, cyme a solitary 3–5-fld. hemispheric head much exceeded by the horizontal filiform lower bracts, flowers pale or dark, sepals oblong-lanceolate membranous obtuse, anthers exserted, style long, capsule included beaked, seeds shortly tailed.

SUBALPINE HIMALAYA, alt. 12,000 ft.; Garwhal, *Duthie*; Sikkim, *J. D. H.*

Stems tufted, 6–8 in., fistular; basal sheaths soft. *Leaves* subcompressed tubular. *Cyme* ½ in. broad, upper bracts rather membranous, brown, equalling the shortly pedicelled flowers; sepals ¼ in. long; anthers linear, as long as the filaments. *Capsule* ovoid, 1-celled. *Seeds* scobiform, testa shortly produced at each end.—Buchenau places this in the group with a leaf on the stem, this may occur occasionally, but I think that specimen of *J. leucanthus* may have been mixed with *bracteatus*. On the other hand the absence or presence of a stem leaf in the species of this section is I fear far from a good one, and *J. bracteatus* is perhaps only a form of *leucomelas*.

** Cyme a solitary sessile head. Stem with one or more leaves above the middle. Anthers exserted, linear.

17. **J. leucanthus,** *Royle ex Don in Trans. Linn. Soc.* xviii. 318; stem slender, basal sheaths hard brown, leaves filiform, cyme solitary 6–10-fld. pale yellow, bracts short brown, sepals oblong-lanceolate subacute membranous, capsule and long style exserted beaked with the long style, seeds with very short tails. *Buchen. in Engl. Bot. Jahrb.* vi. 218; xii. 395.—*Wall. Cat.* 9002 B and 3480 in part.

ALPINE HIMALAYA; from Kumaon to Sikkim, alt. 11–13,000 ft.

Stem 6–8 in., tufted, at length hollow. *Leaves* very slender, uppermost equalling the stem, unitubular, subacute. *Cyme* ¼–½ in. diam., bracts ovate-oblong, acute, lowermost equalling the flowers, sometimes produced to 1 in.; flowers shortly pedicelled; sepals ⅛ in. long; anthers half as long as the filaments; style long, slender, stigmas short. *Capsule* obovoid-oblong, cuspidately beaked, 3-septate. *Seeds* obliquely ovoid, testa loose shortly produced at each end.—Buchenau has a var. *alpina* (l. c. xii. 395), from Jongri in Sikkim (alt. 13,000 ft., *Clarke*), smaller with brown cymes and smaller flowers.

18. **J. membranaceus,** *Royle ex Don in Trans. Linn. Soc.* xviii.

320; stem tall slender 1–3-leaved, leaves filiform acute, cyme many-fld. white exceeded or not by the lower bract, sepals oblong-lanceolate obtuse membranous inner longer, capsule usually far exserted long-beaked, seeds with very long tails. *Buchen. in Engl. Bot. Jahrb.* xii. 397. J. Hoffmeisteri, *Klotzsch in Bot. Reis. Pr. Waldem.* 60, t. 98; *Buchen. l. c.* vi. 220. J. benghalensis, *Kunth Enum.* iii. 360; *Buchen. l. c.* vi. 211; xii. 400. J. sphenostemon, *Buchen. l. c.* xii. 401. J. concinnus, *in part Herb. Hook. f. & T.* Isolepis sp. *Wall. Cat.* 348 A.

TEMPERATE and SUBALPINE HIMALAYA, alt. 6–13,000 ft., from Kashmir to Sikkim.

Stems 5–20 in., tufted, stoloniferous, at length fistular; basal sheaths membranous. *Leaves* slender, channelled, or flattish above, tubular; sheath long, auricled. *Cyme* 8 24-fld.; lower bracts variable, floral ovate-lanceolate, hyaline; flowers shortly pedicelled; sepals nearly ⅛ in. long; anthers half as long as the filaments, style and stigmas short. *Capsule* often half as long again as the sepals, 1-celled. *Seeds* $\frac{1}{10}$ in. long, tails longer than the nucleus. *J. sphenostemon* appears to me to be only a poor small state of *membranaceus*, the anthers are not cuneate, but almost exactly linear; its seeds are not ripe. *J. benghalensis* was founded on a Wallichian specimen of *membranaceus* with a false locality.

*** Cyme compound of several heads.

† *Stoloniferous. Flowers large* (¼ *in. long and upwards*). *Stamens included.*

19. **J. sphacelatus,** *Decne. in Jacquem. Voy. Bot.* 172, t. 172; stem stout terete leafy, leaves involute, cyme of 2–5 clustered or distant and superposed erect dark brown 2–5-fld. heads, lower bract elongate, sepals narrowly lanceolate much longer than the stamens and prismatic beaked capsule, seeds long-tailed. *Buchen. in Engl. Bot. Jahrb.* vi. 225; xii. 404. —Juncus, *Wall. Cat.* 9001 *in part.*

ALPINE HIMALAYA; from Kashmir to Sikkim, alt. 12–16,000 ft.—DISTRIB. Affghan, Turkestan.

Stems 8–16 in., tufted, smooth, fistular; stolons as thick as a crow-quill. *Leaves* strict, obtuse or acute, unitubular, obscurely septate. *Cyme* with the heads usually distant, sessile or peduncled; floral bracts lanceolate, acuminate; sepals ⅛ to nearly ¼ in. long, thinly glumaceous, tips finely acuminate, of inner hyaline; anthers included, about equalling the filaments. *Capsule* dark brown, obtuse, mucronate, 3-septate. *Seeds* ⅛ in. long, tails very slender.

20. **J. himalensis,** *Klotzsch & Garcke in Bot. Reis. Pr. Waldem.* 60, t. 97; stem tall stout rigid, leaves filiform or involute, cyme of 2 or more dark brown 3–8-fld. heads, lower bract elongate, outer sepals lanceolate inner linear-oblong with broad membranous margins and tip rather longer than the stamens and the ovoid long-beaked capsule, seeds long-tailed. *Buchen. in Engl. Bot Jahrb.* vi. 229, t. 3; xii. 405. J. scirpoides, *Jacquem. mss.* J. castaneus, *Herb. Ind. Or. Hook. f. et Thoms.* Juncus No. 7.—Juncus, *Wall. Cat.* 9001, *in part.*

ALPINE and SUBALPINE HIMALAYA, alt. 7–14,000 ft.; from Kashmir and Western Tibet to Bhotan.

Stems 8–20 in., erect, leafy below, 1-leaved above, hollow. *Leaves* tubular, channelled above, obscurely septate; auricles obscure. *Cyme* irregularly branched; branches sometimes an inch long and spreading; bracts ½–¾ in. diam.; flowers shortly pedicelled, brown; sepals ¼ in. long, glumaceous, lanceolate, acute obtuse or mucronate; petals more oblong, obtuse, margins broadly scarious; anthers linear,

¼ shorter than the filaments; style slender, stigmas long. *Capsule* nearly twice as long as the sepals, tip conical beaked, dark brown, shining. *Seeds* nearly ¼ in. long, tails very slender.—Very near *J. castaneus*, of which it may be considered a large more robust form, with more membranous sepals, and filaments longer in proportion to the anthers. Buchenau makes two varieties; *genuina*, with slender stem and leaves, very long stigmas, and an ovoidly prismatic obtuse mucronate capsule, and var. *Schlagentweitii* (*Sp. Buchen. in Nachr. Koen. Ger. Wiss. Goett.* 1869, 255); stouter, with leaves cylindric below and subulate above, and more narrowly margined inner sepals.

21. **J. sikkimensis,** *Hook. f. in Hook. Ic. Pl. ined.*; rootstock very stout creeping, stem stout base clothed with red brown rigid sheaths, leaf solitary or few terete or compressed equalling the stem, cyme of two dark brown unilateral sessile 4–6-fld. heads, lower bracts foliaceous sheathing longer than the heads, sepals glumaceous outer lanceolate finely acuminate, inner linear-oblong obtuse, anthers included much longer than the very short filaments, capsule included, seeds with short stout tails.

Sikkim Himalaya; Lachen valley, alt. 12–14,000 ft. *J. D. H.*

Rootstock as thick as a small quill; sheaths of stem ½–1 in. long; stem and channelled leaf solid, soft. *Bracts* 1–2 in., erect or horizontal, its sheath brown. *Flowers* sessile; floral bracts broad, membranous, equalling the flowers; sepals ⅛–¼ in. long, smooth, shining, very dark brown, inner with membranous tips; stamens half the length of the sepals, anthers linear, at length twisted. *Ovary* small; style very slender, exserted, stigmas long. *Capsule* hardly exceeding the sepals, obovoid, acute, shortly beaked, dark brown, shining, 3-septate. *Seeds* $\frac{1}{12}$ in. long, with thick white tails.

Var. *monocephala*; much smaller, very slender, stem filiform, cyme a solitary head with an erect stout filiform lower bracts ½–¾ in. long, sepals ¼ in.—Lachen valley, Sikkim, alt. 12,000 ft.

†† *Coespitose, not stoloniferous. Stem more or less leafy. Flowers small (about* $\frac{1}{6}$ *in. long). Anthers exserted.*

22. **J. concinnus,** *Don Prodr. Fl. Nep.* 44; *in Trans. Linn. Soc.* xviii. 321; stem slender, leaves flat or channelled, cyme branched of 2–7 very pale 6–10-fld. heads, sepals oblong-lanceolate acute membranous, inner rather shorter obtuse, anthers far exserted, much shorter than their filaments, capsule ovoid, beak stout exserted, seeds very minute shortly produced at one end. *Buchen. in Engl. Bot. Jahrb.* vi. 215, t. 2; xii. 406. J. elegans, *Royle ex Buchen. in Bot. Zeit.* 1867, 146.—Juncus, *Wall. Cat.* 9002 B.

Temperate and Alpine Himalaya, alt. 7–13,000 ft., from Kashmir to Sikkim. Khasia Hills, alt. 5–6000 ft.

Stems tufted on a tuberous rootstock, 4–8 in. high, hollow, sulcate. *Leaves* few, variable, filiform or involute, many-tubular; sheath membranous. *Cyme* with erect or spreading branches; heads ½–¾ in. diam., at length spherical; lowest bract elongate, slender, or like the floral short and membranous; flowers subsessile, white or yellowish; sepals ⅛ in. long; filament four times as long as the anther; style slender, stigmas short. *Capsule* very pale, shining. *Seeds* exceedingly long minute, brown.—Leaves sometimes flat as in *J. Clarkei.*

23. **J. khasiensis,** *Buchen. in Engl. Bot. Jahrb.* xii. 407; very slender, leaves few filiform curved channelled, cyme of usually two (1–3) 3–10-fld. white heads, bracts all shorter than the lanceolate obtuse sepals,

anthers exserted ½ shorter than the slender filaments, capsule as long as the sepals narrowly lanceolate prismatic, seeds with slender tails.

KHASIA HILLS, *Griffith* (*Kew distrib.* 5451), alt. 5–5500 ft., *Clarke*.

Stems 4–10 in., tufted, suberect, grooved, leafless above. *Leaves* shorter than the stem, wiry; sheath membranous. *Heads* usually 2, a lateral and terminal, sessile, ⅛–¼ in. diam., quite white; bracts 3–4, ovate, acute, rarely finely acuminate and exceeding the sessile flowers; outer sepals ⅛ in. long, keeled, inner rather longer; anthers linear; style slender, exserted, stigmas short. *Capsule* 1-celled. *Seeds* $\frac{1}{10}$ in. long.—The long narrow capsules distinguish this at once from *J. concinnus*.

24. **J. nematocaulon,** *Hook. f. in Hook. Ic. Pl. ined.*; stems capillary grooved flexuous, leaves capillary channelled, cymes of 1–3 distant 1–3-fld. heads, bracts very short lower rarely capillary, sepals small pale green lanceolate acuminate not half as long as the prismatic acuminate pale capsule, anthers far exserted much shorter than the very slender filaments, style long, stigmas short.

ASSAM; on the Naga hills, Jakpho, alt. 9900 ft., *Clarke*.

Stems tufted, 1–1½ in., 1-leaved above, sometimes with only one terminal flower, and a capillary bract. *Leaves* few, flexuous; sheaths very short, membranous. *Flowers* sessile, floral bracts membranous about as long as the pale sepals which equal the petals and are ⅛ in. long, 1-nerved. *Capsule* with the beak ⅛ in. long, membranous, pale shining, 1-celled. *Seeds* with a long slender tail at one end and an equally long inflated one at the other.—A very singular (annual ?) species, allied to *J. concinnus* and *khasiensis*, differing from both in the capsule much longer than the sepals. *Seeds* not seen.

Sect. VI. Perennial. *Leaves* flat or with involute margins, grass-like, strongly nerved. *Cymes* of several capitate clusters.

25. **J. minimus,** *Buchen. in Bot. Zeit.* 1867, 145; *in Engl. Bot. Jahrb.* vi. 209; xii. 412; stem short stout, leaves chiefly basal, cymes of 1–2 3–6-fld. dark chesnut sessile heads, lower bract usually foliaceous, sepals lanceolate glumaceous finely acuminate, petals shorter acute, stamens included, capsule exserted turgid obtuse or retuse, seeds very minute, testa forming an oblong very loose sac.

SIKKIM HIMALAYA, alt. 16–18,000 ft., *J. D. H.*

Rootstock short, stout; stems 2–4 in., densely tufted, naked or 1-leaved, grooved. *Leaves* shorter than the stem, ⅛–⅛ in. broad, flat, grooved. *Cyme* with sessile heads ⅛–⅛ in. diam.; flowers subsessile; sepals ⅛ in. long; petals rather broader; anthers small, much shorter than the filaments; ovary ovoid; style and stigmas short. *Capsule* rarely half as long again as the sepals, dark brown, shining. *Seeds* $\frac{1}{12}$ in. long, testa white, rounded at both ends.—Imperfect flowers, or even cymes, occur amongst the basal leaves.

26. **J. Clarkei,** *Buchen. in Engl. Bot. Jahrb.* vi. 210; xii. 413; stoloniferous, stem slender many-leaved, leaves longer than the stem soft, flat, grass-like, cyme of 1–5 globose peduncled 4- many-fld. straw-colrd. heads, lower bract leafy, sepals lanceolate membranous, stamens exserted, capsule much exserted prismatic long-beaked, seeds with long slender tails.

SIKKIM HIMALAYA, alt. 10–13,000 ft., *J. D. H.* BHOTAN, *Griffith.* MUNNIPORE, on Jakpho, alt. 9900 ft., *Clarke*.

Stems 6–10 in., tufted, terete, striate. *Leaves* ⅛–¼ in. broad, finely acuminate, flaccid; sheaths membranous. *Cyme* with heads ⅛–⅛ in. diam; flowers pedicelled; sepals ⅛–¼ in. long, outer lanceolate, inner more oblong; anthers linear, about ⅛

shorter than the filaments; style long, slender, stigmas short. *Capsule* membranous, pale, shining. *Seeds* ⅛ in. long, including the very long tails.—Leaves often involute and very slender as in *J. concinnus*, but seeds very different.

2. LUZULA, *DC.*

Leaves grass-like, hairy. *Perianth*-segments glumaceous. *Stamens* 3 or 6. *Ovary* 1-celled, 3-ovuled.—Species about 30, temperate and Asiatic.

1. **L. plumosa,** *E. Meyer in Linnæa*, xxii. (1849) 387; cyme subumbellate, branches very slender, flowers solitary, testa produced into a horn-like appendage. *Buchen. in Engl. Bot. Jahrb.* vi. 195 and xii. 85. L. pilosa, *var.* plumosa, *C. A. Meyer ex Franch. in Nouv. Arch. Mus. Paris*, x. (1887) 100. L. Forsteri *Herb. Ind. Or. H. f. & T.* Juncus plumosus, *Wall. mss.*—*Wall. Cat.* 9003.

TEMPERATE HIMALAYA, alt. 9–10,000 ft.; from Kumaon eastwards. KHASIA HILLS; alt. 6000 ft., *Clarke*.—DISTRIB. China.

Perennial, 6–18 in. high. *Leaves* linear, acuminate, ⅛–¼ in. broad, glabrous or sparsely ciliate with very long hairs. *Branches* of cyme capillary, very unequal, divaricate, few-fld.; bracts scarious, much shorter than the flowers. *Sepals* $\frac{1}{10}$–¼ in., lanceolate, acuminate, pale brown. *Stamens* 6. *Capsule* oblong, obtuse or apiculate, about as long as the sepals.

2. **L. effusa,** *Buchen. in Engl. Bot. Jahrb.* vi. 196; xii. 106; cyme very laxly paniculately branched, branches divaricate very long and slender, flowers solitary sessile or pedicelled, testa with a terminal boss.

SIKKIM HIMALAYA, alt. 9–10,000 ft., *J. D. H., Clarke*. MUNNIPORE; on Jakpho, alt. 9900 ft., *Clarke*.

Perennial, 12–24 in. high. *Leaves* linear, ⅛–¼ in. broad, glabrous or sparsely ciliate below. *Cyme* long-peduncled; branches 1–3 in. long; bracts ovate, acute, brown. *Sepals* $\frac{1}{12}$–$\frac{1}{10}$ in. long, ovate-lanceolate, acuminate, pale or dark brown. *Stamens* 6. *Capsule* oblong, rather longer than the sepals, obtuse, mucronate.—The Munnipore specimens have leaves ⅛ in. broad, and a closer inflorescence, with shorter capsules; the seeds appear to be diseased.

3. **L. campestris,** *DC. Fl. Franc.* iii. 161; cyme subumbellately branched, flowers in peduncled capitate clusters, testa apiculate at the tip caruncled at the base. *Buchen. in Engl. Bot. Jahrb.* v. 198; xii. 155; *Boiss. Fl. Orient.* v. 349; *Reichb. Ic. Fl. Germ.* ix. t. 375, 376. Juncus campestris, *Linn. Sp. Pl.* i. 329.

TEMPERATE and ALPINE HIMALAYA; alt. 10–14,000 ft., from Kashmir eastwards. The KHASIA, NILGHIRI and ANAMALLAY HILLS, alt. 5–7000 ft.—DISTRIB. N. temp. regions.

Perennial, 6–18 in. high. *Leaves* ⅛–¼ in. broad, glabrous or ciliate. *Branches* of cyme very unequal, ¼–½ in.; heads ¼–¼ in. diam.; bracts very short, scarious. *Flowers* sessile. *Sepals* $\frac{1}{12}$–$\frac{1}{10}$ in. long, pale or dark brown, ovate-lanceolate, acuminate. *Stamens* 6. *Capsule* shorter than the sepals, broadly oblong or subglobose, obtuse or mucronate.—I have described above only the Indian form (which is a common European one) of this widely diffused and variable plant.

4. **L. spicata,** *DC. Fl. Franc.* iii. 161; cyme a solitary oblong drooping or nodding bracteate head, testa rounded at the tip, caruncled at the base. *Buchen. in Engl. Bot. Jahrb.* v. 197; xii. 127; *Boiss. Fl. Orient.* v. 348; *Reichb. Ic. Fl. Germ.* ix. t. 379.

ALPINE HIMALAYA; from Kashmir to Kumaon, alt. 12-14,500 ft., *Royle*, &c.—DISTRIB. North Alpine and Arctic regions.

Perennial, 2–10 in. high. *Leaves* densely fascicled, radical 1–4 in. long, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, channelled, ciliate or not. *Cyme* $\frac{1}{2}$–$\frac{3}{4}$ in. long; lower bract leafy, usually elongate, floral as long as the flowers, lanceolate, aristate; bracts brown with broad white membranous ciliate margins and tip. *Sepals* $\frac{1}{8}$ in. long, ovate-lanceolate, aristate, very dark brown. *Stamens* 6. *Capsule* oblong, obtuse, shorter than the sepals.

DOUBTFUL SPECIES.

L. sp. ?; Sikkim Himalaya, alt. 10–11,000 ft., *J. D. H.*, *Pantling*; referred by Buchenau doubtfully to the European *L. parviflora*, var. *subcongesta*, but in much too young a state for identification. The bracts are ciliate, the sepals ovate acuminate and the stamens are 3 only.—There are other Himalayan species in too imperfect a state for determination.

ORDER CLXIII. PALMEÆ.

By Dr. O. Beccari & J. D. Hooker.

Shrubs or trees, solitary or gregarious, naked or prickly, rarely pubescent. *Stem* erect scandent or decumbent, rarely branched above. *Leaves* alternate, plaited in bud, pinnatisect or palmate, rarely simple or bipinnate; petiole sheathing. *Flowers* 1- or 2-sexual, small, in panicles or spikes that are enclosed in one or more large sheathing bracts (spathes), usually 3-bracteate. *Perianth* inferior, segments 6 in two series (sepals and petals) usually all free, imbricate or valvate. *Stamens* 3 or 6, rarely more; anthers versatile. *Ovary* 1–3-celled or of 3 1-celled carpels; stigmas 3, usually sessile; ovules 1–2 in each carpel, aduate to the wall, base, or top of the cell, anatropous. *Fruit* a 1–3-celled drupe or hard berry or of 1–3 carpels; pericarp smooth, rough, or clothed with shining scales that imbricate downwards. *Seeds* erect or laterally attached, rarely pendulous; raphe usually branching all over the testa; albumen horny or bony, solid (equable) or ruminate; embryo small, in a small cavity near the surface of the albumen.—Genera about 130, species about 1100, chiefly tropical.

I am deeply indebted to Dr. Beccari for the generous loan of the mss. of his most valuable researches on the Palms of British India, which form the materials for an elaborate treatise on all the Asiatic and Malayan genera and species of the Order, of which fragments have appeared in his (now abandoned) admirable work, "Malesia." The mss. include materials for framing more or less complete descriptions of most of the Indian Palms, with notes on others; and are very voluminous, many closely written foolscap pages being often devoted to a single species. This, and the fact of the whole being in Italian, and in an orthography that is not always legible, requires me to crave Dr. Beccari's and my readers' indulgence, if in the framing of diagnoses and descriptions I have in any case misinterpreted his statements or views.

It was, indeed, a great disappointment to me, that Dr. Beccari declined to undertake the completion of his work, and the drawing up of specific diagnoses in the form adopted in the Flora of British India, a task which he is so good as to assure me it would have gratified him to have accomplished, had he not definitely given up the further study of botany. This has compelled me to associate my name with his as joint author, which I do with great reluctance, for he is not only more familiar than I am with the genera through his long journeys in the Malayan Archipelago, but had collected together and examined, for the purpose of his work, the materials contained in all the principal European and Indian Herbaria. It remains to add that, after having examined all available specimens at Kew, I have throughout adopted Dr. Beccari's systematic disposition of the species, and his names for those previously undescribed.

TRIBE I. **Arecæ.** *Leaves* pinnatisect; leaflets free with reduplicate sides, or confluent as a plaited limb. *Flowers* monœcious or dicœcious. *Seeds* with ventral raphe and dorsal embryo.

A. Spadix infrafoliar (that is flowering after the fall of the leaf in the axil of which it was formed).

Subtribe 1. EUARECEÆ. *Male fl.* unsymmetric; sepals small; petals imbricate. *Stigma* in the fruit terminal.—Spadix androgynous; flowers usually ternate, the middle one female.

* *Ovule basilar, erect.*

Male fl. minute, solitary or 2-nate towards the tips of the branches, 3- or 6-androus; fem. larger solitary. Albumen ruminate . . . . . 1. ARECA.
Male fl. one on each side of a fem., stamens 6 or more. Albumen ruminate . . . . . 2. PINANGA.

** *Ovule parietal.*

Male fl. 6-androus; sepals equalling or longer than the petals; fem. sepals and petals broadly imbricate. Albumen ruminate . . . . . 3. NENGA.
Male fl. 9–12-androus; fem. petals with valvate tips. Albumen ruminate . . . . . 4. LOXOCOCCUS.

Subtribe 2. PTYCHOSPERMEÆ. *Male fl.* symmetric; sepals broad, rounded, imbricate. *Stigma* in the fruit terminal. *Ovule* parietal or pendulous from the tip of the cell.—Spadix androgynous, flowers usually ternate, the middle one female.

Stamens 6. Albumen ruminate. Leaflets acuminate. Seeds deeply grooved along the raphe . . . . . 5. PTYCHORAPHIS.
Stamens 6–15. Albumen equable. Leaflets entire or obliquely 2-toothed . . . . . 6. CYRTOSTACHYS.

Subtribe 3. ONCOSPERMEÆ. *Male fl.* symmetric or not; sepals imbricate; stigma in fruit lateral or basilar.

Male sepals small, acute. Stamens 6–12. Albumen ruminate. Armed palms; leaflets acuminate . . . . . 7. ONCOSPERMA.

B. Spadix interfoliar (flowering while the leaf in whose axil it is formed is still green) or infrafoliar in some *Caryotideæ*.

Subtribe 4. IGUANUREÆ. Spadix androgynous; fem. fl. between two males; male sepals broadly imbricate. *Ovules* basilar or parietal. *Stigma* in fruit lateral or basilar.

Stamens 6–9. Ovules parietal. Stigma in fruit basilar or subbasilar. Leaflets obliquely truncate . . . . . 8. IGUANURA.

Subtribe 5. GEONOMEÆ. Spadices unisexual; flowers sunk in cavities of its branches; perianth glumaceous; sepals imbricate. *Stigma* in fruit basilar or lateral.

Filaments free. Leaflets acuminate . . . . . 9. BENTINCKIA.

Subtribe CARYOTIDEÆ. Spadices unisexual; flowers solitary, or ternate with the fem. placed above the others. *Petals* of both sexes valvate.

* *Spathes many*; *flowers symmetric*; *stigma in the fruit terminal.*

Male calyx tubular. Stamens 6. Albumen equable . . . 10. WALLICHIA.
Male calyx cupular. Stamens many. Albumen equable . 11. DIDYMOSPERMA.
Male sepals 3. Stamens many. Albumen equable. . . . 12. ARENGA.
Male sepals 3. Stamens many. Albumen ruminate . . . 13. CARYOTA.

** *Spathes* 2; *flowers unsymmetric*; *stigma in the fruit basilar.*

Male calyx minute. Stamens 3 or 6, extrorse. Albumen equable . . . . . 14. ORANIA.

ANOMALOUS GENUS.

Male fl. in catkin-like branches of a drooping androgynous spadix; fem. capitate at the apex of the spadix . . . . 15. NIPA.

TRIBE II. **Phœniceæ.** *Leaves* pinnatisect; leaflets with induplicate sides. *Spadices* interfoliar; spathe solitary. *Flowers* dicœcious. *Ovary* of 3 free carpels, one only ripening. *Seed* ventrally grooved; embryo usually dorsal.

16. PHŒNIX.

TRIBE III. **Coryphineæ.** *Leaves* flabelliform, orbicular or cuneiform, plaited, lobes or segments with induplicate sides. *Spadices* interfoliar; spathes many. *Flowers* usually bisexual. *Ovary* entire or 3-lobed, or of 1–3 smooth carpels. *Fruit* smooth, except *Pholidocarpus*. *Seeds* with a small hilum; rapho ventral.

* *Stigma in the fruit basal. Albumen equable.*

Ovary 3-lobed; style short. Embryo apical. . . . . 17. CORYPHA.
Ovary 3-celled; style subulate. Embryo dorsal . . . . 18. NANNORHOPS.

** *Stigma in the fruit terminal. Albumen equable*; *embryo dorsal.*

Ovary of 3 trigonous carpels; style filiform . . . . . 19. LICUALA.
Ovary of 3 globose carpels; styles 3, free or coherent . . 20. LIVISTONA.

*** *Albumen ruminate*; *embryo basal.*

Fruit small, smooth . . . . . 21. TRACHYCARPUS.
Fruit large, tuberculate or tessellate . . . . . 22. PHOLIDOCARPUS.

TRIBE IV. **Lepidocarpeæ.** *Leaves* pinnatisect, leaflets with reduplicate sides. *Spadices* interfoliar or terminal; spathes usually many. *Ovary* 1–3-celled. *Fruit* clothed with reflexed shining closely imbricating appressed scales.—Leaves copiously and strongly armed, except *Metroxylon*.

* Polycarpic palms, flowering annually.

† *Leaflets acuminate, quite entire, nerves parallel.*

Stem elongate. Spathes tubular, persistent . . . . . 23. CALAMUS.
Stem elongate. Spathes cymbiform or open, deciduous . . 24. DÆMONORHOPS.
Stem short or 0. Spathes many, persistent . . . . . 25. ZALACCA.

†† *Leaflets rhomboid cuneate or oblanceolate, toothed*; *nerves flabellate.*

Stem short or 0. Spathes many, persistent . . . . . 26. KORTHALSIA.
Stem scandent. Spathe solitary, deciduous . . . . . 27. CERATOLOBUS.

** Monocarpic palms, flowering once and then dying.

† *Spadices axillary from the uppermost leaves.*

Stem scandent. Spadix with long amentiform branches clothed with large closely imbricating inflated spathels that conceal the spikelets of flowers . . . . . 28. PLECTOCOMIA.

Stem scandent. Spadix much branched, the branches bearing small infundibular spathels, each containing a small spikelet. Scales of fruit distinct . . . . . 29. PLECTOCOMIOPSIS.

Stem scandent. Spadix as of the preceding; scales of fruit most minute . . . . . 30. MYRIALEPIS.

†† *Spadix very large, terminal.*

Stems short, tufted. Leaves armed . . . . . 31. EUGEISSONIA.

Stem stout, erect. Leaves unarmed . . . . . 32. METROXYLON.

TRIBE V. **Borasseæ.** *Leaves* flabelliform. *Spadices* interfoliar; spathes numerous, sheathing. *Flowers* dicœcious; males minute, sunk in cavities of the catkin-like branches; perianth glumaceous; fem. very large, sessile on very short branches of a very stout spadix, each clothed with large coriaceous rounded bracts.

33. BORASSUS.

TRIBE VI. **Cocoineæ.** *Leaves* pinnatisect, leaflets with reduplicate sides. *Spadices* interfoliar, unisexual or androgynous; spathes 2. *Ovary* 3-celled, stigmas terminal. *Fruit* a drupe with a fibrous pericarp and terminal stigmas; endocarp woody or stony, with 3 terminal pits of which two answer to arrested cells, the third is immediately over the position of the embryo in the subjacent albumen. *Seed* adherent to the endocarp by the diffuse reticulations of the raphe, which ramifies all over the seed.

34. Cocos.

1. ARECA, *Linn.*

Stem erect, annulate. *Leaves* pinnate. *Spadices* infrafoliar, branched; MALE FL. many, minute; sepals small; petals obliquely lanceolate, valvate. *Stamens* 3 or 6; anthers basifixed, erect. FEM. FL. much larger, few at the base of the branches; perianth acrescent; sepals and petals orbicular, imbricate, the petals with acute valvate tips; ovary 1-celled; stigmas 3, sessile; ovule basal, erect. *Fruit* ovoid or oblong, stigmas terminal. *Seed* with a truncate base, albumen ruminate, embryo basilar.—Species about 24, tropical Asia and Australia.

1. **A. Catechu,** *Linn. Sp. Pl.* 1189; hexandrous, trunk tall, fruit ovoid. *Roxb. Cor. Pl.* i. 54, t. 75; *Fl. Ind.* iii. 615; *Mart. Hist. Nat. Palm.* iii. 169, t. 102; *Kunth Enum.* iii. 184; *Blume Rumph.* iii. 65, t. 102 A. et t. 104; *Griff. in Calc. Journ. Nat. Hist.* v. 153; *Palms of Brit. Ind.* 47; *Miq. Fl. Ind. Bat.* iii. 8; *Kurz For. Fl.* ii. 536; *Gamble Man. Ind. Timb.* 421; *Scheff. Arec.* 9; in *Ann. Jard. Bot. Buitenz.* i. 144, t. i. v. iii. f. 2. Areca Faufel, *Gærtn. Fruct.* i. 19, t. 7, f. 2. A. hortensis, *Lour. Fl. Cochinch.* 568.—*Rheede Hort. Mal.* i. t. 5–8.

Cultivated in the hot damp regions of ASIA and the MALAYAN ISLANDS.

Trunk solitary, 40–100 ft. *Leaves* 4–6 ft.; leaflets numerous, 1–2 ft., upper

confluent, quite glabrous. *Spathe* glabrous, compressed. *Spadix* much branched, rachis stout compressed, branches with filiform tips bearing more or less distichous minute male fl. *Fem. fl.* solitary at the bases and axils of the branches; sepals ½ in., ovate, obtuse; petals subsimilar; staminodes 6, connate. *Fruit* 1½–2 in., smooth, orange or scarlet.—Betel nut.

2. **A. concinna,** *Thw. Enum.* 328; hexandrous, trunk short slender, fruit subfusiform.

CEYLON, Reigam and Pasdoon Corles, *Thwaites.*

Trunk 8–12 ft., 1½–1¾ in. diam., green. *Leaves* about 7, 3–3½ ft. long, subglabrous, leaflets 2 ft. long. *Spadix* and flowers as in *A. Catechu.* *Fruit* 1½ in. long, umbonate, reddish yellow.

3. **A. nagensis,** *Griff. in Calc. Journ. Nat. Hist.* v. 156; *Palms Brit. Ind.* 149; triandrous, trunk tall, fruit narrowly ovoid.

ASSAM, in the Naga hills, *Jenkins.*

Trunk 30–40 ft. *Leaves* 7 ft.; leaflets 19–20 in. *Spadix* 1 ft., branches stout, flexuose. *Fruit* 1 in., narrowed at both ends.—Description from Griffith, who states that the leaves were imperfect and open to doubt from their resemblance to *A. gracilis* (*Pinanga gracilis*).

4. **A. triandra,** *Roxb. Hort. Beng.* 68; *Fl. Ind.* iii. 617; triandrous, stems tufted slender, fruit ellipsoid. *Ham. in Mem. Wern. Soc.* v. 310; *Mart. Hist. Nat. Palm.* t 149; *Griff. in Calc. Journ. Nat. Hist* v. 154; *Palms Brit. Ind.* 148, t 230 A.; *Kurz For. Fl.* ii. 537.

CHITTAGONG, MARTABAN, TENASSERIM, the ANDAMAN ISLANDS, and the MALAYAN PENINSULA.

Stems 12–25 ft. by 1–1½ in. diam., green, sending out basal offshoots. *Leaves* 4–6 ft.; petiole slender; leaflets 1½–3 ft., lateral sometimes as well as the terminal confluent. *Spathe* 1 foot or more. *Spadix* and flowers as in *A. Catechu,* but triandrous. *Fruit* the size of an olive, orange-colrd., at length scarlet, tip truncate.

2. PINANGA, *Blume.*

Stem erect, annulate. *Leaves* pinnate with the upper leaflets confluent. *Spadices* infrafoliar, androgynous; spathe solitary; flowers 3 together (a fem. between 2 males) clusters in 2–4 or 6 series. MALE FL. obliquely trigonetrous; sepals acute, keeled, not imbricate; petals ovate or lanceolate, valvate; stamens 6 or more, anthers subsessile, basifixed, erect. FEM. FL. much smaller, ovoid or globose; sepals and petals orbicular, broadly imbricate; ovary 1-celled, stigmas 3; ovule basilar erect. *Fruit* ovoid or ellipsoid, pericarp fibrous. *Albumen* ruminate; embryo basilar.—Species about 24, tropical Asiatic and Malayan.

A. SPIRANTHEÆ, Becc. *Flowers* in 3 or more spiral series on the spadix or its branches.

1. **P. hexasticha,** *Scheff. in Ann. Jard. Bot. Buitenz.* i. 148; stems slender gregarious, leaves pinnate, petiole scaly, spadix simple reflexed, male fl. in 5–6 series, fruit fusiform. *Kurz For. Fl.* ii. 539; *Becc. in Ann. Jard. Bot. Buitenz.* ii. 80, 86; *Males.* iii. 122. Areca hexasticha, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 201, t. 12.

PEGU; in marshy forests, *Kurz.*

Stems 25–30 ft. by 1½ in. diam. *Leaves* 3–5 ft., sheaths and short petiole scaly; leaflets 1–1½ ft., many, narrow, linear, subfalcate, 2–3-ribbed, lower acuminate,

upper truncate, toothed. *Spadix* about 1 ft. long; rachis as thick as the finger, fleshy; flowers sessile, rows spirally arranged. *Fruit* narrowed at the top.

2. **P. gracilis,** *Blume, Rumph.* ii. 77; stems slender usually gregarious, leaves sparingly pinnate, petiole scurfy, spadix simple reflexed, male fl. in 3 rows, fruiting spadix pendulous, fruit ellipsoidly fusiform. *Kurz For. Fl.* ii. 538; *Becc. in Ann. Jard. Bot. Buitenz.* ii. 81, 86; *Males.* iii. 122. Pinanga patula β. gracilis, *Scheff. in Natuurk. Tijdsch. Ned. Ind.* xxxii. 178. Seaforthia gracilis, *Mart. Hist. Nat. Palm.* iii. 185 (*Ed.* 2, 184) 313; *Kunth Enum.* iii. 191. Areca gracilis, *Roxb. Fl. Ind.* iii. 619; *Griff. in Calc. Journ. Nat. Hist.* v. 460; *Palms Brit. Ind.* 154, t. 232 A, C, f. 2 (not B) *Kurz in Journ. As. Soc. Beng.* xliii. ii. 201. *T. Anders. in Journ. Linn. Soc.* xi. 5. Nenga gracilis, *Becc. Males.* i. 25. A. triandra, *Roxb.*? *Wall. Cat.* 8599.

SIKKIM and BHOTAN HIMALAYA, alt. 2–3000 ft., *J.D.H.* ASSAM, the KHASIA HILLS, and CHITTAGONG to TENASSERIM. *Roxburgh, &c.*

Stems 6–20 ft. by ¼–½ in. diam., thickened upward. *Leaves* 3–4 ft.; petiole and sheaths scurfy; leaflets inserted by a very broad base, 1 ft. long or more, lower 2–3-ribbed finely acuminate, upper 3–5 in. broad præmorse many-ribbed. *Spathe* solitary, 2–fid. *Spadix* white or scarlet, glabrous. *Male fl.* broad, flat, imbricating; calyx minute; petals broad, cuspidately acuminate. *Fruit* ½ in. long, scarlet or orange, tapering to the tip, smooth.

3. **P. Griffithii,** *Becc. Males.* iii. 117; stem ? leaves pinnatisect leaflets numerous, spadix peduncled reflexed subdigitately branched, branches 4 spreading, male calyx shorter than the petals, fruits spirally disposed in 4 series ovoid narrowed at the mamillate tip. Areca sp. *Griff. in Calc. Journ. Nat. Hist.* v. 461 (*under A. gracilis,* fruit only); *Palms Brit. Ind.* 55, t. 232 (*spadix only*).

KHASIA HILLS; *Griffith.*

Stem apparently very slender. *Peduncle of spadix* 2 in., branches 3–5, spreading, not compressed. *Fruit* rather more than ½ in. long by ¼ diam., narrowed at the base, mamillate, pericarp thin, albumen deeply ruminate.—Beccari (Males. l. c.) has founded his *P. Griffithii* on the spadix with tetrastichous fruits described by Griffith, but regards the leaves (only supposed by the latter author to belong to it, and which are simple and forked) to belong to another plant. In the diagnosis of *P. Griffithii* ("Malesia," l. c.) there is no description of the leaves, but the author has added in pencil "pinnatisect, segments numerous 3–many-costate."

4. **P. polymorpha,** *Becc. Males.* iii. 172; stem slender, leaves short subentire forked or more or less pinnatifid, petiole very slender, sheath not grooved, spadix slender refracted after flowering simple or 2–3-partite, branches short, fl. 3–4-seriate, fruit small ellipsoid or obovoid subacute, base narrowed.

MALAY PENINSULA; Singapore, *Lobb*; Perak, alt. 3–4000 ft., *Scortechini* (n. 345 a.), *King's Collector* (n. 8072).

Stems solitary, ¼–½ in. diam., internodes 2½–4 in. long. *Leaves* very variable, 8–12 in. long, with 1–6 many-costate leaflets on each side and a broad flabelliform forked apex; petiole variable and sheath scaly. *Spathe* elliptic, acute. *Spadix* 3–5 in. long, peduncle nearly as long slender. *Male fl.* acuminate, calyx shortly 3-toothed; stamens 12; *fem. fl.* globose. *Fruit* ¼ by ¼–½ in., tipped by the stigma; black, shining; (dark yellow *King's Collector*) pericarp thin. *Seed* obovoid; albumen densely ruminate. The fruits in some specimens are ellipsoid and narrowed at both ends, girt with a thickened ring at abont ¼ of their length below the tip, from the shrinking of the pericarp.

5. **P. robusta,** *Becc.* mss.; stem taller and much more robust than *P. polymorpha,* 15–20 ft. high by 1½–2 in. diam., leaves 1½–2 ft. long, petiole and costa of blade nearly as thick as the little finger, spadix and its branches very stout.

MALAY PENINSULA; Perak, on the top of Gunong Booboo, alt. 3–5300 ft. *King's Collector* (No. 7372).

Evidently allied to *P. polymorpha,* but the specimens are insufficient for a fuller description.

6. **P. Scortechini,** *Becc. Males* iii. 170; stem solitary, young internodes scurfy, leaves pinnatifid, leaflets distant long narrow, petiole long slender, branches of spadix 5–6 ascending digitate, flowers spirally arranged in 4-series, fruit ovoid or obovoidly-oblong.

MALAY PENINSULA; Perak, *Scortechini,* alt. 3000-4000 ft., *King's Collector.*

Stem 6-15 ft., ¾–1¼ in. diam. *Leaves* 3–4 ft. long; sheaths scurfy; leaflets numerous, 1–1½ ft. by 1–1½ in., rather rigid, 2–5-ribbed, finely acuminate, base hardly narrowed. *Spathe* elliptic-oblong. *Spadix* stoutly peduncled, depressed, ¾–1¼ in. long, with a large triangular deciduous bract; branches 2½–4 in. long. *Male fl.* sepals triangular, cuspidate, petals rather longer acuminate. *Sepals of fem. fl.* cuspidate, ciliolate; petals rather larger. *Fruit* ⅔ in. long, black, shining, tip rounded or subacute; albumen densely ruminate.

B. ORTHOSTICHANTHEÆ, Becc. *Flowers* in 2 series on the spadix or its branches.

* Leaves entire or sparingly divided.

7. **P. disticha,** *Blume (fid. H. Wendl. in Kerch. Palm.* 253); stem very slender short, leaves small cuneately obovate simple and deeply forked or with a few broad lateral leaflets, spadix small simple refracted villous, male petals much longer than the calyx, fruit ovoid or fusiform acuminate. *Becc. Males.* iii. 123. P. bicolor, *Blume in Bull. Néerl.* 1838, 65; Rumphia, ii. 92, t. 113, f. 2; *Kunth Enum.* iii. 641. Areca disticha, *Roxb. Fl. Ind.* iii. 620; *Griff. in Calc. Journ. Nat. Hist.* v. 461 (*partly as to descript. & local.*); *Palms Brit. India* 155 (*partly*). A. humilis, *Roxb. Ic. pict. ined.* Areca curvata, *Griff. Ic. Pl. Ind. Or.* t. 248 (non *Notul.* iii. 164.) Seaforthia disticha, *Mart. Hist. Nat. Palm.* 184; *Kunth l. c.* 190. Ptychosperma disticha, *Miq. Fl. Ind. Bat.* iii. 28 et *Suppl.* 253. 590; *Journ. Bot. Néerl.* i. 7; *De Palm. Arec.* 24.

PENANG, *Roxburgh, Curtis* (No. 391); Perak alt. 100–800 ft. *Herb. Calc.* (Nos. 2536, 4423.)

Stems 2–6 ft. by ½–¾ in., usually tufted. *Leaves* 12–15 in., forked, and many-nerved, the nerves ending in setaceous points, or with a few unequal acuminate lateral leaflets inserted by a broad base; sheath closely grooved and short petiole scurfy. *Spadix* 2–3 in. long. *Stamens* about 15, pistillode 0. *Fruit* ¼ in. long, narrowed at both ends, but most so above, orange-red. *Seed* ovoid; albumen according to Roxburgh's description, and his drawing (copied by Griffith, t. 233) solid, but there are a few streaks of rumination in No. 4423 from Perak.—The leaves are often mottled with pale yellow green.

8. **P. subruminata,** *Becc. Males.* iii. 174, stem very slender, leaves cuneately obovate forked, lobes truncate doubly-toothed 12–15-nerved, petiole long slender, sheath deeply closely grooved, spadix piercing the sheath of the old leaf very short reflexed bipartite glabrous, branches flexuous, fruit narrowly ovoid or ellipsoid apiculate.

MALAY PENINSULA; Perak, alt. 100 ft., *Herb. Calcutt.* (No. 7797); *King's Collector* (No. 1968). PENANG, alt. 1500–2000 ft., *King's Collector.*

Stem 2–6 ft. by ¼ in.; internodes 2–2½ in., brown-scurfy. *Leaves* 9–12 by 4–5½ in., glabrous; petiole 6–10 in., subterete; sheath 4 in., tubular, scurfy; ligule scarious, fimbriate. *Spadix* with its stout peduncle ¾ in. long, branches sinuous, few-fld. *Fruit* about ½ by ¼ in., red. *Seed* narrowed at the tip; raphe with 5 branches; albumen very faintly ruminate.

** Leaves much divided.

† *Spadix large, much branched.*

9. **P. Manii,** *Becc. Males.* iii. 178; trunk tall stout, leaves large, leaflets very many strongly 1–3-nerved, spadix reflexed stoutly peduncled, branches filiform pendulous, male sepals about as long as the petals, fruit small ovoid from an acute base, seed subglobose. Areca costata, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 200. *excl. all. synons.*

NICOBAR ISLANDS, *Man.* SOUTH ANDAMAN ISLDS., *Kurz.*

Trunk 50 ft. by 5½ in. diam. *Leaves* 6½ ft.; leaflets ensiform, straight, longest (middle) about 30 in. by 1½–3½ broad, 2–3-partite, pale beneath. *Spadix* 19–20 in. long, shortly peduncled, branches 45–50 spirally arranged; flowers 2-seriate. *Fruit* $\frac{4}{10}$ by $\frac{2}{10}$–$\frac{3}{10}$; pericarp thin. *Seed* with reticulate raphe, albumen densely ruminate.

10. **P. Kuhlii,** *Blume in Bull. Néerl.* 1838, 65; *Rumph.* ii. 82, t. 111 et β t. 111, f. 11–13; stems tufted slender, leaves pinnate, leaflets many falcate linear to linear-lanceolate finely acuminate strongly 2–3-ribbed upper confluent, petiole subscurfy, spadix refracted shortly peduncled robust simply branched glabrous, branches elongate, fruit obovoid or ellipsoid shortly apiculate. *Kunth Enum.* iii. 641; *Miq. Pl. Jungh.* 57; *Scheff. in Natuurk. Tijdsch. Ned. Ind.* xxxii. 182; *in Ann. Jard. Bot. Buitenz.* i. 152; *Becc. Males.* iii. 138. P. costata, *Bl. in Bull. Néerl. l. c.*; *Rumphia l. c.* 80, t. 109 et β t. 109 C.; *Kunth l. c.*; *Miq. l. c.* 156; *Kurz, For. Fl.* ii. 538. Seaforthia, Kuhlii, *Mart. Hist. Nat. Palm.* iii. Ed. 2, 185, 313. S. oryzæformis, *Mart. l. c.* Ed. 1, 185 (*excl. all syns. but Gærtn.*); *Kunth l. c.* 191. S costata, *Mart. l. c.* 313. Ptychosperma, Kuhlii, *Miq. Fl. Ind. Bat.* iii. 21; *De Palm. Archip. Ind.* 23. P. costata, *Miq. ll. cc.* 25, 23. Areca oryzæformis, *Gærtn. Fruct.* i. 20, t. 7, f. 2, 6 (*not of Rumph.*).

SOUTH ANDAMAN ISLANDS, *Kurz.*—DISTRIB. Sumatra, Java.

Stem soboliferous, 20–30 ft. (Kurz), (10 ft., Becc.). *Leaves* 3–4 ft.; leaflets 1–2 ft.; petiole variable in length. *Spadix* 1 ft. *Fruit* nearly ½ in. long. *Seed* adherent to the pericarp; albumen deeply ruminate.—The above is chiefly from Kurz's *P. costata* in For. Fl. It may be the *P. coronata* mentioned by Kurz in his Andaman Report as abundant in the South Andaman Islands.

†† *Spadix with few distichous branches.*

11. **P. Dicksonii,** *Blume Rumph.* ii. 85; trunk solitary tall, leaves pinnate, leaflets numerous elongate broadly linear præmorse 5–7-nerved, uppermost confluent, spadix refracted branches 4–8, male sepals subulate nearly equalling the petals, stamens 20–30, fruit ovoid or oblong. *Scheff. in Natuurk. Tijdsch. Ned. Ind.* 174; *in Ann. Jard. Buitenz.* i. 149; *Becc. Males.* i. 138. Areca Dicksonii, *Roxb. Fl. Ind.* iii. 616; *Griff. in Journ. As. Soc. Beng.* v. 458; *Palms Brit. Ind.* 153, t. 231. Seaforthia Dicksonii, *Mart. Hist. Nat. Palm.* iii. 184, 313; *Kunth Enum.* iii. 190.

WESTERN GHATS; on the Nilghiri and Travancore hills, alt. 2500 ft.

Trunk 16–18 ft. by about 2 in. diam. *Leaves* 4 ft., forked; leaflets sessile,

12–24 by ½–1 in. *Spathe* simple. *Spadix* with the branches stout, densely clothed with imbricating flowers. *Male fl.* sepals subulate, petals rather longer, ovate-cordate, tips tapering; stamens very numerous; filaments very short; pistillode 0. *Fem. fl.* sepals reniform; petals similar; staminodes 6, clavate, tips penicillate. *Fruit* about ½–¾ in. long by ½ in. diam.

12. **P. malaiana,** *Scheff. in Natuurk. Tijdsch. Ned. Ind.* xxxii. 175; stem slender, leaves pinnate, leaflets numerous linear acuminate glaucous beneath 2-nerved, upper confluent, spadix refracted branches 3–5, male sepals lanceolate acuminate much smaller than the petals, stamens about 40, fruit ovoid. *Becc. Males.* iii. 137. Areca hæmatocarpa, *Griff. Notul.* iii. 165; *Palms Brit. Ind.* 153. A. malaiana, *Griff. in Calc. Journ. Nat. Hist.* v. 457; *Palms Brit. Ind.* 252, t. 230 C. Seaforthia malaiana, *Mart. Hist. Nat. Palm.* iii. 184, Ed. 2, 183, 313, t. 158, f. 3; *Kunth Enum.* iii. 190. Ptychosperma malaiana, *Miq. Fl. Ind. Bat.* iii. 23; *de Palm. Arch. Ind.* 23.

MALACCA, *Griff.* PENANG, Herb. Hort. Calc. (3190). PERAK, *King's Collector* (8120).—DISTRIB. Sumatra.

Stem 8–12 ft., ½–1 in. diam., internodes generally subclavate. *Leaves* 5–8 ft. long, spreading; leaflets 1½–2 ft. by ½–¾ in., finely acuminate, upper cuneate bipartite, lobes præmorse; petiole 1½–1½ ft.; sheath as long. *Spathe* 10 in., cuspidate. *Spadix* 6 in., blood red in fruit; branches 3–5, flowers crowded. *Male fl.* flat, sepals membranous, lanceolate; petals much larger; filaments very short. *Fem. fl.* sepals and petals very short; staminodes 0; stigma discoid. *Fruit* 1–1½ by ½–¾ in., narrowed at both ends, blackish purple, mamillate. *Seed* ovoid, raphe about 7-branched; albumen deeply ruminate.

13. **P. pectinata,** *Becc. mss.*; stems 7–15 ft., cæspitose, robust, leaflets numerous elongate acuminate 1–5-ribbed straight much contracted at the base, glaucous beneath, spadix with 3–9 short branches, male calyx shorter than the petals, fruit elongate ovoid tipped with the conical stigma.

PERAK, *King's Collector*; Goping, alt. 5800 ft. (n. 4393).

Stems 2½–3½ in. diam. *Leaves* 3–4 ft.; leaflets 10–16 by 1½–1¾ in. *Spadix* with branches 4–5 in. long. *Fruit* ⅝–⅞ in. long by ⅜–½ diam. *Seed* ovoid, obtuse, base truncate.—Fruit much smaller than in *P. malaiana.*

14. **P. perakensis,** *Becc. Males.* iii. 175; stems short gregarious, internodes short the upper scurfy, leaves long-petioled, leaflets numerous stiff straight linear or ensiform acuminate 1–2-costate, spadix short subdigitately 5–7-branched, male calyx much shorter than the petals, fruit ovoid or oblong crowned with the minute stigma.

PERAK; alt. 1200–1500 ft., *Scortechini*, on Maxwell hill, *Wray.*

Stems 3–4 ft. by 2–3 in. diam. *Leaves* 2–2½ ft.; leaflets 18–20 by ¾–1 in., inserted at an angle of 45°, bright green, paler beneath; petiole 10–12 in., terete; sheath 8 in, squamulose; ligule ¾–1½ in. *Spathe* elliptic-oblong, apiculate, 2-keeled. *Spadix* 4–6 in., shortly peduncled; branches compressed; flowers subremote, 2-seriate. *Male fl.* calyx 3-toothed; stamens numerous. *Fem. fl.* globose; sepals and petals similar; stigma capitellate. *Fruit* ½ long by ⅛ in. diam., purple-black. *Seed* conform to the fruit, raphe simply branched; albumen densely ruminate.

15. **P. Hookeriana,** *Becc. Males.* iii. 141; stem slender, petiole and rachis of leaves scurfy, leaflets numerous narrowly linear-lanceolate subfalcate acuminate 2–3-costate, spadix with a slender peduncle and 4–5 slender branches, male calyx much shorter than the petals, fruit ellipsoid apiculate. Areca sp. *Griff. in Calc. Journ. Nat. Hist.* v. 462, in foot-note.

KHASIA HILLS; alt. 2–4000 ft., *Griffith*, J. D. H., &c. (*in Herb. Webb.*), Nunklow and Churra, *Clarke*.

Stem 3–4 ft.; internodes clavate, young scurfy. *Leaves* 4½ ft.; leaflets opposite, 1 ft. long, much obliquely acuminate, 3–4-keeled above, terminal lobe 2-fid; petiole 6 in. *Spathe* 4 in., oblong. *Spadix* 3–4 in.; branches compressed, flexuose, flowers crowded. *Male fl.* calyx membranous 3-toothed; petals very unequal; stamens about 15; pistillode 0. *Fem. fl.* sepals and petals subequal; staminodes 0; stigma large, discoid. *Fruit* about ½ in. long by ¼ diam., narrowed at the top. *Seed* of the same shape.—This is the plant alluded to by Griffith (Calc. Journ. Nat. Hist. l. c. 462), and described as probably a form of *A. gracilis* collected by Major Jenkins and himself in the Khasia hills and Assam, and of which he says, in a footnote, "*Stem* and *leaves* much the same as in *A. gracilis*, spadices slenderer 3–4-times branched, fem. fl. distichous distant." The above is from Malesia. I have seen no specimen.

††† *Spadix unbranched.*

16. **P. hymenospatha,** *Hook. f.*; stem slender, petiole and rachis of leaves slender scurfy, leaflets very numerous falcately very narrowly ensiform finely acuminate unicostate, spadix very short, spathe fusiform terete acuminate membranous, male fl. flat imbricate.

BURMA; at Moulmein, *Lobb*.

Stem as thick as a goose-quill; internodes long. *Leaves* 12–14 by 4–5 in.; leaflets 3–4 by ¼–½ in., very numerous (15–20 pairs) quite regularly close set, alternate, flat, thin, dark green above and brownish beneath when dry, costa slender, prominent on both surfaces; petiole 3 in., subterete; sheath 3–4 in., striate. *Spathe* 1½ in., ellipsoidly fusiform, erect, quite membranous, subhyaline. *Spadix* as long as the spadix, flowering to the base. *Male fl.* closely imbricating, ¼ in. diam., trapezoidly orbicular; dorsal sepals twice as long as the others, apiculate; stamens 9, unequal; filaments very short, anthers linear. *Fem. fl.* minute, globose; ovary ovoid, stigma pulvinate, ovule erect.—A very distinct species remarkable for its membranous spathe and very elegant foliage.

17. **P. paradoxa,** *Scheff. in Natuurk. Tijdsch. Ned. Ind.* xxxii. 31: stem slender, leaves entire or pinnatisect with few broad 3- or more-nerved leaflets, spadix short decurved, fruit very narrow tapering from above the base to the obtuse tip often curved. *Becc. Males.* iii. 129, *in note.* Areca curvata. *Griff. Notul.* iii. 164, *partly, as to the descr.* (*not Ic. Pl. Asiat.* t. 248). A. paradoxa, *Griff. in Calc. Journ. Nat. Hist.* v. 463; *Palms Brit. Ind.* 156, *as to descr. of fruit, and fig. of fruit*, t. ccxxxvii. C, f. 11. Kentia paradoxa, *Mart. Hist. Nat. Palm.* 111, 312. Nengella paradoxa, *Becc. Males.* i. 32. Ophiria paradoxa, *Becc. in Ann. Jard. Bot. Buitenz.* ii. 128. Cladosperma, N.G. *Griff. Notul.* iii. 165.

MALACCA; foot of Mt. Ophir, *Griffith*. PERAK, alt. 3–4000 ft., *Scortechini* (427ᵇ, 2413); on Gunong Batu, *Wray*.

Stem 3–6 ft., very slender, ¼ in. diam.; internodes 1–2 in. *Leaves* 1 ft. long, entire and oblong, or with 3–5 pairs of sigmoidly linear-lanceolate acuminate leaflets with a broad base, 4–5 in. long by ¼–½ broad; petiole 1–1½ ft., very slender and rachis scurfy; terminal lobe deeply forked, toothed; sheath long, deeply striate. *Fruiting spadix* 2–2½ in long, slender, nearly glabrous; peduncle short. *Fruits* distichous, ¾ in. long by ⅓ broad, red; albumen equable.

DOUBTFUL SPECIES.

18. P. PATULA, *Blume in Bull. Néerl.* 1838, 65; *Rumphia*, ii. 86, 87, t. 115; *Kunth Enum.* iii. 641; *Kurz in Journ. As. Soc. Beng.* xlii. ii. 201; *Scheff. in Natuurk. Tijdsch. Ned. Ind.* xxxii. 176 (*partly and excl. all vars.*); *in Ann. Jard. Bot. Buit.* i. 150 (*partly as to descr.*), t. 18, f. 4, t. 19; *Becc. Males.* iii. 139. Seaforthia patula, *Mart. Nat. Hist. Palm.* 323. Ptychosperma patula, *Miq. Fl.*

Ind. Bat. iii. 26, and Suppl. 253; *in Journ. Bot. Néerl.* i. 7; *De Palm. Archip. Ind.* 23; stems tufted slender 6–7 ft. high ¼–1 in. diam., leaflets few, rarely many, broad, distant, sigmoidly lanceolate and falcate from a narrowed base caudate-acuminate 2- many-nerved, terminal broader 7–9-nerved truncate and deeply doubly toothed, spadix refracted, branches 2–5, fruit elliptic-ovoid, narrowed and acute at the tip, about ½–⅔ in. long ⅓–½ diam.—Perak, on Ulu Bubong, *King's Collector* 10702). Sumatra, Borneo — The above description is chiefly from Sumatran specimens. The Perak have internodes 2¾–3¼ in. long, $\frac{5}{10}$ in. diam., covered with white scurf, a 4-branched spadix, and the leaves minutely puberulous beneath. A very similar plant collected by Helfer in Burma (n. 6427) without flowers, in fruit, has broader leaflets with the nerves puberulous beneath.

3. **NENGA,** *H. Wendl. & Drude.*

Characters of *Pinanga*, but sepals and petals subequal, subulate, and ovule parietal.—Species few, Malayan.

1. **N. Wendlandiana,** *Scheff. in Ann. Jard. Bot. Buitenz.* i. 153 (*partly*), t. 9–10; leaves pinnate, leaflets alternate ensiform finely acuminate, spadix about 4-branched, flowers tetrastichous, male sepals subulate rather longer than the petals, fruit ovoid mamillate, stigma conical, seed ovoid acute. *Becc. Males.* i. 25; *in Ann. Jard. Buitenz.* ii. 83. N. pumila, *Wendl. in Kerchov. Palm.* 251. Pinanga Nenga, *Blume Rumphia*, ii. 77, t. 107 (*excl. var. pachystachya*). Areca Nenga, *Blume in Mart Hist. Nat. Palm.* iii. 179; *Scheff. in Natuurk Tijdsch. Ned. Ind.* xxxii. 166 (*excl. var.* γ). Areca pumila, *Blume in Mart. l. c.* 177, t. 153, f. 1–3; *Miq. Fl. Ind. Bat.* iii. 14 (*excl. var.* γ); *De Palm. Arch. Ind.* 23.

Var. *malaccensis*, Becc. Males. iii. 182; petiole very short, fruit broadly ovoid about 1 in. long, seed broadly truncate at the base cuspidate and spinous at the tip. Areca (Anachasmus) pumila, *Griff. in Calc. Journ. Nat. Hist.* v. 456; *Palms of Brit. Ind.* 151.

Var. *malaccensis*, Ching forest, Malacca, *Griffith.* PERAK, Larut, *King's Collector* (4022).—DISTRIB. (of the species) Sumatra, Java.

Stem 10–20 ft. by 2–3 in. diam. *Leaves* 8–9 ft., pinnate nearly to the base, leaflets alternate 2½ ft. by ½–1½ in. broad, caudate-acuminate, bright green, coriaceous, 2-ribbed; petiole as thick as the little finger; sheaths 2 ft. long, subventricose. *Spathe* about 2 ft. *Spadix*; peduncle 1½ in., branches 8–12 in., level-topped, pendulous, fruiting very thick; flowers about 4-ranked, yellowish white. *Male fl.* sepals ½–⅔ in. long, triangular-subulate, finely acuminate; petals ovate-oblong, cuspidate, stamens 6; pistillode 0. *Fem. fl.* sepals and petals roundish; staminodes 0. *Fruit* 1 in. by nearly ½ in. broad, orange-colrd.—An abnormal form in which the male fl. has 3 sepals, and 6 petals; 2 rows (var. *malaccensis hexapetala*, Becc. Males. iii. 183), was found at Perak by *Scortechini.*

2. **N. macrocarpa,** *Scortech. mss. ex Becc. Males.* iii. 180; leaves pinnate, leaflets sigmoidly falcate, spadix 3–4-branched, flowers hexastichous, male sepals subulate hardly longer than the petals, fruit elongate ellipsoid, crowned by the large deeply 3-lobed stigma, seed broadly ovoid abruptly spinescent.

PERAK; on Maxwell hill, alt. 3200–5300 ft., *Scortechini* (No. 547[a], 302[b]); Goping, *King's Collector* (4775), on Gunong Batu Pateh, *Wray* (930).

Stem solitary, 6–10 ft. *Leaves* 3–4 ft.; leaflets 18–30 pairs, rigid, acuminate, lower narrow 1-nerved, 16–20 by 1–1½ in., upper longer broader and 2-nerved; petiole 4–12 in.; sheath as long, smooth or subscaly. *Spathe* glabrous, purplish. *Spadix* at first erect, then spreading; peduncle short, stout; branches 7–12 in. *Male fl.* stamens 6; pistillode of 3 tubercles. *Fem. fl.* sepals ciliolate and petals suborbicular;

staminodes 6 minute teeth. *Fruit* about 1½ in. long by ½ in. diam., ellipsoid; stigmas 3, broad, triangular.

4. LOXOCOCCUS, *H. Wendl. & Drude.*

Stem erect, annulate. *Leaves* pinnatisect, leaflets obliquely truncate. *Spadix* infrafoliar, branched; spathes 2; flowers 3 together (a fem. between 2 males) clusters spirally arranged. *Male fl.* Sepals 3, rounded, imbricate; petals 3, much larger, ovate, valvate; stamens 9–12, filaments very short, anthers subversatile. *Fem. fl.* smaller, subglobose; sepals rounded, broadly imbricate; petals ovate, base broad imbricate, tips valvate; ovary 1-celled, stigmas 3, minute; ovule parietal. *Fruit* subglobose, cuspidately beaked, stigmas terminal; albumen ruminate; embryo subbasilar.

L. rupicola, *H. Wendl. & Drude in Linnæa,* xxxix. 185; *Hook. f. Bot. Mag.* t. 6358. Ptychosperma rupicola, *Thw. Enum.* 328. Caryota mitis, *Willd.*?; *Moon Cat. Ceyl. Pl.* 64.

CEYLON; in forests of the Southern and Central Provinces.

Trunk 30–40 ft. by 4–5 in. diam. *Leaves* 6–8 ft., spreading; leaflets 12–20 pairs, 2 ft. by 2½ in., spreading, linear, subglaucous beneath, and sparsely furfuraceous; petiole 1–2 ft., sheath very short. *Spathe* 1 ft., pale yellow. *Spadix* 1 ft., blood-red, subdeltoid; peduncle short and branches stout spreading quite glabrous; flowers in scattered clusters of 3. *Male fl.* ¼ in. diam.; filaments about equalling the anthers; pistillode minute, 3-fid. at the tip. *Fruit* about 1 in. long, globosely ovoid. *Seed* globose.

5. PTYCHORAPHIS, *Becc.*

Stem slender, annulate. *Leaves* pinnatisect, leaflets narrow, caudate-acuminate. *Spathes* 2, complete, caducous. *Spadix* infrafoliar, paniculately branched; flowers spirally disposed, male only towards the tips of the branches, a fem. between 2 males towards the base. *Male fl.* symmetric; sepals suborbicular; petals valvate; stamens 6, anthers versatile; pistillode conical or columnar. *Fem. fl.* bibracteolate; sepals rounded, concave; petals longer, tips valvate; staminodes 4–6; ovary ovoid, stigmas 3, triangular, acute; ovule parietal. *Fruit* small, ovoid, stigmas terminal. *Seed* ovoid, obtuse, deeply grooved along the long linear hilum; albumen deeply ruminate; embryo basilar, oblong.—Species 3, Malayan.

1. **P. singaporensis,** *Becc. in Ann. Jard. Bot. Buitenz.* ii. 90, t. 126; *Males.* iii. 109; stem slender, leaflets about 1 ft. long very numerous, spadix slender 5–7-branched, rachis rusty furfuraceous, fruit ovoid. Ptychosperma singaporensis, *Becc. Males.* i. 61. Rhopaloblaste singaporensis, *Hook. f. in Gen. Pl.* iii. 892. Drymophlœus singaporensis, *Hook. f. in Kew Gard. Rep.* (1882) 1884, 55.

SINGAPORE; *Maingay* (*Kew dist.* 1536). JOHORE; on Gunong Pulai, *Hullett* (6000), *Kunstler* (230).

Stem 6–12 ft. by 1½ in. diam., soboliferous. *Leaves* 3–6 ft., regularly pinnatisect; leaflets very many, alternate, straight, about 8 by 1½ in., 3-nerved, upper shorter, midrib beneath scaly; petiole 2–2½ ft. and rachis very slender, furfuraceous. *Spadix* about 1 ft., 5–7-branched from the base; flowers yellow. *Fruit* nearly ½ in. long by ¼ in. diam., ovoid or elliptic-ovoid, tip conical, slightly excentric. *Seed* free, elliptic-ovoid, rounded at both ends, raphe branches descending to the base.

2. **P. augusta,** *Becc. in Ann. Jard. Bot. Buitenz.* ii. 90; *Males.* iii. 110; trunk very tall, leaflets numerous 2–3 ft., spadix decompound, fruit elliptic-oblong. Areca augusta, *Kurz in Journ. Bot.* 1875, 331, t. 170.

NICOBAR ISLANDS; in woods in Kamorta, *Kurz.*

Trunk slender, 80–100 ft. by 1 ft. diam. *Leaves* 8–12 ft.; leaflets sessile, narrowly linear, acuminate, 3-costate; petiole very short; rachis flat above, furfuraceously tomentose. *Spadix* decompound, 2½–3½ ft. *Male fl.* bracts broad smooth; sepals broadly ovate; petals oblong, obtuse. *Fem. fl.* sepals and petals nearly alike, concave, imbricate. *Fruit* 1 in. long, elliptic-oblong, scarlet. *Seed* oblong.

6. CYRTOSTACHYS, *Blume.*

Stems slender, cæspitose, annulate. *Leaves* pinnatisect; leaflets linear-lanceolate, acuminate, 1-costate. *Spathes* 2, complete, caducous. *Spadix* infrafoliar, shortly peduncled, broadly paniculately branched; branches 1–2 ft. long, stout, spreading; flowers in spirally disposed clusters of 3, a fem. between 2 males. *Male fl.* symmetrical; sepals orbicular, imbricate; petals valvate; stamens 12–15, exserted; anthers short, versatile; pistillode 2-fid. *Fl. fem.*; sepals orbicular; petals longer, broadly imbricate, tips valvate; staminodes forming a membranous cup; ovary narrowly ovoid; stigmas subulate; ovule pendulous from the tip of the cell. *Fruit* small, ovoid, stigma terminal. *Seed* adherent to the endocarp, globose, hilum apical; albumen equable; embryo basilar.—Species 2, Malayan.

1. **C. Lakka,** *Becc. in Ann. Jard. Bot. Buitenz.* ii. 141; fruit conico-ovoid gradually narrowed to the tip, seed ovoid. C. Lakka *var.* singaporensis, *Becc. l. c.*

SINGAPORE; in humid jungles.—DISTRIB. Borneo.

A slender tall soboliferous Palm. *Leaves* about 4 ft.; leaflets about 20 by 1–1½ in., upper shorter obtuse or toothed, green above, ashy grey beneath; sheath red *Fruit* ⅓ in. long, by about ⅓ diam.—Very near *C. Rendah* of Sumatra, which has an ovoid fruit abruptly constricted at the tip, and a globose seed.

7. ONCOSPERMA, *Blume.*

Prickly palms. *Leaves* terminal, pinnatisect. *Spathes* 2, complete. *Spadix* infrafoliar, branched; branches with solitary male flowers above, and ternate flowers below (a fem. between 2 males). *Male fl.* asymmetric; sepals suborbicular, acute; petals obliquely ovate, valvate. *Stamens* 6–12; anthers elongate; pistillode columnar, 3-fid. *Fem. fl.* globose; sepals and petals orbicular, imbricate; staminodes 6; ovary obliquely ovoid, 1–3-celled; stigmas minute; ovule parietal. *Fruit* small, globose, stigmas lateral or basal. *Seed* suborbicular, raphe broad; albumen deeply ruminate.—Species 5–6, Malayan.

1. **O. filamentosa,** *Blume, Rumphia* ii. 97, t. 82, 103; stoloniferous, leaflets subequidistant drooping, male fl. hexandrous, fruit spherical ⅓ in. diam. O. cambodianum, *Hance in Journ. Bot.* (1876) 261. Areca tigillaria, *Jack* in *Mal. Misc.* ii. vii. 88 (*in Calc. Journ. Nat. Hist.* iv. 12); *Griff. in Calc. Journ. Nat. Hist.* v. 423; *Palms Brit. Ind.* 157, t. 133 B. A. Nibung, *Mart. Hist. Nat. Palm.* iii. 173, 311, t. 153.

MALAY PENINSULA; in swamps.—DISTRIB. Borneo, Cochin China.

Trunk 30–40 ft., armed with long black spines. *Leaves* many, 10–12 ft., drooping; leaflets 2 ft., narrow, acuminate, pendulous, coriaceous, many-nerved, scurfy beneath; petiole armed, scurfy. *Spathes* boat-shaped, 2-keeled, outer armed, inner velvety. *Spadix* shortly produced, peduncle slightly armed, branches many, long, flexuous, upper simple; fruiting 1–2 ft., pendulous, red-purple. *Male fl.*; sepals cuspidate, keeled; petals suddenly acuminate, tip setiferous; filaments short; anthers deeply bifid below. *Fem. fl.*; sepals and petals fleshy.

2. **O. horrida,** *Scheff. in Natuurk. Tijdsch. Ned. Ind.* xxxii. 189; *in Ann. Jard. Buitenz.* i. 159; stoloniferous, leaflets subequidistant spreading, male fl. hexandrous, fruit spherical ¾–1 in. diam. Areca horrida, *Griff. in Calc. Journ. Nat. Hist.* v. 465; *Palms Brit. Ind.* 158, t. 233 C; *Mart. Hist. Nat. Palm.* iii. 312.

MALAY PENINSULA, *Griffith.*—DISTRIB. Borneo.

Trunk 30–40 ft., armed. *Leaves* few, spreading, 14–16 ft.; leaflets 2–3 ft., very narrow, acuminate, spreading, coriaceous. *Spathes* 2 complete, acutely margined, outer 1–1½ ft., armed, inner cuspidate. *Spadix* with the stout peduncle armed below; branches 1–2 ft., pendulous, flexuous; fruiting with pendulous branches 2–3 ft. long. *Fruit* purplish black.—Griffith, from whom the above descriptions are taken, says of this allied to *A. tillgiaria*, but very distinct in the spathes and fruit.

3. **O. fasciculata,** *Thw. Enum.* 328; stoloniferous, leaflets fascicled tips drooping, flowers enneandrous, fruit ½ in. diam. *Scheff. in Ann. Jard. Buitenz.* i. 160. Caryota horrida, *Moon Cat. Ceyl. Pl.* 64.

CEYLON; in the Central Province, ascending to 5000 ft.

Trunk 30–40 ft. and more, 5–6 in. diam., armed. *Leaves* 18 ft.; leaflets 12–18 by 1–1¾ in., lanceolate, long-acuminate, costa scaly beneath; sheath 2½ ft., armed and scurfy. *Spathes* sparingly scurfy, unarmed. *Spadix* 2 ft., unarmed, paniculately branched, dense-fld. *Male fl.* ¼ in. long. *Drupe* black-purple.

8. IGUANURA, *Blume.*

Slender unarmed palms. *Leaves* terminal, entire or pinnatisect, with broad acute or præmorse leaflets. * *Spathes* 2, persistent, short. *Spadix* inter- or infra-foliar, branches spreading; flowers spirally disposed, 3-nate (a fem. between 2 males), or the upper on the branches males. *Male fl.* symmetric; sepals orbicular, imbricate; petals connate below, ovate or lanceolate, valvate; stamens 6 or 9, anthers dorsifixed; pistillode trigonous. *Fem. fl.* subglobose; sepals and petals orbicular; staminodes of 6 teeth; ovary ovoid or oblong, 1–3-celled; stigmas sessile; ovule solitary, parietal. *Fruit* small, oblong ovoid or elongate conical, stigmas subbasilar. *Seed* suberect, hilum lateral; albumen equable or ruminate.—Species 8–10, Malayan.

* *Spadix interfoliar, very long and long peduncled, simple or with 2–3 long equal pendulous branches.*

1. **I. geonomæformis,** *Mart. Hist. Nat. Palm.* iii. 229, 178; stem slender, leaves pinnate, leaflets 6–8 pairs obliquely acuminate or præmorse and erosely toothed, spadix furfuraceous, branches thick, fruit obovoid-oblong. Slackia geonomæformis, *Griff. in Calc. Journ. Nat. Hist.* v. 469; *Palms Brit. Ind.* 162, t. 234.

MALACCA, rather common in forests, *Griff.* (*Kew distrib.* 6406, 6407), on Mt. Ophir, *Hullett* (851).

Stem 2–4 ft. by ½ in., annulate. *Leaves* 3–3½ by 1–1½ ft., linear-oblong; leaflets linear, 1 ft. by ½–2 in., 2- or more-keeled, terminal forked, lobes erose-dentate; petiole 1 ft., base scurfily pubescent; sheath a span long. *Spathes* subcoriaceous, lowest 2-keeled, upper conduplicate and spadix brown-pubescent. *Spadix* with a long slender erect peduncle, and 2 or more pendulous spongy spikes or branches 6–10 in. long, loosely covered with flowers; fruiting 1–1½ ft. nodding; flowers inserted in pits with membranous margins. *Male fl.* in pairs; sepals oblong, striate; petals ovate-lanceolate; filaments inflexed in bud; pistillode stout, tip 3-lobed. *Fem. fl.* towards the base of the spike; sepals of the male; petals broad; ovary gibbous. *Fruit* over ½ in. long by ½ diam., black-purple. *Seed* erect; albumen ruminate.

2. **I. malaccensis,** *Becc. Males.* iii. 102; stem slender, leaves pinnate, leaflets about 5 pairs, lower falcate caudate-acuminate upper broader, petiole pubescent, spadix simple filiform, finely tomentose.

MALAY PENINSULA; Selangore, *F. Keheding*; Perak, Larut, *King's Collector* (1869, 2994).

Closely allied to *I. geonomæformis*, differing in the fewer leaflets and simple not furfuraceous but finely tomentose spadix.

** *Spadix interfoliar, long peduncled, with few subterminal short simple or forked branches or spikes.*

3. **I. Wallichiana,** *Hook. f. in Gen. Plant.* iii. 908; leaves simple or pinnatisect, fruit globosely obovoid. Areca Wallichiana, *Mart. in Wall. Cat.* 8600; *Hist. Nat. Palm.* iii. 178, 312; *Becc. Males.* iii. 100.

PENANG, *Porter.* SINGAPORE, *Lobb.*

Stem solitary, 2–12 ft., straight, slender. *Leaves* very variable in size, 10 in.–2 ft. long, simple and forked or more or less pinnatisect, with long narrow leaflets. *Spathes* 2, lower 2½ in., hidden in the leaf sheath, strongly compressed, acutely 2-keeled, tip 2-toothed; upper shorter, acuminate, rusty-pubescent. *Spadix* long-peduncled; peduncle 18–24 in., branches 3–7 variable in length. *Fruit* rather more than ½ in. long by ⅓–½ in. diam., red when ripe.—The following varieties are from Perak:—

Var. α *major*, Becc.; stem 10–12 ft. by 2½–3½ in. diam., leaves 2–4 ft. undivided or pinnatisect, fruit about ⅝ by ⅜.—*King's Collector* (431, 8227, 3127).

Var. β *minor*, Becc.; stem 18–30 in., leaves about as long simple or pinnatisect, fruit rather smaller.—*King's Collector* (454, 7941, 7996, 7999).

*** *Spadix interfoliar, very shortly peduncled.*

4. **I. brevipes,** *Hook. f.*; leaves pinnate, leaflets distant broadly trapezoidly cuneate or subquadrate præmorse many-nerved coarsely toothed, spathe long deeply grooved, spadix laxly paniculate, branches divaricate lax-fld.

PERAK, Larut, 3–4000 ft., *King's Collector* (2029).

Stem thicker than a swan's quill. *Leaf* 15 in., leaflets 5 pairs, 5–6 in. long by 1½–3 broad, inserted by a contracted but very broad base, upper margin subcaudate; rachis glabrous; sheath 5 in., many-ribbed. *Spadix* with the peduncle wholly included in the leaf-sheath, quite glabrous; primary branches 3–4, 3–4 in. long, sparingly again divided, rather slender, angled (when dry). *Male fl.* scattered, about ⅛ in. long; sepals orbicular; petals broadly oblong, obtuse, very coriaceous; stamens 6, filaments inflexed, anthers linear-oblong; pistillode columnar, capitate.

**** *Spadix infrafoliar, peduncle shorter than the spathe or shortly exceeding it.*

5. **I. diffusa,** *Becc. mss.*; leaves large, leaflets numerous equidistant

narrow, spadix with 8–10 very spreading slender branches of which the lower are twice or thrice forked, peduncle closely embraced by the spathe.

PERAK; on Gunong Tjok, *Scortechini*.

One of the largest of the genus. *Leaves* about 3–4 ft.; leaflets very numerous, alternate and opposite, 12–15 in. by 1–1½ in., obliquely præmorse, rachis glabrous. *Spadix* about 20 in., including the 10 in. peduncle, which is closely sheathed by the persistent spathe; branches 6–10 in., filiform, divaricate.—The specimen which is very imperfect may be a luxuriant state of *I. polymorpha*.

6. **I. polymorpha,** *Becc. Males.* iii. 189; leaves pinnatisect, leaflets trapezoid subfalcate præmorse, spadix erect, peduncle sheathed by both the spathes with 3–9 simple branches at the apex, fruit ovoid or elongate conic straight or curved.

PERAK, *Scortechini*.

Stem 3–7 ft. *Leaves* oblong, 14–16 by 8–10 in.; leaflets 10–14 on each side, obliquely præmorse and toothed, 1–5-nerved. *Spadices* often two, 12–20 in. long, erecto-patent, branches filiform, angular, peduncle 5–6 in., slightly compressed.

Var. *typica*; spadix with 3–9 branches, flowers spirally disposed, male oblong subacute, fruit ⅜–½ in. by ⅓ in. diam., others ½ by ⅓ in., ovoid or elliptic-ovoid.—*Scortechini* (3180).

Var. *canina*, Becc. l. c. 190; spadix with 7–9 branches, flowers alternate subdistichous, male ovoid acute, fem. petals twice as long as the sepals, fruit ⅓ by ¼ in. elongate conical curved.

7. **I. corniculata,** *Becc. Males.* iii. 187; leaves pinnatisect, leaflets all similar cuneately trapezoid 3–5-nerved, tip very obliquely præmorse toothed, base constricted, spadix slender undivided, peduncle closely embraced by the very slender tubular spathe, spike furfuraceous, fruit narrow elongate conical tip incurved or involute.

PERAK, alt. 3–400 ft., *Kunstler* (3131).

Stem very slender, 3–4 ft., by ¼ in. diam. or less; internodes ¾–1¼ in. *Leaves* 10–12 by 6–8 in.; leaflets 5–6, spreading like a butterfly's wings 3½–4 by 1–1½ in., upper margin produced into a tail, 3–4-nerved, furfuraceous beneath along the folds; petiole slender, 3–4½ in., rustily furfuraceous, as is the sheath. *Spadix* about a foot long, including the peduncle of 3–4 in.; spike rusty scurfy; flowers subspirally disposed; males very small. *Fruit* granulate, ⅔–¼ by ⅛ in.—The fruit is in shape unique in the order.

8. **I. parvula,** *Becc. mss.*; leaves small oblong tip forked margin undulate, spadix filiform sparingly branched, peduncle about as long as the petiole more than half embraced by the spathes.

PERAK, *Scortechini*.

Stem ⅓–¼ in. diam. *Leaves* 8–10 by 3 in.; petiole 2–2½ in.—Described from a single specimen. Possibly a very small form of *I. polymorpha*.

9. **I. bicornis,** *Becc. Males.* iii. 188; leaves pinnatisect, leaflets sigmoidly trapezoid, spathes deciduous, spadix erecto-patent very shortly peduncled, branches 5–8 slender diffuse, fruit oblong base narrowed tipped by 2 obtuse unequal bosses.

MALAY PENINSULA; Perak, *Scortechini* (n. 1188), at Larut, alt. 12–1300 ft.; *King's Collector* (6375), alt. 3–4000 ft.

Stems tufted 5–8 ft. by ¼ in. diam.; internodes ½–1¼ in. *Leaves* 12–16 by 4–6 in., leaflets 2–4 pairs, with a deeply bifid terminal; petiole 3–4 in., glabrous,

sheath as long, tubular, mouth truncate. *Spadix* 4–8 in., peduncle ¾–1¼ in., branches 3–6 in., scattered, filiform; flowers minute. *Fruit* ½ by ⅓ in.

9. **BENTINCKIA,** *Berry.*

Unarmed Palms. *Leaves* terminal, equally pinnatisect. *Spathes* many, 2 lower short incomplete, upper 2-fid. *Spadix* interfoliar, branched; flowers minute, monœcious or polygamous, solitary or 3-nate with the intermediate female, clustered in spirally arranged pits on the branches; bracts forming a 2-lipped mouth to each pit; bracteoles 2. *Male fl.* subsymmetric, glumaceous, often reduced to ciliate scales; sepals oblong, obtuse, connate below, imbricate; petals longer, connate below into a stipes, valvate; stamens 6, anthers versatile; pistillode conical. *Fem. fl.* ovoid; sepals broad, obtuse, imbricate; petals longer, convolute; staminodes 6, minute. *Ovary* 3-celled, 1-ovuled; stigmas minute. *Fruit* small, subspherical; stigmas subbasilar. *Seed* pendulous from the top of the cavity, sinuately grooved or ridged; albumen equable.—Species 2.

1. **B. Coddapanna,** *Berry, in Roxb. Fl. Ind.* iii. 621; stem slender 10–20 ft., fruit subspherical. *Mart. Hist. Nat. Palm.* iii. 165, 228, t. 139; *Kunth Enum.* iii. 228; *Griff. in Calc. Journ. Nat. Hist.* v. 467; *Palms Brit. Ind.* 160; *Append.* xxvi.; *Wight in Madr. Journ. Nat. Sc.* ii. 385. Keppleria, *Mart. mss. ex Endl. Gen. Pl.* 25.

TRAVANCORE, *Wight*, &c.

A slender palm; stem 1 in. diam. or more, annulate. *Leaves* 3–4 ft.; leaflets 2 ft. or more by 1 in. broad, close together, linear, 2-keeled, keels paleaceous, tip usually 2-fid; lobes 2–4 in., triangular. *Spathes* membranous, lower truncate, upper complete. *Spadix* 1–2 ft., male scarlet, fem. lilac or violet; peduncle 2–3 in.; branches few, again branched, ultimate 6–10 in.; bract at the base broad; pits on the branches 3–4-fld., flowers emerging and opening singly, the upper first. *Fruit* rather compressed, about ½ in. diam.

2. **B. nicobarica,** *Becc. in Ann. Jard. Bot. Buitenz.* ii. 165; trunk tall 60–70 ft., fruit obovoidly oblong tip rounded. Orania nicobarica, *Kurz in Journ. Bot.* xiii. (1875) 331, t. 171, f. 19–25.

NICOBAR ISLANDS; Kamorta, *Kurz, E. H. Man.*

Trunk annulate, 9 in. diam. *Leaves* 5–8 ft.; leaflets ½–2 ft., sessile, linear, coriaceous, tip obtusely 2-lobed, petiole short and rachis glabrous. *Spadix* 1½–2 ft., decompound, glabrous, branches and branchlets inserted in woolly grooves of the rachis; bracteoles densely villous within. *Fem. fl.*; sepals and petals subsimilar, broadly ovate, obtuse, shining. *Fruits* tristichously arranged, globose (sub-ovoid when dry), the size of a cherry. *Seed* ovoid-oblong, ventrally flat, dorsally convex rugosely ribbed; albumen equable; embryo lateral and apical.

10. **WALLICHIA,** *Roxb.*

Soboliferous palms. *Leaves* pinnatisect; leaflets linear or oblong, irregularly toothed, base cuneate, unicostate, nerves flabellate. *Spathes* very many, tubular, clothing the peduncle of the spadix, upper large cymbiform. *Spadices* interfoliar, monœcious or polygamous; males ovoid, excessively branched and dense-fld.; fem. looser-fld. *Male fl.* symmetric; calyx cylindric or cupular, membranous, truncate; corolla cylindric, deeply 3-lobed, lobes oblong, valvate; stamens 6, on the corolla-tube; filaments short, anthers large; pistillode 0. *Fem. fl.* much smaller, subglobose;

sepals orbicular, coriaceous, imbricate; petals triangular valvate; staminodes few or 0; ovary 2–3-celled, stipitate; stigmas conic; ovules subbasilar. *Fruit* ovoid-oblong, 1–3-celled and -seeded. *Seeds* erect, plano-convex; albumen equable; embryo dorsal.—Species 3 or more, Indian and Malayan.

1. **W. densiflora,** *Mart. Hist. Nat. Palm.* ii. 190, & *Suppl.* 315; leaflets oblong or linear-oblong sinuately lobed acutely toothed white beneath, fem. fl. crowded 2-bracteate, male corolla twice as long as the calyx, mouth of calyx quite entire, fem. corolla shorter than the ovary. *Kurz For. Fl.* ii. 532; *Brandis For. Fl.* 549; *Bot. Mag* t. 4584. W. oblongifolia, *Griff. in Calc. Journ Nat Hist.* v 486; *T. Anders. in Journ. Linn. Soc.* xi. 6. Harina oblongifolia, *Griff. Palms Brit. Ind.* 175, t. 237 A, B, C. W. caryotoides, *Wall. Cat.* 8596 B.

TROPICAL HIMALAYA from Kumaon eastwards, ascending to 3000 ft. ASSAM, the KHASIA HILLS, and CHITTAGONG.

Stems very short or 0 (or often 8–15 ft. *Kurz*); trunk sheathed, scurfy, sheaths villous, resolving into strong fibres. *Leaves* 8–10 ft.; leaflets 1–2 ft., very many, alternate or the lower 2–4-nate, 1-costate and with many parallel nerves, bright green above; sheaths scurfy. *Spathes* purple. *Spadices* 12–18 in. long, branches of fem. very stout; flowers in many spiral series; *male fl.* yellow, solitary, or the lower in pairs with an intermediate fem.; filaments adnate to the petals; *fem. fl.* purplish; calyx very short, corolla-lobes obtuse. *Fruit* about ½ in. long, dull purple.

2. **W. caryotoides,** *Roxb. Cor. Pl.* iii. t. 295; leaflets oblong or linear-oblong panduriformly excised and acutely toothed white beneath, fl. fem. distant 3-bracteate, male corolla half as long as the calyx, mouth of calyx 3-toothed, fem. corolla about twice as long as the ovary. *Mart. Hist Nat. Palm.* ii. 180, t. 136; *Wall. Cat.* 8596 A; *Griff. in Calc. Journ. Nat. Hist.* v. 485; *Kurz For. Fl.* ii. 532; *Miq. Fl. Ind. Bat.* iii. 34. Harina caryotoides, *Ham in Mem. Wern Soc* v. 317; *Griff. Palms Brit. Ind* 174, t. 237. Wrightia caryotoides, *Roxb. Hort. Beng.* 68; *Fl. Ind.* iii. 621.

CHITTAGONG, and BURMA, in hill forests, ascending to 4000 ft.

Habit of *W. oblongifolia*, and very similar in foliage and inflorescence, but differing in the characters given above and in the fruit, which Kurz describes as being as large as a nutmeg, ovoid-oblong, rarely 2-seeded.—(Roxburgh says as large as a coffee bean.)

3. **W. disticha,** *T. Anders. in Journ. Linn. Soc.* xi. 6; trunk tall stout, leaves distichous, leaflets fascicled linear narrowed to the base præmorse denticulate, male calyx cupular 3-lobed, corolla thrice as long, fem. corolla longer than the ovary. W. Yomæ, *Kurz For. Fl.* ii. 533. Caryota mitis, *Herb. Calcutt.*

SIKKIM HIMALAYA, in tropical gorges, *T. Anderson*, and probably eastwards. PEGU; *Kurz.*

Trunk 10–15 ft. by 5–6 in. diam., naked, annulate. *Leaves* 6–10 ft., alternate erect; leaflets narrowing from near the truncate apex to the base and with a large tooth on each side about the middle, 1–2 ft., by 2–2½ in., glaucous beneath; petiole and sheath short, scurfy. *Male spadix* 3–4 ft., very narrow, linear in outline, with innumerable recurved slender crowded branches. *Fem. spadix* 6–8 ft., pendulous; branches stout, simple; flowers disposed in many spiral series, green. *Fruit* oblong, top obscurely 2–3-lobed, reddish.—Kurz describes the leaves as disposed in a ⅓ spiral.

11. DIDYMOSPERMA, *H. Wendl. & Drude.*

Small low palms. *Leaves* terminal, unequally pinnatisect; leaflets few, trapezoid, erose, uni-costate, nerves flabellate. *Spathes* many, sheathing the peduncle of the spadix. *Spadix* interfoliar, stout and simple, or slender and branched; monœcious or ?dioecious; flowers rather large. *Male fl.* symmetric; calyx cupular, 3-fid, imbricate; petals coriaceous valvate; stamens 10–30, anthers linear, erect; pistillode 0. *Fem. fl.* subglobose; sepals rounded, coriaceous; petals thick, triangular, incurved, valvate; staminodes 0. *Ovary* depressed, 3-gonous, 2–3-celled, stigmas conical; ovules basilar. *Fruit* ovoid or oblong, 1–2-celled and -seeded, stigmas terminal. *Seeds* erect, oblong, plano-convex; albumen equable; embryo dorsal.—Species 6, Malayan and Indian.

1. **D. Hookeriana,** *Becc. Males.* iii. 186; stem slender, leaves small long-petioled white beneath, some oblong from a cuneate base, some entire or lobed, others pinnatisect with obovate oblong or trapezoid long-tailed leaflets shortly ansate at the base, spadix filiform.

MALAY PENINSULA; Perak, *Scortechini*, No. 229b. 136b.) *King's Collector* (n. 2446).

Stem 3–4 ft., solitary or tufted, ½–¾ in. diam. *Leaves* extremely variable, 12–30 in. long; petiole slender; sheath furfuraceous. *Spadices* about 8 in. long, sheathed with 5–6 spathes; flowers spirally disposed in clusters of 3; *male fl.* oblong, subclavate, top rounded. *Fruit* unripe, globose.

2. **D. hastata,** *Becc. Males.* iii. 99.; stem slender, leaf-sheaths scurfily hispid, leaflets 6–7 terminal trapezoid, lateral petiolulate trapezoid caudate-acuminate, base hastate and ansate, spadices filiform nodding.

MALACCA, at Selangore, *F. Kehedimy.* PERAK, Larut, *King's Collector* (3125).

Stem 3 ft., solitary or sparingly tufted. *Leaves* 1½–2 ft.; terminal leaflet 4½–6 in. by 1–2 in., lateral rather longer and broader, lower margin straight, anterior sinuate-toothed. *Spadix* 1 ft. long; *male fl.* ⅛ in.—Habit, &c., of *D. Hookeriana*, but the leaf-sheaths are brown scurfy, as are the leaflets more or less beneath, and the latter have broadly cuneate more or less ansate bases; petiolule 1 in. and more.

3. **D. nana,** *H. Wendl. & Drude in Kerchov. Palm.* 243; leaves pinnatisect, leaflets about 5, terminal flabelliform, lateral opposite obliquely trapeziformly lanceolate acuminate not caudate irregularly lobed and toothed, pale beneath, spadices erect very stout simple or sparingly branched rustily scurfy dense-fld. *Hook. f. Bot. Mag.* t. 6836. Wallichia nana, *Griff. in Calc. Journ. Nat. Hist.* v. 488; *Mart. Hist. Nat. Palm.* 190, t. 315; *Miq. Fl. Ind. Bat.* iii. 34. Harina nana, *Griff. Palms Brit. Ind.* 176, t. 238 A, B.

ASSAM and the KHASIA HILLS, ascending to 4000 ft.

Stem 3–5 ft., clothed with rusty leaf-sheaths, petioles and spathes. *Leaves* 18 in. –2 ft.; leaflets 1–3 pairs, terminal flabellate, variously lobed, lateral 7–10 by 3–5 in., also variously lobed. *Fem. fl.* ⅛ in. diam. *Fruit* ½ in. long, oblong, white.

4. **D. gracilis,** *Hook f.*; stem very slender leafy upwards, leaflets 6–8 lateral broadly cuneate below the middle above it triangular or 3-lobed or truncate and acutely toothed, fem. spadix slender erect 3-branched, fruit elongate ovoid obtuse base rounded, seed elliptic-oblong concavo-convex.

ASSAM; Daphla hills, *Booth*.

Stem 2 ft., about as thick as a duck's quill. *Leaves* 8–18 in., rachis and petiole very slender; leaflets 1–3½ in. long and broad, white beneath. *Spadix fruiting*, 8 in., sheathed below the middle with narrow long terete glabrous striate spathes; lateral branches (or spikes) 3 in., terminal 4 in. long. *Fruit* ¾ by ¼ in. diam. rather curved. *Seed* ⅔ in. long, equally narrowed at both obtuse ends; raphe very obscure; albumen equable.—Apparently a very distinct species, found by Mr. Booth, Mr. Nuttall's collector in Assam.

12. **ARENGA,** *Labill.*

Tall stout palms, flowering first from an upper leaf-axil, and successively from lower; trunk densely clothed above with fibrous remains of the leaf-sheaths. *Leaves* terminal, long, pinnatisect; leaflets long, linear, usually præmorse, unicostate, base 1–2-auricled. *Spathes* many, clothing the peduncle of the spadix. *Spadices* interfoliar, large, much branched, peduncle short decurved, branches slender pendulous; male and fem. flowers usually solitary and in separate spadices, rarely 3-nate a fem. between 2 males. *Male fl.* symmetric; sepals orbicular, imbricate; petals oblong, valvate; stamens numerous, filaments short, anthers apiculate; pistillode 0. *Fem. fl.* subglobose; sepals accrescent; petals triangular, valvate; staminodes many or 0; ovary subglobose, 3-celled, stigmas conic. *Fruit* obovoidly globose, 2–3-seeded; stigmas terminal. *Seeds* compressed or plano-convex; albumen equable; embryo dorsal.—Species about 10, trop. Asia, Malaya and Australia.

1. **A. saccharifera,** *Labill. in Mem. Inst. Fr.* iv. 209; trunk tall very stout, leaflets 4-fariously fascicled linear lobed and variously toothed towards the tip, base 1–2-auricled white beneath, male buds obtuse. *Mart. Hist. Nat. Palm.* 191, t. 108 and 161, f. 4; *Miq. Fl. Ind. Bat.* iii. 35; *Kurz For. Fl.* ii. 534; *Griff. in Calc. Journ. Nat. Hist.* v. 472; *Palms Brit. Ind.* 164, t. 135 A. A. Griffithii, *Seem. ex H. Wendl. in Kerchov. Palm.* 232. Saguerus Rumphii, *Roxb. Fl. Ind.* iii. 626. S. saccharifer, *Wurmb. Verh. Bat. Genoostsch.* i. 350; *Blume, Rumphia*, ii. 128, t. 123–4. Gomutus saccharifer, *Spreng. Syst.* ii. 622. Borassus Gomutus, *Lour. Fl. Cochinch.* ii. 759.

ASSAM, PEGU, BURMA, and the MALAY PENINSULA.—DISTRIB. E. Asia and Malaya.

Trunk 20–40 ft. *Leaves* very many, 20–28 ft.; leaflets up to 115 on each side, 3–5 ft. long, subsessile, linear, coriaceous, costa stout, scurfy beneath; petiole scurfy. *Male spadix* 4–5 ft., simply branched, flowers oblong-clavate purple 1 in. long and less. *Fem. fl.* solitary, 1 in diam. *Fruit* 2–2½ in. long, oblong-turbinate, base narrowed, top rounded or depressed.

2. **A. obtusifolia,** *Mart. Hist. Nat. Palm.* 191, t. 147, 148, 161; trunk tall very stout, leaflets bifarious linear narrowed and truncate 2-lobed or toothed at the tip white beneath, base 1- or ex-auricled, male buds acute. *Miq. Fl. Ind. Bat.* iii. 36. A. Westerhoutii, *Griff. in Calc. Journ. Nat. Hist.* v. 474; *Palms Brit. Ind.* 166, t. 235 B, C, D; *Mart. l. c.* 192; *Miq. l. c.* 37. Saguerus Langkab, *Blume Rumph.* ii. 131, t. 96, 125. Gomutus obtusifolius, *Blume mss.*

PENANG, *Lewes*. MALAY PENINSULA, at Naning, *Westerhout*.

Very nearly allied to *A. saccharifera*, distinguished by the arrangement of the leaflets, which according to Griffith are bifarious with deflexed tips, the upper alone

auricled and only on one side, the acute male buds, and by the oblong fruit narrowed at both ends.

3. **A. Wightii,** *Griff. in Calc. Journ. Nat. Hist.* v. 475; *Palms Brit. Ind.* 167, t. 235 E; trunk short stout soboliferous, leaflets alternate crowded linear 2-auricled at the base, tip narrowed unequally 2-lobed and toothed white beneath, male buds acute.

The DECCAN PENINSULA; Coimbatore, *Wight*; Nilghiri hills, alt. 3000 ft., *Gamble.*

Trunk 3–8 ft. *Leaves* 12–28 ft.; leaflets linear-ensiform, 3–3½ ft. by 1½–2 in., margins sparingly toothed from the middle upwards; lower auricle very large, overlapping the petiole; petiole 6–8 ft. *Spadices* 4 ft., peduncle 2 ft. *Fruit* about the size of a crab-apple, globosely turbinate, broader than long.

13. CARYOTA, *Linn.*

Tall palms, soboliferous or not, flowering from the upper leaf-sheaths, and successively from lower (alternately male and fem.); trunk naked or sheathed. *Leaves* few, very large, broad, bipinnatisect; leaflets very obliquely dimidiately flabelliform, or cuneiform, præmorse or rounded at the tip, petiolules or bases swollen at the insertion. *Spathes* 3–5, incomplete, tubular. *Spadices* interfoliar, shortly peduncled, much fastigiately branched; branches slender, pendulous; flowers solitary and male, or 3-nate with the intermediate fem. *Fem. fl.* symmetric; sepals rounded, imbricate; petals linear-oblong, valvate; stamens very many, filaments very short, anthers long. *Fem. fl.* subglobose, sepals rounded, imbricate; petals rounded, valvate; ovary 3-celled, stigma 3-lobed, ovules erect. *Fruit* globose, 1–2-seeded, stigma terminal. *Seeds* erect; albumen ruminate; embryo dorsal.—Species about 10, tropical Asiatic, Malayan and Australian.

1. **C. urens,** *Linn. Fl. Zeyl.* 187; trunk stout tall not soboliferous, leaflets cuneiform very obliquely truncate acutely serrate-toothed, upper margin produced and caudate, male buds cylindric about 3 times as long as broad, stamens 40–45, fruit ⅝–¾ in. diam., base apiculate, testa adherent. *Gærtn. fruct.* i. 20, t. 7; *Roxb. Fl. Ind.* iii. 625; *Mart. Hist. Nat. Palm.* 193, t. 107 and 108, and 162; *Griff. in Calc. Journ. Nat. Hist.* v. 479; *Palms Brit. Ind* 160; *Thw. Enum.* 329; *Dalz. & Gibs. Bomb. Fl.* 278; *Miq. Fl. Ind. Bat.* iii. 11.—*Rheede Hort. Mal.* i. t. 11.

Throughout the HOTTER PARTS OF INDIA, from the Sikkim Himalaya and Assam southwards to Ceylon and Singapore—DISTRIB. Trop. Asia, Malaya.

Trunk 30–40 ft. 1 ft. diam., annulate. *Leaves* 18–20 by 10–12 ft., leaflets 5–6 ft., curved and drooping, pinnules 4–8 in., broadly cuneate, upper narrower, outer margin caudate; petiole very stout. *Spadix* 10–12 ft. long; spathes 1½ ft.; branches all reaching the same level; flowers 3-nate, a fem. between two males; male ½ in. long, or more. *Fruit* reddish.

2. **C. obtusa,** *Griff. in Calc. Journ. Nat. Hist.* v. 480; *Palms Brit. Ind.* 170; glabrous, trunk tall stout not soboliferous, leaflets very obliquely cuneiform crenate, upper margin not caudate, male buds about as long as broad, stamens very many, fruit ¾–1 in. diam., base not apiculate. *Mart. Hist. Nat. Palm.* iii. 195. C. obtusidentata, *Griff. Palms Brit. Ind.* 236 A, B.

UPPER ASSAM; Mishmi Mts., alt. 3–4000 ft., *Griffith.*

Habit and stature of *C. urens*, from which it differs in the more rounded and crenate apex of the leaflets, in the shorter unexpanded male flowers and slightly in the fruit.

Var. *æquatorialis*, Becc. mss.; pinnules more acute more deeply crenate or serrate, male fl. larger, stamens more than 100. ? *C. ochlandra*, *Hance in Journ. Bot.* 1879, 174.—Malay Peninsula; Perak, *Wray* (n. 1239). Malay Islands, China

3. **C. mitis,** *Lour. Fl. Cochinch* ii. 569; stem low soboliferous, petioles leaf-sheaths and spathes scurfily villous, leaflets very obliquely cuneiform erose and toothed, upper margin acute, spadix branches scurfy, male buds cylindric, stamens about 15–25. *Mart. Hist. Nat. Palm.* iii. 195; *Kunth Enum.* iii.; *C. sobolifera*, *Wall. Cat.* 8594, *Mart. l. c.* iii. 194, t. 107, f. 2; *Griff. in Calc. Journ. Nat. Hist.* v. 481; *Palms Brit. Ind.* 171, t 236 C; *Miq. Fl. Ind. Bat.* iii. 41; *Kurz. For. Fl.* ii. 530. *C. urens*, *Jacq. Fragm.* 20, t. 12, f. 1. *C. nana*, *Wall. Cat.* 8595. *C. furfuracea*, *Blume in Mart. l. c.* 195; *Rumphia*, ii. 141 (*excl. var.* caudata). *C. propinqua*, *Blume in Mart. l. c.* 195, *in Rumphia l. c.* 138, t. 155 (*partim*) 162. *C. Griffithii*, *Becc. in Nuov. Giorn. Bot. Ital.* iii. 15.

BURMA; from Arracan southwards, and the MALAY PENINSULA, PENANG and the Andaman Islands.—DISTRIB. Malay Islands.

Stem 15–25 ft. by 1–5 in. diam. *Leaves* 4–9 ft., pinnules 4–7 in., irregularly toothed. *Spadix* as in *C. urens*, but much smaller, with fewer unequal scurfy branches, and much smaller flowers, the males about ¼ in. long. *Stamens* apiculate. *Staminodes* 3, tips glandular. *Fruit* ½ in. diam., blueish black. *Seed* globose, testa loose.

14. **ORANIA,** *Zippel.*

Tall, stout, unarmed palms. *Leaves* terminal, equally and regularly pinnatisect; leaflets linear, tips obliquely lobed or torn, strongly unicostate; petiole stout, sheath short. *Spathes* 2, lower short, tubular, compressed; upper large, clavate, cleft longitudinally. *Spadix* interfoliar, elongate, shortly peduncled, branches slender fastigiate; flowers minute, upper or all male, lower or all 3-nate, a fem. between 2 males. *Male fl.* subsymmetric; calyx minute, 3-fid; petals oblong or lanceolate, valvate; stamens 3 or 6, filaments subulate, anthers erect slits extrorse; pistillode conic. *Fem. fl.* larger, ovoid; calyx membranous, 3-fid; petals ovate, obtuse, valvate; staminodes 3 or 6; ovary 3-gonous, 3-celled, stigmas recurved; ovules pendulous. *Fruit* globose, 1–3-celled, stigmas basilar. *Seed* globose, testa spongy, adherent to the endocarp; albumen equable; embryo dorsal.—Species about 5, tropical Asiatic and Malayan.

1. **O. macrocladus,** *Mart. Hist. Nat. Palm.* iii. 186, t. 177, f. 1; flowers all 3-nate, a fem. between 2 males, more or less distichously arranged, stamens 6. *Becc. in Ann. Jard. Bot. Buitenz.* ii. 152, 164, t. 13. Macrocladus sylvicola, *Griff. in Calc. Journ. Nat. Hist.* v. 489; *Palms Brit. Ind.* 177, t. 239 A, B.

MALAY PENINSULA; Malacca, in the Ching forests, *Griffith.*—DISTRIB. Java.

Trunk 40 ft.; crown densely leafy, subhemispheric. *Leaves* 12–15 ft., subovate in outline; leaflets 2½–3 ft. by 2 in., white and scurfy beneath; petiole 5 ft. *Spathes* and spadix scurfy. *Spadix* paniculately branched, nodding, branches slender; flowers white. *Fruit* 1¼–1½ in. diam., smooth, whitish.

15. **NIPA,** *Wurmb.*

A prostrate æstuarial gregarious palm; stem (or rootstock) branched. *Leaves* pinnatisect; leaflets lanceolate, plicate. *Spathes* many, sheathing. *Spadix* terminal, branched, erect, fruiting drooping; flowers monœcious, male in catkin-like lateral branches of the spadix, female in a globose terminal head, perianth glumaceous. *Male fl.* minute mixed with setaceous bracteoles; sepals linear, with broad truncate inflexed tips, imbricate; petals smaller; stamens 3, filaments cuneate, anthers linear basifixed; pistillode 0. *Fem. fl.* much larger; sepals 6, rudimentary, displaced; staminodes 0; carpels 3, tips free, each with an oblique stigmatic line; ovules 3, erect. *Fruit* large globose, syncarp of many obovoid hexagonal 1-celled 1-seeded carpels, with pyramidal tips and infra-apical stigmas, pericarp fleshy and fibrous, endocarp spongy and flowery. *Seed* erect, grooved on one side, testa coriaceous viscid within, and adherent to the endocarp, hilum broad, albumen equable, hollow; embryo basilar, obconic.

1. **N. fruticans,** *Wurmb. in Verh. Bat. Genootsch.* i. 349; *ex Blume Rumph.* ii. 72; iii. 164, 165; *Mart. Hist. Nat. Palm* iii. 305, t. 208; *Lam. Illustr.* t. 897; *Labill. in Mem. Mus. Par.* v. t. 21, 22; *Gaud. Voy. Bonite,* t. 67; *Kunth Enum.* iii. 110, 589; *Miq. Fl. Ind. Bat.* iii. 150; *Griff. Notul.* iii. 168; *Ic. Pl. Asiat.* 244; *Roxb. Fl. Ind.* iii. 650; *Thw. Enum.* 327; *Kurz. For. Fl.* ii. 541.

From the SUNDERBUNDS, southwards to the MALAY PENINSULA. CEYLON.—DISTRIB. Malay Archip. and Australia.

Trunk or rootstock very stout. *Leaves* 15–30 ft.; leaflets 1–5 ft., rigid, glaucous beneath; petiole 4–5 ft., very stout. *Spadix* 4–7 ft.; peduncle 3–4 ft. *Fruit* as large as a man's head; carpels 4–6 in. long, smooth, brown.—Not recorded as existing in either coast of the Deccan Peninsula.

16. **PHŒNIX,** *Linn.*

Low or tall dioœcious palms. *Leaves* pinnate; leaflets lanceolate or ensiform, sides induplicate. *Spadices* usually several, interfoliar, erect or drooping in fruit, branched; spathe basilar, complete, coriaceous: flowers small, yellowish, coriaceous. *Male fl.*, calyx cupular 3-toothed; petals 3, obliquely ovate, valvate; stamens 6 (3–9), filaments subulate, anthers erect, dorsifixed; pistillode minute or 0. *Fem. fl.* globose, calyx of the male, accrescent; petals rounded, imbricate; staminodes 6, or a 6-toothed cup; carpels 3, free, stigmas sessile, uncinate; ovules erect. *Fruit* oblong, terete, 1-seeded, stigma terminal, pericarp fleshy, endocarp membranous. *Seed* oblong, ventrally grooved; albumen equable or subruminate, embryo dorsal or subbasilar.—Species 10 or 11, African and Asiatic.

The following attempt at diagnosing the Indian species of *Phœnix* is tentative, and awaits much further knowledge of the living plants before it can be accepted as trustworthy. The true Date, *P. dactylifera*, has been introduced into Sindh and N.W. India.—*J. D. H.*

* Embryo ventral.

† *Stem tall, (or short* in *P. zeylanica).*

1. **P. sylvestris,** *Roxb. Hort. Beng.* 73; *Fl. Ind.* iii. 787; trunk solitary stout, petiole spinous, leaflets 1–2 ft. fascicled 2–4-farious rigid glaucous green, male spadix 2–3 ft., fruit 1–1¼ in. long, terete. *Mart. Hist. Nat. Palm.* iii. 276 (*excl syn. Linn. & Kaempf.*) 326, t. 136. *Kunth Enum.* iii. 255; *Wall. Cat.* 8602; *Griff. in Calc. Journ. Nat. Hist.* v. 350; *Palms Brit.* 141, t. 228 A; ? *Dalz. & Gibs. Bomb. Fl.* 278; *Brand. For. Fl.* 554; *Kurz, For. Fl.* ii. 535; *Becc. Males.* iii. 347, 364, t. 43, f. 3. Elate sylvestris, *Linn. Sp. Pl.* 1189, *in part.* Katou Indel, *Ham. in Trans. Linn. Soc.* xv. 86.—*Rheede Hort. Mal.* iii. t. 22, 25.

Cultivated throughout the plains of INDIA and BURMA. Wild in the Indus basin, *Aitchison.*

Trunk 25–40 ft., clothed with the persistent bases of petioles. *Leaves* 10–15 ft., quite glabrous. *Spathe* 12–16 in., scurfy, petiole short. *Spadices* erect, fruiting inclined with spreading branches; branches of male filiform; male fl. ¼–½ in. long. *Fruiting peduncle* short, 6 in. or more. *Fruit* orange yellow, seed rounded at both ends, pale brown.—Very near *P. dactylifera* and possibly the origin of that plant, of which the leaflets point more forward and are of a brighter green, and the seeds are acute at both ends, but most variable in this respect and often imperfect. The Bombay Flora is cited above with doubt, as its authors imply that the leaflets are not fascicled. They say "Roxburgh says the leaflets are fascicled, this is surely a mistake." They mention another species as growing in the Hewra Garden, and brought from the Ghats, with a stem 6–8 ft. high, and leaves more slender and delicate than *sylvestris* and *acaulis*. The *Elate sylvestris* of Linnæus includes this and a Ceylon palm (see *P. zeylanica*).—Griffith observes that Rheede's figure represents the fruit as very much smaller and of a different shape from that of the Bengal plant. The whole subject wants a careful study.

2. **P. zeylanica,** *Trimen in Journ. Bot.* 1885, 267; *Syst. Cat. Zeyl. Pl.* 96, stem 14 ft. or less, leaflets subequidistant quadrifarious bright green rigid, fruiting spadix with long slender spreading branches, fruit scarlet then dark purple. P. zeylanica, *Hort; Hook. f. in Kew Report,* 1882, 63. P. sylvestris, *Thwaites Enum.* 329. P. pusilla, *Gærtn. Fruct.* i. 24, t. 9; *Mart. Hist. Nat. Palm.* iii. 273, 321, t. 136 (*partly as to descr., and excl.* figs. x., xi., in t. W., and 1–15 in t. 124). Elate sylvestris, *Linn. Sp. Pl.* 1189 (*the Ceylon plant only*).

CEYLON; in shady woods.

Stem 8–20 ft., rarely much shorter. *Leaves* rather short; leaflets very many, not fascicled, 7–10 in., pungent, spreading at right angles. *Fruit* ½ in. or rather more, ¼ in. diam. *Seed* nearly as long, with the groove dilating into a canal of various forms.—(Trimen's appropriate name should replace Gærtner's misleading one, even if Gærtner had been right in assuming his plant to be the "Palma dactylifera aculeata minima" of Plum. Gen. Amer. 3, which he cites doubtfully as a synonym, and which is an American plant.—*J. D. H.*)

3. **P. rupicola,** *T. Anders. in Journ. Linn. Soc.* xi. 13; trunk solitary slender naked, leaflets 1½ ft. bifarious and not fascicled flaccid bright green, fem. spadix 3–4 ft. long peduncled, fruit ¾ in. long. *Becc. Males.* iii. 348, 395. P. Andersoni, *Cat. Hort. Calcut.* No. 119 (1886–7), p. 29 ?; *Gard. Chron.* 1877, ii. 45, fig. 4.—Phœnicoidea, *Griff. Journals,* 46.

SIKKIM HIMALAYA, alt. 400–1400 ft., *Anderson.* ASSAM and the MISHMI HILLS, *Griffith.*

Trunk 15–20 ft. by 8 in. diam. *Leaves* 10 ft., quite glabrous; petiole compressed. *Spadices* elongated, much compressed, females with a few fascicled spikes on the acute margins near the apex; spathe 1 ft. long. *Fruit* oblong, shining,

yellow. *Seed* ½–¾ in. long; groove dilated inwards.—The numerous bright green decurved leaflets all in one plane, are peculiar to this beautiful species.

†† *Stem normally very short or* 0 (sometimes elongate in *P. humilis*).

4. **P. acaulis,** *Buch. ex Roxb. Fl. Ind.* iii. 783, *Hort. Beng.* 73; stem bulbiform, leaflets in subopposite fascicles multifarious subglaucous, spathes 6–8 in., rigid, spadix and its peduncle very short, and branches erect very stout, fruit ½ in. long. *Ham. in Trans. Linn. Soc.* xv. 87; *Kunth Enum.* iii. 257; *Griff. in Calc. Journ. Nat. Hist.* v. 345; *Palms Brit. Ind.* 137, *var.* melanocarpa, *ll. cc.* 346, 138, t. 227; *Mart Hist. Nat. Palm,* iii. 274, 321; *Dalz. & Gibs. Bomb. Fl.* 278; *Brandis, For. Fl.* 555; *Becc. Males.* 348, 397, t. 44, iv. f. 51–57; *Wall. Cat.* 8602 C.

NORTHERN and CENTRAL INDIA; from Kumaon eastwards to the KHASIA HILLS and BURMA.

Stem 6–10 in. diam., densely clothed with sheaths and bases of petioles. *Leaves* 2–6 ft.; pinnules ¾–1½ ft., very rigid; marginal nerve very strong; petiole 1 ft. or more with many spines. *Spadix* 6–10 in., compressed, rather longer than the lanceolate obtuse spathe, branches very stout; male fl. ¼–½ in. long. *Fruit* elliptic-oblong, mucronate, bright red to blue black. *Seed* ¾ ⅜ in. long, groove broad.

5. **P. farinifera,** *Roxb. Cor. Pl.* i. 55, t. 74; *Hort. Beng.* 73; *Fl. Ind.* iii. 785; stem very short, leaflets subopposite 4-farious ensiform rigid pungent dark green, fruiting spadix 8–12 in, branches spreading, drupe small black. *Mart. Hist. Nat. Palm.* iii. 274 (excl. syn. *pusilla*); *Griff. in Calc. Journ. Nat Hist.* v. 348; *Palms Brit. Ind.* 140 (*excl. syn.*); *Brand. For. Fl.* 556; *Stevens. in Proc. Agric. Hort. Soc. Madras,* N.S. iv. (1886) 346. ? P. pusilla, *Trim. in Journ. Linn. Soc.* xxiii. 173; *Becc. Males.* 349, 402, t. 44, f. 28–37.

COROMANDEL coast, not far from the sea. CEYLON, in the north part of the island.

Shrubby; stem at most 4 ft., thickly clothed with old leaf sheaths. *Petiole* with one or more pairs of spines. *Spathes* leathery smooth, marcescent. *Spadix* 8–12 in., much branched; male fl. ⅛ in. long. *Fruit* the size of a large French bean, pulp sweet and mealy. *Seed* pretty smooth, brown, grayish within.—Roxburgh, who is the only sure authority for this species, does not give the length of the fruiting peduncle, of the spathe, or of the petiole. The stem, he says, has a farinaceous pith. Mr. Stenvenson observes that the foliage is so spinous that it is impossible to walk through clumps of this species.

6. **P. humilis,** *Royle Ill.* 394, 397, 399; stems short tufted (and bulbiform ?) rarely elongate, leaves subglaucous, leaflets scattered interruptedly fascicled, fruiting spadix long-peduncled, branches spreading rather slender, fruit oblong, pericarp thin. *Becc. Males.* iii. 347, 373.

Hilly districts of INDIA; from Kumaon eastwards to Burma, and southwards to Malabar.—DISTRIB. China, Cochin China.

Neither the published description nor available collections suffices to distinguish this satisfactorily by habit and foliage from *P. acaulis,* though it is doubtless a different species, and easily recognized when in flower and fruit. According to Royle (who gives no description) both inhabit Kumaon, as both do the Khasia hills. The following forms are referred to it by Beccari, besides the var. *ε, P. Hanceana,* of China, and his remarkable Parusnath var. *γ, robusta,* which I discovered in 1848, and which cannot, I think, be included.—*J. D. H.*

Var. *α*, *typica*, Becc. l.c. 347, 379, t. 44, and ii. f. 22–24; stem short or moderately long, leaflets elongate pale green in usually remote fascicles, fruiting peduncle usually very long, fruit rather long, groove of seed very short. P. humilis, *Royle l.c.* P. Ouseleyana, *Griff. in Calc. Journ. Nat. Hist.* v. 347; *Palms Brit. Ind.* 139. P. sylvestris?, *Wall. Cat.* 8602 B.—Outer Himalaya, alt. 1–5000 ft., from Kumaon eastwards. Assam (*Jenkins*), the Khasia hills and Central India; at Chota Nagpore, *Cal. Ouseley.*—Griffith describes *P. Ouseleyana, from an Assam specimen*, as having the ovoid bulbous stem of *P. acaulis*, a foot long by 6 in. diam., leaves 2½–3 ft., leaflets very narrow indeed and strongly conduplicate 1 ft. long by (owing to the conduplication) ¼ in. broad, lower spinescent, male spadix 1 ft. rather longer than the spathe, fem. spadix 2–2½ ft. much longer than its spathe with few terminal long flexuose spikes, male fl. ¼ in. long (in Sikkim specimen). The seeds examined are from Sikkim, ½–¾ in. long, with a broad groove.

Var. *β*, *Loureirii*, Becc. l.c. 348, 379, t. 44, ii. f. 16, 17; stem short or very short, leaflets subglaucous often approximate mostly falciform, fruiting peduncle elongate, fruit ovoid. P. Lqureirii, *Kunth Enum.* iii. 257. P. pusilla, *Lour. Fl. Cochinch.* 614 (*non. Gærtn.*). P. Roebelinii, *O'Brien*, in Gard. Chron. 1889, ii. 475, 758, fig. 68.—Assam, the Khasia Hills, Burma, Munnipore, Cochin China.

Var. *δ*, *pedunculata*, Becc. l.c. 379, 387, t. 44, f. 13–15, 18–21, 25–27; stem short, pinnæ subglaucous more or less fascicled, spathe 8 in. long, margin fringed, fruiting peduncle very long, fruit small oblong-ovoid black, groove of seed usually dilating into a canal. P. pedunculata, *Palms Brit. Ind.* 139. P. acaulis, *Miq. Pl. Hohen. Nilg.* No. 1243.—Western Ghats, from the Concan southwards, ascending to about 6000 ft. on the Nilghiri hills, *Wight*, &c.—Griffith describes this, as soboliferous, with leaves 4–5 ft., leaflets 1 ft., petiole bearing solitary or fascicled spines, male spadix about a span long, fem. a little longer, with a very long fruiting peduncle, fruit ½–⅔ in. by ¼–½ in. diam.—Mr. J. Steavenson (*in Journ. Agric. Hort. Soc. Madras*, N.S. (1866), 337), observes that this is a graceful pale green palm, with the stem never more than a foot or so high. The seeds described above are from Nilghiri specimens and are ⅓–½ in. long. Specimens, presumably of this var., sent by Mr. Talbot from N. Canara, have spathes 8 in. long, with a deep brown fringe of matted woolly hairs; fruit black; seeds ½–⅔ in. long, groove narrow, hardly dilated within.

** Embryo basilar.

7. **P. paludosa,** *Roxb. Hort. Beng.* 75; *Fl. Ind.* 789; gregarious, subarboreous, leaflets opposite and alternate bifarious ensiform with filiform tips whitish or farinose beneath, branches of spadix spreading, fruit ovoid black. *Mart. Hist. Nat. Palm.* iii. 272, 320, t. 136; *Kunth Enum.* iii. 256; *Wall. Cat.* 8603; *Griff. in Calc. Journ. Nat. Hist.* v. 353; *Palms Brit. Ind.* 144, t. 229 A, B; *Kurz in Journ. As. Soc. Beng* xliii. ii. 202; *For. Fl.* ii. 536; *Brandis, For. Fl.* 556; *Gamble, Man. Ind. Timb.* 419. P. siamensis, *Miq. Palm. Archip. Ind.* 14.

Aestuarial shores from BENGAL to BURMA and the ANDAMAN ISLANDS—DISTRIB. Siam, Cochin China.

Trunks 8–25 ft., often inclined, soboliferous, annulate, 12–18 in. diam. *Leaves* 8–10 ft., leaflets 1–2 ft.; petiole 3–5 ft., slender, scurfy, with many long spines, sheath fibrous. *Male spadix* with its peduncle 1¼ ft., compressed; spathe as long, scurfy; fem. spathe shorter; male fl. ¼ in. long; fem. subglobose with 6 staminodes. *Fruit* ½ in. long, mucronate, black purple when fully ripe.

IMPERFECTLY KNOWN SPECIES.

8. **P. robusta,** *Hook. f.*; trunk 15–20 ft. as thick as a man's body closely clothed and appearing tessellated from the sheaths of the fallen leaves, leaves about 3 ft. long, leaflets fascicled quadrifarious strict,

strongly conduplicate, fruiting peduncle 2 ft. P. humilis, *var.* robusta, *Becc. Males.* 348, 384.

BEHAR; on Parusnath, alt. 4000 ft., *J. D. H.*, &c.

A very remarkable species from the great bulk of the trunks, and their tessellated appearance, due to the comparatively small size of the appressed old leaf-sheaths, of which, judging from excellent photographs procured for me by Mr. Clarke, there must be very many in a plane cutting the diameter of the trunk; they give to the trunk the appearance of a Cycas. The figure of *P. cycadifolia*, Regel, Gartenfl. 1879, 131, t. 974, a plant referred to *dactylifera*, strongly resembles *robusta* in the bulk and marking of the trunk.

17. CORYPHA.

Tall stout unarmed palms, dying after once flowering and fruiting. *Leaves* very large, orbicular or lunate, flabellately multifid; petiole spinous. *Spadix* very large, terminal, erect, paniculate; spathes many, tubular. *Flowers* small, bisexual. *Calyx* cupular, 3-fid. *Petals* 3, connate below in a stipes, ovate, acute, imbricate or subvalvate. *Stamens* 6, filaments subulate, anthers dorsifixed. *Ovary* 3-lobed, 3-celled; style short, subulate, stigma minute. *Fruit* of 1–3 globose fleshy drupes, styles basilar. *Seed* erect, globose or oblong; albumen equable; embryo spiral. —Species about 6, tropical Asiatic.

1. **C. elata,** *Roxb. Fl. Ind.* ii. 176; trunk spirally ridged, leaves lunate, petiole with black margins and curved spines, panicle rounded ovoid, branches spreading, drupe about 1 in. diam. stipitate. *Mart. Hist. Nat. Palm.* 233; *Kunth Enum.* iii. 236. *Griff. in Calc. Journ. Nat. Hist.* v. 314; *Palms Brit. Ind.* 112, t. 220 D. C. Gebanga, *Kurz For. Fl.* ii. 525, *an Blume?*

BENGAL and BURMA.

Trunk straight, 60–70 ft. high by 2 ft. diam. *Leaves* 8–10 ft. diam., 80–100-fid to about the middle; lobes ensiform, obtuse or 2-fid; petioles 6–12 ft., spirally arranged, auricled. *Spadix* about ¼ the height of the trunk, much narrower in span than the foliage, supradecompound; spathes many. *Flowers* in scattered fascicles on the rather stout spreading branchlets of the spadix; calyx 3-toothed, petals reflexed; ovary suddenly contracted into the short style. *Drupe* very shortly stipitate, olive colrd., smooth; pericarp friable, endocarp adnate to the testa.—Griffith describes the leaves as nearly circular, 5–6 by 15 ft. broad, with narrower segments than in the other Indian species.

2. **C. umbraculifera,** *Linn. Sp. Pl Ed.* ii. 1657; trunk annulate, leaves sublunate or circular palmately pinnatifid conduplicate above the middle, panicle pyramidal, primary branches piercing the spathes, drupes 1½ in. diam. *Gærtn. Fruct.* i. 18, t. 7 (seed inverted); *Kunth Enum.* iii. 236; *Roxb. Fl. Ind.* ii. 177; *Mart. Hist. Nat. Palm.* iii. 232, t. 108, 127 (*partim*); *Griff. in Calc. Journ. Nat. Hist.* v. 319; *Palms Brit. Ind.* 116. *Thw. Enum.* 329; *Dalz. & Gibs. Bomb. Fl. Suppl.* 94; *Kurz For. Fl.* ii. 525; *Brand. For. Fl.* 549; *Wall. Cat.* 8615.—*Rheede Hort. Mal.* iii. t. 1–12.

MALABAR COAST and CEYLON.

Trunk 60–80 ft. diam. *Leaves* 6 ft. long by 13 broad, 80–100-fid to about the middle, segments obtusely 2-fid; petiole 7 ft., spines often in pairs. *Spadix* attaining 20 ft., pyramidal, branches spreading. *Calyx* broadly 3-lobed. *Ovary* suddenly contracted into the style. *Drupe* shortly stipitate.

3. **C. Talliera,** *Roxb. Cor. Pl.* iii. 251, t. 255, 256; *Fl. Ind.* ii. 174;

trunk obsoletely annulate, leaves subrotund complicate above the middle subglaucous, basal lobes overlapping, panicle pyramidal, branches axillary to the spathes spreading, secondary forked, drupes 1½ in. diam. *Kunth Enum.* iii. 236; *Mart. Nat. Hist. Palm.* iii. 231; *Griff. in Calc. Journ. Nat. Hist.* v. 317; *Palms Brit. Ind.* 114, t. 220 E, F, *Wall. Cat.* 8616. Talliera bengalensis *Spreng. Syst.* ii. 18. T. Tali, *Mart. in Roem. & Sch. Syst.* vii. 1306.

BENGAL, *Roxburgh.*

Trunk about 30 ft., dark brown, rather rough. *Leaves* 6 ft. long by 15 broad, 90–100-fid, lobes deeper and broader than in *umbraculifera*, the central 3–3½ ft.; petiole 5–10 ft., not spirally arranged, biauricled, spinous. *Spadix* 20 ft. or more high; primary branches with ascending tips, secondary bifarious, drooping; flowers in close clusters. *Calyx* obscurely 3-lobed. *Ovary* suddenly contracted into the style. *Drupes* 1–3, dark olive or greenish-yellow.

4. **C. macropoda,** *Kurz in Journ. Beng. As. Soc.* xliii. ii. (1874) 197, t. 15; *For. Fl.* iii. 525; stemless, leaves palmately flabellate 12–20 ft. diam. divided to the middle 6–10 ft. long, petiole 18–25 ft. slender base as thick as the arm, spines black, drupe the size of a cherry smooth olive brown.

SOUTH ANDAMAN ISLDS., *Kurz.*

IMPERFECTLY KNOWN SPECIES.

5. C. MARTIANA, *Becc. mss.*; panicle hemispherical, branchlets pendulous, petiole armed with small strong black spines, calyx broadly 3-lobed, ovary conico-ovoid narrowed into the short style, drupe on a stipes $\frac{1}{10}$ in. long.

BURMA; Mergui? (*Hort. Calcutt.*).

6. C. UMBRACULIFERA, *Linn.*; *Wall. Cat.* 8615; branchlets of panicle about 2 ft., as in *C. Taliera*, calyx distinctly 3-lobed, ovary gradually narrowed into a short style.—Hort. Carey 1828, *Wallich.*

18. NANNORHOPS, *H. Wendl.*

A gregarious tufted low-growing glabrous palm, with prostrate branching robust rhizomes or stems. *Leaves* cuneately flabellate, rigid, plicate, split into curved 2-fid segments; petiole short. *Spadix* interfoliar, much branched; spathes tubular, sheathing, spathels ochreate; flowers polygamous. *Calyx* tubular, membranous, unequally 3-lobed. *Corolla* 3-partite, segments valvate. *Stamens* in hermaph. fl. 6, in male about 9. *Ovary* trigonous; style short, stigma 3-toothed; ovules basilar. *Drupe* small, globose or oblong, 1-seeded, style basilar. *Seed* free, erect, ventrally hollowed; hilum small, albumen equable; embryo dorsal or subbasilar.

1. **N. Ritchieana,** *H. Wendl. in Bot. Zeit.* 1879, 148; *Aitchis. in Journ. Linn. Soc.* xix. 140, 141 and 187, t. 26. Chamærops Ritchieana, *Griff. in Calc. Journ. Nat. Hist.* v. 342; *Palms Brit. Ind.* 135; *Brand. For. Fl.* 547; *Gard. Chron.* 1886, 652, *fig.* 128, 129; *Mart. Hist. Nat. Palm.* iii. 252.

SINDH, and the WESTERN PANJAB; on the Salt Range and at Attok, *Aitchison.*—DISTRIB. Affghanistan.

Stem or rhizome 8–10 ft. long, as thick as a man's arm, dichotomously branched, covered with old leaf sheaths. *Leaves* 2–3 ft. long and broad, whitish, split to the middle or lower into rigid segments with often interposed fibres; petiole 6–12 in.; margins serrulate. *Spadix* pyramidal, 2–3 ft., branches ascending and recurved, branchlets slender; flowers in pairs within a membranous spathella, one sessile

bracteate, the other pedicelled ebracteate. *Stamens* in the male fl. inserted in the corolla-tube; in the hermaph. fl. in its throat; anthers deeply sagittate. *Ovary* narrowed into the style. *Drupe* globose ellipsoid or oblong, from the size of a pea to a bullet.

19. LICUALA.

Low, rarely tall palms; stems annulate. *Leaves* more or less orbicular, or flabellate, plicate, deeply partite; petiole usually spinous. *Spadices* interfoliar, sheathed by tubular coriaceous persistent spathes, simple or branched, glabrous tomentose or scurfy; flowers usually small, scattered, hermaphrodite; bracts and bracteoles obscure or 0. *Calyx* cupular or tubular, mouth 3-fid. *Corolla-lobes* coriaceous, valvate. *Stamens* 6, filaments subulate; anthers cordate. *Ovary* of 3 free or nearly free truncate 1-ovuled carpels; styles filiform; ovules erect. *Drupes* small; style terminal. *Seed* erect, globose, free, ventral face often hollowed; albumen equable, embryo dorsal.—Species about 45, trop. Asia, Australia and Pacific.

There are several unnamed Burmese and Malayan-Peninsular species in the Kew Herbarium, which I fail to identify with any of the Indian ones enumerated by Beccari. I refrain from describing them, as they are solitary specimens, and may be the same as known Malayan island species, of which I have seen no specimens.—*J. D. H.*

A. Flowers ½–¾ in. long.

1. **L. peltata,** *Roxb. Fl. Ind.* ii. 179; leaf orbicular 12–30-partite, petiole armed throughout with strong curved spines, spadix with many superposed branches tomentose and flowers tomentose. *Ham. in Mem. Wern. Soc.* v. 313; *Griff. in Calc. Journ. Nat. Hist.* v. 325; *Palms Brit. Ind.* 120, t. 222. *Mart. Hist. Nat. Palm.* 234, t. 162; *Kunth Enum.* iii. 238; *Wall. Cat.* 8617; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 204; *For. Fl.* ii. 527; *T. Anders. in Journ. Linn. Soc.* xi. 13; *Gard. Chron.* 1872, 1657, *fig.* 350.

SIKKIM HIMALAYA, ASSAM, the KHASIA HILLS, SILHET, BURMA and the ANDAMAN ISLDS.

Stems 8–15 ft., usually gregarious. *Leaves* 3–5 ft. diam., segments variously connate, many-toothed at the apex, teeth ½–2 in.; very variable in length and breadth, obtusely 2 fid; petiole 3–4 ft., stout. *Spathes* tubular, 6–12 in. long by ½–¾ in. broad, mouth irregularly toothed or lobed. *Spikes* of tall stout spadix distant, 6–10 in., pendulous, fulvous-tomentose; flowers stipitate. *Calyx* campanulate, silkily pubescent, shortly lobed. Petals ¼–½ in. long, lanceolate, very coriaceous. *Fruit* ½ in. long, ellipsoid, narrowed equally at both ends, orange-colrd. *Seed* with the intruded hilar process dilated within.

B. Flowers much less than ½ in. long.

I. Spathes tubular, with entire or lacerate mouths.

* Spadix with 8–10 superposed branched inflorescences arising from special spathes.

2. **L. paludosa,** *Griff. in Calc. Journ. Nat. Hist.* v. 233; *Palms Brit. Ind.* 118, t. 221, A, B, C; leaves flabelliform or orbicular 7–9-partite, lateral segments deeply acutely 3–4-lobed, the rest truncately 4–8-lobed, petiole unarmed above, flowers minute glabrous, petals very short. *Becc. Males.* iii. 74.

MALACCA; *Griffith*. PERAK, *Scortechini, King's Collector*, 7339, 8534.—DISTRIB. Siam.

Stem 4–10 ft. 3–9 in. diam., smooth. *Leaves* 3 ft. diam.; petiole 1–2 ft., spines few short, recurved; sheaths very fibrous. *Spathes* ¾ in. broad, mouths lacerate. *Spadix* very stout; branches 4–8 in., spreading and recurved; flowers sessile. *Calyx* cup-shaped, $\frac{1}{10}$ in. broad. *Petals* ovate. *Fruit* spherical, ¼ in. diam.—Griffith observes that this species approaches *L. spinosa*, but is abundantly distinct by its smooth stem, which does not look much like the stem of a Palm, and by the small smooth turbinate flowers. I doubt Kurz's Andaman plant being the same, it has shortly tomentose branches of the spadix and flowers.

3. **L. longipes,** *Griff. in Calc. Journ. Nat. Hist.* v. 330; *Palms Brit. Ind.* 125, t. 221 A, B; stem very short, leaves orbicular about 20-partite, segments cuneate crenate lateral obliquely truncate terminal about 11-toothed, crenatures 2-fid crenulate, petiole shortly armed, spathes short broad, spadices much shorter than the petioles, branches spreading and flowers glabrous or pubescent, calyx cylindric, base truncate, petals cordate-lanceolate, ovary villous. *Kurz in Journ. As. Soc. Beng.* xliii. 204; *For. Fl.* ii. 528.

TENASSERIM; forests in Mergui. MALACCA, *Griffith, Kurz.*

Leaves 3–4 ft. diam.; petiole 1–5 ft., trigonous, deeply channelled above, glabrous; spines very variable in size and number, but never long. *Spathes* 3–6 in. long by ½ in broad, compressed, deeply lacerate at the mouth. *Spadix* stout and flowers sparsely or sometimes densely pubescent; branches stout, curved and spreading; flowers sessile. *Calyx* shortly lobed, lobes 2-fid. *Petals* very short. *Ovary* villous. *Fruit* seated on the pedicel-like perianth.—The cylindric calyx with a broad truncate base is a good character.

** Spadix with 3–6 digitately branched or forked inflorescences.

† *Branches of spadix and flowers pubescent or scurfy.*

4. **L. spinosa,** *Wurmb. in Verh. Bat. Genootsch.* ii. 469; leaves orbicular-reniform sub 18-partite, lateral segments obliquely premorse 3–4-lobed or 2-partite, median 10–11-lobed, petiole armed throughout, spadix with many finely pubescent dense-fld. spikes and flowers, fruiting calyx campanulate, petals very small, ovary glabrous, fruit obovoid. *Roxb. Fl. Ind.* ii. 181 ? (*excl. syn. Rumph.*); *Griff. in Calc. Journ. Nat. Hist.* v. 321; *Palms Brit. Ind.* 119; *Blume Rumph.* ii. 39, t. 82, 88: *Mart. Hist. Nat. Palm.* iii. 235, 318, t. 135, 1, 2; *Miq. Fl Ind. Bat.* iii. 53; *Suppl.* 254. *Becc. Males.* iii. 74. L. paludosa, *Kurz in Journ. As. Soc. Beng.* xliii. 528; *For. Fl* ii. 528. L. ramosa, *Bl. in Schult. Syst.* vii. 1303; *Rumphia*, ii. 39. L. horrida, *Blume Rumph.* ii. 41, t. 89, f. 1; *Mart. l. c.* 237, 318.

MALACCA, *Griffith*. ANDAMAN ISLANDS, *Kurz, Man.*—DISTRIB. Malay Islands.

Stems 8–10 ft., stout, 2–4 in. diam., densely tufted, rough with scars of fallen leaves. *Leaves* 4 ft. diam.; petiole obtusely trigonous, spines stout curved; ligule 1–1½ in., scarious. *Spathes* very long, scurfy, ¾ in. diam., mouths lacerate. *Spadix* rather longer than the leaves; branches 7–10, adnate to the rachis up to the mouth of the spathes; lower compound, spreading, generally secund; flowers 2–3-nate. *Calyx* lobed to the middle. *Petals* broadly lanceolate, acuminate. *Fruit* obovoid, ¼ in. long, pedicelled by the calyx-tube, red.—Beccari (mss.) refers Kurz's Andaman *L. paludosa* to *spinosa*, I think rightly (*J. D. H.*).

5. **L. malayana,** *Becc. Males.* iii. 197; leaves peltately digitate, segments 20–26, teeth very short broad obtuse, petiole very long spinous at

the base only, spadix elongate, branches many 3-partite spreading pubescent, flowers solitary spirally disposed finely pubescent, calyx tubular campanulate hardly toothed, base truncate and intruded, petals rather longer acute, ovary glabrous, fruit globose.

PERAK, *Scortechini*; Goping, *King's Collector*, 469, 8127.

Stem 4–6 ft., 1¼ diam. *Leaves* about 3 ft. diam.; petiole 5–6 ft., slender. *Spathes* narrow, 4–6 in. long by ½ in. broad, subfurfuraceous; lower acutely keeled, mouth shortly lacerate. *Spadix* 2½–3 ft., branches spreading and curved or flexuous; flowers inserted in small tubercles which (in the dried state) are sunk in the lobulate base of the calyx. *Staminal cup* deeply lobed. *Fruit* ¼ in. diam., rather longer than broad, tipped with the scale-like remains of the abortive carpels, dried pericarp chiefly lacemose.—Allied to *L. spinosa*, distinguished by the petiole armed only at the base, the form of the flowers, and the staminal cup deeply divided into large lobes.

6. **L. triphylla,** *Griff. in Calc. Journ. Nat. Hist.* v. 352; *Palms Brit. Ind.* 126, t. 225; stem very short, leaves few flabelliform 3–9-partite, segments broadly crenate, median narrowed into a petiolule, petiole very long and slender sparingly armed with small spines, spathes very slender, spadix short slender, branches few slender few-fld. and flowers puberulous, calyx turbinate, petals minute, fruit pisiform.

MALACCA; forests Ayer Punnus, *Griffith*. PERAK, *King's Collector* (2860, 3007).

Stem 3–4 in. *Leaves* with segments 8–10 in. long, of very various breadth, the tips of the central crenate with very short rounded notched lobes, the lateral obliquely premorse and notched; petiole 2 ft., not ¼ in broad; spines ⅛ in. *Spathes* 1½–2 in. long by ⅛–¼ in. diam., mouth split. *Spadix* a foot long, very slender, branches short, flowers $\frac{1}{10}$ in. long, scattered, subsessile. *Petals* minute, acute. *Seed* with a curved internal process.

7. **L. ferruginea,** *Becc. mss.*; leaves orbicular 3–7-partite, segments broadly crenate, the central subpetiolulate, petiole very long armed almost throughout furfuraceous or glabrate, spathes large broad flattened furfuraceous, spadix and its branches very stout thickly furfuraceously tomentose, flowers sessile, calyx cupular, petals very small.

SINGAPORE, *Gaudichaud, Lobb.* PERAK, at Sunki, 100–800 ft., *King's Collector* (3041).

Leaves 3 ft. diam., young furfuraceous towards the base below, segments merely notched as in *L. triphylla*; petiole 3–4 ft. with concave face and sides, and rounded back, young villously furfuraceous along the margin between the short stout spines. *Spathes* 4–6 in. long by 1½–2 in. broad, compressed, 2-keeled, mouth lacerate. *Spadix* very stout, with stout rusty-tomentose branches 6–8 in. long; flowers sessile, $\frac{1}{10}$ in. diam., rusty pubescent. *Calyx* very short, lobes rounded. *Fruit* ½ in. long, ellipsoidly obovoid, obscurely 3-ribbed when dry.

†† *Branches of spadix and flowers glabrous.*

8. **L. glabra,** *Griff. in Calc. Journ. Nat. Hist.* v. 329; *Palms Brit. Ind.* 124, t. 223; stem slender, leaves flabelliform 16–18-partite, segments linear-cuneate median 2–3-fid, tips with short bifid lobes separated by a broad sinus, petiole very slender almost unarmed, spathes glabrous, spadix slender elongate and flowers quite glabrous, branches adnate to the rachis far above the spathes 4–5-partite, calyx campanulate, petals lanceolate.

MALACCA; Mt. Ophir, *Griffith, Hullett* (852). PERAK; on Gunong Batu Pateh, alt. 3–4000 ft., *King's Collector* (8148); *Scortechini* (319[b], 593[b]).

Stem 3–4 ft., 1–1½ in. diam. *Leaves* 2–3 ft. diam.; petiole 4–5 ft., plano-convex. *Spathes* 3–6 in. narrow, cylindric, the lower a little compressed, mouth oblique bifid, tips quite entire. *Spadix* 4 ft. (in King's specimens), perfectly glabrous throughout, rachis quite smooth, furrowed when dry; branches 4–6 in., divaricate; flowers subsessile. *Calyx* obscurely 3-lobed. *Petals* twice as long, acuminate. *Young fruit* ellipsoid, narrowed at both ends, keeled, ½ in. long, stipitate by the calyx tube and spreading petals, tipped by the remains of the abortive carpels.

II. Spathes compressed, split on one side (tubular in *L. Kingii*).

* *Spadix with 2 or more superposed simple or branched inflorescences.*

9. **L. modesta,** *Becc. Males.* iii. 195; stem elongate, leaves semicircular, segments very many narrowly cuneate, petiole very long spinous towards the base only, spathes flattened acutely 2-edged glabrous margins of mouth quite entire, branches of spadix and flowers fulvous pubescent, staminal cup 6-lobed, ovary glabrous.

PERAK; Maxwell hill, *Scortechini*, alt. 3360 ft.; Larut, *King's Collector* (1945, 1951, 1983, 2420, 3243).

Stem 2–10 ft. *Leaves* palmately multifid; segments 2–3 nerved; petiole 3–4 ft., spines short recurved. *Spathes* 4–6 long by ½ in. broad, flat, glabrescent. *Spadix* 16–30 in.; branches spreading; flowers seated on small tubercles; calyx campanulate, lobes very short tipped with hairs; corolla rather longer; style subulate. *Fruit* globosely obovoid, about ½ in. long, pedicelled by the calyx.—Difficult to distinguish from *acutifida*.

10. **L. Kunstleri,** *Becc.*; stem robust, leaves long-petioled, mid-segment not petiolulate, petiole armed at the base, spathe much compressed furfuraceous mouth not lacerate, branches of spadix very scurfily and rustily hairy, flowers pedicelled pubescent.

PERAK; on Ulu Bubong, *Kunstler* (10,205).

Stem 4 ft. by 4–5 in. diam. *Calyx* campanulate, base narrowed, pubescent; petals rather longer.—Only a solitary imperfect specimen seen, well characterized by the pedicelled flowers. Allied to *acutifida*, differing in the robust stem, much broader leaf-segments, and longer floral pedicels.

11. **L. acutifida,** *Mart. Hist. Nat. Palm.* iii. 236, t. 135, f. 3, 4 (excl. Syn. Roxb.); stem slender, leaves many long-petioled, segments 15–20 very narrow terminating in long narrow bifid lobes, median petiolulate, petiole very slender shortly armed and furfuraceous towards the base, spadix spathes and flowers furfuraceously velvety, flowers seated on a rather prominent pedicel, calyx obconic. *Griff. in Calc. Journ. Nat. Hist.* v. 327; *Palms Brit. Ind.* 122, t. 222 A, B; *Wall. Cat.* 8618.

PENANG, *Lewis, Oxley.* SINGAPORE, *Lobb.*

Stem 15–20 ft., 1–2 in. diam. *Leaves* 1–2 ft. diam., segments 1–3-costate; terminal lobes ½–1 in.; petiole 18–48 in.; ligule elongate. *Spathes* paleaceously scurfy, 2-lobed, 4–6 in. long by ½ in. diam., silkily or silverily paleaceous. *Spadix* 12–18 in.; spikes 3–5 in., simple or forked, adnate to the rachis, lower flowers 2-nate, upper solitary; calyx obtusely 3-fid, pubescent; petals striate. *Ovary* obovoid, smooth; style filiform. *Fruit* ⅔ in. diam., stipitate by the calyx. *Seed* pisiform.

12. **L. pusilla,** *Becc. Males.* iii. 194; stemless, leaves palmately 9-fid, segments very narrow, median 3-fid on 3-partite shortly and obtusely toothed, lateral with very oblique tips having several short and one long

tooth, mouth of spathe lacerate, spadix nodding compressed, branches 3 simple subtomentose, flowers sessile, calyx campanulate pubescent, fruit very small pisiform.

PERAK; at Semhi, *King's Collector* (3028).

Closely allied to *L. triphylla*, but leaf-segments more numerous, mid-segment not petiolulate, and branches of the spadix simple. *Fruit* (dried) ¼ in. diam.—I have seen no flowers. *J. D. H.*

** *Spadix bearing a solitary simple or digitately branched inflorescence.*

13. **L. Scortechini,** *Becc. Males.* iii. 192; leaves semicircular sub 17-partite, segments with long 2-fid teeth, mid-segments 9 lateral 1–3-nerved, spathes 2 acutely 2-keeled inflated above acute, spadix and flowers fulvously pubescent, branches 4–5 filiform digitately branched, calyx obconico-campanulate truncate, petals pubescent striate, staminal cup 6-toothed, ovary glabrous.

PERAK; *Scortechini.*

Described from a single leaf and flowering spadix.

14. **L. Kingiana,** *Becc. Males.* iii. 193; stem slender, leaves small semicircular 5-partite, segments broad obtusely obliquely toothed, median broadest sessile cuneiform, petiole very slender, spathes 2, outer tubular acuminate split at the side, upper very narrow mouth lacerate, spadix terminating in a solitary dense-fld. spike, calyx campanulate hairy, staminal cup 6-toothed, ovary glabrous.

PERAK; at Goping, *Kunstler* (471).

Stem about 5 ft. by 1 in. diam. *Leaves* 10–12 in. diam.; segments all cuneiform, many-toothed; teeth ¼–⅓ in., obtuse, entire or 2-fid; petiole 18–20 in., armed from the lower third with small straight or recurved spines. *Spathes* very slender, ½–⅔ in. diam., nearly glabrous. *Spadix* 6–10 in., erect, and spike (2–4 in.) tomentose. *Calyx* irregularly lobed. *Petals* broadly ovate, finely pubescent, not striate. *Ovary* turbinate, glabrous; style subulate. *Fruit* not seen.

20. LIVISTONA, *Br.*

Tall palms, trunk annulate. *Leaves* orbicular, flabellately plicate, split to the middle into 2-fid narrow lobes; petiole long, margins spinous. *Spadices* interfoliar, long peduncled, erect, fruiting pendulous, loosely panicled; spathes many, tubular, sheathing; flowers minute, 2-sexual. *Sepals* 3, rounded, imbricate. *Corolla* 3-lobed, coriaceous, lobes valvate. *Stamens* 6, filaments subulate, united in a ring; anthers cordate. *Ovary* of 3 nearly free carpels; styles short, free or coherent, stigmas minute; ovules basilar, erect. *Drupes* 1–3, globose oblong or ellipsoid; style subterminal. *Seed* erect, ventral face hollowed; albumen equable; embryo dorsal.—Species about 13, tropical Asiatic and Australian.

L. chinensis, *Br.* (L. sinensis, *Mart.*;) *Griff. Palms of Brit. Ind.* 131, t. 226 D; *Wall. Cat.* 8620, a Chinese and Japanese species, is cultivated in India, and may be recognized by its reniformly flabellate leaves with long pendulous deeply bipartite divisions and the olive-like drupe.

1. **L. cochinchinensis,** *Mart. Hist. Nat. Palm.* iii. 242; leaves 9–10 ft. diam. orbicular, lobes 2-partite, segments very long linear pendulous, tips filiform, drupe globose ½–⅔ in. diam. *Becc. Males.* iii. 69. L.

spectabilis, *Griff. in Calc. Journ. Nat. Hist.* v. 336; *Palms Brit. Ind.* 130, t. 226 C. Corypha Saribus, *Lour. Fl. Cochinchin.* i. 212. Saribus cochinchinensis, *Blume Rumph.* ii. 49.

MALACCA, *Griffith.* PENANG, *Lewis.*—DISTRIB. Cochin China.

Trunk 50–60 ft., smooth. *Leaves* about 90-fid, divisions ensiform, central 2½–3 ft.; petiole obtusely trigonous, spiny throughout its length, spines stout compressed recurved. *Spadices* 4–5 ft., nodding; branches 1–1½ ft., spreading, much divided; spathes coriaceous, brown. *Flowers* sessile. *Calyx* cupular obtusely 3-toothed to the middle, corolla a little longer. *Carpels* cohering by their styles. *Drupes* pale blue; endocarp subopeous.

2. **L. Jenkinsiana,** *Griff. in Calc. Journ. Nat. Hist.* v. 334; *Palms Brit. Ind.* 128, t. 226 A, B; leaves 5–6 ft. diam. reniformly flabellate glaucous beneath, divisions very narrow straight shortly obtusely 2-toothed, drupe reniformly globose, ¾–1 in. diam.

ASSAM, common, *Jenkins.*

Trunk 20–30 ft. by 6–7 in. diam. *Leaves* 5–6 ft. broad, 70–80-fid; petiole spinous throughout its length. *Spadices* 2–3 ft., branches dichotomous, simple or compound; spathes 2 ft., woody, scurfy. *Flowers* clustered on small tubercles, small, greenish, ebracteate; calyx cupular, base truncate intruded; corolla twice as long. *Drupes* ¾–1 in. diam., leaden blue.

3. **L. speciosa,** *Kurz in Journ Beng. As. Soc.* xliii. ii. (1874), 196, 204, t. 13, 14; *For. Fl.* ii. 526; leaves 6–7 ft. diam., palmately flabellate divisions very shortly 2-toothed, teeth lanceolate acuminate converging, drupe obovoid ¾–1 in. long.

PEGU and TENASSERIM; *Kurz, Brandis.*

Trunk 50–70 ft. *Leaves* as broad as long, divisions linear; petiole with very strong sharp long recurved flattish black spines throughout its length. *Spadix* 2–4 ft., paniculate; spathes brown, smooth. *Flowers* solitary or in pairs on small tubercles; sepals and petals about ⅛ in. *Drupes* ¾ in. long, dark blue.

4. **L. Kingiana,** *Becc. Males.* iii. 199; leaves 15 ft. diam. orbicular, divisions broadly lanceolate rigid 2-fid lobes triangular, drupe globose 1½–2 in. diam.

MALAY PENINSULA; Perak, *Kunstler* (3904).

Trunk 60–100 ft. by 12–18 in. diam. *Leaves* as broad as long, very coriaceous, divisions 2–2½ in. broad; petiole 6 ft., armed throughout its length with sigmoidly flexuous very large stout spines like shark's teeth and ¾ in. long. *Spadix* much branched, branchlets subulate slender. *Drupe* smooth, peculiarly fleshy, endocarp grumous and tessellated.

21. TRACHYCARPUS, *H. Wendl.*

Tall unarmed palms. *Leaves* suborbicular or reniform, plicately multifid, segments narrow, rachis 0. *Spadices* many, interfoliar, stout, branched; spathes many, sheathing, embracing the peduncle and branches of the spadix, coriaceous, compressed, tomentose; bracts and bracteoles minute; flowers small, polygamo-monœcious. *Sepals* 3, ovate. *Petals* 3, broadly ovate, valvate. *Stamens* 6, filaments free; anthers short, dorsifixed. *Carpels* 3; stigmas 3, recurved; ovules basilar. *Drupes* 1–3, globose or oblong, style subterminal. *Seed* erect, ventrally grooved, hilum basilar; albumen equable; embryo dorsal.—Species 2 or 3, Himalayan, Chinese and Japanese.

1. **T. Martiana,** *H. Wendl. in Bull. Soc. Bot. Fr.* viii. (1861) 429; trunk for the most part naked annulate, fem. fl. solitary sessile, drupe oblong equally rounded at both ends, seed grooved throughout its length embryo opposite the middle of the groove. *T. khasiana, H. Wendl. l. c.*; *Hook. f. Bot. Mag.* t. 7128. Chamærops Martiana, *Wall. Cat.* n. 8621; *Mart. in Wall. Pl. As. Rar.* iii. 5, t. 211; *Hist. Nat. Palm.* iii. 251, 320; *Royle Ill.* 394,-7,-9; *Griff. in Calc. Journ. Nat. Hist.* v. 339; *Palms Brit. Ind.* 133. C. Griffithii, *Lodd. Cat. Palm.* 1841; *Hort. Par. ex Rev. Hortic.* 1879, 212, f. 43, ed. 1881, 143. C. khasyana, *Griff. in Calc. Journ. Nat. Hist.* v. 341; *Palms Brit. Ind.* 134, t. 227 A, B, C; *Brand. For. Fl.* 546; *Kurz in Journ. As. Soc. Beng.* xliii. 204; *For. Fl.* ii. 526; *Gamble Man. Ind. Timb.* 418; *Houllet in Rev. Hortic.* 1879, 272 (*with woodcut*).

TEMPERATE HIMALAYA, alt. 6–8000 ft., from Nepal eastwards, the KHASIA HILLS, alt. 4000–5000 ft. MUNNIPORE, *Watt.* BURMA, alt. 4–6500 ft., *Kurz.*

Trunk 20–50 ft., slender; clothed beneath the crown with persistent leaf-sheaths; young parts softly furfuraceously hairy. *Leaves* 4–5 ft. diam., subglaucous beneath, cut about half way down into linear 2-lobed segments; rigidly coriaceous; petiole 1½–2½ ft., margins denticulate; sheath leaving stiff erect fibres. *Spadix* 1–1½ ft., nodding, glabrous; basal spathes 1 ft., coriaceous, split. *Flowers* yellow, ovaries villous. *Drupe* 1–3, ½ in. long, blueish, "dirty blue" (*Kurz*) "yellow lepidote" (*Wall.*).

2. **T. excelsa,** *H. Wendl. in Bull. Soc. Bot. Fr.* viii. 429; trunk clothed throughout with old leaf-sheaths, flowers clustered 2–4 on a tubercle, drupe reniform, deeply hollowed on one side, embryo opposite the umbilicus. T. Fortunei, *Wendl. l. c.* Chamærops excelsa, *Thunb. Fl. Jap.* 130 (*not var.* β); *Mart. Hist Nat. Palm.* iii. 251. *Miquel Prolus. Fl. Jap.* 329. *J. Gay in Bull. Soc. Bot. Fr.* viii. 410; *Franch. & Sav. Enum. Pl. Jap.* ii. 1; *Carrière in Rev. Hortic.* 1877, 223. C. Fortunei, *Hook. Bot. Mag.* t. 5221.

UPPER BURMA, Yunan, *T. Anderson.*—DISTRIB. China, Japan.

T. excelsa closely resembles *T. Martiana,* except in the trunk being clothed with old leaf-sheaths.

22. PHOLIDOCARPUS, *Blume.*

Trunk tall. *Leaves* orbicular, 4–5-partite; petiole spinous. *Fruit* globose or ovoid with a tessellated pericarp. *Seed* laterally inserted, hilum oval; albumen ruminate; embryo basilar.—Species 5, Malayan, all very imperfectly known.

1. **P. macrocarpa,** *Becc. Males.* iii. 90, 92, t. 9, f. 1–3; fruit globosely obovoid 4–4½ in. diam. distinctly tessellate, endocarp globose densely fibrous, fibres elongate. ?P. Ihur, *Miq. Fl. Ind. Bat.* 591 (*non Blume*). ?Livistona Diepenhorstii, *Teysm. fid. Miq. l. c.*

MALAYAN PENINSULA; Klang, near Selangore, *Keheding.*

Nothing further of this species is known; it differs from the *P. Ihur* of Amboyna in the larger more deeply tessellated fruits, and the long fibres of the outer coat of the endocarp.

23. CALAMUS, *Linn.*

Armed, erect or scandent, tufted palms. *Leaves* alternate, pinnatisect; leaflets acuminate, nerves parallel, rachis often produced into an armed

flagellum; sheath armed, produced into a ligula or ochrea, and with or without a lateral armed flagellum. *Spadices* axillary, usually elongate, much branched, sometimes produced into a flagellum. *Spathes* tubular or open, persistent, sheathing the peduncle and branches of the spadix and passing into bracts and bracteoles (spathels and spathellules). *Flowers* small, polygamo-dicœcious, in usually distichous often scorpioid spikelets solitary or binate (a fem. or male or both) in the bracteoles. MALE FL. *Calyx* cupular, 3-toothed. *Petals* 3, acute, coriaceous, valvate. *Stamens* 6, filaments short, anthers dorsifixed. FEM. FL. slightly accrescent, fruiting pedicelliform or explanate. *Calyx* of the male. *Corolla* tubular below, 3-fid, valvate. *Staminodes* forming a cup. *Ovary* incompletely 3-celled, clothed with retrorse scales; style short or rather long, stigmas 3; ovules basilar, erect. *Fruit* globose or ellipsoid; style terminal; pericarp thin, clothed with appressed deflexed closely imbricating polished scales. *Seed* subglobose or oblong, smooth or pitted; albumen equable or ruminate; embryo ventral or basal.—Species about 160–170 trop. Asiatic, Malayan, Australian and a few trop. African.

The following arrangement of the groups and species is taken from Beccari's mss. The diagnoses and descriptions of the species are from his rough notes and the works of Roxburgh, Griffith, Martius and Kurz, in all cases aided by specimens when I had access to them.—*J. D. H.*

GROUP I. *Leaves* with many equidistant leaflets. *Spathe* 1st, elongate-tubular, dilated and lacerate above; 2nd, tubular, infundibular. *Spadix* with the partial infl. and spikelets provided with a pedicellar portion included in their respective spathes. *Fruiting perianth* explanate. *Spathellule* of fem. fl. short, not pedicelliform. Sp. 1–9.

GROUP II. *Leaves* with very few radiating or digitate leaflets, rachis not flagelliferous; leaf sheath flagelliferous. *Spathe* 1st very long, tubular, mouth lacerate; 2nd, thick, inflated, lacerate. *Spadices* male and fem. simply decompound; partial infl. and spikelets with a pedicelled portion inserted at the mouth or back of their respective spathes. *Fruiting perianth* explanate. *Spathellules* of fem. fl. short, not pedicelliform. *Fruit scales* more than 12–15-seriate. *Seed* not ruminate; embryo basilar.—(Slender scandent species; stamens 2-seriate, filaments thickened at the base, tips not inflected). Sp. 10–12.

GROUP III. *Leaves* paripinnate, leaflets equidistant; rachis not flagelliferous, leaf-sheath flagelliferous. *Spathe* 1st, elongate-tubular, closely sheathing. *Partial* infl. and spikelets (inserted at the mouth and back of the spathe). *Fruiting calyx* explanate or hardly callous and pedicelliform. *Spathellules* of fem. fl. not pedicelliform. *Seeds* not dorsally ruminate-alveolate; embryo basilar. Sp. 13–31.

GROUP IV. *Rachis* of leaves not flagelliferous; leaf-sheath flagelliferous or not. *Spathe* 1st very long, at first tubular closed, at length longitudinally split open, loriform, laminar or foliaceous. *Seed* not superficially alveolate; albumen equable. Sp. 32–39.

GROUP V. *Rachis* of leaves not flagelliferous; sheath flagelliferous. *Spathe* 1st submembranous, at first elongate tubular at length longitudinally more or less split and partly sublaminar. *Fruiting calyx* more or

less pedicelliform. *Spathellules* of fem. fl. pedicelliform. *Seed* dorsally alveolate; albumen subruminate; embryo basilar. Sp. 40, 41.

GROUP VI. *Rachis* of leaves not flagelliferous; leaf-sheath flagelliferous. *Spathe* 1st tubular, coriaceous, narrow, not split or lacerate. *Spathellule* of fem. fl. exserted beyond the spathels, and as it were supported on a pedicel. *Fruiting perianth* pedicelliform. *Seed* superficially furrowed; albumen ruminate; embryo basilar. Sp. 42–43.

GROUP VII. *Rachis* of leaves not flagelliferous; leaf-sheath flagelliferous. *Spathes* tubular, strictly sheathing. *Spathellules* not pedicelliform. *Fruiting calyx* pedicelliform; albumen deeply ruminate. Sp. 44–47.

GROUP VIII. *Rachis* of leaf not flagelliferous; leaf-sheath flagelliferous. *Spathes* strict, tubular; spathellules distinctly pedicelliform. *Fruiting-perianth* pedicelliform. *Seed* with many plaits radiating from the centre to one face; embryo lateral. Sp. 48.

GROUP IX. *Leaf-sheaths* flagelliferous; leaflets broad, many-nerved, two terminal completely free with a very short interposed flagellum. *Spathe* strict, tubular; spathellules of fem. fl. not pedicelliform. *Fruiting-perianth* subpedicelliform. *Albumen* superficially ruminate; embryo basilar. Sp. 49.

GROUP X. *Rachis* of leaves flagelliferous; leaf-sheath not flagelliferous. *Spathe* elongate, tubular, narrow. *Spathellule* of fem. fl. not pedicelliform. *Fruiting calyx* pedicelliform. *Albumen* ruminate or not, embryo basilar or lateral Sp. 50–56.

GROUP XI. *Rachis* of leaves flagelliferous; sheath not flagelliferous. *Spathe* narrow, elongate, tubular. *Spathellules* of fem. fl. not pedicelliform. *Fruiting-perianth* pedicelliform or not. *Albumen* not ruminate; embryo basilar. Sp. 57–63.

GROUP XII. *Rachis* of lower leaves or leaves of young plant not flagelliferous, of the adult plant or its upper leaves shortly flagelliferous; leaf-sheath flagelliferous. *Spathes* elongate, tubular, narrow; spathellules of fem. fl. not pedicelliform. *Fruiting calyx* distinctly pedicelliform. *Seed* strongly dorsally alveolate, at least superficially ruminate? embryo basilar. —Leaflets large or in any case with not fewer than 3 primary nerves. Sp. 64–70.

GROUP XIII. *Leaves* imparipinnate, subflagelliferous; sheath flagelliferous. *Spadix* contracted. *Spathes* tubular at the base, open dilated and auriculiform above; spathellules of fem. fl. not pedicelliform. *Fruiting-perianth* explanate. *Albumen* deeply ruminate; embryo basilar, excentric. Sp. 71, 72.

GROUP I. See p. 437.

* Albumen ruminate, embryo basilar.

1. **C. erectus,** *Roxb. Fl. Ind.* iii. 774; stems tall stout erect, leaflets concolorous subequidistant linear-lanceolate margins and midrib beneath remotely ciliolate, spines of petiole and rachis and lower spathe in half whorls flat straight pale, spadices branched elongate ending

in a flagellum, spathels cymbiform acute, flowers ⅓ in. long. *Mart. Hist. Nat. Palm.* iii. 332; *Griff. in Calc. Journ. Nat. Hist.* v. 35; *Palms Brit. Ind.* 43; *Walp. Ann.* iii. 438, v. 829; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 209, t. 23, 24 (*excl.* longisetus); *For. Fl.* ii. 516. C. schizospathus, *Griff. ll. cc.* 32 & 41, t. 187; *Mart. l. c.* 332; *Walp. ll. cc.* 482, 829; *T. Anders. in Journ. Linn. Soc.* xi. 7.

SIKKIM HIMALAYA, ASSAM, SILHET, CHITTAGONG, the KHASIA HILLS, MUNNIPORE and PEGU, ascending to 4000 ft.

Stems densely tufted 12–18 ft. high, internodes 2–3 in. long, 1–1½ in. diam. *Leaves* 12–18 ft.; leaflets few, 1½–2 ft. by 1½–2 in., 1-nerved; young petiole furfuraceous, spines on the full-grown petiole ½ in. and upwards. *Spadices* 1–2 ft.; spikes 6–10 in. by ½ in. across the imbricating coriaceous spathels. *Calyx* acutely 3-toothed; corolla thrice as long. *Stamen* free, filaments broad, erect. *Fruit* about 1 in. long, ovoid-oblong, subtended by the spreading perianth; scales trapezoid, dark brown with a yellow base.

Var. β. COLLINA, *Becc.*; smaller, petiole with solitary or sparingly clustered spines, spadices shorter often depauperate shortly peduncled, tip not or shortly cirrhiferous, fruit ellipsoid. C. collinus, *Griff. in Calc. Journ. Nat. Hist.* v. 31 *Palms Brit. Ind.* 39 (*excl. leaf*), t. 186 (*spadix only*).—Khasia hills.

Var. γ. MACROCARPA, *Becc.*, fruits larger. C. macrocarpus, *Griff. in Mart. l. c.* 333, t. 176, f. x. *Griff. Palms Brit. Ind.* 40, t. 186, A. f. i. ii. *Walp. ll. cc.* 484 380.—Sikkim, &c.

2. **C. flagellum,** *Griff. in Mart. Hist. Nat. Palm.* iii. 333, t. 176, f. ix.; stem stout at length scandent, leaflets subopposite linear-lanceolate concolorous margins and midrib beneath remotely setulose, petiole furfuraceous rachis and peduncle of the spike and upper spathes armed with short recurved spines, leaf-sheaths scurfy bearing a clawed flagellum armed with long and short spines and bristles. *Griff. Palms Brit. Ind.* 48; *Walp. Ann.* iii. 484, v. 830; *Anders. in Journ. Linn. Soc.* xi. 8. C. Jenkinsianus, *Griff. l. c.* 40, t. 186 A., f. iii. (*not* 89). ?C. polygamus, *Roxb. Fl. Ind.* iii. 780.

SIKKIM HIMALAYA, ASSAM, SILHET, and the KHASIA HILLS, ascending to 1000 ft.

Stem 1–1½ in. diam. *Leaves* 6–7 ft.; leaflets 2–2½ ft. by 1–1½ in. broad, concolorous; petiole 1–1½ ft. *Spathes* tubular, lowest 1½–2 ft., compressed, upper lacerate. *Spadix* 8–10 ft.; spikes 8–10 in., pendulous, unarmed; spathels very like C. *erectus*. *Flowers* ⅓ in. long, decurved. *Calyx* 3-fid to the middle. *Corolla* twice as long. *Stamens* free. *Fruit* 1 by ¾ in., ovoid-oblong, cuspidately beaked, subtended by the spreading perianth; scales deeply furrowed, pale with a dark band down the middle.

** Albumen equable.

† *Erect or scandent. No flagellum on leaf-sheath or spadix.*

3. **C. arborescens,** *Griff. in Calc. Journ. Nat. Hist.* v. 33; *Palms Brit. Ind.* 42, t. 188 A, B, C; stem erect tufted stoloniferous, leaflets equidistant linear-lanceolate white beneath margins closely setulose, midrib beneath and sometimes above setose, petiole scurfy, armed with whorls or half whorls of long flat black spreading spines, spadix very long pendulous, spathels very short closely imbricate truncate. *Mart. Hist. Nat. Palm.* iii. 332; *Walp. Ann.* iii. 483, v. 829; *Miq. Fl. Ind. Bat.* iii. 113; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 208, t. 22; *For. Fl.* ii. 516. C. hostilis, *Hort. Calc.*

PEGU; in marshy places, *Griffith.*

Stem 15–20 ft., 2½ in. diam.; internodes 7 in., crown densely leafy. *Leaves* 5–6 ft., decurved leaflets 8–18 in. by 1–1½ broad; petiole naked except for the long usually very black spines ½–2 in. long. *Lower spathes* with many half-whorls of short black spines; upper short, unarmed. *Spadices* longer than the leaves, very graceful; spikes 4–6 in. long by ¾ in. across the flowers, which are nearly ½ in. long, curved. *Calyx* trifid to the middle. *Petals* oblong-lanceolate, acute. *Stamens* shortly monadelphous.

4. **C. castaneus,** *Griff. in Calc. Journ. Nat. Hist.* v. 28; *Palms Brit. Ind.* 37, t. 185 A, B, C; stem very short stout, leaves very long, leaflets very many equidistant linear 3-costate margins and costæ beneath remotely prickly, petiole very stout and short, sheaths armed with very unequal scattered solitary or 2–3-nate rather short straight stout flattened pale spines, spadices erect or nodding very stout nearly unarmed, male decompound, spathels very short and broad. *Mart. Hist. Nat. Palm.* iii. 331; *Walp. Ann.* iii. 482; v. 829; *Miq. Fl. Ind. Bat.* iii. 112.

MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1533); PERAK at Gopung, *King's Collector* (5880).

Stem 3–5 ft., with the sheaths 3–4 in. diam. *Leaves* with the petiole 12–15 ft.; leaflets 12–24 by 1–2½ in., very dark green, young scurfy beneath; petiole as thick as the little finger, rounded with a channelled upper surface. *Spathes* generally unarmed. *Spadices* 2–3 ft., male panicled, elongate flexuous, fem. shorter, nearly as broad as long, simply branched; spikes of male 2–3 in., of fem. much larger, scorpioidly recurved, ½ in. broad. *Male fl.* ⅛ in. long. *Calyx* trifid to the middle. *Petals* hardly longer. *Stamens* inflexed in bud. *Fem. fl.* larger. *Fruit* 1 in. long, ellipsoid, embraced at the base by the erect perianth; strongly beaked, scales in 24–26 rows, minute, dark brown.

5. **C. Griffithianus,** *Mart. Hist. Nat. Palm.* iii. 332; closely allied to *C. castaneus*, and dwarf like it, in the leaflets spadices, &c., but the petioles are described as terete, and the fruits are larger more globose with fewer (18–20) rows of larger scales. *Walp. Ann.* iii. 482; v. 829; *Miq. Fl. Ind. Bat.* iii. 112. C. castaneus (*partly*) *Griff. in Calc. Journ. Nat. Hist.* v. 29. C. castaneus, var. α *Griff. Palms Brit. Ind.* 38.

MALACCA, *Griffith.* PERAK, *King's Collector* (3040, 3048).

Probably only a form of *castaneus.*

†† *Scandent, stout. Leaf-sheath flagelliferous. Spadix long, often flagelliform. Spikelets much flattened.*

6. **C. longisetus,** *Griff. in Calc. Journ. Nat. Hist.* v. 36; *Palms Brit. Ind.* 44, t. 189 A, B; scandent or erect? glabrous, leaflets lanceolate concolorous, lower fascicled 3-costate, margins and midrib above and beneath and lateral nerves beneath setulose, terminal connate, petiole and its sheath and lower spathes densely armed with whorls and half whorls of straight black flattened spines intermixed with scattered shorter ones, male spadices decompound nodding, upper spathes unarmed, spathels densely imbricate truncate, fruit ovoid-oblong narrowed into a very stout beak. *Mart. Hist. Nat. Palm.* iii. 333; *Walp. Ann.* iii. 483; v. 830; *Miq. Fl. Ind. Bat.* iii. 114. C. tigrinus, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 211, t. xxiv. xxvi.; *For. Fl.* ii. 519.

PEGU, *Hort. Bot. Calc., Griff.* (*Kew Distrib.* 6392), *McLelland*; BURMA, and the ANDAMAN ISLANDS, *Kurz.*

Stem upwards of 1 in. diam. *Leaves* 4–8 ft., rachis not flagelliferous; leaflets 1½–2

ft. by ¾–2 in.; petiole and rachis pale, smooth, except for the spines; sheaths very strongly armed. *Male spadix* slender, branched, *fem.* much stouter and shorter. *Lower spathes* elongate, tubular, compressed, strongly armed, upper short, lacerate; spathels densely imbricate, scurfy, truncate, often lacerate. *Fruit* 1 in. stipitate by the erect perianth; scales ¼ in. long and broad, flat, thin, yellowish with a very broad lunate brown band across the middle and fimbriate margins (the whole fruit banded like a tiger-skin).—Griffith describes *longisetus* as erect, and Kurz *tigrinus* as scandent.

7. **C. Thwaitesii,** *Becc.*; differs from *C. longisetus* in the rachis of the petiole bearing very stout recurved claws with black tips, the upper spathes bearing scattered spinescent tubercles; and in the smaller fruits with fewer paler tumid scales erose or the margin channelled down the centre and with a narrow brown marginal band. C. longisetus, *Thw. Enum.* 330 (*not of Griff.*).

CEYLON; in the Central Province, *Thwaites.* CANARA, *Ritchie, Talbot.*

A Canara plant collected by Ritchie and Talbot, probably belongs here, the fruit is exactly similar to that of the Ceylon plant.

††† *Scandent, slender. Leaf-sheaths flagelliferous. Spikelets short, scorpioid.*

8. **C. leptospadix,** *Griff. in Calc. Journ. Nat. Hist.* v. 49; *Palms Brit. Ind.* 60, t. 194 A, B, C; leaflets very many close-set narrowly linear acuminate, margin and sometimes the 3 costæ beneath setulose or aculeolate, petiole terete and scurfy rachis with distant straight flattened spines and a few short claws at the base, sheath short scurfy sparingly armed, spadices very long slender pendulous, with very many distichous short recurved spines, lower spathes long slender densely armed with flat thin spikes and minute recurved ones upper shorter unarmed, flowers small, fruit small globose mucronate. *Mart. Hist. Nat. Palm.* iii. 335, f. ii.; *Walp. Ann.* iii. 485; v. 483. *T. Anders. in Journ. Linn. Soc.* xi. 8.

SIKKIM HIMALAYA, *J. D. H.*, &c.; KHASIA HILLS, *Griffith*, &c.; MUNNIPORE and NAGA HILLS, *Watt.*

Stem slender, scandent. *Leaves* 3–4 ft.; leaflets 8–10 by ½–¾ in., thin, pale green; rachis armed with simple recurved spines. *Spathes* very slender, tubular. *Spadices* several feet long, branched, below and armed with hooked short spines, branches very long and slender, with 20–40 recurved spikelets ½–1 in. long, and ⅛ in. diam.; flagellum of spadix very long, armed with 1–3-fid recurved claws. *Spathels* cupular, acute membranous. *Male fl.* ⅛ in. long; calyx 3-fid to the middle; petals twice as long. *Fruit* ½ in. diam., subtended by the spreading perianth; scales very small, broad, yellow with a red-brown margin.

9. **C. rivalis,** *Thw. ex Trimen in Journ. Bot.* xxiii. (1885), 268; (*Err. typ.* nivalis); habit of *C. leptospadix,* leaflets numerous equidistant linear-lanceolate setulose on the margins and three costæ beneath, sheaths copiously armed with straight flat pale spines, rachis with recurved ones, spadices very long slender armed with short recurved spines and terminated by a clawed flagellum, spikes very many short distant recurved, lower spathes or all armed with very short prickles, fruit small ovoid beaked. C. rudentum, *Mart. Hist. Nat. Palm.* iii. 340 (*non Lour.*).

CEYLON; *Walker*, &c.

Leaves about 3 ft long, leaflets 12–18 by ½–⅔ in., broader and more coriaceous than in *C. longisetus*; rachis scurfy. *Spathels* very obliquely cup-shaped, coriaceous. *Male fl.* crowded, calyx trifid to the middle. *Petals* and *stamens* stipitate. *Fem. fl.*

larger, less crowded. *Fruit* ½ in. long, subtended by the spreading perianth; scales broader than long, pale yellow, not channelled, narrowly bordered with red-brown.

GROUP II. See p. 437.

10. **C. pachystemonus,** *Thw. Enum.* 431 (in part.); stem slender scandent, leaves pinnately 4–7-foliolate, leaflets elliptic acute or acuminate 3–5-costate, margins and costæ beneath setulose, petiole short and rachis armed with solitary stout recurved spines, sheath striate sparingly tubercled and armed with flat pale spines, ochrea very short truncate, spadices very slender elongate decompound, spikes very many recurved, male corolla slender.

CEYLON; *Walker*; near Galle, *Thwaites*.

The greater part of Thwaites *C. pachystemonus* including the fruiting specimens are *C. digitatus*, which differs in the longer petioles, few terminal longer oblanceolate leaflets and smaller curved male flowers.

11. **C. digitatus,** *Becc. mss.*; leaflets digitately 2–4-foliolate oblanceolate cuspidately acuminate 3–5-costate, petiole slender, sheath armed with long strong straight flat spines and conical short ones, ochrea ligulate, spadices very slender elongate decompound, spikes very many recurved, male corolla slender, fruit small globose. *C. gracilis, Thwaites Enum.* 330 (*not of Roxb.*).

CEYLON; in the southern parts of the island, *Thwaites* (C. P. 2334 *in part*). *Stems* very slender, scandent. *Leaflets* at the end of the short petiole, 8–12 by 1–2 in., concolorous, many-nerved; petiole 6–8 in., unarmed or with a few solitary recurved spines and small prickles; sheath copiously armed. *Spadices* 3–4 ft., branched below, male spikes ½ in., fem. 1–2 in. *Lower spathe* elongate, cylindric; upper very slender, mouth truncate, entire; spathels cupular, truncate. *Male fl.* ⅛ in. long; corolla very narrow, curved, twice as long as the calyx. *Stamens* 2-seriate, filaments thickened upwards. *Fruit* ⅓ in. diam., subtended by the spreading perianth; scales pale yellow, very broad with narrow brown margins.

12. **C. radiatus,** *Thw. Enum.* 431; leaflets 6–7 subradiately disposed at the apex of a shortly spinous petiole linear acuminate, sheath densely armed with short straight spines and long bristles, spadices very long slender branched armed with small recurved spines, spikes many short recurved.

CEYLON; in the southern parts of the island. *Walker, Thwaites*.

Stems very slender, scandent. *Leaflets* 8–12 by ⅓–1 in., thin, midrib beneath and margins quite without bristles or spines; petiole 2–3 in. with scattered short recurved spines. *Spathes* few, very long and slender. *Peduncle* of spadix 2–3 ft. long, as slender as a sparrow-quill; spikes ½–⅔ in. long; spathels cup-shaped, not densely imbricate, deeply striate. *Fruit* ½ in. diam., globose, shortly beaked; scales broader than long, triangular, pale yellow with a narrow brown entire border.

GROUP III. See p. 437.

* Fruiting calyx hardly callous below, indistinctly or not pedicelliform.

† *Leaflets few broad; terminal large, often connate at the base.*

13. **C. javensis,** *Blume Rumph.* ii. 137, iii. 62, var. PENINSULARIS, *Becc. mss.*; leaflets 3–6 inequidistant elliptic or oblong-lanceolate 7–9-costate,

basal pair reflexed on the sheath, petiole very short and rachis armed with short scattered recurved spines, sheath with short straight spines, spadix very long slender, fruit small subglobosely ovoid shortly beaked, scales in 17–18 series. ?*C. penicillatus*, *Roxb. Fl. Ind.* iii. 781.

PENANG and the MALAY PENINSULA; Perak, alt. 300–3500 ft., *King's Collector* (1996 ♀, 2673 ♂).

Stem 10–25 ft., with the leaf-sheaths as thick as the little finger, scandent. *Leaves* 1½–2 ft.; leaflets 8–10 by 1½–2½ in., often opposite, the upper pair free or confluent, margins and costæ beneath quite smooth; sheaths and their short spines pale. *Spadices* very long and slender and long slender spathes armed with small hooked spines; spikes 2–3 in., slender, ¼ in. across the flowers; spathels densely imbricate, shallow, acute, striate and subscabrid; flowers ⅛ in. long. *Calyx* 3-fid to the middle. *Corolla* not striate; segments narrow. *Scales* in 12–18 series.—*C. javensis* is, as its name implies, a Javan species.

Subvar. *polyphyllus*, Becc.; as above, but leaflets 8–12 subequidistant, basal reflexed or spreading.—Perak, summit of Gunong Tambang Betall, *Scortechini* (657[b]); *King's Collector* (6312).

Subvar. *intermedius*, Becc.; as above, but more slender, and with fewer inequidistant leaflets.—Perak, *Scortechini* (236).

Subvar. *tenuissimus*, Becc.; very slender, leaflets fewer (3–4) remote longer, petiole longer, fruit elliptic-obovoid moderately beaked, scales more than 15-seriate.—Perak, summit of Gunong Tambang Batok, *Scortechini* (648[b]).

Subvar. ?*purpurascens*, Becc.; like the type, but leaflets few large basal much reflexed, sheath moderately spiny.—Penang, *Curtis*. Perak, *King's Collector* (7932).

Subvar. ?*penangiana*, Becc.; as in *purpurascens*, but sheath with strong spines.—Penang.

14. **C. filipendulus**, *Becc. mss.*

PERAK; *Scortechini*, 232[b]; *King's Collector* (5659, 5773, 8019).

I have seen no specimens of this species, and fail to draw up a diagnosis of it as distinguished from *C. javensis*, from Beccari's notes, except as regards the fruit which he describes as ovoid-conic about ½ in. long, gradually narrowed into a very slender acute beak terminated by the recurved stigmas and with the scales in only 12 series. The terminal pair of leaflets are confluent, as they are sometimes in *C. javensis*.

†† *Leaflets many, narrowly ensiform; upper distinct or hardly connate at the base.*

15. **C. rugosus**, *Becc. mss.*; stem very slender, leaves long-petioled, leaflets very many equidistant narrowly lanceolate finely acuminate 3-costate, upper pair quite free, petiole rachis and spadix very slender armed with few scattered short recurved spines, sheath armed with short straight spines, spadices filiform, branches very distant with few slender spines, spathels scabrid.

PERAK; *Scortechini*.

Stem with the sheaths ½ in. diam. *Leaflets* 7–8 by about ½ in., concolorous, setulose on the margins and 3 costæ above and only on the median beneath, petiole 5–7 in., margins acute; sheath gibbous above, larger spines flat, others minute and seriate. *Spathes* 2, lower prickly, upper and spathels scabrid.—I have seen no specimen.—*J. D. H.*

16. **C. radulosus**, *Becc. mss.*; stem slender, leaves sessile, leaflets very many narrowly ensiform equidistant concolorous, margins naked, 3-costate

costæ beneath armed with rigid bristles, the central alone sparsely setulose above, rachis armed beneath and at the margins with short hooked scattered spines, sheath densely armed with scattered flat spines, lower spathe densely armed upper and spathels finely scabrid, spadices very long.

PERAK; *Scortechini* (468[b]); Goping, *King's Collector* (8171).

A lofty climber; stem with the sheaths 1–1¼ in. diam. *Leaves* 2–2½ ft.; larger leaflets 18 by 1 in., upper much shorter and shortly connate at the base. *Lower spathe* elongate-tubular, with short spines on the outer faces, upper scabrid and scurfy with a lacerate mouth. *Spadix* with the partial inflorescences very long, bearing many recurved spikelets. *Fruit* small, pisiform, long-beaked.—Well characterized by the armature of the sheath, the naked margins of the leaflets, and the scabridity of a portion of the spadix.

17. **C. viminalis,** *Willd. Sp. Pl.* ii. I. 203; var. FASCICULATUS, *Becc. mss.*; stem rather stout, leaflets many inequidistant or fascicled 3-costate, margins and costæ beneath spinulose, floccose rachis and petiole with scattered long straight spines, sheath and flagelli with scattered short hooked spines, spadix very long clothed with long spathes, tip flagelliferous, branches paniculate, spikes 4–5 in., lower spathes compressed with subulate spines, upper prickly, fruit small globose beaked. C. fasciculatus, *Roxb. Fl. Ind.* iii. 779 (*excl. cit. Rheede*); *Kunth Enum.* iii. 208; *Mart. Hist. Nat. Palm.* iii. 338, t. 116, f. iv.; *Walp. Ann.* 488, v. 831; *Griff. in Calc. Journ. Nat. Hist.* v. 52; *Palms Brit. Ind.* 62, t. 195 B (*excl.* A. *Roxburghii*), t. 190 A, f. ii.; *Miq. Fl. Ind. Bat.* iii. 127; *Palm. Archip. Ind.* 27; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 210, t. 27 B; *For. Fl.* ii. 517. C. extensus, *Mart. l. c.* iii. 210, Ed. 1, *partly*, t. 116, f. iv. 1 (reduced in Ed. 2 to *fasciculatus*). C. Pseudo-Rotang, *Mart. l. c.* 209, Ed. 1, t. 116, f. vi. (reduced in Ed. 2 to *fasciculatus*); *Griff. in Calc. Journ. Nat. Hist.* v. 42; *Palms Brit. Ind.* 53; *Kunth Enum.* iii. 207.—*Wall. Cat.* 8608, 8611.

LOWER BENGAL, ORISSA, and the CARNATIC, CHITTAGONG, BURMA, the ANDAMAN ISLANDS and PENANG, *Wall.*—DISTRIB. Cochin China. (Of the type Malay Islands.)

A stout scrambling and climbing species. *Leaves* 2–3 ft.; leaflets 4–10 by ⅔–¾ in., pale green, young and rachis and sheath white-floccose, petiole short and rachis very stout, spines slender ½–1¼ in. long, pale hardly flattened. *Spathes* coriaceous, mouth obliquely truncate; flagelli with hooked 2–3-fid claws. *Spadix* and its spreading branches rather stout, internodes (and truncate spathels) ½–¾ in. *Fruit* ⅓–½ in. diam.; scales pale yellow, obscurely channelled down the middle.

18. **C. concinnus,** *Mart. Hist. Nat. Palm.* iii. 332; erect or stemless?, leaflets many subequidistant linear-lanceolate acuminate glossy above 3-costate, margins and costæ beneath setulose, rachis and spadix rusty tomentose sparingly armed with short stout straight deflexed spines, spadix stout decompound, spathes loose coriaceous armed with short spines, secondary lax membranous long acuminate, spathels annular, fruit small globose beaked. *Kunth Enum.* iii. 207; *Walp. Ann.* iii. 483, v. 829; *Griff. in Calc. Journ. Nat. Hist.* v. 49; *Palms Brit. Ind.* 59; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 214, t. 20 C.—*Wall. Cat.* 8607.

TENASSERIM, *Wallich*; at Mergui, *Helfer* (*Kew distrib.* 6388, 6394, 6395).

Leaflets in the only specimens I have seen 10–18 by 1–1½, very shining on both surfaces. *Fruit* ½ in. diam.

19. **C. floribundus,** *Griff. in Calc. Journ. Nat. Hist.* v. 56; *Palms*

Brit. Ind. 66, t. 197; leaflets few inequidistant linear-lanceolate acuminate uppermost crowded at the end of the rachis and often connate, margins and costæ beneath setulose, petiole lower spathe and rachis armed with very short stout and long scattered flattened pale spines, sheath densely armed with needle-like setæ and spines, spadix elongate decompound, internodes sheathed by truncate ciliate spathels, spikes short spreading and recurved, lower spathe very long keeled, fruit globose shortly beaked. *Mart. Hist. Nat. Palm.* iii. 337; *Walp. Ann.* iii. 487, v. 831. C. mishmiensis, *Griff. ll. cc.* 55 and 65; *Mart. l. c.*; *Walp. Ann. ll. cc.* C. multiflorus, *Mart.*—*Wall. Cat.* n. 8613.

ASSAM, SILHET and the KHASIA HILLS, *Wallich*, &c. MISHMI HILLS, *Griffith.*

Stem as thick as the middle finger. *Leaflets* bright green, 10–18 by 1 1½ in.; spines of rachis ½–1 in. long, rather flattened and deflexed. *Lower spathe* 18 in., coriaceous, terete, mouth very oblique. *Spathels* acuminate, and flowers almost floccose with long white hairs, striate. *Flagelli* with short or long simple or compound recurved claws and spines. *Fruit* ½ in. diam.; scales very pale yellow, channelled down the back.

20. **C. pseudo-tenuis,** *Becc. mss.*; leaflets many equidistant linear-lanceolate minutely setulose on the margins setose or not on the 3 costæ beneath, rachis (young brown scurfy) armed with strong flattened straight and short recurved spines, sheath densely armed with flattened spreading pale spines, spadix very long decompound, spikelets very short decurved, male flowers and spathellules minute quite glabrous, fruit small ovoid strongly beaked. C. tenuis, *Thw. Enum.* 330 (*not of Roxb.*).

CEYLON; in the hotter parts of the island. DECCAN PENINSULA; on the WESTERN GHATS; from Canara southwards.

Stem slender. *Leaflets* 10–18 by ¾–¾ in., upper free; rachis rather stout; petiole short; sheath ¾ in. diam. *Spathes* flattened, lower 2-edged; spathels elongate. *Spadix* 2–3 ft., branches 6–10 in.; spikes of male fl. very short, of fruits 4–6 in. *Male fl.* $\frac{1}{10}$ in. long, shining, not striate. *Fruit* ⅛ in. diam.; scales rounded, pale with broad brown margins.—Readily distinguished from *viminalis* by the equidistant leaflets, glabrous spathellules, and ovoid fruit.—A plant collected by Talbot near the seashore at Marmagoa, Bombay, seems a very different plant, has black tipped claws on the rachis of the leaf and spadix and flagellum, and curved male flowers ¼ in. long.—*J. D. H.*

21. **C. densiflorus,** *Becc. mss.*; leaves very shortly petioled, leaflets many equidistant linear-ensiform finely acuminate concolorous upper gradually smaller terminal very short margins setulose costæ 3 all spinulose above and sparsely setulose on the middle one only beneath, sheath strongly armed with pale flat horizontal spines, spadix very long, spikes elongate dense-fld., spathels and spathellules scabridly pubescent, fruit small beaked ovoid.

PERAK; at Thaiping and Larut, *King's Collector* (8434, 5527).

Stem scandent, 1¼–1½ in. diam. with the sheaths. *Leaflets* rigidulous, larger 13–14 by about ½ in.; sheath with a long stout clawed flagellum, gibbous above, mouth truncate; rachis armed with strong claws. *Spadix* 5 ft., stout, clawed. *Lower spathe* strictly sheathing, prickly; upper unarmed glabrous truncate. *Spikes* 2½–3½ in.; spathels and spathellules very short, striate. *Fruit* immature, with a distinctly pedicelliform perianth, about ¼ in. diam; scales scarcely channelled, pale margined with brown.—I have seen no specimens. *J. D. H.*

22. **C. luridus,** *Becc. mss.*; leaflets rather numerous equidistant remote

elongate ensiform acuminate with 3 strong costæ beneath, terminal pair shortly adnate below, margins and costæ beneath more or less setulose, sheath closely armed with long flat horizontal unequal spines, spadix very long ending in a flagellum paniculately branched, lower spathes tubular strictly sheathing spiny on the outer side, upper smooth striate, fruit globosely ovoid.

PERAK, summit of Gunong, *Scortechini*; Malacca and Larut, *King's Collector* (2647, 6284, 6400, 7203).

Stem slender, scandent. *Leaflets* 14–16 by 1¼ in.; petiole 4–6 in. *Spadix* 8–12 in.; spikelets 1½–2½ in. *Calyx tube* short, corolla rather longer. *Fruiting perianth* very shortly pedicelliform, strongly striate.—I have seen no specimens. *J. D. H.*

23. **C. delicatulus,** *Thw. Enum.* 330, 431; leaflets very many equidistant linear-lanceolate finely acuminate margins and 3 costæ setose, petiole very short shortly spiny, rachis brown-scurfy when young clawed, sheath densely armed with short and long slender black flattened spines, male spadix very long filiform decompound, spathes unarmed long-ciliate at the tip, spikes very slender, flowers rather distant very minute.

CEYLON; at Galle and Hinidoon Pattoo, *Thwaites.*

Leaves 2–3 ft. *Leaflets* 8–10 by ½ in., concolorous, shining, upper smaller, tips filiform; flagellum very long, slender, clawed. *Fruit* about ⅓ in. diam., scales pale with a very narrow brown border.—Very near *C. Helferianus*, but the leaflets are not aggregate, the spikelets more slender, and flowers smaller.

24. **C. Helferianus,** *Kurz. in Journ. As. Soc. Beng.* xliii. ii. 213; *For. Fl.* 521; leaflets many scattered inequidistant in series of 2–8 on a side, narrowly linear finely acuminate 3-costate margins and lateral costæ above and median beneath setulose, rachis slender 3-gonous armed with short scattered recurved spines, spadix long very slender compound glabrous, spathes narrow tubular compressed and truncate partial sparingly shortly spiny or unarmed, spikes 1½–3 in., male spathellules very short crowded, fem. more remote, corolla twice as long as the stamens not striate.

TENASSERIM (or the Andaman Islands), *Helfer* (6389 ♂, 6392 ♀).

Sparingly armed. *Stem* slender, scandent. *Leaves* without flagelli, leaflets 8–12 by ½–⅔ in., concolorous, uppermost quite free, costæ 3–5 strong beneath; rachis with naked intervals sometimes 4 in. long, on one or both sides; sheath not seen. *Spadix* several feet long, flexuous, as thick as a sparrow-quill; upper spike simple, lower panicled, males shortest and more slender. *Lower spathe* long, narrow, compressed, with a short erect limb and short spines on the keels, partial 1½–1 in. long. *Spathellules* of male fl. very short and crowded, of fem. ⅛ in. long. *Male fl.* ⅛–⅙ in. long, calyx 3-fid. *Fruit* unknown.

25. **C. nicobaricus,** *Becc.*; leaflets very many equidistant linear-ensiform long-acuminate sparsely setose on the median costa only on both surfaces lateral costæ slender naked, petiole channelled above armed with long straight marginal spines and short claws on the back, sheath very pale at first scurfy densely armed with very unequal long flat spines and short claws.

NICOBAR ISLANDS, *E. H. Man.*

A very slender species, with varnished internodes ⅛–¼ in. diam. *Leaflets* 7–8½ by about ¼ in., shining above. *Spadix* and fruit unknown. *Flagelli* exceedingly slender.—Appears to be allied to *C. delicatulus*, from which it is distinguished by the leaflets being setose only on the median costa.—I have seen no specimen. *J. D. H.*

** Fruiting perianth distinctly pedicelliform.

26. **C. tenuis,** *Roxb. Fl. Ind.* iii. 780; leaflets very many equidistant uppermost gradually smaller linear-lanceolate acuminate 3 costæ all setose above, the median only below, petiole short margined with straight spines and rachis armed with one row of short recurved spines, sheaths flagelliferous sparingly armed with short flat spines, spadix very long decompound flagelliferous, spathes elongate tubular lower with a short limb and scattered recurved spines, partial short unarmed young scurfy, spathellules densely crowded cymbiform, flowers very small, fruit subglobose. *Kunth Enum.* iii. 211; *Mart. Hist. Nat. Palm.* iii. (*Ed.* 1, 212), 335; *Griff. in Calc. Journ. Nat. Hist.* v. 46; *Palms Brit. Ind.* 57, t. 193 A, B, C; *Walp. Ann.* iii. 485, v. 830; *Miq. Fl. Ind. Bat.* iii. 118; *Kurz in Journ As. Soc. Beng.* xliii. ii. 212, t. 31 B; *For. Fl.* ii. 520. C. Royleanus, *Griff. ll. cc.* 40 and 53, t. 191; *Mart. l. c.* 335; *Walp. ll. cc.* 485 and 830. C. amarus, *Lour.* i. 210 C. Heliotropium, *Herb. Ham.*; *Mart. l. c.* 211, 334; *Kunth l. c.* 210; *Griff. ll. cc.* 51 and 61; *Walp. Ann. ll. cc.* 484 and 830.

TROPICAL HIMALAYA, from Kumaon eastwards, BENGAL, ASSAM, SILHET, CHITTAGONG and BURMA.—DISTRIB. Cochin.

Stems very long, scandent; internodes not thicker than a goose-quill. *Leaves* 1½–2 ft.; leaflets approximate, lower 8–12 by ⅛–½ in., margins minutely setulose or spinulose, bristles on costæ ¼ in.; petiole pale, stout; spines with broad laterally compressed conical bases, flagelli filiform. *Lower spathes* 6–10 in. by nearly ¾ in. diam., upper shortly scurfy. *Lower spikes* panicled, 1½–4 in. long. *Male fl.* ⅒ in. long, not distichous and spreading but secund in 3–4 series, imbricating, suberect. *Fruit* ½ in. diam., mucronate; scales pale with a shallow median channel and very narrow discoloured margins.

27. **C. diffusus,** *Becc. mss.*; leaflets many equidistant rigidulous upper shorter narrowly linear-lanceolate very long-acuminate margins naked slightly thickened, costæ 3 setose above the median spinulose beneath, rachis armed throughout with half whorls of hooked spines or 3-fid claws, male spadix diffusely supra-decompound, branches of partial infl. spirally inserted, lower spathe tubular green smooth coriaceous armed with hooked spines on the outer surface, upper tubular-infundibular unarmed, spathels short broad, flowers rather distant, calyx campanulate striate, corolla twice as long.

SINGAPORE; *Lobb.*

Leaves apparently 2–3 ft.; leaflets 10–12 by ½–¾ in. *Male spikelets* 1–2 in.; flowers crowded, distichous, ⅛–⅙ in. long; spathellules and calyx strongly ribbed; corolla twice as long as the calyx, not striate.—Fem. fl. and fruit unknown, position hence uncertain.

28. **C. Rotang,** *Linn. Sp. Pl.* Ed. 1, 325; Ed. 2, 463 (the Ceylon plant only); leaflets many equidistant linear-ensiform rarely subaggregate upper smaller, margins spinulose, petiole very short or 0, rachis armed beneath with short stout uniseriate claws, sheath armed with short straight conical based scattered spines, male spadix slender decompound, spikelets ½–1 in. recurved, spathellules short, flowers crowded, corolla deeply striate, fem. spikelets much stouter and longer, flowers distant, fruit globose very pale. *Willd. Sp. Pl.* iii. 202 (*excl. Syn. Lour.*); *Lamk. Ill.* t. 770, f. 1; *Schult. f. Syst. Veg.* vii. ii. 1322 (*excl. all cit. but Linn. & Willd.*); *Roxb. Fl. Ind.* iii. 777; *Mart. Hist. Nat. Palm.* iii. 334, t. 116, f. 8; *Kunth Enum.* iii. 207; *Blume Rumph.* iii. 33; *Walp. Ann.* iii. 484, v. 830;

Miq. Fl. Ind. Bat. iii. 117. C. Roxburghii, *Griff. in Calc. Journ. Nat. Hist.* v. 43; *Palms Brit. Ind.* 55, t. 195 A (*under fasciculatus*) (and t. 112 ? *monoicus*, Roxb.); *Thw. Enum.* 330. C. monoicus, *Roxb. Fl. Ind.* iii. 783; *Mart. l. c.* (209, Ed 1) 334 (*excl. descr.*) *Wall. Cat.* n. 8604 ?; *Griff. ll. cc.* 48 and 58; *Kunth l. c.* 208; *Wulp. ll. cc.* 484 and 830. C. scipionum, *Lam.* (*in part*) *Encycl.* vi. 304 ((*excl. Syn. Lour. & Rheede*).

The DECCAN PENINSULA and CEYLON.

Stem scandent, very slender. *Leaves* 2–3 ft.; leaflets 8–10 by ½–⅔ in., median costa unarmed on both surfaces or armed beneath only, lateral unarmed on both surfaces; in Madras specimens there is often a strong solitary spine above the base of the leaflet on the midrib beneath; sheath in Madras specimens with horizontally flattened spines. *Spadix* and its slender tubular spathes unarmed or nearly so. *Male fl.* biseriate, but not distichous, densely crowded, ⅛–⅛ in. long; spathellules acuminate. *Fruit* ⅔–¾ in. diam.; scales with an obscure sometimes discoloured channel, margins not or faintly narrowly discoloured.

29. **C. Brandisii,** *Becc. mss.*; stem slender, leaflets few fascicled lanceolate ensiform naked beneath sparsely setose above on the 3 costæ, petiole slender with few very long slender straight spines, rachis with long stout solitary straight and recurved spines, sheath armed with solitary or aggregate slender flattened straight spines mouth with very long needle-shaped spinules, male spadix elongate shortly flagelliferous with few partial inflorescences, spathes narrow tubular upper funnel-shaped unarmed embracing the bases of the spikelets, flowers 4-seriate in bud.

TRAVANCORE; at Courtallam, alt. 3–5000 ft., *Brandis.*

I have seen no specimen of this species, which appears from a photograph to be remarkable for the long straight very slender spicules at the mouth of the leaf-sheath.—*J. D. H.*

30. **C. Feanus,** *Becc. mss.*; stem scandent, leaflets few remote subequidistant elliptic-lanceolate or oblanceolate 7–9-costate, petiole very short and rachis armed with short hooked spines, sheath flagelliferous coriaceous green marbled with black scurfy spots strongly armed with scattered long spreading or deflexed and short stout reflexed spines, male spadix decompound erect rigid with 7 partial inflorescences, lower spathe tubular 2-keeled mouth compressed keels armed with short stout spines, upper truncate obliquely, spikelets recurved, fruit broadly ovoid.

TENASSERIM; alt. 3–5000 ft., *L. Fea.*

Stem scandent; internodes ½–½ in. diam. *Leaves* rather short, about 3 ft. 3 in. long; sheath ½–⅔ in.; ochrea very short, truncate; leaflets 6–8, the larger 8–12 by 2–2¾ in., terminal free. *Male spadix* 1½ in. *Fruit* about ½ in. by ¼ diam., beak conical acute; scales about 15-seriate, not channelled on the back, where they are opaque and as if pulverulent with a broad rather discoloured band. *Seed* deeply pitted.—Near *acanthospathus*, but very distinct by the opaque not channelled scales of the fruit.

31. **C. acanthospathus,** *Griff. in Calc. Journ. Nat. Hist.* v. 39; *Palms Brit. Ind.* 50, t. 190 B (excl. A, f. 1); leaflets few large inequidistant elliptic-lanceolate strongly 5–7-costate usually unarmed on both surfaces, rachis and long petiole very stout scurfy and armed with 2–3 series of very stout recurved spines, sheath stout densely armed with long flattened and short stout straight or recurved spines, spadices very stout flagelliferous, peduncle armed with unequal subulate spines, lower spathe very stout tubular compressed with a lanceolate limb, back armed with conical based spines, upper spathes clavate unarmed, partial

inflorescence sheathed up to the spikelets, fruit obovoid or globose shortly beaked brown. *Mart. Hist Nat. Palm.* iii. 333, t. 176, f. vi.; *Walp. Ann.* iii. 484, v. 830. C. montanus, *Anders. in Journ. Linn. Soc.* xi. 9.

EASTERN NEPAL, SIKKIM and BHOTAN HIMALAYA, ascending to 6000 ft., *J. D H.*, &c. KHASIA HILLS, alt. 2-1000 ft., *Griffith*, &c.

Stem slender, scandent, as thick as a swan's quill. *Leaves* 2 3 ft.; leaflets 10–16 by 2 3 in., margins naked or spinulose, both surfaces quite naked or very rarely with a few small spines on the costæ of the upper surface; flagellum of the sheath 10–12 ft. *Spadix* 4–6 ft., erect, armed with short recurved spines; branches of fruiting spadix very stout; spikes 1-1½ in., strongly recurved. *Lower spathe* 1 ft., scurfy, as thick as the thumb; uppermost glabrous. *Fruit* ⅜ in. diam., pericarp thin; scales chesnut brown, obscurely channelled, shining; fruiting calyx large, cupular, ⅛ in. diam., lobes very short. *Seed* deeply pitted.

GROUP IV. See p. 437.

32. **C. Guruba,** *Ham. in Mart. Hist. Nat Palm.* iii. 206 and 330, t. 175, f. 1; leaflets alternate equidistant narrowly linear, margins and 3 costæ above setose midrib usually alone setose beneath, long slender petiole and rachis armed with long brown recurved and short conical spines below and on the margins, sheaths flagelliferous covered with long flattened spines and crowded smaller ones, spathes glabrous tube of lower compressed margins with long spines back with short ones, limb recurved, upper spathes nearly unarmed, male spadix elongate very slender decompound, spikes spreading very slender, spathellules very shallow, flowers distichous pointing forwards, fruit pistiform apiculate. *Griff. in Calc. Journ. Nat. Hist.* v. 42; *Palms Brit Ind.* 54; *Kunth Enum.* iii. 210; *Kurz in Journ. As. Soc. Beng.* xlii. ii. 214; *For. Fl.* ii. 522. C. Mastersianus, *Griff ll. cc.* 76 and 84. t. 206. Daemonorops Guruba, *Mart. l. c.* 330; *Walp. ll. cc.* 479 and 828; *Miq. Fl. Ind. Bat.* iii. 100.

BENGAL, ASSAM, the KHASIA HILLS, SILHET, CHITTAGONG and BURMA.

Tall, scandent, stem without the sheaths very slender. *Leaves* 5-6 ft.; leaflets 12–15 by ½–¾ in., upper smaller free, sometimes quite naked on both surfaces; sheath with a long membranous lacerate ligule. *Spathes* with terete tubular bases and long flat thinly coriaceous obtuse brown laminæ, of the lower 12–18 long by 1-1½ broad, flagellum very stout and stoutly armed. *Male spikes* 2-3 in., flexuous; spathellules very small membranous cups. *Flowers* ⅛ in. long, calyx striate; corolla twice as long, polished. *Fruit* ¼ in. diam., abruptly beaked; scales very pale, obscurely channelled, margin brown.

33. **C. nitidus,** *Mart. Hist. Nat. Palm.* iii 334; leaflets equidistant rigidulous close-set linear-lanceolate acuminate shining margins thickened, costæ 3 setulose on both surfaces or on the upper only, rachis with simple or compound recurved spines, spadices decompound, spathes glabrous, fruit globose, scales brown in the middle 17–18-seriate. *Kunth Enum.* iii. 211; *Griff. in Calc. Journ. Nat. Hist.* v. 49; *Palms Brit. Ind.* 59; *Miq. Fl. Ind. Bat.* iii. 117; *Walp. Ann.* iii. 484; v. 830; *Wall. Cat.* 8609.

TENASSERIM, *Wallich, Helfer* (*Kew distrib.* (6390, 6396, 6398).

Very near to and probably not distinct from *C. Guruba*, but the leaflets are shorter 6–7 by ½–¾ in., and the flowers smaller, about ⅒ in. long.—The specimens are very insufficient.

34. **C. platyspathus,** *Mart. Hist. Nat. Palm.* iii. 210; leaflets few scattered alternate ensiform acuminate strongly 5–7-costate, margins

costæ almost unarmed, rachis armed with straight and recurved strong solitary and binate spines with swollen bases, sheath armed with close-set straight subulate spines, male spadix long very slender sparsely shortly armed, inflorescences short subsessile paniculately branched, spikelets very short few-fld. upper spathes with very short sheaths and flat linear-oblong laminæ, spathellules very short acute, corolla twice as long as the calyx not striate. *Griff. in Calc. Journ. Nat. Hist.* v. 75; *Palms Brit. Ind.* 83; *Kurz in Journ. As. Soc. Beng.* xl. 214. C. polyspathos, *Wall. Cat.* 8610. Dæmonorops platyspathus, *Mart. l. c.* Ed. 2, 206, 329; *Miq. Fl. Ind. Bat.* iii. 99; *Walp. Ann.* iii. 479, v. 828.

TENASSERIM, at Tavoy, *Gomez*.

Leaflets 10–12 by 1–1½ in., rigid, margins bristly towards the apex, young pale softly scurfy beneath, margins thickened with obscure distant asperities. *Upper spathes* 3–4 by ⅓ ⅔ in, flat. *Inflorescences* of male spadix as long as their spathes, very compound; spikelets ¼–½ in. *Flowers* $\frac{1}{10}$ in. long, pale, close-set, pointing forwards. *Calyx* sharply toothed, striate. *Fem. spadix* and fruit unknown.

35. **C. paspalanthus,** *Becc. mss.*; leaflets equidistant close-set very narrow finely acuminate 3-costate costæ closely spinulose beneath more remotely above, margins nearly smooth, petiole very long white armed below with flat appressed long and short spines, rachis brown scurfy rounded beneath with short recurved single and trifid spines, lower spathe very long tubular armed with short spines, male spadix stout erect decompound with erect branches and very short lacerate spathels, spikes erect very dense-fld., spathellules closely imbricating lunate very strongly nerved, flowers minute.

PERAK; at Goping, *King's Collector* (577).—DISTRIB. Borneo.

Leaves not flagelliferous; leaflets 4–10 by ⅛ in., shining, strict; petiole about 2 ft., white, but covered with a fine brown scurf when young; sheath flagelliferous. *Spadix* quite unlike any other, from the upright branches and spikes, and dilacerate short membranous spathels. *Spikes* ½–¾ in., strict, like those of some *Panicum*; spathellules very peculiar, flabellately nerved. *Male fl.* distichous, spreading horizontally, $\frac{1}{14}$ in. long. *Calyx* cupular, striate, broadly obtusely lobed. *Corolla* not twice as long; petals broadly elliptic, obtuse, obscurely striate.—I have seen no complete spathe. Described from Borneo specimens collected at Sarawak by Lobb, which Beccari says are identical with those from Perak (which I have not seen). He adds that its affinities are uncertain, and it is perhaps allied to *C. leptospadix*.

36. **C. ramosissimus,** *Griff. in Calc. Journ. Nat Hist* v. 78; *Palms Brit. Ind.* 87, t. 207; leaflets very large scattered ensiform or elliptic-lanceolate acute coriaceous many-costate, margins and costæ smooth, petiole very stout armed below with scattered very long straight flat and many small spines, rachis very stout back rounded armed with broad short recurved solitary and 2–3-nate claws, male spadix ovoid decompound erect densely branched, peduncle very stout tomentose, branches and spikes erecto-patent, spathes very large blade thickly coriaceous lower with a spinous tube, upper open, fem. spadix furfuraceous with very stout simple spikes, spathellules of both sexes very short. Dæmonorops ramosissimus, *Mart. Hist. Nat. Palm.* iii. 330; *Miq. Fl. Ind. Bat.* iii. 100; *Walp. Ann.* iii. 479, v. 828.

MALACCA? *Griffith*. PERAK; Larut, on Gunong Tjuk, *Scortechini* (51b, 1235); alt. 2500–3500 ft., *King's Collector* (2617, 2910, 6342, 7181).

Stem 20–30 ft., scandent, 1–1½ in. diam. *Leaves* 6–8 ft., dark green, glossy; leaflets 18–24 by 1½–2 in., 7–13-costate, almost plicate; rachis as thick as the little finger, plano-convex, spines ¼–½ in. long, recurved, longer spines on lower part of petiole 1½ in., on sheath 2–3 in. *Blade* of lower *spathe* 1–2 ft. by 1–2 in. *Inflo-*

rescences of male spadix 10–12 by 3–4 in., furfuraceous; peduncle as thick as the little finger, compressed; branches fastigiate, strict, suberect; spikes distichous, 1–1½ in.; spathellules very shallow; flowers close-set, pointing forwards, ⅛ in. long, *Calyx* shortly tubular, obliquely acutely trifid, striate. *Corolla* twice as long, smooth. *Fem spadix* sessile; spikes 1½–2½ in., brown scurfy, ⅛ in. diam. *Fruit* (young) globose with a very stout beak; scales all brown.—Described from a Perak specimen, the male spadix of which does not resemble the slender lax flowered one of Griffith's t. 207.

37. **C. perakensis,** *Becc. mss.*; stem erect very short, leaves terminal, leaflets very numerous equidistant strictly ensiform acutely 3-costate above spinulose on 3 costæ above and only on the median beneath, petiole long armed with long stout horizontal marginal spines, male and fem. spadices subsimilar strict erect more or less sprinkled with white cottony tomentum, spathes unarmed much compressed shorter than their respective partial inflorescences, fem. spadix not very decompound, flowers cylindric.

PERAK, *Scortechini* (317[b]).

The above description is from Beccari's notes, who adds that it is a very distinct species, somewhat allied to *C. ramosissimus*.—I have seen no specimen. *J.D.H.*

38. **C. hypoleucus,** *Kurz For. Fl.* ii. 523; leaflets alternately and interruptedly approximate by twos on each side oblong-lanceolate acuminate ciliate towards the apex white beneath many-costate, petiole short armed with long and short conical straight and recurved spines, rachis with scattered recurved spines, sheaths densely spiny with unequal spines 1 in. long and less, fem. spadix small short, peduncle slender spinous, spathes oblong-lanceolate, spathels tubular small distant, flowers distichous, calyx ⅛ in. shortly 3-lobed, corolla twice as long segments acute. Dæmonorops hypoleucus, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 208 (*partim*), t. xviii. (excl. t. xix.).

BURMA; on Thoungyeen, *Brandis.*

Stem slender, scandent, as thick as a goose-quill without the sheaths. *Leaves* 2–3 ft., not flagelliferous; sheaths flagelliferous; leaflets 6–9 in. long. *Fem. spadix* 12 in. long; peduncle about 1 in. Male fl. and fruit unknown.—Description from Kurz. I have seen no specimen. *J.D.H.*

39. **C. myrianthus,** *Becc. mss.*; leaflets very long narrowly elliptic-lanceolate many-costate pale almost white beneath smooth on both surfaces or with minute bristles on the costæ beneath, margin obscurely aculeolate, rachis dorsally rounded shortly spinous, male spadix very long slender sparsely spinous, spathels tubular truncate, inflorescences laxly decompound, branches very slender, spike ½–½ in. zigzag almost filiform, spathellules minute, flowers minute pointing forward closely imbricate, calyx acutely 3-lobed striate, corolla twice as long acute estriate. Dæmonorops hypoleucus, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 208 (*partim*) t. xix.

TENASSERIM; at Mergui, *Helfer* (*Kew distrib.* 6397).

The only materials for this species seen by me are Helfer's specimens, consisting of a portion of the rachis of a leaf with two leaflets, and portions of a male spadix; the leaflets are 30 by 2 in., very thin and pale beneath, with indistinct cross nervules. —Beccari has identified with it the plate xix. of Kurz's *C. hypoleucus* on the faith of some specimen supposed to be of Kurz's plant communicated by Dr. Brandis. That figure represents much shorter and broader leaflets than those of Helfer's plant, with distinct bristles on the margins and costæ beneath.—There is no evidence of Helfer's plant belonging to this section. *J.D.H.*

GROUP V. See p. 437.

40. **C. travancoricus,** *Beddome mss.*; leaflets in distant opposite groups of 3–5 narrowly oblanceolate acuminate thin, costæ 3 very slender naked above sparsely setulose beneath, rachis and petiole very slender armed with small straight and recurved spines, sheath armed with slender straight flattened prickles, spadix long slender flagelliferous, inflorescences shorter than the membranous flat spathes, male decompound, fem. with simple distichous spikes, upper spathes and spathels tubular obliquely truncate, spathellules short acute, calyx strongly striate, corolla estriate twice as long.—*Rheede Hort. Mal.* XII. t. 64.

DECCAN PENINSULA; from Malabar to Travancore, *Wight, Beddome.*

Stem very slender, scandent. *Leaves* 18–24 in.; leaflets 4–6 by ½–¾ in., broadest about or above the middle and thence tapering to a capillary point, shining above; rachis scurfy when young; petiole 4–6 in., dorsally rounded, margins acute much compressed towards the base and there chiefly spiny. *Spadix* flagelliferous, 2–3 ft.; peduncle short, flattened, young white scurfy, margins shortly spiny. *Lower spathes* tubular, compressed at the base, with shortly spinous angles, produced into a long membranous sheathing lamina; upper with unarmed tubes. *Inflorescences* about 2 in. long, males with spreading very slender branches bearing short flexuous almost capillary spikes of flowers ⅛ in long; fem. with simple recurved spikes and rather larger flowers.—Rheede's figure is very good for its time.

41. **C. Rheedei,** *Griff. in Calc. Journ. Nat. Hist.* v. 73; *Palms Brit. Ind.* 36, 83; leaflets in very distant groups of 3 on a long rachis armed with scattered short recurved spines linear-lanceolate acuminate, fruiting spadix with the flat open acute spathes longer than the ovoid dense clusters of ellipsoid or oblong fruit. Dæmonorops Rheedii, *Mart. Hist. Nat. Palm.* iii. 330; *Miq. Fl. Ind. Bat.* iii. 100; *Walp. Ann.* iii. 479, v. 828.—*Rheede Hort. Mal.* XII t. 65.

MALABAR, *Rheede.*

Of this species nothing is known beyond Rheede's rude plate, which is very inferior to that of *C. travancoricus*, from which it differs in the much longer leaf the leaflets being grouped in threes, one of each group apparently on one side of the rachis and 2 on the other; four leaflets terminate the rachis. The fruits are represented as ⅔ in. long by ⅓ in. broad and very shortly beaked. Beccari thinks that a *Calamus* fruit sent from Malabar to Kew by Major Campbell exactly corresponds to Rheede's figure.

GROUP VI. See p. 438.

42. **C. Huegelianus,** *Mart. Hist. Nat. Palm.* iii. 338; leaflets many equidistant elongate ensiform acuminate strongly 3-costate, margins smooth unarmed above beneath pale and with a very few long bristles on the lateral costæ, petiole stout young scurfy back rounded with very stout short recurved spines, sheath armed with very stout scattered long and short spines, fem. spadix stout erect, spathes sparingly armed with stout claws narrowly tubular truncate, fruiting branches 6–10 in. very stout, spikes recurved, calyx pedicelled cupular with spreading lobes, fruit globose black shining. *Walp Ann* iii. 488, v 831. C. Wightii, *Griff. Palms Brit. Ind.* 102, t. 216 C. C. melanolepis. *H. Wendl. in Kerch. Palm.* 237. Dæmonorops melanolepis, *Mart. Hist. Nat. Palm* iii. 331, t. 175, f. xi.; 342 *under* C. diœicus *and* tab. 116, f. xi.; *Walp. ll cc.* 481, and 829.

NILGHIRI HILLS; alt. 5–6000 ft., at Sisparah, *Wight,* &c.; at Naduvatam, *Gamble.*

Apparently a stout scandent species. *Leaflets* 12–16 by ⅝–1 in., tips spinelosely ciliate, margins below obscurely aculeolate, pale green, not shining, almost white beneath, the very distant bristles on the lateral nerves beneath sometimes absent, at others nearly ½ in. long; rachis and petiole pale. *Fruit* ½–¾ in. diam., very shortly beaked; scales subacute, with fimbriate margins, not channelled; fruiting calyx nearly ½ in. diam.; petals acute.

43. **C. Gamblei,** *Becc. mss.*; leaflets as in *C. Huegelianus*, but with shorter scattered bristles on the 3 costæ of the lower surface and a few on the upper, fruiting spikes of the spadix recurved, calyx cupular long-pedicelled, lobes very short, fruit globose or broadly obovoid, scales pale yellow acute deeply channelled.

NILGHIRI HILLS; Makurti forests, alt. 5000 ft., *Gamble*.

A very distinct species differing from *Huegelianus* by the longer leaflets, 2–2½ ft., the more slender spathellules, longer pedicel of the more campanulate calyx which has shorter lobes, and by the pale fruit with deeply channelled scales.—A variety with spherical fruit is mentioned by Beccari.

GROUP VII. See p. 438.

44. **C. gracilis.** *Roxb. Fl. Ind.* iii. 781 (*excl. Syn. Hort. Mal.*); leaflets few in opposite groups of 3–5 on each side of the slender rachis elliptic-lanceolate acuminate 3–7-costate, costæ very slender more or less setose above, petiole short and rachis and sheath armed with short hooked spines, fem. spadix elongate slender drooping flagelliferous spathes tubular acuminate sparingly spinous, upper unarmed, spathels not imbricate, fruiting calyx sessile shortly cylindric, lobes very short, fruit oblong, scales very pale ripe channelled. *Mart. Hist. Nat. Palm.* iii. 348; *Kunth Enum.* iii. 209, *Griff. in Calc. Journ. Nat Hist.* v. 54; *Palms Brit Ind* 64, t. 196; *Walp. Ann* iii. 488, v. 831; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 212, t. 31 C; *For. Fl.* ii. 520.

The KHASIA HILLS, ascending to 4000 ft., UPPER ASSAM, *Mann*. CACHAR, *Keenan*. CHITTAGONG, *Kurz*.

Slender, scandent, naked stem not thicker than a quill. *Leaves* 2–3 ft.; leaflets 5–7 in., margins obscurely bristly except at the tip where the bristles are long; petiole very short and rachis fugaciously scurfy; sheaths green, glabrous. *Spathes* fugaciously brown-scurfy; spathels unarmed. *Corolla* three times as long as the calyx. *Fruit* ¾ in. long; scales straw-cold. with or without a narrow brown border; fruiting calyx pedicelliform. *Seed* wrinkled.—Descript. chiefly from Kurz.

45. **C. melanacanthus,** *Mart. Hist Nat. Palm.* iii. 333, t. 116, f. 13 (*in part*); leaflets many equidistant membranous linear with capillary tips 3-costate upper much shorter, shortly setose or naked on the costæ beneath, rachis with a single row of short recurved black spines, sheath with subwhorled spines, fem spadix decompound ending in a flagellum, spathes shortly sparsely spinous upper nearly unarmed, fruiting calyx sessile campanulate pedicelliform, fruit ellipsoid shortly beaked, scales very pale channelled, embryo lateral. *Kunth Enum* iii 211; *Griff. in Calc Journ. Nat. Hist.* v. 49; *Palms Brit. Ind.* 59; *Walp. Ann.* iii. 484, v. 830; *Miq. Fl. Ind. Bat.* iii. 119; *Palm. Archip. Ind.* 27; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 215, t. xx. B.—*Wall. Cat.* 8606 B.

TENASSERIM; at Chapredong, *Wallich*.

Scandent. *Leaflets* 6–13 by ½ in., upper 2–3 in., shining, tips sparsely bristly or naked. *Corolla* hardly longer than the (fruiting) calyx-lobes. *Fruit* ¾ in. long, greyish yellow with very narrow brown margins; lobes very short. *Albumen*

deeply ruminate; embryo in the middle of the side, a very unusual position in the genus.—The specimens examined are of the portion of a leaf and of a fruiting spadix.

46. **C. Diepenhorstii,** *Miq. in Journ. Bot. Neerl. Ind.* i. 21; *Palm. Archip. Ind.* 27; *Fl. Ind. Bat.* 594; leaflets very many equidistant long narrow finely acuminate 3-costate, costæ naked or very sparsely setose above, margins thickened smooth, petiole very long armed with straight scattered spines, rachis angular armed with one row above and two below of short recurved spines, sheath copiously armed with long flat straight deflexed black spines, spadices very long supradecompound, fruiting calyx very short sessile cupular, fruit obovoid shortly beaked, embryo basal. C. melanacanthus, *Mart. (partim).*—*Wall. Cat.* 8606 A.

PENANG, *Wallich, Curtis* (765). PERAK; on Gunong Tambang Batok, alt. 500–2000 ft., *Scortechini* (647b). Larut and Gunong Malacca, *King's Collector* (7201, 2352).—DISTRIB. Sumatra.

Stem 20–30 ft., stout, scandent. *Leaves* 3–4 ft.; leaflets 18–20 by ⅔–¾ in., straight, upper smaller; spines of sheath ½–⅔ in. long. *Fruiting spadix* 10–12 ft., slender. *Fruit* ¾ in. diam., orange-yellow when ripe (King's collector); fruiting calyx very short, sessile, lobes obscure; scales channelled, very narrowly bordered with brown.—Very distinct from *melanacanthus* in the much stouter petiole and rachis, long flat spines on the sheath, long leaflets with thickened margins, very long fem. spadix, with very long branches, and basal embryo.

? 47. **C. singaporensis,** *Becc. mss.*; leaflets many rather distant narrowly linear finely acuminate 3-costate, tips setose, margins and costæ on both surfaces unarmed or nearly so, upper part of rachis slender angled with 1–2 rows of short recurved black spines, male spadix very slender flagelliform decompound, spathes very slender tubular lower shortly spinous, upper ending in flat laminæ uppermost with oblique membranous mouths, spikes 1 in., spathellules densely imbricate short striate, flowers very young.

SINGAPORE; in the forest near the Bot. Garden, *Murton.*

Apparently a very slender species of doubtful position, known only by an upper portion of a leaf and young male spadix. *Leaflets* 10–12 by ⅛–¼ in., margins hardly thickened.

GROUP VIII. See p. 438.

48. **C. exilis,** *Griff. Palms Brit. Ind.* 51 (axilis, 35); leaflets many equidistant narrow finely acuminate copiously setulose on the margins, costæ and often the intermediate nerves above and beneath, rachis scurfy setose and armed with a single row of hooked spines, petiole long flattened 2-edged with marginal straight slender spines, sheath scabrid and armed with short straight flattened spines, fem. spadix decompound scabrid all over as are the spathes, fruit linear oblong sharply beaked. *Mart. Hist. Nat. Palm.* iii. 333, t. 176, f. 7; *Walp. Ann.* iii. 484, v. 830; *Miq. Fl. Ind. Bat.* iii. 116.

MALACCA; on Gunong Ladang, *Fernandez.* PERAK, Larut and Ulu Bubong, alt. 4000 ft., *Scortechini* (657b), *King's Collector* (2734, 6245, 8457) 10,259, *Herb. Calc.*).

Stem 15–20 ft., ¾ in. diam. *Leaves* 3–3½ ft.; leaflets 8–10 by ⅛–½ in., cross nervules strong; petiole scaberulous, with distant dorsal hooked spines and many marginal; sheath with coarse matted hairs at the mouth. *Lower spathes* 12–14 in., compressed and 2-edged with slender marginal spines below and smaller ones above, mouth oblique, upper spathes 4–6 in., tubular, armed with small scattered spines.

Branches of fem. spadix 6–8 in., coarsely scabrid, bearing short alternate few-fld. spikes; fruiting calyx pedicelled and pedicelliform, campanulate; lobes as long as the tube and as the petals. *Fruit* nearly 1 by ½ in. diam., dirty yellow; scales margined with brown. *Seed* linear-oblong, transversely grooved; albumen not ruminate; embryo in the middle of the back.

GROUP IX. See p. 438.

49. **C. tomentosus,** *Becc. mss.*; sheath, rachis and flagellum softly almost flocculently white-tomentose, leaflets few distant or in distant pairs elliptic acuminate coriaceous strongly nerved, margin crisped or waved.

PERAK, *Scortechini* (431[b]); alt. 2500–3000 ft., *King's Collector* (5332, 6993).

Stem 20–40 ft., ½–¾ in. diam., light grey. *Leaves* 2–3 ft.; leaflets 8–14 by 3–6 in., base narrowed, green on both surfaces or yellowish beneath with brown stripes above; nerves flabeliate; sheath unarmed, ochrea annular very coriaceous, acute posteriorly; petiole short, very stout, subterete, armed with few distant 3-fid short claws; flagellum 8–10 ft., ending in a long filiform prickly tip, armed with strong 3-fid claws at about equal distances, towards the base the surface of the petiole is granulate when dry. A portion of a flowerless and fruitless spadix is terete with tubular spathes and bears distant spreading spikes 4 in. long, with rather distant coriaceous subcampanulate spathels.—A remarkable plant of which the specimens are very imperfect. The description of the stem and colour of the leaflet is from notes by King's Collector; the rest from his specimens, one of which (5332), with smaller leaves is from Larut, "within 300 ft.," perhaps meant for 3000 (as in n. 6993).

GROUP X. See page 438.

50. **C. zeylanicus,** *Becc. mss.*; leaflets many long equidistant ensiform long acuminate 3–5-costate, margins minutely setulose or naked, costæ very sparingly setose above naked beneath, rachis very stout, male spadix decompound, lower spathe acute armed with very short scattered prickles, upper striate smooth or sparsely aculeate, uppermost funnel-shaped truncate, branches of male spadix 6–10 in. clothed with short broad imbricate spathels, spikelets very many distichous, spathellules extremely short and densely imbricate, fem. spikes and spikelets much longer and laxer, fruit globose long-beaked. *C. rudentum, Thw. Enum.* 330 (*excl. syn.*) (*non Lour.*); *Hance in Journ. Bot.* 1874, 262.

CEYLON, *Walker*; Suffragam district, *Thwaites* (CP. 2874).

Stem very stout. *Leaves* probably 4–5 ft. long; leaflets 1½–2 ft. by 1–1½ in., smooth; rachis pale, finely scurfy, with short appressed marginal spines above and lower down with 3-fid claws beneath; flagellum very stout, with very broad claws of 3–6-nate recurved black spines. *Male spadix* with long spreading branches clothed with short spathels and bearing short broad flat spikelets ½–1 in. long and ¼ broad of most densely imbricate short spathellules and small flowers ⅛ in. long. *Fem. spadix*; branches and spikes much longer; calyx sessile, very short, deeply 3-lobed; fruiting calyx sub-pedicelliform; petals as long, both striate. *Fruit* ¾ in. diam., dull yellow; scales deeply channelled, margins scarious pale. *Seed* globose; albumen deeply ruminate, embryo lateral.

51. **C. latifolius,** *Roxb. Fl. Ind.* iii. 775[1]; leaflets few large scattered or 2-nate elliptic or elliptic-lanceolate 3–9-costate tips setose, margins aculeolate, costæ naked on both surfaces, rachis flageliferous very stout variously armed with scattered spines, sheath densely covered with very short broad whorled spines and a few very large straight flat solitary or whorled ones, spadix decompound, spathes short subcompressed sparsely

spinous mouth oblique, spathels short, male spikes densely imbricate, fruiting calyx sessile, pedicelliform broadly campanulate lobes short, fruit subglobose pale. *Mart. Hist. Nat. Palm.* iii. 339, t. 160, f 5: *Griff. in Calc. Journ. Nat. Hist.* v. 60; *Palms Brit. Ind.* 68, t 198 (*excl cit. Hort. Malab.*); *Kurz in Journ. As. Soc. Beng.* xliii. ii 210 (*excl.* t. 31 A); *For. Fl.* ii. 518 (*partim*). C. macracanthus et inermis, *T. Anders. in Journ. Linn. Soc.* xi. 10, 11; ? C. humilis, *Roxb. Fl. Ind.* iii. 773.

From the SIKKIM HIMALAYA and ASSAM, ascending to 2000 ft., to TENASSERIM. *Stem* stout, 1–2 ft., as thick as the thumb. *Leaves* with the flagellum 10–15 ft.; leaflets 1–2 ft. by 1–2½ in., upper sometimes flabellately clustered or connate at the base; cross nervules very many and close; petiole short or long, sometimes bearing the leaflets only far up the flagellum; base sometimes ⅔ in broad, smooth, biconvex, spines very various always scattered. *Spadix* very large; spathes and branches usually armed with scattered very short broad spines. *Fruit* (not quite ripe) nearly 1 in. long, rather narrower, pale dull yellow; scales convex, deeply channelled, shining, margin very narrowly scarious.—*C. humilis*, Roxb., is probably founded on a very young plant of *C. latifolius* with undeveloped flagella.

52. **C. Doriaei,** *Becc. mss.*

BURMA; on Mt. Karin, *L. Fea.*

Only a portion of a spadix with fruit known. It appears to be nearly allied to *C. latifolius*, from which it is distinguished by the elongate fruit ¾–1 by ½ in.—I have seen no specimen. *J.D.H.*

53. **C. simplex,** *Becc. mss.*; leaves flagelliferous, leaflets very few large elliptic 3–6-costate, spadix supra-axillary quite simple elongate not flagelliferous bearing at every primary spathe a solitary simple spikelet or at most two from the lowest spathe, fruiting calyx callous shortly pedicelliform, fruit rather large broadly ovoid, seed globose, albumen deeply ruminate, embryo subbasilar.

PERAK; on Gunong Tambang Batak., *Scortechini* (432).

Differs from all other known species in the few divisions of the spadix.—I have seen no specimen. *J.D.H.*

54. **C. caesius,** *Blume Rumph.* iii. 57; leaves subsessile flagelliferous, leaflets very inequidistant in distant fascicles of 5–7 oblanceolate cuspidately acuminate glaucous or farinose beneath acutely 4-costate above and setulose, margins setulose acute, rachis armed with solitary and subwhorled spines, sheath not flagelliferous very gibbous above fugaciously scurfy armed with scattered long horizontal spines with broad callous bases and small acute tubercles. *Mart. Hist. Nat. Palm.* iii. 340; *Walp. Ann.* iii. 490, v. 832; *Miq. Anal. Bot. Ind.* i. 6; *Fl. Ind. Bat.* iii. 129; *Palm. Archip. Ind.* 28. C. glaucescens, *Blume, l.c.* 65; *Mart. l.c.* 339; *Walp. ll. cc.* 489, 830; *Miq. ll. cc.*

PERAK, *Scortechini.*—DISTRIB. Borneo.

A lofty climber. *Leaves* 2–3 ft.; leaflets 12–14 by 2–2¼ in. *Fruit* unknown.—Appears to be allied to *C. melanoloma* of Java. I have seen no specimen. *J.D.H.*

55. **C. axillaris,** *Becc. mss.*; leaves shortly petioled, leaflets numerous very inequidistant above oblanceolately ensiform, margins smooth, rachis unarmed below armed above with scattered simple and ternate claws, spadix not flagelliferous elongate with several erect partial inflorescences, spathes 1st and 2nd fugaciously scurfy unarmed or the lower scarcely armed,

spikelets short scorpioid, 3rd spathe infundibular, limb open truncate margin fimbriate, spathels and spathellules striate margins ciliate, flowers distichous, calyx finely striate.

PERAK, *Scortechini*.

Described from a single specimen which I have not seen. The fruit, and hence the position of the species, is unknown. *J.D.H.*

56. **C. pallidulus,** *Becc. mss.*; leaves subsessile, leaflets inequidistant hardly fascicled ensiform acuminate, costæ 3 unarmed on both surfaces, margins sparsely spinulose, rachis strongly armed with uniform short black tipped 3-fid claws, sheath with scattered short straight spines, spathes armed with short stout scattered simple conical spines, fruit spherical shortly beaked pale, seed deeply pitted, albumen ruminate.

PERAK; at Thaiping, *Wray* (2392, 3017).

Leaflets 8–10 in. The upper spathes are naked with much dilated obliquely truncate mouths. The fem. spikes 2 2½ in., strongly recurved; spathels strongly muricate. *Fruit* ¾ in. diam., very pale; scales obscurely channelled, margins hardly scarious, beak cylindric; fruiting calyx pedicell form.—Described from two leaves, a small portion of a sheath, a fragment of a spadix with ripe fruit.

GROUP XI. See p. 438.

* *Fruiting perianth not pedicelliform.*

57. **C. ovoideus,** *Thw. ex Trimen in Journ Bot.* 1885, 269; leaves petioled, leaflets equidistant broadly linear alternate 3-costate tip bristly, margin thickened smooth, costæ setose beneath, rachis fugaciously scurfy, margins prickly back rounded with solitary hooked spines, sheath densely armed with rings of flat deflexed often lacerate black spines, lower spathes armed with short broad flat reflexed spines, fruiting spadix with very stout recurved spikelets, fruiting perianth stellate, fruit obovoid strongly beaked.

CEYLON; Saffragam district, *Thwaites* (CP. 3925).

Stem stout, scandent. *Leaves* 14 ft. and more including the flagellum; leaflets 10–14 by ¾–1 in., bright green above, duller beneath. *Fruit* ⅝–¾ in. long, strongly beaked, scales pale greyish yellow, strongly channelled, narrowly margined with orange-brown.—Described from Trimen l. c.

58. **C. andamanicus,** *Kurz in Journ. As. Soc. Beng.* xliii. ii. 211, t. xxvii. A, xxviii.; *For. Fl.* ii. 519; leaflets alternate equidistant linear subulate-acuminate 3-costate, margins thickened and costæ setose, petiole and rachis armed with stout recurved spines, petiole with blackish tuberous-based ones mixed with long black spines, sheath red brown covered with seriate whorls of capillary black and broad flat black spines, spadix decompound nodding, spathes subcompressed armed with strong reflexed solitary and ternate spines, partial unarmed, fruit elliptic-ovoid acuminate, scales with long fimbriate tips.

ANDAMAN and NICOBAR ISLANDS, *Kurz, Man.*

Stem lofty, scandent, as thick as the arm (with the sheaths on). *Leaflets* 2–2½ ft. by 1 in. broad. *Fruit* distichous, uniformly brown, about ½ in. long; scales rhomboid, greenish, bordered with chesnut-brown, rather flat, not furrowed, tips prolonged into a lanceolate pale brown opaque acute ciliolate membranous appendage, longer than the scale itself. *Seed* semiconvex, grooved; albumen equable.—(The above from Kurz.)

59. **C. palustris,** *Griff. in Calc. Journ. Nat. Hist.* v. 62; *Palms Brit. Ind.* 71, t. 199; leaves shortly petioled, leaflets alternate the median approximate in pairs broadly elongate-lanceolate acuminate with bristly tips 3-costate and many-nerved, margins not thickened and costæ smooth, petiole with 1–2 rows of short very broad fascicled or simple hooked spines with swollen bases, sheath green sparingly armed with short black or broad hooked spines, spathes tubular obliquely truncate armed with recurved spines, spathels glabrous, fruiting perianth stellate, fruit ellipsoid-oblong, scales obtuse. *Mart. Hist. Nat. Palm.* iii. 339; *Miq. Fl. Ind. Bat.* iii. 131; *Walp. Ann.* iii. 490, v. 831. C. latifolius, *Kurz* (*not Roxb.*) *in Journ. As. Soc. Beng.* xliii. ii. 210, t. 31 A; *For. Fl.* ii. 518 (*partly*).

TENASSERIM, *Griffith.* PERAK, *Scortechini* (50[b]). ANDAMAN ISLANDS, *Kurz, Man.*

Stem scandent, everywhere glabrous, with the sheaths on 2–3 in. diam. *Leaves* 8–12 ft.; leaflets 1–2 ft. by 3–5 in., rather thin, uniformly green. *Spadix* bifariously decompound, elongate, drooping. *Fruit* about ½ in. long, scales slightly biconvex, hardly channelled, pale brown with a blackish border. *Seed* almost semiconvex; grooved and irregularly wrinkled.—(Descript. from Kurz.)

** *Fruiting perianth more or less pedicelliform.*

60. **C. unifarius,** *H. Wendl. in Bot. Zeit.* xvii. (1839) 158; var. Pentong, *Becc. mss.*

NICOBAR ISLANDS. *E. H. Man.*

The plant referred as above consists of a leaf and a portion of a spadix with the fruit wanting. *C. unifarius* is a Javan plant, described as having rather few inequidistant lanceolate or oblong-lanceolate acuminate 7-costate leaflets; the fruit is subglobose about $\frac{1}{10}$ in. diam., with channelled scales and deeply sinuately furrowed seeds with a basal embryo.—I have seen no specimen. *J.D.H.*

61. **C. neglectus,** *Becc. mss.*

MALACCA, *Griffith* (Kew Distrib. 6399 bis).

This species is founded in the flagelliferous apex of a leaf and a portion of a fruiting spadix. The flagellum is very slender; the leaflets subequidistant, 4–6 in. by ½ in., membranous, linear-lanceolate, finely acuminate, setaceous pointed, with 3 slender costæ and thickened setose margins; spathes coriaceous, tubular, obliquely truncate, armed with short scattered straight stout spines; fruiting calyx subpedicelliform, with broad spreading obtuse lobes; young fruit ½ in. long, ellipsoid, scales dull pale yellow with broad scarious brown margins and tips, not channelled, beak stout.—I have seen no specimen. *J.D.H.*

62. **C. viridispinus,** *Becc. mss.*; leaf flagelliferous, leaflets in very distant fascicles variously grouped ensiform finely acuminate, costæ 3 strong sparingly setose above naked beneath, rachis trigonous smooth with few solitary very short hooked spines on the lateral angles, spadix elongate filiform, fem. spikes elongate with alternate remote horizontal flowers, young fruit oblong strongly beaked, fruiting calyx pedicelliform, petals small, albumen solid.

PERAK, *Scortechini* (316[b]); at Larut, alt. 3500–4000 ft. (*Herb. Calcutt.* 4127). *Stem* 20–25 ft. *Leaves* bright green; leaflets 10 by nearly 1 in.—I have seen only a fragment of a leaf, from Larut, and a spike of very young fruit. *J.D.H.*

63. **C. Oxleyanus,** *Teysm. & Binnend. Cat. Pl. Hort. Bogor.* 1886, 75 (*name only*) erect, leaflets very many in subopposite distant fascicles linear-lanceolate acuminate, tip bristly, costæ 5 setose above naked

beneath, petiole long stoutly armed, sheath excessively armed with large seriate straight or deflexed spines and scattered short ones. *Miq. Palm. Archip. Ind.* 17, *with fig.* C. Fernandezii, *H. Wendl. in Kerchov. Palm.* 236. Dæmonorops fasciculatus, *Mart. Hist. Nat. Palm.* iii. 330; *Walp. Ann.* iii. 480, v. 829; *Miq. Fl. Ind. Bat.* iii. 101.—Rotang Pajare, *Griff. in Calc. Journ. Nat. Hist.* v. 89; *Palms Brit. Ind.* 95.

MALACCA, *Fernandez, Orley.*—DISTRIB. Banca?

Stem with the sheaths about 1 in. diam. *Leaves* 10–11 ft. long exclusive of the long flagellum; leaflets 1 ft. by ¾ in.; petiole about 2 ft.; its lower part armed like the sheath; sheath with a very oblique mouth.—Descript. from Griffith.

GROUP XII. See p. 438.

64. **C. Martianus,** *Becc. mss.*—*C. paniculatus,* Mart. Hist. Nat. Palm. iii. 334 (not of Roxb.).

PENANG; *Gaudichaud.*

Stem scandent. *Leaflets* 4–5 in., equidistant, alternate, lanceolate, tip shortly acuminate and bristly 7–9-costate, margins and surfaces unarmed, petiole very short, rachis and slender flagellum armed with short spines, sheath with a short obliquely truncate ochrea. *Male spadix* decompound, lower spathes subterete faintly 2-keeled and rachis armed with short scattered spines, upper unarmed, spikes slender spreading equalling or twice as long as their spathes.—Description from Martius, neither Beccari nor have I seen specimens.—*J.D.H.*

65. **C. spathulatus,** *Becc. mss.*; leaflets very few alternate distant uppermost pair connate at the base elliptic obtuse convex above, costæ 5–9 and margins quite smooth, petiole very short and slender, rachis copiously armed with large solitary and 2–3-nate recurved black-tipped spines, sheath flagelliferous elongate cylindric copiously armed with uniform short straight conical-based spines, fem. spadix slender flagelliferous, spathes slender terete armed with short hooked spines, fruiting calyx pediceliform short contracted sessile, base broadly truncate, fruit (young) long-beaked very pale.

MALACCA, *Lobb, Hervey.*

Stem scandent; very slender. *Leaves* probably 2–3 ft. long; leaflets 4–7 by 2–2½ in., coriaceous, shining above, base acute, cross-nervules very many and close; petiole and rachis subterete, flagellum very slender; sheath as thick as the fore-finger, thickly coriaceous, pale, smooth between the short flattened subseriate spines, flagellum very stout. *Fem. spadix* long, slender, with distant branches which are adnate to the rachis far above the slender closely appressed spathes; spathule of branches tubercled ½ in. long; spikes 1–1½ in., spreading and recurved; spathellules very short. *Fruit* (young) ¼ in. long, shortly oblong or ellipsoid with a long cylindric beak; scales very pale straw-cold., faintly channelled.

Var. *robusta,* Becc.; spadix much larger, very stout.—Perak, Geelong-Malacca, *King's Collector* (7136).

66. **C. insignis,** *Griff. in Calc. Journ. Nat. Hist.* v. 58; *Palms Brit. Ind.* 69; leaflets few distant alternate uppermost pair connate at the base elliptic-oblong or -oblanceolate cuspidately subacute convex 7–9-costate margins thickened recurved and both surfaces quite smooth, rachis slender and terete petiole shortly very sparingly prickly, sheath long slender polished very sparingly armed with tubercular spines or conical tubercles, *Mart. Hist Nat. Palm.* iii. 338; *Walp. Ann.* iii. 488, v. 831; *Miq. Fl. Ind. Bat.* iii. 128.

MALACCA, *Fernandez.* PERAK, *Scortechini.*

Stem scandent, as thick as a goose-quill, shining; internodes 2 in. *Leaves* 12–18 in.; leaflets 3–6 by 1–1½ in., polished above, cross-nervules very many and close set; petiole 3–5 in.; sheath not so thick as the little finger, very long, cylindric and smooth.—The leaflets resemble those of *C. spathulatus* but are smaller. —I have seen no Perak specimens, of which Beccari says that they are more robust, and have rather larger and more numerous leaflets with more distant transverse nerves. *J.D.H.*

67. **C. quinquenervius,** *Roxb. Fl Ind.* iii. 777; scandent, leaves flagelliferous, leaflets alternate remote equidistant narrowly lanceolate, spines in belts slender, fruit spherical. *Kunth Enum.* iii. 209; *Mart. Hist. Nat. Palm* iii. 339; *Griff. in Calc. Journ. Nat. Hist.* v. 61; *Palms Brit. Ind.* 72.

SILHET, *Roxburgh.*

Climbing. *Stem* exclusive of the leaf-sheaths, about as thick as the middle finger, internodes 6–8 in.—Probably a well-known species, but not identifiable by the character given, nor recognized by Beccari or myself.

68. **C. ornatus,** *Blume in Rœm. & Sch. Syst.* vii. ii. 1326; *Rumphia,* iii. t. 148; *Mart. Hist. Nat. Palm.* iii. 208, t. 116, f. 2.—

Var. HORRIDA, *Becc. mss.* leaves petioled not flagelliferous, leaflets large equidistant narrowly ensiform acute 3–5-costate glaucous beneath, margin and costæ beneath caducously setulose, petiole and rachis shortly armed, sheaths with long flat spines, fem. spadix very long flagelliferous, spathes tubular armed with very long spines, branches few erect, spathels smooth, male spikes close set recurved very stout, spathellules broadly imbricating. C. ornatus, *Griff. in Calc. Journ. Nat. Hist.* v. 37; *Palms of Brit. Ind.* 46; *Miq. in Journ. Bot. Neerl. Ind.* i. 21; *Fl. Ind. Bat. Suppl.* 256. C. ovatus and C. aureus, *Renw. ex Mart. l. c.* 208, 241.

MALACCA. *Fernandez.* PERAK; *Scortechini* (587[b]) (*Herb. Calc.* 3931).—DISTRIB. Malayan Islands.

Stem robust; 50–80 ft., 1½ in. diam. without the sheaths; sheaths about 2 in. diam. *Leaves* 12–15 ft.; leaflets 2–2½ ft. by 2¼ in. broad, tip rather obtuse often 2-fid, bristly; mid-costa above with stout bristles towards the tip; petiole 3 ft., 1½ in. diam., somewhat flattened, rusty-pubescent, much armed with broad strong flattened spines ½ in. long; sheath copiously armed with whorled flat appressed often imbricating spines 1 in. long, and ½–½ in. broad at the base. *Spadix* 16–18 ft.; branches 2½ ft. apart; spathes tubular, armed like the sheaths; spikes 2–3 in.; spathels smooth, bracts and spathellules ciliate. *Male spikes* recurved, flattened, ⅔ in. across the distichous large spreading spathellules; *male fl.* broadly ovoid, terete, obtuse; calyx sessile, hemispheric, petals twice as long. *Calyx* oblong, shortly 3-toothed, fruiting pedicelliform. *Fruit* 2 in. long, obovoid; scales rufous, margins pale, lacerate.—Descript. chiefly from Griffith; of the fruit from Martius.—Beccari regards the Malacca plant as a var (*horrida*) with glabrescent sheaths, seriate spines, and adult leaflets 3- or sub 5-costate and scarcely spinulose.

69. **C. giganteus,** *Becc. mss.*; very robust, leaves large flagelliferous, leaflets many equidistant broadly ensiform acuminate plicately sub 5-costate, costæ and margins unarmed, petiole long and rachis armed with short spines, sheath very stout woody smooth densely armed with very broad basal flat long scattered or subseriate spines and short scattered ones, male spadix supradecompound, branches close together, spathes tubular shortly spiny, fruiting calyx pedicelliform, fruit large ellipsoid-ovoid, acute.

PERAK; *Scortechini.*

Apparently scandent, leaf-sheaths 2–3 in. diam. *Leaves* 8–10 ft. long; petiole 3 ft.; leaflets 2 ft. by 1½–2 in. *Fruit* above an inch long, suddenly contracted into a conical point; scales shining, straw-colored.—Very near *C. ornatus*, but more robust, and more densely armed; abundantly distinct in the non-flagelliferous spadix, longer branches, and armed secondary spathes.—I have seen no specimen. *J.D.H.*

70. **C. scipionum,** *Lour. Fl. Cochinch.* i. 210; leaves not flagelliferous, leaflets numerous firm equidistant upper gradually smaller elongate-lanceolate or subensiform aculeolate tips bristly, costæ 5–7 naked on both surfaces or sparsely aculeolate beneath, margins nearly smooth, uppermost pair connate at the base, rachis and petiole armed with very stout conico-subulate scattered recurved spines, spadices very long flagelliferous, lower spathes very long tubular unarmed or their keels armed, fruiting calyx very small pedicelliform, fruit small ovoid or globose abruptly mammillate brown. *Lam. Encycl.* vi. 304 (*non Illustr. & excl syn*); *Mart. Hist. Nat. Palm.* iii. 342; *Kunth Enum.* iii. 206; *Walp. Ann.* iii. 342; v. 832; *Griff in Calc. Journ. Nat. Hist.* v. 35; *Palms Brit. Ind.* 43; *Miq. Fl. Ind. Bat.* iii. 138. C. micranthus, *Blume Rumph.* iii. 53 (*leaf only*), t. 157 (*excl. spadix & anal. fl.*).—Ching, *Griff. l.c. c.c.* 37 and 46.

MALACCA, *Griffith.* PERAK, *Scortechini* (501ᵇ); at Gunong-Malacca, *King's Collector* (7171)—DISTRIB. Borneo.

Stem 40–60 ft., sheath 2–3 in. diam. *Leaves* 4–5 ft.; flagellum 10–12 ft; larger leaflets 18–20 by 1½–2 in., rather coriaceous, tips not produced; rachis as thick as the little finger, smooth except from the scattered spines, obtusely trigonous. *Male spadix* 20 ft.; fem. about 10 ft. long; lower spathe compressed, upper cylindric; spathels 1 in., tubular, truncate, smooth, unarmed, or with a few conical tubercles; branches of fem spadix long; spikes 2–4 in., rather distant, spreading and recurved, stout; spathellules and bracts very short imbricate; fem. fl. sessile. *Fruiting calyx* small, broadly urceolate, base truncate intruded, mouth much contracted, lobes very short; petals rather longer, broadly ovate. *Fruit* (young) ½ in. long, scales brown shining tumid hardy channelled, with broad pale scarious margins. *Seed* (young) sub-obovoid, alveolate, embryo basilar.

GROUP XIII. See p. 438.

71. **C. conirostris,** *Becc. mss.*; leaf long-petioled shortly flagelliferous, leaflets numerous equidistant narrowly ensiform tips slender strongly setulose, costæ 3 more or less setulose above the median only beneath, rachis and flagellum armed with stout recurved 3–5-fid claws, petiole very stout, margins densely armed with subsolitary stout straight erect and spreading spines, sheath armed with very long and slender spines, spathes copiously armed with subseriate straight spines, fem. spadix very stout, spathels densely spinous, spikes very short and stout, bracts large densely imbricate cupular, fl. large, fruit narrowly ovoid narrowed into a stout beak black.

PERAK; at Goping, alt 500–1000 ft., *King's Collector* (4593, 5808).

Stem 15–20 ft., 1–1¼ in. diam. *Leaves* 6–8 ft. glossy; leaflets 10–18 ft. by ¾–1 in.; upper smaller, membranous; petiole as thick as the middle finger, concave-convex, back sparsely shortly armed; upper spines of sheath 4 in. long, acicular. *Fruit* 1¼ in. long by ⅔ in. diam., very smooth; scales flat, brown-black, quite smooth and polished, closely imbricating, the basal concealed part yellow, fruiting calyx ¼ in. diam., cupular, not pedicelliform; lobes large broad appressed; petals very small. *Seed* ovoid, rough; albumen cancellate throughout.

72. **C. Lobbianus,** *Becc. mss.*; leaflets equidistant linear-lanceolate caudate-acuminate membranous, clothed beneath with an appressed white substance (as if coated with lime), costæ 3 all naked or with a very few bristles beneath, spadix slender and rachis and upper spathes aculeate, male spikes crowded very short and broad with densely crowded distichous large flowers.

SINGAPORE, *Lobb, G. Panti* (210 *Herb. Calcutta*).

A small palm, stem 18 in., 6–8 in. diam. *Leaves* 5–6 fl.; leaflets 12–14 by 1–1½ in., rachis of the portion seen unarmed. *Spathes* (upper?) with a short keeled sheath and acuminate limb, armed with straight slender spines ¼–½ in. long on the sides and keel; branch of *male spadix* 3 in. long, oblong; spathellules most densely imbricate, ¼ in. diam. *Male fl.* nearly ½ in.; calyx cupular, with broad triangular lobes, not pedicelliform; petals twice as long, the lobes narrowly lanceolate.—I have seen only the branch of a male spadix and a fragment of a leaf with 7 leaflets, both from G. Panti. *J.D.H.*

DOUBTFUL SPECIES.

C. EXTENSUS, *Roxb. Fl. Ind.* iii. 777. Probably *C. palustris.*

C. HUMILIS, *Roxb. l. c.* 773, is possibly 51, *latifolius.*

C. METZIANUS, *Schlecht. in Linnæa,* xxvi 727 from Canara (? = *C. rivalis,* Thw.).

C. PENICILLATUS, *Roxb. Fl. Ind.* iii. 781. If for 30–40 pair of segments in Roxburgh's description, 3–4 be substituted, this might apply to *C. javensis,* Bl.

C. POLYGAMUS, *Roxb. Fl. Ind.* iii. 780; *Mart. Hist. Nat. Palm.* 210; *Griff. in Calc. Journ. Nat. Hist.* v. 48; *Palms Brit. Ind.* 58, is not recognisable.

24. DÆMONOROPS, *Blume.*

Characters of *Calamus,* but outer sheaths or spathes cymbiform, deciduous, at first enclosing the inner; flowers often more pedicellate.—Species about 80. Distrib. as of *Calamus.*

Dæmonorops differs so little from *Calamus,* and by sectional rather than generic characters according to Griffith, Kurz and others, that it was united with the latter in the "Genera Plantarum." As, however, Beccari, the latest and best authority on Indian Palms, keeps them apart, and as the elaboration of the species no less than their nomenclature in this work owes so much to him, I think it right to follow his lead. The difficulty of separating them in practice, working upon herbarium specimens, is shown by the synonymy of various species of both.

Sect. I. **Cymbospathæ.** *Spathes* cymbiform, beaked, two outer completely enveloping the inner. *Male spadix* fusiform before flowering.

* *Stem scandent.*

1. **D. Jenkinsianus,** *Mart. Hist. Nat. Palm.* iii. 327; leaflets equidistant linear finely acuminate, costæ 3 all sparsely setose above with very long bristles, the central only beneath, margins setulose, petiole rachis and flagellum with many marginal and dorsal hooked spines or 3–5-fid claws, sheath armed with very long flat deflexed and shorter more slender spines, spadix elongate decompound, outer spathe flattish 2-keeled armed with flat spines narrowed into a long spinescent beak, fruiting calyx nearly flat, fruit globose apiculate. *Walp. Ann.* iii. 475; v. 827. D. nutantiflorus, *Mart. l.c.* 326; *Walp. l.l. c.c.* 474, 827. Calamus Jenkinsianus, *Griff. in Calc.*

Journ. Nat. Hist. v. 81; *Palms Brit. Ind.* 89 (*excl. fruit* & t. 186 A. f. 3 (=C. Flagellum). *T. Anders. in Journ. Linn. Soc.* xi. 11. C. **nutantiflorus**, *Griff. in Calc. Journ. Nat. Hist.* v. 79; *Palms Brit. Ind.* 88, t. 208.

The SIKKIM HIMALAYA, ASSAM, the KHASIA HILLS, BENGAL and CHITTAGONG.

Stem very stout, with the sheaths 1½ in. diam., young parts grey-pubescent. *Leaves* large; leaflets 2 ft. by ⅔–¾ in.; petiole 5–6 in.; spines of rachis many, short, scattered; of sheath 1–1½ in. long. *Outer spathe* 1–2 ft., spines ½–¾ in.; inner 12–18 in., lanceolate, long acuminate, quite smooth. *Male spadix* thyrsiform, densefld.; calyx oblong, 3-toothed, and petals and bracts deeply grooved. *Fem. spadix* with spreading branches, fruiting erect; calyx cupular, not pedicelliform; petals twice as long. *Fruit* ⅔ in. diam., pale yellow brown; scales deeply channelled, margins narrowly scarious. *Seed* subglobose, smooth; albumen punctate, or the surface rummate by very slender channels.

2. **D. Manii**, *Becc. mss.*; leaflets very many and narrow naked beneath setulose on the 3 costæ above, spadix very long slender, peduncle compressed hardly armed, outer spathe very long gradually narrowed into a long pale dorsally-keeled beak, spines few large flat, inner lanceolate acuminate, fruiting spadix erect glabrous, fruit globose shortly mammillate scales pale slightly channelled margins pale, tip not discoloured.

ANDAMAN ISLDS, *E. H. Man.*

Allied to *C. Jenkinsianus*.—I have seen no specimen. *J.D.H.*

3. **D. Kurzianus**; stem and petioles very stout, leaflets very many equidistant elongate ensiform acuminate margins minutely aculeolate, costæ 3–5 naked or with a few long bristles above, rachis semi-terete very stout flat above with short scattered spines on the margins, outer spathe with seriate spines inner linear, fruiting spadix erect branches very stout, fruiting calyx explanate, fruit globose very shortly beaked pale yellowish. D. grandis, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 208 (*not of Mart.*). Calamus grandis, *Kurz For. Fl.* ii. 523 (*not of Griffith*).

SOUTH ANDAMAN ISLDS., *Kurz.*

Stem with the sheath as thick as the arm. *Leaves* shortly petioled; leaflets 1–2 ft. by 1–1¼ in., tips ciliate; rachis enormously stout, 1½ in. diam., dorsally convex and unarmed, ending in a clawed flagellum; petiole armed below with long flat and short recurved spines; sheath with whorled spines. *Outer spathe* cymbiform, scurfy, inner unarmed. *Fruit* ⅔ in. diam., pale brownish yellow, scales deeply channelled, margins brownish with a very narrow scarious edge; fruiting calyx with a very short base and broad striate lobes; petals twice as long, striate. *Seed* subcompressed, albumen as in *C. Jenkinsianus*.—I have seen only a portion of a leaf with the enormous rachis described above, imperfect leaflets, and a very old fem. spadix with fruit. *J.D.H.*

4 **D. grandis**, *Mart. Hist. Nat. Palm.* iii. 327, t. 173; leaves and leaflets as in *D. Kurzianus*, but pale and subglaucous, costæ beneath naked or sparsely ciliate as are the margins, spathe as in *D. Kurzianus*, calyx subentire villously ciliate, fruit globose. *Miq. Fl. Ind. Bat.* iii. 88; *Teysm. & Binn. Cat. Hort. Bogor.* 74; *Walp. Ann.* iii. 476, v. 827. Calamus grandis, *Griff. in Calc. Journ. Nat. Hist.* v. 84; *Palms Brit. Ind.* 91, t. 210 A (?B et C)., t. 216, f. iii. *Miq. Palm. Archip. Ind.* 28.

MALACCA, *Griffith.* PERAK, *Scortechini.*

Stem very stout, scandent, sheaths 2 in. diam. *Leaves* 15–16 ft.; leaflets 18–20 by 1¼ in.; petiole about 2 ft. *Lower spathes* 14–15 in. long, inner included, unarmed, rustily scurfy. *Male spadix* 15–18 in., decompound, spikes about

¼ in., flexuous. *Calyx* oblong, shortly 3-toothed. *Fem. spadix* very stout, scurfy, branches ascending; spikes short. *Flowers* shortly pedicelled, calyx striate; petals ½ longer. *Fruit* the size of a large marble. *Seed* erect, abounding in dragons' blood; albumen ruminate; embryo basilar.—Descript. chiefly from Griffith l.c.

5. **D. hygrophilus,** *Mart. Hist. Nat. Palm.* iii. 204, t. 177, f. 11; robust, leaflets very many and narrow equidistant linear tip filiferous, margin and 3 costæ above bearing long bristles and a few on the mid costa beneath, sheath armed with long flat spines, outer spathe gradually narrowed into a long beak as long as the body dorsally armed with broad flat scattered spines and a few longer ones. *Miq. Fl. Ind. Bat.* iii. 90; *Walp. Ann.* iii. 476, v. 827. Calamus hygrophilus, *Griff. Palms Brit. Ind* 96, t. 213 C.

MALACCA, *Fernandez.* PERAK, *Scortechini.*

Stem stout, sheaths 1½ in. diam. *Leaflets* 12 by ½ in.; petiole forming a thick ring around the sheath, armed with scattered spines below and with stout recurved ones above and on the rachis, young rusty woolly. *Spadix* nearly 2 ft. *Outer spathe* 2-keeled, inner unarmed.—Descript. from Griffith. I have seen no specimen. *J.D.H.*

6. **D. angustifolius,** *Mart. Hist. Nat. Palm.* iii. 329; leaves shortly petioled, leaflets very many narrow and close set equidistant narrowly linear-lanceolate tip filiform, costæ 3 all and margins setulose or with the median only beneath, bristles very long, rachis ¼-terete armed with straight and recurved trifid claws, petiole with small scattered flat spines, sheath armed with scattered flat spines, outer spathe narrow long-beaked armed like the sheaths, spadix thyrsiform scurfy. *Miq. Fl. Ind. Bat.* iii. 89; *Walp. Ann.* iii. 476, v. 827 Calamus angustifolius, *Griff. in Calc. Journ. Nat. Hist.* v. 89; *Palms Brit. Ind.* 95, t. 213 A, B.

MALACCA, *Griffith.*

Scandent. *Leaves* 5–5½ ft., flagelliferous; leaflets 8–10 by ¼–½ in.; petiole 3–4 in. *Outer spathe* about 14 in. long, the beak half its length, flat; 2nd spathe sparsely spinous. *Male spadix* with a slender sparingly armed peduncle; branches crowded, erect; spikes 1 in., flexuous, 8–10-fld.; flowers small, oblique; calyx cylindric-oblong, teeth small; petals thrice as long.—Descript. from Griffith, who describes it as in all respects a very distinct species, but I do not see how he distinguishes it by his description from *D. hygrophilus.* I have seen leaves only of which the flat spines of the leaf and brown scurfy sheath are erect, white, and closely appressed; the petiole is concave above at the base. *J.D.H.*

7. **D. intermedius,** *Mart. Hist. Nat. Palm.* iii. 377, t. 175, f. viii.; leaves long-petioled, leaflets opposite or scattered linear-lanceolate acuminate, margins and 3–5 costæ on both surfaces more or less setulose, petiole armed with scattered and flattened spines, sheath with seriate black flat spines, outer spathe ovoid very long and stoutly beaked, its spines long slender deflexed, beak longer than the body. flowers and fruit as in *D. grandis,* but scales tipped with black. *Miq. Fl. Ind. Bat.* iii. 88; *Walp. Ann.* iii. 476, v. 827. Calamus intermedius, *Griff. in Calc. Journ. Nat. Hist.* v. 86; *Palms Brit. Ind.* 93, t. 211 A, B.

MALACCA, *Fernandez.* PERAK, *Scortechini, King's Collector* (7135).

Stem 15–20 ft., ¾ in. diam. *Leaves* 4–6 ft.; leaflets 18–20 by 1–1½ in., membranous, dark green, median costa stout lateral very slender; rachis ½-terete, sparingly armed; petiole 1 ft. *Outer spadix* 18 in., beak twice as long as the body. *Spadix* thyrsitorm. *Fruit* ⅔ in. diam., suddenly contracted into a narrow beak; scales yellow, obscurely channelled; fruiting calyx not pedicelliform, broadly 3-lobed; petals much

longer, linear. *Seed* globose, muriculate; albumen foveolately ruminate.—Griffith says "with difficulty distinguishable from *grandis*, and chiefly by the very slender more numerous deflexed spines of the spathe."

8. **D. Sepal,** *Becc. mss.*; leaflets rather numerous equidistant narrowly linear finely acuminate setulose on the 3 costæ above and margins, rachis armed with 3-fid claws, petiole dorsally compressed armed with scattered and clustered short straight flattened spines, sheaths with subseriate flat spines their mouth with long spines, outer spathes long-beaked dorsally armed with flat slender and shorter clustered spines, fruiting spadix nodding or pendulous, fruit obovoid.

PERAK, alt. 3–4000 ft., *King's Collector* (4133); on Gunong Tambang, *Scortechini* (433[b]).

Stem 20–30 ft., ½–¾ in. diam. *Leaves* 6–8 ft.; leaflets 8–12 by ½–⅔ in.; spines of sheath ¼ in. long, mixed at the juncture with the petiole with more slender shorter black ones. *Fruit* ⅔ in. long, abruptly beaked, light brown, glossy; scales deeply channelled, margins brown; fruiting calyx pedicelliform, lobes broad; petals twice as long.

9. **D. Pseudosepal,** *Becc. mss.*; leaflets not numerous very long and narrow setiferous on the 3 costæ above and median beneath, petiole with scattered very short spines except at the base where longer and more slender, sheath with very long elastic flat seriate spines, mouth nearly naked, fem. spadix short, fruit globose with a short broad mucro.

PERAK; alt. 300 ft., *King's Collector* (7975); *Scortechini*.

Stem 10–15 ft., nearly ¾ in. diam. *Leaves* 3–4 ft.; leaflets inequidistant, dark green, ⅔–¾ in. broad; petiole 15–18 in., armed on the back and margins. *Fruit* ⅔ in. diam., pedicelled, dirty yellow; scales few, channelled, margins narrowly scarious, tips discoloured; fruiting calyx not pedicelliform.—Affinity doubtful from want of spathes.

10. **D. Lewisianus,** *Mart. Hist. Nat. Palm.* 327, t. 175, f. iv.; leaflets equidistant approximate linear bristle-pointed costæ 3 setulose above nearly naked beneath, margins appressedly setulose, petiole dorsally armed with hooked spines and long flat straight whorled and solitary ones, margins with shorter conical spines, sheath armed with solitary or seriate black flat spines, outer spathe shortly beaked armed with weak deflexed long black spines, inner with 2 rows of slender spines, spadix as in *D. intermedius*, but branches more slender and less scurfy, fruiting spadix erect, fruit spherical. Calamus Lewisianus, *Griff. in Calc. Journ. Nat. Hist* v. 87; *Palms Brit. Ind.* 94, t. 212 A.

PENANG; *Lewis*.

Stem scandent with the sheaths about 1 in. diam *Petiole* about 1 ft., base much swollen and then armed with scattered short deflexed spines, and above with spines 1¼ in. long; leaflets 13–15 by ¼–1 in. *Outer spathe* 3–9 in.; peduncle armed with flat spines, beak one-third the length of the body. *Male* and *fem. spadix* as long as the spathe; flowers scurfy, males most so. *Male calyx* obtusely toothed, margins bearded; fruiting petals twice as long. *Fruit* pale yellowish; scales in 15 rows, blackish towards the margin.—Descript. chiefly from Martius and Griffith.

** *Stems erect or subscandent, upper leaves alone with flagella.*

11. **D. monticolus,** *Mart. Hist. Nat. Palm.* iii. 328, t. 175, f. v.; leaves petioled, leaflets equidistant alternate linear-subulate acuminate, costæ 3 all bristly above naked beneath except the median at the apex,

margin bristly, rachis unarmed, petiole armed with stout hooked spines, sheaths scurfy armed with long flat black deflexed seriate spines, outer spathe long-beaked dorsally armed with weak long deflexed flat spines, spadix unarmed scurfy, fruit globose cuspidate. *Miq. Fl. Ind. Bat.* iii. 90; *Walp. Ann.* iii. 4771, v. 827. Calamus monticolus, *Griff. in Calc. Journ. Nat. Hist.* v. 90; *Palms Brit. Ind.* 97, t. 214 A, B, C.

MALAY PENINSULA; on Goonong Miring, a spur of Mt. Ophir, alt. 1500–2000 ft., and PENANG HILL, half way up, *Griffith.*

Stem about 8 ft. *Petiole* 10 in.; leaflets 10–11 by ½ in. *Outer spathe* very open, 16–17 in. long; beak 9–10 in., flat, sparingly armed except towards the apex. *Fruit* the size of a marble, tawny; scales channelled and with a dark brown intramarginal line; fruiting calyx explanate, lobes broad; petals twice as long, ovate. *Seed* with a fleshy covering.—Descript. from Griffith. The Penang plant has much coarser spines on the spathe and the fruit is more narrowed into a beak; Beccari doubts its being conspecific with the Malaccan. I have seen only very imperfect specimens.

12. **D. petiolaris,** *Mart. Hist. Nat. Palm.* iii. 326; slender, scurfy, leaves long-petioled, leaflets very long crowded equidistant very narrowly linear tips spinulose, costæ 3 setulose above the median only beneath, margins setulose, petiole armed below with seriate spines above with dorsal hooked spines, sheaths crinitely clothed with long close-set ascending slender seriate spines, outer spathe shortly beaked densely armed with long slender spines, spadix short fusiform, branches tomentose, male calyx cylindric 3-toothed. *Miq. Fl. Ind. Bat.* iii. 87; *Walp. Ann.* iii. 475, v. 827. Calamus petiolaris, *Griff. in Calc. Journ. Nat. Hist.* v. 93; *Palms Brit. Ind.* 101, t. 216, f. vii.; ? *Miq. Palm. Archip. Ind.* 28.

MALACCA, *Griffith.*

Stem erect. *Leaves* 4–5 ft., exclusive of the 5–7 ft. petiole; leaflets 15–17 by ½–¾ in. *Spathe* 4–5 in., narrowly fusiform, scurfy, beak ⅛–½ the length of the body, or longer. *Petals* narrowly lanceolate.—Griffith says that probably two species are included here, differing in the length of the leaves; one with an unarmed rachis of the leaves, longer more tomentose spadices and longer spikes and a cylindric acutely shortly toothed calyx, but his definition of the two is not very clear.

13. **D. tabacinus,** *Becc. mss.*; sheaths rachis and petiole of leaf and branches of spadix brown-furfuraceous, leaves long-petioled, leaflets very many equidistant narrowly linear tips spinulose, costæ 3 setulose above and on the median beneath, margins setulose, petiole subcylindric and sheath armed with small flat pale spines, outer spathe narrowed into a beak as long as the body or longer, crinitely clothed with long straight slender spines, fruit subglobose pale, beak conical.

PERAK; *King's Collector* (2537).

Stem erect, 2–3 ft. *Leaflets* 12–14 by ½–¾ in. *Spathe* 6 in., its beak 3 in. *Fruit* ¾ in. diam., pale straw-cold, suddenly narrowed at both ends; scales channelled, tips dark-cold.; fruiting calyx subpedicelliform, lobes broad; petals twice as long.—Distinguished from *D. petiolaris* by the long beak of the spathe.

14. **D. calicarpus,** *Mart. Hist. Nat. Palm.* iii. 326, t. 175, f. vi.; leaflets equidistant very many linear bristle-pointed, 3 costæ above setulose median or all beneath, margins setulose, petiole armed with long straight and short hooked spines, sheaths scurfy armed with long slender subseriate flat erect spines, outer spathe moderately beaked, crinite all over with long slender pale bristles, 2nd and 3rd bearded chiefly along the middle, male spadix much branched, margins of pedicels bearded,

spikes scurfy, fruit globose tawny. *Miq. Fl. Ind. Bat.* iii. 87; *Walp. Ann.* iii. 475, v. 827. Calamus calicarpus, *Griff. in Calc. Journ. Nat. Hist.* v. 92; *Palms Brit. Ind.* 99, t. 215 A, B, C, D, t. 116, f. v. vi.

MALACCA, *Griffith.* PERAK, *Scortechini.*

Stem erect or subscandent, with the sheaths 1 in. diam. *Leaves* 6–8 ft., upper small, with long flagella; leaflets 12–13 by ½–½ in.; petiole 1 ft., base not gibbous or puckered. *Outer spathe* 12–16 in., spines and hairs 1–1½ in. long; beak 2–3 in., naked or bristly at the base only. *Male spadix* 6–16 in., much branched; spikes flexuous, scurfy; calyx subcylindric, 3-toothed; petals not twice as long. *Fem. spadix* shorter, 4–8 in., less but more stoutly branched; calyx ovoid, teeth bearded. *Fruit* cuspidately mammillate, ⅜ in. diam., tawny, scales with a dark marginal band, deeply channelled; fruiting calyx explanate, lobes broad; petals rather longer. *Seed* globose; albumen deeply ruminate; embryo basilar.—Descr. chiefly from Griffith. Beccari says of it, very difficult to distinguish from *petiolaris* and *monticolus* in the absence of complete specimens of all.

Sect. II. **Piptospathæ.** *Outer spathe* not completely enclosing the inner. *Spadix* diffusely branched.

* Spathes at first tubular, then open; all deciduous or the outer alone more persistent, armed with short stout spines. Spadix narrow and elongate before flowering, then paniculate.

† *Mouth of sheath naked or armed with scattered spines pointing variously. Fruit resiniferous except D. leptopus.*

15. **D. micracanthus,** *Becc. mss.*; leaflets alternate or distantly subopposite linear-lanceolate caudate-acuminate, costæ 3 minutely setulose on both surfaces, as are the margins, petiole very gibbous and transversely puckered at the base slender 2-edged biconvex armed with long rather distant small curved prickles on the back and here and there on the sides and on the rachis, sheath long slender glabrous armed with very short deciduous prickles, at length muriculate. Calmus micracanthus, *Griff. in Calc. Journ. Nat. Hist.* v. 62; *Palms Brit. Ind.* 72; *Mart. Hist. Nat. Palm.* iii 339; *Miq. Fl. Ind. Bat.* iii. 128; *Walp. Ann.* iii. 489, v. 831 (*micranthus*).

MALACCA, *Griffith.*

The only specimen seen is of a leaf with a cylindric pale sheath a foot long, covered with scattered or subseriate minute tubercles; a rather slender petiole, 6 in. long, dilated at the base and gibbous, with small very scattered spines; the rachis more flagelliferous, very slender and smooth; the leaflets 8–10 by ½ in., with very long filiform bristly tips.

16. **D. propinquus,** *Becc. mss.*; leaflets numerous equidistant linear-lanceolate, costæ 3 all sparsely setulose above the median alone beneath, margins setulose, rachis very stout with large flat solitary straight spines, petiole with stout dorsal and very long scattered lateral flat spines as has the sheath, spathes many imbricating almost woody with obtuse points and recurved margins outer armed with seriate deflexed spines, spadix erect fruiting nodding, fruit globosely ovoid strongly beaked red brown, scales deeply channelled. Calamus Draco, *Griff. in Calc. Journ. Nat. Hist.* v. 65; *Palms Brit. Ind.* 75 (*excl. Syn. Roxb.*), t. 201 A, B; *Mart. Hist. Nat. Palm.* iii. 175, f. 10, 3–8.

PENANG, *Griffith, Lewes.* PERAK, *Scortechini.*—DISTRIB. Sumatra.

Stem stout, erect, at length scandent. *Leaflets* 12–18 by ½–¾ in.; petiole ½-terete, 1 in. diam. *Fruit* ⅜ in. diam., exuding dragon's-blood copiously, stoutly

pedicelled; scales naturally whitish but incrusted with red gum. *Seeds* rarely 2, subconical, dorsally alveolate and tubercled with a deep lateral cleft.—The Perak fruits are accompanied by ensiform leaflets 2 ft. long by 2 in. broad with aculeolate margins. Beccari doubts their belonging to the same species as the fruits.—The seeds of Griffith's plant are globose and smooth. *J.D.H.*

17. **D. didymophyllus,** *Becc. mss.*; leaflets in distant opposite or alternate pairs broadly ensiform or elliptic, costæ and margins quite smooth, fruit as in *D. propinquus*, but with less resin.

PERAK, *Scortechini*; alt. 2500–3000 ft., *King's Collector* (2593, 5704, 6313). JOHORE, *Kurz.*—DISTRIB. Sumatra.

Stem 20–30 ft., scandent. *Leaves* 5–7 ft.; leaflets 8–16 by 1–2½ in., acute, many-nerved, quite smooth on both surfaces, as are the margins; petiole 2–3 ft., and rachis semiterete, both armed with scattered small short stout nearly straight spines and tubercles; rachis armed with distant solitary spines and 3-fid claws; sheaths scurfy, armed with very broad flat spines, mouth oblique naked. *Spathes* coriaceous, flat, lower 6–10 in., transversely armed with many series of confluent short irregular spines; upper persistent, smaller. *Spadix* erect; peduncle armed with strong straight flat scattered spines; spikes densely fascicled, slender, erect, flexuous. *Fruit* ½ in. diam., cuspidate, red brown, and explanate calyx as in *D. propinquus*.

18. **D. leptopus,** *Mart. Hist. Nat. Palm.* iii. 206, 329; leaves long-petioled, leaflets many equidistant narrowly linear-lanceolate caudate-acuminate, costæ 3 all naked, or setulose beneath near the margins, rachis very stout armed with short stout simple and 2–3-fid claws, petiole armed with short solitary spines, sheath swollen at the petiole armed with fascicled or seriate flat spines, outer spathe with revolute margins towards the open tip, keels 2 armed with stout spines, fruit ovoid or ellipsoid. *Miq. Fl. Ind. Bat.* iii. 99; *Walp. Ann.* iii. 479, v. 818. Calamus leptopus, *Griff. in Calc. Journ. Nat. Hist.* v. 73; *Palms Brit. Ind.* 87, t. 205, A, B.

MALACCA, *Griffith.* PERAK, *King's Collector* (4774, 5919); *Scortechini.*

Stem scandent, 20–30 ft., sheaths about 1 in. diam. *Leaflets* 15–16 by ½–1 in., tip capillary bristly, rachis as thick as the thumb, subbiconvex; petiole about 2 ft., trigonous; lower spines 1 in. and upwards. *Spathes* coriaceous, lower 8–10 in., lanceolate, open, tip flat broad; upper open much longer than their inflorescences. *Spadix* 3–4 ft., very slender; peduncle stoutly armed, branches erect, unarmed spikes 1½–3 in., flexuous, flowers unilateral. *Calyx* rather large, teeth acute, corolla ventricose. *Fruit* ¾ in. long, pedicelled by the calyx and spathellules, cinnamon brown, scales deeply channelled. *Seed* with a hard resinous coat, chalaza grooved; albumen ruminate; embryo basal.—The young spadix resembles *D. propinquus*, the mature is more like *D. Hystrix.*—Descript. chiefly from Griffith.

†† *Mouth of leaf-sheath armed with long flat erect spines; fruit not or sparingly resiniferous.*

19. **D. Hystrix,** *Mart. Hist. Nat. Palm.* iii. 205, 328, t. 176, f. 4, 3–4; leaflets very many equidistant narrow setaceously acuminate, margins and 3 costæ setulose on both surfaces, rachis clawed, petiole armed with scattered long straight and short spines, sheath swollen armed with very long (1 foot long) flat erect and shorter spines, lower spathe small elliptic thickly armed upwards with strong long spines, fruiting spadix with spreading branches and spikes, fruit ellipsoid long-pedicelled. *Miq. Fl. Ind. Bat.* iii. 91; *Walp. Ann.* iii. 477, v. 828. D. hirsutus, *Blume Rumph.* iii. 21 (*excl. descr. fruit*), t. 135, f. A, B, C (excl. D, E *oblongus*); *Miq. l. c.*

Suppl. 593. Calamus Hystrix, *Griff. in Calc. Journ. Nat. Hist.* v. 71; *Palms Brit. Ind.* 80, t. 204, A, B, C; *Miq. Palm Archip. Ind.* 28.

MALACCA, *Griffith*; at Ager Punnus, *Maingay*. PERAK, *Scortechini*, *King's Collector* (951).—DISTRIB. Java, Sumatra.

Stem scandent, with the very stout sheaths 1½ in. diam. *Leaves* 7–10 ft.; rachis flagelliferous; leaflets 10–18 by ½–⅝ in., tips very slender, setulose costæ sometimes 5; petiole 1–2 ft.; sheath woody, scurfy, obliquely crossed with half-whorls of close set flat spines, of which the lower series are ½–½ in. long lanceolate very thin and appressed to the surface, the upper or oral enormously long, strict. *Lowest spathe* 4–5 in., almost woody, stoutly armed, not beaked; upper narrower, more or less armed. *Spadix* 2–3 ft., peduncle rather slender, armed; spikes 2–3 in., scurfy, ascending, flexuous; flowers pedicelled; calyx cupular, teeth obtuse villous-tipped; corolla twice as long, ovoid. *Fruit* about ⅜ in. long by ¼ in. diam., pale brown, not shining, shortly mammillate; scales obtuse, channelled, margins of channels rather elevated. *Seed* oblong, pitted, pits resinous, albumen deeply ruminate; embryo basilar.—The enormous spines of the leaf-sheaths are a remarkable character.

Var. *minor*, Becc. mss.; stem 2–8 ft., with the sheaths ½–¾ in. diam, leaves 1–4 ft., leaflets 5–10 in., fruit much smaller.—Perak 300–1500 ft., *King's Collector* (5097, 5142, 5486).

20. **D. Kunstleri,** *Becc. mss.*; leaflets many equidistant linear setulose on the 3 costæ above and median beneath, margins setulose, petiole robust scurfy margins armed with long stout spreading spines, sheath with many oblique series of long stout flat spines alternating with shorter setiform ones, mouth with a few very long ones, lower spathe coriaceous softly scurfy keel spinous, peduncle of spadix long slender armed with whorls of spines, fruit globose top conical not beaked.

PERAK; *Scortechini* (652), *King's Collector* (10,204).

Stem erect, 2–3 ft., sheaths 3 in. diam. *Leaflets* 14–18 by ⅜–½ in., rachis armed with 3-fid. claws. *Peduncle* of spadix 8–10 in. *Fruit* ⅜ in. diam., tawny, top suddenly contracted into a low cone; scales few, channelled, broad, margins not scarious and hardly discoloured; fruiting calyx small, explanate. *Seed* subglobose.—I have seen only a portion of a leaf and of a fruiting spadix.

21. **D. vagans,** *Becc. mss.*

PERAK; alt. 4000–5000 ft., *King's Collector* (4129).

Stem scandent, sheaths ¾ in. diam. *Leaflets* 14 by ⅜ in., very narrow straight and finely acuminate. *Fruit* as in *Kunstleri* but smaller.—I have seen only a portion of a leaf and fruit without calyx.

** Outer spathes at first tubular, then open, all deciduous or the outer more persistent, hardly spinous, but densely clothed with rigid needle-like spiculæ. Sheath of leaf with a spinulose membranous collar or ring. Spadix elongate before flowering, then paniculate.

22. **D. Sabut,** *Becc. mss.*; leaflets in fascicles of 9–10 in., the lower part of the rachis and 4–6 on the upper elongate oblanceolate suddenly narrowed to a setulose tip, margins and 3 costæ setulose above the median alone beneath, petiole very stout stoutly armed with short and long single and compound spines, sheath with a toothed setulose and spinular mouth.

PERAK, *Scortechini* (653b).

Internodes 6–8 in., with a reversed membranous collar. *Flagellum* of rachis very short.—I have seen no specimen. *J.D.H.*

23. **D. oligophyllus,** *Becc. mss.*; leaflets 10–12 in distant fascicles elongate-oblanceolate with setulose tips, costæ 3 nearly naked on both surfaces, sheath densely filamentously scurfy, internodes with 2–3 membranous strongly nerved collars appressed to the sheath and densely crinite, petiole biconvex margins obtuse rather closely armed with claws.

PERAK, *Scortechini.*

Founded on two flowerless specimens, neither of which have I seen.—*J.D.H.*

24. **D. macrophyllus,** *Becc.*; leaflets 4 in 2 very distant pairs oblong-lanceolate 20 by 4–5 in. with 7–8 acute naked costæ, petiole 2 ft. biconvex, armed with 2–3-fid spines, sheaths ⅔–¾ in. diam. with 3–4 membranous collars.

PERAK; *Scortechini.*

Founded on a single flowerless specimen, which I have not seen.—*J.D.H.*

25. **D. verticillaris,** *Mart. Hist. Nat. Palm.* iii. 329, t. 175, iii. t. 72, f. vi., vii.; leaflets many equidistant ensiform setaceously acuminate, margins and costæ very sparingly setulose, sheath armed with whorls of very long flat weak spines alternating with whorls of confluent black bristles, lower spathe thinly coriaceous densely crinite with series of fascicled black bristles, male spadix slender, spikes sub-erect slender, flowers minute densely crowded in two collateral series, fruit small sessile globose. *Miq. Fl. Ind. Bat.* iii. 99; *Walp. Ann.* iii. 478; v. 828. Calamus verticillaris, *Griff. in Calc. Journ. Nat. Hist.* v. 63; *Palms Brit. Ind.* 73, t. 200 A, B, C, D.

MALACCA, *Griffith.* PERAK, *Scortechini*; at Larut and Goping, *King's Collector* (576, 6388).

Stem 20–40 ft. scandent, sheaths about 1½ in. diam. *Leaves* 5–15 ft.; leaflets 10–18 by ¾–1 in.; rachis flagelliferous, armed dorsally with multifid claws; petiole stout, armed below with half whorls of pale flat weak spines 1–5 in. long, and short black bristles; sheath with similar long flat pale erect spreading or deflexed spines, closely alternating with comb-like whorls of densely compacted black-tipped bristles confluent into stiff laminæ ½ in. deep. *Lower spathe* 2–3 ft., with a long narrow point; bristles ½-1 in. long, in closely packed whorls, black, shining; upper spathe quite or nearly smooth. *Spadix* 2 ft. long, scurfy, decompound, male rather contracted, fem. with spreading branches, peduncle unarmed. *Male spikes* ¾–1 in.; spathellule cupular, acute. *Flowers* distichous, horizontal, most densely packed; calyx cupular, obscurely toothed; petals twice as long. *Fem. spikes* 3–4 in. *Fruit* ½ in. diam., top conical, scales whitish faintly channelled, margins brown. *Seed* globose, albumen deeply ruminate.

*** Outer spathe acutely 2-keeled, keel alone setose. Leaf sheaths armed with flat spines confluent in an annular spinulose crest.

26. **D. geniculatus,** *Mart. Hist. Nat. Palm.* iii. 329; leaflets scattered or in groups of 3–7 elongate ensiform tips filiform very long, costæ 3–5 smooth or more or less setulose, margins smooth, petiole stout armed towards the base with simple and compound very long white flat stiff spines, mouth of sheath with a few similar spines and a brush of needle-like bristles below which is a thick ring of confluent bristles, outer spathe lanceolate, spadix much branched, male fl. densely crowded in collateral series, fruit subglobose shortly stoutly beaked. *Miq. Fl. Ind. Bat.* iii. 93; *Walp. Ann.* iii. 478, v. 828. Calamus geniculatus, *Griff. in Calc. Journ. Nat. Hist.* v. 67; *Palms Brit. Ind.* 77, t. 202, A, B; *Miq. Palm. Archip. Ind.* 28.

PENANG, *Lewes*. PERAK, alt. 2–3500 ft., *King's Collector* (2931, 2735, 6306, 7849). SINGAPORE, *Lobb*.

Stem stout 20–25 ft, scandent; nodes swollen. *Leaves* 10–14 ft.; leaflets 16–20 by ⅓–1 in., margins quite smooth, long tips setose; petiole stout, spines on lower portion often ternate with the central 6–7 in. long and slender but stiff. *Spathes* all deciduous, upper thinly coriaceous, unarmed. *Spadix* (geniculate, Griff.) 3 ft.; peduncle 6–12 in., flattened, with marginal spines, not 2-edged; spikes ½–¾ in., spreading, with the flowers ⅛ in. broad. *Male flowers* most densely imbricate, horizontal in two series, ⅛ in. long and narrow; spathellules quite entire; calyx shortly cylindric, striate; corolla terete, four times as long, smooth, not striate, very narrow. *Fruit* ⅔ in. long, shortly pedicelled; sometimes almost ellipsoid, pale dull yellowish brown; scales with a shallow channel and brown margin.—There may be more than one species included here, the fruiting spadices of Nos. 576 and 7849 look very different. No. 576 from Goping Perak has the slender fruiting spadix, with distant fruits, as in Griffith's figure. No. 2735 from Perak is a male plant and has the mouth of the sheath with needle-shaped spines. No. 2931 from Perak has the very long spines on the petiole. No. 7849 from Perak has the branches of the fruiting spadix as broad as long with very short stout internodes and stout spikes 4–6 in. long; it most resembles the Penang form.

******** Outer spathe lanceolate, slenderly 2-keeled, wholly deciduous after flowering. Leaf sheaths armed with isolated or confluent spines, not annular crests. Spadix elongate.

27. **D. longipes,** *Mart. Hist. Nat. Palm.* iii. 329, t. 176, f. v. 2, 3, leaflets equidistant linear-lanceolate or ensiform subulate-acuminate margins and tips bristly 3 costæ setulose above or on both surfaces, petiole convex below and armed with long irregular spines, channelled above, with toothed margins, rachis triangular with solitary short dorsal teeth, sheath armed with broad stout flat solitary or seriate spines mixed with bristles, spathes narrowly lanceolate long acuminate unarmed, spadix very long long-peduncled, spikes flexuous, fruit ovoid-oblong shortly stipitate, beak conical. *Miq. Fl. Ind. Bat.* iii. 93; *Walp. Ann.* iii. 478, v. 828. D. strictus, *Blume Rumph.* iii. 19, t. 163 A, B; *Mart. l. c.* 326. *Miq. l. c.* 86; *Suppl.* 255; *in Journ. Bot. Neerl.* i. 18; *Walp. l. c.* 474, 827. Calamus longipes, *Griff. in Calc. Journ. Nat. Hist.* v. 68; *Palms Brit. Ind.* 78, t. 203 A, B (*excl. syn. Rumph.*). C. strictus, *Miq. Palm. Archip. Ind.* 28.

MALACCA, *Fernandez, Maingay, Hervey.*—DISTRIB. Sumatra, Banca.

Leaves with the flagellum about 12 ft.; petiole 2 ft., young floccosely scurfy; leaflets 12–14 by 1¼ in. *Spathes* long and narrow, thinly coriaceous, nearly or quite unarmed, young scurfy. *Male spadix* nodding; peduncle 2 ft., 2-edged, unarmed or with a few marginal spines; branches decompound; spikes ½–1 in., very slender and zig-zag, spathellules (or bracts?) very minute. *Flowers* ⅛ in. long, erecto-patent; calyx obtusely toothed, quite glabrous, striate; petals hardly twice as long, not striate. *Fruiting spadix* large, very broad, much branched; branches not stout, scurfy; spikes 3–5 in. *Fruit* ¼ in. apart, ⅔ in. long; calyx very shortly pedicelled, broadly campanulate, 3-lobed to the middle lobes appressed to the base of the fruit; scales pale yellow-brown, shining, concolorous, faintly channelled. *Seeds* oblong; albumen strongly ruminate; embryo basal.—Griffith describes *Calamus longipes* as having equidistant leaflets, his specimens are too imperfect to show this character. In Maingay's specimen they are inequidistant as described by Blume in his *D. strictus*. As in other species the costæ of the leaflets probably vary much as to being more or less setulose on one or both surfaces.

IMPERFECTLY KNOWN SPECIES.

Besides enumerating the above more or less imperfectly described species,

Beccari has indicated the existence of about 7 other new Malayan Peninsula ones, but these are in far too imperfect a condition to render it advisable to register here the names he has given them.

25. **ZALACCA,** *Reinw.*

Stemless, soboliferous, armed palms. *Leaves* pinnatisect, not flagelliferous; leaflets narrowly linear-lanceolate. *Spadix* interfoliar, pendulous, flowering branches catkin-like. *Spathes* persistent; lower sheathing, incomplete; bracteoles cupular, 2-celled; flowers coriaceous, densely crowded, polygamous. *Male fl.*, calyx tubular, 3-fid.; corolla tubular, segments valvate; stamens 6, anthers short. *Fem. fl.* larger; perianth accrescent; calyx trifid; corolla-lobes lanceolate, valvate; staminodes 3 or 6; ovary 3-celled, stigmas 3, subulate; ovules basilar. *Fruit* globose or obovoid, 1–3-seeded, clothed with reversed or spreading scales. *Seeds* 1–3, erect, top excavated, testa crustaceous, outer coat fleshy; albumen equable; embryo subbasilar.—Species 9 or 10, chiefly Malayan.

The species are for the most part imperfectly known. The Malayan *Z. edulis*, Reinw., not hitherto found in the Malayan Peninsula, has the leaflets white beneath.

1. **Z. secunda,** *Griff. in Calc. Journ. Nat. Hist* v. 12; *Palms Brit. Ind.* 14, t. 177; leaflets straight concolorous acutely 3-costate margins setulose above the middle, costæ spinulose on the under face, male spadix compact, spikes much longer than their spathes peduncled, fem. spadix paniculately branched, spikes tomentose, fruit clothed with spreading lanceolate scales. *Becc. Males.* iii. 673. Calamus collinus, *Griff. Palms Brit. Ind. t.* 186 (*leaf only*).

UPPER ASSAM, *Mann*; in the Mishmi Mts., *Griffith.*

A very imperfectly known species, of which Griffith describes only the male spike. Mann's specimen consists of a leaflet, and young fruit; he describes the leaf as 30 ft. long; the leaflets as 33 in. long by nearly 3 broad, coriaceous, with three stout costæ acute on both surfaces and spinulose beneath.—Fruits received quite recently at Kew from Mr. Mann are unfortunately in too broken a condition to determine their form; they appear to have been ovoid, 2 in. ? long, ending in a stout cone as in *Eugeissona*; the pericarp thin, clothed with spreading and ascending subulate-lanceolate recurved dark brown scales ¼ in. long and under; there is no appearance of a succulent endocarp. *Seeds* (1–3 ?) 1–1½ in. long, very various in shape, from subglobose to hemispheric or trigonous with a convex back, and very rounded angles, dark brown, not polished, with a deep small apical hollow leading to the canal which extends more than half way into the dense albumen; embryo above the base dorsal or sublateral, indicated externally by a circular convexity with depressed margins ¼ in. diam. or less.

2. **Z. affinis,** *Griff. in Calc. Journ. Nat. Hist.* v. 9; *Palms Brit. Ind.* 12, t. 176, A, B, C; leaflets concolorous strongly falcate costæ 3 and margins not setulose, male spadix elongate, spikes small tomentose shortly exserted from the sides of their long spathes, fem. spadix compact with short interrupted spikes much shorter than their spathes, fruit ovoid smooth. *Becc. Males.* iii. 67.

MALACCA, *Griffith.* PERAK, at Larut, *King's Collector* (3448).—DISTRIB. Sumatra.

Leaves 12–13 ft.; petiole half the length, slender, armed with long slender spines, leaflets fascicled, 18–20 by 2½ in.; costæ slender, acute beneath. *Male spadix* about 1½ ft.; spathes imbricate lacerate. *Spikes* ⅜–½ in.; bracts membranous, 2-fid.;

bracteoles penicillate. *Fruit* 2½ by 1½ in., cuspidately mammillate; scales closely imbricate, chesnut brown. *Seeds* 1–3, plano-convex.—Descr. chiefly from Griffith.

3. **Z. conferta,** *Griff. in Calc. Journ. Nat. Hist.* v. 16; *Palms Brit. Ind.* 19, t. 180, A, B, C; leaflets linear-ensiform concolorous straight or slightly falcate, fem. spadix large copiously branched from the base very compact, spikes densely crowded much longer than their spathes, fruit turbinate not spinous. *Mart. Hist. Nat. Palm.* iii. 201, t. 173, 174; *Becc. Males.* iii. 67.

MALACCA, *Griffith.*—DISTRIB. Borneo.

Stems stout, less tufted than in others, forming an impenetrable jungle. *Leaves* 18-20 ft.; petiole half the length of the blade, stout, flattened above; spines short, white, fascicled; leaflets equidistant, alternate, 2 ft. by 2½ in., subulate-acuminate, tip and margins setose, costæ of upper leaflets bristly on the upper surface. *Spadix* 8–12 in., crowded with cylindric spikes 6 in. long; male fl. in pairs; bracteoles villous. *Fruit* crowded in a formless mass; scales quite smooth, aspect waxy and shining, margins denticulate, tawny greenish; mesocarp white spongy. *Seed* broadly turbinate.—Distinguished by habit, direction of the leaflets their bristly costæ and slender short white spines and crowded thyrsiform fruiting spadixes.—Descr. from Griffith.

4. **Z. Wallichiana,** *Mart. Hist. Nat. Palm.* iii. 200, 325, t. 118, 119, 136; leaflets inequidistant falcate oblong-lanceolate with very long filiform setulose tips, costæ naked, male and fem. spadices very long fastigiately branched, spikes very distant much shorter than their spathes, fruit obovoid shortly imbricate, scales with long reflexed points. *Kurz in Natuurk. Tijdshr. Ned. Ind.* xxvii. (1864) 216; *For. Fl.* ii. 511; *Becc. Males.* iii. 66. Z. edulis, *Wall. Cat.* n. 5000; *Pl. As. Rar.* iii. 14, t. 222–224; *Z. Rumphii*; *Griff. in Calc. Journ. Nat. Hist.* v. 8; *Palms Brit. Ind.* 10, t. 175. *Blume Rumphia,* ii. 159. Z. macrostachya, *Griff. ll. cc.* 13, and 15, t. 178 A, B, C; *Becc. l. c.* 66.

BURMA, *Kurz.* MALACCA; at Ching, *Griffith.* PENANG and SINGAPORE.—DISTRIB. Siam, Banca.

Stem very short or 0. *Leaves* 15–20 ft.; leaflets approximate in groups of 2–4, and alternate, 2–3 ft. by 1½–2 in., spinulosely ciliate above the middle, upper confluent; petiole 8–10 ft. and rachis copiously armed with broken spirals of strong subreflexed spines. *Spadices* several feet long, rachis woolly. *Spikes* cylindric, villous, 1½–2 in. long; flowers small, rose-cold. *Spathes* variously ruptured, floral terminated by dense tufts of rose-cold. paleaceous hairs. *Fruit* in dense heads, 1 in. long or more, 1–3-celled; scales brown, tips terminating in a reflexed brittle bristle.—Descr. from Kurz For. Fl. l. c.—"Spadices dimorphic, one male only, with densely tomentose spikes; the other monœcious very dense-fld. and difficult to make out; each bract I find to correspond to a cluster of 3 flowers, a female between 2 males or neuters, and with two densely tomentose bracteoles."—*Beccari.* Griffith's *Z. macrostachya* referred to *Wallichiana* by Beccari (mss.) is a much stouter form, with oblanceolate leaflets and spikes 3 in. long and nearly 1 in. diam. In Griffith's figure of the whole plant (Tab. 178 C) the leaves have not the long tapering filiform tips of *Z. Wallichiana.*

5. **Z. glabrescens,** *Griff. in Calc. Journ. Nat. Hist.* v. 14; *Palms Brit. Ind.* 17, t. 179; leaflets close set slightly falcate concolorous, tips subulate filiferous, male spadix much branched, spikes much longer than their spathes, fem. spadix reduced to few branches each bearing a very large solitary long peduncled nodding glabrous spike clothed with broad glabrous imbricating bracts.

PENANG, *Lewes, Wray* (2435).

Leaves 12–15 ft.; petiole slender, trigonous, apparently armed with a simple row of spines on each face; leaflets equidistant, 20–22 by 2½ in., margins setose towards the tips. *Spadices* much branched, less covered than usual in the genus by the primary spathes; branches entirely covered by loosely sheathing spathes; young spikes slender, looking as if annulate by the broad shallow bracts, glabrous externally. *Males* 3–4 in., slender, bracteoles obsolete or nearly so. *Fem. fl.* large, oblique. *Ovary* strigose with erect stout hairs, ovoid. *Fruit* (accompanying Wray's specimen) globose, 1 in. diam., suddenly contracted into a columnar beak ⅛ in. long, clothed (including the beak) with small very dark brown scales in vertical series, each with a short recurved setose tip, and an obtuse keel on the back.—"Erroneously referred to *Z. edulis* in Malesia iii. 64."—O.B.

6. **Z. Beccarii,** *Hook. f.*; leaflets strict concolorous elongate-ensiform acuminate, tips shortly filiform, margins spinulosely setose, costæ 3 with few scattered long bristles beneath, rachis with short hooked black claws, fem. spadix very long, rachis brown woolly, lower spathes very long, upper twice as long as the large stout spikes, fruit-scales recurved spinescent.

RANGOON, *McLelland.*

Leaflets apparently equidistant, 18–24 by 1½ in., shining on both surfaces, margins with strong straight setæ almost throughout their length, mid-costa stout, lateral slender; bristles ¼–½ in. long, black; very young leaflets pale beneath with very long slender pale bristles on the costæ. *Fem. spadix* 3 ft. long or more; lower spathe 1 ft. long; upper 4–6 in. *Spikes* 2½ in. long, ¾ in. diam.; bracts woolly; flowers ¼ in. long; sepals and petals subequal, broadly ovate, acute. *Fruit* (much broken) apparently small; scales pale chesnut, with broad bases and paler recurved spinous tips.—Very distinct from *Z. Wallichiana* in the long strict leaflets with long bristles, short tips, and margins armed throughout their length.

26. KORTHALSIA, *Blume.*

Scandent, spinous palms. *Leaves* pinnatisect; leaflets more or less cuneate or trapezoid and erose (except *K. echinometra*); rachis flagelliferous; petiole short, sheath often produced into a large ligule (ochrea). *Spadix* axillary, loosely branched, pendulous, sheathed with tubular persistent spathes; bracts membranous; bracteoles reduced to hairs. *Flowers* bisexual, crowded in cylindric catkin-like spikes; sepals orbicular or oblong; petals ovate or lanceolate, valvate; stamens 6 or more, filaments short, anthers linear; staminodes 6 or more; ovary imperfectly 3-celled; ovules basilar. *Fruit* globose or ovoid, 1-seeded; pericarp thin, tessellate with recurved shining scales. *Seed* erect, top hollowed, chalaza lateral; albumen ruminate; embryo ventral.—Species about 20, Indian and Malayan.

The swollen ochreæ of the first section form nidi for ants. The species are very imperfectly known.

* *Ochrea inflated.*

1. **K. echinometra,** *Becc. Males.* ii. 66, t. vii.; ochrea narrow elliptic-lanceolate armed with long flattened black spines, leaflets very narrowly linear-lanceolate finely acuminate mealy-white beneath more or less toothed towards the tip.

PERAK, *Scortechini* (n. 458ᵇ).—DISTRIB. Borneo.

Stem about ¾ in. diam. *Leaves* flagelliferous; leaflets opposite, 12–15 in. long, 6–8 broad, acuminate, green and shining above, 3–4-nerved; petiole about 20 in.; spines short; rachis with stout claws; sheath armed with short flattened spines almost enveloped by the ochrea, which is 5–6 in. long, and armed with scattered spines 2–3 in. long.—Flower and fruit unknown.

2. **K. scaphigera,** *Mart. Hist. Nat. Palm.* iii. 211; ochrea cymbiform lanceolate armed with short conical spines, leaflets rhomboid-obovate or -cuneate acuminate erosely lobulate above the middle. *Miq. Fl. Ind. Bat.* iii. 750; *Palm Archip. Ind.* 26; *Becc. Males.* 67, t. 5. K. Lobbiana, *H. Wendl. in Bot. Zeit.* xvii. 174; *Miq ll. cc.* K. rostrata, *Blume, Rumph.* ii. 168.? Calamosagus scaphigera, *Palms Brit. Ind.* 30, t. 184 A; *Kurz For. Fl.* ii. 513. *C. wallichiæfolius,* Mart. Hist. Nat. Palm. Ic. 211.

MALACCA, *Griffith.* PERAK, *King's Collector* (6833, 8144). — DISTRIB. Sumatra.

Stem slender, ½–¾ in. diam. *Leaves* 2½ ft.; leaflets distant, sessile, glaucous beneath; sheath armed with a few scattered conical prickles and generally split along the back into a fibrous network; ochrea forming the upper ⅔, boat-shaped, closely half embracing the next sheath; petiole roundish, back armed with claws.—Descr. from Griffith.

3. **K. Scortechinii,** *Becc. mss.*; ochrea elongate armed with short scattered spines, leaflets linear or cuneately oblanceolate 8–10 times longer than broad.

PERAK, *Scortechini.*

Leaflets 14–16 by 1½–2 in., alternate and subopposite, equidistant, oblanceolate, white beneath, 5–7-nerved, acutely toothed; sheath and ochrea (6–8 in. long) armed. —Distinguished from *Z. scaphigera* by the much longer ochrea, and more numerous narrower leaflets.

4. **K. wallichiæfolia,** *H. Wendl. in Kerchoff Palm.* 248; leaflets many broadly cuneately obovate obtusely erosely toothed as long or twice as long as broad. *Becc. Males.* ii. 75. Calamosagus wallichiæfolius, *Griff. in Calc. Journ. Nat. Hist.* v. 24; *Palms Brit. Ind.* t. 184. C. harinæfolius, *Griff. l. c.* in text p. 29.

MALACCA (from the interior), *Griffith.*

A very little-known plant. Griffith describes the leaves as resembling those of *Z. laciniosa,* but with less deep more obtuse incisions; the spadix as covered with long smooth spathes with lacerate mouths; spikes (immature) a span long by ¼ in. diam.; lateral pedicels plano-convex, bearing a long spathe about the middle, which reaches the base of the spike; bracteæ broad, longer than the dense wool.

** *Ochrea not inflated.*

5. **K. laciniosa,** *Mart. Hist. Nat. Palm.* iii. 212; leaflets rhomboid ovate or trapezoid about as long as broad acutely erosely toothed, ochrea dilacerate sparingly armed, spikes tomentose. *Kurz in Journ. As. Soc.* xliii. pl. ii. (1874) 207; *Becc. Males.* ii. 74 (*excl. pl. Salangore*). K. scaphigera, *Kurz l. c.* 206 (*excl. all syns.*) t. 20, 21; *For. Fl.* ii. 513 (*not of Mart.*). K. andamanensis, *Becc. Males.* ii. 76. Calamosagus laciniosus, *Griff. in Calc. Journ. Nat. Hist.* v. 23, t. 1; *Palms Brit. Ind.* 27, t. 183.

BURMA, the ANDAMAN and NICOBAR ISLDS.

Stem slender, ½ in. diam. *Leaves* 2–4 ft.; leaflets subapproximate, 4–7 in. long, terminal broadest, fugaciously white tomentose beneath; petiole 1½–2 ft., with

straight spines; rachis and flagellum with reversed claws. *Spikes* 3–4 in., tawny-tomentose, very compact; bracts smooth, a little longer than the villous bracteoles. *Fruit* ½ in. long, obovoid, mucronate; scales with a broadly lacerate pale brown membranous border.—Descr. from Kurz (of his *scaphigera*) in *For. Fl. l. c.* referred here by Beccari.

6. **K. ferox,** *Becc. Males.* ii. 73; leaflets shortly petiolulate trapezoid about as long as broad pale beneath obtusely erosely toothed, sheath and ochrea thickly armed especially on the petiolar side with short spines, above fibrous-reticulate glabrous or finely scurfy.

Var. *malayana*, Becc. mss.; spines of the sheath and ochrea shorter, and covering the ventral face of the latter.

Var. *malayana*, PERAK, at Larut (Hort. Calc. 6563); at Gunong Tjick, Sept., 1844, *Scortechini.*

I have seen no specimen. The type is Bornean.

7. **K. polystachya,** *Mart. Hist. Nat. Palm.* iii. 210, t. 172, f. 1; leaflets cuneiform or obliquely trapezoid glaucous beneath obtusely toothed, sheath and ochrea unarmed, spikes long slender flexuous. *Miq. Fl. Ind. Bat.* iii. 77; *Becc. Males.* ii. 74. Calamosagus polystachyus, *Griff. ex Mart. l. c.* 211. C. ochriger, *Griff. Palms Brit. Ind.* p. x. t. 216, f. 1.

MALACCA, *Griffith.*

Stem very slender, about ½ in. diam., including the sheaths. *Leaves* about 2 ft., including the flagellum, subsessile; leaflets 10–12, irregularly alternate, ferruginously woolly, shortly petiolulate, 6 by 3 in.; rachis and flagellum armed with claws, young rusty-pubescent; ochrea short, truncate. *Spadices* from the terminal axils, together forming a panicle 3–3½ ft. long, clothed with long closely appressed spathes; branches a span to a foot long. *Spikes* 5–7 in.; peduncle with a tertiary spathe; lower bracts empty; upper broad, 1-fld., and filled with stout wool.—Descr. from Griffith's *C. ochriger.* Beccari thinks that Kurz is mistaken in uniting this with *K. rigida*, Blume.

8. **K. tenuissima,** *Becc. Males.* ii. 275; very slender, leaflets 3–6 obovate or oblanceolate acuminate subacutely toothed pale beneath, sheath sparingly armed, ochrea unarmed, spikes few, spathes tubular inflated dilated above.

MALAY PENINSULA; Perak, at Larut, *King's Collector* (4057).

Leaves with a very slender petiole; leaflets 1–4 in. long by 1–1½ broad; petiole very short, base callous swollen. *Spikes* apparently glabrous from the bracts exceeding the calyx.

9. **K. flagellaris,** *Miq. in Journ. Bot. Neerl.* 15; *Fl. Ind. Bat. Suppl.* 255, 591; leaflets numerous narrow elongate-cuneate rusty pubescent beneath acutely erosely toothed, sheath armed dorsally unarmed on the petiolar side, ochrea armed only ventrally, spikes tomentose. K. angustifolia, *Miq. Palm. Archip. Ind.* 15, 26 (excl. sp. from Borneo and var. β) (not of Blume).

MALAY PENINSULA; Perak, *Scortechini*; at Assam Kumbung, *Wray* (n. 3127).

Resembles in the form of its leaflets and their colouring beneath *Z. rubiginosa*, which has longer straighter less cuneate leaflets with short not subulate teeth.

27. CERATOLOBUS, *Blume.*

Palms with the habit and foliage of *Korthalsia*, but with flagelliferous leaves. *Spadix* very slender, loosely panicled; branches filiform; peduncle very long, pendulous, prickly, usually adnate to the sheath of the leaf opposite; spathe small, solitary, membranous, narrow, flattened, beaked, at length split down the ventral face; flowers polygamous, in pairs, the upper ebracteate, the lower bracteate and bracteolate. *Male fl.* Calyx small, 3-fid; lobes triangular, valvate; stamens 6, on the bases of the petals, anthers linear; pistillode minute. *Fem. fl.* Calyx of the male; corolla 3-fid, valvate; ovary ovoid; ovules 3, basilar, erect. *Fruit* small, 1-celled, 1-seeded, pericarp as in *Korthalsia*. *Seed* globose, erect; testa fleshy; albumen ruminate; embryo basilar.—Species Malayan.

1. **C. lævigatus,** *Becc. mss.*; leaflets in inequidistant groups of 2–3 pairs narrowly linear- or ob-lanceolate acuminate suddenly contracted into a long straight point naked on both surfaces and margins, spadix shortly peduncled, fruit spherical broadly beaked. Calamus lævigatus, *Mart. Hist. Nat. Palm.* iii. 339; *Miq. Fl. Ind. Bat.* iii. 129. Calami sp. *Griff. in Calc. Journ. Nat. Hist.* v. 72, & *Palms Brit. Ind.* 72 (*last 5 lines*).

PERAK, *King's Collector* (575, 971, 5916); on Waterfall hill, *Wray* (2919).

Stem 15–20 ft., about ½ in. diam. *Leaves* 18–30 ft.; leaflets concolorous, dark green, 5–9 by ½–¾ in., thin, rachis slender, sparsely armed with solitary recurved spines; petiole very short, base tumid; sheath strongly ribbed, armed with scattered simple flattened spines. *Spadix* 4–8 in., very shortly peduncled, erect, narrow; branches slender, sparsely pubescent. *Spathe* 6–10 in., linear-lanceolate, coriaceous, smooth. *Male fl.* sessile, subglobose, $\frac{1}{12}$ in. diam.; calyx cupular, 3-lobed and broad petals and bracteoles deeply grooved. *Fruit* brown, subglobose or ovoid, narrowed to a broad conical beak; scales obscurely channelled. *Seed* obtusely tubercled. *Fruiting calyx* as in the male, but petals much narrower and longer.

Var. *angustifolia*, Becc. mss.; more slender, leaflets narrower gradually produced into a slender point, median costa setulose, spathe 4 in. long, much thinner and spadix much smaller, probably a different species. Perak; *King's Collector* (1879).

2. **C. Kingianus,** *Becc. mss.*; leaflets few large cuneately rhomboid or trapezoid, lobed and toothed in the upper half deeply plicate pale beneath, spadix sessile, fruit spherical shortly broadly beaked.

PERAK, *Hullett* (*Herb. Calc.* 2547, 2856, 5589); *Wray* (2869).

Stem 20–25 ft., about 1¼ in. diam. *Leaves* 3–4 ft.; leaflets 6–9 by 3–4 in., lower half triangular-cuneate; rachis stout armed with short solitary and 2-5-fid. claws; petiole 6–8 in., more or less muricate and armed with scattered short simple and compound spines; sheath transversely muricately ridged, unarmed, young white furfuraceous. *Spadix* 8–10 in., erect, narrow; branches short, glabrous. *Spathe* 8–12 in., elongate-oblong, flat, thinly coriaceous, quite smooth. *Male fl.* sessile, about $\frac{1}{12}$ in. long, narrowly oblong; calyx minute, cupular; petals narrow thrice as long, both deeply grooved. *Fruit* ⅔–¾ in. diam., brown, scales hardly channelled. *Seed* nearly smooth. *Fruiting calyx* minute; petals broadly ovate.

28. PLECTOCOMIA, *Mart.*

Scandent monocarpic spinous palms, stem very long. *Leaves* flagelliferous; leaflets linear lanceolate. *Spadix* simply branched; branches very long, pendulous, clothed with closely imbricating distichous inflated coriaceous persistent spathels which conceal the spicate dioecious flowers.

Spikelets short, male many-fld., fem. shorter few-fld.; bracts and bracteoles subulate. *Male fl.* Calyx cupular, 3-toothed; petals lanceolate, valvate; stamens 6–12, filaments cuneate below, anthers linear. *Fem. fl.* larger, perianth accrescent; corolla 3-fid, lobes valvate; staminodes 6. *Ovary* 3-celled; ovules basilar. *Fruit* globose, 1- rarely 3-seeded, beaked; pericarp thin, tessellated with reflexed shining scales. *Seed* erect; albumen equable, embryo basilar.—Species 6 or 7, Himalayan and Malayan.

1. **P. khasyana,** *Griff. in Calc. Journ. Nat. Hist.* v. 106; *Palms Brit. Ind.* 106, t. 218; leaflets strongly 3-costate finely furfuraceous beneath tip not filiferous, rachis of spadix glabrate, of spikelets white-tomentose, spathels rusty-puberulous, male petals ⅓ in. long elongate-lanceolate, fruit-scales ciliate and with deciduous recurved fimbriate tips. *Mart. Hist. Nat. Palm.* iii. 199. P. assamica, *Hook. Bot. Mag.* t. 1505 (*excl. syn.*).

KHASIA HILLS, alt. 4–5000 ft., *Griffith*, &c.

Stem 60–80 ft, as thick as the arm. *Leaves* 30 ft. including the flagellum; leaflets 8–16 by 2–3 in., broadly lanceolate; rachis armed beneath with very short digitate spines. *Male spadix* branched from the base; branches 3 ft. long by 2 ft. across the spathels, which are 1½ in. long, oblong, white with broad green acute or acuminate tips and a broad brown interposed band. *Spikelets* 1 in., many-fld. *Stamens* 8–12. *Fruit* 1–1¼ in. diam., globose, abrubtly beaked.

2. **P. himalayana,** *Griff. in Calc. Journ. Nat. Hist.* v. 100; *Palms Brit. Ind.* 108, t. 218; leaflets concolorous tips filiform, spadix and spikelets scurfily tomentose, male petals ¼ in, fruit-scales fimbriate tips appressed. *Mart. Hist. Nat. Palm.* iii. 129; *T. Anders. in Journ. Linn. Soc.* xi. 12. P. montana, *Herb. Ind. Or. Hook. f. & Thoms.*

SIKKIM HIMALAYA, alt. 4–7000 ft.

Stem 1 in. diam. *Leaves* 6–8 ft. including the flagellum; leaflets 12–16 by 1–1½ in., with 5 slender costæ, margins aculeolate, rachis scurfy and flagellum armed with recurved claws; petiole unarmed or margins spiny; sheath tubular, scurfy, spines whorled. *Spathes* conduplicate, scurfy. *Spadices* erect; branches 2–3 ft., drooping; spathels 1–2 in., rhomboid, acute; spikelets 3–7-fld. *Calyx* (male and fem.) cupular, 3-toothed, petals ovate-lanceolate. *Fruit* ½ in. diam., depressed-globose; scales very small.

3. **P. Griffithii,** *Becc. mss.*; very stout, leaflets glaucous beneath, spathels glabrous or scurfy towards the tips, male spikelets sparsely scurfy sessile, fem. fl. pedicelled, scales of fruit fimbriate and toothed. P. elongata, *Griff. in Calc. Journ. Nat. Hist.* v. 96; *Palms Brit. Ind.* 104, t. 217 A, B, C (*not of Blume*).

MALACCA, *Griffith.*

A gigantic species. *Stem* as thick as a man's leg. *Leaves* with the flagellum about 20 ft.; leaflets distant, 2–3 ft. by 2–3 in., decurved; rachis and flagellum armed as in other species. *Spadix* very large, branches many, 2–3 ft. *Spathels* 1½ in. broad. *Fruits* 3–5 in each spathel, "size of a carbine bullet," in diam.—Allied to *P. elongata*, differing in the more numerous flowers of the fem. spikelet, and by the much smaller fruit, the scales of which are not striated.—I have seen no specimen. *J.D.H.*

4. **P. macrostachya,** *Kurz in Journ. Beng. As. Soc.* xliii. pt. ii. 207, t. 16, 17; *For. Fl.* ii. 514; leaflets white beneath, rachis of spadix scurfy, spathels acute glabrous, male spikelets scurfy, flowers shortly pedicelled, margins of calyx-teeth densely tomentose.

TENASSERIM; on the Bithoko hills, alt. 3000 ft., *Kurz, Brandis.*

A lofty climber. *Leaflets* approaching in pairs, 12–18 in. long, linear-lanceolate, finely acuminate; petiole and rachis spinous, spines straight. *Branches* of *spadix* 4–5 ft.; spathels 1½–2 in. long, blackish towards the upper border. *Fruit* unknown. —I have seen no specimen. *J.D.H.*

5. **P. assamica,** *Griff. in Calc. Journ Nat. Hist.* v. 97; *Palms Brit. Ind.* 107, t 218 a.a.; leaflets white and finely furfuraceous beneath, tip not thread like, costæ slender, branches of fruiting spadix very stout scurfy, spathels 2½ in. long, sepals broadly ovate ¼ in. long, petals lanceolate ½ in. long, fruit villous from the deeply ciliate split recurved points of the scales. *Mart. Hist. Nat. Palm.* iii. 199, t. 176, f. 11.

ASSAM; *Hort. Bot. Calc.*

Leaves very large; leaflets 18–24 by 2–2½ in., lateral costæ marginal; petiole 1½ in. broad, with short stout marginal spines and short seriate scattered clusters of more slender dorsal ones. *Branches* of fruiting spadix 4–5 ft. long by 4–5 in. across the large subacute nearly glabrous spathels; rachis rusty tomentose. *Spikelets* 8–10 fld. *Male calyx* cupular, 3-toothed; petals lanceolate, ½–⅔ in. long. *Fruiting sepals* broadly ovate, ¼ in. long; petals lanceolate, ½ in. *Fruit* 1 in. diam., bright rusty red. —A mutilated spadix-branch of this or a nearly allied species, sent by the late Major Hannay from Debraghur to the Calcutta Gardens, has narrower spathels, brown mealy externally, ovate-lanceolate fem. sepals ¼ in. long and petals narrowly lanceolate ¾ in. long; the very young fruit is clothed with recurved lacerate scales.

6. **P. elongata,** *Mart. in Roem. & Sch. Syst.* vii. 1333; *Hist Nat. Palm.* 199, t. 114 and 116, f. 1; leaflets sparsely white furfuraceous beneath tip not filiferous, costæ 3 very slender, branches of spadix very long, spathels 1⅓ in. sub-3-lobed acute glabrous, flowers very small, calyx of male minute 3-toothed, petals ¼ in. obliquely oblong-ovate acute, calyx of fem. larger urceolate 3-toothed, petals small linear-lanceolate, fruit 1 in. diam., densely villous from the long lacerate spreading tips of the scales. *Kunth Enum.* iii. 202; *Blume, Rumphia,* iii 68, t. 158 and 163 A. Calamus maximus, *Reinw. ex Blume Cat. Hort. Bogor.* 59.

PENANG, *Jack, Wallich*; alt. 2500 ft., *Curtis.*—DISTRIB. Sumatra, Java.

Leaves very large; petiole stout; leaflets 1–1½ ft. by 2 in. broad, rather membranous, lateral costæ marginal. *Branches* of *spadix* 3–4 ft., 2–3 in. across the spreading spathels, which have acutely angled sides.

29. PLECTOCOMIOPSIS, *Becc. mss.*

Characters of *Plectocomia*, but upper leaves reduced to sheaths with long flagella and no leaflets, spathels small, infundibular, and fruit clothed with very minute almost microscopic scales, arranged in vertical series. *Seed* globose, smooth; albumen equable; embryo basilar.—Species 3, Malayan.

1. **P. geminiflorus,** *Becc. mss.*; leaves subsessile, leaflets very many and narrow equidistant finely acuminate, spadices with long pendulous spikes, the lower branched, spikelets very short 2–3-fld., fruit subturbinate with more than 35 rows of minute scales. Calamus geminiflorus, *Griff. ex Mart. Hist. Nat. Palm.* iii. 338; *Palms Brit. Ind.* 70, t. 199 A. Plectocomia geminiflora, *H. Wendl. mss.*

MALAY PENINSULA,; Malacca, *Fernandez*; Perak, *Scortechini* (No. 283ᵇ).

Stem slender, attaining 80 ft. *Sheaths* striate, sparsely prickly, uppermost unarmed. *Leaves* 6–10 ft.; leaflets 5–10 by ½ in., finely acuminate, keel sparsely bristly above, smooth beneath. *Spadices* many, from the uppermost leaf-sheaths, which bear a simple armed flagellum and no leaflets; lower 4–5 in., with 4–5 pendulous spikes each 6–8 in. long. *Spathes* short, tubular, like the secondary spathes of *Calamus*. *Spikes* flexuous, rusty-pubescent; flowers 2-bracteolate, outer bracteole minute, inner auricular. *Fruit* immature; pericarp spongy; scales brown, with whitish fimbriate margins.

2. **P. Wrayii,** *Becc. mss.*; leaves petioled, fruit globosely ovoid shortly narrowed at the top with about 23 rows of scales.

MALAY PENINSULA; Perak, *Wray* (2421 ♀); *Herb. Hort. Calcutt.* (5282 ♀, 3447 ♂).

Very near *P. geminiflorus*; distinguished by the longer petiole and fruit.

3. **P. paradoxus,** *Becc. mss.*; leaves shortly petioled, leaflets lanceolate scattered in distant pairs shortly acuminate, spadices bifariously decompound, spathels tubular, male spikelets exserted recurved. Calamus paradoxus, *Kurz in Journ. As. Soc.* xliii. (1874) ii. 213, t. 29, 30; *For. Flor* ii. 521.

MARTABAN, *Kurz.*

Stem with the sheaths 1–2 in. diam. *Leaves* 5–7 ft.; leaflets 1–1½ ft. by 1 in., in alternate pairs, thin, obscurely remotely appressedly ciliolate; petiole armed, sheath with pectinate spines; flagellum very long. *Spathes* tubular, smooth, obliquely truncate and acuminate; spathels similar, but much smaller, distichously imbricated; bracts spreading, glabrous. *Fem. fl.* and *fruit* unknown.

30. MYRIALEPIS, *Becc. mss.*

Characters as far as known of *Plectocomiopsis*, but the minute scales of the fruit are disposed without order.—Species 2, a Bornean and the following.

M. Scortechini, *Becc. mss.*

MALAY PENINSULA; Perak, *Scortechini* (n. 457[b]).

Leaves unknown. *Fem. fl.* solitary in the spathels; calyx 3-lobed; corolla rather longer. *Fruit* globose; scales acuminate, tips not recurved; mesocarp between spongy and corky. *Seed* globose; albumen horny, equable.—Differs from the Bornean species (*M. triqueter*, Becc., *Calamus triqueter*, Becc., Malesia, iii. 62) in the obtusely angled trigonous sparsely spinous leaf-sheaths. The specimens are very imperfect.

31. EUGEISSONIA, *Griff.*

Tufted monocarpic spinous palms. *Leaves* pinnatisect; leaflets lanceolate; rachis armed, not flagelliferous. *Spadix* terminal, erect, thyrsiform, clothed below with reduced flagelliferous leaf-sheaths; branches erect, clothed with subdistichous obtuse spathes passing into bracts and bracteoles. *Flowers* large, coriaceous, solitary or 2–3-nate, 1–2-sexual. *Male fl.* calyx cupular, 3-fid; petals elongate-lanceolate, pungent, valvate; stamens about 12, anthers elongate, basifixed. *Fem. fl.* larger; perianth accrescent; calyx of the male; petals with a dilated base and transverse crest of hairs; ovary oblong, 3-celled, stigmas flattened. *Fruit* ovoid, narrowed into a very broad obtuse beak, 1-celled, 1-seeded, scales minute; endocarp osseous. *Seed* ovoid, 6–12-grooved; albumen equable; embryo basilar.—Species about 6, Malayan.

E. tristis, *Griff. in Calc. Journ. Nat. Hist.* v. 101; *Palms Brit. Ind.* 109, t. 220 A; *Mart. Hist. Nat. Palm.* iii. 212, t. 179, 180; *Becc. in Nuov. Giorn. Bot. Ital.* iii. 28.

MALAY PENINSULA and PENANG, *Griffith*, &c.

Stems densely tufted, very short or 0. *Leaves* 15–20 ft.; leaflets many, 2–2½ ft., narrow-lanceolate, subulate, acuminate, midrib bristly above; petiole 7–10 ft., armed with flat brown spines. *Spadix* 4–6 ft., sheaths and spathes armed; flowers 1–1½ in. long, terminal on the flexuous branches of the spadix; bracts many, closely imbricating. *Fruit* the size of a hen's egg, beak clothed to the tip with scales.

32. METROXYLON, *Rottb.*

Stout monocarpic palms. *Leaves* equally pinnatisect, leaflets opposite. *Spadix* very large, paniculed, clothed with coriaceous spinous spathes; spikes sessile, catkin-like, short, distichous, recurved; bracts broader than long, bracteoles cupular. *Flowers* polygamous, densely crowded; perianth coriaceous. *Male fl.* calyx 3-fid, funnel-shaped, nerved; corolla segments oblong, valvate; stamens 6, anthers dorsifixed; pistillode 3-partite. *Fem. fl.* like the males, perianth hardly accrescent; staminodes a membranous cup; ovary oblong, retrorsely scaly, imperfectly 3-celled; style conic, 3-toothed, ovules 3, basilar. *Fruit* ellipsoid or subglobose, 1-celled, 1-seeded, pericarp tessellate with reversed scales; endocarp spongy. *Seed* erect, subglobose, rough; albumen ruminate; embryo ventral. Species 6 ? Malayan and Pacific.

1. **M. Sagus,** *Rottb. in Nye Saml. K. Dansk. Vid. Skrift.* ii. 527; spathes unarmed. *Miq. Fl. Ind. Bat.* iii. 147; *Becc. in Nuov. Giorn. Bot. Ital.* iii. 29. M. inermis, *Mart. Hist. Nat. Palm.* iii. 215. Sagus lævis, *Rumph. Herb. Amb.* i. 76; *Blume Rumphia*, ii. 147, t. 86; *Griff. in Calc. Journ. Nat. Hist.* v. 20; *Palms Brit. Ind.* 24 (*not* t. 182). S. Rumphii, *Blume l. c.* t. 126, 227. ? S. Kœnigi, *Griff. ll. cc.* 19 and 22, t. 181. S. inermis, *Roxb. Fl. Ind.* iii. 623.

MALACCA (wild or cult. ?) *Jack*, &c.—DISTRIB. Malay Islds.

Trunk about 20 ft. with many basal offshoots, as stout as that of the cocoa-nut, annulate, clothed above with old leaf sheaths. *Leaves* as in the cocoa-nut, but more erect, unarmed; leaflets linear, acute, keeled, smooth. *Infl.* appearing when the plant is about twenty years old. *Spadices* several, terminal, alternately branched, spikes 5–8 in. *Flowers* minute, sunk in rusty wool, hardly larger than a grain of mustard seed, bisexual. *Fruit* (takes three years to mature) globose, size of a small apple, scales shining, channelled.—Desc. from Jack in Mal. Misc., but according to Griffith the Indian *Metroxylon* bears no resemblance to a Cocoa-nut Palm.—The Sago Palm.

2 **M. Rumphii,** *Mart. Nat. Hist. Palm.* iii. 213, 313, t. 102, 159; spathes armed with long spines. *Miq. Fl. Ind. Bat.* iii. 140; *Becc. in Nuov. Journ. Bot. Ital.* iii. 30; *Malesia*, i. 91. Sagus Rumphii, *Willd. Sp. Pl.* iv. 404; *Roxb. Fl. Ind.* iii. 623. S. genuina, *Blume Rumphia*, ii. 150. S. farinifera, *Gærtn.* ii. 186, t. 120, f. 3.—*Rumph. Herb. Amb.* i. 75, t. 17, 18.

MALACCA (wild or cult.).—DISTRIB. Malay Islds.

There appears to be great confusion in the synonymy of the two common species of this genus, and that here given may be open to correction. Beccari states that *M. Rumphii* is much less cultivated than *M. Sagus*.

33. BORASSUS, *Linn.*

A very tall dicœcious palm; trunk stout, unarmed. *Leaves* terminal,

fan-shaped, plicately multifid; petiole spinous, ligule short. *Spadices* very large, simply branched; peduncle sheathed with open spathes, males with stout cylindric branches that are densely clothed with closely imbricating bracts, enclosing spikelets of flowers, which hence appear as if sunk in cavities of the branch; fem. spadix sparingly branched, bearing few scattered solitary flowers. *Male fl.* small, mixed with scaly bracts, secund in two series in a small spikelet, and protruding one by one from the cavities of the branch of the spadix, as the rachis of the spikelet elongates; perianth glumaceous; sepals 3, narrowly cuneate, tip inflexed truncate, imbricate; petals shorter than the sepals, obovate-spathulate, imbricate; stamens 6, anthers subsessile large oblong; pistillodes of 3 bristles. *Fem. fl.* larger, globose; perianth fleshy greatly accrescent; sepals reniform, imbricate; petals smaller, convolute; staminodes 6–9; ovary globose, subtrigonous, entire or 3–4-partite, 3–4-celled; stigmas 3, sessile recurved; ovules basilar, erect. *Fruit* a large subglobose drupe with 1–3-obcordate fibrous pyrenes; pericarp thinly fleshy, stigmas terminal. *Seeds* oblong, top 3-lobed; testa adherent to the pyrene; albumen equable hollow; embryo subapical.

B. flabellifer, *Linn. Sp. Pl.* 1187; B. flabelliformis, *Murr. Syst. Ed.* xiii. 827; *Roxb. Cor. Pl.* i 50, t. 71, 72; *Fl. Ind* iii. 790; *Griff. Notul.* iii. 167; *Mart. Hist. Nat. Palm.* iii. 221, t. 108, 121, 162; *Kunth Enum* iii. 222; *Thw. Enum.* 329; *Brand. For. Fl.* 544; *Kurz For. Fl.* ii. 529; *Blume Rumph.* ii. 88; *Miq. Fl. Ind. Bat.* iii. 45. B. dichotomus, *White in Grah. Cat. Bomb. Pl.* 226. B. æthiopum, *Mart. l c.* 221. Lontanus domestica, *Rumph. Herb. Amb.* i t. 10. *Ham. in Mern. Wern. Soc.* v. 314; *Gærtn. Fruct.* i. 21, t. 8.—*Rheede Hort. Mal.* i. t. 9, 10.

Cultivated throughout the plains of INDIA, BURMA and CEYLON.—DISTRIB. Malaya; Afr. trop.

Trunk 60–70 ft., very rarely branching, often swollen above the middle. *Leaves* 6–10 ft. diam., palmately fan-shaped, rigidly coriaceous; segments 2–4 ft., linear, 2-fid, margins spinulose. *Spadix* male and fem. several feet long and very stout. *Male fl.* small; fem. 1 in. diam. *Drupe* broadly obovoid, brown, 8 in. diam.

34. COCOS, *Linn.*

Unarmed, monœcious palms. *Leaves* pinnatisect; leaflets narrow. *Spadix* erect, at length drooping, simply panicled; branches bearing scattered fem. fl, often between 2 males towards their bases and males above. *Spathes* 2 or more, lower short, upper fusiform or clavate; bracts various; perianth coriaceous *Male fl.* unsymmetric; sepals small, valvate; petals oblong, acute, valvate; stamens 6, filaments subulate, anthers linear, erect; pistillode minute or 0. *Fem. fl.* usually much larger, ovoid; perianth greatly accrescent; sepals imbricate; petals shorter, convolute with imbricate tips; disk annular or 0; ovary 3-celled, usually 1-ovuled; style short, stigmas recurved; ovules subbasilar. *Fruit* large, ovoid, terete or trigonous, 1-seeded, style terminal; pericarp thick, fibrous; endocarp bony or stony, with 3 basal pores, the remains of the 3 cells. *Seed* cohering with the endocarp; albumen solid or hollow, or merely lining the endocarp with a thick hard coat; embryo opposite one pore.—Species about 30, all American, one of them cosmopolitan in the tropics.

C. nucifera, *Linn. Sp. Pl.* 1188; *Mart. Hist. Nat. Palm.* iii. 123. t. 62, 75, 88; *Kunth Enum.* iii. 285; *Roxb. Cor. Pl.* i. 52, t. 73; *Fl. Ind.* iii.

614; *Thw. Enum.* 330: *Brand. For. Fl* 556; *Kurz For. Fl.* ii. 540; *Blume Rumph.* iii 82; *Miq. Fl. Ind. Bat.* iii. 64; *Hook Journ. Bot* ii. (1850), t. 1. C. nana, *Griff. Notul.* ii. 166.—*Rheede Hort. Mal.* i. t. 1–4.

Cultivated in the hot damp regions of India, Burma, and Ceylon, especially near the sea (indigenous in the Cocos Isld. and N. Andaman, *Kurz*).—DISTRIB. All tropical shores.

Trunk 40–80 ft., flexuous, annulate, base thickened. *Leaves* 12–18 ft.; leaflets 2–3 ft, coriaceous, flaccid; petiole 3–5 ft. stout. *Spadix* 4–6 ft., branches flexuous; lower spathe 2–3 ft, oblong, hard, splitting lengthwise; male fl. small; fem. 1 in. long, 2-bracteolate, disk annular. *Drupe* 4–10 in long, trigonously obovoid or subglobose, green or yellowish; albumen lining the endocarp. *C. nana* is a small low var. grown in the Maldive Islds. and Ceylon.

ADDENDUM TO PALMS.

TEYSMANNIA ALTIFRONS, *Reichb. f. & Zoll. in Linnæa* xxviii. 657; *Miq. Fl. Ind. Bat.* iii. 749.—Mr. Ridley (Singapore) informs that this noble Sumatran Palm is also a native of the Malay Peninsula. The genus is of doubtful affinity, but most probably belongs to the Tribe *Coryphæ*. It may be recognized by its almost stemless habit, and enormous erect elongate-rhombic plaited leaves.

ORDER CLXIV. **PANDANEÆ.**

Small diœcious trees or shrubs, often scandent with aerial roots. *Leaves* usually trifarious, narrow, acuminate, coriaceous, margins and keel usually spinously toothed. *Spadices* axillary or terminal, simple or branched, clothed with leafy spathes; flowers small, crowded on a catkin-like spadix or its branches, bracts and bracteoles 0. *Perianth* 0. *Male fl.* stamens many, filaments free or connate; anthers erect, basifixed; pistillode 0 or small. *Fem. fl.* staminodes 0 or small; ovary 1-celled, free or connate with those of contiguous flowers; stigmas subsessile, papillose; ovules solitary and suberect, or many and parietal. *Fruit* a globose oblong mass of free or connate 1–∞-celled woody or fleshy angular drupes. *Seeds* minute, testa striated, albumen hard fleshy; embryo minute.

Stem erect or prostrate. Staminodes in fem. fl. 0. Carpels 1-ovuled. 1. PANDANUS.
Stem usually climbing. Staminodes of fem. fl. hypogynous. Carpels many ovuled . . . . . 2. FREYCINETIA.

1. **PANDANUS,** *Linn. f.*

Characters as above.—Species numerous, all tropical, chiefly Mascarene and Malayan.

I am compelled to be brief with the characters of the Indian species, very few of which are fully described; and of the Malayan especially, the available specimens are most unsatisfactory. I omit many usually cited references, and some synonyms which appear to me to be doubtful, and am by no means confident as to the value of much that remains.

* Carpels not united in groups.

† *Male fl. of free stamens with very short filaments. Drupes with a pyramidal crown produced into a straight or curved spinescent style.*

1. **P. fœtidus,** *Roxb. Fl. Ind.* iii. 742; shrubby, leaves 4–6 ft. by 3–4 in., strongly spinous-toothed, anthers very long slender, fruit subsolitary oblong or subglobose, crown of drupes smooth or nearly so. *Kunth*

Enum. iii. 98; *Kurz in Seem. Journ. Bot.* v. (1867) 101, t. 62, f. 4, 5, 6; *& For. Fl.* ii. 506; *Solms in Linnæa*, xlii. (1878) 8. Frisquetia macrocarpa, *Gaud. Voy. Bonite Bot.* t. iv. f. 2–8.—Pandan. *Wall. Cat.* 8591.

ASSAM and the KHASIA HILLS, and Eastwards to BURMA. The CONCAN?

A densely branched shrub. *Leaves* with large strongly incurved usually distant marginal spinules. *Spathes* pale yellow. *Anther* ¼–⅓ in. long. *Fruit* very variable in size, from a hen's egg to a man's fist, red when ripe.

2. **P. caricosus,** *Spreng. Syst.* iii. 897; shrubby, leaves 5–8 ft. by 2–2½ in. spinulose-toothed, spinules minute white, anthers very long slender, fruits spicate subglobose obovoid or broadly oblong, crown of drupes muricate. *Kunth Enum.* iii. 98; *Hassk. in Flora*, 1842, ii. *Beibl.* 13 *& Cat. Hort. Bogor.* 60; *Miq. Fl. Ind. Bat.* iii 163, *& Ann. Mus Lugd. Bat* ii. 54; *Kurz in Seem. Journ. Bot.* v. (1867) 100, t. 62, f. 1–3 *& in Journ. As. Soc. Beng.* xxxviii. ii. (1869) 146, *in Flora* (1869) 450; *Solms in Linnæa* xlii. (1878) 7; *Carriere in Rev. Hortic.* (1878) 405, *with ic. of male spadix.* P. atrocarpus, *Griff. Notul.* iii. 160.

MALACCA, *Griffith.*—DISTRIB. Malay Islds.

Apparently closely allied to *fœtidus*, and like it with fœtid yellow spathes, differing in the spicate dark coloured or even blackish fruits and muricate crowns of the drupes. I have seen no specimens. I do not cite Rumph. Herb. Amb. iv. 154, though it is the authority for the species, the description and plate not being sufficiently explicit. Nor are others of the authorities cited quite dependable.

** *Male fl. of many anthers umbellate on the connate filaments. Drupes with a low crown and subulate or flattened simple or forked stigma.*

3. **P. furcatus,** *Roxb. Fl. Ind.* iii. 744; arboreous, leaves 15–20 ft., subglaucous beneath spinously toothed, spines curved, fruits solitary or racemed ellipsoid or oblong, drupes obconic crown convex, style very short flattened entire or 2–3-fid. *Spreng. Syst.* iii. 898; *Kunth Enum.* iii. 98; *Miq. Fl. Ind. Bat.* iii. 162, t. 37 male fl.; *Hassk. Pl. Jav. Rar.* 163; *Kurz in Seem. Journ. Bot.* v. (1867) 102, *in Journ. As. Soc. Beng.* xxxviii. ii. (1869) 147, *in Miq. Mus. Lugd. Bat.* ii 54; *in Flora* (1869) 450, *& For Fl.* ii. 507; *Solms in Linnæa*, xlii. (1878) 13; *Regel, Gartenfl.* 1878, 298; *Carr. in Rev. Hortic.* 1879, 290, with fig., and 1881, 174. P. crassipes, *Wall. mss.* P. caricosus, *Miq. Analect. Ind.* ii. 16. P. spinifructus, *Dennst. Schluess. Hort. Malab.* 23. Ryckia furcata, *De Vriese in Verhandl. Kl. Acad. Wet.* (1854); *in Tuinb. Fl.* i. 161, *& in Hook. Kew Journ* vi. (1854) 268. Barrotia diodon, *Gaud. Voy. Bonite Bot.* t. xiii. f. 15–24.—Pandan. *Wall. Cat.* 8951.

SIKKIM HIMALAYA, alt. 2–5000 ft. *J.D.H.* ASSAM, KHASIA and NAGA HILLS, and SILHET, alt. 0–4000 ft., CHITTAGONG and BURMA.—DISTRIB. Malay Islds.

Stem 30–40 ft., with aerial roots towards the base, as thick as the arm or leg, sparingly dichotomously branched above. *Leaves* 4 in. broad, marginal spines ⅛–½ in. long, flattened, lower curved. *Spathes* inodorous, 1½–2 ft., golden yellow, very coriaceous. *Stamens* 8–14, filaments united in a fleshy tube longer than the anthers, tips free or variously cohering. *Fruit* 6–9 in. long or less, very variable in size, red brown. *Drupes* rather fleshy, 5–6-angled; style shining.—In specimens from Churra in the Khasia and from Sikkim, the column of filaments is much broader and the free portion is much shorter than in those from Silhet.

4. **P. ceylanicus,** *Solms in Linnæa*, xlii. (1878) 16; stems tall tufted very slender, leaves elongate margins with strong recurved spines, anthers very short crowded on a very short fleshy tube, fruit broadly oblong, crown conical narrowed into a nearly straight spinescent style notched at the tip. P. furcatus, *Thw. Enum.* 327.

CEYLON, *Thwaites.*

According to a photograph of this plant as growing in the Ceylon Botanical Gardens, it has the habit of *P. furcatus* but with a much more slender stem, more erect branches, and narrower leaves. In the dried specimens, the spathes are much smaller, with long slender tips, the anthers much shorter, and the combined filaments very short. The fruit resembles *P. fœtidus*, but the anthers are very different, about $\frac{1}{10}$ in. long.

5. **P. minor,** *Ham. in Wall. Cat.* 8592; dwarf, stem prostrate slender, leaves ensiform flat margins spinulose tips abruptly caudate, spathes navicular apiculate, filaments in palmate clusters, anthers minute, fruit solitary broadly oblong, drupes smooth, crown hemispheric with a small concave central claw-like style. *Solms in Linnæa*, xlii. (1878) 18. P. unguifer, *Hook. f. Bot. Mag.* t. 6347.

In hot valleys of the SIKKIM HIMALAYA, ASSAM, SILHET, CHITTAGONG and PEGU.

Stem 2–3 ft., as thick as the thumb. *Leaves* subdistichous, 18–24 by 1–2 in., flaccid, marginal spines distant. *Fruit* shortly peduncled, as large as the fist, yellow. *Drupes* obovoidly clavate, very smooth; style red.—In young fruit, the style is flattened and often forked, much as in *P. furcatus*. *Male fl.* unknown.

** Carpels connate in groups. Stigmas sessile, peltate or reniform. Filaments connate, anthers apiculate or aristate.

6. **P. fascicularis,** *Lam. Encycl.* 372, t. i.; shrubby, rarely erect, densely branched with copious aerial roots, leaves 3–5 ensiform caudate-acuminate, margin with ascending spinules, anthers interruptedly spicate, fruit large drupes obconic. *Kunth Enum.* iii. 98; *Solms in Linnæa*, xlii. (1878) 38. P. odoratissimus, *Roxb. Cor. Pl.* i. 65, t. 94–96; *Fl. Ind.* iii. 738; *Kunth l. c.* 94, *excl. some syn.*; *Griff. Notul.* iii. 159: *Ic. Pl. Asiat.* t. 174; *Kurz For. Fl.* ii. 508; *Presl. Epimel.* 239. P. Candelabrum, *Kurz in Journ. Bot.* v. (1867) 127 [*non Beauv.*]. P. odoratus, *Salisb. Prodr.* 3. P. verus, *Kurz in Seem. Journ. Bot.* v. (1867) 125, *in Flora*, 1869, 453. P. Rheedii, *Gaud. Voy. Bonite, Bot.* t. 22, f. 12. P. leucacanthus, *Hassk. in Flora*, 1842, ii. *Beibl.* 14.—Pandanus, *Wall. Cat.* 8590. Hasskarlia leucacantha, *Walp. Ann.* i. 753.—*Rheede Hort. Mal.* ii. t. 1–8.

Throughout the hotter moister parts of INDIA, and much planted for fences.—DISTRIB. MALAY ISLDS. and Mauritius, China, Polynesia.

Stem sometimes erect and 10–12 ft., usually much lower and branching from the base. *Leaves* drooping, glossy green. *Spathes* white, fragrant. *Fruit* 6–8 in. diam., orange yellow or brown. *Drupes* confluent in groups of 5–20 rarely fewer, very woody, 1½–2 in. long, top rounded or sublobate with a depressed centre bearing a depressed small variously lobulate stigma.—I have given only a selection of the citations and synonyms of this widely diffused species. The *P. odoratissimus* of Vidal, Fl. Forest. Filip. Atlas xlii. t. 95 A appears to differ in the very small fruit and obtuse anthers. Possibly some of the plates of Rheede's "Perin Khaida Taddi," and especially t. 8, may belong to a different species, its carpels are all free; it is the *P. unipapillatus* of Dennst. Schluess. Hort. Mal. 23.

7 **P. andamanensium,** *Kurz. in Journ. As. Soc. Beng.* xxxviii. ii. (1869) 148; *in Flora* 1869, 452; *For. Flor.* iii. 507; trunk 60–70 ft. as thick as the human body, leaves 15–18 ft. by 4–5 in., marginal spines slender, fruit solitary large globose, drupes with a flat or depressed crown and an oblique lamelliform depressed style pungent when dry. *Solms in Linnæa*, xlii. (1878) 59. P. Leram, *Kurz in Seem. Journ. Bot.* v. (1867) 105.

ANDAMAN ISLDS., *Kurz.*

Habit of a gigantic *P. furcatus*; fruit as large as the human head or smaller,

orange yellow. *Drupes* 2½–3 in. long, usually in groups of 3–5 in. one series but often more, epicarp fleshy.—Descr. from Kurz.

IMPERFECTLY KNOWN AND UNDESCRIBED SPECIES.

1. P. ALBUS, *Hort. ex Steud. Nom. Ed.* 2, ii. 251.—"Ind. Or."

2. P. GRAMINIFOLIUS, *Kurz in Seem. Journ. Bot.* v. (1867) 104; *For. Flor.* ii. 507; leaves 12–18 by ½–¾ in., margins with minute straight spinules, young fruit erect ellipsoid, stigma sessile trigonous. *Solms in Linnæa*, xlii. (1878) 50.—Tenasserim, *Helfer.*

3. P. HUMILIS, *Thwaites Enum.* 327 (excl. syn.); leaves 7 ft. by 1–1½ in., very coriaceous, with stout marginal spines, filaments very short, anthers very slender ½–¾ in. long, fruit globose spicate and drupes like those of *P. furcatus.*—Ceylon, *Thwaites*; CP. 3740 (used for fencing).

4. P. HOULLETII, *Carriere in Rev. Hortic.* 1868, 210, f. 23; leaves 6 ft. 6 in. by 3–3½ in. abruptly caudate-acuminate reddish green above coppery red beneath, marginal spines distant incurved, male spadix 16 in. long, spikes 2½–4½ in., spathes coppery rose-colrd., stamens in compact bundles.—Singapore.

5. P. INTEGRIFOLIUS, *Lour. ex Steud. Nom. Ed.* 2, ii. 251.—"Ind. Or. China."—I do not find this name in Loureiros Fl. Cochinch. or elsewhere.

6. P. LAIS, *Kurz in Nat. Tydschr. Ned. Ind.* xxvii. (1864) 218; *in Ann. Mus. Bot. Lugd. Bat* ii. 54; habit of *P. furcatus*, fruit solitary or racemed, crown flat or depressed, stigmas more slender incurved bifid. *Solms l. c.* P. horridus, *Reinw.* (fld. Kurz). P. furcatus, *Hassk. Pl. Jav. Rar.* 163; ? *Miq. Analect Ind.* ii. 10, t. 11, pl. ♂?. P. furcatus β malesica, *Kurz in Seem. Journ. Bot.* v. (1867) 102.—Singapore (*Kurz*), Sumatra, Java, &c.

7. P. LAEVIS, *Rumph.*; *Kurz For. Fl.* ii. 508; arboreous or shrubby much branched 20–25 ft., branches rooting, leaves elongate linear glaucous green 2–4 ft. by 2–2½ in. very acuminate without spines, male spadix very scented exactly as in *P. odoratissimus*, but margins and midrib of the white spathes quite unarmed, stamens racemosely connate, anthers mucronate, fruit unknown. ? *Wall. Cat.* 8588 B.—Burma, cultivated, *Kurz*; ? Tavoy, *Wallich*.—Descr. from Kurz.

8. P. LERAM, *Jones in As. Research.* iii. (1799) 163, with two plates; a tall tree 40–50 ft., with the habit of *P. furcatus*, but very slender, and with much larger fruit, drupes aggregate. *Voigt Hort. Suburb. Calcutt.* 683; *Kurz in Journ. As. Soc. Beng.* xxxvii. (1869) 452; *For. Fl.* iii. 507; *Solms l. c* 66 P. Leram, *var.* macrocarpa, *Kurz in Seem. Journ. Bot.* v. (1867) 106. Roussinia indica, *Gaud. Voy. Bonite Bot.* t. 21.—Nicobar Islds., *Fontana*; Andaman Islds., *Kurz.*

9. P. LINNÆI, *Gaud. Voy. Bonite Bot.* t. 22, f. 1–8; *Solms l. c.* 67.—India.—Of this Solms remarks, cf. *P. fasciculatus.* According to Gaudichaud's figure the drupes are very large, 3 in. long, in groups of 10 with rounded crowns and short stigmas grooved on one side; nothing is known of its origin.

10. P. ORNATUS, *Kurz in Journ. As. Soc. Beng.* xxxviii. (1869) 147; *in Flora*, 1869, 451; leaves very long caudate-acuminate acutely serrate, fruit solitary terminal long pedunculed cylindric glaucous surrounded by very short scale-like spathes, drupes unripe small obconic densely crowded but not confluent in groups, crown polygonal glaucous narrowed into a spiniform slender upcurved style with a linear stigma. *Solms l. c.* 11. Fisquetia ornata and militaris, *Gaud. Voy Bonite Bot.* t. 5; *Solms l. c.* 65.—Malacca and Singapore, *Gaudichaud, Griffith.*—Described chiefly from Solms, who examined Gaudichaud's specimen and drawing. There are young fruits of it in the Kew Museum, from Griffith; they are spicate, cylindric, 3–4 in. long by 1–1½ diam., and remarkable for their glaucous surface.

11. P. OVATUS, *Kurz in Journ. As. Soc. Beng.* xxxviii. (1869) 147; *in Flora*, 1869, 451; a small species according to Gaudichaud's figure, with leaves 18–24 by ¾ in., gradually narrowed into fine points, and small globosely oblong terminal

fruits 2 in. by 1½ in. diam.; drupes with conical crowns passing into an upcurved subulate style. Fisquetia ovata, *Gaud. Bot. Bonite Voy.* t. 4, f. 1.—Malacca, *Gaudichaud*; Keddah Peak, *Lt.-Col. Low.*

12. P. POLYCEPHALUS, *Lam.*; *Wall. Cat.* 8588 A; leaves gradually finely acuminate, margins with stout distant incurved marginal spines in one specimen, and smaller closer ones in another, fruits spicate resembling those of *P. fœtidus*, carpels not in groups, but drupes with rather longer spinescent crowns.—Burma, at Amherst, *Wallich.*—Lamarck's description of *P. polycephalus*, founded, may apply to this.

13. P. TURBINATUS. *Lodd. ex Steud. Nom. Ed.* 2, ii. 251.—"Ind. Or."—Probably an undescribed plant of Loddige's Catalogue.

14. P. YVANI, *Solms in Linnæa*, xlii. (1878) 20; leaves linear-lanceolate caudate-acuminate more than 12 in. long serrulate, teeth pale, spathes concave elongate ovate, fem. fl. minute densely crowded narrowed into a simple upcurved shining spine.—Malacca, *Yvan* (*Herb. Delessert*).—The above characters (from Solms) are worthless for the identification of a *Pandanus*.

15. PANDANUS sp.; dwarf, stem about as thick as a swan's quill, leaves 12–18 by 1¼–1½ in. flat ensiform rather abruptly caudate acuminate finely spinulose-serrate with erect spinules 1-nerved, fruit terminal solitary young globose ¾ in. diam. drupes not aggregate crown conical narrowed into a stout incurved spine.—Malacca, *Griffith*, *Kew Distrib.* 6373.—Apparently a very well marked species, closely resembling *ovatus* in fruit, but with very different leaves, and which more resemble those of *P. minor*. In the present chaotic condition of the genus I do not name it.

2. FREYCINETIA, *Gaud.*

Characters, see p. 483.—Species Malayan, Australian and Polynesian.

1. **F. angustifolia,** *Blume Rumph.* i. 159, t. 43; leaves linear 12–18 by ⅛–½ in. finely acuminate margins smooth or minutely serrulate, spadices racemose, fem. cylindric, filaments very short conic. *Kunth Enum.* iii. 587; *Miq. Fl. Ind. Bat* iii. 17; *Kurz in Seem. Journ. Bot.* v. 134 *in part*; *Solms in Linnæa*, xlii. (1878) 81. F. Brunoniana, *Wall. Cat.* n. 3660. F. Debregeseana, *Gaud. Voy. Bonite Bot.* t. 37, f. 1–11.—Pandaneæ, *Wall. Herb.* n. 9124 (*not distributed*).

TAVOY, *Gomes*; PENANG, SINGAPORE and MALACCA, *Wallich*, &c.—DISTRIB. Malay Islds.

Dicœcious. *Stems* climbing, as thick as a goose quill. *Leaves* grass like, costa very slender, nerves close set. *Spadices* 3–5, racemed on a short peduncle, males ½–1 in. by $\frac{1}{10}$–$\frac{1}{6}$ in. diam., very dense-fld., fem. ¾–1 by ¼–⅓ in. diam.; staminodes minute; stigmas 3–4; spathes ovate-lanceolate, finely acuminate.

2. **F. pycnophylla,** *Solms in Linnæa*, xlii (1878) 91; stem and leaves as in *F. angustifolia*, spadices in sessile umbels, fem. oblong, filaments elongate. F. angustifolia, *Kurz in Seem. Journ. Bot.* v. 134 *in part.*

CEYLON, *Walker, Thwaites* (CP. 366).

Very similar to *F. angustifolia*, but at once distinguished by the larger spathes, oblong male and fem. spadices forming a sessile umbel or stout pedicel ½–⅔ in. long, and their greater size; males ⅓–⅔ by ¼ in. diam., fem. ½–¾ by ⅔–½ in. diam.

3. **F. Walkeri,** *Solms in Linnæa*, xlii. (1878) 92; leaves elongate linear-lanceolate finely acuminate margins spinulose towards the base 18–24 by ½–⅔ in., spadices few in sessile umbels, fem. very stoutly pedicelled oblong, anthers subsessile.

CEYLON, *Walker, Thwaites*, CP. 2333. ? ANDAMAN ISLDS., on Mt. Harriet, *Kurz.*

Stem as thick as the middle finger. *Leaves* much longer broader and more coriaceous than in the preceding species. *Male spadices* in bad condition; fem. 1½-2 by ¾-1 in. diam.; pedicel as long.

4. **F. Gaudichaudii,** *Bennet, Pl. Jav. Rar.* 31, t. 9; leaves 5-6 by ¾-¾ in. strict linear-lanceolate serrulate towards the caudate tip, spadices umbellate stoutly shortly peduncled, fem. stout cylindric, spathes short fleshy. *Kunth Enum.* iii. 102; *Miq. Fl. Ind. Bat.* ii. 170; *Kurz in Seem. Journ. Bot.* v. (1867) 134; *Solms in Linnæa,* xlii. (1878) 86.

MALACCA, *Maingay* (*Kew Distrib.* 1537).

Stem as thick as a swan's quill. *Leaves* coriaceous, flat; sheaths short, membranous. *Spathes* 1½-2 in., cymbiform. *Fem. spadix* 1½ by ½ in. diam. or more.—The fem. spadices appear longer stouter and upon much shorter pedicels than are represented in the figure cited, but no dependence can be placed on drawings and descriptions of a succulent inflorescence made from dried specimens.

5. **F. insignis,** *Blume Rumph.* 158, t. 42; leaves 1½-3 ft. by ⅔-1 in., acuminate spinulose-serrate on the margins and midrib beneath, spadices 2-3 peduncled erect, outer spathes greenish inner red, fruit 2-4 in. elongate-oblong green, berries free at the conical 3-5-cornered apex, stigmas 3-1 horse-shoe shaped. *Kunth Enum.* iii. 586; *Miq. Pl. Jung.* i. 166; *Fl. Ind. Bat.* iii. 170; *Kurz For. Fl.* ii. 509.

ANDAMAN ISLDS., *Kurz.*—DISTRIB. Java.

A lofty sparingly branched climber.—I have seen no specimens; the characters are from Kurz.

ORDER CLXV. **TYPHACEÆ.** By J. D. Hooker.

Aquatic or marsh perennial herbs. *Leaves* linear, erect or floating. *Flowers* small or minute densely crowded in globose or cylindric unisexual bracteate spikes the upper of which are males; perianth of green scales or fine hairs. *Male fl.* Stamens 1-7, filaments free or connate, anthers basifixed. *Fem. fl.* Ovary superior, 1-2-celled, cells 1-ovuled, styles persistent, stigmas laterally papillose; ovule pendulous from the top of the cell. *Fruit* small, membranous or drupaceous. *Seed* pendulous, albumen fleshy or floury; embryo axile, cylindric, radicular end thickened, plumule in a lateral slit.—Genera 2, species about 15, cosmopolitan.

Perianth of slender hairs	1. TYPHA.
Perianth of green scales	2. SPARGANIUM.

1. **TYPHA,** *Linn.*

Marsh herbs. *Leaves* erect, spongy. *Flowers* in very dense superposed cylindric spikes (catkins), often intermixed with capillary bracteoles (hairs with dilated tips). *Perianth* of capillary hairs, or 0 in the male. *Stamens* 1 or more, tip of connective thickened. *Ovary* (often reduced to a clavate tipped hair) very minute, on a long capillary stipes, narrowed into a capillary style with a clavate or filiform stigma. *Fruit* very minute; pericarp membranous, indehiscent or laterally dehiscent; albumen floury.—Species about 10, temp. and trop.

In all the Indian species the male spike is more or less distant from the fem. I am very doubtful as to their limits and synonyms. I am indebted to the works referred to under the species of Rohrbach and Korner for indications of some minute characters. The male fl. are sometimes replaced by clavate bodies.

1. **T. elephantina,** *Roxb. Fl. Ind.* iii. 566; stem 6–12 ft., leaves 1–1½ in. broad trigonous above the sheath, margins often undulate above the middle, flowers bracteolate, pollen 4-globate, stigma lanceolate. *Kunth Enum.* iii. 92; *Schnizl. Typha*, 26; *Kœrner in Verh. Zool. Bot. Ges. Wien.* xxxix. 165, t. 5, f. 10; *Kurz in Journ. Bot.* v. 95; *in Journ. As. Soc. Beng.* xxxviii. i. 146. T. latifolia, *Edgew. in Proc. Linn. Soc.* vi. (1862) 194; *Kurz l. c.* T. Maresii, *Balland. in Bull. Soc. Bot. Fr.* 1887, 389.

Marshes from N.W. INDIA to ASSAM and southwards.—DISTRIB. Algiers.

Male spike 8–12 in., rachis clothed with short often forked hairs; bracts 3 or more; anthers 1–5, $\frac{1}{10}$ in. long. *Fem. spike* much stouter 6–10 by ½–1 in. diam.; flowers mixed with clavate pistillodes; bracteoles with fasciate tips much longer than the hairs, which are shorter than the stigmas.

2. **T. javanica,** *Schnizl. in Zolling. Verz. Ind Arch. Pfl.* 77; stem 4–6 ft., leaves ½–¾ in. broad biconvex above the sheath, hairs of male fl. simple forked or toothed, bracteoles with subspathulate tips and hairs shorter than the linear stigmas, fem. fl. mixed with pistillodes, pollen simple. *Rohrb. in Verh. Bot. Ver. Brandenb.* 1869, 98; *Kœrner in Verh. Bot. Zool. Ges. Wien.* xxxix. 157, t. v. f. 6. T. angustifolia, *Thw. Enum.* 331. T. latifolia, *Moon Cat. Ceyl. Pl.* 81.

CEYLON, *Thwaites*, &c.—DISTRIB. Ms. Mascarene and Malay Islands.

A smaller plant than *T. elephantina*, from which it differs in the form of the base of the leaf, simple pollen and linear stigma. *Fem. spike* 5–6 by ⅛–⅓ in. diam. *Anthers* ¼ in.

3. **T. angustata,** *Chaub. & Bory Exped. Scient. Morée Bot.* 338; stem 6–10 ft., leaves ¾–1 in. broad, semicylindric above the sheath, bracteoles of fem. fl. subspathulate equalling the linear stigmas, both longer than the hairs, fem. fl. mixed with clavate-tipped pistillodes, pollen simple. *Rohrb. in Verh. Bot. Ver. Brandenb.* 1869, 81; *Boiss. Fl. Orient.* v. 50; *Aitchis. in Trans. Linn. Soc.* N.S. iii. 120; *Kœrner in Verh. Bot. Zool. Ges. Wien.* xxxix. 159, t. iv. f. 6, v. f. 1. T. angustifolia, *Kurz in Journ. Bot.* v. 95 (*excl. syn.*); *Roxb. Fl. Ind.* iii. 567; *Aitchis. in Journ. Linn. Soc.* xix. 188; *Wall. Cat.* 4989.

NORTHERN INDIA, from KASHMIR to MUNNIPORE and southwards to SCINDE and COROMANDEL.—DISTRIB. N. Asia and westward, N. Africa and S. Europe.

Closely resembles the common European *T. angustifolia*, Linn., which is distinguished by the bracteoles shorter than the stigmas.

4. **T. Laxmanni,** *Lepech. in Nov. Act. Acad. Petersb.* 84, 355 (*excl. syn. DC.*), t. 4.; dwarf, 2–3 ft. high, leaves slender semicylindric at the sheath, male spikes 1–2 in., fem. ¾–1 in. by ⅛–⅓ in. diam., fem. fl. ebracteolate mixed with pistillodes, hairs very short much shorter than the subobtuse stigmas, pollen simple. *Kœrner in Verh. Zool. Bot. Ges. Wien.* 167, t. iv. f. 3, v. f. 15. T. minima, *Kurz in Journ. Bot.* v. 96. T. Martini, *Aitchis. in Journ. Linn. Soc.* xix. 188. T. stenophylla, *Rohrb. in Verh. Bot. Ver. Brandenb.* 90; *Boiss. Fl. Orient.* v. 50.

KASHMIR, alt. 9000 ft., *Thomson*, *Giles*.—DISTRIB. N. Asia and westwards to Russia.

At once distinguished from all the previous species by its small size and slender leaves, but very closely allied in the European and Oriental *T. minima*, which, according to Kœrner, has bracteoles.

2. SPARGANIUM, *Linn.*

Flowers in globose unisexual heads, subtended by leafy bracts.

Perianth of 3–6 membranous scales. *Stamens* 2–3, connective hardly produced at the tip. *Ovary* 1- rarely 2-celled; style very short, persistent, stigma unilateral; cells 1-seeded. *Drupes* obovoid, spongy; endocarp bony, tip perforated. *Seed* adherent to the endocarp.—Species about 6.

1. **S. ramosum,** *Huds. Fl. Angl.* 401; erect, leafy, leaves linear triquetrous at the base, heads sessile on the branches of a panicle, drupes sessile shortly beaked. *Kunth Enum.* iii. 89; *Boiss. Fl. Orient.* v. 48. S. erectum, *Kurz in Journ. Bot.* v. (1867) 96. S. stoloniferum, *Ham. in Wall. Cat.* 4990. S. carinatum, *Ham. ex Royle Ill.* 408.

North West India; from the plains to 5200 ft. in Kashmir. Burma, *Griffith.*—Distrib. N. temp. regions.

Stems 1–4 ft. *Leaves* 2–5 ft., 1 in. broad or less; margins concave. *Male heads* olive-brown, ¼–⅜ in. diam., deciduous; fem. 1 in. diam. in frt.; scales linear, tips spathulate. *Drupe* ¼ in. long, angled; stigma linear.

2. **S. simplex,** *Huds. Fl. Angl.* 401; erect, leafy, leaves linear triquetrous at the base rarely floating, fem. heads racemose, male spicate, drupe shortly stipitate long-beaked. *Kunth Enum.* iii. 89; *Boiss. Fl. Orient.* v. 48. S. erectum, *var.* β *Linn. Sp. Pl.* 971; *Kurz in Journ. Bot.* v. (1867) 96.

Sikkim Himalaya, alt. 7–9000 ft., *J.D.H.* Khasia Hills, alt. 5–6000 ft., *Griffith*, &c. Burma, *Griffith.*—Distrib. N. temp. regions.

Stem 1–2 ft. *Leaves* narrower than in *S. ramosum*, margins flat. *Male heads* yellow. *Scales* linear-oblong, tips toothed. *Drupes* fusiform, simple linear.

Order CLXVI. **AROIDEÆ.**

Perennial herbs with radical leaves, or scandent shrubs. *Leaves* alternate. *Flowers* 1–2-sexual, sessile on a spadix which is more or less enclosed in a green or coloured spathe; if unisexual the males usually towards the apex and fem. at the base of the spadix, with often neuters between them and above the males; perianth 0 or of scales. *Anthers* 2–4-celled, dehiscence dorsal or by pores; pollen various. *Ovary* sessile, 1–3-celled, style short or long, stigma discoid or lobed; ovules 1 or more, variously inserted. *Fruit* baccate. *Seeds* 1 or few, rarely many, often imbedded in pulp; testa various; albumen 0 or copious; embryo axile, or in exalbuminous genera, thick with the plumule in a lateral slit.—Genera about 100, species about 1000, for the most part tropical.

I am indebted to the studies of Mr. N. E. Brown for valuable notes on many of the Indian species entered in the Kew Herbarium, and for aid in the preparation of the following descriptions:—

Series A. *Flowers* monœcious (rarely dicœcious in *Arisæma*). *Perianth* 0.

Tribe I. Arineæ. *Spadix* with a flowerless top (appendage) or 0 in *Pistia* and *Cryptocoryne*. *Stamens* free; anther-cells larger than their connective. *Fem. fl. Staminodes* 0. *Ovary* 1-celled, ovules orthotropous.

Submerged or marsh herbs. Ovaries in one whorl .	1. Cryptocoryne.
Marsh herbs. Ovaries spirally disposed	2. Lagenandra.
Floating stemless herb	3. Pistia.
Terrestrial tuberous herbs:	
Leaves compound; ovules basal	4. Arisæma.
Leaves pedatipartite, appearing after the flowering; ovules basal	5. Sauromatum.

Leaves undivided; ovules parietal	6. ARUM.
Leaves various and flowers coetaneous; ovules basal	7. TYPHONIUM.
Leaves pedatipartite; ovules basal and apical . .	8. THERIOPHONUM.

Tribe II. PYTHONIEÆ. *Spadix* with or without an appendage. *Stamens* free, anther-cells broader than their connective. *Ovary* 1- or more-celled; ovules anatropous or semianatropous.—Tuberous herbs, often flowering before leafing; leaves 3-sect, segments pinnatifid.

Appendage naked; neuters 0	9. AMORPHOPHALLUS.
Appendage slender, naked; neuters below the males .	10. SYNANTHERIAS.
Appendage covered with conical neuters	11. THOMSONIA.
Appendage 0; neuters very large	12. PLESMONIUM.

Tribe III. COLOCASIEÆ. *Spadix* with or without an appendage, usually shorter than the spathe. *Anthers* sessile, densely crowded, prismatic or broad, free or connate, connective very thick. *Leaves* undivided, often peltate.

* *Tube of spathe not enclosing the fruit. Fem. infl. partially adnate to the spathe.*

Ovary many-ovuled; stigma 4-6-cleft	13. ARIOPSIS.
Ovary many-ovuled; stigma discoid	14. STEUDNERA.
Ovary 1-ovuled; stigma discoid	15. HAPALINE.

** *Tube of spathe enclosing the fruit. Spadix wholly free from the spathe.*

Limb of spathe refracted, open; ovules parietal . . .	16. REMUSATIA.
Limb of spathe refracted, convolute; ovules basal . .	17. GONATANTHUS.
Limb of spathe erect; ovules many parietal	18. COLOCASIA.
Limb of spathe erect; ovules few basal	19. ALOCASIA.

Tribe IV. PHILODENDREÆ. *Spadix* without an appendage, usually shorter than the spathe. *Stamens* free, rarely connate in a prismatic body; connective usually broader than the cells. *Fruit* enclosed in the tube of the spathe.—Perennial herbs, flowering and leafing at the same time.

Spathe deciduous; ovary 1-2-celled	20. AGLAONEMA.
Spathe wholly persistent; ovary 2-4-celled	21. HOMALONEMA.
Limb of spathe deciduous; ovary 1-celled	22. SCHISMATOGLOTTIS.

SERIES B. *Flowers* hermaprodite, a few rarely unisexual. *Perianth* 0.

Tribe V. CALLEÆ. *Spadix* without an appendage. *Stamens* distinct; filaments flat, anther-cells terminal. *Ovary* truncate, stigma central.—Mostly climbers.

Spadix stipitate; ovule 1 basal; berries free	23. ANADENDRON.
Spadix sessile; ovule 1-basal; berries free	24. SCINDAPSUS.
Spadix sessile; ovary 1–2-celled, many-ovuled; berries confluent	25. RHAPHIDOPHORA.
Spadix sessile. Ovary 1-celled; ovules 2 or more (rarely 1) basal	26. EPIPREMNUM.

SERIES C. *Flowers* hermaphrodite. *Perianth* of 4–6 segments.

Tribe VI. ORONTIEÆ. *Spadix* without an appendage.

* *Spadix flowering downward; ovary* 1-*celled.*

Prickly rigid herbs; spathe many times longer than the sessile spadix	27. LASIA.
Prickly rigid herb; spadix stipitate	28. PODOLASIA.
Prickly rigid herbs; spathes twice as long as the spadix	29. CYRTOSPERMA.
Unarmed herbs; leaves membraneous, pinnate	30. ANAPHYLLUM.

** *Spadix flowering upwards; ovary* 1–3-*celled.*

Stem scandent; leaves distichous	31. POTHOS.
Stemless; leaves ensiform; spathe 0	32. ACORUS.

1. CRYPTOCORYNE, *Fisch.*

Aquatic or marsh herbs, with creeping rootstock and short stem or 0. *Leaves* broad or narrow. *Tube of spathe* with connate margins and a transverse septum within. *Spadix* very slender, its tip adnate to the septum of spathe; male infl. cylindric; anthers 2-celled, cells with conical perforate tips, pollen vermiform; fem. infl. a single whorl of connate 1-celled many-ovuled ovaries with a few neuters; styles short, recurved; ovules erect, orthotropous. *Fruit* of coriaceous connate 2-valved many-seeded carpels. *Seeds* oblong, albuminous; embryo axile.—Species about 25, tropical Asiatic.

* Tube of spathe narrow, longer than the limb (or as long in *C. Griffithii*).

1. **C. ciliata,** *Fisch. ex Schott Melet.* 16; leaves linear-oblong or -lanceolate, limb of spathe oblong densely fimbriate. *Kunth Enum.* iii. 12; *Schott Aroid.* 7; *Syn.* 2; *Prodr.* 15; *in Bonpland.* (1857), 222; *Wight Ic.* t. 775; *Wall. Cat.* 8914; *Griff. in Trans. Linn. Soc.* xx. t. 10–12; *Blume Rumph.* i. 86; *Engler Arac.* 624, and *in Beccari Males.* i. 297; *N. E. Br. in Journ. Linn. Soc.* xviii. 245. C. elata, *Griff. Notul.* iii. 134; *Ic. Pl. Asiat.* t. 170, 171 (alata). C. drymorhiza, *Zipp. in Miq. Ann. Mus. Bot.* i. 122. Ambrosinia ciliata, *Roxb. Cor. Pl.* iii. 90, t. 294; *Fl. Ind.* iii. 491.

BENGAL, in ponds, &c. (in salt marshes, *Kurz*). MALACCA, *Griffith.*—DISTRIB. Malay Islds.

Tuberous, stoloniferous. *Leaves* 6–16 in., lower half sheathing, midrib stout. *Scape* very short. *Tube of spathe* 4–10 in.; limb 2–3 in., oblong, cuspidate, fimbriæ purple. *Ovaries* 5–7. *Fruit* long-peduncled, globose, 1 in. diam.; cells 6–8-seeded. *Embryo* polyphyllous, germinating in the fruit.—Javan specimens have leaves 14 by 3½ in.

2. **C. Walkeri,** *Schott in Bonpland.* (1857) 221; *Prodr. Aroid.* 15; leaves long-petioled oblong or oblong-lanceolate base cuneate or rounded, limb of spathe linear-lanceolate strongly twisted glabrous. *Engler Arac.* 625. C. spiralis, *Thw. Enum.* 334.

CEYLON, *Walker.*

Leaves 2–3 in., acute, thin; petiole 6 in., very slender. *Scape* very short. *Tube of spathe* 2 in.; limb 1½ in. *Ovaries* 4–5.

3. **C. retrospiralis,** *Kunth Enum.* iii. 12; leaves lanceolate to narrowly linear, tube of spathe and glabrous limb both closely twisted. *Wight Ic.* t. 772; *Schott Aroid.* 8; *Syn.* 2; *Prod.* 18; *in Bonpland.* (1857) 222; *Engler Arac.* 625 *& Ic. ined.* No. 16. Ambrosinia retrospiralis, *Roxb. Fl. Ind.* iii. 492.

BENGAL, BURMA, CENTRAL INDIA and the DECCAN.

Leaves 3–12 by ¼–¾ in., narrowed into a short stout petiole, or sessile, finely acuminate, costa slender. *Spathe* subsessile, nearly as long as the leaves, deep green streaked with purple. *Ovaries* 5–6, 3- or more-ovuled; stigmas orbicular.

4. **C. consobrina,** *Schott in Bonpland.* (1857) 222; *Prodr.* 16; leaves oblong-lanceolate finely acuminate, petiole long, limb of spathe ovate long-caudate glabrous not twisted. *Engler Arac.* 626.

The DECCAN PENINSULA, *Perrottet*, &c.

Leaves 4–6 by ¾–1 in., midrib stout. *Spathe* about equalling the petiole, its tail about three times longer than the blade.

5. **C. cordata,** *Griff. Notul.* iii. 138; *Ic. Pl. Asiat.* t. 172; leaves long-petioled broadly ovate or oblong-ovate base cordate or emarginate, tube of peduncled spathe very long, limb small lanceolate not twisted glabrous. *Schott Syn.* 2; *Prodr. Aroid.* 14; *in Bonpland.* (1857) 220; *Engler Arac.* 626 *& Ic. ined.* No. 6; *in Beccari Males.* i. 298; *N. E. Br. in Journ. Linn. Soc.* xiii. 242.

MALACCA, *Griffith.*—DISTRIB. Java, Borneo.

Leaves 3–4 in., petiole usually much longer. *Spathe* very variable in length (according to depth of water); tube 10–12 in.; limb 1½ in., purplish green, base contracted, peduncle 2–3 in. *Ovaries* 6–8; ovules many.

6. **C. Griffithii,** *Schott Syn. Aroid.* 1; *Prodr. Syst. Aroid.* 14; leaves broadly oblong or orbicular ovate subcordate petiole very long and slender, tube of spathe a little longer than the ovate cuspidate limb. *Engler Arac.* 631; *N. E. Br. in Journ. Linn. Soc.* xviii. 244. Cryptocoryne, sp. *Griff. Notul.* iii. 139; *Ic. Plant. Asiat.* t. 173, f. 3 (ovules).

MALACCA, *Griffith.*

Leaves coriaceous, obtuse, base very various, rarely rounded sometimes 2-auricled, green above purple beneath, nerves obscure; petiole 6–8 in. *Spathe* 2–2½ in., dark livid red and papillose within, and having a dimidiate hollow cone descending from the base of the convolute portion and enclosing the male fl. *Fruit* ovoid, rugose, reddish, few-seeded.

7. **C. Beckettii,** *Thw. ex Trim. in Journ. Bot.* xxiii. (1885) 269; leaves long-petioled oblong-lanceolate undulate base cordate, tube of small sessile spathe narrow straight about twice as long as the small tailed blade.

CEYLON; Matale east, *Beckett.*

Leaves 2½–4 in., subacute, 5–7-nerved; petiole 4–8 in. *Spathe* not 1 in. long, limb shortly tailed. *Stipes* of male infl. shorter than it. *Carpels* 5.—Descr. from Trimen.

8. **C. Wightii,** *Schott Prodr. Syst. Aroid.* 17; leaves narrowly linear narrowed at both ends strongly crisped and waved, tube of long-peduncled spathe very long, limb lanceolate acuminate not twisted glabrous. *Engl. Arac.* 627. C. unilocularis, *Schott in Bonpland.* 1857, 223 (*not of Kunth*).

MYSORE, *Wight.*

Leaves 6–10 by ¼ in.; petiole shorter. *Tube of spathe* 5–6 in., limb 1½–2 in.; peduncle 2-2½ in. *Ovaries* 6–7, stigmas orbicular.

9. **C. affinis,** *N. E. Br. mss.* leaves petioled oblong-ovate base rounded or emarginate strongly bullate, spathe peduncled, tube about as long as the twisted limb, base inflated.

PERAK, *Scortechini* (586, 586[b]).

Leaves 1–2½ in. by ¼ 1 in., subacute, purplish beneath, 5–7-nerved, margin subcrenate; petiole 1–3 in. *Spathe* 2½–3 in., with the peduncle lengthening after flowering, limb narrowly lanceolate dark-purple. *Appendage* of spadix sessile, ovoid. *Carpels* 6–7, very many-ovuled; stigmas oblong.

** Tube of spathe shorter than the limb.

† *Limb of spathe transversely rugose or plicate within.*

10. **C. spiralis,** *Fisch. mss. ex Wydler in Linnæa*, v. 428; leaves linear-lanceolate, spathe sessile, tube very short obconic, limb linear-lanceolate, strongly twisted at first. *Kunth Enum.* iii. 12; *Blume Rumph.* i. 84, t. 36 C.; *Wight. Ic* t. 773; *Schott Melet.* 16; *Syn. Aroid.* 2; *Gen.* t. 1; *Prodr.* 18; *Aroid.* 8, t. 13; *Schmitz. Iconog.* 1, t. 72; *Engler Arac.* 628. Ambrosinia spiralis, *Roxb. Fl. Ind.* iii. 492. Arum spirale, *Retz. Obs.* i. 30; *Bot. Mag.* t. 2220; *Lodd. Bot. Cat.* t. 525.

BENGAL, the DECCAN PENINSULA, &c.

Leaves 3–8 by ¼–¾ in., acute or acuminate, narrowed from the middle to both ends, costa slender, nerves parallel; petiole long or short. *Spathe* 3–5 in. long, at first twisted, transversely lamellate within. *Ovaries* 5–6, several-ovuled; stigmas broadly elliptic.

11. **C. Huegelii,** *Schott Aroid.* 8, t. 12; *Prodr.* 18; petiole as long as the elliptic-oblong leaf-blade, spathe shortly peduncled, tube very short cylindric, limb linear-lanceolate long-acuminate, ovaries 4–2-ovuled. *Engl. Arac.* 628.

EAST INDIES, *Huegel in Herb. Vienna.*

I have seen no specimen of this species.

†† *Limb of spathe smooth within.*

12. **C. cognata,** *Schott in Bonpland.* 1857, 222; *Prodr.* 16; leaves oblong-lanceolate or linear-oblong margins undulate, limb of spathe much longer than the tube narrowed into a very long twisted tail. *Engl. Arac.* 629.

The CONCAN, *Law*, &c.

Leaves 6–10 by 1–1½ in,, narrowed and acute at both ends; midrib very broad; petiole very stout, shorter than the blade. *Spathe* 7–8 in., shortly peduncled, tube 2–2½ in., limb 5-6 in.

13. **C. Roxburghii,** *Schott Prodr.* 18; leaves narrowly linear acuminate, spathe about as long as the leaves, limb much longer than the cylindric tube very slender closely twisted. *Engl. Arac.* 629. C. Roxburghii, *Dalz. & Gibs. Bomb. Fl* 257 C. unilocularis, *Wight. Ic.* t. 774; *Kunth Enum.* iii. 13. Ambrosinia unilocularis, *Roxb. Fl. Ind.* iii. 493. Arum spirale, *Grah. Cat. Bomb. Pl.* 228.

NORTHERN CIRCARS and the CONCAN.

Leaves 8–12 by ½–¾ in., ecostate, nerves parallel. Tube of spathe about ½ in., blade 6–8 in. *Ovaries* 4–5, stigmas orbicular or oblong, close to the stipes of the spadix; ovules very many. *Fruit* conical, 5-celled, many-seeded.

14. **C. Thwaitesii,** *Schott in Bonpland.* 1857, 221; *Prodr.* 14; leaves broadly ovate or subobovate base cordate or emarginate, tube of spathe cylindric one-third shorter than the linear hardly twisted limb. *Engler Arac.* 630; *Ic. ined.* No. 7; *Thw. Enum.* 334.

CEYLON, in forests, *Thwaites.*

Leaves 2–2½ by 1¼–1½ in., densely papillose above, petiole rather shorter than the blade, margin undulate. *Spathe* subsessile, 1½ in. long, limb oblong, gradually narrowed into a slender tail, tube hardly swollen at the base. *Ovaries* 6; styles rather long, stigmas oblong.

15. **C. Gomezii,** *Schott in Bonpland.* 1857, 221; *Prodr.* 14; leaves long-petioled ovate or ovate-oblong obtuse base cordate, spathe long-peduncled, limb broadly lanceolate not twisted three times as long as the oblong ovoid tube narrowed into a long tail. *Engler Arac.* 630. —Aroid. *Wall. Cat.* 8958.

SILHET, *Gomez.*

Leaves 2–3 by 1–1½ in., base often unequal-sided, tip obtuse acute or rounded. *Tube of spathe* ½–¾ in., limb 1¾ 2 in., broad below and concave.

16. **C. elliptica,** *N. E. Br. mss.*; leaves orbicular- or ovate-cordate, tube of peduncled spathe 2–2½ times as long as the lanceolate limb, which is twisted and bent forward at the apex.

PERAK; at Larut, *King's Collector.*

Allied to *C. Griffithii,* but leaves smaller not so deeply cordate, and limb of spathe much smaller narrower and not papillose within. *Leaves* 1–1½ by 1½ in. obtuse fleshy, brown beneath; petiole 2–3 in., sheath short. *Spathe* with the peduncle hardly lengthening in fruit; tube white, 1½ in., base slightly inflated; limb ½–¾ in., black within. *Fruit* 6-celled, stigmas small.

DOUBTFUL SPECIES.

C. DALZELLII, *Schott. in Bonpland.* 1857, 221; *Prodr.* 15; leaves lanceolate margin erosely serrulate, lateral nerves 4 on each side ascending, fruit ovoid 5-gynous, seeds bisernate oblong subtrigonous.—Bombay, *Dalzell.*

2. LAGENANDRA, *Dalzell.*

Habit and characters of *Cryptocoryne,* but the fem. inflor. consists of a spiral row of many free ovaries, with peltate or discoid stigmas, and the fruit is baccate and indehiscent.—Species 4, Indian.

1. **L. toxicaria,** *Dalzell in Hook. Journ. Bot.* iv. (1852) 289; v. (1853) t. 4; petiole as long as the oblong or elliptic-oblong obtuse or acute leaf, nerves very slender divergent from the stout costa, spathe lanceolate caudate-acuminate slightly twisted, tube much shorter than the long-tailed limb. *Dalz. & Gibs. Bomb. Fl.* 257; *Schott Syn. Aroid.* 3 (*excl. syn.*); *Engler Arac.* 621. L. ovata, *Thwaites Enum.* 334. Cryptocoryne ovata, *Schott Melet.* i. 16; *Blume Rumph.* i. 86; *Kunth Enum.* iii. 12, Caladium ovatum, *Vent. in Roem. Arch.* ii. 357. C. montanum, *Herb. Heyne.* Arum ovatum, *Linn. Sp. Pl.* 967.—*Rheede Hort. Mal.* xi. t. 23.—Aroid. *Wall. Cat.* 8966.

The SOUTH CONCAN, and BELGAUM, in marshes, *Dalzell.* CEYLON; common in the central provinces.

Rootstock creeping. *Leaves* with petiole 8–36 by 2–5 in., coriaceous, base acute or rounded; sheath of petiole elongate. *Spathe* longer than the compressed peduncle, 3–8 in. long; tube broad, limb lanceolate. *Syncarp* globose, 1½–2 in.

diam.; carpels in many cycles, free, about ½ in. long. *Seeds* several in each carpel, minute, basal.

2. **L. Thwaitesii,** *Engler Arac.* 621; petiole longer or shorter than the oblong- or linear-lanceolate leaf, nerves diverging from the costa, spathe slender convolute at length open, tube very much shorter than the limb.

CEYLON, *Thwaites.*

Rootstock branched. *Leaves* 4–6 by ¾–1½ in., base acute or rounded; petiole 2–6 in., rather slender, sheath short. *Spathe* 1½–2 in., much longer than the peduncle; tube ovoid; appendage of spadix very short. *Carpels* in 8–9 cycles, connate at the base.—A much smaller species than *L. toxicaria.* The specimens are not very good.

3. **L. lancifolia,** *Thw. Enum.* 334; petiole about equalling the lanceolate or ovate-lanceolate leaf, nerves diverging from the costa, spathe oblong beaked rugose within, tube obconic half as long as the limb. *Engler Arac.* 622. Cryptocoryne lancifolia, *Schott in Bonpland.* 1857, 221; *Prodr. Aroid.* 15 (*in part*); *Gen.* t. 1.

CEYLON; or banks of streams, *Thwaites.*

Leaves 2–4 by ¾–1½ in., dotted with white, sparsely above, densely beneath; base rounded or acute; sheath of petiole short. *Spathe* 1–2 in., dark purple; appendage of spadix very short. *Carpels* 30–40, in 5–6 cycles; stigma conical.

4. **L. Kœnigii,** *Thw. Enum.* 334; leaves subsessile narrowly linear-lanceolate acuminate, nerves at first parallel to the costa, peduncle long slender, spathe-tube several times shorter than the subulate limb. *Engler Arac.* 623; and *Ic. ined.* No. 15. Cryptocoryne Kœnigii, *Schott in Bonpland.* 1859, 81; *Prodr.* 16.

CEYLON; in the Singhe-rajah forest, *Thwaites.*

Leaves 1–2 ft. by ½–¾ in., dotted with white beneath; costa stout below evanescent above; petiole reduced to a short sheath. *Spathe* 3–3½ in. long; peduncle 2–8 in. *Appendage of spadix* clavate. *Carpels* about 30, in many cycles, 1-ovuled. *Berries* smooth. *Seed* deeply grooved.

5. **L. insignis,** *Trim. Cat. Pl. Ceyl.* 97; *in Journ. Bot.* i. (1885) 269; petiole as long as the ovate-lanceolate or oblong acuminate leaf, nerves very many and slender scurfily papillose divergent from the very stout costa, spathe very large, tube infundibular, limb very broad expanded abruptly caudate.

CEYLON; Pasdun Korle, *Trimen.*

Leaves 12 by 3–4 in., closely dotted beneath. *Spathe* stoutly peduncled, tube 1½–2 in.; limb 4–6 in. broad, drooping, crisped and undulate, membranous, purple with white veins (like an *Arisæma*).

3. PISTIA, *Linn.*

A floating, gregarious, stemless, stoloniferous herb. *Leaves* sessile, obovate-cuneate, together forming an erect cup. *Spathe* small, shortly peduncled, tubular below, open above. *Spadix* adnate to back of the tube of the spathe, free above. *Male infl.* of few sessile connate stamens beneath the apex of the spadix, slits vertical, with a ring of confluent minute neuters below them. *Fem. infl.* a solitary conico-ovoid 1-celled ovary; style conical, stigma discoid; ovules many, orthotropous, basal or subparietal. *Fruit* membranous, few-seeded. *Seeds* oblong or obovoid, albuminous, testa at length rugose; embryo minute, apical, cuneiform.

P. Stratiotes, *Linn. Sp. Pl.* 963; *Roxb. Cor. Pl.* iii. 63. t. 269; *Fl. Ind.* iii. 131; *Griff. Notul.* 12, 211; *Ic. Plant. Asiat.* t. 260, 261; *Dalz. & Gibs. Bomb. Fl.* 281; *Bot. Mag.* t. 4564.—*Rheede Hort. Mal.* t. 32.

Throughout INDIA, and CEYLON; in still sweet water.—DISTRIB. tropics generally.

Roots of tufted simple white fibres clothed with fibrillæ. *Leaves* 1½–4 in. long in Indian forms, apex rounded or retuse, undulate, pubescent above and beneath; nerves raised beneath, flabelliform, converging within the margin. *Spathe* white, obliquely campanulate, ½ in. long, tomentose externally, gibbous and closed below, contracted about the middle, dilated and nearly circular above.

4. ARISÆMA, *Mart.*

Tuberous herbs. *Leaves* 3-sect, pedatisect, or leaflets whorled. *Spathe* deciduous, tube convolute, limb often acuminate or tailed, usually incurved. *Spadix* included or exserted, appendage various often excessively long and filiform. *Male fl.* many, stipitate (sessile and connate in a continuous stratum in *A. flavum*), anthers 2–5 oblong or subglobose. *Fem. fl.* densely crowded; ovary 1-celled; style short or 0, stigma disciform; ovules 2 or more, basilar, orthotropous. *Neuters* 0, or a few above the males or females, or on the appendage, subulate. *Berries* 1-few-seeded. *Seeds* albuminous; embryo axile.—Species about 50, temp. and trop. Asia, and N. America.

The characters taken from the plants being mono- or dicœcious are not absolute but very constant, as are those of leaves one or two.

A. TRISECTA. *Leaves* trifoliolate (Sp. 1–17).

* Appendage much shorter than the limb of the spathe.—Usually all dicœcious.

1. **A. Roxburghii,** *Kunth Enum.* iii. 18; leaves 2, leaflets ovate-lanceolate caudate-acuminate lateral subsessile median petiolulate, limb of spathe ovate-lanceolate acuminate incurved or involute, appendage very slender acute naked or with a few basal neuters. *Schott Syn. Aroid.* 27; *Prodr.* 33. A. cuspidatum, *Engler Arac.* 536. Arum cuspidatum, *Roxb. Fl. Ind.* iii. 506; *Wight Ic.* t. 784.

PENANG, *Roxburgh*; on Govt. Hill, alt. 2000 ft., *Curtis*. PERAK, *Scortechini, Kunstler*.—DISTRIB. Java (*Ic. Horsfield.*)

Rootstock horizontal, rooting all over. *Petiole* elongate sheathing the scape, 14–18 in., and peduncle mottled-green and pink; leaflets 4–10 by 1–5 in. *Spathe* pale yellow-green, tube 4 in., longer than the limb, margins not recurved around the mouth of the tube in Roxburgh's drawing, but distinctly in one of Scortechini's, which represents a much broader strongly incurved limb of the spathe with a caudate tip. *Male spadix* very slender, tapering into the short filiform appendage which bears a few subulate neuters.

2. **A. Kunstleri,** *Hook. f.*; leaf solitary, leaflets ovate or ovate-lanceolate subcaudately acuminate all or the median only petiolulate, limb of the green spathe suberect ovate-lanceolate acuminate about as long as the tube but broader, base dilated round the tube hardly recurved, male spadix very slender ending in a very slender naked finely acuminate appendage.

PERAK, *Kunstler* (*Ic. in Herb. Calcutt.*). PENANG, *King's Collector* (1653), on Govt. Hill, alt. 2000 ft., *Curtis*. ? KHASIA HILLS; Nya Bungalow, alt. 2000 ft. *Clarke*.

Root tuberous. *Petiole* and *peduncle* 4–10 in., slender, green, obscurely mottled with red. *Leaflets* membranous, 3–6 in., lateral unequal at the base, median acute or cuneate at the base, margins sometimes obscurely erose (when dry). *Spathe* 2–3 in. long.—Very near *A. laminatum*, Blume of Java, which has a white tube of the spathe, and the green limb is contracted at the base, and is not carried round the mouth of the tube.

3. **A. album,** *N. E. Br. in Journ. Linn. Soc.* xviii. 247; leaf solitary, leaflets petiolulate lateral dimidiate-ovate median elliptic base cuneate or acute, tube of white spathe about as long as the ovate-lanceolate acuminate limb, appendage filiform shorter than the spathe bearing towards the tip scattered subulate neuters. Arisæma, *Wall. Cat.* n. 8924.

KHASIA HILLS, alt. 4000 ft., *de Silva, Clarke.*

Tuber depressed. *Petiole* 10–12 in.; lateral leaflets about 8 by 4 in., base very unequal, tips filiform, median rhombic-ovate; petiolules ¾–1 in. *Peduncle* about as long as the petiole. *Spathe* 3–4 in., tip filiform, margins below not revolute. *Spadix* (female) with scattered neuters on the base of the appendage, besides those towards its tip.

4. **A. petiolulatum,** *Hook. f.*; leaf solitary, leaflets all petiolulate ovate or ovate-oblong abruptly cuspidately caudate, tube of spathe equalling the lanceolate acuminate limb contracted at the base, appendage slender cylindric erect obtuse naked.

KHASIA HILLS, alt. 4–5000 ft., *J.D.H. & T.T., Clarke.* MUNNIPORE, alt. 8800 ft., *Watt.*

Rootstock elongate, rooting all over. *Petiole* and shorter peduncle slender; leaflets subequal, 6–10 by 2½–3¾ in., lateral cuneate or unequal-sided at the base, median with an acute base. *Spathe* with a funnel-shaped tube and purplish limb 5 in. long, twice as long as the slender male spadix.

5. **A. Wattii,** *Hook. f.*; leaves 2, leaflets subsessile finely acuminate, lateral dimidiate-ovate median elliptic-oblong, tube of spathe longer than the orbicular-ovate caudate-acuminate limb, appendage long-stipitate stout cylindric naked top rounded.

MUNNIPORE; at Mao, alt. 4000 ft., *Watt.*

Petiole 8–10 in., leaflets 5–8 in., lateral 2–3½ in. broad, inner half very narrow and evanescent below; nerves many, strong. *Peduncle* shorter than the petiole. *Spathe* 5–6 in. long, limb 2 in. broad, margins below surrounding the tube and recurved. *Appendage* 2½ in., ¼ in. diam., stipes ½ in.

6. **A. anomalum,** *Hemsl. in Journ. Bot.* (1887) 205; leaves solitary, leaflets petiolulate ovate acuminate tips filiform, limb of spathe broad ovate acuminate strongly incurved broader and rather shorter than the tube, appendage slender narrowed upwards naked. *N. E. Br. in Gard. Chron.* (1890) i. 321; *Bot Mag.* t. 7211.

STRAITS OF MALACCA, Larut Islds., *Curtis.* PERAK, alt. 2500–3500 ft., *Scortechini, King's Collector.*

Rootstock deformed, lobed; lobes bearing solitary leaves or peduncles or both. *Petiole* slender, green, leaflets 4–6 by 1¾ in. *Peduncle* shorter than the petiole, purplish-green. *Spathe* 2 in. long, tube striped purplish-brown; limb dark brown purple, striped with white, lower margin forming a broad recurved border round the mouth of the tube. *Spadix* male or bisexual; male fl. often mixed with subulate neuters. *Stigma* penicillate.—There is in the Calcutta Herbarium a drawing of a closely allied plant from Penang, with a dull purplish tube and green limb of the spathe, and no neuters amongst the male fl.

** Appendage much longer than the spathe, tapering into a very long filiform pendulous tip.

† Appendage naked.

a Limb of spathe broad, rounded truncate retuse or 2-lobed.—All diœcious.

7. **A. verrucosum,** *Schott in Œstr. Bot. Wochenbl.* (1857) 341; *Prodr.* 29; leaf solitary, petiole sheath and peduncle warted, leaflets sessile rhomboidly orbicular or lateral ovate, limb of spathe very broad obcordate cuspidately acuminate decurved, base of appendage dilated into a lobed disc. *Engler Arac.* 537.

EASTERN TEMPERATE HIMALAYA, alt. 8–11,000 ft., *J. D. H. Clarke.*

Tuber large, depressed. *Petiole* 8–10 in., very stout, dull dark green, studded with minute warts; leaflets 2–7 in., dark-purple beneath, margins waved purplish, nerves stout beneath. *Peduncle* like the petiole. *Spathe* 5–7 in., tube white closely striped with dark purple; limb twice to five times as broad, reticulated with white and dark purple; apex ½–2 in. long. *Spadix* stout shortly stipitate, dark purple, base intruded, narrowed above it into a fusiform body that tapers into an exserted thread 12–18 in. long or more.—Very near to *A. utile*, from which the warted petiole and peduncle distinguish it. The colours are taken from a drawing of my own, and no doubt vary much.

8. **A. Griffithii,** *Schott Syn. Aroid.* 26; *Prodr.* 54; leaves 2, leaflets sessile all rhombic-orbicular acuminate crenate, limb of spathe galeate many times broader than the tube which it overhangs deeply 2-lobed, with a long linear interposed tail that embraces the filiform tail of the appendage. *Engler Arac.* 538; *Clarke in Journ. Linn. Soc.* xxi. 386; *Bot. Mag.* t. 6491. A. Hookerianum, *Schott in Œstr. Bot. Wochenbl.* (1857) 334; *Prodr.* 30. A. Hookeri, *Schott Gen. Aroid.* t. 6, f. 11–19. —Pythonii *Sp. Griff. Itin. Notes*, 201, No. 1179.

EASTERN TEMPERATE HIMALAYA; Sikkim, alt. 7–10,000 ft. BHOTAN, alt. 3–5000 ft., *Griffith.*

Tuber depressed, 3–5 in. diam. *Petiole* as thick as the middle finger, green, smooth; leaflets 6–10 in., sometimes broader than long, margins faintly yellow, nerves deeply sunk. *Peduncle* much shorter than the petiole. *Tube of spathe* 2–3 in., purple ribbed with white; limb 5–8 in. broad, incurved, head rounded, lobes forming two broad dull violet flaps, reticulate with green; sinus 2–3 in. deep; tail 2–4 in., purple. *Spadix* stout; appendage purple, stipitate, suddenly narrowed from a broad disciform lobed intruded base into a tortuous capillary tail 1–3 ft. long.—Variable in colour and size. Clarke observes that in ascending from 8000 to 12,000 ft. the spathe varies from 6–8 in. broad curved and ridged, to 1 in. broad scarcely dilated with obscure ridges; but possibly other species were confounded with *Griffithii.*

9. **A. utile,** *Hook. f. in Schott Prodr. Aroid.* 30; *Bot. Mag.* t. 6474; leaves solitary, leaflets sessile rhombic-ovate or obovate crenate, limb of spathe broadly obcordate or obovate oblong retuse or 2-lobed with a short interposed tail that embraces the filiform tail of the appendage. *Engler Arac.* 537 and *Ic. ined.* No. 55.

TEMPERATE HIMALAYA, from Kashmir, alt. 7500 ft., *Clarke*, eastwards to Sikkim, alt. 9–13,000 ft., *J. D. H.*, &c.

A smaller plant than *A. Griffithii* with the same habit, but with pale green leaves with undulate golden margins and a much narrower limb of the spathe 4 in. broad or less, which is not longer than the tube, is red brown or purplish and coarsely

reticulated. Appendage as in *A. Griffithii*, of which Clarke (*Journ. Linn. Soc.* xxi. 386) considers it a trifling variety. The Bot. Mag. figures, however, uphold the characters which I never failed to observe in Sikkim. Hybrids, of course, may occur. The Western specimens have longer petioles and peduncles and paler greener spathes. All my specimens are 1-leaved, but two are represented in the reduced figure of the Bot. Mag. drawing.

β. Limb of spathe lanceolate acuminate, or caudate.—Dicœcious, except *A. Prazeri*.

10. **A. speciosum,** *Mart. in Flora* (1831), 458; *in Wall. Cat.* 8923; leaf solitary, leaflets all petiolulate acuminate lateral dimidiate cordate median ovate, nerves broadly reticulate, limb of spathe ovate-lanceolate incurved caudate-acuminate, appendage cylindric or fusiform at the often inflated base, narrowed into a very long filiform tail, base not truncate or disciform. *Blume Rumphia* i. 101; *Kunth Enum.* iii. 18; *Schott Melet.* i. 17; *Syn.* 26; *Prodr.* 27; *Clarke in Journ. Linn. Soc.* xxiii. 390; *Bot. Mag.* t. 5964; *Engler Arac.* 539. Arum speciosum, *Wall. Tent. Fl. Nep.* 29, t. 20.

Temperate Himalaya; from Kumaon, to Sikkim, alt. 7–8000 ft., and Bhotan 9–10,000 ft., *Griffith*.

Rootstock oblique, or shortly creeping and rooting; often 5 in. diam. *Petiole* very stout, green, smooth, often marbled with brown or purple; leaflets 16–19 in., edged with red or purple, median cuneate or rounded at the base; petiolule ½–2 in. *Peduncle* much shorter than the petiole. *Tube* of spathe 2–4 in., striped with purple; limb 2–6 in. long, banded white and purple. *Spadix* pink or yellowish tail 12–18 in, dark purple; base of appendage usually ovoid; anther-cells 4–5; ovaries ovoid, stigma sessile pulvinate.—Very variable in size and colouring. Schott made three species of it, reduced by Engler to two varieties, both founded on my drawings; they are *A. eminens*, Schott in Œstr. Bot. Zeitschr. (1875) 357; *Syst. Aroid.* 30, simply a gigantic specimen with the spathe 8 in. long; and *A. mirabile*, Schott ll. cc. 366 and 31, with an abnormally inflated base of the appendage. Wallich's *Arisæma*, n. 8925 in fruit, from Tavoy, may be *speciosum*.

11. **A. intermedium,** *Blume Rumph.* i. 102; leaves 1 or 2, leaflets sessile lateral dimidiate-ovate or -cordate median elliptic base acute or cuneate nerves broadly reticulate, limb of spathe lanceolate incurved narrowed into a filiform cusp, appendage substipitate subcylindric narrowed from a dilated fusiform base into a very long fusiform tip. *Kunth Enum.* iii. 18; *Schott Syn. Aroid.* 27; *Prodr.* 28; *Engler Arac.* 540. A. Stracheyanum, *Schott in Œstr. Bot. Zeitschr.* (1857), 533; *Prodr.* 27; *Engl. l. c.* and *Ic. ined.* No. 11. A. dolosum, *Schott in Bonpland.* (1859) 26; *Prodr.* 28.

Temperate Western Himalaya,, alt. 7–9000 ft., from Simla to Kumaon.

A smaller plant than *A. speciosum*, with more membranous sessile leaflets, the median of which is elliptic with a very acute base. From *Wallichianum* it differs in the elliptic median leaflet. The nervation at once distinguishes it from *A. costatum*. *A. dolosum* and *Stracheyanum* in no way differ from *intermedium*.

12. **A. Wallichianum,** *Hook. f.*; leaf solitary, leaflets sessile all rhombic-orbicular, bases cuneate, margins undulate, lateral subequal at the base, nerves broadly reticulate, limb of spathe oblong or lanceolate caudate-acuminate, appendage shortly stipitate, base dilated truncate or disciform narrowed into a very long filiform tail. A. costatum, *Wall. Cat.* 8922 *non Mart.* (*not* Arum costatum, *Tent. Fl. Nep.*).

TEMPERATE HIMALAYA; from Simla, alt. 6–8000 ft., to Sikkim, alt. 12–14,000 ft.

Tuber depressed. *Petiole* 6–12 in.; leaflets 3–8 in., and as broad, rather membranous. *Peduncle* shorter than the petiole. *Spathe* 3–8 in., narrow, striped with dark purple; limb suberect or slightly incurved, much longer than the tube, tip filiform.—The Sikkim specimens are much smaller than the Nepalese and western. A fine drawing of this made in Nepal by Wallich's native artists is in Kew Herbarium.

13. **A. propinquum,** *Schott in Œstr. Bot. Zeitschr.* (1857) 333; *Prodr. Aroid.* 29; leaves 2, leaflets sessile acuminate, lateral dimidiate-ovate, median rhomboidly orbicular base contracted subpetiolulate, nerves broadly reticulate, limb of spathe oblong or lanceolate caudate-acuminate, appendage stipitate fusiform above the dilated truncate lobulate base narrowed into a filiform shortly exserted tail. A. intermedium, *var.* propinquum, *Engler Arac.* 541.

SIKKIM HIMALAYA, alt. 12,000 ft., *J.D.H., Clarke.*

Rootstock depressed globose. *Petiole* very stout, 8 in. long, green, closely speckled and striate with dark green; leaflets 3–4 in. long and broad, succulent, shining, nerves strong beneath; basal sheaths long, irrorate with pink purple and green. *Peduncle* about equalling the petiole. *Spathe* very like *Wallichianum* and *speciosum*; limb suberect, striped with purple on the sides, reticulate towards the top. *Spadix* pink.—Described chiefly from a drawing of mine. The shortly exserted appendage seems to be a constant character and a great contrast to its allies. It has been regarded by Engler as a variety of *intermedium*, from which the two leaves and rhombic median leaflet distinguish it.

14. **A. costatum,** *Mart. in Flora* (1831) ii. 458; leaf solitary, leaflets sessile or subsessile lateral dimidiate-cordate median broadly ovate all caudate-acuminate, and with very close set parallel nerves, limb of spathe oblong-lanceolate incurved suddenly narrowed into a long filiform tip, appendage shortly stipitate subcylindric from a dilated lobulate base then narrowed into a very long filiform tail. *Blume Rumph.* i. 101; *Kunth Enum.* iii. 17; *Schott Syn. Aroid.* 26; *Prodr.* 29; *Engler Arac.* 541. Arum costatum, *Wall. Tent. Fl. Nep.* 28, t. 19.

NEPAL; *Wallich.*

Tuber depressed, 3–4 in. diam. *Petiole* 12–18 in., very stout, sheath embracing the stout green peduncle; leaflets 10–16 by 5–7 in., dark green. *Spathe* 4–6 in., white striped with dull purple.—Wallich's published figure in Tent. Fl. Nep., and a fine coloured drawing made in Nepal, now in Kew Herbarium, from which it is taken, are the only authority for this species which in the nervation of the leaves differs from all its congeners.

15. **A. Prazeri,** *Hook. f.*; leaf solitary, leaflets ovate acute or acuminate, lateral subsessile median petiolulate, nerves very slender distant, tube of spathe short, limb much longer oblong-lanceolate acute contracted at the base, appendage slender twice as long as the spathe, base not swollen.

UPPER BURMA; Koni, *J. C. Prazer.*

Rootstock tuberous. *Petiole* 10–18 in., sheathing beyond the middle, or not; leaflets 3–4 by about 2 in., nearly symmetrical or lateral rather oblique with rounded or broadly cuneate bases; median more elliptic, less acute. *Peduncle* longer or shorter than the petiole, slender. *Spathe* 3½ in., tube 1 in., limb apparently erect, about ⅔ in. broad. *Male fl.* very small, subsessile. *Ovaries* minute, contracted into a short style with disciform stigma.—A few male fl. occur on the stipes of the appendage.

16. **A. galeatum,** *N. E. Br. in Gard. Chron.* (1879) ii. 102; leaf solitary, leaflets all petiolulate, lateral dimidiate-ovate or -cordate acuminate crenulate, median elliptic or ovate, tube of green spathe cylindric top incurved galeate much longer than the ovate-lanceolate acuminate pendulous limb the lower margins of which are recurved, appendage gradually narrowed from an elongate conic truncate base into a long thread. *Bot. Mag.* t. 6457.

SIKKIM HIMALAYA; *Gammie* (*Hort. Kew*).

Tuber small. *Petiole* 1–2 ft.; leaflets 7–14 in., median broadest, nerves broadly reticulate; petiolules 1-1½ in. *Peduncle* much shorter than the petiole. *Spathe* 4–5 in., striped with white; limb 1½ in., hanging half-way down the tube. *Spadix* white; appendage sessile in the fem., stipitate in the male, thread pale purple

†† Appendage of spadix far exserted bearing many neuters.

17. **A. fimbriatum,** *Masters in Gard. Chron.* (1884) ii. 680, f. 119; leaf solitary, leaflets subsessile broadly ovate caudate-acuminate, tube of purple spathe shorter than the large erect or incurved ovate-lanceolate limb, appendage filiform clothed with filiform neuters. *Regel Gartenfl.* (1886) 357, f. 40; *Bot. Mag.* t. 7150; *Journ. of Hortic.* 1886, f. 19.

LANGKAWI ISLDS., north of Penang (*Hort. Sander*), *Curtis.*

Rootstock tuberous. *Petiole* 6–10 in.; leaflets 5–7 in., nerves deeply sunk. *Peduncle* as long as the petiole. *Spathe* about 6-7 in., tube 2½ in., striped green and white, limb striped purple and white. *Spadix* very slender throughout; appendage twice as long as the tube, pendulous, red-purple, base not swollen; neuters nearly 1 in., flexuous; male fl. with a few ovaries scattered amongst the lower flowers. —The Philippine Isld. locality recorded in *Gard. Chron.* is probably an error.

B. PEDATISECTA. *Leaves* pedatisect. (Sp. 18–22.)

* *Appendage of spadix elongate, far exserted.*

18. **A. tortuosum,** *Schott Meletem.* i. 17; *Syn.* 29; *Prodr.* 36; leaves 2–3, leaflets 5–18 sessile or petiolulate ovate- or linear-lanceolate subcaudately acuminate, tube of green spathe about as long as the large incurved broadly cymbiform acuminate limb, appendage narrowed from the base to the tip erect then porrect and again erect. *Kunth Enum.* iii. 19; *Blume Rumph.* i. 105; *Engler l.c.* 545, and *Ic. ined.* n. 58. A. curvatum, *Kunth l.c.* 20; *Schott Syn.* 29; *Prodr.* 37; *Dalz. & Gibs. Bomb. Fl.* 258; *Bot. Mag.* t. 5931; *Engler l. c.* 544, and *Ic. ined.* No. 57. A. Steudelii, *Schott in Bonpland.* (1839) 26; *Prodr.* 37; *Engler l. c.* and *Ic. ined.* n. 61. A. helleborifolium, *Schott Syn* 29; *Prodr.* 36. A. commutatum, *Schott in Bonpland.* (1859) 26; *Prodr.* 35 Arum curvatum, *Roxb. Fl. Ind.* iii. 506; *Wight Ic.* t. 788. A. tortuosum, *Wall. Pl. As. Rar.* ii. t. 10.—Arisæma, *Wall. Cat.* 8926, 8927.

TEMPERATE and SUBTROPICAL HIMALAYA, alt. 8000 ft., from Simla to Bhotan. The KHASIA HILLS, MUNNIPORE, the WESTERN GHATS, from the Concan to Malabar.

Tubers spheroidal, attaining 5 in. diam. *Petiole* 1–3 ft., green or with the sheaths mottled with purple; leaflets 8–18 in., distant or crowded, or almost radiately disposed. *Peduncle* 2-4 ft. *Spathe* 4–6 in., pale green or purplish, tube subcylindric, gaping, gradually dilating into the limb. *Spadix* uni- or bisexual; appendage like a rat's tail, quite smooth.—Very common and varying greatly in stature, the numbers and proportions and breadth of the leaflets, colour of the spathe, and monœcious or diœcious flowers. In *A. Steudelii* there are a few neuters above the male fl. The recorded Ceylon habitat is an error.

19. **A. Wrayi,** *Hemsl. in Journ. Bot.* (1887) 205; leaves 1–3, leaflets 5–9 petiolulate narrowly elliptic-lanceolate tips apiculate or filiform, tube of spathe open as long or longer, limb ovate obtusely acuminate dilated at the base with two large revolute auricles, appendage very long filiform pendulous. *N. E. Br. in Gard. Chron.* (1889) ii. 136; *Bot. Mag.* t. 7105.

PERAK, *Wray*; Larut, alt. 3–4000 ft., *Scortechini.*

Tuber subglobose, rooting all over. *Petiole* 12–18 in. and petiolules mottled green and white and dotted with red; leaflets 6–10 by 1–2 in., dark green, median longest with petiolule 1–2½ in. *Peduncle* taller than the petiole, slender. *Spathe* 5–7 in., erect; limb pale yellow green or lilac with darker stripes. *Spadix* very slender; fem. with scattered didymous bicuspidate anthers on long filaments on the base of the appendage. *Stigma* penicillate.

** *Appendage of spadix included or shortly exserted.*

20. **A. decipiens,** *Schott in Œstr. Bot. Zeitschr.* (1857) 373; *Prodr.* 34; dicœcious, leaves 2, leaflets 5–7 elliptic-lanceolate caudate-acuminate, lateral sessile on a common petiolule, median long-petiolulate, tube of spathe as long as the lanceolate caudate incurved limb, tail as long as the rest of the spathe, appendage hardly longer than the tube subtruncate straight. *Engler Arac.* 542; *N. E. Br. in Journ. Linn. Soc.* xviii. 251.

KHASIA HILLS, alt. 5–6000 ft., *Griffith*, &c.

Rootstock horizontal, rooting, as thick as the thumb. *Petiole* 12 16 in., slender, sheaths very long, mottled; leaflets 6–10 in.; petiolule of median 1–1½ in.; lateral divaricate. *Peduncle* shorter than the petiole. *Spathe* 4 5 in., excluding the filiform tail which is 3–5 in., dull purple; lower margins not recurved. *Spadix* slender; appendage stipitate, cylindric, erect, rather thickened towards the base; male fl. subsessile.—The Javan habitat is an error.

21. **A. flavum,** *Schott Prodr.* 40; monœcious, leaves 2, leaflets 9–11, lateral sessile oblong or lanceolate acuminate, median sessile or petiolulate, spathe very short, limb ovate cuspidate or acuminate as long or twice as long as the subhemispheric tube, base not recurved, spadix included, appendix very short clavate. *Engler Arac.* 548. A. abbreviatum, *Schott in Œstr. Bot. Zeitschr.* (1857) 382; *Prodr.* 40; *Engler l. c.*, and *Ic. ined.* No. 7. Dochafa flava, *Schott Syn.* 24; *Gen. Aroid. App.* Arum flavum, *Forsk. Fl. Ægypt. Arab.* 157.

TEMPERATE HIMALAYA and WESTERN TIBET, alt. 5–9000 ft., from Kashmir to Kumaon. CHUMBI; N.E. of Sikkim, *King's Collector.*—DISTRIB. Afighanistan, Arabia.

Rootstock globose. *Petiole* 8–12 in., sheath usually very long; leaflets 2–4 in. *Spathe* 1–2 in., green, yellow, or the limb faintly purple below. *Spadix* conical; fem. infl. of a few rows of closely packed globose ovaries, in close contact with the male infl., which consists of a most dense layer of subsessile connate anthers, from the top of which emerges the appendage, which is about ½ in. long.—A highly curious plant, the spadix quite unlike that of any congener. I find no difference whatever between the Himalayan and Arabian specimens.

22. **A. Scortechini,** *Hook. f.*; dicœcious, leaf solitary, leaflets 3–5 lanceolate acuminate, lateral subsessile, median petiolulate, tube of spathe cylindric, limb ovate or ovate-lanceolate erect, tip shortly filiferous, base dilated into two large rounded spreading auricles.

PENANG, *Curtis.* PERAK, *Scortechini, King's Collector.*

Rootstock horizontal, rooting all over. *Petiole* 2–6 in., slender, green; leaflets 4–6 in., dark green (with white along the middle in a drawing in Herb. Calcutt.), tips often shortly filiferous. *Spathe* 3 in., green; limb 1½ in. long, erect, white towards the centre, auricles dull yellow-green. *Spadix* (male) dull purple, narrowly conical, tapering into the erect naked yellow obtuse appendage.

C. RADIATISECTA. Leaflets *whorled.* (Sp. 23 to end.)

* Spadix much longer than the spathe.

23. **A. neglectum,** *Schott in Bonpland.* (1859) 26; *Prodr.* 36; monœcious, leaflets 4–7 sessile elliptic or oblanceolate cuspidately acuminate, tube of spathe cylindric base swollen, limb about as long oblong-cymbiform acuminate top incurved, appendage twice as long as the spathe erect then porrect and again erect. *Engler Arac.* 554. A. filiforme, *Thw. Enum.* 334 (*not of Bl.*). A. Wightii, *Bot. Mag.* t. 5507 (*not of Schott*).

WESTERN GHATS; from the Concan to the Nilghiri hills, alt. 6000 ft. CEYLON; in the south part of the island, *Thwaites, Huegel.*

Tuber globose. *Leaves* 1 or 2; petiole green or clouded; leaflets usually broadest in the middle. *Spathe* 3–4 in., green; limb open, margins not recurved, base not dilated. *Spadix* rather stout, appendage sessile, remarkably like that of *A. tortuosum.*

** Spadix not longer than the spathe.

† *Dicœcious* (*rarely monœcious*). *Fem. spadix with neuters above the inflorescence.*

24. **A. nepenthoides,** *Mart. in Flora* (1831), 458; *in Wall. Cat.* 8919; leaflets 5-sessile elliptic or oblanceolate acuminate, tube of spathe elongate, limb elliptic-ovate base dilated into two broad rounded recurved auricles, appendage erect subcylindric top rounded. *Schott Melet.* i. 17; *Syn.* 31; *Prodr.* 48; *Blume Rumph.* i. 94; *Kunth Enum.* iii. 16; *Bot. Mag.* t. 6446; *Engler Arac.* 551. Arum nepenthoides, *Wall. Tent. Fl. Nep.* 26, t. 18.

TEMPERATE HIMALAYA; alt. 9–11,000 ft.; Nepal, *Wallich,* Sikkim, *J.D.H.* &c.

Tuber globose, very large. *Leaves* 2; petiole peduncle and tube of spathe dull yellowish clouded with dark streaks. *Peduncle* shorter than the petiole. *Spathe* 6–8 in., tube 2–3 in., cylindric, base not swollen; limb 4 in., whitish within, yellow without; auricles nearly 1 in. broad-green spotted with brown and with a broad purplish-brown margin. *Spadix* whitish; appendage stipitate, much shorter than the spathe, contracted in the middle. *Ovaries* obovoid, contracted into a rather long style, stigma simple.—Lateral leaflets sometimes lobed at the outer base, showing a tendency to the pedate section.

25. **A. Leschenaultii,** *Blume Rumph* i. 93; leaflets 5–11 oblanceolate acuminate serrulate, tube of spathe cylindric as long as the suberect cymbiform long caudate-acuminate limb, appendage stout cylindric or slightly clavate tip rounded. *Kunth Enum.* iii. 15; *Schott Syn. Aroid.* 30; *Prodr.* 51; *Engler Arac.* 552. A. papillosum, *Steud. ex Schott Prodr.* 46; *Thw. Enum.* 335; *Bot. Mag.* t. 5496 (*excl. syn.* erubescens); ? A. erubescens, *Dalz. & Gibs. Bomb. Fl.* 258. A. Huegelii, *Schott Syn.* 27; *Prodr.* 44.—Arisæma, *Wall. Cat.* 8921.

WESTERN GHATS, from the Concan southwards.

Tuber large, globose. *Leaf* solitary; petiole 1–2 ft., usually mottled and

banded with red and brown; leaflets 4-6 by 1½-2½ in. *Spathe* 3-8 in., green with broad dark purple bands; tube narrow; limb leaning forward, margins below hardly recurved, tip straight obtusely acuminate, very variable in length. *Spadix* 4 in., nearly cylindric throughout, hardly stipitate; neuter fl. few short.

26. **A. consanguineum,** *Schott in Bonpland.* (1859), 27; *Prodr.* 52; leaflets about 15 (10–20) narrowly linear-lanceolate with long capillary tips, spathe green, limb about equalling the tube broadly ovate or ovate-lanceolate incurved with a long filiform tip margin recurved at the base, appendage stout cylindric obtuse.—Arisæma, *Wall. Cat.* 8915.

TEMPERATE HIMALAYA, alt. 5–7000 ft. from Garwhal to Sikkim. KHASIA HILLS, alt. 4–6000 ft. MUNNIPORE, *Watt.*

Tuber depressed globose, 1–5 in. diam. *Leaf* solitary; petiole 1–4 ft., often very stout and peduncle mottled dark pink and red or brown; leaflets 3 16 in., ¼–2 in. broad, filiform tips 1–3 in. *Spathe* 3–7 in., excluding the filiform tip, margins more or less recurved below. *Spadix* hardly longer than the tube, appendage subsessile with a few neuters at the base.

27. **A. concinnum,** *Schott in Bonpland.* (1859) 27; *Prodr. Aroid.* 50; leaflets 7–11 subsessile narrowly lanceolate or oblanceolate acuminate, tube of spathe elongate cylindric, limb broadly ovate narrowed into a very long decurved tail margins below not or slightly recurved, spadix usually much shorter than the spathe, appendage very slender erect tip clavate truncate, base not thickened. *Engl. Arac.* 556; *Bot. Mag.* t. 5914; *N. E. Br. in Journ. Linn. Soc.* xviii. 254. A. alienatum & affine, *Schott ll. cc.* 26, 27; 45–51.—Arisæma, *Wall. Cat.* 8920.

TEMPERATE HIMALAYA, alt. 6–10,000 ft. from Garwhal to Bhotan.

Tuber globose. *Leaf* solitary; petiole 1–2 ft. and peduncle green or mottled with brown or purple; leaflets 8–12 in. *Peduncle* shorter than the petiole. *Spathe* green or purple striped with white, tube 2–3 in.; limb as long or shorter, open. *Spadix* slender; sometimes monœcious; appendage exserted beyond the tube, fem. with a few neuters at its base.—Very near *A. Leschenaultii*, differing in the slender appendage. A small state from Sikkim, alt. 10–11,000 ft., has more cuneately obovate cuspidately caudate leaves.

28. **A. pulchrum,** *N.E. Br. in Journ. Linn. Soc.* xviii. 252, t. 6; leaflets 8–12 cuneately oblanceolate cuspidate, tube of spathe elongate cylindric below infundibular and gaping above, limb broadly ovate suddenly narrowed into a decurved tail as long as the tube margins below revolute, appendage stout cylindric erect rather thickened below, tip rounded.

INDIA (*Hort. Bull.*).

Tuber globose. *Leaf* solitary; petiole and peduncle stout, clouded and speckled with pale red-brown; leaflets 4–6 in., dark green above, subglaucous beneath. *Spathe* 3 in., purplish striped with green, limb 2 in. broad. *Spadix* much shorter than the spathe, shortly exserted beyond the tube; appendage with an elongate ovoid base, and a few scattered neuters.

** *Dicœcious. Neuters* 0.

29. **A. Jacquemontii,** *Blume Rumph.* i. 95; leaflets 5–7 elliptic- or obovate-lanceolate acuminate, tube of spathe narrow green, limb as long or longer oblong- or ovate-lanceolate incurved narrowed into a long acuminate erect or drooping tail, appendage elongate stipitate narrowed from the conical or truncate base to the slender forward curving tip. *Decne. in Jacquem. Voy. Bot.* 168, t. 168; *Kunth Enum.* iii.

16; *Schott Syn. Aroid.* 31; *Syst.* 43; *Engl. Arac.* 555. A. cornutum, *Schott in Bonpland.* (1859), 27; *Prodr.* 48; *Engler l. c.* 557.

TEMPERATE HIMALAYA, from Kashmiri alt. 7–8000 to Bhotan, alt. 10–12,000 ft.

Tuber subglobose. *Leaves* solitary or 2; petiole ½–3 ft., stout or slender; leaflets 2–6 by 1–2½ in., almost caudate-acuminate but not filiferous. *Spathe* 3–5 in., striped with white, margins narrowly recurved below, tip often thread-like ½–3 in. long. *Appendage* stipitate, sometimes with a truncate base, at others slender from an ellipsoid base.—Very variable in size. In a specimen apparently of this species from Sikkim and another from Kumaon (*Duthie*, 6063) the appendage is 4 in. quite as long as the limb of the spathe (without its long point). The spathe is incurved above the middle and terminates in a very long erect horn.

30. **A. exile,** *Schott in Bonpland.* (1859), 26; *Prodr.* 42; leaflets 5–11 narrowly oblanceolate finely acuminate, spathe very narrow, tube elongate, limb as long lanceolate narrowed into a long thread, appendage stipitate very slender filiform as long as the tube of the spathe. *Engler Arac.* 554.—Arisæma, *Wall. Cat.* 8918.

TEMPERATE HIMALAYA; Nepal, *Wallich.*

Tuber small. *Leaves* solitary or 2; petiole 8–26 in., very slender; leaflets 3–6 in., minutely erose. *Peduncle* longer than the petiole. *Spathe* 4 in., limb hardly broader than the tube, pale green striped with white, slightly incurved, margins hardly recurved below, filiform tip 1–3 in. *Spadix* very slender; appendage stipitate, base ovoid.

31. **A. erubescens,** *Schott Meletem.* i. 17; *Syn.* 30; *Prodr.* 53; leaflets 9–12 narrowly oblanceolate acuminate glaucous beneath, tube of pink spathe cylindric, limb oblong or ovate-oblong or -lanceolate incurved narrowed into a long filiform tail, margins below recurved, appendage stout erect subcylindric from an elongate ovoid base, tip rounded. *Blume Rumph.* i. 93; *Kunth E um.* iii. 16; *Engler Arac.* 557. A. vituperatum, *Schott in Bonpland.* (1859), 28. Arum erubescens, *Wall. Pl. As. Rar.* ii. 30, t. 135.—Arisæma, *Wall. Cat.* 8917.

TEMPERATE HIMALAYA; Nepal, *Wallich;* Sikkim 6–8000 ft., *J.D.H.*

Tuber subglobose. *Leaf* solitary; petiole 12–18 in., and peduncle pale rose-colrd., streaked with red in bars; leaflets 5–7 in., margins undulate, tips not filiferous. *Spathe* about 4 in., excluding the filiform tail, white striped with rose; tube longer than the incurved rather broader limb. *Appendage* hardly exserted beyond the tube pale.—Differs from *A. exile* chiefly in the stout short appendage.

32. **A. echinatum,** *Schott Meletem.* i. 17; *Prodr.* 49; leaflets 7–9 narrowly lanceolate caudate-acuminate, tube of green spathe infundibular, limb ovate-lanceolate incurved tapering into a very long pendulous tail margins below revolute, appendage short cylindric top truncate rugose or echinulate. *Blume Rumph.* i. 94; *Kunth Enum.* iii. 16; *Engler Arac.* 555; *Wall. Cat.* 8916. Arum echinatum, *Wall. Pl. As. Rar.* ii. 30, t. 136.—Pythonium, *sp. Griff. Itin. Notes* 176; *Notul.* iii. 156; *Ic. Pl. Asiat.* t. 163.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 9–11,000 ft.—*J.D.H.*; Bhotan, *Griffith.*

Tuber small, globose. *Leaf* solitary; petiole 10–18 in., and peduncle all green or streaked with red-brown, leaflets 6–12 in. *Spathe* 6–10 in., greenish, striped with white and brown, or purple within, tail longer than the limb and tube. *Spadix* hardly exserted; appendage stipitate, contracted in the middle, white streaked with purple, base rather swollen rounded, tip green.

33. **A. filicaudatum,** *N. E. Br. in Journ. Linn. Soc.* xviii. 253; leaflets 5–7 shortly petiolulate oblanceolate cuspidately acuminate, tube of spathe short cylindric, limb about as long very broadly ovate abruptly caudate, tail very long and slender tip clubbed, spadix very slender, appendage slender exserted erect hardly thickened at the base tip clavellate smooth.

CEYLON, at Morowe Korle, alt. 3000 ft., *Thwaites.*

Leaf solitary; petiole 1 ft.; leaflets petiolulate, 6 by 2–2½ in., very thin. *Peduncle* about equalling the petiole. *Tube of spathe* 1½ in., limb short, incurved, tail filiform 6 in.. *Spadix* unisexual; male fl. scattered, subsessile.—Only one specimen seen.

34. **A. fraternum,** *Schott in Bonpland.* (1859), 26; *Prodr.* 45; leaflets 7–9 elliptic-lanceolate finely acuminate, tube of green spathe cylindric shorter than the broadly ovate erect cuspidately acuminate (not caudate) limb, appendage sessile stout subclavate top rounded. A. Leschenaultii (*in part*), *Engler Arac.* 552.

KHASIA HILLS; Churra, alt. 4000 ft. *Griffith.*

Tuber depressed globose. *Leaf* solitary; petiole 6–12 in., reddish barred with duller streaks; leaflets 3–5 in., sessile, tips not filiferous. *Peduncle* shorter than the petiole. *Spathe* 4–5 in., suberect, limb recurved at the base. *Spadix* very stout, shortly exserted, of male sessile, green.—Griffith's are the only specimens that I have seen, but there is a fine drawing in Herb. Calcutt. without a habitat.

35. **A. Wightii,** *Schott in Bonpland.* (1859), 26; *Prodr.* 43; leaflets 5–8 cuneately obovate cuspidately acuminate, tube of spathe as long as the ovate-lanceolate caudate acuminate limb margin below recurved, appendage stipitate slender, narrowed from a conical base to the tip. A. Jacquemontii (*in part*), *Engler Arac.* 555.

NILGHIRI HILLS, *Wight, King.*

Tuber spherical. *Petiole* 8–12 in.; leaflets 4–5 by 1½–2 in., sessile or shortly petiolulate. *Spathe* 4–6 in., apparently striped white and purple, limb rather broader than the tube, gradually narrowed into a tail ¾–2 in. long. *Male spadix* 2 in.

36. **A. ochraceum,** *Schott in Bonpland.* (1859), 27; *Prodr.* 49; dioecious, tube of spathe cylindric rather swollen below as long as the ovate cymbiform erect shortly cuspidate limb, appendage stipitate stout cylindric contracted in the middle tip rounded base swollen lobulate truncate intruded. *Engler Arac.* 559.

SIKKIM HIMALAYA; summit of Tonglo, alt. 10,000 ft.—*J.D.H.*

Leaves radiatisect. *Peduncle* stout and tube of spathe pale red streaked with brown. *Spathe* 5½ in. long; limb yellowish with brown stripes, lower margin not revolute. *Fem. spadix* stout, appendage nearly as long as the limb of the spathe, yellowish; ovaries green with purple stigmas.—Founded on a drawing of mine of a female spathe and spadix, and note as to the leaves being radiatisect.

*** *Monœcious or rarely dioecious. Neuters* 0 *or few.*

37. **A. Murrayi,** *Hook. Bot. Mag.* t. 4388; leaflets 5–9 ovate- or oblong-lanceolate acuminate, tube of spathe broadly cylindric base almost truncate, limb as long or longer broadly ovate cymbiform acute (not caudate) incurved lower margins dilated round the mouth of the tube, appendage curved narrowed from the base to the tip included or exserted. *Dalz. & Gibs. Bomb. Fl.* 258; *Schott Syn.* 31; *Prodr.* 44; *Engler Arac.* 552; *Fl. des Serres,* t. 1322. Arum Murrayi, *Grah. Cat. Bomb. Pl.* 229.

The CONCAN; in the Ghats, *Gibson, &c.*

Tuber large. *Leaf* solitary, maturing after the flowering; petiole 10–14 in. and subequal p duncle greenish mottled with red-brown; leaflets 4–6 in. *Spathe* 3–5 in., tube green. striated, ¾–1 in. diam.; limb rather broader, margins not recurved, except round the mouth of the tube. *Spadix* narrowed from the base upward; appendage 1–1½ in., sessile; male fl. scattered, with a few neuters above them.

38. **A. caudatum,** *Engler Monog. Arac.* 559; leaflets 7 cuneately elliptic acuminate with long capillary tips, tube of spathe elongate cylindric, limb incurved ovate-lanceolate rather abruptly narrowed into a very long subulate tail, margins below recurved, appendage rather short not thickened below included.

The CONCAN, *Stocks* (*Ic. in Herb. Kew*).

Tuber depressed globose. *Leaf* solitary; petiole stout, and peduncle irrorately barred and streaked; leaflets petiolulate, 5 by 2 in. exclusive of the thread-like tips which are 1–3 in. long. *Peduncle* very short. *Spathe* 6 in., exclusive of the 3 in. caudate tip. *Spadix* androgynous; appendage shorter than the flowering portion, tip rounded.—Described from a drawing by Stocks; I have seen no specimen.

UNRECOGNIZED SPECIES.

A ? PENTAPHYLLUM, *Schott Meletem.* i. 17; *Syn.* 28; *Prodr.* 59; *Kunth Enum.* iii. 20; *Blume Rumph.* i. 109; *Engler Arac.* 560. Arum pentaphyllum, *Linn. Sp. Pl.* 964.—Ind. Or.; China.

A ? HEPTAPHYLLUM, *Blume Rumphia* i. 109; *Kunth Enum.* iii. 20. *Schott Syn.* 31; *Prodr.* 59; *Engler Arac.* 560.—Ind. Or.

5. SAUROMATUM, *Schott.*

Tuberous herbs, leafing after flowering. *Leaf* solitary, pedatipartite. *Spathe* shortly peduncled, tube cylindric short, margins connate below; limb very long, reflexed, narrow, open. *Spadix* sessile, very long; male and fem. infl. widely distant, short, dense fld., with a few large clavate scattered neuters close above the fem.; appendage slender, as long as the spathe. *Anthers* subsessile, 4-celled. *Ovaries* oblong, 1-celled; stigma sessile; ovules 1–2, basal, erect. *Berries* obpyramidal, 1-seeded.—Species tropical Asiatic and African.

S. guttatum, *Schott Meletem.* i. 17; *Prodr.* 71; *Blume Rumph.* i. 126; *Engler Arac.* 570. S. pedatum, *Schott Melet. l. c.*; *Gen.* t. 11; *Syn.* 24; *Prodr.* 70; *Blume l. c.*; *Kunth Enum.* iii. 28; *Engler l. c.* 569; *Bot. Mag.* t. 4465; *Regel Gartenfl.* (1866), 3, t. 495. S. venosum, *Schott Prodr.* 71. S. sessiliflorum, *Kunth l. c.*; *Schott l c.*; *N. E. Br. in Journ. Linn. Soc.* xviii. 256. S simlense, *Schott in Œstr. Bot. Zeitschr.* (1858), i. 263; *Prodr.* 72; *N. E. Br. l. c.*; *in Gard. Chron.* (1880), ii. 134, 198. S. punctatum, *C. Koch in Berlin Wochenschr.* i. 263; *N. E. Br. in Gard. Chron. l. c.* Arum guttatum, *Wall. Pl. As. Rar.* ii. 10, t. 115. A. pedatum, *Willd. Enum. Suppl.* 54; *Link. et Otto Ic.* 19, t. 8. A. sessiliflorum, *Roxb. Fl. Ind.* iii. 507; *Wight Ic.* t. 800. A. venosum, *Lindl. Bot. Reg.* t. 1017. A. clavatum, *Desf. Cat. Hort. Par.* 385.

The PANJAB, UPPER GANGETIC PLAIN, and the HIMALAYA, from Nepal to Simla, ascending to 5000 ft. ? The CONCAN, *Herb. Stocks.*

Tuber large. *Petiole* stout, 12–18 in.; leaf 6–12 in. broad, segments or lobes 7–15, very variable, 2–15 by 1–3 in., lobes of young leaves sometimes rounded or the lateral dimidiate-ovate or cordate, when numerous oblong or lanceolate. *Peduncle* 1–2 in., very stout, green or spotted. *Spathe* 12–28 in., tube ovoid or subglobose;

limb linear-lanceolate, thick, green or yellowish with dark purple spots or blotches, margins usually purple and waved. *Spadix* as long as the spathe or nearly so; fem. infl. ½ in.; neuters ½ in. long, spreading; male infl. 3 in. above the fem., ½ in. long; anthers densely packed; appendage 2–8 in., cylindric and obtuse, or narrowed from the base to a fine point, green or dark purple.—*S. guttatum* is confined to North-West India, except Stocks' specimens should prove to be from the Concan, of which there is no evidence.

6. **ARUM**, *Linn.*

Tuberous herbs. *Leaves* simple. *Spathe* deciduous or withering, tube convolute; limb cymbiform, erect. *Spadix* exserted, androgynous, with subulate suberect neuters between the male and fem. infl., and deflexed ones above the male; appendage subcylindric. *Anthers* sessile, pollen vermiform. *Ovary* 1-celled; stigma sessile; ovules many on 2–3 parietal placentas. *Berries* obovoid, many-seeded. *Seeds* albuminous, embryo axile.—Species about 20, Europe, N. Africa, W. Asia.

A. Jacquemontii, *Blume Rumph.* i. 118; leaves hastately sagittate or hastate, limb of spathe narrowly lanceolate acuminate or caudate. *Schott Prodr.* 99. A. Griffithii, *Schott Syn.* i. 15; *Prodr. l. c.*; *Boiss. Fl. Orient.* v. 38; *N. E. Br. in Journ. Linn. Soc.* xviii. 257.

N.W. INDIA, *Jacquemont.* KASHMIR; Gilgit, alt. 6–7000 ft., *Giles.*—DISTRIB. Affghan.

Tuber as large as a chesnut. *Leaves* 5–12 in.; petiole 5–16 in. *Peduncle* equalling or longer than the petiole. *Spathe* 3–7 in., white-greenish or purplish. *Ovaries* globose. *Berries* red.

7. **TYPHONIUM**, *Schott.*

Tuberous herbs. *Leaves* entire, 3–5-lobed or pedatisect. Tube of *spathe* short, convolute, mouth constricted, persistent; limb ovate-oblong lanceolate or linear, deciduous. *Spadix* exserted, male and fem. infl. distant with neuters above the fem. and sometimes below the males; appendage elongate, smooth. *Anthers* subsessile. *Ovaries* 1-celled; stigma sessile; ovules 1–2, basal, erect, orthotropous. *Berries* ovoid, 1–2-seeded. *Seeds* globose, albuminous; embryo axile.—Species about 13, tropics of the Old World.

* *Limb of spathe broadly ovate, open, narrowed into a long point.*

1. **T. trilobatum,** *Schott in Wien. Zeitschr.* iii. (1829) 72; *Aroid.* i. 12; t. 16; *Syn.* 18; *Prodr.* 108; leaves hastately 3-lobed or sub-3-partite, neuters above fem. infl. very many and long filiform curved, appendage stipitate base expanded truncate lobulate intruded. *Blume Rumph.* i. 132 (in part); *Kunth. Enum.* iii. 26 (in part); *Engler Arac.* 614; *in Bull. Soc. Tosc. Ort.* iv. 301; *N. E. Br. in Journ. Linn. Soc.* xviii. 261. T. orixense, *Schott in Wien. Zeitsch. l. c.*; *Wall. Cat.* 8829. T. siamense, *Engler l. c.* 615. T. triste, *Griff. Notul.* iii. 145. Arum trilobatum, *Linn. Sp. Pl.* 965; *Thw. Enum.* 334; *Grah. Cat. Bomb. Pl.* 228. A. orixense, *Roxb. Fl. Ind.* iii. 503; *Wight Ic.* t. 801; *Lodd. Bot. Cab.* t. 442; *Andr. Bot. Rep.* t. 356; *Bot. Reg.* t. 450; *Griff. Ic. Pl. Asiat.* t. 50 (*anal.*). ? A. pumilum, *Lamk. Engc.* iii. 8. ? Arisæma pumilum, *Blume Rumph.* i. 107; *Kunth l. c.* 20; *Schott Syn.* 27; *Prodr.* 59.

LOWER BENGAL, BURMA, the EASTERN and WESTERN PENINSULA and CEYLON.—DISTRIB. Siam, Malay Islds.

Tuber subglobose. *Leaves* 5–12 in. diam.; lobes ovate, acute; petiole 1 ft. or shorter. *Peduncle* 1–4 in. *Spathe* 3–12 in. long; limb 1½–4 in. broad, red purple inside, nearly flat, tip not twisted. *Appendage* bright red, stout or slender.

2. **T. Roxburghii,** *Schott Aroid.* i. 12, t. 17; *Prodr.* 106; leaves hastate or cordately triangular or 3-lobed or 3-partite with 1 rarely 2 veins in the sinus, neuters above the fem. infl. subulate crowded spreading and decurved, appendage very slender stipitate base truncate. *Saunders, Refug. Bot* t. 283. T. divaricatum γ and δ, *Engler Arac.* 612. T. javanicum, *Miq. Fl. Ind. Bat.* iii. 103; *Ann. Mus. Lugd. Bat.* iii. t. 3 B, *in Bot. Zeit.* (1856) 563; *Schott Prodr.* 107; *Engler Ic. ined.* No. 13. Arum trilobatum, *Roxb. Fl. Ind.* iii. 505; *Wight Ic.* t. 803.—Arisarum amboinense, *Rumph.* v. 320, t. 110, f. 2.

SINGAPORE, *Kunstler (in Herb. Calcutt.)*, Ceylon, *Thwaites.*—DISTRIB. Java.

A smaller and more delicate plant than *A. trilobatum* with a very slender spadix and much shorter decurved neuters. The tip of the spathe is very slender and usually twisted in Ceylon specimens, as in Roxburgh's description; but not in Saunders' figure.

3. **T. Motleyanum,** *Schott Prodr.* 106; differs from *T. Roxburghii* in the presence of 2–3 veins in the sinus of the leaves which are considerably larger. T. divaricatum *var.* Motleyanum, *Engler Arac.* 612; *Ic. Arac. ined.* No. 130.

MALACCA, *Herb. Wight*; *Maingay.* PENANG, *King's Collector.*—DISTRIB. Borneo.

Very near *T. Roxburghii*, with similar neuters, but leaves with much more numerous nerves.

4. **T. divaricatum,** *Decne. in Ann. Nat. Hist.* iii. (1834); leaves hastate or deeply cordately sagittate entire or sub-3-lobed, tip of spathe twisted, neuters above the fem. infl. short linear suberect, base of appendage rounded or truncate. *Wight Ic.* t. 790; *Blume Rumph.* i. 130, t. 36; *Kunth Enum.* iii. 26; *Schott Aroid.* i. 12, t. 18; *Gen. Aroid.* t. 17; *Syn.* 17; *Prodr.* 106; *Engler Arac.* 611 (*excl. vars.*) *Ic. ined.* No. 128; *So-Mokou Zoussets, Ed.* 2, XIX. t. 4. Arum divaricatum, *Linn. Sp. Pl. Ed.* 2, 1369; *Roxb. Fl. Ind.* iii. 503; *Wall. Cat.* 8930; *Grah. Cat. Bomb. Pl.* 228. A. trilobatum, *Bot Mag.* t. 339 and 2324.—*Rheede Hort. Mal.* xi. t. 20.

DECCAN PENINSULA, Mootaloor, *Herb. Wight* (*ex Wall. Cat.*). CEYLON; at Colombo and Peradenya.—DISTRIB. Malay Islds., Japan, China.

Tuber curved. *Leaves* 2–5 by 2–4 in.; petiole 4–8 in. *Peduncle* 1–2 in. *Spathe* 4–7 by 1½–3 in., red brown, narrowed into a long tail sometimes twisted at the tip.

** *Limb of spathe linear-oblong.*

5. **T. diversifolium,** *Wall. Cat.* 8933; leaves ovate-lanceolate cordate sagittate or hastate to 3–5-lobed or pedatisect lateral lobes or all triangular to linear, spathe acuminate, neuters above the fem. infl. with clavate tips, appendage shorter than the spathe slightly swollen at the cuneate base obtuse. *Schott Ic. Aroid.* i. 13, t. 20; *Engler Arac.* 617; *N. E. Br. in Journ. Linn. Soc.* xviii. 261. T. Huegelianum, *Schott l. c.* t. 19. T. foliolosum, *Engler l. c.* 618. Heterostalis diversifolia & foliolosa, *Schott in Œstr. Bot. Zeit.* (1857) 261; *Gen. Aroid.* t. 18; *Prodr.* 110. H. Huegeliana, *Schott ll. cc.*; *N. E. Br. in Gard. Chron.* (1879) ii. 76.—Arisæma? *Wall. Cat.* 8928 in part.

WESTERN HIMALAYA; Nepal and Kumaon, alt. 6–8000 ft., *Wallich*, &c. SIKKIM, alt. 7–10,000 ft. TEMPERATE HIMALAYA, alt. 6–11,000 ft., from Simla to Bhotan.

Tuber globose. *Leaves* extremely variable, 3–5 in. long, and as much across the lobes which vary from 3–7, from oblong to narrowly linear, and spread variously; petiole 3–12 in. *Peduncle* 2–9 in. *Spathe* erect, 2–8 in., acuminate, purplish. *Appendage* stout or slender.

*** *Limb of spathe narrowed from an ovate or lanceolate short base into a long tail.*

6. **T. brevipes,** *Hook. f.*; leaves pedately 5–7-partite, segments lanceolate long-acuminate, peduncle very short, spathe lanceolate produced into a narrow linear tail, neuters above the fem. infl. with clavate tips, appendage very long and slender, base not thickened. T. pedatum, *Schott in Œstr. Bot. Wochenbl.* (1857) 262 (in part).

SIKKIM HIMALAYA; near Darjeeling, alt. 7–8000 ft., on rocks and tree trunks, *J.D.H., Clarke, Gammie.*

Tuber depressed globose. *Leaves* membranous; segments 2–10 by ½–1½ in.; petiole 4–12 in. *Peduncle* ½–¾ in. *Spathe* with a tumid ellipsoid tube ¾ in. long, limb 4½ in. long by ½ in. broad, membranous. *Neuters* yellow on capillary stalks; appendage as long as the spathe very slender.—A curious species. I have seen but one spathe, collected by Mr. Gammie.

7. **T. bulbiferum,** *Dalz. in Hook. Kew Journ.* iv. (1852) 113; leaves triangular-hastate sagittate or cordate, spathe very slender from a short lanceolate base, neuters above the fem. infl. linear erect, appendage equalling the spathe filiform base rounded or cuneate. *Schott Prodr.* 106; *Engler Arac.* 611; *Ic. ined.* n. 129; *Dalz. & Gibs. Bomb. Fl.* 258.

SOUTHERN CONCAN, *Stocks*, &c.

Tuber ⅕–½ in. *Leaves* 2–4 in. long and often as broad across the lobes, angles acute; petiole 5–6 in., slender, usually with a pisiform tuber at the top. *Peduncle* 1–2½ in. *Spathe* pale rose, 3–5 in., convolute. *Spadix* as long, slender, yellow; neuters in one series fleshy, rather incurved, yellow (acinaciform, *Stocks*).

8. **T. pedatum,** *Schott. in Œstr. Bot. Wochenbl.* (1857) 262 (in part); *Prodr.* 108 (*non Engler*); leaves pedatisect, segments lanceolate, spathe linear acuminate, neuters above the fem. infl. many crowded filiform erect, appendage slender, base not thickened. *N. E. Br. in Journ. Linn. Soc.* xviii. 260.

PEGU, *McLelland.*

Leaves about 4 in. broad; segments 7, linear-lanceolate, acuminate, about 4 by ¾ in., outer smaller, *Peduncle* 1¾ in. *Spathe* 2¼ in., longer than the spadix.—Founded on a single specimen. As pointed out by Mr. Brown, the Sikkim plant referred to this by Schott is another species (*T. brevipes*, H. f.), and that of Engler (Arac. 613) is *T. fallax*, N. E. Br., a native of Java.

9. **T. cuspidatum,** *Blume Cat. Hort. Buit.* 101; *Rumph.* i. 133, t. 10, f. 1–3; leaves sagittately cordately or hastately ovate oblong or lanceolate, limb of spathe with a short lanceolate base produced into a very long slender tail, lower neuters above the fem. infl. clavate upper subulate, appendage produced into a long filiform tail equalling the spathe base conical. *Decne. Descr. Herb. Timor.* 39; *Kunth Enum.* iii. 26; *Schott Ic. Aroid.* i. 12; *Syn.* 19; *Miq. Fl. Ind. Bat.* iii. 194; *Engler Arac.* 616; *N. E. Br. in Journ. Linn. Soc.* xviii. 262. T. flagelliforme, *Blume in Wall.*

Cat. n. 8931. Arum cuspidatum, *Blume Cat. Hort. Buitenz.* 101. A. flagelliforme, *Lodd. Bot. Cab.* t. 396; *Roxb. Fl. Ind.* iii. 502; *Wight Ic.* t. 791; *Griff. Itin. Notes*, 13, No. 193; *Griff. Notul.* iii. 144 (flagelliferum). A. angulatum, *Griff. Notul.* iii. 143.—*Rheede Hort. Mal.* ii. t. 20.

LOWER BENGAL, the MALAYAN PENINSULA and BURMA.—DISTRIB. Malay Islds.

Tuber subglobose. *Leaves* 1–7 in., sometimes almost 3-partite and 6 in. across the linear or oblong lobes, at others quite simple with a rounded or cordate base. *Petiole* 6–12 in. *Peduncle* slender, long or short. *Spathe* 4–8 in., lurid red, papillose within. *Appendage* as long as the spathe or a little longer.

10. **T. gracile,** *Schott Aroid.* i. 12; *Prodr.* 108; leaves pedately 3–5-partite, segments elliptic-oblong acuminate lateral lobed at the outer base, spathe very long and slender from a lanceolate base, neuters above the fem. infl. filiform recurved or revolute, appendage sessile as long as the spathe narrowed from the base to the very slender tip. *Engler Arac.* 613. Arum gracile, *Roxb. Fl. Ind.* iii. 505; *Wight Ic.* t. 793; *Grah. Cat. Bomb. Pl.* 228. ? Arisæma gracile, *Kunth Enum.* iii. 21.—*Rheede Hort. Mal.* xi. t. 21.

SILHET, *Roxburgh*; KHASIA HILLS, *Griffith* (*Kew Distrib.* 6000).—The PANJAB; Jhelum river, *Aitchison.*

Tuber globose. *Leaves* 4–6 in. broad across the segments, which are sessile or petiolulate, and from broadly oval to oblong or lanceolate, acuminate; petiole 6–12 in.; petiolules sometimes ½ in. *Peduncle* 1–1½ in. *Spathe* 6–8 in.

8. THERIOPHONUM, *Blume.*

Characters of *Typhonium*, but leaves always undivided cordate or sagittate, neuters all subulate, anthers didymous and the more numerous ovules basilar and pendulous from the top of the ovarian cell.—All Indian.

* *Anthers beaked, opening by slits. Neuters many, all near the anthers.*

1. **T. crenatum,** *Blume Rumph.* i. 128; spathe 4–5 in. subcylindric margins waved and crenate, anthers shortly beaked, neuters ⅛–¼ in. *Miq. Fl. Ind. Bat.* iii. 196; *Schott in Œstr. Bot. Zeitschr.* (1858) 2; *Aroid.* i. 15, t. 21; *Prodr.* 102; *Engler Arac.* 607 (*excl. var.* rostratum); *N. E. Br. in Journ. Linn. Soc.* xviii. 259. T. Kleinii, *Schott in Œstr. Bot. Zeit.* 1858; *l. c.* 3; *Prodr.* 103. Typhonium crenatum, *Schott Melet.* i. 17. *Wall. Cat.* 8934. Arum crenatum, *Wight in Hook. Bot. Misc.* ii. 100; *Suppl.* t. 3; *Grah. Cat. Bomb. Pl.* 228

The DECCAN, CONCAN and CARNATIC, *Heyne*, &c.

Tuber small. *Leaves* 3–4 in. long and often as broad, orbicular hastate or cordately sagittate; petiole 4–12 in. *Spathe* membranous, pale yellow-green; base of tube broadly truncate, intruded. *Spadix* half as long as the spathe; appendage cylindric, dark-purple.

2. **T. Wightii,** *Schott in Œstr. Bot. Zeitschr.* (1858) 3; *Prodr.* 103; spathe 4–6 in. linear-oblong acute, anthers long-beaked, lower neuters ¼–⅓ in. *N. E Br. in Journ. Linn. Soc.* xviii. 259. T. crenatum, *var.* rostratum, *Engler Arac.* 607 (*excl. syn.* arum crenatum). Typhonium minutum, *Schott ex Wall. Cat.* 8932 (*not of Blume*).

The CARNATIC, *Wight.*

Very near *T. crenatum*. *Leaves* sometimes 3-lobed.—Specimens indifferent.

3. **T. zeylanicum,** *N. E. Br. in Journ. Linn. Soc.* xviii. 258; **spathe 2½–3½ in., anthers globose shortly beaked, lower neuters twice as long as the upper.** Arum divaricatum, *Thw. Enum.* 334 (*excl. syn.*).

CEYLON; common in the hotter parts of the island, *Thwaites.*

Leaves hastate, 3½–7 in. long, lobes linear or median broader; petiole 4–12 in. *Peduncle* 1½–4 in. *Spadix* 1½–2 in. *Ovaries* few.

** *Anthers not beaked, opening by pores. Lower neuters near the ovaries, upper few or* 0.

4. **T. Dalzellii,** *Schott Aroid.* i. 15; *Syn.* 21; spathe 5–7 in. *Engler Arac.* 608. Tapinocarpus Dalzellii, *Schott Gen. Aroid.* t. 15; *Prodr.* 104. T. indicus, *Dalz. in Hook. Journ. Bot.* iii. (1851) 346.

The Southern CONCAN and Northern CANARA, *Stocks, Talbot.*

Tuber size of a walnut. *Leaves* 4–6 in., elliptic oblong or linear, base rounded hastate or sagittate; petiole 3–10 in., very stout. *Peduncle* stout; fruiting twisted and decurved to the ground. *Spathe* oblong-lanceolate, tube white; limb flat, dark purple. *Appendage* terete, twice as long as the infl.—Much the stoutest species.

5. **T. infaustum,** *N. E. Br. in Journ. Linn. Soc.* xviii. 260; **spathe 1½–2 in.** T. Wightii, *Engl. Arac.* 608 (*not of Schott*). Calyptrocoryne Wightii, *Schott in Œstr. Bot. Wochenbl.* (1857) 262; *Prodr.* 105; *Gen. Aroid.* t. 16. Typhonium minutum, *Blume Rumph.* i. 134; *Engler, l. c.* 609. Arum minutum, *Willd. Sp. Pl.* iv. 484; *Grah. Cat. Bomb. Pl.* 228. A. mucronatum, *in part, Spreng. Syst.* iii. 769.—*Rheede Hort. Mal.* xi. t. 17 (*small figure*).

MALABAR (*Rheede*); Paul Ghat, *Wight.*

Leaves as in *T. Dalzellii,* but smaller with the basal lobes usually rounded. *Spathe* narrowly lanceolate, acute, white or purplish. *Appendage* stipitate, base elongate conical.

9. AMORPHOPHALLUS, *Blume.*

Tuberous herbs, flowering before leafing. *Leaves* 3-partite, segments pinnatisect. *Spathe* various; limb campanulate infundibular convolute or open, marcescent. *Spadix* exserted or included; appendage large, short or long; infl. cylindric, dense fld., male and fem. contiguous, neuters 0. *Anthers* 2–4, sessile, cells oblong, pores apical. *Ovaries* globose or obovoid, 1–4-celled; style short or long, stigma entire or 2–4-lobed; ovules solitary, subbasilar, anatropous. *Berries* subglobose or obovoid. *Seeds* exalbuminous; embryo macropodous.—Species about 30–40, tropics of the Old World.

* Style many times longer than the ovary.

1. **A. campanulatus,** *Blume ex Decne. in Ann. Mus. Hist. Nat. Par.* iii. (1834), 366 (*excl. all syn. but Roxb.*); peduncle very short and petiole rough, spathe campanulate limb suberect or recurved waved and crenulate, spadix hardly longer than the spathe, appendage globosely conoid or amorphous sinuously-lobed. *Thw. Enum.* 335. *Dalz. & Gibs. Bomb. Fl.* 259; *Engler Arac.* 309 (*excl. many syns. & citations*). A. Chatty, *André in Illustr. Hortic.* (1872), 361. A. virosus, *N. E. Br. in Gard. Chron.* (1885) 759; *Bot. Mag.* t. 6978. Candarum Roxburghii, *Schott Melet.* i. 17. Arum campanulatum, *Roxb. Cor. Pl.* iii. 68, t. 272; *Fl. Ind.* iii. 509; *Wight Ic.* t. 785, and ? 782.

PLAINS OF INDIA, from the PANJAB to BENGAL, the DECCAN, and CEYLON.

Tuber a depressed bulbilliferous sphere 8–10 in. diam. *Leaves* 1–2½ 1–3 ft. broad, segments simple or forked; leaflets oblong, acute; petiole dark green with pale blotches. *Peduncle* elongating in fruit; sheaths linear-oblong. *Spathe* 6–9 in. across the orbicular-ovate obtuse limb, coriaceous or fleshy, variable in colour, green, usually with white spots below, greenish purple above, rough and dark purple within towards the base. *Spadix* very stout; fem. infl. cylindric, male subturbinate; appendage dark-purple, sometimes 6 in. diam. *Berries* obovoid.—The geographical limits of this species are quite uncertain (owing to its being cultivated widely in the East for its tubers); and its synonymy is so mixed that I have withheld many supposed synonyms and all habitats but India. The name *campanulatus* first appeared under *Amorphophallus* in 1834, in Decaisne's paper cited above, as a Timor plant; and Roxburgh's *Arum campanulatum* is there given by Blume as its type, together with *Arum Rumphii*, Gaud. in Freyc. Voy. Bot. 127, t. 34, &c. Whether either of the above is the Timor plant has never been discovered, but the appended description applies to Roxburgh's species. In 1835 in Rumphia, Blume described, also as Roxburgh's *Arum campanulatum*, and giving the same diagnosis as in Decaisne) a very much larger Javanese plant, with a widely expanded spathe and longer spadix with a long conico-ovoid appendage. As Blume evidently all along believed that he was dealing with Roxburgh's Indian plant I think it best to name and limit the Indian species in accordance with his intentions and his and Roxburgh's diagnosis, and accept Dr. Prain's name for the Javanese plant (*A. Rex*) which, being also a native of the Andaman Islds., comes within the pale of the Brit. Ind. Flora. Wight gives copies of two drawings of Roxburgh's *A. campanulatus*, one, t. 785, the true plant; the other, t. 782, has a much larger broadly campanulate spathe, 15 in. diam., with recurved margins, more like that of *A. Rex*, but with a short broad appendage 8 in. diam. and about as tall. Of this Wight says he finds no description in Roxburgh's Flora; it is, however, no doubt to it that Roxburgh alludes in speaking of large plants with the appendage 6 in. diam.

2. **A. Rex,** *Prain mss.*; peduncle very short and petiole rough, spathe broadly campanulate with waved revolute margins, spadix much longer than the spathe, appendage elongate conoid sinuously waved. A. campanulatus, *Blume Rumph.* i. 139, t. 32, 33 (*excl. syn.*).

ANDAMAN ISLDS.; Narcondam Islds., *Prain.*—DISTRIB. Java.

A very much larger plant than *A. campanulatus*, with the depressed tuber attaining nearly a foot diam., the leaf blade 5 ft. diam., the alternate segments 6–10 in., the petiole attaining 5 ft., and stout peduncle 2–3 in. elongating to 30 in. in fruit. *Spathe* very broadly campanulate, 12–18 in. diam., with broad undulate revolute margins, sometimes produced on one side into a prolonged pendulous apex, pale red-purple. *Spadix*, &c., as in *A. campanulatus*, but much larger, with a sinuate appendage 10–14 in. long, that rises high above the spathe, is broadly conical and purple-brown or pale and spotted with brown.

3. **A. dubius,** *Blume Rumph.* i. 142; petiole rough, spathe 3–5 in. diam. subsessile campanulate with a rather long oblong tube and ovate waved quite entire suberect or spreading limb, spadix shorter than the spathe, appendage globosely ovoid quite smooth. *Kunth Enum.* iii. 32; *Schott Syn.* 38; *Prodr.* 130; *Bot. Mag.* t. 5187; *Engler Arac.* 310. Dracontium polyphyllum, *Denst. Clav. Hort. Mal.* 38 (*not of Linn.*).—*Hort. Mal.* xi. t. 18.

MALABAR (*Rheede*), CEYLON, *Thwaites.*

Leaves as in *A. campanulatus*; petiole green with pale blotches. *Peduncle* very short; sheaths equalling the tube of the spathe, oblong, retuse, apiculate. *Spathe* with the tube 3 in. long, green without and within; limb ovate in outline, disk dull dark purple with a bright green narrow waved border. *Spadix* 4 in., male infl. nearly 1 in. diam.: fem. ½ in.; appendage 1½ in. diam., chestnut-brown, anthers

linear-oblong; stigma 2-fid.—Described from the figure in Bot. Mag. Rheede's figure represents fem. infl. much shorter than in *A. campanulatus*.

4. **A. longistylus,** *Kurz Andaman Rep.* 50 (name); spathe long-peduncled, limb acute or acuminate hardly broader than the convolute ovoid tube, appendage cylindric narrowed to the tip many times longer than the infl. and spathe.

ANDAMAN ISLDS.; *Kurz.*

Tuber a depressed sphere, not bulbilliferous. *Leaf* very large, leaflets 3–5 by 2–2½ in., broadly elliptic ovate or obovate, base contracted; petiole 2–3 ft., green spotted with purple; sheaths closely wrapping the base. *Spathe* 13 by 5 in., dull red purple with darker blotches, sides infolding above the middle convolute low down. *Spadix* sessile; infl. shorter than the spathe; male ½ in., fem. shorter; appendage 7 in., dark violet-purple. *Anthers* very short.—Described from a drawing in *Herb. Calcutt.*

** Style very short or 0.

† *Spadix not or very little longer than the spathe.*

5. **A. bulbifer,** *Blume Rumph.* i. 148; spathe long-peduncled tube broad turgid limb rather longer ovate cymbiform obtuse, spadix very stout shorter or a little longer than the spathe, appendage as long as infl. and broader than elongate conoid or oblong top rounded. *Kunth Enum.* iii. 34; *Regel Gartenfl.* (1871), t. 688; *Engler Arac.* 317, and *Ic ined.* No. 156. Arum bulbiferum, *Roxb. Fl. Ind.* iii. 510; *Bot. Mag.* t. 2072, 2508; *Grah. Cat. Bomb. Pl.* 229; *Wall. Cat.* 8935, 8936 (spathe). A. occultatum *and* taccoides, *Herb. Ham.* Pythonium bulbiferum, *Schott Melet.* i. 18. Conophallus bulbifer, *Schott Syn.* 34; *Gen.* t. 30; *Prodr.* 128.

EASTERN BENGAL, SIKKIM, the KHASIA HILLS, and BURMA, ascending to 5000 ft. The CONCAN, *Graham.*

Tuber globose. *Leaf* 12–18 in. diam., ultimately bulbilliferous at the base, forks, and nerves above; leaflets 3–8 in., obovate or lanceolate; petiole 3–4 ft., and peduncle 8–10 in., green and pink streaked with green or black. *Spathe* 5–8 in., erect, pale pink or yellowish clouded with pink, rose-pink within. *Spadix* sessile; infl. 3 in. by ½ diam.; appendage 3–4 in., pale flesh-colrd. or white. *Anthers* short. *Stigma* 2-lobed.

6. **A. commutatus,** *Engler Arac.* 319; spathe long-peduncled erect ovate-lanceolate obtuse base shortly sheathing, spadix about as long as the spathe, appendage three or four times longer than the infl. but not stouter, tapering from the sessile base upwards. Conophallus commutatus, *Schott in Bonpland.* (1859), 28; *Prodr.* 128.

The CONCAN; *Stocks.*

Tuber and *leaf* unknown. *Peduncle* 1–3 ft. *Spathe* 6–10 by 1½–4 in., rough at the base within, tip obtuse. *Spadix* columnar, sessile; male infl. 1½–2 in., fem. ½–1½ in., both cylindric; appendage not contracted above the infl., smooth, tip obtuse. *Anthers* very shortly oblong. *Stigma* sessile, disciform.

7. **A. purpurascens,** *Kurz mss.*; leaflets elliptic-obovate, spathe small very long-peduncled cymbiform acute base shortly convolute, spadix shorter or rather longer than the spathe stout, appendage rather longer but little broader than the infl. stout elongate conoidal tip rounded.

PEGU, MARTABAN, and in the IRRAWADDY and SITTANG VALLEYS, *Kurz.*

Tuber small, 2 in. diam., not bulbilliferous. *Leaf* small, 10 in. diam., 3-sect with segments 3–5 by 1–2 in., petiole 18 in., pale green. *Peduncle* 16 in., red-purple,

striate; wrapped at the base by short sheaths. *Spathe* (perhaps immature) 3 in., dark green, blue at the sides with red margins. *Spadix* 3 in.; infl. cylindric, stout, male the longest; appendage nearly 2 in., not contracted at the base, white. *Anthers* very short. *Stigma* sessile, disciform, lobulate.

8. **A. chlorospathus,** *Kurz mss.*; leaflets linear, spathe cymbiform erect base shortly convolute, spadix shorter than the spathe stout, appendage rather longer but not broader than the infl. stout elongate conoidal tip rounded.

PEGU, the IRAWADY and SITANG VALLEYS, *Kurz.*

Tuber a depressed sphere or hemisphere, 2 in. diam., not bulbilliferous. *Leaf* 2 ft. diam., trisect, segments winged and pinnatifidly cut into finely acuminate leaflets 5–8 by ¼–½ in.; petiole 18–20 in., green. *Peduncle* 16 in., stout, green, pale reddish-brown below; sheaths not long. *Spathe* 4 in., green, paler within. *Spadix* 2½–3 in., infl. cylindric, male longest; appendage not contracted at the base, white. *Anthers* very short. *Stigma* sessile, discoid.

9. **A. sparsiflorus,** *Hook. f.*; spathe with an ovate-oblong suberect acute limb the basal margins revolute round the mouth of the infundibular tube, spadix much shorter than the spathe, appendage fusiformly conoid as long as the infl., male and fem. fl. scattered.

PERAK; Maxwell's Hill, *Wray* (No. 111), *Kunstler.*

Tuber orange-shaped. *Leaf* bulbiferous at top of petiole, green, shaded with red or brown; leaflets 7, shortly petiolulate, 6–8 by 1½ in., oblanceolate, acuminate. *Peduncle* 1–2½ in., sheaths longer, linear. *Spathe* 5 in.; tube 1½ in., pale red-brown spotted with purplish-brown. *Spadix* 3½ in. *Anthers* minute, very short. *Ovaries* small, globose, style very short, stigma capitate.

†† *Spadix much longer than the spathe.*

10. **A. oncophyllus,** *Prain mss.*; spathe long-peduncled tube ovoid dilating into a large orbicular-ovate limb the lower margins of which are revolute round the open mouth of the tube, spadix far exserted, appendage as long as the infl. elongate conoid.

ANDAMAN ISLDS.; on Cocos Islets, *Prain.*

Tuber depressed, 5–9 in., diam., bulbilliferous. *Leaf* 3½ ft. broad; leaflets 6–8 in.; petiole 2–3 ft., dull green, blotched with greenish white. *Peduncle* 12–15 in., fruiting longer, very stout; sheaths 2–7 in. *Tube* of spathe 3 in. long and broad, whitish, obliquely streaked with green and spotted with dull green; limb 8 in. long by 5 broad, inclined, dull red-purple blotched with yellow. *Spadix* 8–18 in., sessile; male infl. about equalling the fem.; appendage creamy-yellow. *Anthers* short. *Stigma* 2-lobed.—A superb species, described from a drawing, dried specimen and a living plant at Kew.

11. **A. Prainii,** *Hook. f.*; spathe obliquely campanulate tube very broad suboylindric base truncate, limb short orbicular-ovate margins waved, spadix very stout, exserted appendage very large conoid smooth much longer and broader than the infl.

PERAK; Larut, *Scortechini, Kunstler.* PENANG (*Ic. in Herb. Kew*).

Tuber 6–10 in. diam., not bulbilliferous. *Leaves* 4 ft. broad, leaflets 4–8, lanceolate, caudate-acuminate; petiole 3–5 ft., green mottled with grey, or white and red. *Peduncle* 3–5 in.; sheaths very large, 8–12 by 4 in., pinkish. *Tube* (or rather convolute parts) of spathe 2 in. long and as broad, pale green spotted with white; limb 6–8 in. diam., yellow, base within rough purple-brown. *Male* infl. subturbinate, fem. about as long, appendage 6–8 in. by 2–3 diam. cream-colrd. smooth. *Anthers* linear. *Stigma* 2-lobed.—Spathe and spadix more like *A. campanulatus* than are others with short styles.

12. **A. burmanicus,** *Hook. f.*; spathe broadly ovate from a short tumid oblong tube erect, spadix far exserted, appendage ovoid or cylindric-ovoid much shorter than the male infl.

BURMA; on the Karen Hills, alt. 3000 ft., *Kurz.*

Peduncle 4–6 in., much longer than the sheaths. *Spathe* 4–5 by 3–4 in., nearly smooth within, tube 1½ in. long. *Spadix* 3–6 in., male infl. 1–2 in., fem. ¾–2 in.; appendage 1½ in., anthers short, prismatic. *Ovaries* depressed-globose, with a short stout style, stigma large, quite entire.—Tuber and leaf wanting.

13. **A. hæmatospadix,** *Hook. f.*; spathe campanulate convolute below dilating above into an ovate or ovate-lanceolate obtuse erect limb with margins revolute all round the mouth of the tube nearly to the tip, spadix stout exserted, appendage cylindric-clavate three times as long as the infl. blood-red tip rounded.

PENANG? *Curtis* (*Hort. Kew*, 1892.)

Tuber shortly turbinate, 2½ in. diam. *Leaf* about 20 in. diam.; leaflets 5–7 in. oblong-lanceolate, finely acuminate; petiole 16 in., very stout, green, terete below, ribbed and keeled above. *Peduncle* 10 in., terete, brown, striated; sheaths appressed to the base, red-brown. *Spathe* 5 in., limb primrose-yellow, tube striate with pink, dark purple within. *Spadix* sessile, 7 in.; infl. 1½ in., male 3 times as long as the few-fld. fem.; appendage ¾ in. diam. at the thickest part. *Anthers* very short. *Ovary* globose, narrowed into a short rather slender style, stigma small, capitate.

14. **A. elatus,** *Hook. f.*; peduncle very tall rough, spathe lanceolate acute erect sheathing for the lower half margins not revolute, spadix more than twice as long as the spathe very stout, appendage more than twice as long as the infl. narrowed from below the middle to the slender tip.

MALAY PENINSULA; Larut, Perak, *Kunstler.*

Tuber and *leaves* unknown. *Peduncle* 3–4 ft., and *petiole* variegated green brown white and red. *Spathe* 6 in., cream-colrd., membranous, appressed to the spadix, apparently mottled; tube 1½ in. diam., base rounded. *Spadix* a foot long, rather narrowed towards the base, about ¾ in. diam. in the thickest part, dark and light blue; male infl. 3 in.; fem. 1¾ in. *Anthers* small, very short. *Ovaries* globose; style very short, stout, stigma capitate.—A stately species, the colours are taken from Kunstler's notes. The specimen is unique in Herb. Calcutta; its nearest ally is perhaps Blume's *A. variabilis.*

IMPERFECTLY KNOWN AND EXCLUDED SPECIES.

A. GIGANTEUS, *Blume Rumph.* i. 147, t. 34, is not British Indian; and the reference under it to *Densl. Clav. Hort. Mal.* and *Rheede Hort. Mal.* should be struck out.

A. LYRATUS, Engler Arac. 319 (Arum lyratum, *Roxb. Fl. Ind.* iii. 508, Conophallus lyratus, *Schott Syn.* 35; *Prodr.* 130) is according to Roxburgh's drawing *Tacca pinnatifida*, with the detached berry of an *Arisæma*?

A. TUBERCULIGER, *Engler Arac.* 317; tuber small, leaf 3-sect, branches 1–2 in. pinnatifidly or pinnatisectly 3–5-foliolate, segments 3–4 by 1–1½ in. sessile elliptic-lanceolate caudate-acuminate; petiole 10–12 in. bearing a pisiform bulbil at the top. Conophallus tuberculiger, *Schott, Bonpland.* (1859), 78; *Prodr.* 129.—Khasia Hills, alt. 3–4000 ft. *J. D. H.* and *T. T.*—Described by Schott from leaves only. Engler has added a description of the spathe of *A. bulbifer*, from the drawing of a Sikkim specimen of that plant which he supposed to be the same.

10. SYNANTHERIAS, *Schott.*

Characters of *Amormophallus*, but male and fem. infl. distant, with oblong depressed interposed neuters.

RHAPHIOPHALLUS, *Schott Gen. Aroid.* t. 27; *Syn.* 125; *Engler Arac.* 321, would appear from the characters given not to be separable from *Synantherias*. It was founded on a Canara plant collected by Hohenacker, of which I have seen no specimen; and is described and figured as having a few gibbous neuters, and a slender subulate appendage shorter than the spathe. In other respects it agrees with *S. sylvatica*.

S. sylvatica, *Schott Gen. Aroid.* t. 28; *Prodr.* 176; *Engler Arac.* 320; *Ic. ined.* No. 155; *Bot. Mag.* t. 7190. Amorphophallus sylvaticus, *Kunth Enum.* iii. 34; *Dalz. & Gibs. Bomb. Fl.* 259. A. zeylanicus, *Blume Rumph.* i. 148; *Thw. Enum.* 335; *Engler Arac.* 314. Brachyspatha sylvatica, *Schott Syn.* 35. B. zeylanica, *Schott Syn.* 35; *Prodr.* 127. Arum sylvaticum, *Roxb. Fl. Ind.* iii. 511; *Wight Ic.* t. 802.

The DECCAN PENINSULA, from the northern Circars to the Concan, and southwards to CEYLON.

Tuber subglobose, bulbilliferous. *Leaves* 1 or 2, 1½–2½ ft. diam.; divisions 1–2-pinnatifid; leaflets 2–6 in., lanceolate, long-acuminate; petiole and peduncle 1–2 ft., and spathe clouded barred and streaked with green and pale pink. *Spathe* 2–4 in., tube broad convolute, base truncate; limb very short, ovate, acute. *Spadix* stipitate; infl. as long as the spathe, terminating in a brown flexuous appendage 5–6 times as long; infl. cylindric, male narrowed; neuters sub 2-seriate, quite flat, peltately adnate, yellow-brown. *Male fl.* of scattered or fascicled minute sessile obcuneate anthers. *Ovaries* globose, style very short; stigma capitate; ovules subbasilar.

11. THOMSONIA, *Wall.*

Characters of *Amorphophallus*, but appendage clothed below with depressed neuters and all over above with tubercles.

T. nepalensis, *Wall. Pl. As. Rar.* 83, t. 99; *Blume Rumph.* i. 150; *Engler Arac.* 306. T. Hookeri, *Engler l. c.* 307. Pythonium Wallichianum, *Schott Melet.* i. 17; *Syn.* 36; *Gen.* t. 25; *Prodr.* 123; *Kunth Enum.* iii. 30. Arum grandiflorum, *Herb. Ham.*—Aroid. *Wall. Cat.* n. 8949.

TROPICAL HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 2–6000 ft., *J. D. H.* ASSAM, *Hamilton.* KHASIA HILLS, alt. 1–5000 ft.

Tuber 4–5 in. diam., not bulbilliferous. *Leaf* 12–18 in. diam. or more; leaflets 3–5 in., ovate or oblong-lanceolate, caudate-acuminate; petiole 18 in. and very stout. *Peduncle* light green blotched with much darker, sheaths pink. *Spathe* 12–18 by 3–6 in. diam., oblong-cymbiform, shortly narrowly convolute at the base, erect, green. *Spadix* 5–10 in., exserted, very stout; male infl. 2–5 in., fem. ½–2 in.; appendage 3–4 in. and as long or shorter than the male infl., cylindric, green changing to yellow, top rounded. *Anthers* 3–5, substipitate, compressed, 2-celled, pollen vermiform. *Ovaries* globose, 2-celled; style stout; larger than the cells, upcurved, stigma discoid; obscurely lobed; ovule 1, basilar, erect, anatropous. *Fruit?*

T. Hookeri, *Engler Arac.* 307 (Allopythion, Hookeri *Schott Gen.* 24, t. 24; *Prodr.* 122; founded on a very bad specimen of a Khasian plant (the leaf of which Mr. Brown thinks may be that of an *Arisæma*) is altogether doubtful. There is a drawing in Herb. Kew of a curious state of *T. nepalensis*, with a fan-shaped green foliaceous spathe, cut irregularly and deeply into lanceolate acuminate costate lobes.

12. PLESMONIUM, *Schott.*

Characters of *Amorphophallus*, but male and fem. infl. distant, with large obovoid pearl-like or turbinate neuters interposed, and no appendage.

P. margaritiferum, *Schott Syn.* 34; *Gen.* t. 26; *Prodr.* 124; *Engler*

Arac. 303. Amorphophallus margaritiferus, *Kunth Enum.* iii. 34. Arum margaritifer, *Roxb. Fl. Ind.* iii. 512; *Wight Ic.* t. 795. Caladium discretum, *Herb. Ham.*—*Wall. Cat.* 8937 A.

HINDOSTAN; *Roxburgh.* BENGAL, at Dacca, *Clarke.*

Tuber 6 in. diam. or less, bulbilliferous all over. *Leaves* 1½ ft. diam., 3-sect; segments pinnatisect, lateral forked; leaflets few, 4–6 in., linear, acuminate; petiole 1½–2 ft., green. *Peduncle* 12–18 in., stout, pale green streaked with darker green. *Spathe* 5–6 in. by 4 broad, erect, broadly ovate, obtuse, concave, loosely convolute below the middle, pale yellow-green, flushed with pink within, dark purple at the base. *Spadix* very stout, stipitate, obtuse, as long as the spathe; male infl. much the longest; neuters as large as peas, white. *Anthers* crowded, very short, pores confluent. *Ovaries* scattered, globose, narrowed into a short style; stigma large, 2–3-lobed.—*P. dubium*, Schott (*Prodr.* 125; *Engler Arac. l. c.*) founded on a very imperfect spathe and spadix from Pegu (*McLelland*) is distinguished by its auther by the neuters being (in a dried state) turbinate with acute margins all round.

13. ARIOPSIS, *Nimmo.*

Small tuberous herb. *Leaves* entire, peltate. *Spathe* small, cymbiform, open (tube 0) persistent. *Spadix* shorter than the spathe, appendage 0; male fl. cylindric; fem. adnate to the base of the spathe. *Male fl.* embedded in the tissue of the spadix; anthers connate in groups of 3, each 2-celled, surrounding a pore into which all open. *Ovaries* few, oblong, 1-celled; stigma sessile, 4–6-fid; ovules many, orthotropous, 2-seriate on 4–6 parietal placentas. *Berries* 3–6-angled, many-seeded, stigmas stellate. *Seeds* pendulous, albuminous; embryo axile.

This genus has hitherto been ascribed to Graham, in whose "Catalogue of the Plants of Bombay and its vicinity" it first appeared, and where the letter N. following the name was assumed by Schott and all subsequent authors to mean "Nobis." It really means "Nimmo," Graham's coadjutor in the work, an excellent botanist.

1. **A. peltata,** *Nimmo in Grah. Cat. Bomb. Pl.* 252; *Schott Syn.* 40; *Gen.* t. 85; *Prodr.* 135; *Bot. Mag.* t. 4222; *Engler Arac.* 528. A. protanthera, *N. E. Br. in Rep. R. Gard. Kew*, 1877, 57. Remusatia vivipara, *Wight Ic.* t. 900 (*not of Schott*). Caladium? ovatum, *Herb. Ham.*—Aroid. *Wall. Cat.* 8956, 8957.

WESTERN SUBTROPICAL HIMALAYA, from Nepal to Sikkim, alt. 4–6000 ft. BURMA; in the Karen Hills, *Kurz.* WESTERN GHATS; from the Concan to Travancore, *Heyne, &c.*

Tubers small, clustered. *Leaves* 1–6 in. diam., orbicular or cordate, tip rounded or acute, membranous, glaucous beneath; petiole 2–7 in., slender. *Peduncle* 1–4 in., very slender. *Spathe* 1 in., incurved, apiculate, violet with a green dorsal ridge, paler within. *Spadix* decurved; male infl. dark purple; fem. green, stigma yellow.—*A. protanthera*, owes its origin to the fact, that whereas all the Himalayan specimens then in Kew Herbarium from various collections showed that flowering had preceded leafing by a considerable interval; all those from the Western Ghats showed that those processes had been contemporaneous. Specimens of the Himalayan plant recently received from the Calcutta Herbarium, have invalidated the above character.

14. STEUDNERA, *C. Koch.*

Herbs; caudex stout. *Leaves* ovate, long-petioled, peltate. *Spathe* shortly convolute at the base, limb ovate-lanceolate, expanded, reflexed, marcescent. *Spadix* very short, dense-fld.; male infl. clavate or capitate;

fem. adnate below to the spathe. *Stamens* 3–6, connate in a peltate body with a flat crenulate crown; anther-cells globose. *Ovaries* mixed with clavate staminodes, subglobose, 1-celled; stigma 4–5-lobed; ovules many, parietal, orthotropous.—Species 6 or 8, Indian and Burman.

1. **S. discolor,** *Hort. Bull.* (*Cat.* 1875, No. 75); leaves 10–12 in. ovate acute with dark blotches between the nerves, base retuse, spathe 4½ in. ovate acuminate golden yellow on both surfaces, base within purple. S. colocasiæfolia, *Hook. f. Bot. Mag.* t. 6076 (*copied in Fl. des Serres,* xxi. t. 2201). S. colocasiæfolia, *var.* discolor, *Engl. Arac.* 452.

INDIA, *Hort. Bull.*

Stem short, stout, clothed with brown sheaths. *Leaves* dark green above, paler with dark blotches beneath. *Spadix* 1½ in., pale; staminodes 4–5, clavate.

2. **S. colocasiæfolia,** *C. Koch in Œstr. Bot. Wochenschr.* (1862), 114; leaves 10–12 in. ovate acute concolorous, base retuse, spathe 6 in. lanceolate caudate-acuminate golden yellow without dark purple within. *Schott in Bonpland.* x. (1862), 222; *Regel Gartenfl.* (1869), 323, t. 633; *André Ill. Hortic.* xix. 33, t. 90; *Bot. Mag.* t. 6762; *Engler Arac.* 452, and *Ic. ined.* No. 141 (excl. *var.* discolor and *Hab.* Burma, and *Syn.* Gonatanthus).

MARTABAN, and the Karen Hills, *Kurz.*

Closely allied to *S. discolor*, but a larger coarser plant, with stronger nerves, a longer differently coloured spathe, and fewer staminodes.

3. **S. assamica,** *Hook. f.*; leaves 7–8 in. ovate-oblong acute base rounded, spathe 3–3½ in. lanceolate caudate-acuminate red purple on both surfaces. Aroid. *Wall. Cat.* 8953.

ASSAM; Duphla Hills, *Lister* (*Ic. in Herb. Calcutt*). CACHAR, *Keenan.*

Caudex as thick as the thumb, fibrous above. *Leaves* bright green, paler beneath; petiole 6–8 in., slender. *Peduncle* 3–5 in. *Spathe* erect. *Spadix* ¾–1 in.; male infl. cylindric.—Wallich's specimen is without locality.

4. **S. Griffithii,** *Schott in Bonpland.* (1862), 222; leaves 4–5 in. ovate-oblong acute or cuspidate base emarginate or shortly 2-lobed, spathe 2–3 in. ovate-lanceolate acuminate yellowish green on both surfaces brown purple below the middle within. Gonatanthus Griffithii, *Schott Prodr.* 143.—Arum sp. *Griff. Notul.* iii. 144; *Ic. Pl. Asiat.* t. 164, *f.* 1.

UPPER BURMA, *Griffith*, at Namtuseek (*Kew Distrib.* 5970).

Caudex prostrate, elongate, clothed with fibres, as thick as a swan's quill. *Leaves* deep green above, glaucous-white beneath. *Spadix* ¼ in., male infl. cylindric.

5. **S. colocasioides,** *Hook. f.*; leaves 9–24 in. broadly ovate acute base broadly retuse, spathe 5–9 in. narrowly lanceolate acuminate tube convolute limb creamy-yellow, fem. infl. half free. Aroid. *Wall. Cat.* 8944, 8947.

SIKKIM HIMALAYA, *King* (*Ic. in Herb. Calcutt.*). SILHET, *De Silva.* CACHAR, *Keenan* (*Hort. Kew*).

Caudex elongate, 1½ in. diam., fibrous above. *Leaves* thin in texture, light green above, glaucous beneath; petiole 12–18 in., green. *Peduncles* several, 5–7 in. *Spathe* erect, tube 1 in., ovoid, green; limb membranous. *Spadix* 2 in., fem. infl. cylindric above the middle; male as long as the fem. cylindric. *Ovaries* globose; staminodes very minute, clavate?—Very different from its congeners in size and spathe.

6. **S. capitellata,** *Hook. f.*; leaves 8–9 by 7–8 in. orbicular-ovate subacute base broadly retuse, spathe 3½–4 in. pendulous from the decurved peduncle lanceolate acuminate yellowish-brown without pale purple and striated within, male infl. globose.

BURMA; in evergreen forests, Tonkyaghet, *Kurz* (*Ic. in Herb. Calcutt.*).

Caudex as thick as the little finger, densely fibrous; sheaths 4 in. *Leaves* pale green above, paler beneath, nerves about 5 pairs, strong, arched; petiole 1 ft., slender. *Peduncles* many (4 in the drawing), 4–5 in., very slender. *Spadix* ½–1 in., fem. infl. very long.

15. HAPALINE, *Schott.*

Small tuberous herbs. *Leaves* membranous, cordate or sagittate. *Spathe* long-peduncled, tube cylindric, decurrent tightly convolute, limb lanceolate or linear-oblong, flat. *Spadix* equalling the spathe; male and fem. infl. remote; male elongate; fem. adnate to the spathe, of few uniseriate ovaries. *Male fl.* an elongate hexagonal peltate shortly stipitate body, with 4–6 minute globose anther-cells pendulous from its margin. *Ovaries* ovoid, 1-celled, 1-ovuled; stigma disciform; ovule erect, anatropous.

1. **H. Benthamiana,** *Schott in Œstr. Bot. Wochenbl.* (1857), 85; *Prodr.* 162; leaves oblong-sagittate basal lobes narrow obtuse more than half as long as the anticous, spathe acuminate; *Engler Arac* 489; *Kurz in Journ. As. Soc. Beng.* xlii. ii. (1873), 109, t. 9. Hapale, *Schott Gen. Aroid.* t. 44.—*Aroid. Wall. Cat.* 8953 A.

BURMA; banks of the Attran river, *Wallich.* PEGU and MARTABAN, in dry forests, *Kurz.*

Tuber small. *Leaves* few, 3–4 in. long; sinus deep, narrow; petiole and peduncle slender. *Spathe* 2–3 in. long, membranous, white.

2. **H. Brownii,** *Hook. f.*; leaves ovate acuminate deeply cordate, basal lobes rounded ⅓rd the length of the anticous, spathe oblong apiculate.

MALAY PENINSULA; Quedah, alt. 100–500 ft. *King's Collector.*

Habit of *H. Benthamiana*, differing in the basal lobes of the leaf and form of the spathe.—Named after Mr. N. E. Brown, assistant in the Kew Herbarium.

(See p. 490).

16. REMUSATIA, *Schott.*

Tuberous *herbs*, flowering and leafing in alternate years? bearing long radical bulbilliferous shoots. *Leaf* solitary, entire, peltate. *Spathe* coriaceous; tube convolute, ovoid, accrescent over the fruit; limb broad or narrow, erect or spreading and reflexed, deciduous. *Spadix* very short, sessile, male and fem. infl. separated by neuters; appendage 0; male infl. clavate, of densely packed angular table-topped male fl. and neuters; fem. short, cylindric. *Stamens* with a fleshy connective bearing 2–3 small anther-cells opening by terminal slits. *Ovaries* ovoid, 1-celled; stigma sessile, disciform; placentas parietal; ovules many, orthotropous. *Berries* small. *Seeds* albuminous, embryo axile.

1. **R. vivipara,** *Schott Melet.* i. 18; *Syn.* 43; *Gen. Aroid.* t. 36; *Prodr.* t. 137; in *Ann. Gand.* (1846), t. 66; bulbilliferous shoots very stout suberect or ascending simple or very shortly branched, limb of spathe

reflexed broadly orbicular-obovate cuspidate. *Kunth Enum.* iii. 36; *Miquel Fl. Ind. Bat.* iii. 205; *Dalz. & Gibs. Bomb. Fl.* 259; *Grah. Cat. Bomb. Pl.* 228; *Wall. Cat.* 8939; *Engler Arac.* 496. Caladium viviparum, *Lodd. Bot. Cab.* t. 281. Colocasia vivipara, *Thw. Enum.* 336. Arum viviparum, *Roxb. Fl. Ind.* iii. 496; *Wight Ic.* t. 798.—*Rheede Hort. Mal.* xii. t. 9.

SUBTROPICAL HIMALAYA; alt. 2–3000 ft. from Kumaon to Sikkim. The KHASIA HILLS and BURMA. BEHAR, on Parasnath, alt. 4500 ft., *Clarke*. The WESTERN GHATS, and CEYLON.—DISTRIB. Java.

Tuber size of a hazel or walnut, viviparous shoots 6–11 in., bulbils squamosely crinite. *Leaf* 5 by 3½ to 18 by 12 in. membranous, orbicular ovate or cordate, acute or acuminate; petiole 1 ft. or less. *Spathe* 4–5 in. long, tube green, limb 2–3 in. broad, golden yellow. *Spadix* 1–1½ in.

2. **R. Hookeriana,** *Schott in Œstr. Bot. Wochenbl.* (1858), 133; *Prodr.* 187; bulbilliferous shoots slender prostrate or pendulous much branched, limb of spathe erect ovate-oblong acuminate. *Engler Arac.* 497.

TEMPERATE HIMALAYA; Simla to Sikkim, alt. 4–7000 ft.

Tuber as in *R. vivipara*. *Leaves* ovate-oblong, cordate, caudate-acuminate beneath between the nerves; petiole 2–9 in. *Spathe* 1½–2½ in., limb ½–⅔ in. broad, sometimes coppery, more or less convolute.

17. GONATANTHUS, *Klotzsch.*

Tuberous herbs, with the habit foliage and bulbilliferous shoots of *Remusatia*, but the shoots are branched and the spathe has a slender elongate convolute limb, there are no neuters between the male and fem. infl., and the ovules are numerous and basilar.

G. sarmentosus, *Klotzsch in Link & Kl. Ic. Pl.* i. 33, ii. 14; leaves ovate-cordate. *Kunth Enum.* iii. 36; *Schott Syn.* 44; *Gen.* t. 39; *Prodr.* 142; *Bot. Mag.* t. 5275; *Gartenfl.* (1868), 227, t. 588; *Engler Arac.* 571. Caladium pumilum, *Don Prodr.* 21. Colocasia? pumila, *Kunth Enum.* iii. 40.—Aroid. *Wall. Cat.* 8952.

TEMPERATE HIMALAYA; from Kumaon to Sikkim, alt. 4–6500 ft. KHASIA HILLS, alt. 4–5000 ft.

Tuber small and slender branched shoots with the small crinite bulbils of *Remusatia Hookeriana*. *Leaves* peltate, acuminate, dark green above; petiole 4–8 in. *Peduncle* 2–3 in. *Spathe* 6–10 in. long, tube ½–¾ in., ovoid, green; base of limb as long or longer than the tube, inflated, reclined, the rest suberect, with a long recurved tip, golden yellow, contracted at the base, margins completely convolute. *Spathe* with the fem. infl. in the tube, the stipitate clavate red-brown male in the swollen base of the limb. *Spadix* 1–1½ in. long; stipes of male infl. angular and crown of anthers chocolate-brown; fem. infl. short, ovaries few closely packed, globose, stigma a disciform area. *Berries* yellow. *Seeds* on long funicles, ovoid; testa rough, with a fleshy yellow coat.

2. **G.? ornatus,** *Schott in Œstr. Bot. Zeitschr.* (1858), 121; leaves lanceolate or oblong-lanceolate base cordate.

SIKKIM HIMALAYA, *Thomson*. KHASIA HILLS, alt. 5000 ft., *J. D. H. & T. T.*

In the absence of inflorescence this is an altogether doubtful plant. It differs from *G. sarmentosus* in the much narrower leaves, 5–10 by 1½–3½ in., which in the originally described Khasia specimens were of a fine coppery-purple between the green nerves and the broad green margin. In specimens apparently of the same plant from both Sikkim and the Khasia Hills, the leaves are green and concolorous. No bulbilliferous shoots have been seen.

18. COLOCASIA, *Linn.*

Tall coarse herbs, tuberous or with a stout short caudex, flowering and leafing together. *Leaves* stoutly petioled, peltate, ovate-cordate. *Spathe* stoutly peduncled; tube thick, accrescent, persistent, mouth constricted; limb erect, deciduous. *Spadix* shorter than the spathe, stout or slender; male and fem. infl. with usually interposed flat neuters; appendage cylindric subulate or 0. *Ovaries* and *ovules* as in *Remusatia*. *Berries* obconic or oblong. *Seeds* oblong, sulcate, albumen copious; embryo axile. —Species 6 or 7 tropical Asiatic.

1. **C. Antiquorum,** *Schott Melet.* i. 18: *Syn.* 40; *Prodr.* 38; leaves large ovate with a broad triangular basal sinus, tube of spathe oblong 2–4 times shorter than the narrow lanceolate limb, appendage very variable. *Miquel Fl. Ind. Bat.* iii. 202; *Kunth Enum.* iii. 37; *Thwaites Enum.* 335; *Benth. Fl. Austral.* vii. 155; *Engler Arac.* 491 and *Icon. ined.* No. 251. C. esculenta, and acris, *Schott Melet.* i. 18; *Kunth l. c.* C. nymphæifolia, *Kunth l.c.* C. Fontanesii, *Schott in Œstr. Bot. Wochenbl.* (1854), 409. C. pruinipes, *Koch & Bouché, Ind. Sem. Hort. Berol.* (1854), 4. C. euchlora, *C. Koch. & Lindl. l. c. App.* Caladium esculentum, *Vent. Hort. Cels.* 30; *Willd. Sp. Pl.* iv. 489; C. acre, *Br. Prodr.* 336; C. nymphæifolium, *Vent. l. c.*; *Griff. Notul.* iii. 144, t. 161 B 2 (ovules). Arum Colocasia *Linn. Sp. Pl.* 965; *Roxb. Fl. Ind.* iii. 494; *Grah. Cat. Bomb. Pl.* 228; *Wight Ic.* t. 786, f. 1. A. nymphæifolium, *Roxb. & Grah. ll. cc.*; *Wight l. c.* f. 2. A. peltatum, *Lam. Encycl.* iii. 13.—Colocasia, *Wall. Cat.* 8943—*Rheede Hort. Mal.* xi. t. 23.

Throughout the hotter parts of INDIA (up to 7600 ft. in the Himalaya) and CEYLON, in moist and dry places, wild or cultivated.—DISTRIB. cult. in all hot countries.

Leaves 6–16 in., dark green, dull, sometimes clouded with black; petiole stout, 3–4 ft., green or violet. *Peduncles* solitary or clustered and connate, much shorter than the petioles. *Spathe* 8–18 in., caudate-acuminate, erect, pale yellow. *Spadix* shorter than the spathe; fem. infl. as long as that of the staminodes, male infl. longer.—Very common and variable, Roxburgh distinguishes 3 varieties besides *nymphæifolia*, they are—1, a dark one from wet places in which the roots (base of stem?) never swell, but send out many suckers, and the leaves and petioles are more or less purple, it is much eaten; 2, one that grows on dry ground with dark purple or bluish clouds in the leaf; 3, one like the last but all green. Of *nymphæifolia*, which he describes as having repand leaves. He says that he doubts if it is anything but a large aquatic state, abundant wild on borders of lakes, with the subterraneous stem often as long and thick as a man's arm, reddish petioles peduncles and leaves, narrower leaves, and a short appendage; all parts are eaten.

2. **C. affinis,** *Schott in Bonpland.* (1859) 28; *Prodr.* 138; leaves ovate or orbicular-ovate base rounded retuse or cordate nerves very slender, tube of spathe cylindric 4–6 times shorter than the linear-lanceolate long acuminate limb, appendage as long or twice as long as the infl., stigma sessile discifform. *Engler Arac.* 492. Colocasia, No. 3, *Herb. Ind. Or. Hf. & T.* Alocasia Jenningsii, *Veitch in Ill. Hort.* (1869), t. 585; *Gard. Chron.* (1869), 136; *Flora des Serres*, xvii. 1818.—Aroid. *Wall. Cat.* 8952 B.

SIKKIM HIMALAYA, *King*. ASSAM, *Hamilton*. KHASIA HILLS, alt. 2–4000 ft. *J. D. H.* and *T. T.* BURMA; Prome Hills, *Wallich*.

Tuber small. *Leaves* 4–6 in. long and nearly as broad, membranous, green with dark blotches between the nerves, glaucous beneath, tip obtuse or acute; petiole slender, 6–8 in. *Peduncle* 3–5 in. *Spathe* 4–6 in., tube 1 in., tumid, green; limb primrose yellow. *Spadix* with a narrow neck between the male and fem. infl.

covered with flat neuters; appendage slender, narrowed to the tip, golden yellow.—In a fine drawing of this species in Herb. Calcutt. the stigma is represented as disciform.

3. **C. fallax,** *Schott in Bonpland.* (1859), 28; *Prodr.* 138; leaves orbicular-ovate base cordate or emarginate, nerves strong, tube of spathe 4–6 times shorter than the lanceolate limb, fruiting subspherical, style short, stigma disciform. C. Wendlandii, *Engl. Ic. ined.* No. 240.—Aroid. *Wall. Cat.* n. 8952 A.

Sikkim Himalaya, alt. 1–3000 ft., *Clarke.* Khasia Hills, alt. 1–4000 ft. *J. D. H.* and *T. T.*

Tuber small. *Leaves* 4–6 by 3–5 in., largest 8 by 7 in., much thicker in texture and with much stronger nerves than *C. affinis.* *Spathe* and *spadix* much as in *affinis,* but usually with fewer neuters between the male and fem. infl. *Anthers* stellately crenate in both.

4. **C. virosa,** *Kunth Enum.* iii. 39 (*in part*); leaves large ovate sub-undulate and repand, base rotuse, tube of spathe oblong much shorter than (but hardly distinct from) the narrowly lanceolate blade, spadix four times shorter than the spathe, appendage 0. *Schott Syn.* 41; *Prodr.* 139; *Engler Arac.* 494. Calla virosa, *Roxb. Fl. Ind.* iii. 517; *Wight Ic.* t. 808. Zantedeschia virosa, *C. Koch Ind. Sem. Hort. Berol.* (1854), *App.* 9.

Bengal and the lower Provinces of India, *Roxburgh.*

Stem short, simple, cylindric. *Leaves* 1–2 ft. by 6–15 in.; petiole about as long, terete, smooth, green. *Peduncles* clustered. *Spathe* nearly straight, subulate, convolute. *Spadix* 3 in., obtuse, lower third female. *Anthers* peltate, 8–12-celled; ovaries broadly ovoid 1-celled, stigma large subsessile peltate; placentas 3–4.—Descript. from Roxburgh; nothing further being known of this plant.

5. **C. Mannii,** *Hook. f.*; leaves oblong-ovate base sagittate lobes very obtuse sinus broad acute, spathe narrowly oblong cymbiform, spadix half as long as the spathe sub-acute, appendage 0.

Upper Assam; at Makum, *Mann.*

Leaves 8–12 by 4–7 in., nerves 6–7 pairs, not stout, basal lobes 4 in.; petiole 1–3 ft. *Peduncle* rather slender. *Spathe* 6–7 in., tube 1 in. *Spadix* 1½–4 in.; male infl. 1 in. intermediate space ½ in.; male 1½–1½, tip rounded. *Anthers* stellately crenate. *Ovaries* globose, stigma a discoid area.

6. **C. gigantea,** *Hook. f.* petiole pruinose, leaves very large ovate-cordate, spathe 6 in., limb oblong or elliptic-oblong cymbiform cuspidate, appendage very short acute. C. indica, *Engler Arac.* 494 (*not Kunth*). Leucocasia gigantea, *Schott in Œstr. Bot. Wochenbl.* (1857), 34; *Prodr.* 141 (*excl. syn.* pruinipes).

Perak, *Scortechini.*—Distrib. Cochinchina, Java.

Leaves 18–20 by 14–18 in., base deeply cordate, margin repand; nerves 8–10 pairs, very stout; lobes 6–8 in., rounded, sinus open; petiole 2–3 ft. *Peduncle* very stout, tall. *Spathe* 5–6 in., coriaceous; tube 2½ in., glaucous, limb erect. *Spadix* yellow, fem. infl 1½ in. conic; neuter infl. 1 in. slender; male stout, cylindric, terminating in a rudimentary conic appendage. *Ovaries* very numerous, narrow, stigma very broad, covering the whole ovary; ovules parietal, scattered.—The ovaries are quite unlike those of its congeners.

19. ALOCASIA, *Schott.*

Characters of *Colocasia,* but ovules few, basilar, erect.—Species perhaps 20 or 30, tropical Asiatic.

* *Leaves not or slightly peltate, lower nerves approximate and flabellately spreading.*

1. **A. cucullata,** *Schott Melet.* 18; *in Œstr. Bot. Wochenbl.* (1854), 410; *Syn.* 48; *Prodr.* 156; leaves subpeltate broadly ovate-cordate nerves 6–7 pairs, petiole very long, peduncles shorter subsolitary. *Engler Arac.* 498. A. rugosa, *Schott in Wochenbl. l. c.*; *Syn.* 49; *Prodr. l. c.* Colocasia cochleata, *Miq. Epimel. Sem. Hort. Amstelod.* (1853). C. rugosa, *Kunth Enum.* iii. 41. C. cucullata, *Schott Melet.* i. 18; *Wall. Cat.* 8940; *Kunth l. c.* 38; *Thw. Enum.* 336. Caladium cucullatum, *Pers. Syn.* ii. 575. Arum cucullatum, *Lour. Fl. Cochinch.* 656; *Roxb. Fl. Ind.* iii. 501; *Wight Ic.* t. 787.

BENGAL, *Roxburgh* (cultivated *Clarke*). The KHASIA HILL., alt. 4000 ft. *J. D. H.* and *T. T.* PEGU, *Kurs.* CEYLON (native?) *Thwaites.*

Rootstock 1–2 ft., with many suckers, branched, inclined. *Leaves* 6–12 by 4–7 in., ½-circular, nerves very stout; petiole 1–3 ft., green. *Spathe* 6–12 in. fleshy, tube 2–4 in.; limb narrowly cymbiform, margins convolute. *Spadix* shorter than the spathe, appendage short.

2. **A. montana,** *Schott in Œstr. Bot. Wochenbl.* (1854), 140; *Syn.* 47; *Prodr.* 154; leaves broadly ovate-cordate repand, nerves 5–6 pairs, petiole short stout, peduncles many connate below. *Miq. Fl. Ind. Bat.* iii. 209; *Engler Arac.* 499. Colocasia? montana, *Kunth Enum.* iii. 40. Arum montanum, *Roxb. Fl. Ind.* iii. 497; *Wight Ic.* t. 796.

NORTHERN CIRCARS, *Roxburgh.*—DISTRIB. Java.

Rootstock subcylindric, as thick as the wrist, with long suckers from the crown. *Leaves* 6–8 in., shining; petiole 8–10 in., sheathing half way up. *Spathe* 4–6 in., coloured, limb thrice as long as the tube. *Spadix* nearly as long as the spathe; appendage 2½ in. *Stigma* 3–4-lobed.—I have seen no specimen.

3. **A. rapiformis,** *Schott Prodr.* 157; *Engler Arac.* 510. Colocasia rapiformis, *Kunth Enum.* iii. 40.

PEGU, *Carey.*

Differs, according to Roxburgh, from *A. montana* in having a tuberous turnip-shaped root.—I have seen no specimen.

** *Leaves not or hardly peltate, nerves pinnate.*

4. **A. indica,** *Schott in Œstr. Bot. Wochenbl.* (1854), 410; *Syn.* 46; *Prodr.* 144; leaves large ovate deeply sagittately cordate repand, lobes rounded sinus narrow, tube of spathe many times shorter than the very long linear-oblong subtruncate cuspidate limb, stigma sessile 3–4-cleft. *Miquel Fl. Ind. Bat.* iii. 206; *Engler Arac.* 501. Colocasia indica, *Kunth Enum.* iii. 39. Arum indicum, *Roxb. Fl. Ind.* iii. 498; *Wight Ic.* t. 794.—Aroid. *Wall. Cat.* 8948.

TROPICAL ASIA; native and cultivated.—DISTRIB. tropics (cult.).

Stem attaining 8 ft., stout, 3–8 in. diam., emitting bulbilliferous suckers. *Leaves* 2–3 ft., tip a deflexed cusp, basal lobes sometimes very shortly connate, nerves about 8 pairs; petiole stout, transversely clouded. *Peduncles* (always in pairs, *Roxb.*) shorter than the petioles. *Spathe* 8–12 in., pale yellow-green. *Spadix* equalling the spathe; appendage longer than the infl. *Ovary* 1-celled.

5. **A. denudata,** *Engler Arac.* 507; leaves triangular-sagittate, shortly acuminate about a third as broad as long, basal lobes nearly as long as the anticous with the costæ marginal, petiole and peduncle long slender. A. singaporensis, *Linden in Gartenfl.* xiv. 292.

SINGAPORE, *Gaudichaud.*

I have seen only two leaves of a cultivated specimen of *A. singaporensis* which so conform to the description and habitat of *A. denudata*, that I conclude they are referable to that species, one has a triangular ovate hastate leaf with divaricate lobes, the other more sagittate with approximate lobes as long as the terminal.

**** Leaves peltate, basal lobes connate for $\frac{1}{10}$–$\frac{1}{3}$ (rarely $\frac{1}{2}$) their length.*

6. **A. macrorrhiza,** *Schott in Œstr. Bot. Wochenbl.* (1854), 409; *Syn.* 45; *Gen.* t. 40; *Prodr.* 146; leaves broadly ovate-sagittate repand basal lobes rounded connate for $\frac{1}{10}$ their length, sinus narrow, peduncles short, tube of spathe half as long as the coriaceous incurved cymbiform cuspidate limb, stigma subsessile disciform entire. *Miq. Fl. Ind. Bat.* iii. 205; *Engler Arac.* 502 *& in Mart. Fl. Bras.* iii. Pt. ii. 202, t. 46, 47. A. odora, *C. Koch Ind. Sem. Hort. Berol.* (1854), *App.* 5; *Engler Arac.* 503. A. commutata, *Schott in Œstr. Bot. Wochenbl.* (1854), 409. Colocasia macrorrhiza. *Schott Melet.* i. 18, *Thw. Enum.* 336; C. odora, *Brongn. in Ann. Mus. Par.* iii. (1834), 145, t. 7; *Kunth Enum.* iii. 39. C. odorata, *Hook. Bot. Mag.* t. 3935. C. mucronata, *Kunth l. c.* 40. Caladium macrorrhizon, *Br. Prodr.* 336. C. odorum, *Lindl. Bot. Reg* t. 641. C. odoratissimum, *C. Koch in Berl. Allg. Gartenz.* (1857), 20. C. glycirrhizum, *Fraser in Hook. Bot. Misc.* i. (1830), 259. Philodendron? peregrinum, *Kunth l. c.* 51. Arum macrorrhizon and peregrinum, *Linn. Sp. Pl.* 965, 966. A. odorum, *Roxb. Fl. Ind.* iii. 499; *Wight Ic.* t. 797; *Lodd. Bot. Cat.* t. 416.—Colocasia, *Wall. Cat.* n. 8941.

TROPICAL and SUBTROPICAL INDIA, wild and cult. Cult. in the tropics generally.

Stem 6–16 ft., attaining 1 ft. diam. *Leaves* 2–4 by 6–18 in., nerves 10–12 pairs, very stout, basal lobes incurved; petiole 2–4 ft., base sometimes as thick as the arm. *Peduncles* 2 (or more?) in each axil, 6–8 in., stout. *Spathe* 6–10 in., limb hooded and cuspidate at the top. *Spadix* nearly as long as the spathe; appendage nearly equalling the infl., cylindric, obtuse, sinuously sulcate. *Ovary* incompletely 4-celled. *Berries* size of a cherry.

7. **A. decipiens,** *Schott in Bonpland.* vii. (1859), 28; *Prodr.* 28; leaves oblong sagittate twice as long as broad cuspidate, posticous lobes half the length of the anticous united for $\frac{1}{3}$–$\frac{1}{10}$ their length, petiole long slender, peduncles long, tube of spathe shorter than the oblong cymbiform acuminate limb, style short, stigma capitate entire.

PEGU, *McLelland.* ANDAMAN ISLDS., *Prain.*

Leaves 9–18 by 4–9 in.; lobes 7 in., ovate-oblong, sinus broad open; nerves 6–7 pairs; petiole 2–3 ft. *Peduncle* 12–24 in. *Spathe* 4 in., tube 1½ in.; appendage? *Ovaries* globose. *Fruiting* tube of spathe ellipsoid or pyriform, 1–1½ in. *Seeds* ½–¾ in diam.

8. **A. fornicata,** *Schott in Œstr. Bot. Wochenbl.* (1854), 410; *Syn.* 47; *Prodr.* 157; leaves ovate-lanceolate sagittate basal lobes much shorter than the anticous connate ¼ or ⅓ their length obtuse or subacute sinus narrow acute, tube of spathe about half as long as the oblong cymbiform acuminate limb, ovary narrowed into a distinct style, stigma 3–4-lobed. *Engler Arac.* 506. Colocasia? fornicata, *Kunth Enum.* iii. 41. Arum fornicatum, *Roxb. Fl. Ind.* iii. 501; *Wight Ic.* t. 792 (*not* t. 789); *Griff. Notul.* iii. 130, 132, t. 167.—Colocasia, *Wall. Cat.* 8941, 8945.

BENGAL, SILHET, ASSAM and CHITTAGONG, *Roxburgh,* &c.

Stem 1–3 ft., inclined or prostrate, 1½ in. diam. *Leaves* 8–12 by 4–5 in., acute or obtuse, slightly waved, nerves 6–8 pairs; petiole 8–12 in. and shorter peduncle clouded. *Spathe* 3–4 in., greenish yellow. *Spadix* nearly as long as the spathe; appendage ½–1½ in., about as long as the infl. *Seeds* ⅛ in. diam., globose.

9. **A. navicularis,** *Koch & Bouché Ind. Sem. Hort. Berol.* (1855), *App.* 2; *in Ann. Sc. Nat. Ser.* IV. i. 338, leaves broadly oblong sagittate contracted opposite the triangular obtuse divergent posticous lobes which are united for ¼–⅓ their length, tube of spathe half as long as the oblong cymbiform acute limb, style very short, stigma disciform obscurely lobed. *Engler Arac.* 505 (*excl. syn.* fallax); *Ic. Arac.* No. 124. Colocasia navicularis *Koch & Bouché l. c.* (1853), 13.

KHASIA HILLS, alt. 1–4000 ft.—*J. D. H. & T. T.*

Stem short. *Leaves* 8–18 by 5–8 in., cuspidate; basal lobes 3–7 in., much shorter than the anticous, nerves 4–6 pairs; petiole 1–2 ft. *Spathe* 4–5 in.; spadix about 3 in.; appendage as long or longer than the infl., sinuously sulcate. *Seeds* turbinate, ⅛ in. long.

10. **A. fallax,** *Schott in Bonpland.* vii. (1859), 28; *Prodr.* 150; leaves broadly ovate or orbicular-ovate sagittate basal lobes one-third as long as the anticous connate from ⅓–½ their length converging sinus narrow, tube of spathe oblong lanceolate cuspidate limb, ovaries narrowed into a rather long style, stigma 3-cleft.

SIKKIM HIMALAYA and KHASIA HILLS, alt. 2–4000 ft.; *J. D. H. & T. T.*

Leaves 12–20 by 9–12 in. or more; basal lobes 4–8 in.; nerves numerous, 7–9 pairs; petiole 1–2 ft. *Peduncle* 18 in. *Spathe* 5–6 in., membranous, yellow; fruiting tube 2–2½, ellipsoid or pyriform. *Seeds* ¼ in. diam., globose.—Near *A. decipiens*, but seeds larger, and stigma very different, basal lobes of many-nerved leaves approximate. It is probably nearer *A. fornicata.*

11. **A. longiloba,** *Miq. Fl. Ind. Bat.* iii. 207; *in Bot. Zeit.* (1856), 564 leaves oblong-lanceolate caudate-acuminate sagittate, basal lobes obtusely triangular more than half as long as the anticous connate from ½–1 in., sinus triangular obtuse. *Schott Prodr.* 153; *Engler Arac.* 506. A. amabilis, *Hort. Bull.* Caladium heterophyllum, *Presl. Plant. Jav. Zolling.* n. 601.

SINGAPORE (*Herb. DC*), ?*Wallich*, without name, number or locality.—DISTRIB. Java, Borneo.

Leaves 12–20 by 4–5 in. across the insertion of the petiole. Limb of *spathe* 4 in., lanceolate, acuminate. *Spadix* 3 in. *Seeds* $\frac{1}{10}$–⅛ in. diam.

******** *Leaves peltate, basal lobes connate for half or all their length.*

12. **A. acuminata,** *Schott in Bonpland.* vii. (1859), 28; leaves elongate-rhombic caudate-acuminate contracted opposite the basal lobes which are half as long as the anticous and connate for ¼ their length. *Engler Arac.* 450.—Colocasia? *Wall. Cat.* 8946.

CHITTAGONG, *J. D. H.* and *T. T.*; PEGU, *Kurz.* UPPER BURMA, *Anderson*; Saluen river, *Wallich.*

Caudex horizontal. *Leaves* 6–12 by 3–5 in., membranous, costal nerves 3–4 pairs, lobes nearly parallel, sinus narrow, obtuse.

13. **A. Beccarii,** *Engler Arac. Spicileg. Born. e Pap.* 14; leaves coriaceous oblong-ovate or -lanceolate caudate-acuminate narrowed to the basal lobes which are connate throughout their length and ⅓–½ as long as

the anticous, tube of spathe as long as the cymbiform limb, appendage as long as the infl. A. perakensis, *Hemsl. in Journ. Bot.* xvii. (1887), 205.

PERAK; *Wray, Scortechini.*

Stem subscandent, rooting, as thick as a swan's quill. *Leaves* thickly coriaceous or fleshy, nerves 3–4 pairs, slender, depressed, posticous lobes parallel; petiole 3–5 in., slender, sheath very short. *Peduncle* as long as the petiole. *Spathe* 2½ in., white or green, tube oblong; appendage cylindric, obtuse. *Ovaries* scattered, obovoid; style long, stigma disciform, 3-lobed. *Seeds* globose, ¼ in. diam.

DOUBTFUL AND EXCLUDED SPECIES.

A. ALBA, *Schott in Œstr. Bot. Zeitschr.* (1852), 59; *Syn.* 48; *Prodr.* 149; is a Javan species, attributed to Ceylon on the faith of a specimen from Herb. Burmann (*in Herb. Delessert.*)

A. FORNICATA (Caladium), *Roxb. of Wight Ic.* t. 789 (*not of Fl. Ind. & Wight Ic.* t. 792).—*Ic. Roxb.* n. 1655.

Stem as thick as the wrist, annulate. *Leaves* ovate-cordate, acuminate, 6–7 by 5 in., basal lobes connate for $\frac{1}{10}$ of their length, sinus very acute, nerves 5–6 pairs; petiole 8–12 in., sheathing half way up. *Peduncles* binate, 6 in. *Spathe* 4 in., tube 1 in., ellipsoid, green; limb 1½ in. broad, obovate, cuspidate, open, yellow. *Spadix* as long as the spathe, pale yellow; appendage stout, conical, acuminate, as long as the infl. *Ovary* ovoid, narrowed into a style with a 3-fid stigma. *Seed* broadly ovoid.—I cannot identify this with any Indian species; it is probably one of Roxburgh's plants collected near Samulcottah in the Northern Circars.

ALOCASIA, sp. Malacca, *Griffith* (*Kew Distrib.* 6308, 6009), and A. sp., Malacca, *Maingay* (*Kew Distrib.* 1549, 1549[a]) may both be new, but are not in a good state, and may be referable to Malayan species unknown to me.

20. AGLAONEMA, *Schott.*

Herbs, caudex erect or prostrate. *Leaves* ovate or oblong. *Spathe* erect, deciduous, tube convolute, limb cymbiform gaping or base shortly convolute. *Spadix* equalling the spathe, or shorter, stipitate; male and fem. infl. usually contiguous, with rarely neuters interspersed; appendage 0. *Stamens* 2–4, distinct, subclavate; anthers short, cells remote with apical pores. *Ovaries* few, 1-rarely 2-celled, stigma large or small, discoid or cupular; ovules solitary in the cells, anatropous, subbasilar. *Berries* capitate. *Seeds* exalbuminous; embryo macropodal.—Species about 20, Tropical Asiatic and African.

* Nerves of leaf numerous, close, parallel, all uniform, very slender. (See also 10. *A. pumilum*).

1. **A. Griffithii,** *Schott Syn.* 123; leaves 12–16 by 3–4 in. linear-oblong obtuse, petiole 2–3 ft., stigma cup-shaped. A palustre, *Teysm. and Binnend. in Naturk. Tijdschr. Ned. Ind.* xxv. (1863), 305; *Kurz in Journ. As. Soc. Beng.* xiv. pt. ii. (1876), 153. Aglaodorum Griffithii, *Schott Gen.* t. 58; *Prodr.* 306; *Engler Arac.* 443.

MALACCA, *Griffith* (*Kew Distrib.* 5991).—DISTRIB. Sumatra.

Leaves coriaceous; petiole very stout. *Peduncle* 12–18 in., very stout. *Spathe* 2 in., oblong, cuspidate. *Ovaries* 2-celled.

2. **A. oblongifolium,** *Schott in Wien. Zeitschr.* iii. (1829), 892 (*ex Linnæa* vi. (1831), *Litterb.* 53); leaves 8–24 by 2–4 in. linear-oblong acu-

minate base acute, petiole 4–6 in. sheathing to near the top, spathe 2–4 in. oblong cuspidate. *Kunth Enum* iii. 55. A. integrifolium, *Schott Melet.* 20. A. nitidum, *Kunth l. c.* 56; *Schott Syn.* 122; *Prodr.* 302; *Engl. Arac.* 438. Calla oblongifolia, *Roxb. Fl. Ind.* iii. 516; *Wight Ic.* t. 806. C. nitida, *Jack. in Mal. Misc.* i., No. 1, 24. Arum integrifolium, *Link. Enum. Hort. Berol.* ii. 394.—Aroid. *Wall. Cat.* 8965.

PENANG, PERAK, and SINGAPORE, *Wallich*, &c.—DISTRIB. Borneo.

Caudex 1–3 ft. *Leaves* coriaceous, dark green, shining. *Peduncles* 4–8 in. *Spathe* green, margins white. *Spadix* stout, nearly as long as the spathe; male infl. subacute. *Ovary* 1-celled; stigma tabular, much broader than the ovary (ex *Ic. Scortechini*).

3. **A. Helferi,** *Hook. f.*; leaves 6–10 by 2–2¼ in. oblong-lanceolate caudate-acuminate base acute, petiole 5–6 in. sheathing for the lower third, peduncles 2–3 in., spathe 1 in. oblong-lanceolate acute.

TENASSERIM, *Helfer* (*Kew Distrib.* 5994).

Caudex 6 in. and upwards, branched, as thick as a swan's quill, leafy upwards. *Leaves* thin, costa not very stout, nerves very slender. *Spadix* with the stipes nearly equal the infl. *Ovary* 1-ovuled, stigma disciform.

4. **A. Clarkei,** *Hook. f.*; scandent, leaves 7–9 by 2–3 in. elliptic-lanceolate caudate-acuminate base acute, petiole 8–9 in. slender sheathing at the base only, peduncle 5–6 in., seeds ¾–1 in., fusiform.

CHITTAGONG; at Kasalong, *Clarke.*

Near *Helferi*, but the petioles are much longer and more slender, the leaves of a firmer texture with stronger costa and nerves.

** Primary nerves much stronger than the intermediate or secondary.

† *Leaves* 8–12 *in.*

5. **A. Hookerianum,** *Schott in Bonpland.* vii. (1859) 30; *Prodr.* 301; leaves 8–11 by 3½–4½ in. elliptic-ovate or -oblong acuminate, base rounded or cuneate and unequal-sided, primary nerves 6–8 pairs arching, petiole 6–8 in. stout sheathing to about the middle or beyond it, spathe 1½–2 in. oblong cuspidate. *Engler Arac.* 438; *N. E. Br. in Gard. Chron.* (1882) iii. 333.

KHASIA HILLS, alt. 2–3000 ft., *Griffith*, &c. CACHAR, *Keenan.* CHITTAGONG, at Seetakoond, *H.f. & T., Lister.* ARRAKAN; *Kurz.*

Caudex elongate, ½ in. thick, nodose. *Leaves* thinly coriaceous, dark green above; nerves very slender. *Spathe* cymbiform, dark green. *Spadix* long-stipitate. *Ovaries* few, flagon-shaped, narrowed into a conical style. *Seeds* ½–1 in. long, cylindric.

6. **A. birmanicum,** *Hook. f.*; leaves 8–10 by 2½–3½ in. elliptic-oblong or -lanceolate caudate-acuminate, base rounded, primary nerves about 10 pairs erecto-patent slightly curved, petiole 2–5 in. sheathing to about the middle, peduncle very short, spathe 1½ in. linear-oblong caudate-acuminate.

UPPER BURMA; in low woods towards Nempean, *Griffith.*

Caudex 2 ft., erect, probably as thick as the little finger, leafy at the top only; sheaths 1–2 in, red. *Leaves* thinly coriaceous, primary nerves distinct. *Peduncle* ½–1 in. *Spathe* greenish. *Spadix* white.—The less curved nerves and narrow caudate spathe are quite unlike any allied species.

7. **A. Schottianum,** *Miq. Fl. Ind. Bat.* iii. 316; *in Bot. Zeit.* (1856),

565; leaves 8–12 by 1½–4½ in. oblong acuminate or subcaudate, base acute rounded on cordate sometimes unequal-sided, primary nerves 9–12 pairs, petiole sheathing to ½–⅓ its length, peduncles short, spathe 1½ in. oblong cuspidate. *Schott Prodr.* 303; *Engler Arac.* 440. A. longe-cuspidatum, *Schott l. c.* 304. A. malaccense, *Schott in Bonpland.* (1859) 30; *Prodr.* 302.—Aroid. *Wall. Cat.* 8961.

BURMA; from Pegu to Tenasserim, *Wallich*, &c. PERAK, *Scortechini.* MALACCA, *Griffith* (*Kew Distrib.* 5984, 5985).—DISTRIB. Java, Borneo.

Stem stout (climbing often 30–40 ft., *King's Collector*). *Leaves* subcoriaceous, usually 3 times as long as broad, with parallel sides, rarely ovate-lanceolate; lower nerves spreading and arching or nearly straight; petiole 3–7 in., stout. *Seeds* ½ in. long.—The narrower leaved specimens represent the typical *Schottianum.*

8. **H. nicobaricum**, *Hook. f.*; leaves ovate or oblong shortly acuminate, base rounded equal or somewhat unequal-sided, principal nerves 7–9-pairs, petiole short sheathed to the middle, peduncles equalling or shorter than the petiole, spathe 1½ in. oblong acuminate.

NICOBAR ISLANDS, *Kurz*, *King's Collector.*

Stem probably as thick as the little finger. *Leaves* 8–10 by 3–4½ in., secondary nerves indistinct; petioles 3–5 in., rather slender.—The broad thin leaves with short points are very different from *birmanicum* and *malaccense.*

†† *Leaves 3–4 in. long; petiole sheathing at the base only.*

9. **A. Scortechinii**, *Hook. f.*; leaves ovate to elliptic-oblong acuminate, primary nerves 6–7 pairs arched strong beneath secondary few obscure, petiole ½–1 in. sheathing at the base only, spathe terminal, peduncle ½–2 in.

PERAK, *Scortechini.*

Stem erect, 6–12 in., as thick as a swan's quill. *Leaves* membranous, rather waved, "pustular beneath," *Scort.*). *Seed* ellipsoid, obtuse, ⅛ by ¼ in.

10. **A. pumilum**, *Hook. f.*; leaves 3–4½ in. ovate or ovate-lanceolate acuminate, base rounded, primary nerves very faint arched, petiole shorter than the limb, spathe ¾ in. oblong apiculate, peduncle slender nearly as long as the petiole. Aroid. *Wall. Cat.* 8960 B.

BURMA; Chappedong Hill, *Wallich*; Mergui, *Griffith.*

Caudex probably as thick as a goose-quill, rooting. *Leaves* thinly coriaceous, primary nerves sometimes undistinguishable from the secondary. *Seed* ⅛ in. long, ellipsoid.

11. **A. minus**, *Hook. f.*; leaves 3–4 oblong or ovate-oblong acuminate, base rounded, primary nerves 3–4 pairs faint arched, petiole shorter than the limb, peduncle very short. A. pictum, *Engler Arac. in part* (*not of Kunth*).—Aroid. *Wall. Cat.* 8960 A.

SINGAPORE, *Wallich.*

Caudex erect, 6–7 in., as thick as a swan's quill. *Leaves* thinly coriaceous, brown when dry, primary nerves sometimes undistinguishable from the secondary; petiole slender. *Peduncle* ½–¾ in.

12. **A. nanum**, *Hook. f*; leaves 4–5 in. ovate- or oblong-lanceolate acuminate coriaceous, base subacute unequal-sided, primary nerves 5–6 pairs arched, sunk above prominent beneath, petiole shorter than the blade, peduncles 1–1½ in., spathe ¾ in. oblong beaked.

PERAK; in dense Bamboo forests, alt. 4–600 ft., *King's Collector.*

Stem as in *A. minus*, but leaves much more coriaceous, with strong nerves,

secondary very indistinct. *Petiole* not half the length of the blade, slender. *Spathe* yellow-green. *Seed* ¼ in. long, linear-oblong.

13. **A. costatum,** *N. E. Br. in Gard. Chron.* 1892, i. 426; leaves 4–5 in. ovate acute or cuspidate, blotched with white base retuse or subcordate, primary nerves 7–9 pairs spreading and strongly arched, petiole stout, shorter than the blade, peduncle stout, spathe 1 in. obovoid, spadix protruding.

PERAK, *Curtis* (*Hort. Veitch*).

Leaves 2½–3 in. broad, dark green, costa stout, base rather unequal-sided; petiole ⅛ in. diam., terete, sheath basal. *Spathe* light green, subacute. *Spadix* very large, the protruding male part ¾ in. long, ⅓ in. diam.

21. **HOMALOMENA,** *Schott.*

Herbs, rhizome stout or 0 *Leaves* entire very variable in shape. *Spathe* usually erect, convolute, wholly persistent round the fruit. *Spadix* included; male and fem. infl. close together, cylindric; ovaries with or without clavate staminodes. *Stamens* distinct, in dense groups; anther-cells very short or oblong opening by pores or slits; connective thick. *Ovaries* ovoid or globose, perfectly or imperfectly 2–4-celled, stigma sessile; ovules 2-seriate or the placentas, anatropous or ½-anatropous. *Berries* few- or many-seeded. *Seeds* small, ovoid, albuminous. *Embryo* axile.—Species about 30, tropical.

Chamæcladon, as constituted by Schott, cannot (as Mr. N. E. Brown had previously observed) be separated from *Homalomena* by the ovarian cells, or by any other character. A more natural generic division of the species of both would be into those with the spathe contracted above the fem. infl. and those with no such contraction; and I have adopted this as a sectional character. The further grouping of the species here described is artificial, and not very reliable, it is the best I could devise from Herbarium and often hardly sufficient specimens. *H. rostrata* differs from the generic character in having a vacant space in the spadix between the male and fem. infl.

* Spathe contracted above the female infl.

1. **H. sagittæfolia,** *Jungh. ex Schott Prodr.* 311; leaves ovately or deltoidly sagittate acuminate not much longer than broad, basal lobes usually spreading, sinus rounded at the base, spathes many 3–4 in. long, tube much shorter than the limb. *Miq. Fl. Ind. Bat.* iii. 212; *Engler Arac.* 334. ? H. propinqua, *Schott in Ann. Mus. Lugd. Bat.* i. 280; *Engler l. c.* 33.

PERAK; *Scortechini, Wray,* alt. 2500–3500 ft., *King's Collector.*—DISTRIB. Borneo.

Robust (stemless, *Scortech.*). *Leaves* 8–14 by 6–10 in., firm; lobes rarely conniving, sinus broad or narrow; nerves rather strong; petiole 1–1½ ft., sheathing to the middle. *Peduncle* 6–9 in. *Tube of spathe* 1–1½ in., limb 2–3 in. by 1 broad, white, pink when young. *Spadix* stipitate. *Male infl.* 3 in. by ¼ in. diam., fem. 1 in. *Stamens* in groups of 5–6. *Ovary* oblong, 3-celled; stigma pulvinate.—Descript. chiefly from notes by Scortechini.

2. **H. paludosa,** *Hook. f.*; leaves oblong-hastate usually twice as long as broad acuminate, basal lobes divaricate obtuse or rounded, sinus broad rather deep, base rounded, spathes numerous 3–4 in., tube as long as the limb.

PERAK; *Larut*, in very wet jungly places, *King's Collector*, *Scortechini*.

Leaves 7–10 by 2½–4 in.; primary nerves slender; petiole 8–12 in.. sheathing to the middle. *Peduncles* 2–7, 6–7 in. when flowering, elongating to 12 in. *Spathe* white, striped with pale green. *Spadix* stout, stipitate, male infl. rather slender, about equalling the fem. *Ovary* 3-celled; stigma pulvinate, obscurely 3-lobed.

3. **H. rostrata**, *Griff. Notul.* iii. 154 (*err. typ. roshalum*); limb of leaves 12–20 by 3–6 in. oblong-lanceolate acuminate, petiole as long sheathing to beyond the middle, spathes many 4–6 in. *Schott Syn.* 119; *Prodr.* 312. Chamæcladon sanguinolentum, *Griff. l. c.* 147; *Schott Prodr.* 316.

MALACCA, *Griffith* (*Kew Distrib.* 5989, 5990).

Habit of *Calla aromatica* (Griffith). *Leaves* coriaceous, dark green, undulate, base acute or cuneate; primary nerves many, faint. *Peduncles* crowded, blood-red, 8–12 in. *Spathes* constricted below the middle, fleshy, green, margins white; tube narrow, limb convolute. *Spadix* shortly stipitate, slightly curved; male infl. about twice as long as fem. with a short naked space intervening; staminodes capitate. *Ovaries* subglobose, 2–4-celled; stigma pulvinate.

** Spathe not contracted above the fem. infl.

† Leaves 6–12 in. broad, deeply cordate sagittate or hastate. Spathe 2–4 in. long.

4. **H. rubescens**, *Kunth Enum.* iii. 57; leaves cordate or sagittately cordate acuminate, basal lobes semi-ovate or rounded approximate much shorter than the anticous, sinus narrow, spathes red. *Schott Syn.* 118; *Prodr.* 310; *Engl. Arac.* 336 (excl. *singaporensis*). H. rubra, *Hassk. ex Regel Gartenfl.* (1869), t. 634. Zantedeschia rubens, *C. Koch Ind. Sem. Hort. Berol.* 1854, *app.* Calla rubescens, *Roxb. Fl. Ind.* iii. 515; *Wight Ic.* t. 807.

SIKKIM HIMALAYA and KHASIA HILLS, *J. D. H.* CHITTAGONG, *Buchanan.*—DISTRIB. Java.

Caudex short, rooting, 1 in. diam. *Leaves* 6–12 in, usually tinged with red, sinus subacute or rounded at the red petiole, which is longer than the leaf, and sheathing for ⅓ its length. *Peduncles* several, 3–4 in., stout. *Spathe* 3 in., oblong, acute at base and top.—I am very doubtful as to the limits and habitats of this species, it being impossible to distinguish some forms of *cærulescens* from it. Roxburgh, perhaps by error, describes the petioles as 1–5 ft. long; he figures the sinus as more acute than in any of the specimens I refer to the species.

5. **H. aromatica**, *Schott Melet.* i. 20; *Syn.* 117; *Prodr.* 309; leaves as in *H. rubescens* but lobes divaricate and spathe green. *Engler Arac.* 335. H. cordata, *Schott Melet.* 20; *Syn.* 118; *Prodr.* 309; *Kunth Enum.* iii. 57; *Miq. Fl. Ind. Bat.* iii. 211. H. Gaudichaudii, *Schott in Miq. Ann. Mus. Lugd. Bat.* i. 280. Zantedeschia aromatica, cordata and fœtida, *C. Koch Ind. Sem. Hort. Berol.* (1854), *app.* Calla aromatica, *Roxb. Fl. Ind.* iii. 513; *Bot. Mag.* t. 2279; *Wight Ic.* t. 805. C. occulta, *Lodd. Bot. Cab.* t. 12.

ASSAM; *Masters*, *Griffith* (*Kew Distrib.* 5966, 5967). CHITTAGONG, *Roxburgh*.

This is no doubt a different plant from *H. rubescens*, as living specimens would show; but except the green more obtuse spathe, as shown in Roxburgh's drawing, I find no diagnostic characters given, and I have seen no authentic specimens. Roxburgh's character of basal lobes rounded and divaricate is contravened by one of the leaves in his drawing, which accord in its deeply cordate base and very acute sinus with *H. rubescens*.

6. **H. cœrulescens,** *Jungh. ex Schott Prodr.* 310, leaves deltoidly ovate acute or acuminate, base subhastate or cordate with a broad shallow sinus, rarely sagittately cordate, lobes rounded at the tip, spathe 2½–3½ in. subacute pale yellow white within. *Miq. Fl. Ind. Bat.* iii. 212; *Engler Arac.* 339, *Ic. ined.* No. 67. H. minus and majus, *Griff. Notul.* iii. 152, 153; *Schott Syn.* 119, *Prodr.* 312; *Engler l. c.* 343. H. Wallichii, *Schott in Bonpland.* (1859), 30; *Prodr.* 311; *Engler l. c.* 335. Caladium amboinense, *Herb. Ham.*—Aroid. *Wall. Cat.* 8951.

PENANG, *Wallich.* PERAK, *Scortechini.* MALACCA; *Griffith* (*Kew Distrib.* 5965, 6011). *Maingay* (*Kew Distrib.* 1542).—DISTRIB. Java.

Rootstock short, as thick as the thumb or thicker. *Leaves* 5–12 in., and often as broad as long, nerves very many and close; petiole 8–36 in., sheathing for ⅓ or ¼ its length. *Peduncles* 6–10 in. *Spadix* shortly stipitate, very stout; fem. infl. about as long as the male.—In the usually divaricate basal lobes of the majority of the specimens, this accords with Roxburgh's character of *H. aromatica*, but the leaves are rather more membranous and the spathe usually larger. Living specimens are wanted to distinguish this, *aromatica*, and *rubescens*.

7. **H. pontederæfolia,** *Griff. mss.*; leaves 4–8 in. coriaceous hastately deltoid acuminate base truncate or subcordate, principal nerves strong, peduncles short stout, spathe 1½–2½ in. obtuse.

MALACCA; at Ayer Punus, in heavy forest, *Griffith* (*Kew Dist.*, 5964). PERAK, *Scortechini, Hervey.*

Stem short. *Leaves* nearly black when dry, principal nerves 6–7 pairs, intermediate very obscure; petiole 6–15 in., sheathing for ¼ of its length. *Peduncles* several, 2–4 in., decurved after flowering.—In a sketch by Scortechini the spathe is represented as inflated and spadix shortly exserted.

†† Leaves rarely 6 in. broad, base acute or rounded rarely truncate.

§ *Limb of leaves usually as long as the petiole or longer, rarely shorter. Spadix sessile in all but H. Griffithii.*

8. **H. angustifolia,** *Hook. f.*; leaves 5–6 by ½–¾ in. narrowly linear-lanceolate acuminate at both ends coriaceous, nerves few straight nearly parallel to the margin, peduncle very short, spathe ⅔–¾ in. oblong apiculate ribbed. Chamæcladon angustifolium, *Schott in Bonpland.* (1858), 369; *Prodr.* 313? *Engler Arac.* 344; *Ic. ined.* No. 103. Calla angustifolia, *Jack in Mal. Misc.* i. No. 124.—Aroid. *Wall. Cat.* 8959 (*in part*).

PENANG, *Wallich.*

Rootstock as thick as a goose-quill, prostrate. *Leaves* with a thickened mucro; petiole 4–5 in. rather slender, sheathing from ¼ or ⅓ their length. *Peduncles* ½–1 in. *Spathe* thin. *Spadix* with the fem. infl. ⅓ the length of the male.

9. **H. lancifolia,** *Hook. f.*; leaves 6–9 by 1½–2½ in. narrowly elliptic lanceolate gradually acuminate at both ends, nerves many pairs erecto-patent, peduncles short, spathe ⅔ in., linear-oblong cuspidately acuminate.

PERAK, *Scortechini.*

Rootstock suberect, rooting. *Leaves* rather coriaceous, nerves raised above; petiole 6–10 in., sheathing ¼–⅓ its length. *Peduncles* 1½–2 in. slender. *Spathe* membranous, striate. *Spadix* with the fem. infl. nearly half as long as the male.—Near *Cham. consobrina*, Schott, of Sumatra, but a much stouter plant.

10. **H. humilis,** *Hook.* f.; leaves 4–6 by 1½–2 in. elliptic-oblong acute

or acuminate, base rounded or cuneate, nerves 5–8 pairs erecto-patent arched, petiole slender sheathing half way up or less, peduncles many very short, spathe elliptic acuminate or cuspidate, fem. infl. ¼–⅓ the length of the male. Chamæcladon humile, *Miq. Fl. Ind. Bat.* iii. 213; *Engler Arac.* 345; *Ic. ined.* No. 104. Calla humilis, *Jack in Mal. Misc.* i. No. 1, 22.—Aroid. *Wall. Cat.* 8959 (*in part*).

PENANG, *Wallich, Porter.* PERAK, *Scortechini.*—DISTRIB. Borneo.

Rootstock 2–3 in., as thick as a swan's quill. *Leaves* rather thin, margins often minutely crisped when dry; petiole 5–6 in.; costa and nerves beneath slender. *Peduncles* ½–1 in. *Spathe* rather membranous, not striate. *Spadix* sessile, ¾ in. long, obtuse; fem. infl about ¼ in. with or without staminodes.—Engler figures the nerves as very numerous, but describes them corectly as 5–8 pairs.

11. **H. velutina,** *Scortechini mss.*; leaves 2½–5 by 1¼–2½ in. broadly oblong or obovate-oblong acute, base rounded cuneate or cordate at the petiole, nerves 10–15 pairs strong beneath, petiole sheathing ¼ to ⅓ of its length, peduncles many very short, spathes ½–⅔ in. narrow with a recurved cusp, spadix sessile, fem. infl. ¼–½ the length of the male.

PERAK, *Scortechini*; at Sunga Ryah, *King's Collector.*

Rootstock as thick as the little finger, copiously rooting. *Leaves* rather coriaceous, rigid when dry, tip apiculate, or not, upper surface minutely papillose; nerves slender, raised on both surfaces; petiole 1–2 in.; rather stout. *Peduncles* ⅓–½ in. *Spathe* cylindric, blood-red. *Ovaries* with or without small staminodes, ovoid, stigma very large.—Name given by Scortechini, who describes the upper surface of the leaf as velvety (which is, I think, caused by minute papillæ) and the under surface as dotted with white. Probably a form of *H. humilis,* distinguished by the more numerous nerves of the leaf.

12. **H. Griffithii,** *Hook. f.*; leaves 4–7 by 1½–2½ in. more or less obliquely elliptic-oblong or oblong-lanceolate tip curved subcaudate acuminate base rounded or cuneate, nerves 4–5 pairs erecto-patent slightly arched, petiole slender sheathing ¼ the way up, peduncles many very short, spathe ⅝–1¼ in. ovoid acuminate or rostrate, spadix stipitate. Chamæcladon Griffithii, *Schott in Bonpland.* (1858), 369; *Prodr.* 315; *Engler Arac.* 346; *Ic. ined.* n. 113.

MALACCA, at Ayer Punus, *Griffith.*—DISTRIB. Borneo.

Rhizome as thick as the little finger, copiously rooting. *Leaves* rather thin, base usually unequal-sided, costa and nerves slender, tip mucronate red-brown; petiole 4–6 in. *Peduncle* 1–2 in. *Spathe* green. *Male infl.* rather longer than the fem. acuminate; fem. with many capitate staminodes amongst the ovaries.

13. **H. Scortechinii,** *Hook. f.*; leaves 5–7 by 1–2 in. elliptic- or oblong-lanceolate or oblanceolate acuminate base narrowed acute or obtuse, nerves 5–7 pairs erecto-patent arched very slender, petiole slender sheathing ⅓–½ way up, peduncles 2–3 in., spathe 1–1¼ in. oblong with a curved beak, spadix sessile.

PERAK, *Scortechini;* on Mt. Bubong in bamboo forests, *King's Collector.*

Rootstock as thick as a swan's quill, rooting. *Leaves* rather thin, tip curved, base rarely unequal-sided; petiole 2–6 in. *Peduncle* rather slender. *Spathe* light green with a darker green center (King's Coll.); dark green "with (velvety gloss above," *Scortechini*). *Spadix* sessile, fem. infl. shorter than the slender male. *Ovaries* globose, stigma disciform.—Near *H. Griffithii,* but the leaves are narrower at the base, the peduncles much longer, the spathes larger, obtuse with a recurved beak, and the spadix is sessile.

14. **H. obliquata,** *Hook. f.*; leaves 4–6 by 1½–3 in. lanceolate or

ovate-lanceolate caudate-acuminate base obliquely acute rounded subtruncate or subcordate, nerves 6–10 pairs, petiole slender sheathing ⅛–¼ way up, peduncles very short, spathe ½–⅔ in. oblong cuspidately beaked, spadix sessile, fem. infl. half as long or nearly as long as the male. Chamæcladon obliquatum, *Schott in Bonpland.* (1858), 369; *Prodr.* 315; *Engler Arac.* 347; *Wall. Cat.* n. 8963.

PENANG, *Phillips, Wallich*; MALACCA, *Maingay.*

Rootstock as thick as the thumb. *Leaves* very variable, usually broadest at the base with unequal rounded sides; nerves slender, nearly straight, except the basal where the base of the leaf is broad, tip with a thick long mucro. *Peduncles* ½–2 in. *Stigma* disciform. *Seeds* many, faintly sulcate, red brown.—Closely resembles *H. Griffithii*, but the spadix of that plant is stipitate.

15. **H. Kingii,** *Hook. f.*; leaves 4–5 by 2–2½ in. oblong or ovate-oblong acute and mucronate, base rounded or subcuneate, nerves 4–5 pairs, petiole stout sheathing from ⅓–½ way up, peduncles short, spathes ¾–1 in. oblong cuspidately beaked, fem. infl. nearly as long as the male.

SINGAPORE; in swamps, *King.*

Rootstock as thick as the little finger. *Leaves* thinly coriaceous, slightly unequal-sided; nerves erecto-patent, slightly arched, tip with a thick mucro; petiole rather stout. *Peduncle* 1½–1½. *Berries* about 15-seeded. *Seeds* red-brown.

16. **H. truncata,** *Hook. f.*; leaves 3–4 by 1–1½ in. oblong or triangular- or oblong-lanceolate acuminate from a broad truncate or subhastate base, nerves very slender, petioles slender sheathing from ¼–⅓ their length, peduncles half as long as the petioles or shorter, spathes 1–1¼ in. oblong cuspidately beaked, fem. infl. half as long as the male or more, with many staminodes intermixed and below the infl. Chamæcladon truncatum, *Schott in Bonpland.* (1858), 369; *Prodr.* 314; *Engler Arac.* 347.

MERGUI, *Griffith.*—DISTRIB. Borneo?

Rootstock as thick as a goose-quill. *Leaves* very membranous; nerves many, nearly straight, except the basal, base usually unequal-sided, tip mucronulate. *Spathes* slightly curved, narrowly oblong in flower, broader in fruit. *Spadix* narrowed and few-fld. at the base but hardly stipitate. *Stigma* capitate. *Seeds* very many, striate.—The Bornean specimen included by Schott has identical leaves, but a larger narrower falcate finely acuminate spathe, a distinctly stipitate spadix, no (or obscure) staminodes, and furrowed seeds.

17. **H. pumila,** *Hook. f.*; leaves 1½–2 in. elliptic-ovate obovate or oblong subacute apiculate membranous nerves very faint, petiole very slender sheathing at the base, peduncles short slender, spathe ½–⅔ in. linear oblong cuspidately beaked, spadix sessile, fem. infl. ¼ the length of the acute male, staminodes few.

SINGAPORE, *Maingay.*

Rootstock creeping and copiously rooting, rather slender. *Leaves* green; nerves 3–5 pairs, arching. *Peduncles* ½–½ in. *Seeds* few in the berries, pale spotted with black.—Very near the Javan and Bornean *H. purpurescens* (*Chamæcladon*, Schott) but the leaves are green, of a very much more delicate texture, the petiole much more slender, and the fem. infl. shorter.

18. **H. nutans,** *Hook. f.*; leaves 4½–5 by 2–2¼ in. elliptic acuminate at both ends tip mucronate, nerves very faint, petiole sheathing for half its length, peduncles short decurved above, spathe cernuous broadly ovate with a recurved cusp, spadix stout sessile much shorter than the spathe, fem. infl. half as long as the broadly ovoid obtuse male.

PERAK; at Larut, alt. 100–1000 ft., *King's Collector*.

Rhizome as thick as the little finger, elongate, rooting. *Leaves* seriate on the rhizome (not tufted) coriaceous, pale beneath, primary nerves inconspicuous straight; petiole rather stout. *Peduncles* 1–2 in. *Spathes* rather turgid. *Spadix* about half the length of the spathe. *Ovaries* ovoid; stigma large, pulvinate; staminodes 0?—The spathe exactly resembles Engler's figure of that of *Schismatoglottis elongata*.

§§ *Petiole longer than the leaf blade. Spadix stipitate in all.*

19. **H. elliptica,** *Hook. f.*; leaves 3–4 by 1¾–2 in. subfalcate elliptic-ovate acute or acuminate hardly mucronate many-nerved base cuneate, petiole slender sheathing for ⅛ to ¼ its length, peduncles elongate, spathe ½–1 in. linear-oblong cuspidately beaked, spadix shortly stipitate, fem. infl. not ¼ the length of the male with intermixed staminodes.

PERAK; along watercourses, *Scortechini*.

Rootstock creeping, as thick as a swan's quill. *Leaves* more or less unequal-sided, coriaceous; nerves 7–8 pairs, rather strong, impressed above, slightly arched. *Peduncles* few, 3–4 in. *Spathe* nearly straight.

20. **H. ovata,** *Hook. f.*; leaves 6–7 by 3–4 in. ovate acuminate base rounded few-nerved, petiole rather longer than the blade sheathing less than half way up, peduncle 2–3 in., spathe 1¼ in. linear-oblong acute, spadix stipitate, fem. infl. half the length of the male, staminodes 0. Chamæcladon ovatum, *Schott in Bonpland.* (1859), 30; *Prodr.* 315; *Engler Arac.* 348.—Aroid. *Wall. Cat.* n. 8964.

SINGAPORE; *Wallich*. PENANG; *Herb. Delessert*.

Rootstock as thick as the middle finger. *Leaves* rather coriaceous, base unequal or not, nerves 5–6 pairs slightly arched, rather strong beneath, secondary obscure; petiole not very stout. *Spathe* 1–1¼ in., straight. *Spadix* as long as the spathe; fem. infl. not half as long as the elongate conoidal acute male; ovaries subglobose, stigma subcupular obscurely lobed.

21. **H. trapezifolia,** *Hook f.*; leaves 4–5 by 2½–4 in. trapezoidly or deltoidly ovate caudate-acuminate many-nerved, base cuneate or truncate and cuneate at the insertion of the long petiole which is sheathing ¼–½ of its length, peduncle elongate, spathe 1 in. narrowly oblong acuminate, spadix stipitate, fem. infl. hardly half as long as the narrow male.

PERAK; *Scortechini, King's Collector*.

Rootstock creeping, as thick as the thumb. *Leaves* chartaceous, narrowed from a broad base with rounded angles to a fine slender curved apiculate tip, sides sometimes incurved; nerves about 10 pairs, rather strong, nearly straight, or the lower spreading and arched; petiole 6–14 in., slender. *Peduncles* 2–3 in., stout. *Staminodes* 0 or few and clavate. *Stigma* disciform.

22. **H. deltoidea;** leaves 6 by 4 in. deltoidly ovate or subhastate acuminate basal angles or lobes rounded, sinus very broad rounded not cuneate at the insertion of the petiole, peduncles short, spathe 2 in. narrowly ellipsoid narrowed into a long slender cusp.

PERAK, *Scortechini*.

Rootstock as thick as the little finger. *Leaves* chartaceous, very like those of *H. trapezifolia*, but not cuneate at the insertion of the petiole; nerves 4–5 pairs, with innumerable slender intermediates; petiole 12–14 in. sheathing for ¼ its length. *Peduncles* several. *Spathe* not constricted above the fem. infl., much longer than in *H. trapezifolia*, and spadix stouter. *Stigma* discoid.—I have seen only one specimen.

DOUBTFUL SPECIES.

H. SINGAPORENSIS, *Regel Ind. Sem. Hort. Petrop.* (1869), 18; *in Gartenfl.* (1870), 53; leaves 7–9 by 6–8 in., almost exactly deltoid acuminate, base truncate, basal angles rounded, petiole clouded sheathing half-way up, red at the base, spathes green without white within.—Singapore.

22. SCHISMATOGLOTTIS, *Zoll. & Morritz.*

Stotoniferous, herbs; stem short. *Leaves* entire, intramarginal nerve strong. *Spathe* cylindric, convolute, hardly constricted, limb deciduous. *Spadix* sessile, included in the spathe, appendage 0, with barren organs in the middle or top. *Inflorescences* contiguous or nearly so; male cylindric or clavate; stamens 2–3, distinct, filament flat; anthers truncate, prismatic or compressed, cells with large pores, connective warted at the tip; pollen vermiform. *Fem. Infl.* cylindric or conic; staminodes few, clavate, or 0. *Ovary* oblong, 1-celled; stigma discoid; ovules many, anatropous; parietal. *Berries* oblong, enclosed in the tube of the spathe, many-seeded. *Seeds* ellipsoid.—Species about 15, Malayan.

* Tube of spathe after flowering subcylindric.

† *Leaves rounded or if cordate not deeply lobed at the base.*

1. **T. Wallichii,** *Hook. f.*; limb of leaf 5–9 in. shorter or longer than the petiole lanceolate or oblong-lanceolate caudate-acuminate, nerves 8–10 pairs or more, petiole sheathing for ⅓ its length, spathe long-peduncled narrowly linear-oblong acuminate, spadix with neuters in the middle and male at the top.—Aroid. *Wall. Cat.* 8962.

PERAK, *Scortechini, King's Collector.* SINGAPORE, *Wallich.* MALACCA; *Maingay.*

Leaves 1¼–2¼ in. broad, rather membranous, with slender reticulate secondary nerves between the primary, base rounded or subcordate; petiole 8–12 in. *Peduncle* 3–4 in. *Spathe* 3–3½ in., nearly straight, acuminate, white. *Spadix* rather slender; fem. infl. as long as the neuter, male shorter clavate; ovaries globose, stigma disciform.

VAR. *oblongata;* leaf 8–10 by 3½–4 in. more coriaceous cuspidately caudate base rounded, costa very stout, nerves obscure.—Perak, in marshy places, *Scortechini, King's Collector.* Perhaps a different species.

2. **S. brevicuspis,** *Hook f.*; limb of leaf equalling or exceeding the petiole 4–6 by 1½–3 in. oblong-ovate acuminate with a very short subulate cusp, nerves many spreading arching, intermediates few, petiole sheathing for half its length, peduncles short, spathe 3 in. long-acuminate, spadix nearly equalling the spathe, fem. infl. elongate followed by a short neuter portion, male infl. elongate its conical tip sterile.

PERAK, *Scortechini.*

Rootstock as thick as a goose-quill, elongate, trailing. *Leaves* membranous, deep green above, the intermediate nerves forming areolæ between the primary. *Peduncle* 1–3 in. *Spathe* greenish. *Ovaries* oblong, 2–3-lobed; stigma subsessile, disciform.

3. **S. Scortechini,** *Hook. f.*; limb of leaf about equalling the petiole

oblong or obovate obtusely acuminate not apiculate base rounded acute or subcordate, nerves many spreading and arched, petiole sheathing ⅓ of its length, peduncles very short, spathe 2–2¼ in. cylindric acuminate, spadix stout, fem. infl. short, male twice as long with a few neuters at its base and terminated by a cylindric sterile cone as long as the whole infl.

PERAK, *Scortechini.*

Rootstock stout. *Leaves* 5–7 by 2½–3 in., coriaceous; costa stout; nerves 20–30 pairs, slender; petiole 5–7 in. *Peduncle* 1–2 in., very stout. *Spathe* slightly contracted above the fem. infl., sessile by a very oblique base. *Spadix* 1½–2 in. *Ovaries* turbinate, the top covered by the flat circular stigma.

4. **S. brevipes,** *Hook. f.*; limb of leaf longer than the petiole coriaceous ovate or oblong acute base cordate, nerves spreading and arching, petiole sheathing beyond the middle, peduncles few very short, spathe 1½ in. much constricted above the fem. infl., spadix constricted in the middle, fem. infl. with a few capitate neuters intermixed, male infl. sterile above.

PERAK, *Scortechini.*

Rootstock as thick as a goose-quill. *Leaves* 3–5 by 1½–2 in., tip not apiculate, nerves 8–12 pairs. *Tube* of spathe ¾ in., ellipsoid.. *Spadix* 1½ in., sessile; fem. infl. about as long as the sterile portion of the male. *Ovaries* turbinate; stigma pulvinate.

5. **S. minor,** *Hook. f.*; limb of leaf small shorter than the petiole membranous oblong or ovate acute base cordate, nerves very slender spreading and arching, petiole slender sheathing for ⅓–½ its length or less, peduncle solitary slender, spathe oblong acute hardly contracted in the middle.

PERAK, *Scortechini.*

Rootstock very slender, as thick as a crow-quill, elongate, flexuous, rooting. *Leaves* 2–2½ by 1–1½ in., pale beneath, tip not apiculate, costa and nerves (7–8 pairs), papillose beneath; petiole 3–4 in. *Peduncle* 2-2½ in. *Tube of spathe* ¾ in., limb ovate. *Spadix* with the fem. infl. adnate for nearly half its length to the spathe. *Ovaries* scattered below, globose, few-ovuled; placentas 2; stigma pulvinate, sessile. —The specimens are very scanty and contained but one spathe.

†† *Leaves deeply cordate at the base.*

6. **S. mutata,** *Scortechini mss.*; leaves ovate-cordate or subsagittate cuspidately acuminate membranous many-nerved, petiole sheathing for ⅓ or ½ its length, peduncles several, spathe ⅔–5 in. very narrow acuminate tip recurved slightly constricted much below the middle, spadix with the fem. and male infl. about equal each ⅓ the length of the spadix with a narrow intervening constriction covered with neuters, male terminating in an elongate barren cone.

PERAK; *Scortechini*; at Goping, *King's Collector.*

Stem sometimes 2 ft., nearly 1 in. diam. (*King's Collector*). *Leaves* 6–9 by 4–5½ in., tip not apiculate, sinus acute; basal lobes rounded, sometimes diverging and narrowed to the rounded tip; nerves 18–20 pairs, spreading and arched, intermediates very slender; petiole 5–12 in. *Peduncle* 2–4 in. *Spathe* yellow, tube 1½ in., limb membranous. *Spadix* rather slender; male and fem. infl. each about 1 in., cylindric; sterile cone 1 in., covered with very large flat sinuous neuters.

7. **S. longipes,** *Miq. Fl. Ind. Bat.* iii. 214; *in Bot. Zeit.* (1856) 565;

leaves cordately ovate or ovate-lanceolate caudate-acuminate membranous many-nerved, petiole sheathing for ⅓ or ¼ its length, peduncles many, spathe 2–3 in. constricted about the middle, spadix with fem. infl. for half its length followed by a constriction with neuters, male infl. clavate, the upper half broadly conic sterile. *Schott Gen. Aroid.* t. 55; *Prodr.* 321.

PERAK, *Scortechini.*—DISTRIB. Java, Sumatra.

Rootstock elongate, as thick as a swan's quill, rooting. *Leaves* 5–7 by 2–3½ in., pale beneath, tip with a deciduous long mucro, costa stout; nerves 12–18 pairs, spreading and arching; petiole equalling or exceeding the limb. *Peduncles* 4–8 in. *Spathe* with an inflated acuminate limb, tube ¾–1 in. *Ovaries* oblong; stigma pulvinate, obscurely lobed.—Reduced to *S. calyptrata*, Zoll. and Morr. (Syn. Verz. Zoll. 83), by Engler, which is founded on *Calla calyptrata*, Roxb. (Wight Ic. t. 799), an Amboyna plant with oblong leaves, short stout petioles and a capitate summit of the male infl.

8. **S. Kurzii**, *Hook. f.*; leaves 8–12 by 4–6 in. ovate deeply cordate many-nerved membranous, basal sinus very acute, petiole 12–14 in. broadly sheathed to the middle.

PEGU YOMAH, *Kurz.*

Resembles *S. mutata*, but a much larger leaved plant, with a very stout petiole. I have seen no spathe. It is interesting as the most northern species of the genus known in India.

** Tube of spathe after flowering broadly funnel-shaped. (RHYNCOPYLE, *Engler.*)

9. **S. elongata**, *Engler in Bull. Soc. Ort. Tosc.* iv. (1879) 298; leaves elliptic-lanceolate or oblanceolate acute at both ends. Rhyncopyle elongata, *Engler in Beccari Males.* i. 289, t. 23, f. 3–15; *Ic. ined.* n. 199.

PERAK; sandy creeks, alt. 3000 ft., *Scortechini.*—DISTRIB. Borneo (or Sumatra).

Rootstock short. *Leaves* 4–8 by 1–2½ in., coriaceous, pale beneath, tip with a tubular mucro; nerves 7–8 pairs, nearly straight and costa beneath strong; petiole sheathing at the base. *Peduncles* equalling the petioles or shorter. *Spathe* 1½–2 in., erect or inclined, green, oblong, acute or acuminate. *Spadix* sessile, much shorter than the spathe, stout; fem. infl. shorter than the male, narrowed below, with tabular neuters below it; male rounded at the top; connective broad, pubescent. *Berries* very small, turbinate; stigma a small sessile disc. *Seeds* fusiform, with a transparent fleshy coat which is produced into a long tail at top and base.—Engler figures the spathe exactly as in *Homalomena nutans*, namely, broadly ovate and cernuous on a decurved peduncle.

23. ANADENDRUM, *Schott.*

Scandent shrubs rooting on trees. *Leaves* distichous, entire or pinnatifid, petiole geniculate at the tip; primary nerves many, secondary branching. *Spathe* ovate acuminate, deciduous. *Spadix* stipitate, elongate, cylindric; flowers crowded, bisexual; perianth 0, annular, or cupular. *Stamens* 4–6, filaments very short, flattened; anthers terminal, cells erect subreniform. *Ovary* obconic, truncate, 1-celled, crown flat; stigma small, sessile, linear; ovule solitary (or 2 in *A. medium*), basilar. *Berries* small, scattered; pericarp without intercellular needles. *Seed* exalbuminous, testa thick; embryo macropodal.—Species 4 or 5, Malayan.

* *Leaves entire.*

1. **A. montanum,** *Schott in Bonpland.* v. (1857); *Prodr.* 371; leaves drying black ovate-oblong or oblong-lanceolate, petiole slender, sheath very narrow. *Engler Arac.* 97; *Ic. ined.* No. 83. Scindapsus montanus, *Kunth Enum.* iii. 64; *Miq. Fl. Ind. Bat.* 184. Pothos malayanus, *Miq. l. c. Suppl.* 596. P. elegans, *Wall. Cat.* 4444. Calla montana, *Blume Cat. Hort. Buit. et in Flora* (1825), 147.

TENASSERIM; at Mergui, *Helfer.* PENANG, *Wallich.* PERAK, *Scortechini· King's Collector.* MALACCA, *Griffith, Maingay.*—DISTRIB. Malay Islands.

Stem as thick as a goose-quill, terete, smooth. *Leaves* 6–12 by 2½–4 in., coriaceous, base cuneate rounded or subcordate often unequal-sided; nerves very many, spreading; petiole 3–9 in., sheathed to the knee in young leaves, to a variable height in older; knee ¼–½ in. *Peduncles* 2–4 in., slender, rigid. *Spathe* 1½–2 in., beak long straight. *Spadix* 1–2 in.; stipes slender. *Perianth* cupular, nearly as high as the ovary. *Berries* pisiform.

Var. *longirostris*; beak of spathe as long as the body.—Perak, *Wray,*—Borneo.

2. **A. marginatum,** *Schott in Œstr. Bot. Wochenbl.* (1857), 117; *Prodr.* 390; leaves drying green oblong-lanceolate acute or acuminate, petiole very broadly sheathing up to the knee. *Engler Arac.* 96. Pothos marginatus, *Wall. Cat.* 4443.

PENANG, *Porter.* PERAK, *Scortechini, King's Collector.*—DISTRIB. Sumatra.

Stem stout. *Leaves* 6–12 by 2–3½ in., base acute acuminate cuneate or rounded, usually unequal-sided; nerves very many, suberect or spreading; petiole 4–6 in., sheath ½–¾ in. broad, 2-auricled at the tip; knee short. *Peduncles* 3–5 in. *Spathe* 1½–2¾ in. long, as in *A. montanum,* white on pale yellow. *Perianth* annular.

3. **A. latifolium,** *Hook. f.*; leaves drying greenish broadly oblong cuspidately acuminate base acute, petiole rather slender, sheath very narrow.

PERAK; *Scortechini, King's Collector.*

Stem as thick as a swan's quill. *Leaves* 10–13 by 4½–5½ in., coriaceous; nerves about 12 pairs, strong, spreading and arched; petiole 7–10 in., narrowly sheathing for ⅔ its length. *Peduncle* 3–5 in. *Spathe* 2–3 in., white within, greenish without; beak ½–¾ the length of the body. *Spadix* 1–2 in., shortly stipitate. *Perianth* annular.

** *Leaves pinnatifid.*

4. **A. medium,** *Schott in Bonpland.* v. (1857) 45; *Prodr.* 392; Rhaphidophora Huegeliana, *Schott ll. cc.* 45, 384. Scindapsus medius, *Zoll. and Moritz Syst. Verz.* n. 82; *Miq. Fl. Ind. Bat.* iii. 186. Epipremnum medium, *Engler Arac.* 250. Pothos pinnatus, *Wall. Cat.* 4438.

PERAK, *Scortechini, King's Collector.* SINGAPORE, *Wallich, Maingay.*—DISTRIB. Malay Islands.

Stem 20 ft., less than 1 in. diam. *Leaves* 6–14 in. long and broad, or broader than long, membranous, deeply pinnatifid or pinnatisect, often perforate towards the costa; lobes 2–4 pairs, obliquely truncate, upper angle acute, basal lobes dimidiate-ovate; petiole channelled, sheathing towards the base. *Peduncle* 4–6 in. *Spathe* 2–3 in., cymbiform, pale green without, white or cream-colrd. within. *Spadix* shorter than the spathe, yellow, stipes ½ in. *Ovary* 2-celled, according to Maingay, but Mr. Brown and I find but one cell with 2 erect basal ovules, and so it is represented in a drawing by Scortechini. *Berry* turbinate. *Seed* (judging by a figure of Scortechini) with a macropodal embryo.—Engler has referred this rather anomalous plant to *Epipremnum,* but the stipitate spadix, ovules, the want of

needles in the pericarp, and apparently macropodal embryo, all point to ***Anadendrum***. There are needles in the tissue of the petioles, which I do not find in any other ***Anadendrum***.

24. **SCINDAPSUS,** *Schott.*

Climbing shrubs with the characters of *Anadendrum*, but the spadix is sessile, there is no cupular perianth, and the pericarp of the berries abounds in intercellular needles.—Species about 10, tropical Asiatic, Australian and Polynesian.

See note under genus *Rhaphidophora*.

* *Leaves obliquely ovate elliptic or lanceolate.*

1. **S. officinalis,** *Schott Meletem.* i. 21; *Gen.* t. 81; *Prodr.* 395; branches wrinkled when dry, leaves 5–10 by 2½–6 in. ovate elliptic-ovate or nearly orbicular caudate-acuminate base rounded or slightly cordate, primary nerves distinct, petiole 3–6 in. broadly winged up to the knee, spathe 4–6 in. oblong subcylindrical beaked. *Kunth Enum.* iii. 63; *Miq. Fl. Ind. Bat.* i. 452; *Engler Arac.* 254. Pothos officinalis, *Roxb. Fl. Ind.* i. 431; *Wight Ic.* t. 778; *Wall. Cat.* 4436. Calla ovata, *Herb. Ham.*

TROPICAL HIMALAYA; from Sikkim eastwards. BENGAL, CHITTAGONG, BURMA, and the ANDAMAN ISLDS.

Stem as thick as the little finger. *Leaves* dark green. *Peduncle* solitary, terminal, much shorter than the petiole. *Spathe* about 4–6 in. long, green without, yellow within, beak slender. *Spadix* equalling the spathe, elongating in fruit, greenish-yellow. *Stigma* elongate; fruiting hemispheric. *Berries*, few only ripening, fleshy. *Seed* ovate-cordate.—Fruiting spadix sometimes a span long.

2. **S. pictus,** *Hassk. Cat. Hort. Bogor.* (1844), 58; *Pl. Jav. Rar.* 159; branches angled and muriculate when dry, leaves 5–7 by 1½–5 in. falcately ovate-lanceolate to broadly ovate acute or acuminate, petiole 1–1½ in. winged to the knee, spathe 1½–2½ in. cymbiform beaked. *Miq. Fl. Ind. Bat.* iii. 183; *Schott Prodr.* 393; *Engler Arac.* 252. S. pothoides, *Schott l.c.* 394 (*not of Miq.*). S. argyræa, *Engler l.c.* 255.

PERAK; *King's Collector.*—DISTRIB. Java, Borneo.

Stem 6–8 ft., as thick as a goose-quill or more, 4–6-angled when dry through contraction of the tissues, and pale red-brown. *Leaves* thickly coriaceous, dull green; nerves very close and slender, primary and secondary hardly distinct. *Peduncles* equalling the petiole, very stout. *Spathe* white. *Spadix* green.—The leaves of young plants are orbicular-cordate, green blotched with white.

3. **S. Scortechinii,** *Hook. f.*; branches deeply wrinkled when dry not muriculate, leaves 3–6 by 1½–2½ in. ovate orbicular or falcately lanceolate, acute or acuminate, base rounded or subcordate, primary nerves very obscure, petiole 2–5½ in. broadly winged, spathe 1½–2½ in. ovate acute or acuminate.

PERAK; *Scortechini*, alt. 3–4000 ft., *King's Collector*; on Maxwell's Hill, *Wray*.

Stem scandent, as thick as a swan's quill or less, pale, wrinkled, otherwise quite smooth. *Leaves* thickly coriaceous; nerves very many, primary hardly distinguishable from the secondary; petiole winged to the knee or ⅔ way up. *Peduncle* much shorter than the petiole. *Spathe* yellowish on both surfaces. *Spadix* much shorter. *Berries* about ¼ in. diam. across the crown.

4. **S. hederacea,** *Schott in Bonpland.* v. (1857), 45; *Prodr.* 395; branches terete smooth, leaves 5–8 by 1–2½ in. falcately lanceolate acuminate base acute, primary nerves indistinct, petiole 2–4 in. broadly winged up to the knee, spathe 2–2½ in. narrow long-beaked. *Engler Arac.* 253; *Ic. ined.* No. 13 (*young plant*). S. pothoides, *Miq. Fl. Ind. Bat.* iii. 184 (*not of Schott*). S. inquinatus, *Schott in Miq. Ann. Mus. Lugd. Bat.* 283.

PERAK; *Scortechini, King's Collector.* MALACCA; *Griffith, Maingay.*—DISTRIB. Java.

Stem climbing, 30–40 ft., as thick as a goose-quill or more. *Leaves* rather thinly coriaceous; petiole with pale sheaths. *Peduncle* 1–2 in., stout. *Spathe* much narrower than in any of the previous species, terete, slightly curved, pale yellow. *Fruiting spadix* 3–4 in., white. *Berries* about ¼ in. diam. across the crown.—Leaves broadly ovate cordate in young plants.

5. **S. perakensis,** *Hook. f.*; branches stout terete smooth, leaves 8–12 by 2–3 in. oblong-lanceolate or falcately lanceolate acuminate thinly coriaceous, base acute or rounded, primary nerves distinct beneath, petiole 4–7 in. broadly winged up to the knee, peduncle 3–6 in. very stout, spadix (after flowering) 3–5 in. cylindric or subclavate.

PERAK; *Scortechini, King's Collector.*

Stem 30–40 ft., 2–3 in. diam. (*King's Coll.*), pale when dry. *Leaves* coriaceous, costa rather slender; primary and secondary nerves undistinguishable above, nervules trabeculate; petiole sometimes 1 in. across the opened sheath. *Peduncle* 3–4 in. *Spathe* not seen. *Fruiting spadix* nearly 1¼ in. diam.; carpels slatey blue, ⅓ diam. across the crown. *Seeds* lenticular, ⅛ in. diam., black.

** *Leaves broadly or narrowly oblong, rarely ovate or sublanceolate.*

6. **S. crassipes?** *Engler in Bot. Jahrb.* i. 182; *in Beccari Males.* i. 4; *Ic. ined.* No. 1; branches as thick as the thumb terete smooth, leaves 8–10 by 2–3 in. oblong acute base rounded densely coriaceous, costa very thick, primary nerves obscure, petiole 1–2 in. broadly thickly winged, peduncle very stout.

PERAK, *Scortechini.*—DISTRIB. Borneo?

I have seen only an imperfect specimen and drawing by Scortechini, in which the leaves are narrower and petiole shorter than in Engler's figure. In Scortechini's drawing and specimen the stem is very stout; petiole 1 in. across the thick coriaceous wings; peduncle 2 in.; young fruit 6 in. by 1 diam. *Berries* ½ in. diam. across the crown.

7. **S. Beccarii?** *Engler Bot. Jahrb.* i. 182; *in Beccari Males.* i. 277; branches very stout, leaves 12–18 by 4–5½ in. oblong or linear-oblong acuminate-coriaceous, base acute, petiole 6–12 in. winged to the knee, primary nerves distinct beneath, peduncle included in the leaf sheath, spathe 3–3½ in. oblong terete acute.

PENANG and PERAK, *Scortechini, King's Collector.*—DISTRIB. Sumatra.

Differs from Engler's figures of *S. Beccarii*, in the petiole sheathing to the knee, and in the spathe emerging from the middle of the leaf sheath, and not from its apex. King's Collector describes the stem as 15–20 ft. and 1½–2 in. diam.; leaves dark glossy green; spathe waxy white; spadix cream-colrd. The ovaries are very narrow and laterally compressed, not $\frac{1}{10}$ in. across the crown.

8. **S. cuscuaria,** *Presl. Epimel.* 242? stemless, leaves 12–18 by 4–7 in. caudate-acuminate, base acute or rounded, nerves very many and close

uniform anastomosing, petiole as long as the blade or longer stout winged to the knee, peduncle very stout, spathe 3 in. cymbiform acuminate, spadix stout. S. marantæfolius, *Miq. Fl. Ind. Bat.* iii. 187. Cuscuaria marantifolia, *Schott Gen.* t. 80; *Prodr.* 398; *Engler Arac.* 251. C. spuria, *Schott* in *Bonpland.* ix. (1861), 367. Aglaonema? cuscuaria, *Miq. l. c.* 217. C. Rumphii, *Schott in Miq. Ann. Mus. Lugd. Bot.* i. 130.

NICOBAR ISLDS.; (*Jelink. in Herb. Calcutt.*)—DISTRIB. Malay Islds.

Rootstock very stout. *Leaves* coriaceous, costa stout, base unequal-sided.—The only specimen is an imperfect one, but agrees so far with the Javan plant. I have taken the synonymy from Engler.

25. RHAPHIDOPHORA, *Schott.*

Habit and characters of *Anadendrum*, but spadix sessile, perianth 0, ovules many parietal; the many-seeded berries confluent and their tissue loaded with intercellular needles; seed albuminous, embryo axile.—Species about 30, tropical Asiatic, Australian and Polynesian.

I greatly doubt the value of characters taken from the stigmas of dried specimens of this genus, *Scindapsus* and *Epipremnum*, whether raised or sessile in the crown of the ovary, and whether orbicular or oblong, or linear; they appear to change in form with age, and certainly do so in drying The nerves of the leaves which afford characters in the dried state are often invisible in the fresh.

* Leaves entire and imperforate (see also *R. pertusa*).

† *Petiole not more than half the length of the blade* (*a rather variable character*).

1. **R. crassifolia,** *Hook.f.*; leaves 6–7 by 1½–2 in. subfalcately lanceolate acuminate thickly coriaceous base narrowed acute or rounded, nerves very obscure, petiole 1½–2½ in. slender channelled up to the blade, peduncle very short, spathe 3 in. cylindric apiculate, stigma raised.

PERAK, *King's Collector.*

Stem 20–30 ft. as thick as a goose-quill or thicker. *Leaves* very dark grey and opaque when dried, with recurved margins; costa rather slender, nerves sunk in the tissue, most obscure above and there marked only by superficial wrinkles, absolutely concealed beneath under the smooth epidermis. *Spathe* thickly coriaceous, cream-colrd. *Ovaries* $\frac{1}{16}$ in. diam., with raised pulvinate central stigmas.—Closely resembles *R. angustifolia*, Schott, in form of foliage, but quite distinct in the texture and nervation of the leaves and in the large spathes. In the Calcutta collection of drawings is that of a plant named *Pothos ventricosa*, Wall. mss. from N. E. Bengal, which resembles this; the spathe is represented as purple.

2. **R. Maingayi,** *Hook.f.*; leaves 6–8 by 2–2½ in. oblong-lanceolate acute shining above, base acute, nerves uniform and raised on the upper surface primary very slender but distinct beneath erecto-patent, petiole short, spathe sessile ? 4½ in. cylindric beaked, stigma circular depressed on the surface of the (dry) ovary.

MALACCA, on trees, *Maingay.*

The specimens are imperfect, the leaves being detached from a portion of apparently a tortuous branch as thick as the little finger. *Leaves* coriaceous, drying yellow brown, costa rather slender, the apparent difference between the nervation of the two surfaces is great, the nerves in the upper being raised through the shrinking of the tissues, whilst beneath the erecto-patent primaries are capillary, the secondaries

very obscure. *Spathe* remarkably thick-walled (at least ⅛ in. thick). *Ovaries* narrow, $\frac{1}{10}$ in. across the crown.

3. **R. Wrayi,** *Hook. f.*; leaves 7–12 by 1½–2 in. narrowly lanceolate caudate-acuminate submembranous, base narrowed acute or rounded, nerves capillary on both surfaces, petiole 2–3 in. slender channelled up to the blade, spathe 1½–2½ in. peduncled cylindric or ovoid beaked spadix as long as the spathe, stigma raised pulvinate.

PERAK; *Wray* (*with* No. 662), *Scortechini*, *King's Collector*.

Stem 30–40 ft., woody, as thick as a goose-quill or less, internodes ½–1 in., surface striate. *Leaves* drying greenish-brown and quite opaque; nerves erecto-patent, $\frac{1}{10}$–⅛ in. apart with anastomosing nervules; petiole slender, stiff. *Peduncle* ½–1½ in. *Spathe* terete, walls very thick, green, cream-colrd. within. *Fruiting spadix* oblong, 2½ in. long by 1 in. diam. *Stamens* 2. *Berries* ⅛ in. across the crown.

4. **R. Lobbii,** *Schott in Bonpland.* v. (1857), 45; *Prodr.* 379; leaves 3–8 by 1½–3 in. ovate oblong linear-oblong or lanceolate acuminate or caudate thinly coriaceous. base acute or rounded, primary nerves distant and usually well marked beneath all spreading and arched, petiole 1–2½ in. channelled up to the knee or limb, spathe small (1–1½) peduncled oblong beaked, stigma raised. *Engler Arac.* 241.

PERAK; *Scortechini*, *King's Collector*. MALACCA; *Griffith*, *Maingay*. SINGAPORE; *Lobb*.—DISTRIB. Borneo, Java.

Stem 20–30 ft. much branched, as thick as a goose-quill or less. *Leaves* greenish brown and opaque when dry; 8–10 primary nerves very indistinct above, undersurface very smooth. *Peduncle* 1 in. *Spathe* turgid. *Spadix* oblong. *Ovaries* $\frac{1}{10}$ in. diam. across the crown.—*Stamens* 6–8 and ovary 2–3-celled. *Maingay*, *mss.*

5. **R. minor,** *Hook. f.*; leaves 3–5 by 1¼–1½ in. elliptic-lanceolate acute or acuminate base acute or cuneate, primary nerves many slender erecto-patent raised on both surfaces, petiole 1–2 in. broadly channelled up to the blade, spathe peduncled 2–3 in. beak long slender, stigma raised pulvinate.

PERAK; *Scortechini*. MALACCA; *Griffith* (*Kew Distrib.* 5988), *Maingay*.

Branches as thick as a goose-quill or less, soft, striate, and foliage pale yellowish brown, not shining when dry. *Leaves* thinly coriaceous; nerves slightly arching. *Peduncle* 1–1½ in., yellowish. *Spathe* coriaceous, apparently red, beak ending in a very slender point. *Spadix* cylindric. *Ovaries* $\frac{1}{12}$ in. diam. across the crown. *Berries* ⅛ in. diam.

6. **R. Schottii,** *Hook. f.*; leaves 8–14 by 2–4½ in. falcately lanceolate or oblong-lanceolate or oblanceolate caudate-acuminate coriaceous, base acute, nerves very many and slender uniform erecto-patent raised on both surfaces, petiole 1½–3 in. stout channelled to the middle of the knee, spathe 3 in. ovoid acuminate, spadix peduncled very stout, stigma raised pulvinate. *R.* Peepla (*in part*), *Schott in Bonpland.* v. (1857), 45. *Engler Arac.* 242.

ASSAM; *Masters*. KHASIA HILLS; alt. 0–4000 ft., *J. D. H. & T. T.*

Stem as thick as the little finger, smooth, terete, purple except the young branches. *Leaves* thinly coriaceous, in young plants distichous 3–4 in. ovate acute, base very oblique. *Peduncle* 1–4 in. *Spathe* yellow inside and out. *Spadix* reddish, when advancing to fruit 3 in. by 1 in. diam. *Ovaries* transversely elongate, ⅛ in diam. —In the dried spadix (Assam) advancing to fruit, the pulvinate stigmas are raised on a very short conical style; but in my drawing of the ovary, made in the Khasia Hills, it is a depressed areole in the centre of the flat crown of the ovary. The petioles

vary greatly in length.—Near *R. Peepla*, but a very much stouter plant, with larger, longer and narrower leaves.

7. **R. Scortechinii,** *Hook. f.*; leaves 10–12 by 3–4 in. ovate-lanceolate unequal-sided caudate-acuminate base cuneate submembranous, primary nerves 14–20 pairs strongly raised on both surfaces spreading and arched, petiole 4–6 in. broadly channelled up to the limb, peduncle 3–4 in., spadix 2 by ⅝ in., stigma elliptic sessile.

PERAK; *Scortechini.*

Stem creeping or stones, nearly as thick as the little finger. *Leaves* subcoriaceous, yellow undulate and opaque when dry.—The above is chiefly from Scortechini's drawing and notes attached to his specimens. The nerves of the leaves are at least 14–20 pairs, united by oblique nervules. Scortechini describes the seeds as winged, the lateral wings oblique, but he does not figure them so.

†† *Petiole more than half the length of the leaf-blade.*

8. **R. lancifolia,** *Schott in Bonpland.* (1857), 45; *Prodr.* 380; leaves 6–10 by 1½–3 in. falcately-lanceolate or ovate-lanceolate acuminate or caudate membranous, base acute or rounded unequal-sided, nerves very many raised on both surfaces erecto-patent, petiole 4–7 in. channelled to the knee, spathe peduncled 3–4 in. ovate-oblong long beaked, stigmas raised pulvinate. *Engler Arac.* 241; *Masters in Gard. Chron.* (1874), ii. 611; fig. 124.

The KHASIA HILLS and MUNNIPORE; alt. 3–6000 ft., *Griffith, Watt,* &c.

Stem scandent, rooting, as thick as a goose or swan's quill. *Leaves* thinly coriaceous, adult greenish-brown when dry, not shining above; nerves with anastomosing nervules; petiole slender. *Peduncle* 1–4 in. *Spathe* thickly coriaceous, pale or darker red within. *Spadix* 1½–2 in. (fruiting 3–4 in.); ovaries ⅛ in. diam.—The 3–5 erecto-patent primary nerves described by Schott are with difficulty distinguished from the secondary, and in very few leaves only.

9. **R. Peepla,** *Schott in Bonpland.* v. (1857), 45 (*partly*); leaves 5–8 by 2–4½ in. very unequal-sided obliquely ovate cuspidately acuminate coriaceous, base rounded or cuneate, nerves very many uniform raised on both surfaces, petiole 4–8 in. channelled up to the limb, peduncle 3–5 in. long, spathe 2½ in. lanceolate narrowed into a straight beak, stigmas raised. R. calophyllum, *Schott l. c.*; *Prodr.* 242; *Engler Arac.* 242. Scindapsus Peepla, *Schott Melet.* i 21; *Kunth Enum.* iii. 62. Pothos Peepla, *Roxb. Fl. Ind.* iii. 454; *Wight Ic.* t. 780 (*not of Wallich*). Monstera Peepla, *Schott* (*ex Linnæa*), vi. (1831), *Litterat. Ber.* 52.

SIKKIM HIMALAYA and the KHASIA HILLS, alt. 4–6000 ft.; *Roxburgh, Griffith* (*Kew Distr.*, 5959). BURMA; on the Karen Hills, *Kurz.*

Stem as thick as a swan's quill, smooth, terete. *Leaves* coriaceous, drying pale yellow-brown and shining above, nerves with rectangular nervules. *Spathe* greenish yellow. *Ovaries* creamy, ⅛ in. diam.; stigma pulvinate on a very short conical style.—Roxburgh's figure represents a spathe 5 in. long and the leaves as having 5–7 pairs of primary arching nerves, which are not distinguishable in the dried specimens. I have seen no Ceylon specimens, for Thwaites' *R. Peepla* is *R. pertusa.*

10. **R. gracilipes,** *Hook. f.*; leaves 6–8 by 2 4 in. broadly or narrowly oblong-ovate unequal-sided cuspidately acuminate submembranous opaque, base rounded or cuneate, primary nerves 14–16 pairs raised beneath widely spreading and arching, petiole 5–10 in. very slender,

grooved channelled up to the limb, spathe 3–4 in. cylindric long-beaked, stigmas raised pulvinate.

PERAK; Larut, *Scortechini*, *King's Collector*.

(*Stem* 20–40 ft. by 1–1½ in. diam., branches ½ in. diam., *King's Collector*). *Leaves* pale greenish or yellowish-brown and undulate when dry; petiole pale. *Peduncle* 1–2½ in. *Spathe* yellow, cream-colrd., or tinged with pink within. *Spadix* shorter than the spathe. *Ovaries* $\frac{1}{10}$ in. diam.; stigmas orbicular.—In form the leaves closely resemble *R. Peepla*, but their texture and nervature are very different.

11. **R. Kunstleri**, *Hook. f.*; leaves 10–16 by 2½–5 in. oblong or oblong-lanceolate acuminate rather membranous, base acute or cuneate, primary nerves many spreading and arched prominent beneath, petiole 10–15 in. grooved channelled up to the blade, spathe 6–8 in. cylindric with a long stout beak, stigmas raised.

PERAK, at LARUT, *Kunstler* (*King's Collector*).

(*Stem* 40–60 ft., 3–4 in. diam. *Kunstler*), branches 5½ in. diam. *Leaves* rigidly undulate, opaque and dirty-brown when dry, sometimes very unequal-sided at the base, deep green when fresh, crowded at the tips of the branches; nervules oblique; petiole slender, pale. *Peduncle* 1–3 in., very stout. *Spathe* white, thick walled. *Ovaries* $\frac{1}{10}$ in. diam., stigma minute.—The spathe is one of the longest in the genus.

12. **R. Hookeri**, *Schott in Bonpland.* (1857), 45; leaves 7–24 by 2½–12 in. membranous oblong cuspidately caudate-acuminate, base unequal-sided cuneate rounded or cordate, primary nerves very many spreading and arched, petiole 3–12 in. channelled up to the knee, spathe 2½–3½ in. ovoid-oblong turgid, beak long slender, stigmas very broad orbicular pulvinate. Pothos Peepla, *Wall. Cat.* 4444 (*in part*).

SIKKIM HIMALAYA, alt. 1–4000 ft., *J. D. H.* UPPER ASSAM, *Griffith*. SILHET and KHASIA HILLS, alt. 2–3000 ft., *Wallich*, &c. MUNNIPORE, alt. 6000 ft., *Watt*.

A lofty climber; stem as thick as the thumb. *Leaves* the largest of the entire-leaved species, very thin in texture, dark green, drying a dull grey-brown, with a rather shining surface. *Petiole* pale, not deeply channelled. *Spathe* green, yellow within and along the outer margins, walls very thick, base rounded. *Spadix* short, stout. *Ovaries* ⅛ in. diam.; stigmas remarkably large for the genus.

** Leaves perforated, pinnatifid, or pinnatisect.

13. **R. Beccarii**, *Engler Bot. Jahrb.* i. 181; *in Beccari Males.* i. 271, t. 19, f. 6–9; leaves narrowed from the middle to an acute base entire or pinnatifid with falcate caudate-acuminate 1-many-nerved lobes, petiole 6–10 in. of young leaves broadly winged, peduncle 4–8 in., spathe 3–4 in. cylindric acuminate, stigmas orbicular or oblong raised. Epipremnum Beccarii, *Engler in Bull. Soc. Tosc. Ort.* 1879, 269.—*Wall. Cat.* 4438 B.

PERAK, *Scortechini*, *King's Collector*.—DISTRIB. Siam, Borneo.

Rootstock short, tufted, as thick as the little finger, creeping and rooting (or 15–20 ft., *King's Collector*). *Leaves* 10–15 by 4–8 in., unequal-sided, pale beneath; lobes very variable in breadth; petiole channelled up to the limb. *Spathe* dull cream-coloured.—The stigmas in a drawing by Scortechini are sessile, very small and oblong, but in his and other dried specimens they are large oblong or orbicular and often cupped. Engler figures them as oblong raised and cupped.

14. **R. pertusa**, *Schott in Bonpland.* v. (1857) 45; *Prodr.* 382; leaves 8–18 in. long and 6–10 in. broad, young small ovate entire, old pinnatifid to below the middle or perforate, base truncate or subcordate, lobes few

broad falcate acuminate, primary nerves 5–8 pairs, spathe 5–7 in. ovate-oblong beaked. *Miq. Fl. Ind. Bat.* iii. 185; *Engler Arac.* 244. Scindapsus pertusus, *Schott. Melet.* i. 21; *Kunth Enum.* iii. 62. S. Peepla, *Thw. Enum.* 336. Pothos pertusas, *Roxb. Fl. Ind.* i. 434, *Wight Ic.* t. 781. P. officinalis, *Wall. Cat.* 4436 G.—*Rheede Hort. Mal.* xii. t. 20, 21.

The DECCAN PENINSULA; Coromandel, Malabar, and southward to CEYLON.—DISTRIB. Malay Islands.

A tall climber. *Leaves* usually with oblong holes on one side; petiole about as long as the blade, deeply channelled, young winged, wings not auricled at the top. *Spathe* shortly peduncled. *Spathe* yellow. *Ovaries* 4-angled; stigma sessile, pulvinate.

15. **R. glauca,** *Schott in Bonpland.* v. (1857) 45; *Prodr.* 382; leaves 6–10 in. long and broad glaucous beneath pinnatisect, segments falcate linear or broader caudate-acuminate 2–7-nerved, petiole as long as the blade slender channelled up to the blade, spathe 4–6 in. oblong or lanceolate cuspidate. *Engler Arac.* 245; *Ic. ined.* 101. Scindapsus glaucus, *Schott Melet.* i. 121; *Kunth Enum.* iii. 61. Monstera glauca, *C. Koch ex Schott.* Pothos glaucus, *Wall. Pl. As. Rar.* ii. 45, t. 156; *Cat.* 4440.

TROPICAL and SUBTROPICAL HIMALAYA; from Nepal, *Wallich*, eastwards to the KHASIA, NAGA, and MUNNIPORE HILLS, ascending to 7000 ft.

Stem as thick as the thumb, climbing lofty trees. *Leaves* of a fine glaucous blue beneath; young elliptic-ovate; segments 2–4 pairs, narrowed towards the base, 2–5-nerved; petiole 6–10 in. *Peduncle* 3–7 in. *Spathe* very variable in size, longer than the spadix, yellow on both surfaces. *Spadix* pale yellow. *Stigma* of fresh ovary a longitudinal slit, of the dried pulvinate and raised.

Var. ? *khasiana*; leaves 12–14 in., segments 3–7, 7–9 in. long.—Khasia Hills at Churra and Pomrang, *J.D.H. & T. T.*—Referred by Schott to *R. glauca*, with which it agrees in form of segments of leaf, and spathe and spadix, but the leaves are longer with more numerous and longer segments.

16. **R. eximia,** *Schott in Bonpland.* v. (1857) 45; *Prodr.* 387; leaves 1–2 ft. longer than broad oblong pinnatisect with 4–7 pairs of obliquely truncate acute 1-costate and many-nerved segments, petiole very stout, spathe a foot long oblong cuspidate, stigma raised on the conical top of the ovary. R. grandis, *Schott in Œstr. Bot. Zeit.* 1858, 394; *Prodr.* 386.

TROPICAL HIMALAYA; Kumaon, alt. 4000 ft., *Strachey & Winterbottom*; Sikkim, alt. 2–5000 ft., and KHASIA HILLS, alt. 0–4000 ft., *Griffith*, &c.

A lofty climber; stem as thick as a child's wrist. *Leaves* bright green on both surfaces. *Peduncle* 6–10 in., as thick as the thumb. *Spathe* orange-yellow, outside and in. *Spadix* shorter than the spathe, white.

17. **R. decursiva,** *Schott in Bonpland.* v. (1857) 45; *Prodr.* 385; leaves 1–3 ft. longer than broad oblong pinnatisect base, broadly cordate, segments 8–15 pairs falcately ensiform acuminate costate and with several lateral nerves, petiole very stout, spathe 5–7 in. subcylindrically cymbiform yellow beaked, stigma raised on the conical top of the ovary. *Engler Arac.* 246 (*excl. many syns.*); *Bot. Mag.* t. 7282. Scindapsus decursivus, *Schott Meletem.* i. 21; *Kunth Enum.* iii. 62; *Wight Ic.* t. 779; *Miq. Fl. Ind. Bat.* iii. 186; *Thw. Enum.* 336; *Bot. Mag.* t. 7282. Monstera decursiva, *Schott in Wien. Zeitschr.* 1829 (*Linnæa* (1831) *Literat. Ber.* 52). Pothos decursiva, *Roxb. Fl. Ind.* i. 436; *Wall. Pl. As. Rar.* ii. 83, *excl. the Attran plant*). P. decurrens (*error for decursivus*), *Wall. Cat.* 4437 A, *in part.*

SIKKIM HIMALAYA, alt. 2–5000 ft., *J.D.H.* KHASIA HILLS, alt. 0–4000 ft.

A lofty climber, stem as thick as a child's wrist. *Leaves* bright green on both surfaces, segments 6–18 by 1–2 in., tip sometimes almost truncate but always more acuminate than in *R. eximia*; petiole 1–2 ft., as thick as the little finger. *Peduncle* 3–6 in. *Spathe* bright yellow on both surfaces.

18. **R. affinis,** *Schott in Bonpland.* v. (1857) 45; *Prodr.* 385; leaves 1–2 ft. longer than broad oblong base broadly cordate pinnatisect or pinnate, segments many pairs falcately ensiform acuminate narrowed at the base 1-costate with very slender lateral nerves, spathe 5–6 in. oblong cymbiform purple cuspidate, stigma raised on the conical top of the ovary. *Engler Arac.* 247.

KHASIA HILLS, alt. 3–5000 ft., *Griffith* (*Kew Distrib.* 5952), &c.

Habit and characters of *R. decursiva,* and as robust, differing as far as my specimens and drawing tell, in the beautiful violet-purple spathe, and very slender lateral nerves of the narrower unicostate leaflets.

19. **R. Korthalsii,** *Schott in Miq. Ann. Mus. Lugd. Bat.* i. 129; leaves oblong 1–2½ ft. by 6–15 in. pinnatisect longer than their petioles, segments many pairs linear falcate truncate acute 2–4-costate and many-nerved, spathes crowded 6–8 in., stigmas slightly raised. *Engler Arac.* 247.

PENANG, *Maingay* (*Kew Distrib.* 1555). PERAK, *Scortechini, King's Collector.* —DISTRIB. Java.

Stem 30–40 ft., 2–3 in. diam., branching above, densely crinite below the uppermost leaves and inflorescences. *Leaves* dark green; segments 3–8 in., base not contracted; petiole as thick as the little finger, sheathed up to the knee. *Peduncles* 3–8 in., very stout. *Spadix* 6–7 in. cylindric. *Ovaries* very small.

20. **R. tetrasperma,** *Hook. f.*; leaves 5–7 in. long and broad broadly ovate or orbicular cordate sparingly pinnatifid lobes cuspidate or acuminate, petiole rather shorter than the blade, spathe 1½–2 in. turgidly cymbiform acute, placentas each 2-ovuled.

PERAK, *Scortechini.*

Stem ¼–½ in. diam., flexuous, terete, rooting at the nodes, which are 3–4 in. apart. *Leaves* often very unequal-sided; lobes 1–2, broad, acute, 1–2-costate; petiole channelled up to the knee. *Peduncle* 1–2 in., very stout. *Spathe* white. *Spadix* subclavate. *Stigma* a raised furrow on the top of the ovary. *Berries* full of intercellular needles.—Scortechini figures and describes the ovary as 2-celled, with an erect ovule in each cell; but Mr. Brown and I find 1 cell and 2 ovules on each placenta.

26. EPIPREMNUM, *Schott.*

Characters of *Rhaphidophora,* but the ovules are 1–3 anatropous on a nearly basal placenta, and the berries are not confluent.—Species about 8, Malayan and Polynesian.

This genus had better be merged in *Rhaphidophora.*

1. **E. giganteum,** *Schott in Bonpland.* v. (1857) 45; *Prodr.* 389; leaves entire oblong obtuse base cordate, nerves very many and close horizontal, spathe 6–10 in. subsessile fusiform falcate woody. *Engler Arac.* 249. Scindapsus giganteus, *Schott Meletem.* i. 21; *Kunth Enum.* iii. 63. Monstera gigantea, *Schott in Wien. Zeitsch.* (1829), *ex Linnæa,* 1831, *Litter. Ber.* 53. Pothos giganteus, *Roxb. Fl. Ind.* i. 434.

PENANG, *Roxburgh.* PERAK, *Scortechini, King's Collector.*

A lofty climber, over 100 ft.; stem 2–3 in. diam. *Leaves* 12–24 by 6–12 in., bright green (drying yellow-brown) very coriaceous, shining above; costa very stout, nerves trabeculate by the rectangular nervules; petiole as long as the blade, winged throughout its length. *Peduncle* solitary. *Spathe* ending in a curved beak. *Spadix* as long as the spathe. *Stigmas* on a style that rises from the hollow crown of the ovary.—Roxburgh describes the spathe as dirty dull purple, but it is dull green in his drawing. King's Collector says of the Perak spathe, green outside and yellow within, its walls are about ⅛ in. thick.—A closely allied flowerless plant in Herb. Wallich (No. 4442, from Singapore), has leaves 18 in. long by 5½ broad.

2. **E. mirabile,** *Schott Gen. Aroid.* t. 79; *Prodr.* 338; leaves entire pinnatifid or pinnatisect, base cordate, segments ensiform falcate truncate acute or acuminate 1–3-costate base rounded or broadly cordate, spathe ⅔ in. cymbiform. *Engler Arac.* 249; *N. E. Br. in Gard. Chron.* 1882, i. 180, and *Journ. Bot.* (1882) 332. Rhaphidophora caudata, *Schott in Bonpland.* v. (1857) 45. R. Wallichii, *Schott Prodr.* 383; *Engler l. c.* 245. R. pinnata and pinnatifida, *Schott in Bonpland. l. c.; Prodr.* 384. R. lacera, *Hassk. Cat. Hort. Bogor.* 58; *Pl. Jav. Rar.* 155. R. Cunninghamii, *Schott in Bonpland.* ix. (1861) 367. Scindapsus caudatus, pinnatifidus and pinnatus, *Schott Meletem.* i. 21; *Kunth Enum.* iii. 62–63. S. caudatus, *Engl. l. c.* 248. Pothos caudatus, *Roxb. Fl. Ind.* i. 436; *Wall. Pl. As. Rar.* ii. t. 192. P. decursivus, *Wall. in As. Res.* ii. 83, t. 192; *Pl. As. Rar.* ii. 83 (*the Attran plant only*). P. pinnatifidus, *Roxb. Fl. Ind.* i. 437. P. decurrens (*error for* decursivus). *Wall. Cat.* 4437 A (*in part*), B.—Monstera pinnatifida, *Schott in Wien. Zeitschr.* 1820; in *Linnæa*, vi. *Litter. Ber.* 52. *Rumph. Herb. Amb.* v. 489, t. 183, f. 2.

MARTABAN and TENASSERIM, *Wallich, Falconer.* PENANG, *Roxburgh.*—DISTRIB. Malaya, Australia, Polynesia.

A lofty climber; stem stout, 1 in. diam., clothed above with a network of the fibrous remains of the stipular sheaths. *Leaves* 12–20 by 7–12 in., always with small fenestrations or perforations along the region of the midrib, by which it may be distinguished from all allied plants; lobes 4–10 pairs, terminal trapezoid; petiole 8–15 in., knee 1–1½ in. *Spathe* 4–4½ in., green without, yellowish within. *Spadix* sessile, ⅔ in. thick, obtuse, green. *Ovaries* 1-celled, placentas stretching half-way across the cell; stigma linear; ovules 1–3 at the base of the placentas.—Schott figures many arrested ovules which I do not find. Roxburgh says of the Penang plant growing in the Bot. Garden, that the extreme leafless shoots are long and pendulous, differing thus from all other species of *Pothos* known to him. This species (if the identifications are correct with the Pacific plant) is the Tonga drug, much lauded in cases of rheumatism. I am indebted to Mr. Brown for unravelling the intricate synonymy of *E. mirabile* and *Rhaphidophora decursiva.*

3. **E. humile,** *Hook f.*; dwarf, leaves entire ovate-cordate acuminate, nerves spreading and arched, spathe 1–1¼ in. cymbiform beaked. Anadryum humile, *Schott in Miq. Ann. Mus. Lugd. Bat.* i. 127; *Engler Arac.* 181; *Ic. ined.* No. 152.

PENANG, *Maingay* (*Kew Distrib.* 1560.) PERAK, *Curtis, Scortechini.*—DISTRIB. Sumatra.

Rootstock as thick as the little finger, creeping (climbing?). *Leaves* 4–7 by 3–4½ in., coriaceous, acuminate, sinus deep narrow rounded at the base; nerves many, spreading, arched, and branching with the secondary; petiole 6–12 in., not sheathing. *Peduncle* solitary, 1½-2 in. *Spathe* erect. *Spadix* shorter. *Stamens* 4. *Ovary* obpyramidal, truncate, 1-celled; placenta parietal, stretching nearly across the cell, with one erect anatropous ovule on each side of its base; stigmas hemispheric.—The ovary is certainly 1-celled according to both Mr. Brown's and my own analyses, the ovules are detected with great difficulty. The habit is very unlike that of either *E. giganteum* or *mirabile.*

27. LASIA, *Lour.*

A stout spinous marsh plant; rhizome branched and petiole peduncle and leaf nerves beneath all prickly. *Leaves* long-petioled, hastate, entire or pedately pinnatifid. *Spathe* very long, narrow, fleshy, twisted, base convolute, deciduous. *Spadix* short, cylindric, dense-fld., flowering downwards. *Sepals* 4–6, obovate, tips truncate incurved. *Stamens* 4–6, filaments short, flat; anther-lobes parallel, slits extrorse. *Ovary* ovoid, 1-celled, 1-ovuled; style stout; stigma depressed; ovule pendulous from the top of the cell, anatropous or semi-anatropous. *Berries* obpyramidal, 6-sided, top warted or muricate. *Seed* compressed, rugose, exalbuminous; embryo macropodal.

L. heterophylla, *Schott Melet.* 21; *Kunth Enum.* iii. 67; *Miq. Fl. Ind. Bat.* iii. 176. L. Zollingeri, Jenkinsii, and Hermanni, *Schott in Bonpland.* v. (1857) 125. L. desciscens, *Schott in Ann. Mus. Lugd. Bat.* i. 127. L. Roxburghii, *Griff. Itin. Notes,* iii. 155; *Notul.* iii. 155. L. spinosa, *Thw. Enum.* 336; *Engl. Monog. Arac.* 273. Pothos Lasia, *Roxb. Fl. Ind.* i. 438; *Wall. Cat.* 4447. P. heterophylla, *Roxb. l. c.* 437; *Wight Ic.* t. 777. P. spinosa, *Ham. in Wall. Cat.* 4447. Dracontium spinosum, *Linn. Sp. Pl.* 967.

From tropical SIKKIM HIMALAYA, ASSAM, BENGAL, and BURMA, southwards to SINGAPORE and CEYLON.—DISTRIB. Malay Islds., China.

Rootstock 1 in. diam. *Leaves* 6–18 in. long, rigidly coriaceous, young hastate or sagittate with broad or narrow basal lobes, older often broader than long, and deeply pinnatifid, base cordate, lobes 1-costate acuminate; petiole terete, 2–4 ft., sheathing towards the base. *Peduncle* about as long as the petiole, slender. *Spathe* 8-14 in., claret-colrd., opening at the base only. *Spadix* about 1 in., claret-colrd., fruiting 4–5 in. and 1 in. diam.

28. PODOLASIA, *N. E. Br.*

Habit and characters of *Lasia,* and like it prickly, but the leaves are always entire, the spathe short, open to the base, the ovule is laterally attached towards the base of the ovarian cells, and the berries are globose, quite smooth, and entirely exserted beyond the sepals.

P. stipitata, *N. E. Br. in Gard. Chron.* 1882, ii. 70.

PERAK, *Scortechini, King's Collector.*—DISTRIB. Borneo.

Rootstock as thick as the little finger or thicker, creeping. *Leaves* 8–14 in., broad or narrow, hastate or sagittate, 6–12 in. broad across the insertion of the petiole; basal lobes parallel divaricating or horizontal, ½–4 in. broad, acute or acuminate; petiole as long as the blade or shorter, slender. *Peduncle* shorter than the petiole, very slender. *Spathe* 3–5 in., narrowly cymbiform, deep red. *Spadix* about ⅔ as long as the spathe, red; stipes ¼–½ in. *Berries* ¼ in. diam., few on the spadix, red.

29. CYRTOSPERMA, *Griff.*

Perennial warted or prickly herbs. *Leaves* hastate. *Spathe* expanded, straight or twisted, base convolute or not, persistent. *Spadix* short, dense-fld., flowering downwards. *Sepals* 4–8, truncate, tip incurved. *Stamens* 4–8, filaments short, flat; anthers ovate-oblong, slits extrorse. *Ovary* 1-celled; stigma sessile, pulvinate; ovules 1 or more, semi-anatropous, pendulous by long funicles from near the middle of the cell. *Berries* crowded,

obovoidly globose, smooth, 1-7-seeded, scarcely longer than the accrescent sepals. *Seeds* compressed, crested; albumen scanty; embryo hooked.—Species about 10, tropical.

C. lasioides, *Griff. Itin. Notes* iii. 149; *Notul.* iii. 150; *Ic. Pl. Asiat.* t. 169; leaves sagittate, lobes caudate-acuminate, petiole and peduncle prickly, flowers 6-merous, ovules 2. *Schott Gen.* t. 84; *Prodr.* 403; *Engler Arac.* 270; *Ic. Ined.* No. 89.—*Wall. Cat.* 4447.

PERAK; in marshes, *Scortechini, King's Collector.* MALACCA, *Griffith.* SINGAPORE, *Gaudichaud,* &c.—DISTRIB. Borneo.

Rootstock stout. *Leaves* like those of *Lasia,* 2½–3 ft., basal lobes as long as the median, costa and nerves prickly beneath; petiole 2–8 ft., sometimes as thick as the middle finger. *Peduncle* shorter than the petiole. *Spathe* 1–5 in., lengthening to 8 in fruit, open to the base, flat, ovate or lanceolate, caudate-acuminate, many-nerved, white or yellow within, reddish-brown without striped with green. *Spadix* pink; stipes stout, dorsally adnate to the spathe. *Fruiting* spadix 4–6 by 1 in. diam. *Berries* closely packed.—Young plants are smaller in foliage and spathe.

30. ANAPHYLLUM, *Schott.*

A tall herb, with creeping rootstock. *Leaves* broad, membranous, pinnate or pedatipartite. *Spathe* large, broadly lanceolate, caudate, twisted, membranous, deciduous, base very shortly convolute. *Spadix* short, cylindric, stipitate, flowering downwards, base adnate to the spathe. *Sepals* 4, large, obovate, truncate, incurved. *Stamens* 4, filaments flat; anther-cells saccate, pores terminal. *Ovary* ovoid or oblong, 1-celled, 1-ovuled; stigma sessile, disciform; ovule semianatropous, parietal. *Berries* obovoid.

A. Wightii, *Schott Gen. Aroid.* t. 83; *Prodr.* 404; *Engler Arac.* 275.—*Wall. Cat.* 8968.

TRAVANCORE; Courtallam. *Wight.*

Leaves 1-2 ft. long or more; leaflets 2–6 pairs, sessile or petiolulate, 8–18 by 2–4 in., acuminate, 1-costate, base cuneate rounded or acuminate, terminal lobe simple or divided; petiole 3–4 ft., quite smooth. *Peduncle* longer than the leaf. *Spathe* 6–12 by 2–4 in. *Spadix* 1 in.

31. POTHOS, *Linn.*

Climbing branched shrubs, branches rooting. *Leaves* distichous. *Peduncles* terminal or axillary or from lateral shoots. *Spathe* small, reflexed, cymbiform, or elongate, persistent. *Spadix* sessile or stipitate, flowering upwards, stipes often decurved or flexuous. *Sepals* 6, tips incurved. *Stamens* 6, filaments flat; anther-cells ellipsoid, slits extrorse. *Ovary* 3-celled; stigma small; ovules 1 in the inner angle of each cell, anatropous. *Berries* 1–3-seeded. *Seeds* exalbuminous; embryo macropodal.—Species about 20, tropical Asiatic, Australia and Pacific, with one Madagascar.

A. *Leaves* with a broad flat truncate petiole, and short entire sheath. *Spadix* (in the Indian species) very short, globose oblong or pyriform, stipes long.

1. **P. scandens,** *Linn. Sp. Pl.* 968; leaves 2–4 in. obovate or lanceolate, peduncles ⅛–¼ in., bracts very small, spathe cymbiform cuspidate, spadix globose ovoid or shortly oblong. *Bot. Reg.* t. 133; *Hook. Ic. Pl.* t.

175; *Schott Meletem.* i. 21; *Aroid.* i. 22, t. 33; *Prodr.* 563; *Roxb. Fl. Ind.* ii. 457; *Kunth Enum.* iii. 65; *Grah. Cat. Bomb. Pl.* 229; *Dalz. & Gibs. Bomb. Fl.* 257; *Wall. Cat.* 4435; *excl.* D, E, F; *Engler Arac.* 84 (*excl.* var. β). P. exiguiflorus *and* cognatus, *Schott ll. cc.* 21, 22, t. 41, 48, and 561, 562. P. fallax, *Schott Prodr.* 560. P. decipiens, *Schott in Bonpland.* (1859), 165; *Prodr.* 562. P. Roxburghii, *De Vriese in Plant. Jungh.* i. 103. —*Rheede Hort. Mal.* vii. t. 40.

Throughout India, on walls and tree trunks, from BENGAL eastward to BURMA, and southward to SINGAPORE; and from the CONCAN to CEYLON, and the ANDAMAN and NICOBAR ISLDS.—DISTRIB. Malay Islds., China.

Stem as thick as the little finger, much branched; internodes ½–1 in. *Leaves* very variable, ½–2 in. broad, acute apiculate or acuminate; base cuneate or rounded; petiole 1–3 by ¼–⅔ in., base ½-amplexicaul. *Peduncles* equalling or exceeding the bracts, which are ⅛–⅓ in. long. *Spathe* ⅙–¼ in. green. *Spadix* ⅛–¼ in. diam., yellow, about as long as its stipes. *Berries* ½–⅔ in. long, oblong.—*P. cognatus*, distinguished by the short peduncle is not even a constant variety, and there are not a few other Schottian species, that must go under *P. scandens*.

2. **P. Vriesianus,** *Schott Aroid.* 22, t. 36; *Prodr.* 565; characters of *P. scandens*, but bracts much larger, ½ in. long and broad, spadix larger erect inclined or deflexed. *Engler Arac.* 80. P. Roxburghii, *Schott Aroid. l. c.* t. 37 (*not of de Vriese*). *Engler l. c.* 81. P. scandens, *Wall. Cat.* 4435?

SIKKIM HIMALAYA, alt. 1–4000 ft., *J. D. H.* BHOTAN, *Griffith*; SILHET, *Wallich.*

Almost exactly intermediate between *P. scandens*, of which it has the foliage, &c., and *P. Cathcartii*; which has larger but quite similar spathes and spadix. De Vriese erred in supposing that Roxburgh's and Wight's plant differed from *scandens*.

3. **P. Cathcarti,** *Schott Aroid.* i. 22, t 44, 45; *Prodr.* 565; leaves 3–6 in. ovate oblong or lanceolate acute or acuminate, peduncle very stout ½–⅔ in., bracts large concave, spathe orbicular, spadix stoutly stipitate suberect or decurved oblong or globose. *Engler Arac.* 85. P. scandens, *Don Prodr.* 21; *Wall. Cat.* 4435, D, E, F.

TROPICAL HIMALAYA, ascending to 4000 ft. from Kumaon, *Strachey & Winterbottom* to BHOTAN, ASSAM, the KHASIA HILLS, MUNNIPORE and BURMA.

A very much larger plant than *P. scandens*, or *Vriesianus*, with thickly coriaceous bracts, the inner sometimes ½ in. long, a spathe sometimes nearly an inch broad, and spadix ¼–½ in. diam., on a stipes ½–⅔ in. long. *Berries* ½–⅔ in. long, obovoid or oblong, scarlet.

4. **P. angustifolius,** *Presl. Epimel.* 242; leaves 1½–2 by ⅛–⅓ in. linear apiculate, peduncle very short, bracts small, spathe lanceolate, spadix suberect minute globose or ellipsoid. *Schott Aroid.* i. 21, t. 31; *Prodr.* 559; *Engler Arac.* 81.

TENASSERIM, *Helfer*, &c.

Stem much branched; branches short, as thick as a crow-quill; internodes ¼–½ in. *Leaves* ⅛–⅓ in. broad; nerves parallel; petiole ⅓–½ in. *Spathe* ⅛ in. long. *Spadix* ⅙–⅛ in. diam.

5. **P. Hookeri,** *Schott Aroid.* i. 23, t. 46; *Prodr.* 566; leaves 3–4 in. lanceolate acuminate, peduncle 1½–2¾ in. decurved, bracts ovate acute, spathe cymbiform acuminate, spadix oblong. P. scandens, *Hook. Ic. Pl.* t. 175. P. scandens, *var.* Hookeri, *Engler Arac.* 84.

CEYLON, *Walker*.

Stem and foliage as in the common state of *P. scandens* and *Vriesianus*. *Peduncle* often longer than the petiole. *Spathe* ½–¾ in. *Spadix* ½–¼ in., its stipes about as long.

6. **P. macrocephalus,** *Scort. mss.*; leaves lanceolate apiculate, petiole as long as the blade, peduncle 1½–2 in. decurved, spathe ovate-cordate or orbicular cuspidate, spadix globose or shortly pyriform.

PERAK, *Scortechini, King's Collector*.

Climbing 60–80 ft.; branches as thick as a crow-quill, internodes ½–¾ in. *Leaves* 2½–3½ by ½–⅔ in.; rather broader than the petiole. *Peduncle* rather stout; bracts very variable, sometimes few with the longest only ¼ in., at others many, and ½ in. long. *Spathe* ½–⅔ in. diam., white; occasionally a second smaller superior spathe occurs. *Spadix* ½ in. diam., or less, yellow.—This differs from *P. Junghunianus* and *macrophyllus*, de Vriese (in Plant. Jungh. i. 103, 104) of Java and Sumatra solely in the narrower leaves and great length of the petiole. I suspect that all there may prove forms of one.

B. *Petiole* (*knee* only) very short; sheath very long, split to the base. *Spadix* long, sessile or stipitate.

* *Spadix cylindric, dense-fld.; flowers not in clusters.*

7. **P. Kingii,** *Hook. f.*; stout, leaves 6–10 by 3–4 in. oblong or oblong-lanceolate caudate-acuminate, base narrowed rounded, bracts 1½–2 in., spathe 4–6 in. ovate-lanceolate.

PERAK; *Scortechini, King's Collector*; alt. 2–3000 ft.

Stem 6–10 ft., as thick as a swan's quill, branches 2–3 ft., pale. *Leaves* coriaceous, often unequal-sided, shining on both surfaces; petiole ¼ in.; sheath 3–4 in., margins membranous, at length fibrous, tip 2-auricled. *Spathe* dark purple within, pale without. *Spadix* half as long. *Ovary* oblong; style very short, stigma penicillate.

8. **B. Barberianus,** *Schott Aroid.* 24, t. 53; *Prodr.* 573; leaves 3–5 by 1½–1¾ in. oblong- or ovate-lanceolate acuminate base rounded, sheath clasping the branch, peduncles terminal and axillary, spathe linear-lanceolate. *Engler Arac.* 90.

PERAK; on rocks, *Scortechini, King's Collector*.—DISTRIB. Borneo.

Stem slender, branches as thick as a crow-quill. *Leaves* thinly coriaceous, tip sometimes caudate; petiole ⅛ in., sheath 2–3 in., by ⅛–¼ in. broad, biauricled. *Peduncle* deflexed, 1–1½ in. *Spathe* ¾–1 in., acuminate. *Spadix* as long, sessile. *Stigmas* pulvinate, sessile.

9. **P. Wallichii,** *Hook. f.*; leaves 3½–4 in. oblong-lanceolate acuminate, base cuneate or rounded, sheath divergent from the branch, peduncles axillary and terminal, spathe linear-lanceolate acuminate. P. tenera, *Wall. Cat.* 4439, B. (*not Wall. in Roxb. Fl. Ind. Ed. Carey*). P. gracilis, *Schott Prodr.* 572. *Engler Arac.* 91 (*not of Roxb.*)

PENANG, *Porter, Curtis*; PERAK, *Scortechini*.

Very similar to *B. Barberianus* in foliage, but a more slender plant, with the spreading leaf-sheaths not ⅛ in. broad, the peduncle 1½–3 in. long much more slender, a shortly stipitate spadix, and a slender minute style with a very inconspicuous stigma.—In Carey's Edition of Roxburgh's Flora Indica, Wallich proposed the name of *P. tenera* for an Amboyna plant cultivated in the Calcutta Garden, named *P. gracilis* by Roxburgh in mss.

10. **P. lancifolius**, *Hook. f.*; leaves 4–7 by 1–1¾ in. narrowly oblong-lanceolate caudate-acuminate base cuneate sheath divergent from the branch, peduncle terminal, bracts 0, spathe ovate-lanceolate acuminate.

PERAK; *Scortechini.*

A large climber, branches as thick as a crow-quill. *Leaves* thinly coriaceous, pale when dry, and undulate within the margin, tip slender; nerves erecto-patent; petiole ⅛–¼ in., sheath slender, tip bifid. *Peduncle* 1-1½ in., spreading or deflexed. *Spathe* 1½ in., lurid purple, striate. *Spadix* 1–1½ in., subsessile, cylindric, obtuse, ¼ in. diam. *Sepals* and *stamens* 6 each; filaments linear-oblong. *Stigma* minute.

** *Spadix slender; flowers in small spirally disposed or whorled clusters.*

11. **P. latifolius**, *Hook. f.*; leaves 5–7 by 2½–4 in. oblong or obovate-oblong acute or obtuse base rounded or cuneate, sheath divergent from the branch, peduncle terminal, bracts 0, spathe linear from a rounded base, tip emarginate mucronate in the sinus much shorter than the stipitate spadix.

PERAK; Larut, alt. 2–3000 ft., *King's Collector.*

Stem climbing, 10–15 ft.; branches rather stout, internodes 1-1½ in. *Leaves* coriaceous, nerves nearly horizontal, slightly arching; petiole ¼–½ in., sheath 3–4 in. *Peduncle* deflexed or sigmoid. *Spathe* 2½ in., pale green, reflexed, 5-nerved, mucro ½ in. long. *Spadix* 3–5 in., yellow, flowers in approximate equidistant whorls or spirally disposed.

12. **P. Maingayi**, *Hook. f.*; leaves 4–5 by 1–1½ in. narrowly oblong-lanceolate acuminate base cuneate or rounded, sheath divergent from the branch, peduncles terminal, spathe linear oblong? much shorter than the slender stipitate spadix, flowers very minute laxly distantly whorled.

MALACCA, *Maingay.* (*Kew Distrib.* 1538, *P. gracilis*).

Branches as thick as a crow-quill, internodes ½–1 in. *Leaves* coriaceous, drying brown; nerves widely spreading, slightly arched; petiole ⅛ in.; sheath 2½–3 in. *Peduncle* 1½–2 in., usually tortuous. *Spathe* imperfect. *Spadix* 3 in., stipes ¼ in. *Stamens* very short.

13. **P. Curtisii**, *Hook. f.*; leaves 5–7 by 1¼–2 in. oblong-lanceolate or linear-oblong acuminate base cuneate or rounded, sheath divergent from the branch, peduncles terminal, spathe narrowly linear from a dilated rounded base shorter than the slender stipitate spadix, flowers in crowded spirals.

PERAK; *Scortechini*; *King's Collector.* PENANG; *Curtis.*

Resembles *P. Maingayi* so closely that I hesitate to describe it as specifically different, but the flowers are more than twice as large as in that plant, and densely clustered on the much longer (often 6 in.) spadix; and the stamens are much longer. The narrow reflexed spathe is 2–2½ in. long.

14. **P. Kunstleri**, *Hook. f.*; leaves 8–12 by 2–3½ in. unequal-sided oblong or subfalcately oblanceolate caudate-acuminate, base cuneate or rounded, sheath divergent from the branch, peduncle terminal, spathe linear apiculate, spadix very slender, flowers spirally whorled.

PERAK; *King's Collector.*

Stem climbing 10–15 ft. *Leaves* coriaceous, very variable, the older or lower (like those of *P. latifolius*) are up to 3 in. broad, acuminate, base rounded, the younger are as long but only 2–2½ in. broad, with very long pointed tips and acute bases; nerves spreading and arching, much more close in the older leaves; sheaths

2–3 in. *Peduncle* 1½ in., decurved or tortuous. *Spathe* 1½ by ½ in., tip obtuse apiculate. *Spadix* 5 in.; flowers solitary or clustered.

15. **P. remotiflorus**, *Hook. Ic. Pl.* t. 133; leaves 3–6 by ½–2 in. unequal-sided linear or oblong-lanceolate or oblanceolate caudate-acuminate, base acute or obtuse, sheaths very slender divergent from the branch, peduncles terminal and axillary, spathe linear-lanceolate apiculate, spadix very slender zigzag, flowers solitary. *Kunth Enum.* iii. 65; *Schott Aroid.* i. 25, t. 54; *Prodr.* 573; *Thw. Enum.* 337; *Engler Arac.* 92. P. elliptica, *Moon Cat. Pl. Ceyl.* 10 (*name only*); *Miq. Fl. Ind. Bat.* iii. 182.

CEYLON; *Walker*; up to 4000 ft., *Thwaites*.

Stem as thick as a sparrow-quill, much branched. *Leaves* coriaceous, tips filiform; nerves erecto-patent, arched; petiole ¼ in., very slender, sometimes in a straight line with the sheath, which is ¼–1¼ in. long. *Peduncle* 1–1½ in., erect, decurved, or slender. *Spathe* ¾–2¼ in., striate, base rounded. *Spadix* 1–2¼ in.

C. *Petiole* very short, base semi-amplexicaul (sheath 0).

16. **P. Thomsonianus**, *Schott Aroid.* i. 24, t. 51; *Prodr.* 571; leaves 4–6 by 1¼–2 in. elliptic- or oblong-lanceolate caudate-acuminate, base cuneate, peduncles lateral and terminal, spathe small oblong-lanceolate, spadix subsessile cylindric dense-fld.

The CARNATIC; *G. Thomson*.

Branches as thick as a duck's quill. *Leaves* thinly coriaceous, rather unequal-sided, drying yellowish; petiole ⅛–¼ in. *Peduncle* 1 in., decurved. *Spathe* ¼ in. *Spadix* ¾–1 in.—Formed parts of a herbarium made by collectors in the Carnatic employed by the late Gideon Thomson, Esq., of Madras, for his brother, the late Director of the Calcutta Bot. Garden.

INDETERMINABLE SPECIES.

P. BIFARIUS, *Wall. Cat.* 4445, from Singapore, young leaves only.
P. OBLIQUUS, *Wall. Cat.* 4446; from Tavoy, *Gomez*.

32. ACORUS, *Linn.*

Aromatic marsh herbs, rootstock creeping. *Leaves* distichous, ensiform, base equitant, nerves parallel. *Peduncle* leaf-like. *Spathe* the ensiform continuation of the peduncle. *Spadix* sessile, cylindric, dense-fld., flowering upwards. *Sepals* 6, orbicular, concave, tips incurved. *Stamens* 6, filaments linear flat; anther reniform, cells confluent above, slits extrorse. *Ovary* conical, 2–3-celled; stigma minute; ovules many, pendulous from the top of each cell, orthotropous. *Berries* few-seeded. *Seeds* oblong, micropyle often fimbriate, albumen fleshy, embryo axile.—Species 2 north temp. regions.

1. **A. Calamus**, *Linn. Sp. Pl.* 324; leaves 3–6 ft. midrib stout. *Roxb. Fl. Ind.* ii. 169; *Don Prodr.* 21; *Wall. Cat.* 196; *Grah. Cat. Bomb. Pl.* 230; *Dalz. & Gibs. Bomb. Fl. Suppl.* 96; *Thw. Enum.* 337; *Griff. Notul.* iii. 157; *Ic. Pl. Asiat.* t. 162. *Engler Arac.* 217. A. Griffithii and nilaghirensis, *Schott in Œstr. Bot. Zeitschr.* (1858), 357, and (1859), 101; *Prodr.* 580, and 579. A. Belangeri, *Schott in Ann. Mus. Lugd. Bat.* i. 284. A. Casia, *Bertol. Pl. Nuov. Asiat.* ii. (1865), 8.—*Rheede Hort. Mal.* xi. t. 48.

Throughout INDIA and CEYLON, in marshes, wild or cult., ascending the Himalaya to 6000 ft. in Sikkim. DISTRIB. north, temp. and warm regions.

Rootstock very aromatic. *Leaves* 3–6 ft. by ¾–1¼ in., margins waved. *Peduncle* ⅛–⅜ in. broad. *Spathe* 6–30 in. long. *Spadix* 2–4 in. ½–¾ in. diam., slightly curved. *Sepals* about equalling the ovary.—Sweet Flag.

2. **A. gramineus,** *Soland. in Ait. Hort. Kew,* i. 474; midrib 0. *Schott Prodr.* 580; *Engler Arac.* ii. 218. A Calamus, *Benth. Fl. Hongk.* 345. A. terrestris, *Spreng. Syst.* ii. 118; *Schott l. c.* 579. A. Tatarinovii, *Schott in Œstr. Bot. Zeitschr.* (1859) 101. A. Calamus *var.* terrestris, *Engler l. c.* 217.

SIKKIM HIMALAYA, alt. 6000 ft. *J.D.H.* KHASIA HILLS, alt. 4–5000 ft., *Griffith*, &c.—DISTRIB. China, Japan.

Much more variable in size than *A. Calamus*, from 6 in. to 3 ft., with a shorter spathe and more slender spadix.

ORDER CLXVII. LEMNACEÆ.

Minute or small annual floating green scale-like plants, rootless or with capillary roots, propagated by budding or by hybernating bulbils, rarely by seed. *Flowers* 1–3, naked, or in a spathe; perianth 0. *Stamens* 1–2, anthers 1- or 2-celled. *Ovary* 1-celled; style short; stigma truncate, or funnel-shaped; ovules 1–7. *Utricle* bottle-shaped. *Seeds* 1- or more, testa coriaceous; albumen 0, or fleshy; embryo axile, cylindric.—Genera 2, or according to various authors 3 or 4. Species about 20, in all countries.

1. LEMNA, *Linn.*

Fronds with one or more roots, bearing the flowers in marginal clefts. *Filaments* slender; anthers 2-celled. *Ovules* 1–7.—Species 17, natives of all countries.

L. obcordata, Ham. in Wall. Cat. 5201, is a species of *Riccia*.

1. **L. minor,** *Linn. Sp. Pl.* 976; root solitary, frond symmetrical obovoid or oblong nearly flat on both surfaces, ovule solitary. *Kunth Enum.* iii. 4. *Reichb. Ic. Fl. Germ.* vii. t. 14. *Hegelm. Lemnæ*, 141, t. 9, 10; *Boiss. Fl. Orient.* v. 29; *Kurz in Journ. Linn. Soc.* ix. 266.

Throughout INDIA? WESTERN TIBET, to 9500 ft., *Thomson.*—DISTRIB. Cosmopolitan.

Frond ⅛–¼ in. long; young sessile on the old, but soon detached, green above, epidermal cells with flexuous walls. *Root-sheath* not appendaged, cap obtuse. *Spathe* 2-lipped. *Stamens* 2 (each a male fl.). *Style* long. *Seed* horizontal, hemianatropal, albuminous.—Kurz (Journ. Linn. Soc. xi. 266) thinks that *L. minor* does not occur in India proper. If this be so, *L. paucicostata* has been mistaken for it, a point I must leave it for local botanists to clear up. Hegelmaier gives the Caucasus and W. Tibet as the only Asiatic habitats.

2. **L. paucicostata,** *Hegelm. Lemnæ*, 139, t. 8; root solitary, frond asymmetrical obovate or obovate-oblong nearly flat on both surfaces, ovule solitary. *Boiss. Fl. Orient.* v. 30. L. minor, *Griff. Notul.* iii. 216; *Hegelm. in Seem. Journ. Bot.* (1865), 112; *Thw. Enum.* 331.

In various parts of INDIA and CEYLON; ascending the Khasia Hills to 6000 ft.—DISTRIB. Cosmopolitan tropical.

Distinguished from *L. minor* by the asymmetric fronds, appendaged root-sheath, acute root-cap, and erect orthotropous seed.

3. **L. gibba,** *Linn. Sp. Pl.* 970; root solitary, frond orbicular or

obovoid tumid beneath, ovules 2–7. *Reichb. Ic. Fl. Germ.* vii. t. 14; *Boiss. Fl. Orient.* v. 30; *Hegelm. Lemnæ*, 145, t. 11–13. Telmatophace gibba, *Schleid. in Linnæa*, xiii. 391; *Kunth Enum.* iii. 6; *Kurz in Journ. Linn. Soc.* ix. 266.—Lemna, *Griff. Notul.* iii. 221 (2nd species), *Ic. Pl. Asiat.* t. 263.

Still waters throughout INDIA, ascending to 7000 ft. in the Himalaya.—DISTRIB. Cosmopolitan.

Frond ⅛–¼ in. diam., opaque, young sessile, cells beneath very large, epidermis with flexuous walls. *Root-sheath* elongate, cylindric, root-cap acute. *Stamens* 2. *Utricle* circumciss. *Seeds* erect, anatropous, albumen scanty or 0.

4. **L. trisulca,** *Linn. Sp. Pl.* 970; root solitary, frond oblanceolate tip serrate young hastate persistent, ovule solitary. *Kunth Enum.* iii. 5; *Reichb. Ic. Fl. Germ.* vii. t. 15; *Hegelm. Lemnæ*, 134, t. 5, 6; *Boiss. Fl. Orient.* vi. 29; *Dalz. & Gibs. Bomb. Fl.* 281. L cruciata, *Roxb. Fl. Ind.* iii. 566.—Lemna, *Griff Notul.* 218; *Ic. Plant. Asiat.* t. 262.

PANJAB, *Stewart.* BENGAL, The CONCAN, MUNNEPORE, and BURMA.—DISTRIB. Temp. and trop. regions.

Fronds ⅛–¼ in. long, young on one or both sides placed cross-wise to the old; epidermis 0. *Root-cap* acute. *Style* very short. *Seed* hemianatropous, horizontal; testa rough, grooved.

5. **L. polyrrhiza,** *Linn. Sp. Pl.* 970; roots many, frond herbaceous broadly obovate or orbicular flat or nearly so 7-nerved, ovules 1–2 erect. *Reichb. Ic. Fl. Germ.* vii. t. 15; *Thw. Enum.* 331; *Kurz in Journ. Linn. Soc.* ix. 267. L. orbiculata, *Roxb. Fl. Ind.* iii. 565. L. major, *Griff. Notul* iii. 216; *Ic. Plant. Asiat.* t. 264 (*anal.*). Spirodela polyrrhiza, *Schleid. in Linnæa*, xiii. 392; *Kunth. Enum.* iii. 7; *Hegelm. Lemnæ*, 151, t. 13–15; *Boiss. Fl. Orient.* v. 30.

Common throughout INDIA and CEYLON.—DISTRIB. Temp. and trop. regions.

Fronds ¼–⅓ in. diam., dark green above, usually purplish beneath; epidermal cells with flexuous walls. *Spathe* 2-lipped. *Stamens* 2. *Ovules* 1–2, semianatropous.—Kurz describes a var. *concolor* with much larger fronds, green on both surfaces, as occurring under trees in Bengal.

6. **L. oligorrhiza**, *Kurz in Journ. Linn. Soc.* ix. 267, t. 5; roots few, fronds membranous ovate or oblong 3–5-nerved. *Benth. Fl. Austral.* vii. 163. Spirodela oligorrhiza, *Hegelm. Lemnæ*, 147, t. 16. S. melanorrhiza and pleioirrhiza, *F. Muell. ex Kurz in Seem. Journ. Bot.* (1867) 115.

BENGAL, *Kurz*, and elsewhere in India.—DISTRIB. Trop. Asia, Australia, Polynesia.

Fronds ¼–⅓ in. long by half as broad, thin, shining, collected in circinate groups, purple beneath. *Roots* 2–5, very long. *Flowers* as in *L. minor.*—Kurz, from whom the above characters are taken, says that he at first took it for an extreme form of *L. polyrrhiza*, in company of which he always found it in Bengal; but on discovering the flowers he considered it distinct. It has the general form and size of *L. minor.*

2. WOLFFIA, *Horkel.*

Fronds like grains of sand, rootless, proliferous, bearing the flowers on the upper surface. *Spathe* 0. *Anthers* sessile, 1-celled. *Style* short, stigma depressed; ovule 1, erect.

1. **W. arrhiza,** *Wimm. Fl. Schles.* 140; fronds subglobose. W. Michelii, *Schleid. Beitrag. Bot.* 233. W. Delilii, *Kurz in Journ. Linn. Soc.*

ix. 265 (*not of Schleid.*). Lemna arrhiza, *Linn. Mant.* 294. L. globosa, *Roxb. Fl. Ind.* iii. 565; *Grah. Cat. Bomb. Pl.* 252; *Dalz. & Gibs. Bomb. Fl.* 281. Grantia globosa, *Griff. Notul.* iii. 229; *Ic. Pl. Asiat.* t. 267, f. 2. Bruniera vivipara, *Franchet in Billot.* 1864, 25.

Common, probably throughout INDIA and CEYLON.—DISTRIB. Cosmopolitan.

Of this Kurz distinguishes two Indian varieties, a larger, *Delili* (*Grantia globosa*, Griff.), and a smaller with more cylindric fronds, the *Lemna globosa*, Roxb.

2. **W. microscopica,** *Kurz in Journ. Linn. Soc.* ix. 265; frond flat above, conical beneath and tapering into a root? *Hegelm. Lemnæ*, 127. Grantia microscopica, *Griff. Notul.* iii. 226; *Ic. Plant. Asiat.* t. 266–268.

BENGAL, *Griffith.*

Known only through Griffith's description and drawings.

ORDER CLXVIII. TRIURIDEÆ.

Slender, leafless, coloured annuals. *Stem* subsimple, filiform, with a few distant scales. *Flowers* unisexual, small, in terminal corymbs or racemes; pedicels decurved, bracteate. *Perianth* inferior, 6–8-partite or -lobed; lobes ovate-lanceolate or subulate, valvate in bud. MALE FL. *Stamens* 2–6, hypogynous or perigynous, anthers free or immersed in a thick disk, cells 2, confluent, slits extrorse; pistillodes 3, subulate, or 0. FEM. FL. *Staminodes* 0 or few. *Carpels* many, sessile on a receptacle, 1-celled; style terminal lateral or basal, persistent; stigma acute, clavate, or penicillate. *Ovules* solitary, erect, anatropous. *Achenes* in a globose head, obovoid, coriaceous or fleshy, nucleus hard, embryo not seen.—Genera 2, tropical America and Asiatic.

SCIAPHILA, *Blume.*

Perianth 3–8-partite or -lobed. *Anthers* sessile at the base of the perianth. *Style* ventral or basilar.—Species about 14, Asiatic and American.

1. **S. erubescens,** *Miers in Proc. Linn. Soc.* ii. (1850) 74; *in Trans. Linn. Soc.* xxi. 48; raceme many-fld., perianth segments 6 broadly lanceolate naked style, clavate penicillate hardly longer than the ovary. *Thw. Enum.* 294; *Benth. in Hook. Journ. Bot.* vii. (1855) 10. Aphylleia erubescens, *Champ. in Calcutt. Journ. Nat. Hist.* vii. 468.

CEYLON; in shady woods at Galle, *Champion*; Colombo, *Ferguson.*

Stem 3–4 in. *Flowers* ⅛ in. diam., hyaline, pale purplish, speckled with red streaks; pedicels ¼ in.

2. **S. secundiflora,** *Thw. ex Benth. in Hook. Journ. Bot.* vii. (1855) 10; *Enum.* 294; raceme secund, few-fld., perianth segments 6 subulate acuminate naked, style clavate penicillate hardly longer than the ovary.

CEYLON; forests near Sittawake, *Thwaites.*

Stem 6–14 in., purplish; bracts broad, acute. *Flowers* monœcious, pedicel $\frac{1}{10}$–¼ in.; perianth about ⅛ in. diam. *Anthers* sessile, transversely oblong, white.

3. **S. janthina,** *Thw. Enum.* 294; flowers long-pedicelled, perianth segments 8 lanceolate, stamens 4, style subbasilar filiform much longer than the ovary. Hyalisma janthina, *Champ. in Calc. Journ. Nat. Hist.* vii. (1847) 466; *Miers. in Trans. Linn. Soc.* xxi. 49.

TRAVANCORE; Tinnevelly, *Beddome.* CEYLON; in damp forests, *Champion.*

Stem 4–8 in.; bracts about $\frac{1}{12}$ in. *Flowers* alternate, opposite and whorled, mono- or dicœcious, pedicel $\frac{1}{4}$–1 in.; male $\frac{1}{8}$ in. diam., fem. $\frac{1}{4}$ in. *Anthers* sessile on a thick disk.

4. **S. khasiana,** *Hook. f. in Gen. Plant.* iii. 1003; perianth segments 4–5 ovate-acuminate, male fl. with 3 subulate pistillodes, style ventral filiform much longer than the ovary.

KHASIA HILLS, alt. 4000 ft., *J. D. H. & T. T.*

Plant red-purple. *Stem* 3–6 in., filiform or capillary, flexuous, simple or branched, naked or with a few scales, fem. much the stoutest. *Flowers* dicœcious, racemose, male $\frac{1}{10}$ in. diam., fem twice as large and longer pedicelled; bracts of male minute, of fem. $\frac{1}{8}$ in., subulate; perianth papillose. *Anthers* very large, globosely 4-lobed, white, dehiscence transverse; pistillodes erect, subulate, purple. *Carpels* many, papillose. *Achenes* reniformly obovoid, pericarp cellular, purple. *Seed* conform to the pericarp; testa chartaceous, yellow-brown, transversely strongly reticulate; nucleus oblong, cellular, homogeneous, white.—Described from drawings I made in the Khasia.

ORDER CLXIX. ALISMACEÆ.

Marsh or water plants of various habit. *Leaves* radical, entire. *Flowers* regular, uni- or bisexual. *Perianth segments* 6, 2-seriate, outer (sepals) herbaceous, inner petaloid rarely 0. *Stamens* 6 or more, hypogynous or perigynous; anthers erect, basifixed, 2-celled, slits lateral or dorsal. *Carpels* 3–6 or more, 1-celled, sessile or stipitate on a flat or raised receptacle; style short, long (or 0), subterminal or ventral, stigma simple; ovules 1 or more, insertion various. *Fruit* of small achenes or follicles. *Seeds* small, exalbuminous; embryo straight or conduplicate.—Genera 12, species about 60, cosmopolitan.

Tribe 1. ALISMACEÆ. *Fruit* of 3 or more achenes.

Flowers bisexual. Stamens 6–9. Receptacle flat . .	1. ALISMA.
Flowers polygamous Stamens 6. Receptacle flat . .	2. LIMNOPHYTON.
Flowers unisexual. Stamens many. Receptacle globose or oblong	3. SAGITTARIA.
Flowers monœcious. Stamens 3	4. WISNEBIA.

Tribe II. BUTOMEÆ. *Fruit* of follicles.

Petals marcescent. Embryo straight	5. BUTOMUS.
Petals deciduous. Embryo hippocrepic	6. BUTOMOPSIS.

1. ALISMA, *Linn.*

Scapigerous herbs. *Leaves* lanceolate, cordate, or sagittate. *Flowers* bisexual in umbelled or panicled whorls, white or pink. *Sepals* 3, herbaceous, persistent. *Petals* 3, membranous, deciduous. *Stamens* 6 or 9, filaments filiform. *Carpels* few or many; receptacle small; stigma small, terminal; ovule solitary, anatropous, basilar. *Fruit* of few or many compressed or turgid, coriaceous or hard achenes. *Seeds* erect, testa membranous; embryo hippocrepic.—Species about 10, cosmopolitan.

1. **A. Plantago,** *Linn.*; leaves linear ovate-lanceolate or subcordate 5–7-nerved, fruiting sepals spreading, achenes membranous compressed, style slender deciduous. *Kunth Enum.* iii. 148; *Reichb. Ic. Fl. Germ.* vii. t. 57; *Micheli in DC. Monog. Phan.* iii. 32; *Boiss. Fl. Orient.* v. 9; *Wall. Cat.* 4998. ? A. intermedium, *Griff. ex Voigt Hort. Suburb. Calcutt.* 680.

Marshes, &c. of the LOWER HIMALAYA, alt. 1–7000 ft., from Kashmir to Munnepore and Burma.—DISTRIB. N. and S. temp. regions.

Rootstock fleshy, swollen. *Leaves* 6–8 in., erect or spreading. *Scape* 1–4 ft. *Flowers* in panicled whorls, ¼ in. diam.; petals pink or rose with a yellow claw. *Achenes* 20–30, in a single whorl; style ventral.—A small state found in Kashmir, alt. 7000 ft., by Clarke, resembles *A. ranunculoides*, but the carpels are in one whorl, though irregularly disposed.

2. **A. reniforme,** *Don Prodr.* 22; leaves orbicular-cordate or reniform 13–17-nerved, fruiting sepals persistent, achenes 5–8 turgid, endocarp thick hard, style slender persistent. *Wight Ic.* t. 322; *Kunth Enum.* iii. 151; *Benth. Fl. Austral.* 186. A. calophyllum, *Wall. Cat.* 4997. A. parnassifolium, β majus, *Micheli in DC. Monog. Phan.* iii. 36.

Marshes, &c., throughout the plains and low country of India, ascending the hills to 5000 ft. (not in Ceylon).—DISTRIB. Australia.

Leaves coriaceous, 1½–4 in. (up to 7 in. broad), often broader than long, tip rounded or emarginate, nervules very fine and close. *Scape* 1–3 ft. *Flowers* white, ¼ in. diam., in very large whorled panicles; branches and pedicels long; sepals as long as the petals, at first erect in fruit, at length reflexed. *Achenes* not whorled, obovoid, dorsally ribbed, ribs smooth; style subterminal.—United by Micheli with the European *A. parnassifolium*, but differing much in the coriaceous very broad large leaves and in geographical distribution.

3. **A. oligococcum,** *F. Muell. Fragm. Phyt. Austral.* i. 23; leaves membranous broadly ovate-cordate with acute lobes and a narrow sinus punctate 11–17-nerved, bracts very large lanceolate, fruiting sepals reflexed, achenes 2–6 whorled turgid dorsally keeled keels tubercled, endocarp thick hard, style very short terminal deciduous. *Benth. Fl. Austral.* vii. 185; *Micheli, in DC. Monog. Phan.* iii. 37. A. glandulosum, *Thw. Enum.* 332. A. apetalum, *Ham. in Wall. Cat.* 4996.

Marshes, &c., in the plains of the PANJAB and BENGAL, but not common. CEYLON, *Thwaites.*—DISTRIB. Africa trop., Australia.

Leaves 3–6 in. long by 2–3 in. broad, nervules distant. *Panicle* 6–9 in. long and broad; bracts herbaceous, lower 1–3 in. long, lanceolate. *Flowers* of *L. Plantago*.

2. LIMNOPHYTON, *Miquel.*

An erect succulent marsh plant, with the characters of *Alisma*, except that the flowers are polygamous.

L. obtusifolium, *Miq. Fl. Ind. Bat.* iii. 242; *Micheli, in A.DC. Monogr. Phan.* iii. 39. Alisma sagittifolium, *Willd. Sp. Pl.* ii. 277; *Kunth. Enum.* iii. 151. A. Kotschii, *Hochst. in Flora*, 1843, 499. A. obtusifolium, *Thw. Enum.* 332. Sagittaria obtusifolia, *Linn.*; *Kunth. Enum.* iii. 158; *Roxb. Fl. Ind.* iii. 646; *Dalz. & Gibs. Bomb. Fl.* 249; *Wall. Cat.* 4992. Dipseudochorion sagittifolium, *Buchen. in Flora*, 1865, 241.—*Rheede Hort. Mal.* xi. t. 45.

The DECCAN; from the Concan southwards, in tanks, &c. CEYLON, *Thwaites.*—DISTRIB. Trop. Africa, Madagascar.

Usually very robust, but sometimes dwarf. *Leaves* 6–12 by 4–8 in., reniformly sagittate or triangular, with long tapering spreading lobes, many-nerved; petiole 2–3 ft. *Scape* 2–4 ft., stout, angled. *Flowers* many, ½–¾ in. diam., white, upper mostly male. *Sepals* reflexed after flowering. *Petals* obovate. *Stamens* 6, filaments of the male enlarged at the base. *Achenes* numerous, turbinate, turgid, epicarp fleshy; style ventral, stigma capitate.

3. SAGITTARIA, *Linn.*

Erect stemless, usually perennial water plants. *Leaves* long-petioled, elliptic cordate or sagittate. *Flowers* in panicled or spicate whorls, unisexual or polygamous. *Sepals* 3, herbaceous. *Petals* 3, membranous, deciduous. *Stamens* 6 or more; filaments filiform, compressed. *Carpels* very many, crowded on a large globose or oblong receptacle, laterally flattened; style ventral or apical, stigma papillose; ovules solitary, basilar. *Fruit* a globose or oblong head of flattened crested or winged achenes. *Seeds* erect, testa thin; embryo hippocrepic.—Species about 15, temperate and tropical.

1. **S. sagittifolia,** *Linn.*; leaves hastate or sagittate, achenes flat dorsally winged. *Kunth Enum.* iii. 156; *Roxb. Fl. Ind.* iii. 645; *Wall. Cat.* 4991; *Reichb. Fl. Germ.* vii. t. 53; *Boiss. Fl. Orient.* v. 11; *Micheli in A.DC. Monogr. Phan.* iii. 66. S. hermaphrodita, *Ham. in Wall. Cat. l. c.* S. hastata, *Don Prodr.* 22. S. Doniana, *Sweet, Hort. Brit.* 1826.

In tanks, &c., throughout the plains of INDIA from the Panjab to Bengal and Munnipore.—DISTRIB. Europe, N. Asia, N. America.

Leaves obtuse or acute, 2–8 in. long, very rarely elliptic or lanceolate, lobes more or less diverging; petiole 8–18 in., trigonous. *Scape* 6–18 in., with 3–5 whorls of 3–5 flowers each ½ in. diam.; lower whorls fem., upper male, with longer pedicels; bracts short, obtuse. *Flowers* ¾ in. diam.; petals white, claw often purple. *Achenes* obliquely obovate, apiculate, wings broad entire or subcrenate.

2. **S. guayanensis,** *Humb. Bonpl. & Kunth, Nov. Gen. & Sp.* i. 250; leaves floating broadly ovate deeply cordate obtuse, achenes flat surrounded by a broad toothed wing. *Kunth Enum.* iii. 161. S. cordifolia, *Roxb. Fl. Ind.* iii. 647; *Kunth l. c.* S. Lappula, *Don. Prodr.* 22. S. parviflora, *Wall. Cat.* (*ex Micheli*). Alisma? Hamiltonianum and cristatum, *Wall. Cat.* 4993, 4994, 4995. A. stellatum and pubescens, *Ham. ex Wall. Cat.* 4993, 4995. Lophiocarpus guayanensis, *Micheli in A.DC. Monogr. Phan.* iii. 62.

In tanks and marshes, throughout the plains of INDIA, to BURMA and the MALAY PENINSULA, but not very common; (not in Ceylon).—DISTRIB. Malay Islands, China, trop. Australia.

Petioles, scape, and *pedicels* often more or less hairy. *Leaves* 1–2 in., membranous, lobes broad acute or obtuse, sinus broad or narrow; nerves radiating, obscure; petiole long or short. *Scape* 6–18 in., stout. *Flowers* ¾ in. diam., white, in few approximate irregular whorls; pedicels short, very stout; flowers of the lower whorls usually ternate, bisexual, 9–12-androus, of the upper more numerous, male, 6–10-androus. *Petals* obovate, erose. *Anthers* cordate at the base. *Achenes* very many.

4. WISNERIA, *Micheli.*

Scapigerous marsh or water herbs. *Leaves* long-petioled, filiform lanceolate or oblanceolate. *Flowers* minute, monœcious, in remote involucrate whorls on a very slender rachis; involucre campanulate, truncate, membranous. *Sepals* 3, equal or one larger, persistent. *Petals* 2–4, equalling or smaller than the sepals. MALE FL. *Stamens* 3. *Pistillodes* subulate. FEM. FL. *Staminodes* setaceous. *Carpels* 3–6, erect, ovoid; receptacle small tumid; style 0, or terminal, short, stigma minute; ovule solitary, basilar. *Achenes* and *seed* subglobose or compressed; embryo conduplicate, hyppocrepic.—Species 3, Trop. Asia, Africa, and Madagascar.

W. triandra, *Micheli in A.DC. Monog. Phan.* iii. 82; sepals and petals 3 each, achenes subglobose, stigma sessile. Sagittaria triandra, *Dalz. in Hook. Journ. Bot.* ii. (1850), 144; *Dalz. & Gibs. Bomb. Fl.* 249.

The CONCAN; in water holes, Malwan, *Stocks.*

Leaves with the petiole 9–16 in., narrowly linear-spathulate obtuse, ¼–½ in. broad, midrib stout penni-nervuled, lateral nerves slender submarginal. *Scape* shorter than the petiole. *Flowers* ternate, very shortly pedicelled, white; sepals linear-oblong; petals much larger, obovate. *Filaments* short, anthers didymous. *Achenes* few, subglobose or obovoid, smooth.

5. **BUTOMUS**, *Linn.*

A glabrous erect water plant, with a stout creeping rootstock. *Leaves* erect, linear, elongate, triquetrous, blade 0. *Scape* erect, terete. *Flowers* bisexual, in simple bracteate umbels, pink. *Sepals* and *petals* both coloured and persistent, coriaceous, erect. *Stamens* 9, hypogynous, filaments elongate-subulate; anthers linear, didymous after dehiscence. *Carpels* 6, whorled on a flat receptacle, connate below; stigma ventral elongate furrowed; ovules many, scattered, parietal, ascending. *Fruit* of 6 coriaceous beaked many-seeded follicles. *Seeds* linear-oblong, furrowed; embryo straight.

B. umbellatus, *Linn.*; *Kunth Enum.* iii. 164; *Reichb. Ic. Fl. Germ.* vii. t. 58; *Boiss. Fl. Orient.* v. 12; *Wall. Cat.* 7244.

The PANJAB and KASHMIR; in marshes, &c., alt. 1–5000 ft.—DISTRIB. Europe; N. Asia.

Leaves 3–4 ft. by ½ in. broad, acuminate, base sheathing. *Umbel* many-fld., bracts 3; pedicels 2–4 in. *Flowers* 1 in. diam.

6. **BUTOMOPSIS**, *Kunth.*

An annual marsh herb with milky juice. *Leaves* elliptic, acute. *Flowers* in solitary or superposed bracteate whorls; perianth as in *Butomus*, but petals larger than the sepals, membranous, fugacious, white. *Stamen* 8–12; anthers oblong. *Follicles*, 6–7, erect; membranous. *Seeds* very many, minute, smooth.

B. lanceolata, *Kunth Enum.* iii. 165; *Dalz. & Gibs. Bomb. Fl.* 249; *Benth. Fl. Austral.* vii. 187; *Micheli in A.DC. Monog. Phan.* iii. 87. B. ? latifolia, *Kunth l. c.* Butomus lanceolatus, *Roxb. Fl. Ind.* ii. 315; *Wall. Cat.* 4999. B. latifolius, *Don Prodr.* 22. B. Dobia, *Ham. in Wall. l. c.* Tæganocharis cordofana, *Hochst. in Flora* (1841), 369.

PLAINS OF INDIA, from Rohilkund to Assam and the Deccan.—DISTRIB. tropics of the old world.

Very variable in stature and stoutness. *Leaves* 2–6 in., broad or narrow, 3–7-nerved, acute obtuse or apiculate. *Scape* as long as the leaves, stout or slender. *Umbels* 3–20-fld.; bracts few, short, scarious; pedicels 2–8 in., erect. *Flowers* ½–1 in. diam.; sepals ovate or orbicular; petals longer, obovate. *Stamens* 8–10, filaments rather slender, anthers oblong. *Follicles* 6–7, tapering into short beaks, membranous, connate below.

ORDER CLXX. **NAIADACEÆ.**

Aquatic or marsh herbs of various habit. *Rootstock* usually creeping. *Stems* usually elongate (short or 0 in *Triglochin*) branched. *Leaves* erect,

or submerged or floating, base sheathing; stipules 0 or within the sheath. *Flowers* inconspicuous, usually green, 1–2-sexual. *Perianth* 0, or tubular, or of 3–4 inferior valvate segments. *Stamens* hypogynous; anthers 1–2-celled. *Ovary* of 1–4 1-ovuled carpels, style long or short, stigma various; ovule erect or pendulous. *Fruit* of 1-seeded utricles achenes or drupelets. *Seed* exalbuminous; embryo straight or curved, radicular end very large.—Temperate and tropical; genera 16, sp. about 120.

* Stigmas discoid or decurrent on the ovary.

† *Perianth of sepals or scales. Flowers bisexual.*

Marsh herbs.	Sepals 6, herbaceous green	1. TRIGLOCHIN.
Aquatics.	Sepals 1–3, white, membranous	2. APONOGETON.
Aquatics.	Sepals 4, herbaceous, green	3. POTAMOGETON.

†† *Perianth* 0. *Flowers uni- or bi-sexual.*

Aquatics.	Stamen 2. Carpels stipitate	4. RUPPIA.
Aquatics.	Stamen 1. Carpels sessile	5. ZANNICHELLIA.

** Stigmas subulate or capillary. Flowers unisexual.

Fresh or brackish aquatics.	Perianth hyaline	6. NAIAS.
Marine.	Perianth 0	7. CYMODOCEA.

1. TRIGLOCHIN, *Linn.*

Scapigerous marsh herbs. *Leaves* rush-like, flat or terete. *Flowers* small, bisexual, spicate or racemose, 2-bracteate. *Perianth-segments* 3 or 6, herbaceous, concave, deciduous. *Stamens* 6, inserted on the base of the segments; anthers didymous, slits extrorse. *Carpels* 6, 1-celled, 1-ovuled, 3 alternate often imperfect; styles short, often connate, stigmas penicillate; ovules basilar, erect, anatropous. *Fruit* of 3 or 6 free or connate achenes or follicles with recurved tips. *Seed* erect; embryo straight.—Genus cosmopolitan; species about 12.

1. **T. palustre**, *Linn. Sp. Pl.* 338; leaves ½-terete throughout, fruit clavate, carpels 3 slender attached to the axis by a point. *Kunth Enum.* iii. 143; *Reichb. Ic. Fl. Germ.* vii. t. 51; *Boiss. Fl. Orient.* v. 13.—Triglochin, *Griff. Notul.* iii. 204; *Ic. Pl. Asiat.* t. 271.

TEMPERATE and ALPINE HIMALAYA, and WESTERN TIBET, alt. 8–15,000 ft.—DISTRIB. N. temp. regions and S. America.

Stem 6–24 in., tuberous and stoloniferous. *Leaves* 2–12 in., flaccid. *Scape* slender; raceme elongating after flowering, pedicels short. *Perianth* green, margins purplish. *Anthers* purple. *Fruit* ¼ in. long, appressed to the rachis; carpels dorsally terete.

2. **T. maritimum**, *Linn. Sp. Pl.* 339; leaves slightly flattened at the tip, fruit oblong of 6 separable carpels. *Kunth Enum.* iii. 145; *Reichb. Ic. Fl. Germ.* vii. t. 52; *Boiss. Fl. Orient.* v. 13.

TEMPERATE and ALPINE HIMALAYA, and WESTERN TIBET, from 12,000–16,000 ft.—DISTRIB. N. temp. regions.

Larger, stouter, and more tuberous at the base than T. *palustre*. *Scape* stout, curved; raceme longer, but not elongating so much in fruit; flowers larger; fruit ⅛ in., not appressed to the scape, carpels grooved on the back.

2. APONOGETON, *Thumb.*

Submerged scapigerous plants; rootstocks tuberous. *Leaves* floating or erect, oblong. *Scape* long, bearing a single or twin sessile spikes of often unilateral or distichous bisexual flowers; the very young spikes enclosed in a conical deciduous sheath. *Perianth* 0, or of 1-3 equal or unequal white segments. *Stamens* 6 or more, filaments subulate, unequal, persistent; anthers didymous. *Carpels* 3-6, 2- or more-ovuled; style short, stigma discoid or decurrent; ersistent; ovules basilar, anatropous. *Fruit* of 3 or more coriaceous follicles. *Seeds* erect; embryo straight.—Species about 20, Asiatic, African and Australian.

1. **A. monostachyon**, *Linn f. Suppl.* 214; leaves floating oblong 3-5-nerved opaque, cross nervules distinct, spike solitary, sepals 2 shorter than the 3 smooth 4-8-seeded follicles. *Roxb. Cor. Pl.* i. 58, t. 81; *Fl. Ind.* ii. 210; *Thw. Enum.* 333; *Dalz. & Gibs. Bomb. Fl.* 248; *Griff. Notul.* iii. 203; *Wall. Cat.* 5167, A, B, C, E.; *Andr. Bot. Rep.* vi. t. 406. A. monostachys, *Edgew. in Hook. Lond. Journ. Bot.* iii. (1844), 405, t. 17. A. lucens, *Herb. Madr.* A. flavidum, *Herb. Ham.* Spathium monostachyum, *Edgew. in Calc. Journ. Nat. Hist.* iii. (1843), 533, t. 16. Potamogeton indicus, *Roth ex Roem. & Sch. Syst.* iii. 576. Saururus natans, *Linn. Mant.* 227.—*Rheede Hort. Mal.* ii. t. 15.

Tanks, &c., throughout INDIA and CEYLON.—DISTRIB. Trop. Asia and Australia.

Leaves 3-6 in., acute or obtuse, herbaceous, base cuneate rounded or cordate. *Spike* 1-6 in., lax or dense-fld. *Sepals* obovate to lanceolate. *Stamens* 6. *Seeds* oblong.—Submerged leaves membranous transparent and with distinct cross-nervules as in *A. crispum*.

2. **A. crispum**, *Thunb. Nov. Gen.* i. 73; leaves submerged from linear-oblong to lanceolate 3-7-nerved membranous translucent cross-nervules distinct, spike solitary, sepals much longer than the 3-4 smooth 1-2-seeded follicles. *Thw. Enum.* 333. A. undulatum, *Roxb. Fl. Ind.* ii. 211; *Wall. Cat.* 5167, D. 5168; 5175, F.; *Aitchis. Cat. Panjab Pl.* 145. Ouvirandra undulata, *Edgew. in Hook. Lond. Journ. Bot.* iii. (1844), 405, t. 18. Spathium undulatum, *Edgew. in Calc. Journ. Nat. Hist.* iii. (1843), 533, t. 15.—Limogeton, *Edgew. ex Griff. Notul.* iii. 203.

Tanks throughout INDIA and CEYLON.—DISTRIB. Australia.

Leaves 1-3 ft., flat or undulate; base acute rounded or cordate. *Sepals* very variable in size, if two species be not confounded under this name. Roxburgh describes them "as in *monostachyon*," but in some specimens they are fully ½ in. long.

3. **A. echinatum**, *Roxb. Fl. Ind.* ii. 210; leaves floating linear-oblong 3-5-nerved opaque cross-nervules obsolete, spike solitary, sepals shorter than the 3 echinate 2-seeded follicles.

Tanks in BENGAL, *Roxburgh*.

I have seen but one specimen of what I take to be this plant, in Herb. Wight, named *A. dispermum*. Wight says it quite resembles *A. monostachyon*, except in the follicles, which are larger, 2-seeded, more narrowed into a nearly straight beak, and they are dorsally irregularly ridged. Roxburgh describes *echinatum* as about 6-seeded; but he figures on the plate of *A. monostachyon*, apart from the enlarged 6-seeded follicles of that plant, 3 others carpels which are strongly echinate and 2-seeded, and to which he doubtless alludes under his description of the former,

saying, "There is a var. if not a distinct species with hedgehog 2-seeded capsules, but in all other respects the same."—It follows that he, by inadvertence, describes the follicles of *A echinatum* as 6-seeded.

4. **A. microphyllum**, *Roxb. Fl. Ind.* ii. 211; leaves very small oblong long-petioled sides incurved, spike solitary, sepals much larger than the 3 smooth 1-2-seeded follicles, seeds globose. Spathium microphyllum, *Voigt Hort. Suburb. Calcutt.* 694.

BHOTAN MTS.; in damp places, *Roxburgh.*

I have seen no specimens, and Roxburgh's description differs much from a drawing in his collection. The latter represents a plant seven inches high, with a smooth naked tuber, four leaves with sheathing petioles 1½ in. long, blade ½ by ¼ in. concave recurved, apparently oblong acute, and quite opaque; spike 1½ in., clothed with spreading white sepals ¼ in. long, and red-brown anthers. Roxburgh, on the other hand, describes the leaves as many times shorter than the spike, spreading close to the surface of the earth, 1 in. long by ⅛ broad, and the spike as everywhere covered with beautiful blue flowers. The globose seeds are remarkable.

3. POTAMOGETON, *Linn.*

Submerged water-plants with creeping rootstock. *Leaves* submerged or floating, opposite or alternate, entire or toothed; stipules intrafoliaceous. *Flowers* small, spicate on a scape rising from a membranous spathe, ebracteate. *Perianth-segments* 4, concave, green, valvate. *Anthers* 4, sessile on the segments, didymous, slits extrorse. *Carpels* 4, sessile, 1-celled, 1-ovuled; stigma subsessile or decurrent, persistent; ovule inserted in the inner angle of the cell, campylotropous. *Drupelets* small, coriaceous or spongy. *Seed* subreniform; embryo macropodal.—Species about 50, cosmopolitan.

In determining the Indian species of *Potamogeton* I have had the invaluable aid of Mr. Arthur Bennett, F.L.S., whose knowledge of the genus is as full as it is accurate.

* *Upper or all the leaves floating.*

1. **P. indicus**, *Roxb. Fl. Ind.* i. 452; upper leaves floating oblong elliptic or elliptic-lanceolate coriaceous, lower submerged longer narrower membranous, stipules 1–1½ in. free, spike dense-fld., drupelets small smooth. *Kunth Enum.* iii. 139; *Don Prodr.* 21; *Wall. Cat.* 5175 *excl.* F.; *Grah. Cat. Bomb. Pl* 200; *Dalz. & Gibs. Bomb. Fl.* 248. P. Roxburghianus, *Schult. f. Mant.* iii. 367. P. natans, *Thw. Enum.* 333.

Throughout the plains of INDIA, ascending the Himalaya to 9000 ft. in Sikkim. BURMA, *Collett.* CEYLON, *Thwaites.*—DISTRIB. Malay and Sandwich Islds.

Stem terete. *Floating leaves* 3–4½ by 1–2½ in., alternate or uppermost opposite, base acute or rounded, opaque; stipules as long as the petioles or shorter. *Peduncle* stout or slender.—Differs from *P. natans* especially in the shorter stipules and smaller drupelets.

2. **P. natans**, *Linn. Sp. Pl.* 126; upper leaves floating oblong elliptic or elliptic-lanceolate biplicate at the insertion of the petiole, submerged few or 0, stipules 4–5 in. free spikes dense-fld., peduncle stout, drupelets dorsally keeled shortly beaked. *Kunth Enum.* iii. 127. *Reichb. Ic. Fl. Germ.* vii. t. 50; *Boiss. Fl. Orient.* v. 15; *Aitch. Cat. Panjab Pl.* 145. P. rufescens, *Aitch. l. c.* 145.

The PANJAB, *Thomson.* KASHMIR, alt. 5000 ft., *Jacquemont*, &c.—DISTRIB. widely diffused especially in temp. climates.

Stem terete. *Leaves* 2–6 in. ; submerged (if present) sessile, long, narrow, and without a limb. *Peduncle* stout. *Drupelets* ⅛ in. long.

3. **P. oblongus,** *Viv. Fl. Ital.* 2, t. 13; floating leaves long-petioled elliptic or lanceolate thinly coriaceous, submerged narrowly lanceolate, stipules 1½ in., peduncle and dense-fld. spike very slender, drupelets minute shortly beaked not keeled. *Engl. Bot.* t. 2849. P. polygonifolius, *Pourr. in Mem. Acad. Toul.* iii. (1788), 325; *Hook. f. Students' Brit. Fl. Ed.* 3, 431. P. digynus *and* P. elegans, *Wall. Cat.* 5177, 5178.

NEPAL, *Wallich.* KHASIA HILLS, alt. 4–5000 ft. *J.D.H. & T.T.* SINGAPORE ? *Wallich.*—DISTRIB. Temp. and trop. regions of the old world.

The more membranous leaves, shorter stipules, very slender peduncle and spike, smaller flowers and minute drupelets not $\frac{1}{10}$ in. long, distinguish this from *P. natans.*

4. **P. javanicus,** *Hassk. in Verh. Natuurk. Ver. Ned. Ind.* i. (1856), 26; floating leaves small ovate-oblong or elliptic acute at both ends 5–7-nerved longer than their petiole, submerged linear acuminate, stipules ½–1 in., peduncle slender, spike lax fld., drupelets ½-orbicular beaked, ribs often toothed or tubercled, beak hooked, *Miq. Fl. Ind. Bat.* iii. 750. P. tenuicaulis, *F. Muell. Fragn.* i. 90, 244; *Benth. Fl. Austral.* vii. 171. P. parvifolius, *Buchen. in Brem. Abhandl.* vii. (1880), 32. P. heterophyllus, *Ham. in Wall. Cat.* 5181. P. hybridus, *Mich.*? *Herb. Ind. Or. Hf. & T.*

Plains of INDIA; ascending the Himalaya to 7000 ft., in the N. West, and 9000 ft. in Sikkim. KHASIA HILLS, alt. 6000 ft.—DISTRIB. Trop. Asia, Africa and Australia.

Stem very slender. *Leaves* ½–1½ in.; blade twice as long as the petiole or longer *Spike* ½–½ in.; flowers very small, in interrupted whorls; peduncle as long or longer. *Sepals* orbicular-obovate. *Drupelets* $\frac{1}{12}$ in., turgid, beak stout.

** *Leaves all submerged, ovate oblong or broadly linear, translucent.*

5. **P. perfoliatus,** *Linn. Sp. Pl.* 126; stem stout, leaves amplexicaul ovate-cordate entire 5–9-nerved, peduncle short stout, drupelets hardly keeled shortly beaked. *Kunth Enum.* iii. 133; *Reichb. Ic. Fl. Germ.* vii. t. 29; *Boiss. Fl. Orient.* v. 17; *Dalz. & Gibs. Bomb. Fl.* 248.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4–8000 ft. WESTERN TIBET, alt. 8–14,000 ft.—DISTRIB. N. temp. regions, Australia.

Stem terete, dichotomous. *Leaves* 1–4 in., margins scaberulous, upper opposite; stipules small, caducous. *Peduncle* stout, not thickened upwards. *Spike* dense-fld. *Sepals* long-clawed. *Drupelets* $\frac{1}{10}$ in., compressed, beak straight.

6. **P. crispus,** *Linn. Sp. Pl.* 126; stem slender, leaves semiamplexicaul linear or linear-oblong crisped serrulate 3-nerved, peduncle curved tapering upwards, spike few-fld., drupelets obliquely ovoid long-beaked. *Kunth Enum.* iii. 133; *Reichb. Ic. Fl. Germ.* vii. t. 29, 30; *Boiss. Fl. Orient.* v. 17. P. tuberosus, *Roxb. Fl. Ind.* i. 472; *Wall. Cat.* 5174; *Grah. Cat. Bomb. Fl.* 200; *Dalz & Gibs. Bomb. Fl.* 248. P. crenulatus, *Don Prodr.* 22.

PLAINS of INDIA and TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 4–6000 ft. MUNNIPORE, *Watt.*—DISTRIB. N. and S. temp. and subtrop. regions.

Stem dichotomous, compressed. *Leaves* 1–3 in., alternate and narrowed at the base, or opposite and amplexicaul, tip rounded; stipules small, caducous. *Peduncle*

long. *Spike* very short, few-fld.; flowers very small. *Drupelets* ¼ in., obliquely ovoid, compressed, ribs entire or toothed.

7. **P. lucens,** *Linn. Sp. Pl.* 126; stem stout, leaves large subsessile oblong-lanceolate cuspidate undulate serrulate many-nerved, peduncle stout thickened upwards, spike stout, drupelets small turgid shortly beaked. *Kunth Enum.* iii. 132; *Reichb. Ic. Fl. Germ.* vii. t. 36, 37, 40; *Boiss. Fl. Orient.* v. 16.

KASHMIR, alt. 5–6000 ft., *Jacquemont*, &c. KUMAON, alt. 6400 ft., *Strachey & Winterbottom.*—DISTRIB. N. temp. regions, Australia.

Stem branched. *Leaves* 4–10 in., very variable, upper opposite sometimes floating; stipules large, long, 2-winged or -keeled. *Drupelets* $\frac{1}{10}$ in., convex on both faces, obtusely beaked.

8. **P. mucronatus,** *Presl Epimel.* 245; leaves all submerged longer than their petioles, elliptic- or oblong-lanceolate acute or cuspidate membranous many-nerved base acute or obtuse, stipules much longer than the petiole lanceolate connate, peduncle very long, spike of interrupted groups or whorls of flowers. P. malaianus, *Miq. Ill. Fl. Archip. Ind.* 46. P. lucens, *Ham. in Wall. Cat.* 5176.

BENGAL; at Dinagepore and Kulna and Karnata, *Hamilton.*—DISTRIB. Borneo Philipp. Islds.

Leaves 3–5 by ½–⅔ in., 5–9 or more-nerved, blade twice or thrice as long as the petiole; stipules 1–1½ in. *Spike* 1½–2 in.; flowers laxly crowded or whorled. *Sepals* suborbicular, very shortly clawed. *Fruit* ½-orbicular, shortly beaked.—Has a good deal the aspect of *P. lucens*, to which Hamilton referred it. The specimens are very poor, and insufficient for a satisfactory diagnosis.

*** *Leaves all submerged, very narrowly linear or filiform.*

9. **P. pectinatus,** *Linn. Sp. Pl.* 127; leaves filiform acute opaque 1–3-nerved, margins slightly thickened, stipules adnate to the leaf-sheath, drupelets large turgid smooth hardly beaked. *Kunth Enum.* iii. 137; *Reichb. Ic. Fl. Germ.* vii. t. 19; *Boiss. Fl. Orient.* v. 18; *Aitch. Cat. Panjab Pl.* 145. P. marinus ?, *Ham. in Wall. Cat.* 5179 A, B *in part.* Ruppia subsessilis, *Thw. Enum.* 333, *in part.*

Plains of INDIA, the HIMALAYA, and WESTERN and EASTERN TIBET, alt. 12–17,000 ft. CEYLON, *Thwaites.*—DISTRIB. most regions.

Stem filiform, densely distichously branched. *Leaves* 3–8 by $\frac{1}{20}$–$\frac{1}{5}$ in., lower sometimes 5-nerved. *Peduncle* not thickened upwards; flowers interruptedly whorled. *Drupelets* ⅛ in., dimidiate-obovoid.

10. **P. pusillus,** *Linn. Sp. Pl.* 127; leaves narrowly linear or filiform acute usually 3-nerved membranous, stipules small free, peduncle long filiform, flowers few minute clustered, drupelets turgid stoutly beaked obtusely keeled. *Kunth Enum.* iii. 136; *Reichb. Ic. Fl. Germ.* vii. t. 22; *Boiss. Fl. Orient.* v. 18; *Wall. Cat.* 5180.

KASHMIR, alt. 5000 ft., *Thomson.*—DISTRIB. N. and S. temp. regions.

Stem filiform, densely distichously branched. *Leaves* ½–3 in., rarely acuminate, rarely 5–7-nerved. *Spike* 6–10-fld. *Drupelets* obliquely ovoid.

Subsp. *flabellatus*, Hook. f., Students' Brit. Fl. 436; leaves $\frac{1}{12}$ in. broad 3–5-nerved. P. flabellatus, *Bab. in Proc. Linn. Soc. Ser.* ii. (1853), *nom.*; *in Phytologist*, iv. 1158. P. marinus ? *Ham. in Wall. Cat.* 5179 B, *in part.*—Upper Bengal; Patna, *Wallich.* The Panjab, *Thomson.*—DISTRIB. Britain.

4. **RUPPIA**, *Linn.*

Submerged slender branched brackish-water plants. *Leaves* elongate, filiform, sheaths stipuliform. *Flowers* minute, bisexual, 2–6 together within the leaf-sheath on a short peduncle which usually elongates greatly after flowering, and is then straight or spirally twisted. *Perianth* 0. *Anthers* 2, sessile, opposite, 2-celled. *Carpels* 4, 1-ovuled, at length (in fruit) long-stipitate, stigma sessile; ovule pendulous. *Achenes* ovoid, obtuse or beaked. *Seed* uncinate, embryo macropodal.—Species temperate and sub-tropical.

R. rostellata, *Koch in Reichb. Ic. Crit.* ii. 66, fig. 306; *Ic. Fl. Germ.* vii. t. 25; peduncle straight after flowering, achenes obliquely ovoid acutely beaked. *Boiss. Fl. Orient.* v. 20. R. maritima, *Griff. Notul.* iii. 196; *Ic. Pl. Asiat.* t. 257–259.

THROUGHOUT INDIA and in CEYLON, in brackish water.—DISTRIB. Europe temp. and trop. Asia.

Stem 2 ft. and upwards. *Leaves* 1–3 in. *Fruiting peduncle* 1–6 in. *Achenes* $\frac{1}{12}$ in. long.

5. **ZANNICHELLIA**, *Linn.*

Submerged salt-water plants, with slender rootstock and stems. *Leaves* linear, sheaths stipular. *Flowers* minute, enclosed in the leaf-sheaths, a male and fem. in one membranous spathe. *Male fl.* a linear 2–3-celled anther, filament slender. *Fem. fl.* perianth cupular hyaline. *Carpels* 2–9, sessile; style long slender, stigma oblique peltate crenate; ovule solitary, pendulous, orthotropous. *Achenes* 4, sessile or stipitate, reniform, crested. *Seed* pendulous, testa thin; embryo subcylindric, cotyledonary end twice folded on itself.—Species 4–5, or forms of one.

Z. palustris, *Linn. Sp. Pl.* 969; *subsp.* PEDICELLATA; male peduncle short, achenes 2–4 subsessile, back crenate or tubercled, style as long as the body of the achene or longer, anthers 2-celled. *Aschers. Fl. Brandenb.* 668; *Boiss. Fl. Orient.* v. 15; *Micheli, Nov. Gen.* t. 34, f. 2. Z. pedunculata, *Reichb. Fl. Germ.* vii. t. 16; *Ic. Crit.* viii. t. 760. Z. gibberosa, *Reichb. l. l. c. c.* t. 16 and t. 759. *Ic. Fl. Germ.* vii. t. 21, 22. Z. pedicellata, *Ham. in Wall. Cat.* 5185; *Griff. Notul.* iii. 190; *Ic. Pl. Asiat.* t. 255, 256.

Salt marshes and lagoons throughout INDIA, ascends to 15,000 ft. in W. Tibet.—DISTRIB. (of *Z. palustris*), all regions but ? Australia.

I find the following forms amongst the Indian specimens: *a*, from Western Tibet; flowers sessile or very shortly peduncled, achenes stipitate, dorsally crenate, style shorter than the achene; *b*, from the Panjab and Behar; flowers sessile, achenes stipitate smooth or tubercled dorsally or ventrally or both, style very long; *c*, from Western Tibet, alt. 12–13,000 ft.; flowers sessile, achenes sessile very slender; *d*, from the Panjab; flowers subsessile, style as long as the achenes; *e*, from the Panjab and Behar; flowers peduncled, achenes small as long as their stalks, style shorter than the achene.

6. **NAIAS**, *Linn.*

Submerged plants; stem branched, filiform, smooth or muricate. *Leaves* opposite alternate or whorled, linear, entire or toothed. *Flowers* minute, axillary, monœcious or dicœcious. MALE FL. *Perianth* an outer tubular or inflated entire or 4-fid tube and a hyaline inner. *Stamen* 1, adnate

to the inner perianth, apiculate or cuspidate, 1–4-celled. *Fem. perianth* 0, or hyaline and adherent to the carpel. *Carpel* 1, sessile, 1-ovuled; stigmas 2–4, slender; ovule basilar, erect, anatropous. *Achene* oblong. *Seed* erect, testa very thin; embryo straight.—Species about 10, temperate and tropical.

The Indian species of this genus require a very close examination, which I regret to say I have not materials in flower and fruit sufficient to enable me to undertake.

1. **N. major,** *All. Fl. Pedem.* ii. 221; stem terete toothed, leaves linear almost pinnatifidly toothed, teeth triangular, base hardly dilated, flowers solitary, anther 4-celled. *Kunth Enum.* iii. 112; *Nees Gen. Fl. Germ.* iii. t. x.; *in Linnæa,* ix. t. 7, and x. t. 1; *Boiss. Fl. Orient.* v. 27. N. fucoides, *Griff. Notul.* iii. 184; *Ic. Pl. Asiat.* t. 251, f. 1. N. muricata, *Del. Fl. Egypt.* 281. N. spinosa, *Ham. in Wall. Cat.* 5182.

Throughout India, in fresh and brackish water, ascending to 8000 ft. in Western Tibet. CEYLON.—DISTRIB. Europe, Asia, Africa.

Stem terete, branched. *Leaves* ½–1½ in., teeth 4–8 on each side, dorsally spinous; sheath with rounded entire sides. *Flowers* dœcious; invol. of male oblong, 2–3-toothed. *Carpel* oblong, stigmas 2–3, filiform. *Achene* $\frac{1}{12}$–$\frac{1}{8}$ in.

2. **N. graminea,** *Del. Fl. Egypt.* 282, t. 50, f. 3; leaves narrowly linear or subulate acuminate flaccid acutely many-toothed, basal auricles erect lanceolate toothed on both margins, flowers fascicled monœcious, anthers 4-celled. *Kunth Enum.* iii. 115; *Boiss. Fl. Orient.* v. 28; *A. Braun in Seem. Journ. Bot.* ii. (1864) 278, f. 5. N. seminuda, *Griff. Notul.* iii. 184; *Ic. Pl. Asiat.* t. 251, f. 2, and t. 253, 254. N. semistipula, *Balb. Fl. Ticin.* t. 15. Caulinia alzanensis, *Pollin. Fl. Veron.* iii. 49. Fluvialis indica, *Pers. ex Wall. Cat.* 5183 B.

Throughout INDIA in still fresh water, and CEYLON.—DISTRIB. the Old World generally.

Stem 1–2 ft. *Leaves* ¾–1 in., usually whorled, broader, more transparent and more acutely toothed than is *N. minor.*

3. **N. minor,** *All. Fl. Pedem.* ii. 221; leaves very narrowly linear remotely toothed basal auricles rounded or truncate toothed rarely acute and entire, flowers fascicled monœcious, anther 1-celled. *Kunth Enum.* iii. 113; *Nees Gen. Fl. Germ.* iii. t. x.; *Boiss. Fl. Orient.* v. 28. N. dichotoma, *Roxb. Fl. Ind.* iii. 749. N. ternata, *Roxb. ex Griff. Notul.* iii. 183; *Griff. Ic. Pl. Asiat.* t. 252. N. indica, *Cham. in Linnæa,* iv. 501. Caulinia indica, and fragilis, *Willd. in Mem. Acad. Berl.* (1798) 89. C. indica, *Wall. Cat.* 5183, *in part.*

Throughout INDIA and CEYLON, in still sweet water.—DISTRIB. Old World generally.

Stem very slender, much branched. *Leaves* spreading, or the upper recurved, ½ in. or less, hardly $\frac{1}{20}$ in. broad, green or brown when dry.—There may be two or more species in India under the above name. The other plant under Wallich's 5183 is a *Chara.*

4. **N. falciculata,** *A. Braun in Seem. Journ. Bot.* ii. (1864) 278, f. 4; stem rigid, leaves as in *N. minor,* but auricles falcately incurved entire or the inner margin entire the outer toothed.

MADRAS; at Tuticoreen, *Wight.*—DISTRIB. Philippine Islands.

I greatly doubt this being distinct from *N. minor,* amongst numerous specimens of which I find some with basal auricles very like those figured by Braun as *falciculata.*

INDETERMINABLE SPECIES.

N. TENUIS, *A. Br.* (not *Z. tenuis*, Reut. Cat. Jard. Gener., 1854) is a plant from Behar alluded to by Magnus in his "Beitrag. Gatt. Naias," *Vorwort*, p. vii., and refers probably to a form of *N. minor* as above diagnosed.

N. HETEROMORPHA, *Griff. ex Voigt Hort. Suburb. Calcutt.* 694. A Serampore specimen so named in Herb. Kew, by Griffith, has a very long laxly leafy stem, the long toothed leaves have no auricles, or most minute toothed ones. It is not in flower or fruit.

N. RIGIDA, *Griff. Notul.* iii. 181. I cannot identify any Indian species with this. It is a native of Serampore, described as blackish green when dry with fleshy rigid leaves. Some specimens included under *N. minor* answer to the colour.

7. CYMODOCEA, *Kœnig.*

Submerged marine plants; rootstock rigid, jointed, creeping. *Leaves* oblong or linear; sheaths stipular. *Flowers* axillary, uni- or bi-sexual, in membranous sheaths. *Perianth* 0. MALE FL. *Anthers* 2, elongate, connate, stipitate, slits extrorse; pollen confervoid. FL. FEM. *Carpels* 2, subsessile, ovoid, compressed, 1-ovuled; style short, stigmas subulate recurved; ovule pendulous, orthotropous. *Fruit* of 2 ovoid coriaceous or woody and externally succulent carpels. *Seed* pendulous; testa thick; embryo inflexed.—Species 4 or 5, Indian and Pacific Oceans.

As this sheet was passing through the press, I received from Dr. Trimen a list of the Ceylon Halophytes known to him, and in which I find *Cymodocea serrulata* (true) and *C. australis*. And amongst the *Hydrocharideæ*, there are to be added at p. 663 of vol. v., *Halophila Beccarii*, Asch., and *Thalassia Hemprichii*, Asch.

1. **C. ciliata,** *Ehrenb. ex Aschers. in Sitzb. Ges. Naturf. Fr. Berl.* (1867) 3; *in Linnæa* XXXV. 162; leaves 3–6 by $\frac{1}{3}$–$\frac{2}{3}$ in. linear falcate, tip rounded ciliate-serrulate. *Boiss. Fl. Orient.* v. 23; *Benth. Fl. Austral.* vii. 178; *Aschers. in Sitzb. Bot. Ver. Brandb.* (1882) 28. Thalassia ciliata, *Kön. Ann. Bot.* ii. 97; *Kunth Enum.* iii. 120. Posidonia serrulata, *Thw. Enum.* 333. Zostera ciliata, *Forsk. Fl. Ægypt. Arab.* 157.

ANDAMAN ISLDS., *Prain.* CEYLON, *Gardner, Harvey.*—DISTR. of the genus.

Stem or *rhizome* 3–12 in., woody, branched, covered with annular scars. *Fl. and frt.* unknown.

2. **C. serrulata,** *Aschers. & Magn. in Sitzb. Ges. Naturf. Fr. Berl.* (1867) 3; leaves 4–6 by $\frac{1}{8}$–$\frac{1}{4}$ in. linear nearly straight, tip entire or denticulate. Posidonia serrulata, *Spreng. Syst.* i. 181.

CEYLON, *Thwaites* (C.P. 3056).—DISTRIB. of the genus.

I have seen no Ceylon flowering or fruiting specimens.

3. **C. isœtifolia,** *Aschers. l. c.*; *in Linnæa, l. c.* 163; *and in Nuov. Giorn. Bot.* ii. 182; stem short, leaves terete fleshy grooved tip 3-toothed. *Boiss. Fl. Orient.* v. 22; *Benth. Fl. Austral.* vii. 178. C. æquorea, *Kunth Enum.* iii. 118 (*excl. Syn.*); *Thw. Enum.* 333.

SOUTH CARNATIC; at Tuticoreen, *Wight.* CEYLON, *Harvey, Glenie.*—DISTRIB. Indian Ocean.

Leaves 3–5 by $\frac{1}{15}$–$\frac{1}{10}$ in., glaucous. *Flowers* in dichotomous cymes.

4. **C. australis,** *Trim. Cat. Ceylon Pl.* 99; leaves 5–7 by $\frac{1}{8}$–$\frac{1}{6}$ in., linear nearly straight tip rounded or truncate and 3-toothed. Halodule australis, *Miq. Fl. Ind. Bat.* iii. 227. Diplanthera tridentata, *Steinh. in Ann. Sc. Nat. Ser.* ii. ix. 98. Zostera uninervis, *Forsk. Fl. Ægypt. Arab.* CXX. and 157.

CEYLON, fid. *Ascherson.*—DISTRIB. of the genus.

I have seen no Ceylon specimens, and regard the identification of all the above enumerated species but *C. isætifolia*, as provisional only.

ORDER CLXXI. ERIOCAULEÆ.

Marsh or aquatic scapigerous herbs. *Leaves* narrow. *Flowers* very minute, in involucrate heads, bracteate, unisexual, usually monœcious; perianth inferior. MALE FL. *Sepals* of 2–3 free or connate scales. *Petals* 2–3, equal or unequal, often very obscure, inserted on the top of a clavate elongate stipes. *Stamens* 6 or fewer, some often reduced to filaments, 3 opposite to or adnate to the petals; anthers dorsified. *Pistillode* minute or 0. FEM. FL.; *sepals* 2–3, caducous. *Petals* 3 (rarely 2 or 0) persistent, spathulate or oblanceolate, usually ciliate or villous, and with a black gland on the disk. *Ovary* 3, rarely 2-celled; style short, persistent, stigmas 2–3 slender, with sometimes interposed lobes or appendages; ovules solitary in the cells, pendulous, orthotropous. *Capsule* deeply 3-lobed, membranous; lobes globose, loculicidal. *Seeds* pendulous, testa coriaceous, striolate and often papillose; embryo outside the floury albumen.—Genera 6, species 6–700 chiefly tropical.

The Indian species all belong to the genus *Eriocaulon*, in which the anthers are didymous and 2-celled, the stigmas without appendages, and the inner involucral bracts are not radiating. They are most difficult of classification, presenting no good sectional characters, that of flowers trimerous or dimerous being quite deceptive. The leaves vary greatly in length, breadth and nervation; as do the scapes in length. The sheath of the scape is usually membranous at the tip, but sometimes green, which latter is, I think, a good character. The outer invol. bracts may be erect spreading or deflexed, in the latter case they are usually hidden under the flowers, but they are sometimes though hidden spreading. The male fl. are invariably pedicelled; the fem. usually so, and this appears to afford a pretty good character; as is that of the fem. petals and ovary being raised on a stipes above the sepals, or not. The 3 male sepals may be, in the same head, connate in a funnel-shaped sheath split on one side, or 2, or all free. The male petals are often obsolete, and the filaments very variable in number and length in the same head. The fem. sepals are normally 3, and are very caducous, but the anticous is usually smaller and flatter than the others, more caducous, and often easily overlooked, when the calyx appears to be dimerous. The fem. petals vary a good deal in breadth, length and hairyness, and especially in the size and position of the gland (if present), even in the same head. I can found no characters on the length of the stigmas and style, which, however, differ a good deal in different species. The seeds in some species vary a good deal in colour, from amber-yellow to red-brown; normally they are broadly oblong, striated, with often papillose ridges, and most minute transverse striolations. The hairs of the head are of two kinds, white opaque stout obtuse bristles, and capillary transparent jointed ones; they are sometimes intermixed, and it is often difficult to say to which category the hairs should be referred.

In the following epitome of the Indian *Eriocaulons* (with which I am far from being satisfied) I have been obliged to propose a good many new species. Some of them may be described Malayan ones, of which I have seen no specimens, and the descriptions of which are too imperfect for their identification. I have minutely examined most of the old world species accessible to me, but find very few conspecific with the Indian.

ERIOCAULON, *Linn.*

A. Aquatics. *Stems* elongate, branched, submerged, densely leafy, upper branches floating. *Leaves* capillary. *Heads* very small. *Invol. bracts* very small, oblong or cuneate, glabrous. (See also *E. Dalzellii* at end of genus.)

1. **E. setaceum,** *Linn. Sp. Pl.* 87; receptacle conical villous, fl. bracts cymbiform acute coriaceous glabrous black, seeds dark brown. *Kunth Enum.* iii. 550. *Steud. Syn. Pl. Cyp.* ii. 270; *Thw. Enum.* 341. E. intermedium, *Kœrn. in Linnæa,* xxvii. 601.—*Rheede Hort. Mal.* xii. t. 63.

MALABAR; at Quilon, *Wight.* CEYLON; *Walker,* &c.

Stem 2-3 ft., stout or slender, flexuous. *Leaves* 1½-2 in., flexuous, 1-nerved. *Peduncles* very many, slender, 1½-3 in.; sheath ¾-1 in., tip membranous. *Heads* ⅛ in. diam. *Male petals* obscure; stamens 6; fem. sepals cymbiform, glabrous or nearly so; petals narrow, ciliate, with or without a gland. *Seeds* oblong, quite smooth.

2. **E. capillus-naiadis,** *Hook. f.*; receptacle conical or convex villous, fl. bracts whitish membranous outer glabrous inner with long white dorsal hairs, seeds dark olive-green or black E. setaceum, *Wall. Cat.* n. 6077; *Mart. in Wall. Pl. As. Rar.* iii. 29; *Kœrn. in Linnæa,* xxvii. (*excl. syn. Linn.*).

BENGAL; Serampore, *Griffith,* Vicrampore, *Clarke.* KHASIA HILLS; at Nonkreem, *J. D. H. & T. T.* BURMA; Tavoy and Pegu, *Wallich,* &c. The CONCAN, *Stocks.*—DISTRIB. Cochin China.

Closely resembles *E. setaceum* in habit, foliage, &c. In the Burmese and Khasian specimens the fem. petals are ciliate with long hairs, in the Concan and Cochin-Chinese they are nearly glabrous.

3. **E. bifistulosum,** *Van Heurck. Obs. Bot.* 105; receptacle conical glabrous, fl. bracts dark all with short dorsal bristles, seeds chesnut brown. E. setaceum, *Benth. Fl. Austral.* vii. 191.

KHASIA HILLS, at Myrung, alt. 5000 ft. *Griffith.*—DISTRIB. W. Africa, Australia.

This is closely allied to *E. capillus-naiadis* and *setaceum,* differing from both in the glabrous receptacle, and from the former in the very short hairs of the fl. bracts which are more mucronate and less membranous; the seeds too are much smaller. The fem. petals are narrow, glabrous, with minute apical glands, as in the Concan specimens of *E. capillus-naiadis.*

B. Terrestrial or marsh plants; stem rarely elongate.

* Petals of male fl. 3, one much the largest and protruded beyond the floral bracts, rarely subequal and all protruded. *Invol. bracts* globose in all; floral bearded.

† Heads more than ½ in. diam. Receptacle villous.

4. **E. robustum,** *Steud. Syn. Pl. Cyp.* 271; subcaulescent, scape subsolitary very stout, invol. bracts ovate-oblong or lanceolate acuminate pale shining, sepals and petals villously bearded, fem. fl. subsessile. *Kœrn. in Linnæa,* xxvii. 674. S. bracteosum, *Steud. l. c.* 272.

NILGHIRI HILLS; alt. 6000 ft., *Wight,* &c.

Rootstock often as thick as the thumb. *Leaves* 1-9 by ¼-¾ in., narrowed to the obtuse or rounded tip, soft, thin, opaque, very many-nerved, striate, often shining. *Scape* 8 in.-3 ft., as thick as a crow-quill or less. *Heads* ½-¾ in. diam.; invol. bracts many-seriate, scarious; receptacle convex, villous; fl. bracts narrowly lanceolate, acuminate. *Flowers* 3-merous; sepals of both sexes 3, concave villous; stamens 6; fem. fl. with the ovary and petals stipitate above the sepals, stipes villous.—Much the stoutest Indian species.

5. **E. caulescens,** *Hook. f. & Thoms. Herb. Ind. Or.*; caulescent, scape subsolitary from the stem or its branches, invol. bracts oblong outer

obtuse inner acute black shining, fem. fl. subsessile, sepals and petals villously bearded. E. atratum, β major, *Thw. Enum.* 341.

CEYLON; *Wight*; *G. Thomson*; central province, alt. 5–7000 ft., *Thwaites* (No. 131).

Stem simple, in young plants 3–4 in. long and as thick as the thumb, often copiously branched in old; branches 6–10 in. long, leafy throughout. *Leaves* 2–6 by ⅛–¼ in., narrowed from the base to the obtuse tip, rigid, quite opaque; nerves very many, close, obscure. *Scape* stout or slender. *Heads* ¼–⅜ in.; invol. bracts sub 3-seriate, scarious; receptacle flat, villous; fl. bracts oblanceolate, acute, dark, shortly bearded; 2 sepals of fem. fl. concave, the 3rd flat; petals very unequal, glands large; ovary with petals stipitate, stipes villous.—The only Indian much-branched species.

†† Heads ½ in. diam. or less.

§ *Receptacle villous.*

6. **E. subcaulescens,** *Hook. f.*; stem short stout densely leafy, leaves linear acute concave thick opaque, scapes 2–3, bracts all yellowish, involucral broadly obovate scarious, floral cuneately oblanceolate acute bearded, fem. fl. sessile, petals oblanceolate villous, ovary with petals sessile.

CEYLON; Newera Ellia, *Gardner*, *Thwaites* (C.P. 61 and 789 *in Herb. Kew*).

Stem 3–4 in., as thick as the little finger. *Leaves* very many, 2–3 by ⅛–¼ in., erect, very many-nerved, quite smooth on both surfaces; sheath slightly woolly at the base. *Scape* 12 in., slender. *Head* ⅛–½ in. diam., depressed spherical, pale; male and fem. sepals 2 concave, 1 flat, all bearded; fem. petals oblanceolate villous; ovary villous at the base. *Seed* sub-globose, smooth.—Closely resembles a Bornean species from Kina Balu, in which the male petals are shorter.

7. **E. longicuspis,** *Hook. f.*; stem short stout, leaves short linear-subulate acuminate flat thick opaque, scapes tall very slender, invol. bracts very small cuneately obovate scarious blackish, floral cuneate tip black rounded toothed and with a long black cusp, fem. fl. pedicelled, petals oblanceolate ciliate with the ovary long-stipitate. E. cristatum, var. *Thw. Enum.* 341.

CEYLON, *Thwaites* (C.P. 1002 in *Herb. Kew*; 789 in *Thw. Enum.*).

Rootstock as thick as a swan's quill. *Leaves* 2–2½ in., narrowed from the base to the tip, many-nerved, obscurely striate; sheaths obscurely woolly at the base. *Scapes* 18–20 in., weak, flexuous. *Heads* ¼ in. diam., the black cusps of the fl. bracts contrasting with the white small petals; receptacle hemispheric; male fl. on slender pedicels; sepals 3, free, tips bearded; stamens 6; fem. petals very unequal, longer than the sepals, glands large.—I have seen only one specimen of this well-marked species.

8. **E. polycephalum,** *Hook. f.*; rootstock very stout, leaves elongate narrowly sword-shaped acuminate flat thin, scapes very many tall slender, invol. bracts very small cuneately obovate scarious blackish shining, floral oblanceolate long-cuspidate black softly bearded, fem. fl. shortly pedicelled, sepals and petals softly hairy, ovary subsessile.

CENTRAL INDIA; near Pachmarchi, *Duthie*.

Rootstock as thick as the middle finger. *Leaves* many, 2–8 by ⅛–¼ in., lower recurved, very many-nerved, narrowed to the acuminate tip, rather glossy. *Scapes* 30 or more, 8–20 in. *Heads* ¼–½ in., globose, ash-colrd., hairs flexuous; receptacle convex, shortly villous; tips and cusps of bracts black; male sepals 3, free; stamens 6; fem. sepals long, narrow; petals narrowly oblanceolate, ciliate with long soft hairs.—A very handsome species, closely allied to *E. longicuspis*, but very much larger with many scapes.

9. **E. odoratum,** *Dalz. in Hook. Kew Journ.* iii. (1851), 280; leaves short subulate recurved 7-nerved, scapes many filiform, heads snow white, invol. bracts short obovate-oblong obtuse scarious dark, floral cuneately obovate bearded, fem. fl. pedicelled, sepals narrow subequal oblanceolate, petals oblanceolate villously ciliate, ovary with petals very shortly stipitate. *Dalz. & Gibs. Bomb. Fl.* 280; *Kœrn. in Linnæa,* xxvii. 683.

The CONCAN; prov. Malwan, in stagnant water, *Dalzell.*

Leaves 1 in., ½ in. broad at base, narrowed thence to the finely acuminate tip, translucent. *Scapes* 6–10 in., deeply grooved; tip of sheath membranous. *Heads* ¼–½ in. diam., globose; recept. hemispheric, shortly villous with brownish hairs; fl. bracts concealed by the male petals; fem. sepals longer than the petals.—Smells strongly of chamomile, *Dalzell.*

10. **E. atratum,** *Kœrn. in Linnæa,* xxvii. 610; leaves very slender linear obtuse opaque; scape long solitary, invol. bracts cuneately obovate black shining inner acute, floral black shortly bearded outer orbicular-obovate very shortly cuspidate inner narrow cuneate acute, fem. fl. sessile, petals oblanceolate villous.

CEYLON; *Gardner* (n. 972).

Densely tufted. *Leaves* 4–6 in., erect or spreading from an erect base, $\frac{1}{16}$–$\frac{1}{12}$ in. broad, sheaths woolly at the base, nerves very many, close. *Scapes* 1 ft. and under. *Heads* ¼ in. diam., hemispheric; invol. bracts convex, rigid, incurved; inner floral black above the middle; recept. hemispheric, densely villous; male fl. pedicelled, stamens 6; fem. subsessile; 2 sepals of fem. concave, narrow flat; ovary sessile, base hairy.—I am rather doubtful of this being Kœrnicke's *E. atratum,* which he describes from a specimen in the Berlin Herb. as being stouter than *E. cristatum,* and broader leaved. It is most like the Khasian *cristatum* of the Ceylon species.

§§ *Receptacle glabrous or nearly so* (*or villous in* E. cristatum, *var.*).

11. **E. cristatum,** *Mart. in Wall. Pl. As. Rar.* iii. 28; *Cat.* 6070; densely tufted, leaves erect 3–6 in. narrowly linear flat tip obtuse rigid opaque many-nerved striate, scapes 1 or more rigid about twice as long as the leaves, heads snow-white, invol. bracts cuneately obovate edged with black, floral dark broadly obcuneate acute very shortly bearded, fem. fl. shortly pedicelled, petals narrowly oblanceolate villously ciliate, ovary sessile. *Kœrn. in Linnæa,* xxvii. 609.

KHASIA HILLS; alt. 4–5000 ft., common.

Leaves $\frac{1}{24}$–$\frac{1}{10}$ in. broad, narrowed to the obtuse tip; sheaths short, not woolly at the base. *Scapes* rigid, deeply grooved. *Heads* ¼–⅓ in. diam., black and white; invol. bracts coriaceous; floral rather rigid; receptacle flat or convex, quite glabrous, or very sparsely hairy. *Seeds* oblong with papillose ridges.—The *E. cristatum* of Benth. Fl. Hongk. differs in the equal or subequal male petals.

Var. MACKII; leaves broader, receptacle densely villous.—Assam (probably Khasia) *Mrs. Mack.*—Perhaps a different species.

12. **E. melaleucum,** *Mart. in Wall. Pl. As. Rar.* iii. 28; *Cat.* 6080; leaves 1–2 in. subulate acuminate 3–7-nerved opaque, scapes subsolitary, invol. bracts membranous black, outer obovate-oblong obtuse, acute, floral acuminate black thickly bearded, fem. fl. subsessile, petals linear villously ciliate tipped with short white bristles, glands 0, ovary with petals subsessile. *Kunth Enum.* iii. 568; *Kœrn. in Linnæa,* xxvii. 164. E. leucomelas, *Steud. Nom. Ed.* 2, i. 585; *Syn. Pl. Cyp.* 272; E. quinquangulare, *Herb. Heyne.*

NILGHIRI HILLS, *Heyne, Schmidt.* ARRAKAN, *King.*

Leaves translucent, recurved, more opaque in Schmidt's specimen; sheath glabrous at base. *Scape* strongly grooved. *Head* ⅓ in. diam. black and white;

invol. bracts at length reflexed shining; receptacle subglobose; male sepals 3 free or 2 connate, odd petal shortly protruded; fem. sepals narrow, as long as the petals, 2 free concave 3rd flat; ovary and petals very shortly stipitate.—Very near *E. atratum* in which the recept. is villous, and the odd petal of male fl. not protruded. The specimens are few and poor, except King's. Kœrnicke describes the recept. as villous, but it is decidedly glabrous in Wallich's specimen.

13. **E. mitophylum,** *Hook. f.*; densely tufted, leaves 2–3 in. almost filiform from a broad sheathing base acuminate flattened opaque, scape twice as long as the leaves, heads very small hemispheric, invol. bracts spreading obovate-oblong obtuse black, floral black cuneately obovate obtuse very shortly bearded, fem. fl. sessile, petals oblanceolate obtuse villously ciliate.

KHASIA HILLS; Myrung, alt. 5000 ft. *Griffith* (*Kew Dist.* 5578, 5580); Jaintea, alt. 4000 ft., *Clarke.*

Leaves flaccid, 5–7-nerved; sheath not woolly at the base. *Sheath* of scape not lacerate at the mouth. *Heads* ⅓–½ in. diam., white and black; invol. bracts 3–4-seriate, at length lacerate, not shining; receptacle globose; sepals of male 3, free; truncate tips bearded; odd petal shortly exserted; fem. sepals 2 concave 3rd flat; ovary very shortly stipitate.—Perhaps a form of *E. miserum*, but the large leaf-sheaths are very different, and the receptacle is globose.

14. **E. miserum,** *Kœrn. in Linnæa*, xxvii. 607; densely tufted, leaves very short capillary or 0, scape solitary very long filiform, heads very small globose, outer invol. bracts orbicular-oblong obtuse coriaceous lacerate pale brown or black, floral oblanceolate acute bearded, male petals subequal, fem. fl. sessile, petals subequal spathulate villous. E. cristatum, *Mart. in Wall. Pl. As. Rar.* iii. 28; and *Cat.* 6070 (*in part*).

SILHET; *Bruce* (*Herb. Wall.*); KHASIA HILLS, in river sand, alt. 2500 ft., *Clarke.*

Rootstocks matted, 1–2 in. long, slender clothed with capillary roots. *Leaves* few, 1–2 in., much shorter, or 0 in Clarke's specimens. *Scapes* 12–18 in. flexuous, not deeply grooved, tips of sheaths membranous. *Head* ⅓–½ in. diam., grey-white; fl. bracts concealed by the male petals; invol. bracts 2–3-seriate; receptacle slender, columnar; male sepals bearded, petals subequal or one longest; fem. sepals 2 oblong cymbiform 3rd flat, all bearded; ovary with petals sessile or very shortly stipitate.—Wallich's specimens are young and imperfect.

15. **E. Collettii,** *Hook. f.*; leaves short broadly subulate acuminate recurved many-nerved, scapes tall slender, heads globose snow-white, invol. bracts very small linear-oblong obtuse membranous pale, floral oblanceolate acute, petals of male fl. subequal, fem. fl. sessile, sepals much shorter than the petals which are villous and with the ovary shortly stipitate.

UPPER BURMA; Shan Hills, alt 4000 ft., *Collett.*

Leaves 1½ by ¼ in., narrowed from the base to the tip, opaque, striate. *Scapes* several, 6-grooved; sheaths rather short. *Heads* ⅓–½ in. diam.; invol. bracts 2-seriate, pale or dark, at length reflexed and concealed under the flowers; receptacle convex; fl. bracts much shorter than the flowers, male sepals truncate bearded, one petal largest; fem. sepals much shorter than the petals, of which 2 are oblong obtuse concave tip bearded, the 3rd flat; petals oblanceolate, glands large.

16. **E. breviscapum,** *Kœrn. in Linnæa*, xxvii. 676; leaves (floating?) very long strap-shaped flat flaccid, scape solitary, head broadly hemispheric (or globose?) invol. bracts few very small oblong obtuse scarious dark, floral oblanceolate acute shortly bearded, fem. fl. subsessile, sepals villously bearded, petals oblanceolate villous with long hairs, ovary with petals shortly stipitate.

INDIA; *Huegel.* N. CANARA, Tinai Ghat, alt. 2000 ft., in streams and pools, *Talbot.*

Stem very short. *Leaves* 6–15 by $\frac{1}{6}$–$\frac{1}{4}$ in., exactly linear, opaque, 7–11-nerved, nerves very slender. *Scape* shorter or longer than the leaves; sheath 2–2½ in., tip obtuse membranous. *Heads* ½ in. diam., black and white, rather few-fld.; receptacle convex, glabrous; invol. bracts green, much shorter than the floral; male sepals densely bearded, petals villous, one much largest; stamens 6; fem. sepals short oblong concave, tips truncate bearded; petals subequal, glands large. *Seeds* very minute, subglobose, pale yellowish, shining.—Male petals and stamens sometimes sessile between the sepals, the conical stipes being very short or 0.

** Petals of male fl. subequal, or one rather larger, often very obscure, none produced beyond the floral bracts.

† Involucral bracts woolly or hairy (sometimes glabrous in *E. Brownianum*). Receptacle villous in all.

17. **E. Wightianum,** *Mart. in Wall. Pl. As. Rar.* iii. 28; *Cat.* 6067; tall, stout, leaves broadly linear or ensiform, tips obtuse, heads globose snow-white, invol. bracts pale cuneiform reflexed tips truncate or rounded, floral oblanceolate acuminate strongly cuspidate villous, male petals small subequal, fem. fl. sessile, sepals narrow concave, bearded, petals obovate or oblanceolate villous with very long hairs, ovary sessile. *Kunth Enum.* iii. 563; *Steud. Syn. Pl. Cyp.* 271; *Kœrn. in Linnæa,* xxvii. 658 (*excl. syn.*) E. sexangulare, *Herb. Heyne.*

TENASSERIM, *Wallich,* &c. PEGU, *Kurz.* The CONCAN, *Stocks,* &c. CEYLON, ascending to 7000 ft. (C.P. 378, 3382).

Rootstock often as thick as the thumb. *Leaves* 4–10 by ¼ in. (and scapes), glabrous or sparsely hairy, many-nerved. *Scapes* many, stout, ribbed and deeply grooved; sheaths with long free green tips. *Heads* ½ in. diam., subsquarrose from the prominent tips of the fl. bracts; invol. bracts coriaceous at the base; receptacle convex villous; flowers pedicelled; male petals minute in the Tenasserim specimens, small subequal in the Concan; stamens 6. *Seeds* globosely oblong, dark red-brown, papillose.—Fem. fl. sometimes 4-merous.

18. **E. Brownianum,** *Mart. in Wall. Pl. As. Rar.* iii. 25, t. 248; *Cat.* 6066; tall, slender, leaves narrowly linear or ensiform acuminate glabrous or hairy, scapes solitary very tall, heads ½ in. diam. globose or hemispheric snow-white, invol. bracts obovate-oblong or cuneiform rigid spreading at length reflexed, outer floral cuneiform inner spathulate obtuse, male petals small, fem. fl. pedicelled, petals narrow villous with very long straight hairs, ovary subsessile. *Kunth Enum.* iii. 562; *Steud. Syn. Pl. Cyp.* 271; *Kœrn. in Linnæa,* xxvii. 663. E. nilagirense, *Steud. l. c.*; *Kœrn. l. c.* 661.

KHASIA HILLS, alt. 4–6000 ft., common. MUNNIPORE, *Watt.* NILGHIRI HILLS, *Wight, Gardner.* CEYLON, *Gardner,* ascending to 7000 ft., *Thwaites* (C.P. 377, 1001).

Rootstock stout. *Leaves* 6–18 by $\frac{1}{12}$–$\frac{1}{8}$ in., many-nerved, and scapes glabrous pubescent or copiously hairy. *Scape* 1–2 ft., ribbed and deeply grooved; sheath very long, tip acuminate green. *Heads* sometimes depressed and concave beneath, the stiff pale or dark invol. bracts ¼–⅜ in. long, equalling the flowers; receptacle flat or convex; male sepals free or connate, tips bearded, petals subequal; fem. sepals cymbiform, dorsally hirsute, acute or cuspidate. *Seeds* oblong or subglobose, papillose and striate.—The hairs of the fem. petals are much longest in the Khasian plant.

19. **E. sericans,** *Mart. in Wall. Pl. As. Rar.* iii. 29; *Cat.* 6079; leaves short subulate, scapes 1–2 slender, heads ¼ in. diam. globose snow-white, involucral bracts oblong pale yellow scarious not reflexed tips rounded, floral cuneate-obovate acute pubescent tips of outer glabrous, male sepals small orbicular, fem. fl. pedicelled, sepals narrow concave, petals oblanceolate ciliate, ovary with petals very shortly stipitate or sessile. *Kunth Enum.* iii. 568; *Steud. Syn. Pl. Cyp.* 272. E. gracile, *Mart. l. c.*; *Wall. Cat.* 6079; *Kunth l. c.* 558. E. infirmum, *Steud. l. c.* 270.

BURMA; at Prome and Tavoy, *Wallich.*

Rootstock small. *Leaves* ½–1 in., erect and recurved, 3-5-nerved, opaque. *Scapes* 4-grooved; sheath short, tip acuminate green. *Heads* very pale; involucral bracts shining, pubescent; receptacle small, hemispheric; flowers pedicelled; male sepals 3, narrow, free or 2 connate bearded; petals unequal; fem. petals unequal, glands 0. *Seeds* globosely oblong, papillose.—I have no doubt as to the specific identity of *sericans* with *gracile*; Kœrnicke unites the former with *Wightianum*, it is certainly very close, but the heads are much smaller; the male petals larger and fem. broader. The ovary with petals is sessile in *gracile* very shortly stipitate in *sericans*. The specimens are very few.

20. **E. lanceolatum,** *Miq. in Pl. Metz exsicc.* n. 131; leaves narrowly oblong-lanceolate many-nerved translucent, scapes many slender, sheath inflated above tip green, heads globose ¼ in. diam. snow-white, involucral bracts small pale quadrate or obovate scarious not reflexed, male petals obscure, fem. fl. sessile, sepals 2 deeply cymbiform 3rd flat all bearded, petals very unequal oblanceolate ciliate, ovary with petals sessile. *Steud. Syn. Pl. Cyp.* 271; *Kœrn. in Linnæa,* xxvii. 656.

The CONCAN and CANARA, *Metz, Stocks.*

Rootstock small. *Leaves* 1–2½ by ¼–½ in., acute or acuminate, flaccid, hardly sheathing. *Scapes* 4–6 in., not deeply grooved; sheath very slender below, inflated above the middle, tip acuminate. *Heads* very like those of *E. sericans*, as are the bracts and seeds.—One of the fem. sepals is sometimes winged at the back.

†† Involucral and floral bracts both glabrous or nearly so.

§ *Receptacle glabrous or sparsely hairy.*

21. **E. Sieboldianum,** *Sieb. & Zucc. ex Steud. Syn. Pl. Cyp.* 272; leaves short subulate or setaceous, scapes very many, heads small globose or ovoid, bracts all scarious, involucral oblong obtuse gradually passing into the oblong-lanceolate subacute shining floral, fem. fl. long-pedicelled, sepals 1–2 slender or 0, petals 0, ovary long-stipitate. E. sexangulare, *Mart. in Wall. Pl. As. Rar.* iii. 28. E. hexangulare, *Kunth Enum.* iii. 551; *Thw. Enum.* 341; *Steud. l. c.*; *Kœrn. in Linnœa,* xxvii. 613; *Dalz. & Gibs. Bomb. Fl.* 279; *Wall. Cat.* 6073. E. setaceum, *Herb. Heyne.* E. nitidum and tenue, *Herb. Ham.*

THROUGHOUT INDIA; from Kashmir to Assam and Burma, and southward to CEYLON (C.P. 795).—DISTRIB. China, Japan, Mt. Philipp.

Annual. *Leaves* 2–4 in., 3–5-nerved, rarely $\frac{1}{10}$ in. broad, opaque or translucent. *Scapes* slender; sheath short. *Heads* ¼ in. diam., pale whitish or purplish; involucral bracts spreading or ascending, much shorter than the head; receptacle columnar, glabrous or sparsely hairy; fl. bracts imbricating upwards, closely appressed, often with a broad purplish central band; male sepals 3, petals minute, stamens 1–6; fem. fl. with a long stipes above the sepals which is jointed between the sepals and ovary. *Seeds* minute, red-brown, quite smooth.—Closely allied to Australian E.

cinereum, Br., which has a villous receptacle. As ascertained by Trimen (*Linn. Soc.* xxiv. 136) from the examination of Hermann's Herbarium, the *E. sexangulare* of Linnæus is *E. Wallichianum* of Martius. In Herb. Linn. *E. sexangulare* bears its right name; where there is also a specimen of *E. Sieboldianum*, from Kœnig, unnamed.

22. **E. Duthiei,** *Hook.f.*; leaves very short broadly subulate, scapes many very slender, heads ¼ in. diam. broadly ovate or hemispheric, involucral bracts spreading oblong obtuse scarious shining passing into the dark linear-oblong or oblanceolate acuminate glabrous glistening floral, fem. fl. shortly pedicelled, sepals 2 very narrow, petals 3 filiform.

CENTRAL PROVINCES; Bhimkund, in the Khandma district, *Duthie.*

Leaves ½–¾ in., many-nerved. *Scapes* 2–5 in.; sheath short. *Heads* nearly black, glistening; fl. bracts strongly incurved, sometimes obscurely pubescent towards the tips; receptacle very tall and slender, quite glabrous; flowers shortly pedicelled; male sepals 2, narrow, subacute, glabrous; petals very obscure; stamens 6; ovary with the petals stipitate. *Seeds* broadly oblong, quite smooth, yellow.

23. **E. alpestre,** *Hook.f. & Thoms. Herb. Ind. Or.*; leaves broadly or narrowly subulate, scapes very many short stout, heads broadly obconic few-fld., involucral bracts suberect as long as the flowers cuneiform coriaceous, floral obovate-oblong, fem. fl. sessile, sepals oblong cymbiform obtuse glabrous, petals 3 subequal obovate coriaceous glabrous glands apical. E. kiusianum, *Maxim. in Herb. Hort. Petrop.*

SIKKIM HIMALAYA, alt. 8–12,000 ft., and KHASIA HILLS, alt. 5–6000 ft., *J. D. H., Clarke.*—DISTRIB. W. China, Japan.

Leaves very many, 1–5 by ⅛–½ in., narrowed from a broad base to the acute tip, few or many-nerved, usually spreading. *Scapes* shorter or longer than the leaves, often flexuous. *Heads* ¼ in. diam. or less; involucral bracts yellowish and black; floral black, coriaceous; receptacle small, convex, glabrous; male sepals 3, truncate, glabrous; petals obscure; stamens 6; fem. petals white, shortly clawed; ovary with petals sessile. *Seeds* large, oblong, yellowish or dark, quite smooth.—An unusually well-marked species by the glabrous coriaceous fem. petals.

24. **E. truncatum,** *Ham. ex Mart. in Wall. Pl. As. Rar.* iii. 29; *Wall. Cat.* 6076; leaves 1–2 in. subulate, scapes many stout, heads ¼–½ in. diam. hemispheric, involucral bracts cuneate spreading shining, floral scarious obovoid tip concave truncately rounded glabrous, fem. fl. pedicelled, sepals 2 narrow, petals 3 filiform or very narrowly oblanceolate ciliate, ovary with petals stipitate. *Kunth Enum.* iii. 555; *Steud. Syn. Pl. Cyp.* ii. 270; *Kœrn. in Linnæa*, xxvii. 631; *Thw. Enum.* 341 (*excl. syn.*). E. cinereum, *Ham.* Leucocephala spathacea, *Roxb. Fl. Ind.* iii. 613.

ASSAM, BENGAL, BURMA, and southward to MALACCA and CEYLON (C.P. 793).—DISTRIB. Malay and Philippine Islands, China.

Leaves ⅛ in. broad at the base or less, acuminate, few- or many-nerved. *Scapes* 1–4 in. *Heads* glistening; involucral bracts sub-2-seriate; floral incurved and imbricating; receptacle conical, sparsely hairy; male sepals free or coherent; petals minute, ciliate; fem. fl. long-pedicelled, sepals concave or linear and flat; petals very variable in breadth. *Seeds* pale, ribs papillose.—This is unquestionably Roxburgh's *Leucocephala spathacea*, of which he had a good drawing made.

VAR. *malaccense*; floral bracts broader, flowers of both sexes sessile, petals broader and more coriaceous, gland apical, ovary with petals stipitate, seeds larger.—Malacca, *Griffith* (*Kew Distrib.* 5567); at Kwala Pehang, *Ridley.*—Possibly a different species.

§§ *Receptacle more or less villous.*

25. **E. oryzetorum,** *Mart. in Wall. Pl. As. Rar.* iii. 28; *Wall. Cat.* 6069; leaves ensiform, scapes many short or tall, heads yellow globose or ovoid, bracts all scarious hyaline, invol. oblong obtuse passing into the cuneate-obovate cuspidate densely imbricate floral, fem. fl. shortly pedicelled, petals slender. *Kunth. Enum.* iii. 552; *Steud. Syn. Pl. Cyp.* 270; *Kœrn. in Linnæa,* xxvii. 639. E. Hamiltonianum, *Mart. l. c.* 29; *Wall. Cat.* 6075; *Kunth l. c.*

TROPICAL HIMALAYA, from Kumaon to Sikkim; ASSAM, SILHET, PEGU, CHOTA NAGPORE, SINGAPORE and PENANG.

Rootstock short, stout, or 0. *Leaves* 1–3 by $\frac{1}{6}$–$\frac{1}{4}$ in., spongy, very many-nerved, narrowed to a truncate coriaceous tip. *Scapes* 8–18 in. (shorter in dwarf states), soft, flexuous. *Heads* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., straw-colrd., base intruded; receptacle conical or columnar, densely villous; male sepals 2, tips fimbriate or glabrous; petals minute or 0; stamens 6; fem. fl. pedicelled, sepals 3, slender, caducous; petals filiform to oblanceolate, naked or ciliolate, caducous; ovary with petals stipitate above the sepals. *Seeds* pale yellow, very minute, smooth.—*E. Hamiltonianum* is certainly an immature state of *oryzetorum.*

26. **E. stellulatum,** *Kœrn. in Linnæa,* xxvii. 620; leaves membranous broadly subulate or linear, scapes many hairy, heads globose, bracts all many times longer than the flowers white scarious stellately spreading and finely acuminate, involucral ovate-lanceolate, floral narrowly lanceolate, fem. fl. sessile, petals oblanceolate ciliate with long hairs, ovary with petals sessile.

The CONCAN, *Hugel, Stocks.* ? BENGAL (*Herb. Kew*).

Leaves 1–2 in. by $\frac{1}{4}$–$\frac{1}{3}$ in. broad at the base, tapering to a point, very many-nerved. *Scapes* 2–7 in., hairs spreading; sheaths shorter than the leaves, tips long free acuminate. *Heads* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., perfectly glabrous except the conical receptacle and ciliate fem. petals; male sepals 2, free or connate, glabrous, hyaline; petals very short; stamens 6; fem. fl. sessile; sepals 3, dimidiate-ovate falcately incurved with long slender recurved points, dorsally crenately winged, petals narrowly oblanceolate, ciliate. *Seeds* dark chesnut, smooth.

27. **E. echinulatum,** *Mart. in Wall. Pl. As. Rar.* iii. 29; *Wall. Cat.* 6082; leaves subulate opaque finely acuminate, scapes many obscurely grooved, heads small globose, bracts all white rigid stellately spreading subulate-lanceolate, floral many times longer than the dimerous subsessile flowers, ovary with petals stipitate. *Kunth Enum.* iii. 568; *Steud. Syn. Pl. Cyp.* 272; *Kœrn. in Linnæa,* xxvii. 519.

TAVOY; Mergui, *Gomez, Griffith.*—DISTRIB. Tonkin, China.

Leaves many, $\frac{3}{4}$–1 in., erecto-patent, spongy. *Scapes* rather stout, 1–5 in., terete, shining; sheath short. *Heads* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., straw-colrd.; invol. bracts ovate, narrowed into a slender rigid point; floral longer, narrowed at the base; receptacle villous; male sepals connate, glabrous; petals minute, deformed; stamens 5–6; fem. sepals falcately lanceolate, clawed, dorsally crenately winged below the middle, margins spinulose-serrate; petals 0.

28. **E. minutum,** *Hook. f.*; very small, leaves subulate or filiform acute or obtuse, scapes very many, sheaths membranous and inflated above, heads minute subglobose few-fld. pale, invol. bracts erect ovate-lanceolate acuminate scarious, floral oblanceolate acute or cuspidate, fem. fl. subsessile, sepals falcate winged or keeled, petals 1–3 very slender or 0, ovary with petals sessile or substipitate.

The CONCAN, *Law.* MYSORE, *Sir F. Adams.* RAJPUTANA, on Mt. Aboo, *Stocks, Duthie.*

Densely tufted. *Leaves* ½–¾ in., compressed, opaque, 3–5-nerved, base dilated and sparsely woolly within. *Scapes* 1½–2½ in., capillary, flexuous; sheath short. *Heads* $\frac{1}{10}$ in. diam., shining; invol. bracts much longer than the floral, which are glabrous or sparsely hairy; receptacle small, columnar, sparsely villous; male calyx infundibular, split on one side, tips bearded; petals minute; stamens 3–4; fem. sepals 2, with rarely a filiform 3rd, falcately incurved with recurved tips, glabrous, keel or wing spinulose. *Seeds* oblong.—Resembles *E. achiton*, but invol. bracts very different.

††† Involucral bracts glabrous, floral bearded villous or pubescent.

§ *Receptacle glabrous or sparsely hairy.*

29. **E. sexangulare,** *Linn. Sp. Pl.* 87; tall, stout, leaves long, scapes many tall, heads conoid or hemispheric hard hoary base truncate, invol. bracts coriaceous subquadrate or orbicular, floral persistent densely imbricate spathulate cuspidate rigid, fem. fl. sessile, petals short filiform with a terminal pencil of hairs, ovary with petals subsessile. E. Wallichianum, *Mart. in Wall. Pl. As. Rar.* iii. 26, t. 249; *Cat.* 6068; *Kunth Enum.* iii. 564; *Nees in Nov. Act. Nat. Cur.* xix., *Suppl.* i. 449; *Steud. Syn. Cyp.* 271; *Kœrn. in Linnæa*, xxvii. 687; *Thw. Enum.* 341; *Dalz. & Gibs. Bomb. Fl.* 280; *Trimen in Journ. Linn. Soc.* xxiv. 136. E. quidrangulare, *Lour. Fl. Cochinch.* 77.

TENASSERIM, southward to MALACCA; and the DECCAN PENINSULA, from CANARA southwards. CEYLON, *Macrae*, &c. (C.P. 220).—DISTRIB. Tropical Asia, Madagascar.

Rootstock as thick as the little finger or less. *Leaves* 4–12 in., ¼–¾ in. broad at the base, flat, narrowed up to the acuminate or subacute tip, many-nerved, opaque, striate, drying brown. *Scapes* up to 18 in., stiff; tips of sheaths acuminate, not membranous. *Heads* ⅛ in. diam. or less; invol. bracts shining, horizontal, rigid, appressed; floral dark, rigid, with white tips; receptacle globose columnar or hemispheric, sparsely shortly pilose; flowers flat; male sepals free or connate, one sometimes dorsally winged, petals minute; fem. sepals 3, 2 cymbiform incurved acute dorsally crenately winged or not, 3rd linear, narrow. *Seeds* subglobose or oblong, the ridges papillose.—In some Concan specimens from Dalzell the leaves are ⅛–¼ in. broad, linear, flaccid, quite translucent, and the heads very small. The Australian *E. australe*, Br., hardly differs.

VAR. *longifolium*; more slender, leaves often longer, fem. fl. dimerous, petals sparsely hairy from the middle upwards. E. longifolium, *Nees in Herb. Willd. ex Kunth l. c.* 567; *Steud. l. c.*; *Kœrn. l. c.* 690. E. sexangulare, *Willd. Herb.*—Tenasserim, Malacca, the Andaman Islands, and Ceylon.

30. **E. Dalzellii,** *Kœrn. in Linnæa*, xxvii. 605; rhizome elongate, leaves very slender finely acuminate, scapes many, heads hemispheric white villous, invol. bracts scarious obovate- or cuneate-oblong, floral hyaline oblanceolate subacute, fem. fl. pedicelled, sepals 2 linear slender, petals 3 narrowly oblanceolate ciliate with flexuous hairs, ovary with petals stipitate. E. rivulare, *Dalz. in Hook. Kew Journ.* iii. (1851) 280; *Dalz. & Gibs. Bomb. Fl.* 280.

SOUTH CONCAN; in the Malwan Province, in streams, *Dalzell.*

Rootstock elongate, prostrate, densely clothed with tortuous capillary rootlets. *Leaves* in a terminal tuft, 4–10 by $\frac{1}{16}$–$\frac{1}{10}$ in., flexuous, flattened, opaque, 7-nerved. *Scapes* 7–18 in., 10-grooved. *Heads* ¼ in. diam., base truncate or intruded; invol. bracts short, yellowish; receptacle hemispheric or columnar, sparsely hairy; fl. bracts incurved, hairs caducous; male sepals free or connate, tips villous, petals small elliptic subequal; stamens 6. *Seeds* globose, smooth, shining.—Some flowerless very

long leaved specimens have a leafy stem 2–3 in. long, as in Sect. A, but much stouter. *E. fluviatile*, Trim. (see end of genus) is probably allied.

31. **E. cuspidatum,** *Dalz. in Hook. Kew Journ.* iii. (1851) 281; leaves short linear-ensiform flaccid 7–9-nerved translucent, margins thickened, tip rounded and cuspidate, scapes several very long, heads globose or hemispheric white villous, invol. bracts cuneiform or rounded, scarious, floral membranous cuneate-obovate, fem. fl. sessile, sepals 3, 2 deeply cymbiform dorsally tubercled, ovary with petals sessile. *Dalz. & Gibs. Bomb. Fl.* 280.

The SOUTHERN CONCAN; between Vingorla and Malwan, *Dalzell.*

Leaves 1–4 by $\frac{1}{8}$–$\frac{1}{4}$ in., erect and recurved. *Scapes* few or many, 6–10 in., soft, shining, obscurely furrowed; sheath much longer than the leaves, tips membranous. *Heads* $\frac{1}{4}$–$\frac{1}{2}$ in. diam., base intruded; invol. bracts yellow, passing into the hyaline floral; receptacle convex, quite naked; male sepals 2, narrow, free; petals small, subequal, fimbriate; stamens 6; fem. sepals coriaceous; petals 3, very narrow, fimbriately villous towards the tip. *Seeds* oblong, quite smooth.

32. **E. nepalense,** *Prescott ex Bong. in Act. Acad. Petrop. Ser.* vi. i. 610; leaves broadly subulate or ligulate many-nerved, scapes many slender, heads globose grey, invol. bracts cuneate-obovate scarious at length recurved, floral linear oblong dark obtuse or apiculate, fem. fl. shortly pedicelled, sepals cymbiform, petals very narrowly oblanceolate ciliate with the ovary stipitate. *Kunth Enum.* iii. 554; *Steud. Syn. Pl. Cyp.* 270. E. viride, *Kœrn. in Linnæa*, xxvi. 637. E. quinquangulare, *Wall. Cat.* 6072 E.

TEMPERATE HIMALAYA; from Garwhal, alt. 5–6000 ft., to Sikkim, alt. 4–5000 ft. The KHASIA HILLS, alt. 4–6000 ft.

Rootstock small. *Leaves* 2–3 by $\frac{1}{6}$–$\frac{1}{4}$ in., usually subulate and narrowed from the base to the acute tip, but often broader flaccid linear and obtuse or rounded at the tip, opaque or translucent, many-nerved. *Scapes* 4–9 in., soft; sheaths with membranous tips. *Head* $\frac{1}{6}$ in. diam.; receptacle convex or columnar, quite glabrous; floral bracts finely hairy; male sepals 3; petals minute; stamens 6; sepals very concave, tips ciliate. *Seeds* oblong, ribs papillose.—Very similar to *E. luzulæfolium* but the invol. bracts of the fully formed head are recurved, the receptacle is glabrous. The ligulate leaved specimens look different.

33. **E. gregatum,** *Kœrn. in Linnæa*, xxvii. 606; dwarf, tufted, leaves very slender flat acute flexuous opaque, scapes subsolitary, heads very small hemispheric or globose white or hoary, invol. bracts spreading or erect cuneiform black, floral oblanceolate obtuse and subacute dark, male petals small subequal, fem. fl. sessile, sepals 2 dorsally bearded narrowly cymbiform 3rd flat, tips villous with stout hairs, petals spathulately oblanceolate densely villous, ovary with petals sessile.

KHASIA HILLS; alt. 5–6000 ft., on rocks in streams, *Griffith*, &c.

Roots of capillary fibres. *Leaves* 1–1½ by $\frac{1}{15}$ in. *Scapes* slender, often flexuous, deeply 4- or 5-grooved; sheaths with membranous tips. *Heads* $\frac{1}{6}$ in. diam., white above the black involucre; receptacle columnar, glabrous; male sepals 3, free or connate; petals minute, obovate, subequal, villous; stamens 2–6; fem. petals with large black glands. *Seeds* broadly oblong, yellow.—Allied to *E. mitophyllum* and *miserum*, but the male petals are small and equal.

34. **E. Pumilio,** *Hook. f.*; leaves very short subulate acuminate, scape few short slender, sheath pale green not striate subinflated tip rounded, head $\frac{1}{10}$ in. diam. few-fld. hairy, invol. bracts 3–4 erect obovate

or cuneately oblong tips rounded, floral cuneately oblanceolate subacute, fem. fl. sessile, sepals 2 oblong concave tips ciliate flat, petals oblanceolate ciliate, ovary with petals sessile.

WESTERN HIMALAYA; Kumaon, 3–4000 ft. and Garwhal, alt. 8–9000 ft., *Duthie.*

Leaves ½–½ in., spongy, opaque, green. *Scapes* 1–1½ in., obscurely 4-grooved; sheath as long as the leaves, tip membranous. *Heads* subglobose; invol. bracts scarious, glistening, pale or dark; floral dark, sprinkled with white hairs; receptacle small, conical, glabrous; male sepals free, tips ciliate; petals very minute; stamens 6. *Seeds* oblong, pale, with papillose ridges.—Near *E. achiton*, but the receptacle is quite glabrous.

§§ *Receptacle villous.*

35. **E. luzulæfolium,** *Mart. in Wall. Pl. As. Rar.* iii. 28; *Cat.* 6071; leaves short broadly subulate many-nerved, scapes many flexuous, head small hemispheric pubescent base truncate and intruded, invol. bracts spreading or erect (never reflexed) outer broadly cuneiform shining, floral cuneately oblanceolate obtuse, fem. fl. pedicelled, sepals slender concave tipped with bristles, petals 3 linear-lanceolate ciliate, ovary with petals stipitate. *Kunth Enum.* iii. 553; *Schnizl. Icon.* t. 46, f. 2, 5; *Steud. Syn. Pl. Cyp.* 270; *Kœrn. in Linnæa* xxvii. 636.

Throughout INDIA; from Bengal to Burma and the Concan, ascending the Khasia Hills to 6000 ft., common. CEYLON, *Gardner.*

Rootstock elongate and as stout as a swan's quill, or slender, densely fibrous. *Leaves* 1–3 by $\frac{1}{10}$–$\frac{1}{5}$ in., narrowed from the base to the tip, opaque, rarely translucent. *Scapes* 3–12 in., slender; sheath obtuse. *Heads* ⅓ in. diam., pale; invol. bracts coriaceously scarious; floral dark, shortly hairy, receptacle conical or columnar; male sepals 2–3, tips ciliate; petals minute, obscure; pedicel of fem. fl. slender. *Seeds* oblong, yellow.—Difficult to distinguish at sight from *E. trilobum* and *quinquangulare.*

36. **E. quinquangulare,** *Linn. Sp. Pl.* 87; leaves linear ensiform or subulate acute or acuminate, scapes many, heads globose grey or snow-white, invol. bracts very short scarious linear-oblong to broadly cuneate at length reflexed under the head, floral oblanceolate or spathulate hyaline acuminate or finely cuspidate, male petals minute, fem. fl. pedicelled, sepals slender, petals narrowly oblanceolate sparsely ciliate, ovary with petals stipitate or substipitate. *Mart. in Wall. Pl. As. Rar.* iii. 28; *Cat.* 6072; *Kunth Enum.* iii. 556; *Steud. Syn. Pl. Cyp.* 270, *Dalz. & Gibs. Bomb. Fl.* 280; *Thw. Enum.* 341. (*excl. var.*); *Kœrn. in Linnæa,* xxvii. 646. E. argenteum, *Mart. l. c.* E. Martianum, *Wall. Cat.* 7279 (*proliferous state*). E. argyræum, *Steud. l. c.* 271. E. erythropodum, *Miq. in Hohen. Herb. Canara,* n. 131. Sphærochloa quadrangularis, *Beauv. ex Desv. in. Ann. Sc. Nat. Sc.* xiii. 47. Leucocephala graminifolia, *Roxb. Fl. Ind.* iii. 612.

Throughout INDIA; from the Upper Gangetic plain to BURMA, and southward to CEYLON (C.P. 792).

Leaves 1–4 by $\frac{1}{6}$–⅓ in.; usually narrowed from the base to the acuminate tip, few or many-nerved, opaque or subtranslucent, often bright red when dry. *Scapes* 1–4, rather stout and flexuous; sheath short, tip membranous. *Heads* ⅛–¼ in. diam., grey when the fl. bracts are sparsely shortly villous, snow-white when they are many and densely villous; invol. bracts very variable in breadth, pale, glistening; receptacle globose or columnar; male sepals 3 or 2 or all connate, tips long-ciliate; petals very small; stamens 6. *Ovary* usually with the petals stipitate. *Seeds* oblong, smooth.—It is difficult to distinguish forms of this from *luzulæfolium* and

trilobum. It is said to be Australian, but I have seen no specimen from that country.

37. **E. trilobum,** *Ham. in Wall. Cat.* n. 6072 D; leaves broadly subulate or ensiform acute or acuminate many-nerved, scapes many, heads globose dark grey base intruded, involucral bracts small linear-oblong reflexed, floral spathulately oblanceolate obtuse or subacute, male petals minute, fem. fl. subsessile, sepals 3 dark cymbiformly oblanceolate, petals narrowly oblanceolate sparingly ciliate, ovary with petals sessile or subsessile. E. quinquelobum, *Wall. Cat. l. c.*; *Kœrn. in Linnæa,* xxvii. 645. E. subulatum, *Bojer ex Kœrn. l. c.*. E. Sollyanum, *Royle Ill.* 409, t. 97, f. 1.

Throughout INDIA; from Kumaon, ascending to 4000 ft., to Bengal, the Concan and Malabar.

Habit of *E. quinquangulare,* from which it is often difficult to distinguish forms, but the heads are usually smaller, much darker in colour, the involucral bracts are narrow, the floral never acuminate or cuspidate, and the flowers are very shortly, if at all pedicelled, with broader concave fem. sepals that are strongly ciliate on the back. *Ovary* sessile or very shortly stipitate.—Mr. Law has sent specimens of a variety with broader leaves and the narrower lanceolate acute involucral bracts radiating and longer than the head; the fem. sepals too are narrower, these are accompanied with specimens in which the involucral bracts are normal, together with intermediates. I have seen no specimen with the conspicuous red foliage so common in *E. quinquangulare.*

38. **E. Helferi,** *Hook. f.*; leaves ensiform acute flaccid, scapes many, heads globose or hemispheric white, involucral bracts obovate-oblong scarious spreading or at length recurved, floral cuneately obovate acute dorsally tomentose, male sepals 3 glabrous, petals obscure, fem. fl. sessile, sepals 3 oblong, 2 concave obovate ciliate, ovary with petals sessile.

TENASSERIM, *Helfer* (*Kew Dist.* 5584).

Leaves 3–4 by ¼–⅓ in., translucent. *Scapes* 4–9 in., flexuous, young glabrous or hairy below; sheath acuminate. *Heads* ⅓ in. diam., softly tomentose; receptacle densely villous; involucral bracts much shorter than the floral, which are much longer than the flowers; male fl. pedicelled; sepals concave, tip hooded; stamens 4–6; fem. petals remarkably broad, unequal. *Ovary* sessile. *Seeds* minute, dark red-brown, strongly striate and papillose.

39. **E. Walkeri,** *Hook. f.*; densely tufted, leaves narrowly subulate or linear few-nerved tips obtuse, heads globose snow-white, involucral bracts shorter spreading outer quadrate or cuneiform inner oblong, floral oblanceolate acute or mucronate, fl. fem. sessile, sepals narrowly oblong obtuse, petals oblanceolate villously ciliate with very long jointed spreading hairs and tipped with short stout obtuse white ones, ovary with petals sessile. E. quinquangulare, *var.* argenteum, *Thw. Enum.* 341.

CEYLON; at Caltura, *Macrae*; in paddy fields, *Thwaites* (C.P. 3562).

Leaves 1–2 by $\frac{1}{16}$–$\frac{1}{10}$ in., glistening, opaque. *Scapes* 6–8 in., very slender. *Heads* ⅛–¼ in. diam. or less; involucral bracts pale, scarious; floral white, membranous densely villous above the middle; receptacle hemispheric, hairs as long as the hyaline flowers; male sepals 3 (2 connate) long-bearded, petals 3 small orbicular subequal villous. *Seeds* broadly oblong, orange-yellow, shining, not striolate; chalaza very large.—A very distinct species, well characterized by the copious very long slender white hairs of the fem. petals, which appear to envelop the flower.

40. **E. Thwaitesii,** *Kœrn. in Linnæa,* xxvii. (1854), 627; leaves linear subulate or ensiform acuminate many-nerved, scapes many twice as long, head hemispheric dark sparsely mealy, involucre as broad as the heads,

bracts spreading and incurved obovate-oblong shining, floral oblanceolate acute tips hoary, male sepals glabrous, fem. fl. pedicelled, sepals cymbiform, petals short filiform penicillate above the middle with long spreading hairs, ovary with petals sessile.

NILGHIRI HILLS; *Schmidt.* CEYLON, *Walker, Thwaites* (C.P. 790, *in part*).

Leaves 1–2½ by $\frac{1}{16}$–$\frac{1}{4}$ in., few- or many-nerved, opaque. *Scapes* flexuous; tips of sheath acuminate, not membranous. *Heads* $\frac{1}{8}$–$\frac{1}{4}$ in. diam.; receptacle convex, densely villous; fl. bracts greenish-brown scarious; male sepals 3 (2 connate) glabrous or nearly so, petals very small, stamens 6; fem. sepals nearly glabrous, dorsally rounded or subcarinate. *Seeds* oblong with papillose striæ.—Well marked by the slender fem. petals, much like those of *E. sexangulare*. The Nilghiri specimens are much smaller and narrower leaved than the Cingalese.

41. **E. collinum,** *Hook. f.*; leaves short narrowly linear or subulate, scapes many, heads globose dark grey, invol. bracts small, outer very short cuneate-obovate, floral oblanceolate or spathulate acute acuminate or cuspidate dorsally hoary or the outer glabrous, male petals 3 small one often largest and exserted beyond the sepals but not beyond the bracts, fem. fl. pedicelled, sepals 2 cymbiform 3rd flat, petals narrowly oblanceolate ciliate, ovary and petals sessile or shortly stipitate. E. luzulæfolium, *Thw. Enum.* 341.

NILGHIRI HILLS, *Foulkes, Schmidt, Gardner*; Conoor, 7000 ft., *Clarke.* CEYLON; Newera Elia, *Gardner*, &c., alt. 4000 ft. (C.P. 796, 1000).

Densely tufted. *Leaves* 1–2½ by $\frac{1}{12}$–$\frac{1}{6}$ in., obtuse, compressed, 1–9-nerved, opaque or translucent. *Scapes* 1½–12 in., rigid, flexuous; sheath stout, equalling or shorter than the leaves, tip obtuse membranous. *Heads* ¼ in. diam.; invol. bracts scarious, at length reflexed; receptacle hemispheric or columnar, densely villous; sepals of male and fem. dark.—The well developed male petals distinguish this species from the others of this section except *E. Walkeri*, in which they are subequal.—In Wight's Herbarium there are specimens (without habitat) of this or a closely allied plant, smaller in size, in which the male petals are equal.

42. **E. achiton,** *Kœrn. in Linnæa*, xxvii. (1854), 630; small, leaves subulate, scapes twice as long, heads very small hemispheric few-fld., invol. bracts erect cuneiform pale, tip truncate or rounded, floral obovate-spathulate hirsute or hoary, fem. fl. shortly pedicelled, sepals 2 slender, petals 3 or 0, ovary with petals stipitate.

KHASIA HILLS; alt. 4–5000 ft., *Griffith* (*Kew Distrib.* 5376), *Clarke.*

Leaves ½–1 in., flattened, opaque, 3–5-nerved at the base. *Scapes* few, filiform; sheath finely acuminate, tip not membranous. *Heads* $\frac{1}{10}$–$\frac{1}{8}$ in. diam.; invol. bracts few, coriaceous, shining; floral incurved, nearly glabrous; receptacle hemispheric, villous; flowers shortly pedicelled; male sepals 2, narrow; petals minute or obsolete; stamens few; fem. sepals filiform linear or dilated and concave towards the hairy tips, petals in the most developed heads 3, narrowly oblanceolate, ciliate. *Seeds* oblong, transversely striolate, red-brown.—Very near the *E. nigricans*, Br. of Australia.

43. **E. xeranthemum,** *Mart. in Wall. Pl. As. Rar.* iii. 29; *Wall. Cat.* 6084; dwarf, leaves subulate acuminate, scapes twice as long stout, heads broadly obconic, invol. bracts erect, outer much longer than the floral lanceolate acuminate, floral obovate-oblong or oblanceolate tips hirsute, fem. fl. subsessile, sepals 2 narrow tips ciliate, petals 3 narrowly oblanceolate ciliate, ovary with petals shortly stipitate. *Kunth Enum.* iii. 555. *Steud. Syn. Pl. Cyp.* 270; *Kœrn. in Linnæa*, xxvii. 624. E. pygmæum, *Dalz. in Hook. Kew Journ.* iii. (1851), *Dalz. & Gibs. Bomb. Fl.* 280. E. xeranthemoides, *Heurck & Muell. Arg. Obs. Bot.* 103.

NEPAL, *Wallich.* BENGAL, SILHET, the KHASIA HILLS, and TENASSERIM, *Griffith*, &c. The CONCAN, *Stocks.* CHOTA NAGPORE, *Clarke.*—DISTRIB. trop. Afr.

Tufted, annual. *Leaves* ½–1½ in., many-nerved, often recurved. *Scapes* striate, hardly grooved; sheath tumid, tips membranous. *Heads* ⅛–¼ in. diam.; invol. bracts scarious, stellately spreading, pale, shining, often lacerate; receptacle convex, villous; flowers subsessile; male sepals 3, free (or 2 connate); petals minute or obsolete; fem. sepals rarely 3, the third capillary. *Seeds* much narrower than in most other species, linear-oblong, papillose all over, pale yellow.

IMPERFECTLY KNOWN SPECIES.

E. fluviatile, *Trim. in Journ. Bot.* xxiii. (1885), 270; rootstock very slender, leaves scattered very slender, scape solitary, heads small depressed globose, invol. bracts roundish-oval brown, floral linear-oblong with coarse white hairs on the upper part, fl. dicœcious? fem. sepals linear-spathulate, petals narrower membranous tipped with scanty white hairs.

CEYLON; Western province, in rapid stream, *Trimen.*

Submerged except the head; rootstock flexuous; roots copious, long. *Leaves* 8–10 by about ½ in., solid, compressed, chanelled, flaccid; sheath dilated, cottony within. *Scape* rather shorter than the leaves; sheath not dilated, tip acute. *Head* ⅛ in. diam. (receptacle?).—Descr. from Trimen. The only specimen seen by me is in a very young state, with the flowers not available for analysis. Compare *E. Dalzellii.*

E. CEYLANICUM, *Kœrn. in Linnæa*, xxvii. 667; a foot high, stem very short, leaves 2–3½ in. tufted linear suddenly mucronate, scapes solitary 1 in., heads rather large cylindric-globose woolly white 4 in. long, invol. bracts obovate at length hidden under the head, floral cuneate-obovate submembranous pale, receptacle hairy, male sepals obtuse membranous, anticous petal much largest, fem. fl. sessile, sepals free acute like those of the males, petals 3 spathulate obtuse spongy anticous much the largest far longer than the sepals.—Hairs of bracts and perianths obtuse. Ceylon, *Herb. Berlin.*—Evidently near *E. atratum*, but leaves mucronate.

E. EURYPEPLON, *Kœrn. l. c.* 685; 2–3 in. high, leaves 3 in. tufted broadly linear narrowed upwards tip obtuse membranous, scapes crowded 4-winged 1½–3 in., heads subglobose 1¾–2¼ in. broad powdery pubescent and nigro-niveous, invol. bracts rigid powdery-pubescent olive-black much shorter than the heads, floral rhombic-cuneate olive-black rigid closely imbricate hiding the fl., receptacle hairy.—*Ind. Or.*

E. HETEROLEPIS, *Steud. Syn. Pl. Cyp.* 271; *Kœrn. l. c.* 572; tufted, stem very short, leaves lanceolate from a broad base subobtuse, hardly 1 in. long.—Bombay, *Roux.*

E. MINIMUM, *Lam. Encycl.* iii. 275; *Kunth Enum.* iii.; *Steud. Syn. Pl. Cyp.* 268; *A. Rich. Tent. Fl. Abyss.* ii. 347?; *Kœrn. l. c.* 635.—Ind. Or., *Sonnerat.* (*Herb. Lamarck*). Male sepals 2, free, linear-oblong.—Perhaps a form of *E. truncatum*, fid Kœrn. more probably *E. Sieboldianum.*

E. NEESIANUM, *Kœrn. l. c.* 628.—Ceylon (*Herb. Berol.*).—Is likened to *truncatum* and *achiton* by its dimerous sepals, but the receptacle is shortly villous. Very like *E. viride* in the head, differs in the form and number of the perianth segments and the obtuse floral bracts, *Kœrn.*

ORDER CLXXII. CYPERACEÆ. By C. B. Clarke, F.R.S.

Grass- or rush-like herbs. *Stems* solid. *Leaves* 3-ranked, rarely 0; sheaths closed. *Flowers* 1-2-sexual, small or minute, solitary in the axils of the scales (glumes) of the spikes or spikelets that are solitary or variously disposed on the stem. *Perianth* 0, or of hypogynous bristles or scales. *Stamens* 1-3, rarely more; anthers linear, basifixed on the flattened fila-

ments. *Ovary* (*in Cariceæ* enclosed in a utricle) 1-celled; style short or slender, 2–3-cleft, branches slender stigmatic; ovule 1, basal, erect, anatropous. *Fruit* a compressed or 3-gonous nut. *Seed* erect, free; embryo minute, inside the usually floury albumen.—Genera 60; species 3000, universally distributed.

The above Ordinal character applies especially to the Indian *Cyperaceæ*, and takes no account of exceptions to it, which occur in extra-Indian species.

I am indebted to Mr. C. B. Clarke, F.R.S., for the following account of the Indian *Cyperaceæ*. It will be observed that in it the citations of authors and of Floras have been almost restricted to those in which the species and their synonyms have been first indicated or described, and to the standard works of Kunth, Boeckeler and Steudel (and of Boott in the genus *Carex*), to a good figure when acceptable, and to the various Indian Floras, monographs, &c. The vast literature of the order, so many species of which are scattered over large areas of the globe and are hence described in many extra Indian works, renders this course unavoidable in the case of a "Flora" which, like that of British India, must have circumscribed limits. I have myself supplied the following clavis.—*J. D. H.*

A. CYPEREÆ. *Spikelets* of few or many glumes; lower 1–2 gl. always empty, uppermost male empty or imperfect, intermediate ones bisexual. *Remirea* is exceptional.

Tribe I. EUCYPEREÆ. *Fl. glumes* usually many, distichously arranged. *Hypogynous bristles* 0.

* *Style* 2-*fid.* (*in Juncellus very rarely* 3-*fid.*).

Rhachilla of spikelet deciduous	1. KYLLINGA.
Rhachilla of spikelet persistent. Nut laterally compressed	2. PYCREUS.
Rhachilla of spikelet persistent. Nut dorsally compressed	3. JUNCELLUS.

** *Style* 3-*fid.*

Rhachilla of spikelet persistent	4. CYPERUS.
Rhachilla of spikelet deciduous	5. MARISCUS.
Spikelet much flattened. Nut narrow, otherwise as *Mariscus*	6. COURTOISIA.

Tribe II. SCIRPEÆ. *Fl. glumes* usually many, spirally arranged. *Hypogynous bristles* often present.

* Style-base constricted or articulate above the nut. Leaves all near the base of the stem. Inflorescence umbelled.

Hypogynous bristles nearly always present. Leaves 0	7. ELEOCHARIS.
Hypogynous bristles 0. Style-base persistent, or if deciduous not leaving a tumour on the nut	8. FIMBRISTYLIS.
Hypogynous bristles 0. Style-base deciduous leaving a tumour on the nut. Leaves with long fine hairs	9. BULBOSTYLIS.

** Style-base passing gradually into the nut.

Hypogynous bristles 0–6, undivided, linear, rarely oblong	10. SCIRPUS.
Hypogynous bristles 6, divided to base into linear segments	11. ERIOPHORUM.
Hypogynous bristles 6 or 3, interior 3 broadly obovate (except in *F. Wallichii*, &c.	12. FUIRENA.
Hypogynous scales 2, hyaline, elliptic, enclosing the nut	13. LIPOCARPHA.

Tribe III. RYNCHOSPOREÆ. *Fl. glumes* 1 or 2, with several lower empty glumes and several upper empty or male glumes which are thinner and not keeled. *Hypogynous bristles* filiform, linear, or 0.

* *Style* 2-*fid.*

Style-base thickened not passing gradually into the nut . . 14. RYNCHOSPORA.

** *Style* 3-*fid.*

Lowest fertile gl. somewhat distant from the one above it. . 15. SCHŒNUS.
Spikelets panicled, 1–7-fld., lowest fl. alone perfect . . . . 16. CLADIUM.
Spikelets 3–4-fld., uppermost fl. alone perfect . . . . . 17. MICROSCHŒNUS.
Spikelets 1-2-fld., uppermost fl. alone perfect; hypog. scales long . . . . . 18. LEPIDOSPERMA.
Spikelets 1–2-fid, as in 18, hypog. scales 0 . . . . . 19. GAHNIA.

Anomalous genus.

Spikelets sessile in dense digitate cylindric spikes; glumes 4, 3 empty, uppermost with a perfect flower . . . . . 20. REMIREA.

B. HYPOLYTREÆ. *Spikelets* with one terminal fem. flower, two basal opposite male glumes, and 0–9 intercalated monandrous or empty spirally arranged glumes.

Spikes corymbose; style 2-fid . . . . . 21. HYPOLYTRUM.
Spikes corymbose; style 3-fid . . . . . 22. THORACOSTACHYUM.
Spikes congested; style 3-fid . . . . . 23. MAPANIA.
Spikes in an oblong panicle . . . . . 24. SCIRPODENDRON.
Spikes in a unilateral dense spiciform panicle . . 25. LEPIRONIA.

C. SCLERIEÆ. *Spikelets* 1-sexual or with one basal fem. flower and one or more male or empty glumes. *Nut* stipitate, osseous. *Hypogynous scales* or bristles 0. . . . . 26. SCLERIA.

D. CARICEÆ. *Spikelets* uni- or bisexual, monœcious or diœcious. *Nuts* enclosed in an entire or 2-fid sac (utricle).

Utricle split down one side . . . . . 27. KOBRESIA.
Utricle entire or 2-fid at the tip only . . . . 28. CAREX.

1. KYLLINGA, *Rottb.*

Stem erect, simple, leafy below only, terminated by 1–3 sessile capitate spikes. *Spikes* ovoid or cylindric, dense, with numerous small compressed spikelets. *Glumes* 4–5, distichous, rhacheola disarticulating above the two lowest which are empty; gl. iii. bisexual; gl. iv. male or empty, rarely fertile; gl. v. rudimentary or 0 (rarely additional upper glumes occur). *Stamens* 1–3, anterior; anthers linear-oblong, muticous or nearly so. *Nut* compressed laterally; style linear, base continuous with nut; branches 2, linear.—Sp. 33; all hot and temp. regions except Europe.

* *Nut-bearing glume not winged in the upper half of its keel.*

1. **K. triceps,** *Rottb. Descr. et Ic.* 14, t. 4, fig. 6 (*excl. cit. Rheede*); nearly glabrous, rhizome very short, stem thickened at base, spikes 3–1 (rarely 4–5) subcylindric whiteish, nut ultimately yellow-brown. *Roxb. Fl. Ind.* i. 181; *Nees in Wight Contrib.* 91; *Thw. Enum.* 345; *Boeck. in Linnæa*, XXXV. 413 (*excl. var. β*). K. monocephala, *Nees in Wight Contrib.* 91 (*not of Rottb.*). K. brevifolia? *Hb. Heyne.*—Kyllingia, *Wall. Cat.* 3443. I. Lipocarpha, *Wall. Cat.* 3445, *partly.*

From N.W. INDIA and SIND to BENGAL, BURMA, and CEYLON.—DISTRIB. Africa, China, Austral.

Stems 2-12 in., base tumid. *Leaves* as long (or half as long) as the stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. *Head* $\frac{1}{6}$–$\frac{1}{2}$ in. in diam.; bracts 3–4, up to 2–3 in. *Spikelets* $\frac{1}{12}$–$\frac{1}{10}$ in.

Fertile glume ovate, keel smooth green subexcurrent, sides 3–4-striate, straw-colrd. *Stamens* usually 2. *Nut* ⅔ length of glume, ellipsoid, obtuse.

2. **K. cylindrica,** *Nees in Wight Contrib.* 91, *partly;* nearly glabrous, rhizome very short, stem not thickened at base, spikes 3–1 subcylindric straw-colrd., nut yellow-brown ultimately black. *Boeck. in Linnæa,* xxxv. 415.—Kyllingia, *Wall. Cat.* 3442, *partly,* 3443 D, *partly.*

Scattered widely in INDIA, not plentiful anywhere. TROPICAL HIMALAYA, from Kumaon to Sikkim. PARASNATH, *T. Anderson.* CHITTAGONG, *H. f. & T. Th.* NILGHERRIES, *King.* SINGAPORE, *Hullett.*—DISTRIB. Afric., Austral.

Stems 4–12 in. *Leaves* ⅛–¼ in. broad, usually much shorter than stem. *Head* often of 3 spikes, median cylindric ⅔ in. long, lateral much shorter, subovoid; bracts 3–4, up to 2–3 in. *Spikelets* ⅛–¼ in. long. *Fertile glume* ovate, keel green scarcely excurrent, sides not glandular-papillose. *Nut* ⅔ length of glume, ellipsoid, obtuse.

3. **K. melanosperma,** *Nees in Wight Contrib.* 91; glabrous, rhizome thick very short, stem elongate, leaves short, head solitary ovoid, nut ultimately black. *Thw. Enum.* 345; *Boeck. in Linnæa,* xxxv. 419. K. brevifolia, *Nees l. c.* 91 (*partly, not of Rottb.*). K. fuscescens, *Boeck. l. c.* 421, *partly.* K. vaginata (and *var.* major), *Zoll. Verz. Ind. Archip.* ii. 63; *Miq. Fl. Ind Bat.* iii. 290.—Kyllinga, sp. *Wall. Cat.* 3440.

NILGHERRIES, *Leschenault,* &c. CEYLON, *Thwaites,* &c. SINGAPORE, *Kurz.*—DISTRIB. Java, S. Africa, Madagasc.

Rhizome about 1 in. *Stems* 20 in., sharply triquetrous at top. *Leaves* often 4 by ⅛ in., always much shorter than stem. *Spike* ⅔ by ¼ in., thicker than in *K. cylindrica;* bracts up to 2–4 in., leaf-like. *Spikelets* ⅛ in. long, usually with 1 rarely 2 nuts. *Fl. glume* ovate, acute, keel green scarcely scabrous, sides 3–4-striate fuscous. *Stamens* often 3. *Nut* ⅔ length of glume, oblong-obovoid.

4. **K. brevifolia,** *Rottb. Descr. et Ic.* 13, t. 4, fig. 3; glabrous, rhizome creeping elongate, leaves long or short, spikes 3–1 ovoid, fl. glume submucronate eglandular, keel upwards not winged, nut ultimately yellow-brown. *Nees in Wight Contrib.* 91 (*partly*); *Thw. Enum.* 345; *Boeck. in Linnæa,* xxxv. 424. K. intermedia, *Br. Prodr.* 219. K. cruciata, *Nees in Linnæa,* ix. 286. K. monocephala, *Thunb. Fl. Japon.* 35; *Miq. in Ann Mus. Lugd. Bat.* ii. 142 (*not of Rottb.*). K. sororia, *Kunth Enum.* ii. 131; *Miq. Fl. Ind. Bat.* iii. 293 (*partly*). K. gracilis, *Kunth l. c.* 134; *Miq. l. c.* 292. K. fuscata, *Miq. l. c.* 294. K. aurata, γ Hohenackeri, *Boeck. l. c.* 423. K. triceps, *Thunb. Fl. Japon.* 35 (*not of Rottb.*). Schœnus coloratus, *Linn. Sp. Pl.* ed. 2, 64, *and herb. propr.*—Kyllingia, *Wall. Cat.* 3443, *partly.*

Throughout INDIA; from the Panjab to Assam, CEYLON, and MALACCA.—DISTRIB. All warm regions except the Mediterranean.

Rhizome 4–12 in. *Stems* 4–24 in. (or sometimes ⅛–2 in. curved). *Leaves* ⅛–⅛ in. broad, longer than the stems or very much shorter. *Head* ⅛–⅛ in. diam., green or brownish; spikes often 1; if 3, median ovoid, scarcely cylindric; bracts 3–4, up to 4 in. *Spikelets* ⅛–⅛ in., usually with 1 nut only. *Fl. gl.* ovate, keel green 3-nerved slightly excurrent or recurved, lower half setulose-scabrous, upper smooth or sparsely setulose, sides 3–4-striate. *Stamens* 3 or 2. *Nut* ⅔ or ½ the length of glume, ellipsoid, obtuse; style as long as half the nut.

** *Nut-bearing glume winged in upper half of keel.*

5. **K. monocephala,** *Rottb. Descr. et Ic.* 13, t. 4, fig. 4; nearly glabrous, rhizome creeping elongate, spikes 1–3 ovoid, fl. glume submucronate

upper half of keel with a lunate crested glandular wing, nut yellow-brown. *Roxb. Fl. Ind.* i. 180; *Nees in Wight Contrib.* 91 (*partly*); *Miq. Fl. Ind. Bat.* iii. 291; *Thw. Enum.* 345; *Boeck. in Linnæa*, xxxv. 427. K. triceps, *Linn. f. Suppl.* 104 (*partly, not of Rottb.*). K. sororia, *Miq. Fl. Ind. Bat.* iii. 293 (*partly, not of Kunth*). K. gracilis, *Zoll. Verz. Ind. Archip.* ii. 63 (*not of Kunth*). K. mindorensis, *Steud. Syn. Pl. Cyp.* 67. Scirpus Cephalotes, *Jacq. Hort. Vind.* t. 97.—Kyllingia, *Wall. Cat.* 3443 A, F (*partly*), H (*partly*).

Throughout INDIA, common; from Kumaon to Assam, CEYLON and SINGAPORE. —DISTRIB. Hot and warm temp. regions of the Old World except the Mediterranean.

Closely resembles *K. brevifolia* except in the crest (usually straw-colrd. with scattered red circular resinous glands) on the upper part of keel of nut-bearing glume.

6. **K. squamulata,** *Vahl Enum.* ii. 381; nearly glabrous, roots fibrous, spikes 1–3 ovoid, fl. glume scarcely acute its keel winged by a broad hyaline incise-toothed crest, nut brown. *Boeck. in Linnæa*, xxxv. 431. K. Metzii, *Steud. Syn. Pl. Cyp.* 70. K. monocephala, *Strachey Herb. Kumaon*, 74 (*not of Rottb.*).

Western India; KASHMIR, *Thomson.* GURWHAL, up to 5500 ft., *Duthie.* MT. ABOO, *King.* CANARA, *Metz.*—DISTRIB. Trop. Africa.

Stems tufted (annual), 2–12 in. *Leaves* often longer than stem, $\frac{1}{8}$ in. broad. *Head* $\frac{1}{3}$ in. in diam., green or brown. *Spikelets* $\frac{1}{3}$ in. long, maturing 1 nut only.

2. PYCREUS, *Beauv.*

Characters of 4 *Cyperus* but nut compressed laterally, and style branches 2.—Species 50, all warm and temp. regions.

* Outer superficial cells of nut (at least on its shoulders) longitudinally oblong or elliptic; nut often appearing transversely lineolate or imperfectly zonate (by reason of the narrow ends of the cells running into an undulating line).

1. **P. flavescens,** *Nees in Linnæa*, ix. 283; annual, slender, umbel simple or reduced to 1 head, bracts spreading, spikelets linear $\frac{1}{10}$ in. wide yellow or pale, nut obovoid compressed shining black hardly half as long as the glume. Cyperus flavescens, *Linn. Sp. Pl.* 68 (*not of Linn. Herb.*); *Kunth Enum.* ii. 5; *Reichb. Ic. Fl. Germ.* viii. 31, t. 278, figs. 662–664; *Boeck. in Linnæa*, xxxv. 438, *and in Journ. Linn. Soc.* xviii. 104; *Clarke, l. c.* xxi. 36; *Boiss. Fl. Orient.* v. 364 (*excl. Cabul sp.*).

PUNJAB; Kurrum Valley, *Aitchison*, n. 964.—DISTRIB. N. temp. regions.

Stems 1–12 in. *Leaves* often $\frac{1}{2}$ length of stem, $\frac{1}{12}$ in. wide, grass-like. *Spikelets* clustered or very shortly spicate, spreading in fruit. *Nut* obtuse, with transverse white lines; black cells of surface longitudinally oblong.

2. **P. stramineus,** *C. B. Clarke*; umbels reduced to 1 compound head of 5–12 straw-colrd. spikelets, bracts and spikelets (even in fruit) suberect (otherwise nearly as *P. flavescens*). Cyperus stramineus, *Nees in Wight Contrib.* 74; *Kunth Enum.* ii. 9; *Clarke in Journ. Linn. Soc.* xxi. 39. C. capillaris, *Hochst. ms.*; *Steud. Syn. Pl. Cyp.* 4 (*not of Kœnig.*). C. coromandelinus, *Boeck. in Linnæa*, xxxv. 480 (*not of Spreng.*). C. filiformis, *Heyne*; *Wall. Cat.* 3320 (*partly*).

Throughout INDIA, except the drier country, frequent, alt. 0–3000 ft.; from KHASIA, *H. f. & T. T.*, to CEYLON and TAVOY.

Roots aromatic (*J. D. Hooker*). *Spikelets* 15–40-fld., or often long, even up to 70-fld.

3. **P. latespicatus,** *C. B. Clarke*; middle-sized, umbel simple or reduced to 1 head, spikelets spicate ½ in. wide straw-colrd. more or less chestnut-red marked, nut obovoid compressed black hardly as long as ½ glume. Cyperus latespicatus, *Boeck. in Flora*, xlii. 433 *bis, and in Linnæa*, xxxv. 467; *Clarke in Journ. Linn. Soc.* xxi. 40. C. diaphanus, *Schrad. ex Roem. & Sch. Syst.* ii., *Mant.* 477; *Kunth Enum.* ii. 9; *Boeck. in Linnæa*, xxxv. [1867–8] 437; *Clarke, l. c.* 80. C. intermedius, *var.* indica, *Boeck. l. c.* 451 (*not of Steud.*). C. pseudo-bromoides, *Boeck. l. c.* 464 (*the Nepal plant*). C. angulatus, *Strachey Cat. Pl. Kumaon*, 74; *Duthie in E. T. Atkinson Gaz.* x. [1876] 620 (*not of Nees*). C. aphyllus, *Boeck. l. c.* 450. C. pauper, *C. B. Clarke, l. c.* 41 (*the Himal. plant* not of Hochst.).—Cyperacea, *Griff. Itin. Notes*, 32, n. 506.

From KUMAON to KHASIA, alt. 3–6000 ft. BENGAL, CHOTA NAGPORE, and MALABAR.

Usually annual. *Stems* 4–16 in., occasionally 0. *Leaves* usually ½ length of stem, ⅛ in. wide, sometimes 0. *Spikelets* stouter than in *P. flavescens*, 20–60-fld. *Nut* with longitudinally oblong cells.—Strachey's plants are depauperated, filiform, bearing only 1 or 2 spikelets, and were formerly referred by me to *P. pauper*, an Abyssinian sp.

** Outer cells of the surface of nut all subquadrate hexagonal, none oblong.

† *Stem decumbent at base, often clothed ⅓ its length by leaf-sheaths.*

4. **P. sanguinolentus,** *Nees in Linnæa*, ix. 283; middle-sized (or depauperate and filiform), umbel simple or contracted into 1 head, spikelets linear or oblong generally red-marked, glumes loosely imbricate, nut obovoid biconvex almost turgid. Cyperus sanguinolentus, *Vahl Enum.* ii. 351; *Nees in Wight Contrib.* 75; *Thw. Enum.* 342; *Aitch. Cat. Punjab. Pl.* 156. C. Eragrostis, *Vahl l. c.* 322? (*exclud. syn. Retz.*); *Kunth Enum.* ii. 7; *Moritz. Verz. Zoll. Pfl.* 96; *Strachey Cat. Pl. Kumaon*, 74; *Boeck. in Linnæa*, xxxv. 443; *Clarke in Journ. Linn. Soc.* xxi. 57, and xxv. 80. C. cruentus, *Roxb. Fl. Ind.* i. 196 (*not of Rottb.*). C. pumilus, *Rottb. Desc. et Ic.* 29, t. 9, fig. 4 (*not of Linn.*). C. atratus, *Steud. in Zoll. Verz. Ind. Archip.* ii. 62, and *Pl. Cyp.* 12; *Miq. Fl. Ind Bat.* iii. 259; *Boeck. l. c.* 446. C. concolor, *Steud. Pl. Cyp.* 6. C. Rehmanni, *Boiss. Fl. Orient.* v. 364. C. grossarius, *Heyne ms.* C. jeminicus, *Heyne ms.* (*not of Rottb.*). —Cyperus, *Wall. Cat.* 3318 (*mainly*), 3335.

Throughout INDIA, ascending to 10,800 ft.; from KASHMIR to ASSAM, CEYLON, and SINGAPORE.—DISTRIB. Warm parts of the Old World.

Glabrous. *Rhizome* creeping, 4–10 in., or often flowering the first year. *Stem* 4–20 in. *Leaves* as long as stem or much shorter, $\frac{1}{10}$ in. wide. *Spikelets* shortly spicate or clustered, ½–1 by ⅛ in., 6–24-fld. *Glumes* boat-shaped, ovate, obtuse, 3 green nerves on back, sides usually red- or chestnut-marked. *Nut* hardly ½ length of glume, ashy-brown.—Belongs to a very small group of closely-allied species, which alone of all the *Cypereæ* have nodes (and sheaths and leaves) far above base of stem; usually a prominent character in *P. sanguinolentus*, but frequently absent. Sikkim

specimens from 10,000 ft., are 4–6 in. high with stem (and leaves) capillary, bearing 1 or 2 spikelets only, and may be a new species.

†† *Small or medium-sized, roots fibrous, leaves close to base of stem.*

5. **P. nitens,** *Nees in Linnæa*, ix. 233, *and in Nov. Act. Acad. Nat. Cur.* xix., *Suppl.* i. 43; small or scarcely middle-sized, umbel simple or reduced to 1 head, spikelets small clustered or shortly spicate linear or linear-oblong straw-colrd. or dusky, glumes minutely mucronate or nearly muticous, nut small obovoid. Cyperus pumilus, *Linn. Sp. Pl.* 69; *Gaertn. Fruct.* i. 9, t. 2, fig. 2; *Kunth Enum.* ii. 4 (*in small part*); *Roxb. Fl. Ind.* i. 196 (*excl. syn. Rottb.*); *Strachey Cat. Pl. Kumaon*, 74; *Clarke in Journ. Linn. Soc.* xxi. 43 (*not of Rottb. or Nees*). C. nitens, *Vahl Enum.* ii. 331; *Kunth Enum.* ii. 3; *Boeck. in Linnæa*, xxxv. 483 (*not of Retz.*). C. membranaceus, *Vahl. l. c.* 330; *Kunth l. c.* 3. C. punctatus, *Roxb. Fl. Ind.* i. 193 (*excl. cit. Pluk.*). C. pulvinatus, *Nees & Meyen in Wight Contrib.* 74; *Thw. Enum.* 342. C. obstinatus, *Steud. Syn. Pl. Cyp.* 10; C. tortuosus, *Herb. Roxb.*; *Wall. Cat.* 3339.—Cyperus, *Wall. Cat.* 3312 (*mainly*).

Throughout INDIA, alt. 0–6000 ft., frequent; from the PUNJAB to ASSAM, CEYLON, and SINGAPORE.—DISTRIB. Warm regions of the Old World.

Annual. *Stems* tufted, 1–12 in. *Leaves* often as long as stem, $\frac{1}{16}$ in. wide, weak. *Umbel* rays 1–6 in. up to 2–4 in. long, usually shorter. *Spikelets* 5–30 in a spike, $\frac{1}{5}$–$\frac{1}{6}$ by $\frac{1}{12}$ in., 8–44-fld.; rhachilla slender, persistent. *Glumes* boat-shaped, 3–5-nerved, back green, sides pale nerveless, keel (in the Indian form) nearly always excurrent recurved. *Stamen* in the Indian plant usually 1 (in large examples sometimes 2). *Nut* compressed, brown, nut ½ as long as the glume.

6. **P. pumilus,** *Nees in Linnæa*, ix. 283; annual, umbel simple, spikelets spicate oblong 6–10-fld. much compressed, glumes on back 3-nerved green, sides 2–3-nerved pale, keel excurrent recurved, nut broad ellipsoid flattened. Cyperus hyalinus, *Vahl Enum.* ii. 329; *Kunth Enum.* ii. 3; *Miq. Fl. Ind. Bat.* iii. 254; *Boeck. in Linnæa*, xxxv. 482; *Clarke in Journ. Linn. Soc.* xxi. p. 46; *Ridley in Forbes East. Archip.* 520. C. pumilus, *Nees in Wight Contrib.* 74 (*excl. all syn.*); *Kunth l. c.* 4 (*in great part, not of Linn.*) C. strictus, *Wight ms.* (*not of Roxb.*); *Wall. Cat.* 3336, C *partly.*

MADRAS; in rice-fields, *Wight, Leith.*—DISTRIB. Timor.

Stems 2–8 in. *Leaves* as long as stem, $\frac{1}{6}$ in. wide, weak. *Umbel* rays 3–7, up to 2 in. long. *Spikelets* 4–12 in a spikelet, not clustered, ⅛ by ⅛ in. *Glumes* almost glistening on their pale or yellowish nerved sides. *Nut* obtuse, ashy-black, more than ½ length of glume.

7. **P. capillaris,** *Nees in Linnæa*, ix. 283 and in *Mart. Fl. Bras.* ii. pars. 1, 9; umbel apparently simple or condensed into 1 head, (see var. γ) spikelets clustered linear many-fld. much compressed straw-colrd., brown or black, nut small ellipsoid compressed apiculate chestnut-black. Cyperus globosus, *All. Fl. Pedem. Auctuar.* 49; *Reichb. Ic. Pl. Crit.* iii. 26, t. 229, and *Ic. Fl. Germ.* viii. 32, t. 279, fig. 665; *Boeck. in Linnæa*, xxxv. 458; *Clarke in Journ. Linn. Soc.* xx. 279 and xxi. 47. C. flavidus, *Decne. in Nouv. Ann. Mus.* iii. 359 (*not of Retz. or Roxb.*). C. capillaris, *Kœnig. ms.*; *Roxb. Fl. Ind.* i. 194; *Nees in Wight Contrib.* 76; *Dalz. & Gibs. Bomb. Fl.* 283. C. Lamarckianus, *Schultes in Roem. & Sch. Syst.* ii. *Mant.* 108; *Kunth Enum.* ii. 9. C. vulgaris, *Sieber ms.*; *Kunth l. c.* 4. C. mucronatus, *Moritzi Verz. Zoll. Pfl.* 95 (*not of Rottb.*). C. flaves-

cens, *Thw. Enum.* 342; *Aitch. Cat. Pl. Punjab* 155. C. polystachyus, *Strachey Cat. Pl. Kumaon*, 74; *Duthie in E. T. Atkinson Gaz.* x. 620.—Cyperus, *Wall. Cat.* 3318.

N. INDIA; alt. 0–6000 feet, from KASHMIR to CHOTA NAGPORE and ASSAM.—DISTRIB. Temp. and trop. old world.

Glabrous. *Stems* tufted, 4–24 in. *Leaves* 4–12 by $\frac{1}{6}$ in., weak. *Umbel* rays up to $2\frac{1}{2}$ in., usually very short; bracts 4–8 in. *Spikes* subglobose. *Spikelets* 5–50, $\frac{1}{4}$ by $\frac{1}{6}$ in., 40-fld. *Glumes* ovate, obtuse. *Stamens* 2; anthers small, muticous. *Nut* $\frac{1}{2}$ length of glume.—The Himal. plant is identical with the European; its spikelets are rather broad, ferruginous-green, and the glumes are (in fruit) rather loose, thin. In the Khasia Hills the glumes are often browner, chestnut, or very black, rigid, tightly imbricated.

Var. β. *nilagiricus*, C. B. Clarke in Journ. Linn. Soc. xxi. 49; spikelets narrower more rigid, glumes (even in fruit) rigidly imbricated not inflated straw-colrd. or brown or (more often) chestnut or black. Cyperus nilagiricus, *Hochst. ms.*; *Steud. Syn. Cyp.* 2; *Boeck. in Linnæa*, xxxv. 457. C. atro-ferrugineus, *Steud. l. c.* 2. C. Junghuhnii, *Miq. Fl. Ind. Bat.* iii. 260. C. ater, *Dalz. & Gibs. Bomb. Fl.* 283 (*not of Vahl.*). C. lucidus and lividus, *Heyne ms.* C. Eragrostis, *Rottler, ms.* C. semiteres, *Heyne ms.*, *Wall. Cat.* 3310.—The Deccan Peninsula and Ceylon.—DISTRIB. Afric., S.E. Asia, Austral.—This var. is founded on the narrower spikelets; colour is accidental.

Var. γ *stricta*, C. B. Clarke, l.c.; spikelets narrower straw-colour or yellow less compressed frequently short 6–12-fld. sometimes curved or twisted, glumes closely packed but loosely imbricated. Cyperus strictus, *Lam. Ill.* i. 146; *Roxb. Fl. Ind.* i. 200; *Kunth Enum.* ii. 12; *Miq. Fl. Ind. Bat.* iii. 258. C. tortuosus, *Kœnig ms.*; *Roxb. l. c.* 197; *Nees in Wight Contrib.* 75; *Kunth l. c.* 16. C. divaricatus, *Herb. Ham*; *Wall. Cat.* 3312 (*partly*).—N. India, from the Punjab to Assam, Chittagong and Chota Nagpore.—DISTRIB. Asia, Afric.

8. **P. polystachyus,** *Beauv. Fl. Owar.* II. 48, t. 86, fig. 2; umbel apparently simple or contracted into 1 head, spikelets clustered even in fruit suberect (see var. β) linear many-fld. dusky straw-colour often red-marked, nut oblong nearly symmetric truncate. Cyperus polystachyus, *Br. Prod.* 214; *Roxb. Fl. Ind.* i. 193; *Nees in Wight Contrib.* 75; *Kunth Enum.* ii. 13; *Dalz. & Gibs. Bomb. Fl.* 281; *Thw. Enum.* 342; *Boeck. in Linnæa*, xxxv. 477; *Boiss. Fl. Orient.* v. 365; *C. B. Clarke in Journ. Linn. Soc.* xx. 280 and xxi. 51. C. odoratus, *Linn. Sp. Pl.* col. i. 46. C. teretifructus, *Steud. in Zoll. Verz. Ind. Archip.* ii. 62 and *Syn. Cyp.* 3. C. strigosus, *Wight ms.* C. corymbosus, *Roxb. ms.* (*not of Rottb.*). C. filiformis, *Herb. Heyne*, *Wall. Cat.* 3320 A. (*partly*). C. bicarinatus, *Herb. Heyne*, *Wall. Cat.* 3333.—Cyperus, *Wall. Cat.* 3340.

Near the coast of INDIA from SIND to SINGAPORE; common. SILHET, *Hook.f. & T. T.*—DISTRIB. all warm especially maritime regions.

Glabrous. *Stems* 12–30 in., sometimes 0. *Leaves* overtopping stem or much shorter, $\frac{1}{8}$ in. broad, weak. *Umbel* rays 1–7, up to 0–2 in.; spikes compound of 10–50 spikelets; bracts 3–6, spreading, up to 4–16 in. spikelets $\frac{1}{4}$ by $\frac{1}{12}$ in., 20–50-fld. *Glumes* boat-shaped, ovate, muticous, papery, not rigid. *Stamens* 2 (usually); anthers small, oblong. *Nut* compressed, biconvex, black, $\frac{1}{2}$ length of glume.

Var. β. *laxiflorus*, Benth. Fl. Austral. vii. 261; spikes more open, spikelets in fruit rectangularly spreading subsolitary, often more tinged with yellow red or brown. Cyperus paniculatus, *Rottb. Descr. et Ic.* 40. C. plenus, *Heyne ms.*; *Kunth Enum.* ii. 12. C. geminatus, *Heyne ms.* C. Hookerianus, *Arnott ms.* (*not of Thwaites*).

The DECCAN, and MALAY Peninsulas, and CEYLON, frequent.—DISTRIB. all hot regions.

9. **P. ferrugineus,** *C. B. Clarke*; spikelets rather broader redder, glumes more distant (otherwise as *P. polystachyus*, Var. β). Cyperus ferrugineus, *Poir. in Lam. Encyc.* vii. 261; *Kunth Enum.* ii. 11; *Baker Fl. Maurit.* 408. C. polystachyus, Vars. ferruginea and macrostachya, *Boeck. in Linnæa*, xxxv. 479, Vars. ferruginea, micans and filicina, *C. B. Clarke in Journ. Linn. Soc.* xxi. 54, 55. C. strictus, *Rottler ms. Heyne ms.* (*not of Roxb.*)—*Wall. Cat.* 3331.

The DECCAN PENINSULA; *Rottler, G. Thomson.* CHITTAGONG; *J. D. H.*—DISTRIB. Afric. Americ.

10. **P. sulcinux,** *C. B. Clarke*; as *P. polystachyus*, var. β, but spikelets longer, glumes more remote, nut unsymmetric its faces much compressed usually concave. Cyperus sulcinux, *C. B. Clarke in Journ. Linn. Soc.* xxi. 56 and xxv. 80.

BENGAL; up to 5000 feet, alt. frequent. ANAMALLAY MTS.; *Beddome.* PEGU; *Kurz.* TENASSERIM; *Helfer* (*Kew Distrib.* n. 6209, 4).—DISTRIB. Afr. trop. Malaya.

Slender. *Spikelets* up to 40–50-fld. Narrow edge of *nut* much flattened against the rhacheola.

††† *Robust, spikelets larger, yellow brown or red, leaves close to base of stem.*

11. **P. angulatus,** *Nees in Linnæa*, ix. 283; robust, umbel simple, spikelets yellow or brown-yellow (see also var. β) spicate, nut small obovoid ¼–⅓ length of glume. Cyperus unioloides, *Br. Prod.* 216; *C. B. Clarke in Journ. Linn. Soc.* xxi. 60. C. bromoides, *Willd. ms.*; *Link Jahrb.* iii. 85; *Kunth Enum.* ii. 8; *Boeck. in Linnæa*, xxxv. 463. C. angulatus, *Nees in Wight Contrib.* 73; *Boeck. l.c.* 465.—Cyperus, *Wall. Cat.* n. 3324.

NEPAL; *Wallich.* DINAJPORE; *C. B. Clarke.* KHASIA; alt. 3–5000 feet, *Hf. & T. T.*, &c. NILGHIRI HILLS; *Wight.* AVA; *Wallich.*—DISTRIB. tropics.

Glabrous. *Rhizome* long, ⅛ in. in diam., or often 0. Roots fibrous. *Stem* 1½–3 ft. *Leaves* often ¾ length of stem, ⅛ in. broad. *Umbel* rays 3–8, up to 2–4 in. long (in depauperated a single few-spikeleted head); bracts 4–5, up to 8–12 in., leaf-like. *Spikes* of 3–20 spikelets, sometimes slightly compound; bracteoles inconspicuous. *Spikelets* ⅜ by ⅛ in., 22-fld. *Glumes* ⅛ in., ovate, triangular-acute, loosely imbricate in fruit, 1-3-nerved, back green, sides shining yellow brown, margin crisped. *Stamens* 3; anthers oblong-linear. *Nut* compressed, black; style small, branches linear shortly exsert.

Var. β *Wightii*; umbel contracted into a subcompound head, spikelets larger shining chestnut-brown.

Deccan Peninsula; *Wight.*—A remarkable plant, only once collected. The spikelets are, in size and colour, unlike any Indian or other example of *P. angulatus*, while they most closely resemble *P. macranthus*, a Cape plant; but the nuts have the surface-cells subquadrate, while in *P. macranthus* these are longitudinally oblong.

12. **P. puncticulatus,** *Nees in Linnæa*, ix. 283; umbel compound or simple, spikelets red spicate, nut broad-ellipsoid truncate ½ length of glume. P. Baccha, *Nees in Linnæa*, ix. 283. Cyperus puncticulatus, *Vahl Enum.* ii. 348; *Kunth Enum.* ii. 15; *Dalz. & Gibs. Bomb. Fl.* 283; *Thw. Enum.* 342; *Boeck. in Linnæa*, xxxv. 472 (*excl. syn. Roxb.*); *C. B. Clarke in Journ. Linn. Soc.* xxi. 68. C. Baccha, *Kunth l.c.* 115. C. inundatus, *Nees in Wight Contrib.* 76 (*not of Roxb.*). C. procerus, *Roxb.*

Fl. Ind. i. 203, chiefly. C. flavidus, *Herb. Heyne*; *Wall. Cat.* 3336, A. C. tegetum, *Herb. Wight*; *Wall. Cat.* 3355, B.

The DECCAN PENINSULA; *Rottler, Wight,* &c. CEYLON; *Thwaites.*—DISTRIB. China.

Glabrous, annual. *Stem* erect at base, subsolitary, 1–2 ft. *Leaves* often as long as stem, ¼ in. broad. *Spikelets* ⅔ by ⅛ in., 7–30-fld., sides very parallel.

Var. β. *quinquangintiflorus*, C. B. Clarke, l.c. 69; spikelets elongate up to 50-fld., anthers apiculate. Cyperus macrostachyus, *Vahl Enum.* ii. 349 (*as to plant of Rottler, not of Lam. or Poir.*). C. longus, *Herb. Heyne*; *Wall. Cat.* 3336 B.—Madras, *Heyne.*

13. **P. albomarginatus,** *Nees in Mart. Fl. Bras.* ii. part 1, 9; umbel simple or compound, spikelets long yellow or ruddy brown, glumes obtuse white-edged in fruit spreading not imbricate, nut obovoid greatly compressed nearly as long as glume. Cyperus Hochstetteri, *Nees ms.*; *Krauss in Flora*, xxviii. 755 (*in note*); *Boeck. in Linnæa*, xxxv. 471; *C. B. Clarke in Journ. Linn. Soc.* xxi. 69. C. flavicomus, *Torrey Bot. Mexic. Bound.* 226; *Benth. Fl. Austral.* vii. 261 (*excl. syn., not of Michx.*).

CONCAN and MALABAR; *G. Thomson,* &c. RANGOON; *R. Scott, Kurz.*—DISTRIB. Tropics.

Glabrous, annual. *Stem* erect at base, subsolitary, 1-3 ft. *Leaves* often ⅔ length of stem, ¼ in. broad. *Umbel* rays sometimes 11, up to 7 in. long, sometimes 2–3, only 1 in. long. *Spikelets* often large, 1 by ⅛ in.

INDETERMINABLE SPECIES.

C. KAMPHŒVENERI, *Boeck. Cyp. Novæ*, i. (1888), 5; rhizome tuberous, style but little exserted shortly 2-fid.—NICOBAR ISLDS.; *Kamphœvener.*

3. JUNCELLUS.

Stem erect, simple, leafy only near base. *Inflorescence* umbellate or capitate. *Spikelets* linear or oblong, compressed; rhacheola persistent. *Glumes* distichous, deciduous, concave, muticous, 2 lowest empty, 4–∞ succeeding bisexual, uppermost 1–3 sterile or empty. *Stamens* 3–2, anterior; anthers oblong-linear. *Nut* plano-convex, broad plane face flat against rhacheola; style-base continuous with nut, not tumid; branches 2, linear. —Species 12, in all warm climates.

This genus is *Cyperi Sect. Juncellus* of Kunth, and differs from *Cyperus* by having a 2-fid style, and more or less compressed, not equilaterally trigonous nut. Several of the species have been considered by Boeckeler and others as forms with 2-branched styles of corresponding species of *Cyperus.*

* *Inflorescence umbelled.*

1. **J. serotinus,** *C. B. Clarke*; stoloniferous, stout, stem at top triquetrous thick, leaves and bracts long, umbel compound, spikelets linear in dense spikes, glumes broad-ovate obtuse 7–9-nerved, nut longer than ½ the glume. Cyperus serotinus, *Rottb. Descr. et Ic.* 31; *Kunth Enum.* ii. 19; *Boeck. in Linnæa*, xxxv. 492. C. Monti, *Linn. f. Suppl.* 102; *Host. Gram. Austr.* iv. 38, t. 67; *Reichb. Ic. Fl. Germ.* viii. 32, t. 279, fig. 666; *C. B. Clarke in Journ. Linn. Soc.* xxi. 72, t. 3, fig. 29; *Boiss. Fl. Orient.* v. 366. C. japonicus, *Miq. in Ann. Mus. Lugd. Bat.* ii. 140. C. puncticulatus, *Aitch. in Journ. Linn. Soc.* xix. 189 (*not of Vahl*).—Monti, *Bonon. Prodr.* 12, t. 1, fig. 2.

KASHMIR; alt. 1000 ft., *Jacquemont*, &c. PUNJAB; alt. 1000 ft., *Thomson*, &c.—DISTRIB. from Spain to Japan.

Glabrous, except sometimes rhachis of spikes. *Stems* solitary, 1–3 ft. *Leaves* often as long as stem, ⅛–¼ in. broad. *Bracts* 3–5, up to 8–18 in. leaf-like. *Umbel* rays 3–6, up to 2–6 in. long, very unequal, rather stout; umbellules shortly corymbose or capitate; bracteoles short. *Spikes* of 5–40 spikelets. *Spikelets* ⅛–¼ by $\frac{1}{10}$–⅛ in., 12–30-fld. (or shorter 6–8-fld.), turgid; rhacheola robust, tetragonous, excavated, scarcely winged. *Glumes* approximate; margins narrowly scarious, in dried ripe examples incurved crisped. *Stamens* 3; anthers scarcely apiculate. *Style* short; branches about as long as nut. *Nut* obovoid, obtuse, smooth, dark-brown.—Much confused in herbaria with *Cyperus pilosus*, Vahl, which it generally resembles and has further the rhachis of the spikes minutely hairy, a rare character in *Cyperus*.

2. **J. stylosus,** *C. B. Clarke*; stem at top trigonous slender, leaves and bracts rather short, glumes not striate towards their margins, style-branches very long, nut (not quite ripe) small; otherwise as *J. serotinus*. Cyperus Monti, var. β ? stylosa, *C. B. Clarke in Journ. Linn. Soc.* xxi. 73.

KHASIA HILLS; *Griffith*.

Leaves not half length of stem. *Bracts* scarcely overtopping inflorescence. *Rhachis* of spikes glabrous. *Glumes* chestnut-red, with very narrow white margins, inflated as in *J. serotinus*. *Spikelets* comose from the persistent long dark-red styles. *Nuts* perhaps all imperfect.

3. **J. inundatus,** *C. B. Clarke*; stout, stem at top triquetrous thick, leaves and bracts long, umbel compound, spikelets in loose spikes, glumes obtuse 5–7-nerved, nut longer than ½ the glume. Cyperus inundatus, *Roxb. Fl. Ind.* i. 201; *Wall. Cat.* 3342 A, B; *C. B. Clarke in Journ. Linn. Soc.* xxi. 31, 73 (*not of Br. or Nees*). C. diluvialis, *Schultes in Roem. & Sch. Syst.* ii. *Mant.* 124. C. puncticulatus, *Steud. Syn. Cyp.* 10 (*partly, not of Vahl*).—Cyperus, *Wall. Cat.* 3355, C. 3359, F.

BENGAL; in swamps, from Sylhet to the sea, frequent.—DISTRIB. China.

Rhachis of spike glabrous, 1–2 in., spikelets often ⅛–$\frac{1}{16}$ in. apart. Differs little from *J. serotinus*, but by the open spikes. In herbaria it is more frequently mixed either with *Cyperus procerus* or *Pycreus puncticulatus*.

4. **J. alopecuroides,** *C. B. Clarke*; large, leaves and bracts long, umbel large compound, spikes cylindric very dense, spikelets linear-oblong bearing 8–30 nuts, glumes concave dirty straw-colour, rhachilla rather stout subquadrangular not winged, nut small ⅓ length of glume. Cyperus alopecuroides, *Rottb. Descr. et Ic.* (1773), 38, t. 8, fig. 2; *Nees in Wight Contrib.* 76; *Kunth Enum.* ii. 19; *Thw. Enum.* 342; *Dalz. & Gibs. Bomb. Fl.* 282; *Miq. Fl. Ind. Bat.* iii. 261; *Boeck. in Linnæa*, xxxvi. 322 (*excl.* var. α); *Boiss. Fl. Orient.* v. 367; *C. B. Clarke in Journ Linn. Soc.* xxi. 30, 74, t. 2, fig. 13; *King in T. E. Atkins. Gaz.* x. (1876), 320. C. compositus, *Br. Prodr.* 217. C. semidives, *Steud. Syn. Cyp.* 36. C. speciosus, congestus, alopecuroides, *Herb. Heyne*; *Wall. Cat.* 3344, B, C.

Throughout India, from PESHAWUR, *Griffith* (*Kew Distrib.* 6150) to SILHET, *Hook. f. & T. T.*, and CEYLON, *Thwaites*.—DISTRIB. Afric. and Austral. trop.

A large glabrous annual, 2–3 ft. *Leaves* often as long as stem, ⅛–½ in. broad. Rays of *umbel* 4–6 in.; bracts 12–18 in., leaf-like; raylets often 1 in. bearing at apex 2–4 ebracteolate spikes. *Spikes* 1–1½ by ¼ in. *Spikelets* ⅛ in., lanceolate, compressed. *Glumes* muticous or mucronulate. *Stamens* 3; anthers muticous. *Nuts* plano-convex, finally ashy-black (many imperfect pale); style as long as nut, branches longer, shortly exsert.—United by Boeckeler with

Cyperus exaltatus, Retz; but separated by the very crowded spikes and 2-fid style.

** *Stem with one head of spikelets.*

5. **J. pygmæus,** *C. B. Clarke*; annual, leaves and bracts long green flaccid, spikelets innumerable in a compound head linear often curved or twisted, nut plano-convex ⅓–½ length of glume. Cyperus pygmæus, *Rottb. Descr. et Ic.* 20, t. 14, figs. 4, 5; *Nees in Wight Contrib.* 72; *Kunth Enum.* ii. 18; *Miq. Fl. Ind. Bat.* iii 261; *Boiss. Fl. Orient.* v. 368 (*excl. syn. Roxb.*); *Boeck. in Linnæa*, xxxv. 493 (*excl. var.* β); *C. B. Clarke in Journ. Linn. Soc.* xx. 282 and xxi. 28–30, 81, t. 2, figs 10, 10a; *King in E. T. Atkinson Gaz.* x. (1876), 320. C. squarrosus, *Roxb. Fl. Ind.* i. 190. C. monocephalus, *Roxb. mss.* (*not Fl. Ind.*). Dichostylis pygmæa, *Nees in Linnæa*, ix. 289. Pycreus diffusus and pygmæus, *Nees in Linnæa*, ix. 283.—Isolepis? *Wall. Cat.* 3495.

From KASHMIR to BURMA and Ceylon. All warm regions (*excl.* Europe).

Glabrous. *Stems* cæspitose (often very many), 1–10 in. *Bracts* 3–6 in., spreading. *Head* ¼–¾ in. in diam. *Spikelets* often 100, ¼ in., 8–21-fld., greenish-white, finally pale brown. *Glumes* close-packed, boat-shaped. *Stamens* 2–1; anthers small, linear-oblong, muticous. *Nut* ellipsoid, brown, top pyramidal; style shorter than nut; branches shortly exsert.—Much confused (by Boeckeler finally united) with *Scirpus Michelianus, Linn.*; so that the synonymy cannot be completely extricated. In the young state it is difficult to distinguish the two apart; but when the spikelets of *J. pygmæus* are ripe, and the glumes (except a few of the top infertile) have fallen away, the scars on the rhacheola (and therefore the glumes and nuts) are seen to be exactly distichous; whilst the rhacheola of ripe *S. Michelianus*, shows the scars arranged spirally from the base of the spikelet. Rheede's Hort. Mal. xii. t. 54, on which alone several specific names are grounded, is usually referred here, but it is as likely to be *Fimbristylis argentea*, Vahl.

6. **J. lævigatus,** *C. B. Clarke*; rhizome creeping, leaves short or long, lower bract as though continuing stem, head lateral, spikelets 1–30 linear 16–40-fld. somewhat turgid, glumes close-packed obtuse, nut ½–⅔ length of glume. Cyperus lævigatus, *Linn. Mant.* 179; *Rottb. Descr. et Ic.* 19, t. 16, fig. 1; *Miq. Fl. Ind. Bat.* iii. 260; *Boeck. in Linnæa*, xxxv. 486; *Boiss. Fl. Orient.* v. 366; *C. B. Clarke in Journ. Linn. Soc.* xx. 282 and xxi. 77, t. 3, figs. 20, 21 and t. 4, fig. 33; *Aitch. in Trans. Linn. Soc. ser.* 2; *Bot.* iii. 121. C. mucronatus, *Rottb. l. c.* 19, t. 8, fig. 4; *Roxb. Fl. Ind.* i. 185; *Nees in Wight Contrib.* 72; *Kunth Enum.* ii. 17; *Reichb. Ic. Fl. Germ.* viii. 31, t. 278, fig. 661. C. lateralis, *Forsk. Fl. Æg. Arab.* 13; *Roxb. l. c.* 186; *Nees in Wight Contrib.* 73 (*not Linn. f.*). C. Roxburghianus, *Presl. in Oken Isis*, xxi. 271. C. pleuranthus, *Nees l. c.* 73. C. acuminatus, *Roxb. ms.* C. mucronatus and C. niveus, *Herb. Heyne*; *Wall. Cat.* 3311. Pycreus lævigatus, *Nees in Linnæa*, x. 130. P. mucronatus and lateralis, *Nees l. c.* x. 283.

Throughout WESTERN INDIA from the Punjab, *Aitchison*, and Bundelkund, *Duthie*, to SOUTH MADRAS, *Wight.*—DISTRIB. most warm climates.

Glabrous. *Rhizome* usually woody, ⅛ in. in diam. internodes very short densely covered by chestnut or red scales, when floating sometimes 3–6 ft. with long internodes. *Stems* 4–24 in. *Leaves* sometimes as long as stem, ⅛ in. broad, usually short, occasionally obsolete (i.e. sheaths terminated by a lanceolate process not green). *Spikelets* closely clustered, ⅓–½ in., rigid, often curved, straw-colrd. or tinged with chestnut or chestnut-red; rhacheola stout, tetragonous, hardly winged. *Glumes* concave, ovate, 7–11-nerved. *Stamens* 3; anthers yellow with a small

linear-lanceolate red scabrous crest. *Style* slender, hardly as long as nut; branches shortly exsert. *Nut* plano- or concavo-convex, top obtuse.

Var. β. *junciformis*; rigid, spikelets 1–6 rigid shining chestnut or black. C. distachyos, *All. Fl. Pedem. Auctuar.* 48, t. 2, fig. 5; *Boiss. Fl. Orient.* v. 367. C. junciformis, *Desfont. Fl. Atlant.* i. 42, t. 7, fig. 1; *Boiss. l. c.* C. lævigatus, var. junciformis, *C. B. Clarke in Journ. Linn. Soc.* xxi. 79.

Peshawur; *Stewart.* Sind; *Stocks.*—DISTRIB. Oriental.

4. **CYPERUS,** *Linn.*

Stem erect, simple, leafy only near base. *Inflorescence* umbellate or capitate. *Spikelets* linear or oblong, compressed; rhacheola persistent. *Glumes* distichous, 2 lowest empty, 4–∞ succeeding bisexual seriatim deciduous, uppermost 1–3 sterile or empty. *Stamens* 3–2, rarely 1; anther linear or oblong, sometimes crested. *Nut* triquetrous, trigonous or plano-convex, plane face flat against rhacheola; style-base continuous with nut, not tumid, branches 3 linear (occasionally 2 in upper fl. of *C. stoloniferus*, and in *C. Cephalotes*).—Species 300, all warm and temperate regions.

Subgenus I. ANOSPORUM (Genus), *Nees in Linnæa*, ix. 287. *Style* long, undivided or obscurely 3–2-toothed. Hydroschoenus, *Moritzi Verz. Zoll. Pfl.* 95. Trentepohlia, *Boeck. in Bot. Zeit.* xvi. 249.—(Sp. 1).

1. **C. Cephalotes,** *Vahl Enum.* ii. 311; leaves and bracts long, infl. of one compound dense head, nut stipitate below corky. *Kunth Enum.* ii. 48; *Miq. Fl. Ind. Bat.* iii. 271; *C. B. Clarke in Journ. Linn. Soc.* xxi. 25, 34, t. 1, figs. 1–6. C. monocephalus, *Roxb. Fl. Ind.* i. 188. C. Hookerianus, *Thw. Enum.* 342 (*not of Arn.*). C. leucocephalus, *Wight ms.* (*not of Retz*). C. natans, *Ham. ms.* C. dubius, *Rottler in Neue Schr. Gesell. Freunde Berlin*, iv. 193, *in Obs.* Anosporum monocephalum, *Nees in Linnæa*, ix. 287, *and in Wight Contrib.* 92; *Griff. Notul.* iii. 103; *Boeck. in Linnæa*, xxxvi. 411. A. Cephalotes, *Kurz in Journ. As. Soc. Beng.* xlv. pt. 2, p. 159. Hydroschoenus kyllingioides, *Zoll. & Mor. ms.*; *Moritzi Verz. Zoll. Pfl.* 95; *Miq. l. c.* 296. Trentepohlia bifoliata. *Boeck. in Bot. Zeit.* xvi. 249. Ungeria monocephala, *Nees ms.*—Kyllinga, *Wall. Cat.* 3441 (*mainly*). *Rheede Hort. Mal.* xii. t. 53.

From BENGAL to MADRAS and BURMA.—DISTRIB. China, Malaya, Austral.

Glabrous, floating in tanks; stolons slender. *Stems* 4–16 in. *Leaves* 2–5, as long as ⅔ stem, $\frac{1}{6}$ in. broad. *Bracts* 3–5 up to 4–8 in., leaf-like. *Heads* ½–¾ in. diam. *Spikelets* 10–70, ¼–½ by ⅛ in., compressed, rigid, often bent, 10–36-fld.; rhachilla stout, persistent, angular, hardly winged. *Glumes* closely packed, boat-shaped, green, more or less marked with red or chestnut. *Stamens* 3–2; filaments broadly ligulate; anthers large, linear-oblong, muticous. *Nut* ½ length of glume, ovoid, unequally trigonous (i. e. somewhat plano-convex) passing gradually into the linear style ⅔ length of nut.—In the *Cyperaceæ* which float in tanks that are never dry, a corky thickening of the cells especially towards the lower angles of the nut enables them to float, and hence vegetate among the rotting surface vegetation of the tank.

Subgenus II. PYCNOSTACHYS. *Inflorescence* umbellate throughout or capitate; spikelets digitate or clustered, not spicate. *Style-branches* linear, rarely linear-lanceolate. (Sp. 2–26.)

Sect. 1. *Natantes.* *Style*-branches linear-lanceolate. *Nut* corky below. —Tank floaters. (Sp. 2.)

2. **C. platystylis,** *Br. Prodr.* 214; leaves and bracts long, umbel compound, spikes near together often very numerous. *C. B. Clarke in Journ. Linn. Soc.* xxi. 27, 117, t. 1, figs. 7–9 (*excl. syn. C. caducus*). C. pallidus, *Heyne ms.*; *Nees in Linnæa,* ix. 284, *and in Wight Contrib.* 79; *Kunth Enum.* ii. 40; *Thw. Enum.* 343. C. canescens, *Herb. Heyne,* and C. fluitans, *Herb. Ham.*; *Wall. Cat.* 3337, 3359 D (*partly*). Anosporum pallidum, *Boeck. in Linnæa,* xxxvi. 412.

From BENGAL and BURMA to CEYLON and PENANG.—DISTRIB. Malaya, Austral.

Glabrous, floating in tanks. *Stolons* covered by ovate acute striate pale-brown scales. *Stems* solitary, 6–42 in. *Leaves* often as long as stem, up to ⅛-½ in. broad, coarse, cutting, nerves many, strong. *Umbel* 1–10 in. diam.; bracts 8–18 in., leaf-like, somewhat corymbose. *Spikelets* 5–1300, 1–6-together digitate, ½ by ⅛ in., 20–40-fld., brown pale or reddish; rhachilla persistent, scarcely winged. *Glumes* very close-packed, boat-shaped, back with 3 green nerves. *Stamens* 3; filaments ligulate; anthers linear-oblong, crested with a small linear-lanceolate red mucro. *Nut* ellipsoid, ⅔ length of glume, unequally trigonous, pale brown, corky cells of the angles straw-colrd.; style much shorter than nut, deciduous, branches as long as style.

Sect 2. *Amabiles.* Slender annuals. *Umbel* very rarely reduced to a single head. *Spikelets* small. *Glumes* mucronate. (Sp. 3–5.)

3. **C. amabilis,** *Vahl Enum.* ii. 318; spikelets linear, golden-brown, glumes truncate mucro short erect, stamen 1, nut obovoid ⅔ length of glume. *Kunth Enum.* ii. 108; *C. B. Clarke in Journ. Linn. Soc.* xx. 283, and xxi. p. 85. C. aureus, *H. B. K. Nov. Gen. et Sp.* i. 205; *Kunth l. c.* 21. *Boeck. in Linnæa,* xxxv. 494.

KUMAON, *King.* MORADABAD, *Thomson.* CHOTA NAGPORE; up to 2000 ft., *C. B. Clarke.*—DISTRIB. Warm regions.

Glabrous. *Stems* cæspitose, 2–8 in. *Leaves* ⅓–½ length of stem, 1/12 in. broad, weak. *Umbel* often very compound, rays 4 in. long; sometimes reduced to 1 head (very variable in development); bracts up to 2 in., leaf-like. *Spikelets* 3–10 in a spike, up to ⅔ by 1/16–1/12 in., 36-fld. (often much shorter). *Glumes* boat-shaped, back 3–5-nerved, sides nerveless, mucro variable (often very short). *Anthers* small, oblong. *Nut* fine brown; style as long as nut, branches 3, linear.

4. **C. castaneus,** *Willd. Sp. Pl.* i. 278; small, umbel rarely compound, spikelets linear chestnut or pale, glumes obtuse mucro conspicuous recurved, stamens 2–1, nut exactly oblong ⅓–⅔ length of glume (mucro excluded). *Roxb. Fl. Ind.* i. 195; *Nees in Wight Contrib.* 79; *Kunth Enum.* ii. 21; *Thw. Enum.* 343; *Boeck. in Linnæa,* xxxv. 496 (*excl. Wall.* 3376 B); *C. B. Clarke in Journ. Linn. Soc.* xxi. 87. C. squarrosus, *Trimen Cat. Ceylon Pl.* 100. C. pusillus, *Herb. Wight*; *Wall. Cat.* 3323.

From EAST NEPAL, *J. D. Hooker,* to CEYLON, *Thwaites,* and PERAK, *King.*—DISTRIB. Tonkin, Austral.

Glabrous. *Stems* ⅔–6 in. *Leaves* as long as stem, 1/12 in. broad, or (usually) shorter. *Umbel* rays 0–2 in. rarely again divided, sometimes reduced to a single head; bracts often as long as inflorescence. *Spikelets* 3–20 in a cluster, black-chestnut in type form, ⅓–½ by 1/18 in., 15–70-fld. *Glumes* boat-shaped, back 3-nerved, keel excurrent greenish-yellow. *Anthers* small, short-oblong. *Nut* red-black, sides exactly parallel; style much shorter than nut; branches small, linear.

5. **C. cuspidatus,** *H. B. & K. Nov. Gen. et Sp.* i. 204; glumes strongly 3-nerved, mucro conspicuous recurved, nut oblong-obovoid ⅓

length of glume (mucro excluded) otherwise as *C. castaneus*. *Kunth Enum.* ii. 22; *Boeck. in Linnæa*, xxxv. 496; *C. B. Clarke in Journ. Linn. Soc.* xx. 284, and xxi. 88, and xxv. 80; *Trimen Cat. Pl. Ceylon*, 100. C. angustifolius, *Ham. ms.*; *Wall. Cat.* 3376 (*mainly*); *Nees in Wight Contrib.* 79; *Kunth Enum.* ii. 21. C. castaneus, *Hance in Journ. Linn. Soc.* xiii. 130; *Miq. Fl. Ind. Bat.* iii. 261 ("forma Sundaica"). C. solutus, *Steud. Syn. Cyp.* 14; *Miq. Fl. Ind. Bat.* iii. 263.

Throughout INDIA; from KASHMIR and ASSAM to CEYLON and PENANG.—DISTRIB. All warm regions.

The older botanists referred the chestnut-colrd. examples to *C. castaneus*, the ferruginous-brown to *C. cuspidatus*, and these are the prevalent colours of the spikelets. But the colour varies in both, and Boeckeler has distinguished them by the nut (which is broader upwards in *C. cuspidatus*) tolerably satisfactorily. *C. cuspidatus* is a very common plant, *C. castaneus* a rare one.

Sect. 3. *Difformes.* Small or middle-sized, annuals or biennials; rhizome 0, or in *C. Haspan* creeping. Leaves and bracts moderately long, narrow, weak. *Inflorescence* umbellate, sometimes reduced to a single head. *Spikelets* small, numerous. *Glumes* scarcely cuspidate. (Sp. 6–11.)

6. **C. fuscus,** *Linn. Sp. Pl.* 69; annual, small, umbel simple compound or reduced to a head, spikes clustered small linear-oblong, nut ellipsoid triquetrous apiculate $\frac{2}{3}$–$\frac{4}{5}$ length of glume. *Host Gram. Austr.* ii. 49, t. 73; *Kunth Enum.* ii. 37; *Boeck in Linnæa*, xxxv. 585; *C. B. Clarke in Journ. Linn. Soc.* xxi. 135; *Boiss. Fl. Orient.* v. 370.

KASHMIR and N.W. HIMALAYA, alt. 6000 ft., *Thomson*, &c.—DISTRIB. Westward to Britain.

Glabrous. *Stems* cæspitose, 2–16 in., weak. *Leaves* longer or shorter than stem, $\frac{1}{8}$–$\frac{1}{4}$ in. broad, grass-like. *Rays of umbel* often 1–1$\frac{1}{2}$ in., sometimes much longer; bracts usually exceeding inflorescence. *Spikes* $\frac{1}{4}$–$\frac{1}{2}$ in. in diam. *Spikelets* 5–15, $\frac{1}{8}$–$\frac{1}{4}$ by $\frac{1}{12}$ in., 16–36-fld., often reddish. *Glumes* boat-shaped, ovate, scarcely mucronate. *Stamens* usually 2; anthers oblong, obtuse. *Nut* equally or unequally triquetrous, pale brown. *Style* much shorter than nut, deciduous; branches linear.

7. **C. difformis,** *Linn. Sp. Pl.* 67; annual, middle-sized, umbel simple compound or reduced to 1 head, spikelets very small linear-oblong most densely crowded, glumes obovate truncate, nut broad ellipsoid nearly as long as glume. *Rottb. Descr. et Ic.* 24, t. 9, fig. 2; *Roxb. Fl. Ind.* i. 195; *Nees in Wight Contrib.* 88; *Kunth Enum.* ii. 38; *Dalz. & Gibs. Bomb. Fl.* 282; *Miq. Fl. Ind. Bat.* iii. 269; *Boeck. in Linnæa*, xxxv. 586; *Thw. Enum.* 344; *King in E. J. Atkinson Gaz.* x. (1876) 323; *Boiss. Fl. Orient.* v. 370; *C. B. Clarke in Journ. Linn. Soc.* xx. 290, and xxi. 133. C. Goeringii, *Steud. Syn. Cyp.* 24; *Miq. Fl. Ind. Bat.* iii. 271.—Cyperus, *Wall. Cat.* 3363 (*mainly*).

Throughout INDIA, alt. 0–8000 ft., universal throughout the Old World in ricefields; Mexico (introduced ?).

Glabrous. *Stems* 4–20 in., acutely triquetrous at top. *Leaves* usually somewhat shorter than stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, flaccid. *Umbel* usually contracted, rays up to 2 in., sometimes much larger; bracts 2–10 in., lowest often suberect (i.e. umbel lateral). *Spikes* $\frac{1}{4}$–$\frac{1}{2}$ in. in diam., globose. *Spikelets* $\frac{1}{5}$–$\frac{2}{5}$ by $\frac{1}{20}$ in., somewhat turgid, 10–30-fld. *Glumes* close-packed, concave, very obtuse, straw-colrd., sides more or less red. *Stamen* 1, rarely 2; anther small, oblong, muticous. *Nut* subsessile, subequally trigonous, pale-brown; style much shorter than nut, branches linear short.

8. **C. silletensis,** *Nees in Wight Contrib.* (1834) 79; middle-sized or slender, stolons 0, umbel contracted or reduced to 1 head, spikes globose dense, spikelets small linear many-fld., glumes ovate-oblong, nut oblong-obovoid $\frac{1}{3}$–$\frac{2}{3}$ length of glume. *Kunth Enum.* ii. 33; *Boeck. in Linnæa,* xxxv. 555; *C. B. Clarke in Journ. Linn. Soc.* xxi. 132.—Cyperus, *Wall. Cat.* 3363 F, 3536 (partly).

Bengal, Assam, Sikkim, and Burma.

Stems 4–12 in., rather slender at top, flowering the first year, but often producing short lateral shoots from the base of stem. *Spikes* pale brown. *Glumes* at top sub-triangular. Otherwise resembling *C. difformis.*—Seldom collected, but not rare.

9. **C. pulcherrimus,** *Willd. ex Kunth Enum.* ii. 35; middle-sized, stolons 0, umbel dense usually compound with innumerable spikes of 5–10 very small linear spikelets, glumes ovate-oblong, their oblong tip inflexed towards rhachilla, nut broadly ellipsoid $\frac{1}{2}$ length of glume. *Miq. Fl. Ind. Bat.* iii. 267; *Boeck. in Linnæa,* xxxv. 573; *C. B. Clarke in Journ. Linn. Soc.* xxi. 132; *Trimen Cat. Pl. Ceylon,* 100. C. eumorphus, *Steud. in Zoll. Verz. Ind. Archip.* ii. 63, *and Syn. Cyp.* 22; *Miq. l. c.* 268. C. silletensis, *Thw. Enum.* 343. C. Haspan, *Benth. Fl. Austral.* vii. 270 (*partly*).—Cyperus, *Wall. Cat.* 3357.

Sind, *Pinwill.* Bengal, *Wallich.* Assam, *Griffith,* &c. Ceylon, *Thwaites.* Penang, *Curtis,* n. 1954.—Distrib. Java, Borneo.

Very near *C. silletensis;* dried examples are easily distinguished by the crisped incurved top of glume. Spikelets very like those of *C. flavidus,* which is a slender species.

10. **C. Haspan,** *Linn. Sp. Pl.* 66 (*partly*); middle-sized or small, pale or red not yellow, rhizome long-creeping but plant often flowering in first year, spikelets 2–6-digitate small linear, stamens 3–2, nut small ovoid or obovoid $\frac{1}{3}$–$\frac{1}{2}$ length of obtuse glume. *Roxb. Fl. Ind.* i. 210; *Nees in Wight Contrib.* 80 (*partly*); *Kunth Enum.* ii. 34; *Dalz. & Gibs. Bomb. Fl.* 282; *Thw. Enum.* 343; *Boeck. in Linnæa,* xxxv. 574, var. *a* partly, and var. *β*; *C. B. Clarke in Journ. Linn. Soc.* xx. 287, and xxi. 119. C. graminifolius, *Poir. in Lam. Encyc.* vii. 267; *Kunth l. c.* 98. C. pes-avium, *Bertol. Misc. Bot.* viii. 30, t. 3, fig. 1. Cyperus gracilis, *Herb. Heyne, Wall. Cat.* 3369, D, E, F, 3372.—Scirpus, *Rottb. Descr. et Ic.* 58, t. 17, fig. 3 (*excl. Syn. Linn.*).

Throughout India; abundant, especially in dibbled rice-fields.—Distrib. All warm regions.

Glabrous. *Rhizome* in typical form creeping, 6 in. and upwards, covered by ovate triangular scales and with distant solitary stems; but stems often cæspitose on a very short rhizome or with fibrous roots only. *Stems* 4–30 in., sometimes stout, almost 3-winged at top, sometimes slender trigonous. *Leaves* short or longer and overtopping the stem, or 0. *Umbel* small or large, compound or simple, thin straggling with few spikes, or dense with innumerable spikes; bracts short or long and far overtopping umbel, (in Khasia examples) long, $\frac{1}{4}$ in. broad, tip triangular-lanceolate. *Spikelets* $\frac{1}{6}$–$\frac{2}{5}$ by $\frac{1}{20}$–$\frac{1}{10}$ in., 10–40-fld., varying much in development. *Glumes* close-packed, ovate, obtuse, obscurely (or not) mucronate. *Anthers* linear-oblong, often bristly at top. *Nut* trigonous, slightly compressed, minutely scabrid or smooth, pale brown (sterile white); style about as long as nut, branches linear slightly exsert.—This and many other species show that in *Cyperaceæ* stoutness of stem, length and breadth of leaves, development of umbel, length of bracts, are often futile characters.

11. **C. flavidus,** *Retz. Obs.* v. 13; slender, annual, ripe yellow or

finally blackening, stamen 1 (rarely 2), nut plano-convex (plane face against rhachilla), ripe marble-white (otherwise as *C. Haspan*). *Roxb. Fl. Ind.* i. 200; *Nees in Wight Contrib.* 80, in note; *Dalz. & Gibs. Bomb. Fl.* 283; *C. B. Clarke in Journ. Linn. Soc.* xx. 287, and xxi. 122 and xxv. 81. C. Haspan, *Rottb. Descr. et Ic.* p. 36, t. 6, fig. 2; *Boeck. in Linnæa*, xxxv. 574 (*Var. a partly*). C. tenuispica and C. Fieldingii, *Steud. Syn. Cyp.* 11. C. microcarpus, *Boeck. in Bremen Abhandl.* vii. 37. C. strictus, *Herb. Heyne*; *Wall. Cat.* 3365. C. Haspan and C. hexangularis, *Herb. Wight*; *Wall. Cat.* 3369, A, B, C.—Cyperus, *Wall. Cat.* 3313 (*partly*).

Throughout INDIA, abundant in rice-fields.—DISTRIB. Warm regions of the Old World.

Lives about 3 months. *Bracts* usually longer than stem. *Glumes* rather smaller than in *C. Haspan*. *Nut* very obtuse at top.

Sect. 4. *Nivei*. *Rhizome* woody, very short; rootlets wiry. *Inflorescence* of one head. (Sp. 12–14.)

12. **C. Teneriffæ,** *Poir. in Lam. Encyc.* vii. 245; stems at base cylindric thickened by coloured sheaths, spikelets 10–36-fld. much compressed red, glumes very acute conspicuously mucronate, nut ⅓ length of glume. C. nitens, *Rottb. in Neue Schr. Ges. Freunde, Berlin*, iv. 193, *in Obs.* (not of Retz.). C. coromandelinus, *Spreng. Syst.* i. 217 (*not of Boeck.*). C. pectiniformis, *Roem. et Sch. Syst.* II., *Mant.* 128 (*not of Nees*). C. pectinatus, *Roxb. Fl. Ind.* i. 190 (*not of Vahl*). C. Wightii, *Nees in Wight Contrib.* 78; *Kunth Enum.* ii. 99; *Boeck. in Linnæa*, xxxv. 507. C. rubicundus, *Kunth l. c.* 49; *Webb et Berth. Phyt. Canar.* iii. 361, t. 240 (nut too acute); *C. B. Clarke in Journ Linn. Soc.* xxi. 104 (*not of Vahl*). C. arenarius, *Herb. Heyne*; *Wall. Cat.* 3314, A (*partly*). C. nitens, *Herb. Madras*; *Wall. Cat.* 3314, B.

DECCAN PENINSULA, *Rottler, Wight.* POONA, *Woodrow.* NILGHIRIS, *Hohenacker.*—DISTRIB. Africa, Arabia.

Glabrous, whole plant usually more or less red; stolons 0. *Stems* 2–11 in. *Leaves* usually ⅔ length of stem, ⅛–⅓ in. broad, weak; sheaths broad, usually scarious, inflated. *Bracts* 2, lower 1–1½ in. *Spikelets* 3–20 in 1 head, ⅔ by ¼ in. *Glumes* close-packed, much imbricated at base, 9–15-striate, keel very acute excurrent conspicuously. *Stamens* 3; anthers nearly muticous. *Nut* obovoid, triquetrous with concave faces, reticulate black and white; style as long as nut, branches linear.—*C rubicundus*, Vahl, is a Puerto Rico plant; and the description can hardly (admitting error in habitat) refer to *C. Teneriffæ*, as Vahl does not describe the excurrent mucro of the glumes. Finally, even were our plant *C. rubicundus*, Vahl, it must take the earlier name of *Teneriffæ*. The name *C. nitens*, Rottler, is earlier; but *C. nitens*, Retz., cannot be set aside, because almost the only certain thing regarding it, is that it was not a *Pycreus*, and therefore not the *Cyperus nitens*, auctorum.

13. **C. niveus,** *Retz. Obs.* v. 12; culms at base nodose closely uniseriate, spikelets 3–12 in one head strongly compressed linear-oblong 20–40-fld. white or cinnamomeous, glumes muticous, nut oblong-obovoid ⅓ length of glume. *Roxb. Fl. Ind.* i. 191; *Nees in Wight Contrib.* 78; *Kunth Enum.* ii. 45; *Miq. Fl. Ind. Bat.* iii. 271; *Boeck. in Linnæa*, xxxv. 530; *Aitch. Cat. Punjab Pl.* 155, and in *Journ. Linn. Soc.* xix. 189; *C. B. Clarke l. c.* 108.—Cyperus, *Wall. Cat.* 3377.

From KASHMIR to UPPER BURMA, alt. 0–6000 ft. and southward to Calcutta and Hyderabad.—DISTRIB. Cabul, China.

Glabrous. *Rhizome* woody, almost wholly constructed of the nodose bases of

stems. *Stems* 8–16 in., slender. *Leaves* ½ length of stem, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, weak. *Bracts* 2–3, up to 1–1½ in. *Spikelets* commonly ⅔ by ⅛ in. (sometimes nearly twice as long). *Glumes* very close-packed, acutely keeled, many-nerved. *Nut* sessile, trigonous, black; style nearly as long as nut, branches linear.

14. **C. leucocephalus,** *Retz. Obs.* v. 11; stems slender nodose at base, with one dense globose white head, spikelets compressed, glumes oblong-obtuse obscurely 3–1-nerved, nut oblong ⅓–⅔ length of glume. *Kunth Enum.* ii. 97; *Boeck. in Linnæa,* xxxv. 590; *C. B. Clarke in Journ. Linn. Soc.* xxi. 107. C. pulchellus, *Br. Prodr.* 213. C. sorostachys, *Boeck. l. c.* 588. Sorostachys kyllingioides, *Steud. Syn. Cyp.* 71; *Miq. Fl. Ind. Bat.* iii. 296.—Cyperus, *Wall. Cat.* 3536 (*partly*). Lipocarpha, *Wall. Cat.* 3445, D.

Scattered from MONGHIR, *Wallich,* to MYSORE, *Law,* and MARTABAN, *Wallich*; (seldom collected).—DISTRIB. Tropics generally.

Glabrous. *Stems* 4–10 in., cæspitose on a very short woody rhizome. *Leaves* about ½ length of stem, narrow. *Inflorescence* ⅓–⅔ in. in diam. *Spikelets* 6–50, in large forms nearly ½ by $\frac{1}{5}$ in., up to 28-fld.; in small only $\frac{1}{6}$ in. long 6–8-fld. *Stamen* 1. *Nut* black, white reticulate; style much shorter than nut, branches linear small.

Sect. 5. *Conglomerati.* Rhizome woody, creeping; rootlets thick, often woolly. Inflorescence umbelled or with 1 head. (Sp. 15–19.)

15. **C. arenarius,** *Retz. Obs.* iv. 9; stems solitary distant on a much-divided creeping rhizome subterete at top 1-headed, spikelets elliptic-oblong 10–16-fld., glumes ovate obtuse, nut obovoid unequally trigonous ⅓ length of glume. *Nees in Wight Contrib.* 77; *Kunth Enum.* ii. 46; *Dalz. & Gibs. Bomb. Fl.* 284; *Thw. Enum.* 342; *Boeck. in Linnæa,* xxxv. 536; *Aitch. Cat. Punjab Pl.* 154; *C. B. Clarke in Journ. Linn. Soc.* xxi. 106. C. conglomeratus, var. γ *Boiss. Fl. Orient.* v. 369 (*not of Rottb.*). Robartia indica, *Linn. Fl. Zeyl.* 17, *& Amœn. Acad.* i. 388); *cf. Trimen in Journ. Linn. Soc.* xxiv. 135.)—*Pluk. Almag.* 178, t. 300, fig. 7.—Cyperus, *Wall. Cat.* 3314 A. (*partly*), 3535.—Scirpus glomeratus, *Herb. Heyne*; *Wall. Cat.* 3460.

Seacoast from SIND to CEYLON and ORISSA. PUNJAB PLAIN; *Aitchison, Duthie.*—DISTRIB. Persia, Arabia.

Glabrous. *Rhizome* slender, roots not woolly. *Stems* 4–12 in. *Leaves* often overtopping stem, $\frac{1}{12}$–$\frac{1}{6}$ in. broad. *Bracts* 2–3, lowest 2–4 in. long, suberect often as though continuing stem. *Spikelets* straw-colrd., finally brown. *Glumes* boat-shaped, strongly 3-nerved. *Nut* concavo-convex dusky black; style very short, branches linear longish.

16. **C. conglomeratus,** *Rottb. Descr. et Ic.* 21, t. 15, fig. 7; roots woolly, stems at base approximate somewhat thickened, spikelets linear rather large 8–16-fld., glumes minutely mucronate, nut obovoid unequally trigonous ⅓ length of glume. *Decne. in Ann. Sc. Nat.* ser. 2, ii. 15; *Boiss. Fl. Orient.* v. 369 (var. *a in great part*). C. Jeminicus, *Rottb. Descr. et Ic.* 25, t. 8, fig. 1 (*not of Retz*). C. pungens, *Boeck. in Linnæa,* xxxv. 537 (*except part of a elata*); *C. B. Clarke in Journ. Linn. Soc.* xxi. 113. C. proteinolepis, var. β pumila, *Boeck. l. c.* 523.

SIND; *Lace.*—DISTRIB.; Westwd. to N. Africa.

Glabrous. *Rhizome* sometimes elongate, ⅛–⅓ in. in diam. *Stems* 4–24 in., somewhat robust. *Leaves* often ½ length of stem and upwards. *Umbel* simple, not rarely contracted into 1 head; rays often 3–4, about 1 in. long.

17. **C. pachyrrhizus,** *Nees ex Boeck. in Linnæa,* xxxv. 545; stems long robust at top trigonous 1-headed, leaves often as long as stem rigid concave, bracts 3–4 long spreading, spikelets very numerous densely agglomerated (otherwise as *C. conglomeratus*). *C. B. Clarke in Journ. Linn. Soc.* xxi. 111; *Trimen Cat. Pl. Ceylon,* 100. C. conglomeratus, *Thw. Enum.* 343. C. arenarius, *Prain Laccadive Pl. in Ic. Mem. Med. Off. Army Ind.,* part v. (1890), 54 (*not of Retz.*). C. leucocephalus, *Wight ms.* (*partly*).

CEYLON; *Thwaites, Wight.* LACCADIVE ISLDS.; *Hume.*

Roots densely woolly. *Stems* 12–20 in. *Head* more than 1 in. in diam. of 30–80 spikelets.—Trimen doubts (with reason) whether this is other than a large form of *C. conglomeratus,* Rottb.

18. **C. effusus,** *Rottb. Descr. et Ic.* 22, t. 12, fig. 3; spikelets linear compressed 20–60-fld., glumes most densely packed scarcely mucronate (otherwise as *C. conglomeratus*). *Kunth Enum.* ii. 47; *Edgew. in Journ. As. Soc. Beng.* xvi. 1220. C. proteinolepis, *Steud. Syn. Cyp.* 15; *Boeck. in Linnæa,* xxxv. 522; *C. B. Clarke in Journ. Linn. Soc.* xxi. 113. C. conglomeratus, var. effusa, Boiss. Fl. Orient. v. 369. C. conglomeratus, var. β major, *Boeck. l. c.* 544; *C. B. Clarke l. c.* 112. C. curvulus, *Boeck. . c.* 541 (*partly*). C. densus, *Br. in Salt Abyss. Append.* 62.

SIND; *Pinwill.*—DISTRIB. Westwd. to N. Africa.

Spikelets ⅓–1 by $\frac{1}{12}$–⅛ in. broad, much narrower than in *C. conglomeratus.* —*C. effusus* includes many plants differing greatly in size (as does *C. conglomeratus*) but all unlike *C. conglomeratus* in the exceeding closely packed glumes; the spikelets are not longer than in *C. conglomeratus,* but have twice as many flowers.

19. **C. Atkinsoni,** *C. B. Clarke in Journ. Linn. Soc.* xxi. 109; roots not woolly, stems thickened at base approximated on a short rhizome top nearly terete, umbel simple contracted, spikelets linear much compressed 20–30-fld. pale brown (otherwise as *C. effusus.*)

KASHMIR; Bimbur, *Atkinson.* N.W. HIMALAYA; Kotgurh, *Thomson.* SIND; Kurrachee, *Stocks.*

This plant is not very near *C. niveus* (where originally placed) differing not merely by the umbellate spikes but by the structure of the spikelet, which is very close to that of *C. effusus.* Though the character of woolly rootlets holds good in this group throughout a great series of herbarium material, Schweinfurth tells me that it is not to be relied on for the discrimination of species, as it is merely an adaptation for growth in sand.

Sect. 6. *Diffusi.* Tall or middle-sized perennials with green somewhat broad often 3-nerved leaves. Umbels compound, generally decompound. (Sp. 20–26.)

20. **C. diffusus,** *Vahl Enum.* ii. 321; spikelets 4–24-fld., glumes broadly ovate suddenly acute-mucronate in fruit somewhat distant upper margins not imbricate, nut broadly ellipsoid triquetrous subpyramidal at either end ⅔ length of glume. *Nees in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. 58; *Miq. Fl. Ind. Bat.* iii. 264. C. elegans, *Sw. Obs. Bot.* 30; *Kunth Enum.* ii. 28; *Boeck. in Linnæa,* xxxv. 533; *C. B. Clarke in Journ. Linn. Soc.* xx. 288 and xxi. 125 *excl. tab. Sloane* (*not Linn.*). C. longifolius, *Decne. in Nouv. Ann. Mus.* iii. 359; *Ridley in Forbes East. Archip.* 520 (*not Poir*). C. mœstus, *Kunth l. c.* 31. C. nigro-viridis, *Thw. Enum.* 344. —Cyperus, *Wall. Cat.* 3358, 3362, 3370, A. Hypælyptum, *Griff. Itin. Notes,* 17, n. 243.

Throughout INDIA, except the dry west, common from SIKKIM and ASSAM to CEYLON and PENANG.—DISTRIB. All warm regions.

Glabrous. *Rhizome* very short; roots wiry. *Stems* 8–30 in. *Leaves* often as long as stem, ⅛–⅜ in. broad, flat, green, 3-nerved. *Umbel* 4–12 in. in diam., decompound (depauperated examples with few spikes occur); bracts 4–10, up to 1–2 ft., leaf-like. *Spikelets* 3–9 together, digitate, ⅛–½ by ⅛–⅙ in. (sometimes much longer). *Glumes* boat-shaped, green, back 3–5-nerved; wings of rhachilla narrow, not deciduous. *Stamens* 3–2; anthers small, linear-oblong, often (when young) with a small linear-lanceolate crest. *Nut* dusky black; style much shorter than nut, sometimes hardly any; branches linear, shortly exsert.—One of the commonest of the genus, best known as *C. elegans*, Linn., but no part of Linnæus's *elegans*, whose type, his figure cited, and his description, are all of *C. viscosus*, Aiton. Nor can his description include *C. diffusus*, Vahl. Kunth, in transferring the name *C. elegans*, Linn., to this plant, followed Swartz and Willdenow.

21. **C. pubisquama,** *Steud. in Zoll. Verz. Ind. Archip.* ii. 62 and *Syn. Cyp.* 20; spikelets very numerous rigid, glumes minutely mucronate often puberulous, their upper margins tightly imbricate even in fruit (otherwise as *C. diffusus*). *Miq. Fl. Ind. Bat.* iii. 266. C. lagorensis, *Steud. Syn. Cyp.* 36. C. diffusus, *Kunth Enum.* ii. 30; *Boeck. in Linnæa*, xxxv. 534; *C. B. Clarke in Journ. Linn. Soc.* xxi. 127 and xxv. 81; *Trimen in Journ. Bot.* xxiii. 140 (*not of Vahl or Roxb.*).—Cyperus, *Wall. Cat.* 3370, B.

From ASSAM and BURMA to PERAK and CEYLON.—DISTRIB. Malay Islds.

Differs, uniformly, from large examples of *C. diffusus*, Vahl in the tightly-packed glumes (even in fruit); but might be treated as a var.

22. **C. Helferi,** *Boeck. in Linnæa*, xxxviii. 360; middle-sized, umbel middle-sized flaccid, glumes distant ovate-lanceolate shortly mucronate, nut ½ length of glume (otherwise as *C. diffusus*). *C. B. Clarke in Journ. Linn. Soc.* xxi. 128.—Fimbristylis, *Wall. Cat.* 3528.

BURMA; Chappedong River, *Wallich.* PEGU; *Kurz.* MERGUI; *Griffith* (*Kew Distrib.* 6140). TENASSERIM or ANDAMANS, *Helfer* (*Kew Distrib.* 6140).

23. **C. multispicatus**, *Boeck. in Linnæa*, xxxviii. 362; umbel very decompound, spikelets many solitary compressed slenderer, glumes densely imbricated minutely mucronate, nut ½ length of glume (otherwise as *C. diffusus*). *C. B. Clarke in Journ. Linn. Soc.* xxi. 129 (and 14, C. multistriatus, *by error*).

CACHAR; *Keenan.* TENASSERIM or ANDAMANS; *Helfer* (*Kew Distrib.* 6163).

Umbel 12–16 in. across; spikelets innumerable, in Helfer's specimen nearly all pedicelled solitary, in Keenan's about half solitary half 2–3 together digitate. *Glumes* in fruit with upper margins imbricated.

24. **C. Kurzii**, *C. B. Clarke in Journ. Linn. Soc.* xxi. 129; umbel very decompound secondary rays rigidly divaricate, spikelets 20–40-fld. wings of rhachilla broad persistent, glumes closely imbricate tip triangular acute scarcely mucronate (otherwise as *C. multispicatus*).

ANDAMAN ISLES; Phœacia, *Kurz.*

This does not match any of the foregoing closely-allied species (nn. 20–24 inclusive).

25. **C. turgidulus,** *C. B. Clarke in Journ. Linn. Soc.* i. 130; stem at top triquetrous almost 3-winged, umbel dense secondary rays divaricate, spikelets few-fld. turgid sometimes almost terete clustered in small globose

heads (otherwise as *C. diffusus*). Scirpus trialatus, *Boeck. in Linnæa*, xxxvi. 721.—Isolepis, *Wall. Cat.* 3473.

From PEGU to PENANG and MALACCA, frequent, *Helfer* (*Kew Distrib.* 6164), &c.—DISTRIB. S. China.

Stems 12–20 in. *Umbels* 3–4 in. in diam. *Spikelets* usually about 6-fld.

26. **C. radians**, *Nees & Meyen ex Nees in Linnæa*, ix. 285 (name) and *in Nov. Act. Nat. Cur.* xix. *Suppl.* 1, 63; umbel simple or compound rays longer than stem, spikelets 1–30 clustered compressed or nearly terete, glumes broad striate mucronate, nut broad ovoid ½ length of glume. *Benth. Fl. Hongk.* 386; *Boeck. in Linnæa*, xxxv. 515; *C. B. Clarke in Journ. Linn. Soc.* xxi. 100. C. radicans, *Kunth Enum.* ii. 95. C. Griffithii, *Steud. Syn. Cyp.* 316; *C. B. Clarke, l. c.* 101. C. macropus, *Miq. Fl. Ind. Bat. Suppl.* 260, 599 (*not of Boeck.*). C. sinensis, *Debeaux in Act. Linn. Soc. Bordeaux*, xxxi. 14, t. 2, and xxxviii. 30.—Cyperus, *Wall. Cat.* 3371, B. (*partly*). Rynchospora, *Wall. Cat.* 3427.

MALAY PENINSULA. TENASSERIM, *Helfer* (*Kew Distrib.* 6209); SINGAPORE, *Wallich.*—DISTRIB. China, Malaya.

Glabrous. *Rhizome* very short; stolons 0. *Stems* frequently less than 1 in. *Leaves* much exceeding stem, ¼ in. broad, rigid, not 3-nerved, often becoming brown. Rays of *umbel* always remarkably long (13 in. in *Maingay*, n. 1721). *Spikes* ⅜–¾ in. in diam., sometimes globose, dense with 10–30 spikelets, sometimes in clusters of 2–5 spikelets, or occasionally spikelets mostly solitary pedicelled. *Spikelets* ⅓ by ⅛ in., 6–12-fld.; rhachilla not winged. *Glumes* closely imbricate, green usually marked with red, muticous. *Nut* and *style* much as in *C. diffusus*.—Ridley has proved *C. Griffithii* to be only a form of *C. radians*. This unmistakable species is not very closely allied to *C. diffusus*; but, unless a section is made for it alone, it is not clear where it can be better arranged than at the tail of the *Diffusi*.

Subgen. III. CHORISTACHYS. *Infl.* umbellate, spikes often more or less corymbed; spikelets (sometimes very shortly) spicate. Style-branches linear. (Sp. 27–61.) [N.B.—There is no line of separation between this subgenus and II. *Pycnostachys*.]

Series A. Rhachilla of spikelets not much winged. Leaves and bracts long (except in *C. malaccensis*). (Sp. 27–39.)

Sect 1. *Compressi*. Annuals, or sometimes flowering the second year. (Sp. 27–31.)

27. **C. compressus**, *Linn. Sp. Pl.* 68; green, leaves and bracts long, umbel simple, spikes of 3–10 spikelets very shortly spicate, glumes boat-shaped keel acute excurrent, rhachilla of spikelets not winged, nut obovoid obtuse black acutely triquetrous with concave faces. *Burm. Fl. Ind.* 21; *Roxb. Fl. Ind.* i. 194; *Nees in Wight Contrib.* 76; *Kunth Enum.* ii. 23; *Miq. Fl. Ind. Bat.* iii. 263 and *Suppl.* 260, 599; *Dalz. & Gibs. Bomb. Fl.* 282; *Thw. Enum.* 342; *King in E. T. Atkinson Gaz.* x. 320; *Boeck. in Linnæa*, xxxv. 517; *C. B. Clarke in Journ. Linn. Soc.* xx. 284 and xxi. 97; *Boiss. Fl. Orient.* v. 372 (*not of Jacq.*). C. pectiniformis, *Nees in Wight Contrib.* 77 (*excl. syn. Roxb.*). C. Meyenii, *Nees et Meyen in Nov. Act. Nat. Cur.* xix. *Suppl.* i. 57.—C. viridis, *Herb. Roxb.*; *Wall. Cat.* 3308.

Throughout INDIA; from the Punjab and Assam to Ceylon and Singapore.—DISTRIB. All warm countries (except Australia).

Glabrous. *Stems* cæspitose, 4–16 in., or (in the form *C. pectiniformis*, Nees) 0–2 in. *Leaves* often nearly as long as stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. *Umbel* rays 0–6 in.; bracts often longer than umbel, leaf-like. *Spikelets* $\frac{1}{2}$–1 by $\frac{1}{8}$–$\frac{1}{4}$ in. (in form *pectiniformis* up to $1\frac{1}{2}$ in. and 20–60-fld. *Glumes* densely, not rigidly, imbricated, ovate, many-nerved, mucro scarcely recurved. *Stamens* 3; anthers linear-oblong, scarcely apiculate. *Nut* $\frac{1}{3}$ length of glume, very broad; style shorter than nut, branches linear shortly exsert.

28. **C. glaber,** *Linn. Mant.* 179; umbels contracted, spikelets very closely spicate more or less red-tinged, glumes muticous or very nearly so, nut obovoid obtuse minutely conic-apiculate (otherwise as *C. compressus*). *Reich. Ic. Fl. Germ.* viii. 32, t. 280, fig. 669; *Boeck. in Linnæa*, xxxv. 517; *C. B. Clarke in Journ. Linn. Soc.* xxi. 104; *Boiss. Fl. Orient.* v. 371. C. patulus, *Kitaib. ex Host Gram. Austr.* iii. 49, t. 74; *Kunth Enum.* ii. 24; *Ledeb. Fl. Ross.* iv. 240 (*not of Bieb.*).

SIND; *Pinwill.*—DISTRIB. Westward to Sicily.

Umbel rays $\frac{1}{2}$–$1\frac{1}{2}$ in. *Glumes* nearly always reddish on the sides (green in *C. compressus*).

29. **C. aristatus,** *Rottb. Descr. et Ic.* 23, t. 6, fig. 1; small, umbel nearly simple or reduced to 1 head, spikelets densely spicate 6–30-fld., glumes ovate-lanceolate many-striate over nearly their whole breadth acuminate into a recurved bristle, nut oblong or narrow-obovoid $\frac{1}{2}$ length of glume (bristle inclusive). *Roxb. Fl. Ind.* i. 190; *Kunth Enum.* ii. 23 (*excl. syn. Burm.*); *Strachey Cat. Pl. Kumaon* 74; *Miq. Fl. Ind. Bat.* iii. 262; *Thw. Enum.* 343 (*excl. syn. Ham.*); *Boeck. in Linnæa*, xxxv. 500; *C. B. Clarke in Journ. Linn. Soc.* xxi. 91; *Trimen Cat. Ceylon Pl.* 100. C. squarrosus, *Linn. Sp. Pl.* 66 (*partly*). C. versicolor, *Nees in Wight Contrib.* 78. C. arenarius, *Herb. Wight*; *Wall. Cat.* 3374, 3375.—Isolepis echinulata, *Kunth Enum.* ii. 205.

TROPICAL and TEMP. HIMAL.; alt. 0–8500 ft., and thence to Ceylon.—DISTRIB. Tropics.

30. **C. Iria,** *Linn. Sp. Pl.* 67 (*excl. Rheede*); leaves and bracts long, spikelets spicate or subracemose linear 6–20-fld., glumes obovate in fruit hardly imbricate, nut triquetrous nearly as long as glume. *Roxb. Fl. Ind.* i. 201; *Nees in Wight Contrib.* 87; *Kunth Enum.* ii. 38; *Miq. Fl. Ind. Bat.* iii. 269 and *Suppl.* 260; *Dalz. & Gibs. Bomb. Fl.* 282; *Edgew. in Journ. Linn. Soc.* ix. 319; *Boeck. in Linnæa*, xxxv. 595; *King in E. T. Atkinson Gaz.* x. 620; *Aitch. in Journ. Linn. Soc.* xix. 189; *Boiss. Fl. Orient.* v. 370; *C. B. Clarke in Journ. Linn. Soc.* xx. 289 and xxi. 137. C. songaricus, *Karel. et Kiril. in Bull Soc. Mosc.* [1841] 859. C. seminudus, *Moritzi Verz. Zoll. Pfl.* 96 (*not of Roxb.*). C. diaphaniria and microiria, *Steud. in Zoll. Verz. Ind. Archip.* ii. 62 and *Syn. Cyp.* 23. C. microlepis, *Baker Fl. Maurit.* 410 (*not of Boeck.*).—Cyperus, *Wall. Cat.* 3360, 3361.—Cyperus, *Coldstream, Grass. S. Punjab*, t. 38, A.

INDIA, general in rice-fields.—DISTRIB. Old world.

A glabrous shortlived weed. *Stems* cæspitose, 4–20 in. *Leaves* often nearly as long as stem, $\frac{1}{4}$ in. broad, grass-like. *Umbel* 2–20 in. in diam., varying greatly in size, usually compound, 3–5, up to 4–12 in.; primary rays sometimes at apex corymbose sometimes again umbelled. *Spikes* very loosely spicate, rhachis $\frac{1}{3}$–2 in. *Spikelets* 5–20, obliquely erect, yellow or brown (not red nor chestnut), $\frac{1}{3}$–$\frac{1}{2}$ by $\frac{1}{12}$ in.; rhacheola not winged. *Glumes* 3–5-nerved on back, sides nerveless, muticous or scarcely apiculate. *Stamens* 2 or 3; anthers oblong, muticous. *Nut* triquetrous, black; style much

shorter than nut, branches linear shortly exsert —*Rheede Hort. Malab.* xii. 105, t. 56, cited by Linnæus, &c., is *C. inundatus*, Roxb.

Var. *β paniciformis* (sp.) Franch. et Savat. Pl. Japon. ii. 103, 537; spikelets bearing 2–4 nuts, spikes (in the extreme typical form) drawn out into nearly linear racemes. C. parviflorus, *Nees in Wight Contrib.* 87 (*excl. all syn.*). C. Iria, *Thw. Enum.* 344.

From Kashmir to Ceylon and the Andamans.

31. **C. glomeratus,** *Linn. Sp. Pl.* 68; large, without stolons, leaves and bracts long narrow, umbel compound, spikelets in very dense short-cylindric spikes, glumes elliptic-oblong obtuse ferruginous finally brown, nut oblong ⅔ length of glume, *Host Gram. Austr.* iii. 48, t. 71; *Kunth Enum.* ii. 77; *Reich. Ic. Fl. Germ.* viii. 33, t. 284, fig. 675, *Boeck. in Linnæa*, xxxv. 592; *C. B. Clarke in Journ. Linn. Soc.* xxi. 141; *Boiss. Fl. Orient.* v. 372.

KASHMIR; Sonamurg, alt. 6500 ft., *Thomson.*—DISTRIB. From Italy to China and Japan.

Glabrous. *Stems* 12–33 in. *Leaves* often as long as stems, ⅛–¼ in. broad. *Umbel*, rays 3–8 up to 3–4 in. long, often concentrated nearly into 1 head; bracts 3–5, 6–12 in. long. *Spikes* ¾ by ⅔ in. *Spikelets* 40–50, ⅛ by $\frac{1}{16}$ in., compressed, 12–20-fld. *Glumes* scarcely keeled, in fruit loosely imbricated; rhacheola with narrow hyaline wings. *Stamens* 3; anthers small, oblong, muticous. *Nut* exactly oblong, pyramidal at either end, dusky black; style much shorter than nut, branches linear shortly exsert.

Sect. 2. Rhizome becoming woody; elongate stolons frequent. Large (or middle-sized). (Sp. 32–39.)

32. **C. distans,** *Linn. f. Suppl.* 103; umbel large compound, spikelets spicate narrow-linear 10–20-fld., glumes remote oblong-elliptic obtuse, nut oblong or narrowly ellipsoid ⅛–⅓ length of glume. *Jacq. Ic.* ii. t. 299; *Roxb. Fl. Ind.* i. 207; *Nees in Wight Contrib.* 88; *Kunth Enum.* ii. 93; *Thw. Enum.* 344; *Boeck. in Linnæa*, xxxv. 612; *Dalz. & Gibs. Bomb. Fl.* 283; *Duthie in E. T. Atkinson Gaz.* x. 620; *C. B. Clarke in Journ. Linn. Soc.* xx. 290 and xxi. 144. C. elatus, *Rottb. Descr. et Ic.* 37, t. 10 (*not of Linn.*). C. nutans, *Presl in Oken. Isis.* xxi. 271; *C. B. Clarke, l. c.* 291 and 143 (*partly*). C. Jacquini, *Schrad. in Linnæa*, xi., *Litt. Ber.* 87; *Steud. l. c.* 49. C. graminicola, *Steud. in Zoll. Verz. Ind. Archip.* ii. 63 and *Cyp.* 49. C. Kurrii, *Steud. Syn. Cyp.* 38; *Miq. Fl. Ind. Bat.* iii. 279.—Cyperus, *Wall. Cat.* 3350, 3366.

From the HIMALAYA, alt. 0–3000 ft., to CEYLON and SINGAPORE.—DISTRIB. All warm regions.

Glabrous. *Stolons* up to 2 by $\frac{1}{16}$ in. clothed by dark brown elliptic acute scales. *Stems* 1–3 ft. (depauperated less than 1 in.). *Leaves* often as long as stem, ¼–½ in. broad. *Umbel* 8–12 in. in. diam., from a single head 2½ in. diam. to an umbel with one ray 26 in. copiously 3–4 times compound; bracts rather longer than umbel, leaf-like. Rhachis of spike ½–2 in., glabrous. *Spikelets* ⅔–1 by $\frac{1}{10}$ in., young nodding, mature spreading at right angles, more or less red; wings of rhachilla narrow, hyaline, ultimately caducous. *Stamens* 3; anthers oblong, muticous. *Nut* dusky black; style much shorter than nut, branches shortly exsert.—The slender rhacheola of spikelet, apparently wavy from the very distant scars of the fallen glumes, usually marks this species.

33. **C. nutans,** *Vahl Enum.* ii. 363; large, spikelets racemose (i.e. loosely spicate) ripe suberect, glumes somewhat remote often minutely mucronate (otherwise as large examples of *C. distans*). *Kunth Enum.* ii.

94; *Miq. Fl. Ind. Bat.* iii. 286; *Boeck. in Linnæa*, xxxv. 597. *C. B. Clarke in Journ. Linn. Soc.* xxi. 143 (*excl. syn. and Madag.*). C. exaltatus, *Strachey Cat. Pl. Kumaon*, 74; *Duthie in E. T. Atkinson Gaz.* x. 620 (*not of Retz*). C. distans, β major, *Thw. Enum.* 432.—Cyperus, n. 54, *Herb. Ind. Or. H. f. et T. T.*

From the PUNJAB to CACHAR and CEYLON.

Usually 2–3½ ft. *Umbel* primary rays often 8–12 in.; spikes bowing on the ultimate rays. *Spikelets* in ripe fruit collapsing in a tassel (not spreading at right angles as in *C. distans*), rather broader than in *C. distans* with less remote glumes.—It is difficult to draw a line between this species and fine examples of *C. distans*.

34. **C. eleusinoides,** *Kunth Enum.* ii. 39; umbel large compound, spikelets densely spicate linear 20–40-fld., glumes not very remote often mucronulate, nut narrowly ellipsoid often curved ½–¾ length of glume. *Miq. Fl. Ind. Bat.* iii. 270; *Boeck. in Linnæa*, xxxv. 596; *C. B. Clarke in Journ. Linn. Soc.* xxi. 142 and xxv. 81; *Boiss. Fl. Orient.* v. 371. C. xanthopus, *Steud. in Flora*, xxv. 595 and *Syn. Cyp.* 36; *Thw. Enum.* 344. C. infra-apicalis, *Nees mss.*; *Aitch. Cat. Punjab Pl.* 155, and *in Journ. Linn. Soc.* xix. 189. C. racemosus, fastigiatus and mysurensis, *Herb. Heyne*; *Wall. Cat.* 3346. C. complanatus, *Herb. Wight*; *Wall. Cat.* 3347.

From the PUNJAB to CEYLON, frequent; the Naga Hills, *C. B. Clarke.*—DISTRIB. Asia, Africa, Austral.

Glabrous. *Stems* 15–40 in., with short lateral shoots at base; no elongate stolons seen. *Spikelets* ⅔–⅘ by ⅛ in., pale or testaceous, scarcely becoming red or chestnut-brown as in *C. distans* and *nutans*, to which species it is closely allied.

35. **C. Thomsoni,** *Boeck. in Linnæa*, xxxvi. 295; rhizome very short woody, umbel dense large compound or contracted nearly simple, spikelets somewhat large spicate linear 16–24-fld. pale, glumes loosely imbricate elliptic subacute, nut oblong or ellipsoid ⅓–½ length of glume, *C. B. Clarke in Journ. Linn. Soc.* xxi. 177.—Cyperus sp. n. 55, *Herb. Ind. Or. H. f. et T. T.*

SIKKIM TERAI, ASSAM, CACHAR and BENGAL.—DISTRIB. Tonkin.

Glabrous. *Stems* 12–20 in., robust. *Leaves* often as long as stem, ⅛–¼ in. broad, strong. *Umbel* (in Hooker n. 263 ("type" of Boeckler) 4½ in. in diam., but often much larger (primary rays up to 7 in.); bracts exceeding umbel. *Spikes* dense, rhachis ½–⅔ in.; glabrous. *Spikelets* 20–40 nearly 1 by ¼ in., moderately compressed; wings of rhacheola very narrow, persistent. *Glumes* with 7–9 very close dorsal nerves, sides nerveless. *Stamens* 3; anthers linear-oblong narrow, minutely tipped by red obtuse connective. *Nut* trigonous, black, top acutely pyramidal; style shorter than nut; branches linear, shortly exsert.

36. **C. malaccensis,** *Lam. Ill.* i. 146; rhizome creeping, culms robust almost 3-winged at top, spikelets spicate linear 6–12-fld., glumes obtuse when dry with margins incurved all round, nut very narrowly oblong ¾ length of glume. *Kunth Enum.* ii. 74; *Boeck. in Linnæa*, xxxv. 603; *C. B. Clarke in Journ. Linn. Soc.* xxi. 147; *Boiss. Fl. Orient.* v. 373 (*excl. syn. C. enodis*). C. odoratus, *Linn. Sp. Pl.* 46 (*partly*). C. gangeticus, *Roxb. ms.*; *Wall. Cat.* 3351 A (*partly*). C. incurvatus, *Roxb. Fl. Ind.* i. 196. C. Pangorei, *Roxb. l. c.* 202. C. procerus, *Roxb. l. c.* 203 (*partly*, i.e. *at least tab. cited*). C. scoparius, *Decne. in Nouv. Ann. Mus.* iii. 359; *Ridley in Forbes East. Archip.* 520 (*not Poir.*). C. Wallichii, *Nees in*

Wight Contrib. 83 (*part of Wall. n.* 3342 *C. with trifid style*). C. spaniophyllus, *Steud. Cyp.* 21; *Miq. Fl. Ind. Bat.* iii. 267. C. tegetiformis, *Benth. Fl. Austral.* vii. 279 mostly (*not Roxb.*). C. Pangorei and Panimotha, *Herb. Ham.*; *Wall. Cat.* 3329, M. N.—*Rheede Hort. Mal.* xii. 93, t. 50.

On brackish mud banks, from BENGAL to SINGAPORE. SIND; *Pinwill.*—DISTRIB. Asia, Austral., Polynes.

Glabrous. *Stolons* long, $\frac{1}{8}$–$\frac{1}{6}$ in. diam., clothed by broad lax black-chestnut scales 1 in. long, hardening into woody creeping rhizomes. *Stems* 18–36 in., at top $\frac{1}{8}$–$\frac{1}{6}$ in. in diam. with 3 concave faces. *Leaves* usually few, topmost 2–6 in. erect, green, sword-shaped, shortly caudate. *Umbel* 2–6 in. in diam., simple compound or congested; bracts 3–5, up to 6 by $\frac{2}{3}$ in., lowest usually erect (till fruit-time). *Spikes* of 4–10 spikelets, rhachis glabrous. *Spikelets* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{20}$–$\frac{1}{16}$ in. *Glumes* about $\frac{1}{24}$ in., very concave, in dry examples loosely imbricated. *Stamens* 3; anthers linear-oblong, not crested. *Nut* trigonous, becoming black; style $\frac{1}{3}$ length of nut; branches linear, slightly exsert.—This perhaps from its short leaves is more nearly allied to *C. tegetiformis*, Roxb., but differs in the very narrow wing to rhachilla. Easily recognized, when dry, by the glumes (though closely packed) being forced apart by their edges being crispidly incurved all round.—Cyperus, *Rottb. Descr. et Ic.* p. 40, t. 11, fig. 3, is adduced here by various authors; but I do not see how it differs from *C. polystachyus*, Rottb. (which may be anything except *Pycreus polystachyus*, Beauv.).

37. **C. pilosus,** *Vahl Enum.* ii. 354; stolons slender, stems at top acutely triquetrous, secondary umbels closely corymbed, rhachis of spikes scabrous-pilose (or in form *C. marginellus* and var. γ glabrous); spikelets linear 10–20-fld., nut ellipsoid apiculate $\frac{3}{5}$ length of glume. *Kunth Enum.* ii. 80; *Strachey Cat. Pl. Kumaon*, 74; *Thw. Enum.* 344; *Boeck. in Linnæa*, xxxv. 598; *Duthie in E. T. Atkinson Gaz.* x. 620; *C. B. Clarke in Journ. Linn. Soc.* xxi. 148 and xxv. 81. C. paniculatus, *D. Don Prodr.* 39 (*cf. Spreng. Syst. Cur. Post.* 29). C. Donianus, *Dietr. Sp. Pl.* ii. 290. C. fimbriatus, *Nees in Wight Contrib.* 86; *Kunth l. c.* 100; *W. Wats. in E. T. Atkinson Gaz.* x. 393. C. marginellus, *Nees in Wight Contrib.* 83; *Kunth l. c.* 75. C. procerus, *Roth. Catal. Bot.* iii. 5 and *Nov. Pl. Sp.* 35; *Nees l. c.* 83 (*partly, not Rottb.*). C. honestus, *Kunth l. c.* 74. C. venustus, *Moritzi Verz. Zoll. Pfl.* 96 (*not Br.*). C. subulatus, pauciflorus, and hebes, *Steud. Syn. Cyp.* 31, 34, 315. C. piptolepis, *Steud. in Zoll. Verz. Ind. Archip.* ii. 63 and *Syn. Cyp.* 40. C. Heyneanus, *Boeck. in Flora*, xlii. 440 *bis.* C. truncatus, *Franch. et Savat. Pl. Jap.* ii. 105 (*not of Turcz.*). C. Griffithianus, *Boeck. in Linnæa*, xxxv. 601. C. Wallichii, *Wight ms.* (*not Nees*).—Cyperus, *Wall. Cat.* 3334, 3348, 3355 (*partly*).

Throughout INDIA, alt. 0–5000 ft., abundant.—DISTRIB. Trop. As., Afric., and Austral.

Glabrous, except the rhachis of spikes. *Stolons* scarcely $\frac{1}{20}$ in. diam., with distant nodes and scales $\frac{1}{4}$–$\frac{1}{3}$ in. long, easily overlooked when young as roots, but afterwards thickening somewhat into a wiry rhizome. *Stems* from 3 ft. with umbel 16 in. across, to 4 in. with umbel reduced to 1 head. *Leaves* often $\frac{3}{4}$ length of stem, $\frac{1}{8}$–$\frac{1}{4}$ in. broad; bracts overtopping umbel, leaf-like. *Rhachis of spikes* in most examples definitely pilose, often only more or less scabrous subpilose, in the form *marginellus* microscopically glabrous. *Spikelets* (commonly) $\frac{2}{5}$ by $\frac{1}{15}$ in., compressed, reddish or brown or straw-colrd., close or remote, when ripe spreading at right angles; rhacheola obscurely (or not) winged. *Glumes* ovate, muticous, scarcely keeled, 3–7-nerved on back, ultimately loosely imbricated. *Stamens* 3; anthers linear-oblong, muticous. *Nut* acutely trigonous, black; style shorter than nut; branches linear, moderately exserted.—Of all *Cypereæ* this has proved the most

dangerous to Cyperologists; many examples have the rhachis of the spikes distinctly scabrous-pilose, occasionally it is quite glabrous. Further, there are two plants exceedingly like *C. pilosus* in general aspect, viz. *Juncellus Monti* and *Cyperus procerus*, Rottb., and in both of these the rhachis of spikelets is occasionally scabrous-pilose.

Var. β *obliqua*, C. B. Clarke l. c. 151; spikelets with fewer (sometimes only 5–6) flowers, often pale and very far apart. C. obliquus, *Nees in Wight Contrib.* 86; *Kunth Enum.* ii. 60; *Boeck. in Linnæa*, xxxv. 611; *W. Wats. in E. T. Atkinson Gaz.* x. 383. C. quinqueflorus, *Hochst. ms.*; *Steud. Syn. Cyp.* 37 (*partly*).—INDIA; widely scattered, but very much less common than the type.—Java.

Var. γ *polyantha*, C. B. Clarke l. c.; umbel rays 2½ in., secondary umbels corymbose, rhachis of spikes nearly glabrous, spikelets 1 in. 40–45-fld. chestnut-red.—Bengal; Mymensingh, *C. B. Clarke.*

38. **C. Babakensis,** *Steud. in Zoll. Verz. Ind. Archip.* ii. 62; umbel of few rays, secondary umbels condensed into oblong or square dense rigid compound-spikes, rhachis of spikes not pilose (scarcely scabrous), spikelets more robust than those of *C. pilosus*, glumes boat-shaped hispid-scabrous at the top of keel, nut hardly ¼ glume (otherwise as *C. pilosus*). *Boeck. in Linnæa*, xxxv. 521. C. Babakan, *Steud. Syn. Cyp.* 6 (*wrongly placed in Pycreus*). C. bengalensis and pilosus, var. δ Babakensis, *C. B. Clarke in Journ. Linn. Soc.* xxi. 151. C. Bacha, *Herb. Ham.*; *Wall. Cat.* 3336 E. (*partly*).

EAST BENGAL; *Griffith* (*Kew Distrib.* n. 6207); Nathpur, *Wallich*, n. 3336, E. (*partly*); Mymensingh, *C. B. Clarke.*—DISTRIB. Java.

Rays of umbel 3–6, lowest much longer than the others, erect, stout. *Spikes* 2 by 1½ in. very dense. *Spikelets* ⅔ by ⅛–⅙ in., 14–40-fld., red-brown; rhacheola stout.

39. **C. procerus,** *Rottb. Descr. et Ic.* 29, t. 5, fig. 3; stout, glabrous (but see var. β), secondary umbels loosely corymbed of 1–5 spikes, spikelets remote large 20–46-fld., glumes broad obtuse, nut obovoid ½ length of glume (otherwise nearly as large *C. pilosus*). *Nees in Wight Contrib.* 83 (*excl. syn.*); *Roxb. Fl. Ind.* i. 203 (*excl. cit. Rheede*) and *Kunth Enum.* ii. 72; *Thw. Enum.* 343; *Boeck. in Flora*, lviii. 84; *C. B. Clarke in Journ. Linn. Soc.* xxi. 152 (*excl. syn. Roth.*). C. ornatus, *Br. Prodr.* 217. C. carnosus, *Heyne ms.*; *Nees l. c.* C. amoyensis, *Hance in Ann. Sc. Nat.* ser. 5, v. 249. C. Heynei, *Boeck in Linnæa*, xxxv. 600. C. carnosus and spadiceus, *Herb. Heyne*; *Wall. Cat.* 3355, A.

BENGAL to CEYLON and SINGAPORE; mostly near the sea, rarely alt. 0–3000 ft. in valleys.—DISTRIB. Amoy, Tonkin, Java.

Very like large forms of *C. pilosus*, but with open inflorescence, distant larger spikelets, often 1 by ⅛–⅕ in., either straw-colour or red-tinged, sometimes high-red. —Though very closely allied to *C. pilosus*, it is seldom referred to it, because the rhachis of spikes is glabrous. From its red colour it has been confounded with *Pycreus puncticulatus*, Nees.

Var. β *lasiorrhachis*; axis of spikelets scabrous-pilose.—Chota Nagpore; alt. 2000 ft., *C. B. Clarke.*—Perhaps the plant collected by V. Ball in Chota Nagpore; cf. *C. B. Clarke in Journ. Linn. Soc.* xxi. 151, in note.

Series B. Rhachilla of spikelets (usually conspicuously) winged. (Sp. 40–end.)

Sect. 3. *Bulbosi.* Stolons slender, soon disappearing, terminating in tunicated bulbils.—Closely allied to *Mariscus* Sect. *Bulbocaules.* (Sp. 40.)

40. **C. bulbosus,** *Vahl Enum.* ii. 342; coat of bulbils striated black splitting into elliptic very acute segments, leaves overtopping stem narrow flagellate, umbel contracted corymbiform lowest ray somewhat distant (spikelets nearly as in *C. rotundus*). *Nees in Wight Contrib.* 80; *Dalz. & Gibs. Bomb. Fl.* 284; *Boeck. in Linnæa,* xxxvi. 300; *Trimen in Journ. Bot.* xiii. (1884), 358. C. jemenicus, *Retz. Obs.* iv. 11 (jeminicus); *Roxb. Fl. Ind.* i. 191; *C. B. Clarke in Journ. Linn. Soc.* xxi. 175, t. 2, figs. 17, 18 (*var. β excl.*) and *in Journ. Bot.* xix. 18, cum fig. (*not of Rottb.*). C. geminatus, *Kœnig ms.*; *Ainslie Mat. Med. Hind.* (1813), 250; *Moon Cat. Pl. Ceylon,* 6 (*not of Schrader*). C. oleraceus, *Roxb. ms* C. stoloniferus, *Nees in Wight Contrib.* 81 (*partly, not of Retz.*). C. hexastachyus β pendulus, *Nees in Wight Contrib.* 82 (*partly*). C. rotundus, *Kunth Enum.* ii. 51 (*partly*); *Thw. Enum.* 343 (*partly*).—Cyperus, *Wall. Cat.* 3317, A. (*partly*).

SIND; *Stocks, &c.* ALIGURH; *Duthie* (n. 7670). The DECCAN PENINSULA and CEYLON.—DISTRIB. Trop. Afric., As. and Austral.

Glabrous. *Stolons* 1–2½ in., thread-like; bulbils ovoid-conic, at first ⅛ in., white, edible, ultimately larger with thick black coat. *Stems* 4–12 in., slender. *Leaves* numerous, subbasal, up to ⅛ in. broad, tip long caudate. *Umbel* sometimes evolute, rays up to 2 in., usually contracted 1–1½ in. in diam. interruptedly subcorymbose; bracts overtopping inflorescence, similar to leaves. *Spikelets* 3–20 reddish, up to ¾ by $\frac{1}{12}$ in., 8–26-fld.; wings of rhachilla elliptic, persistent. *Glumes* boat-shaped, ovate, obtuse, 11-nerved. *Stamens* 3; anthers linear, muticous. *Nut* obovoid, obtuse, triquetrous, black, hardly ½ glume; style shorter than nut, branches linear, somewhat long.—In the absence of roots this species can generally be discerned by the imperfection of the umbel i.e. lowest bract with its ray a little distant.

Sect. 4. *Brevefoliati.* Tall. Stolons long, hardening into creeping rhizomes. Leaves short, rarely ½ length of stem. Glumes approximate, closely imbricate. (Sp. 41–44.)

41. **C. articulatus,** *Linn. Sp. Pl.* 66; stem robust terete, leaves hardly any, umbel compound of many spikes, bracts very short acute scale-like, spikes linear many-fld., nut oblong-ellipsoid ⅓ length of glume *Kunth Enum.* ii. 53; *Nees in Wight Contrib* 80; *Thw. Enum.* 343; *Boeck. in Linnæa,* xxxvi. 274; *C. B. Clarke in Journ. Linn. Soc.* xx. 291, and xxi. 155. C. nudus, *Roxb. Fl. Ind.* i. 187 (*not* 209, *nor H. B. & K.*). C. gymnos. *Roem. & Sch. Syst.* ii., *Mant.* 97. C. diphyllos, *Benth. Fl. Austral.* vii. 279 (*chiefly, not Retz*) —Cyperus, *Wall. Cat.* 3364.

BENGAL to CEYLON.—DISTRIB. All warm regions.

Glabrous. *Stolons* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., clothed by ovate-lanceolate striate brown-black scales ⅔ in. long. *Stems* 3–6 ft., often 2–4 in. apart on the thick woody rhizome, at top ⅛–$\frac{1}{10}$ in. in diam., terete or scarcely trigonous, when dry usually with false nodes ½ in. apart; upper sheaths usually terminated by a subspathaceous lanceolate-colrd. limb, rarely by a small green leaf. *Umbel* rays often 10, up to 2–6 in.; bracts ⅓–⅔ in., ovate, striate, subturgid at base hardly keeled, concave, margins not reflexed. *Spikelets* 5–15 together, shortly spicate, ⅛–1¼ by $\frac{1}{12}$ in., 12–50-fld., straw-colrd., afterwards dusky. *Glumes* even in fruit imbricate, ovate, obtuse, concave, scarcely keeled, obscurely 3–5-nerved on back; wings of rhachilla oblong or elliptic, scarious, ultimately deciduous. *Stamens* 3; anthers linear-oblong, muticous. *Nut* trigonous, acute at either end, black; style shorter than nut; branches linear, shortly exsert.

42. **C. tegetiformis,** *Roxb. Hort. Beng.* 6, *and Ic. ined.* t. 1321; leaves hardly any, stem trigonous at top often triquetrous not (or obscurely) transversely septate, bracts short (rarely ½ length of umbel) lowest green (not ovate at base) with margins recurved in dried examples (otherwise as *C. articulatus*). *Wall. Cat.* 3351 B (*partly*); *Kunth Enum.* ii. 56; *Arn. in Wight Contrib.* 89, *in note*; *C. B. Clarke in Journ. Linn. Soc.* xxi. 157. C. nudus, *Roxb. Fl. Ind.* i. 209, not 187 nor *H. B. K.* C. bengalensis, *C. Spreng. Neu. Entd.* iii. 101. C. Gula-Methi, *Roem. & Sch. Syst.* ii. *Mant.* 125. C. corymbosus, *Ic. Madras*, *Wall. Cat.* 3351 (*largely*).—Cyperus sp. n. 40, *H. f. & T. Th. Herb. Ind. Or.* (Chittagong example).

Bengal and Assam, Madras and Bundelcund.—Distrib. China, Japan.

This has been confused with *C. malaccensis*, Lam., which differs by the very narrow wing to rhachilla of spikelets, by the loosely imbricated concave subinflated glumes, and by the apex of stem 3-winged.

43. **C. corymbosus,** *Rottb. Descr. et Ic.* 42, t. 7, fig. 4; stem at top obscurely trigonous, uppermost leaf short or 0, bracts ½–¾ length of umbel or sometimes overtopping it, spikelets ferruginous or reddish (otherwise as *C. tegetiformis*). *Thw. Enum.* 344; *C. B. Clarke in Journ. Linn. Soc.* xxi. 158. C. diphyllus, *Retz Obs.* v. 11; *Kunth Enum.* ii. 54; *Boeck. in Linnæa*, xxxvi. 272. C. Koenigii, *Vahl Enum.* ii. 302; *Kunth l. c.* C. monophyllus, *Vahl l. c.* ii. 352 (*fide Nees*). C. seminudus, *Roxb. Fl. Ind.* i. 187; *Nees in Wight Contrib.* 80; *Kunth l. c.* 55 (*not of* Moritz.). C. enodis, *Boeck. l. c.* 271. Papyrus Pangorei, *Nees l. c.* 88 (*partly*).—Fimbristylis, *Wall. Cat.* 3525 E.

From Kumaon, *Wallich*, to Assam, Burma, Ceylon.—Distrib. As., Afric., and Amer.

Stems 2–3 ft., when dry often more or less transversely septate. Uppermost *leaf* in the type example of Retz, nearly 6 in. long. *Bracts* leaf-like, green, not ovate at base, keeled, with margins recurved in the dry state, in the type of *C. diphylla*, Retz, much overtopping the inflorescence.

Var. β *Pangorei*, C. B. Clarke, l. c. 292, 159; spikelets 1 in. 18–36-fld. C. Pangorei, *Rottb. l. c.* 31, t. 7, fig. 3; *Kunth l. c.* 57. C. corymbosus *var.* macrostachya, *Boeck. l. c.* 277 (cf. *Steud. Syn. Cyp.* 31, *note* to C. corymbosus).—Deccan Peninsula, *Wall. Cat.* 3351 C, &c. (Herb. Kew).—Madagasc.

44. **C. scariosus,** *Br. Prodr.* 216; stolons slender, stems long slender at top triquetrous, umbel slender contracted, spikelets linear pale straw-colour (very like those of *C. tegetiformis*). *C. B. Clarke in Journ. Linn. Soc.* xxi. 159. C. pertenuis, *Roxb Fl. Ind.* i. 198; *Nees in Wight Contrib.* 83. C. rotundus, *Thw. Enum.* 343 (*partly*); *Boeck. ms.* partly, not of *Linn.*

Bengal; Soondreebun, *C. B. Clarke*, common. Pegu, *Kurz ms.*, 683, 684 (*Herb. Calcutta*).—Distrib. Australia.

Glabrous. *Stolons* ⅛–2 by $\frac{1}{16}$ in., clothed by elliptic acute lax striate concolorous scales ⅛ in. long. *Stems* 16–36 in., at top $\frac{1}{24}$–$\frac{1}{16}$ in. in diam. *Leaves* (in the Indian as in Brown's examples) variable, usually short (less than ½ stem), sometimes much longer, sometimes 0, narrow, weak. *Umbel* thin; rays slender, sometimes up to 3 in. long, sometimes not ¼ in.; bracts nearly always as the leaves, i. e. hardly any when leaves short, exceeding inflorescence when leaves longish.—Not very near *C. rotundus*; differs little from *C. tegetiformis*, but in the extreme slenderness of stem and umbel.

Sect. 5. *Subimbricatæ.* Tall. Rhizome very short, woody; stolons 0, i. e. lateral shoots from base of stem immediately ascending. Glumes

scarcely imbricate in fruit (in this differing from the *Brevefoliatæ* and *Rotundæ*). (Sp. 45–47.)

45. **C. macer,** *C. B. Clarke in Journ. Linn. Soc.* xxi. 160; stems long slender, leaves few short, umbel loose irregular slender, spikelets linear 8–16-fld., glumes obtuse, nut obovoid $\frac{1}{2}$–$\frac{3}{5}$ length of glume.

On rocks in rivers. PEGU, *Kurz*, n. 671. CHITTAGONG, *C. B. Clarke.* CENTRAL INDIA; *Duthie*, n. 9837.

Glabrous. *Stems* 2–3 ft., at top very slender triquetrous. *Leaves* inconspicuous, uppermost 4–6 (rarely 8–10) in. long, erect, narrow. *Umbel* rays 3–6, slender, 2–4 in. long, sometimes again divided; bracts $\frac{1}{2}$–2 in., leaf-like. *Spikelets* $\frac{1}{2}$ by $\frac{1}{15}$ in.; wings of rhachilla narrow-oblong, hyaline, disappearing. *Glumes* somewhat remote, in fruit not imbricate, ovate-oblong, 3–5-nerved, back green, sides brown nerveless. *Stamens* 3; anthers linear-oblong muticous. *Nut* trigonous, ashy-black; style shorter than nut; branches linear, long.—Somewhat resembling slender forms of *C. tegetum*, but the narrow evanescent wing of rhacheola would remove it out of the present series altogether.

46. **C. tegetum,** *Roxb. Fl. Ind.* i. 208; stem robust at top trigonous or triquetrous, leaves usually short or 0 (sometimes pretty long), umbel compound or decompound usually large, spikelets shortly spicate linear many-fld. often coloured, wings of rhachilla strong caducous, glumes somewhat remote in fruit obliquely spreading, nut oblong-obovoid $\frac{1}{2}$ length of glume. *Wall. Cat.* 3332 A, 3352 *mainly*; *C. B. Clarke in Journ. Linn. Soc.* xxi. 160 (*excl. syn. C. Schimperianus, and African plants*), and xxv. 81. C. corymbosus, *Kœnig ms.*; *Rottl. in Neu. Schr. Gesell. Freunde, Berlin*, iv. 219 *in Obs.*; *Boeck. in Linnæa*, xxxvi. 276 (*mostly*); *Duthie in E. T. Atkinson, Gaz.* x. 620 (*not of Rottb.*). C. dehiscens, *Nees in Linnæa*, ix. 286; *Kunth Enum.* ii. 56 (*excl. syn. Roxb.*); *Trimen Cat. Pl. Ceylon*, 100. C. Pangorei (*i. e.* Pangorei), *Wight ms.*; *Thw. Enum.* 344 (*not of Rottb.*). C. tegetiformis, *W. Wats in T. E. Atkinson Gaz.* x. (1876) 393 (*not of Roxb.*). C. Pangorei & C. subulatus, *Herb. Heyne*; *Wall. Cat.* 3330. Papyrus dehiscens, *Nees in Wight Contrib.* 89. P. Pangorei, *Nees l. c.* 88 (*mostly*). P. corymbosus, *Nees l. c.* 89 (*excl. syn. Rottb.*).

Throughout INDIA, alt. 0–6000 ft., from KASHMIR to CEYLON and BURMA.—DISTRIB. Cult. in Mauritius (*C. textilis*, Bojer).

Glabrous. *Rhizome* horizontal, stout, woody. *Stems* 3 ft. *Leaves* uppermost usually 4–8 by $\frac{1}{4}$ in.; often 0, occasionally 16 in. *Umbel* usually 4–12 in. in diam.; umbellules corymbose, spikes numerous. *Spikelets* $\frac{3}{4}$ by $\frac{1}{10}$ in., 10–20-fld., usually fine-brown or reddish. *Glumes* elliptic-oblong obtuse, 3–5-nerved, scarcely keeled. Wings of *rhacheola* ovate, acute, finally yellow or red-brown separating by a clean cut. *Stamens*, *nut*, and *style* much as in *C. macer*.

Var. *β ambigua*, C. B. Clarke l. c. (1884) 162; spikelets $1\frac{3}{4}$ in., glumes $\frac{1}{5}$ in., wings of rhacheola narrow hardly separating. Madras Peninsula, *Wallich*, n. 3329 F, *in Herb. Kew* (*not Herb. propr.*), and one of the two examples of n. 3330, *in herb. propr.*

47. **C. Zollingeri,** *Steud. in Zoll. Verz. Ind. Archip.* ii. (1854) 62, *and Syn. Cyp.* 17; culm elongate, leaves long narrow, umbel compound with long slender rays or sometimes reduced to 1 head, spikelets spicate long-linear yellow, glumes somewhat remote large, nut obovoid black $\frac{1}{2}$ length of glume. *Boeck. in Linnæa*, xxxvi. 352. C. compressus, var. *Thw. Enum.* 342. C. rotundus, *Miq. Fl. Ind. Bat. Suppl.* 260, 600. C. rotundus, *var.* carinalis, *Benth. Fl. Austral.* vii. 280. C. tenuiculmis, *Boeck. l. c.* 286 (*not of Flora*, lxii. 554). C. Wightii, *Hance in Journ. Bot.*

xvi. 14 (*not of Nees*). *C. lucidulus*, *C. B. Clarke in Journ. Linn. Soc.* xxi. 99, and xxv. 80 (*not of Klein*, except by mixture).—Cyperus, *Wall. Cat.* 3321, 3367.

Throughout moist INDIA, alt. 500-5000 ft., plentiful, from NEPAL, *Wallich*, and ASSAM, *Griffith*, to CEYLON, *Thwaites*, and MALACCA, *Griffith*.—DISTRIB. Trop. As., Afric., and Austral.

Glabrous. *Rhizome* short, horizontal, woody. *Stems* solitary but not distant, of 1½–3 ft. (small examples under a foot occur), slender for their length, triquetrous. *Leaves* ⅔ stem, $\frac{1}{6}$ in. broad. *Umbel* in well-developed examples large, straggling, rays 4–10 up to 9 in. with radioles of secondary umbels up to 3 in., but small 1-headed examples are frequent, with all intermediate forms; bracts as long as umbel or greatly overtopping it. *Spikes* large, open, rhachis glabrous. *Spikelets* 3–16, often 1 by $\frac{1}{6}$ in., 20-fld., compressed. *Glumes* boat-shaped, ovate, obtuse, 7–11-nerved, in fruit scarcely imbricated; rhachilla slender, in fruit flexuose, wings oblong hyaline separating. *Stamens* 3; anthers linear-oblong, muticous. *Nut* triquetrous, obtuse; style shorter than nut, slender; branches linear, slender.

Sect. 6. *Rotundi.* Tall or medium plants, stoloniferous or rhizome woody. Leaves and bracts long. Rhachilla of spikelets winged. Glumes closely imbricated. (Sp. 48–55.)

48. **C. longus,** *Linn. Sp. Pl.* 67; rhizome somewhat thick creeping, stem rather robust at top subacutely trigonous, at base oblique or decumbent not nodosely thickened nor suddenly contracted into a wiry rhizome, spikelets shortly spicate linear-oblong 6–16-fld., nut ellipsoid $\frac{1}{3}$–$\frac{1}{2}$ length of glume. *Kunth Enum.* ii. 60; *Boeck. in Linnæa*, xxxvi. 279, var. *a*; *Boiss. Fl. Orient.* v. 375, vars. *β*, *γ*; *C. B. Clarke in Journ. Linn. Soc.* xxi. 164, excl. vars. *β*, *γ*.

QUETTA, *Hamilton*. MT. ABOO, *G. King*.—DISTRIB. Westward to the Atlantic.

Glabrous. *Rhizome* $\frac{1}{10}$–$\frac{1}{5}$ in. in diam., clothed by loose ovate triangular striated brown scales. *Stems* 1–3 ft. *Leaves* ½–¾ stem, $\frac{1}{6}$ in. broad. *Umbel* rays 3–10, 1–10 in. long. *Spikelets* ½ by $\frac{1}{10}$ in., slightly compressed, greenish ferruginous or chestnut-red. *Glumes* ovate, obtuse, hardly keeled, 5–7-nerved, back green, margins narrowly scarious. *Stamens* 3; anthers linear-oblong, muticous or scarcely apiculate. Wings of *rhacheola* elliptic, hyaline, persistent. *Nut* trigonous, black; style shorter than nut, branches linear shortly exsert.—Var. *tenuiflora*, Boeck., the commoner Mediterranean form is not Indian, and is scarcely included in the above description.

49. **C. stenostachyus,** *Benth. Fl. Austral.* vii. 280; tall, stolons long with distant bulbous thickenings, umbel compound compact, spikelets densely spicate suberect (otherwise nearly as *C. longus*).—Australia.

Stolons long, $\frac{1}{12}$ in. in diam. *Stems* 2½ ft., triquetrous, at base erect somewhat bulbose. Lowest *bract* 12–16 in., as though a continuation of stem.—This might be esteemed a var. of *C. longus* (as by Boeckeler), which has the stem at base decumbent, passing into the root without a bulbose thickening, and the spikelets rectangular spreading.

Var. *β indica*; lowest bract suberect very long, spikelets ferruginous brown. C. longus, *Linn.*, var. gracilis, *Boeck. in Linnæa*, xxxvi. 281. C. denudatus, *Heyne, in Wall. Cat.* 3349, 3329, F.—DECCAN PENINSULA, *Wallich*.

50. **C. rotundus,** *Linn. Sp. Pl.* 67 (*not Linn. Herb.*); stem at base nodosely thickened suddenly constricted into a wiry rhizome (otherwise nearly as *C. longus*). *Roxb. Hort. Beng.* 5, *and Fl. Ind.* i. 197: *Kunth Enum.* ii. 58 (*excl. C. bulbosus, Vahl, and others*); *Boeck. in Linnæa*, xxxvi.

283; *Dalz. & Gibs. Bomb. Fl.* 283; *Thw. Enum.* 343, *partly*; *C. B. Clarke in Journ Linn. Soc.* xx. 292, and xxi. 167; *Aitch. & Hems. in Trans. Linn. Soc.* ser. 2, *Bot.* iii. 121. C. hexastachyus, *Rottb. Descr. et Ic.* 28, t. 14, fig. 2; *Nees in Wight Contrib.* 81 (*partly*). C. leptostachyus, *Griff. Itin. Notes*, 321 (*not of Nees*). C. tenuiflorus, *Royle Ill.* 412 (*not Rottb.*).—Cyperus, *Wall. Cat.* 3317 A (*partly*), 3322, 3353, 3373. C. albidus, *Herb. Heyne*; *Wall. Cat.* 3356; *Rumph. Herb. Amb.* vi. 1, t. 1.

INDIA, alt. 0–6000 ft., a pestiferous weed.—DISTRIB. All warm regions.

Glabrous. *Stolons* slender, up to 4–8 in., hardening into wiry roots, thickened into black woody ovoid tubers ¼–1 in. in diam., not (or very obscurely) zoned. *Stems* subsolitary, 4–32 in, at top triquetrous. *Leaves* long, often overtopping stem, ⅛–¼ in. broad. *Umbel* frequently compound, primary rays 2–8 in., spikes loosely spicate of 3–8 spikelets; but umbel sometimes large, sometimes reduced to 1 head and (in a common Calcutta form) to 1 spikelet. *Spikelets* in flower or fruit undistinguishable from *C. longus*.

Var. β *centylora*, C. B. Clarke in Journ. Linn. Soc. xxi. 171; spikelets elongate many-fld. often curved or twisted. MONGHYR, *Wall. Cat.* 3373 (right-hand example). The DECCAN, *A. Thomson*, n. 258.—In this (n. 258) the spikelets are 3¾ in., with 118 flowers, but all forms intermediate between this and *C. rotundus* occur.

51. **C. stoloniferus,** *Retz Obs.* iv. 10; rhizome woody long-creeping, stems at top trigonous at base nodose, umbel simple contracted or subcapitate, spikelets terete shortly spicate, glumes close-packed concave obtuse, style-branches 3 long, nut obovoid unequally trigonous somewhat curved. *Nees in Wight Contrib.* 81; *Boeck. in Linnæa*, xxxv. 489 (*excl. syn. C. tuberosus and var.* β); *C. B. Clarke in Journ. Linn. Soc.* xx. 286, and xxi. 172. C. littoralis, *Br. Prodr.* 216. C. tuberosus, *Bojer. Hort. Maurit.* 379; *Kunth Enum.* ii. 50; *Dalz. & Gibs. Bomb. Fl.* 283. C. rotundus, part, *Kunth l. c.* 59. C. bulboso-stoloniferus, *Steud. in Zoll. Verz. Ind. Archip.* ii. 62, and *Syn. Cyp.* 18. C. conjunctus, *Steud. Syn. Cyp.* 18. C. lamprocarpus, *Boeck. l. c.* 490. C. juncifolius, *Klein ms.*; *Wall. Cat.* 3315, A. C. Jemenicus, *Heyne*; *Wall. Cat.* 3315, B. C. arenarius, *Hance ms.*—Cyperus, *Wall. Cat.* 3309, mixed.

Shores of INDIA, especially in sea sand; from Sind to Ceylon, Coromandel, and the Malay Peninsula.—Nilghiri Mts., *Foulkes.* DISTRIB. Mauritius, China, Malaya, Australia.

Stolons long, hardening into the creeping rhizome, not producing tunicated bulbils. *Stems* 4–8 in. *Umbel* rays 0–1 in.; bracts usually 3, varying in length as do the leaves. *Spikelets* ⅛ by $\frac{1}{12}$ in., 8–20-fld.; glumes more closely packed than in *C. rotundus*, their margins often glistening hyaline.

52. **C. Fenzelianus,** *Steud. Syn. Cyp.* 33; tall, stolons long thickish, leaves and bracts elongate, umbel large compound, spikelets (young and old) straw-colour (otherwise as *C. longus* or large *C. rotundus*). *Boeck. in Linnæa*, xxxvi. 297. C. pallescens, *Boiss. Fl. Orient.* v. 375 (*not of Desfont*). C. ochreoides, *Steud. l. c.* 34. C. tenuiflorus, *Balfour Socotra*, 305 (*not of Rottb.*). C. longus var. pallida, *Boeck. l. c.* 280 (*excl. C. mitis, not of Boiss.*). C. longus, vars. β pallescens and ε elongata (*partly*), *C. B. Clarke in Journ. Linn. Soc.* xxi. 165, 166. C. rotundus, *Boeck. in Flora*, lxii. 554.

MADRAS; Chingapuna, *G. Thomson*, n. 383.—DISTRIB. Westwd. to N. Africa.

Stems 2–3 ft., robust, at base somewhat nodose then suddenly narrowed into a creeping rhizome $\frac{1}{12}$–⅛ in. diam. *Leaves* often nearly as long as stems, ⅛ in. broad,

fleshy sometimes almost spongy, when dry convolute.—Habit and general aspect of *C. longus*, but the root of large states of *C. rotundus*. Schweinfurth, who has studied this whole series of species alive, doubts if any line can be drawn between *C. longus* and *C. rotundus*.

53. **C. subcapitatus,** *C. B. Clarke*; stems and leaves long slender, umbel as though lateral of 24 spikelets contracted or subcapitate, lowest bract long narrow as though a continuation of the stem (otherwise nearly as *C. rotundus*). C. polystachyus, *Rottb. Descr. et Ic.* 39, t. 11, fig. 1?—Cyperus, *Wight in Wall. Cat.* n. 3316.

DECCAN PENINSULA; *Wallich.* NILGHIRI HILLS; alt. 2000 ft., *Gamble.*

Stem 20 in., at top less than $\frac{1}{10}$ in. in diam., at base oblique nodosely thickened then abruptly contracted into a long slender rhizome. *Leaves* somewhat shorter than stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. *Umbel* rays 0–$\frac{1}{2}$ in. *Spikelets* slender, ferruginous-brown.

54. **C. tuberosus,** *Rottb. Descr. et Ic.* 28, t. 7, fig. 1, *fide Boeck.*; stolons elongate rather slender, stem tall at base bulbous woody, umbel evolute rays slender (in form *C. tenuiflorus*, sp. Roxb., very slender), spikelets linear (in form *C. tenuiflor.* very slender), glumes in fruit not closely imbricated (otherwise as (*C. rotundus*), *Roxb. Hort. Beng.* 5 & *Fl. Ind.* i. 199; *Kunth Enum.* ii. 50 (*in small part*); *Boeck. in Linnæa*, xxxvi. 285 (*excl. the Cape plants and descrip. of nut*). C. Pangorei, *Retz. Obs.* iv. 10 (*not of Rottb. or Roxb.*). C. lucidulus, *Klein*; *Link. Jahrb.* iii. 86 (*not of C. B Clarke*). C. rotundus, *Benth. Fl. Austral.* vii. 279 (*chiefly*). C. rotundus (tenuiflora) *Thw. Enum.* 343. C. rotundus, *var.* procerula, *C. B. Clarke in Journ. Linn. Soc.* xxi. 172 (*in great part*). C. rotundus, *var.* acuta, *Boeck. l. c.* 230. C. tenuiflorus, *Roxb. l. c.* 199; *Nees in Wight Contrib.* 82 (*Indian plant*); *Dalz. & Gibs. Bomb. Fl.* 284; *W. Wats. in E. T Atkinson Gaz.* x. (1876), 393; *Trimen in Journ. Bot.* xxiii. 140; *C. B. Clarke in Journ. Linn. Soc.* xx. (1883), 193 and xxi. 174 (*not Rottb. or Boeck.*). C. procerulus, *Nees in Wight Contrib.* 82; *Kunth Enum.* ii. 51. C. Retzii, *Nees l. c.*; *Kunth l. c.* 73; *Thw. Enum.* 343. C. hexastachyus, *Nees l. c.* (*partly*). C. Roestelii, *Kunth l. c.* 58. C. pertenuis, *Bojer Hort. Maurit.* 379 (*not Roxb.*). C. longus, *Baker Fl. Maurit.* 411. C. mitis, *Steud. Cyp.* 316 (*cf. Boeck. in Flora*, 1859, p. 447). C. procerus, *Herb. Roxb.*; *Wall. Cat.* 3329, A.

CEYLON; *Thwaites*, nn. 3750, 3966, Deccan Peninsula; *Wallich, Wight.* BENGAL; *Wallich, Griffith* (*Kew Distrib.* n. 6141).—DISTRIB. Mauritius, Austral.

Equal in size to the large forms of *C. rotundus*, but has slenderer rays and spikelets. It is *C. tuberosus* of herbs of Kœnig, Rottler and Roxburgh, the figure of Rottboel (*tuberosus*) does not agree very well; but, as it is satisfactory to Boeckeler, and as it is impossible to identify an old picture without analyses, it saves complication to accept his identification, rather than to separate further the *C. tuberosus* of Rottler (and others) from that of Rottboell.

55. **C. esculentus,** *Linn. Sp. Pl.* 67; stem at base erect, stolons lateral long very slender bearing tubers, leaves and bracts long, spikelets yellow or yellow-brown, glumes over nearly their whole breadth plicate-striate (otherwise as *C. rotundus*). *Kunth Enum.* ii. 61; *Boeck. in Linnæa*, xxxvi. 287; *C. B. Clarke in Journ. Linn. Soc.* xx. 293 and xxi. 178. C. Tenorii, *Presl.*; *Reichb. Ic. Fl. Germ.* viii. 32, t. 281, fig. 670. C. pumilus and C. jeminicus, *Herb. Heyne*; *Wall. Cat.* 3354.

From the PUNJAB, *T. Thomson*, to NILGHIRI MTS., *Hohenacker*, scattered, not common.—DISTRIB. S. Europe, Afric., Americ.

Stolons exceedingly slender, with small pale scales, often disappearing after the tubers are formed; tubers (ripe) woody, more regularly zoned than those of *C. rotundus*. *Glumes* in fruit slightly rigid, so that they are less closely imbricated (than in *C. rotundus*) the spikelets more turgid.—So close to *C. rotundus* that it is much mixed with it in many herbaria.

Sect. 7. EXALTATI. Tall. Stolons 0. Leaves and bracts long. Umbel large compound, spikes and spikelets many. Rhachilla of spikelets conspicuously winged. Anthers apiculate, not rarely crested. Style (with its 3 branches) small. Nut small, ashy black. (Sp. 56–61.)

56. **C. radiatus,** *Vahl Enum.* ii. 369; spikes digitate scarcely peduncled long-cylindric dense, spikelets linear 12–30-fld., glumes (even in fruit) closely imbricate, wings of rhachilla oblong persistent, anthers short-oblong not crested, *Kunth Enum.* ii. 71; *Boeck. in Linnæa*, xxxvi. 317; *C. B. Clarke in Journ. Linn. Soc.* xxi. 185. C. involucratus, *Poir. in Lam. Encyc.* vii. 253. C. verticillatus, *Roxb. Fl. Ind.* i. 206; *Kunth l. c.* 71; *Nees in Wight Contrib.* 87. C. digitatus, *Nees l. c.* 85 (*not Roxb.*). C. Royleï, *Arn. in Wight Contrib.* 85 (*in note*); *Kunth l. c.* 100. C. obscurus, *Nees in Hook. Kew Journ.* vi. 27. Cyperus, *Wall. Cat.* 3345.

From AGRA, *Munro* to PENANG, *Curtis*; plentiful in Bengal.—DISTRIB. As., Afric., Amer.

Glabrous. *Stems* 1–3 ft. *Leaves* often $\frac{2}{3}$ stem, $\frac{1}{3}$ in. broad. *Umbel* simple or compound; spikes 1 by $\frac{1}{3}$ in., very dense. *Spikelets* commonly $\frac{1}{5}$– by $\frac{1}{20}$ in., usually dull-colrd., not bright yellow or red-brown. *Glumes* broad ovate, keeled, obtuse, 3–5-nerved on back, muticous or sometimes mucronate. *Nut* ovoid, $\frac{2}{3}$–$\frac{1}{2}$ length of glume; style $\frac{1}{2}$ as long as nut, branches 3 linear small.

57. **C. exaltatus,** *Retz Obs.* v. 11; spikes (some) peduncled long-cylindric, spikelets very many (not tightly crowded) linear 8–20-fld., glumes (even in fruit) closely imbricate, wings of rhachilla oblong persistent, anthers oblong not crested, *Kunth Enum.* ii. 70; *Nees in Wight Contrib.* 84 (*excl. C. fastigiatus*); *Thw. Enum.* 343; *Boeck. in Linnæa*, xxxvi. 319; *C. B. Clarke in Journ. Linn. Soc.* xxi 186 (*incl.* var. β *amœna.*) C. odoratus, *Burm. Fl. Ind.* 20, t. 8, fig. 2 (*not Linn.*). C. venustus, *Br. Prodr.* 217; *Kunth l. c.* 68 (*partly*); *Thw. Enum.* 432. C. umbellatus, *Roxb. Fl. Ind.* i. 205; *Dalz. & Gibs. Bomb. Fl.* 284; *Arn. in Wight Contrib.* 85 in *Obs.* (*not Benth.*). C. alopecuroides, *Roxb. l. c.* 208. C. acerosus, *Roxb. ms.*; *Arn. l. c.* 84 (*in note*). C. oryzeticola, *Steud. Syn. Cyp.* 37. C. racemosus, *Heyne, ms.*; *Boeck. in Flora*, lxii. 555 (*not Boeck. in Linnæa*, xxxvi. 310). C. parviflorus, *Heyne, ms., Wall. Cat.* n. 3343, B. (cf. Kunth Enum. ii. 115, *not of Nees*). Papyrus venustus, *Schrader in Mart. Fl. Bras.* ii. (part i.) 59 in note. C. maximus, elatus, parviflorus, extensus, spicatus, *Herb. Heyne*; *Wall. Cat.* 3343. C. verticillatus, *Herb. Wight & Herb. Ham.*; *Wall. Cat.* 3343, H, I.—Cyperus, *Wall. Cat* 3327, 3328.

From the PUNJAB to ASSAM and CEYLON; common.—DISTRIB. Trop. and subtrop. regions.

Stem 3–6 ft.—Hardly to be distinguished from large forms of *C. radiatus*, but by the less dense spikes. *Spikelets* often brightly coloured.

Var. β *dives*, C. B. Clarke l. c. 187; umbel divaricate rigid, ripe spikelets rigid hard spreading at right angles somewhat turgid, style 3-fid. *C. dives, Delile Fl. Egypt*, 5, t. 4, fig. 3; *Kunth Enum.* ii. 71; *C. B. Clarke l. c.* 293. C. alopecuroides, *Boeck. in Linnæa*, xxxvi. 322.—N. India; from Sind, *Pinwill* to Chittagong, *J. D. Hooker.*—Africa.

58. **C. Oatesii,** *C. B. Clarke*; umbel large compound, spikes (at least some) peduncled cylindric, spikelets very many distant linear 14-fld., glumes obtuse white-edged slightly inflated incurved not tightly imbricated, wings of rhachilla linear yellow soon separating, anthers oblong not crested, nut small yet nearly $\frac{2}{3}$ length of glume. C. exaltatus, *var.* Oatesii, *C. B. Clarke in Journ. Linn. Soc.* xxi. 188.

BURMA; Thyat Myo, *Oates.*

Very like slenderer forms of *C. exaltatus*, but differing especially in the very narrowly lanceolate yellow deciduous wings of the rhachilla.

59. **C. digitatus,** *Roxb. Fl. Ind.* i. 205; stem tall at top triquetrous, umbel large compound rays divaricate, spikes cylindric, spikelets very many linear 6–40-fld., wings of rhachilla lanceolate yellow soon deciduous, anthers linear-oblong scarcely crested, nut oblong-obovoid $\frac{1}{2}$ length of glume. C. auricomus, *Benth. Fl. Austral.* vii. 286; *C. B. Clarke in Journ. Linn. Soc.* xxi. 188 (*partly, scarcely of Sieber*). C. venustus, *Nees in Wight Contrib.* 86 (descr. erroneous); *Kunth Enum.* ii. 68 (*chiefly*); *Boeck. in Linnæa*, xxxvi. 316 (*partly*) (*not Br.*). C. Neesii, *Kunth l. c.* 101 (*excl. syn. Linn.*).; *Boeck. in Linnæa*, xxxvi. 315; *Trimen in Journ. Bot.* xxiii. 140. C. racemosus, *Retz* (??) (*fid Arn. in Wight Contrib.* 85 *in Obs.* C. quinqueflorus, *Steud.* (*Herb. propr.*) *Syn. Cyp.* 37 (*partly*). C. tuberiferus, *Schrad.*; *Steud. l. c.* 41. Papyrus venustus, *Nees in Linnæa*, x. 138.—Mariscus, *Wall. Cat.* 3429, 3438.

From the PUNJAB to ASSAM, CEYLON, and PENANG.—DISTRIB. Tropics.

Glabrous (even the rhachis of spikes). *Stem* 1½–4½ ft. *Leaves* often as long as stem, ½–¾ in. broad. *Umbel* 8–24 in. in diam.; bracts usually longer than umbel. *Secondary umbels* usually conspicuously bracteoled; spikes corymbose, shortly peduncled. *Spikelets* often ⅓–½ by $\frac{1}{20}$–$\frac{1}{12}$ in., very variable in size, yellow golden rufous or brown. *Glumes* boat-shaped, ovate, scarcely mucronate.—The African *C. auricomus*, Sieber, with which this was united by Bentham, is very closely allied, but differs by the stem sub-3-winged at top, the irregular umbel and other small points.

Var. β *Hookeri* (sp.) Boeck. in Linnæa, xxxvi. 308; spikelets somewhat broader rigid very densely spicate ultimately bright brown, nut a little more acuminate at top. C. Neesii, *Thw. Enum.* 344; *C. B. Clarke in Journ. Linn. Soc.* xxi. 189 in Obs. (*scarcely of Kunth*). C. auricomus, *var.* khasiana, *C. B. Clarke l. c.* 188 and 81. Papyrus elatus, *Nees in Wight Contrib.* 88 (*not Cyperus elatus*, Linn.).—From the Khasia Hills, alt. 4000 ft., to Ceylon.

60. **C. elatus,** *Linn. Sp. Pl.* 67; tall, leaves and bracts long, broad, umbel large compound, spikes narrow cylindric dense with brown suberect spikelets, spikelets linear 14-fld., wings of rhachilla lanceolate yellow caducous, anthers narrow oblong, crest ⅓–½ length of anthers, nut ½–⅔ length of glume. *C. B. Clarke in Journ. Linn. Soc.* xxi. 189. C. racemosus, *Retz Obs* vi. 20?; *Nees in Wight Contrib.* 85; *Kunth Enum.* ii. 100; *Boeck. in Linnæa*, xxxvi. 310.—Cyperus, *Wall. Cat* 3341, A.

DECCAN PENINSULA; *Wight.* PENANG; *Wallich.*—DISTRIB. Malaya.

Stem 3–4 ft. *Leaves* nearly as long, ½ in. broad. Primary rays of *umbel* 6 in.

Var.? *macronus*, C. B. Clarke l. c. 190; larger, with still larger umbel, nut nearly as long as glume.—Bengal; Comilla, *C. B. Clarke.*—*Leaves* ¾ in. broad, two lateral nerves above strongly marked, keel beneath scabrous cutting. Primary rays of umbel 10 in.

61. **C. platyphyllus,** *Roem & Sch. Syst.* ii. 876; very large, leaves

and bracts very long broad, umbel very large, spikes long linear-cylindric, spikelets linear subterete suberect dirty straw-colour, wings of rhacheola broad-lanceolate yellow separating, crest of anthers ½–⅔ length of cells. *C. B. Clarke in Journ. Linn. Soc.* xxi. 190. C. elatus, *Roxb. Fl. Ind.* i. 204 (*not of Linn.*). C. maximus, *Roxb. ms.* C. fastigiatus, *Rottl. in Neu. Schr. Gesell. Freunde Berlin*, iv. 210 (*not of Rottb.*). C. eminens, *Klein, ms.*; *Kunth Enum.* ii. 70; *Boeck. in Linnæa*, xxxvi. 312. C. Roxburghii, *Nees in Wight Contrib.* 84; *Kunth l. c.* 99; *Thw. Enum.* 843. Papyrus latifolius, *Willd. in Abhandl. Akad. Berol.* (1816), 74.—Cyperus, *Wall. Cat.* 3341, B.

DECCAN PENINSULA; *Rottler*, &c. CEYLON; *Thwaites* (n. 3041).

Stem 6 ft., sometimes more, at top triquetrous, scabrous, angles cutting. *Leaves* often 1 in. broad, two lateral nerves prominent above, whitish underneath, often scabrous on keel. Primary rays of *umbel* 8–10 in. *Spikes* 4 in.

RESIDUARY SPECIES.

C. BRUNNESCENS, *Boeck. Cyp. Nov.* ii. 3; robust, wholly brown-fuscous, umbel simple 6–8 in. diam., spikelets oblong obtuse, glumes 8–10-striate with recurved mucro, style very slender deeply 3-fid. Singapore; *Voigt.*

C. CORONARIUS, *Kunth Enum.* ii. 44. (Scirpus coronarius, *Vahl Enum.* ii. 261. Isolepis coronaria, *Roem. & Sch. Syst.* ii. 113.) Bengal. Style trifid, *Kunth*; *bifid*, Vahl, "Resembles Kyllingia monocephalæ" Vahl.

C. CYLINDRICUS, *Boeck. in Flora*, xlii. 437 bis.—IND. ORIENT. "Very like *C. Wallichianus*, Spreng.," Boeckeler. But *C. Wallichianus*, Spreng. has been inscrutable to botanists (see Kunth Enum. ii. 98) nor is it known where Boeckeler has elucidated it.

C. INDICUS, *Boeck. Cyp. Nov.* i. 6 (*not of Persoon*); 2 ft., umbel compound 6 in. diam., spikes dense cylindric, style deeply 3-fid, rhacheola narrowly winged.—Himalaya; Bulwascher Valley, alt. 2000 ft., and Jubbulpore, alt. 1000 ft., *O. Kuntze* ("Near *Cyp. chilensis*," Boeck.).

C. PUSILLUS, *Vahl Enum.* ii. 303, i.e. C. pygmæus, *Retz. Obs.* iv. 9.—Tranquebar.

C. RIGIDULUS, *Vahl Enum.* ii. 342.—Ind. Orient.

C. SETIFOLIUS, *Don Prodr.* 38.—Nepaul.

C. SPONGIOSO-VAGINATUS, *Boeck. Cyp. Nov.* i. 6; tall, umbel compound, spikelets loosely spicate, wings of rhachilla linear-oblong cuspidate yellow soon separating.—BENGAL; *O. Kuntze*.—Perhaps *C. digitatus* or *C. Oatesii*.

C. TENER, *Vahl Enum.* ii. 299.—Ind. Orient.—"Isolepidis sp. 2." *Kunth.*

C. TRISULCUS, *Don Prodr.* 39.—Nepaul.

C. UMBELLATUS, *Burm. Fl. Ind.* 21, t. 9, fig. 1. (*not Roxb.*).—Perhaps grass.

C. WALLICHIANUS, *Spreng. Syst. Cur. Post.* 28 (C. pulcher, *Don Prodr.* 38).—Nepaul.

5. MARISCUS, *Vahl.*

Leaves and *bracts* grass-like. *Glumes* persistent, 2 lowest empty, 1–12 succeeding bisexual nut-bearing; rhacheola disarticulating above the 2 lowest empty glumes leaving a knob.—Otherwise as *Cyperus*.—Sp. 160, warm regions.

Subg. I. BULBOCAULIS. Base of stem oblong thickened by the turgid membranous coloured sheaths. (Sp. 1–2.)

1. **M. Dregeanus,** *Kunth Enum.* ii. 120; stolons 0, umbel contracted into 1 very dense ovoid head, spikelets ovoid bearing 2–6 nuts. **M. irroratus,** *Nees in Hook. Kew Journ.* vi. 28. M. kyllingiæformis, *Boeck. in Flora,* xlii. 443, 496 (*style wrongly* 2-*fid*). Cyperus dubius, *Rottl in Neu Schr. Gesell. Freunde Berlin,* iv. 193; *Roxb. Fl. Ind.* i. 189. *Wall. Cat.* 3326; *Nees in Wight Contrib.* 85; *Thw. Enum.* 344; *Boeck. in Linnæa,* xxxvi. 336 (*in small part*); *C. B. Clarke in Journ. Linn. Soc.* xx. 285 and xxi. 197 (*not of Rottb.*). C. kyllingiæoides, *Vahl Enum.* ii. 312; *Kunth Enum.* ii. 94. C. cruentus, *Boeck. l. c.* 338 (*not of Roxb.*). Scirpus glomeratus, *Linn. Sp. Pl.* 32. Schœnus coloratus, var. β *Linn. Sp. Pl.* ed. ii. 64. Sch. niveus, *Linn. Syst. Veget.* (ed. xiii.), 81.

LOWER BENGAL; *Wallich.* S. DECCAN; up to 5000 ft.; *Rottler, Wight.* CEYLON; *Thwaites,* C.P. 855, 2942, &c. MALAY PENINSULA; from Pegu, SINGAPORE. DISTRIB. Afric., Borneo.

Glabrous. *Stems* 4–16 in., at top triquetrous, rather slender; lowest persistent as torn fibrils. *Leaves* often as long as stems, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, weak; sheath dilated, ferruginous or reddish. *Inflorescence* $\frac{1}{3}$ in. in diam.; bracts 3–5, up to 4–6 in. long, leaf-like. *Spikelets* numerous, $\frac{1}{10}$–$\frac{1}{8}$ in. long, nearly terete; nodes of rhachilla short with elliptic wings. *Nutbearing glume* ovate, blunt, triangular, 14–19-nerved. *Stamens* 3–2; anthers linear-oblong, muticous. *Nut* oblong or somewhat obovoid, trigonous, ashy black, $\frac{2}{3}$–$\frac{3}{4}$ length of glume; style shorter than nut; branches linear, somewhat long.—Cyperus dubius, *Rottb. Descr. et Ic.* 20, t. 4, fig. 5, brought here by all authors, is a *Kyllinga,* probably *K. brevifolia,* Rottb.; the general appearance of the head will not do for *M. Dregeanus*; also in *Kyllinga* the style is always 2-fid, in *Mariscus always* 3-fid.

2. **M. bulbosus,** *C. B. Clarke* (*not of Steud.*); stolons slender, umbel simple with short rays or subcapitate, spikes cylindric dense pale, spikelets broad-oblong, bearing 1 nut. M. pictus, *Nees in Wight Contrib.* 90 (*partly*). Kyllinga bulbosa, *Kœnig ms.*; *Vahl Enum.* ii. 376, *in note*; *Roem. & Sch. Syst.* ii. 247, *in Obs.* (*not of Beauv.*)—Mariscus, *Wall. Cat.* 3435 C (*mainly*). Kyllinga, *Wall. Cat.* 3441 A (*partly*).

DECCAN PENINSULA, *Rottler, Heyne*; Palavarum to Permacoil, in the hills, *Wight*; N. Canara, *Young.*

Glabrous. *Stems* 3–8 in., thickish, trigonous, striate; stolons elongate, $\frac{1}{25}$ in. in diam., clothed by oblong striate pale-brown scales. *Leaves* as long as stem, $\frac{1}{6}$–$\frac{1}{4}$ in. broad; lower sheaths much inflated, striated, brown. *Spikes* about 7, on rays 0–$\frac{1}{2}$ in., up to $\frac{3}{5}$ by $\frac{1}{4}$ in.; bracts 5–7, up to 4–7 in., leaf-like. *Spikelets* $\frac{1}{12}$–$\frac{1}{8}$ in., spreading at right angles. Nut-bearing *glume* ovate, acute, 11–17-striate, straw-colour. *Nut* ellipsoid, trigonous, black-chestnut, $\frac{2}{3}$ length of glume.

Subgen. II. EU-MARISCUS. Base of *stems* not oblong thickened by much dilated leaf-sheaths (though often shortly nodose). *Rhacheola* of spikelets only breaking up at *one* node, viz. that above the two lowest empty glumes.

Sect. 1. Umbellati. *Leaves green. Spikelets green or becoming yellow, bearing* 1–2 (*very rarely* 3) *nuts. Lowest glume of spikelet* (*bracteole of some*) *very acute, aristate.*—[Nearly all are considered by Bentham as varieties of his *Cyp. umbellatus.*] (Sp. 3–7.)

3. **M. paniceus,** *Vahl Enum.* ii., *partly*; stolons long slender, umbel simple, bracts 4–5 long, rays unequal usually short, spikes solitary cylindric dense ebracteate, spikelets small 1-fld.. in fruit broad-lanceolate trigonous curved more or less recurved. *Nees in Wight Contrib.* 89;

Kunth Enum. ii. 119 (*in small part*). M. Wallichianus, *Kunth l. c.* 117. M. Pullu, *Steud. Syn. Cyp.* 66. Kyllinga panicea, *Rottb. Descr. et Ic.* 15, t. 4, fig. 1. Cyperus paniceus, *Boeck. in Linnæa*, xxxvi. 381 (*fig. of Rottler only*). C. umbellatus, *Thw. Enum.* 345 (*not of Roxb.*). C. umbellatus, *var.* panicea, *C. B. Clarke in Journ. Linn. Soc.* xx. 296, and xxi. 201.—Mariscus, *Wall. Cat.* 3433, 3435, *partly*, 3437 B, *partly*.

From LOWER BENGAL to CEYLON.—DISTRIB. Mauritius.

Glabrous, slender. *Stolons* 2–3 by $\frac{1}{25}$ in., clothed by lanceolate striate rich-brown scales. *Stems* 4–12 in., trigonous, nodose at base. *Leaves* often as long as stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, flaccid. *Rays* of umbel 0–1½ in.; bracts often 4 in., leaf-like. *Spikes* ½ by ⅛ in., exactly cylindric, ultimately pale. *Spikelets* (ripe) $\frac{1}{4}$ by $\frac{1}{15}$ in., apparently 4-glumed; 2 lowest glumes empty, persistent; 3rd glume nut-bearing, ovate, deciduous, its upper margins broad scarious nerveless enclosing nut; 4th glume (really the rhacheola of the upper suppressed flower), lanceolate, tip rudimentary glume) elongated. *Nut* oblong, trigonous, black, ⅔ length of glume.

Var. β *Roxburghiana;* larger, stems up to 2 ft., rays of umbel up to 2 in., bracts 5–7, spikelets larger ⅓ in. long (1-fld.). M. cyperinus, *Nees in Wight Contrib.* 90, var. α (*not of Vahl*). Kyllinga umbellata, *Roxb. Ic. Ined.* t. 191. Scirpus echinatus, *Linn. Sp. Pl.* 50, the Ceylon plant, see *Trimen in Journ. Linn. Soc.* xxiv. 135.—Mariscus, *Wall. Cat.* 3434, 3435 B (*partly*).—From Simla to Ceylon.—Distrib. Java.—Rhachilla (above the nut-bearing glume) winged, as long as nut, terminated by a rudimentary glume or by a very small triangular-lanceolate plate.

4. **M. cyperinus,** *Vahl Enum.* ii. 377; rhizome hardly any, umbel simple, bracts 5–7 long, rays short or curved, spikes solitary broad-cylindric dense, spikelets linear-lanceolate usually 2-fld. in fruit suberect brown-green. *Nees in Wight Contrib.* 90 (β only). M. umbellatus, *Moritzi Verz. Zoll. Pfl.* 98; *Zoll. Verz. Ind. Archip.* ii. 63. M. sundaicus, *Miq. Fl. Ind. Bat.* iii. 289. Kyllinga cyperina, *Retz Obs.* vi. 21. Cyperus umbellatus, *Benth. Fl. Hongk.* 386; *Thw Enum.* 345 (*partly*). C. paniceus, *Boeck. in Linnæa*, xxxvi. 381 (*the 2-fld. Java plants*). C. umbellatus *forma* cyperina, *C. B. Clarke in Journ. Linn. Soc.* xxi. 200.—Mariscus, *Wall. Cat.* 3431, 3435 A, *partly*, 3436.

NORTH-WEST INDIA; Moradabad, *Thomson.* COROMANDEL, *Roxburgh*, &c. CEYLON, *Thwaites.* MALAY PENINSULA, *Griffith*, &c.—DISTRIB. As. trop., Polynesia.

Glabrous. *Rhizome* perennial, hardly ⅔ in. Rays of *umbel* 5–10, rigid, acutely triquetrous. *Spikes* ⅔ by ⅛ in., ebracteate. *Spikelets* ⅛ by $\frac{1}{20}$ in., in fruit obliquely erect, dusky reddish-green.—Otherwise as *M. paniceus.*

Var. β *bengalensis;* umbel contracted into 1 head, spikes shortly cylindric or ovoid, spikelets linear bearing 2–4 nuts in fruit spreading at right angles. C. Andersonianus, *Boeck. in Engler Jahrb.* v. 502 (*from descript.*).—Mariscus, *Wall. Cat.* 3437 F. Bengal, alt. 0–4000 ft.; UPPER ASSAM, Sikkim, and KHASIA HILLS.—Stems 1–2 ft., stronger. *Inflorescence* ⅔–1½ in. in diam. *Spikelets* ⅛ by $\frac{1}{15}$ in.; glumes (with ripe nuts) somewhat distant.

5. **M. pictus,** *Nees in Wight Contrib.* 90 (*chiefly*); rhizome short, umbel simple contracted, bracts long, spikes solitary cylindric dense, spikelets linear-oblong bearing 1 nut suberect yellow in fruit, rhacheola very short. Cyperus pictus, *Wallich ms.* C. umbellatus, *Thwaites Enum.* 345 (*partly*). C. paniceus, *Boeck. in Linnæa*, xxxvi. 327 (*partly*). C. umbellatus, *var.* α typical (*partly*), *C. B. Clarke in Journ. Linn. Soc.* xxi. 200 (not *var.* γ picta, 201).—Mariscus, *Wall. Cat.* 3435 A (*partly*).

DECCAN PENINSULA, *Heyne*, &c.

Resembles *M. cyperinus* or *paniceus* β, but differs much in the structure of

the spikelet; the nut is formed as usual in the 3rd glume, the rhacheola above its base is exceedingly short, while the 4th glume (usually containing a barren flower) is well developed.—The ripe nut thus is contained apparently by the 3rd and 4th glumes, not by the 3rd glume and the rhacheola.

6. **M. tenuifolius,** *Schrad. in Mart. Fl. Bras.* ii. (pars 1) 46; stolons slender, umbel simple contracted, spikes solitary cylindric or ovoid loose, spikelets usually bearing 2 nuts dusky-green ultimately suberect. C. umbellatus, *Thw. Enum.* 345 (*partly*). C. umbellatus, *var.* laxata, *C. B. Clarke in Journ. Linn. Soc.* xxi. 201.—Mariscus, *Wall. Cat.* 3432.

DECCAN PENINSULA, *Wallich*, &c. MONGHIR, *Wallich.* MALACCA, *Griffith*, Kew, n. 6241.

Stolons scarcely $\frac{1}{25}$ in. in diam., clothed by lanceolate striate scales. *Stems* slender. *Leaves* very narrow. *Rays* of umbel 0–1 in. *Spikelets* bearing 1–3 (mostly 2) nuts.—From the stolons this plant is usually mixed with *M. paniceus*, but from the structure of the spikelets it must be more closely allied to *M. pictus*.

7. **M. Sieberianus,** *Nees in Linnæa*, ix. 286; rhizome short, umbel simple, bracts 5–10, rays 5–12 up to 1–4 in. ultimately straight, fruiting spikes exactly cylindric, fruiting spikelets linear-lanceolate (or lanceolate) bearing 2–1 nuts dense yellow or pale divaricate on all sides at right angles, nut linear-oblong or oblong (cf. the 3 vars). M. umbellatus, *Vahl Enum.* ii. 376 (*partly*); *Nees in Wight Contrib.* 90 (*chiefly*); *Kunth Enum.* ii. 118 (*chiefly*); *Strachey Cat. Pl. Kumaon*, 74; *E. T. Atkinson Gaz.* x. [1876] 622; *Dalz. & Gibs. Bomb. Fl.* 285. M. cyperinus, *Nees in Wight Contrib.* 90, var. *a* (& var. β *partly*, i. e. *plant of Sieber*); *Royle Ill.* 412. M. paniceus, *Strachey*, 74; *E. T. Atkins l. c.* 622. Scirpus cyperoides, *Linn. Mant.* 181. Kyllinga umbellata, *Roxb. Fl. Ind.* i. 182 (*scarcely of Rottb.*). Cyperus umbellatus, *Miq. in Ann. Mus. Lugd. Bat.* ii. 142. C. umbellatus, *var. a* (*partly*) & ϵ, *C. B Clarke in Journ. Linn. Soc.* xxi. 201. C. ovularis, *Boeck. in Linnæa*, xxxvi. [1869-70], *var. a* (*partly*, not of Torrey). C. cylindrostachys, *Boeck. l. c.* 383 (*chiefly*). C. Steudelianus, *Boeck. in Engler Jahrb.* v. [1884] 91.—Mariscus, *Wall. Cat.* 3437 (*mainly*).

From NORTH-WEST HIMALAYA, alt. 0–6000 ft., and ASSAM to CEYLON and SINGAPORE.—DISTRIB. Warm regions of Old World.

Glabrous. *Stems* 1–2½ ft. *Leaves* often nearly as long as stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, rather weak. *Umbel* 1–5 in. in diam; rays ultimately very straight (not curved as in *M. cyperinus*). *Spikes* solitary (see, however, var. γ), often 1 by ½ in.; bracteoles inconspicuous. *Spikelets* sometimes 1– sometimes 2-fld., varying in length accordingly. *Nut* trigonous, chestnut-colrd., ⅔–¾ length of glume.—*M. umbellatus* is *Kyllinga umbellata*, Rottb. Descr. et Ic. 15, t. 4, fig. 2, a plant abundant in Africa and very close to *M. Siberianus*, but has smaller shorter more bracteate spikes, fuscous-green when ripe.

Var. β *evolutior;* spikelets linear bearing 2–4 nuts. M. corymbosus, *Boeck. in Flora*, xli. 409? Cyperus umbellatus, var. ϵ cylindrostachys, *C. B. Clarke, Journ. l. c.* 201 (*chiefly*). C. biglumis, *C. B. Clarke l. c.* 199 (*partly*), (scarcely Mariscus biglumis, *Gaertner*).—Throughout India (except Madras?).—DISTRIB. Tropics.

Var. γ *subcomposita;* spikes often digitate on the rays bracteolate. M. biglumis, *Gaertn. Fruct.* i. 12, t. 2, fig. 8; *C. B. Clarke l. c.* 199 (*partly*).—Kumaon, alt. 5000 ft., *Strachey.* MADRAS PENINSULA (?), *Wall. Cat.* n. 3437 E.—Japan, Polynesia.—Rheede Hort. Mal. xii. 119, t. 63, usually brought here differs by the spikes not exactly cylindric, the spikelets not spreading at right angles; and is, perhaps, *M. cyperinus* drawn a little too large.

Var. ? δ *khasiana;* spikelets small obtuse yellow bearing 1 deciduous nut.—East Bengal, *Griffith*; Khasia Hills; Shillong, alt. 4000 ft., *C. B. Clarke.*

Sect. 2. Pseudo-cyperus. *Glumes in fruit scarcely imbricate (but persistent). Spikelets bearing* 4 *(or more) nuts.* (Sp. 8–10.)

8. **M. ischnos,** *C. B. Clarke*; umbel of 1–3 spikes nearly (or quite) agglomerated into 1 head, spikelets oblong bearing 4–7 nuts dirty-white, rhacheola very narrowly winged, nut oblong-ellipsoid $\frac{1}{3}$ length of glume. Cyperus ischnos, *Schlecht. in Bot. Zeit.* vii. 99; *Boeck. in Linnæa,* xxxvi. 280.

NILGHIRI and KURG HILLS, *G. Thomson* (the single Old World example).—DISTRIB. Trop. America.

Nearly glabrous. *Rhizome* short. *Stems* 1–2 ft., slender. *Inflorescence* $\frac{1}{4}$ in. in diam., ovoid, dense. *Spikelets* $\frac{1}{4}$ by $\frac{1}{12}$ in. Nut-bearing *glumes* elliptic-oblong, obscurely 9-nerved. *Style* short; branches 3, linear.

9. **M. Hookerianus,** *C. B. Clarke*; umbel of 7 cylindric dense spikes, rays scarcely any, spikelets oblong bearing 4 nuts dirty-white, wings of rhachilla lanceolate deciduous, nut oblong-ellipsoid as long as glume.

SIKKIM; in hot valleys, *J. D. Hooker.*

Glabrous. *Rhizome* (seen) horizontal, woody, rather slender. *Stems* approximate, 20 in. *Leaves* 8–12 by $\frac{1}{6}$ in. *Umbel* $1\frac{1}{2}$ in. in diam.; rays 0–$\frac{1}{4}$ in.; bracts 4, up to 6 in. *Spikes* $\frac{2}{3}$ by $\frac{1}{4}$ in. *Spikelets* $\frac{1}{5}$ by $\frac{1}{16}$ in., when ripe obliquely erect. Nut-bearing *glumes* obtuse, with 9–11 strong nerves. *Nut* trigonous; style branches 3, linear.

10. **M. squarrosus,** *C. B. Clarke*; slender, annual, umbel subsimple spikes loose broad quadrate, spikelets divaricate linear 6–26-fld., glumes elliptic with long recurved mucro, style 3-fid, nut linear-oblong curved. Cyperus squarrosus, *Linn Sp. Pl.* 66, *Rottb. Descr. et Ic.* 25, t. 6, fig. 3; *Nees in Wight Contrib.* 75; *Kunth Enum.* ii. 22; *Dalz. & Gibs. Bomb. Fl.* 281; *Boeck. in Linnæa,* xxxv. 501; *C. B. Clarke in Journ. Linn. Soc.* xx. 284, and xxi. 94 (*excl. var.* β). C. maderaspatanus, *Willd. Sp. Pl.* i. 278 (*excl. syn. Pluk.*). C. hyalinus, *Herb. Heyne*; *Wall. Cat.* 3313 A. C. pusillus, *Herb. Wight (partly).* Pycreus squarrosus, *Nees in Linnæa* ix. 283.—Cyperus, *Wall. Cat.* 3312 D (*partly*).

From BENGAL to CEYLON, and MERGUI.—DISTRIB. Trop. Afric.

Glabrous. *Stems* 3–8 in., caespitose. *Leaves* often as long as stems, $\frac{1}{16}$ in. broad, weak. *Umbel* rays rarely up to 2 in.; bracts exceeding umbel, leaf-like. *Spikelets* 6–20 in a rather loose spike, in the common form $\frac{1}{4}$ in. 6–8-fld., sometimes nearly 1 in., 26-fld.; rhachilla dehiscing from a pulvinus above the two lowest empty glumes. *Stamen* 1. *Nut* about $\frac{1}{3}$ length of glume (excl. its long arista).—Resembles *Cyperus aristatus,* Rottb., with which it was mixed by Linnæus, and by many authors since.

Sect. 3. *Turgiduli. Spikelets oblong or subovoid, hardly compressed. Umbels compound. Robust plants with coarse leaves.* (Sp. 11.)

11. **M. albescens,** *Gaud. in Freyc. Voy. Bot.* 415; leaves somewhat thick transversely lineolate, spikelets closely approximate hardly congested somewhat turgid oblong bearing 3–6 nuts, glumes obtuse, nut short broad ovoid. Cyperus pennatus, *Lam. Ill.* i. 144; *Kunth Enum.* ii. 80; *Thw. Enum.* 343; *C. B. Clarke in Journ. Linn. Soc.* xxi. 194. C. canescens, *Vahl Enum.* ii. 355 (*excl. syn. Rheede*); *Nees in Wight Contrib.* 84; *Kurz*

Veget. Andamans, 54; *Boeck. in Linnæa*, xxxvi. 340.—Cyperus, *Wall. Cat.* 3359 (*mainly*).—*Rheede Hort. Mal.* xii. 103, t. 55.

From BENGAL to CEYLON and SINGAPORE.—DISTRIB. Trop. Afric., Malaya, Austral., Polynes.,—mostly near the sea.

Stems 1–3 feet. *Leaves* often nearly as long as stem, ⅛ in. broad. Rays of *umbel* often 4 in. *Spikes* cylindric or ovoid, cinnamomeous-red or brown or straw-colour.

Sect. 4. Flabelliformes. *Spikelets subulate, bearing* 4–14 *nuts.*

12. **M. microcephalus,** *Presl. Rel. Haenk.* i. 182; large, leaves and bracts spongy, umbel compound or decompound, spikes stellately globose brown, spikelets straight, glumes obtuse rather remote, nut narrowly obovoid top conic almost beaked. M. dilutus, *Nees in Wight Contrib.* 90. M. giganteus, *Boeck. in Flora*, xlii. 443. Cyperus compactus, *Retz Obs.* v. 10, *fide Kunth.* C. dilutus, *Vahl Enum.* ii. 357; *Kunth Enum.* ii. 92; *Thw. Enum.* 344; *Boeck. in Linnæa*, xxxvi. 354; *Kurz Rep. Andamans*, 54, *and in Journ. As. Soc.* xlv. (part 2) 158; *C. B. Clarke in Journ. Linn. Soc.* xxi. 193. C. spinulosus, *Roxb. Fl. Ind.* i. 203.—Mariscus, *Wall. Cat.* 3430, 3439.

Throughout INDIA, alt. 0–3000 ft.; from MUSSOOREE and ASSAM to CEYLON and PENANG.—DISTRIB. Mauritius, China, Malaya.

Glabrous. *Rhizome* short. *Stems* 1–3 ft. *Leaves* nearly as long as stem, ⅛ in. broad. *Umbel* often 8–12 in. in diam.; spikes of 20–40 spikelets. *Spikelets* sometimes ⅔ by $\frac{1}{12}$ in., bearing 14 nuts, often much shorter bearing 4–8 nuts. Nut-bearing *glumes* boat-shaped with 9 faint nerves. Wings of rhachilla oblong, hyaline persistent.

Subg. III. TORULINIUM (*Gen. Desv.*). Spikelets bearing several nuts; rhacheola finally breaking up into joints each containing 1 nut.

13. **M. ferax,** *C. B. Clarke*; large or middle-sized, umbel usually large compound, spikelets numerous spicate linear bearing 4–16 small oblong black nuts, which fall off in the joints of rhacheola held by the persistent wings. Cyperus ferax, *L. C. Rich. in Act. Soc. Hist. Nat. Paris*, i. 106; *Kunth Enum.* ii. 89; *Boeck in Linnæa*, xxxvi. 399; *C. B. Clarke in Journ Linn. Soc.* xx. 295 (*excl. syn. C. lutens*), and xxi. 191. C. odoratus, *Forst Prod. Ins. Austral.* 6; *Boeck. in Linnæa*, xxxvi. 407 (*not of Linn.*). C ferox, *Vahl Enum.* ii. 357. C. pennatus, *Herb. Mus. Paris*; *Boeck. l. c.* 404 (*not of Lam.*). Diclidium ferox, *Schrad. in Mart. Fl. Bras.* ii., pars 1, 54.

BENGAL; Furidpore, *C. B. Clarke.* PEGU, *Kurz*, n. 2686. MERGUI, *Griffith* (*Kew Distrib.* nn. 6143, 6198).—DISTRIB. All warm regions.

Glabrous. *Stolons* 0; rhizome hardly any. *Stems* often 12–20 in., leaves nearly as long, ⅛ in. broad; but small examples occur. *Umbel* very variable, from ½–24 in. in diam.; bracteoles (bracts to the secondary umbels) usually conspicuous, leaf-like, but sometimes (as in type of L. C. Richard) very small. Axis of *spikes* ½ in. carrying about 20 spikelets which ultimately spread at right angles. *Spikelets* commonly ⅛–½ by $\frac{1}{16}$ in., bearing 6–10 nuts, yellow or brown. *Glumes* quadrate-elliptic, hardly keeled, about 7-nerved; rhachilla (especially in fruit) usually flexuose; wings short, elliptic, ultimately becoming firmer, yellowish-brown, enfolding the nut. *Nut* oblong or ellipsoid, overtopping the wings; style hardly ½ length of nut, slender; branches linear.—This abundant American species has, after several doubtfully-distinct forms have been split off as species, been described under 53 names.

6. COURTOISIA, *Nees.*

Glumes persistent, 2 lowest empty, 1–3 succeeding (in the Indian species) bisexual nut-bearing winged on keel; rhacheola disarticulating above the two lowest empty glumes. Otherwise as *Mariscus*.—Species 2 or 3, in Africa, Madagascar, India.

C. cyperoides, *Nees in Linnæa,* ix. [1834] 286, *and in Wight Contrib.* 92; umbel compound, spikes globose very dense yellow-brown, spikelets compressed very flat broad-elliptic containing 1–2 nuts, style 3-fid, nut narrow-oblong ⅔ length of glume. *Arn. in Edinb. N. Phil. Jonrn.* xvii. 262; *Kunth Enum.* ii. 127; *Boeck. in Flora,* xliv. 335, *and in Linnæa,* xxxv. 434; *Benth. in Hook. Ic. Pl.* t. 1341. Kyllinga cyperoides, *Roxb. Fl. Ind.* i. 182. Mariscus cyperoides, *Dietr. Sp. Pl.* ii. 348. Cyperus Kleinianus, *Hochst. in Herb. Hohenack.*, n. 645. C. glomeratus, *Klein ms.*—*Wall. Cat.* 3537.

From SIKKIM and ASSAM to MADRAS and PEGU, alt. 0–6000 ft., frequent.—DISTRIB. Madagascar.

Glabrous, annual. *Stems* 3–16 in., caespitose. *Leaves* often as long as stem, ⅛ in. broad, nearly smooth. *Umbel* rays 3–10, up to 1-4 in. long; bracts 3–7, up to 4–12 in. long; raylets of umbellules 3–5, up to 1 in.; bracteoles of umbellules often 1 in. *Spikes* ¼–½ in. in diam. *Spikelets* ⅛ in. *Glumes* boat-shaped, flattened; keel with a continuous glistening entire wing its whole length; sides not striate. *Stamens* 3; anthers oblong. *Nut* trigonous, acutely-pyramidal at top, almost beaked, chestnut black, smooth, outermost cells small, subquadrate. *Style* short, persistent; branches linear, much longer than style, exsert.

7. ELEOCHARIS, *R. Br.*

Glabrous. *Stems* simple, erect, without nodes. *Leaves* 0, sheaths few cylindric truncate or with a small unilateral subapical tooth, barren leaf-like stems often present. *Inflorescence* a single (rarely more) terminal spikelet. *Glumes* imbricate on all sides, obtuse; lowest "bract," (but not always empty), not longer than the spikelet. Lowest *flower* nut-bearing, perfect; many succeeding glumes usually nut-bearing, upper tabescent. Hypogynous *bristles* 8–5, rarely fewer (in *E. atropurpurea*, often small or 0). *Stamens* 3–1, anterior; anthers linear-oblong, not crested. *Style* linear, as long as the nut, branches 3 or 2, linear; style-base dilated, constricted or apparently articulated on the nut, but usually persistent. *Nut* obovoid, plano-convex (when style bifid) or trigonous (when style trifid).—Species 113, cosmopolitan.

Sect. I. LIMNOCHLOA, *Nees in Wight Contrib.* 114 (*not of Lestib.*); stems stout or medium; spikelets elongate, many-fid.; glumes subrigid, plano-concave, not (or scarcely) keeled, of one colour nearly.—All stoloniferous.

* *Nut smooth* (i.e. outer cells small, quadrate-hexagonal, inconspicuous). *Style* 2–3-fid.

1. **E. plantaginea,** *Br. Prod.* 224 (*in note*); stems robust terete transversely septate when dry, spikelet fuscous straw-colrd. hardly wider than stem, style 2–3-fid. *Miq. Fl. Ind. Bat.* iii. 302; *Thwaites Enum.* 352. E. tumida, *Roem. & Sch. Syst. Mant.* ii. 86. Scirpus plantaginoides, *Rottb. Descr. et Ic.* 45, t. 15, fig. 2. S. plantagineus, *Retz. Obs.* v. 14; *Roxb. Fl. Ind.* i. 212 ? S. dubius, *Roxb. l. c.* 215 (specimen imper-

fect). S. tumidus, *Roxb. l. c.* Limnochloa plantaginea and tumida, *Nees in Wight Contrib.* 114. Heleocharis plantaginea, *Boeck. in Linnæa*, xxxvi. 474 in small part. Eleocharis, *Wall. Cat.* 3454 (*except B*).

From SIND, SAHARUNPORE and ASSAM to CEYLON and the MALAY PENINSULA. —DISTRIB. Tropics of Old World.

Stolons long, $\frac{1}{8}$ in. diam. *Stems* 1–3 ft., $\frac{1}{6}$–$\frac{1}{4}$ in. diam.; slender (*Sc. plantaginineus*, Roxb.), or stout (*Sc. tumidus*, Roxb.); sheaths membranous, soon torn. *Spikelet* $\frac{1}{2}$–1$\frac{1}{2}$ by $\frac{1}{8}$–$\frac{1}{3}$ in. (in some Madagascar examples 3$\frac{1}{2}$ in. long). *Glumes* $\frac{1}{3}$ in., suberect, densely packed, obovate, with numerous striations on the back; 1–3 lowest empty persistent, lowest stouter appearing as though a continuation of the stem. *Bristles* 7, equalling or exceeding the nut, retrorsely scabrous, yellow-brown. *Nut* rather large, $\frac{1}{3}$–$\frac{2}{3}$ of glume, biconvex or obscurely trigonous; style-base depressed conic, brown-black. The American plants referred to *plantaginea* by Boeckeler are very distinct (*E. interstincta*, Br.) (see Benth. Fl. Austral. vii. 292).

2. **E. equisetina,** *Presl. Rel. Hænk.* i. 195; stems slender terete transversely septate when dry, spikelet fuscous straw-colrd. wider than the stem, style 2-fid.

CEYLON; *Walker, Thwaites* (C.P. 3777).—DISTRIB. N. Caledonia, Philippines.

Stems 1 foot, $\frac{1}{10}$–$\frac{1}{8}$ in. diam.; uppermost sheath close-fitting, firm, terminated on one side by an oblong-triangular tooth. *Nut* obovoid, somewhat narrowed triangularly at top.—Perhaps a var. of *E. plantaginea*; I cannot distinguish the Ceylon from the Philippine examples.

** *Nut reticulate or trabeculate. Style* 3-*fid, rarely* 2-*fid.*

3. **E. variegata,** *Kunth Enum.* ii. 153; stems robust nearly terete not transversely septate, glumes suberect laxly imbricate red-brown near their margin, bristles 7 retrorse scabrous about as long as the cancellate nut. Heleocharis variegata, *Boeck. in Linnæa*, xxxvi. 470.—Mascarene Isles.

Var. *laxiflora*, stems more slender, subtrigonous under narrower spikelet, glumes fuscous green not red brown near margin, bristles longer than finely trabeculate nut. Scirpus laxiflorus, *Thw. Enum.* 435.—Eleocharis, *Wall. Cat.* 3454, B (*partly*).

ASSAM; *Simons.* SILHET; *J. D. Hooker.* CEYLON; *Thwaites*, MALAY PENINSULA, frequent to SINGAPORE, *Kurz.*—DISTRIB. Malaya, China, Polynesia.

Stems 8–16 in.; uppermost sheath membranous, on one side ovate, subacute at top. *Spikelet* nearly 1 by $\frac{1}{8}$ in. *Glumes* $\frac{1}{3}$ in., lowest as though a continuation of the stem, persistent. *Style* 3-fid, or sometimes 2-fid. *Nut* slightly narrowed at apex, style-base conic; outer cells transversely oblong, small, superposed in 30–40 vertical series, the nut appearing longitudinally 30–40-striate.

4. **E. ochrostachys,** *Steud. Syn. Cyp.* 80 (*not of Boeck.*); stems slender nearly terete not transversely septate many barren intermixed, spikelet slender scarcely broader than the stem, glumes suberect laxly imbricate dusky green, style 3-fid. Heleocharis subulata, *Boeck. in Flora*, xli. 412.

MALACCA; *Griffith.* SINGAPORE; *Ridley.*—DISTRIB. Java, Borneo.

Stems 8 by $\frac{1}{10}$–$\frac{1}{12}$ in. *Spikelet* less than $\frac{1}{2}$ in.—This does not differ much from very slender examples of *S. variegata*, var. *laxiflora*, except by the numerous barren stems.

5. **E. fistulosa,** *Schultes in Roem. & Sch. Syst.* ii. *Mant.* 89; stems robust not transversely septate triquetrous under the spikelet, spikelet

nearly an inch acute, bristles 6 as long as the cancellate nut retrorsely scabrous, style usually 3-fid. E. acutangula and media, *Schultes l. c.* 91. E. planiculmis, *Steud. Syn. Cyp.* 80; *Zoll. Verz. Ind. Archip.* ii. 62. Scirpus fistulosus, *Poir. Encycl.* vi. 749. S. acutangulus and medius, *Roxb. Fl. Ind.* i. 213. Limnochloa media and acutangula, *Nees in Wight Contrib.* 114. Heleocharis fistulosa, *Boeck. in Linnæa*, xxxvi. 472.—Eleocharis, *Wall. Cat.* 3453.

From NEPAL and ASSAM to BURMA and CEYLON.—DISTRIB. Tropics generally.

Stems 1–3 ft. by $\frac{1}{8}$ in. *Spikelet* scarcely broader than the stem, dusky green. *Glumes* $\frac{1}{3}$ in., suberect, obovate, rather laxly imbricate, dirty straw-colrd. *Nut* as long as $\frac{1}{2}$ glume, unequally biconvex, obovoid, top narrowed; style-base ovoid-conic; outermost cells transverse-oblong, superposed in 24–40 vertical series, nut hence longitudinally striate.

6. **E. spiralis,** *Br. Prod.* 224 (*in note*); stems robust not transversely septate triquetrous under spikelet, spikelet $\frac{2}{3}$–1 in. obtuse, glumes obtuse subtruncate, bristles much shorter than cancellate nut irregular smooth. *Thw. Enum.* 352 (*excl. syn. media*). Scirpus spiralis, *Rottb. Descr. et Ic.* 45, t. 15, fig. 1; *Roxb. Fl. Ind.* i. 212; *Wall. Cat.* 3454, B (*partly*). S. mutatus, *Roxb. mss.* Limnochloa spiralis, *Nees in Wight Contrib.* 114.

S. INDIA; not common; E. BENGAL; *Griffith*; *Kurz.* BOMBAY; Salsette, *Jacquemont.* DECCAN PENINSULA; *Wallich.* BURMA; *Griffith*, &c. CEYLON; *Thwaites*, &c.—DISTRIB. Mauritius?

Stems 2 ft. by $\frac{1}{8}$–$\frac{1}{4}$ in. *Spikelet* $\frac{1}{6}$–$\frac{1}{5}$ in. diam.; very dense, marked by a spiral line apparently i.e. the summits of the very erect close regular glumes. *Glumes* obovate, summit much depressed triangular nearly truncate. *Style* 2–3-fid. *Bristles* slender from $\frac{1}{4}$–$\frac{1}{3}$ the length of the glume, half-obsolete. *Nut* half as long as glume; style-base often nearly confluent with nut; outermost cells shortly transversely oblong, superimposed in 36–40 vertical series, so that the nut exhibits 36-40 slender striations.

Sect. II. ELEOGENUS, *Nees in Wight Contrib.* 112 (Genus); stems slender or medium; spikelets many or few-fld., usually wider than the stems; glumes membranous, usually 1–3-nerved, keel green; style 2-fid.—Heleocharis (Genus), *Lestib. Essai Cyp.* 41.

7. **E. atropurpurea,** *Kunth Enum.* ii. 151; roots fibrous, stems slender, spikelet small ovoid or subcylindric, bristles retrorsely scabrous white or 0, nut black smooth, style 2-fid base small depressed-conic white. *J. Gay in Flora* xxv. 641; *C. B. Clarke in Journ. Bot.* xxv. 269. Scirpus atropurpureus, *Retz. Obs.* v. 14; *Roxb. Fl. Ind.* i. 219; *Reich. Ic. Fl. Germ.* viii. 37, t. 295. Eleogenus atropurpureus, *Nees in Wight Contrib.* 113. Heleocharis atropurpurea, *Boeck. in Linnæa*, xxxvi. 454 (*excl. var.* γ).—Isolepis, *Wall. Cat.* 3489.

WEST HIMALAYA, alt. 3000 ft., to ASSAM and CEYLON.—DISTRIB. Tropics generally, except Malaya.

Stems 2–6 in. *Spikelet* $\frac{1}{3}$–$\frac{1}{2}$ in., many-fld. *Glumes* broad, obtuse, black-chestnut, keel green. *Bristles* in the Indian tropical examples usually 7–5, as long as the nut, in the Himalayan (as in the European) examples 0 or very small. *Nut* minute, obovoid, compressed, as long as $\frac{1}{3}$–$\frac{2}{3}$ glume.

8. **E. capitata,** *Br. Prod.* 225; roots fibrous, stems somewhat slender, spikelet small dense obtuse, bristles as long as nut retrorsely scabrous brown or ferruginous, nut black smooth, style 2-fid base small depressed

pale. *Decne in Nouv. Ann. Mus.* iii. 361; *Thw. Enum.* 351; *Dalz. & Gibs. Bomb. Fl.* 285; *Miq. Fl. Ind. Bat.* iii. 299. Scirpus capitatus, *Linn. (partly)*; *Roxb. F. Ind.* i. 215. Eleogenus capitatus, *Nees in Wight Contrib.* 112. Heleocharis capitata, *Boeck. in Linnæa*, xxxvi. 461.—Isolepis? *Wall. Cat.* 3486, 3487, A, 3493.

BEHAR and BENGAL to CEYLON and SINGAPORE, not common.—DISTRIB. Most warm countries.

Stems 2–14 in. *Spikelet* ⅛–½ in., pale. *Bristles* 7, or fewer. *Nut* as long as ⅔ glume, compressed, obovoid.—Usually easily distinguished from *E. atropurpurea* by its larger size; but small examples can hardly be separated except by the coloured bristles (which are glistening-white in *E. atropurpurea*).

9. **E. ovata,** *Br. Prod.* 224 (*in note*); roots fibrous, stems somewhat slender, spikelet small dense, bristles exceeding the nut retrorsely scabrous brown, nut straw-colrd. or brownish smooth, style 2-fid base broad triangular. *C. B. Clarke in Journ. Bot.* xxv. 268. Scirpus ovatus, *Roth. Catal.* i. 5. Eleogenus ovatus, *Nees in Linnæa*, ix. 294. Heleocharis ovata, *Boeck. in Flora*, xliii. 2, and *in Linnæa*, xxxvi. 462; *Boiss. Fl. Orient.* v. 387.

INDIA; *Wallich*, 3487 (*partly in Herb. Kew*).—DISTRIB. Tropics and temp. regions.

Very much resembles *E. capitata*, except in the colour of the nut, and the shape of the style-base.

10. **E. palustris,** *Br. Prod.* 224 (*in note*); rhizome creeping, stems medium or stoutish, spikelet ellipsoid or cylindric dense-fld., nut yellow or brownish, style 2-fid base conical or ovoid, *Nees in Wight Contrib.* 113; *C. B. Clarke in Journ. Bot.* xxv. 267. E. uniglumis, *Nees l. c.* 113. Scirpus palustris, *Linn. Sp. Pl.* 70; *Reichb. Ic. Fl. Germ.* viii. 38, t. 297. S. uniglumis, *Link Jahrb.* iii. 77. Heleocharis palustris, *Boiss. Fl. Orient.* v. 386; *Boeck. in Linnæa*, xxxvi. 466 (excl. examples with 3-fid style).—Eleocharis, *Wall. Cat.* 3449, 3450, 3451, 3455.

From the W. HIMALAYA, ascending to 12,500 ft., to SIND and BENGAL.—DISTRIB. Cosmopolitan (not known from Australia, Oceania or Malaya).

Rhizome black or chestnut. *Stems* 4–20 by $\frac{1}{25}$–$\frac{1}{8}$ in. diam.; uppermost sheath truncate, on one side sometimes triangularly produced. *Spikelet* ⅛–1 by ⅛ in., chestnut or straw-colrd. *Glumes* obtuse, persistent, keel green, lowest empty about ½ surrounding or (in form *uniglumis*) almost wholly surrounding stem. *Bristles* 6, as long as nut, retrorsely scabrous, rusty-brown, or (more frequently) reduced both in numbers and length. *Stamens* 3, but in flowers near the tabescent top of the spikelet, and in small depauperated examples, 2–1. *Nut* as long as ½ glume, unequally biconvex, obovoid, much narrowed at top, sometimes to a very short beak; style-base contracted below on nut; outer cells of nut quadrate-hexagonal or shortly longitudinal oblong, obscure i.e. nut smooth; or very rarely cells more prominent, i.e. nut reticulated.

Sect. III. ELEOCHARIS proper.—As Sect. II. (Eleogenus), but style 3-fid.—Limnochloa, *Lestib. Essai Cyp.* 41 (*not of Nees.*)

* Aciculares. *Nut trabeculate* i. e. its outer transversely-oblong small cells superimposed in vertical series so that the nut appears longitudinally striate.

11. **E. acicularis,** *Br. Prod.* 224 (*in note*); rhizome filiform, stems capillary, spikelet slender few-fld., style 3-fid, nut oblong-lanceolate straw-

colrd. *C. B. Clarke in Lond. Journ. Bot.* xxv. 270. Scirpus acicularis, *Linn. Sp. Pl.* 71 (*partly*); *Reich. Ic. Fl. Germ.* t. 294, eleocharis; *Boeck. in Linnæa*, xxxvi. 431. Chætocyperus costulatus, *Nees et Meyen Pl. Meyen*, 96.

MADRAS PENINSULA; *Rottler* (*Herb. Kew*).—DISTRIB. Europe, N. & E. Asia, America.

Stems 2–4 in. *Spikelet* ⅛ in., with 4–6 (rarely 8–10) nuts. *Glumes* in the few-fld. spikelets subremote, lower 2–3-stichous, upper distinctly spiral. *Bristles* 3–4, white, feebly retrorse scabrid, variable in length, occasionally wanting. *Nut* as long as ½–⅔ the glume, polyhedral, subterete, with 12–15 longitudinal ribs; style-base small narrow bulbiform.

** Chætarieæ. *Nut coarsely prominently cancellate*, i.e. its outer sub-quadrate large cells prominent.

12. **E. Chætaria**, *Roem. & Sch. Syst.* ii. 154 and *Mant.* ii. 90; roots fibrous, stems small, spikelet small few-fld., style 3-fid, nut triquetrous white truncate. E. setacea, *Br. Prod.* 224 (*in note*), not 225. Cyperus setaceus, *Retz. Obs.* v. 10; *Roxb. Fl. Ind.* i. 185. Chætocyperus Limnocharis, *Nees in Wight Contrib.* 96. Ch. setaceus, *Nees in Linnæa*, ix. 289; *Miq. Fl. Ind. Bat.* iii. 298; *Thw. Enum.* 351. Heleocharis Chætaria, *Boeck. in Linnæa*, xxxvi. 428.—Isolepis, *Wall. Cat.* 3485.

BENGAL to CEYLON and MALACCA.—DISTRIB. Tropics.

Rhizome 0, or sometimes nearly an inch, filiform, white. *Stems* usually 1–4 in., occasionally 6–10 in.; uppermost sheath lax, whitened, scarcely torn. *Spikelet* ⅛ in., with 1–4 nuts. *Glumes* subdistichous, upper spiral. *Bristles* 6, as long as nut, retrorsely scabrous, pale, occasionally smaller or obsolete. *Nut* as long as ½ glume, the acute angles sometimes excurrent at its shoulder, outer cells in each face in 6–10 series, sometimes perforated, style-base depressed-conic.

*** Leiocarpicæ. *Nut smooth*, i.e. outer cells quadrate-hexagonal or shortly longitudinal oblong obscure so that the nut is neither distinctly striated nor distinctly reticulated.

13. **E. subvivipara**, *Boeck. in Linnæa*, xxxvi. 424 (Heleocharis) cæspitose, stems filiform, spikelet often proliferous, lower glumes 2–3-stichous, nut obovoid much narrowed at top, style 3-fid base linear-conic. H. cæspitosissima, *Baker in Journ. Linn. Soc.* xxi. 450.

KHASIA HILLS; alt. 4–5000 ft., *C. B. Clarke*; NILGHIRI HILLS (fide Boeckeler).—DISTRIB. Madagascar.

Roots fibrous, or (fide Baker) slender stolons sometimes present. *Stems* 4–16 in.; uppermost sheath truncate. *Spikelet* ⅛–⅓ in., few-fld., sometimes longer clavate with many empty lower glumes. *Bristles* 6, as long as nut, retrorse-scabrous, pale ferruginous. *Nut* as long as ½–⅔ the glume, trigonous, olive, narrowed at top into an exceedingly short narrow neck; style-base very much narrower than nut, wider than neck of nut.

14. **E. afflata**, *Steud. Syn. Cyp.* 76; caespitose, stems slender uppermost sheath truncate spikelet dense sometimes proliferous, nut obovoid yellowish green, base large pyramidal, style 3-fid, *Miq. Fl. Ind. Bat.* iii. 299. E. subprolifera, *Steud. l. c.* 80; *Miq. Fl. Ind. Bat.* iii. 300. Scirpus afflatus, *Benth. Fl. Hongk.* 394. Heleocharis subprolifera, *Boeck. in Linnæa*, xxxvi. 426. H. Thomsoni, *Boeck. l. c.* 451. H. ochrostachys, *Boeck. l. c.* 452 (*not of Steud.*). H. chlorocarpa, *Boeck. in*

Flora, lxi. 1878, 34. H. Kuntzei, *Boeck. Cyp. Nov.* i. 14.—Eleocharis sp. n. 3, *Herb. Ind. Ord. H. f. & T. Th.*

KHASIA HILLS, alt. 0–6000 ft.; ASSAM; *Griffith*; MUNNIPORE, *Watt*; BURMA, *Griffith*, &c.—DISTRIB. E. Asia, Java.

Stems 4–16 in., 4–6-striate; uppermost sheath with an oblique triangular (scarcely mucronate) mouth. *Spikelet* ⅓–½ in., lower glumes in numerous spires. *Bristles* 6 or 5–4, as long as nut, retrorsely scabrous, pale brown. *Nut* as long as ½–¾ glume, trigonous, top slightly narrowed truncate closely applied to style-base (not forming a minute neck under it).

15. **E. congesta,** *Don Prodr.* 41; caespitose, stems slender, uppermost sheath truncate with a lateral tooth, spikelet dense sometimes proliferous, style 3-fid, nut obovoid narrowed at top yellowish brown, style-base bulbiform. E. palustris (? Br. vel. sp. nova) *Strachey Cat. Pl. Kumaon*, 73. E. ovata, *Thw. Enum.* 351 (*not Br.*). Scirpus congestus, *Spreng. Syst. Cur. post.* 27.—Eleocharis purpurascens, *Boeck. in Linnæa*, xxxvi. 455.

Throughout INDIA, alt. 3–6500 ft. (except Bengal). KASHMIR, *C. B. Clarke*; NEPAL, *Wallich*; CHOTA NAGPORE, *C. B. Clarke*; NILGHIRI HILLS, *Perottet*; CEYLON; *Thwaites.*

Stems with many striations (hence nearly terete), not 4–6-striate angular (as *E. afflata*); mouth of uppermost sheath usually horizontal with a small tooth ⅛ in. long excurrent horizontally below the margin then curving upwards.—Otherwise as *S. afflata*, of which this may be a Western var., often referred to *E. palustris*, from which species it widely differs in the fibrous roots, 3-fid style and trigonous nut.

16. **E. tetraquetra,** *Nees in Wight Contrib.* 113; rhizome short, stems 4–3-quetrous, spikelet oblong-ellipsoid dense, bristles 6 longer than nut brown-red densely retrorse-scabrous subplumose, style 3-fid. *Thw. Enum.* 351. E. erythrochlamys, *Miq. Fl. Ind. Bat.* iii. 300. Heleocharis tetraquetra, *Boeck. in Linnæa*, xxxvi. 447. H. Wichurai, *Boeck l. c.* 448. H. alta, *Boeck. Cyp. Nov.* i. 17. Scirpus Wichurai, *Franch. & Sav. Fl. Japon.* ii. 544 (*not of Boeck.*). S. Hakonensis and S. Onaei, *Franch. & Sav. l. c.* ii. 110, 111. S. petasatus, *Maxim. in Bull Soc Mosc.* liv. 64.—Eleocharis, *Wall Cat.* 3452.

Throughout INDIA in the hills, alt. 1500–11,000 ft.; from KUMAON to SIKKIM, and the KHASIA HILLS to CEYLON and BURMA.—DISTRIB. E. Asia, Australia.

Rhizome usually descending, short; long slender stolons covered by scales, sometimes present. *Stems* 8 in. to nearly 3 ft.; uppermost sheath truncate, with sometimes a minute lateral tooth. *Spikelet* ⅛–⅓ in., often a fine brown. Retrorse barbs of the *bristles* much longer more densely placed than in other species, in evolute examples bristles quite plumose. *Nut* ⅓ length of glume, trigonous, obovoid, yellowish, narrowed at top; style-base equalling ⅓–¾ length of nut, ovoid, fuscous, scabrous.

8. FIMBRISTYLIS, *Vahl.*

Stems tufted, roots fibrous or woody, short; stolons 0 (except in *F. stolonifera & Pierotii*). *Leaves* only near base of stem. *Inflorescence* terminal, umbellate, corymbose or reduced to few (or one) spikelets. *Spikelets* solitary or clustered, many-fld. *Glumes* imbricate on all sides or (in Sect. *Abildgaardia*) lower distichous or subdistichous, uppermost nut-bearing spiral; 1-2 (rarely 3) lowest empty, several succeed-

ing with bisexual flowers deciduous, upper tabescent. *Stamens* 3 or 2–1, anterior; anthers not (or shortly) crested. *Bristles* 0. *Style* long or longish, often villous, 3- or 2-fid, deciduous (leaving no button), or persistent; style-base dilated, constricted below the dilatation. *Nut* obovoid (very rarely oblong), obtuse; gynophore more or less prominent, sometimes dilated at apex into an obscurely 3-lobed saucer.—Species 125, all warm regions.

CONSPECTUS OF THE SECTIONS (exceptions omitted).

Sect. I. ELEOCHAROIDES. Stems with one spikelet	Sp. 1–9.
Sect. II. DICHELOSTYLIS. Style 2-fid.	
Series A. Spikelets solitary	Sp. 10–26.
Series B. Spikelets clustered	Sp. 27–30.
Sect. III. TRICHELOSTYLIS. Style 3-fid.	
Series A. Spikelets solitary	Sp. 31–45.
Series B. Spikelets clustered	Sp. 46–51.
Sect. IV. ABILDGAARDIA. Lower glumes distichous	Sp. 52–58.

Sect. I. ELEOCHAROIDES, *Benth. Fl. Austral.* vii. 301. Lowest fertile glumes of the spikelet spirally imbricated; stems with 1 spikelet (1–3 in *F. polytrichoides*).

* *Style 2-fid; nut biconvex.*

† *Nut oblong, style subpersistent.*

1. **F. tetragona,** *Br. Prod.* [1810] 226; stem nearly leafless, spikelet somewhat large conic dense-fld., style-branches 2 short, nut reticulate straw-colrd. *Benth. Fl. Austral.* vii. 305. F. cylindrocarpa, *Kunth Enum.* ii. 222; *Boeck. in Linnæa,* xxxvii. 7; *Kurz in Journ. As. Soc.* xxxix. part 2. 85. F. abjiciens, *Steud. Syn. Cyp.* 107; *Miq. Fl. Ind. Bat.* iii. 316. F. Arnottii, *Thw. Enum.* 348. Mischospora efoliata, *Boeck. in Flora,* xliii. 113.—Isolepis ?, *Wall. Cat.* 3490 F.

Throughout INDIA, except the North-West, alt. 0–3000 ft.; from NEPAL and BOMBAY to CEYLON and TAVOY.—DISTRIB. E. Asia, Australia.

Glabrous. *Stems* 4–24 in., tufted, obscurely quadrangular; uppermost sheath laterally mucronate or produced, sometimes up to 1–1½ in., lanceolate, coloured, hardly foliaceous. *Spikelet* ⅛–⅔ in., terete, erect. *Glumes* oblong, truncate, scarcely mucronate, keeled, horizontally spreading; 2 or 3 lowest empty, ovate, much shorter than spike. *Stamens* 2 (rarely 3). *Style* long, flattened, villous nearly to the base. *Nut* as long as ⅓–¾ glume, linear-oblong, plane-convex, curved, deciduous with glume, stalked; outermost cells quadrate-hexagonal, conspicuous, in about 9 longitudinal series on each face of nut.

†† *Nut obovoid, transversely wavy wrinkled or ridged* (outermost cells longitudinally oblong).

2. **F. acuminata,** *Vahl Enum.* ii. 285; stem leafless with one erect lanceolate spikelet, style 2-fid, nut obovoid transversely wavy wrinkled straw-colrd. rarely becoming discoloured brown. *Nees in Wight Contrib.* 96; *Miq. Fl. Ind. Bat.* iii. 314; *Thw. Enum.* 348; *Boeck. in Linnæa,* xxxvii. 3. F. acicularis, *Br. Prod.* 226. Scirpus scaber, *Roxb. Fl. Ind.* i. 220. Eleogiton scabra, *Dietr. Sp. Pl.* ii. 99.—Isolepis ?, *Wall. Cat.* 3487 B (*partly*), 3494.

Throughout INDIA, alt. 0-2000 ft., from KUMAON and ASSAM, to CEYLON and MALACCA.—DISTRIB. E. Asia, Malaya, Australia.

Glabrous. *Stems* 4–12 in., slender, obscurely quadrangular; uppermost sheath produced on one side, 0–½ in. *Spikelet* ⅓–¾ in. *Glumes* ovate, scarcely mucronate, pale or chestnut with green keel; lowest 2–3 empty, much shorter than spikelet. *Stamens* usually 2. *Style* nearly as long as nut, flattened, slightly villous at top; branches shorter than style. *Nut* as long as ⅓–½ glume, biconvex, with 4–7 strong transverse ridges.

3. **F. setacea,** *Benth. in Hook. Lond. Journ. Bot.* ii. [1843] 239; stem bristle-like, leafless (see var.) with one slender erect lanceolate spikelet, style 2-fid, nut very small obovoid transversely wavy wrinkled white. F. acuminata, β minor, *Miq. Fl. Ind. Bat.* iii. 314; *Boeck. in Linnæa,* xxxvii. 4. Isolepis cochleata, *Steud. Syn. Cyp.* 100.

S. BURMA, *Kurz.* SINGAPORE, *Kurz, Ridley.*—DISTRIB. Amboyna, N. Australia.

Stem 4–6 in. *Spikelet* ¼ by $\frac{1}{12}$ in. *Glumes* pale, thin, almost (except keel) hyaline.—Differs from *F. acuminata* by its slenderness and very small nut.

Var. *brevifolia* (sp.) *Steud. l. c.* 72 (sub *Abildgaardia*); leaves more or less developed, sometimes nearly as long as stem.—Philippines, Australia.

4. **F. nutans,** *Vahl Enum.* ii. [1806] 285; stem nearly leafless, spikelet oblong or ovoid often oblique, style 2-fid, nut obovoid transversely wavy wrinkled white rarely discoloured. *Nees in Wight Contrib.* 96; *Thw. Enum.* 348; *Boeck. in Linnæa,* xxxvii. 5. Scirpus nutans, *Retz Obs.* iv. 12.

KHASIA HILLS, alt. 2500 ft., *C. B. Clarke.* BURMA, *Griffith,* &c. NICOBARS, *Kurz.* CEYLON, *Thwaites,* &c.—DISTRIB. Borneo, China, Australia.

Stem 8–20 in. *Spikelet* ½ by ⅛ in. *Glumes* rusty-brown, lowest a little larger, much shorter than the spikelet, deciduous.—Hardly differs from *F. acuminata* but by the rather broader, oblique spikelet.

††† *Nut obovoid, smooth, reticulate* (*i.e.* outermost cells arranged as brick-wall parenchyma).

5. **F. polytrichoides,** *Vahl Enum.* ii. [1806] 248; slender, glabrous, stem with 1 (rarely 2–3) ellipsoid-oblong obtuse spikelet, glumes ovate obtuse, style 2-fid, nut smooth brown-black often slightly white-scaly on shoulders. *Nees in Wight Contrib.* 96; *Thw. Enum.* 348. F. sub-bulbosa, *Boeck. in Flora,* xli. 598. F. juncea, *Boeck. in Linnæa,* xxxvii. 4 (*not of Roem. & Sch.*). Scirpus polytrichoides, *Retz. Obs.* iv. 11. Isolepis ?, *Wall. Cat.* 3487 B (*partly*), C, 3532.—*Rumph. Amb.* vi. 17, t. 7, fig. 1.

From BENGAL to CEYLON and MALACCA, common near the sea.—DISTRIB. Tropics of Old World.

Stems 1½–8 in. *Leaves* about half as long as stem; sheaths glabrous or obscurely puberulous. *Spikelet* commonly ⅓ by ⅛ in. *Glumes* many, densely imbricate on all sides, fuscous brown; 2–3 lowest empty, often like the others, but lowest sometimes 1 in., as though a continuation of stem. *Stamens* 3–1. *Style* rather shorter than nut, glabrous, base little dilated. *Nut* as long as ⅓ glume, obovoid, biconvex; outermost cells in about 30 rows on each face, ultimately marcescent scarious.

Var. HALOPHILA (sp.), *Kurz ms.*; stems and leaves stouter, spikelet up to ½ by ⅛ in.—BENGAL; Soondreebun, *Kurz.* MADRAS; Nellore, *Gamble.*

6. **F. tenuicula,** *Boeck. in Linnæa,* xxxviii. 385; stem bristle-like, sheaths hairy, spikelet cylindric-lanceolate, glumes ovate obtuse minutely

mucronate, style 2-fid, nut smooth brown obscurely white-scaly on shoulders.

SYLHET, *C. B. Clarke.* TENASSERIM, *Helfer.*

Stem 4–8 in. *Spikelet* ⅓ by $\frac{1}{10}$ in. *Glumes* suberect, dirty straw-colour, keel green, lowest like the others or if bracteiform shorter than spikelet. *Stamens* 1–2. *Style* below bifurcation glabrous or sparsely hairy. *Nut* less obtuse than that of *F. polytrichoides;* outermost cells larger, in about 15 longitudinal rows on each face of nut.—Otherwise as *F. polytrichoides,* from which it differs chiefly in its narrower acuter spikelet.

** *Style* 3-*fid*; *nut trigonous.*

7. **F. pauciflora,** *Br. Prod.* 225; stem bristle-like, spikelet slender lanceolate pale, style 3-fid, nut obovoid white shoulders subtubercled. *Benth. Fl. Austral.* vii. 303. F. filiformis, *Kunth Enum.* ii. 221; *Miq. Fl. Ind. Bat.* iii. 314; *Boeck. in Linnæa,* xxxvii. 23. F. pumila, *Benth. in Hook. Lond. Journ. Bot.* ii. [1843] 239; *Miq. Fl. Ind. Bat.* iii. 315. F. malaccana,' *Boeck. in Flora,* xli. 597. Trichelostylis filiformis, *Nees in Wight Contrib.* 102. Isolepis ?, *Wall. Cat.* 3488.

From MERGUI, *Griffith,* to SINGAPORE, *Wallich.*—DISTRIB. E. Asia, Malaya, N. Australia.

Annual, glabrous. *Stems* 4–8 (rarely 12) in., tufted, leafless, or lower sheaths sometimes leaf-bearing (or fide Boeckeler uppermost sheath sometimes leaf-bearing). *Spikelet* $\frac{1}{5}$ by $\frac{1}{20}$ in. *Glumes* ovate, imbricate (somewhat loosely) on all sides, erect, concave, adpressed, white, subscarious, with rusty spots on the back, all falling; rhacheola scarcely hispid. *Stamens* frequently 2. *Style* below trifurcation nearly glabrous, deciduous together with its narrowly-pyramidal style-base. *Nut* as long as ⅓ glume; outermost cells small, obscure.

8. **F. Kingii,** *C. B. Clarke ms.*; *Boeck. Cyp. Nov.* ii. 40; stem slender hairy, spikelet ovoid-ellipsoid, glumes ovate obtuse, style 3-fid, nut obovoid dusky black minutely scabrid.

NILGHIRI HILLS, alt. 6–8000 ft.

Rhizome very short. *Stems* 4–12 in., tufted. *Leaves* as long as ½–¾ stem, narrow, hairy. *Spikelet* ½ in., terminal, erect, terete, dense-fld. *Glumes* imbricate on all sides, adpressed, concave scarcely keeled, chestnut-brown, slenderly 3–5-nerved, glabrous; lowest empty, like the others or more seldom bract-like ½–1 in. *Stamens* 3. *Style* long, slender, glabrous, deciduous together with its narrowly-pyramidal base; branches long. *Nut* as long as ⅓ glume, trigonous; outermost cells small, subquadrate, lax, subpapillose, scarious.—Near the Australian *F. monandra,* F. Mueller.

9. **F. subtrabeculata,** *C. B. Clarke*; stem slender, spikelet ellipsoid, glumes ovate obtuse, style 3-fid, nut obovoid straw-colrd. smooth subtrabeculate.

NILGHIRI HILLS; Pykara, alt. 5600 ft., *Gamble.*

Glabrous. *Rhizome* 0, or short, slender, descending nearly vertically. *Stems* 4–8 in., tufted. *Leaves* several, longish (often ⅔ stem), bristle-like. *Spikelet* ¼ in., fine brown; bract 0 or shorter than spikelet. *Glumes* numerous, imbricate on all sides, concave, scarcely keeled, brown, 3-nerved, paler on back. *Style* long, glabrous, deciduous together with its narrowly-pyramidal base, branches long, linear. *Nut* as long as ⅔ glume, obtuse, scarcely stalked, trigonous; outermost cells transversely oblong white not vertically superimposed in regular series; nut thus not longitudinally striate but irregularly conspicuously trabeculate.—This may be *F. sub-bulbosa,* Boeck. Cyp. Nov. ii. 39 (*non Flora* xli. 598) from description; but Boeck. says this is "allied to *F. juncea,* Roem. & Sch. with 2-fid style (sometimes 3-fid)."

Sect. II. DICHELOSTYLIS, *Benth. Fl. Austral.* vii. 309 (not Dichostylis [Genus] *Nees*). Lowest fertile glumes of the spikelet spirally imbricated; stems with many or several (depauperated examples not rarely with 1) spikelet; style 2-fid; nut biconvex; style usually flattened from front to back, often villous below its bifurcation.—This section contains all such species as are neither *Eleocharoides* nor *Abildgaardia*, and have only 2 branches to the style. In this section the style is *never* 3-fid (except *F. stolonifera*, var. β). Compare, among the species placed in *Trichelostylis*, *F. globulosa*, and *F. cymosa* in which 2-fid styles *sometimes* occur.

Series A. Spikelets all (or nearly all) solitary—*except* in *F. rigidula* often paired, in *F. diphylla* (and in other species) occasionally clustered; in *F. spathacea* the umbel is dense, sometimes congested into a head.

* Stem with few (often 3–1) spikelets.

10. **F. schœnoides,** *Vahl Enum.* ii. 286; glabrous, stem with 1–3 middle-sized ovoid spikelets, style 2-fid, nut obovoid stalked biconvex smooth white rarely discoloured brownish. *Nees in Wight Contrib.* 97; *Thw. Enum.* 348; *Boeck. in Linnæa*, xxxvii. 5 (*excl. var.* β). F. bispicata, *Nees l. c.* 97 (*mainly*); *Boeck. l. c.* 6 (*partly*). F. inconstans, *Steud. Syn. Cyp.* 107. F. polymorpha *var.* depauperata, *Boeck. in Flora*, lviii. 111. Scirpus schœnoides, *Retz Obs.* v. 14. S. monostachyus, *Kœnig. ms.*; *Roxb. Fl. Ind.* i. 219. S. bispicatus, *Roxb. l. c.* 220. Isolepis monostachya, *Spreng. Neue Entdeck.* iii. 11. I. bispicata, *Roem. & Sch. Syst. Mant.* ii. 61. I. rariflora, *Schrad. in Roem. & Sch. l. c.* 65. Eleogiton monostachya, *Dietr. Sp. Pl.* ii. 97. Abildgaardia nervosa, *Presl. Rel. Haenk.* i. 180.—Isolepis?, *Wall. Cat.* 3490 (except F).

Throughout INDIA, alt. 0–6500 ft.—DISTRIB. S.E. Asia, N. Australia.

Rhizome 0, or rarely horizontal, very short. *Stems* 4–12 in., tufted, rather slender, striate, base often thickened. *Leaves* as long as ½–¾ stem (occasionally longer than stem), narrow, edges incurved (when dry) most minutely scabrous. *Spikelets* ¼–¾ in., dense-fld., pale or brown. *Glumes* ovate, obtuse, scarcely mucronate, adpressed, incurved, many-striate, rusty-brown rarely green on back; lowest empty, like the rest, or rarely bract-like with green nerve excurrent ½–1 in.; all caducous seriatim, leaving the rhachilla minutely hairy by the ragged edges of the areoles. *Stamens* 3, rarely 2; anthers not crested. *Style* long, flattened, villous nearly to base; branches short. *Nut* as long as ⅓–½ glume; outermost cells very small, subquadrate obscure.—The large Khasi form, with rusty-brown spikelets ⅔ in. long, is by Boeckeler added (perhaps rightly) to *F. sub-bispicata*.

11. **F. sub-bispicata,** *Nees & Meyen, in Nov. Act. Acad. Nat. Cur.* xix., *Suppl.* i. 75; glabrous, stem with 1–3–6 large cylindric spikelets, style 2-fid, nut obovoid stalked biconvex smooth white or becoming brown. *Benth. Fl. Hongk.* 391. F. japonica, *Sieb. et Zucc. ms.*; *Steud. Syn. Cyp.* 107. F. bispicata, *Boeck. in Linnæa*, xxxvii. 6 (*partly*).

ORISSA; Pooree, *W. S. Atkinson.*—DISTRIB. China, Japan.

Stems 8–20 in. *Spikelets* up to 1 by ⅛ in. *Nut* scarcely as long as ¼ glume.—The type of Nees and Meyen is an abundant East Asiatic plant near the sea, and appears distinct from *F. schœnoides* by its larger size and larger spikelet; but the species is scarcely otherwise separable, though admitted by Bentham.

** Stem with many or several spikelets [but, even in the case of species that have normally a compound umbel, small examples with few (sometimes with 1) spikelets occur.]

† *Nut linear-cylindric, curved.*

12. **F. dipsacea,** *Benth. in Gen. Pl.* iii. 1049; slender, umbel simple or compound of 12–1 spikelets, glumes aristate, squarrose, style longish branches 2 long. Scirpus dipsaceus, *Rottb. Descr. et Ic.* 56, t. 12, fig. 1; *Boeck. in Linnæa,* xxxvi. 736. S. minimus, *Roxb. Fl. Ind.* i. 219. Echinolytrum dipsaceum, *Desv. Journ. Bot.* i. 21, t. 1; *Nees in Wight Contrib.* 96. Isolepis dipsacea, *Roem. & Sch. Syst.* ii. 119; *Thw. Enum.* 350. I. elachista, *Roem. & Sch. Syst. Mant.* ii. 61. I. verrucifera, *Maxim. Prim. Fl. Amur.* 300.—Isolepis, *Wall. Cat.* 3478 A, 3479 (*mainly*).

From CENTRAL INDIA, BENGAL, and ASSAM, to BURMA and CEYLON.—DISTRIB. Afric., E. Asia.

Annual, nearly glabrous. *Stems* 1–6 in., tufted. *Leaves* often as long as stem, capillary. *Umbel* often 1–3 in. diam.; bracts several, often overtopping umbel. *Spikelets* ¼ in. diam., subglobose, dense with aristate glumes. *Glumes* elliptic, pale, nerve green long excurrent into a curved tail. *Stamen* 1 or 2; anthers small, oblong, not crested. *Style* slender, glabrous, branches longer than nut; style-base slightly bulbous, persistent or deciduous. Young *pistil* frequently ornamented by clavate glands, which usually disappear in fruit, but in Wight, n. 1865 (described in Gen. Pl. iii. 1049), are developed into ovoid processes nearly as wide as nut. *Nut* nearly as long as glume (omitting its arista), usually smooth pale brown, minutely transversely wavy-lined, but sometimes papillose scabrous by reason of the persistent glands.—Perhaps a distinct genus, for it is not closely allied to any other species. Most authors have placed it in *Scirpus,* Sect. *Micranthi,* to which it has little resemblance, except in the aristate squarrose glumes; the nut and style are wholly different. Bentham has placed it in *Fimbristylis* with which the inflorescence glumes and even nut fairly agree, but the style does not; it is often deciduous, and then sometimes leaves a minute button on the apex of nut, much as in *Bulbostylis.*

†† *Style-base with many long pendent hairs.*

13. **F. squarrosa,** *Vahl Enum.* ii. 289; slender, umbel compound, glumes shortly aristate more or less squarrose, style 2-fid, nut obovoid smooth straw-colrd. *Reichb. Ic. Fl. Germ.* viii. 44, t 735; *Boeck. in Linnæa,* xxxvii. 10. F. comata, *Nees in Wight Contrib.* 102. Scirpus æstivalis, *Wall. in Roxb. Fl. Ind.* i. 230 (*in note, not of Retz.*). Pogonostylis squarrosa, *Bertol. Fl. Ital.* i. 312.—Fimbristylis, *Wall. Cat.* 3517 C, *partly.*

From KASHMIR and ASSAM to MT. ABOO and BURMA; especially in rice-fields. DISTRIB. All warm regions.

Annual; all parts pubescent, puberulous or glabrous. *Stems* 2–8 in., striate. *Leaves* as long as ½–¾ stem. *Umbels* often 2–4 in. in diam., with many spikelets; bracts usually short, sometimes as long as umbel. *Spikelets* ⅛–¼ by $\frac{1}{10}$ in. *Glumes* fuscous, keel 3–5-nerved, excurrent into a curved tail. *Stamens* often 2. *Style* small, hairy below bifurcation; from the margin of style-base hang 10–18 unicellular slender linear trichomes, as long as ½–¾ nut, closely adpressed to it; style-base easily deciduous with the (then conspicuous) trichomes. *Nut* as long as ½ glume, never conspicuously striate longitudinally.

††† *Nut obovoid, conspicuously longitudinally striate, trabeculate (by reason of the transverse short-oblong cells between the striations).*

14. **F. dichotoma,** *Vahl Enum.* ii. 287; umbel compound or decompound, spikelets many solitary oblong angular, glumes ovate acute glabrous, style 2-fid, nut 5–9-striated on each face straw-colrd. or rarely discolrd. black-brown. *Nees in Wight Contrib.* 101; *Boeck. in Linnæa,*

xxxvii. 12 (*excl.* var. β, γ, F. Royeniana *and* American sp.); *Benth. Fl. Austral.* vii. 310 (*excl. some syns.*). F. pallescens, *Nees l. c.* 101; *Strachey Cat. Pl. Kumaon*, 73; *Thw. Enum.* 348. Scirpus dichotomus, *Linn. Sp. Pl.* 50; *Rottb. Descr. et Ic.* 57, t. 13, fig. 1. S. annuus, *Host Gram. Austr.* iii. 42, t. 63 (style wrongly 3-fid). S. pallescens, *Roxb. Fl. Ind.* i. 229.—Fimbristylis, *Wall. Cat.* 3511, 3515, 3516 B, 3517 A.

Throughout INDIA, alt. 0–4000 ft., especially in rice-fields.—DISTRIB. Warm regions of Old World.

Annual, pubescent or puberulous. *Stems* 2–10 in., tufted. *Leaves* often as long as stem, narrow. *Umbel* often 2–4 in. diam., sometimes with 9–5 spikelets only; bracts often as long as umbel. *Spikelets* ¼ by ⅛ in., somewhat angular from the acute keels to glumes. *Glumes* boat-shaped, ferruginous, keel green 1–3-nerved, lowest empty more or less bract-like often pubescent. *Stamens* 2–1 (or 3 fide Boeckeler). *Style* long, flattened, often villous nearly to base. *Nut* as long as ½ glume, biconvex; outermost cells, shortly transversely oblong, conspicuous, vertically superimposed in 5–9 rows on each face of nut.—Closely allied to *F. diphylla*, in which the spikelets are terete, the glumes being much less keeled than in *F. dichotoma*.

15. **F. diphylla,** *Vahl Enum.* ii. 289; tufted, roots fibrous, leaves as long as ⅓–⅔ stem, umbel compound or simple or reduced to 1 spikelet, spikelets ovoid-oblong terete, glumes glabrous, style 2-fid, nut 5–13-striated on each face straw-colrd., or rarely discolrd. brown, *Nees in Wight Contrib.* 100; *Thw. Enum.* 348. F. laxa, *Vahl Enum.* ii. 292. F. tomentosa, *Vahl l. c.* 290. *Nees l. c.* 100 & *in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843) 81. F. glauca, *Vahl l. c.* 288. F. annua, *Roem. & Sch. Syst.* ii. 95, and *Mant.* ii. 55; *Reichb. Ic. Fl. Germ.* viii. 44. F. depauperata, *Br. Prodr.* 227. F. curvifolia, *Steud. Cyp.* 116. F. brachyphylla, *Schultes in Roem. & Sch. Syst.* ii. *Mant.* 530. F. foliosa, *Link Hort. Berol.* i. 288. F. cincta, *Nees l. c.* 98 (*in note*). F. Royeniana, *Nees l. c.* 99. F. ovalis, *Nees l. c.* 98; *Thw. Enum.* 348. F. podocarpa, *Nees l. c.* (*partly*) & *in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843) 77 (*partly*); *Benth. Fl. Hongk.* 391. F. communis, *Kunth Enum.* ii. 234; *Strachey Cat. Pl. Kumaon*, 73 (*excl. syns.*). F. Metzii, *Steud. Syn. Cyp.* 127. F. similis, *Steud. Syn. Cyp.* 112. F. spadicea, *Boeck. in Flora*, xlii. 70 (*not of Vahl*). F. pentastachya, *Boeck. l. c.* xl. 36 & *in Linnæa*, xxxvii. 17. F. Heynei, *Boeck. in Flora*, xliii. 244. F. polymorpha, *Boeck. in Linnæa l. c.* 17 (*excl. some syns.*). F. rigidula, *Thw. l. c.* 348 (*not of Nees*). Scirpus diphyllus, *Retz Obs.* v. 15; *Roxb. Fl. Ind.* i. 227. S. annuus, *Allioni Fl. Pedem.* ii. 171, t. 88, fig. 5. S. miliaceus, brevifolius, arvensis and glomeratus, *Roxb. l. c.* 224, 226, 227. Trichelostylis curvifolia, *Nees l. c.* 105 (*in note*). Isolepis curvifolia, *Schrad. in Roem. & Sch. Syst.* ii. *Mant.* 70.—Fimbristylis, *Wall. Cat.* 3501, 3507 (*mainly*) 3508, 3539 (*mainly*) 3513, 3521 A.

Throughout INDIA, alt. 0–6000 ft.; common.—DISTRIB. All warm regions.

Glabrous or hairy. *Rhizome* none, or very rarely 0–1 in.; stolons 0. *Stems* 1–24 in., striate, 3–5-angled (rarely compressed) under umbel. *Leaves* linear or filiform, obtuse or acute, glabrous or hairy, never reduced to sheaths. *Umbels* 1–8 in. diam.; bracts 3–4, sometimes short suberect, sometimes spreading much longer than umbel. *Spikelets* commonly ⅛–⅖ in. *Glumes* concave, glabrous (rarely minutely ciliate on margins), brown or reddish, rarely chestnut-colrd., back green; lowest 1–3 empty like the others, or rarely somewhat elongated bract-like. *Stamens* 3, 2 or 1. *Style* long, flattened, villous (at least in the upper half); branches rather short. *Nut* as long as ½ glume, biconvex, obovoid, shortly stalked, smooth, almost glistening white, or in the Malay examples slightly tubercular on shoulders.—As

limited here, this is one of the most widespread weeds in the world.—The following varieties (among many others) have been esteemed species :—

Var. 1. ANNUA (sp.) *Roem & Sch.*; umbel with few (often with 3–1) ellipsoid obtuse spikelets.—Common in Europe, rare in Bengal.

Var. 2. DEPAUPERATA (sp.) *Br.*; stems very slender, flaccid, with few spikelets —C. B. Clarke (n. 44119) from Assam, has a long slender stem, with a single lateral spikelet, overtopped by most slender leaves; recedes from the type *F. diphylla* more than does the Australian *F. depauperata.*

Var. 3. PLURISTRIATA, var. *C. B. Clarke* (*F. pilosa* of most authors not of Vahl); sheaths and leaves often hairy, nut 10–16-striate on each face often verrucose or tubercular on shoulders.—A very common southern, especially Malay form.

Var. 4. SPIROSTACHYS (sp.) *F. Muell.*; large, umbel large, spikelets large.—In Australia; but a Khasia form is equally large.

Var. NILAGIRICA; rhizome very short, creeping; stems 12 in. in a close linear series; leaves filiform.—Perhaps referable to *F. stolonifera.* Nilghiri Hills, Pykara, *King.*

16. **F. stolonifera,** *C. B Clarke*; stoloniferous, spikelets dark chestnut, otherwise as *F. diphylla.*—Fimbristylis, *Wall. Cat.* 3503, A, B (*part*) C.

KHASIA HILLS, alt 2–5600 ft., common. MUNEYPOOR; *Watt.* NEPAL or BENGAL; *Wallich.*

Stolon breaking out horizontally from the base of stem, hardening into a long wiry rhizome clothed with lanceolate striate dusky scales. *Stems* subsolitary, 1–2 ft., slender. *Leaves* as long as $\frac{1}{2}$–$\frac{2}{3}$ stem, erect, very narrow, tip obtuse, hairy or glabrate. *Umbel* nearly simple, sometimes depauperated with few spikelets. *Spikelets* $\frac{2}{3}$ by $\frac{1}{8}$ in.

Var. *ludens*; style-branches 3 or 4.—Khasia; alt. 6–7000 ft., *C. B. Clarke.*

†††† *Nut obovoid, smooth, reticulate (not conspicuously striate longitudinally.)*

17. **F. æstivalis,** *Vahl Enum.* ii. 288; umbel compound or decompound, spikelets many solitary oblong subcylindric, glumes ovate acute submucronate, style 2-fid, nut smooth obscurely reticulate straw-colrd. *Nees in Wight Contrib.* 102; *Boeck. in Linnæa,* xxxvii. 11; *Trimen Cat. Pl. Ceylon,* 101 (*excl. syn.*). F. Griffithiana, *Steud. Syn. Cyp.* 110. F. dichotoma, *Boeck. in Flora,* xlii. 70 (*not of Vahl*). F. tricholepis, *Miq. Fl. Ind. Bat.* iii. 319. F. Griffithii, *Boeck. in Flora,* xliii. 241. Scirpus æstivalis, *Retz Obs.* iv. 12; *Roxb. Fl. Ind.* i. 227.—Isolepis, *Wall. Cat.* 3475.—Fimbristylis, *Wall. Cat.* 3516, A, 3517 B, D, E.

Throughout INDIA, alt. 0-3000 ft. (except the North-west), abundant.—DISTRIB. S. and E. Asia, Australia and a var. in America.

Annual, more or less pubescent or puberulous. *Stems* 2–10 in. *Leaves* often as long as $\frac{1}{2}$–$\frac{3}{4}$ stem. *Spikelets* $\frac{1}{4}$ by $\frac{1}{10}$ in. *Glumes* keeled, glabrous or pubescent, erect or subsquarrose. *Stamens* 1–2. *Style* scarcely longer than nut, slightly compressed, usually villous; margin of style-base often minutely hairy (not with long pendent trichomes of *F. squarrosa*). *Nut* as long as $\frac{1}{2}$ glume; outermost cells quadrate-hexagonal, arranged in 12–16 vertical rows on each face of nut, but far less prominent than in *F. dichotoma.*

18. **F. scaberrima,** *Nees in Wight Contrib.* 102; stems middle-sized compressed under umbel, leaves and bracts long, umbel compound

and decompound, style 2-fid, nut obovoid smooth straw-colrd. *Boeck. in Linnæa*, xxxviii. 409 (*not* xxxvii. 13.)—Fimbristylis, *Wall. Cat.* 3507, C.

Sylhet; *Wallich.*

Glabrous. *Roots* fibrous, stout. *Stems* 12–20 in. scabrous on edges at top. *Leaves* flat, robust, often overtopping stem. *Bracts* 3–4, two lower often 4–5 in. very scabrous on margins. *Spikelets* many, ⅛ by $\frac{1}{10}$ in., 5–8-fld., acute, chestnut-brown. *Glumes* ovate, acute, adpressed-incurved. *Stamens* 3. *Style* long, scarcely compressed, nearly glabrous; branches long. *Nut* as long as ⅔ glume, biconvex, scarcely stalked; outermost cells very small in 20–24 vertical series on each face.—From the flattened top of stem and small spikelets this has been sometimes referred to *F. complanata.*

19. **F. podocarpa,** *Nees in Wight Contrib.* 98 (*partly*); nut smooth finely reticulated not longitudinally striated, gynophore very prominent obpyramidal, otherwise as *F. diphylla. Nees & Meyen in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843) 77, var. δ (*and part a not β.*) F. communis, *Kunth Enum.* ii. 234 (*partly*). F. polymorpha, *Boeck. in Linnæa*, xxxvii. 14 (*partly*).—Fimbristylis, *Wall. Cat.* 3521 B.

From the W. Himalaya to Upper Assam and Dacca; Chota Nagpore, *C. B. Clarke*; Khasia, *H. f. et T. T.* (*Fimbristylis* n. 33); &c.—Distrib. Malaya, China, Marianne Isles.

This is *F. podocarpa,* Munro ms. and *Herb. Hook. f.*; the type example of *F. podocarpa* in Wight named by Nees' hand is typical *F. diphylla,* Vahl.—In *F. podocarpa* (as here understood) the gynophore is obpyramidal, distinguishable from the nut, its apex is dilated sometimes into a 3-lobed saucer resembling much some *Sclerias.* The nut has the small outermost cells in 20–24 rows on each face.

20. **F. fuscinux,** *C. B. Clarke*; nearly glabrous, stems middle-sized, leaves long, umbel large compound, glumes keeled acute puberulous, style 2-fid, nut obovoid smooth dusky finally black.

N. India; Moradabad, *T. Thomson*; Sikkim Terai, *C. B. Clarke.*

Stems 8–20 in. *Leaves* as long as ½–¾ stem, rigid, tip subobtuse. *Umbel* often 6 in. diam. *Spikelets* all solitary, ovoid, ⅓–½ in. long, somewhat angular by reason of the keeled glumes. *Glumes* glabrate, margins ciliate hairy, shoulders often puberulous, tips spreading not adpressed incurved (as in *F. ferruginea*).—From the large umbel and long leaves this has been referred to *F. diphylla*; it is nearer *F. ferruginea.*

21. **F. albo-viridis,** *C. B. Clarke ms. in Herb. Calcutt.*; umbel somewhat lax, nut obovoid straw-colrd. shining smooth or with numerous obscure longitudinal striations—otherwise as *F. diphylla.*

E. Bengal; *Griffith* (*in Herb. Calcutt.*); River Megna, *J. D. Hooker*; Upper Assam, *Jenkins.*

Stems 12–20 in. *Leaves* long, nearly glabrous. *Umbel* once or twice compound, pedicels long. *Spikelets* ¼–⅓ in. long, greenish-white, sometimes tinged purple-chestnut. *Nut* often with minute scattered white scales; outermost cells small, in 25–30 longitudinal series on each face.—Very near *F. diphylla,* but all the examples agree closely, and the marking of the nut is unlike that of *F. diphylla*—much nearer that of *F. podocarpa.*

22. **F. ferruginea,** *Vahl Enum.* 291; stems 8–30 in., leaves short sometimes none, glabrous or hairy, umbel simple or compound usually contracted, glumes often puberulous below tip, style 2-fid, nut obovoid smooth pale finally brownish. *Delile Fl. Ægypt,* 10, t. 6, fig. 3; *Nees in*

Wight Contrib. 97; *Dalz. & Gibs. Bomb. Fl.* 287; *Thw. Enum.* 348; *Boeck. in Linnæa*, xxxvii. 16. F. arvensis, *Vahl Enum.* ii. 291. F. marginata, *Labill. Sert. Austro-Caledon.* ii. t. 16, fig. 1. F. Roxburghii, *Dietr. Sp. Pl.* ii. 162. F. confinis, *Steud. Syn. Cyp.* 115. F. trispicata, *Steud. l. c.* 107. F. cyrtophylla, *Miq. Fl. Ind. Bat.* iii. 325. F. ochreata, *Boeck. in Flora* xli. 599 (*cf.* xliii. 177). F. andamanica, *Kurz Andaman Rep. Append.* B, 21. Scirpus ferrugineus, *Linn. Sp. Pl.* 74. S. arvensis, *Retz Obs.* iv. 11 (*not of Roxb.*). S. globulosus, *Roxb. Fl. Ind.* i. 217 (*not Fimbr. globulosa, Kunth*). S. tristachyus, *Roxb. l. c.* 221. S. tranquebariensis. *Roth. Catal. Bot.* iii. 6 (*see Boeck. in Flora*, xliii. 36). Schœnus polymorphus, *Rottb. Descr. et Ic.* 67.—Fimbristylis, *Wall. Cat.* 3506 (*mainly*), 3522, 3527.

Throughout INDIA, alt. 0–3000 ft., abundant near the sea. —DISTRIB. All warmer regions.

Rhizome none or hardly any. *Stems* 8–30 in., tufted, base slightly thickened, often clothed by shining hard rusty scales. *Leaves* usually hardly any, sometimes 4–6 in., very narrow. *Umbel* usually of 5–10 spikelets, sometimes with 20 spikelets, rarely with 1–3 spikelets; bracts shorter than umbel, often very short. *Spikelets* $\frac{2}{3}$ in. *Glumes* obtuse scarcely mucronate, brown, tip incurved, keel green. *Stamens* 3 or 2; filaments ligulate; anthers not crested. *Style* longer than nut, flattened, villous below bifurcation. *Nut* as long as $\frac{1}{3}$–$\frac{1}{2}$ glume, shortly stalked; outermost cells small, in numerous longitudinal series.

Var. ? *tenuissima*, stems 16 in. very slender slightly flattened with 1–3 small pale spikelets, glumes nearly glabrous, nut very smooth. CEYLON; *Mrs. Marriot* (*Herb. Delessert*).—*Leaves* 1–6 in., very slender. *Bracts* $\frac{1}{4}$ in. *Spikelets* $\frac{1}{4}$ in., ellipsoid. *Glumes* with obscure round red glands. *Nut* as of *F. ferruginea*.—This looks like a distinct species, but only known by one sheet of specimens.

23. **F. compressa,** *Boeck. in Linnæa*, xxxviii. 387 (*not of Roem. & Sch.*); stems long base slender, leaves longish, umbel twice or thrice compound, spikelets cylindrical, glumes dusky-brown puberulous, style 2-fid, nut obovoid smooth dusky-brown. F. tenuifolia, *Nees ms.* F. gracilis, *Arnott ms.* Scirpus fuscus, *Roxb. ms.*

MADRAS, *Roxburgh, Wight.* MERGUI, *Griffith.* TENASSERIM, *Helfer.*

Stems 8–20 in., 3–5-angular under umbel, basal sheaths herbaceous. *Leaves* 8 in., very narrow, glabrous, sheaths often fimbriate hairy in mouth. *Umbel* often 4–5 in. diam. with 25–40 spikelets; bracts frequently overtopping umbel. *Spikelets* nearly $\frac{1}{3}$ in. long, glumes very densely imbricate. Otherwise as *F. ferruginea*, to which it is specifically very near.

24. **F. longispica,** *Steud. Syn. Cyp.* 118; nearly glabrous, stems middle-sized, leaves long, umbel compound or decompound, spikelets cylindric-lanceolate rusty green, style bifid, nut obovoid smooth, minutely reticulate finally brownish. *Miq. Fl. Ind. Bat.* iii. 325. F. Buergueri and F. ferruginea, *Miq. in Ann. Mus. Lugd. Bat.* ii. 144. F. spadicea, var. β major, *Boeck. in Linnæa*, xxxvii. 20.

SINGAPORE; Pahang, *Ridley.*—DISTRIB.—Malaya, China, Japan. (The American *F. spadicea* is hardly separable).

Leaves as long as $\frac{1}{2}$–$\frac{2}{3}$ stem, stout, flat. *Umbel* 1–3 in. diam.; branches suberect; lowest bract overtopping umbel. *Spikelets* $\frac{1}{2}$ by $\frac{1}{10}$ in., terete, hard. *Glumes* ovate, scarcely apiculate, erect, closely imbricate, horny, rusty brown with 3 green nerves on back. *Style* and *stamens* nearly as in *F. diphylla*. *Nut* as long as $\frac{2}{3}$ glume, very shortly stalked; outermost cells small, in about 20 series on each face, i.e. nut slenderly obscurely 20-striate on each face, subtrabeculate between the striations.

25. **F. rigidula,** *Nees in Wight Contrib.* 99; rhizome horizontal woody short, leaves longish, umbel once or twice compound, spikelets very obtuse solitary and paired, style 2-fid, nut obovoid smooth dirty straw-colrd. F. Hanceana, *Boeck. in Linnæa,* xxxviii. 394.—Fimbristylis, *Wall. Cat.* 3519 (*partly*).

From KUMAON, alt. 0–6000 ft. to Bengal, *C. B. Clarke.* MUNEYPOOR, *Watt,* SHAN HILLS, *Collett.*—DISTRIB. China, Philippines.

Stems 4–16 in., thickened at base, closely 1-seriate on rhizome. *Leaves* as long as ½ culm, glabrous, or (with their sheaths) pubescent; tip subobtuse. *Umbel* 1–5 in. diam., somewhat lax; bracts short, *Spikelets* ⅛–½ in., ellipsoid or subglobose. *Nut* nearly as of *F. ferruginea,* but paler, less glistening; outermost cells in 20–30 series on each face, i.e. nut minutely reticulate, faintly 20–30 striate longitudinally. —Well-marked by the rhizome and paired subglobose spikelets. The *F. rigidula,* Herb. Berol. reduced to *F. diphylla* by Kunth and Boeckeler, is not the plant of Nees.

26. **F. spathacea,** *Roth. Nov. Pl. Sp.* 24; leaves short rigid, umbel compound with solitary spikelets often contracted sometimes subcapitate, glumes obtuse often notched, style 2-fid, nut obovoid smooth or somewhat tubercled dusky. F. Wightiana, *Nees in Wight Contrib.* 99; *Thw. Enum.* 349. F. glomerata, *Nees in Linnæa,* ix. 290; *Boeck. in Linnæa,* xxxvii. 47. F. rigida, *Kunth Enum.* ii. 231. F. ciliolata, *Steud. Syn. Cyp.* 109. F. capitata, *Zoll. Verz. Ind. Archip.* ii. 61 (*not of Br.*). F. lævissima, *Steud. l. c.* 117. F. junciformis, *Munro in Seem. Bot. Voy. Herald,* 422 (*not of Kunth*). F. biumbellulata, *Boeck. in Flora,* xli. 604 (see xlii. 34). Scirpus glomeratus, *Retz Obs.* iv. 11 (*not of Roxb.*). S. strictus, *Roxb. Fl. Ind.* i. 226.—Cyperus, *Wall. Cat.* 3300 (*partly*).

From SIND, and ORISSA, to CEYLON and SINGAPORE.—DISTRIB. Warm regions.

Stems 4–16 in., tufted, rigid. *Leaves* as long as ½ stem (often much shorter), narrow, glabrous, margins incurved. *Umbel* 2 in. diam. in well-developed examples, usually somewhat dense with solitary but closely approximated spikelets; in less developed examples the spikelets are nearly or quite clustered, sometimes virtually in a single head; bracts short, broad. *Spikelets* ⅛–¼ by $\frac{1}{10}$ in., cylindric or ellipsoid, up to 60 in an umbel. *Glumes* ovate, concave, incurved, margins scarious. *Stamens* usually 2. *Style* somewhat shorter than nut, often glabrous. *Nut* as long as ⅔ glume, biconvex, shortly stalked.—This plant offers a transition to the next series (*F. argentea, sericea,* &c.) by the often clustered spikelets; Boeckeler appears only to know this contracted form (which is not Nees' type), and to have placed it (on account of such occasionally contracted heads) in the 3-stigma group of *F. cymosa, junciformis,* &c. In *F. spathacea,* the style is never 3-fid.

Series B. Spikelets, or some of them, clustered. (See also *F. spathacea, F. rigidula,* and occasionally *F. diphylla* in series A, B.)

* *Stems with only one head.*

27. **F. argentea,** *Vahl Enum.* ii. 294; stems leafy at base, spikelets linear-cylindric grey or whiteish, glumes scarcely acute, style 2-fid, nut obovoid pale smooth or obscurely transversely wavy-lined. *Nees in Wight Contrib.* 100; *Dalz. & Gibs. Bomb. Fl.* 287; *Thw. Enum.* 348; *Boeck. in Linnæa,* xxxvii. 8. Scirpus argenteus, *Rottb. Descr. et Ic.* 51, t. 17, fig. 6; *Roxb. Fl. Ind.* i. 223. S. monander, *Rottb. Descr. et Ic.* 50, t. 14, fig. 3 (*not of Roxb.*).—Isolepis, *Wall. Cat.* 3483.—*Rheede Hort. Mal.* xii. t. 54.

From BENGAL and CENTRAL INDIA to CEYLON.—DISTRIB. Mauritius, fide Boeckeler.

Stems annual, tufted, trigonous, 4–8 in. (or in Duthie n. 9860, stem 0, spikelets basal). *Leaves* usually shorter than stem, narrow, glabrous. *Spikelets* 4–20 in the head, $\frac{3}{5}$ by $\frac{1}{10}$ in., densely-fld.; bracts 2–4, much overtopping head. *Glumes* ovate, silver-grey, keel green. *Stamen* often 1. *Style* small, shorter than nut, nearly glabrous, deciduous with its base. *Nut* very small, about $\frac{1}{3}$ as long as glume, biconvex, almost margined; outer cells obscure.

28. **F. albicans,** *Nees in Wight Contrib.* 100; stems leafy at base, spikelets ellipsoid rusty grey, glumes scarcely acute, style 2-fid, nut obovoid straw-colrd. smooth transversely minutely trabeculate. *Boeck. in Linnæa*, xxxvii. 9.—Isolepis, *Wall. Cat.* 3482.

DECCAN PENINSULA; *Wight, Wallich.*

Nearly glabrous. *Stems* 8–14 in., slender. *Leaves* narrowly ligulate, tip suddenly narrowed acute. *Spikelets* 4–15 in the head, $\frac{1}{4}$ by $\frac{1}{8}$ in. *Stamens* often 2. *Style* longer than nut, slender, glabrous, with long linear branches. *Nut* small, shining; outermost cells conspicuous, transversely oblong, not accurately superimposed in vertical series (so that the nut is scarcely striated longitudinally).—Otherwise as *F. argentea.*

** *Clusters of spikelets subumbellately corymbed.*

29. **F. Hookeriana,** *Boeck. in Linnæa*, xxxvii. 22; nearly glabrous, spikelets clustered and solitary linear-lanceolate, style 2-fid, nut obovoid yellow-brown squamose-tuberculate.

KHASIA HILLS, alt. 1500–4000 ft. CHOTA NAGPORE; alt. 2000 ft. *Clarke.*

Annual. *Stems* 4–10 in., tufted, compressed. *Leaves* often as long as stem, narrow, flat. *Umbel* often 4–6 in. diam.; branches oblique-erect; bracts like the leaves, often overtopping umbel. *Spikelets* 1–6 in a cluster, $\frac{1}{2}$ by $\frac{1}{12}$–$\frac{1}{10}$ in., terete. *Glumes* rather remote, oblong, shortly acute, adpressed incurved, rusty-green, keeled, brown-scarious on sides. *Stamens* usually 2. *Style* longer than nut, scarcely flattened, slightly dilated at base, villous nearly its whole length, deciduous with style-base. *Nut* as long as $\frac{1}{5}$–$\frac{1}{4}$ glume, biconvex, obtuse, very shortly stalked; outer cells transversely-oblong, regularly superimposed in 12–15 vertical series in each face (i.e. nut slenderly longitudinally 12–15-ribbed); shoulders of nut subtuberculate by small scales or papillæ.

30. **F. sericea,** *Br. Prod.* 228; leaves numerous, white silky strigose beneath, spikelets ellipsoid-oblong silvery grey, style 2-fid, nut obovoid smooth pale. *Boeck. in Linnæa*, xxxvii. 22. F. decora, *Nees & Meyen in Wight Contrib.* 101. F. dasyphylla, *Miq. Fl. Ind. Bat.* iii. 327. F. velutina, *Franch in Bull. Soc. Bot. France*, xxvi. 87.

ORISSA; Poori, *W. S. Atkinson*; Ganjam, *Lawson.* SINGAPORE, *Ridley.*—DISTRIB. E. Asia, Malaya, Australia.

Rhizome descending or horizontal, woody, up to 3 in. long, sometimes divided, densely covered by leaves. *Stems* 4–8 in., rigid, striate. *Leaves* as long as $\frac{1}{2}$–$\frac{1}{3}$ stem, rigid, curved, $\frac{1}{12}$–$\frac{1}{8}$ in. broad. *Umbel* $\frac{2}{3}$–3 in. in diam., simple or compound; bracts $\frac{1}{3}$–$\frac{1}{2}$ in. *Spikelets* 2–6 in a cluster, $\frac{1}{4}$ by $\frac{1}{8}$–$\frac{1}{6}$ in., somewhat densely-flowered. *Glumes* erect adpressed, ovate, keeled, scarcely acute, striate, dusky purple-green, pubescent by minute white hairs, margins scarious white. *Style* about as long as nut, slightly villous below bifurcation, deciduous with style-base. *Nut* as long as $\frac{1}{3}$–$\frac{2}{3}$ glume, biconvex, scarcely stalked.

Sect. III. TRICHELOSTYLIS (Genus), *Lestib. Essai Fam. Cyp.* 40. Lowest fertile glumes of spikelet spirally imbricated; stems with many or several (rarely few or 1) spikelets. *Style* 3-fid (in *F. cymosa* and *F. globulosa*, the lowest flowers in a spike have often 3-fid style, the upper a 2-fid style).

Series C. Spikelets all (or nearly all) solitary.

* Stem with few (*sometimes* 3–1) spikelets.

31. **F. tenera,** *Roem. & Sch. Syst.* ii., *Mant.* 57; stems 8–12 in. slender, umbel lax subcompound, spikelets ellipsoid ultimately cylindric-lanceolate, glumes ovate acuminate submucronate glandular-puberulous, style 3-fid, nut obovoid white smooth or subtuberculate coarsely reticulate. *Boeck. in Linnæa,* xxxvii. 26. F. muriculata, *Benth. in Hook. Niger. Fl.* 554. Scirpus tenellus, *Roxb. Fl. Ind.* i. 224. Trichelostylis tenella, *Nees in Wight Contrib.* 103.

DECCAN PENINSULA, *Wight.*—DISTRIB. Trop. Africa.

Roots fibrous. *Stems* tufted, 4–5-angular under umbel, base sometimes thickened. *Leaves* as long as ½ stem, $\frac{1}{20}$–$\frac{1}{12}$ in. broad, flat, glabrous. *Umbel* 1–2 in. in diam., with 7–9 spikelets; bracts 2–3, bristle-like, up to 1 in. long. *Spikelets* ¼ by $\frac{1}{12}$ in., about 10-fid. *Glumes* adpressed, boat-shaped, chestnut-red, margins scarious. *Stamens* often 2. *Style* longer than nut; glabrous, deciduous with pyramidal style-base. *Nut* as long as ⅔ glume, round-trigonous.—Described from Nees' type in Herb. Wight.

Var. *oxylepis,* (sp.) *Steud. Syn. Cyp.* 110; glumes glabrate, nut verrucose yellow-brown. F. glabra, *Steud. l.c.* 111. Fimbristylis, *Wall. Cat.* 3514 B, E, partly, 3531.—From Lahore and Bengal to Madras.

Var. ? *obtusata;* leaves numerous $\frac{1}{12}$ in. broad obtuse, glumes glabrate not mucronate, nut verrucose yellow-brown (spikelets sometimes clustered).—Lower Bengal, *Wallich, Kurz.* Singapore, *Ridley.*—Borneo.

32. **F. monticola,** *Steud. Syn. Cyp.* 111; glabrous, stems 6–14 in. slender, umbel lax simple or hardly compound, spikelets oblong-lanceolate, glumes ovate acute, style 3-fid, nut broadly obovoid brown slightly tubercled. F. tenuifolia, *Thw. Enum.* 434—Fimbristylis, *Wall. Cat.* 3514 A.

SOUTH MADRAS and CEYLON; Cannanore, *Campbell.* NILGHIRI HILLS, *Hohenacker.* ANAMALLAYS, *Beddome.*

Leaves bristle-like, margins (when dry) incurved. *Umbel* 1 in. in diam., with 4–8 spikelets; rays ultimately recurved deflexed. *Nut* as long as ⅓–⅔ glume, acutely trigonous; outermost cells transversely oblong, in 12–15 irregular vertical series.—Otherwise as *F. tenera.*

33. **F. merguensis,** *C. B. Clarke*; stems 1 ft. rather slender, leaves several short, umbel once compound, spikelets largeish lanceolate, style 3-fid, nut small obovoid straw-colrd. smooth. F. Thwaitesii, var. *Boeck. ms.* Trichelostylis sp., n. 21, *Herb. Ind. Or. H.f. & T. T.*

MALAY PENINSULA; Mergui, *Griffith*; Tenasserim, *Helfer* (*Kew Distrib.* 6330).

Glabrous. *Roots* fibrous. *Stems* tufted, obscurely 3–4-angular under umbel. *Leaves* as long as ⅛–⅓ stem, narrow, flat, tip obtuse. *Umbel* 1–3 in. in diam., with 12 spikelets; bracts scarcely ½ in. *Spikelets* nearly ½ by ⅛ in., terete, acute, fine rusty-brown. *Glumes* erect adpressed, rigid, ovate, shortly acuminate. *Stamens* 3–2. *Style* long, white, glabrous, deciduous with the narrowly pyramidal style-base. *Nut* as long as ¼ glume, trigonous, minutely mucronate.

34. **F. Pierotii,** *Miq. in Ann. Mus. Lugd. Bat.* ii. 145; stoloniferous, glabrous, stems 1 ft. somewhat slender, umbel simple or once compound, style 3-fid, nut obovoid straw-colrd. laxly reticulate smooth or somewhat tubercled. *Boeck. in Linnæa,* xxxvii. 32. Trichelostylis sp., n. 20, *Herb. Ind. Or. H.f. & T. T.* (*partly*).

N.W. HIMALAYA, alt. 4–9000 ft. SIMLA, *T. Thomson, Gamble.* KUMAON, *Duthie.*—DISTRIB. Japan.

Stolons up to 2 in., densely clothed by lanceolate striate scales, finally hardening into a woody rhizome. *Leaves* as long as ½ stem, flat, acute. *Umbel* 1–3 in. in diam., with 5–14 spikelets; bracts short. *Spikelets* ⅛ by ⅛ in., ellipsoid-lanceolate, 10-fld. *Glumes* adpressed, boat-shaped, ovate, shortly acuminate, chestnut or testaceous, usually with round glands in upper half, margins scarious. *Style* long, glabrous, deciduous with narrow style-base. *Nut* as long as ⅓–⅖ glume, tip subpyramidal.

** Stem with many spikelets (at least in fairly developed examples).

† *Nut slenderly trabeculate (outermost cells transversely oblong).*

35. **F. Arnottiana,** *Boeck. in Linnæa,* xxxvii. 28; stems a foot (at least), umbel decompound, spikelets cuboid-ellipsoid one-colrd., glumes ovate obtuse brown hardly keeled, style 3-fid, nut obovoid yellow-brown transversely lineate obscurely tuberculated.

DECCAN PENINSULA; Cannanore, *Campbell* (*Herb. Wight* propr., n. 1884, *right-hand plant only*).

Stems somewhat slender, 4–5-angular under umbel. *Umbel* 3–4 in. diam., glabrous, with 30 spikelets; bracts 3–4, up to ¾ in. long, very narrow. *Spikelets* ⅛ by ⅛ in., obtuse, 10-fid., styles conspicuously protruded. *Glumes* concave, adpressed incurved, scarcely striate. *Stamens* 2–3; anthers linear-oblong, scarcely apiculate. *Style* as long as nut, slender, glabrous, deciduous with the narrow style-base. *Nut* small, as long as ⅓–⅖ glume.—Founded on some upper portions of stems without leaves, pasted down (in Herb. Wight) with *F. quinquangularis*, to which it is closely allied.

36. **F. filifolia,** *Boeck. in Linnæa,* xxxvii. 32; stems 2 ft. quadrangular, leaves long narrow convolute or 0, umbel decompound and supradecompound, spikelets ellipsoid acute, style 3-fid, nut obovoid straw-yellow smooth obscurely transversely lineolate.—Trichelostylis sp., n. 14, *Herb. Ind. Or. H. f. & T.*

SIKKIM TERAI; Dulkajhar, alt. 500 ft., *C. B. Clarke.* KHASIA HILLS; Churra, alt. 4200 ft., *J. D. H.*, &c.

Glabrous. *Leaves* sometimes as long nearly as stem, often shorter, sometimes 0. *Umbel* 4–12 in. in diam., with many (sometimes 250) solitary spikelets; bracts ½–2 in. *Spikelets* ⅛ by ⅛ in., brown. *Glumes* ovate, obtuse, with 3 green nerves. *Style* as long as nut, slender, slightly villous below trifurcation, deciduous with the narrow pyramidal style-base; branches long linear. *Nut* as long as ⅔ glume, round trigonous; outermost cells in about 12 longitudinal series on each face.—Resembles large examples of *F. diphylla*, but differs not only in the 3-fid style, but in the long linear style-branches.

37. **F. asperrima,** *Boeck. in Linnæa,* xxxvii. 40; stems 1½–2½ ft., leaves long, umbel decompound with numerous spikelets, bracts acute often longer than umbel, style 3-fid, nut ellipsoid brown smooth transversely trabeculate smooth or slightly tuberculate. F. chætorrhiza, *Thw. Enum.* 349 (*partly, not of Kunth*). Isolepis dura, *Moritzi, Verz. Zoll. Pl.* 97. Trichelostylis asperrima, *Nees ms.*—Fimbristylis, *Wall. Cat.* 3502 B (*partly*), 3525 (*mixed*).

CEYLON, *Thwaites*, &c. From TAVOY, *Wallich*, to SINGAPORE, *Ridley*, frequent. —DISTRIB. Malaya.

Stems either 5-angular or flattened under umbel. *Leaves* several, often as long as stem. *Umbel* large, sometimes with 150 solitary spikelets. *Spikelets, style,* and

nut much as in *F. complanata* (but nut more trabeculate).—Much resembles larger forms of *F. complanata*, Link, but differs by the long bracts. The Khasia plants referred here by Boeckeler were perhaps *F. Thomsonii*, Boeck.

38. **F. quinquangularis,** *Kunth Enum.* ii. 229; stems 8–24 in., leafy at base or leafless, umbel decompound or supradecompound, spikelets small ellipsoid-lanceolate 6–14-fld., style 3-fid, nut obovoid transversely lineolate pale or brownish more or less tuberculate. *Thw. Enum.* 349; *Dalz. & Gibs. Bomb. Fl.* 287; *Boeck. in Linnæa*, xxxvii. 42 (excl. F. Salbundia). F. Salbundia, *Boeck. in Linnæa*, xxxvii. 44 (*mostly, not of Kunth*). F. angularis, *Steud. Syn Cyp.* 116. F. Boeckeleri, *Steud. l. c.* 113 (*partly, see Boeck. in Flora*, xlii. 69). F. tenera, *Boeck. l. c.* 111 (*not of Roem. & Sch.*). Scirpus quinquangularis, *Vahl Enum.* ii. 279; *Roxb. Fl. Ind.* i. 229. S. miliaceus, *Linn. Herb.* (? *Sp. Pl* i. 75). S. pentagonus, *Roxb. l. c.* 218. S. Salbundius (Satbundius), *Ham. ms.* (*not* F. Salbundia, *Kunth*). Trichelostylis quinquangularis, *Nees in Wight Contrib.* 104. Isolepis angularis and I. ? pentagona, *Roem. & Sch. Syst.* ii., *Mant.* 69.—Fimbristylis, *Wall. Cat.* 3499, 3512 (*mainly*).

Throughout INDIA, alt. 0–4000 ft., CEYLON, and MALAY PENINSULA.—DISTRIB. Malaya, China, Austral. Mauritius introd. ?

Glabrous, annual, very variable in size. *Stems* usually flattened at base with subdistichous sheaths, often 4–5-angular under umbel. *Leaves* often as long as ½ stem, very variable in development. *Umbel* often 4–8 in. in diam. with 100 spikelets, sometimes small with 15–5 (larger than usual); bracts ½–1½ in. *Spikelets* ⅛–⅕ in. long, more acute than in *F. miliacea*, subterete (not polygonal as in *F. Salbundia*, Kunth). *Glumes* ovate, subacute, 3-nerved. *Style* longer than nut, slender, slightly villous below trifurcation, deciduous with the narrow pyramidal style-base, branches long. *Nut* small, as long as ⅔ glume.—Hardly separable from *F. miliacea* (see Arnott *in Wight Contrib.* 105).

Var. *crassa*; more robust, rhizome woody, stems stouter often 2–3 ft. leafless or nearly so, spikelets rather larger broadly ellipsoid. F. aphylla, *Steud. Syn. Cyp.* 114. F. globulosa, *var.* β aphylla, *Miq. Fl. Ind. Bat.* iii. 322.—Ceylon, *Thwaites* (n. 823, *partly*), &c. Nilghiri, alt. 5–8000 ft., plentiful.—Java, Tonkin.

39. **F. miliacea,** *Vahl Enum.* ii. 287; stems 8–24 in., leafy at base or (rarely) leafless, umbel decompound or supradecompound, spikelets small globose (or ultimately cylindric) obtuse many-fld., style 3-fid, nut obovoid transversely lineolate pale or brownish more or less tuberculate. *Thw. Enum.* 348; *Dalz. & Gibs. Bomb. Fl.* 287; *Miq. Fl. Ind. Bat.* iii. 321; *Boeck. in Linnæa*, xxxvii. 43. F. littoralis, *Gaud. in Freyc. Voy. Bot.* 413. F. benghalensis, *Roem. & Sch. Syst.* ii. 94, and *Mant.* 530. F. flaccida, *Steud. Syn. Cyp.* 113; *Miq. Fl. Ind. Bat.* iii. 321. F. flaccidula, *Zoll. Syst. Verz. Ind. Archip.* ii. 61. Scirpus miliaceus, *Burm. Fl. Ind.* 22, t. 9, fig. 2; *Rottb. Descr. et Ic.* 57, t. 5, fig. 2 (*not of Roxb.*). S. tetragonus, *Poir. Encyc.* vi. 767; *Roxb. Fl. Ind.* i. 228. S. benghalensis, *Pers. Syn.* i. 68. Isolepis ? tetragona, *Roem. & Sch. Syst. Mant.* ii. 69. I. miliacea, *Presl. Rel. Haenk.* i. 188 (excl. var. β). Trichelostylis miliacea & tetragona, *Nees in Wight Contrib.* 103, 104.—Fimbristylis, *Wall. Cat.* 3500, 3524.

Throughout INDIA, alt. 0–6000 ft., abundant.—DISTRIB. All warm regions.

Hardly separable from *F. quinquangularis*, but by the obtuser spikelets. Outer cells (transverse) of nut translucent, appearing themselves longitudinally striolate.

†† *Nut smooth verrucose or tubercular, not trabeculate.*

40. **F. globulosa,** *Kunth Enum.* ii. 231; stems 8–16 in., top sheath

leafless, spikelets cuboid-ellipsoid obtuse, glumes obtuse, style 3-fid (see var. β), nut obovoid verrucose pale brown. *Thw. Enum.* 349; *Boeck. in Linnæa*, xxxvii. 45. F. umbellaris, *Vahl Enum.* ii. 291. F. efoliata, *Steud. Syn. Cyp.* 109. Scirpus umbellaris, *Lam. Ill.* i. 141. S. globulosus, *Retz Obs.* vi. 19. Isolepis globulosa, *Roem. & Sch. Syst.* ii. 119. Trichelostylis globulosa, *Nees in Wight Contrib.* 105.—Fimbristylis, *Wall. Cat.* 3518, 3529.

CEYLON, *Thwaites*. From NEPAL, *Wallich*, ASSAM, *Griffith*, and SHAN HILLS, *Collett*, to PENANG, *Wallich*.—DISTRIB. Malaya, Tonkin, Polynes.

Glabrous. *Rhizome* none or scarcely any. *Stems* tufted, 4–5-angular under umbel. Lower *sheaths* bearing long leaves or leafless. *Umbel* sometimes 2 in. diam., with 20 spikelets; often smaller, sometimes with 2–1 spikelets; bracts rarely ½ in. *Spikelets* ¼ by ⅛ in., dense-fid., dusky-brown. *Glumes* concave, incurved, 3-nerved. *Stamens* often 2. *Style* as long as nut, deciduous with the narrowly pyramidal style-base; branches linear. *Nut* as long as ⅔ glume, round trigonous; outermost cells lax (i. e. nut somewhat verrucose), shortly transversely oblong, superimposed in 12–15 vertical series in each face (i. e. nut slenderly longitudinally striate).—Spikelets sometimes barren at top, elongate-cylindric.

Var. *Torresiana* (sp.), Gaud. in Freyc. Voy. Bot. 413; style 2-fid, nut biconvex. Assam, *Masters*. Bengal, *J.D.H.*—Marianne Islands.—No 3-fid styles could be found; the examples have the uppermost sheath leafless as in typical F. globulosa.

Var. *Vicaryi*; lower sheaths with long leaves, uppermost sheath with a green leaf ⅓–⅔ in. long, central sessile spikelet usually deficient. Trichelostylis sp., n. 16, *Herb. Ind. Or. H.f. & T.*—Banks of the Chenab, *Thomson*; Dehra Doon, *Vicary*.

41. **F. insignis,** *Thw. Enum.* 349; stems 12–16 in. robust base leafy, umbel compound with about 10 large lanceolate spikelets, style 3-fid, nut small obovoid smooth white laxly reticulated. *Hance in Journ. Linn Soc.* xiii. 132 (excl. syn. Trichelostylis, n. 20). F. Thwaitesii, *Boeck. in Linnæa*, xxxvii. 34. F. amblyphylla, *Steud. Syn. Cyp.* 116 (*the plant described in Obs.*).

CEYLON, *Thwaites*.—DISTRIB. Borneo, China.

Glabrous. *Rhizome* short, descending. *Stems* obscurely 4–5-angular under umbel. *Leaves* several, as long as ½ stem, narrowish, flat, tip suddenly narrowed. *Umbel* 1½–3½ in. in diam., sometimes simple with 4–5 spikelets; bracts 2–3, less than ⅔ in. long. *Spikelets* ½–⅔ by ⅛ in., hard, acute. *Glumes* ¼ in., boat-shaped, acute submucronate, brown-chestnut. *Stamens* 3. *Style* long, villous, white, tardily deciduous with the narrowly pyramidal style-base. *Nut* as long as ⅛–¼ glume, triquetrous with concave faces, obtuse almost emarginate.

42. **F. pentaptera,** *Kunth Enum.* ii. 229; stems 16–36 in. leafless hairy acutely 5-angular under umbel, umbel decompound, bracts small, style 3-fid, nut obovoid shining brown smooth minutely reticulate. *Boeck. in Linnæa*, xxxvii. 30. F. Salbundia, *Thw. Enum.* 349 (*not of Kunth*). S. quinquangularis, *Boeck. in Linnæa*, xxxvii. 42 (*as to Thw. C.P.* 823). Trichelostylis pentaptera, *Nees in Wight Contrib.* 105.

Ceylon, up to 6000 ft., *Gardner, Thwaites*. Deccan Peninsula, *Wight* (n. 2904, *in Herb. Calcutt.*).

Rhizome short, horizontal, woody. *Stems* somewhat thickened at base; sheaths hard, yellow-brown. *Umbel* 2–5 in. in diam., with sometimes 40–85 spikelets. *Spikelets* ¼ by 1/12 in., chestnut-colrd. *Glumes* adpressed, ovate, scarcely acute. *Stamens* often 2. *Style* long, glabrous, deciduous with the narrowly pyramidal style-base. *Nut* as long as ⅓ glume.—Easily recognized by the hairy stem.

43. **F. complanata,** *Link Hort. Berol.* i. 292; stems 8–24 in. flattened under umbel, leaves almost premorse, style 3-fid, nut minute obovoid pale more or less tuberculate. *Thw. Enum.* 349. F. autumnalis, var., *Roth. Nov. Pl. Sp.* 26; *Boeck. in Linnæa,* xxxvii. 38. F. scabra, *Kunth Enum.* ii. 245. F. Boeckeleri, *Steud. Syn. Cyp.* 113, partly. Scirpus complanatus, *Retz Obs.* v. 14; *Roxb. Fl. Ind.* i. 228. S. anceps, *Willd. in Berl. Mag.* ii. 288, t. 8, fig. 2; *Roxb. l. c.* 230. Cyperus complanatus, *Willd. Sp. Pl.* i. 270. Isolepis complanata & Willdenowii, *Roem. & Sch. Syst.* ii. 119, 120. Trichelostylis complanata & T. scabra, *Nees in Wight Contrib.* 103.—Fimbristylis, *Wall. Cat.* 3502 A, 3510, 3525 (*partly*).

Throughout INDIA in the warm region.—DISTRIB. All warm regions.

Glabrous. *Rhizome* hardly any, sometimes very short horizontal. *Leaves* often 4–8 by $\frac{1}{8}$ in. *Umbel* often 4 in. in diam., compound and supradecompound, sometimes with 180 spikelets; bracts 2, shorter than umbel (often suberect), similar to leaves, almost premorse. *Spikelets* $\frac{1}{4}$ by $\frac{1}{12}$ in. *Stamens* usually 3. *Style* longer than nut, glabrous; branches linear, long. *Nut* about $\frac{1}{3}$ length of glume; outermost cells short oblong transverse, in vertical series but obscure (i. e. nut scarcely striate).

Var. *microcarpa* (sp.), F. Muell. Fragm. Phyt. Austral. i. 200; stems slender hardly flattened under umbel, spikelets more slender, nut very small velate (i. e. outermost cells withering and partly peeling off). *Benth. Fl. Austral.* vii. 316. F. tenera, *Boeck. in Flora,* lviii. [1875] 111 (excl. var., *not of Roem. & Sch.*).—Kumaon, alt. 8000 ft., *Strachey & Winterbottom,* n. 2; Sikkim, alt. 9500 ft., J.D.H. Bombay, *Dalzell.*—Eastern Asia, Australia.

This species admitted by Bentham, comes between *F. complanata,* Link, and *F. autumnalis,* Roem. & Sch., species which Boeckeler unites.

Var. *Kraussiana,* (sp.) Hochst. in Flora, xxviii. 757; stems slender obscurely flattened under umbel, umbel more compact less compound often with 10–30 spikelets. F. connectens, *Thw. Enum.* 349.—Ceylon, *Thwaites.*—China, Malaya, Africa.

Var. *fenestrata*; spikelets larger rusty-brown, glumes large laxly subpatent obtuse shining, nut white fenestrate by the strongly reticulate persistent outermost cells.—Deccan Peninsula; Palimcottah, *Wight* (n. 2899).—Roots fibrous. *Stems* 12–16 in., tufted, conspicuously flattened at top. *Leaves* as long as $\frac{2}{3}$ stem, $\frac{1}{6}$ in. broad, tip subobtuse. *Umbel* and bracts nearly as in *F. complanata,* typ. *Spikelets* $\frac{2}{5}$ by $\frac{1}{8}$ in., many-fid.

44. **F. Thomsonii,** *Boeck. in Linnæa,* xxxvii. 37; stems 8–24 in., leaves flat tip obtuse, umbel compound and supradecompound, spikelets ellipsoid acute, style 3-fid, nut oblong-obovoid straw-colrd. verrucose or subtuberculate obscurely transversely lineolate. F. complanata, *Benth. Fl. Hongk.* 393.—Trichelostylis, sp. n. *Herb. Ind. Or. H. f. & T.*

N.E. INDIA, alt. 500–4000 ft., from SIKKIM, ASSAM and Chota Nagpore to MARTABAN and SHAN HILLS, common.—DISTRIB. Tonquin, China.

Glabrous. *Roots* fibrous. *Stems* upwards obscurely 4-angular, or sometimes subcompressed. *Leaves* sometimes short 2–4 in., sometimes a foot. *Umbel* 2–6 in. diam., with sometimes 80 spikelets; bracts 4–5, usually shorter than umbel. *Spikelets* $\frac{3}{4}$ by $\frac{1}{8}$ in. *Nut* as long as $\frac{2}{3}$ glume.—This species is near the large form of *F. complanata,* Link, from which it mainly differs by the thicker spikelets and larger nut (is probably often passed for *F. diphylla,* Vahl).

45. **F. Salbundia,** *Kunth Enum.* ii. 230; stems 1½–3 ft. leafless 4–5-angular, umbel decompound with 120 ovoid testaceous spikelets, glumes keeled rather lax, style 3-fid, nut obovoid yellow-brown opaque smooth or slightly tuberculate. Trichelostylis Salbundia, *Nees in Wight Contrib.*

105 (*at least in part*) not Scirp. Salbundius, *Ham. in Wall. Cat.* n. 3499 A, nor F. Salbundia, *Boeck.*).—Fimbristylis, *Wall. Cat.* 3499 C. in Herb. Berlin (*not in Herb. Linn. Soc.*), 2526, 3527 (*in Herb.* DC. *not in Linn. Soc.*).

SILHET; *Wallich.* KHASIA HILLS, *Griffith.* AMHERST; *Wallich* n. 3527 (*in Herb. DC.*).—DISTRIB. Australia.

Glabrous. *Rhizome* very short, obliquely descending. *Stems* tufted, acutely angular. *Umbel* 2–4 in. diam.; bracts scarcely an inch, bristle-like. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in., angular, about 10-fld. *Glumes* ovate obtuse, margins broadly scarious.—Has been greatly confused with the leafless form of *F. quinquangularis*, from which it is easily known by the testaceous spikelets, polygonal by reason of the acutely keeled glumes.

Series D. Spikelets clustered (some solitary often added).

46. **F. leptoclada,** *Benth. Fl. Hongk.* 393 (not Fl. Austral.); stems 1 foot slender, leaves long narrow, spikelets small in 1–3 small clusters dark brown, glumes very obtuse tip ciliate, style 3-fid, nut obovoid yellow-brown verrucose. F. retusa, *Thw. Enum.* 349; *Boeck. in Linnæa*, xxxvii. 46; *Hance in Lond. Journ. Bot.* xvi. 112.

CEYLON; *Thwaites.* MALACCA; *Griffith.*—DISTRIB. Borneo, China.

Annual, glabrous. *Leaves* as long as $\frac{1}{2}$ stem (or all stem) $\frac{1}{20}$–$\frac{1}{12}$ in. broad. *Umbel* $\frac{1}{2}$–1 in., often congested into a head; bracts hardly $\frac{1}{8}$ in. *Spikelets* usually 3–8, $\frac{1}{6}$ in., ellipsoid, obtuse. *Stamen* often 1. *Style* as long as nut, glabrous, deciduous with the shortly pyramidal style-base; branches linear. *Nut* as long as $\frac{2}{3}$ glume, round trigonous.

47. **F. paupercula,** *Boeck. in Linnæa*, xxxviii. 396; stems 1 ft. slender, clusters of spikelets in a simple umbel, style 3-fid, nut obovoid with many longitudinal striations finally black.

DECCAN PENINSULA; Pulney Mts.; *Wight* (n. 2896).

Nearly glabrous. *Rhizome* short, obliquely descending. *Stem* under umbel 5-angular, minutely scabrous pilose. *Leaves* as long as $\frac{1}{2}$ stem, narrow. *Umbel* rays 4–5, 1 in. long; bracts hardly $\frac{1}{2}$ in. *Spikelets* 2–7 to a cluster, $\frac{1}{8}$ in. long, ellipsoid, brown, about 6-fld. *Glumes* ovate, keel slightly excurrent as a mucro, glandular upwards, sometimes puberulous. *Nut* as long as $\frac{1}{3}$ glume, triquetrous, apex obtuse; outer cells shortly transversely elliptic, regularly arranged in about 16 vertical series on each face.—This is in Herb. Calcutt., Paris, and Berlin; but not in Mus. Brit. or Kew.

48. **F. junciformis,** *Kunth Enum.* ii. 239; stems 4–16 in., leaves several rigid, umbel compound and decompound, spikelets clustered, style 3-fid, nut obovoid nearly smooth or verrucose straw-colrd. or pale brown. *Boeck. in Linnæa*, xxxvii. 49. F. Hænkei, *Dietr. Sp. Pl.* ii. 161. F. chætorrhiza, *Kunth l. c.* 240; *Strachey Cat. Pl.* ii. 73. F. falcata, *Kunth l. c.* 239. Scirpus falcatus, *Vahl Enum.* ii. 275. Isolepis falcata, *Roem. & Sch. Syst.* ii. 118. Trichelostylis junciformis and chætorrhiza, *Nees in Wight Contrib.* 106.—Fimbristylis, *Wall. Cat.* 3519 (*partly*), 3520.

Throughout INDIA, alt. 1500–5000 ft., from KASHMIR and ASSAM to MADRAS and PEGU.—DISTRIB. Madagascar, Philippines.

Glabrous. *Rhizome* woody, short; or sometimes 2 in. long horizontal. *Stems* tufted, rigid, upwards 4–5-angular or obscurely flattened. *Leaves* usually short but sometimes as long as $\frac{1}{2}$–$\frac{2}{3}$ stem, $\frac{1}{12}$–$\frac{1}{6}$ in. broad, flat, margins incurved, tip obtuse. *Umbel* 1–4 in. diam., with 20–30 clusters, often much smaller with 3–5 clusters; bracts 2–4, short, rarely 1 in. *Spikelets* 2–5 to a cluster, with none or few solitary

spikelets in the typical form, but examples with many solitary few clustered spikelets occur, ⅛–¼ in., brown or chestnut-colrd., many-fld. *Glumes* ovate, obtuse, margins conspicuously scarious. *Stamens* 3. *Style* longer than nut, slender, slightly villous below trifurcation, deciduous with the small pyramidal style-base; branches long. *Nut* as long as ⅓ glume, not (or obscurely) striate.—*F. Haenkei*, Dietr. is the older (but less certain) name for this species. The Californian habitat given by Boeckeler is probably erroneous.

Var. *abbreviata* (sp.) Boeck. in Flora, xli. 601; spikelets some paired but mostly solitary. F. chætorrhiza, *Thw. Enum.* 349 (*partly*).—Ceylon; *Thwaites, Gardner.* Deccan Peninsula; *Wallich* n. 3520 A. (*partly*). Anamallay Mts.; *Beddome.*

Var. *latifolia* (sp.) Kunth *l. c.* 239; leaves ½–2 by ⅛ in. flat curved and twisted, spikelets rather many (rarely all) solitary. F. falcata, *Boeck. in Linnæa*, xxxvii. 48. F. torta, *Kunth l. c.* 24; *Boeck. l. c.* 31. Trichelostylis torta and T. latifolia, *Nees in Wight Contrib.* 105, 106.—Fimbristylis, *Wall. Cat.* 3498.—Deccan Peninsula; *Wight, Wallich.* Ceylon; *Walker.*

49. **F. nigrobrunnea,** *Thw. Enum.* 434; stems 8–20 in., leaves several stout obtuse, umbel simple compound or decompound, spikelets some clustered (rarely all solitary), glumes shining hard dark-brown lower few-ranked or obscurely distichous, style 3-fid, nut obovoid yellow-brown verrucose or nearly smooth. F. subtetrastachya, *Boeck. in Linnæa*, xxxvii. 50. F. pycnostachya, *Hance in Journ. Bot.* xv. 338. Abildgaardia Eragrostis, *Boeck. l. c.* 55 (*partly, not of Nees & Meyen*).—Fimbristylis, *Wall. Cat.* 3523.—Trichelostylis sp. n. 20, *Herb. Ind. Or. H. f. & T.*

KHASIA HILLS, alt. 3–5000 ft. MUNEYPOOR; alt. 3500 ft., *Watt.* DECCAN PENINSULA; Courtallum, *Wight.* NICOBARS. CEYLON, *Thwaites*, &c.—DISTRIB. Cambodia.

Glabrous. *Rhizome* hardly any. *Leaves* as long as ⅛–⅔ stem, by ⅛ in. broad. *Umbel* ½–6 in. diam.; bracts about ½ in.; spikelets in the common Khasia form 2–10 to a cluster, in the Ceylon form solitary. *Spikelets* ½ by ⅛ in., or sometimes much smaller. *Glumes* ovate, acute, keeled, adpressed. *Stamens* generally 2. *Style* as long as nut, slightly villous below trifurcation. *Nut* as long as ⅔ glume.—This species might perhaps be arranged in Sect. Abildgaardia.

50. **F. uliginosa,** *Steud. Syn. Cyp.* 109; stems 4–8 in. slender, leaves almost bristle-like, spikelets clustered black-chestnut, style 3-fid, nut obovoid smooth pale slightly narrowed at top. *Boeck. in Linnæa*, 25, 25.

NILGHIRI HILLS; alt. 6–7000 ft., *Perrottet*, &c.

Leaves as long as ½–½ stem, $\frac{1}{20}$–$\frac{1}{12}$ in. broad. *Umbel* simple or often reduced to a single cluster sometimes to a single spikelet.—Otherwise as *F. nigro-brunnea*, Thw., of which this may be a small mountain state.

51. **F. digitata,** *Boeck. in Flora*, lxi. 35; stems 2–5 in. bristle-like base bulbous, spikelets 3–8 straw-colrd. in a subterminal head, style 3-fid, nut obovoid smooth straw-colrd. or finally brownish. *Benth. & Hook. f. Gen. Pl.* iii. 1050. Scirpus Lawianus, *Boeck. in Linnæa*, xxxvi. 479. Trichelostylis digitata, *H. f. & T. ms.*

BOMBAY; *Dalzell.* CANARA; *Law, Young*; Belekerri, *Talbot.*

Glabrous. *Leaves* as long as ½ stem, bristle-like. *Bracts* 2–1, shorter than head. *Spikelets* ¼–½ by $\frac{1}{12}$–⅛ in., 6–18-fld. *Glumes* ovate-oblong, scarcely acute, keeled, chaffy, nearly 1-colrd. *Style* nearly as long as nut, glabrous, deciduous, with small pyramidal style-base, branches linear. *Nut* as long as ½ glume, sessile, round-trigonous, obtuse at top.

Sect. IV. ABILDGAARDIA (Genus) *Vahl Enum.* ii. 296. Lower glumes of spikelet distichous or nearly so, upper fertile glumes spirally placed. (See also F. *nigrobrunnea*, sp. n. 49 above.) Spikelets not clustered.

* *Spikelets pale, nut large triquetrous base much narrowed.*

52. **F. monostachya,** *Hassk. Pl. Jav. Rar.* 61; stems leafy at base with 1 (rarely 2–3) spikelet, nut-bearing glumes 2–3-stichous shortly mucronate, style 3-fid, nut somewhat large obovoid more or less tuberculate straw-colrd. or pale-brown. *Benth. Fl. Austral.* vii. 308. Cyperus monostachyus, *Linn. Mant.* 180; *Rottb. Descr. et Ic.* 18, t. 13, fig. 3. C. indicus, *Pers. Syn.* i. 65. Scirpus schœnoides, *Roxb. Fl. Ind.* i. 221. Abildgaardia monostachya, *Vahl Enum.* ii. 296; *Dalz. & Gibs. Bomb. Fl.* 286; *Thw. Enum.* 347; *Boeck. in Linnæa*, xxxvii. 53. A. lævigata, *Link Jahrb.* iii. 81. A. Rottboelliana, *Nees in Wight Contrib.* 95. A. compressa, *Presl. Rel. Hænk.* i. 179. A. indica, *Nees in Linnæa*, ix. 289.—Abildgaardia, *Wall. Cat.* 3491.

Throughout warmer INDIA.—DISTRIB. All warm regions.

Glabrous. *Rhizome* 0, or very short. *Stems* 2–16 in., tufted, slender, angular. *Leaves* as long as ½ stem, narrow. *Spikelet* quasi-terminal (bract hardly any) ¼ by ⅛ in., or in some of Wallich's collections nearly twice these dimensions, compressed with glumes distichous), or often twisted. *Glumes* ovate, acute, keel green, sides straw-colrd. or yellow. *Stamens* 3; anthers linear-oblong not crested. *Style* long, villous nearly to the base, deciduous with pyramidal style-base; branches rather short. *Nut* as long as ½–1 glume, base much contracted.

53. **F. tristachya,** *Thw. Enum.* 434 (*not of Br. or Nees*); stem stout leafy at base with 2–5 (rarely 1) large spikelets, nut-bearing glumes 2–3-stichous shortly mucronate, style 3-fid, nut large obovoid tuberculate ultimately brown-black. Cyperus triflorus, *Linn. Mant.* 62. Schœnus cyperoides, *Retz Obs.* iv. 8. Abildgaardia tristachya, *Vahl Enum.* ii. 297; *Nees in Wight Contrib.* 95; *Thw. l. c.* 347; *Boeck. in Linnæa*, xxxvii. 54. A. monostachya, var. *Hassk. Pl. Jav. Rar.* 61.—Isolepis ?, *Wall. Cat.* 3492.

DECCAN PENINSULA, frequent; *Wight*, &c. CEYLON; *Thwaites.*—DISTRIB. Warmer Africa.

Stems 1–2½ ft. *Leaves* as long as ½ stem, rigid. *Spikelets* 1 in., compressed, often twisted.—This species is altogether larger than the common forms of *F. monostachya*; from the large form of *F. monostachya* it does not differ much except by its dark nut.

** *Spikelets brown, nut small base not much narrowed.*

54. **F. fusca,** *Benth. in Gen. Pl.* iii. 1048; leaves several short flat, umbel often compound, bracts short, glumes few-ranked boat-shaped acute brown puberulous, style 3-fid, nut obovoid pale smooth slightly verrucose. F. cinnamometorum, *Hance in Journ. Linn. Soc.* xiii. 132 (*not Kunth*). F. Kamphœveneri, *Boeck. in Engler Bot. Jahrb.* v. 505. Gussonia pauciflora, *Brongn. in Bot. Duperr. Voy.* 171, t. 34, B. Abildgaardia fusca, *Nees in Wight Contrib.* 95; *Boeck. in Linnæa*, xxxvii. 54. A. pauciflora, *Kunth Enum.* ii. 249. Schœnus puberulus, *C. A. Meyer Cyp. Nov.* 2, t. 1. Rynchospora ? anomala, *Steud. Syn. Cyp.* 149; *Miq. Fl. Ind. Bat.* iii. 337. Isolepis longispica, *Steud. l. c.* 104.—Fimbristylis, *Wall. Cat.* 3530.

NEPAL; *Wallich.* BURRAKUR; *Kurz.* PEGU; *Kurz.* PENANG; alt. 2500 ft., *Kunstler.*—DISTRIB. Malaya, China.

Rhizome very short, woody, horizontal, densely leafy. *Stems* about 1 ft., slender, angular, glabrous. *Leaves* scarcely as much as ¼ stem, $\frac{1}{12}$ in. broad, minutely pubescent or nearly glabrous, tip obtuse. *Umbel* 1–2½ in. diam., with about 10–20 spikelets; bracts ½–⅔ in., usually hairy. *Spikelets* ⅛–⅖ by ⅛ in., flattened; lowest three glumes empty, lowest 2 shorter; nut-bearing glumes 2–6, subdistichous, upper glumes 3–6 male or sterile 3-several-ranked. *Glumes* submucronate, margins scarious, upwards often glandular. *Stamens* usually 2. *Style* long, slender, glabrous, deciduous with pyramidal style-base; branches linear. *Nut* as long as ¼–⅓ glume, subacutely trigonous, obtuse; outermost cells somewhat lax, sometimes almost papillose.

55. **F. fulvescens,** *Thw. Enum.* 434; annual, glabrous, leaves as long as ½–¾ stem, otherwise nearly as *F. fusca*, var. β *longifolia. Boeck. in Linnæa*, xxxvii. 55. Abildgaardia fulvescens, *Thw. l. c.* 347.

CEYLON; *Walker, Thwaites* (n. 679).

Stems tufted. *Umbel* nearly as in *F. fusca*, or sometimes more loose, with pale-cinnamon long-pedicelled spikelets; bracts ligulate scabrous. *Spikelets* ⅛–⅙ in. broad, i.c. often rather broader than in *F. fusca.*

56. **F. cyperoides,** *Br. Prodr.* 228; leaves several long narrow, umbel compound, bracts short, glumes few-ranked boat-shaped acuminate brown glandular, style 3-fid, nut oblong-obovoid pale transversely trabeculate. *Benth. Fl. Austral.* vii. 317. F. biflora, *Boeck. in Linnæa*, xxxviii. 393. Abildgaardia cyperoides, *Nees in Wight Contrib.* 95 (*in note*). Gussonea cyperoides, *Presl. Rel. Hænk.* i. 183, t. 33 (see *Benth. & Hook. f. Gen. Pl.* 1049.)

N. AUSTRALIA, PHILIPPINE, CAROLINE ISLES.

Stems about 1 ft., slender (base thickened by horny sheaths) closely approximate on a very short rhizome. *Leaves* as long as ½–⅔ stem, glabrous or minutely hairy. *Umbel* 1–3½ in. diam., sometimes with 80 spikelets usually with much fewer, glabrous or minutely hairy; bracts ½–1 in. *Spikelets* ¼ by $\frac{1}{12}$ in., flattened; lowest 2–3 glumes empty, lowest 1–2 small; nut-bearing glumes 2–4, distichous, upper glumes 3–6, male or sterile, 3-several-ranked. *Stamens* often 3. *Style* long, slender, deciduous with its hairy pyramidal style-base; branches linear. *Nut* as long as ⅔ glume, round trigonous.—California (Presl.) is an error for Manila.

Var. *cinnamometorum* (sp.) Kunth Enum. ii. 229; roots fibrous, stems tufted, nut shining somewhat polygonal, outermost cells transversely oblong superimposed regularly in 7–11 vertical series on each face (i.e. nut 7–11-ribbed on each of its 3 faces). *Boeck. in Linnæa*, xxxvii. 35. F. glabra, *Steud. Syn. Cyp.* 111, chiefly. Scirpus cinnamometorum, *Vahl Enum.* ii. 278. Trichelostylis cinnamometorum, *Nees in Linnæa*, ix. 290. Abildgaardia cinnamometorum, *Thw. Enum.* 347 (*excl. syn. fusca*).—Pegu and Ceylon; China.—Steudel's *F. glabra* is founded on Hohenacker n. 131, a, which is this "cinnamometorum," mixed with *F. tenera* var. *oxylepis*; Steudel's description regards mostly *cinnamometorum.*

57. **F. actinoschœnus,** *C. B. Clarke*; leaves hardly any, spikelets in one small dense head 4–1-fld., glumes about 6 few-ranked lower subdistichous, style 3-fid, nut small obovoid trigonous. Actinoschœnus filiformis, *Benth. in Hook. Ic. Pl.* xiv. 33, t. 1346. Arthrostylis filiformis, *Thw. Enum.* 352; *Boeck. in Linnæa*, xxxvii. 524.

CEYLON; *Thwaites* (n. 3469), *Beckett.*

Glabrous, perennial. *Stems* slender, 12–30 in. *Leaves* 0–½ in., setaceous, green, close to base of stem. *Spikelets* up to 20 in a globose head ⅓–½ in. diam.; bracts 0–½ in., setaceous. *Spikelets* ⅛ in., usually 2-fld., lower flower alone perfecting a

nut; but sometimes 4-fld., the three lower flowers perfect. Lowest 3 *glumes* smaller empty; glume subaristate, with recurved point (but see var. β). *Style* deciduous; base conic, dilated. *Nut* smooth, reticulate.

Var. β *chinensis*; spikelets less numerous, points of fl.-glumes shorter suberect. Arthrostylis chinensis, *Benth. Fl. Hongk.* 397. Actinoschœni sp. *Benth. in Hook. Ic. Pl.* xiv. 33.—Perak, alt. 6500 ft., *Wray*, n. 351, alt. 800 ft., *Kunstler* (n. 3373).—Hongkong.

58. **F. disticha,** *Boeck. in Linnæa*, xxxviii. 393; stems 4–10 in. slender base leafy, umbel 1–3 times divided slender lax, spikelets small narrowly oblong flattened, lower glumes distichous, style 3-fid, nut obovoid pale verrucose almost tuberculate.

TAVOY; *Wallich.* MOULMEIN; *Parish.* MERGUI; *Griffith.*—DISTRIB. Cochin China.

Annual. *Stem* 5-striate, base thickened by numerous sheaths. *Leaves* in the type 2 in., often much longer, flat, glabrous, tip obtuse. *Umbel* 4 in., nearly glabrous, bracts ½ in. *Spikelets* ⅛ by $\frac{1}{16}$ in., pale brown, with about 15 flowers. *Glumes* boat-shaped, ovate, subobtuse, glabrous, margins minutely hairy, 1–2 lowest empty deciduous. *Stamens* often 3. *Style* long, glabrous, deciduous with pyramidal style-base, branches long. *Nut* as long as ⅓–⅔ glume, round-trigonous.

Var? *Kurzii;* stouter, umbel denser, rays hairy, spikelets stouter, glumes distichous densely minutely hairy.—Sikkim Terai; Titaliya, Kurz.

DOUBTFUL SPECIES OF *Fimbristylis.*

F. GAMBLEANA, *Boeck. Cyp. Nov.* ii. 40.—MADRAS; alt. 3000 ft., *Gamble.*—"Allied to *F. tenera*," Boeck.

9. **BULBOSTYLIS**, *Kunth.*

Annuals. *Stems* slender, leafy only at base. *Leaves* very narrow and sheaths generally finely hairy. *Corymb* umbelliform or congested, sometimes reduced to 1 spikelet. *Spikelet* of numerous axillary perfect flowers, tabescent at top. *Glumes* imbricated on all sides, 2–1 lowest empty. Hypogynous *bristles* 0. *Stamens* 3–1, usually 2; anthers not crested. *Style* as long as nut, linear, glabrous; branches 3, linear; style-base very small, bulbiform; style with style-base deciduous, leaving a minute button on apex of nut. *Nut* obovoid, obtuse, 3-gonous, scarcely stalked, smooth. —Species 70, all warm regions.

This genus comprises a large group of very closely allied species, easily recognized by the fine leaves and needle-like hairs, as well as by the peculiar button left on the nut (itself ultimately deciduous). They are placed in *Fimbristylis* by Bentham, who laid great stress in the *Cyperaceæ* on the inflorescence; and by Boeckeler in *Scirpus*. They are really very closely allied to *Eleocharis* (of which genus one American species is *Bulbostylis nudipes*, Kunth), from which genus the few Indian *Bulbostylides* are easily distinguished by their leaves.

1. **B. barbata,** *Kunth Enum.* ii. 208 (see p. 205); stem glabrous with 3–20 spikelets in a globose head, style 3-fid, nut straw-colour obscurely reticulated or porose-punctate. B. Wallichiana and Willdenowii, *Kunth l. c.* 209, 210. Scirpus barbatus, *Rottb. Descr. et Ic.* 52, t. 17, fig. 4; *Boeck. in Linnæa*, xxxvi. 751 (*excl.* var. β). S. antarcticus, *Thunb. Fl. Cap.* 96; *Roxb. Fl. Ind.* i. 223 (*not Linn.*). S. monander, *Roxb. l. c.* 222. S. puberulus, *Boeck. l. c.* 767 (*armeroides only*). Isolepis barbata, *Br. Prodr.* 222; *Nees in Wight Contrib.* 109; *Strachey Cat. Pl. Kumaon*, 73; *Miq. Fl. Ind. Bat.* iii. 310; *Thw. Enum.* 350. I. Wallichiana, *Roem. &*

Sch. Syst. Mant. ii. 533. I. capillaris, *Don Prodr.* 39 (*not Roem. & Sch.*). I. Cumingii and I. involucellata, *Steud. Syn. Cyp.* 101. I. subtristachya, *Hochst.*; see *Boeck. l. c.* 752. Fimbristylis monandra, *Roem. & Sch. Syst. Mant.* ii. 59. F. barbata, *Benth. Fl. Austral.* vii. 321.—*Burm. Thes. Zeyl.* t. 47, fig. 2.—Isolepis, *Wall. Cat.* 3481, 3497.

Throughout INDIA, alt. 0–4000 ft., from KASHMIR and ASSAM to CEYLON and SINGAPORE.—DISTRIB. Warm regions.

Stems tufted, 2–10 in., bristle-like, striated. *Leaves* as long as ½ stem; sheaths usually with needle-like hairs at least in their throat. *Capitulum* ⅕–⅔ in. diam.; bracts shorter, or much longer, than head. *Spikelets* ⅛–¼ in., oblong-lanceolate. *Glumes* boat-shaped, ovate, scarcely acute, rusty brown with green keel, margins minutely ciliate, sides puberulous or glabrate. *Nut* as long as ¼ glume.

Var. *pulchella* (sp.) Thw. Enum. 350 (under *Isolepis*); lower glumes ovate-lanceolate longer more rigid than in *B. barbata* type. Scirpus Thwaitesii, *Boeck. in Linnæa*, xxxviii. 380,—Isolepis, *Wall. Cat.* 3480, B. 3481 C.—South Madras. Pondicherry; *Perrottet*; Tuticorin; *Wight* n. 2891, *Wallich.* Ceylon; *Thwaites* n. 829, 3761), &c.—The type form of this var. looks a separable species, but there are intermediates which I cannot sort between the two; Wight regarded all as one species.

2. **B. subspinescens,** *C. B. Clarke*; stem hairy with about 10 spikelets in an almost prickly head, style 3-fid, nut pale brown.

ORISSA; Poori, *W. S. Atkinson, Clarke.*

Whole plant pubescent. *Stems* 4 in., rigid, curved. *Leaves* as long as ⅓ stem. *Spikelets* nearly ⅓ in., hard, almost stellately spreading; bracts about as long as the head. *Glumes* scarcely keeled, densely pubescent.—Otherwise as *B. barbata*, of which it might be treated as a var. growing in sea sand.

3. **B. capillaris,** *Kunth Enum.* ii. 212 (see p. 205); stem glabrous, spikelets nearly all solitary in a simple or compound umbel, style 3-fid, nut pale transversely undulate. Scirpus capillaris, *Linn. Mant.* 321.

Throughout AMERICA.

Var. *trifida* (sp.) *Kunth Enum.* ii. 213; nut smooth or often verrucose not transversely undulate. Scirpus densus, *Wall. in Roxb Fl. Ind.* (ed. Carey & Wall.) i. 231. S. gracillimus, *Boeck. in Linnæa* xxxvi. 761. S. trifidus, *Hance in Journ. Bot.* xvi. 112. Isolepis trifida, *Nees in Wight Contrib.* 108; *Strachey Cat. Pl. Kumaon*, 73; *Thw. Enum.* 350. I. tenuissima, *Don Prodr.* 40. I. densa, *Roem. & Sch. Syst. Mant.* ii. 71; *Nees in Wight Contrib.* 109. I. trichokolea, *Steud. Syn. Cyp.* 96; *Miq. Fl. Ind. Bat.* iii. 308. Fimbristylis capillacea, *Steud. l. c.* 111. F. capillaris, *Benth. Fl. Austral.* vii. 322 (*partly*); *Boiss. Fl. Orient.* v. 390.—Isolepis, *Wall. Cat.* 3476.

Very common from the HIMALAYA, alt. 0–8500 ft., to CEYLON.—DISTRIB. Warm regions of Old World.

Stems tufted, 4–10 in., slender, striate, glabrous under umbel. *Leaves* as long as ½–⅔ stem, bristle-like, nearly glabrous; sheaths with needle-like hairs at least in their throat. *Umbel* very variable; in form *densus* (sp. Wall.) umbel very compound dense with spikelets; in *trifida* (sp. Kunth) umbel with 3 or not rarely 2–1 spikelets. *Spikelets* in the Indian plants solitary, ⅕ in., ellipsoid or oblong, 6–15-fld. *Glumes* boat-shaped, ovate, obtuse, brown or blackish, puberulous, keel green scarcely excurrent in a mucro. *Nut* as long as ⅔ glume.—Some Indian specimens have stems 16 in. with large compound umbels.—I cannot separate this specifically from the American type *capillaris*; the shape of the outermost cells of the nut is identical in the two, the superficial difference in marking is often imperfectly developed.

4. **B. puberula,** *Kunth Enum.* ii. 213 (see p. 205); stem pubescent or

puberulous under umbel, umbel often congested (sometimes lax) spikelets solitary, style 3-fid, nut pale transversely wrinkled. Scirpus puberulus, *Poir Encycl.* vi. 767; *Boeck. in Linnæa*, xxxvi. 767. S. Wightianus, *Boeck. l. c.* 765 (*in great part*). S. barbatus, *Boeck. l. c.* 751 (*as to syn. Isolepis gracilis and Thwaites* n. 834). I. gracilis, *Nees in Wight Contrib.* 109 (*not Linnæa*, x. 161); *Kunth l. c.* 217; *Thw. Enum.* 350. I. puberula, *Steud. Syn. Cyp.* 103. Cyperus pubescens, *Steud. l. c.* 50.

DECCAN PENINSULA, *Wight.* CEYLON; *Thwaites* n. 834. MERGUI; *Griffith.* MALACCA; *Kunstler.* SINGAPORE; *Burbidge.*—DISTRIB. Trop. Africa, Malaya and Cochin China.

Very near *B. capillaris*; the spikelets are really solitary, but often closely packed in an umbel less than 1 in. diam. In Wight n. 1892 (type of *Isolepis gracilis*, Nees) the stems are long, very slender; the umbel is lax, some pedicels $\frac{2}{3}$ in. long.

10. **SCIRPUS,** *Linn. (partly).*

Herbs of very various habit, all glabrous (or the inflorescence slightly hairy). *Spikelets* usually many-fld. (lower glumes spirally imbricated) sometimes few-fld. (lower glumes subdistichous upper spirally imbricated). *Glumes* 1–2 (rarely 3) lowest empty, several (rarely 1) succeeding with perfect nut-bearing flowers, upper tabescent. Hypogynous *bristles* 7–1 setaceous, or 0, or (in *S. littoralis* and *S. Isolepis*) sometimes broad ovate. *Stamens* 3–1, anterior; anthers linear-oblong or oblong, crested or unappendaged. *Style* long or short, glabrous, 3-fid or 2-fid, base linear or linear-conic, continuous with apex of nut. *Nut* trigonous or plano-convex, sessile or nearly so.—Species 125, all regions.

This genus here includes (in several very dissimilar sections) all the scirpoid species left after the neighbouring genera have been taken out. *Eleocharis* and *Fimbristylis* differ by the enlarged style-base (separated from the nut by a constriction or a line); *Fuirena* and *Bulbostylis* have hairy leaves; *Eriophorum* has bristles ligulate, laciniate (to the base in the Indian species)

Sect. I. MONOSTACHYI. Small or slender. Stems (or branches) with one spikelet. Style long.

1. **S. fluitans,** *Linn. Sp. Pl.* 71; stem weak elongate branched leafy upwards, bristles 0, style 2-fid, nut plano-convex obovoid smooth pale. *Reichb. Ic. Fl. Germ.* viii. 38, t. 298 (*excl. the triquetrous nut*); *Boeck. in Linnæa*, xxxvi. 485 (*excl. var. γ and part β*). Isolepis fluitans, *Br. Prodr.* 221; *Thw. Enum.* 350. I. curvula, *Kunth Enum.* ii. 189. I. curvata, *Zoll. Verz. Ind. Archip.* ii. 62. Eleogiton fluitans, *Link Hort. Berol.* i. 284. E. curvulus, *Nees in Wight Contrib.* 110.

KHASIA HILLS; alt. 1–3000 ft. NILGHIRI HILLS; *Perrottet*, &c., with more rigid purple glumes (var. *spadicea*). CEYLON; *Thwaites*, &c., with shortened curved nodes and clustered peduncles and leaves (var. *curvula*).—DISTRIB. Nearly all regions.

Root fibrous. *Stems* 2–12 in. long, flaccid, in water or on mud. *Leaves* $\frac{1}{4}$–$2\frac{1}{2}$ in., very narrow. *Peduncles* 1–4 in. *Spikelet* $\frac{1}{10}$–$\frac{1}{5}$ in., many- or few-fld.; bract usually shorter than the spikelet, or 0. *Glumes* ovate, obtuse, concave. *Nut* as long as $\frac{1}{2}$–$\frac{2}{3}$ glume; outermost cells small quadrate-hexagonal obscure (i.e. nut smooth or obsoletely reticulate).

2. **S. submersus,** *Sauvalle Fl. Cuba*, 175; stem weak elongate branched leafy upwards, bristles 6 overtopping nut, style 2-fid, nut (only

one in each spikelet) plane-convex lanceolate-obovoid smooth pale. S. confervoides, *Poir. Encyc.* vi. 755 (*non Boeck.*); *Kunth Enum.* ii. 173 partly (*the descript. not the diagnosis*). Eleocharis? confervoides, *Miq. Fl. Ind. Bat.* iii. 303. Rynchospora ruppioides, *Benth.* (Rhyncospora) *in Hook. Ic. Pl.* xiv. 31, t. 1344; *Trimen Cat. Ceylon Pl.* 103 and *in Journ. Bot.* xxiii. 140. Websteria limnophila, *S. H. Wright in Bull. Torrey Club*, xiv. [1887] 135.

CEYLON; *Thwaites* (C.P. 3936); Colombo, *Beckett.*—DISTRIB. Sporadic, tropical.

Floating. *Stems* 10–20 in. *Leaves* 2–4 in., clustered, capillary. *Spikelet* ¼ in., oblong-lanceolate. *Glumes* two lowest concave, elliptic-oblong, thin, enclosing the spikelet; upper glumes smaller, male or sterile, sometimes 0; lowest glume empty, the next supporting a perfect nut-bearing flower. *Bristles* setaceous, retrorse-scabrous, straw-colrd. *Nut* half as long as its glume, itself style and style-base exactly as in *S. fluitans*, but much larger.

3. **S. pauciflorus,** *Lightf. Fl. Scot.* 1078; leafless, spikelet quasi-terminal few-fld., bristles 6–3, style 3-fid, nut trigonous obovoid smooth pale or somewhat brown; *Reichb. Ic. Fl. Germ.* viii. 38, t. 299; *Boeck. in Linnæa*, xxxvi. 479. S. Bæothryon, *Ehrh. Phytoph.* n. 31; *Linn. f. Suppl.* 103.

WEST TIBET; *Thomson.* KASHMIR; alt. 8000 ft., *C. B. Clarke.*—DISTRIB. N. temp. and cold regions.

Roots fibrous, but stolons sometimes added. *Stems* 2–10 in., leafy only near base, erect, clustered; uppermost sheath truncate, often marked by a brown transverse line, sometimes apiculate on one side. *Spikelet* ⅛–¼ in., subebracteate, bearing about 5 nuts. *Glumes* ovate, obtuse, dusky chestnut. *Bristles* about as long as nut, retrorse-scabrous, straw-colrd. *Nut* as long as ⅔ the glume; style-base narrowly pyramidal continuous with nut; outermost cells of nut small, subhexagonal, withering (i.e. nut smooth, lead-colrd., smooth or minutely reticulate, white-veiled).

4. **S. pumilus,** *Vahl Enum.* ii. 243; leaves very short, spikelet quasi-terminal few-fld., bristles 0, style 3-fid, nut trigonous obovoid glistening black. S. alpinus, *Schleich. Cat.* 1821; *Reichb. Ic. Fl. Germ.* viii. 38, t. 300; *Boeck. in Linnæa*, xxxvi. 480; *Boiss. Fl. Orient.* v. 378. S. cæspitosus, *Boeck. in Linnæa*, xxxvi. 488 (the Asiat. examples and syns.). Isolepis pumila, *Roem. & Sch. Syst.* ii. 106. I. oligantha, *C. A. Meyer Cyp. Nov.* 3, t. 1.

KASHMIR; W. Tibet, Skardo and Hanle, alt. 14,000 ft. *Thomson*; Gurais, *Winterbottom*; Gilgit, *Giles.*—DISTRIB. N. temp. and cold regions.

Stolons slender, becoming wiry black creeping rhizomes. *Stems* 2–6 in., setaceous, green. *Leaves* ½–⅔ in., setaceous, green. *Spikelet* scarcely ⅛ in., ovoid.—Otherwise as *S. pauciflorus*, Lightf., of which this species has been reckoned a var. (see Roem. & Sch. Syst. Mant. ii. 72 in Obs.); ripe examples are easily recognized by the shining black nut. The rhizome (most commonly 0 in *S. pauciflorus*) is here black, woody, though very thin.

Sect. 2. ISOLEPIS (Genus), *Br. Prodr.* 221. Small or middle-sized. Stems leafy only near the base. Spikelets usually in clusters. No trace of hypogynous bristles. Style long, 3-fid.

5. **S. setaceus,** *Linn. Sp. Pl.* 73 (*partly*); small, stem bearing 1–3 spikelets in a quasi-lateral head, style 3-fid, nut longitudinally striate and transversely trabeculate between the striations, *Reichb. Ic. Fl. Germ.* viii. 39, t. 301. *Boeck. in Linnæa*, xxxvi. (*excl. var. β & γ*). Isolepis setacea, *Br. Prodr.* 222; *Nees in Wight Contrib.* 107; *Strachey Cat. Pl. Kumaon*, 72 (*excl. syn. pygmæa*).

Temp. and Alpine HIMALAYA, alt. 8–13,000 ft., from Kashmir to SIKKIM.—DISTRIB. Throughout Europe, Asia; in Africa; in Australia.

Rhizome ½–3 in., almost filiform, or more often 0. *Stems* 1–8 in. *Leaf* usually about 1 in., setaceous, sometimes nearly as long as the stem. *Spikelets* ⅛–¼ in., 6–20-fld.; bract as though a continuation of the stem. *Glumes* ovate, obtuse, keeled. *Nut* as long as half its glume, trigonous obovoid, obtuse, minutely apiculate; outermost cells transversely short-oblong, superimposed in 6–9 vertical series on each face, so that the nut appears on each face longitudinally 6–9-striate.—Much mixed in herbaria, and by many authors (even Boeckeler), with *S. cernuus*, Vahl (*S. Savii*, *Sebast. & Mauri*) which differs in the smooth nut, i.e. the outermost cells are quadrate-hexagonal, somewhat obscure, not arranged in vertical series (nut minutely reticulate not horizontally striate). *S. cernuus*, Vahl is a cosmopolitan species, *except* India and the adjacent countries.

6. **S. Holoschœnus,** *Linn. Sp. Pl.* 72; stems rather stout, umbel lateral (rarely reduced to a single head) of distant dense globes of numerous small spikelets, style 3-fid, nut trigonous obovoid smooth minutely reticulate leaden-black. *Boeck. in Linnæa*, xxxvi. 720; *Boiss. Fl. Orient.* v. 381. Holoschœnus vulgaris, *Link Hort. Berol.* i. 293. H. filiformis and H. australis, *Reichb. in Flora*, 1830, p. 499, 500, and *Ic. Fl. Germ.* viii. 44, 45, t. 316, 317 (erroneous as to setæ).

PUNJAB; Hazara, alt. 4000 ft., *Stewart.* SIND; *Pinwill.*—DISTRIB. Europ., Afric., W. Asia.

Rhizome horizontal, woody, covered by ovate chestnut scales; fibrous roots thick, often (when growing in sand) woolly. *Stems* 8–30 in., approximate, terete. *Leaves* all near the base of the stem, sometimes 6 in. long, usually shorter, or reduced almost to sheaths. *Umbel* simple or very compound of 1–80 usually (2–10) heads; lowest bract sometimes 4–8 in., sometimes ½–1 in. *Spikelets* scarcely ¼ in., ellipsoid, dense-fld. *Glumes* ovate, keel subexcurrent, tip hairy (rarely glabrous). *Stamens* 3; anthers red-crested. *Nut* small, as long as ½–⅔ glume, subtriquetrous, obtuse, minutely apiculate; outermost cells minute, quadrate-hexagonal, obscure, withering (nut more or less white-veiled by such withered fragments on the dark nut).—In one example in Herb. Calcutta (from the N.-W. Himalaya?) I found two lateral scales, very similar, and similarly placed to those occasionally found in *S. Isolepis*, Boeck., but much stouter, and which I suppose may represent 4 bristles dilated and connate in pairs. (See *Journ. Bot.* xxx. 321—323.)

Sect. 3. SCIRPUS PROPER. Large or middle-sized. Stems leafy only near the base. Inflorescence various, but spikelets not spicate. Hypogynous bristles often present. Style long.—Differs from *Sect. Isolepis* very little except in the frequent presence of bristles.

* *Nut more or less transversely muricated (the outer cells of the nut are longitudinal oblong, so that their thickened, often elevated, ends form a transverse wavy line).*

In these 6 closely allied species—spikelets clustered—clusters solitary or umbellate glumes entire, i.e. apex neither emarginate nor hispid—bristles simply scabrous or 0—anthers not crested—style 3-fid (or in *S. debilis* 2-fid.)

7. **S. supinus,** *Linn. Sp. Pl.* 73 (*partly*); stems medium terete, spikelets in a single lateral head (in var. heads few closely umbelled), glumes ovate keeled with suberect mucro, bristles 0, style 3-fid, nut obovoid triquetrous obtuse transversely scabrous-undulate black. *Roxb. Fl. Ind.* i. 217; *Reichb. Ic. Fl. Germ.* viii. 40, E, 302; *Boeck. in Linnæa*, xxxvi. 699 (*excl.* var. β and γ). S. melanospermus, *A. C. Meyer, Cyp. Nov.* t. 2. Isolepis supina,

Br. Prod. 221; *Nees in Wight Contrib.* 107; *Miq Fl. Ind. Bat.* iii. 309. Schœnus junceus, *Willd. Phyt.* i. 2, t. 1, fig. 4.—Scirpus, *Wall. Cat.* 3461.

Throughout INDIA and CEYLON (except Assam), alt. 0–3000 ft.—DISTRIB. Old World generally, and in America.

Roots fibrous. *Stems* 2–12 in. *Leaves* short, usually less than an inch. *Head* of 7–1 spikelets, quasi-lateral; lowest bract as though a continuation of the stem, 1–4 in., terete, channelled (not triquetrous). *Spikelets* ⅓–½ in, many-fld., subpentagonous. *Nut* as long as half glume, acutely triquetrous, or slightly compressed.

Var. *uninodis*; heads umbellate, on 3–1 rays rarely so much as 1 in. S. mucronatus, *Roxb. Fl. Ind.* i. 216 (*not of Linn.*). Isolepis uninodis, *Delile Fl. Egypt.* 8, t. 6, fig. 1. I. ambigua, *Zoll Syst. Verz. Ind. Archip.* ii. 62 (*not of Steud.*). I. oryectorum, *Steud. Syn. Cyp.* 96.—SIND; *Punwill.* BENGAL; *Wallich, J. D. H.* COROMANDEL; *Roxburgh*; *Wight.* CEYLON; *Leschenault, Macrae.*—DISTRIB. Trop. Africa, Java, Austral.

8. **S. erectus,** *Poir. Encyc.* vi. 761; stems medium or elongate terete, spikelets in a single lateral head, glumes ovate concave incurved, bristles 6–5 rarely 0, style 2–3-fid, nut broadly obovoid plane-convex obtuse slightly transversely wavy black. S debilis, *Pursh Fl. Am. Sept.* i. 55; *Benth. Fl. Austral.* vii. 232. S. juncoides, *Roxb. Fl. Ind.* i. 216; *Miq. Fl. Ind. Bat.* iii. 303. S. luzonensis, *Presl. Rel. Hænk.* i. 193; *Nees in Wight Contrib.* 112. S. Wallichii, *Nees in Wight Contrib.* 112. S. junciformis, *Nees l. c.* 112 (*not of Retz*). S. timorensis, *Kunth Enum.* ii. 162. S. supinus, var. β and γ *Boeck. in Linnæa*, xxxvi. 600. S. lateralis, *Herb. Heyne* and S ternatus, *Herb. Ham.*; *Wall. Cat.* 3462, 3468, 3469, 4471. Eleocharis juncoides, *Schultes in Roem. & Sch. Syst. Mant.* ii. 90.

Throughout INDIA with CEYLON; alt. 0–3000 ft.—DISTRIB. Temp. Asia and N. Am., Austral.

This species united with *S. supinus* by Boeckeler has been again separated by Bentham l. c. on the characters of the bristles, style branches and nut. The two appear amply distinct; *S. supinus* has carinate glumes and angular spikelets, *S. erectus* has concave glumes and terete spikelets.

9. **S. articulatus,** *Linn. Sp. Pl.* i. 70; stems medium terete spongy leafless, spikelets in a single lateral dense head, glumes ovate acute, bristles 0, style 3-fid, nut obovoid triquetrous faintly transverse wavy brown summit subpyramidal. *Rottb. Descr. et Ic.* 53; *Roxb. Fl. Ind.* i. 214; *Boeck. in Linnæa*, xxxvi. 702 S. fistulosus, *Forsk. Fl. Ægypt-Arab.* 14. S. prælongatus, *Poir. Encyc.* vi. 764 and *Suppl.* v. 91. S. incurvatus and S. subarticulatus, *Roxb. Fl. l. c.* 214, 215. Isolepis articulata, *Nees in Wight Contrib.* 108; *Thw. Enum.* 350; *Dalz. & Gibs. Bomb. Fl.* 286. I. prolongata and I. incurvata, *Nees in Wight Contrib.* 108. Eleocharis incurvata, *Schultes in Roem. & Sch. Syst. Mant.* ii. 92. Holoschœnus incurvatus and H. subarticulatus, *Dietr. Sp. Pl* ii. 165, 166.—Scirpus, *Wall. Cat.* 3456, 3457, 3458, 3459.—*Rheede Hort. Mal.* xii. t. 71.

Throughout INDIA, alt. 0–3000 ft., from the HIMALAYA to CEYLON and MOULMEIN.—DISTRIB. Africa, Philippines, Australia.

Root fibrous. *Stems* 4–30 in., densely tufted, soft, often (when dry) transversely septate; sheaths at top membranous, soon torn. Lowest *bract* similar to the stem, appearing a continuation of it, and often longer than it. *Spikelets* ⅛–½ in. long, rusty or purple, usually many, but heads of few spikelets occur. *Glumes* slightly keeled, not notched at tip, margins neither fimbriate nor hairy. *Stamens* usually 3.

Style slender; branches 3, long. *Nut* nearly half as long as glume, almost symmetric-trigonous, faces concave.

10. **S. quinquefarius,** *Ham. in Wall. Cat.* 3465; stems medium or slender terete nearly leafless, spikelets 1–9 in a single lateral dense head, glumes broadly ovate acute inflated in fruit, bristles 0, style 3-fid, nut obovoid triquetrous faintly transversely wavy black. *Boeck. in Linnæa*, xxxvi. 701. Isolepis lupulina *and* I. Roylei, *Nees in Wight Contrib.* 107.

NORTHERN INDIA, from RAWUL PINDEE, *Aitchison*, SIND, *Pinwill*, and CENTRAL INDIA, *King*, to ASSAM, *Wallich & Griffith*.—DISTRIB. Turkestan, Cabul, Transvaal.

Root fibrous. *Stems* 2–12 in., often (when dry) transversely septate. *Spikelets* shining straw-brown. *Glumes* many-ribbed, sometimes laxly spiral, sometimes 5-ranked. *Nut* with interrupted paler transverse lines.—Very nearly allied to *S. articulatus*; but in the fruiting spikelets the glumes are looser inflated more shining, reminding Nees of hops (whence his name *lupulina*).

11. **S. mucronatus,** *Linn. Sp. Pl.* 73; stems medium or robust triquetrous nearly leafless, spikelets in a single lateral dense head, glumes ovate subacute, bristles 5 or 6 unequal, style 3-fid, nut obovoid trigonous shining black smooth scarcely transversely wavy. *Reichb. Ic. Fl. Germ.* viii. 40, t. 303; *Boeck. in Linnæa*, xxxvi. 703. S. muticus, *Don Prodr.* 41. S. triangulatus, *Roxb. Fl. Ind.* i. 217; *Nees in Wight Contrib.* 111. S. javanus, *Nees l. c.* 112. S. sundanus, *Miq. Fl. Ind. Bat.* iii. 304. S. mysurensis, *Herb. Heyne*; *Wall. Cat.* 3467.

Throughout INDIA, alt. 0–6000 ft.—DISTRIB. Europe, Madagascar, warmer Asia, Australia.

Roots fibrous or a short horizontal rhizome. *Stems* 8–30 in.; sheaths triangular-lanceolate membranous at top on one side. Lowest *bract* ½–4 in., as though a continuation of the stem, trigonous. *Spikelets* ⅛–⅓ in., pale or (especially in the hills) chestnut-colrd. *Glumes* keeled, many-ribbed, not notched at top, margins glabrous or minutely scabrous-hairy. *Bristles* retrorsely scabrous, two longer ones nearly as long as nut. *Nut* somewhat compressed, as long as ¼ glume.

12. **S. corymbosus,** *Heyne ex Roth. Nov. Sp. Pl.* 28; stems stout terete leafless, spikelets clustered on rays of a lateral umbel, glumes ovate acute mucronate, bristles 0, style 3-fid, nut obovoid trigonous black smooth or with faint transverse lines. *Boeck. in Linnæa*, xxxvi. 706. S. inclinatus, *Delile*; *Boiss. Fl. Orient.* v. 381. S. bangalorensis, *Herb. Heyne*; *Wall. Cat.* 3464. Isolepis corymbosa, *Roem. & Sch. Syst.* ii. 110, and *Mant.* ii. 65; *Nees in Wight Contrib.* 108. I. inclinata, *Barbey Levant*, t. 8, fig. 9.—Isolepis, *Wall. Cat.* 3471, 3472.

WESTERN INDIA; Sind, *Pinwill*. MOUNT ABOO and GOONAH, *King*. JUBBULPORE, *Beddome*. HYDERABAD, *Campbell*. BANGALORE, *Wallich*.—Africa, Madagascar.

Rhizome 2–4 in., horizontal. *Stems* approximate, 3 ft., at base ¼ in. in diam. *Umbel* simple or compound, rays usually short sometimes 5 in. long; lowest bract ½–4 in., suberect, hardly simulating a continuation of stem. *Spikelets* ¼–⅓ in., rusty. *Glumes* faintly striate, glabrous, not notched at top. *Nut* scarcely ½ as long as glume, pyramidal at top.—*S. supinus*, var. *uninodis* differs by having leaves and nut more obtuse.

** *Nut smooth or obscurely reticulate (outer cells of nut subquadrate or, if longitudinally oblong, arranged as brick-wall parenchyma).—Glumes notched at top, except in* S. grossus. *Bristles* 7–2, *rarely* 0.

13. **S. triqueter,** *Linn. Mant.* 29; stems stout triquetrous, leaves short, umbel subsimple lateral, spikelets clustered, bristles 3–6 retrorse-scabrous, style 2-fid, nut plane-convex smooth pale ultimately brown. *Reichb. Ic. Fl. Germ.* viii. 40, t. 305; *Benth. Fl. Austral.* vii. 334, in note. S. Pollichii, *Gren. & Godr. Fl. Franc.* iii. 374; *Boeck. in Linnæa,* xxxvi. 711.

KASHMIR and BALTISTHAN, alt. 6–8000 ft., *Jacquemont, Thomson,* &c.—DISTRIB. Europe, Central Asia to Japan, S. Africa.

Glabrous, except margin of glumes. *Rhizome* elongate, branching; scales ovate-triangular, striate, rusty-brown, often rubbed off. *Stems* 1–3 ft., two faces plane, third (flower-bearing) concave. *Leaves* ⅛–3 in. long, or hardly any. Lowest *bract* ½–2 in., triquetrous, as though continuing stem. Rays of *umbel* ½–2 in. with 2–8 clustered spikelets on each; or umbel congested nearly to a single head. *Spikelets* ½ in. long, broad cylindric, rusty-brown (in the Himal. form). *Glumes* broadly ovate, keeled, notched at top with a short mucro in notch; margins scarious, ciliate, hairy. *Bristles* rigid, brown-red, often about as long as nut, incurved over its shoulders, scabrous with short white reflexed teeth (not plumose). *Stamens* 3, anthers with short red crests. *Style* fide Boeckeler sometimes 3-fid. *Nut* less than ¼ length of glume.—As to the specific name, Bentham has shown l. c. that this plant was *S. triqueter,* Linn., and that Boeckeler erred in discarding that name. It hardly differs from *S. lacustris* var. *carinata,* except by the more acutely triquetrous stem.

Var. *segregata;* ultimate rays of the umbel all (or nearly all) with one spikelet, bristles 3 (sometimes 2). ? S. subulatus, *Prain in Journ. As. Soc. Beng.* lx., part 2, 335.—Lower Bengal, especially the *Soondreebun, C. B. Clarke.*—New Guinea. —*Stolons* slender. Rays of the *inflorescence* sometimes again divided, sometimes 3½ in. long. *Bristles* 3 or 2 (usually 4 or more in *S. triqueter,* typ.), black-red.

14. **S. lacustris,** *Linn. Sp. Pl.* 72; stems stout terete or somewhat trigonous, umbels usually compound, spikelets clustered and solitary, bristles 6–5 retrorsely simply scabrous, style 2–3-fid, nut obovoid smooth finally black. *Reichb. Ic. Fl. Germ.* viii. 41, t. 306; *Boeck. in Linnæa,* xxxvi. 712; *Strachey Pl. Kumaon,* 73. S. validus, *Vahl Enum.* ii. 268. S. Tabernæmontani, *Gmel. Fl. Badens.* i. 101; *Reichb. l. c.* t. 307, 723. S. carinatus, *Sowerby Engl. Bot.* t. 1983. S. Duvallii, *Hoppe*; *Reichb. l. c.* 42, t. 308. S. Meyenii, *Nees in Linnæa,* ix. 293. S. subulatus, *Aitch. in Journ. Linn. Soc.* xix. 189. Juncus zebrinus, *Gard. Chron.* [1877] 399, t. 62.

KASHMIR, alt. 5500 ft., and LADAK, *Schlagintweit,* &c. Kumaon, alt. 4500 ft., *Thomson, Strachey & Winterbottom.* MUNEYPOOR, *Watt.*—DISTRIB. Europe, Africa, Australia, N. America.

Rhizome horizontal. *Stems* 1½–4 ft., often standing in water. *Leaves* hardly any, or sometimes 4 in., or (floating) 1–2 ft. *Umbel* usually once or twice divided, 4–6 in. in diam., sometimes reduced almost to a small head; lowest bract suberect, short. *Spikelets* ½ in. long. *Glumes* ovate, notched at top with a small mucro in notch; margins membranous, pilose. *Bristles* as long as the nut or reduced, sometimes almost 0. *Stamens* 3, anthers crested. *Nut* ⅓–½ glume, plane-convex.—In type *S. lacustris,* the stem is terete, the style 3-fid; var. *Tabernæmontani* differs in style bifid; var. *carinata* in stem obscurely trigonous.—(*S. lacustris* of S. America is *S. riparius,* Presl.).

15. **S. maritimus,** *Linn. Sp. Pl.* 74; stems robust trigonous, leaves several long, umbel compound simple or capitate, glumes notched hairy at top mucronate, bristles 6–3 retrorse-scabrous rarely subobsolete, style 3-fid (see var.), nut obovoid smooth finally black. *Nees in Wight Contrib.* 111; *Reichb. Ic. Fl. Germ.* viii. 42, t. 310, 311; *Boeck. in Linnæa,* xxxvi.

722; *Dalz. & Gibs. Bomb. Fl.* 288. S. corymbosus, *Forsk. Fl. Ægypt. Arab.* 14 (*not of Heyne*). S. tridentatus, *Roxb. Fl. Ind.* i. 225.—Fimbristylis, *Wall. Cat.* 3504, 3505.

From KASHMIR, *Jacquemont*, KASHGAR, alt. 10,000 ft., *Scully*, and MORADABAD, *T. Thomson*, to MALABAR, *Law*, and MYSORE, *Heyne*.—DISTRIB. Old World, with vars. in Australia and America.

Rhizome creeping, woody, divided, nodes dilating into tubers. *Stems* 1½–6 ft., often covered some way up by sheaths. *Leaves* grass-like, harsh, often as long as stems. *Umbel* very variable in development, branches corymbose or subumbellate; spikelets 3–8 or solitary on each ray; or umbel rarely reduced to a head of 3–1 spikelets. Lowest *bract* often 4–10 in., sometimes much shorter. *Spikelets* large, commonly ¼ in. in diam. *Glumes* erect, fine brown or chestnut-colrd. (but see var.); margins often subfimbriate. *Bristles* usually somewhat shorter than the nut, rigid, often unequal. *Stamens* 3; anthers red-crested. *Style* long. *Nut* very variable in size and shape at top; in the Indian form hardly more than ⅓ length of glume.

Var. *affinis* (sp.), Roth. Nov. Pl. Sp. 30; spikelets capitate usually 3–1, large ovoid lanceolate, glumes straw-colrd. sparingly hairy, bristles 4 as long as nut, style 2-fid, nut small. *Nees in Wight Contrib.* 111. S. strobilinus, *Roxb. Fl. Ind.* i. 219. S. maritimus, *var.* (sp. ?), *Maxim. Prim. Fl. Amur.* 299. S. macrostachys, *Boeck. Cyp. Nov.* i. 19. S. Balna, *Ham.*; *Wall. Cat.* 3463.—Throughout N. India, in the plains; from the Punjab, *Thomson*, and Bombay to Assam and Pegu.—N. Asia, Turkestan, N. China, Amurland.—Appears distinct from the typical *S. maritimus* by its few pale large spikelets and 2-fid style, but the American and Australian varieties connect it. The extreme state of *affinis* is the Burmese form, in which the stem is terminated by one very large spikelet 1⅓ by ⅔ in.

16. **S. littoralis,** *Schrad. Fl. Germ.* i. 142, t. 5, fig. 7; stems stout trigonous upwards, leaves short or 0, umbel lateral, spikelets mostly solitary, bristles 7–2 plumose brown, style 2-fid, nut obovoid smooth chestnut or black. *Reichb. Ic. Fl. Germ.* viii. 42, t. 309. S. subulatus, *Vahl Enum.* ii. 268; *Miq. Fl. Ind. Bat.* iii. 306; *Dalz. & Gibs. Bomb. Fl.* 288; *Boeck. in Linnæa*, xxxvi. 715. S. fimbrisetus, *Delile Descr. Egypt.* 11, t. 7, fig. 1. S. plumosus, *Br. Prodr.* 223. S. pectinatus, *Roxb. Fl. Ind.* i. 218; *Thw. Enum.* 351. S. triqueter, *Gren. & Godr. Fl. Franc.* iii. 373; *Boeck. l. c.* 716 (*not of Linn.*). Malacochæte littoralis, *Nees in Linnæa*, ix. 292. M. pectinata, *Nees in Wight Contrib.* 110.—Fimbristylis, *Wall. Cat.* 3506 C (*partly*).

From KASHMIR, alt. 3500 ft., and BENGAL to CEYLON.—DISTRIB. Europe, Africa, W. Asia, Australia.

Glabrous, except margins of glumes. *Rhizome* hardly any; sometimes slender stolons are present. *Stems* 1½–2½ ft., terete at base. *Leaves* 1–2 in. long, membranous; or sometimes 4 in. long, green. *Umbel* compound or decompound, often 4 in. diam.; branches suberect. Lowest *bract* 1–3 in. (sometimes 6 in.), erect. *Spikelets* up to ⅔ by ⅛ in., subcylindric. *Glumes* ovate, obtuse, notched at top, mucronate in notch by excurrent green keel, rusty or brown, ultimately almost scarious. *Bristles* (or scales) ligulate (sometimes broad), plumose by spreading moniliform hairs, in the Indian plant often 4, somewhat longer than nut. *Stamens* 3 or 2; anthers red-crested. *Nut* ½ glume, compressed.—Easily recognized among the Indian Scirpi by the plumose bristles.

17. **S. grossus,** *Linn. f. Suppl.* 104; very large, leaves only near base of stem long, corymb large compound depressed divaricate, spikelets very many solitary, glumes ovate not notched, bristles 6 simply scabrous (see also var. *β*) sometimes small or 0, style 3-fid, nut trigonous obovoid smooth ashy-grey or black. *Roxb. Fl. Ind.* i. 231; *Thw. Enum.* 351; *Dalz. & Gibs. Bomb. Fl.* 288; *Boeck. in Linnæa*, xxxvi. 723. S. maximus, *Roxb.*

l. c. 231. S. æmulans, *Steud. in Zoll. Verz. Ind. Archip.* ii. 62, & *Syn. Cyp.* 87 (*partly*). S. maritimus, *var.* æmulans, *Miq. Fl. Ind. Bat.* iii. 306. S. canaliculato-triqueter, *Steud. l. c.* 318. S. Griffithii, *Boeck.*, and S. scaberrimus, *Boeck. in Flora*, xli. 595. Hymenochæte grossa, *Nees in Edinb. N. Phil. Journ.* [1834] 264, & *in Wight Contrib.* 110. H. maxima, *Nees in Linnæa*, ix. 293. Isolepis maxima, *Dietr. Sp. Pl.* ii. 130.—Scirpus, *Wall. Cat.* 3470.

Throughout INDIA (except the N.W.), alt. 0–2000 ft.; from SIND and ASSAM to CEYLON and MALACCA.—DISTRIB. Malaya, Tonkin, Philippines.

Glabrous, or glumes with pedicels minutely puberulous-scabrous. *Stem* 3–9 ft., thick at base, roots fibrous often in water or mud; stolons not rarely added. *Leaves* often ½ length of stem, stout, broad, keeled, serrate-edged. *Corymb* often 8–16 in. in diam., supradecompound; bracts several, divaricate, lowest up to 3 ft., leaf-like. *Spikelets* sessile and pedicelled, ¼ in. long, ovoid, brown, dense-fld. *Glumes* ovate, obtuse with a minute mucro. *Bristles* 6 or fewer, in type as long as nut, linear, brown, scabrid or setose by short unicellular hairs, but not rarely bristles depauperated very short smooth, 0 in form *S. maximus*. *Stamens* 3; anthers scarcely crested. *Style* long. *Nut* scarcely ½ glume, minutely beaked by style-base confluent with nut.

Var. KYSOOR (sp.), *Roxb. l. c.* 230; glumes more mucronate, bristles 6, villous or almost plumose by numerous multicellular hairs. Rynchospora Kysoor, *Dietr. Sp. Pl.* ii. 74. Hymenochæte Kysoor, *Nees* (cf. note *in Wight Contrib.* 110).—Assam, *Jenkins*. Bengal, *Griffith*, &c. Chota Nagpore, alt. 2000 ft., *C. B. Clarke*. Bombay, *Dalzell.*—Stolons fide Roxburgh Icon sometimes bearing black tubers ⅓ in. in diam.

Sect. 4. BLYSMUS (Genus), *Panzer in Roem. & Sch. Syst. Mant.* ii. 41. Medium or slender plants. Spikelets closely spicate. Style long.

* *Stem with leaf-bearing nodes above the base, style* 2-*fid.*

18. **S. Caricis,** *Retz Fl. Scand.* 11; spikelets subdistichously closely spicate or densely subpaniculate, bristles 6 much longer than the nut, nut smooth ashy-black narrowed at both ends (but see var.). S. compressus, *Pers. Syn.* i. 66; *Boeck. in Linnæa*, xxxvi. 707. Schœnus compressus, *Linn. Sp. Pl.* 65. Blysmus compressus, *Panzer in Link. Hort. Berol.* i. 278; *Reichb. Ic. Fl. Germ.* viii. 36, t. 293. Leptolepis tibetica, *Boeck. Cyp. Nov. heft.* i. 31.

W. HIMALAYA and W. TIBET, alt. 7–15,000 ft.; from LEH, *Stoliczka*, to KUMAON, *Duthie*. PHARBE (N.E. Sikkim), *G. King.*—DISTRIB. Europe, W. and Centr. Asia

Glabrous. *Rhizome* creeping, divided. *Stems* 4–8 in., leafy below, angular striate or terete. *Leaves* often as long as stems, linear. *Spike*, in type form, 1–2 in., dense; lowest bract short, or much overtopping spike. *Spikelets* usually distichous, sometimes on all sides the rhachis (lowest sometimes remote) ¼ in. long, 6–9-fld., brown. *Glumes* ovate-triangular, subacute, concave, several-nerved. *Rhachilla* of spikelet compressed at base, somewhat zigzag, lowest fl. somewhat distant from next above nearly as in *Schœnus*. *Bristles* slender, minutely retrorse-scabrous, red-brown. *Stamens* 3; anthers with a linear-lanceolate red crest. *Style* long, slender. *Nut* ½ glume, compressed or plano-convex; outermost cells small, obscure.

Var. *brevifolia* (sp.), Decne in Jacquem. Voy. Bot. 173, t. 173; stems 1–2 ft. with nodes and leaves above the middle, spikelets scarcely distichous lowest somewhat distant. *Strachey Cat. Pl. Kumaon*, 73.—West Himalaya; Chini, *Jacquemont*. W. Tibet, alt. 13,000 ft., *Stoliczka*.—Glumes often scarcely striate. Bristles and nut as in *S. Caricis* typ.—A trifling var.

Var. *sikkimensis*; stems 4–16 in., spikelets distichous, nut sessile ellipsoid, margins near its base thickened by large corky cells.—Sikkim; Lachen, alt. 8500 ft., *J.D.H.*—This would be an *Anosporum* of Boeckeler, as the nut probably germinates while floating in water.

Var. *dissita* (sp.), Duthie in Saharunpore Report, 1885; stem 14 in. bearing two long-peduncled distant spikes, spikelets densely panicled not distichous, nut sessile ellipsoid margins near its base thickened by large corky cells.—Kumaon; Kutti, alt. 12,500 ft., *Duthie.*—Very unlike the ordinary *S. Caricis.*

19. **S. rufus,** *Schrad. Fl. Germ.* i. 133, t. 1, fig. 3; spikelets subdistichously closely spicate, bristles 0 or very short slender, style 2-fid, nut ovoid acute smooth ashy or brown. *Boeck. in Linnæa*, xxxvi. 707. Schœnus compressus, var., *Lightf. Fl. Scot.* 1138, t. 24, fig. 2. S. rufus, *Huds. Fl. Angl.* 15. Blysmus rufus, *Link. Hort. Berol.* i. 278; *Reichb. Ic. Fl. Germ.* viii. 36, t. 293.

W. TIBET, *Thomson.*—Europe, Centr. Asia, Canada, Chili.

Very near *S. Caricis*, Retz, differing by the small bristles and the sessile nut. *Glumes* usually chestnut-black, but sometimes brown as of *S. Caricis*. *Bristles* usually rudimentary, smooth, sometimes nearly as long as nut and rough with microscopic papilli but not setulose.

** *Nearly leafless, style* 3-*fid.*

20. **S. subcapitatus,** *Thw. Enum.* 351; stems long slender with nodes only close to the base, spikelets 6–1 subcapitately spicate, style 3-fid, bristles 6 long, nut oblong smooth black. *Boeck. in Linnæa*, xxxvi. 704.

DECCAN PENINSULA, *Wight.* NILGHIRIS, *Gardner.* CEYLON, *Thwaites, T. Anderson.*—DISTRIB. Sumatra, China.

Glabrous. *Rhizome* woody, very short. *Stems* 8–20 in., rigid, terete, sheathed only near base. *Leaves* 0–½ in., subulate. *Bracts* short; lowest ½ in., shorter than spike. *Spikelets* ¼ in., many-fld., brown. *Glumes* ovate, acute, concave, entire not notched, keel with 3 yellow nerves. *Bristles* very slender, much longer than nut, in fruit somewhat lengthened, red-brown, smooth, near tips slightly thickened papillose-scabrous. *Stamens* 3; anthers crested. *Style* long; branches 3, long. *Nut* ⅓ glume, regularly trigonous, exactly oblong, shortly pyramidal at base and apex, ripe shortly acuminate at apex; outermost cells, minute, quadrate-hexagonal, nut hence smooth or minutely granular.—A remarkable species, placed on account of its spicate inflorescence with *Blysmus* to avoid making another section for it only. The nut and bristles are as in the next section *Sylvaticæ*.

Sect. 5. SYLVATICÆ. Stems tall with many leaf-bearing nodes in the upper part. *Panicle* long; corymbs decompound, large, spreading. *Bristles* (if any) undivided, more or less elongate in fruit.—SEIDLIA (Genus), *Opiz Natural. Tausch.* ix. 349.—Eriophori sp., *Benth in Gen. Pl.* iii. 1052.

21. **S. Eriophorum,** *Mich. Fl. Bor. Am.* i. 33; spikelets in clusters of 4–1 comose in fruit by elongate bristles, style 3-fid, nut trigonous ellipsoid acute smooth brown. *Boeck. in Linnæa*, xxxvi. 731. S. Wichurai, *Boeck. l. c.* 729. Eriophorum cyperinum, *Linn. Sp. Pl.* 77; *Benth. in Gen. Pl.* iii. 1052. Trichophorum cyperinum, *Pers. Syn.* i. 69.

KHASIA, alt. 2500–6000 ft., common. ASSAM, *Jenkins.* E. HIMALAYA, *Griffith.*—DISTRIB. E. Asia, N. America.

Glabrous, except pedicels. *Stems* 2–6 ft. *Leaves* up to 18 by ¼ inch. *Bracts* several, often longer than inflorescence. *Umbel* 4–12 in. in diam. *Spikelets* ¼ in., many-fld., ellipsoid, brown. *Glumes* small, ovate, acute. *Bristles* 6–5, ultimately

2–4 times nut, slender, brown, smooth below, near apex thickened papillose-scabrous. *Anthers* not crested. *Nut* small, ½–⅔ glume, shortly beaked.

22. **S. chinensis,** *Munro in Seem. Bot. Voy. Herald,* 423; spikelets clustered, bristles 3 slender or 0, style 2-fid, nut compressed ovoid apiculate smooth pale. *Benth. Fl. Hongk.* 395. S. sylvaticus, *Strachey Cat. Pl. Kumaon,* 73. S. ternatanus, *Reinw.*; *Miq. Fl. Ind. Bat.* iii. 307. S. Eriophorum *var.* conglomeratus, *Boeck. in Herb. Berol.*—Hypolytrum, *Wall. Cat.* 3404 D (*partly*).

From CHUMBA and KUMAON, alt. 0–5500 ft. *Strachey & Winterbottom* to MUNEYPOOR, *Watt,* and MARTABAN, *Wallich.*—DISTRIB. China, Bonin Isles.

Glabrous, except ultimate rays of umbel. *Stems* 2–7 ft., solitary, in swamps often stoloniferous. *Leaves* long, often overtopping stem, ⅛ in. broad, scabrous on margins and keel. *Umbel* 4–8 in. diam., divaricate; bracts several, lowest up to 20 in. *Spikelets* in clusters of 3–15, small, about ⅛ in., many-fld., ellipsoid, obtuse, brown. *Glumes* concave, ovate, obtuse. *Bristles* often 0, sometimes 3, rarely 5, overtopping nut, as long as glume, ultimately scarcely elongate not twisted (spikelets not comose), smooth, minutely papillose-scabrous near the top. *Stamens* 2, rarely 3; anthers scarcely crested. *Nut* ½ glume, smooth or sometimes microscopically verrucose.—The leaf-sheaths are long, occasionally perforated at base by descending shoots (aerial stolons) covered with small ovate scales.

Sect. 6. MICHELIANI. Low, tufted, leafy. *Spikelets* small, in a single head, bracts long. *Glumes* scarcely acute, not notched. *Bristles* 0. *Style* long, or branches long, continuous with the smooth nut.

23. **S. kyllingioides,** *Boeck. in Linnæa,* xxxvi. 733; spikelets very small, style 3-fid, nut oblong-obovoid obtuse smooth brown or black. Isolepis kyllingioides, *A. Rich. Tent, Fl. Abyss.* ii. 502. Kyllinga microcephala, *Steud. Syn. Cyp.* 70 (*excl. the Obs.*).

DEHRA DHOON; *Vicary.* MT. ABOO, alt. 3000 ft., and GOONA, *King.* SAUGOR; *Vicary.* HYDRABAD; *Campbell.* CANARA; *Young.*—DISTRIB. Trop. Africa.

Glabrous. *Stems* 4–10 in., slender, base thickened, sometimes with slender long stolons. *Leaves* ½–¾ stem, very narrow, green. *Head* ¼ in. diam., of 5–15 spikelets; bracts 1–3 in., leaf-like. *Stamens* 2 (3 fide Boeckeler); filaments scabrous; anthers short oblong, not crested. *Style* slender, not longer than nut, branches long (sometimes 2 fide Boeckeler). *Nut* ⅓ glume, equally trigonous or subcompressed, minute apiculate; outermost cells subhexagonal, ultimately often punctate.—Easily known from the next species by its small head of very small spikelets, but is very like a small *Kyllinga.*

24. **S. Michelianus,** *Linn. Sp. Pl.* 76; spikelets numerous densely compound-capitate, style 2-fid (very rarely 3-fid), nut oblong or narrowly obovoid subacute smooth yellow-brown. *Reichb. Ic. Fl. Germ.* viii. 43, t. 312; *Boeck. in Flora,* liv. 158, 159. Isolepis Micheliana, *Roem. & Sch. Syst.* ii. 114; *C. B. Clarke in Journ. Linn. Soc.* xxi. 29, 30, t. 2, fig. 11. Cyperus pygmæus, var. β, *Boeck. in Linnæa,* xxxv. 494; *Benth. in Gen. Pl.* iii. 1044 (*partly*). C. diffusus, *Roxb. Fl. Ind.* i. 189 (*excl. syn.*). C. musarius, *Herb. Ham.*; *Wall. Cat.* n. 3325 A. Dichostylis Micheliana, *Nees in Wight Contrib.* 94.—Isolepis, *Wall. Cat.* 3484 A, B.

Throughout BRITISH INDIA; from Kashmir to Tenasserim, common.—DISTRIB. Europe, Asia, Algeria.

Annual, tufted, glabrous. *Stems* 1–8 in., triquetrous. *Leaves* often longer than stem. *Head* ¼–¾ in. diam., bracts several long leaf-like. *Spikelets* ⅛–⅓ in.; rhachilla of spikelet marked spirally by the lozenge-shaped scars. *Stamens* usually 2; anthers hardly crested. *Style* about as long as nut. *Nut* ½ glume, shortly pyramidal at

both ends; outer cells subhexagonal, ultimately lax hyaline (so that a nut appears microscopically hyaline-margined).—Ripe examples of this species, with fallen glumes, are easily seen to belong to *Scirpus* not *Cyperus*; but young small examples are difficult to distinguish from *Cyperus pygmæus*.

Sect. 7. MICRANTHI. Small tufted annuals. *Stems* with few short leaves near base. *Spikelets* 1–4, capitate, lateral dense-fld. *Bristles* 0. *Style* very short, branches short, recurved. *Anthers* small, oblong.

25. **S. Isolepis,** *Boeck. in Linnæa*, xxxvi. 499; stem setaceous with one spikelet, glumes obovate obtuse, style 2-fid, nut oblong-obovoid smooth reticulate, black. Hemicarpha Isolepis, *Nees in Edinb. N. Phil. Journ.* xvii. 263, and in *Wight Contrib.* 92.

BENGAL; *Griffith.* BEHAR; *J. D. H.* CHOTA NAGPORE; alt. 2000 ft., *C. B. Clarke.* DECCAN PENINSULA; *Wight.*—DISTRIB. Africa.

Glabrous. *Stems* ½–4 in. *Leaves* 1–2, ½–1 in., linear. *Spikelet* $\frac{1}{10}$–$\frac{1}{6}$ in., rectangularly divaricate, 20–40-fld.; bract ½–1½ in., erect, as though continuing stem. *Glumes* rhomboid, deciduous, rarely minutely mucronate. A thin hyaline obovate irregular scale as long as nut (very rarely 2 scales) is sometimes present, oblique lateral between nut and glume. *Stamen* 1, lateral. *Style* less than ¼ nut, deciduous, style-base not dilated. *Nut* a little shorter than glume, biconvex.

26. **S. squarrosus,** *Linn. Mant.* 181; stem slender with few spikelets, glumes narrowly obovate long-caudate, style 3-fid, nut narrowly obovoid smooth reticulate yellow-brown or finally black. *Rottb. Descr. et Ic.* 49, t. 17, fig. 5; *Roxb. Fl. Ind.* i. 222; *Boeck. in Linnæa*, xxxvi. 734. Isolepis squarrosa, *Roem. & Sch. Syst.* ii. 111; *Nees in Wight Contrib.* 106; *Thw. Enum.* 350; *Dalz. & Gibs. Bomb. Fl.* 286. Ascolepis tenuior, *Steud. Syn. Cyp.* 105. Lipocarpha microcephala, *Hance in Ann. Sc. Nat.* ser. 5, v. 249.—Isolepis, *Wall. Cat.* 3477, 3478 B.—*Rheede Hort. Mal.* xii. 71, t. 38.

Throughout EASTERN PENINSULA, PUNJAB, alt. 0–6000 ft., and ASSAM to CEYLON.—DISTRIB. Trop. Africa, Madagasc., Java, China.

Glabrous. *Stems* 2–16 in. *Leaves* short, in the Indian specimens commonly 1-2 in., linear. *Spikelets* 1–10 (usually 2–4) capitate, divaricate, ⅛–½ in., densely softly echinulate from tails of glumes. *Glumes* very many, caducous, small, narrowly obovate, suddenly narrowed into the ligulate curved subobtuse tail. *Stamen* 1, sometimes 2; anthers not crested. *Style* scarcely ¼ nut, deciduous, style-base scarcely dilated. *Nut* a little shorter than glume (without its tail), nearly regularly trigonous.

DOUBTFUL SPECIES OF SCIRPUS.

S. QUADRANGULUS, *Don Prodr.* 40. Sc. Donianus, *Spreng. Syst. Cur. Post.* 28; perennial; stem 1½ ft. strict, 4-gonal, base sheathed by 2–3 leaves; leaves linear erect often longer than the stem, channelled, keeled beneath, smooth below, scabridly toothed on the margin towards the apex; umbel compound, proliferous, not a little like *Juncus acutiflorus*, shorter than the 5-leaved involucre; spikelets small, ovate brown; few-fld. glumes ovate concave mucronulate; style not jointed on the ovary. Alps of Nepal, *Wallich.*

11. ERIOPHORUM, *Linn.*

Glabrous. *Stem* with leaves only near base. *Corymb* of few (or 1) spikelets, or compound umbelliform. *Spikelets* with numerous perfect flowers. *Glumes* imbricate on all sides. Hypogynous *bristles* 6, divided nearly to base, segments ligulate, finally elongate i.e. heads comose.

Stamens 3–1, on the anterior side of nut. *Style* slender, glabrous, deciduous, long (in Sect. *Lachnophorum* short); branches 3 (accidentally 2 or 4) long. *Nut* sessile, trigonous, smooth, dusky black, apex narrowed.—Species 10, Arctic or N. Temperate, except Sect. *Lachnophorum*.

The genus was well-marked, until Bentham (Gen. Pl. iii. 1052) removed the comose species of *Scirpus* (the *Sylvaticæ* Sect.) into it, on the ground that the hypogynous bristles are similar. But in each flower of *Eriophorum* the bristles are 20–40 (or with 20–40 segments), while in *Scirpus, Sect. Sylvaticæ* they are 6; and in their ligulate structure (see Fl. Dan. Suppl. t. 8) they differ greatly from *Scirpus*. Also, in *Scirpus Sect. Sylvaticæ*, the stems have leaf-bearing nodes in their upper half.—E. filamentosum, *Boeck. in Engler Jahrb.* v. is *Xerotes leucocephala*, Br.

Sect. I. ERIOPHORUM proper. *Leaves* moderately long. *Style* long.

1. **E. Scheuchzeri,** *Hoppe Taschenb.* 104; stoloniferous, sheaths not lacerate, stem bearing 1 spikelet, bracts 0, style 3-fid, nut smooth. *Reichb. Ic. Fl. Germ.* viii. 35, t. 685; *Boeck. in Linnæa*, xxxvii. 92. E. capitatum, *Host Gram. Austr.* i. 30, t. 38. E. vaginatum, *Curtis Fl. Lond.* ii. t. 11. E. humile, *Turcz. in Bull. Soc. Nat. Mosc.* (1838), 103. E. vaginatum, *var.* humile, *F. Nylander in Act. Soc. Sc. Fenn.* iii. 13.

KASHMIR; alt. 13,000 ft., *Lance*; *C. B. Clarke*.—DISTRIB. Arctic and Alpine regions.

Stems 4–12 in., often covered some way up by sheaths. *Leaves* (except in dwarf examples) shorter than stem, edges (in dried specimens) much inrolled. *Spikelet* ½ in., broad ellipsoid. *Glumes* ovate, scarious, and black. *Bristles* white, or ultimately brownish. *Anthers* not crested. *Style* longer than nut, very slender; branches 3, long. *Nut* ⅔ glume, trigonous, cylindric ellipsoid or subovoid.

Sect. II. LACHNOPHORUM, *F. Nylander in Acta Soc Sc. Fenn.* iii. 22. *Leaves* numerous, linear, long. *Glumes* keeled, acute. *Style* short (branches long).

2. **E. comosum,** *Wall. Cat.* 3446 (*excl.* var. *β*); stems robust, umbel compound or decompound, spikelets numerous rusty brown, style 3-fid. *Nees in Wight Contrib.* 110 (*excl. var. β*); *Miq. Fl. Ind. Bat.* iii. 330; *Boeck. in Linnæa*, xxxvii. 98. E. arundinaceum, *Wall. Cat.* 3448; *Nees l. c.* Scirpus comosus, *Wall. in Roxb. Fl. Ind.* ed. Carey and Wall. i. 234. S. elongatus, *Ham. ex Don Prodr.* 40. Trichophorum comosum and T. arundinaceum, *Strachey Cat. Pl. Kumaon*, 73.—Eriophorum, *Wall. Cat.* 3447, *partim.*

Very common; from SIND and the HIMALAYA, alt. 0–10,000 ft. to SAUGOR, CHITTAGONG, and BURMA.—DISTRIB. Tonkin, China.

Glabrous. *Rhizome* hardly any. *Stems* 4–20 in., slender, tough. *Leaves* often overtopping stem, harsh, edges serrulate; lower sheaths chestnut-black, ultimately often lacerate. *Umbel* 2–8 in. diam.; spikelets mostly solitary, often 100; bracts very long, often 8–12 in. *Spikelets* ¼–⅓ in., narrowly ellipsoid, many-fid. *Glumes* acute or obtuse, green on back. *Anthers* with lanceolate scabrous high-red crest. *Style* shorter than nut. *Nut* ½–⅔ glume, oblong-ellipsoid, trigonous, beaked, smooth, brown-black.—In Wallich Cat. n. 3447 the woolly rhizome of *Spodiopogon angustifolius*, Trin. is mixed; hence *Eriophorum cannabinum*, Royle Ill. 415 is *Spodiopogon angustifolius*.

3. **E. microstachyum,** *Boeck. in Linnæa*, xxxviii. 399; stem 2–6 in. slender with 1–3 subcapitate chestnut-brown spikelets, style 3-fid. E. comosum, *β* nanum, *Nees in Wight Contrib.* 110.

ALPINE HIMALAYA, alt. 8-16,000 ft.; head of Jumna Valley, *Jacquemont*; Nynee Tal, *Thomson*; Chupcha in Bhotan, *Griffith*.

This may be regarded as a depauperated alpine form of *E. comosum*; but the examples are numerous, exactly alike, from distant localities; and there are wanting intermediate forms.

12. **FUIRENA,** *Rottb.*

Stem bearing leaves or leaf-like bracts even in its upper half. *Leaves* grass-like, base sheathing. *Spikelets* clustered, with numerous perfect flowers, tabescent at top. *Glumes* imbricate on all sides, strongly aristate, hairy in upper half. Hypogynous *bristles* 6 (3 in the position of sepals, 3 of petals) or much reduced, or 0; 3 sepals bristle-like, 3 petals (in the typical species) battledore-shaped. *Stamens* 3 anticous, or 2. *Style* long, slender, glabrous, finally deciduous; branches 3, long. *Nut* small, obovoid, or ovoid, triquetrous, more or less stalked, smooth reticulated or trabeculate, usually narrowed at top often with a minute beak (which may be the persistent style-base).—Species 25, scattered all warm regions.

The spikelets with the stem leafy in upper half, are like no other sedges but the *Sylvaticæ* section of *Scirpus*, from which *Fuirena* is known by its strongly aristate glumes.

Sect. I. PSEUDO-SCIRPUS. Three inner hypogynous bristles (petals) linear or narrow, or more often 0.

1. **F. pubescens,** *Kunth Enum.* ii. 182; spikelets in a terminal cluster (axillary clusters not rarely added), hypogynous bristles 0 or rudimentary linear, style 3-fid, nut smooth white not (or most minutely obscurely) reticulated. *Boeck. in Linnæa*, xxxvii. 104 (excl. all Indian syns. and specimens). Scirpus pubescens, *Lam. Ill.* i. 139; *Desfont. Fl. Atlant.* i. 52, t. 10 Carex pubescens, *Poir. Voy. en Barb.* ii. 254. C. Poiretii, *Linn. Syst.* [ed. Gmelin] ii. 140. Isolepis pubescens, *Roem. & Sch. Syst.* ii. 118.

PUNJAB; *Thomson* (*Herb. Brit. Mus.*).—DISTRIB. S.W. Europe, all Africa.

Rhizome creeping, short. *Stems* 12–20 in., triquetrous, glabrous except at top. *Leaves* 2–8 by ¼ in., glabrous or hairy. *Spikelets* in clusters of 5–1, ovate-oblong, ⅔ in. long; bracts as long as spikelets (occasionally very much longer). *Glumes* lurid black or glaucescent, often somewhat regularly 5-ranked. *Nut* subsessile; beak pyramidal, minutely scabrous.

2. **F. Wallichiana,** *Kunth Enum.* ii. 182; spikelet-clusters corymbed, hypogynous bristles 0 or linear (see also var.), nut slenderly striate longitudinally finely trabeculate between striæ. F. cuspidata, *Kunth l. c.* 187; *Dalz. & Gibs. Bomb. Fl.* 286. F. pubescens, *Boeck. in Linnæa*, xxxvii. 104 (*all Indian syns. and specimens, not of Kunth*). Scirpus cuspidatus, *Roth. Nov. Pl. Sp.* 31.—Fuirena, *Wall. Cat.* 3545.

N.W. INDIA. Hurdwar, *Wallich*; Sutledge Valley, *Thomson*. CENTRAL INDIA; Goona, &c., *King*. KHANDWA; *Duthie*. POONA; *Jacquemont*. BOMBAY, *Dalzell*, &c.

Hardly distinguishable from *F. pubescens*, Kunth, but by the elegantly striate nut, and more compoundedly corymbose inflorescence. *Leaves* and sheaths glabrous. *Sepals* often ⅓-⅔ nut, linear, often unequal, retrorsely scabrous or smooth, often 0. *Petals* always 0 (except in var.). *Nut* ellipsoid, triquetrous, narrowed at both ends, yellow brown or testaceous; beak small, pyramidal, hardly scabrous; outermost cells transversely oblong, superimposed regularly in longitudinal series.

Var. *evoluta;* petals narrowly elliptic 3-nerved shortly stalked with long linear papillose-scabrous arista, overtopping nut.—Rajpootana; Merwar, *Duthie* (n. 4919).

Sect. 2. FUIRENA *proper.* Three inner hypogynous bristles (petals) obovate or subquadrate, broad-headed.

3. **F. glomerata,** *Lam. Ill.* i. 150; annual, clusters of spikelets 1-3 approximate, petals clawed with subquadrate heads, style 3-fid, nut ovoid smooth pale. *Miq. Fl. Ind. Bat.* iii. 328; *Thw. Enum.* 347; *Boeck. in Linnæa,* xxxvii. 107. F. canescens, *Vahl Enum.* ii. 385. F. ciliaris, *Roxb. Fl. Ind.* i. 180. F. Rottboellii, *Nees in Wight Contrib.* 94; *Miq. Fl. Ind. Bat.* iii. 329. Scirpus ciliaris, *Linn. Mant.* 182; *Rottb. Descr. et Ic.* 55, t. 17, fig. 1. S. pilosus, *Retz Obs.* vi. 19 (*not of Thunb.*). S. aristatus, *Willd. Sp. Pl.* i. 300.—Fuirena, *Wall. Cat.* 3544 (*partly*).

Throughout warmer INDIA, very common in rice-fields, from the HIMALAYA to CEYLON and the MALAY PENINSULA.—DISTRIB. Trop. Africa, S.E. Asia, and Australia.

Usually hairy, sometimes (except inflorescence) glabrate. *Stems* 4–16 in. *Spikelets* in clusters of 3–10, $\frac{2}{3}$ by $\frac{1}{10}$ in.; bracts not much overtopping clusters. *Sepals* linear, as long as nut or short, smooth or scabrous at top. *Petals* often as long as nut; lamina quadrate, cordate or hastate at base, 3-nerved, brown with 3 minute teeth at top, glabrous or minutely hairy at top. *Nut* triquetrous; beak cylindric, sometimes minutely hispid.

4. **F. uncinata,** *Kunth Enum.* ii. 184; annual, clusters of spikelets 1-3 approximate (one distant sometimes added), glumes strongly hooked-aristate, petals clawed broadly obovate pubescent on margin, nut ovoid smooth brown. *Boeck. in Linnæa,* xxxvii. 108 (*not Thw.*). F. ciliaris, *Nees in Wight Contrib.* 93; *Thw. Enum.* 347. Scirpus uncinatus, *Willd. Sp. Pl.* i. 300. S. capitatus, *Burm. Fl. Ind.* 21. Isolepis uncinata, *Roem. & Sch. Syst.* ii. 111.—Fuirena, *Wall. Cat.* 3544 A and D (*partly*).—Pluk. Alm. 190, fig. 7.

DECCAN PENINSULA; *Rottler,* &c. CANARA; *Thomson.* CEYLON; *Moon, Thwaites* (C.P. 3038), &c.

Stems 4–8 in., hairy upwards. *Sepals* linear, shorter than nut, minutely retrorse-scabrous or smooth. *Petals* nearly as long as nut, scarcely hastate at base.—Otherwise as *F. glomerata,* to which it is closely allied, but readily distinguished by the strong hooked bristles to the glumes.

5. **F. Trilobites,** *C. B. Clarke*; annual, clusters of spikelets 1-3 approximate, petals very long-clawed with lunate heads long retro-cuspidate at base on each side, style 3-fid, nut ovoid smooth pale.

DECCAN PENINSULA. Secunderabad; *Wight;* near Hydrabad, *Campbell.* (The same locality, and probably one collection.)

Noted by Wight as perhaps a var. of *Rottboellii* i.e. of *F. glomerata,* Lam.; the petals are different and remarkable. *Spikelets* rather slenderer (than in *F. glomerata*), glumes blacker with longer green aristæ. *Petals* as long as nut, their head at top semicircular entire, their two lower angles long-produced downwards, cuspidate.

6. **F. umbellata,** *Rottb. Descr. et Ic.* 70, t. 19, fig. 3; rhizome creeping woody, clusters of spikelets often many in an elongate panicle, petals obovate subsessile, style 3-fid, nut ovoid smooth pale or finally brownish.

Thw. Enum. 347; *Boeck. in Linnæa*, xxxvii. 110. F. paniculata, *Lam. Ill.* i. 150, t. 39. F. pentagona, *Nees in Wight Contrib.* 93; F. quinquangularis, *Hassk. in Flora*, xxv. (1842) *Beibl.* 3. F. uncinata, *Thw. l. c.* 347 (*not of Kunth*).—Fuirena, *Wall. Cat.* 3542, 3543.

Throughout INDIA, except the drier North-west, alt. 0–3000 ft.—DISTRIB. All warm (not too dry) countries.

Stolons hardening into rhizomes, clothed by ovate-lanceolate striate scales. *Sepals* much shorter than nut, linear, glabrous or retrorse-scabrous, often 0. *Petals* nearly as long as nut, 3-nerved, minutely hairy, truncate at top and often notched sometimes with a minute mucro in the notch.—Generally known from *F. glomerata* by the more compound corymb—an unsafe character; when the rhizome is wanting, dried examples can be certainly distinguished only by the shape of petals.

13. **LIPOCARPHA,** *Br.*

Glabrous. *Stem* leafy only near base, bearing a single head of few (usually 1–6) spikelets. *Spikelets* with very many hermaphrodite flowers, tabescent at top. *Glumes* imbricated on all sides, deciduous leaving the persistent rhachilla marked by lozenge-shaped scars. *Squamellæ* 2, an anticous and posticous, hyaline, elliptic, as long as nut (formed out of coalescent hypogynous bristles). *Stamens* 3–1, anticous; anthers small, linear-oblong, muticous. *Style* small, slender, glabrous, shortly 2-fid (sometimes 3-fid) scarcely exsert. *Nut* small, oblong or ovoid, plano-convex, smooth, reticulated, finally brown-black.—Species 13, warm regions.

This genus in habit, inflorescence, rhachilla of spikelet, style and nut, is excessively like (and really closely allied to) *Scirpus Sect. Micranthæ*; from which it only differs in the squamellæ standing fore and aft, not laterally. These squamellæ are hyaline, cling to the nut, and are difficult to see.

1. **L. argentea,** *Br. in Append. Tuckey Congo*, 459; spikelets 1–8 pale or fuscous, nut much shorter than squamellæ, style linear 3-fid as long as ½–⅔ nut. *Thw. Enum.* 347; *Strachey Cat. Pl. Kumaon*, 73; *Boeck. in Linnæa*, xxxvii. 114 (excl. American examples). L. lævigata, *Nees in Wight Contrib.* 92. Hypælyptum argenteum, *Vahl Enum.* ii. 283. Tunga lævigata, *Roxb. Fl. Ind.* i. 183. Kyllinga albescens, *Steud. Syn. Cyp.* 68; *Miq. Fl. Ind Bat.* iii. 294.—Lipocarpha, *Wall. Cat.* 3445 F, G, H.

From the WESTERN HIMALAYA, alt. 0–6000 ft.; and ASSAM to CEYLON and SINGAPORE.—DISTRIB. Trop. and sub-trop. Old World.

Rhizome hardly any. *Stems* 4–24 in., obtusely trigonous, smooth. *Leaves* as long as stem or much shorter, $\frac{1}{10}$ in. broad. *Spikelets* up to ¼ by ⅛ in.; bracts often 2 in. *Glumes* obovate, apex obtusely triangular incurved. *Nut* sessile, obovoid or ellipsoid obtuse.

2. **L. sphacelata,** *Kunth Enum.* ii. 267; spikelets 1–8 black-purple or if pale usually purple spotted, nut nearly as long as squamellæ, style very short 3-fid. *Thw. Enum.* 347; *Boeck. in Linnæa*, xxxvii. 116. L. triceps, *Nees in Wight Contrib.* 92. Hypælyptum sphacelatum, *Vahl Enum.* ii. 283. H. ceylanicum, *Nees in Linnæa*, ix. 288. Tunga triceps, *Roxb. Fl. Ind.* i. 183. Scirpus hemisphæricus, *Roth. Nov. Pl. Sp.* 29. Hypelytrum triceps, *Dietr. Sp. Pl.* ii. 363.—Lipocarpha, *Wall. Cat.* 3444.

Throughout INDIA (except the dry N.-West), alt. 0–2000 ft., from NEPAL and ASSAM to CEYLON and TAVOY.—DISTRIB. Trop. Africa and America.

Very like *L. argentea*, but can usually be distinguished by the more purple heads. It is largely confused in collections with *L. argentea*, but can be satisfactorily separated by the shorter squamellæ and style.

3. **L. microcephala,** *Kunth Enum.* ii. 268; spikelets 4–1 pale or fuscous squarrose, glumes acuminate tip excurrent recurved, style 3-fid, nut linear-oblong as long as squamellæ *Boeck. in Linnæa*, xxxvii. 118; *Debeau Fl. Tchefou*, 146, t. 3, fig. 2. L. Zollingeriana, *Boeck. in Flora*, xlii. 100. Hypælyptum microcephalum, *Br. Prodr.* 220. Ascolepis kyllingioides, *Steud. Syn. Cyp.* 105.

SINGAPORE; *Ridley.*—DISTRIB. S.E. Asia, Australia.

Glabrous. *Stems* 4–10 in., slender. *Leaves* ⅛–⅔ length of stem, narrow, weak. *Glumes* ovate, scarcely obovate, acuminate. *Spikelets* smaller than in the two preceding species.

14. RYNCHOSPORA, *Vahl.*

Plants varying much in size and habit. *Leaves* long, narrow. *Spikelets* in 1 or more heads, or panicled, often clustered. *Glumes* often 7–8, lower more or less distichous, upper spirally imbricated; three lowest (sometimes more) empty, fourth usually longer containing a perfect nut-bearing flower; uppermost more or less tabescent, male or sterile, thinner in texture rounder on back than nut-bearing glume; above the fourth glume another (in *R. Sikkimensis* 2–4 more) similar nut-bearing glume follows. Hypogynous *bristles* often present. *Stamens* 3 (or 2–1), anterior. *Style* long, linear, glabrous, branches 2, long or short, style-base dilated. *Nut* oblong or ovoid, compressed, beaked by the persistent style-base (clearly distinguishable from nut).—Species 150, in the warmer regions of the world, specially numerous in America.

Series A. HAPLOSTYLEÆ, *Benth. & Hook. f. Gen. Pl.* iii. 1059. Style very shortly 2-fid, or almost undivided.

Division I. CAPITATÆ. Spikelets in a single terminal head. Stems with leaves only near the base.

Sect. I. SPHÆROSCHŒNUS (Genus), *Nees in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843), 97. Spikelet bearing one nut. *Glumes* subdistichous. *Nut* laterally compressed i.e. flattened with one edge next axis (as in *Pycreus*).

1. **R. Wallichiana,** *Kunth Enum.* ii. (1837), 289 (Rhynchospora); stems slender, head globose dense brown, bracts longer than head, style very shortly 2-fid, nut obovoid smooth or minutely scabrous on shoulders. *Benth. Fl. Hongk.* 396 and *Fl. Austral.* vii. 349; *Thw. Enum.* 352; *Boeck. in Linnæa*, xxxvii. 542 (excluding American examples). R. Hænkei, *Presl. Rel. Hænk.* i. 199. Schœnus ruber, *Lour. Fl. Cochinch.* i. 52. Morisia Wallichii, *Nees in Edinb. New Phil. Journ.* 1834 (*n.* 34) 265 and *in Wight Contrib.* 115. Haplostylis Meyenii, *Nees in Linnæa*, ix. (1834), 295, *and in Edinb. New Phil. Journ.* 1834 (n. 34) 265, *and in Wight Contrib.* 115 (*partly*). Sphæroschœnus Wallichii, *Arnott & Nees in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. 97. Cephaloschœnus parvus, *Nees l. c.* 100. Mariscus umbellatus var. procerior, *Zoll. Verz. Ind. Archip.* ii. 63.—Rynchospora, *Wall. Cat.* 3422, 3428.

Throughout INDIA (except the North-west) alt. 0–5000 ft., common; from

NEPAL and ASSAM to CEYLON, NICOBARS, *Kurz* and MALACCA.—DISTRIB. Trop. Africa, S.E. Asia to Japan, Malaya, trop. Australia.

Stems tufted, 4–24 in., trigonous, striate, smooth; stolons 0. *Leaves* several, ½ stem, ⅛ in. broad, flat, minutely scabrous, glabrous or sometimes hairy. *Spikelets* 20–50 in a head, ⅛–½ in. diam.; bracts 3–8, 1–3 in., glabrous or villous-ciliate. *Glumes* 6–7; 3 (or 4) lowest empty, ovate, scarcely acute; fourth longer containing a perfect flower, fifth containing a sterile (or no) flower; seventh glume (when present) narrow, thin, rudimentary. Hypogynous *bristles* sometimes 6 as long as nut, brown, scabrous (teeth pointing upwards) sometimes 6–4 half as long less scabrous, sometimes rudimentary or 0. *Stamens* 2, less often 3; anthers linear-oblong, crested. *Nut* ⅓ glume; beak narrow conic, ¼–½ nut, pale, smooth or rarely scabrous.

Sect. 2. HAPLOSTYLIS (Genus), *Nees in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843), 101. *Spikelet* bearing one nut. *Glumes* obscurely distichous. *Nut* dorsally compressed i.e. flattened with one face next axis (as in *Juncellus*).

2. **R. Wightiana,** *Steud Cyp.* (1855), 148 (Rhynchospora); spikelets about ¼ in., hypogynous bristles 6 scabrous, style very shortly 2-fid, nut linear-oblong black minutely white dotted. *Boeck. in Linnæa*, xxxvii. (1873), 544. Haplostylis Wightiana, *Nees in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843), 101.

MADRAS PENINSULA, from POONA, *Jacquemont* and CHUNDA, *Duthie*, to QUILON, *Wight.*—DISTRIB. Cochin China. (Also a var. in Brasil.)

Stems tufted, 4–24 in., slender, trigonous, glabrous; stolons 0. *Leaves* several, ¼–¾ stem, $\frac{1}{10}$ in. broad, glabrous, or scarcely ciliate. *Spikelets* numerous, in a dense rusty brown head ⅓ in. diam.; bracts 3–6, 2–6 in., ciliate on margins near base. *Glumes* 6–7; 3 (or 4) lowest small empty, fourth longer with perfect nut-bearing flower, upper male or rudimentary. *Bristles* rigid, as long as nut (sometimes twice as long), brown, minute teeth pointing upwards. *Nut* ⅔ glume, sometimes ornamented by scattered papillæ; beak ½ nut, pale, decurrent on margins of nut.

3. **R. longisetis,** *Br. Prodr.* (1810), 230 (Rhynchospora); spikelets nearly ½ in., hypogynous bristles 3 scabrous 3 plumose, style very shortly 2-fid, nut linear-obovoid brown. *Boeck. in Linnæa*, xxxvii. 541; *Benth. Fl. Austral.* vii. 350. R. Prescottiana, *Wall. Cat.* 3423. Schœnus longisetis, *Poir. Encycl. Suppl.* ii. 252. Cephaloschœnus longisetis, *Nees in Linnæa*, ix. 296. C. longirostris, *Nees*? *in Nov. Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843), 101 in Obs.

BURMA; Prome, *Wallich* n. 3423; Karenia and Pegu, *Kurz*; Nummayan, *R. Scott.*—DISTRIB. North Australia.

Closely resembling R. Wightiana, but heads larger. Hypogynous *bristles* usually twice nut (exclusive of beak), in the upper half all are simply scabrous with teeth pointing upwards, in the lower half the 3 inner (petals) are nearly glabrous, the 3 outer (sepals) densely plumose. *Nut* nearly ⅛ in., often minutely bristly on shoulders; beak ¾ nut, conic-oblong, not decurrent on nut. [There are several closely allied Australian species included under *R. longisetis* both by Bentham and Boeckeler.]

Division II. POLYCEPHALÆ. Spikelets in distant dense globose heads. Stems with nodes and leaves far above base.—[The other species of this division form the genus *Cephaloschœnus* proper of Nees, and have the nut dorsally compressed; but the single Indian sp. has the nut laterally compressed i.e. is closely allied to *R. Wallichiana.*]

4. **R. malasica,** *C. B. Clarke*; globose spikes 2-6 distant spiked or racemed, spikelets 1-fld., hypogynous bristles 5–6 twice as long as nut capillary smooth, style very shortly 2-fid, nut obovoid smooth chestnut-colrd. beak narrowly conic pale.

MALAY PENINSULA; Malacca, *Griffith* (Kew n. 6358); Singapore, *Ridley.*—DISTRIB. Borneo.

Stems nearly 2 ft. *Leaves* often overtopping stem, $\frac{1}{5}$ in. broad, glabrous or scabrous pilose; bracts all similar to leaves, lowest sometimes 4 in. from the next. *Spikes* $\frac{1}{2}$–$\frac{2}{3}$ in. diam. of about 15 spikelets. *Spikelets* $\frac{1}{4}$ in., constructed as in *R. Wallichiana.* *Nut* $\frac{1}{2}$ glume, biconvex; beak nearly as long as nut, smooth, base narrow.

Division III. PANICULATÆ. Paniculate. *Spikelets* solitary or clustered. *Stem* robust, with nodes and leaves (or bracts) far above base.—Calyptrostylis (Genus), *Nees in Linnæa,* ix. (1834), 295, is part of this Division.

5. **R. aurea,** *Vahl Enum.* ii. 229; robust, nearly glabrous, without stolons, spikelets numerous in several corymbs, style very shortly 2-fid, nut obovoid truncate, beak as long as nut, and nearly as broad at base. *Benth. Fl. Hongk.* 396, and *Fl. Austral.* vii. 349; *Miq. Fl. Ind. Bat.* iii. 336; *Thw. Enum.* 352; *Boeck. in Linnæa,* xxxvii. 626. R. articulata, *Roem. & Sch. Syst. Mant.* ii. 49; *Dalz. & Gibs. Bomb. Fl.* 288; *Miq. Fl. Ind. Bat.* iii. 337. Scirpus corymbosus, *Linn. Amœn. Acad.* iv. 303. Schœnus articulatus, *Roxb. Fl. Ind.* i. 184 [ed. Wall. 189]. S. surinamensis, *Rottb. Descr. et Ic.* 68, t. 21, fig. 1. Calyptrostylis florida, *Nees in Mart. Brasil Cyp.* 138, t. 13. Cephaloschœnus articulatus, *Nees in Edinb. New Phil. Journ.* (1834), 266, and *in Wight Contrib.* 115. —Cyperus, *Herb. Wight*; *Wall. Cat.* 3371 A.—Rynchospora, *Wall. Cat.* 3424, 3426.

Throughout INDIA (except the north-west), in the hot region, abundant; from SIKKIM and ASSAM to CEYLON and SINGAPORE.—DISTRIB. Warm regions of the globe.

Stems 2–3 ft., smooth or scabrous upwards, with leaves (or leaf-like bracts) their whole length. *Leaves* 1–2 ft. by $\frac{1}{3}$–1 in., on margins (and often on keel beneath) scabrous. *Panicle* often 1 ft. long, composed of 3–5 corymbs. *Spikelets* mostly solitary, rusty-brown, about $\frac{1}{3}$ in. long. *Glumes* about 7; lowest 3 (or 4) smaller, ovate, sometimes mucronate; fourth glume longer, subobtuse, with perfect flower; upper glumes male or sterile. Hypogynous *bristles* 6, as long as nut simply scabrous, not rarely unequal or some deficient. *Style* exceedingly long, minutely bifid at tip. *Nut* $\frac{1}{10}$—$\frac{1}{8}$ in., $\frac{1}{2}$ glume, smooth, reticulated or transversely wavy; beak pale, flattened, more or less grooved longitudinally on each face, rough, hardly exsert from glumes.—In the American forms the nut has usually two furrows on its shoulders and 2 pits (sometimes large) on its back; in the Asiatic plants these furrows and pits are often just "indicated," often entirely absent.

6. **R. triflora,** *Vahl Enum.* ii. 232; somewhat robust, nearly glabrous, stolons often present, spikelets in loose corymbs, style very shortly 2-fid, nut ellipsoid truncate transversely undulate, beak longer than nut linear pyramidal. *Boeck. in Linnæa,* xxxvii. 625. R. ceylonica, *Kunth Enum.* ii. 294. R. zeylanica, *Thw. Enum.* 352. Scirpus triflorus, *Poir. Encycl. Suppl.* ii. 248. Cephaloschœnus Zeylanicus, *Nees in Edinb. New Phil. Journ.* 1834, 265, and *in Wight Contrib.* 115. Ephippiorhynchium triflorum, *Nees in Mart. Fl. Bras.* ii. (pars 1) 136 in note.

CEYLON; *Thwaites* n. 3036, *Macrae.*—DISTRIB. Tropical America.

Stolons rather slender, clothed by ovate striate straw-colrd. scales. *Stems,* leaves,

spikelets as in *R. aurea*, but more slender; spikelets more clustered, less numerous, in a more straggling open panicle. *Nut* hardly ⅛ in., brown, smooth or microscopically transversely muriculate; beak at base very narrowly pyramidal, much narrower than nut.

7. **R. Hookeri,** *Boeck. in Linnæa,* xxxvii. 621 (Rhynchospora); somewhat robust, nearly glabrous, spikelets in loose corymbs, style very shortly 2-fid, nut obovoid chestnut-colrd. smooth suddenly narrowed into a very small cylindric neck, beak linear as long as nut. Schœnus articulatus, *Buch. Ham. ms.* (*not of Roxb.*).—Rynchospora, *Wall. Cat.* 3425.

N.E. INDIA; alt. 0–300 ft. ASSAM; Seebsagur, *C. B. Clarke,* &c. Sylhet Terai; *J. D. Hooker.* North Bengal; Nathpur, *Hamilton, Wallich*; Mudhopoor Jungle, *C. B. Clarke*; Pegu, *Brandis* (Herb. Calcutta).

Hardly stoloniferous, lateral shoots push out from base of stem. *Stems,* leaves, spikelets, nearly as in smaller examples of *R. aurea,* but corymbs much more straggling irregular, spikelets 1–5-clustered. *Nut* $\frac{1}{12}$ in. long, surmounted by the minute neck also chestnut-colrd.; beak greenish-straw-colrd.

Series B. DIPLOSTYLEÆ, *Benth. & Hook. f. Gen. Pl.* iii. 1059. Style deeply divided, branches 2 long-linear. [Stem with nodes bearing leaves (or leaf-like bracts) far above its base. Spikelets loosely corymbose or panicled].

8. **R. gracillima,** *Thw. Enum.* 435 (Rhynchospora), not of Sauvalle; glabrous, very slender, spikelets solitary long-pedicelled panicled bearing often 2 nuts, hypogynous bristles 0, style-branches 2 long, nut broadly obovoid truncate transversely wavy-wrinkled, beak broad depressed. *Boeck. in Linnæa,* xxxvii. (1873), 597; *Kurz in Journ. As. Soc. Beng.* xlv. (1876), pt. i. 159. R. Kamphœveneri, *Boeck. in Engl. Jahrb.* v. 508.

CEYLON; *Thwaites* n. 3818. KHASIA; *J. D. Hooker.* NICOBARS; *Kurz.*—DISTRIB. Hongkong.

Roots fibrous. *Stems* 2 ft. *Leaves* 4–12 in., setaceous. *Panicle* 12 by 3 in., with 18 spikelets. *Spikelets* ¼ by $\frac{1}{12}$ in., dusky brown. *Glumes* 7–8, obtuse, 3 or 4 lowest empty shorter. *Style* long slender, branches 2 as long as style. *Nut* ⅔ glume, pale ash-colour; beak as broad as nut, becoming black, saddle-shaped.

9. **R. glauca,** *Vahl Enum.* ii. 233; glabrous, panicle narrow, corymbs rather small, spikelets numerous bearing 1–2 nuts, hypogynous bristles scabrous with teeth pointing upwards, style-branches 2 long, nut broadly obovoid truncate transversely wavy wrinkled, beak $\frac{1}{3}$–$\frac{3}{5}$ nut. *Boeck. in Linnæa,* xxxvii. 585 (*excl. the "larger" form*). R. gracilis, *Vahl Enum.* ii. 234. R. laxa, *Br. Prodr.* 230; R. laxa β minor, *Thw. Enum.* 352 (*not of Vahl*). R. chinensis, *Nees in Wight Contrib.* 115; *Boeck. l. c.* 586 (the *Khasia plants*).—Rynchospora, *Wall. Cat.* 3421.

KHASIA and NILGHIRI HILLS, alt. 4–6500 ft., NEPAL; *Wallich.* CEYLON, *Thwaites* C.P. n. 2396, &c.—DISTRIB. Warm regions of the globe.

Rhizome biennial or perennial, short, becoming woody; lateral shoots (hardly stolons) push out from base of stem. *Stems* tufted 1–2½ ft., rather slender, nearly smooth, with nodes throughout their length. *Leaves* 8–20 by $\frac{1}{12}$–$\frac{1}{6}$ in., nearly smooth. *Panicle* 12 by 1–2 in.; axillary corymbs often 2–3, distant, peduncled, ⅔ in. diam. *Spikelets* shortly pedicelled or somewhat clustered ⅛ in., with 6–7 glumes. *Hypogynous bristles* 6 or 5, rigid, brown, usually as long as nut rarely reaching top of beak. *Stamens* usually 2; anthers not crested. *Nut* ½–¾ glume,

sessile, turgid, chestnut-brown, with 12-18 transverse wrinkles, beak (in the Old World examples) broadly conic, smooth or nearly so. [The names *glauca* and *gracilis* were published in the same volume. Many authors prefer the *gracilis* supposing the species to be Swartz's *Schœnus gracilis*. But Swartz says his *Schœnus gracilis* had a 3-fid style, so that it was no *Rynchospora* (except perhaps in small part by mixture); Mr. Bentham has hence adopted *glauca*.]

Var. β *chinensis* (sp.) Boeck. l. c. 586 (not of Nees & Meyen); spikelets longer up to ¼ in. often bearing 2 nuts, beak longer often equalling ¾ nut, hypogynous bristles usually reaching top of beak. R. glauca, *Boeck. l. c.* 585 (*partly*). R. lavarum, *Hook. & Arn. Bot. Beech. Voy.* 98 (*not of Gaud.*). R. laxa, *Thwaites Enum.* 352 (*not of Vahl*).—CEYLON; *Thw.* (C.P. 677, &c.). TENÁSSERIM; *Helfer* (*Kew Distr.* n. 6303), *Griffith* (*Kew Distr.* 6302).—DISTRIB. Sea-coasts of Madagasc., Borneo, China, Sandwich Isles. A maritime form.

10. **R. Griffithii,** *Boeck. in Linnæa,* xxxviii. 404, nut narrowly obovoid ellipsoid rounded at top, beak ¾ nut, hypogynous bristles reaching top of beak scabrous; otherwise as *R. glauca.*

EAST BENGAL; *Griffith* (*Kew Distr.* 6303). ASSAM; *Griffith.* KHASIA; *J. D. Hooker*; alt. 4200 ft., *C. B. Clarke.*

Var. β LEVISETIS; hypogynous bristles 6 twice nut smooth. R. chinensis, "forma tenuis," *Boeck. l. c.* 587.—Upper Sikkim; Lachen and Lachoong, alt. 10,000 ft., in wet meadows. *J. D. H.*—A remarkable form, an alpine state of *R. Griffithii.* The nut is narrow, so that Boeckeler's alliance of it with the sea-coast *R. chinensis* is not satisfactory.

11. **R. sikkimensis,** *C. B. Clarke*; glabrous, panicle narrow, corymbs rather small, spikelets numerous bearing 3–6 nuts, hypogynous bristles 6 scabrous twice nut, style-branches 2 long, nut small narrowly obovoid truncate, beak ovoid longer and broader than nut smooth (otherwise as *R. Griffithii*).

UPPER SIKKIM; Catsuperri Lake, alt. 8000 ft.—*J. D. H.*

Spikelets ⅛ in., fine brown, with 12–18 glumes and 3–8 pistilliferous flowers.—This plant may be the *R. chinensis* described by Boeck. in Linnæa, xxxvii. 587, which he says has about 5 fertile flowers to the spikelet; but it does not agree in this particular with *Thwaites* n. 677, which is Boeckeler's type of *R. Chinensis.*

UNDETERMINAL SPECIES OF RYNCHOSPORA.

Scirpus (Rynchospora?) MOLLIS, *Wall. in Roxb. Fl. Ind.* [*ed. Carey and Wall*] i. 227; stems 1–2 ft. hairy, leaves few towards base of stem hairy, umbel 7-rayed, spikelets oblong, glumes ovate subaristate smooth, hypogynous bristles 3 long hairy, style compressed hairy and ciliate with broad cordate articulate base. Fimbristylis? mollis, *Kunth Enum.* ii. 246.

NEPAL; *Wallich.*

The style being compressed must be assumed to be 2-fid; this, joined to the 3 long hypogynous bristles, would fix the plant in Rynchospora (as suggested by Wallich), but it cannot be referred to any known Indian species of that genus.

15. SCHŒNUS, *Linn.* (*in part*).

Spikelets capitate or panicled; flowers axillary. *Glumes* (except the uppermost tabescent) distichous; 3 (or more) lowest empty, 1–4 following perfect, nut-bearing, somewhat remote. Hypogynous *bristles* often present, setaceous, not dilated at base. *Stamens* 3, anterior. *Style* 3-fid, gradually passing into the nut without any constriction below style-base. *Nut* in a

hollow of the zigzag persistent rhachilla, trigonous.—Species 59, chiefly Australian; with a few Cosmopolitan, Malayan, Japanese and Chilian.

1. **S. nigricans,** *Linn. Sp. Pl.* 64; stem without nodes except near base, spikelets almost capitate, hypogynous bristles $\frac{1}{3}$–$\frac{1}{2}$ nut or nearly obsolete, style 3-fid, nut sessile ovoid smooth marble-white. *Boiss. Fl. Orient.* v. 393; *Aitch. in Journ. Linn. Soc.* xviii. 104. Chætospora nigricans, *Kunth Enum.* ii. 323; *Boeck. in Linnæa,* xxxviii. 290.

PUNJAB; Kurum Valley, *Aitchison.* SIND; *Pinwill.*—DISTRIB. Nearly cosmopolitan, except S. E. Asia and Australia.

Almost glabrous. *Rhizome* horizontal, woody; stolons 0. *Stems* 4–24 in., subterete. *Leaves* 4–12 in., often half stem, very narrow with incurved margins. *Spikelets* 1–15, $\frac{1}{8}$–$\frac{1}{4}$ in. long, in a close distinctly compound head; lowest bract suberect, often 1–4 in. *Glumes* ovate, obtuse, microscopically hispid on keel, chestnut or brown; three lowest empty, 1–3 next nut-bearing. *Nut* $\frac{1}{20}$ in ellipsoid, top acutely pyramidal.

2. **S. calostachyus,** *Poir. Encycl. Suppl.* ii. 251; stem with nodes throughout its length, spikelets nearly 1 in. long loosely panicled, hypogynous bristles $\frac{1}{4}$ nut white, style 3-fid, nut ovoid slightly tubercular or wrinkled chestnut-black. *Benth. Fl. Austral.* vii. 368. Chætospora calostachya, *Br. Prodr.* 233. Cyclocampe waigiouensis, *Steud. Syn. Cyp.* 156. Cyclocarpa waigouensis, *Miq. Fl. Ind. Bat.* iii. 339.

SINGAPORE; *Ridley*—DISTRIB. Malaya, Australia.

Rhizome short, horizontal, woody. *Stems* 1–2½ ft., rigid, rather slender, subterete. Lower *leaves* 4–12 by $\frac{1}{10}$ in., glabrous; sheaths at their mouth scarious, scarcely pubescent. *Panicle* 8–16 in. long, with 8–14 spikelets; lower bracts like the leaves, upper reduced nearly to sheaths. *Spikelets* elliptic-lanceolate, compressed, chestnut or brown. *Glumes* elliptic-lanceolate, scarcely acute, minutely hairy on margins; 4–8 lowest empty, densely packed; 3–2 following nut-bearing, distant on zigzag rhachilla. *Nut* $\frac{1}{8}$ in., subsessile, trigonous, curved.

16. CLADIUM, *P. Browne.*

Stout perennials, glabrous or inflorescence minutely hairy. *Stems* round or flattened, leafy or leafless. *Leaves* equitant, xiphoid or trigonous at top, or flat. *Spikelets* panicled, often in sessile clusters at the angles of zigzag branches, small, with 4–11 glumes. *Flowers* 1–7, axillary, lowest of each spikelet perfect, nut-bearing. *Glumes* imbricate on all sides; lowest 1–4 (usually 2–3) empty, smaller (or not larger) than succeeding 1–3 including perfect flowers; uppermost glumes male or sterile, tabescent. Hypogynous *bristles* slender, or small, or 0. *Stamens* 3–2. *Style* linear; branches 3, long; style-base dilated, fused with nut. *Nut* small or scarcely middle-sized; beak large pyramidal, or smaller umbonate, or undistinguishable from nut, or reduced to a speck.—Species 44; one cosmopolitan; the rest insular or maritime, in both hemispheres.

Subgenus I EUCLADIUM, *Benth. Fl Austral.* vii. 402. *Stems* tall, round with nodes carrying leaves (or leaf-like bracts) their whole length. *Leaves* flat, not distichous. *Panicle* oblong of several corymbs. *Spikelets* numerous, clustered, most 2-fid., the lower flower nut-bearing.

1. **C. Mariscus,** *Br. Prodr.* 236; stems 3–8 ft., leaves ½ in. broad scabrous, glumes brown subobtuse, hypogynous bristles 0, style 3-fid. nut ovoid acute shining chestnut-colrd. *Boeck. in Linnæa* xxxviii. 232. C.

germanicum, *Schrad. Fl. Germ*, i. 75, t. 5, fig. 7. C. jamaicense, *Crantz Inst.* i. 362. Schœnus Mariscus, *Linn. Sp. Pl.* i. 62.

KASHMIR; Lake, alt. 5200 ft., *Jacquemont*, &c.—DISTRIB. Cosmopolitan.

Glabrous, stoloniferous. *Leaves* often nearly equalling stem; teeth on margins and midrib beneath cutting. *Panicle* 1–2 ft. long or more; corymbs distant, several times corymbosely divided; lower bracts leaf-like. *Spikelets* usually in globose clusters of 4–12 $\frac{1}{12}$–$\frac{1}{6}$ in., young lanceolate, ripe ovoid, uniform brown. *Glumes* 6–7, ovate, concave; 3–4 lower empty, smaller; rhachilla abbreviated, persistent. *Stamens* usually 2; anthers linear-oblong, crested. *Nut* scarcely $\frac{1}{12}$ in., hard; style-base ovoid, large, fused into nut, of which the cavity is carried up into style-base.

Subgenus II. MACHÆRINA (Genus), *Vahl Enum.* ii. 238. Clusters panicled, mostly sessile at the angles of zigzag branches. Hypogynous *bristles* small. *Nut* more or less stalked, rostrate.

2. **C. Maingayi,** *C. B. Clarke*; stems stout flattened, basal leaves equitant $\frac{3}{4}$ in. broad, spikelets dark-red, hypogynous bristles slender longer than nut, style 3-fid, nut turgid trigonous shortly stalked, beak long pyramidal hairy.

MT. OPHIR (Malacca), alt. 4250 ft., *Griffith* (*Kew Distrib.* 6304), &c.

Stems 1–3 ft. Basal *leaves* several, crowded, often as long as stem; stem leaves 0 or occasionally 1. *Panicle* 12–18 in., oblong; lowest branch often distant. *Spikelets* $\frac{1}{5}$ in., ovoid, usually bearing 2–4 nuts. *Glumes* ovate, tip triangular scarcely acute; 2–3 lowest empty. Hypogynous bristles 6, their upper half thinly clothed with short upward-pointing hairs. *Nut* $\frac{1}{20}$ in. long, on a short obpyramidal stalk.—Very near the West Indian *Machærina restwoides*, Vahl.

3. **C. undulatum,** *Thw. Enum.* 353; stem long round-trigonous, leaves basal very narrow, spikelets brown, hypogynous bristles much shorter than nut, style 3-fid, nut sessile ovoid brown, beak very small. Lepidosperma zeylanicum, *Nees in Linnæa*, xxxviii. 232. Tricostularia fimbristyloides, *Benth. Fl. Austral.* vii. 384. Carpha junciformis, *Boeck. in Linnæa*, v. 38, 267.

CEYLON, *Rottler*, *Thwaites*, &c. MALAY PENINSULA; Pahang, *Ridley*.—DISTRIB. Malaya, Australia.

Nearly smooth and glabrous. *Stem* 1–3 ft., somewhat slender, leafless except near base. *Leaves* 9–18 by $\frac{1}{6}$ in., convolute when dry. *Panicle* 2–12 in., greatly varying in development; branches flexuose or zigzag; lowest bract leaf-like or short. *Spikelets* in clusters of 2–5, $\frac{1}{5}$ in. long, ellipsoid, 1–2-fld.; lower flower perfect, nut-bearing. *Glumes* not distichous; two lowest smaller, empty. Hypogynous *bristles* 6, hardly $\frac{1}{2}$ nut, setaceous, base dilated white. *Nut* scarcely $\frac{1}{20}$ in., smooth; beak depressed, pyramidal or umbonate, not $\frac{1}{4}$ nut, hairy.—The hypogynous bristles are as of *Lepidosperma*, but the lower flower producing the nut does not suit that genus.—Bentham (*Fl. Austral.* vii. 384) considers the Ceylon, Borneo, and Australian plants here united as three species.

Subgenus III. BAUMEA (Genus), *Gaud. in Freycinet Voy. Bot.* 416, t. 29. Clusters of flowers panicled, mostly sessile at the angles of zigzag branches. Hypogynous bristles 0. *Nut* nearly or quite sessile, rostrate (in the Indian species).

4. **C. riparium,** *Benth. Fl. Austral.* vii. 405; stems obscurely flattened, cauline leaves few obscurely xiphoid or subterete, panicle elongate lax of many spikelets, style 3-fid, nut obovoid round-trigonous smooth, beak small conic minutely hairy. Baumea riparia, *Boeck. in Linnæa*, xxxviii. 246.

WEST AUSTRALIA.

Stolons long, densely clothed by lanceolate striate dirty-straw-colrd. scales. *Stems* 3 ft., trigonous, under panicle flattened biconvex. Basal *leaves* often as long as stem, hardly ¼ in. broad; in their upper half very variable in form, sometimes xiphoid (i.e. flat thick in middle without a central nerve), sometimes 3–4-angular or passing into nearly linear-conic. *Panicle* 8–12 in.; lower branches distant; lowest bract 1½ in. long; secondary branches flexuose, minutely scabrous-puberulous. *Spikelets* in clusters of 1–5, ⅛ in. long, 2–1-fld., brown; lowest flower perfect, nut-bearing. *Fl. glume* ovate-lanceolate, at least as long as the two lower empty glumes. *Nut* $\frac{1}{16}$ in., sessile, brown; beak ⅓ nut.

Var. *crassa;* stems usually 6 ft.; spikelets rather larger, densely clustered, 2–4 flowers and 1–3 nuts; styles and filaments conspicuously exserted. Baumea crassa, *Thw. Enum.* 353; *Boeck. l. c.* 238.—BENGAL; Soondreebun, *C. B. Clarke.* KHASIA, alt. 5000 ft., Shillong, *C. B. Clarke* (introduced ?). Ceylon; Prov. Ambagamowa, *Thwaites*, C.P. 845.—In the Ceylon examples (*crassa* type), with which the Bengal agree, the roots are thick black (the plant probably not stoloniferous), the nuts are nearly twice as long as in the Australian plant shining brown. But in the Khasi plant, stolons are generally present and the nuts are like those of *C. riparium*, Benth. typ.

5. **C. glomeratum,** *Br. Prodr.* 237; medium-sized, leaves linear in upper half terete or subtrigonous not transversely septate, panicle elongate narrow interrupted, spikelets clustered, style 3-fid. nut oblong-ellipsoid obtusely trigonous, beak small ovoid hairy. *Kunth Enum.* ii. 304; *Benth. Fl. Austral.* vii. 404 (not *Baumea glomerata*, Gaud.). Chapelliera glomerata, *Nees in Lehm. Pl. Preiss.* ii. 76 *in Obs.*; *Miq. in Ann. Mus. Lugd. Bat.* ii. 146. Baumea rubiginosa & Brownei, *Boeck. in Linnæa*, xxxviii. 241, 242.

SINGAPORE, *Ridley.*—DISTRIB. China, Japan, Austral., and N. Zeal.

Stolons long, clothed by ovate striated scales. *Stems* 1–3 ft., nodose throughout their length. Basal *leaves* 8–20 in., cauline few short or 0. *Panicle* 4–10 by 1–2 in.; lowest bract ½–1½ in., hardly leaf-like. *Spikelets* 1–3 together (clusters often themselves clustered), ⅛ in., rusty-brown, 2–4-fld. bearing 1 (rarely 2) nut. *Fl. glumes* ovate acute, keel upwards scabrid, margins conspicuously thinly villous.

17. MICROSCHŒNUS, *Gen. Nov.*

A very small, glabrous perennial. *Stems* with nodes, bearing narrow leaves. *Inflorescence* of 1–3 approximated spikelets. *Glumes* 6, imbricate on all sides, subsimilar; two lowest empty; 3 (or 2) following male, monandrous; uppermost lateral (appearing terminal) perfect, nut-bearing, monandrous. Hypogynous *bristles* 2, minute, rudimentary (perhaps reduced stamens). *Style* linear-cylindric, smooth, continuous with pistil; branches 3. *Nut* (not well ripe) ellipsoid, trigonous, smooth, pyramidal at base and top.

M. Duthiei, *C. B. Clarke*; stems 1–3 in.

WEST HIMALAYA; Gurwhal, Tihri, alt. 15,500 ft., *Duthie.*

Stems tufted; with very short stolons or short lateral shoots. *Leaves* 2 or 3 on each stem, about 1 in., grass-like; margins incurved, smooth; sheaths short. *Spikelets* about ⅛ in., ellipsoid; lowest bract similar to leaves; upper bracts gradually shorter, passing into glumes. *Glumes* ovate-oblong, concave scarcely keeled, chestnut-red, hardly scarious on edges. *Anthers* linear-oblong, not crested, scarcely exserted.

18. **LEPIDOSPERMA,** *Labill.*

Glabrous, rigid, robust stoloniferous plants. *Stems* leafy only near base. *Panicle* of many spikelets, often oblong, contracted. *Spikelets* of 5–10 glumes, of 2–3 axillary flowers, rarely producing more than 1 nut, lowest flower being always sterile (i. e. male or pistil imperfect). *Fl. glumes* (even young) similar to the lower empty glumes. Hypogynous *bristles* 6, short, ovate with a triangular or setaceous tip. *Stamens* 3. *Style* with 3 long branches; style-base glabrous or nearly so, fused into the glabrous smooth trigonous nut.—Species 36, all Australasian except the present.

L. chinense, *Nees & Meyen in Linnæa,* ix. 302, and in *Nov. Act. Nat. Cur.* xix. (*Suppl.* i) 117; stems robust terete, leaves mostly long terete, panicle oblong dense, spikelets clustered, glumes lanceolate acute subdistichous, style 3-fid, nut $\frac{1}{12}$–$\frac{1}{10}$ in. obtuse. *Benth. Fl. Hongk.* 398; *Boeck. in Linnæa,* xxxviii. 329 (excl. *L. confine*).

Malacca; Mt. Ophir, *Griffith* (*Kew Distrib.* 6115).—Distrib. S. China.

Stems 2–3 ft. *Leaves* stem-like. *Panicle* 2–4 by 1 in., very dense, base scarcely interrupted. *Glumes* 5–7, lower distichous, 1–2 highest spiral tabescent; flowers 3–2, lowest sterile, upper perfect nut-bearing. Hypogynous *bristles* scarcely ¼ length of glume, easily overlooked in young flowers.—Bentham says, "Flowers 3, lowest fertile." Nees says, "Glumes empty except the penultimate which is male, and the terminal thin one" (which Nees supposes nut-bearing). The terminal thin glume is sterile, the penultimate perfect, nut-bearing.

19. **GAHNIA,** *J. R. & G. Forst.*

Coarse, usually scabrous, perennials. *Stem* with nodes, bearing leaves or leaf-like bracts throughout its length. *Panicle* copious, or linear-oblong. *Spikelets* clustered, often black or dark brown, 1–2-fld., upper alone nut-bearing. *Glumes* imbricated on all sides, lower 3–5 (or more) empty, keeled, often mucronate, hispid, upper gradually larger, unaltered in fruit; the top 3 (or 2) glumes heteromorphous, in young fl. very small (usually not ¼ length of uppermost keeled empty glume) subquadrate, scarcely nerved, in fruit enlarged rigid brown or black; lowest heteromorphous glume with 3–6 (often 4) stamens or empty, second heteromorphous glume with 3 stamens perfecting a nut, uppermost empty or 0. Hypogynous *bristles* 0. *Filaments* long (often elongated in fruit holding the nut); anthers crested. *Style* slender, glabrous; branches 3 (or 4) long; style-base continuous with pistil, often a small black conical point to the nut. *Nut* bony, round or trigonous, sessile.—Species 27, from Singapore to the Sandwich Isles, abounding in Australasia.

The structure of the spicula of *Gahnia* has been recently described by Colenso in Trans. N. Zeal. Inst. xviii. 278, and by Hillebrand in Flora Hawaii, 481. In those species (and specimens) which have but one flower in the spikelet, that flower appears terminal and the three small heteromorphous glumes (scales) appear as a perianth of 3 imbricated segments. But the cases where the above three glumes contain two flowers (both of which may be pistilliferous though only the upper nut-bearing), negative this explanation.

G. javanica, *Moritzi Verz. Zoll. Pfl.* 98; tall, leaves long narrow very scabrous, panicle oblong-linear dense, spikelets 2–1-fld. black, style 3-fid, nut linear-oblong shining brown black-tipped. *Boeck. in Linnæa,* xxxviii. 339. Phakellanthus multiflorus, *Zoll. Syst. Verz. Ind. Archip.* ii.

61. Syzyganthus multiflorus, *Steud. Syn. Cyp.* 153. Schœnus paniculatus, *Hassk. Cat. Hort. Bogor.* 296 (not of Burm.). S. Hasskarlii, *Steud l. c.* 166.

MALAY ISLANDS; from Sumatra to Fiji.

Nearly glabrous. *Stem* often 3 ft., terete. *Leaves* often nearly as long as stem, ⅛–½ in. wide, tip caudate very scabrous. *Panicle* 12 by 3 in., dense; branches from each lower sheath usually several (sometimes 15); lower bracts long, similar to leaves. *Spikelets* nearly ¼ in., when young lanceolate; lower flower sterile or male or wanting. Lower *glumes* 3–4, keeled, mucronate; upper glumes 3–2, when young very small, ultimately enlarged hardened, ⅔ as long as the uppermost keeled glume. *Stamens* in lower flower 4, in the upper 3; filaments persistent ultimately elongate and brown, often retaining the nut.

Var. *penangensis*; lowest bract shorter, often not half length of panicle, panicle looser, branches finally nodding (not in suberect clusters).—Penang, alt. 3000 ft., *G. King*. Perak, alt. 6500 ft., *Wray*. Malacca; Punnus, *Griffith* (*Kew Distrib.* 6305).

20. **REMIREA,** *Aublet.*

A glabrous perennial. *Stem* short, with numerous long leaves. *Spikes* digitately capitate; bracts long. *Spikelets* densely sessile, 1-fld. *Glumes* 4, imbricate laxly on all sides, small, ovate-triangular, three lowest empty green striate, uppermost nerveless containing a perfect quasi-terminal flower. Hypogynous *bristles* 0. *Stamens* 3, unilateral. *Style* linear, smooth; base not dilated; branches 3, linear. *Nut* oblong-ellipsoid, trigonous, smooth; style deciduous.

The flower is here really axillary, the continuation of the axis suppressed at an early stage. The plant is allied to the *Rynchosporeæ*, as Bentham has it.

R. maritima, *Aubl. Pl. Guian.* i. 45, t. 16; stem nearly covered by sheaths of leaves (i.e. head sessile) or only covered near base (i.e. head peduncled). *Beauv. Fl. d' Owar.* ii. 22, t. 73; *Kurz in Journ. As. Soc.* xlv (1876), pt. ii. 158; *Boeck. in Linnæa*, xxxv. 435. R. pedunculata, *Br. Prodr.* 236; *Thw. Enum.* 345. R. Wightiana, *Nees in Wight Contrib.* 92. R. disticophylla, *Boeck. in Flora*, xli. 410. Mariscus capitatus, *Zoll. Verz. Ind. Archip.* ii 63. Lipocarpha foliosa, *Miq. Fl. Ind. Bat.* iii. 337; *Kurz Fl. Bangka*, 224.—Cyperus, *Wall. Cat.* 3378.

Sea-coasts. CANARA; *Talbot*. TENASSERIM; *Helfer*; MALACCA, *Griffith*; NICOBARS, *Kurz*; &c. CEYLON; *Thwaites* (C.P. 3227.)—DISTRIB. All tropical sea-coasts.

Rhizome up to 2 ft. *Stems* distant, or tufted from the branched head of rhizome, 2–6 in., subtrigonous, smooth. *Leaves* often longer than stem, narrow, rigid, curved nearly smooth. *Bracts* 2–6, patent, 1–3 in., leaf-like. *Spikes* about ½ in. long, ellipsoid, of about 30 spikelets, dirty straw-colrd. *Spikelets* ⅛ in., ellipsoid. *Nut* ⅔ glume, chestnut-colrd.; outermost cells minute, round-hexagonal, often porose (i.e nut punctiulate)

21. **HYPOLYTRUM,** *L. C. Rich.*

Stem with some nodes far above the base. *Leaves* flat, somewhat thin, 3-nerved, narrowed gradually at each end. *Spikes* panicled, branches rigid; bracts long, leaf-like. *Spikelets* without glumes interposed between the two opposite basal males and the terminal pistil except in *H. turgidum*

and *H. longirostre*. *Style* continuous with ovary, persistent; branches 2 long. *Nut* small, but often overtopping bracteoles, biconvex, osseous, subpersistent; style-base ultimately becoming a conical or ovoid beak.—Species 25, tropical and subtropical.

This and the following four genera, included under the division *Hypolytreæ* (see p. 587), or *Mapanieæ*, are so peculiar in structure that the following observations may prove useful.—*Spikelets* small, in spikes resembling the spikelets of a stout *Scirpus*; the (apparent) glumes being obtuse bracteoles. Spikelets containing one terminal fem. fl. (of a pistil only) and two opposite boat-shaped 1-glumed monandrous male fl. at its base; between these two basal males and the terminal female are placed 0–11 concave or nearly plane glumes unsymmetrically whorled, sterile or 1–6 monandrous; the three inner glumes (empty), often appearing nearly as sepals to the pistil. *Glumes* to the two lowest male flowers (squamellæ), acutely keeled, hairy on keel, placed laterally with respect to the bracteole. *Stamens* small; anthers not crested.

In Hypolytrum the spikelet might be regarded as a single flower, consisting of a bract, two opposite boat-shaped bracteoles, 2 stamens and a pistil. But in *Mapania* (and other genera) the number of male and barren glumes interposed between the squamellæ and the pistil shows that this flower is really an inflorescence, as in *Euphorbia*. The species are sometimes polygamo-dicœcious, some plants producing only empty nuts with abnormal beaks. The seven Indian species here described might be treated as *H. latifolium* with five varieties.

1. **H. latifolium,** *L. C. Rich. in Pers. Syn.* i. 70; stems stout triquetrous upwards, leaves long often ½–1 in. broad, style 2-fid, nut (fertile) wrinkled brown or chestnut, beak small conical pale (large when nut is barren). *Thw. Enum.* 346 (*β and part a*); *Kurz in Journ. As. Soc.* xxxviii. *part* 2, 72 (*partly*). H. giganteum, *Wall. Cat.* 3404 (*partly*); *Nees in Wight Contrib.* 93 (*partly*); *Boeck. in Linnæa*, xxxvii. 131. H. schœnoides, *Nees in Linnæa*, ix. 288. H. myrianthum, *Miq. Fl. Ind. Bat.* iii. 333. H. latifolium and diandrum, *Dietr. Sp. Pl.* ii. 365. Tunga diandra, *Roxb. Fl. Ind.* i. 184. Scirpus anomalus, *Retz. Obs.* v. 15. Albikkia scirpoides and schœnoides, *Presl. Rel. Hœnk.* i. 185, t. 34, 35.—Hypolytrum, *Wall. Cat.* 3402, 3403, 3404 (*mainly*).

SIKKIM and ASSAM to SINGAPORE, TRAVANCORE, CEYLON, NICOBAR and ANDAMAN ISLDS.—DISTRIB. Malaya, China, Austral., Polynesia.

Rhizome perennial, short; roots thick, smooth, very tough. *Stem* 1–3 ft., smooth or slightly scabrous, bearing nodes and leaves above the base, often above the middle. *Leaves* often 6–13 in., scabrous on margins. *Panicle* 2–6 in. diam. pyramidal, compound-corymbose or as if depressed-umbellate, often dense, sometimes depauperated with few spikes; branches divaricate, scabrous, very rigid. *Spikes* nearly all solitary, young ⅛–¼ in. oblong-obovoid, fruiting ⅓ in. subglobose. *Glumes* (i.e. bracteoles) closely spirally imbricate, scarcely $\frac{1}{15}$ in. long, concave, elliptic, obtuse, membranous, 1-nerved, brownish. *Squamellæ* ⅔ glume. *Nut* (without beak) a little longer than glume, sessile; beak about ¼ length of nut.—Wall. Cat. 3404 is this mixed with *Scirpus chinensis*, Munro, and a *Mapania*. In some specimens from the Khasia Terai the nuts are empty, their beaks inflated ovoid-conic twice as long as the nut; these Boeckeler (Linnæa, xxxvii. 130) calls the Indian *H. mauritianum*. —It is possible to refer the Mauritian plant to a var. of *latifolium*; but, if these two are kept distinct, it is not possible to arrange the Khasian plant under both.

2. **H. Wightianum,** *Boeck. in Linnæa*, xxxvii. p. 130; stems stout, leaves long ½–¾ in. broad, panicle compound dense, style 2-fid, nut (fertile) straw-colrd. or pale, beak conical pale ½–¾ nut. H. giganteum, *Nees in Wight Contrib.* p. 93 (*partly*).—*Rheede Hort. Malab.* xii. t. 58.

CANARA; *Dalzell.* MALABAR or CONCAN; *Stocks.* WYNAAD; Goodaloor, *King.* NICOBARS; *Kurz.*

Distributed in Herb. H. f. and T. as a local form of *H. latifolium*, which it closely resembles. The nut is usually glandular-punctate, pitted rugose or nearly smooth.

3. **H. turgidum,** *C. B. Clarke*; stem stout, leaves long ½–¾ in. broad, panicle compound dense, spikelets often of three glumes (besides the bracteole), style 2-fid, fertile nut large brown purple punctate, beak small or hardly any. H. latifolium, *Thw. Enum.* 346 (*partly*).

CEYLON, Central Province, alt. 3000 ft., *Thwaites* (C.P. 3).

Thwaites subsequently (in ms.) separated this as a distinct species. The two boat-shaped squamellæ are lateral (as in all the *Mapanieæ*); the third extra glume is flat concave thin without keel on the anterior side of the spikelet within the squamellæ. A similar extra glume occurs frequently in several of the large American *Hypolytreæ*; thus indicating an approach to *Thoracostachyum.*

4. **H. penangense,** *C. B. Clarke*; stem stout, leaves long ½–¾ in. broad, panicle compound of 100 spikes, young spikes ⅛ by $\frac{1}{20}$ in. linear cylindric.

PENANG; *Maingay* (*Kew Distrib.* 1720).

Imperfectly known from a young example; but the young spikes differ much from those of *H. latifolium* at the same point of development.

5. **H. trinervium,** *Kunth Enum.* ii. 272; stem somewhat slender, leaves ¼–⅓ in. broad, bracteoles broad-oblong obtuse entire brown not scarious-margined, style 2-fid, nut small black-purple, beak conical pale nearly as long as nut. *Miq. Fl. Ind. Bat.* iii. 332 and *Ill. Fl. Archip. Ind.* 59.

"EAST INDIES" (*Herb. Willdenow*).

Altogether slenderer than *H. latifolium*, to which Boeckeler refers it as a weak example.—*Stem* 16 in.; cauline leaves 1 or 2 remote. *Panicle* 1–1½ in. diam., with 25 spikes. *Spikes* in fruit scarcely ⅛ in. diam., themselves their glumes (bracteoles) and nuts much smaller than in *H. latifolium*. *Nut* (with its beak) less than $\frac{1}{20}$ in.; beak straw-colrd., densely covered with round red glands.

6. **H. proliferum,** *Boeck. in Linnæa*, xxxvii. 126; stem somewhat slender, leaves ¼–⅓ in. broad, bracteoles oblong-obovate brown upper margin conspicuously white-scarious lacerate, style 2-fid, nut small dusky brown, beak conical dusky brown rather shorter than nut.

SINGAPORE; *Wichura, Ridley.*—DISTRIB. Borneo.

Rhizome woody, obliquely descending (not "proliferous-branched" as described by Boeckeler). *Stem* 16 in., cauline leaves 1 or 2 remote. *Panicle* 1-1½ in. diam., with 20 spikes. Young *spikelets* ⅛ by $\frac{1}{20}$ in., cylindric, glistening white (broad scarious margins of bracteoles covering up the brown bases). *Spikelets* in fruit ¼ diam., subglobose. *Nut* ovoid, scarcely $\frac{1}{20}$ in. long, nearly smooth.—Very like *H. trinervium*, except as to the conspicuously scarious bracteoles.

7. **H. longirostre,** *Thw. Enum.* 346; stem 12–20 in., corymb rigid, bracteoles hard subacute, one (or more) squamella often interposed between the two basal male squamellæ and pistil, style 2-fid, beak longer than nut conic acute pale not grooved. *Kurz in Journ. As. Soc. Beng.* xxxviii. pt. ii. 75; *Boeck. in Linnæa*, xxxvii. 128. H. latifolium γ minor, *Kurz l. c.* 74 (*partly, not of L. C. Rich.*).

CEYLON; *Thwaites* (C.P. 3468.)

Stolons long, slender, clothed by small red-brown scales, hardening into a

woody horizontal rhizome. *Stem* trigonous, nearly smooth, with few leaves upwards. *Leaves* often as long as stem, ½ in. broad, gradually narrowed at both ends; margins scabrous. *Corymb* 1½ in. diam., with 12–20 spikes; bracts often 6 in., resembling the leaves. *Spikes* ¼ in., ellipsoid, dirty straw-colrd. *Bracteoles* (glumes) ovate, striate, falling with nuts. Lateral third *glume* to spikelet monandrous or sterile. *Nut* scarcely $\frac{1}{10}$ in., subglobose, olivaceous, wrinkled.

22. THORACOSTACHYUM, *Kurz.*

Leaves flat, 3-nerved, narrowed gradually at each end. *Spikes* panicled, branches rigid; bracts long, like the leaves. *Spikelets* small, with usually 4 glumes (of which lowest sometimes monandrous) interposed between the two opposite navicular basal male fl. and the terminal pistil. *Style* 3-fid. *Nut* osseous, shining; beak conic acute (not seen in *T. hypolytroides*).—Species 5, in Ceylon, Seychelles, Malaya, Australia.

1. **T. bancanum,** *Kurz* in *Tydsch. Nat. Vereen. Ned. Ind.* xxvii. 286, and in *Bot. Zeit.* xxiii. (1865), 204 (*Thoracostachys, name only*) and *in Journ. As. Soc. Beng.* xxxviii. pt. ii. 76; stem 1½–3 ft., corymb rigid, spikes short ellipsoid, style 3-fid, nut shining testaceous with 3 longitudinal grooves in its conical top. Lepironia bancana, *Miq. Fl. Ind. Bat. Suppl.* 604 and *Ill. Fl. Archip. Ind.* 63. Hypolytrum borneense, *Kurz in Journ. As. Soc. Beng.* xxxviii. pt. ii. 74; *Miq. Ill. Fl. Archip. Ind.* 59. Mapania bancana, *Benth. & Hook. f. Gen. Pl.* iii. 1055.—Hypolytrum, *Wall. Cat.* 3401, 3404 E.—Cyperus, *Wall. Cat.* 3371 B (*partly*).

SINGAPORE; *Wallich, Ridley.* MALACCA; *Griffith* (*Kew Distrib.* 6273).—DISTRIB. Malaya.

Stolons slender, hardening into a woody *rhizome*. *Stem* scabrous at top, remotely (or not) leaf-bearing upwards. *Leaves* often as long as stem, ⅜ in. broad; margins (at least near tips) scabrous. *Corymb* 1–2 in. diam., with sometimes 50 spikes; bracts often 6 in., leaf-like. *Spikes* ¼ in. diam., ultimately ½ in., beaks of persistent nuts spreading on all sides. *Bracteoles* hardly $\frac{1}{10}$ in., ovate, obtuse, striate, horny. *Nut* about $\frac{1}{10}$ in., beak none, or rather completely fused with nut; grooves very narrowly spathulate.

Var. *longispica*; spikes ½ in. oblong smutted, nuts perfect—Malacca; *Griffith, Kew Distrib.* n. 6357).—The abnormal elongation of the spikes is supposed due to the *Ustilago*.

2. **T. hypolytroides,** *C. B. Clarke*; very large, panicle large decompound with 800 spikes, glumes (bracteoles) membranous elliptic, 4 glumes intercalated between two basal male fl. and pistil, style 3-fid. Hypolytrum Pandanophyllum and Pandanophyllum hypolytroides, *F. Muell. Fragm.* ix. 16. Mapania hypolytroides, *Benth. Fl. Austral.* vii. 341. M. Pandanophyllum, *Schum. & Hollr. Kaiser Wilhelms Land*, 25.

MALAY PENINSULA; Johore, *Ridley* n. 4093.—DISTRIB. N. Guinea, Queensland.

Stem 3–5 ft. *Bracts* 32 by 1 in., 3-nerved. *Panicle* 12 by 8 in. *Spikes* solitary ⅜ in., cuboid-ellipsoid, of very many spikelets.

23. MAPANIA, *Aubl.*

Stem very short; inflorescence congested on scapes. *Leaves* long, often tough and coarse. *Spikelet* of 6 (or 5) glumes besides the bracteole, viz. two lowest boat-shaped, opposite, monandrous; third (on the anterior side of spikelet) plane-concave, not keeled, thin, sterile or monandrous; three

upper as though in a whorl, narrow-oblong, thin, empty. *Style* continuous with ovary, persistent; branches 3, long. *Nut* osseous, small or large, dry or succulent, beaked or obtuse.—Species 33, Tropical, cosmopolitan.

Sect. I. HALOSTEMMA (Genus), *Wall. ex Benth. in Gen. Pl.* iii. 1070 (*by a misreading of bad lithography*). *Leaves* long narrowed at both ends. *Lateral scape* long or short. *Spikes* capitate in a single head, distinct, of many spikelets; bracts shorter than spikes. *Spikelets* often ¼ in. *Nut* dry, buried in the chaffy bracteoles and glumes; beak small conic, or hardly any.

1. **M. silhetensis,** *C. B. Clarke*; scape 1–2 ft. smooth upwards with 1–6 spikes, leaves often 1 in. broad scarcely scabrous on the keel beneath, bracteoles ½ in. 3–5-striate, style 3-fid, nut ovoid much narrowed at base almost stalked. Pandanophyllum palustre β silhetana, *Kurz in Journ. As. Soc. Beng.* xxxviii. pt. ii. 79 (*partly.*)—Cyperacea, *Wall. Cat.* n. 4474.

UPPER ASSAM; alt. 300 ft, *Jenkins, C. B. Clarke.* SYLHET; *Wallich.*

Rhizome long, nearly ½ in. diam. *Leaves* 1–3 ft., margins scabrous. *Scape* robust, sheathed at base by some horny scales, naked upwards. *Spikes* ¾ in., ellipsoid; bracteoles ½ in., chaffy, elliptic-oblong, dirty straw-colour, persistent. *Squamellæ* and glumes linear-oblong, nearly as long as bracteoles; 3rd lateral glume sterile. *Style* long, slender, branches 3 long. *Nut* ⅛ in., ashy black; beak very small, fused with nut.

2. **M. palustris,** *Benth. in Gen. Pl.* iii. 1070; scape 1–2 ft. glandular-scabrous upwards with 10–50 spikes, leaves often 1½ in. broad acutely scabrous on keel beneath, bracteoles ½ in. lacerate at top often sub-bifid, style 3-fid, nut ovoid little narrowed at base. Pandanophyllum palustre, *Boeck. in Linnæa*, xxxvii. 138; *Kurz in Journ. As. Soc. Beng.* xxxviii. part 2, 78 (var. malesica) (*not of Hassk.*). Lepironia palustris, *Miq. Ill. Fl. Archip. Ind.* 63, t. 25.

SINGAPORE; *Ridley.*—DISTRIB. Malaya.

Rhizome long, nearly ½ in. diam. *Leaves* 3–4 ft., margins scabrous. *Scape* robust, sheathed at base by some horny scales. *Heads* 1½–2 in. diam. *Spikes* ½ in. ellipsoid, bracteoles chaffy, persistent. *Squamellæ* and glumes linear-oblong, nearly as long as bracteoles, 3rd lateral glume sterile. *Nut* ⅛ in., ashy-black, beak small conic.—*Pandanophyllum palustre*, Hassk. (in Tydsch. Nat. Vereen. Ned. Ind. x. 119, 297) had a bifid style and 3–5 spikelets, so that it cannot be present plant (according to a specimen in the British Museum from Teysmann it was *Cephaloscirpus*, Kurz, with which the *general* description of Hasskark coincides).

3. **M. Kurzii,** *C. B. Clarke*; scape 4–16 in. smooth upwards with 1–15 spikes, leaves 1 in. broad aculeate on keel beneath, bracteoles ⅔ in. strongly 13-striate reddish-brown.

MALACCA; *Griffith* (*Kew Distrib.* 6356). PERAK; alt. 1750 ft., *King.* PENANG, on Government Hill, alt. 1750 ft., *Maingay, King.*

Rhizome thick. *Leaves* densely equitant, very rigid, harsh, as of a Pandanus; tips long attenuate, trigonous, aculeate. *Inflorescence* 1 in diam., rigid; bracts short, ovate, brown. *Spikes* ¼ in., ellipsoid, brown. *Bracteoles* ovate, obtuse, rigid, incurved, entire at apex. *Squamellæ* nearly as long as bracteole, brown. *Nut* not seen.—Closely allied to *M. palustris*; spikes and spikelets rather smaller.

4. **M. andamanica,** *C. B. Clarke*; scape 4–12 in. smooth upwards, leaves broad almost flaccid smooth on keel beneath, bracteoles ⅔ in.

slenderly striate pale brown. Pandanophyllum zeylanicum, *Kurz in Journ. As. Soc. Beng.* xxxviii. part ii. 80 (*partly*).

ANDAMAN ISLDS.; *Helfer* (*Kew Distrib.* 6298), *Kurz.*

Stolon long, rather slender, covered by ovate striate lax scales. *Scales* at base of *culm* up to 2 in., very lax, striate, pale brown, with an ovate-oblong limb on one side sometimes nearly 1 in. long. *Leaves* much softer than in *M. Kurzii*; margins remotely scabrous or almost smooth. *Infl.* of *M. Kurzii*, but much less rigid; bracteoles loosely imbricate. *Nut* not seen.—Closely allied to *M. palustris.*

5. **M. multispicata,** *C. B. Clarke*; scape 6 in. with head of 10–50 spikes, leaves 3–4 ft. by ½–⅔ in. margins strongly scabrous cutting, bracteoles ½ in. dark-brown, nut very small obovoid. Pandanophyllum humile, *Zoll. Verz. Ind. Archip.* ii. 61; *Miq. Fl. Ind. Bat.* iii. 334 (*not of Hassk.*). Hypolytrum compactum? *Moritzi Verz. Zoll. Pfl.* 98. H. humile, *Boeck. in Linnæa*, xxxvii. 128 (*mainly*).

SINGAPORE; *Ridley.*—DISTRIB. Java.

Head very much smaller than in the preceding species, about ½ in. diam. when young. The species appears more allied to Sect. *Pandanophyllum*, but the spikes are distinct in the head.

Sect. III. PANDANOPHYLLUM (Genus), *Hassk. in Tydsch. Nat. Vereen. Ned. Ind.* x. 118 (*partly*). *Stem* very short, leaves long. Lateral *scapes* short or longish. *Inflorescence* (a corymb) congested into one ovoid or oblong head [a second head rarely added in *M. longa*]; bracts shorter or little longer than spikes. *Spikes* of few (sometimes 1) spikelets; upper bracts passing into bracteoles. *Nut* as in sect. *Halostemma.*

* *Leaves gradually narrowed at base and apex.*

6. **M. Wallichii,** *C. B. Clarke*; scape 4–6 in. stout covered for ⅓ its length with scales, inflorescence a dense head 1–1½ in., ovoid or ellipsoid, partial spikes all containing one spikelet only. Pand. palustre ("*inflorescentiâ juveni*" contained ripe nuts), *Kurz in Journ. As. Soc. Beng.* xxxviii. pt. ii. 79 (*not of Hassk.*).—*Wall. Cat.* 3541.

SINGAPORE, *Wallich.*—DISTRIB. Borneo.

Leaves equitant, up to 3 ft. by ⅔ in., margins aculeolate. *Bracts* ovate-oblong, obtuse, thick, shorter than infl. *Bracteoles* ½ in., elliptic, obtuse, chaffy, tough. *Squamellæ* and glumes a little shorter than bracteole, narrow-oblong. *Nut* ⅓ in., ovoid, ashy-black, beak hardly any.

7. **M. zeylanica,** *Benth. in Gen. Pl.* iii. 1056; scapes 4–12 in. with few scales close to base, leaves aculeate on margin to base, mature infl. broad ovoid more or less compound, i.e. basal spikes containing several spikelets, upper spikes with one spikelet. Pand. zeylanicum, *Thw. Enum.* 345; *Kurz in Journ. As. Soc. Beng.* xxxviii., pt. ii. 80 (excl. Andaman sp.); *Boeck. in Linnæa*, xxxvii. 138. Lepironia ceylanica, *Miq. Ill. Fl. Archip. Ind.* 61, t. 22 (*spikes very young*).

CEYLON, *Thw.*, C.P. 3029. E. IND. PENINS., *Rottler.*—DISTRIB. Borneo.

Resembles *M. Wallichii*, but spike shorter more compound. *Leaves* 2–3 ft. by ¾ in., aculeate on keel beneath, long-attenuate linear, margins aculeolate. *Infl.* in frt. rather more than ½ in. diam. *Spikelets*, glumes, and nut, as in *M. Wallichii. Style* 3-fid and nut subglobose; or (Boeckeler) 2-fid.

8. **M. immersa,** *Benth. in Gen. Pl.* iii. 1056; scapes 1–2½ in. clothed throughout by lanceolate leaf-like scales, leaves (except tip) only slightly

scabrous, infl. ovoid partial spikes rarely containing more than one spikelet. Pand. immersum, *Thw. Enum.* 433; *Kurz in Journ. As. Soc. Beng.* xxxviii., pt. ii. 83.

CEYLON, *Thwaites* (C.P. 3819).

Leaves numerous, equitant, 2½ ft. by ⅜ in., tip caudate. Upper *scales* of scape up to 1–2½ in. long, linear-lanceolate; lower bracts similar to upper scales often overtopping infl.; upper bracts shorter, lanceolate, passing into bracteoles. Partial (lateral) *spikes*, all (or nearly) of one spikelet. *Nut* nearly as in *M. zeylanica*, but more narrowed at base (shortly stalked).

9. **M. tenuiscapa,** *C. B. Clarke*; scapes 4–6 in. very slender with scales only close to base, leaves narrow margins aculeate nearly throughout, infl. in fruit ovoid more or less compound, i.e. basal partial spikes containing more than one spikelet. Pand. Miquelianum, *Kurz in Journ. As. Soc. Beng.* xxxviii., pt. ii. 81 (*partly*). P. angustifolium (sp.), *Kurz ms.* (correcting himself).

MALACCA, *Griffith* (*Kew Distrib.* 6299). JOHORE, *Ridley*.—DISTRIB. Sumatra.

Similar to *M. zeylanica*, but infl. and spikes smaller. *Leaves* numerous, equitant, up to 2½ ft. by ⅖ in., long attenuate at both ends, aculeate on midrib beneath. *Inflorescence* (in fruit) hardly ½ in. in diam. *Squamellæ* 6, ⅛ in. long, hardly shorter than bracteole. *Nut* as of *M. zeylanica*, or scarcely smaller.

10. **M. longa,** *C. B. Clarke*; scapes 10–25 in., naked except close to base, leaves elongate, infl. of 1 (rarely 2) large ovoid head, partial spikes rarely containing more than one spikelet.

SINGAPORE, *Ridley*.—DISTRIB. Borneo.

Leaves 3 ft. by ¾ in., tip attenuate, margins aculeate nearly throughout, keel beneath smooth except towards tip. *Infl.* in fruit ¾ by ½ in.; bracts much shorter than infl. *Nut* ⅛–¼ in., obovoid, beak short.—Perhaps better referred to Sect. *Halostemma*.

** *Leaves broad, suddenly narrowed at base into a quasi-petiole, at top into a linear tail.*

11. **M. humilis,** *Naves & Villar in Blanco Fl. Filip. Append.* 309; scapes 2–5 in. clothed by scales at base, leaves 1–1½ in. broad, infl. of one head ⅜–1 in. M. lucida, *N. E. Br. in Illustr. Hortic.* xxxii. 77, t. 557. Pand. humile, *Hassk. in Tydsch. Nat. Vereen. Ned. Ind.* x. 119; *Kurz in Journ. As. Soc. Beng.* xxxviii., pt. ii. 82. P. Zippelianum, *Kurz in Tydsch. Nat. Vereen.* xxvii. 126, *& in Bot. Zeit.* xxiii. 204. P. Wendlandi, *Gard. Chron.* xxi. [1884] 711. Lepironia cuspidata, *Miq. Fl. Ind. Bat. Suppl.* 603. L. humilis, *Miq. Ill. Fl. Archip. Ind.* 61, t. 23.

PENANG, *Curtis*. PERAK, *King*. MALACCA, *Griffith* (*Kew Distrib.* 6300), *Hervey*. SINGAPORE, *Ridley*.—DISTRIB. Malaya.

Rhizome short, woody, obliquely descending, passing upwards into a short stem terminated by a crown of densely equitant leaves; from the apex of rhizome lateral ascending shoots break out. *Leaves* 1½–3 ft., 3-nerved, aculeate on margins and on keel beneath at least at top; quasi-petiole 2–12 in., dilated at base. *Scapes* axillary in the lower leaves, rather stout, smooth trigonous upwards; basal scales ovate-lanceolate, hard, striate, green with brown-scarious margins. *Infl.* young, oblong, mature ovoid; bracts shorter than head, similar to scales at base of scape. Lower partial *spikes* nearly always compound, i.e. containing a few spikelets; bracteoles ¼ in., ovate, obtuse, striate. *Squamellæ* 6, hardly shorter than bracteole, linear, brownish. *Anthers* linear-oblong, yellow, not crested. *Style* long; branches 3. *Nut* ⅛ in., ellipsoid, sessile, dusky-black; style-base (in pistil and in half-ripe nut) conical, beak-like, in ripe nut nearly completely absorbed.

24. SCIRPODENDRON, *Kurz.*

Stem stout, with nodes upward, terminating in an oblong panicle. Basal *leaves* very long, narrowed at both ends. *Spikes* clustered, ellipsoid, of many spikelets. *Spikelets* of 8–11 glumes beside the bracteole, viz. 2 lowest boat-shaped, opposite, monandrous; 3 uppermost quasi-whorled, narrow-oblong, thin, empty; 3–6 intermediate, monandrous, or sterile. *Style* long linear, branches 3, base continuous with ovary. *Nut* large, osseous, coarsely 6- (or more-) ribbed longitudinally, dusky-black, obtuse.

S. costatum, *Kurz in Journ. As. Soc. Beng.* xxxviii., pt. ii. 85; basal leaves 3–8 ft. by 1 in., narrowed gradually at both ends aculeate on margins and midrib beneath upwards. *Benth. Fl. Austral.* vii. 341; *Goebel in Ann. Jard. Bot. Buitenz* vii. 122, t. 14, fig. 1–11. S. sulcatum, *Miq. Ill. Fl. Archip. Ind.* 65, t. 28. Hypolytrum costatum, *Thw. Enum.* 346. Pand. costatum, *Kurz in Journ. As. Soc. Beng.* xxxviii., pt. ii. 85, *in Obs.* Scleria macrocarpa, *Wall. Cat.* 3538.

CEYLON, *Kœnig, Trimen.* PENANG and SINGAPORE, *Wallich.* MALACCA, *Griffith* (*Kew Distrib.* n. 6134).—DISTRIB. Java, Austral., Samoa.

Rhizome woody. *Stem* 1–2 ft., at top $\frac{1}{5}$ in. in diam. trigonous, smooth. *Panicle* 4–6 in. long; branches clustered, thick, short; lower bracts leaf-like, upper very short. *Spikes* $\frac{2}{3}$ in. long; spikelets $\frac{1}{4}$–$\frac{1}{3}$ in.; bracteole (outermost glume) as long as spikelet, ovate, obtuse, striate, chaffy, dirty straw-colrd. *Squamellæ*, two outer not much shorter than bracteole, hairy on keel; inner narrower, rather shorter. *Nut* $\frac{2}{5}$ in. long, $\frac{1}{3}$ in. in diam., woody, with succulent epicarp (eaten in Samoa by natives).

25. LEPIRONIA, *L. C. Rich.*

Stem long, simple, leafless except a few scales at base. *Spike* (apparently) simple, lateral, oblong-ellipsoid, of many spikelets. *Spikelets* of 8–11 glumes beside the bracteole, viz. 2 lowest boat-shaped, opposite, monandrous; 3 uppermost quasi-whorled, narrow-oblong, thin, empty; 3–6 intermediate, monandrous or sterile. *Style* rather short, linear, branches 2, linear. *Nut* ellipsoid, much compressed, acutely keeled on margins, smooth dry.

L. mucronata, *L. C. Rich. in Pers. Syn.* i. 70; stem 1½–3 ft., terete, lower bract as though a continuation of stem. *Miq. Ill. Fl. Archip. Ind.* 60, t. 20; *Thw. Enum.* 346; *Kurz in Journ. As. Soc. Beng.* xxxviii., pt. ii. 77; *Boeck. in Linnæa*, xxxvii. 140; *Goebel in Ann. Jard. Bot. Buitenz.* vii. 126, t. 14, fig. 12, 13. Scirpus coniferus, *Poir. Encyc.* vi. 756, and *Suppl.* v. 90. Restio articulatus, *Retz. Obs.* iv. 14. Chondrachne articulata, *Br. Prodr.* 220. Choricarpa aphylla, *Boeck. in Flora*, xli. 20.

MALACCA, *Gaudichaud, Griffith.* SINGAPORE, *Lobb.* CEYLON, *Thwaites*, &c.—DISTRIB. Madagascar, Malaya, Queensland, Viti (China cult. only, fide *Hance*).

Rhizome horizontal, woody, clothed by ovate subacute striate ferruginous scales. *Stems* approximate, $\frac{1}{3}$ in. in diam., when dry apparently transversely septate; scales often covering base of stem for 4–8 in.; uppermost produced on one side, lanceolate not green. *Spike* usually ½–1 in. long, occasionally much larger, brown or chestnut, lowest bract often 1–2 in. *Bracteoles* (apparently flower-glumes) spirally imbricated, $\frac{1}{3}$ in., ovate, obtuse, rigid, not striate, ultimately deciduous with nut. Two outer *squamellæ* scarcely shorter than glume, hairy on keel. *Nut* $\frac{1}{3}$–$\frac{1}{2}$ in, obscurely longitudinally striate; linear style-base persistent.

26. SCLERIA, *Berg.*

Perennial or annual. *Stems* erect, leaf-bearing. *Leaves* narrow, sub-3-nerved, often serrate cutting severely; base sheathing. *Panicle* often stout, elongate, compound, sometimes narrow or reduced nearly to a spike; primary bracts leaf-like, secondary narrow often setaceous. *Flowers* all unisexual. *Spikelets* unisexual, rarely bisexual; bisexual spikelet with one fem. fl. below, and a few males above; fem. spikelet similar, but upper male portion reduced to a small rudiment pressed laterally against the nut or occasionally 0 (when the fem. fl. appears terminal). *Glumes* usually 2–4 empty below the fem. glume, or in the male spikelets 2 below the male glumes; fem. glume concave, margins not united at base round the pistil. *Stamens* 3–1; anthers linear-oblong, often mucronate. *Nut* osseous, often shining; style linear, not dilated at base, deciduous; branches 3, linear. *Gynophore* usually prominent under the nut, apex dilated, often into a 3-toothed saucer.—Species 150, in moist warm countries.

Subgenus I. HYPOPORUM (Genus), *Nees in Linnæa*, ix. 303, *character widened.* Bisexual spikelets many.

1. **S. pergracilis,** *Kunth Enum.* ii. 354; very slender, nearly glabrous, roots fibrous, spikelets clustered on a linear interrupted spike, style 3-fid, nut white tubercled fenestrate, disc obsolete. *Strachey Cat. Pl. Kumaon*, 73; *Thw. Enum.* 354; *Boeck. in Linnæa*, xxxviii. 438. Hypoporum gracile, *Nees in Edinb. Phil. Journ.* xvii., p. 267, and *in Wight Contrib.* p. 118.—Scleria, *Wall. Cat.* 3406.

Widely scattered from GURWHAL, alt. 5600 ft., *Duthie*, to SYLHET, *Wallich.* BEHAR, *Kurz.* CHOTA NAGPORE, *T. Anderson.* DECCAN PENINSULA, *Wight.* CEYLON, *Thwaites.*—DISTRIB. Trop. Africa.

Stem 10–20 in. *Leaves* 4–10 by $\frac{1}{8}$ in. *Spike* 2–6 in.; clusters (of 2–5 spikelets) $\frac{1}{3}$–$\frac{2}{3}$ in. apart; bract ovate-lanceolate, hardly longer than clusters. Bisexual *spikelets* scarcely $\frac{1}{6}$ in., numerous, terminal, with sometimes a male spikelet close beneath. *Fem. glume* boat-shaped, ovate-lanceolate, greenish; glume below it similar, sub-opposite; superior male glumes thinner, brownish, more obtuse, not keeled. *Nut* $\frac{1}{20}$ in. in diam., ovoid, trigonous, base narrow trigonous.—Dr. Trimen writes: "The lemon-scented leaves are used to drive away mosquitoes."

2. **S. lithosperma,** *Sw. Prodr.* 18, and *Fl. Ind. Occid.* 92, *in note*; slender or medium, nearly glabrous except the sheaths, rhizome woody, panicle thin straggling, style 3 fid, nut white smooth (except in var. *β*), disc nearly obsolete. *Nees in Wight Contrib.* 117; *Dalz. & Gibs. Bomb. Fl.* 288; *Thw. Enum.* 354; *Boeck. in Linnæa*, xxxviii. 451; *Kurz in Journ. As. Soc.* xlv., pt. ii. 159 (*not Roxb.*). S. tenuis, *Retz. Obs.* iv. 13; *Roxb. Fl. Ind.* iii. 574. S. Wightiana, *Steud. Syn. Cyp.* 176. Scirpus lithospermus, *Linn. Sp. Pl.* [ed. 1] 51. Schœnus lithospermus, *Linn. Sp. Pl.* [ed. 2], 65. Olyra orientalis, *Lour. Fl. Cochinch.* ii. 674. Hypoporum lithospermum, *Nees in Mart. Fl. Bras. Cyp.* 172.—Scleria, *Wall. Cat.* 3417, 3418, 3419.—*Rheede Hort. Mal.* xii. t. 48.

Throughout INDIA (except the West arid area), alt. 0–3000 ft, common, from SIKKIM to CEYLON and MALACCA. ANDAMANS and NICOBARS, *Kurz.*—DISTRIB. All warm regions except Continental Africa.

Rhizome elongate, horizontal. *Stems* 1½–3 ft., not tufted. *Leaves* 6–12 by $\frac{1}{4}$ in.; sheaths usually hairy. *Panicle* (fully developed) a ft., distant primary branches 4 in., ascending, again divided; but often very thin with few spikelets.

Spikelets much clustered, many bisexual $\frac{1}{8}$ in. long, nearly smooth and glabrous, very similar to those of *S. pergracilis* but larger. *Nut* $\frac{1}{10}$ in. long (sometimes much smaller) ellipsoid, trigonous, base narrow trigonous.

Var. β (*Roxburghii*), Thw. Enum. 354; rather stouter, nut rather larger with pyramidal subacute apex, transversely wrinkled by ferruginous glands (at least when young). Hypoporum Roxburghii, *Nees ms.*—Ceylon, *Thwaites*; Deccan Peninsula, *Wight.*—Partial panicles much more rigid, subpyramidal, clusters of spikelets more numerous and dense.—This might be esteemed a species, but too much regard must not be paid to the reticulation or wrinkling of the nut in *Scleria*, which arises from irregularities in drying, &c. The outer cells of the nut in *Scleria* are *in every species* small, quadrate-hexagonal, obscure.

3. **S. corymbosa,** *Roxb. Fl. Ind.* iii. 574; robust, coarse, nearly glabrous, panicle long copious of several compoundedly-corymbose axillary partial panicles, style 3-fid, nut white, smooth, disc very small. S. androgyna, *Nees in Linnæa*, ix. 303, & *Wight Contrib.* 117; *Thw. Enum.* 353; *Boeck. in Linnæa*, xxxviii. 536. S. majus, *Moon Cat. Pl. Ceyl.* 62. S. corymbifera, *Boeck. l. c.* 537.—Scleria, *Wall. Cat.* 3412.

Warm moist region, sparsely scattered from KHASIA TERAI, *J.D.H.*, to CEYLON, *Thwaites*, and MALACCA, *Griffith.*

Rhizome horizontal, often $\frac{1}{2}$ in. in diam., clothed with brown scales. *Stems* 3–8 ft., stout; sheaths triquetrous, not winged. *Leaves* 20 by 1 in.; margins scabrous. *Infl.* 1–2 ft. by 4–6 in.; lower peduncles exserted 1–4 in., rigid. *Spikelets* $\frac{1}{5}$ in. long, nearly all bisexual, clustered and solitary, usually brown or straw-colrd., sometimes more or less chestnut-colrd., constructed nearly as in *S. lithosperma* but stouter; stamens often 3. *Nut* nearly $\frac{1}{8}$ in. long, ellipsoid, subtrigonous, much narrowed at base. *Disc* slightly dilated, scarcely 3-lobed, yellow-brown; margin (inner disc of authors) very short, subtriangular, glandular, often dark red.

4. **S. Ridleyi,** *C. B. Clarke*; slender, nearly glabrous, panicle of few small very distant axillary corymbs, style 3-fid, nut white smooth apiculate, disc very small.

SINGAPORE; Pulau Buru, *Ridley* (n. 1641).—DISTRIB. Hongkong.

Rhizome horizontal, $\frac{1}{8}$ in. in diam., clothed by small ovate striate dark-red scales. *Stem* 2 ft., $\frac{1}{10}$ in. in diam., triquetrous, scabrous; sheaths very narrowly winged; ligule almost truncate, margin narrow scarious hardly hairy. *Leaves* 12 by $\frac{1}{4}$ in. Partial *panicles* scarcely 1 in. in diam., lowest 4–8 in. from the next, with about 8–20 spikelets. Nut-bearing *spikelets* usually with male fl. at top, other male spikelets also added. *Nut* (rather more pointed) and disc as in *S. corymbosa*, Roxb., to which Boeckeler has referred it and which is the true affinity; but the difference in stoutness, stem-leaves, and panicle is very great.

Subgenus II. SCLERIA *proper.* Bisexual spikelets none or few.

Sect. I. TESSELLATÆ. Slender (sometimes tall) plants. *Roots* fibrous, or the rhizome very short not thick. *Leaves* not caudate-setaceous at tip. *Panicle* narrow, the lower axillary panicles often remote, reduced to spikes, sometimes very short.

* *Nut tessellated.*

5. **S. tessellata,** *Willd. Sp. Pl.* iv. 315 (*excl. cit. Rumph.*); slender sometimes tall, hairy or glabrate, roots fibrous, panicle elongate thin lower branches remote, style 3-fid, nut tessellate, lobes of disc-margin short ovate erect thin pale. *Nees in Wight Contrib.* 118; *Thw. Enum.* p. 354 (var. β *only*); *Boeck. in Linnæa*, xxxviii. 470. S. propinqua &

parvula, *Steud. Syn. Cyp.* 169, 174. S. uliginosa, *Boeck. l. c.* 471.—Scleria, *Wall. Cat.* 3405 A.

Throughout INDIA (except the West arid area), alt. 0–8000 ft., frequent; from NEPAL and MUNEYPOOR to CEYLON and PEGU.—DISTRIB. Malaya, China, Japan, Austral.

Roots often black-red. *Stems* 1–2 ft. *Leaves* 4–10 by scarcely ¼ in., lanceolate, subobtuse (not acutely setaceous) at tip, hardly scabrous, with white hairs or glabrate; sheaths conspicuously winged or not. *Panicle* commonly straggling, lower partial panicles on peduncles 0–5 in., narrow or condensed 1–2 in. long, but sometimes evolute more rigid subpyramidal. *Fem. spikelets* ⅛ in. long, ferruginous-green, glabrous. *Nut* scarcely $\frac{1}{12}$ in. in diam., at first white, the raised reticulations covered with minute ferruginous hairs, at last often nearly smooth shining white shallowly reticulated. *Disc* small, salver-shaped, 3 lobes of margin triangular (rarely lanceolate) reaching to ⅛–¼ height of nut.

6. **S. biflora,** *Roxb. Fl. Ind.* iii. 573; slender, nearly glabrate, roots fibrous, panicle elongate thin lower branches remote, style 3-fid, nut tessellate, lobes of disc-margin lanceolate acute or subulate erect stout ferruginous-brown. S. Steudeliana, *Miq. Fl. Ind. Bat.* iii. 344; *Boeck. in Linnæa*, xxviii. 475. S. tessellata, *Benth. Fl. Hongk.* 399; *Thw. Enum.* 354, *a* (*not β*); *Kunth Enum.* ii. 343 (*partly*).—Scleria, *Wall. Cat.* 3405 B.

LOWER BENGAL, *Wallich*; Calcutta, *C. B. Clarke*; Mudhopoor Jungle, *C. B. Clarke.* CACHAR, *Keenan.* CEYLON, *Walker.*—DISTRIB. Malaya, S. China.

Usually glabrous except the (so-called) ligule of leaf. *Fem. glume* scabrid on its keel upwards, or smooth. Lobes of *disc*-margin reaching to ⅓–½ height of nut.—This may be regarded as a var. of *S. tessellata* (which it altogether resembles), only differing in the lobes of the disc-margin.

7. **S. Stocksiana,** *Boeck. in Linnæa*, xxxviii. 474; nearly glabrous, panicle elongate thin lower branches remote, style 3-fid, nut tessellate, lobes of disc-margin short ovate ferruginous their edges reflexed auriculate. S. tessellata (*part*), *Herb. Ind. Or. Hook. f. & T.*

BOMBAY, *Law.*

The examples show only panicles, without leaves or roots. *Nut* rather larger and more glabrous than of *S. tessellata*. *Disc* dark red, glandular.—May have a horizontal rhizome, and be more nearly allied to *S. junciformis*.

** *Nut smooth or very obscurely reticulated.*

8. **S. annularis,** *Kunth Enum.* ii. 359; slightly hairy, rhizome 0, panicles axillary remote oblong rigid, style 3-fid, nut ovoid stoney-white, disc-margin truncate. *Boeck. in Linnæa*, xxxviii. 456. Hypoporum annulare, *Nees ms.* (*fide Kunth*).

N.-WEST INDIA, *Royle.* BENGAL, *Griffith.* CENTRAL INDIA; Chunda, *Duthie.* MALABAR, *Law.*—DISTRIB. China.

Roots fibrous, dark-red. *Stems* 1–2 ft., slender or medium; sheaths 3-winged, hairy or glabrous. *Leaves* 4–8 by ¼ in., lanceolate, tip subobtuse. *Panicles* axillary, often 1 by ⅓ in., subspicate, secondary bracts conspicuously exsert. *Spikelets* glabrous, very like those of *S. tessellata*. *Nut* $\frac{1}{16}$ in., not apiculate, very smooth. *Disc* obconic, as long as contracted nut-base, smooth, chestnut or reddish.—A well-marked species, externally very like *S. tessellata*.

9. **S. zeylanica,** *Poir. Encycl.* vii. 3 (excl. Madagasc.); slender, nearly glabrous or thinly hairy, rhizome hardly any, panicles axillary distant small, fem. glumes glabrous, style 3-fid, nut small (mature) white

smooth or obscurely reticulate, disc-margin subentire. *Nees in Wight Contrib.* p. 118. S. ceylanica, *Kunth Enum.* ii. 358; *Thw. Enum.* 435. S. Thwaitesiana, *Boeck. in Linnæa*, xxxviii. 454. S. lateriflora, *Boeck. l. c.* 455; *Kurz in Journ. As. Soc.* xlv., pt. 2, 159. S. hebecarpa, *Thw. Enum.* p. 354, 435.

TENASSERIM, *Helfer.* NICOBARS, *Kurz.* CEYLON, *Thwaites.*—DISTRIB. Borneo.

Stems 1 ft., connected at base on a very short slender lignescent rhizome *Leaves* with scattered slender needle-white hairs or glabrescent, tip lanceolate subobtuse (not setaceous-caudate). *Spikelets* small, as of *S. tessellata*. *Nut* scarcely $\frac{1}{16}$ in. in diam., dried young reticulate, mature osseous smooth or nearly so. *Disc*-margin coloured, glandulose, not (or obscurely) 3-lobed.—*S. laxa*, R. Br., hardly differs but by its strictly fibrous roots.

10. **S. flaccida,** *C. B. Clarke (non Steud.)*; slender, softly hairy all over, roots fibrous, panicles axillary small distant, fem. glumes hairy, style 3-fid, nut small ovoid smooth white, disc-margin subentire coloured glandular.

ASSAM (in Seebsagur), *C. B. Clarke.* PEGU, *Kurz.*

Stems flaccid, 1–2 ft. *Leaves* $\frac{1}{4}$ in. broad, lanceolate, subobtuse at tip. *Panicles* axillary, $\frac{1}{2}$ in. long. *Spikelets* small, all unisexual, fem. $\frac{1}{8}$ in. long usually containing the depauperated sterile apex of the spikelet as a lateral compressed rudiment (of two glumes) about $\frac{2}{3}$ length of nut. *Nut* broad, obtuse not apiculate.—Might stand as a var. of the Australian *S. rugosa*, Br., which however has a reticulated subtuberculated nut.

**** Nut smooth, white, fluted longitudinally.*

11. **S. caricina**, *Benth. Fl. Austral.* vii. 426; annual, very slender, nearly smooth and glabrous, panicle of several remote small axillary clusters, fem. glume sub-3-toothed, style 3-fid, nut very small, disc-margin obsolete. S. axillaris, *Moon Cat. Pl. Ceylon*, p. 62. Diplacrum caricinum, *Br. Prodr.* 241; *Endl. Iconogr.* t. 25; *Thw. Enum.* 354; *Boeck. in Linnæa*, xxxviii. 434. D. tridentatum, *Brongn. in Duperr. Voy.* t. 26. D. zeylanicum, *Nees in Wight Contrib.* p. 119. Olyra malaccensis, *Kœnig in Herb. Heyne.—Wall. Cat.* 3540.

INDIA, frequent; from the SIKKIM TERAI and ASSAM to CEYLON and TENASSERIM.—DISTRIB. Malaya, China, Australia.

Roots fibrous, slender. *Stems* 1-12 in., tufted. *Leaves* 2 by $\frac{1}{8}$–$\frac{1}{6}$ in., lanceolate, tip subobtuse; sheaths trigonous, not winged. Primary *bracts* (floral leaves) altogether leaf-like tuft usually of very small subsessile clusters just exserted from their sheaths, but in evolute examples, lower clusters are sometimes paniculate with branches 1 in. long. *Spikelets* all unisexual, fem. $\frac{1}{12}$ in. long with 1 or 2 smaller male spikelets closely applied to its base. *Fem. spikelet*: lowest glume ovate boat-shaped obtuse; 2nd glume (sterile) rather longer, boat-shaped, apex deeply emarginate (from the centre of the emargination the midrib is produced as a linear-triangular point), smooth, 2-ribbed on each side; 3rd glume similar to 2nd and subopposite to it, containing fem. flower; no rudiment of an upper glume. *Nut* scarcely $\frac{1}{30}$ in. in diam.; disc small obpyramidal, margin most minute, white, truncate.—See Goebel in *Ann. Jard. Buit.* vii. 132, t. 15, figs. 21–29, who considers the female flower truly terminal, and therefore places the species among the American *Cryptangieæ*.

***** Nut covered by conical tubercles hairy at their tips.*

12. **S. Neesii,** *Kunth Enum.* ii. 358; small, hairy, rhizome hardly any, panicle of 2–1 distant axillary clusters (in Ceylon one terminal head),

spikelets somewhat large lanceolate hairy, style 3-fid, nut small globose as though softly glochidiate. *Thw. Enum.* 354; *Boeck. in Linnæa*, xxxviii. 449. S. stricta, *Moon. Cat. Pl. Ceyl.* 62. Hypoporum capitatum, *Nees in Linnæa*, ix. 303, & *in Edinb. Phil. Journ.* xvii. 267, & *in Wight Contrib.* 118.

CEYLON, *Macrae*, &c.—DISTRIB. Borneo.

In the Ceylon specimens—*Stems* 4–8 in. *Leaves* lanceolate, tip subobtuse. *Head* globose, of about 12 spikelets. *Spikelets* all unisexual (not a *Hypoporum*), nearly ⅛ in. long, ferrugineous; female glume mucronate. *Nut* about $\frac{1}{10}$ in. *Disc* minute, patent, margin as long as contracted base of nut, pale, truncate scarcely 3-lobed.—The Ceylon specimens (not plentiful) have uniformly small 1-headed specimens, but are a small form of a Borneo plant, which is a foot high with the lower axillary head of spikelets remote.

Sect. 2. *Elatæ*. Robust plants with thick (except in *S. psilorrhiza*) woody horizontal rhizome. Leaves (in many) caudate-setaceous at tip. Partial panicles rigid, often pyramidal. Lobes of disc-margin entire [or slightly digitate in *S. multifoliata*].

* *Sheaths (of middle stem-leaves) winged* (sometimes in *S. elata*, and *S. chinensis* obscurely).

13. **S. hebecarpa,** *Nees in Linnæa*, ix. 303, and *in Wight Contrib.* 117; scarcely robust, slightly hairy (see also var. β), panicle thin scarcely rigid, style 3-fid, nut minutely velvety, lobes of disc-margin lanceolate thin brown concavely applied to nut. *Thw. Enum.* 435; *Boeck. in Linnæa*, xxxviii. 478. S. alata, *Moon Cat. Pl. Ceyl.* 62. S. scrobiculata, *Zoll. Verz. Archip. Ind.* ii. 61 (*not of Nees*). S. stipularis, *Thw. Enum.* 353, 435 (*not of Nees*).—Scleria, *Wall. Cat.* 3415.

Throughout INDIA (except the N.W. arid region), alt. 0–5000 ft., and CEYLON, common.—DISTRIB. Malaya, China, Japan, Australia, Polynesia.

Rhizome ⅛ in. in diam., clothed by ovate striate dark-red scales. *Stems* usually 2–3 ft., occasionally taller; sheaths (or some of them) usually distinctly 3-winged. *Leaves* 1 ft., margins scabrous (cutting) in dried specimens more or less revolute, usually long acuminate, occasionally subobtuse. *Panicle* 1 ft. long, oblong; partial panicles usually thin lax of few spikelets, but sometimes stouter pyramidal, their bracts often much exsert conspicuous, but sometimes short. *Spikelets* all unisexual; fem. ⅛ in., slightly scabrous scarcely hairy; fem. glume mucronate; superior sterile rudiment usually present. *Nut* $\frac{1}{10}$ in. long, ovoid, obscurely trigonous, narrowed at apex, straw-colrd. or brown, nearly always obscurely reticulated, margins of reticulations microscopically brown-hispid, or finally glabrate almost shining. Lobes of *disc* margin as much as ¼–⅓ height of nut.

Var. *pubescens* (sp.), Steud. Syn. Cyp. 168; more hairy, sometimes softly villous. *Benth. Fl. Hongk.* 400. S. vestita, *Boeck. l. c.* xxxviii. 482. S. villosula, *Wall. Cat.* 3414. S. sumatrensis, var. β, *Miq. Fl. Ind. Bat.* iii. 344 (*not of Retz*).—From Sikkim and Assam to Chota Nagpore, Malaya, China.—Leaves often softly villous beneath. Rhachis of panicles very hairy. Spikelets sometimes hairy.

14. **S. Thomsoniana,** *Boeck. in Linnæa*, xxxviii. 479; robust, glabrous (even rhachis of panicle), partial panicles remote narrow slenderly pedunculed, style 3-fid, nut tessellated minutely hairy, lobes of disc-margin very short thickened reflexed yellow-brown. S. khasiana, *Boeck. Cyp. Nov.* ii. 29.—Scleria, sp. 12, *Herb. Ind. Or. H.f. et T. T.*

KHASIA HILLS; on the southern slope, alt. 0–3000 ft., from Chela to Lakhat, *H. f. D. H. & T. T.*, &c. MUNEYPOOR, alt. 2500 ft., *C. B. Clarke.*

Rhizome ¼ in. thick. *Stems* 3 ft.; sheaths broadly 3-winged, sometimes obscurely winged; ligule glabrate or not, rarely densely hairy. *Panicle* often tinged red; lowest peduncle often 6 in. *Spikelets* like those of *S. hebecarpa*; disc margin almost spongy shortly reflexed as three ears.—Most easily distinguished from *S. elata* by the *glabrous* rhachis of the panicles.

15. **S. alta,** *Boeck. in Linnæa,* xxxviii. 485; robust, glabrous (even rhachis of panicle), partial panicles narrow somewhat remote, style 3-fid, nut tessellated minutely hairy, lobes of disc-margin 3 united at base appressed to the nut pale green rounded crenate at summit.

East Bengal; Foot of Khasia Hills, *Griffith, J. D. H. & T. T*; Mudhopoor Jungle, *C. B. Clarke.*

Very near *S. Thomsoniana,* except the lobes of disc-margin; secondary bract longer, more conspicuous.

16. **S. elata,** *Thw. Enum.* 353, *a* (*excl.* C.P. 825); robust, more or less hairy (at least rhachis of panicle), partial panicles distant rigid pyramidal, style 3-fid, nut tessellated minutely hairy, lobes of the disc-margin short obtuse or scarcely obtuse-triangular. *Boeck. in Linnæa,* xxxviii. 487. S. lithosperma, *Roxb. Fl. Ind.* iii. 574 (*not of Willd.*) S. Hasskarliana, *Boeck. in Engler Jahrb.* v. [1884] 511. Diaphora cochinchinensis, *Lour. Fl. Cochinch.* 709.—Scleria, *Wall. Cat.* 3408, A, C.

Throughout India (except the N.W. arid region), alt. 0–2000 ft., and Ceylon.—Distrib. Java, China.

Descr. of Thwaites, C.P. 3030.—*Stem* 3 ft. by ⅛ in. in diam., glabrous. *Leaves* 1–2 ft. by ½ in., tip attenuated, margins scabrous, cutting the hand, when dry recurved; sheath 3-winged, wings broad or narrow, two wings often much broadest; ligule depressed-ovate, hairy. *Panicle* 1 ft. by 4 in.; partial panicles 4 by 3 in., branches rectangularly divaricate, red, hairy. *Spikelets* numerous, all unisexual, male and fem. scattered in all parts of infl.; panicle dense, but spikelets scarcely clustered. *Fem. spikelets* ⅛ in; fem. glume shortly mucronate, glabrous, sterile superior glumes tabescent (generally present). *Nut* ⅛–$\frac{1}{10}$ in., as of *S. hebecarpa,* and similarly becoming glabrate ultimately, white or dusky; lobes of disc-margin scarcely attaining ¼ height of nut, ferruginous or red.—Thwaites says of his *S. elata* "sheaths not winged," whereas Boeckeler puts it in his section having "trialate sheaths." The explanation is that Thwaites described *S. elata* mainly from C.P. n. 825 (which is *S. chinensis,* Kunth, var. *β*), while Boeckeler describes C.P. 3030, which is the very common *S. elata.* Thwaites may, however, have rightly treated this (winged leaf-sheaths) as of small importance.

Var. latior; stouter, stems often 6–9 ft. very thick, sheaths conspicuously winged, panicles large dense, spikelets clustered dusky, nut larger white.—N.E. India, alt. 0–3500 ft., common.

Var. *decolorans;* robust, panicle dark-red, nuts larger early discoloured, finally black-purple as are glumes.—Sikkim, Khasia, Muneypoor, alt. 3–6000 ft., common.

17. **S. chinensis,** *Kunth Enum.* ii. 357; similar to *S. elata,* but ligules with an ovate-oblong scarious brown elongation of their margin $\frac{1}{6}$–¼ in. long. *Boeck. in Linnæa,* xxxviii. 486. S. ciliaris, *Nees in Wight Contrib.* 117 (*not of Mich.*). S. scrobiculata, *Moritzi Verz. Zoll. Pfl.* 98 (*not of Nees*).

Singapore, *Ridley* (n. 1556).—Distrib. China, Malaya, N. Australia.

Var. *biauriculata;* wings of leaf sheaths narrow or sometimes obsolete, scarious margin of ligule shorter ($\frac{1}{6}$–⅓ in. long), broad obtuse very fragile biauriculate at base. S. elata, *Thw. Enum.* 353, *partly.* S. exaltata, *Boeck. in Engler Jahrb.* v., p. 511.—Ceylon, *Thwaites.* Singapore, *Ridley* (n. 1556).

18. **S. Radula,** *Hance in Ann. Sc. Nat.* ser. 4, xviii. 232; robust, scabrous, very slightly hairy, partial panicles several peduncled pyramidal, secondary bracts long setaceous conspicuous, style 3-fid, nut smooth white, lobes of disc-margin small ovate. S. lævis, *var.* scaberrima, *Benth. Fl. Hongk.* 400 (*not S. levis*, Retz). S. aspera, *Boeck. in Linnæa*, xxxviii. 483.

MALAY PENINSULA. PERAK, alt. 300 ft., *King's Collector* (n. 1929).—DISTRIB. Hongkong.

Closely allied to robust forms of *S. elata*, Thwaites, but differs by being very scabrous, by the rhachis and rhacheolæ being scabrous (scarcely hairy), and by the nut being smooth (scarcely tessellate).

19. **S. psilorrhiza,** *C. B. Clarke*; robust, nearly glabrous, rhizome wiry slender, panicle contracted nearly to a linear-oblong dense spike, style 3-fid, nut large smooth white, lobes of disc-margin 3 very short obtuse thick subreflexed.

Herb. Kew "a CALCUTTA communicata;" specimen in fine fruit.—There is what I take to be a young example of the same species from Cambodia.

Rhizome creeping, $\frac{1}{16}$ in. in diam., clothed by distant ovate striate red scales. *Stems* 2 ft., scabrous. *Leaves* 1 ft. by $\frac{1}{4}$ in.; sheath 3-winged; ligule ovate, obtuse glabrous. *Panicle* 2–2½ by $\frac{3}{4}$ in., stout, rhachis somewhat hairy; lower branches 0–½ in., secondary bracts ½–1 in. filiform. *Spikelets* all unisexual, as of *S. hebecarpa* and *S. elata*; fem. glume aristate. *Nut* $\frac{1}{5}$ in. long, ovoid, scarcely at all trigonous or hairy; disc obpyramidal, rigid, purpurescent, margin very narrow with rigid yellowish lobes.—Quite unlike the five last sp., and is perhaps more allied to *S. Stocksiana.*

20. **S. oryzoides,** *Presl Rel. Haenk.* i. 201; robust, glabrous, panicle one terminal nearly bractless dense with numerous long suberect branches, spikelets solitary spicate, style 3-fid, nut smooth white, disc truncate. *Nees in Wight Contrib.* 116; *Thw. Enum.* 353. S. latifolia, *Moon Cat. Pl. Ceyl.* 62. S. orizoides, *Boeck. in Linnæa*, xxxviii. 492.—*Wall. Cat.* 3539.

S.E. INDIA; from ASSAM to CEYLON and to MALACCA.—DISTRIB. Zanzibar, Malava, Philippines, Australia.

Stolons long, terete, ¼ in. in diam., usually without scales (because in water). *Stems* 3–6 ft., scabrous. *Leaves* up to 3 ft. by ¾ in., margins very scabrous, tip suddenly narrowed; sheath 3-winged or not rarely nearly wingless; ligule 0. *Panicle* long-peduncled, 6 by 3–4 in.; branches often once divided, secondary 2 in., simple. *Spikelets* unisexual; some plants are nearly male; in others the fem. spikelets (much less fewer than the males) are near base of spikes. *Fem. spikelets* ⅛ in; fem. glume scarcely mucronate. *Nut* ⅛ in. in diam., globose; lobes of disc extremely short reflexed (Nees by some error says the perigynium is profoundly 3-lobed adpressed to the nut).

** *Sheaths* (of middle stem-leaves) *triquetrous, not, or very obscurely, winged.*

† *Leaves* (*that is those next below the bracts*) *almost regularly alternate.*

21. **S. Hookeriana,** *Boeck. in Linnæa*, xxxviii. 498; robust, more or less hairy, partial panicles 1–3 lanceolate or ovoid branches erect, spikelets chestnut-colrd., style 3-fid, nut very obscurely reticulated, lobes of disc-margin (obscurely 3) broad obtuse thick reflexed.—Scleria sp., n. 13, *Herb. Ind. Or. H. f. et T. T.*

KHASIA and NAGA HILLS, and MUNEYPOOR, alt. 4–6000 ft., *J. D. H. & T. T., C. B. Clarke, Watt.*

Rhizome ⅜–½ in. in diam., covered by small ovate striate black-red scales. *Stems* 8 ft., glabrous. *Leaves* up to 1 ft. by ¼ in, tip setaceous, glabrous or hairy; sheath usually wingless or occasionally distinctly 3-winged. *Spikelets* nearly as in *S. elata*. *Nut* ⅛ in. long, young white shallowly tessellate, mature smooth shining.—Most easily known from the *S. elata* by the panicle-branches ascending (not rectangularly divaricate). In the specimen Hooker sent to Berlin, the panicle is contracted into a dense ellipsoid-oblong compound spike, and Boeckeler founded the species on this character; but in well evolute examples, the panicle is large compound—the lower partial panicles several, 8 in. apart.

22. **S. khasiana,** *C. B. Clarke (not of Boeck.)*; robust, softly hairy all over, partial panicles 1–3 lanceolate or subovoid branches erect, style 3-fid, nut reticulate hairy, lobes of disc-margin short ovate erect minutely apiculated.

KHASIA HILLS, alt. 4500–5750 ft., *C. B. Clarke.*

Similar and allied to *S. Hookeriana*, but less robust, more hairy, nut more reticulated, lobes of disc-margin erect, lanceolate-caudate. *Leaves* long-setaceous at tip, very hairy; sheaths densely (usually retrorsely) hairy. *Spikelets* (except bracteoles) nearly glabrous, often brown sometimes chestnut. *Nut* $\frac{1}{10}$ in. long, ultimately reticulated hairy; tails of lobes of disc-margin reaching to $\frac{1}{5}$ height of nut.—*S. khasiana*, Boeck., is S. Thomsoniana.

23. **S. junciformis,** *Thw. Enum.* 354 *(not of Kunth)*; medium-sized, hairy, rhizome short branched, panicle narrow, spikes distant, style 3-fid, nut largeish obtuse obscurely reticulate, disc-margin truncate lobes very short reflexed. S. hirsuta, *Moon Cat. Pl. Ceyl.* 62; *Trimen, Cat. Pl. Ceyl.* 103 *(not of Boeck.)*. S. pilosa, *Boeck. in Linnæa*, xxxviii. 473. Cylindropus junciformis, *Nees in Linnæa*, ix. 303, *& in Edinb. Phil. Journ.* xvii. 266, and *in Wight Contrib.* 118.

CEYLON; Reingan Corle, *Thwaites* (C.P. 3225).

Rhizome ⅛ in. in diam., contorted. *Stem* nearly 3 ft., rather slender. *Leaves* up to 18 by ¼ in., tip lanceolate subobtuse. *Panicle* very slender; lowest partial panicle (spike-like) 1 in., nodding on a slender peduncle 2–4 in. *Spikelets* nearly ⅛ in., ferruginous, almost glabrous, no bisexual spikelets seen. *Nut* ⅛ in. long, as of *S. tessellata.*—Approaches *S. tessellata* by its subobtuse leaves and infl., but the rhizome differs.

24. **S. melanostoma,** *Boeck. in Linnæa,* xxxviii. 514; nearly glabrous except rhachis of panicle, leaves at nearly regular distances, sheaths not winged, ligule short narrowly scarious-margined, partial panicles distant pyramidal, nut tessellated pale or often becoming fuscous-black, disc-lobes very short depressed ovate. S. Hasskarliana *and* S. Plœmii, *Boeck. in Engler, Jahrb.* v. 511, 513. S. melanosperma, *Nees & Arn. ms. in Herb. Wight,* n. 2377.—Scleria sp. 15, *Herb. Ind. Or. H.f. & T. T.*

BENGAL and KHASIA HILLS, frequent, *Griffith,* &c. DECCAN PENINSULA; Courtallum, *Wight.*—DISTRIB. Java.

This species is *S. elata*, without wings to the leaf-sheaths, and like it varies from 1 to 8 ft. As to the colour of the nut, white and discoloured blackish nuts occur often in one panicle.—Some of Hooker's *Scleria*, n. 15, is *S. elata*, and it was all formerly so named by Boeckeler.

†† *Leaves (that is those next below the bracts) imperfectly (falsely) opposite or ternate.*

25. **S. bancana,** *Miq. Fl. Ind. Bat. Suppl.* 602; robust, nearly glabrous, partial panicles dense approximate subcoalescent branches ascending, spikelets dusky stramineous, style 3-fid, nut ovoid apiculate reticulate, lobes of disc-margin 3 ovate-triangular auricles reflexed. S. macrophylla, *Presl. Rel. Haenk.* i. 200; *Nees in Wight Contrib.* 116. S. malaccensis, *Boeck. in Linnæa,* xxxviii. 507.—Scleria, *Wall. Cat.* 3409.

TENASSERIM, *Kurz.* MALACCA, *Griffith.* SINGAPORE, *Wallich.*—DISTRIB. Borneo, Tonkin.

Rhizome woody, $\frac{1}{8}$–$\frac{1}{6}$ in. diam. *Stems* 2–4 ft. *Leaves* (upper approximated in pairs) 12–18 by $\frac{1}{2}$ in., tip lanceolate subobtuse; sheath triquetrous sometimes narrowly 3-winged. *Panicle* uninterrupted in Indian examples (in Borneo lowest partial panicle is sometimes 5 in. distant); secondary bracts long, linear, conspicuously exsert. *Spikelets* nearly as of *S. elata.* *Nut* $\frac{1}{10}$ in. in diam., white or straw-colrd., minutely hairy, ultimately glabrate; lobes of disc-margin reaching to $\frac{1}{4}$ height of nut, adpressed, pale.

26. **S. multifoliata,** *Boeck. in Linnæa,* xxxviii. 510; robust, nearly glabrous or (var.) hairy, partial panicles pyramidal red (except var.), style 3-fid, nut reticulate hairy often finally discoloured, lobes of disc-margin 3 triangular attaining $\frac{1}{3}$–$\frac{1}{2}$ height of nut.—Scleria, *Wall. Cat.* 3407 (*partly*) 3410 ((*partly*), 3411 (*partly*).

RANGOON and TAVOY, *Wallich.* SINGAPORE, *Griffith,* &c.—DISTRIB. Malay Islds.

Leaves (next below lowest bract) in (false) whorls of 2 or 3, tip setaceous, margins scabrous cutting the hand; sheaths not winged. Nut-bearing *spikelets* somewhat obovoid. *Nut* $\frac{1}{10}$ in. long, rather narrower than in adjacent species, often ultimately dark red, shining or subviscid. Margin of *disc* cup-shaped at base, its 3 lobes thick red adpressed sometimes entire often crenulate occasionally their edge cut into short oblong blunt lobes terminated by glands (approaching sub-gen. *Schizolepis*).—Most readily distinguished from *S. sumatrensis* by the narrowed base of the fruiting spikelet.

Var. *pilosula*; more hairy, leaves beneath densely softly hairy, panicles and spikelets fuscous stramineous. S. pubescens, *Zoll. Verz. Ind. Archip.* ii. 61 (*not of Steud.*).—Penang, *King's Collector,* &c. Java.—Plant 3–6 ft.; spikelets greenish white (King); lower bracts subopposite (like the upper leaves); panicle only slightly hairy.

Var. *ophirensis*; panicles fuscous, lower peduncles long, male spikelets narrow, lobes of disc-margin shorter (than in *S. multifoliata* type), pale.—Malacca; summit of Mt. Ophir, alt. 5000 ft., *Hullett* (n. 869).—A very coarse rigid form, which might be treated as a species.

27. **S. sumatrensis,** *Retz. Obs.* v. 19, t. 2; robust, nearly glabrous, partial panicles pyramidal brown or red, style 3-fid, nut globose reticulate often finally discoloured, lobes of disc-margin very large attaining $\frac{1}{2}$–$\frac{3}{4}$ height of nut obtuse. *Nees in Wight Contrib.* 116; *Thw. Enum.* 353; *Boeck. in Linnæa,* xxxviii. 513; *Kurz in Journ. As. Soc.* xlv., part 2, 159. S. setigera, *Roxb. Fl. Ind.* iii. 575. S. purpurascens, *Steud. Syn. Cyp.* 169. —Scleria, *Wall. Cat.* 3407 (*partly*), 3408 B, 3413.

S. BENGAL to SINGAPORE, frequent. NICOBARS, *Kurz.* PENANG, *Wallich.* CEYLON.—DISTRIB. Java.

Resembles *S. multifoliata,* Boeck., and most easily distinguished by the broad rounded base of the fruiting spikelets.—Secondary *bracts* 1 in., filiform, often conspicuous. *Nut* $\frac{1}{10}$–$\frac{1}{5}$ in. diam., mature glabrate, pale or brown, or often dark red shining. Lobes of *disc*-margin sometimes nearly enveloping the nut, truncate sometimes crenulate undulate.

28. **S. levis,** *Retz Obs.* iv. 13; robust, nearly glabrous, partial panicles pyramidal rigid brown, style 3-fid, nut globose smooth white, lobes of disc-margin 3 ovate pale spreading attaining scarce ½ height of nut. S. lævis, *Willd. Sp. Pl.* iv. 314; *Roxb. Fl. Ind.* iii. 575; *Nees in Wight Contrib.* 117; *Thw. Enum.* 354; *Boeck. in Linnæa,* xxxviii. 512; *Kurz in Journ. As. Soc.* xlv., part 2 [1876] 160. S. zeylanica, *Mom Cat. Pl. Ceyl.* 62 (*fide Trimen, not of Poiret*).—Scleria, *Wall. Cat.* 3410 (*partly*), 3411 (*partly*).

From ASSAM to SINGAPORE, alt. 0–1000 ft. NICOBARS, *Kurz.* CEYLON.—DISTRIB. Java, Hongkong.

Similar to *S. sumatrensis* and *S. multifoliata,* but generally easily distinguished by the globose white nut.—*Panicle* usually slenderer than in *S. sumatrensis,* secondary bracts less conspicuous. *Glume* to the nut broadly ovate at base, shortly acute. *Nut* $\frac{1}{10}$–$\frac{1}{8}$ in. in diam., depressed-globose, somewhat trigonous; lobes of disc-margin somewhat thick, white with green nerves, at tip entire or slightly crenate-toothed.

Sect. 3. SCHIZOLEPIS (Genus), *Nees in Mart. Fl. Bras.* ii. (pars. 1) 158, 186 (char. extended). Character of *Elatæ,* but rim of disc-margin with numerous triangular or lanceolate teeth.

29. **S. bracteata,** *Cav. Ic.* v. 34, t. 457; robust, hairy, partial panicles several upper male with numerous small spikelets, lower fem. with fewer larger spikelets (1-sexual plants also occur), style 3-fid, nut globose verrucose, rim of disc truncate rigid crenulate or scarcely toothed. *Boeck. in Linnæa,* xxxviii. 515. Macrolomia bracteata, *Nees l. c.* 182, t. 24.

TROPICAL AMERICA, abundant.

Var. β *assamica*; nut tessellate scarcely verrucose, rim of disc with many triangular (sometimes narrow almost lanceolate) teeth.—Scleria, n. 6, *Herb. Ind. Or. H. f. & T.*—Assam, *Masters* (*in Herb Kew*).—This Assam plant cannot be separated from *Schizolepis.* It is not easy to conjecture how it could be introduced into Assam; but I believe it to be only a form of the purely American *S. bracteata* nevertheless.

UNDETERMINED SPECIES OF *Scleria.*

SCLERIA RINKIANA, *Boeck. Cyp. Nov.* ii. 30.—PENANG, alt. 2500 ft., *Rink.*—"Allied to *S. tessellata,* Willd.," Boeck.

27. KOBRESIA, *Willd.*

Glabrous, nearly smooth, perennials. *Stem* simple, bearing grass-like leaves near base only and one cylindric or oblong terminal spike, or (in sect. 4) leaves and several loosely panicled spikes. *Spikes* (apparently often simple) 1-sexual, or 2-sexual (when fem. spikelets inferior). *Spikelets* male, or fem. 1-fld., or bisexual with one fem. fl. at base. *Fem. glumes* (the bracteole to spikelet) homologous with utricle of *Carex,* its margins in their lower half more or less connate in their upper half free, forming thus frequently an imperfect utricle (which in bisexual spikelets encloses rhachilla of male 1–4-fld. upper portion of spikelet). *Style* 3-fid (in *K. macrantha* 2-fid). *Nut* usually as long as glume, oblong or narrowly obovoid, trigonous (in *K. macrantha* flat).—Species 20, N. temp. region.

Sect. I. HEMICAREX (Gen.) *Benth. in Gen. Pl.* iii. 1072 (*chiefly*). *Stem* with 1 apparently simple linear or oblong spike. *Fem. spikelets* 1-fld., with sometimes the rudiment of rhachilla within fem. glume. *Style* 3-fid.

1. **K. seticulmis,** *Boeck. in Linnæa,* xxxix. 3 *partly* (*char. reform.*); stems slender 2–8 in., vernal leaves flat linear-lanceolate tipped, spikes ⅜–1 in. linear fem. or fem. at base male at top, fem. glume deeply split, style 3-fid, nut (including exserted beak) ⅛ in. Hemicarex Hookeri, *C. B. Clarke in Journ. Linn. Soc.* xx. 383 (*partly*). Carex (*better Kobresia*) mutans, *Boott ms.*—Elyna sp. 2, *Herb. Ind. Or. H. f. & T. T.*

SIKKIM; alt. 12–13,000 ft., Lachen Valley, at Momay, *J. D. H.*

Rhizome very short, woody; roots long, thick, tough. *Stems* cæspitose. Vernal *leaves* 2 by ⅛ in., summer 5–8 in., tip long-caudate, filiform, scabrous; sheath testaceous, becoming brown, not fimbriated. *Spikes* ⅛ in. broad; bracteoles (corresponding to "glumes" of carex) rhomboid-ovate, brown, yellow on back, lower often more or less aristate, upper obtuse. *Glume* (i.e. utricle), subspathiform, at top obliquely truncate, with 2 green ribs; a minute rudiment of rhachilla is sometimes within it. *Nut* linear-oblong, brown, as long as glume; beak ½–⅔ length of nut, exsert.—Boeckeler united with *K. seticulmis, filicina,* and his description of *seticulmis* is mainly drawn from *filicina* (he had only a scrap of *K. seticulmis.*)

2. **K. Hookeri,** *Boeck. in Linnæa,* xxxix. 4; stems rather slender 4–12 in., vernal leaves flat linear-lanceolate tipped, spikes (all fem. at base male at top but see var. β) 1¼–1⅔ in. linear, narrower interrupted at base, fem. glume deeply split, style 3-fid, nut (including exserted beak) ⅛ in. Carex Esenbeckii? *Boott ms. (not of Kunth).* Hemicarex Hookeri, *C. B. Clarke in Journ. Linn. Soc.* xx. 383 (*partly*), t. 30, figs. 3, 4.

SIKKIM, alt. 11–13,000 ft.; Lachen, *J. D. H.*; Singale-lah, *C. B. Clarke.*

Closely allied to *K. seticulmis,* but larger in all its parts. *Leaves* ⅛ in. broad; summer leaves 1 foot long caudate-tipped.—In this group, the stems in flower are short, surrounded by lanceolate-tipped leaves; in fruit the stems are greatly elongated, with long-caudate summer leaves.

Var. ? β *dioica*; spikes (very many seen) unisexual.—SIKKIM; Namdee, alt. 12,000 ft., *Pantling.*—Male spikes 2 by ⅛ in. Fem. spikes 2–2½ in., in two examples branched. These are spring examples, and may be *K. Hookeri,* or a new species allied thereto.

3. **K. angusta,** *C. B. Clarke*; stems slender 1–5 in., all leaves very narrow, spikes dioœcious males short (on short stems) sublanceolate fem. (on elongating stems) linear-filiform interrupted at base, style 3-fid, nut nearly as in *K. seticulmis,* but beak shorter.

SIKKIM; Sundukphoo, alt. 12,000 ft., *C. B. Clarke.*

Vernal leaves 2 by ⅛ in; summer leaves 4–5 in. *Male stems* 1–2 in.; male spikes ⅓–⅔ by ⅛–⅙ in.; male bracteoles elliptic-lanceolate, brown, back green, edges scarious. *Fem. stems* ultimately 4–5 in.; fem. spikes (young) 1½ by ⅛ in.

4. **K. vaginosa,** *C. B. Clarke*; culms 4–8 in. clothed some way up by withered sheaths, leaves all filiform, spikes (mostly dioœcious) male linear-oblong fem. linear with distant bracteoles, style 3 fid, nut linear-oblong, beak ½ length of nut.

SIKKIM; Lachen Valley, at Momay, alt. 15,000 ft., *J. D. H.*

Stems covered up to ½–¾ their length by scarious flaccid sheaths. *Leaves* 2–6 in., at base scarcely ⅒ in. broad. *Male stems* about as long as female. *Male spikes* ⅔ by ⅒ in. *Fem. spikes* (sometimes having male spikelets at top) 1 in., most of the bracteoles (except a few at top) not imbricated.

5. **K. trinervis,** *Boeck. in Linnæa,* xxxix. 548, *in note*; stems 2–8 in. rather slender, summer leaves very long not long-caudate, spikes (usually dioœcious) fem. 2½ in. linear, male bracteoles elliptic-oblong obtuse

cinnamon colour, style 3-fid. C. trinervis, *Nees in Wight Contrib.* 120 (*not of Degland*). C. Esenbeckii, *Kunth Enum.* ii. 522; *Strachey Cat. Pl. Kumaon*, 73; *E. T. Atkins. Gaz.* x. 618 (*not of Boott*). C. linearis, *Boott Carex*, i. 51 (*partly*). Hemicarex trinervis, *C. B. Clarke in Journ. Linn. Soc.* xx. 382 *in small part* (*was chiefly C. linearis, Boott*).

WESTERN NEPAL; *Royle* n. 138. GURWHAL; alt. 10,000 ft., *Strachey & Winterbottom* n. 19.

Leaf-sheaths testaceous or somewhat chestnut-colour, lacerate. Summer *leaves* 12–16 by $\frac{1}{8}$–$\frac{1}{6}$ in. flat. *Male spikes* $\frac{2}{3}$–1 by $\frac{1}{6}$ in. *Fem. spikes* with occasionally a few male spikelets at top.—This does not greatly differ from *K. Hookeri*; in which the summer leaves are shorter, long-caudate. It hardly differs from *Carex linearis*, Boott, but by the "utricle" being split $\frac{2}{3}$ the way down to base.

6. **K. foliosa,** *C. B. Clarke*; dioecious, stems 20 in. somewhat robust, summer leaves 20 by $\frac{1}{6}$ in. not caudate-setaceous, female spikes $1\frac{1}{2}$ in. linear, male bracteoles elliptic-lanceolate acute yellow-brown keel green, style 3-fid.

GURWHAL; alt. 11–13,000 ft., *Duthie* (nn. 57, 4494).

Rhizome oblique, stout, thick with lacerate leaf-sheaths.—Closely allied to *K. trinervis*, but larger.

7. **K. fissiglumis,** *C. B. Clarke*; female stems 4–5 in, summer leaves 4–5 by $\frac{1}{10}$–$\frac{1}{8}$ in. not caudate-setaceous, fem. spikes 1 in. linear black-purple, fem. glume split down to base margins quite free, style 3-fid.

WESTERN NEPAL; alt. 12,500 ft., *Duthie* (n. 6092).

Stems slender, not thickened at base; leaf-sheaths tight, brown, not lacerate. *Fem. spikes* lax, somewhat interrupted at base; upper bracteoles elliptic-oblong, obtuse, black with green back. *Pistil* distinctly stalked.—Specimens all female; a male plant sent by Duthie under the same number appears not to belong to this species (possibly *K. foliosa*).

8. **K. pygmæa,** *C. B. Clarke*; stems $\frac{1}{3}$–$1\frac{1}{3}$ in., leaves $\frac{1}{3}$–$1\frac{1}{3}$ in. setaceous, spikes $\frac{1}{6}$–$\frac{1}{3}$ in. oblong, style 3-fid, beak of nut very short, hardly exsert from glume. Hemicarex pygmæa, *C. B. Clarke in Journ. Linn. Soc.* xx. 383. —Elyna sp. n. 7, *Herb. Ind. Or. H.f. et T. T.*

WESTERN TIBET; Ladak, alt. 12–15,000 ft, *Thomson.* KUNAWUR; *Jacquemont*, n. 1783. SIKKIM; Momay and Kangia Lama, 13–15,000 ft., *J. D. H.*; Phari; *G. King.*

Stems in dense tufts; leaf-sheaths testaceous, little torn. *Leaves* numerous, channelled. *Spikes* unisexual. *Bracteoles* ovate-oblong, scarcely acute, fem. brown, male paler. *Fem. spikelets* 4–6 in each spike. *Fem. glume* having margins united toward base. *Nut* $\frac{1}{10}$ in., oblong-ellipsoid, pale, apiculate, hardly beaked.

Sect. 2. ELYNA (Gen.) *Schrad. Fl. Germ.* i. 155. *Stem* with 1 apparently simple linear or oblong spike. *Fem spikelets* (at least several of lower ones) with rhachilla (within fem. glume) bearing 1–4 male fl. *Style* 2-fid. [*Glume* (i.e. homologue of utricle in *Carex*) split down to base.]

9. **K. filicina,** *C. B. Clarke*; slender, fem. spikes 1–$1\frac{1}{2}$ in. narrow linear neither rigid nor dense, style 3-fid, nut small narrow oblong, beak exsert often ultimately recurved. K. seticulmis, *Boeck. in Linnæa*, xxxix. 3 (*partly*). Hemicarex filicina, *C. B. Clarke in Journ. Linn. Soc.* xx. 384. —Elyna sp. n. 1, *Herb. Ind. Or. H.f. & T. T.*

N.W. HIMALAYA, alt. 10,000 ft.; Simla, *Thomson*; Kumaon, *Duthie.*

Stems 2–10 in. *Leaves* 4–6 by $\frac{1}{12}$ in., tip caudate. *Spike* very slender, $\frac{1}{16}$ in. broad, green ultimately brown. *Upper bracteoles* $\frac{1}{12}$ in., elliptic-lanceolate, acute.

Lower spikelets mostly 2-fld. i.e. lower fem., upper male. *Nut* nearly as long as glume; beak ⅓ length of nut.

10. **K. Duthiei,** *C. B. Clarke*; stems medium-sized rigid, spikes linear dense green, style 3-fid, nut small narrowly obovoid, beak short scarcely overtopping glume.

KUMAON, alt. 11–16,000 ft., *Duthie* (nn. 3461, 6093, 6094) and Gurwhal (n. 5016).

Stems densely cæspitose, 4–8 in., striate; lower sheaths tight, not lacerate. *Leaves* many, ½–⅔ length of stem, $\frac{1}{12}$ in. broad, flat, tip caudate. *Spikes* 1 by $\frac{1}{12}$ in., very rigid; bracteoles $\frac{1}{10}$ in. ovate, closely spirally imbricated. *Spikelets* mostly 2-fld. upper flower male. *Nut*, including beak, about as long as glume; beak ⅓ length of nut.

11. **K. capillifolia,** *C. B. Clarke in Journ. Linn. Soc.* xx. 378; somewhat slender, leaves linear-setaceous, sheaths chestnut-colour somewhat torn, spikes linear, bracteoles obtuse erect margins scarious, style 3-fid, nut ellipsoid (scarcely obovoid) narrowed at top into linear style. K. scirpina, *Boeck. in Journ. Linn. Soc.* xviii. 104 and xix. 90. K. elata and K. brunnescens, *Boeck. Cyp. Nov.* i. 32, 40. Elyna capillifolia, *Decne. in Jacquem. Voy. Bot.* 173, t. 174. E. spicata, *Boiss. Fl. Orient.* v. 394.—Elyna, sp. n. 6, *Herb. Ind. Or. H. f. & T. T.*

KASHMIR to GURWHAL, alt. 10–12,000 ft., frequent, *Jacquemont, T. Thomson, &c.* KURRUM VALLEY; alt. 12,500 ft., *Aitchison.*

Stems 2–12 in. *Spikes* ⅔–1 by $\frac{1}{10}$–¼ in., brown chestnut-colour or yellow; bracteoles ½ in. *Spikelets* mostly 3–4-fld. *Nut* shorter than glume.—Very near the European *K. scirpina*, Willd., but is a finer plant, with a brighter thicker spike.

12. **K. schœnoides,** *Boeck. in Linnæa*, xxxix. 7; stems stout rigid, leaves linear channelled incurved, sheaths shining brown very little torn, spikes oblong dense, bracteoles ¼ in. elliptic oblong obtuse, style 3-fid, nut obovoid obtuse, beak small linear. *Aitch. in Journ. Linn. Soc.* xix. 190; *C. B. Clarke in Journ. Linn. Soc.* xx. 378 (*not of Henders.*). K. sibirica, *Boeck. in Linnæa*, xxxix. 7. K. Royleana, *Henders. Yarkand* 339 (*not* Trilepis Royleana, *Nees*). Elyna schœnoides, *C. A. Meyer in Ledeb. Fl. Alt.* iv. 235 (*in note*); *Kunth Enum.*. ii. 534; *Strachey Cat. Pl. Kumaon*, 73; *Boiss. Fl. Orient.* v. 394. E. Sibirica, *Turcz. in Bull. Soc. Imp. Mosc.* (1838) 103.

HIMALAYA; alt. 10–16,000 ft. from W. TIBET, *Thomson*, to SIKKIM, *J. D. H.*—DISTRIB. Caucasus, Central Asia, Siberia.

Rhizome woody, short. *Stems* 4–24 in., $\frac{1}{12}$–⅛ in. diam. *Leaves* as long as stems, to scarcely ⅓ of stem, $\frac{1}{12}$–$\frac{1}{10}$ in. broad, *Spikes* ½–1 by ⅛ in.; bracteoles chaffy, loosely imbricated, suberect. *Spikelets* 1–5-fld., lowest fl. fem., or towards top of spike wholly male. *Nut* $\frac{1}{12}$ in., ashy black.

13. **K. nitens,** *C. B. Clarke in Journ. Linn. Soc* xx. 379, t. 30, fig. 7; stems rigid, leaves linear channelled incurved, sheaths testaceous-brown scarcely lacerate, spike ellipsoid dense, bracteoles $\frac{1}{5}$ in. ovate obtuse shining, style 3-fid, nut obovoid obtuse, beak very short scabrous.

WEST. HIMALAYA, alt. 12–15,000 ft.; Kashmir, *C. B. Clarke*; Kumaon and Gurwhal, *Duthie.*

Stems 2–10 in. *Leaves* overtopping stem. *Spikes* ½ by ¼ in. *Bracteoles* shining chestnut-colour, paler on back, margins often white-scarious. *Nut* $\frac{1}{12}$ in., very like that of *K. schœnoides.*

Sect. 3. EUKOBRESIA. *Spike* on each stem 1, linear oblong or ovate, compound subpaniculate, dense or interrupted at base (but smaller simple spikes occur in most species occasionally). *Lower spikelets* bisexual except in *C. uncinoides*. *Style* 3-fid.—Trilepis, *Nees in Edinb. N. Phil. Journ.* xvii. 267 (*as to type species*).

14. **K. Royleana,** *Boeck. in Linnæa*, xxxix. 8; stems somewhat stout, leaves linear flat when dried, spikelets medium-sized purple-green or ferruginous-brown, style 3-fid, nut ellipsoid attenuated into beak. K. stenocarpa, *C. B. Clarke in Journ. Linn. Soc.* xx. 380. K. schœnoides, *Henders. Yarkand*, 339 (*not of Boeck.*). Trilepis Royleana, *Nees in Edinb. N. Phil. Journ.* xvii. 267 and *in Wight Contrib.* 119; *Kunth Enum.* ii. 535; *Strachey Cat. Pl. Kumaon*, 73. Elyna stenocarpa, *Karel & Kiril. in Bull. Soc. Imp. Mosc.* xv. (1842), 526.

ALPINE HIMALAYA, alt. 10–16,000 ft.; from W. TIBET, *Thomson*, to SIKKIM, *J. D. H.*, frequent.—DISTRIB. North Cabul, Central Asia.

Stem in Royle's specimens scarcely 4 in., in Thomson's 2 ft. *Leaves* sometimes as long as stem, often very much shorter, very variable in width ($\frac{1}{2}$–$\frac{1}{4}$ in.). *Spikes* (in Royle's) $\frac{3}{6}$ by $\frac{1}{8}$ in.; in Thomson's up to $2\frac{1}{2}$ in., panicled, branches suberect with many spikelets, ferruginous brown. Lower spikelets $\frac{1}{5}$ in., often 3–4 fid. *Nut* $\frac{1}{12}$ in.—The large series of dried examples appears to unite Royle's (the type) with the fine collections of Thomson. Closely allied to the English *K. caricina*, Willd., but has, in general, much larger brighter spikes.

15. **K. uncinoides,** *C B Clarke*; robust, infl. oblong dense compound (a second panicle on remote long peduncle occasionally added), spikes in large part 1-sexual, lower spikelets fem. 1-nutted; fem. glume long utriculate deeply split down, style 3-fid, nut oblong fine brown, style-base linear. Carex uncinoides, *Boott Carex*, i. 8, t. 23; *Boeck. in Linnæa*, xxxix. 109.—Triticoides, *Griff. Ilin. Notes*, 140.

SIKKIM; alt. 10-16,000 ft., *J. D. H.*, &c. BHOTAN; *Griffith.*—DISTRIB. Tibet.

Glabrous. *Rhizome* 3 in. by $\frac{1}{6}$ in. diam., woody, densely scarred. *Stems* 1–2 ft., striate. *Leaves* sub-basal, very much shorter than stem. *Infl.* 3 by $\frac{2}{3}$ in., straw-yellow, somewhat interrupted at base. *Glume* to fem. spikelet $\frac{2}{3}$ in. by $\frac{1}{10}$ in., brown, delicately striate, microscopically pubero-ciliate, mouth whitened shallowly lacerate on one side split down below the top of nut sometimes even in young state nearly to base of nut. Rudiment of the spicula exsert out of mouth of utricular glume.—Boott shows the utricle nearly complete; the margins of the slit fold over as in several other *Kobresia*, and escaped his artist's microscopic power. It is a typical *Kobresia* very like *Royleana* (except the linear style-base); it hardly differs from *Elyna kokanica*, Regel (Descr. Pl. fasc. 8. 23) except in its larger size.

Sect 4. HEMICAREX (Genus), *Benth. in Gen. Pl.* iii. 1072 (*partly*). *Spikes* loosely panicled; lowest bract long, leaf-like. *Style* 3-fid.

16. **K. laxa,** *Boeck. in Linnæa*, xxxix. 6; stems 8–24 in. rather slender, spikes 1- or 2-sexual (lowest spikelet fem.), style 3-fid, nut narrow oblong apiculate scarcely beaked. K. pseudo-laxa, *C. B. Clarke in Journ. Linn. Soc.* xx. 381. Cobresia laxa, *Nees in Wight Contrib.* 119. Elyna? laxa, *Kunth Enum.* ii. 534. Hemicarex laxa, *Benth. Gen. Pl.* iii. 1072; *C. B. Clarke l. c.* 385, t. 30. Carex impunctata, *Boeck. in Linnæa*, xl. (1876), 343 (*the Himal. plant*).

ALPINE HIMALAYA, alt. 650C–12,000 ft.; from N.W. KASHMIR, *Giles*, to SIKKIM, *J. D. H.*

Rhizome creeping, short. *Leaves* as long as stem, $\frac{1}{12}$ in. broad, grass-like. *Panicle* 2–4 in. long, narrow, branches slender erect; sometimes wholly fem., rarely wholly male. *Fem. spikes* long, slender, with lanceolate distant spikelets; bracteoles not imbricated, style-branches conspicuous exsert. *Fem. spikelets* usually 1-fld., sometimes an upper male fl. added. *Male spikelets* 3–several-fld. *Style* linear, hardly ½ length of nut; branches 3, linear very long.

17. **K. curvirostris,** *C. B. Clarke*; stems 4–6 in. slender, spikes (all seen fem.) densely paniculed, nut narrowly oblong, beak cylindric exsert curved. Hemicarex curvata, *C. B. Clarke in Journ. Linn. Soc.* xx. 384.—Elyna sp. n. 10, *Herb. Ind. Or. Hf. & T. T.*

SIKKIM; Tungu, alt. 13,000 ft., *J. D. H.*

Leaves as long as stem, $\frac{1}{12}$ in. broad. *Panicle* 1 by ½ in.—Resembling, and closely allied to, *K. laxa.*

Sect. 5. PSEUDOKOBRESIA. *Style* 2-fid. *Nut* flat.

18. **K. macrantha,** *Boeck. Cyp. Nov.* i. 39; spike ovoid compound, spikelets clustered mostly 3–5-fld. lowest flower female, glume split to base, margins not overlapping. K. filifolia, *C. B. Clarke in Journ. Linn. Soc.* xx. 381. Elyna filifolia, *Turcz Fl. Baical. Dahur.* ii. part i. 288 (*from descript*).

W. TIBET; Nubra, *Schlagintweit* (n. 2424) and Ladak (n. 1314).—DISTRIB. Central Asia.

Rhizome short. *Stems* cæspitose, 2–7 in. *Leaves* many, ½ length of stem, $\frac{1}{20}$–$\frac{1}{16}$ in. broad, flat; sheaths pale, not torn. *Spike* ⅔ by ½ in. *Bracteoles* ¼ in., ovate-oblong, obtuse, nearly flat, brown with green back. *Fem. glume* elliptic-oblong, obtuse, concave, open (nowise utricle-like.) *Nut* $\frac{1}{16}$ in., obovoid, obtuse, brown; style linear, ⅓ length of nut; branches 2, long, linear.

28. CAREX, *Linn.*

Characters of Kobresia, but utricle enclosing nut bottle-shaped, mouth of its beak entire notched or shortly slit.—Species 1100 throughout the world, less abundant in dry or very hot regions.

The so-called "glumes" of *Caricew* are not homologous with the fl. glumes of *Scirpeæ*. The male spike is here considered homologous with the female spike; i.e. not as by Eichler and others who consider in *C. dioica* the male plant to bear a simple spike, the fem. plant to bear a compound spike.

CONSPECTUS OF SECTIONS OF CAREX (exceptions omitted).

Subgenus I. VIGNEA. Style 2-fid.

Sect. 1. *Muricatæ.* Terminal spike fem. at base, male at top.
- * Spikes short, ovoid or oblong (*C. muricata,* &c.) . . . sp. 1–10
- ** Spikes linear-cylindric (*C. brunnea,* &c.) . . . . . sp. 11–14

Sect. 2. *Remotæ.* Terminal spike male at base, fem. at top.
- * Spikes short, ovoid or oblong (*C. remota,* &c.) . . . . sp. 15–18
- ** Spikes linear-cylindric (*C. teres,* &c.) . . . . . sp. 19–22

Sect. 3. *Vulgares.* Terminal spike wholly male (*C. vulgaris,* &c.) . . . . . sp. 23–33

Subgenus II. EUCAREX. Style 3-fid.

Sect. 4. *Raræ*. Stem with 1 spike, fem. at base (*C. rara*, &c.) sp. 34–39
Sect. 5. *Indicæ*. Terminal spike fem. at base, male at top; or, when spikes very numerous many male at top, terminal spike sometimes wholly male.
* Subscapose, basal leaves long (*C. cyrtostachys*, &c.) . . sp. 40–42
** Spikes short, very numerous (*C. cruciata*, &c.) . . . sp. 43–66
*** Spikes long-cylindric. Peduncles mostly solitary (*C. Myosurus*, &c.) . . . . . sp. 67–73
**** Spikes long-cylindric. Peduncles often several from each lower sheath. Terminal spike sometimes wholly male (*C. polycephala*, &c.) . . . . . sp. 74–84
***** Species not easily placed in any one of the preceding 4 subsections (*C. curticeps*, *C. speciosa*, *C. fragilis*, &c.) . . . . . sp. 85–91
Sect. 6. *Atratæ*. Terminal spike male at base fem. at top (*C. atrata*, &c.) . . . . . sp. 92–98
Sect. 7. *Propriæ*. Terminal spike wholly male (in the first group occasionally fem. at top). Spikes not very numerous, occasionally up to 12.
* Utricle glabrous, beak short . . . . . sp. 99–105
** Utricle glabrous, beak long (*C. japonica*, &c.) . . . . sp. 106–125
*** Utricle hairy or minutely setulose (*C. hirtella*, &c.) . . sp. 126–142

Subgenus I. VIGNEA (Genus) *Beauv. in Lestib. Essai Cyp.* 22. Styles 2-fid; in *C. stenophylla* rarely 3-fid.

[N.B.—In Subgen. *Eucarex*, in the Indian species, 2-fid styles occur in 2 or 3 species in the upper part of the spike, or in poorly-developed spikelets.]

Sect. 1. MURICATÆ. Terminal spike (and usually some or many of the others) fem. at base male at top. [Spikelets in *C. fluviatilis* all or mostly 1-sexual, monœcious or diœcious.]

* Spikes short, ovoid or oblong, sessile or nearly so; infl. a dense or interrupted compound spike. [The series of species proceeds from the dense to the more interrupted.]

1. **C. incurva,** *Lightf. Fl. Scot.* ii. 544, t. 24, fig. 1; rhizome descending, stems short, spikes ovoid androgynous male at top forming one ovoid compound spike, glumes brown slightly scarious-edged, style 2-fid, utricle ellipsoid-acuminate inflated thin plicate scarcely nerved, beak short minutely scabrous on margins. *Schk. Riedgr.* i. 27, t. Hh. fig. 95; *Kunth Enum.* ii. 375; *Reichb. Ic. Fl. Germ.* viii. 4, t. 199, fig. 533; *Boott Carex*, iv. 210; *Boeck. in Linnæa*, xxxix. 48. C. juncifolia, *Allioni Fl. Pedem.* ii. 264, t. 92, fig. 4 (*not of Schk.*). Vignea incurva, *Reichb. Fl. Germ. Excurs.* 56.

N. W. HIMALAYA, from Kunawur and Kashmir to the Karakorum, alt. 11–15,500 ft., *Thomson*, &c.—DISTRIB. Mountain and cold regions.

Stems up to 6 in. (in India), often several clustered on top of ascending rhizome. *Leaves* sometimes as long as stem, narrow, often (when dry) incurved sometimes flat. *Infl.* about ½ in. diam.; lowest bract ¼ in. *Glumes* obtuse, margins shining, yellowish, not broadly white scarious. *Utricle* rather longer than glume, larger than nut, withering with folds on it; beak shortly 2-fid, hyaline ultimately at top. *Nut* ⅔ utricle, plano-convex, obtuse, shining-chestnut. *Style* ½ nut, branches long exsert.

2. **C. stenophylla,** *Wahlenb. in Kong. Vet. Akad. Handl. Stockh.* [1803] 142; rhizome descending, stems short, spikes ovoid androgynous male at top forming one ovoid or oblong compound spike, glumes strongly scarious-

edged, style 2-fid, utricle ellipsoid acuminate ultimately thick crustaceous blackish obscurely nerved, beak short scabrous on margins. *Kunth Enum.* ii. 374; *Reichb. Ic. Fl. Germ.* viii. 5, t. 200, fig. 534; *Boott Carex*, iv. 200 and *Ic. Ined.* 676; *Boeck. in Linnæa*, xxxix. p. 50 and *in Journ. Linn. Soc.* xviii. (1881), 105. C. juncifolia, *Schk. Riedgr.* i. (1801), 26 and ii. 6, t. 6, fig. 32 (*non Allioni*), C. glomerata, *Host Gram. Austr*) i. 34, t. 44 (*non Thunb.*). C. Hosti, *Schk. Riedgr.* ii. 7, t. Ii, fig. 32. C. duriuscula, *C. A. Meyer in Mem. Sav. Etrang. Petersb.* i. 214, t. 8; *Kunth Enum.* ii. 374. C. arctica, *Deinb.*; *Fries Novit. Fl. Suec. Mant.* iii. 135; *Anderss Cyp. Scand.* 70, t. 3, fig. 13. C. Deinbolliana, *J. Gay in Ann. Sc. Nat. ser.* 2, xi. 183. Vignea stenophylla, *Reichb. Fl. Germ. Excurs.* 56. Kobresia hyalinolepis, *Boeck. Cyp. Nov.* i. 39. Elyna capillifolia, *Henders. Yarkand*, 339.—Carex sp. *Griff. Itin. Notes*, 239, nn. 310, 311.

N. W. HIMALAYA, and W. TIBET from Piti and Kashmir to the Karakorum, alt. 8–14 000 ft.—DISTRIB. Mountain and cold Northern regions.

Very near *C. incurva*, Lightf.; in good fruit distinguished therefrom by black thick-walled utricle nearly filled by nut, in a younger state often distinguishable by prominent glistening white edge of glumes. But there are examples referred to *C. stenophylla*, Wahl. by Boott that are here placed under *C. incurva*, Lightf. or *C. divisa*, Hudson. Many examples of *C. stenophylla* are referred in herbaria to *Kobresia* (which is separated by the 3-fid style, but a 3-fid style occurs in *Carex stenophylla*.) —In a Himalayan example (Lance n. 285 in Herb. Kew) the ripe fruiting spikes are elongate, the lowest spike ¼ inch distant, but the shining margins of glume and the black crustaceous nuts are exactly as in *C. stenophylla*. The characters taken from roughness of stem, breadth and incurving of leaves, &c., mentioned carefully by European authors, were found not to be valid by Boott.

3. **C. divisa,** *Huds. Fl. Angl.* 348; rhizome horizontal, spikes ovoid androgynous male at top forming one ovoid or oblong or interrupted compound spike, glumes brown, style 2-fid, utricle ovoid acuminate stout moderately nerved, beak short scabrous on margins. *Good. in Trans. Linn. Soc.* ii. 157, t. 19, fig. 2; *Kunth Enum.* ii. 372; *Reichb. Ic. Fl. Germ.* viii. 7, t. 205, fig. 545; *Boott Carex*, iv. 186 and *Ic. Ined.* 631; *Boeck. in Linnæa*, xxxix. 55 and *in Journ. Linn. Soc.* xviii. 105. C. rivularis, *Schk. Riedgr.* i. 30, t. Cc. fig. 87. C. austriaca, *Schk. l. c.* ii. 10, t. Qqq, fig. 157. C. Bertolonii, *Schk. l. c.* ii. 5, t. D fig. 18 and t. Rrr, fig. 202. C. coacta, *Boott in Proc. Linn. Soc.* i. (1846), 285 and *in Trans. Linn. Soc.* xx. 133. C. curaica, *var.* γ coarcta, *Boott Carex* iv. 204. C. curaica, *Boiss. Fl. Orient.* iv. 402.

W. HIMALAYA (*Boott.*)—DISTRIB. Cabul to Britain.

Stems 1–2 ft., or in some Cabul examples 3–6 in. *Leaves* often ½ stem, narrow, margins usually incurved when dry. *Infl.* 2 by ½ in., interrupted at base (in well-developed examples). Lowest bract usually ¼ inch, but sometimes overtopping infl. *Fem. glumes* ovate, hardly mucronate, brown, scarious margin narrow. *Utricle* greenish or yellowish, ultimately brown, somewhat thickened; nerves 5–7 on plane face, slender, 11–13 on convex face rather stronger; beak shortly bifid.—Much stouter than *C. incurva* and *C. stenophylla*, and utricles longer. Resembles generally *C. foliosa* and *C. nubigena*, Don; the plane face of the utricle is in *C. foliosa* hardly striate at all; in *C. nubigena* strongly multistriate; the utricle of *C. divisa* comes between the two. *C divisa*, Huds. can *generally* be distinguished by its shorter bracts, browner glumes, and more creeping rhizome.—The Kuram Valley examples of Aitchison were collected [alt. 10,000 ft.] just outside the then frontier, and the Kashmir examples of Jacquemont cited by Boott are referred here to *C. vulpinaris*, Nees, but *C. divisa*, Huds. is almost certain to occur within British India.

4. **C. vulpinaris,** *Nees in Wight Contrib.* 121; nearly as *C. divisa*, but utricle smaller elliptic-lanceolate membranous obscurely nerved. *Kunth Enum.* ii. 383; *Boeck. in Linnæa*, xxxix. 63. C. curaica, var. β *Boott Carex*, iv. 204 C. divisa, *Boott l. c.* iv. 186 (*partly*). C. Henningsiana, *Boeck. Cyp. Nov.* i. 42.

KUNAWUR; Royle n. 73. GURWHAL; alt. 11,000 ft., *Duthie* (n. 55). LAHOUL; Schlagintweit (n. 2813). KASHMIR; Baramulla, *Jacquemont* (nn. 338, 362).—DISTRIB. Cabul.

Leaves ⅛ in. broad. *Infl.* dense. *Glumes* acute or almost acuminate, brown. *Utricle* slender, very thin; beak somewhat winged on scabrous margins.—Stems 15 in. type form; Jacquemont's are identical, with stems 5–9 in.; one is marked by Boott *C. divisa*, Hudson, the other *C. stenophylla*, Wahl.?

5. **C. curaica,** *Kunth Enum.* ii. 375; rhizome long-creeping, culms distant somewhat stout, spikes ovoid androgynous male at top forming one ovoid compound spike, style 2-fid, utricle ellipsoid lanceolate nearly nerveless, beak minutely or obsoletely scabrous on margins. *Boott Carex*, iv. 204 in small part. C. ovata, *C. A. Meyer in Ledeb. Fl. Alt.* iv. 207 and *Ic. Pl. Ross*, iv. 10, t. 323. C. incurva, var. β, *Trev. in Ledeb. Fl. Ross.* iv. 270 (*excl. syn.*). C. stenophylla, *Benth. in Henders. Yarkand* 338.

KASHMIR; Barzil; alt. 10,500 ft., *C. B. Clarke.* Lower Karakash, alt. 14,000 ft., *Henderson* n. 367.—DISTRIB. Central Asia.

Very like large states of *C. stenophylla*; stems 8–10 in., stouter, leaves broader; margins of glumes less shining scarious. *Ripe utricle* very convex, hardly inflated, yellowish, nerveless on the plane face, very obscurely nerved on the convex face. This plant is (as C. A. Meyer states) near *C. fœtida*, Allioni. The *C. curaica* of Turczan., Maxim., and others is largely (or wholly) founded on *C. pycnostachya*, Karel. et Kiril. (in Bull. Soc. Mosc. xv. 522) which is of similar appearance, and with utricles of similar shape but strongly many-nerved.

6. **C. nubigena,** *D. Don in Trans. Linn. Soc.* xiv. 326 and *Prodr.* 42; rhizome short or 0, leaves long narrow incurved when dry, spikes ovoid androgynous male at top forming an ovoid oblong or interrupted linear compound spike, style 2-fid, utricle ellipsoid narrowed into an oblong-linear beak many-nerved on both faces. *Nees in Wight Contrib.* 120; *Kunth Enum.* ii. 385; *Strachey Cat. Pl. Kumaon*, 73; *Thw. Enum.* 355; *Boott Carex*, i. 1, t. 2; *Boeck. in Linnæa*, xxxix. 90. C. fallax, *Steud. in Zoll. Verz. Ind. Archip.* ii. 60 and *Cyp.* 189; *Boeck. l. c.*—Carex, *Wall. Cat.* 3396.

HIMALAYA; alt. 5–13,000 ft., abundant. KHASIA to MUNEYPOOR, alt. 4–6000 ft., abundant. SIND; *Pinwill.* NILGHIRI, Anamallays, and CEYLON; alt. 5–8000 ft., common.—DISTRIB. Cabul, Malaya, China, Japan.

Stems 6–30 in., cæspitose on a tough perennial rhizome. *Lower leaves* long. *Infl.* from ½ in., dense, ovoid, to 5 in. linear interrupted, greenish becoming brown; lowest bract usually much overtopping infl., sometimes not ¼ in. *Spikes* ½ in., dense. *Fem. glumes* ovate scarcely apiculate, shorter than utricle. *Anthers* linear-oblong, very shortly apiculate. *Style* occasionally 3-fid, fide Boott. *Utricle* small, of thin texture, plano-convex, green or pale brown, 9–11-nerved on plane face, 11–15 on convex; small red glands frequently scattered all over utricle between the nerves; beak not winged, commonly quite smooth, not rarely scabrid, sometimes almost hispid. *Nut* hardly ½ utricle, compressed, obtuse, brown.—General aspect of *C. muricata*, Linn. var. *foliosa*, but may be generally separated by the narrower involute leaves. Well distinguished from all allied Indian species by the utricle many-nerved on both faces. *C. leiorhyncha*, C. A. Meyer Mem. Sav. Etrang. Petersb. i. 217, t. 9, a Central Asian plant, differs only by the leaves being rather broader,

flat when dry, and by the utricles having in their upper half only many larger orange-red glands. Though kept distinct by Boott and Boeckeler it should probably be esteemed only a form of *C. nubigena*.

7. **C. muricata,** *Linn. Sp. Pl.* 1382; rhizome short or 0, leaves not incurved, spikes ovoid androgynous male at top forming an oblong or interrupted linear compound spike or very narrow panicle, style 2-fid, utricle ovoid narrowed into a narrow conic beak, nerveless on plane face. *Schk. Riedgr.* i. 20, tt. E. 22, and Ee. 91; *Kunth Enum* ii. 384; *J. Gay in Ann. Sc. Nat. ser.* 2, x. 355; *Reichb. Ic. Fl. Germ.* viii. 9, t. 215; *Boott Carex*, iv. 192; *Boeck. in Linnæa*, xxxix. 86. C divulsa, *Gooden. in Trans. Linn. Soc.* ii 160; *Schk l. c.* tt. Dd. 89 and Ww. 89; *Kunth l. c.* ii. 385; *Reichb. Fl. Ic. Fl. Germ.* viii. 11, t. 220. Vignea muricata (and divulsa), *Reichb. Fl. Germ. Excurs.* 57 (and 59.)

KASHMIR; alt. 6–9000 ft., *C. B. Clarke.*—DISTRIB. Asia, colder N. regions.

The Kashmir examples resemble ordinary large European typical ones. *Stems* 20 in. *Leaves* $\frac{1}{6}$–$\frac{1}{5}$ in. broad, flat when dry. *Infl.* 2–3 in. by $\frac{1}{2}$ in., consisting of 4–8 globose spikes, lower shortly distant. *Anthers* with a linear crest. *Utricle* large, $\frac{1}{5}$ in. long, yellowish, with a few irregular nerves on convex face, otherwise nearly nerveless, beak bifid $\frac{1}{4}$ its length, margins closely minutely scabrid or nearly smooth. *Nut* $\frac{1}{2}$ utricle, subquadrate-ovoid compressed, not at all trigonous.—The form *C. divulsa* is in infl. and general aspect nearer the subjoined var.

Var. β *foliosa* (sp.) D. Don *in Trans. Linn. Soc.* xiv. 327 and *Prodr.* 42; inflorescence pale of many spikelets at base often subcompound, utricle smaller. *Nees in Wight Contrib.* 121; *Boott Carex* i. 1, t. 3; *Kunth l. c.* 384; *Strachey Cat. Pl. Kumaon*, 73; *Boeck. l. c.* 88. C. notoleia, *Nees l. c.*; *Kunth l. c.* 388. C. Wallichiana, *Spreng. Syst.* iii. 812 (*not of Prescott*). C. muricata, *var.* indica, *Boott Carex*, iv. 193.—Carex, *Wall. Cat.* 3387.—Himalaya; alt. 6–9000 ft., from Kashmir to Upper Sikkim frequent. Sind; Punwill. Khasia hills; alt. 4000 ft., *Griffith.* PULNEY and NILGHIRI HILLS; *Wight.*—Resembles shorter examples of the European *C. divulsa.* Boott finally reduced the whole series under *C. muricata*, Linn. The Indian var. *foliosa* has the crested anthers and flat leaves of *muricata*, and is thus easily distinguished from *nubigena* even when young. Some of the Indian plants referred here are hardly separable from the American *C. stipata*, Muhl. which extends to Japan and Amurland.

8. **C. Thomsoni,** *Boott Carex*, i. 1, t. 1; stem lignescent with many nodes, spikes ellipsoid androgynous male at top forming a close linear compound spike long overtopped by leaves, style 2 fid, utricle ovoid-triangular thinly obscurely many-nerved with numerous red glands throughout. *Boeck. in Linnæa*, xxxix. 93.

HIMALAYA and KHASIA, alt. 1–5000 ft., from Kumaon, *Thomson*, to UPPER BURMA, *Griffith*, frequent, only on river margins.—DISTRIB. Tonkin.

Stems 1 ft., densely cæspitose, very rigid, black in age, and often shining, perennial, not rarely rooting at top and throwing thence a cluster of stems the next season. *Leaves* numerous, infolded when dry, narrow, far overtopping the infl. *Infl.* often by 4–5 by $\frac{1}{2}$ in., dense, of 25–30 regularly placed brownish spikes. *Utricle* small, brownish, plano-convex, hardly narrowed into the triangular shortly-notched beak.—The younger examples have been mixed with *C. nubigena*, Don, which has the infl. sometimes dense and regular; but in *C. nubigena* the infl. is less overtopped by leaves, and the utricle is more narrowed into the beak.

9. **C. fluviatilis,** *Boott Carex*, iv. 172, t. 582; leaves long narrow equalling the green stem, spikes ellipsoid androgynous male at top numerous forming a close linear compound spike, style 2-fid, utricle ovoid

many-nerved without glands acuminated into a short rough-edged beak. *Boeck. in Linnæa*, xxxix. 93.

UPPER BURMA; Wullaboom in Hookhoom, *Griffith* (*Kew Distrib.* n. 6103).—DISTRIB. China, Japan.

Rhizome woody. *Stems* 1–2 ft. *Infl.* 4–6 by ½–⅔ in., dense, of 40–70 spikes; lowest bract scarcely 1 in. *Spikes* nearly ½ in., straw-colrd. *Utricle* (larger than in *Thomsoni*) plane-convex; nerves 8 on the plane, 12 on the convex face; beak minutely scabrous on edges.—Very near *C. Thomsoni*) but much less rigid; the infl. in fruit resembles that of *Setaria italica*. It is sometimes completely dicœcious; in other cases the infl. has male spikes in the middle fem. at both ends (or at top only) as occurs in *C. disticha*.

10. **C. teretiuscula,** *Good. in Trans. Linn. Soc.* ii. 163 (*excl. tab. cited*); stems 2 ft. scabrous at top, leaves nearly as long as stems narrow, spikes ovoid or ellipsoid androgynous male at top green variegated brown forming a linear oblong interrupted compound spike, style 2-fid, utricle small stalked slightly spongy ovoid conical-beaked gibbous few-nerved on convex face, margins of beak serrate subhyaline almost winged. *Schk. Riedgr.* i. 30, tt. D. 19, & T. 69; *Kunth Enum.* ii. 390; *Boeck. in Linnæa*, xxxix. 104. C. teretiuscula, var. β major, *Boott Carex*, iv. 145, t. 466. C. mitis, *Boeck. l. c.* 104.

KASHMIR, alt. 6–7000 ft., *Thomson*. BHOTAN, *Griffith*, n. 2663 (*Kew Distrib.* n. 6104).—DISTRIB. Cooler N. Hemisphere.

Griffith's example shows no root, but is in ripe fruit; the utricle has a ridge on the nerveless face and about 4 nerves on the middle of the turgid gibbous face, exactly as in European *C. teretiuscula*. Thomson's Kashmir plant has numerous stems closely placed on an intricately branched short weak rhizome; the young utricles are stalked and show the subalate margins of the beak. I put these two plants together, for they must be very closely allied; Mr. J. G. Baker says that neither of them matches exactly *C. teretiuscula*.

** Spikes linear-cylindric, peduncled, inflorescence loose.

11. **C. longipes,** *Don in Trans. Linn. Soc.* xiv. 329, & *Prodr.* 43; infl. long very lax, lowest peduncle solitary usually 1-spiked long, fem. glumes mucronate some aristate, style 2-fid, utricles green or fully ripe yellowish. *Nees in Wight Contrib.* 124; *Kunth Enum.* ii. 418; *Drejer Symb. Caric.* 24, t. 10; *Boott Carex*, iv. 190, *Ic. Ined.* t. 644; *Boeck. in Linnæa*, xl. 376 (*not of Thwaites*).—Carex, *Wall. Cat.* 3388.

NEPAL, SIKKIM, and KHASIA, alt. 4–12,000 ft., common.—DISTRIB. China.

Rhizome short, woody, divided. *Stems* 6–24 in., slender. *Leaves* ⅔ the stem, ⅛ in. broad. Cauline *sheaths* distant, lowest often near base of stem. Lowest *peduncle* usually exsert 2–8 in. (but see var. γ), almost filiform, nodding. *Spikes* 3–10 on each stem, 1–3 in., green or yellowish, usually solitary or lowest with 1 or 2 smaller near base. *Male* glumes obtuse with a minute rough excurrent mucro; anthers submuticous. *Fem.* glumes ovate, acuminate, mucro produced into a rough bristle often overtopping utricle. *Utricles* much flattened, ovoid or ellipsoid, suddenly narrowed into a long beak, distinctly 7–9-nerved on each face, glabrous or scabrous on margin sometimes also on two marginal nerves (see var. β); beak narrowly oblong, deeply bifid, lobes lanceolate erect, scabrous or rarely glabrous on margins. *Nut* much flattened, ⅔ utricle (with beak), ovoid, obtuse, dark brown; style little thickened, exsert branches shorter than utricle.

Var. β *nepalensis*, Boott Carex, iv. 190; utricles scabrous-pilose over both faces. C. macrolepis, *Don in Trans. Linn. Soc.* xiv. 329, & *Prodr.* 42 (*not of DC.*). C. nepalensis, *Spreng. Syst.* iii. 811; *Nees in Wight Contrib.* 125; *Drejer Symb.*

Caric. 23, t. 9; *Kunth Enum.* ii. 391.—Carex, *Wall. Cat.* 3388 (*largely*).—Nepal, *Wallich.*—Kept up as a species by Drejer and Nees, working with one or two pieces only. A good series of material shows a transition from the perfectly glabrous utricle (through forms with one or two marginal nerves scabrous) to the very scabrous utricle; and both Boeckeler and Boott unite the two.

Var. γ *dissitiflora*; stouter with broader leaves and longer utricles, lowest peduncle usually very shortly exsert, spikes elongate very slender the lower utricles solitary, distant.—Nilghiri, alt. 6–7000 ft., *Wight*, *C. B. Clarke.* Anamallays, *Beddome.* Khasia, alt. 5–6000 ft., *C. B. Clarke.*—Perhaps a distinct sp., according to *Drejer Symb. Caric.* 24. Lowest peduncle often carrying 2 or 3 spikes. The Nilghiri plant appears a distinct species; but the Khasia series shows a complete transition from var. γ *dissitiflora* to typical *C. longipes.*

12. **C. brunnea,** *Thunb. Fl. Japon.* 38; infl. long lax, lowest peduncle often several-spiked often 2 or more from one sheath, fem. glumes acute or scarcely mucronate, style 2-fid, ripe utricle brown ellipsoid much flattened pilose (in Indian examples) striate, beak linear, exsert portion of stigmas about as long as utricle. *Schk. Reidgr.* ii 16, t. Xx fig 111; *Kunth Enum.* ii. 392; *Boeck. in Linnæa,* xxxix. 145. C. gracilis, *Br. Prodr.* 242; *Boott Carex,* i. 59, tt. 154, 155, 156 [excl. syn. C. lachnosperma, *Wall.*]; *Thw. Enum.* 355. C. flexilis, *Don Prodr.* 42, not of Rudge. C. lenta, *Don in Trans. Linn. Soc.* xiv. 327; *Kunth l. c.* 418. C. nepalensis, *C. B. Clarke in Journ. Linn. Soc.* xxv. 82, not of Spreng.

N.W. HIMALAYA, alt. 4500–6000 ft., frequent. MUNEYPOOR, alt. 3750 ft., *C. B. Clarke.* ASSAM, *Griffith.* SIND, *Pinwill.* PULNEY and NILGHIRI HILLS, alt. 6–7000 ft., *Wight*, &c. CEYLON, alt. 5000 ft., *Thwaites.*—DISTRIB. The Mascarene Isles, Australia, Japan, Sandwich Islds.

Rhizome oblique. *Stems* 1–3 ft., slender. *Leaves* ⅓ stem, ⅛ in. broad. Cauline *sheaths* somewhat distant, lowest usually above middle of plant. *Peduncles* often several from each sheath, lowest exsert 1–8 in., slender, nodding, sometimes bearing 3–10 spikes. *Spikes* 1½–2 in., slender. Male *glumes* obtusely triangular, reddish-brown. Fem. *glumes* ovate, apex triangular, ultimately ferruginous-brown. *Utricle* rather small, not parallel-sided, 9–15-nerved on each face, minutely hairy on nerves, suddenly narrowed into a beak about ¼ utricle; beak shortly bifid, lobes erect. *Nut* much flattened, ovoid, suddenly narrowed at top, yellow-brown, nearly filling utricle except beak. *Style* about as long as beak, slightly swollen, contracted at base; branches long very brown, but much shorter than in the two following species.—Limits and geographic range uncertain. In many of the non-Indian examples the utricles are glabrous, or there are several peduncles even from the middle sheaths of the inflorescence.

13. **C. teinogyna,** *Boott Carex,* i. 60, t. 158; infl. long lax, peduncles often 2 or more from one sheath bearing 1 or few spikes, fem. glumes acute often mucronate, ripe utricle brown oblong much flattened striate, beak linear long deeply bifid, style 2-fid branches longer than utricle. *Boeck. in Linnæa,* xxxix. 145.

KHASIA and JAINTEA HILLS, alt. 3–5000 ft., *Griffith*, &c.

Resembling *C. brunnea,* Thunb., but a slenderer plant with narrower leaves. *Utricle* remarkably parallel-sided, suddenly narrowed into a linear beak nearly as long as itself, many-nerved on both faces, often minutely scabrous pilose on all the nerves, the minute hairs sometimes only on the margins or near the top very rarely wanting; lobes of beak erect. *Nut* oblong, filling utricle. Branches of *style* 2, very long, brown red, persistent on ripe fruit.

14. **C. longicruris,** *Nees in Wight Contrib.* 124; infl. long lax, peduncles often 2 or more from one sheath bearing 1 or few spikes, fem.

glumes lanceolate acute, style 2-fid, ripe utricle ferruginous much flattened ovate-lanceolate acuminate into beak glabrous except green margins, beak slightly notched with the green scabrous margins incurved, exsert portion of style-branches fully as long as utricle. *Kunth Enum.* ii. 417; *Boott Carex*, i. 59, t. 157; *Boeck. in Linnæa*, xxxix. 148. C. longipes, *Thw. Enum.* 355.

W. HIMALAYA; from Kishtwar, alt. 4000 ft., *C. B. Clarke*, to Nepal, *Wallich.* NILGHIRIS, *Perrottet, Wight*, alt. 8000 ft., *C. B. Clarke.* CEYLON, *Thwaites* (C.P. 2749).

Very similar to *C. longipes, brunnea*, and *teinogyna*, but distinct by the utricle. *Utricle* long, triangular-acuminate, the strictly linear portion of beak short; plane face 7–9-nerved, convex face 15-nerved bright ferruginous yellow with two scabrous green margins, margins in lower half of beak incurved over the plane face. Fem. *glumes* shorter than utricle. Branches of *style* 2, nearly as long as in *C. teinogyna.*

Sect. 2. REMOTÆ. Terminal spike male at base fem. at top (or rarely fem. in the middle male at both ends or accidentally wholly male), the other spikes male at base or the lower often wholly fem.

* Spikes short, sessile or nearly so, ovoid or oblong, dense. Glumes pale.

15. **C. remota,** *Linn. Sp. Pl.* 1383; infl. elongate, lower spikes distant, lowest bract long usually overtopping infl., style 2-branched, utricle ellipsoid flattened narrowed into an oblong beak slenderly many-nerved on both faces. *Schk. Riedgr.* i. 46, & ii. 22, t. E, fig. 23; *Nees in Wight Contrib.* 121; *Kunth Enum.* ii. 404; *Reichb. Ic. Fl. Germ.* viii. 8, t. 212, figs. 556, 557; *Boott Carex*, iv. 198, & *Ic. Ined.* 669, 670; *Boeck. in Linnæa*, xxxix., p. 129. C. axillaris, *Linn. Sp. Pl.* 1382. Vignea remota, *Reichb. Fl. Germ. Excurs.* p. 58.

N. TEMPERATE HEMISPHERE.

Glabrous. *Rhizome* short, slender, without stolons. *Stems* clustered, 1–2½ ft., slender. *Leaves* ⅔ stem, scarcely ⅛ in. broad, weak. *Infl.* often half length of plant, lower spikes solitary 1–3 in. apart; lowest bract 4–10 in., very narrow, weak. *Spike* ½–¾ in., ellipsoid, greenish. *Glumes* ovate, acute, keel green, sides pale. *Anthers* linear, muticous. *Utricle* small, glabrous, scabrous on margin; beak 2-fid, lobes erect; margins scabrous. *Nut* subovoid, flattened, ⅔ utricle excluding beak.

Var. β *Rochebruni* (sp.), Franch. et. Savat. Pl. Japon. ii. pp. 126, 555; utricles nerveless on plane face, very slenderly 3–5-nerved on convex face, gradually narrowed upwards into a narrow-triangular beak.—Temperate Himalaya; from Kashmir, alt. 7–8000 ft., to Sikkim, alt. 7–12,000 ft., &c., and KHASIA HILLS, alt. 4500 ft.—Beak of utricle is, in all Indian material, more or less winged, in this (as in the nerveless plane face) showing an approximation to 17. *C. alta.* In general appearance, it matches well typical European *C. remota.*

16. **C. canescens,** *Linn. Sp. Pl.* 1383; infl. linear, spikes short cylindric approximate, bracts short lowest much shorter than infl., style 2-branched, utricle ovoid flattened narrowed into a short triangular beak slenderly 8–10 nerved on both faces. *Reichb. Ic. Fl. Germ.* viii. 7, t. 206, figs. 546, 547; *Boott Carex*, iv. 154, t. 496; *Boeck. in Linnæa*, xxxix. 122. C. curta, *Gooden. in Trans. Linn. Soc.* ii. [1794] 145; *Schk. Riedgr.* i. 43, & ii. 21, t. C, fig. 13; *Kunth Enum.* ii. 403. Vigna canescens, *Reichb. Fl. Germ. Excurs.* 58.

KASHMIR, alt. 6–12,000 ft., *C. B. Clarke.*—DISTRIB. Cooler parts of globe.

Glabrous. *Rhizome* short, slender, without stolons. *Stems* clustered, 2 ft. *Leaves* ⅔ stem, $\frac{1}{6}$-$\frac{1}{5}$ in. broad. *Infl.* 2-5 in., lower spikes solitary, 1 in. apart; lowest bract setaceous, about 1 in. long. *Spikes* ¼-½ in., greenish. *Utricle* small, glabrous, often nearly smooth on margin; beak triangular, hardly notched, minutely glandular-scabrous.

17. **C. alta,** *Boott in Proc Linn. Soc.* i. 254, & *in Trans. Linn. Soc.* xx. 130, & *Carex*, i. 59, t. 153; larger and stouter in all its parts than *C. remota*. beak of utricle strongly winged, so that utricle is widest in its upper half, nut small not filling utricle (otherwise as *C. remota*). *Boeck. in Linnæa*, xxxix. 126. C. Brizopyrum, *Kunze Suppl.* 169, t. 43.

KHASIA; Molim, alt. 5800 ft., *C. B. Clarke.* MUNEYPOOR, alt. 5-6000 ft., *Watt.* —DISTRIB. Java.

Altogether resembles a large *C. remota*. *Leaves* and *bracts* up to $\frac{1}{5}$-$\frac{1}{4}$ in. broad. *Spikes* often ½ in., cylindric. *Utricle* in outline elliptic with a short point, scabrous almost serrulate on the green shoulders formed by the wings of the beak, with a groove on the plane face below the termination of the slit of the beak.

18. **C. cooptanda,** *C. B. Clarke*; small, leaves linear, spikes 2 cylindric short dense close together, upper male at base pale brown, bracts hardly any, style 2-branched, utricle ovoid flattened narrowed into a short conical subentire beak nerveless smooth.

KHASIA HILLS: *Griffith.*

Glabrous. *Rhizome* slender, creeping, divided. *Stems* 6 in., slender. *Leaves* 4 by $\frac{1}{16}$ in. *Spikes* ⅛ in. apart, upper ⅛ by ⅛ in., lower rather smaller female. *Glumes* as long as utricles, ovate, obtuse, brownish with scarious margin upwards. *Utricle* $\frac{1}{10}$ in. long, without glands; exsert part of stigmas as long as utricles.—There are three excellent specimens, exactly like each other, and very unlike any other Indian Carex, with the note of Boott on them in Herb. Hooker stating that they were collected by Griffith in Assam.

** Spikes long-cylindric or linear, lower peduncled. Glumes coloured.

19. **C. prælonga,** *C. B. Clarke*; tall, leaves long, spikes 4-9 linear nodding, styles 2-fid, utricle broadly ovoid compressed nerveless smooth suddenly narrowed into a very short linear subentire beak. C. phacota, β minor, *C. B. Clarke in Journ. Linn. Soc.* xxviii. 141.

SIKKIM, alt. 7-9000 ft., frequent, *C. B. Clarke.*

Glabrous, tufted, lower sheaths shining, brown. *Stems* 2-3 ft. *Leaves* 18 by ¼-⅓ in. Lowest *spike* ½-3 in. distant; peduncle ½-3 in. long; bract overtopping infl., not sheathing. *Spikes* 4 by ⅛ in. terete; terminal male at base, fem. in middle, fem. or male (sometimes branched) at top. Fem. *glumes* as long as utricles, 3-nerved, green on back, black-purple on side, emarginate or acuminate, excurrent green tip often scabrous. *Utricle* ⅛ in., obovate turgid, yellow-brown, whole surface minutely yellow-glandular-punctate; beak exactly linear, granular-glandular, becoming very white when quite ripe, shortly notched; stigmas shortly exsert. *Nut* obovoid, biconvex, very smooth, nearly filling utricle.

Var. β *angustior;* stems 12-18 in. slender more scabrous, leaves scarcely ⅛ in. broad, spikes 3-1 in.—Khasia Hills, alt. 4-6000 ft., *C. B. Clarke.* Burma; Shan States, alt. 5000 ft., *Collett.*—Terminal *spike* occasionally wholly male. There are still 16 Sikkim and 34 Khasi specimens of this species in my collection, which show that Boott was right in attaching moderate importance to the sex of the terminal spike.

20. **C. teres,** *Boott Carex*, i. 62, t. 167 (excl. lower utricle); tall, leaves long, spikes 4-9 linear nodding, styles 2-fid, utricle ellipsoid compressed

nerved smooth gradually passing into a conical entire beak. *Boeck. in Linnæa*, xl. 393.

SIKKIM, alt. 8–9000 ft.; Sinchul, *J. D. H.*; Tonglo and Sundukphoo, *C. B. Clarke, &c.*

Glabrous, tufted, lower sheaths shining brown. *Stems* 3 ft. *Leaves* 18 by ¼ in. Lowest *spike* ½–4 in., distant; peduncle 2–4 in. long; bract overtopping infl., not sheathing. *Spikes* 5 by ¼ in., terete; terminal male at base, fem. in middle and usually at top. Fem. *glumes* as long as the utricles, oblong-lanceolate, aristate, broadly 3-nerved, green on the back, sides black-purple, bristle green scabrous. *Utricles* ⅛ in., turgid, fuscous, 7–11-nerved on each face, whole surface minutely yellow-glandular-punctate; beak scarcely granular, hardly notched; stigmas very shortly exsert. *Nut* ovoid, somewhat narrowed upwards.—This species, from the root to the glumes, is extraordinarily like *C. prælonga*, but rather stouter; the fruiting spikes and utricles are totally unlike.

21. **C. sikkimensis,** *C. B. Clarke*; tall, leaves long narrow, spikes 4–7 linear clavate, styles 2-fid, utricle ellipsoid compressed most slenderly nerved brown smooth narrowed into a conico-linear entire beak.

SIKKIM; Jongri, alt. 12–13,000 ft., *C. B. Clarke.*

Lowest *spike* 2–3 in. distant; peduncle 2–3 in. long; lowest bract overtopping the infl., not sheathing. *Spikes* 2 by ¼ in., terminal usually fem. at top clavate, sometimes fem. only in the middle, sometimes wholly male. Fem. *glumes* as long as utricles, oblong-lanceolate, not or scarcely mucronate, black-purple, back pale yellow. *Utricle* ⅛ in., stalked, not glandular; beak oblong from a conical base, glandular-scabrous; stigmas exsert ⅔ the length of utricle. *Nut* ellipsoid, ½ the length of whole utricle.—Not closely allied to the preceding species; it has the utricle identically of *C. notha* from which it differs not only in the fem. top of the terminal spike, but in its larger size and much larger spikes.

22. **C. cernua,** *Boott Carex*, iv. 171, t. 578; leaves long, spikes 4–8 cylindric very dense, styles 2-fid, utricle broadly ovate much compressed nerveless densely glandular subscabrous to base rich-brown, beak conical entire.

ASSAM; to Sudiya, *Jenkins, Simons, Griffith* (*Kew Distrib.* 6099).—DISTRIB. Tonkin, Japan.

Stems 12–18 in. *Leaves* as long as stem, up to ¼ in. broad. Lowest *spike* ½–2 in. distant; peduncle ½–2 in. long; bract overtopping infl., not sheathing. *Spikes* up to 2½ by ¼ in.; terminal one male at base (sometimes fem. in middle male at both ends). Fem. *glumes* as long as utricle, 3-nerved, green on back, bristle lanceolate excurrent rough. *Utricle* scarcely ⅛ in., stalked; conical beak undistinguishable from utricle with no (or hardly any) linear termination.—In *C. prælonga* the whole utricle is sprinkled with minute yellow translucent glands sunk in the substance of utricle; in *C. cernua* the glands are very thick, white, almost depressed papillæ. *C. cernua* appears really nearer *C. phacota* than *C. prælonga*, but differs from both in the densely packed utricles.

Sect. 3. *Vulgares.* Terminal spike male, the others fem. or male at top, solitary.

23. **C. phacota,** *Spreng. Syst.* iii. 826: spikes 3–11 lower nodding on slender peduncles linear-cylindric, fem. glumes with an excurrent green scabrous tip, styles 2-fid short, utricle ovoid flat nearly nerveless glandular to the base, beak short triangular with hardly any linear prolongation. *Nees in Wight Contrib.* 126; *Kunth Enum.* ii. 420; *Drejer Symb. Caricol.* 15, t. 4 (excl. *C. punctata & notha*); *Boott Carex*, i. 63, t. 168; *Thw. Enum.* 356; *Boeck. in Linnæa*, xl. 434. C. lenticularis, *Don in Trans. Linn. Soc.*

xiv. 331, & *Prodr.* 43 (*not of Mich.*). C. platycarpa, *Hochst. Steud. Syn. Cyp.* p. 214.—Carex, *Wall. Cat.* 3394 (type sheet), 3395 A, *partly*.

HIMALAYA, alt. 4–7000 ft., from Gurwhal to Bhotan, frequent. KHASIA HILLS, alt. 2–6000 ft., and PATKOY MTS., *Griffith*. ASSAM; Luckimpore at 300 ft. TENASSERIM, alt. 3500 ft. PACHMARI, PULNEYS, NILGHIRIS, and CEYLON, alt. 4–6000 ft.—DISTRIB. Malaya, Japan.

Glabrous. *Rhizome* woody, short. *Stems* closely tufted, 1–2½ ft., triquetrous. *Leaves* often as long as stem, ¼ in. wide. *Infl.* usually 4–6 in., lowest spike 1–2 in. distant; lowest bract usually far overtopping the infl., but sometimes shorter than it, not sheathing. Fem. *spikes* 1–2 in. (sometimes longer) by ¼ in., in fruit appearing purple with green linear marks (glumes); male spike 1–2 in., rather slender lax, pale ferruginous. *Fem. glumes* narrow, rather longer than utricle, green 3-nerved on back, sides pale ferruginous or scarious. *Utricle* about ⅛ in., usually dark purple with a green margin, densely granular with red-purple glands throughout; mouth of beak entire.—The large quantity of this common species now to hand leaves hardly any absolute characters to distinguish it from the two following. In some, the bracts are slender, shorter than the infl.; in others, the beak of the utricle has a distinct linear prolongation nearly as in the very close *C. Arnottiana*. The colour of the plant glumes and spikes varies much from the type; the Ceylon examples have the spikes a rich brown (as in *C. Arnottiana*). The most general characters for *C. phacota* appear to be the rough excurrent green tip of the fem. glume with the utricle dense with glands to its base.

24. **C. pruinosa,** *Boott in Proc. Linn. Soc.* i. 255; *Trans. Linn. Soc.* xx. 131, & *Carex*, i. 65, t. 174; spikes broader laxer than in *C. phacota*, utricle larger ⅛ in. long, obscurely 3–5-nerved; otherwise as *C. phacota*, of which Boeckeler esteems it a form.

EAST BENGAL, *Griffith* (*Kew Distrib.* n. 6106). KHASIA HILLS, alt. 4200 ft., *C. B. Clarke*.—DISTRIB. Java.

Boott (Carex, iv. 198, Ic. Ined. 667) has brought here his *C. picta* from Japan, which has nerveless utricles.

25. **C. Arnottiana,** *Nees ms.*; *Drejer Symb. Caricol.* 16, t. 5; excurrent tip of glume smooth, utricle glandular in its upper half, beak short triangular with a minute linear prolongation, otherwise as *C. phacota*. *Boott Carex*, iv. 178, *Ic. Ined.* 607 (*not in Trans. Linn. Soc.* xx. 129); *Thw. Enum.* 356; *Boeck. in Linnæa*, xl. 435.—C. socia, *Boott in Proc. Linn. Soc.* i. 254, & *in Trans. Linn. Soc. l. c.* 128.

CEYLON; elevated parts of Central Province, *Walker, Thwaites*.

26. **C. notha,** *Kunth Enum.* ii. 421; spikes 3–7 lower on slender peduncles linear-cylindric, fem. glumes obtuse or minutely mucronate, styles 2-fid shorter than utricle, utricle ellipsoid plane-convex slenderly 3–5-nerved minutely glandular narrowed suddenly into a short linear beak. *Boott Carex*, i. 8, t. 24; *Boeck. in Linnæa*, xl. 433. C. Victorialis, *Nees in Wight Contrib.* 126 (style erroneously 3-fid); *Kunth Enum.* ii. 516. C. punctata, *Nees l. c.* 127 (*not of Gaudin*). C. Benthamiana, *Boott in Royle Himal.* 412. C. phacota, *Drejer Symb. Caricol.* 15 (*partly*).

HIMALAYA, alt. 5–11,000 ft., from Chini, *Jacquemont*, and Gurwhal, *Thomson*, to Bhotan, *Griffith*.

Male *spikes* 2 in., brown. Lowest *bract* hardly so long as infl. *Glumes* green, obscurely 3-nerved on back, often quite muticous; if a small mucro it is quite unlike *C. phacota*, in which the whole green width of the glume is produced as an oblong-linear flat tip. *Utricle* exceeding the glume about ½ in., with round or linear, yellow or brown, scattered sunk glands; beak slightly notched, minutely granular.—Otherwise as *C. phacota*.

27. **C. fucata,** *Boott ms.*; spikes dense blackish, styles 2 fid exsert about ½ length of utricle, utricle nerveless, otherwise nearly as *C. notha.*

SIKKIM; Lachen, alt. 9–12,000 ft, *J. D. H.*

Lowest *bract* far overtopping infl. *Spikes* much more densely packed, and thicker than in *C. notha*; glumes rather longer, black with a linear green mark on back. Lowest *spike* 3–10 in. distant in some examples.

28. **C. rubro-brunnea,** *C. B. Clarke*; spikes 4–8 close together nearly sessile, styles 2-fid persistent very long red-brown, utricle ellipsoid plane-convex very slenderly 3–5-nerved or nerveless minutely glandular narrowed suddenly into a short linear beak. C. heterolepis, *Boott in Perry Exped. Japan*, ii. 327, not of Bunge.

KHASIA HILLS, alt. 2–6000 ft., very common, *C. B. Clarke.* MUNEYPOOR, *Watt.*—DISTRIB. China, Japan.

Glabrous. *Rhizome* woody, short. *Stems* clustered, 1–2 ft. *Leaves* numerous, often as long as culm, scarcely ⅛ in. broad. *Spikes* 2–3 by ⅛–⅛ in., brown-red, often comose by long persistent styles; male spike paler; lowest spike rarely 1 in. distant; lowest bract much overtopping inflorescence. Fem. *glumes* ovate-triangular, muticous or nearly so, rich brown with yellow keel. *Utricle* very nearly as of *C. fucata* (or *C. notha*), but exsert part of style-branches much longer than utricle.

29. **C. Prescottiana,** *Boott in Proc. Linn. Soc.* i. 286, *& in Trans. Linn. Soc.* xx. 135, *& Carex*, i. 45, t. 115 (*excl. Hawaii plant*); spikes 3–6 lower peduncled 4–6 in. long slender, styles 2-fid, utricle small compressed ovoid slightly nervose smooth eglandular beakless. C. producta, *Boott in Herb. Hook.* C. teres ? partly, *Boott Carex*, i. 62, t. 167 (*lower utricle only*). —Carex, *Wall. Cat.* 3386.

NEPAL, *Wallich.* KHASIA HILLS, alt. 4500 ft.; Myrung and Nunklow, *J. D. H.* —DISTRIB. Japan.

Glabrous. *Stems* 1½–2½ ft. *Leaves* nearly as long as stem, up to ¼ in. broad. Lowest *spike* 1–5 in. distant, peduncle ½–2 in.; lowest bract equalling infl., not sheathing; terminal spike 2½ in. by ⅛ in., male, with a short second male spike often added. Fem. *spikes* nodding, wavy, ⅛ in. broad, yellow brown in fruit. Fem. *glumes* about as long as utricles with a short excurrent tip or obtuse. *Utricle* scarcely ⅛ in., slightly inflated, irregularly 3–5-nerved on each face, with a very few scattered sunk obscure glands, suddenly narrowed at top to a small entire mouth, hardly microscopically a beak.—Very near *C. prælonga*, but the utricles are smaller, less nerved, without linear beak; and in all the specimens seen the terminal spike is *wholly* male.—In his "Carex" i. 62, t. 167 (and herbarium), Boott mixed this with *C. sandwicensis*, Boeck. (C. Prescottiana, *H. Mann*) from the Sandwich Isles of which the utricle differs materially. I think it probable that *C. Prescottiana*, Boott. was *C. heterolepis*, Bunge, Enum. Pl. Chin. Var. [1831] 69 (*not of Boott*); for Bunge says his *C. heterolepis* resembled *C. pendula*, but had a bifid style.

30. **C. cæspititia,** *Nees in Wight Contrib.* 127; spikes 4–10 lowest subsessile or erect on a short peduncle cylindric dense rigid, styles 2-fid, utricle ovoid compressed irregularly few-nerved smooth eglandular suddenly narrowed into a minute entire beak. *Kunth Enum.* v. 2, p. 412; *Boott Carex*, iv. 133, t. 428, fig. 3; *Boeck. in Linnæa*, xl. 437.—Carex, *Wall. Cat.* 3392.

SYLHET, *Wallich, C. B. Clarke.*

Glabrous, 2 ft. high, habit of *C. rigida*, Gooden., but with a most irregular infl. Terminal male *spike* sometimes 4 in. usually 0–2 in. above the next, 2 in. long,

pale, slender, or shorter thicker purple-chestnut. Fem. *spikes* often 1 by ¼ in., often 2–7 fascicled with 1 or 2 remote below, frequently with 1–6 rectangularly divaricate short branches. *Utricles* greyish with green margins, and 1–4 irregular green nerves.—Appears *always* thus irregular ; the rhizome is usually woody, short, but sometimes the stem at base appears slender decumbent rooting in mud. Easily recognized, as being the only low-level Indian species at all resembling *C. rigida*.

31. **C. rigida**, *Gooden. in Trans. Linn. Soc.* ii. 193, t. 22, fig. 10; stems 4–8 (rarely 10–12) in., leaves (dried) flat or margins near base slightly recurved, spikes 3 or 4 close together cylindric short dense, bracts not overtopping the infl., styles 2-fid, utricle ellipsoidal flattened smooth nearly nerveless apiculate by minute entire beak. *Schk. Riedgr.* i. 56, & ii. 25, t. U, fig. 71; *Reichb. Ic. Fl. Germ.* viii. 12, t. 225, fig. 578; *Boeck. in Linnæa*, xl. 414. C. saxatilis, *Schk. l. c.* 54, & ii. 25, tt. i., fig. 40, & tt. fig. 40; *Kunth Enum.* ii. 410. C. vulgaris, *var.* alpina, *Boott Carex*, iv. 167, tt. 568–574. C. orbicularis, *Boott in Proc. Linn. Soc.* i. 254, & *in Trans. Linn. Soc.* xx. [1851] 134.

ALPINE HIMALAYA and W. TIBET, alt. 9–13,000 ft., from Gilgit, *Giles*, to Sikkim, *J. D. H.*—DISTRIB. Cooler parts of the World.

Stoloniferous. *Leaves* often curved. *Spikes* ½–⅝ by ⅛–¼ in. *Fem. glumes* ovate-triangular, acute scarcely mucronate, chestnut-purple.—In the original *C. orbicularis* Boott, the utricles are unusually large, but not larger than in some European forms.

32. **C. vulgaris**, *Fries Nov. Mant.* iii. 153, & *Summ. Veg.* 230; stems often 10–20 in., leaves (dried) conduplicate, spikes less close longer, utricle more or less slenderly nerved, otherwise as *C. rigida*. *Reichb. Ic. Fl. Germ.* viii. 13, tt. 226, 227; *Boott Carex*, iv. 166, tt. 557–567; *Boeck. in Linnæa*, xl. 416. C. cæspitosa, *Schk. Riedgr.* i. 57, & ii. 27, figs. A a, t. 85, a, b, & B b, t. 85, c, d, e; *Kunth Enum.* ii. 411.

N.W. HIMALAYA and W. TIBET, alt. 10–13,000 ft., from Gilgit, *Giles*, to Lahoul, *Jaeschke*, frequent.—DISTRIB. Cooler parts of the World.

Some of the material Mr. Baker considers good Yorkshire *C. vulgaris*, but there are many examples which he considers do not match either *C. vulgaris*, Fries, or *C. rigida*, Gooden.

Var. β *distracta*; spikes less close, lowest 2–7 in. distant.—Kashmir; Gurais, alt. 8000 ft., *C. B. Clarke*.—Altogether unlike any European form, *J. G. Baker*.

33. **C. erostrata**, *Boott ms.*; utricles obovoid compressed beakless, otherwise as C. rigida, *Strachey Cat. Pl. Kumaon*, 73; *Duthie in T. E. Atkins. Gazetteer*, x. 618.

KUMAON; Barji Kang Pass, alt. 14,500 ft., *Strachey & Winterbottom* (*Carex*, n. 22).

Instead of a minute beak there is a triangular notch at the top of the utricle. "I cannot recollect ever seeing any *C. rigida* like it," *J. G. Baker*.

Subgenus II. CAREX *proper*. Style-branches 3 (see also 2. *C. stenophylla*).

Sect. 4. RARÆ. Stem with 1 spike (see also 42. *C. radicalis*), fem. at base. Seta (i.e. rudiment of the suppressed upper part of spikelet) often present within utricle. Bract hardly longer than fem. glumes.

34. **C. microglochin**, *Wall. in Handl. Kong. Akad. Stockh.* 140, & *Fl. Lapp.* 224; spike ¼–½ in., style-branches 3, utricles lanceolate acu-

minate glabrous striate, ripe deflexed with seta protruded. *Schk. Riedgr.* 32, t. Ssss, fig. 110; *Kunth Enum.* ii. 424; *Reichb. Ic. Fl. Germ.* viii. 3, t. 196; *Boott Carex*, iv. 174, t. 589; *Boeck. in Linnæa*, xxxix. 32. Uncinia microglochin, *Spreng. Syst.* iii. 830; *C. B. Clarke in Journ. Linn. Soc.* xx. 401. U. europæa, *J. Gay in Flora* [1827] 28. Leptolepis tibetica, *Boeck. Cyp. Nov.* i. 31 (*partly*, i. e. Schlagintweit, n. 6450).

N.W. HIMALAYA and W. TIBET, alt. 11–15,000 ft.; from the Karakorum, *Thomson*, to Kunawur, *Jacquemont*, frequent.—DISTRIB. N. Europe, Asia, Greenland.

Glabrous. *Rhizome* slender, very short. *Stems* 6–12 in., slender. *Leaves* scarcely ½ length of stems, setaceous. *Spike* pale brown, in flower hardly $\frac{1}{10}$ in. broad. Fem. *glumes* ovate, obtuse, obscurely nerved, shorter than utricle. *Utricle* about ⅛ in. (includ. exsert rigid seta often more than ¼ in.); beak terete, mouth entire. *Nut* oblong-ellipsoid, brown, about ¼ utricle.—In fruit the seta hardens into a straight smooth yellow linear cone filling the mouth of the utricle; at its apex is often a curved point articulated which sometimes is a rudimentary male fl.—*Uncinia* differs from *Carex* only by the hooked end of the seta, but the hook is as much developed in *C. microglochin* as it is in *U. Kingii*; and the only reason for not putting *C. microglochin* into *Uncinia* is that the latter genus is very nearly confined to the S. Hemisphere.

35. **C. parva,** *Nees in Wight Contrib.* 120; spike ¼–¾ in., style-branches 3, utricles lanceolate acuminate long-beaked glabrous striate, ripe deflexed with seta included. *Kunth Enum.* ii. 419; *Boott Carex*, i. 56, t. 418; *Boeck. in Linnæa*, xxxix. 38. C. macrorrhyncha, *Karel. et Kiril. in Bull. Soc. Mosc.* iii. [1842] 521.

HIMALAYA, alt. 11–12,000 ft, from KASHMIR (Deosai), *Winterbottom*, to SIKKIM (Lachen), *J. D. H.*—DISTRIB. Central Asia.

Resembles *C. microglochin*, but stouter in all its parts. *Spike* brown or chestnut. Fem. *glumes* ovate, acute, lower aristate, lowest empty sometimes ½ in. (a bract). *Utricle* usually ¼ in. and more (much like that of *C. microglochin* reckoning in the seta); beak slender terete with oblique subentire mouth. *Seta* sometimes carrying a rudimentary minutely hairy glume, but included.

36. **C. linearis,** *Boott Carex*, i. 51, t. 136; spike 2–3 in. linear, style-branches 3, utricle oblong complete glabrous nerveless beak linear-conic as long as nut with a slit on posticous face extending ⅔ length of beak. *Boeck. in Linnæa*, xxxix. 36. C. Esenbeckii, *Boott in Proc. Linn. Soc.* i. 285, & *in Trans. Linn. Soc.* xx. 133 (*mainly, not of Nees*). C. elynoides, *J. Gay ms.* Hemicarex sp., *Benth. in Gen. Pl.* iii. 1072. H. trinervis, *C. B. Clarke in Journ. Linn. Soc.* xx. 382, chiefly (*not Kobresia trinervis*, Boeck.). Uncinia nepalensis, *Nees ms.*

HIMALAYA, alt. 11–14,000 ft.; from KASHMIR, *Levinge*, to SIKKIM (Lachen), *J. D. H.*

Glabrous. *Rhizome* short, woody. *Stems* densely tufted, clothed at base with testaceous or subcastaneous sheaths becoming torn and fimbrillate; stems ultimately 1–2 ft., in flower often only a few inches. *Leaves* in flower often 2 or 3 in., subsequently 1 ft., setaceous. *Spike* nearly always bisexual, ⅛ in. broad, loose at base. Fem. *glumes* elliptic-oblong, greenish then pale brown, obtuse, lower distant aristate bract-like. *Utricle* ¼ in. long, thin, passing into the beak. *Nut* filling utricle, exactly oblong, trigonous, pale brown, one angle pressing against posticous face of utricle.—Confounded by Boott originally with *C. Esenbeckii* (i. e. *Kobresia trinervis*, Boeck.), and by Bentham and myself. Boott's figure is correct, but in his Herb. he has *Kobresia trinervis* still partly mixed, nor has he perhaps discussed the synonymy quite satisfactorily. Most of the material is easily sorted, because *K. trinervis*

abounds in spikes wholly male, whereas in *C. linearis* the spikes are fem., at top male. But in *K. trinervis* there occur fem. spikes shortly male or barren at top, and these exactly resemble spikes of *C. linearis*. The only diagnostic difference appears to be that in *K. trinervis*, the bracteole (homologous with utricle of *Carex*) is split on the posticous face nearly to its base so that the nut is partially protruded; in *C. linearis* the beak of the utricle is split on the posticous face nearly (not quite) to its base, so that the nut is completely inclosed in the utricle. The habit of *C. linearis* is entirely that of a *Kobresia*, and the two genera touch at this point.

Var. β. *elachista;* stems (with nearly ripe fruits) scarcely 2 in., leaves exceeding stems, spikes in fruit ½ in., very slender all bisexual 2–4-nutted.—W. Nepal, alt. 11–12,000 ft., *Duthie* (n. 6091).—This looks like a distinct species; but there is little of it, and except in size no distinction between it and *C. linearis* has been discovered.

37. **C. vidua,** *Boott ms.*; spike 1 in. linear, style-branches 3, utricle (including beak) oblong-ellipsoid glabrous without nerves, beak as long as nut with a slit on posticous face extending ½ length of beak.

SIKKIM; Lachen, alt. 13,000 ft., *J. D. H.*

Glabrous. *Stems* 6 in., rigid, clustered, at base covered by dark-chestnut shining fimbrillate sheaths. *Leaves* nearly as long as stems, setaceous. *Spikes* seen wholly fem., about ⅛ in. broad, denser, more rigid, than in *C. linearis*. Fem. *glumes* ovate, obtuse, brown, yellow-backed, lowest hardly aristate. *Utricle* with beak ⅛–¼ in. long; utricle proper obovoid, scarcely longer than the obovoid, nut passing imperceptibly into an ovoid compressed beak of same length and width, scabrous on margins, top obtuse.—A strange plant marked by Boott "dioica," the 4 spikes seen have some sterile glumes at top.

38. **C. rara,** *Boott in Proc. Linn. Soc.* i. 284, & *in Trans. Linn. Soc.* xx. 139, & *Carex*, i. 44, t. 109; rhizome very short slender, stems and leaves very slender, spike ½–¾ by ⅛–⅛ in. dense, style 3-branched, utricle ovoid-pyramidal many-ribbed glabrous. *Thw. Enum.* 354; *Boeck. in Linnæa*, xxxix. 36. C. nana, *Boott in Mem. Amer. Acad. N. S.* vi. 418, & *Carex*, iv. 139, t. 449, fig. 2. C. capillacea, *Benth. Fl. Austral.* vii. 438 (*scarcely of Boott*).

BHOTAN, *Griffith.* KHASIA HILLS, *Griffith*, alt. 6000 ft., *C. B. Clarke.* CEYLON, alt. 6000 ft., *Thwaites.*—DISTRIB. Japan, Borneo, Austral.

Glabrous. *Stems* 4–20 in., tufted. *Leaves* often half as long as stems, setaceous. *Spikes* nearly all bisexual, terminal male portion shining ferruginous, very narrow. Fem. *glumes* ovate, obtuse, 3-nerved, shorter than utricles. *Utricle* in fruit close, spreading at right angles, with no linear tip to beak or a most minute subrecurved mucro, strongly closely ribbed without glands, or in Khasi examples sometimes with fewer weaker ribs and scattered large glands between (= the Japan *C. nana*, Boott).

39. **C. capillacea,** *Boott Carex*, i. 44, t. 110; rhizome 0, stems and leaves capillary, spike ¼–⅓ by ⅒–⅛ in. dense, style 3-branched, utricle ovoid-pyramidal many-ribbed glabrous. *Boeck. in Linnæa*, xxxix. 37.

SIKKIM, alt. 9–12,000 ft., *J. D. Hooker*, &c. BHOTAN, *Griffith.*—DISTRIB. Japan.

Stems 4–10 in., tufted.—Smaller in all its parts than *C. rara*, but I see no other difference.—The Australian plant called by Bentham *C. capillacea* has leaves and spikes as wide as *C. rara*, and I refer it to *rara* accordingly; it might be all treated as one.

Sect. 5. INDICÆ. Terminal spike fem. at base male at top; or, when spikes very numerous, many male at top, terminal (1 or few) sometimes wholly male.

* Subscapose, basal leaves long, cauline leaves and bracts very short.

40. **C. cyrtostachys,** *Brongn. in Bot. Voy. Coquille* 152, t. 25; infl. compound, spikes linear-oblong lax pale, style 3-fid, utricle ellipsoid-trigonous many-nerved minutely hairy, beak scarcely ¼ utricle. *Kunth Enum.* ii. 513; *Moritzi Verz. Zoll. Pfl.* 98; *Boott Carex*, ii. 103, t. 310; *Boeck. in Linnæa,* xl. 327.—Carex, *Wall. Cat.* 3383.

PENANG; *Wallich.* PERAK; alt. 3500 ft. *King's Collector,* SINGAPORE, *Ridley.*—DISTRIB. Malaya, China.

Glabrous, except utricle. *Rhizome* horizontal, thick. *Leaves* many, subradical, 1-2 ft. by ⅛–⅓ in., flat, tough, many-nerved. *Scapes* numerous, 4–9 in., with sheaths and peduncles nearly throughout their length; bracts 0–½ in., linear; peduncles exsert 0–1 in., 1–5-spiked. *Spikes* ¾ by ⅛–¼ in. *Fem. glumes* ovate, acute, scarcely mucronate, shorter than utricle. *Utricle* ⅛ in.; beak scarcely notched. *Style* with its 3 branches short, style-base linear. *Nut* "distorted by depressions," *Boott*, gynophore small yellow, there are two main lateral excavated patches. (The only Indian species that has a strongly excavated-distorted nut.)

41. **C. Helferi,** *Boeck. in Linnæa*, xl. 365; basal leaves long up to 1 in. broad, scape with 4–6 distant peduncles each carrying one dense ovoid-cylindric pale head, infl. minutely hairy, style 3-fid, utricle ovoid triquetrous beak linear ⅔ utricle.

TENASSERIM; *Helfer* (*Kew Distrib.* 6111, 2).

Rhizome stout. *Leaves* 20 in., flat, sub 3-nerved. *Scape* 10–14 in.; bracts 2–3 by ¼ in., sublanceolate; peduncles exsert, 4–1 in., minutely hairy. *Spikes* ¼–⅓ in., oblong or (fruiting) ovoid, 4–1-nutted, ferruginous. *Fem. glumes* ovate, bristle exceeding beak of utricle. *Utricle* ⅛ in. and upwards, pyramidal at both ends, slenderly many-nerved, minutely hairy; beak slender, mouth very small, base minutely bulbous to hold slightly bulbous style-base.—An unmistakable species.

42. **C. (?) pandanophylla,** *C. B. Clarke*; leaves long broad, spikes in numerous fascicles on branches of scape female at base male at top, glumes elliptic obtuse minutely scabrous-hairy long cuspidate. Scleria pandanophylla, *Kurz ms.*

PEGU; Yomah, *Kurz.*

Very stout. *Rhizome* oblique, woody. *Leaves* subradical many, 1–2 ft. by 1–1½ in., flat, striated, glabrous, as though petioled, petiole dilated at base. *Scape* stout, 9 in., branches 2-3 in., minutely hairy. *Spikes* ⅓–½ by 1/12 in.; bracteoles ½ in. setaceous. *Glumes* closely imbricated on all sides, chestnut-colrd. with narrow white margin.—Very young; at Calcutta where the material is little more advanced, the minute "flowers" in the lower axils of a spike appeared utricular; but they might represent the youngest stage of a Mapanioid inflorescence; the leaves are altogether like those of *Mapania.*

** Spikes short, very numerous (not scapose).

43. **C. indica,** *Linn. Mant.* 574; leaves subbasal very long, infl. elongate, of distant peduncled pyramidal compound panicles, young spikes ½–⅔ in. linear pale long-bracteoled, glumes aristate, style 3-fid, utricle subglobose trigonous many-striate glabrous suddenly contracted into an oblong-linear beak. *Boott Carex*, ii. 87, tt. 250, 252–254; *Boeck. in Linnæa*, xl. 347 (*excl. Wallich* n. 3420, *not Kunth, or Nees.*) C. Moritzii, *Steud. in Zoll. Verz. Ind. Archip.* ii. 60; *Boeck. in Linnæa*, xl. 350. C. longiaristata, *Boott ms.*; *Kurz in Journ. Asiat. Soc. Beng.* xlv. (pars. 2), 160. C. fissilis, *Boott ms.*

EASTERN PENINSULA; from SIKKIM TERAI (Dulkajhar) *C. B. Clarke*, & CACHAR,

Thomson, to SELANGOR, *Kunstler*. NICOBARS; *Jelinek*.—DISTRIB. Cochinchina, Java.

Glabrous, except secondary panicle-branches. *Rhizome* coarse, woody, with harsh black bristles (remains of sheaths). *Stems* 2–2½ ft. *Leaves* numerous, 2–3 ft. by ½ in., coarse, margins scabrous, nerves very numerous strong, 2 lateral prominent on upper face. *Infl.* 18 in.; lower peduncles often 5 in. exsert; bracts usually as long as infl. *Spikes* (young) $\frac{1}{16}$ in. diam., distant, in fruit divaricate, pale brown with about 6 divaricate utricles. *Utricle* fuscous green, obscurely inflated, 20–30-nerved; beak oblique, sometimes sparsely setose, ⅛–⅜ utricle, mouth small oblique scarcely bifid. *Nut* ellipsoid, trigonous; style-base somewhat bulbous.—This is usually recognized among this critical group by the linear pale spikes and the frequent conspicuous subulate ¼ in. bracteoles at their base. C. divaricata, *Wall. Cat.* 3533 from Saluen River, very young, has been supposed to be *C. indica*, but it wants the characteristic setaceous bracteoles.

Var. ? β, *laetebrunnea*; spikes ⅛ in. fine brown, male glumes scarcely aristate young brown, utricles ripe brown obliquely erect not divaricate, style-base on ripe nut not bulbous. C. Thwaitesi, *Boott ms.* (*not Hance*). C. bengalensis, *Thw. Enum.* 355 (*not Roxb.*). C. indica (*partly*), *Boeck. in Linnæa*, xl. 347; *Boott Carex*, t. 251.—CEYLON; *Thwaites* (C.P. n. 2628). ?MERGUI; *Griffith* (*Kew Distrib.* nn. 6135, 6137, but specimens too young for determination).

Var. *Milnei* (sp.) *Boott ms.*; slenderer with narrower leaves, spikes ⅛–¼ in. male part short, glumes pale strongly aristate. Carex? *Wall. Cat.* 3533.—Pahang, *Ridley* (n. 2143, *a*.) Borneo, New Caledonia, Polynesia.—Stems 1 foot; leaves ¼ in. broad; bracteoles setaceous, less prominent than in *C. indica* type.

44. **C. distracta,** *C. B. Clarke*; leaves sub-basal very long, infl. elongate of distant peduncled pyramidal thin panicles, spikes ¼–⅜ in. linear-oblong solitary brown slenderly bracteate, fem. glumes truncate aristate, style 3-fid. C. fissilis, *Boott ms.* (not *Boott Carex*).

ASSAM; *Herb. Kew.*

Habit and infl. of *C. indica*, Linn. Partial panicles compound but lax, spikes mostly ⅛ in. apart, early divaricate; bracteoles hair-like, ¼ in., inconspicuous. *Utricle* (young) nearly glabrous.—The closest affinity of this plant may not be with *C. indica*, but it is exceedingly unlike Boott's *C. fissilis* from Amherst, of which the type figured is in Herb. Boott.

45. **C. cruciata,** *Wahl. in Kongl. Vetensk. Acad. Stockh.* xxiv. 149; *not of Nees*); leaves very long, infl. elongate of distant peduncled pyramidal compound panicles, spikes ¼ in. linear-oblong ferruginous 3–6-nutted, style 3-fid, utricle ellipsoid trigonous strongly-ribbed suddenly contracted into beak ⅓–⅔ utricle. C. bengalensis, *Roxb. Fl. Ind.* iii. 572; *Boott Carex*, ii. 85 partim (t. 243); *C. B. Clarke in Journ. Linn. Soc.* xxv. 82. C. valida, *Nees in Wight Contrib.* 123; *Kunth Enum.* ii. 513. C. indica, *Munro in Seem. Bot. Voy. Herald* 423; *C. B. Clarke l. c.* xv. 119, *in Obs.* (*not of Linn.*). C. vacua, *Boott ms.*; *Boeck. in Linnæa*, xl. 343 (*partly*). C. Bruceana, *Boott ms.* [*cf. Boott Carex*, ii. 85.] C. condensata, *Boott ms.* (*Griffith, Kew distrib.* n. 6049, &c.) C. canaliculata, *Boott ms.*—*Carex, Wall. Cat.* 3400 B.

SIKKIM; alt. 4–6000 ft., *J. D. H.*, &c. BHOTAN; alt. 6000 ft., *Griffith*. KHASIA; alt. 0–5000 ft., frequent. CACHAR; *J. D. H.* PERAK; alt. 3–600 ft.; *King's Collector*.—DISTRIB. China, Madagascar.

Glabrous except the secondary panicle-branches and sometimes utricles. *Rhizome* woody, horizontal. *Stem* 2–3 ft., stout. *Leaves* often as long as stem, ⅜–⅝ in. broad, flat, many-striate, caudate-acuminate; 2 lateral nerves often manifest; basal sheaths usually shining yellow-brown, rarely much fimbriate into black tough

fibres. *Infl.* 12–20 in.; lower peduncles often 2–3 in. exsert, bracts usually as long as infl., leaf-like. *Spikes* in fruit divaricate on the stiff divaricate panicle-branches. *Glumes* (from middle female flowers) much shorter than utricle, ovate, minutely or not mucronate, 3–1-nerved on back, ferruginous, lineolately marked. *Utricle* $\frac{1}{10}$ in., ferruginous or brown, prominent in fruiting panicle, scarcely inflated, rarely glandular-dotted, quite smooth or minutely scabrous towards neck; ribs about 12, thick; beak usually sparsely scabrous, with elliptic mouth on one side. *Nut* fitting pretty closely utricle, ellipsoid, substipitate, pyramidal at top; style-base scarcely dilated.

Var. *β nagporensis*; secondary panicles with suberect branches scarcely pyramidal sometimes very slender, ripe utricle scarcely inflated fuscous-green often with black or red dots in upper half, beak subconic at base $\frac{1}{3}$–$\frac{2}{3}$ utricle.—Chota Nagpore; alt. 2–4000 ft., common from the Kolhan to the summit of PARASNATH.—A great variety of forms is here included, all undoubtedly one species and no one matching *C. cruciata*, Wahl. typ. One form is large, with the secondary panicles long-peduncled large dense branches in fruit very stout rigid erect; another has very narrow leaves, panicles slender the lower with only 5–8 spikes. There is every gradation between. The utricles are sometimes nearly glabrous, sometimes intensely scabrous with large linear-conic points.

Var. *γ argocarpus*; secondary panicles pyramidal often very dense, ripe utricle glistening white inflated conspicuous. C. bengalensis, *Boott Carex*, ii. 85 (*chiefly*) tt. 240–242; *Boeck. in Linnæa*, xl. 346 (*partly*). C. vacua and C. condensata, *Boott ms.* (*partly.*)—Abundant in INDIA, from the E. Nepal, *J. D. H.*, to Khasia and Assam, Tonkin.—A plant collected by Boott on the Brahmapootra bank, having fuscous-green utricles much less conspicuously ribbed, is supposed a plains form of var. *argocarpus*. Most of the glistening-white fruits are fuscous in the herbarium.

46. **C. parvigluma**, *C. B. Clarke*; leaves very long, stem short, infl. usually of one pyramidal compound panicle, spikes as of *C. cruciata*, style 3-fid, utricle globose trigonous many-striate glabrous suddenly narrowed into a linear beak $\frac{3}{4}$ utricle.

ASSAM; Luckimpore, alt. 1500 ft., *C. B. Clarke.*

Glabrous, except panicle-branches. *Rhizome* horizontal, woody. *Leaves* 2–3 ft. by $\frac{1}{2}$ in. *Stem* including infl. 5–8 in. *Infl.* 3 by $1\frac{1}{2}$ in., resembling much a single peduncled panicle of *C. cruciata*; in one example a small nearly-basal panicle is added. *Fem. glumes* exceedingly small, elliptic, aristate. *Utricle* not inflated, rather larger, and nerves 15–18, slenderer than in *C. cruciata*, to which it is nearly allied, but differs by the short stem, and very small glumes.

47. **C. condensata,** *Nees in Wight Contrib.* 123 (Royle, n. 83 *only, not of Kunth*); leaves very long, infl. elongate of distant peduncled oblong panicles, spikes $\frac{1}{4}$–$\frac{3}{8}$ in. clustered ferruginous 3–6-nutted, style 3-fid, utricle narrow-ellipsoid trigonous irregularly ribbed not inflated, beak $\frac{1}{3}$ length of utricle 2-fid. *Boott Carex*, ii. 86, tt. 247, 248; *Duthie in E. T. Atkinson Gaz.* x. 616. C. bengalensis, *Boeck. in Linnæa* xl. 347 (*chiefly*). C. indica, *var.* condensata, *Strachey Cat. Pl. Kumaon*, 73. C. indica, *Nees in Wight Contrib.* p. 123 (*Royle* n. 85).—Carex, *Wall. Cat.* 3400 A.

SIND; *Pinwill.* HIMALAYA, alt. 1–10,000 ft., common; from Dalhousie to Bhotan. KHASIA HILLS, alt. 4–5000 ft., abundant.

Separated from *C. cruciata* by the less pyramidal partial panicles, and the utricle, which is smaller with linear-oblong shorter beak, less nerved (often nearly nerveless on the plane face), frequently black- or red-dotted in the upper half. The utricle is more or less scabrous-pilose, but sometimes glabrate. The panicle (when dry) is always between cinnamomeous and brown.

48. **C. vesiculosa**, *Boott Carex*, iii. 107, t. 323; infl. irregularly panicled, spikes rarely clustered, style 3-fid, utricle small narrow-ellipsoid trigonous irregularly ribbed not inflated, beak ½ utricle with narrow bifid mouth (otherwise as *C. condensata*). *Boeck. in Linnæa*, xl. 345. C. diffusa, *Boott ms.*—Carex, *Wall. Cat.* 3400 β.

SIKKIM HIMALAYA; alt. 4000 ft., *C. B. Clarke.* BHOTAN; *Griffith.* KHASIA HILLS, alt. 4–6000 ft., very common.

Leaves rarely ¼ in. broad, usually narrower than in *C. condensata*. *Fem. glumes* ovate-lanceolate (hardly mucronate) nearly as long as ripe utricle, more enclosing utricle than in preceding species. Beak of *utricle* longer than in *C condensata*, more narrowed at top. *Infl.* (in dried plants) usually rich-brown, sometimes paler, cinnamomeous.—Hardly separable from *C. condensata*.

Var. β *paniculata*; inflorescence a compound loose rich-brown panicle, utricle $\frac{1}{10}$ in. (larger than in *C. vesiculosa*, Boott type).—Sikkim; alt. 700–2500 ft. (*Herb. Griffith*), *C. B. Clarke.*

49. **C. continua**, *C. B. Clarke*; leaves sub-basal very long narrow, infl. elongate cylindric nearly continuous, spikes numerous solitary fine brown, fem. glume with bristle as long as utricle, style 3-fid, utricle small oblong-ellipsoid trigonous strongly many-nerved hairy narrowed into short deeply bifid beak. C. Bruceana, *Boott ms.* (*in small part.*)

NEPAL; *Wallich.* SIKKIM HIMALAYA; alt. 500–1100 ft., plentiful, *C. B. Clarke.*

Tufted. *Rhizome* woody, short. *Stems* 8–16 in. *Leaves* numerous, much overtopping stems, ⅛–⅓ in. wide, tough. *Infl.* 4–8 by 1½ in., scarcely interrupted at base; bracts long, overtopping inflorescence. *Spikelets* ¼–½ in., 3–7-nutted, numerous and close together, not clustered as in *C. vesiculosa*. *Utricle* ⅛ in., narrow, brown, with 15–20 regular close strong nerves.—The utricle is not unlike that of *C. vesiculosa*, the *infl.* is different, somewhat resembling small forms of *C. cruciata*, with which latter Boott arranged it.

50. **C. stramentitia**, *Boott ms.*; *Boeck. in Linnæa*, xl. 351; infl. young pale straw-colrd. ripe dirty-straw-colrd. not brown, style 3-fid, utricle rather large globose-trigonous many-striate glabrous not inflated, beak linear ½ utricle very shortly 2-fid. C. condensata, *Boott ms.* (*partly*). C. condensata, β flava, *Nees in Wight Contrib.* 123. C. Wightiana, *Boott ms.* (*partly.*) C. filicina, *Boeck. ms in Herb. Schlagintweit* n. 14702.—Carex, *Wall. Cat.* 3398.

From NEPAL to extreme E. ASSAM, alt. 500–3000 ft.; common in lower SIKKIM, *J. D. H.*, &c. GARO, KHASIA and MIKIR HILLS, on Assam face. CHOTA NAGPORE; BEHAR; on Parasnath, alt. 4000 ft., *C. B. Clarke.*

Glabrous except the secondary panicle-branches. *Rhizome* stout, woody. *Leaves* 2–3 ft., often ⅓–⅔ in. broad. *Panicle* often 12–16 in., linear-oblong; partial peduncles compound, lower distant; spikes fascicled, resembling those of *C. condensata*. *Utricle* ⅛ in. and upwards, rather acute, trigonous, fuscous green, very suddenly narrowed into beak; nerves 15–20, slender but well-marked.—From its habit, this plant has been mixed with *C. condensata*, from which its large utricle entirely separates it. It is really very near *C. indica*, Linn., and closely resembles it in the utricle; but the spikelets are shorter, whiter, and the characteristic conspicuous setaceous bracteoles of *C. indica* are wanting.

51. **C. filicina**, *Nees in Wight Contrib.* 123; leaves very long, infl. elongate of distant pyramidal compound panicles, spikes small often very many on slender branches not congested, female glumes small not (or scarcely) mucronate, style 3-fid, utricle small narrow ellipsoid or

ovoid definitely nerved glabrous (very rarely thinly minutely setulose) beak linear about as long as utricle [but see vars. β, γ.] *Kunth Enum.* ii. 510; *Boott Carex*, iii. 105 (vars. α and γ) tt. 311, 312; *Boeck. in Linnæa*, xl. 352; *C. B. Clarke in Journ. Linn. Soc.* v. 82. C. meiogyna, *Nees in Wight Contrib.* 123, var. β (*Wight* n. 1915, b.) C. cruciata, *Thw. Enum.* 355 (*partly.*) C. nilagirica, *Hochst.*; *Steud. Syn. Cyp.* p. 207.

Throughout the KHASIA and NAGA HILLS, alt. 1500–6000 ft.; NILGHIRI and PULNEY HILLS; alt. 4–7000 ft. CEYLON; *Thwaites* (C. P. 820, *partly*), &c.—DISTRIB. China, Java.

Glabrous, except the minutely hairy panicle branches. *Rhizome* very woody, short (no long stolons). *Stems* 1–3 ft. *Leaves* often as long as stems, and in Nees' type rather broad (often ½ in. and more) flat, thin. *Panicle* usually more than ½ stem; partial panicles often very dense; branches much slenderer than in *C. cruciata* or *condensata*. *Fem. glumes* commonly small, ovate, as long as utricle (without beak), sometimes elliptic-lanceolate, glabrous or minutely hairy, chestnut in S. Indian form, often paler or ferruginous in the Khasian. *Utricle* $\frac{1}{10}$ in., trigonous, fitting the black nut very closely, about 15-nerved, tapering or suddenly narrowed at top; beak oblique, curved, subrecurved or straight, more or less scabrous-hairy, mouth very small, shortly bifid.—Here are included the *C. filicina*, α, of Nees and Boott, and the Khasia var. γ *pallida* of Boott which has usually (not always) paler glumes. The utricles in the Khasia plant are often shorter and more ovoid than in the S. Indian.

Var. β *meiogyna*, Strachey Cat. Pl. Kumaon 73; leaves often narrower, beak shorter from ⅓ to ½ utricle. *Duthie in T. E. Atkins. Gaz.* x. 616; *Boott Carex* iii. tt. 313–316. C. meiogyna (sp.) *Nees in Wight Contrib.* p. 123 (only Royle, n 82). Cyperus caricinus, *Don Prodr.* 39.—From N.-W. Himalaya to Bhotan, alt. 3–9000 ft., very common.—Considered here as a stouter form of this (as by Boott dubiously and Boeckeler) with the same distribution is *C. cruciata*, Nees in Wight Contrib. 123 (α *only*); *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex* ii. 319, 320; *Duthie in T. E. Atkins. Gaz.* x. 616, also marked by Boott = *C. ramosa*, Schk. (a Mascarene sp.) which it is near; but it is nearer the true *C. cruciata* above, from which it differs in the slenderer panicle-branches and spikes.

Var. γ *minor*, Boott Carex, iii. 103, tt. 317, 318; leaves very narrow, spikes small pale densely clustered, glumes ferruginous, utricle very small, beak hardly ½ utricle.—N. Sikkim; alt. 7500–10,000 ft., *J. D. H.*, &c.—A very similar plant is found in Khasia, alt. 6000 ft., but with the beak of utricle much longer; it must be a var. of *C. filicina*, Nees.

Var. ? δ *microgyna*; leaves very narrow, spikes very slender, glumes very small ovate obtuse dark brown, utricle very small fuscous, beak hardly ½ utricle.—Carex, *Wall. Cat.* 3399. Kurg and Ceylon. Chittagong; Arracan and Ava.

52. **C. plebeia,** *C. B. Clarke*; leaves narrow, partial panicles pyramidal slender, spikes brown, fem. glumes ovate acute scarcely mucronate, style 3-fid, utricle (for the plant rather large) narrow ellipsoid acutely trigonous strongly many-nerved hairy fuscous-brown, beak scarcely ¼ length of utricle.

CHOTA NAGPORE; alt. 1500–2000 ft., throughout the province, *C. B. Clarke.*

This may be esteemed another var. of *C. filicina*, Nees. It was in cultivation in 1879 in the Calcutta Bot. Garden under the traditional name of *C. bengalensis*, Roxb. It is the only *Carex* that Roxburgh would know at his old Samulcottah station, and the only species convenient for introduction at Calcutta. But Roxburgh describes his *C. bengalensis* as having come from Sylhet; and it is probable that Roxburgh would not have differentiated a low-level Khasia plant of *C. cruciata*, Wahl. from *C. plebeia*. I have therefore thought it more convenient to reduce *C. bengalensis*, Roxb. to *C. cruciata*, than to introduce a great change in the names of this critical group.

53. **C. leptocarpus,** *C. B. Clarke*; leaves subbasal very long, infl. elongate, partial panicles distant long-peduncled pyramidal compound thin, spikes ½ in. distant 3–6-nutted, style 3-fid, utricle very distant ellipsoid tapering-lanceolate much recurved strongly-nerved glabrous greenish, beak linear conic ⅔ utricle.

MUNEYPOOR; *Watt* (n. (6728.)

Glabrous (panicle branches minutely scabrous hairy). *Stems* 2–3 ft., stout. *Leaves* as long as stem, ⅓–½ in. broad, harsh, two lateral nerves conspicuous. *Infl.* 1–1½ foot; lowest peduncle exsert, 6 in.; partial panicles 3 by 2¾ in.; bracteoles ½ in., filiform. Young *spikelets* linear, pale-brown; ripe spikelets rather wide from the strongly divaricate utricles. *Fem. glumes* elliptic-lanceolate, mostly bristle-pointed. *Utricles* $\frac{1}{16}$–$\frac{1}{12}$ in. apart, $\frac{1}{12}$–$\frac{1}{10}$ in. long, slender (not well ripe).—From the remote utricles this species does not resemble any of the other allies of *C. cruciata*, Wahl.

54. **C. mercarensis,** *Hochst. ms.*; *Steud. Syn. Cyp.* 194; partial panicles oblong or scarcely pyramidal, fem. glumes aristate ferruginous (otherwise as *C. filicina*). C. cruciata, var. β *Nees in Wight Contrib.* 124. C. amœna, *Boott Carex*, iii. 106, t. 321; *Boeck. in Linnæa*, xl. 354. C. ramosa, *Boott Carex*, iii. 105, t. 322 (*excl. Maurit. pl., not Schkuhr*). C. Lindleyana, *Herb. Ind. Or. H. f. & T.* (*partly*). C. glaucina, *Boeck. in Linnæa*, xl. 353 *excl. Hohen.* n. 629 (*which Boeckeler never saw*).

NILGHIRI and PULNEY MTS.; frequent, from COURTALLUM, *Wight*, to Ooty, alt. 8000 ft., *C. B. Clarke.*

A nearly glabrous form, branches of panicle only minutely scabrous on angles. *Utricle* nearly ⅛ in., ellipsoid-trigonous, 15-nerved, glabrous, pale, tapering into oblique linear beak about as long as utricle.—Hardly differs from the Madras *C. filicina* growing with it, but by the pale ferruginous-green colour, the rather larger utricles, and (especially) the definitely aristate female glumes. *C. ramosa*, Schkur, a Mauritius plant, with which Boott combined it, has hairy utricles and distant spikelets laxly panicled.

Var. β *major*, Steud. Syn. Cyp. p. 194; spikelets ½–¾ in. linear with 6–10 distant scabrous-hairy utricles. C. ramosa, Schk.? *Boott ms.*—Canara, *Hohenacker* (n. 629); Anamallays, *Beddome.*—This has been greatly confused, having, on account of its number (*Hohenacker*, n. 629) been taken in Herb. Kew for *C. glaucina*, Boeck., and "written up" accordingly. But Boeckeler's *C. glaucina* is founded on Wight, n. 1293 = Boott, tab. 322, which is *not* exactly = Hohenacker n. 629; but here is treated as a form of it.

55. **C. raphidocarpa,** *Nees in Wight Contrib.* 122; leaves minutely hairy, panicle-branches densely hispid (otherwise as *C. mercarensis*). *Kunth Enum.* ii. 512; *Boott Carex*, ii. 85, t. 244; *Boeck. in Linnæa*, xl. 363 (raphiocarpa).

PULNEY HILLS, *Wight*, n. 1911 (*one collection*).

A rather stouter plant than *C. mercarensis*, with rather larger fruits, that might be esteemed merely a larger hairy form of it.

56. **C. ceylanica,** *Boeck. in Linnæa*, xl. 341; glabrous (panicle-branches minutely scabrous), leaves rather short not caudate, utricle rather large shining brown (otherwise as *C. filicina*, Nees). C. cruciata, *Thw. Enum.* 355 (*partly*).

CEYLON; alt. 6000 ft., *Thwaites* (C.P. 820 *partly*).

Leaves not exceeding 5 in., tip sword-shaped (very unlike all the *C. filicina* group). *Fem. glumes* brown-red, ovate-lanceolate, not aristate. *Utricles* ⅛ in., ellipsoid-trigonous, 15-nerved, minutely hairy in upper part, tapering into an oblique

linear beak ½ utricle.—Boott never named this, but left it in his *C. filicina* packet. Munro notes that it looks like *C. Lindleyana*.

57. **C. Wightiana,** *Nees in Wight Contrib.* 122; leaves subbasal very long, infl. elongate, lower panicles distant peduncled oblong often simply spicate, spikes ½ in. often 6–8-nutted pale suberect in fruit, bracteoles inconspicuous, style 3-fid, utricle ellipsoid-trigonous many-nerved greenish scabrous-hairy, beak linear ¾ utricle. *Kunth Enum.* ii. 512; *Boott Carex*, i. 11, t. 30 (*excl. Khasia plant*); *Boeck. in Linnæa*, xl. 366. C. meiogyna. *Nees l. c.* 123 (*all the Madras material, Wight*, n. 1915, &c.). C. indica, *Nees ms. in Herb. Wight* n. 1914, and *in Wight Contrib.* 123.—Carex, *Wall. Cat.* 3400, C. (*partly*).

SOUTH MADRAS; Courtallum, *Wight.*

Glabrous, except panicle-branches and utricles. *Rhizome* stout, horizontal. *Stems* 2–2½ ft. *Leaves* often as long as stem, ⅛–½ in. broad. *Infl.* often 12 by 3 in.; lower panicles in fruit 2 by ½ in. Young *spikes* linear, green, somewhat ferruginous. *Fem. glumes* ovate, acute, pale, often shortly aristate. *Utricles* ⅛–⅙ in., nerves 20 or more; beak nearly straight, mouth slender 2-fid.—A very homogeneous series of specimens, apparently all from one neighbourhood, though Nees described it under three names.

58. **C. ecostata,** *C. B. Clarke*; leaves narrow, infl. elongate dark brown, lowest panicle distant slenderly peduncled narrow oblong (nearly reduced to a spike), fem. glumes ovate-triangular not mucronate, style 3-fid, utricle ellipsoid trigonous nearly nerveless glabrous, beak slightly oblique ⅔ utricle.

EAST ASSAM; Jakpho Summit, alt. 9900 ft., *C. B. Clarke.*

Closely resembles in general appearance and infl. the Indian *C. Wightiana*, but the utricles are almost nerveless; they usually have one face quite nerveless, the other faces with 1 or 2 irregularly-placed thin nerves on each.

59. **C. repanda,** *C. B. Clarke*; panicles very distant small pyramidal, spikelets ¼–½ in. 4-nutted pale divaricate in fruit, bracteoles long conspicuous, utricle narrow-ellipsoid many-nerved pale glabrous, beak linear curved ⅓–¾ utricle (otherwise as *C. Wightiana*). C. Wightiana, *Boott Carex*, i. 11 (var. perigyniis glabris, *Boott, ms.* i.e. the Khasian plant).

KHASIA HILLS, alt. 3000–5500 ft., *J. D. H., C. B. Clarke.*

60. **C. perakensis,** *C. B. Clarke*; leaves subbasal long narrow, infl. elongate, partial panicles linear-oblong erect, spikes oblong 1–4-nutted white, style 3-fid, utricle ellipsoid trigonous many-nerved hairy, beak straight linear about ½ utricle.

PERAK; *Wray.*

Glabrous (panicle branches minutely scabrous scarcely hairy). *Rhizome* stout, woody. *Stem* 2 ft. *Leaves* rather longer than stem, ⅕ in. broad, tough, sub-3-nerved. *Infl.* 8 by 1½ in.; lowest peduncle 3 in. distant; bracts far overtopping inflorescence. Partial *panicles* with erect connivent branches in fruit, the dark-red styles prominent over the white glumes and white-green utricles. *Fem. glumes* as long as utricle, exclusive of short bristle. *Utricle* (with beak) nearly ⅛ in., beak shortly bifid.

61. **C. sanguinea,** *Boott in Proc. Linn. Soc.* i. 285, & *Trans. Linn. Soc.* xx. 137, & *Carex*, ix. 157, t. 515; leaves shorter than infl. narrow, infl. elongate, partial panicles oblong with irregularly capitate dark-red spikes, style 3-fid, utricle narrow ellipsoid trigonous narrowed at

both ends minutely scabrous hairy, beak scarcely ⅓ utricle. *Boeck. in Linnæa*, xl. 374; *Boiss. Fl. Orient.* v. 406.

W. HIMALAYA; alt. 3000–6000 ft.; Kunaor, *Royle*; Hazara, *Stewart*; Murree, *Fleming, Trotter*.

Glabrous (panicle branches minutely scabrous, hardly hairy). *Rhizome* woody, branched, with several approximate stems. *Stems* including infl. 8–18 in. *Leaves* numerous, scarcely ¼ in. broad. *Infl.* often occupying ⅓ the plant; lower peduncles exsert; bracts finely caudate, shorter or longer than inflorescence. *Spikes* ¼–⅓ in., 4–8-nutted, comose from the long red style-branches. *Fem. glumes* ovate-triangular, not aristate, much shorter than utricle. *Utricle* $\frac{1}{16}$–$\frac{1}{12}$ in., narrowed at both ends, red-marked, obscurely nerved. *Nut* stipitate, narrowed into the linear persistent style-base.—The exsert part of style-branches is longer than utricle, and longer than as shown in Boott's picture. This species does not seem very closely allied to the S. Indian *C. Lindleyana*, &c.; it should perhaps stand next *C. vesiculosa*, Boott.

62. **C. rhizomatosa,** *Steud. in Zoll. Verz. Ind. Archip.* ii. (1854), 60 and *Syn. Cyp.* 206; leaves shorter than infl. narrow, infl. linear, peduncles distant slender nearly simple, spikes ovoid 1–4-nutted brown in irregular heads, style 3-fid, utricle broadly ellipsoid trigonous scabrous hairy, beak scarcely ⅓ utricle 2-fid. *Miq. Fl. Ind. Bat.* iii. 348. C. Cumingiana, *Steud. Syn. Cyp.* 206; *Boott Carex*, iii. 107, tt. 324, 325; *Boeck. in Linnæa*, xl. 367; *Vidal Pl. Vasc. Filip.* 286. C. capitulata, *Boott ms.*

ASSAM; Gowhatty, *Boott*. KHASIA HILLS; N. face, alt. 2–3000 ft., frequent, *C. B. Clarke*. MUNEYPOOR; *Watt*. PATKOYE MTS.; *Griffith*.—DISTRIB. Tonkin, Java, Philippines.

Glabrous (except utricles). *Rhizome* very tough, covered with black fibres of torn sheaths (it grows where the grass is burnt annually). *Stems* tufted, 6–18 in. *Leaves* usually 3–6 in. by ⅛ in., not caudate. *Infl.* 6–10 by scarcely ¾ in.; upper bracts about as long as infl. *Heads of spikes* 1–⅓ in. diam., usually only one on each peduncle, but peduncles often 2 from one sheath. *Fem. glume* ovate-lanceolate, brown, often mucronate; male glumes mucronate. *Utricle* fuscous brown, obscurely 8–15-nerved.

63. **C. Lindleyana,** *Nees in Wight Contrib.* 121; leaves subbasal long narrow, infl. elongate lower peduncles distant, partial panicles condensed oblong brown-green, style 3-fid, utricles oblong-ellipsoid many-nerved glabrous, beak linear straight deeply bifid ¾ utricle. *Kunth Enum.* ii. 512; *Boeck. in Linnæa*, xl. 362. C. thyrsiflora, *Boott Carex*, i. 12, t. 34. C. cruciata, *Thw. Enum.* 355 (*partly*).

NILGHIRI HILLS; alt. 6–8000 ft., *Wight*, frequent. CEYLON; alt. 5–8000 ft., *Thw.* (C.P. 3161, &c.)

Stems 1–2½ ft *Leaves* ¼ in. broad, not overtopping infl., not caudate. *Fem. glumes* ovate, sometimes shortly mucronate, many-nerved. *Utricles* not much differing from those of *C. cruciata*, Wahl., with which Thwaites united it. Partial *panicles* 1½ by ½ in., dense, unlike the pale pyramidal partial panicles of *C. cruciata*.

64. **C. leucantha**, *Arnott ex Boott in Proc. Linn. Soc.* i. 257, and *in Trans. Linn. Soc.* xx. 135, and *Carex*, i. 10, t. 28; leaves very long narrow, infl. elongate depauperated, peduncles few distant very short carrying 1 or 2 small whitish heads, style 3-fid, utricles broad-ellipsoid trigonous many-nerved hairy not inflated, beak linear ⅔ utricle. *Thw. Enum.* 355; *Boeck. in Linnæa*, xl. 369.

SOUTH DECCAN; Courtallum, *Wight*. CEYLON; not rare up to 2000 ft. *Thwaites* (C.P. 2631, &c.).

Stems 1–2 ft., rather slender. *Leaves* overtopping infl., ⅛ in. broad. *Lower*

peduncles often 6–8 in. distant, exsert 1–2 in.; heads depauperated, ½ in. diam. of 1–6 spikes. *Spikes* ½ in., ovoid (in fruit), 4–8-nutted. *Fem. glumes* ovate, acuminate, cuspidate (cusp not overtopping beak of utricle), nearly glabrous except at top. *Utricle* (with beak) ⅛ in., nerves 20 not strong; beak rather deeply bifid, very little conic-dilated at base.

65. **C. malaccensis,** *C. B. Clarke*; heads pyramidal rigid ¾ in. diam. white, female glumes minutely hairy, utricle strongly-nerved glabrous subinflated narrowed into conico-linear flattened beak scabrous on margins, otherwise as *C. leucantha.*

Malacca; Langkawi, *Ridley* (n. 1669).

Bracts under terminal head 4 by ⅛ in., leaf-like, horizontally spreading (in *C. leucantha,* weak suberect very narrow). Beak of *utricle* curved inwards trigonous compressed with two acute very scabrous margins (in *C. leucantha* nearly terete). —The long narrow leaves and few depauperated remote white heads are very like *C. leucantha.*

66. **C. spicigera,** *Nees in Wight Contrib.* 121; leaves very long narrow, infl. oblong panicled fuscous, lower peduncles 1–2 in. distant, partial panicles oblong interrupted, style 3-fid, utricle ellipsoid trigonous many-nerved hairy, beak oblong scarcely ¼ utricle. *Kunth Enum.* ii. 512; *Boott Carex,* i. 10, t. 29; *Thw. Enum.* 355; *Boeck. in Linnæa,* xl. 368.

Ceylon; "Central Province up to 6000 ft.," *Thwaites* (C.P. n. 822), &c.

Stems 1–1½ ft. *Leaves* overtopping infl., ⅛–⅛ in. broad. *Infl.* 3 by 1 in.; partial panicles ½ by ¼ in., dense. *Spikes* in fruit ovoid, 4-nutted. *Fem. glumes* ovate, often aristate, shorter (including bristle) than utricle. *Utricle* ⅒ in., brown-red; beak scarcely notched.

Var. β *minor,* Thw. l.c. 355; very slender, infl. 1 by ⅛ in. E. Gardneri, *Boott ms.*—Ceylon (C.P. n. 824), *Gardner. Stems* 8–10 in., almost capillary. *Leaves* scarcely ⅛ in. broad. Inflorescence reduced to a subsessile interrupted spike.

Var. γ *rubella* (sp.) Boott Carex, iv. 176, t. 599; infl. a single terminal pyramidal dense head ¾ in. diam.—Ceylon (C.P. 2629).

Var.? δ *rostrata,* Boeck. in Linnæa, xl. 369; utricles nearly twice as long narrower evidently beaked nearly smooth, glumes muticous. [Cf. Thw. Enum. 355].—Ceylon; *Thw.* (C.P. 2629).—This appears from description scarcely a var. of *C. spicigera,* but I have failed to find it among Thwaites C.P. 2629.

*** Spikes long-cylindric. Peduncles mostly solitary, sometimes 2, in each sheath (cf. *C. arridens,* n. 78.). [Terminal spike sometimes wholly male in *C. desponsa* and *C. præstans.*]

67. **C. baccans,** *Nees in Wight Contrib.* 122; robust, leaves and bracts long, panicle oblong or linear-oblong, fem. glumes striate nearly throughout their width, style 3-fid, utricle ovoid-trigonous gibbous finally berried, beak short ultimately minute. *Kunth Enum.* ii. 513; *Thw. Enum.* 355; *Boott Carex,* ii. 83, tt. 234–236 and 238, 239; *Boeck. in Linnæa,* xl. 339; *C. B. Clarke in Journ. Linn. Soc.* xxv. 82. C. curvirostris, *Kunze Suppl.* 79, t. 20; *Miq. Fl. Ind. Bat.* iii. 350. C. recurvirostris, *Steud. in Zoll. Verz. Ind. Archip.* ii. 60, and *Cyp.* 207. C. dolicophylla, *Link ms.* (*fide Boeckeler*).

Sikkim and Khasia to the Naga Hills; alt. 2500–7000 ft. Malabar Ghats to Ceylon; alt. 3–6000 ft.—Distrib. Java, Sumatra, China, Philippines.

Glabrous. *Rhizome* very stout, short, horizontal, with approximate stems. *Stems* often 3 ft. *Leaves* often overtopping inflorescence, ½ in. broad. *Infl.* 12–18

by 3–4 in. (small examples occur); bracts much overtopping infl.; lowest peduncle usually distant, exsert; partial panicle often 2–5 by 1–2 in. *Spikes* 1½ by ¼ in., male portion dark-red when young. *Fem. glumes* ovate or obovate, acute or obtuse, often cuspidate sometimes (even in large examples) muticous. *Utricle* in the fully developed state ⅛ in. diam., nearly globose, wall thickened more or less succulent, red, nearly glabrous rarely obscurely scabrous-hairy near top; utricles in the half-ripe state usually olivaceous with more prominent recurved beak. *Nut* ellipsoid-trigonous, pyramidal at both ends, black, much narrower than utricle; style-base linear.

Var.? *β siccifructus*; fem. glumes 3–5-nerved close to the keel, ripe utricles ovoid somewhat inflated strongly many-nerved pale scabrous hairy near top, beak straight short bifid. C. baccans (an var. an sp. nova?) *Boott Carex*, t. 237.—Khasia; near Cherra, alt. 3500 ft., *J. D. H., C. B. Clarke.*—Appears nearer *C. Myosurus*, &c., than *C. baccans*; the utricles get more or less red occasionally.

68. **C. Myosurus,** *Nees in Wight Contrib.* 122; robust, leaves and bracts long, panicle elongate usually ample, spikes long many tailed by male portion, style 3-fid, utricle oblong attenuated at both ends nerved slightly hairy, beak short slightly notched nearly straight. *Kunth Enum.* ii. 507; *Boott Carex*, ii. 87, tt. 229, 230, 232; *Boeck. in Linnæa*, xl. 334. C. macrophylla, *Hochst. ms. ex Steud. Syn. Cyp.* p. 207. C. æquata, *Nees ms.*—Carex, *Wall. Cat.* 3384 B.

Nilghiri & Pulney Hills; alt. 5–7000 ft., common. Courtallum; *Wight.*

Glabrous except utricles. *Rhizome* stout, short. *Stems* 2–3 ft. *Leaves* often as long as stem, ¼–½ in. broad, scabrous, caudate. *Panicle* 1 foot, lax (see remarks under var. *β*); branches scabrous, scarcely hairy. *Spikes* 3 by ⅛ in., many male 1½ in., pale or more rarely deep brown. *Fem. glumes* ovate, often cuspidate, sometimes muticous. *Utricle* exceeds ⅛ in. in Nilghiri type, pale, much stipitate; nerves 12–15, not strong. *Nut* narrowly ellipsoid, trigonous, stipitate, filling utricle; style-base not dilate.

Var. *β eminens* (sp.), Nees in Wight Contrib. 122; utricles shorter broader, beak often rather deeply bifid. *Kunth l. c.* 506. C. floribunda, *Boeck. l. c.* 335. C. Myosurus, *Nees l. c.* 122 (Himal. pl.). C. scoparia, *Wallich, ms.* Carex, *Wall. Cat.* 3382, 3397, 3384 A.—Throughout Himalaya, alt. 2500–7500 ft., from Kashmir to Bhotan.—Varies greatly in development; spikes sometimes 6 only, in C. B. Clarke, n. 24,938 are 210 in the part of panicle preserved. The spikes are usually deep-brown in the Himal. plant). The utricles are always considerably shorter (and usually broader) in var. *β* than in the Nilghiri plant; in *C. eminens*, Nees, the common Himal. plant the beak is deeply bifid; in some Sikkim and Bhotan plants (*C. floribunda*, Boeck.) the beak is not more notched than in the Nilghiri plant (the utricle is much broader). In Wallich, n. 3384, A, the whole of the upper part of the infl. is male.

Var. *γ ratongensis*; panicle narrow 10–15-spiked, fem. glumes muticous deep brown, utricle very small oblong ellipsoid, beak very short lightly notched.—"C. Myosurus ? *potius quam* C. baccans," *Boott ms.*—Upper Sikkim, alt. 6–8000 ft., Ratong Valley, *J. D. H.*—Is taken here as an extreme high level state of *C. Myosurus*, Nees (forma floribunda (sp.) *Boeck.*).

69. **C. præstans,** *C. B. Clarke*; tall, very long, lower peduncles very distant solitary long, spikes long many of the upper wholly male or with 1 or 2 fem. only at base, fem. glumes elliptic-lanceolate scarcely mucronate pale overtopping utricles, style 3-fid, utricles ovoid trigonous minutely hairy at top, beak conic-linear ¼ the length of utricle. C. Myosurus, *Duthie ms.*

Kumaon; alt. 7–8000 ft., *Duthie* (n. 6118).

Glabrous. *Stem* 3 ft. *Leaves* and *bracts* as in *C. Myosurus*. *Infl.* 2 ft. long;

lowest peduncle exsert 5 in. *Partial panicles* 4 by 1½, appearing as if simple with distant whorls of sessile spikes. *Spikes* 1¾ in., throughout the plant many male, many with only one basal fem. *Utricle* with many, not prominent, nerves.—This may be a sexual (nearly male) state of *C. Myosurus*, as Duthie regarded it.

70. **C. spiculata**, *Boott in Proc. Linn. Soc.* i. 288, and *in Trans. Linn. Soc.* xx. 139 and *Carex*, i. 3, t. 7; leaves narrow, spikes denser with obliquely ascending fruits, panicle more rigid (otherwise as *C. Myosurus*, var. β).

SIKKIM; alt. 1–2000 ft., common. KHASIA KILLS, alt. 250–6000 ft., very common.

Utricle ellipsoid, trigonous; lanceolate upwards; beak as though short cylindric, the strong margins of the utricle carried up the beak as winged margins.—Boott says separable from *C. Myosurus* by the glabrous utricles, but in Boott's own material the utricle is more or less hairy—just as in *C. Myosurus*.

Var. *nobilis* (sp.) *Boott Carex*, i. 4, tt. 9, 10, 11; infl. large compound, ripe utricle more spreading their short beaks somewhat recurved C. pandata, *Boott ms.*—Jaintea Hills; alt. 3500–5000 ft., *J. D. H*, *C. B. Clarke*.—This local form is very striking, and is named *C. nobilis* by Boott in Herb. Hook.; but the *C. nobilis* Boott, tt. 9, 10, 11, appear large forms of *C. spiculata*, leading on to the Jaintea plant.

71. **C. composita**, *Boott Carex*, i. 3, t. 8; leaves long narrow, panicle long narrow, spikes in fruit dense, fem. glumes brown-margined cuspidate often overtopping beak of fruit, style 3-fid, utricle small obovoid pyramidal-compressed at top hairy nearly or quite nerveless beak very small. *Boeck. in Linnæa*, xl. 328; *C. B. Clarke in Journ. Linn. Soc.* xxv. 82. C. Myosurus, *Boott ms.* (*partly*).

From BHOTAN, *Griffith*, to MERGUI, *Griffith*, KHASIA HILLS; alt. 3–6000 ft., *J. D. H.*, &c., and east to NAGA HILLS.

Glabrous, except utricles. *Rhizome* creeping; stolons often 3–6 in. by ⅛ in. diam. *Stems* 2 ft. *Leaves* usually (with bracts) overtopping stems, ⅛ in. broad, caudate-setaceous rough-tipped. *Infl.* 6–12 in., narrow, 6–15-spiked; lowest peduncle usually short 4–1-spiked, occasionally more distant long filiform. *Spikes* usually 1 1½ in., sometimes nearly 3 in., and much broader with very long fem. glumes. *Utricle* short-stalked, green then stramineous.—Primarily distinguishable from *C. Myosurus* and *C. spiculata* by the nerveless utricles.

72. **C. desponsa**, *Boott Carex*, ii. 82, t. 228; leaves long narrow, peduncles 3–7 very distant 1-spiked, terminal spike with fem. at base or wholly male, fem. glume small ovate cuspidate, style 3-fid, utricle large ellipsoid trigonous nervose glabrous, beak linear ⅔ utricle.

KHASIA HILLS, alt. 5 6000 ft., Moflong and Mairung Woods, *J. D. H.*

Glabrous. *Rhizome* woody, horizontal. *Stems* 12–20 in. *Leaves* numerous overtopping stem, ⅛–¼ in. broad; lower spikes 3–6 in. apart, long-peduncled. *Spikes* 1½ by ¼ in., lax, ferruginous green. *Utricle* (including beak) ¼ in., ferruginous or brown-red, beak sparsely scabrous with 2 small teeth.—Boott likens this to *C. longipes*, Don in general habit. It does not seem really allied to *C. Myosurus*, and the terminal spike being not rarely wholly male, its true affinity is perhaps not with the Sect. *Indicæ*.

73. **C. scitula**, *Boott Carex*, iv. (1867), 177, t. 600; stems slender tufted, leaves overtopping infl. linear, spikes 3–7 oblong cylindric dense comose from brown-red stigmas, fem. glumes lanceolate acuminate, style

3-fid, utricles very small ellipsoid trigonous nerveless minutely hairy, beak short conic. *Boeck. in Linnæa*, xl. 385.

MISHMEE HILLS; Paen Panee (Khosha's), *Griffith* (*Kew Distrib.* 6097).

Glabrous. *Stolons* long, slender, becoming woody. *Stems* 6–10 in. *Leaves* $\frac{1}{6}$ in. broad. *Spikes* $\frac{3}{4}$ by $\frac{1}{8}$ in. *Fem. glumes* $\frac{1}{8}$ in., brown-red. *Utricle* nearly white, narrowed into beak, beak included much shorter than glume. *Style-branches* 3, exsert part much longer than utricle, persistent.

*** Spikes long cylindric. Peduncles often several from one sheath.

74. **C. insignis,** *Boott Carex*, i. 5, t. 14; cauline leaves many shorter than infl. narrow, their sheaths concealing nearly whole stem, infl. long narrow, peduncles several or many from each sheath, spikes long linear lax dark green, style 3-fid, utricle ellipsoid trigonous nerveless nearly glabrous, beak conic-linear $\frac{2}{3}$ utricle. *Boeck. in Linnæa*, xl. 337.

From EAST NEPAL, *J. D. H.*, eastwards to ASSAM and the KHASIA HILLS, alt. 3500–7000 ft., common.

Glabrous. *Stolons* stout, elongate, covered by torn scales. *Stems* 2–3 ft., lowest 6–12 in. covered by nearly leafless red sheaths. *Leaves* 6–12 by $\frac{1}{6}$–$\frac{1}{4}$ in., flat. *Infl.* often 12 by 2 in.; lower bracts similar to the leaves, not overtopping infl. *Spikes* $1\frac{1}{2}$–2 in. by $\frac{1}{4}$–$\frac{1}{6}$ in., mostly shortly male at top, terminal one sometimes wholly male. *Fem. glumes* ovate, obtuse, cuspidate, shorter (cusp included) than utricles. *Utricles* (beak included) $\frac{1}{8}$ in., sometimes hispid-scabrous on angles and margins of beak, otherwise glabrous. *Nut* closely filling utricle; style-base linear.

75. **C. polycephala,** *Boott Carex*, i. 4, t. 12; leaves long, infl. elongate oblong dense, peduncles fascicled, spikes large oblong-cylindric dense straw-colrd., fem. glumes elliptic acute, style 3-fid, utricle ellipsoid trigonous few-nerved glabrous, beak linear as long as utricle. *Boeck. in Linnæa*, xl. 333.

SIKKIM HIMALAYA, alt. 7–10,000 ft., *J. D. H.*, &c.

Glabrous. *Rhizome* stout; stolons elongate. *Stems* 12–18 in., robust. *Leaves* exceeding infl. $\frac{1}{4}$–$\frac{1}{2}$ in. broad. *Infl.* 10 by 2–3 in. *Spikes* numerous, solitary (many long-pedicelled), $\frac{3}{4}$ by $\frac{1}{4}$–$\frac{1}{2}$ in.; terminal spike (always as seen) female at base. *Fem. glumes* acute-triangular, scarcely mucronate, 1-nerved, bright straw-colrd. *Utricles* $\frac{1}{8}$ in. (or rather more), green finally black, not inflated, nerves 6–8, suddenly narrowed at top; beak smooth, shortly 2-fid. *Nut* ellipsoid, trigonous, pyramidal at either end, dark-brown; style-base not dilated.

76. **C. Walkeri,** *Arnott ms. ex Boott in Proc. Linn. Soc.* i. 257 and *in Trans. Linn. Soc.* xx. 129, and *Carex*, i. 2, t. 4; leaves nearly as long as stem, infl. elongate narrow interrupted, peduncles fascicled, spikes long linear, fem. glumes oblong-obovate cuspidate, style 3-fid, utricle oblong trigonous attenuate at either end glabrous, beak conic-linear length of utricle. *Thw. Enum.* 335; *Boeck. in Linnæa*, xl. 333.

NILGHIRI HILLS; alt. 5–7500 ft., frequent, *C. B. Clarke.* CEYLON; alt. 7000 ft., *Thwaites* (C. P. n. 2751), &c.—DISTRIB. Java.

Glabrous. *Stems* 2–3 ft. *Leaves* often $\frac{1}{2}$ stem, $\frac{1}{4}$–$\frac{1}{2}$ in. wide. *Infl.* 20 by 2–3 in.; lowest bract often not reaching halfway to its top. *Spikes* 2 by $\frac{1}{4}$ in., dark-brown in Ceylon examples, pale ferruginous-green in Nilghiri; terminal and upper spikes often wholly male or with only 1 or 2 utricles at base. *Fem. glumes*, cusp included, shorter than utricles. *Utricles* $\frac{1}{4}$–$\frac{1}{3}$ in., scabrous on 3 angles and on beak, attenuated into beak, nerves not prominent. *Nut* oblong-ellipsoid trigonous.

77. **C. decora,** *Boott Carex*, i. 5, t. 15; stout, leaves and bracts long, infl. long narrow, peduncles often clustered, spikes large linear

purple-red, several terminal frequently wholly male, fem. glumes ovate obtuse or retuse, style 3-fid, utricles long narrow-ellipsoid trigonous nerveless glabrous, beak ½ utricle. *Boeck. in Linnæa*, xl. 338.

SIKKIM HIMALAYA; alt. 9–12,000 ft., *J. D. H.*, &c., abundant.

Glabrous. *Rhizome* woody; lateral shoots strong. *Stems* 2–3 ft. *Leaves* often overtopping infl., ⅛–¼ in. broad, coarse. *Infl.* 18 by 3 in.; lower peduncles sometimes 8 in. exsert, 6 in. long, 5-spiked. Terminal *spike* with a few fem. at base, or sometimes 6–10 top spikes wholly male 1½ by $\frac{1}{10}$ in. *Fem. glumes* ⅛–⅙ in., dark-red, scarious-edged, lower often distant. *Style* long, base conic, branches 3 long. *Utricles* ⅛–¼ in., attenuate at both ends, greenish, not inflated; beak conic-linear, often minutely scabrous, teeth 2 long linear.—Varies greatly in size of glumes and utricles; a large form with utricles more than ¼ in. long and clusters of wholly male spikes has been taken for a distinct species.

78. **C. arridens**, *C. B. Clarke*; robust, leaves overtopping stem, infl. elongate, peduncles 2–1 from each sheath bearing many spikes, spikes linear-lanceolate dark-red with few fem. at base or wholly male, style 3-fid, utricle ovoid trigonous nerveless hairy, beak linear hairy longer than utricle.

PEGU; Nattoung, alt. 4000 ft., *Kurz*. PERAK; alt. 3000 ft., *Kunstler*.

Glabrous, except utricles. *Rhizome* oblique, woody, stout. *Stem* 18 in. *Leaves* (subbasal) numerous, ½ in. broad, coarse, strongly striate. *Infl.* 12 by 2 in; lower peduncles distant, exsert 2 in., stout, erect. *Spikes* ½–¾ in., rather stout. *Male glumes* oblong-obovate, obtuse, scarcely mucronate, red-brown with scarious margin. *Fem. glumes* ovate, acuminate, scarcely mucronate, much shorter than utricles (beak included). *Utricle* covered with golden hairs in upper part suddenly narrowed into beak, beak slender 2-fid into two large lips. *Nut* ellipsoid, trigonous, pyramidal at both ends, dark-brown, style-base linear.—*C. divaricata*, Wall. Cat. 3533 from Saluen is very young; it may be this.

79. **C. Daltoni**, *Boott Carex*, i. 5, t. 16; large, leaves long, infl. long compound peduncles clustered, spikes linear, fem. glumes cuspidate, style 3-fid, utricle small narrow ellipsoid trigonous nerveless hairy, beak oblong-linear ⅔ the length of utricle. *Boeck. in Linnæa*, xl. 331. C. crassipes, *Boeck. l. c.* 329.

UPPER SIKKIM; alt. 7–10,000 ft., *J. D. H.*, *Pantling*. BHOTAN; *Griffith*.

Glabrous. *No stolons* seen. *Stems* 2–2½ ft., stout; lower sheaths horny, yellow or chestnut-colour, grooved. *Leaves* many, overtopping the stem, ⅛ in. broad, stout, striate. *Infl.* 18 in. by 6; peduncles in lowest sheath sometimes 6–20, 7 in. long, slender. *Spikes* 2 by ⅛ in., chestnut or pale-yellow or intermediate; terminal spikes often nearly (sometimes wholly) male. *Fem. glumes* ovate, subobtuse, cusp reaching to top of beak of utricle. *Utricles* becoming chestnut-red almost shining when fully ripe, narrowed into beak (yet nut is obovoid rather obtuse); beak not hairy, scabrid on the bifid teeth.

80. **C. inæqualis**, *Boott ms.*; medium sized, leaves long very narrow, infl. long compound, peduncles clustered, spikes linear, glumes shortly cuspidate, style 3-fid, utricles small narrow ellipsoid trigonous nerveless hairy, beak oblong-linear ⅔ utricle.

KUMAON, alt. 8–9000 ft., *Duthie*. SIKKIM HIMALAYA; Lachen, 9–11,000 ft., *J. D. H.*

Stems slender, 12–15 in. *Leaves* as long as stem, hardly ⅛ in. broad. *Infl.* 7 by 1 in. *Spikes* ⅔ by ⅛ in., chestnut or pale; terminal spike sometimes wholly male.—Closely allied to *C. Daltoni*; the utricles turn shining chestnut-red when fully ripe, and (what is unusual in *Carex*) though the utricle is attenuated into the beak, the

nut is obtuse at top.—The difference in size, stoutness, and breadth of leaves between this and *C. Daltoni* is great.

81. **C. Winterbottomi,** *C. B. Clarke*; leaves and bracts narrow slightly overtopping infl., infl. long narrow of 19 spikes whereof 6 terminal wholly male, peduncles clustered, fem. glumes elliptic acute pale, style 3-fid, utricle ellipsoid trigonous nerveless hairy, beak bifid ¼ length of utricle. C. setigera? var. fasciculata, *Strachey Cat. Pl. Kumaon*, 73; *Duthie in T. E. Atkinson Gaz.* x. 616.

KUMAON; alt. 8000 ft., *Strachey & Winterbottom* (n. 16).

Glabrous. *Rhizome* creeping, woody. *Stems* approximate, 10 in. *Leaves* ⅛-⅙ in. broad, rather rigid. *Infl.* 6 by 1 in.; peduncles shortly exserted, little divided. Terminal 6 *spikes* male, 1 by $\frac{3}{10}$ in.; glumes pale brown, acute, not cuspidate, margins white shining. Lower *spikes* ¾ by ⅙–⅓ in., with 4–8 basal females. *Style-branches* 3, rather long. *Fem. glumes* pale, 1 nerved, exceeding utricles.

82. **C. pulchra,** *Boott Carex*, i. 4, t. 13; leaves shorter than infl. narrow, infl. oblong, peduncles short clustered, spikes rather numerous linear, chestnut-brown, fem. glumes very small not cuspidate, style 3-fid, utricle small narrow ellipsoid trigonous nerveless glabrous red-brown, beak conic-linear ⅔ length of utricle shortly bifid. *Boeck. in Linnæa*, xl. 336.

SIKKIM HIMALAYA; alt. 10–14,000 ft., Lachen, *J. D. H.* EAST NEPAL; Tambur River, *J. D. H.*

Glabrous. *Stolons* slender. *Stems* approximate 8–16 in., slender. *Leaves* scarcely ⅛ in. broad, 1 or 2 cauline often present. *Infl.* 4 by 1 in.; spikes mostly fem. with a few males at top, terminal sometimes wholly male; peduncles often 6 or more clustered, not rarely divided. *Spikes* 1 by $\frac{1}{16}$–$\frac{1}{12}$ in., much slenderer than in *C. æqualis* or *Daltoni*. *Fem. glumes* $\frac{1}{20}$ in., about as long as utricle.—This species differs from all (except *C. munda*, Boott) by the very small glumes and utricles, and very slender spikes.

83. **C. munda,** *Boott Carex*, i. 7, t. 20; leaves about as long as infl. narrow, infl. very lax, peduncles distant long lower often paired, spikes oblong-linear straw-colrd., fem. glumes elliptic triangular-tipped, styles 3-fid, utricle ellipsoid-trigonous nerveless glabrous green-yellow, beak ¼ utricle nearly entire. *Boeck. in Linnæa*, xl. 383.

SIKKIM HIMALAYA, alt. 10–14,000 ft., *J. D. H.*, &c., frequent.

Glabrous. *Stolons* slender. *Stems* 10–18 in., very slender. *Leaves* ⅛–⅙ in. broad, weak. *Infl.* of few scattered distant solitary spikes; lower peduncles often exsert 3–6 in. *Spikes* mostly fem. at base (terminal sometimes wholly male), ⅓ by ⅛ in. *Utricle* $\frac{1}{12}$–$\frac{1}{10}$ in.—Closely allied to *C. pulchra*, Boott; spikes and utricles larger (though small). Rhacheola not rarely developed inside utricle. Possibly a form of *C. Stracheyi*; the utricles are rather smaller, glabrous, the terminal spike usually fem. at base.

84. **C. Stracheyi,** *Boott*; *Strachey Cat. Pl. Kumaon*, 73; spikes 20–30 loosely panicled on slender long peduncles, uppermost 2 male, lower fem. slender cylindric pale, style 3-fid, utricle ellipsoid-lanceolate setulose narrowed into a linear-conic beak. *Duthie in T. E. Atkinson Gaz.* x. 618.

N.W. HIMALAYA; Kumaon, alt. 8000 ft. (Mudhari Pass), *Strachey & Winterbottom* (n. 18). GURWHAL, alt. 12–13,000 ft., *Duthie.*

Glabrous. *Stems* 12–18 in. *Leaves* as long as the stems, ¼ in. broad. *Panicle* commencing at 8 in. from base of stem. *Peduncles* 2–5 from one sheath, 3–7 in.,

nearly capillary; bracts not overtopping panicle. *Spikes* solitary (rarely a small second added) $\frac{3}{4}$ by $\frac{1}{10}$ in.; two upper male (in one case with a disjunct fem. at base) ferruginous, the others fem. often shortly male at top. Fem. *glumes* ovate, acute, (lower often mucronate), pale, shorter than utricle. *Utricle* small, less than $\frac{1}{12}$ in., yellow-green, obscurely nerved, setulose-scabrous at least in the upper half, granular or subscabrous below; beak shorter than utricle, setulose, scabrous, shortly notched; exsert style-branches much shorter than utricle. *Nut* fitting the utricle, ellipsoid, triquetrous, brown.—Very like *C. munda*, Boott.

***** Species of Sect. "INDICÆ" not easily placed in any one of the preceding four subsections.

85. **C. curvata,** *Boott Carex*, i. 2, t. 5 (non Knaf); small, leaves filiform, infl. compound oblong yellow dense, spikes very small ovoid 4–6-nutted with few males at top, utricle ellipsoid plano-convex 3-nerved, glabrous, beak very short oblong bifid, style 3-fid. *Boeck. in Linnæa*, xxxix. 110.

SIKKIM HIMALAYA; Tungu, alt. 12–13,000 ft., *J. D. H.* Pharee, *Dungboo.*

Glabrous. *Rhizome* woody. *Stems* densely caespitose, 2–6 in., sometimes curved. *Leaves* overtopping the short stems, often curved, edges inrolled. *Infl.* 1¼ by ⅓ in., lowest bract often overtopping it. Lowest *partial* panicle subsessile (peduncle included in the short sheath), nearly ½ in. with 2–6 spikes. *Spikes* ⅓ in., nearly entirely fem. Fem. *glumes* ovate, acute, scarcely mucronate, yellow, back green, about as long as utricle. *Utricle* $\frac{1}{16}$ in., sessile, almost concavo-convex, yellow with 3 green longitudinal bands; beak bifid, nerves of utricle running up into its teeth. *Rudiment* of the *spicula* usually present, as long as utricle, flat, green, 3-striate, applied to the posticous face of nut, often (as observed by Boott) splitting the utricle down.—Boott was unable to indicate the affinities of this species; Boeckeler has placed it in the middle of *Vignea*; it has several points in common with *Kobresia.*

86. **C. inclinis,** *Boott ms.*; stems 4–9 in. slender 4–6-spiked, leaves much overtopping infl. narrow, spikes solitary nearly all male at top terminal usually fem. at base, style 3-fid, utricle narrow-ellipsoid trigonous nearly nerveless, beak ⅛–½ length of utricle. C. setigera, *var.* δ inclinis, *Boott ms.*

SIKKIM HIMALAYA; Tonglo, alt. 10,000 ft., and Lachen, alt. 12–13,000 ft., *J. D. H.*, &c.

Glabrous, except minutely hairy utricles. *Rhizome* creeping; stolons elongate, rather slender. *Leaves* numerous, 1 ft. (and upwards) by ⅛ in.—Out of 17 terminal *spikes* 2 are wholly male, 15 fem. (usually only a few distant utricles) at base. *Spikes* solitary ¾ by ¼ in.; male glumes dark red. Fem. *glumes* ovate-lanceolate, mucronate, not quite reaching beak of utricle.—Technically near *C. composita*, Boott.

87. **C. fragilis,** *Boott Carex*, i. 7, t. 21; stem very slender, leaves about as long as stem narrow, peduncles 3–6 very distant filiform, spikes pale basal fem. distant, style 3-fid, utricle (unripe) oblong-obovoid minutely scabrous-hairy, beak linear ½–⅔ utricle. *Boeck. in Linnæa*, xl. 383.

SIKKIM HIMALAYA, alt. 11,000 ft.; Lachen and Lachoong, *J. D. H.*

Glabrous, except utricles. *Rhizome* very short, horizontal. *Stems* densely uniseriate, 8–14 in. *Leaves* ⅛ in. broad, lower 1–3 in. long, upper up to 12 in. Lowest *peduncle* 3–4 in., capillary, uppermost 1–2 in. *Spikes* sometimes 1 by ⅛ in. with 10 fems. at base; sometimes 6–8-fld., very slender the 2 or 3 basal fems. distant. Fem. *glumes* elliptic, 3-nerved, emarginate, often muticous. *Utricle* very obscurely few-nerved.—Extremely like *C. inclinis*, collected at the same place by J. D. H.; the material of both being scanty, and the fruits of *C. fragilis* only half ripe, it is not

safe to unite them. *C. fragilis* differs by the extreme slenderness of the infl. and peduncles, and by lowest bract not (or scarcely) overtopping infl.

88. **C. munipoorensis,** *C. B. Clarke*; short, leaves and bracts narrow overtopping infl., spikes all fem. at base oblong solitary straw-colour not very numerous, lower peduncles 2–3-clustered, glumes elliptic-lanceolate elongate, style 3-fid, utricle oblong glabrous beaked.

MUNIPOOR; Jopoo, alt. 9500 ft., *Watt* (n. 6894).

Glabrous. *Rhizome* woody. *Stems* approximate, 6–8 in. *Leaves* subbasal, numerous, up to 11 in. by $\frac{1}{6}$ in., rather tough. *Infl.* 3 by 1 in., a solitary long-peduncled spike sometimes added near base of stem. *Spikes* 12–14 on 1 stem, $\frac{3}{8}$ by $\frac{1}{4}$ in., dense. Male *glumes* very elongate, not cuspidate; fem. glumes similar, rather less elongate, shining, irregularly 3–5-nerved. *Utricle* not ripe.

89. **C. speciosa,** *Kunth Enum.* ii. 504; leaves long, spikes 3–1 very remote linear fem. at base, style 3-fid, fem. glumes short ovate muticous, utricle ovoid-pyramidal many-striate green puberulous hardly beaked. *Boott Carex*, i. 53; *Boeck. in Linnæa*, xl. 388; *C. B. Clarke in Journ. Linn. Soc.* xxv. 82. C. concolor, *Nees in Wight Contrib.* 125 (*not R. Br.*). C. peduncularis, *Wallich ms.* C. courtallensis, *Nees ms.*; *ex. Boott Carex*, i. 52, t. 138.

Widely distributed in INDIA, alt. 1–7000 ft.; from Nepal to Sikkim, and Khasia Hills to Muneypoor; also Rajmahl, Parasnath, and Mts. of S. India.—DISTRIB. Borneo.

Glabrous. *Rhizome* woody, short, with tough fibres (remains of lower sheaths). *Stems* 1–2 ft., slender but tough. *Leaves* (subbasal) often exceeding stem, sometimes scarcely $\frac{1}{6}$ in. wide, tough, many-striate, sometimes $\frac{3}{4}$ in. broad, flat. *Peduncles* usually very short, often not exserted from sheath, but basal often 4–10 in. long (perhaps a stem); bracts like the leaves usually not overtopping infl. *Spikes* 1–3 in. by $\frac{1}{4}$ in. Fem. *glume* triangular-tipped, muticous, shorter than utricle. *Utricles* $\frac{1}{6}$ in., trigonous, not inflated, mouth nearly entire. *Nut* oblong-obovoid, $\frac{2}{3}$ utricle, black; style (and its 3 branches) short, style-base scarcely dilated.

90. **C. radicalis,** *Boott Carex*, i. 56, t. 147; leaves subradical many exceeding the slender stems, spikes 2–1 very remote broad ovoid $\frac{1}{4}$ in. diam., style 3-branched, utricle ovoid many-ribbed hairy. *Boeck. in Linnæa*, xxxix. 40.

SIKKIM HIMALAYA; Lachen, alt. 10–11,000 ft., *J. D. H.*

Glabrous, except utricle. *Rhizome* oblique woody. *Leaves* 10 by $\frac{1}{10}$ in., many. *Stems* almost capillary, sometimes 2 from one sheath, sometimes with a leaf and peduncle in the middle. *Spike* irregular, sometimes of 2 or 3 obscurely fused into one head, pale. *Fem. glumes* ovate-triangular 1-nerved, lower mucronate, lowest bract-like sometimes 1 in. *Utricle* few, small, with no linear beak, dull green.

91. **C. curticeps,** *C. B. Clarke*; leaves as long as stem narrow, spikes 2–14 very long approximate several terminal often male or with few fem. at base, fem. glumes ovate usually cuspidate, style 3-fid, utricle $\frac{1}{3}$ in. and upwards elongate-lanceolate nerveless glabrous, beak $\frac{1}{2}$ as long as utricle.

SIKKIM HIMALAYA, alt. 10–12,000 ft., common, *C. B. Clarke.*

Glabrous. *Stems* 1–2 ft. *Leaves* rarely more than $\frac{1}{6}$ in. broad. *Infl.* $\frac{1}{2}$–$2\frac{1}{2}$ in. long. Fruiting *spikes* 2–$3\frac{1}{2}$ in. long; glumes $\frac{1}{6}$ in. apart, $\frac{1}{2}$ in. long. *Utricle* altogether resembling that of *C. decora*, but sometimes $\frac{1}{2}$ in. long.—Closely allied to *C. decora*, but the infl. is uniform and very different.

Sect. 6. ATRATÆ. Spikes few (1–8), terminal male at base fem. at top. Glumes dark-chestnut or black except keel.

[See also *C. melanantha*, *C. ustulata*, and *C. alopecuroides* in the next section.]

92. **C. alpina,** *Sw. in Liljeb. Svensk. Fl.* ed. ii. 26; slender, spikes (3–4) cuboid or short cylindric approximate short-peduncled, style 3-fid, utricle obovoid-ellipsoid trigonous granular pale obscurely nerved smooth or very nearly so, beak very small oblong emarginate, nut nearly filling utricle. *Boott Carex*, iii. 112 (incl. var. β *infuscata, partly*), tt. 356, 357, 358; *Boeck. in Linnæa*, xl. 394, *& in Journ. Linn. Soc.* xviii. 104. C. Vahlii, *Schkuhr. Riedgr.* ii. 46, t. Ppp. fig. 154; *Reichb. Ic. Fl. Germ.* viii. 16, t. 235; *Kunth Enum.* ii. 431. C. infuscata, *Nees in Wight Contrib.* 125 (*partly*); *Kunth Enum.* ii. 431. C. Lehmanni, *Boott ms.*; *Strachey Cat. Pl. Kumaon*, p. 73; *Boott Carex*, iii. 113 (*partly*); *Duthie in E. T. Atkinson, Gaz.* x. 618.

WEST HIMALAYA, alt. 8–15,000 ft., from KASHMIR to KUMAON, common; Sikkim; Yeumtung, alt. 15,000 ft., *J. D. H.*—DISTRIB. Cold N. Hemisphere.

Glabrous. *Rhizome* short, woody, slender. *Stems* 4–26 in., tufted. *Leaves* usually much shorter than stem, near its base, narrow ($\frac{1}{10}$ in.), weak, nearly smooth; not rarely a node with leaf is added 1–2 in. below the infl. *Spikes* $\frac{1}{2}$–$\frac{1}{4}$ by $\frac{1}{4}$ in., often sessile in a head, lowest scarcely $\frac{1}{4}$ in. distant; lowest rarely 1 in. distant, then on a peduncle $\frac{1}{2}$–1 in.; lowest bract usually about as long as infl. *Glumes* dense, $\frac{1}{8}$ in., ovate, triangular-tipped, yellow keel very variable in width, often 0. *Utricle* about $\frac{1}{10}$ in., yellow or ultimately pale brown, nerveless or irregularly obscurely few-nerved, loose subinflated but fitting nut; oblong part of beak cylindric, short or scarcely any, granular, quite smooth or very sparsely scabrid; style-branches 3, protruded part about half length of utricle.—C. Vahlii, Schkuhr, referred here by Boott and others, is described and figured with utricles hairy all over, and in my opinion should be excluded. As to the W. Nepal plants referred by Boott to *C. Lehmanni*, see remarks under that plant.

Var. β *erostrata*; Boott, l. c. 71, t. 194, fig. 2; beak of utricle 0.—Kunawur, *Royle*. Tibet, alt. 15,000 ft., *Strachey & Winterbottom*.

Var. γ *gracilenta* (sp.), Boott ms.; Strachey, Cat. Pl. Kumaon, p. 73; very slender, leaves scarcely $\frac{1}{16}$ in. broad, spikes small. *Boeck. l. c.* 185; *Duthie l. c.* 618. C. alpina, β infuscata (*partly*), *Boott Carex*, iii. 113, t. 359; *Boeck. l. c.* 394.—Kumaon, alt. 10,000 ft., *Strachey & Winterbottom* (n. 20). Sikkim; Lachen, alt. 11–14,000 ft., *J. D. H.*—*Stems* 2–16 in. *Spikes* $\frac{1}{4}$ by $\frac{1}{6}$ in., considerably smaller than in the usual Himalayan form (*C. infuscata*, (sp.) Wight), but not different from many European examples of *C. alpina*. Though Boeckeler keeps this up as a species, Boott finally accepted Spach's opinion that it is only a form of *C. alpina*.

93. **C. Lehmanni,** *Drejer, Symb. Caricol.* 13, t. 2; lowest spike sometimes 1–3 in. distant, lowest bract usually much overtopping infl., spikes and utricle smaller than those of *C. alpina*, otherwise as *C. alpina*, Sw. *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, iii. 113, t. 361; *Boeck. in Linnæa*, xl. 395. C. infuscata, β microcarpa, *Nees in Wight Contrib.* 125; *Kunth Enum.* ii. 431.—Carex, *Wall. Cat.* 3381.

HIMALAYA, alt. 11–13,500 ft.; from KUMAON, *Strachey & Winterbottom*, to Sikkim, *J. D. H.*, frequent.

Exceedingly near *C. alpina*, Sw. *Stems* sometimes rather stouter, acutely triquetrous, scabrous, but not rarely slender nearly as in *C. alpina*. *Utricle* scarcely $\frac{1}{15}$ in., often scabrous on the shoulders, whence spikes often oblong, narrower than

in *C. alpina*.—Strachey & Winterbottom, n. 21, the plant in Herb. Kew inscribed by Boott as *C. Lehmanni*, Drejer, is, in my opinion, fairly typical *C. alpina*.

94. **C. obscura**, *Nees in Wight Contrib.* 126; spikes (3–7) oblong or cylindric approximate short-peduncled erect dense, style 3-fid, utricle oblong narrowed to each end trigonous granular yellow smooth, beak pyramidal scabrid emarginate, nut nearly filling utricle. *Kunth Enum.* ii. 515; *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, i. 70, t. 192; *Boeck. in Linnæa*, xl. 395. C. infuscata, *Nees in Wight Contrib.* 125 (*partly*). C. hæmatostoma, *Herb. Jacquem.*

West Himalaya, alt. 8–10,500 ft., from Kashmir, *C. B. Clarke*, to Kumaon, *Strachey & Winterbottom*.

Glabrous. Stoloniferous. *Stems* 1–2 ft., rather slender. *Leaves* often overtopping stem, $\frac{1}{6}$ in. broad, flat, weak (the leaf so commonly seen 1–3 in. below the infl. in *C. alpina* never (?) occurs here). *Spikes* often very close, subsessile, or lowest sometimes 2 in. distant on a 1 in. peduncle, $\frac{3}{4}$ by $\frac{1}{6}$ in., dark chestnut or black, terminal occasionally wholly male; lowest bract usually overtopping infl. *Glumes* ovate, triangular-tipped, dark chestnut, often yellow on keel. *Utricle* $\frac{1}{10}$ in. as long as glume, less than $\frac{1}{20}$ in. broad, very obscurely inflated, nerves irregular or obscure; beak none, except hollow elongate pyramidal part of utricle. *Style-branches* shorter than the utricle.—The plant here described as typical *C. obscura* is Royle's, n. 118 (C. hæmatostoma, *Herb. Jacquem.*), which is *C. obscura*, Munro and Boott, but was *C. infuscata* of Nees. *C. parvibracteata*, Nees, referred here by Boott (Carex, iii. 108), is = *C. psycrophila*, Nees.

Var. *β brachycarpa*; utricle much shorter obovoid-ellipsoid narrowed very suddenly into a short-oblong beak scabrous on shoulders granular (not shining yellow) when ripe.—Himalaya, alt. 10–12,000 ft., from Simla, *Duthie*, to Sikkim, *J. D. H.*, &c.—This is Boeckeler's *C. obscura*.—Utricle usually nerveless or nearly so. Basal sheaths a shining horny-brown. Spikes often uniform black.

95. **C. atrata**, *Linn. Sp. Pl.* 1387; spikes 3–6 large approximate cylindric dense lowest peduncled nodding, glumes ovate acuminate, style 3-fid, utricle large ovoid or ellipsoid inflated yellow-brown smooth beakless nearly nerveless, nut sessile much smaller than utricle. *Schkuhr Riedgr.* i. 52, & ii. 42, t. X. fig. 77; *Kunth Enum.* ii. 433; *Reichb. Ic. Fl. Germ.* viii. 16, t. 237; *Boott Carex*, iii. 114, tt. 362–364; *Boeck. in Linnæa*, xl. 398. C. aterrima, *Hoppe in Sturm Fl. Deutsch.* [xxi. 3] 12; *Kunth l. c.* 434; *Reich. l. c.* t. 236. C. caucasica, *Stev. in Mem. Soc. Mosc.* iv. 68; *Kunth l. c.* 433.

Kashmir, alt. 11,000 ft., frequent, *C. B. Clarke*. Sikkim, alt. 11–17,000 ft., *J. D. H.*, *King*.—Distrib. Cold N. Hemisphere.

Glabrous. Stoloniferous. *Stems* 1 in. apart on the creeping rhizome, 2 ft., medium stout, triquetrous scabrous at top. *Leaves* often as long as stem, $\frac{1}{8}$–$\frac{1}{4}$ in. broad. *Spikes* $\frac{3}{4}$–1 by $\frac{1}{4}$–$\frac{1}{3}$ in.; lowest $\frac{1}{2}$ 2 in. distant, sometimes compound; lowest peduncle 1–2$\frac{1}{2}$ in., rather slender; lowest bract usually overtopping infl. *Glumes* $\frac{1}{6}$–$\frac{1}{5}$ in., fem. often nearly uniformly black except margin, sometimes with yellow keel, male paler usually with yellow keel. *Utricle* $\frac{1}{6}$ by $\frac{1}{8}$ in., plane-convex, shining, triangular at both ends, slightly granular, finally shining; mouth small, round, entire or with a short slit on one side. *Style-branches* much shorter than utricle, occasionally the entire protruded part of style is nearly as long as the branches. *Nut* ellipsoid or obovoid, trigonous, less than half the length of nut and about half its breadth.—Much of Boott's Indian *C. atrata* is *C. nivalis*, Boott.

96. **C. Duthiei**, *C. B. Clarke*; spikes approximate, lowest very shortly peduncled, glumes acuminate linear-tipped, utricle narrow oblong, nut small stalked nearly filling utricle, otherwise as *C. atrata*.

GURWHAL; alt. 13–14,000 ft, *Duthie* (n. 4499), SIKKIM; alt. 11–15,000 ft., *J. D. H.*. &c.

May be esteemed a var. of *C. atrata*, but the utricle is not ½ the breadth, so that the nut though smaller than that of *C. atrata*, nearly fills it. The lowest peduncle is usually less than ½ in., the glumes are acuminate to a long linear obtuse black point exceeding the utricles.

Var. β *glacialis*; stems 2–6 in., leaves much shorter than stems, spikes very small (sometimes ½ by ⅛ in.), utricles small very little inflated. C. atrata, *var.* glacialis, *Boott Carex*, iii. 114, t. 365.—N. Sikkim; alt. 15–17,000 ft., *J. D. H.*

97. **C. nivalis,** *Boott in Proc. Linn. Soc.* i. 256 and *in Trans. Linn. Soc.* xx. 136 and *Carex*, i. 13, t. 35 (*partly*); terminal spike wholly male or fem. at top, utricle broad much compressed often of thin texture with minute beak, nut stalked exceedingly small (otherwise as *C. atrata*). *Strachey Cat. Pl. Kumaon*, 73; *Boeck. in Linnæa*, xl. 400. C. cinnamomea & Griffithii, *Boott in Proc. Linn. Soc. l. c.* 257, 286, and *in Trans. Linn. Soc. l. c.* 136, 138. C. Oliveri, *Boeck. in Flora*, lxiii. 455, and *in Journ. Linn. Soc.* xviii. 104.

HIMALAYA and W. TIBET, alt. 11–17,000 ft., common; from the KARAKORUM, *Thomson*, &c., to SIKKIM, *J. D. H.*—DISTRIB. Cabul, Central Asia.

Boott states (Carex, t. 13) that he finally doubted whether this was distinct from *C. atrata*, and it is certainly not, unless Boott's sorting is altered. In *C. nivalis*, the utricle has concavo-convex very acute margins; its texture is very thin becoming often scarious purple or pale. The colour of the glumes varies excessively, being black-red in the type plant, cinnamomeous in the N.-W. Himalaya, yellow-brown in Karakorum, becoming pale yellow or green yellow in the extreme form; the utricles in all these forms are concolorous (or nearly so) with the glumes. In *C. nivalis* (as in *C. atrata*) there occur alpine forms with stems 2–3 in. high. It appears from Fischer's collections that Ledebour, Turczanimow, &c., must have included this under *C. atrata*.—*C. Griffithii*, Boott is founded on Griffith, n. 78, which has, in the four infl. of this number, the terminal spike wholly male, and is so described by Boott. Subsequently Boott mixed with this (undoubtedly correctly) both in Kew Herb. and in his own Griffith n. 142 (from Cabul also) which has in the five infl. seen by me the terminal spike (decisively) fem. at top. This is exactly the plant published as *C. Oliveri* by Boeckeler, who relying on the terminal spike supposed it must be different from *C. Griffithii*. From the large quantity seen by me I should say the terminal spike was about as frequently female at top as wholly male. In his "Ill. Carex" Boott reduces his *C. cinnamomea* to his *C. nivalis*, but does not refer to his *C. Griffithii*.

98. **C. psychrophila,** *Nees in Wight Contrib.* 127; spikes approximate cylindric lowest peduncled, style 3-fid, utricles ellipsoid trigonous smooth pale green suddenly narrowed into a linear-oblong scabrous beak not inflated. *Kunth Enum.* ii. 463; *Strachey Cat. Pl Kumaon*, 73; *Boott Carex*, i. 70, t. 191 (*excl. Royle*, n. 112); *Boeck. in Linnæa*, xl. 402. C. asperula, *Nees l. c.* 124; *Kunth l. c.* 433 (*not of Turcz.*). C. parvibracteata, *Nees l. c.* 125; *Kunth l. c.* 433. C. celsa, *Boott l. c.* iii. 108, t. 330.

HIMALAYA; from KASHMIR, alt. 8–10,000 ft., *C. B. Clarke*, to SIKKIM, alt. 12,000 ft., *J. D. H.*; frequent.

Glabrous. *Rhizome* creeping. *Stems* 1–2 ft., rather slender. *Leaves* ¼ as long as stems, ⅛–⅙ in. wide, weak. *Spikes* ½–¾ by ¼ in. (in fruit), dense; terminal spike nearly always fem. at top, occasionally wholly male; lowest spike often 1–2 in. distant, on a peduncle ½–1½ in. *Glumes* small, ovate, triangular-tipped, chestnut, with or without a yellowish keel. *Utricle* small, obscurely nerved, thin; nut black, nearly filling utricle; exsert part of the 3 style-branches much shorter than utricle (beak included), beak about ⅓ utricle, rather deeply 2-fid.—Not nearly allied to the

preceding group; perhaps near *C. alopecuroides*.—Boott has included Royle, n. 112 (the sole foundation of *C. obscura*, Nees) in his *C. psychrophila*. Subsequently Boott (Carex, iii. 108 in Obs.) reduces *C. parvibracteata*, Nees (which is *C. psycrophila*) to *C. obscura*, Nees.

Sect. 7. PROPRIÆ. Terminal spike wholly male. (In *C. ustulata* and *C. alopecuroides* frequently, in some others very rarely, there occur terminal spikes male at base fem. at top.)

* Utricle glabrous (or scabrous on margins); beak 0 or very short.

99. **C. melanantha,** *C. A. Meyer ex Ledeb. Fl. Alt.* iv. 216 and *Ic. Pl.* iv. 8, t. 317; spikes 3–6 approximate subsessile (lowest peduncle rarely ¼ in.) dense, glumes black-red triangular-tipped, style 3-fid, utricles obovoid-ellipsoid nerveless granular usually dark-red upwards, beak hardly any. *Kunth Enum.* ii. 432; *Boott Carex*, iv. 211; *Turcz. Fl. Baikal. Dahur.* ii. (pars. 1) 269 *a* only; *Boeck. in Linnæa*, xl. 399. C. nigra, var. β *Trevir. in Ledeb. Fl. Ross.* iv. 288. C. nigra, var. orientalis, *Regel Descr. Pl. fasc.* viii. 28. C. atrata *Boott ms.* (*partly*). C. Moorcroftii, var. *Boott ms.* C. nivalis, *Boeck. ms.* (*partly*).

KASHMIR; alt. 9–12,000 ft., *Thomson*, &c., *C. B. Clarke*.—DISTRIB. Central Asia, Cabul.

Stoloniferous. *Stems* 6–24 in. *Leaves* numerous, often nearly as long as the stem, ⅛ in. broad; lower sheaths very pale brown. *Infl.* usually 1–2 in., longer than lowest bract. *Spikes* ½ by ¼ in. *Glumes* nearly uniform black red or with a narrow pale keel. *Utricle* shorter than glume, slightly scabrous on shoulders, trigonous, slightly winged; exsert part of stigmas rather shorter than utricle.—The original description of this species states the terminal spike to be male at base fem. at top, as in the type specimens, but in hardly any others; the Indian examples have the terminal spike male, and Turczaninow and Regel say this is so very generally in the Central Asian plant. Boeckeler and Boissier say that *C. nigra* mainly differs by not being stoloniferous; but *C. nigra* is plentifully stoloniferous. Treviranus therefore unites *C. melanantha* with *C. nigra*; it has the same general aspect, but *C. nigra* has a totally different much-compressed utricle. *C. parviflora*, C. A. Meyer (Enum. Pl. Cauc. p. 30) which includes *C. sabulosa*, Turcz. and *C. melanocephala*, Turcz., is also exceedingly like *C. melanantha* in general aspect; it is common in Central Asia, and very likely to occur in British India, and to have been overlooked. It differs from *C. melanantha* in having the utricle more acuminated into a short (but much more definite) linear beak.

100. **C. Moorcroftii,** *Falconer ms. ex Boott in Proc. Linn. Soc.* xx. (1851), 140, and *Carex.* i. 9, t. 27; spikes larger brighter than in *C. melanantha*, glumes black-red or paler, terminal spike often pale, utricle larger pale upwards, otherwise as *C. melanantha Strachey Cat. Pl. Kumaon*, 73; *Boeck. in Linnæa*, xli. 179. C. melanantha, β baicalensis, *Turcz. Fl. Baikal Dahur.* i. 270. C. melanantha, var. *Boott ms.*

HIMALAYA and TIBET, alt. 12–16,000 ft., from the KARAKORUM to TIBET (N. of Sikkim), alt. 16–17,000 ft., *J. D. H.* and Phari, *King*.—DISTRIB. Central Asia.

Appears like a fine bright-colrd. form of *C. melanantha* as the Russian botanists (and apparently Boott at last) esteemed it The fruiting spikes look very different as pale-yellow utricles alternate with dark-chestnut glumes; whereas in *C. melanantha*, the dull black-red tops of utricles are concolorous with glumes. *C. Moorcroftii* is sometimes nearly 2 ft. high, with spikes ½ in. in diam.

101. **C. supina,** *Wahl. in Handl. Vet. Acad. Stockh.* 158; small, rhizome slender creeping, spikes approximate sessile small, one terminal

slender male, 2–3 subglobose female 4–10-fruited, style 3-fid, utricles rather large trigono-globose nerveless glabrous not inflated, beak minute linear. *Kunth Enum.* ii. 444; *Reichb. Ic. Fl. Germ.* viii. 25, t. 259; *Strachey Cat. Pl. Kumaon*, 73; *Duthie in E. T. Atkinson Gaz.* x. 618. C. glomerata, *Schkuhr Riedgr.* i. 79, t. fig 41. C. Schkuhrii, *Willd. Sp. Pl.* iv. 264; *Schkuhr l. c.* ii. 51, t. Qqq, fig. 158. C. obesa, *var.* γ supina, *Boott Carex*, iv. 161, t. 535; *Boeck. in Linnæa*, xli. 184.

KUMAON, alt. 14–15,000 ft.; Bugdwar, *Strachey & Winterbottom* (n. 17); Kutti Yangti Valley, *Duthie* (n. 6038).—DISTRIB. Central Asia, Alpine Europe.

Glabrous. *Stems* 3–6 in. *Leaves* 3–6 by $\frac{1}{20}$ in. Terminal *spike* $\frac{1}{2}$ in., very slender; fem. spikes $\frac{1}{6}$ in. in diam. *Fem. glumes* ovate, triangular-tipped, chestnut-colrd. *Utricle* obscurely irregularly nerved at base, suddenly contracted, scarcely scabrous at top, nearly filled by nut, green-yellow to pale-brown; beak slightly 2-fid.—C. obesa *Allioni* (*Fl. Pedemont.* ii. 270) differs by its larger size, lowest spike cylindric peduncle, utricle distinctly nerved on their posticous face, more acuminated into a more definite beak.

102. **C. ustulata**, *Wahl. in Handl. Acad. Stockh.* 156; middle-sized or small, spikes 2–5 approximate, terminal male or variously bisexual, lowest nodding on slender peduncle, fem. glumes elliptic-oblong black-red, style 3-fid, utricle ellipsoid nerveless glabrous acuminated into a very short scabrous beak inflated much larger than nut. *Kunth Enum.* ii. 462; *Reichb. Ic. Fl. Germ.* viii. 22, t. 250, fig. 615; *Boott Carex*, i. 70, 71, t. 193, figs. 1, 2, and t. 194, fig. 1; *Boeck. in Linnæa*, xli. 260. C. atro-fusca, *Schk. Riedgr.* i. (1801), 106, t. Y fig. 82. C. coriophora, *Fischer ms. ex Kunth l. c.* 463; *Strachey Cat. Pl. Kumaon*, 73. C. frigida, *Wall. ms.*—Carex, *Wall. Cat.* 3389, A.

HIMALAYA and TIBET, alt. 12–17,000 ft.; from the Karakorum, *Thomson*, to SIKKIM, *J. D. H.*—DISTRIB. Cold N. Hemisphere.

Glabrous. *Rhizome* creeping; scales pale. *Stems* 4–16 in. (taller are called *C. coriophora*, Fisch.). *Leaves* usually $\frac{1}{4}$–$\frac{1}{3}$ length of stem; a node, with a leaf 1–3 in., often occurs $\frac{1}{2}$–4 in. below the infl. *Infl.* 1–4 in.; lowest spike sometimes 1–2 in. distant on peduncle 1–1½ in.; lowest bract much shorter than infl., and when distant usually sheathing. *Spikes* $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{4}$–$\frac{1}{3}$ in., short-cylindric or ovoid, dense; terminal spike in the Europ. and sometimes in the Himal. plants male at base fem. at top, or (not rarely) wholly fem., or frequently fem. with a few males at top, or male at both ends fem. in the middle, or fem. at both ends male in the middle. *Utricle* about as long as glume, more or less black-red, compressed, quite flat when the nut does not ripen, otherwise trigonous with two marginal wings; beak very short, 2-fid or distinctly emarginate. *Nut* stalked, small; style-branches shortly exsert from utricle.

103. **C. cruenta**, *Nees in Wight Contrib.* 128; closely allied to *C. ustulata* but larger in all its parts, spikes 5–12 remote, peduncle of lowest usually 3–6 in. *Kunth Enum.* ii. 463; *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, ii. 75, tt. 201, 202, 203; *Boeck. in Linnæa*, xli. 261.—Carex, *Wall. Cat.* 3389, B.

HIMALAYA, alt. 8–15,000 ft., common; from GILGIT, *Giles*, to SIKKIM, *J. D. H.*—DISTRIB. Central Asia?

Stems often 2 ft. and more; infl. nearly a foot. *Fem. spikes* often 1 in.; lowest peduncle not rarely divided, i.e. with 1–3 spikes; terminal spike (sometimes 2) wholly male in the copious material, except a quantity collected by Levinge at Sonamurg (large typical *cruenta*) where the terminal spikes are all male at base fem. at top. *Fem. glumes* often mucronate. *Utricle* longer narrower than those of *C. ustulata*, less inflated, more or less red-black.—Generally easily recognized, but many

small specimens Boott could not sort between *C. cruenta* and *C. ustulata*. These are very near *C. fuliginosa*, Schkur, which looks different by reason of its paler utricles. *C. cruenta* no doubt extends to Central Asia, but it is not known under what name the Russian botanists record it.

104. **C. maculata,** *Boott in Trans. Linn. Soc.* xx. 128 and *Carex*, i. 9, t. 26; stems 8–24 in. slender, spikes 3–10 cylindric dense rigid dark terminal one male paler, lowest remote, style 3-fid, utricle ovoid-triangular nervose dark brown glabrous granular beakless gland-dotted to base. *Thw. Enum.* 355; *Boeck. in Linnæa*, xl. 191. C. micans, *Boott in Mem. Am. Acad.* (N. s.) vi. 419.

KHASIA; alt. 4000 ft., *C. B. Clarke*, &c. NILGHIRI HILLS; alt. 5000 ft., *C. B. Clarke*, &c. CEYLON; alt. 5000 ft., *Thwaites*. DISTRIB. Korea, Japan, Australia.

Glabrous. *Rhizome* creeping; stems 1–3 together. *Leaves* nearly as long as stem, narrow (hardly more than ⅛ in. broad). *Fem. spikes* nearly 1 in. by ⅛–¼ in. in diam.; lowest (sometimes very remote), peduncled (peduncle often 2–4 in.), upper fem. often clustered erect, male slenderer sessile bright brown; bracts overtopping the infl., leaf-like. *Fem. glumes* ⅛ in., narrow triangular, sub-3-nerved, pale brown with a green centre. *Utricles* unequally trigonous, 5–8-nerved on each face. *Nut* sessile, ½–⅔ utricle.

105. **C. vicinalis,** *Boott Carex*, iv. 133, t. 428, fig. 2; three upper spikes male, fem. 3 distant long-cylindric dense lowest peduncled, style 3-fid or occasionally 2-fid, utricle ovoid beakless glabrous minutely granular.

NILGHIRI HILLS; *Schmidt*.

Apparently 3 ft high. Lowest *bract* about 1 foot, much overtopping infl., not sheathing. *Male spikes* ¾ in., pale bright brown, close together. *Fem. spikes* 1½ by ⅛–¼ in., erect; lowest peduncle 2 in.; lowest spike 3 in., distant. *Fem. glumes* elliptic, obtuse, dark purple with green back. *Utricle* (unripe) ⅛ in. long, dusky grey, obscurely 3–5-nerved on convex face, triangular at either end; style-branches hardly ¼ length of utricle.—Boott compares this species with *C. caespitilia*, Nees; but the style in *C. vicinalis* appears generally 3-fid. The only specimen consists of the top of one stem, as figured by Boott.

** Utricle glabrous, beak long.

106. **C. Jackiana,** *Boott in Proc. Linn. Soc.* i. 260 and *in Trans. Linn. Soc.* xx. 132 and *Carex*, i. 9, t. 25; spikes 3–9 distant, uppermost one male, others cylindric-lanceolate, style 3-fid, utricle rather large ellipsoid-lanceolate strongly many-nerved glabrous lurid green gradually narrowed into conic beak. *Miq. Fl. Ind. Bat.* iii. 353. C. instabilis, *Boott ms. ex Boeck. in Linnæa*, xli. 246. C. papulosa, *Boott in Mem. Am. Acad.* vi. n.s. 418.

KHASIA HILLS; alt. 3–6000 ft., *Griffith* (*Kew Distrib.* 6090), &c.—DISTRIB. Java, Japan.

Glabrous. *Stems* 2 ft., triquetrous, stoutish, scabrous at top. *Leaves* nearly as long as stem, ¼ in. broad. *Spikes* 1 by ⅛ in., lower usually 3–4 in. apart, then erect on short stout peduncle, but rarely a peduncle near base of stem (then of course long slender) is added; spikes lax-fld., sometimes 2–3 in. long with lower flowers remote; bracts overtopping infl. *Fem. glumes* ovate, acute, pale, scarious, acute or mucronate. *Utricle* ⅛ in., subtrigonous, slightly inflated, very strongly nerved; beak as long as nut, notched. *Nut* obovoid, triquetrous, pale.—The Khasian plant agrees very closely with the Javan.

Var. ? *minor*; much slenderer, spikes few often few-fld. ovoid, utricle ovoid slightly nerved suddenly narrowed into a linear beak. C. Jackiana, *Thw. Enum.*

356 (*excl. var.* β); *Boeck. in Linnæa*, xli. 277—NILGHIRI HILLS; alt. 7000 ft., *C. B. Clarke*, n. 11,061. CEYLON; alt. 5000 ft., *Thwaites* (C.P. 3198).—*Stems* 2–10 in., very slender. *Leaves* overtopping stem, ⅛ in. broad. *Spikes* shorter, reduced sometimes to 2–4 flowers. *Utricle* wider than in *C. Jackiana* type, stretched tight on the large nut, shining not lurid, obscurely striate, base obconic, beak narrow minutely scabrid.—This differs a good deal from *C. Jackiana*, and is regarded by Boeckeler (who transposed the name) as specifically different from the Khasian species. Boott subsequently marked the plant as *C. Jackiana*, but he had of it only immature examples.

107. **C. fusiformis,** *Nees in Wight Contrib.* 128; spikes 6–12 loosely panicled, uppermost one male, lower female long linear lax interrupted, female glumes pale mucronate, style 3-fid, utricle ellipsoid rather suddenly narrowed into oblong-linear beak glabrous slenderly striated. *Kunth Enum.* ii. 471; *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, i. 44, t. 111; *Duthie in T. E. Atkinson Gaz.* x. 616; *Boeck. in Linnæa*, xli. 248.

TEMPERATE HIMALAYA; Mussoorie, *Royle*, n. 88; Kumaon, alt. 7000 ft., *Strachey & Winterbottom*. Sikkim; Lachen, alt. 10–12,000 ft., *J. D. H.*

Glabrous. *Stems* 1–1½ foot. *Leaves* 12 by ¼ in., flat. Lower fem. *spikes* often 3–4 in. apart, peduncled, solitary, 2 in.; bracts about as long as infl. *Fem. glumes* ovate, very distant, those near middle of spike aristate. *Utricle* ¼–⅓ in., slender, green, inconspicuously 10-nerved; beak as long as utricle, with a few microscopic scabrous points, notched. *Nut* ellipsoid, filling the utricle, pale; style branches shortly exsert.—General appearance of *C. sylvatica*.

108. **C. finitima,** *Boott Carex*, i. 44, t. 112; female glumes (from the middle of the female spike), elliptic-obtuse with a very short lanceolate point not aristate (otherwise nearly as *C. fusiformis*). *Boeck. in Linnæa*, xli. 247.

SIKKIM HIMALAYA, alt. 9–12,000 ft., frequent, *J. D. H., C. B. Clarke.*—DISTRIB. China.

Stems 1–3 ft. *Spikes* more numerous than in *C. fusiformis*, often several from one sheath; terminal not rarely fem. in the middle. *Utricle* hardly nerved, somewhat suddenly contracted into a long linear beak.

Var. β *attenuata*; slender, leaves shorter ⅛ in. wide, spikes fewer about 1 in., utricles rather smaller.—Khasia Hills, Vale of Rocks, alt. 4500 ft., *C. B. Clarke* (n. 43,675).—*Stems* 8–12 in. *Leaves* much shorter than stems. This appears more different from *C. finitima* than is *C. fusiformis*.

109. **C. breviscapa,** *C. B. Clarke*; stem very short far outtopped by leaves, spikes 8–14 linear greenish uppermost one male, glumes distant obtuse, style 3-fid, utricle broad lanceolar very angular many-nerved glabrous, nut narrow rhomboid truncate at top. C. Jackiana, var. β, breviculmis, *Thw. Enum.* 356; *Trimen Cat. Pl. Ceylon*, 104 (*not of Boott*).

CEYLON; Ambagowa District, *Thwaites* (C.P. 3781.)

Glabrous. *Stems* 1–2 in., excl. of infl. 2–5 in. *Leaves* 2 ft. by ¼ in., tough, many-nerved. *Infl.* narrow; lower peduncles 1½ inch, erect, carrying 2–4 spikes; bracts overtopping *Fem. spikes* 1 by ⅛ in.; male ½–¾ in., very slender. *Fem. glumes* much shorter than utricle, elliptic, yellowish with green back. *Utricles* ⅛ in., green, passing gradually into conic deeply-notched beak. *Nut* trigonous, elongate-rhomboid, truncate at top, closely fitting utricle.—Much more like *C. finitima* than *Jackiana*; but the nut is distinctive, and impresses its peculiarities on the utricle.

110. **C. japonica,** *Thunb. Fl. Japon.* 38; stolons long slender, stems medium almost 3-winged, spikes about 5 close together uppermost one male

(occasionally fem. at base) small, lower fem. cylindric very dense rigid pale, style 3-fid, utricle ovoid glabrous suddenly contracted into a linear-conic beak. *Schk. Riedgr.* i. 115, t. Ww, fig. 110; *Kunth Enum.* ii. 517. C. japonica, β minor, *Boott Carex*, ii. 88. C. chlorostachys, *Don in Trans. Linn. Soc.* xiv. 330 and *Prodr.* 43. C. Doniana, *Spreng. Syst.* iii. 825; *Nees in Wight Contrib.* 128; *Kunth l. c.* 503; *Boott in Perry Exped. Jap.* ii. 327 (Donniana). C Motoskei, *Miq. in Ann. Mus. Lugd. Bat.* ii. 148. C. trichostyles, *Franch. et Savat, Pl Japon.* ii. 152, 581.—Carex, *Wall. Cat.* 3395.

NEPAL; *Wallich.* SIKKIM HIMALAYA; *Herb. Griffith* (*Kew Distrib.* n. 6079) KHASIA HILLS, alt. 5500–6000 ft., frequent, *C. B. Clarke.*—DISTRIB. Japan.

Description of Khasian plant.—Glabrous. *Rhizome* often 8 in. very slender, with pale brown scales. *Stems* 6–15 in., rather stout, very acutely triquetrous. *Leaves* often as long as stem, $\frac{1}{6}$–$\frac{1}{4}$ in. broad. Fem. *spikes* $\frac{1}{2}$–1 by $\frac{1}{4}$ in., very short-peduncled, suberect, green or yellowish, when young almost comose from the brown-red styles; terminal spike small, almost concealed among the fem. spikes; bracts far overtopping infl. Fem. *glumes* ovate-lanceolate, aristate, green with scarious margins, hardly so long as utricle. *Utricles* $\frac{1}{4}$ in., very close-packed, obliquely ascending, trigonous, 8-nerved, beak narrow, notched, glabrous or most minutely scabrous. *Nut* ellipsoid, subacute at both ends, filling the utricle.—None of the Khasian specimens match the original *C. japonica*, described by Thunb. "spicis ovatis," and figured by Schkuhr (= *C. aphanolepis, Franch. et Savat.*). The Indian *C. japonica* is *C. chlorostachys*, Don, which is near the following var.

Var. β *alopecuroides* (sp.) Don in Trans. Linn. Soc. xiv. 332 & Prodr. 43; tall, spikes 2 in. long linear-cylindric, male spike often as long as female frequently female at top, utricle ellipsoid passing almost gradually into oblong beak. *Nees in Wight Contrib.* 128; *Boott Carex*, ii. 88, t. 258; *Boeck. in Linnæa*, xli. 172. C. emodorum, *Spreng. Syst.* iii. 818; *Kunth Enum.* ii. 516. C. japonica, *Boott Carex*, ii. 88, t. 257 (*excl. var.* β); *Boeck. l. c.* 283. C. Doniana, *Drejer Symb.* 26, t. 13. Carex, *Wall. Cat.* 3395 A (*partly*) B.

SIKKIM HIMALAYA; alt. 5–7000 ft., *J. D. H.* KHASIA HILLS; Nunklao, alt. 4–5000 ft., *J. D. H., C. B. Clarke.* MUNEYPOOR: alt. 8500 ft., *Watt.*—DISTRIB. Japan.

Out of 31 spikes collected by me at Nunklao 14 have the terminal spike (mostly plentifully) fem. at top. *Stems* much less 3-winged than in the Khasia *C. japonica*. Both Boott and Boeckeler have reduced this plant to *C. japonica*, Thunb., but it is very unlike it in general aspect; the principal difference I find in the male spike which is in *C. japonica* short occasionally female at base, in var. (?) *alopecuroides* long, frequently fem. at top.

111. **C. diluta,** *M. Bieb. Fl. Taur. Caucas.* ii. p. 388; iii. 614; spikes 3–10 distant, terminal one male, lower fem. cylindric dense rusty green, glumes shorter than utricle rough-tipped, style 3-fid, utricle ellipsoid obscurely striate glabrous green narrowed into a short-oblong notched beak. *Kunth Enum.* ii. 448; *Boott Carex*, iv. 139, t. 448; *Boeck. in Linnæa*, xli. 235; *Boiss. Fl. Orient.* v. 425. C. punctata, *Gaudin Agrost.* ii. (1811), 152 & *Fl. Helvet.* vi. 106, t. 2; *Kunth l. c.* 448; *Reichb. Ic. Fl. Germ.* viii. 22, t. 251; *Boott Carex*, iv. 155, t. 500; *Boeck. l c.* 271. C. lævicaulis, *Kunze Suppl.* 31, t. 6, fig. 2. C. rigidifolia, *Seub. Fl. Azor.* 21, t. 2, fig. 1.

N. KASHMIR; Indus Valley, alt. 7650–9000 ft., frequent, *C. B. Clarke.* KUNAWUR; alt. 11,000 ft., *Munro.*—DISTRIB. Cabul and Central Asia to Lapland and the Azores.

Glabrous. *Stolons* 0. *Stems* caespitose, 6 in. to 3 ft. *Leaves* very variable (in Indian examples) sometimes less than $\frac{1}{4}$ length of stems $\frac{1}{8}$ in. broad, sometimes 20

by ¼ in.; bracts similarly varying. Lower *spikes* always distant, peduncle sometimes hardly exsert from the sheath with erect rigid spike, sometimes much longer with nodding spike (in Kunawur examples capillary with slender spike); 3–5 upper spikes not rarely fascicled. Male *spike* ¾–1½ in., pale brown, glumes hardly mucronate. Fem. *spikes* commonly ¾–1 by ¼ in., dense, not rarely slenderer (in Kunawur hardly ⅛ in. wide, much looser). Fem. *glumes* shorter than utricle, ovate, thin, pale brown, linear-triangular back green excurrent in a scabrous cusp. *Utricle* ⅛ in., trigonous, irregularly nerved, herbaceous, often "punctate" with ferruginous dots (often missing in Europ. and Cent. As. examples); oblong portion of beak about ¼–⅓ length of utricle, glabrous or slightly minutely scabrous. *Nut* filling utricle, obovoid-ellipsoid, trigonous.—The identification of *C. punctata*, Gaudin, with *C. diluta*, M. Bieb. is due to Trevirarus (Bull Soc. Nat. Mosc. 1863, i. 541); and is accepted by Trautvetter, while Regel (*Act. Hort. Petrop.* vii. 573) and Boissier admit both species in Asia. The common Indus Valley plant appears to me identical with the European *C. punctata*, Gaudin.

112. **C. Munroi,** *Boott ms.*; tall slender, leaves narrow, spikes 5–6, lowest very remote on filiform peduncle, topmost male with one utricle at the base linear lax pale brown, female glumes ovate acute scarcely mucronate, style 3-fid, utricle ellipsoid trigonous imperfectly nerved thin glabrous, narrowed into a short oblong-linear beak. C. chinensis, *Munro ms.* C. diluta, var. *Boott ms.*

Kunawur; alt. 11,500 ft. *Munro* (n. 2431).

Glabrous. *Stems* 3 ft. *Leaves* 18 by ⅛ in., flat. Lowest *peduncle* 2 in., distant 11 in. from the next. *Spikes* ¾–1¼ by ⅛–¼ in., drooping, rather lax. Fem. *glumes* shorter than utricle, ferruginous brown, green 3-nerved on back. *Utricle* $\frac{1}{10}$ in., subsessile, wall of thin loose texture pale; beak very shortly bifid, smooth.—Perhaps allied to *C. Chinensis*, which has erect less distant spikes and hairy utricles. The texture and character of the utricle is much like that in *C. diluta*, M. Bieb. In both the examples preserved there is a utricle at base of the terminal male spike.

113. **C. ferruginea,** *Scop. Fl. Carniol.* ii. 225; spikes 3–7 distant, terminal one male, lower fem. cylindric long-peduncled nodding brown, glumes equalling utricle ovate acuminate, style 3-fid, utricle ellipsoid glabrous beak lanceolate longish notched scabrous on edges. *Reichb. Ic. Fl. Germ.* viii. 21, t. 248; *Boott Carex*, iv. 207; *Boeck. in Linnæa*, xli. 228 C. Mielichhoferi, *Schk. Riedgr.* ii. 66, t. Mmmm, fig. 198; *Kunth Enum.* ii. 466.

Kashmir; Pir Pinjul, alt. 11,000 ft., *C. B. Clarke.*—Distrib. Alpine Europe and (if *C. Scopoliana*, Willd. be included) Central Asia.

* Glabrous, brownish. *Stems* 1 ft. *Leaves* nearly as long as stem, in. broad, flat. *Spikes* all distant, ¾–1 in.; bracts sheathing. *Glumes* (male and fem. similar) castaneous-red with green backs, often mucronate. *Utricle* quite glabrous in the Indian example (as in Scopoli's description and in Schkuhr's *C. Mielichhoferi*); beak lanceolate-linear triangular, plane, subconcave on posticous face, glabrous but very scabrous on edges.— *C. Scopoliana*, Schk. Riedgr. ii. 77, t. Nnnn, fig. 199 has utricle hispid somewhat subovoid suddenly narrowed into a small oblong beak. This is united (perhaps rightly) with *C. ferruginea*, Scop. (*not Schk.*) by Boott and Boeck.).

114. **C. tristis,** *M. Bieb. Fl. Taur. Cauc.* iii. 615; leaves flat, spikes 6–8 cylindric, uppermost 3 usually male, lower fem. distant peduncled suberect, fem. glumes ovate hardly mucronate, style 3-fid, utricle ellipsoid trigonous glabrous fulvous-hispid on angles suddenly narrowed into linear shortly-notched beak. *Kunth Enum.* ii. 465. C. sempervirens, *Villars*, var. γ, *Boott Carex*, iv. 218; *Boeck. in Linnæa*, xli.

227. C. Schottii, *Boiss. Diagn.* ser. 2, iv. 123. C. macrogyna, *Turcz.* (*not of Boott, cf. Turcz. Fl. Baical. Dahur.* ii. 284).

N KASHMIR to the KARAKORUM; alt. 13–15,000 ft., *C. B. Clarke.*—DISTRIB. Central Asia.

Glabrous. *Stolons* 0. *Stems* 1–2 ft., rather slender, trigonous. *Leaves* rarely ½ the stem, $\frac{1}{8}$–$\frac{1}{4}$ in. broad. *Spikes* chestnut-purple, fem. ⅔ by ¼ in.; lowest peduncle often 3–5 in. distant, exsert 2–4 in.; bracts not overtopping infl. Fem. *glumes* chestnut with scarious edges, shorter than utricle; keel green-yellow or concolorous. *Utricle* $\frac{1}{10}$ in. (beak excluded), green, prominently 8-nerved; beak ⅓ length of nut, compressed, setose-scabrous on margins. *Nut* filling utricle, shortly-stalked, style scarcely microscopically pubescent.

115. **C. flava,** *Linn. Sp. Pl.* 1384; spikes 3–6 approximate (or lowest somewhat distant) terminal one male, lower fem. short-cylindric dense, fem. glumes ovate, style 3-fid, utricle ovoid subinflated ribbed glabrous flavescent suddenly narrowed into oblong linear beak. *Schk. Riedgr.* i. 72 and ii. 56, t. H. fig. 36; *Kunth Enum.* iii. 446; *Reichb. Ic. Fl. Germ.* viii. 30, t. 273; *Ledeb. Fl. Ross.* iv. 299; *Boeck. in Linnæa,* xli. 272. C. patula, *Host Gram. Austr.* i. 48, t. 64. C. Œderi, *Willd. in Act. Berol.* 44, t. 1, fig. 2 (*fide Kunth*); *Reichb. l. c.* 29, t. 272. C. lepidocarpa, *Tausch. ms.*; *Kunze Suppl.* 52, t. 13, fig. 2; *Reichb. Ic. Fl. Germ.* viii. 29, t. 272.

KASHMIR; alt. 6–11,000 ft., *Jacquemont, Thomson,* &c.—DISTRIB. N. temp. regions, Tasmania (?).

Glabrous. *Stolons* 0. *Stems* caespitose, 1½–20 in. *Leaves* often ⅔ length of stem, $\frac{1}{8}$–$\frac{1}{4}$ in. broad. *Spikes* commonly all approximate, sessile sheath hardly any; or, if one spike is distant, that is peduncled in a distinct sheath (the rule throughout the genus). Fem. *spikes* commonly ½–¾ by ⅓ in., sometimes larger; often much smaller; beaks of ripe fruit stellately spreading or deflexed, rarely obliquely erect. Fem. *glumes* ovate, shorter than utricles, pale often yellowish, muticous or rarely mucronate. *Utricles* with 8 or 9 thick ribs about half as long as utricle; beak with an oblique small mouth or shortly notched. *Nut* not nearly filling utricle, obovoid, trigonous.—Boott has not touched *C. flava* & *C. Œderi.* The Indian examples show the same range of variation as the European; in size from 1½ to 20 in., the spikes varying greatly in size, the beaks of the ripe fruit spreading, or deflexed, or rarely obliquely erect.

116. **C. songorica,** *Karel. et Kiril. in Bull Soc. Mosc.* iii. 525; spikes 3–5 distant erect, uppermost 1 (or 2) male, lower fem. cylindric dense, fem. glumes ovate cuspidate shorter than utricle, style 3-fid, utricle ovoid or ellipsoid inflated corky shining red-brown narrowed into short 2-fid beak sessile subtruncate at base. *Boott Carex,* iv. 200; *Boiss. Fl. Orient.* v. 430. C. Gebleri, *Prescott ms. ex Boott in Proc. Linn. Soc.* i. 261 & *in Trans. Linn. Soc.* xx. 141. C. nutans, *Boeck. in Journ. Linn. Soc.* xviii. 105 & (*var.* microcarpa) in *Linnæa,* xli. 297.

N. KASHMIR; alt. 8–10,000 ft., *C. B. Clarke.*—DISTRIB. Cabul, Central Asia, Mandschuria.

Glabrous. *Rhizome* short, horizontal, woody. *Stems* 1–2 ft. *Leaves* often ½ stems, $\frac{1}{8}$–$\frac{1}{4}$ in. broad. Male *spikes* often pale, narrow, sometimes dark brown much broader (as in *C. nutans,* Host). Lower *spikes* usually nearly sessile, sheath short; sometimes peduncle 1½ in., sheath ¾ in. Fem. *spikes* 1½ by ⅓ in., or smaller. Fem. *glumes* pale or brown with green back, margins usually scarious white. *Utricle* often more than ⅓ in., ellipsoid (as long as in *C. nutans,* Host) but typically shorter, remarkably truncate, sessile; teeth of beak deep, spreading curved. *Nut* long, ellipsoid, pyramidal at both ends, trigonous, dark-brown.—If Boeckeler be followed in treating *C. songorica* as a var. of *nutans,* Host, all the Indian (and neighbouring) material will belong accurately to that var.

117. **C. rostrata,** *Stokes in With. Brit. Pl.* ed. ii. 1059; spikes 3–6 distant erect, uppermost 1 (or 2–3) male, lower fem. cylindric dense, fem. glumes lanceolate not aristate, style 3-fid, utricle ovoid or ellipsoid much inflated thin narrowed suddenly into short beak, nut very small. C. ampullacea, *Gooden. in Trans. Linn. Soc.* ii. 207; *Kunth Enum.* ii. 494; *Reichb. Ic. Fl. Germ.* viii. 31, t. 277; *Boott Carex*, iv. 156, t. 501.

KASHMIR; *Jacquemont*, alt. 10–11,000 ft, *Thomson*, alt. 8–13,000 ft., *C. B. Clarke.* LAHOUL; *Jaeschke.*—DISTRIB. Cool Northern regions.

Glabrous. Stoloniferous. *Stems* 2–3 ft., robust. *Leaves* often ⅔ the stem, ¼ in broad, scabrous near tip. Male *spike* 1½ by ⅓ in. Lowest *fem. spike* 1–1½ by ⅓ in., often 3 in. distant, on a peduncle 0–½ in. Fem. *glumes* purple-chestnut with narrow pale back (in the Indian examples, often pale in the European). *Utricles* (fertile) ⅓ in. long, ellipsoid, longer than glume, but many of the utricles are ovoid more inflated (with sterile nut) shorter than glume; ribs of utricle 6–8, inconspicuous (till the nut is taken out and the wall of utricle looked through); beak in sterile utricles about ⅓ as long as utricles linear-conic, in fertile utricles much shorter, shortly 2-fid with erect teeth. *Nut* (perfect) very small, not ⅓ length or breadth of utricle, obovoid, dark-brown.—This Indian *C. rostrata* is so referred by Boott, and is conspicuous by the narrow chestnut-purple glumes imperfectly covering the pale (nearly white) utricles; the beak of the front is very little split. Mr. Baker says "it is not at all good *C. ampullacea*."

118. **C. vesicaria,** *Linn. Sp. Pl.* 1388 (*partly*); spikes longer than in *C. rostrata*, fem. glumes ovate-lanceolate mucronate or short-aristate pale, utricle rather larger than in *C. rostrata*, beak deeply notched with 2 conspicuous shining lanceolate rigid teeth (otherwise as *C. rostrata*). *Kunth Enum.* ii. 494; *Reichb. Ic. Fl. Germ.* viii. 30, t. 276; *Boott Carex*, iv. 162, tt. 536, 537; *Boeck. in Linnæa*, xli. 319.

KASHMIR; Margan Pass, alt. 11,500 ft., *W. S. Atkinson.*—DISTRIB. Cold temp. N. regions.

Male *spikes* 2¾ in., and up to 1½ in. apart (in the Kashmir examples). Fem. *spikes* up to 3 by ⅓ in., both glumes and utricles pale stramineous.—Atkinson's collection is copious, though not fully ripe; Mr. Baker says it is "satisfactory *vesicaria*."

119. **C. pseudo-cyperus,** *Linn. Sp. Pl.* 1387; spikes 3–7 moderately near together, terminal one male pale, lower fem. cylindric dense nodding, female glumes linear-oblong aristate pale, style 3-fid, utricle ellipsoid-lanceolate subinflated thin pale smooth strongly ribbed, beak 2-fid in two erect whitened almost prickly teeth. *Kunth Enum* ii. 501; *Reichb. Ic. Fl. Germ.* viii. 30, t. 275; *Boott Carex*, iv. 140, tt. 451, 452; *Boeck. in Linnæa*, xli. 321.

KASHMIR; alt. 6000 ft., *Thomson*; Pir Punjal, alt. 11,000 ft., *Levinge*—DISTRIB. Cool N. regions.

Glabrous. *Stolons* 0. *Stems* 2½ ft. *Leaves* often longer than stem, ¼–½ in. broad, flat. *Spikes* 1–3 in. long, lowest 1–3 (rarely 4–6) in. distant. *Utricles* ⅓ in., ultimately divaricate, green or yellowish; beak about half as long as utricle, deeply notched. *Nut* ovoid, somewhat narrower than utricle, and about half as long, brown.

120. **C. acutiformis,** *Ehrh. Beitr.* iv. 43; spikes 3–7 distant erect, uppermost 3–2 male chestnut-red, fem. cylindric dense, fem. glumes elliptic-lanceolate not aristate, style 3-fid, utricle ovoid or ellipsoid inflated thin obliquely erect fuscous glabrous obscurely nerved, beak short, nut very small. *Boeck in Linnæa*, xli. 289. C. spadicea, *Roth Tent.* ii.

461. C. paludosa, *Gooden. in Trans. Linn. Soc.* ii. 202; *Nees in Wight Contrib.* p. 129; *Anderss. Cyp. Scand.* 17; *Kunth Enum.* ii. 487; *Reichb. Ic. Fl. Germ.* viii. 28, t. 266; *Boott Carex*, iv. 214. C. Kochiana, *DC. Hort. Monsp.* 89; *Reichb. l. c.* t. 271.

KASHMIR, alt. 7000 ft., *Thomson*. NEPAL, *Royle* (n. 130).—DISTRIB. Cool N. temp. regions.

This differs from *C. rostrata* and *C. vesicaria* by the thick dark-colrd. male spikes, the suberect (not divaricate) ripe utricles, the fuscous lurid grey colour of utricles with shorter beak.—In Jaeschke's Lahoul collections is a young *Carex* with 11 spikes, the lower peduncles carrying 3–4 spikes, style 3-fid, utricle glabrous; it is too young for determination, and resembles generally *C. acuta* rather than *C. acutiformis*, but the style is 3-fid so that it must be placed here.

121. **C. tumida,** *Boott Carex*, i. 66, t. 181; spikes 5–6 suberect, terminal one male long linear, lower fem. short-peduncled distant long-cylindric dense, fem. glumes lanceolate short aristate pale, style 3-fid, utricle ellipsoid fuscous glabrous suddenly narrowed into a conic-linear shortly-notched beak. *Boeck. in Linnæa*, xli. 243.

SIKKIM HIMALAYA, alt. 9000 ft., *J. D. H.*, alt. 5000 ft., *C. B. Clarke*. KHASIA HILLS; Shillong, alt. 6000 ft., *C. B. Clarke*.

Glabrous. *Stems* 12–18 in. *Leaves* longer than stem, ¼–⅓ in. broad. Terminal *spike* 2 in., very narrow, pale. Lower *spikes* fem. 2–3 by ¼ in., ripe fruits obliquely suberect. Fem. glumes narrow-lanceolate, 3-nerved, stramineous, shorter than utricle, aristate or muticous; bracts much overtopping infl. *Utricle* ⅛ in., not inflated, thin, obscurely nerved, lurid slate-colrd.; beak nearly as long as utricle its lower half conic. *Nut* obovoid-ellipsoid, trigonous, filling utricle.—The swelling in the middle of the beak, figured and insisted on by Boott, is taken from a single (not well-ripe) collection; in well-ripened fruits the lower half of the beak is conic the upper narrow oblong; it is hardly possible to describe it as tumid in the middle.

122. **C. olivacea,** *Boott in Proc. Linn. Soc.* i. 286, *& in Trans. Linn. Soc.* xx. 138, *& Carex*, i. 56, t. 149; spikes 4–8 suberect, terminal one male, lower fem. somewhat distant short-peduncled long-cylindric dense, fem. glumes lanceolate aristate pale, style 3-fid, utricle ovoid inflated fuscous glabrous finally deflexed suddenly narrowed into a short linear notched beak. C. confertiflora, *Boott in Mem. Am. Acad.* N. S. vi. [1859] 418, *& Carex*, iv. 184; *Franch. & Savat Pl. Japon.* ii. 151, 578.

SIKKIM; Terai, *J. D. H.* ASSAM, alt. 300–1000 ft., frequent, *C. B. Clarke*, &c. CACHAR, *Keenan*.—DISTRIB. Java, Japan.

Taller and stouter than *C. tumida*, Boott; leaves in Hooker's examples up to ¾ in. broad. *Stolons* long. Terminal *spike* 2–4 by ½ in., glumes obtuse purple with green keel. Fem. *spikes* (not quite ripe) up to 7 by ¼ in. in Hooker's examples, usually shorter thicker denser. Young *utricle* ovoid-conic, gradually narrowed upwards, when ripe much inflated; teeth of beak short, linear, finally spreading not very prominent. *Nut* ellipsoid or ovoid, much smaller than utricle.—Usually larger than *C. tumida*; it is easily told from it when young by the much thicker deeply-colrd. male spike, when ripe by the inflated deflexed utricles.

123. **C. lobulirostris,** *Drejer Symb. Caric.* 27, t. 14; spikes 4–6 approximate large cylindric erect, terminal one male dark brown, glumes lanceolate aristate dark brown fem. much smaller, style 3-fid, utricle ovoid somewhat inflated black red glabrous nervose suddenly narrowed into a linear shortly-notched beak. *Boott Carex*, iv. 190; *Thw. Enum.* 356; *Boeck. in Linnæa*, xli. 244. C. Arnottiana, *Boott in Proc. Linn. Soc.* i.

260, *& in Trans. Linn. Soc.* xx. 129 (*not of Drejer*). C. Neesiana, *Arnott ms.* (*not of Endl.*).

CEYLON, *Gardner*, &c., alt. 6–7000 ft., *Thwaites*.

Glabrous. *Stems* 2–3 ft., rather stout. *Leaves* often overtopping stem, ¼ in. broad. *Spikes* very close together, subsessile; lowest sometimes 1½ in. distant on a 1 in. peduncle; bracts very long. Fem. *spikes* 2 by ¼–⅓ in., rigid. *Utricle* ⅛ in., spreading, hardly deflexed, longer than glumes, thin but somewhat succulent; beak concolorous less than ¼ length of utricle. *Nut* ellipsoid, trigonous, subsessile, pyramidal at top, shortly apiculate, dark-brown.

124. **C. lurida,** *C. B. Clarke*; spikes 4–5 distant cylindric, terminal 2–3 male purple, lower fem. erect peduncled dense, fem. glumes elliptic aristate, style 3-fid, utricle ovoid inflated thin lurid glabrous suddenly narrowed into a deeply bifid beak with 2 spreading prominent linear teeth. C. rostrata, *Boeck. in Linnæa*, xli. 317 (*the Sikkim plant*). C. ampullacea, *var.* Boott ms.—Caricis sp. (n. 1067), *Griff. Itin. Notes*, 194.

SIKKIM HIMALAYA; Lachen, alt. 9–12,000 ft., *J. D. H.* BHOTAN; Chupcha, alt. 8000 ft., *Griffith* (*Kew Distrib.* n. 6066).

Male *glumes* purple-red with green keel, triangular tipped. Fem. *glumes* purple-red on sides, the 3-nerved yellow back excurrent in a rigid scabrous arista, about as long as utricle. *Utricles* in size and shape about equalling those of small examples of *C. rostrata*, but different in colour; beak 2-fid very deeply into linear teeth finally stellately divaricate, conspicuous.—Boott observes that he has never seen such *fem.* glumes as these in *C. rostrata*.

125. **C. fuscifructus,** *C. B. Clarke*; spikes 3–6 suberect somewhat distant, terminal one male greenish, lower fem. cylindric dense short-peduncled, fem. glumes lanceolate acute mucronate pale, style 3-fid, utricles ovoid fuscous many-nerved glabrous, beak oblong conic very long shortly 2-fid.

ASSAM; Luckimpore, alt. 300 ft., *C. B. Clarke*.

Glabrous, stoloniferous. *Stems* 15 in., rather stout. *Leaves* overtopping stem, scarcely ¼ in. broad. Lowest *spike* sometimes as much as 3 in. distant on a 2 in. peduncle, usually much closer; bracts 1 ft. Male *spike* 1½ in., glumes very green on back, aristate. Fem. *spikes* 1½ by ¼–⅓ in.; glumes 3-nerved, rather shorter than utricles, scabrous-pointed. *Utricle* nearly ⅛ in., conically narrowed at base, somewhat inflated; exserted part of style-branches hardly ½ utricle.

*** *Utricle hairy, or minutely setulose.*

126. **C. flacca,** *Schreb. Spicil. Fl. Lips. Append.* n. 669; spikes 4–6 distant long-cylindric, terminal 3–2 male, fem. glumes ovate acute, style 3-fid rarely 2-fid, utricle ellipsoid turgid obtuse puberulous-scabrous, beak minute subentire. *Host Gram. Austr.* i. 66, t. 90; t. P, fig. 57, & t. Zz, fig. 113. C. glauca, *Scop. Carn.* ii. 223; *Kunth Enum.* ii. 459, *Reichb. Ic. Fl. Germ.* viii. 29, t. 269; *Drejer Symb. Caric.* 20, t. 6; *Boeck. in Linnæa*, xli. 187.

SIND, *Pinwill.*—Temp. N. Hemisphere.

Glabrous, glaucous. *Stolons* long, hardening into a creeping branching rhizome 15 in. long in a Sind example. *Stems* 8–18 in. *Leaves* ⅔ stem, ⅛ in. broad, harsh. Fem. *spikes* 1¼ by ¼ in., dense in fruit; male spikes often longer 1¾ in. in Sind examples. Lowest *spike* short-peduncled, erect, or if very remote long-peduncled long-sheathed; bracts usually about as long as infl. *Utricle* small, about $\frac{1}{10}$ in. in the Sind plant, obscurely trigonous.

127. **C. setigera,** *Don in Trans. Linn. Soc.* xiv. 330, *& Prodr.* 43; stoloniferous, spikes 4–8 cylindric distant, terminal 1 (or 2–3) male, lowest fem. peduncled erect, fem. glumes ovate often aristate, style 3-fid, utricles ovoid hispid suddenly narrowed into small oblong notched beak. *Nees in Wight Contrib.* 126; *Kunth Enum.* ii. 515 (*partly*); *Boeck. in Linnæa,* xli. 189 (*excl. Boott,* t. 6, *cited*). C. hymenolepis, *Nees l. c.* 126; *Kunth l. c.* 505. C. setigera, *var.* minor, *Strachey Cat. Pl. Kumaon,* 73 (*not Boott*).—Carex, *Wall. Cat.* 3385.

HIMALAYA, alt. 7–10,000 ft., frequent, from Mussoorie, *Jacquemont,* to Sikkim, *J. D. H.,* and Phari, *G. King.*

Glabrous. *Rhizome* long, creeping, $\frac{1}{10}$ in. in. diam. *Stems* 1–2 ft. *Leaves* nearly as long as stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. *Spikes* 1$\frac{1}{2}$–2 in. long (in the typical *C. hymenolepis,* hardly half as much in the var. *chroolepis,* Drejer), fem. up to $\frac{1}{4}$ in. broad (but not more than $\frac{1}{6}$ in. broad in smaller forms referred here); lowest fem. spike often male at top, rather lax, often interrupted at base. Fem. *glumes* as long as utricle, with a bristle much overtopping utricle in the standard form (which is often small or disappears) usually with bright brown sides and scarious margins (but the colour of male and fem. glumes varies widely). *Utricle* $\frac{1}{10}$–$\frac{1}{12}$ in., brown-green, very hispid, nerveless, strongly 2-edged, the concave face only obscurely ridged by the angle of nut, margined by the incurved edges. *Nut* ellipsoid, trigonous, narrowed much at base, dark brown; style slender, glabrous, base not dilated; exsert part of branches about as long as utricle.

128. **C. Schlagintweitiana,** *Boeck. Cyp. Nov.* i. 48; stoloniferous, spikes 3–6 very small cylindric distant pale, terminal 1 (or 2) male, lowest fem. peduncled erect, fem. glumes ovate often mucronate, style 3-fid, utricle very small ovoid hispid suddenly narrowed into small oblong notched beak. C. setigera, var. β minor, *Boott Carex,* i. 2, t. 6, fig. 1 (not fig. 2).

N.W. HIMALAYA, alt. 6–10,000 ft; Kashmir, *C. B. Clarke*; Nynee Tal, *Thomson*; Simla, *Schlagintweit* (n. 5039), &c. SIND, *Pinwill.*—DISTRIB. Yarkand.

Stolons numerous, long. *Stems* 4–10 in., slender. *Leaves* overtopping stem, $\frac{1}{12}$ in. broad. Fem. *spikes* (in fruit) $\frac{1}{4}$ by $\frac{1}{10}$–$\frac{1}{8}$ in, weak. *Utricles* hardly $\frac{1}{10}$ in. long.—Otherwise as *C. setigera,* Don, from which this differs mainly in size.

129. **C. inanis,** *Kunth Enum.* ii. 522; spikes 4–12 cylindric approximate, terminal one male, fem. glumes ovate sometimes mucronate, style 3-fid, utricle small ovoid trigonous hispid suddenly narrowed into a small notched beak. C. setigera, β minor, *Boott Carex,* i. 2, t. 6 (*mostly,* i. e. fig. 2). C. setigera, γ humilis, *Nees in Wight Contrib.* 126. C. setigera, *var.* fascicularis, *Strachey Cat. Pl. Kumaon,* 73 C. setigera, *Kunth Enum.* ii. 515 (*partly*).—Carex sp. (*Royle,* n. 122), *Nees in Wight Contrib.* p. 120.

HIMALAYA, alt. 7–10,000 ft.; from Kashmir, *C. B. Clarke,* to Sikkim, *J. D. H.*

Rhizome divided, short, i. e. arises from lateral offsetts not from elongate stolons. *Stems* 2–15 in., slender. *Leaves* overtopping stem, narrow. *Bracts* very long, conspicuously overtopping infl. *Spikes* (in fruit) $\frac{3}{8}$ by $\frac{1}{4}$ in., dense, grey-green, upper often fascicled, lowest sometimes a little distant, short-peduncled, occasionally carrying 3–4 spikes. Fem. *glumes* frequently muticous, the midrib sometimes shortly excurrent. *Utricle* much smaller than in *C. setigera,* Don, more turgid, without one face concave.—Spikes much denser than those of *C. setigera,* Don.

130. **C. kashmirensis,** *C. B. Clarke*; spikes 3–6 short-cylindric approximate, terminal 1–3 male, fem. glumes ovate muticous, style 3-fid, utricle ellipsoid lanceolate trigonous hispid acuminated into oblong deeply bifid beak. C. hirtella, *Boott ms.* (*partly*).

KASHMIR, alt. 10–15,000 ft., *Thomson*, frequent, *C. B. Clarke*.

Resembles generally *C. præcox* or *C. pilulifera*, but has an oblong beak to utricle ending in two scarious lanceolate teeth. *Rhizome* short, creeping, divided. *Stems* 8–16 in., slender. *Leaves* all nearly basal, ⅔ length of stem, ⅛ in. broad, flat. *Infl.* usually 1–1½ in.; bracts not (or scarcely) overtopping infl. *Spikes* very close, nearly sessile; lowest fem. occasionally 1–1½ in. distant, then shortly peduncled. *Spikes* ¼–½ in., ferruginous; fem. with 8–20 utricles. *Utricle* ⅛ in. long (much smaller than in *C. hirtella*), greenish, about 8-ribbed. *Nut* filling utricle, dark brown, oblong-ellipsoid; style microscopically scabrous-pilose, exsert branches about as long as utricle.—The preceding *C. inanis*, Kunth, is distinguished from the present sp. by its very long bracts.

131. **C. hæmatostoma,** *Nees in Wight Contrib.* 125; spikes 4–10 linear-cylindric, uppermost 3–1 male, lower fem. somewhat distant short-peduncled suberect, fem. glumes ovate, style 3-fid, utricle much compressed ovoid tip triangular-oblong deeply 2-fid hairy, nut stalked, style hairy. *Kunth Enum.* ii. 514; *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, i. 72, t. 196; *Boeck. in Linnæa*, xli. 302. C. macrogyna, *Boott l. c.* 7, t. 22; *Boeck. l. c.* 223 (*not of Turcz*).

HIMALAYA and W. TIBET; N. Sikkim, alt. 12–17,000 ft., *J. D. H.*, &c. Kumaon, alt. 10–13,000 ft., *Duthie*, &c. Kunawur, alt. 7–9000 ft., *Royle*, &c. Nubra, alt. 15–17,000 ft., *Thomson*.—DISTRIB. Central Asia.

Glabrous, except spikes. *Rhizome* short; no stolons seen. *Stems* 8–30 in., unusually terete. *Leaves* 4–20 by ⅛ in., weak, flat when dry. *Spikes* sometimes 2½ by ¼ in. (or in some high-level Sikkim examples ½ by ⅛ in. few-fld.), chestnut-purple. Fem. *glumes* shorter than *utricle*, mucronate, dark chestnut with or without a broad green back, in the large Sikkim examples brown-pilose, in Royle's plant nearly (sometimes quite) glabrous. *Utricle* ⅛–⅙ in., with few obscure nerves, usually browner upwards. *Nut* oblong-obovoid, trigonous, obtuse, with short oblong apiculus.

132. **C. hirtella,** *Drejer Symb. Caric.* 21; leaves very narrow enrolled when dry, utricle ellipsoid-lanceolate very long—otherwise as *C. hæmatostoma*, Nees. *Boott Carex*, i. 11, t. 31; *Boeck. in Linnæa*, xli. 209, *& in Journ. Linn. Soc* xviii. 105. C. tenuis, *Nees in Wight Contrib.* 128; *Kunth Enum.* ii. 516.

KASHMIR, alt. 9–13,000 ft., very common. KUNAWUR, *Royle*. GURWHAL, alt. 9–10,000 ft., *Duthie* (n. 62).

The full form has utricles ¼–⅜ in. long and is very marked; but eastern examples have smaller utricles, and are hardly distinguishable from *C. hirtella* by their very narrow inrolled leaves. The utricles in both species are triangular at tip without any definite beak; the terete stems, the much-stalked nut, and the very hairy style are characteristic of both species. The spikes in *C. hirtella* are (usually) 3 male, 3–2 fem.; the glistening margins of the glumes are sometimes very prominent, sometimes not more so than in *C. hæmatostoma* and many sp.

133. **C. cardiolepis,** *Nees in Wight Contrib.* 127; spikes 3–5 distant cylindric, terminal one male, fem. glumes ovate truncate mucronate pale-backed, style 3-fid, utricles obovoid-ellipsoid trigonous scabrous bristly suddenly narrowed into minute oblong beak. *Kunth Enum.* ii. 516; *Strachey Cat. Pl. Kumaon*, 73; *Boeck. in Linnæa*, xli. 200 *& in Journ. Linn. Soc.* xviii. 105; *Boiss. Fl. Orient.* v. 409.

N.W. HIMALAYA, alt. 8–11,000 ft., frequent; from Kumaon to Kashmir.—DISTRIB. Cabul.

Glabrous. *Stems* 6–18 in., cæspitose on a tough short rootstock. *Leaves* often nearly as long as stem. 1/10 in. broad, flat. Lowest fem. *spike* in fruit 1 by ¼ in.,

on peduncle 1½ in.; bract sheathing, its free portion very short (rarely 1 in.). Fem. *glumes* rather large, conspicuous by the strongly-ribbed broad green back; male glumes sometimes similar but often chestnut-red. *Utricle* ¼ in., shorter than glume, round-trigonous, obscurely nerved; beak hardly notched. *Nut* obovoid, trigonous, filling utricle; style very short, base slightly swollen, branches as long as utricle.

134. **C. Halleriana,** *Asso Syn.* 133, t. 9, fig. 2; spikes 3, terminal one oblong-cylindric male, fem. 2 close to it short few-fld., fem. glumes ovate green, style 3-fid, utricle somewhat large ovoid strongly-ribbed green minutely glandular-pilose tip triangular shortly notched. *Boott Carex*, iv. 128, tt. 415, 416; *Boeck. in Linnæa*, xli. 201. C. alpestris, *Allioni Fl. Pedem.* ii. 270; *Kunth Enum.* ii. 479. C. gynobasis, *Vill. Dauph.* ii. 206; *Reichb. Ic. Fl. Germ.* viii. 25, t. 259. C. diversiflora, *Host Gram. Austr.* i. 53, t. 70.

SIND, *Pinwill.*—DISTRIB. Westward to Europe. Also (subspecies) in N. America.

Glabrous. *Stems* 6–12 in., cæspitose on a harsh short rhizome. *Leaves* usually many, often as long as stem, scarcely $\frac{1}{10}$ in. broad. Terminal male *spike* ¾ by ⅛ in., dense, pale brown. Lowest fem. *spike* rarely 1 in. distant, usually ovoid close to the upper fem.; bract very short. (Slender subbasal stems carry often 1 spike wholly female or male at top; there is no line to be drawn between this state and the common form of 1 male spike with 2 shorter female spikes at its base.)

135. **C. læta,** *Boott Carex*, i. 69, t. 188; slender, spikes 2–3 distant cylindric, terminal 1 male, fem. glumes broadly obovate chestnut-purple, style 3-fid, utricle obovoid-ellipsoid trigonous pilose tip short-triangular beakless. *Boeck. in Linnæa*, xli. 199.

SIKKIM HIMALAYA; Tungu, alt. 12–13,000 ft., *J. D. H.*

Glabrous. *Stems* 4–6 in., cæspitose on a small tough woody rootstock. *Leaves* ⅓–½ stem, $\frac{1}{12}$–$\frac{1}{10}$ in. broad, flat. Lowest fem. *spike* ¾ by ⅛ in., on peduncle 1½ in.; bract sheathing, its free extremity very short. Fem. *glumes* very broad, tip depressed-triangular, keel narrowly green. *Utricle* scarcely $\frac{1}{10}$ in., terminated by a small round hole. *Nut* obovoid, triangular, filling utricle; style short.—Boeckeler cites this as "C. pellucida, Hook. f. et T. Thoms., not of Turcz." *C. pellucida,* Turcz., was never published, nor does Boeckeler say what it was: the name was sent Boott (by Fischer on an example) who affixed it in ms. to Hooker's Tungu plant. Turczaninow subsequently published his ms. *C. pellucida* as *C. Kirilowii* [Fl. Baical-Dahur, ii. (pars. 1) 275]; it is very near indeed to *C. læta* but has more acute fem. glumes, and Boott subsequently referred it to *C. pediformis*, C. A. Mey.

136. **C. setosa,** *Boott Carex*, iii. 108, tt. 327, 328, 329; spikes 2–5 distant slender cylindric, terminal one male, fem. glumes elliptic acute or truncate, style 3-fid, utricle oblong-obovoid trigonous setose narrowed rather suddenly into a short oblong scarcely-notched beak. *Boeck. in Linnæa*, xli. 303.

HIMALAYA, alt. 10-12,000 ft. Sikkim, *J. D. H.*, &c. GURWHAL, *Duthie.* KASHMIR, *C. B. Clarke.*

Glabrous. *Stems* cæspitose on a woody horizontal rhizome, 8–12 in., medium in the Sikkim plant, filiform in the Kashmir. *Leaves* hardly ½ stem, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, flat. Terminal male *spike* more than 1 in. in the Sikkim plant, ⅓–½ in. in the Kashmir, pale. Fem. *spikes* 2 by ⅛ in. (in the Sikkim type) dense, on a 2–3 in. erect peduncle; in the Kashmir plants, fem. spikes ¼–½ in., delicate, lax, on filiform wavy peduncles. Fem. *glumes* likewise vary from narrow ovate acute (in Sikkim) to truncate in Kashmir. *Utricle* small, shining brown, with few scattered long fulvous setæ in Hooker's type plant (whence name *setosa*); in the perfectly ripe Kashmir plant utricles are green thin with rather copious short pubescence.—The Gurwhal

examples since Boott (collected by Duthie) are intermediate between the Sikkim and Kashmir. The Kashmir plant, both in the truncate glumes and utricles, is near *C. cardiolepis*, Nees, but the spikes and utricles are much slenderer.

137. **C. oligocarya,** *C. B. Clarke*; slender, spikes 4–1 terminal 1 male, fem. spikes peduncled with 4–1 utricles, style 3-fid, utricle obovoid-ellipsoid pilose suddenly narrowed into a long deeply-notched beak.

N.W. TIBET; Dras to the Karakorum, alt. 12–13,000 ft., *C. B. Clarke.*

Glabrous except utricles. *Rhizome* stout, horizontal. *Stems* 6–10 in. *Leaves* numerous, much shorter than stem, $\frac{1}{10}$ in. broad, flat. *Spikes* ¼–⅓ in., terminal one male often with a fem. close to its base or may be termed "androgynous male at top." Lowest fem. *spike* 1–2 in. distant, on a 1–1½ slender peduncle; bracts shorter than infl. Fem. *glumes* elliptic-lanceolate, hardly mucronate, shorter than fruit. *Utricle* (beak included) ⅓–½ in., trigonous, about 8-ribbed, brown-green; beak ⅔ length of body. *Utricle* ending in two long lanceolate white glabrous teeth. *Nut* ellipsoid, trigonous, filling utricle; base of style not dilated, branches long.—The European and Asiatic few-utriculate species compared have all a much shorter beak than this.

138. **C. breviculmis,** *Br. Prodr.* 242; slender, spikes 2–5 oblong rather small, terminal one male pale, fem. with 8–14 utricles, fem. glumes with long bristle much exceeding utricles, style 3-fid base dilated, utricle small ellipsoid trigonous slightly hairy, tip pyramidal. *Kunth Enum.* ii. 522; *Boott Carex*, iv. 181; *Boeck. in Linnæa*, xli. 209. C. Royleana, *Nees in Wight Contrib.* 127; *Kunth l. c.* 441; *Boott Carex*, i. 6, t. 19. C. leucochlora, *Bunge in Petersb. Mem. Sav. Etrang.* ii. 142. C. Langsdorfii, *Boott in Trans. Linn. Soc.* xx. 144. C. puberula, *Boott in Perry Exped. Jap.* ii. 234.

N.-W. HIMALAYA, alt. 6–10,000 ft., *Royle*, &c. SIND; *Pinwill.* KHASIA HILLS, alt. 4500–6300 ft., *C. B. Clarke.* MUNEYPOOR; alt. 6000 ft., *Watt.* NILGIRI HILLS; alt. 7000 ft., *C. B. Clarke*—DISTRIB. Japan, China, Austral., N. Zealand.

Glabrous, except utricles. *Rhizome* creeping. *Stems* cæspitose, 4–16 in. *Leaves* often ⅔ stem, ⅛ in. broad, flat. *Spikes* usually approximate, subsessile; lowest fem. sometimes 6 in. distant on 2 in. peduncle; fem. ripe spikes ¼ by ⅛ in. *Style* at base dilated green, sometimes forming a button as in the nuts of *Eleocharis*.

139. **C. nemostachys,** *Steud. in Flora*, xxix. 23 and *Cyp.* 218; robust, stolons long, spikes 3–8 approximate long-cylindric very dense, terminal one male, style 3-fid, female glumes linear-caudate, utricle ovoid trigonous somewhat hairy beak long conic-linear. *Miq. in Ann. Mus. Lugd. Bat.* ii. 150, 211; C. excurva, *Boott Carex*, i. 57, t. 150; *Boeck. in Linnæa*, xli. 245. C. Zollingeri, *Boeck. l. c.* 242.—Carex sp., *Griff. Itin. Notes*, 86 (n. 1256).

KHASIA and Jaintea Hills, alt. 3–5000 ft., everywhere very common, *J. D. Hooker*, &c. GARO HILLS; alt. 1200 ft., *C. B. Clarke.*—DISTRIB. China, Japan.

Glabrous, except utricles. *Stolon* very long, stout. *Stems* 3–1 ft., at top triquetrous scabrous. *Leaves* often as long as stem, ⅛ in. broad, flat, margins scabrous, cutting; sheaths often fimbriated. Male *spike* sometimes 4½ by ⅛ in., always long; fem. spikes erect (peduncles hardly ¼ in.) 3 by ¼ in., dense, appearing hispid from the linear beaks spreading in all directions and the long persistent style-branches. Fem. *glumes* from a very short triangular base, linear as long as utricles, finally whitening. *Utricle* (beak included) about ⅛ in.—An unmistakable plant that cuts severely.

140. **C. Wallichiana,** *Prescott in Wall. Cat.* 3380; glabrous except utricles, stolons long, leaves (all sub-basal) long, spikes 4–8 distant long-cylindric dense, 3–1 terminal male, style 3-fid, utricle ovoid-ellipsoid densely hairy, beak very short divided nearly to base into two lanceolate prickly teeth. *Nees in Wight Contrib.* (1834), 129; *Kunth Enum.* ii. 483; *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, i. 6, t. 18; *Boeck. in Linnæa*, xli. 310 (*partly*); *Aitch. Cat. Punjab. Pl.* 152. C. Fedia, *Nees l. c.* 129; *Kunth Enum.* ii. 483. C. hirta, *Boiss. Fl. Orient.* v. 431; *Boeck in Journ. Linn. Soc.* xviii. 105 (*not of Linn*).—Carex, *Wall. Cat.* 3390.

N. INDIA, generally from Rawul Pindee, *Aitchison*, to BURMA, *Griffith*, and from DELHI CANAL, alt. 800 ft., *Edgeworth*, to Sikkim, alt. 9000 ft., *King*.—DISTRIB. Cabul.

Stems 6–30 in. *Leaves* often ⅔ stem, ¼ in. broad, sheaths often fimbriate. *Spikes* often 1½ in.; terminal males pale rather thick, often 3–2, sometimes 6–4, rarely 1; fem. ½ in. thick, ashy, lowest often 3–7 in. distant on erect peduncle; bracts usually overtopping infl. Fem. *glumes* ovate, acute, often mucronate, fuscous, shorter than utricles. *Utricle* (beak included) ⅛–⅙ in. long, 8–10-nerved; teeth of beak ultimately whitening spreading.—United with *C. hirta*, Linn., both by Boeckeler and Boissier; to which it is undoubtedly allied. *C. hirta* differs in the sheaths (or the "ligules" at least) hairy, the male spike smaller, the utricles larger more acuminate into a longer beak.—*C. Wallichiana*, Boeck., was founded partly on Falconer's n. 1164 which is *C. ligulata*, Nees.

141. **C. ligulata,** *Nees in Wight Contrib.* 127; stems with nodes and leaves throughout their length, leaves ¼–⅓ in. wide, spikes 6–8 cylindric distant, terminal one male slender, style 3-fid, utricle densely hairy ovoid acuminate into a short 2-fid beak. *Kunth Enum.* ii. 516; *Strachey Cat. Pl. Kumaon*, 73; *Boott Carex*, i. 45, t. 113; *Boeck. in Linnæa*, xli. 305. C. breviculmis, *Thw. Enum.* 356 *not Br.*). C. Thwaitesii, *Hance in Journ. Bot.* v. 235 (*cf. Trimen Cat. Pl. Ceylon*, 104). C. Wallichiana, *Boeck. in Linnæa*, xli. 310 (*partly, not of Prescott*). C. lachnosperma, var. β major, *Nees in Wall. Cat.* 3379 (*partly*) (3379 β *Wall. Herb. propr.*).—Carex, *Wall. Cat.* 3394 (second sheet).

KASHMIR; *Falconer* to NEPAL, *Wallich*, alt. 5–7000 ft. KHASIA HILLS, alt. 5–6000 ft., *Griffith, C. B. Clarke*. NILGIRI HILLS; alt. 5–7000 ft., *C. B. Clarke*. CEYLON; alt. 4–5000 ft., *Thwaites*.—DISTRIB. China, Japan.

Sheaths and *leaves* (partly) minutely hairy. *Rootstock* woody, short, knotted, not thick. *Stems* 12–30 in. Lower *leaves* short; those springing from middle of stem about as long as infl., flat, striate. Terminal *spike* ¾ by $\frac{1}{10}$ in., brown. Fem. *spikes* 1½ by ⅕ in., erect on short peduncles, pale or fuscous. Fem. *glumes* ovate, acute, mostly mucronate, shorter than utricles. *Utricle* (beak included) $\frac{1}{10}$ in.

142. **C. hebecarpa,** *C. A. Meyer in Petersb. Mem. Sav. Etrang.* i. 223, t. 12; leaves and lower bracts very close together scarcely ¼ in. broad much overtopping infl., fem. spikes slender with distant utricles, fem. glumes whitening (otherwise as *C. ligulata*, Nees) *Kunth Enum.* ii. 471; *Boeck. in Linnæa*, xli. 301. C. Wallichiana, *C. B. Clarke in Journ. Linn. Soc.* v. 25, 83 *partly, not of Prescott*). C. lachnosperma, *Wall. Cat.* 3379, A.

NEPAL; *Wallich*. MUNEYPOOR; alt. 5800 ft., *C. B. Clarke*.
Beak of utricle rather longer and slenderer than in *C. ligulata*, Nees.

Var. β *lachnosperma* (sp.) *Nees in Wight Contrib.* 124 (*excl. syn.*); leaves close together ¼ in. broad, fem. spikes dense ⅛–⅕ in. broad. *Kunth l. c.* 505. C. Kunthii, *Drejer Symb. Caricol.* 22. C. gracilis, *Boott Carex*, i. 59 (*partly*). C. Maubertiana, *Boott l. c.* 45, t. 114. C. ligulata, *Nees, var.* minor and angustifolia, *Boott ms.*

NEPAL; *Wallich.* KHASIA HILLS; alt. 4500 ft., *Griffith* (*Kew Distrib.* 6063), *J. D. H.* MUNEYPOOR; alt. 4000–5000 ft., *C. B. Clarke.*—DISTRIB. Cochin-China.

Appears exactly intermediate between *C. ligulata*, Nees and *C. hebecarpa*, C. A. Meyer; but it grows mixed with the latter in such a way both in Wallich's collections and in Muneypoor, that it must not be separated from it. This raises a presumption that the whole series of plants included under *C. ligulata*, Nees, and *C. hebecarpa* should be regarded as one species. Boott was much puzzled by the intermediate form, and gave it various names; but in reducing it to *C. gracilis*, he forgot that the style in *gracilis* is 2-fid.

UNDETERMINED INDIAN CAREX.

1. C. AITCHISONI, *Boeck. in Flora*, lxiii. 456. Kurrum Valley (British Afghanistan); *Aitchison.* Allied to *C. microlepis*, Boeck. & *C. punctata*, Gaud., *fide Boeckeler.*

2. C. CYLOCISTIS, *Boeck. Cyp. Nov.* I. 47. Tibet; *Schlagintweit*, n. 8860 (*partly*) and (n. 7045). Allied to *C. pulla*, *fide Boeckeler.*

3. C. DIMORPHA, *Boeck. l. c.* 45. W. Himalaya; *Schlagintweit* n. (4175). Allied to *C. alpina*, *fide Boeckeler.*

4. C. EXIGUA, *Boeck. in Engl. Jahrb.* v. 514. Ceylon; *Wichura* (n. 2690). Allied to *C. acicularis* & *C. Archeri*, *fide Boeckeler.*

5. C. HETEROLEPIS, *Boeck. Cyp. Nov.* l. 48 (*not of Boott*). Spiti; *Schlagintweit* (n. 6972). Allied to *C. magellanica*, *fide Boeckeler.*

6. C. LONGEPEDICELLATA, *Boeck. Cyp. Novæ*, i. 41. Ladak; *Schlagintweit* (n. 1642). Allied to *C. stenophylla*, *C. incurva*, *fide Boeckeler.*

7. C. LONGICUSPIS, *Boeck. l. c.* 49. Balti; *Schlagintweit* (n. 6088). Allied to *C. fuliginosa*, *C. frigida*, *fide Boeckeler.*

8. C. MACRANTHA, *Boeck. l. c.* 49. Tibet; *Schlagintweit* (n. 7017). Allied to *C. ustulata*, *fide Boeckeler.*

9. C. MELANOLEPIS, *Boeck. l. c.* 47. Lahoul; *Schlagintweit* (n. 2869) (*partly*). Allied to *C. pulla*, *fide Boeckeler.*

10. C. MINUTIFLORA, *Boeck. l. c.* 51. W. Himalaya; alt. 6000–7300 ft., *Schlagintweit* (n. 4919). Allied to *C. hebecarpa*, C. A. Meyer, *fide Boeckeler.*

11. C. POLYGYNA, *Boeck. l. c.* 40. Kishtwar; *Schlagintweit* (n. 3840). Allied to *C. leiocarpa*, *fide Boeckeler.*

12. C. PSEUDO-BICOLOR, *Boeck. l. c.* 44. W. Himalaya; *Schlagintweit* (n. 8643) Allied to *C. bicolor*, *fide Boeckeler.*

13. C. TIBETICA, *Boeck. l. c.* 46. Spiti; *Schlagintweit* (n. 6960). Allied to *C. Lehmanni*, *fide Boeckeler.*

14. C. TRISPICULATA, *Boeck. l. c.* 45. Gurwhal; alt. 10,000–10,600 ft., *Schlagintweit*) n. 10,056). Allied to *C. bicolor* and *C. pseudo-bicolor*, *fide* Boeckeler.

15. C. UNCINIIFORMIS, *Boeck. l. c.* 40. Kumaon; alt. 11,000–12,000 ft., *Schlagintweit* (n. 9640). Allied to *C. linearis*, Boott, *fide Boeckeler.*

LASIOLEPIS, *Boeck.* (in Flora, lvi. 90, and in Linnæa, xxxviii. 542), referred by its author to *Cyperaceæ*, is, as pointed out in Gen. Plant. (iii. 1043) identical with *Eriocaulon*. The description of the only Indian species, *L. brevifolia*, is too incomplete for identification with any previously described *Eriocaulon*, but answers to several common ones.

INDEX OF GENERA, SPECIES AND SYNONYMS.

The Synonyms and Species incidentally mentioned are printed in italics.

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* Err. typ. for *Cnemidia curculigoides*, read *Tropidia curculigoides*.

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