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FLORA

OF

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THE FLORA OF BRITISH INDIA.

By

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ASSISTED BY VARIOUS BOTANISTS.

VOL. VI.

ORTHIDEÆ TO CYPERACEÆ.

PUBLISHED UNDER THE AUTHORITY OF THE SECRETARY OF STATE FOR INDIA IN COUNCIL.

LONDON: L. REEVE & CO.,
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6, HENRIETTA STREET, COVENT GARDEN,
1894.
Pseudobulb large, conico-obpyriform. Leaves many, 6-10 by \(\frac{3}{4}\) in., midrib stout. Scape 1-3 ft.; sepals \(\frac{3}{4}-1\) in., and petals green with reddish nerves; lip as long as the sepals, white with red crenate nerves; spur short, subcylinic or conical.—Rheedè'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. 20; 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. inconsipucna, Griff. Notul. 349; Le. Pl. Asiat. t. 326; Lindl. in Journ. Linn. Soc. iii. 25.

ASSAM, MANN. BENGAL, J. D. H., Clarke. TENASSERIM, PARIS. NICOBAR ISLANDS, KUR. SINGAPORE, WALICH. MALACCA, MAINGAY. TRAVANCORE, WIGHT. CEYLON, at Damballa, Trimen.

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


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


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 \(\frac{3}{4}\) in.; sepals \(\frac{3}{4}\) in. long; spur a small sac.


WESTERN HIMALAYA; Ceylon, alt. 4-7000 ft., ROUTE, Falconer, Edgeworth, &c. BENGAL, ROBIMURG.; at Kengpore, Clarke. CONCAN, Dalz. & Gibbs. 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.; pod with ovary 3-1 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. iachnocheilla**, Hook. f.; scape stout, raceme lax-fld., bracts equaling 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.
Eulophia.]  
CXLVIII. ORCHIDAE. (J. D. Hooker.)  

Upper Burma; at Maypone, 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-fl.; bracts ¾–1 in., membranous, linear-lanceolate, subspathaceous; flowers 1 in. diam.; lateral sepals inserted at the base of the column; lip shorter than the sepals; hypochile obvate, as long as the rather narrower epichile; spur short, cylindric; column rather long.


Stem 4–6 in., sheathed. Leaves 1–3, 10–18 in., linear-lanceolate, petioloed, 3-nerved. Scape stout, shorter than the leaves, clothed with long sheaths; raceme short, few-fl.; flowers fleshy; bracts 1–1¼ in.; sepals ¾ 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.


Leaves 12–14 in., petioloed, elongate, linear-lanceolate. Scape 3½ ft., very stout below, sheaths appressed; raceme elongate, lax-fl.; bracts ½–1½ in.; sepals as long, fleshy; lip equalling the sepals; spur a small sac; column short, stout, hooded; young fruit 2 in., deflexed.


Nepal; at Maghada, in the Morung, Hamilton. North-West India (Jc. 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-fl.; bracts ½–1 in.; pedicels with ovary ½ in.; perianth yellow and purplish, spreading, ½–¾ 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.


North-West India; on the banks of the Tonse river, Royle.

Leaves 12 in., narrowly ensiform. Scape very tall; raceme elongate, lax-fl.; bracts ¾–1 in., ovate-lanceolate, acuminate; sepals ¾ 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 erre 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 obutse 5-nerved, petals subsimilar, lip sessile broader than long, side lobes large oblong rounded, midlobe small semi-circular, disk with three crenate nerves ending in crenate calli on the midlobe. *Dals. & Gibs. Bomb. Fl. 265.* E. ramentacea, Wight J.c. t. 1666 (not of Lindl.).

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

Leaves few, 10-12 in., long-petioled, narrowly lanceolate, strongly 3-nerved. *Scape 1-3 ft.; sheaths acute, appressed; bracts 1/3 in., ovate-lanceolate; sepals 1/4 in., fleshy; spur conical, acute. Capsule 1/2 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.


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 1/3 in., green; lip golden yellow with red stripes; spur a 2-lobed green sac. Capsule 2 in.


**Upper Assam, Mann.**

Leaves 12 by 1/4 in., narrowly linear-lanceolate. *Scape with raceme 3 ft.; sheaths appressed, acute; bracts 1/3 in., ovate-lanceolate; sepals 1/3 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.)


**Plains of India;** from the Panjab to Oudh, Bengal, Chittagong, and the Deccan.—**Distrib.** Afghanistan.
Scape 6-18 in., stout or slender from a deformed tuber; sheaths subsessile, 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 4 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 Punakha, Griffith.

Scape 12-18 in., slender; sheaths obtuse; bracts ½-¾ 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. xlvi. 155, t. 13, f. 8-12; flowers secund, bracts minute, sepals and petals ¾ 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 ½-¾ in.; sepals and petals white; spur ½ 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 lanceolate, lip obovate-oblung, 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-fl.; 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-fl., bracts filiform equalling the ovary, sepals ½ in. oblong obtuse many-nerved, petals narrower 3-nerved, lip cuneately obovate, side lobes short rounded, midlobe small ovate, disk with 2 carunculate nerves.

**Upper Burma**; Bhamo, Griffith.

Tuber or base of scape oblong. Scape 14 in.; sheaths 1 in.; raceme 4 in.; bracts ½-¾ 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. **Clytopera.** 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-fl., bracts various, flowers large green

**Tropical Himalaya**, from Nepal eastwards, Assam, the Khasia Hills, Munnpore, 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** 1–2 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 dasy-flowered species or variety (*C. Brunoniana*, Wight *mss.*) from the Kaita Falls (Nilghiris), with a root as large as the flat, the lip with a short horn and a linear-oblong pointed slaggby disk; its sepals are green and petals and lip white.


**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 ½–1 in. long; lip ½ 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.


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 obliquely spurred.

21. **E. candida**, Hook. *f.*; flowering with the leaves, scape slender,
Eulophia. ] OXYVIII. ORCHIDAE. (J. D. Hooker.) 7

raceme short many-fl., 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. bicarina. Cyrtopera candida, Lindl. in Journ. Linn. Soc. iii. 31 (in part).

Sikkim Himalaya, alt. 3-4000 ft., J. D. H. Assam, Mann.

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


Western Tropical Himalaya; from Garwal, alt. 4-5000 ft., to Nepal, Travanore, Cullen.—Distrib. Hong Kong.

Flowering before leafing. Scape 2-5 ft., as thick as the finger or less; raceme 1-2 ft.; bracts ½ in.; flowers lemon-yellow; sepals 1-1½ in. long, variable in breadth; lip as long as the sepals; spur a broad sac; anther with a 2-fld. 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-fl., 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 crenatc towards the apex.

Sikkim Himalaya (Lc. in Herb. Calcutt.). Tenasserim; at Moulmein, Parish.

Tuber large. Scape with raceme 18 in., as thick as the little finger; sheaths basal, 0.; bracts ½ in., equalling the filiform pedicels; sepals ½ in. long; petals rather broader; lip shorter than the sepals; spur conic, obtuse; anther with a produced 2-fld. 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-fl.; bracts very slender, as long as the ovary; sepals ½ in. long and petals violet-purple; lip paler.

24. E. macrorhizon, Hook. f.; scape robust, raceme lax-fl., 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 Ryan, 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 in., about equaling 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 orenate.


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-ft.; bracts slender, about equaling 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 ovaid.—Leaves unknown.

26. Eulophia andamanensis, Reichb. f. in Flora 1872, 276; raceme lax-fl.d., 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 reutuse, 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 ½ in. long; lip shorter than the sepals, white with green edges and nerves; spur conic, obtuse; anther 2-tubercled.—This much resembles E. virgins, but the leaves are much broader, and the column produced into a foot.

Species unknown to me.

Cyrtopera Rupa, Thwaites Enum. 302; rootstock tuberous, leaves not seen, scape 2 ft. reddish, sheaths 3 distant, bracts narrowly lanceolate equaling the ovary, flowers rufous 2 in. diam., sepals oblong-lanceolate acute rather longer than the obvate acute petals, lip cuculate, 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-virgins, 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. monophtila, Spens. Moore in Baker’s Flora of the Mauritius, p. 360 (where it is erroneously confounded with the Brazilian E. maculata).

Eulophia sp., Trimem Cat. Pl. Ceyl. 89 (C.P. 3956). Not named or described.

I fail to recognize the following Eulophias described in Griffith’s Notulae, vol. iii. p. 162, and 1c. Pl. Asiatic. 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.


   **N.W. India**, Boyle,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 ⅓-½ in., narrow, membranous; pedicel with ovary 1 in.; flower 1½-1½ in. broad, sepals linear-lanceolate, acute, and rather broader petals white or pale yellowish with pink stripe; 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.


   **Sikkim Himalaya**; Lachen Valley, alt. 6000 ft., J. D. H.

   **Rootstock** very stont. **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 ½ in.; pedicel with ovary ½-⅔ in.; dorsal sepal linear-oblong, obtuse; lateral lanceolate, acute, subfalcate; petala 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.


**Subtropical Himalaya**; from Nepal to Mishmi. **Khasia Hills**, alt. 4-6000 ft., Griffith, &c. **Perae**, alt. 2-4000 ft., Scortechini, &c.—Distrib. Java, China, Japan.

   **Stem** 2-6 in., seaey, 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.
[Cymbidium.]

Tenasserim; on Mooloo-it, alt. 6000 ft., Parish. Burmah; on the Siamidium, Berkeley.

Pseudobulbs 1-1½ in., turbidly 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, Mawn. Khasia Hills, Gibson; on Kollong rock, alt. 5000 ft., J. D. H. & T. T.

Stem very stout at the base, obscurely pseudobulbs. Leaves several, 6-12 in., narrowed into a petiole 3-5 in. scape very stout, 8-10 in.; basal sheaths 1½ in., imbricating; bracts ½ in.; pedicel with ovary 3-4 in.; flowers 1½ in.; 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., turbidly 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.


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 ½-2 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 Calcotte, C. aloifolium is very variable in other respects, and three varieties are distinguishable. 1. Racemes shorter suberect fewer-fld., sepals and petals obtuse dull purplish with yellowish pale margins. This exactly resembles the Chinese? C. aloifolium, Lodde. 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 lamelae 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, Gardiner), 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 sikkimensis. Reichentbach’s description of C. Mannit 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.


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 lamelae, 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 Bijd. 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.


Leaves 1-2 ft. by ½-1½ ft. Raceme 2-3 ft., slender; basal sheaths short, inflected; 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-ft., flowers 1-½ in. broad, sepals and petals linear obtuse, lip pubescent, hypochile saccate, disk with thick arched lamelae, side lobes acute, midlobe as long as the hypochile ovate-oblong obtuse.


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.

Eastern Himalaya; Nepal (Jc. in Herb. Kew). Sikkim, alt. 1000 ft., Clarke.

Khasia Mts., alt. 5000 ft., Griffith, &c.

Leaves 12-24 by \(\frac{3}{4}\) in., acute or acutely 2-fid. Scapes 8-12 in.; sheaths equitant, erect, lanceolate, finely acuminate; bracts acuminate; pedicel with ovary \(\frac{3}{4}\) 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. xxxi. 144; Xyn. Orchid. iii. 55, t. 224 (very bad); in Gard. Chron. 1874, i. 388, 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. 590, has the midlobe and sides of the lip light purple and column light rose-cold.

Var. Dayana; leaves 6 ft. by \(\frac{3}{4}\) 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.


Eastern Himalaya; East Nepal, Sikkim and Bhotan, alt. 5-7500 ft., Griffith, &c.

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


Tropical Himalaya; from Kumaon, ascending to 4000 ft. eastwards to Bhotan and the Khasia Mts., alt. to 4-5000 ft.

Habit of O. grandiflorum and leaves nearly as broad, but flowers smaller and differently coloured.—Blume founds the genus Iridorchis 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
Cymbidium.] OXLVIII. ORCHIDEA. (J. D. Hooker.)

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 \(\frac{1}{2}-\frac{3}{4}\) in., finely acuminate, side lobes of lip pale yellow green, midlobe dark purple with golden margins. C. Lowianum, Reichb. f. in Gard. Chron. 1879, 323, 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 \(\frac{1}{2}-\frac{3}{4}\) in. narrowly linear finely acuminate, scape suberect or decurved many-fld., flowers 2-2\(\frac{1}{2}\) 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. erythraeum, Lindl. l. c. 30. Limodorum angustifolium, Herb. Ham. (ex Lindl. Gen. & Sp.).

SUBTROPICAL HIMALAYA, alt. 5-6000 ft., from Kumaon, Blitwickworth, 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 naris, and pubescent ridges. Lindley's C. erythraeum 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 golden midlobe of the very narrow lip, but it otherwise does not seem to differ from longifolium, to which the specimens of erythraeum in Lindley's Herbarium certainly belong.

†† Bracts large, lanceolate or cymbiform.


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 \(\frac{1}{2}-\frac{3}{4}\) in., distant; flowers 4-7, distast, sweet-scented; lip pubescent within; pollinia 4, broadly oblong, plano-convex, each pair of a large and small placed face to face. The Roxburchian figure of L. longiflorum, 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 candel denuded of leaves, and there is no trace of a spur the bracts, which in the drawing are 1\(\frac{1}{2}-2\) in. long, are undescribed. The species approaches Cyperorchis, differing in habit. Lindley gives Ceylon, Maerae, as a habitat for his C. hamatodes (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 \(\frac{3}{4}-1\frac{1}{3}\) in. sessile or petioled ensiformly lanceolate, bracts shorter than the

**Sikkim Himalaya;** in the Terai. **Khasia Hills**, alt. 2-4000 ft., *J. D. H. & T. T.*, &c. **Ceylon**; in the Central Province, **Thwaites.—Distr.** China, Japan.

The Khasia plant agrees very well with Kämpfer’s figure, which alone represents the leaves as narrowed into a long petiole. In the Bot. Repos. the leaves are only a spand 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*, *Lindl. Cat.* 1863 (name only), *ex III. Hortic. xxviii.* (1881) 95.  
*C. carnosum*, *Griff. Notul.* iii. 389, is probably a *Eulophia*.  
*C. reddicens*, *Don Prodr.* 36, from Nepal, Wallich, doubtfully referred by Lindley to *C. giganteum*, is probably a *Calyogynae*.  

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*.


*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, 1½ in. long: this last is named *Cymbid. elegans*, var. *lutescens*.


**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 pollinaria broader; capsule very much larger.—It is not easy in the case of indiffent dried specimens to distinguish this from *Cymbid. eburneum* except by the smaller flower. Lindley's *Cymbid. microceron* consists of a flowering and fruiting specimen of this, together with the loose lip and column of a *Cologyne*, 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 Surureem (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*, Grifff., from the Churra to the Surureem 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 "Colog. affine," meaning simply that it is a plant allied to *Cologyne*, 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 *Colog. by Cymbidium.* The name of *Mastersii* is an mss. one of Griffith's given to cultivated specimens which he sent from the Cuttata 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-fld 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.


Leaves 2—3 ft. by ½—½ 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/l. CREMASTRA, Lindl.

A terrestrial herb; rootstock tuberous. Leaves radical, elliptic, plicate. 

Scaphe solitary, stout, sheathed. Flowers in second 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 subsessate, 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.


Tuber the size of a chestnut. Leaves 6-10 by 2-2½ in., subsessile or petioled. Scaphe 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 hypogaeal. Leaves elliptic, acute, plicate. Scaphe from the rootstock, stout, erect, sheathed, shorter than the leaves; flowers crowded in decurved racemes, bracts narrow membranous. Sepals and broader petals connivent 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 basal 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 endeavour to improve on it by the analysis of specimens.


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-flowered 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-rooted Indian species; its flowers vary from white veined with red-purple to pale purple with stronger veins.


**Assam, Silhet, Burma**, the Decan 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 subcarnuncled. 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.


**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 crenulate, 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 abseit with Wallich's specimens of this.


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 subobclinate 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 1½ 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. 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. candidum**, Lindl. Foli. Orchid. 3, Limodorum candidum, Roswb., from Silhet, Khasia and Moulmein, is probably dilatatum; it is certainly not **G. candidum**, Wall. Cat. 7374.


**G. fucatum**, Lindl. in Bot. Reg. t. 1687; Foli. 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. barbiferum**, Lindl. Foli. 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. Foli. Orchid. 2. (**Cistella cornua**, 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 semi-terete, foot 0, top incurved; anther broad, 2-celled; pollinia 2, subglobose, 2-cleft, attached one to each horn of a curved strap or head. — Species 3 or 4, Malayan.


**Tenasserim, Perak, Selangor, Malacca, Giffith (Kew Distrib.** 5318), Maingay (K. D. 1655).—Distri. Java, Borneo.

Stems 8-10 ft., tufted, as thick as the wrist. Leaves 1½-2 ft. by 1½-1½ in., equitant, loricate, acute. Scapes 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, dish with depressed
straight nerves and two linear ridges between the side lobes.—I cannot find characters whereby to distinguish Grammatophyllum pseudobulbous and Grammatophyllum aurantiacum; the latter was founded on Griffith’s specimens. The flowers very 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.


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 somewhat clawed; side lobes linear acute, midlobe ovate acute concave, pinkish streaked with crimson, disk and lip villous.


Malacca, in swamps, Griffith (Kew Distrib. 5417), 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.


Chittagong, Roxburgh. Tenasserim, Parish.—Distrib. Borneo.

Pseudobulb 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 ½ in. diam., blotched with brick-red; sepals acute, dorsal lancelolate geniculately arched, lateral falcate ovate.

**Malacca, Maingay.**

Pseudobulbs oblong, ½–1 in. Leaf 3–5 in., from obvate- to linear-oblong. *Scape* with 6–8-fld. raceme 4 in.; flowers 1 in. diam.; sepals acuminate.—Only one specimen seen.


**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-fld 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.


Penang, Perak, Malacca and Singapore (in dry exposed places, Ridley).—

**Distr.** Sumatra, Philippines.

*Stem* 4–8 ft., terete, very stout. *Leaves* 3–5 by ½–1 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 serrat); 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 sub-acute streaked with purple; midlobe rounded apiculate, yellow, granulate; column elongate cymbiform.


**Tenesseim**; 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 papillos; 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.


Leaves 2–3, 4–6 by ½–1 in. Stem stout; panicle glabrous, branches short; sheaths long, coriaceous, flattened; bracts small, acute, persistent; flowers yellow; sepals ½ in. long, acute. Capsule ⅓ 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.


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.


Ceylon, Walker, Gardener.

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. *Synt. Veg.* iii. 742 *(Dendrobium polystachya, Thou. Orchid. Afric. t. 85)*, which Lindley referred to this more resembles *P. Wightii.*

48. **Plocoglossis**, 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.


Perak, alt. 2–3000 ft., King’s Collector.—DISTRIBUT. 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-fläd., simple or with a branch from the base; bracts ⅓ in., lanceolate, acuminate; pedicel with ovary as long; flowers 1 in. diam., sparingly 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.*

**Perea**, alt. 3-1200 ft., Scortechini, King's Collector.—Dist. Java.

Leaf-blade 10-12 by 3-4 in., as long as the very slender petiole. **Scapes** much longer than the leaf, very slender; raceme 8-10 in.; bracts 3-4 in., often recurved; flowers 3/4 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 cuneate; spur a glibosity.—*A Plocoglottis* from Malaca, 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 test at diagnosing the Indian species will want revision and probably correction.

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


Stem 6-12 in., stout; internodes 1/4-1/2 in. Leaves variable in thickness. **Rachis** of spike 3-4 in. Petals 1/4 in. long. **Lip** equalling or rather exceeding the sepals. Column very short. **Capsule** 1/4-1/2 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 purpli with yellow spots. Griffith figures it green with black purple blotches. Wight says, "Flowers pale pink, lip conformable, afterwards purpli." In var. flaveola, Par. & R. f., the flowers are yellow, the hypochile purple and epichile streaked with purple. Lindley's *L. zeylanica* (Macræe, 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 trichlorhiza*, 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*.


**Tropical Western Himalaya**; Garwhal, Falconer; Kumaon, Stewart. **Silhet** and the **Khasia Hills**, Wallich. **Bengal**, at Jessore and Dacca, Clarke. **Tenasserim** (Jo. 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* ½–1 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 ⅓ of upper part, but variable.


**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 ms. 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-fl., flowers ⅓–⅔ 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-fl., flowers ½ 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.

Stem 2-5 in.; internodes 4-½ 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-fl., 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 ¼ in. diam. Flowers ¾ 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 (¾ 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.**


**Tenasserim**; at Moulmein, Parish. *? Khasia Hills*, alt. 3000 ft., Mann.

Stem 1 ft., internodes 1 in. Leaves strict, ½ 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*.


**Leaves** very variable in thickness, sometimes very long and slender. Sepals ½-3 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 8 large calli. Macrae's Ceylon specimen is like the Malabar plant. A Richards' figure of Birches teretifolia is a very bad one. Rheede's figure in xii. t. 5, on which Linneus' Epidendrum tenuefolium (Cymbidium, Willd.) was founded, is not a Luisia, the leaves are grooved, and spike very different.


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 ½ 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. 285, t. 78, f. 2.

Perak, Scortechini, King's Collector.—Distr. 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.


Penang, Curtis.—Distr. 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 indifferet specimens in Herb. Forster, identical with that of his Epidendrum triste.

13. L. Grovesi, 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 "sepals ligulatus acutis petalis longioribus."

**Cymbidium tenuifolium**, Wild. 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 *fiatiformis*, 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 sub-equal 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 subandrophorm, retuse. Column short, foot 0; anther short, 2-celled; pollinia 2, pyriform, 2-cleft; strap linear, sides recurved; gland minute. Capsule slender, elongate.


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 \(\frac{1}{2}–\frac{3}{2}\) 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 \(\frac{1}{2}\) in. diam.; sepals ob-long 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 ovate. Lip as long as the petals, margins adnate to the sides of the column, cym-biform and sigmoidly curved, suddenly narrowed into a compressed 2-candate tip, disk keeled. Column very short, foot 0; anther 2-celled; pollinia 2, globose; strap short linear, sides recurved; grand small. Capsule slender.


Stem 1–3 in., ascending. Leaves 3–4 by \(\frac{1}{2}–\frac{3}{2}\) in., thin and many-nerved when dry. Scape 1–2 in., stout; racillus flexuosus; 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 *Phalanopsis*, 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, sub-globose, 2-cleft; strap broad, gland large.—Species about 8, Malayan.


**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 torned 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 ½ 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.

2. A. bilinguis, Bentham in Gen. Plant. iii. 573; scape few-fl., lateral sepals and petals obovate, 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. Arrhinchnium labrosum, Lindl. in Paxt. Fl. Gard. i. 142.

**TENASSIRIM; at Moulemai, Parish, &c. The Khasia Mts.; at Nurtung (Ic. Jerdon).**

Stem elongate; as thick as a swam’s quill or less. Leaves 5–8 by ½–1 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.


Sikkim Himalaya, alt. 6000 ft., Clarke. Bhotan (Jo. in Hort. Calcutt.).

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

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

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

Malaacca, Mainayi (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," Mainayi); column short, truncate; strap of large oblong furrowed pollen broadly linear, gland transverse.


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., loriciform 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. **Phaleonopsis**, Blume.

Epiphytes; stem short, leafy; pseudobulb 0. Leaves distichous, coriaceous. Scape lateral; flowers usually large, loosely racemose. 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 appended, 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.


Tenasserim; at Mouline, Lobb, Parish. Perak, Scortechini.—Distrib. Sumatra, Java, Borneo.

Leaves 3–8 in., oblong-colate. Scape stout, simple or branched; rachis 3–5 in.; bracts ⅔ in., oblong, tip rounded; sepals oblong-lanceolate; petals shorter; lip suberect, 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.


Leaves 4–10 in., elliptic or oblong-colate, acute. Scape very stout, 1–7-fld.; bracts ovate, acute; lateral sepals oblong-lanceolate, unequal-sided, acute, deflexed; petals smaller, oblong-colate; lip narrow, incurved, broadly clawed or stipitate; side lobes erect, narrow, linear, truncate; midlobe cuneately obovate, apex triangular acute crenulate, disk with a bicuspitate appendage at the base; column rather long.

—Colours of flower apparently very variable; Scortechini describes the sepals and petals as deep carination 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.


TENASSHRIM; at Moulineh, 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 obliquely 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 soft spines behind; column and rostellum pale purple.


ASSAM, Manna.

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. Corna-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 roset-purple flowers.


ANDAMAN ISLANDS, Col. Man.—Distri. Sumatra.

Leaves 12 by 2½ in., cuneately ovate. 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 oblong-lanceolate 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.**


*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.


*Eastern Himalaya*, Lobb, Mann. Cachar, Keenan. Tenasserim, Lobb.
Leaves 3—5 in., linear or obvate-oblong. *Scape* 3—4 in., 6—8-ffd.; flowers ½ in. diam.; sepals and obvate 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. *Lobbiti*, R. f., which has a white lip with two chestnut bands.

**Species of Doubtful Position.**

P. Fusata, Reichb. *f.* in Gard. *Chron.* 1874, ii. 6; "allied to *P. Cornu-cervi*, roots short, leaves very broad oblong obuse 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 ligma on each side behind it, column not angled (swangulate) 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 *Phalanopsis*, 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. tenialis**, Benth. in *Gen. Plant.* iii. 574; *scape* short few-ffd., mentum acute, side lobes of lip very narrow spatulate reflexed on the disk, tips of the forked appendage of the lip hooked. *Arides* teniata,


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

55. **Rynchostylis**, 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-leafed, strap filiform, gland small.—Species 2 or 3, Indian or Malayian.


**Tropical Himalaya,** from Garwhal eastwards to Assam and Tenasserim, and southwards to Bengal, the Western Peninsula and Ceylon.—*DISTRICT.* Malay Islands.

**Stem** stout, creeping in trees. Leaves 6-20 by ½-2 in., curved. Racemes 4-19 in.; bracts broad, obtuse, membranous; flowers ½-¾ in. diam., white blotched with pink or violet; lateral sepals gbaybously 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. Garwalaica as different from R. retusa, also in describing the blade of the lip of Sau. guttatum as lanceolate, which misled Wight, who founded his S. Rheedii on the difference.

**SPECIES UNKNOWN TO ME.**

**SACCOLOBIUM 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 scute; the flowers are white with amethyst spots. Its habitat is unknown, but probably Indian.

**SACCOLOBIUM LITTORALE, Reichb. f. l.c. 1881, ii. 198,** has very long leaves, a short raceme, and the epichile cuculate, 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 variable 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 sub sessile. Column long; rostellum very long, slender. PTEROCERAS, 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. MICROFERA, 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 pulvinius. 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 pedicinate from the uniform persistent laterally compressed fleshy bracts.

  Sect. VIII. PEDUNCULICA stout, solitary. Lip stipitate, articulate with the foot of the column. CRUZILIA. (Sp. 27-33.)

  Sect. IX. PEDUNCULICA filiform, fascicled. Lip sessile. RICHELIA. (Sp. 34.)

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

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


Chittagong, Roxburgh. Tenasserim; at Moulmein, Parish.

*Stem slender, scendent. Leaves 3–5 by ½–¾ in., many-nerved, coriaceous, base contracted. Racemes 3–6 in., shortly pedunled, lax-fld.; rachis stout; bracts small, rounded; flowers ½–¾ 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. long, lateral, racemes very short, peduncle and rachis viscid, lip shortly clawed saccate, side lobes broadly oblong 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 ¾ 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 lanceolate ovate, 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 shorty 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, Scootechini.—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 ½–¾ 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, memranous; pollinia long, strap spathulate, gland small.—Described from similar materials as *S. aureus.*

4. *S. brachyglottis*, Hook. f.; stem very short, leaves elongate oblanceolate acuminata, 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 acuminata, nearly flat, keeled beneath. Peduncle 1 in., stout; bracts minute, broad, persistent; flowers ¾ 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, 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-lobed; anther shortly beaked, 2-celled; pollinia globose, strap short, gland obtuse.—It is impossible to describe the form of the minute lip of this curious species intelligently. I shall hope to give figures of it and of S. aureus in King’s “Annals of the Calcutta Botanical Gardens.”

Sect. II. STERECHILUS, 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.


S. Stem very short. Leaves 3-5 in., very thick. Racemes 1-3 in., drooping; peduncle and rachis slender; bracts short, broad, membranous; flowers 1½ 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 obtuse, 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. (gen.) Uncifera.

Sect. III. (See p. 33.)

6. S. aureus, Hook. f.; stem very short, leaves large long loriform 2-lobed, peduncle stout several-fid., flowers large, sepals lanceolate acuminate many-nerved, petal 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.

PREAK, King’s Collector.

Stems 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 ½ in., straight; sepals 1 in., and petals golden yellow; lip about 1½ 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-fid., 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 (Lc. in Herb. Calcutt.). PHEAK, Lc. Scortechini.

Stems 1 in., not very stout. Leaves recurved and pendulous, 6-12 by 1½-2 in., flat, keeled. Peduncle 1½ in. or more, green; bracts ovate; pedicel with ovary ½ in.; flowers white, 1½ in. diam.; sepals ⅝ 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. Sortechini's drawing is of a young plant.

Sect. IV. Micropera, Lindl. (gen.) (See p. 38.)


Sect. IV.


Bengal; at Comilla, Clarke. Chittagong, Roxburgh, &c. Tenasserim; at Mergui, Griffith (Kew Distr. 5241), Helfer (K. D. 5251).

Sect. IV.


Tenasserim; at Moulmein, Griffith, Parish.

Sect. IV.

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.

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

Sect. V. CHILIOCHISTA, Lindl. (gen.). (See p. 33.)


Tropical Himalaya; Nepal, Wallich. SIKKIM, J. D. H. Roots densely tufted, tortuous; stem 0. Raceme 3—6 in.; bracts ovate, acute, membranous; flowers sessile, 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 stamens; 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 (Thrixpermum); racemes elongate, many-fl., flowers yellow spotted with purple. Sarcoclinthus luniferus, Bot. Mag. t. 7044.

SIKKIM HIMALAYA; at Mungpo (Jc. in Hort. Calcutt.). TENAS-SEBIR; 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.


MALABAR; at Cochin, Johnson. NLGHIERI HILLS; on the western slope of the Wynedd, 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-fl., capsule ½ in. long Cymbidium minimifolium, Thwaites mss.

CEYLON; Central Province, at Hattagodda Hill, Thwaites. Roots much more slender than in S. usneoides. Leaves 2, very minute. Raceme ½—1 in.; flowers ½ 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 (Thrixpermum); 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; Berkeley.
Leaves 6–9 by 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 ¾ 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 Aërides.

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, oblong, many-nerved. Peduncle very stout; lower sheaths annular; bracts short, broad, obtuse; flowers yellow spotted with purple; sepals ¾ in. long, obtuse, lateral inserted on the short 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 ¾ in. falcately oblong, raceme shorter than the leaves 4–8 in. long. petal narrowly clawed, side lobes falcate obtuse as long as the cylindrical obtuse spur, midlobe reduced to a broad humid carunculate lobe. Aërides viridiflorum, Thwaites Enum. 450.

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 ⅔ in. diam.; lateral sepals broadly oblately 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. Bat. Calé.)
Leaves 4–8 by 1½ in., flat, narrowed from beyond the middle downwards, lip rounded with a notch. Peduncle with 4–6-fld. raceme 1–2 in.; bracts ovate; pedicel with ovary ¾ in.; flower subglobose, expanded ¾ 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, Bent. 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. Dendrocola Hystrix, Blume Bijdr. 291.

Tenasserim; at Mergui, Griffith (Kew Distrib. 5232), Parish.—Distrib. Java.
Stem 1-3 in. Leaves 2-3 by ½-½ in., obtusely 2-lobed; sheaths ribbed.
Peduncle 2-3 in., stout or slender, 2-3 sheathed; spike ½-½ in.; flowers white;
sepals and petals ½ 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 2½-½ in., linear, straight.—Reichen-
bach is my authority for this being a Javan plant, and for the Javan synonymy.

Hystrix, but side lobes of lip glabrous. Dendrocola pulchella, Thwaites

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 2½-½ in., slender, straight, subacute.

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 ½-½ in., coriaceous, falcate, narrowed from
the middle downwards, tip recurved. Peduncle ½-1 in.; spike ½-½ in.; bracts
spreading; flowers membranous; lateral sepals ½ 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 1½ in.,
very slender.—A curious little plant with a longer column than usual in the genus.

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 ½-½ in.; bracts very coriaceous; flowers not
seen.

24. S. trichoglossitis, Hook. f. Fl. 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 Singa-
pore. The lateral sepals are inserted at the base of the footless column.

25. S. filiformis, Hook. f. Fl. Plant. ined.; stem elongate, leaves
8–10 in. filiform terete, peduncle much shorter than the leaves, lip a spur-like cylindrical sac with orbicular side lobes.

**Perak;** at Larut, on branches of trees, *King’s Collector.*

*Stem* in the only specimen 3 in.; sheaths ¼ in., strongly ribbed; roots very long and slender. *Leaves* about ½ in. diam., flexuous. *Pedicules* 1½–3 in.; spike ½–¾ in.; *bracts* ½ in., broadly ovate, obtuse, fleshy; pedicel and ovary ½ in.; flowers white; sepals ⅔ 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.


**Tenasserim;** at Mergui, *Grifith* (*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. *Pedicules* ½—1 in., filiform; raceme ½ in.; bracts ovate, acuminate. *Capsule* shortly pedicelled, ½ in. diam., striate, beak ¼ in.

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


**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. *Pedicule* 8–10 in.; sheaths obtuse, appressed; raceme 1–8 in., few or many-fl.; racchis 4-angled; bracts ½ 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. Scoparia, Reichb. f.** *ms. 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* 3–½ in., coriaceous. *Pedicule* 2–3 in., at right angles to the stem; raceme 1 in.; bracts ½ in., ovate, 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 narrowly tips, lip saccate, side lobes short, midlobe conical obtuse fleshy.
Sarcochilus. ]  CXLVIII. ORCHIDÆ. (J. D. Hooker.) 41

PEBAE, Scortechini.

Stem 6 in., very stout, covered by the sheaths, internodes 1 in. Leaves 4–6 by 1–1½ in., coriaceous. Peduncle equaling or longer than the leaves (9 in. in Ic. Scort.); raceme 2 in., bracts close set, ½ in. long; sepals 2½ in. long, ½ 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.


ASSAM, Jenkins, Mann. KHASIA MTS., alt. 4000 ft., Clarke. TENASSERIM and TAVOX, 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 ½–1 in. Peduncles many, 2–4 in., solitary or in pairs, bracts ½ in.; sepals and petals 1¼ in., yellow; lip mottled with red; column very short; pollinia oblong, curved, strap very small, quadrate, gland still smaller, lunate. Capsule 2–2½ in.


CEYLON, Macrae, Walker; Ambgamowa 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 ½–3 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 ½–2 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, Malagay.

Stem as thick as a goose-quill. Leaves 2½–3 by ½–1 in., obtuse, notched. Peduncles at every node with the raceme 1 in., very stout, rigid; bracts 3–4, ½ in. long, rounded; sepals and petals about 1 in. long, keel narrowly winged; column very short; anther low, not beaked.

33. S. pacificus, Hook. f.; stem rigid, leaves rather distant oblong obtuse, peduncle much shorter than the leaves 2–3 in., sepals obovate-oblong 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 Laut range, alt. 3000 ft., Searotechini.
Stem ½ in. diam., flexuous. Leaves 2½–3 by 1½–1¾ in., coriaceous. Peduncle with raceme 1 in., basal sheaths imbricate; bracts ½ in., subacute; sepals § 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. Ridley, gen. ? (See p. 33.)

34. S. notabilis, Hook. f. In. 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 ¼ in. diam. across the ovate incurved coriaceous subacute bracts; pedicel and ovary very slender, ¼ in. long; perianth very membranous, white? sepals and petals § 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.

Specifics unknown to me or imperfectly known.

Thrixspermum Freemani, Reichb. f. in Gard. Chron. 1877, 749; dwarf, roots warty, leaves 6–7 by 1½ in. ligulate unequally 2-toothed, racemes many-fl., bracts semioval larger than the small ovary, sepals linear long narrow, petals a little shorter, lip small saccate 3-toothed, with 4 small stipitate globeose warted bodies before the base, centre white, lateral parts yellow with brown streaks.—Assam, Freeman.—Race-me 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-fl., 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 inapplicable.—Burma?

S.—Sec. Cucullus; resembles S. brachystachys, but stem much more slender, internodes ½–1 in., not strongly ribbed when dry.—Mergui, Griffith (No. 1124).

S.—Sec. Cucullus; resembles S. Arachnites, but capsule 4 in. long and proportionately stout.—Perak, Searotechini.

S.—Sec. Cucullus; 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 panicked 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. Cleiostoma Dawsoniana, Reichb. f. in Gard. Chron. 1868, 815.

**TENASSERIM**; at Moulmein, Parish.

*Stem* 1–2 ft., stout, rooting. *Leaves* few 3–6 by 4–1 in. *Panicle* 18 in., erect, stiff, branches spreading; bracts broadly ovate; pedicel with ovary ½ in.; flowers 1–1¼ in. diam.; anther 2-lobed, crested; pollinia large, strap short slender.—Near *T. fassotata*, 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 basal, with a hisrute 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 ½ in. long, lateral subscrate; column very short; pollinia globose.—Description from Kurz 1. c., I have seen no flowers.

58. **ERIDES**, Lour.

Epiphytes; stem leafy, pseudobulbs 0. *Leaves* linear, coriaceous. *Flowers* many and highly coloured, in dense or lax decurved racemes (few large or sessile in Sect. 1.) *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, saccate; 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 *E. mitratum.*) *Peduncle* 1–2-fd. *Spur* slightly incurved, with a callus half way down the tube. *Anther* shortly beaked.


Stems 1–2 ft., tufted, as thick as a goose-quill; roots \( \frac{1}{2} \) in. broad, flat. Leaves as thick as a duck’s-quill. Petaloid 1–1\( \frac{1}{2} \) in.; flowers 1\( \frac{1}{2} \)–2 in. diam., white; perianth with crisped margins; sepals ovate-oblong; petals broader; side lobes of lip flexuous, as long as the cylindrical spur; segments of midlobe orbicular, toothed; pollinia globose; strap narrowly cuneate, gland large. Capsule 1\( \frac{1}{4} \)–2 in., fusiform.


Nepal, Wall. Upper Assam; Naga Hills, alt. 5500 ft., Clarke.

Much more slender than *Æ. Vandarum*. Leaves as thick as a sparrow-quill. Pedaloid 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.


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, \( \frac{1}{2} \) in. diam., white or tinged with pink; sepals ovate-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.


Tennessee; at Moulmein (Hort. Day).

Stem 1–2 in., and roots very stout. Leaves 2–3 ft., \( \frac{1}{2} \) in. diam., deeply grooved above. Racemes many, suberect, 3 in. long, cylindric; peduncle very stout; bracts minute, acute; flowers \( \frac{3}{2} \) 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.


**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 **EE. multiformum**. They are difficult of detection in Herbarium specimens. According to the published figures the flowers vary in colour, white, red, and purple. **EE. Williamsii** is a white flowered variety. The figure of **EE. affinis** in Bot. Mag. (cited above under *multiformum*) is referred to *Fieldingii* by Morren, but it is of far too slender a habit.—The Foxbrush Orchid. of gardens.


**Western Ghats; from the Concan to Travancore. RAJGOTANA.** on Mt. Abo.

Near **EE. multiformum**, 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. *Schraderi*, Jard. Fleurist. t. 54; Gardner's *Mag.* Bot. ii. 121, with fig.; Pescatorea, t. 36. **EE. illustris**, Reichb. f. in *Gard. Chron.* 1882, 7, is a robust form with fewer shorter leaves, and large flowers blotched with purple, and amethystine tip.


**Tenasserim**, Wallich, Parish, &c.

*Stem* 6–8 in., robust. *Leaves* 8–12 by 1–1½ in. *Raceme* decurved or pendulous, lax-fid.; 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.


**Tenasserim**; at Moulinein, Parish.

Very nearly allied to *A. 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. *Leona*, *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.


The *Deccan Peninsula*; on the Nilgiri 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, racbis stout; bracts minute; flowers $\frac{3}{4}$ 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 $\frac{1}{2}$ in. long, pyriform, angled and grooved.

12. **Æ. lineare**, Hook. f.; stem short stout, leaves 6-12 by $\frac{1}{4}-\frac{1}{2}$ in. very unequally 2-lobed, panicle long peduncled much branched longer than the leaves, flowers as in *Æ. radicosum*, but rather smaller rose-cold. Saccalabium lineare, Lindl. in Wall. Cat. 7312. *S. paniculatum*, Wight 1815; Reichb. f. in Bonpl. iii. 225. Cymbidium lineare, Herb. Heyne.

**DECCAN PENINSULA**; on the Ghat from Canara southwards, alt. 5-7500 ft., Wight, &c. Ceylon; in the Doonbura 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.


Stem 4-12 in., very stout. **Leaves** 6-10 by $\frac{1}{4}-\frac{1}{2}$ in. Racemes many, 10-12 in.; peduncle and racbis stout; flowers purple to nearly white, sweet-smelling, often purple-spotted or tipped; side lobes of lip subuneate, midlobe short; spur very large, uneiculated; column short; anther obtuse; strap of pollinia not long, linear, gland small. Capsule 1-1$\frac{1}{2}$ in., oblong-clavate, angles obtuse; pedicel $\frac{1}{2}$ in., very stout.

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


**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. Emeritii**, Reichb. f. in Gard. Chron. 1882, 586; lobes of
leaves long narrow subacute, sepals longer than the petals, midlobe of lip lanceolate acute.

**ANDAMAN ISLANDS, Berkeley.**

Stem 0.3-3 ft. Leaves 10-12 by 3-1½ in., lobes much longer than in *A. odoratum*. Racemes 6-8 in.; flowers ½ 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.**

*A. Borassif, Ham. ex. Smith in Rees Cyclop. xxxix. No. 8, is undeterminable.

*A. Droumbens, Griff. Notul. iii. 365 (without description); Jc. Plant. Asiat. t. 320, fig. 1; Lindl. in Journ. Linn. Soc. iii. 428; 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 ¼ in., erect; flowers ½ in. diam.; lateral sepals very broad, obtuse.—This has the habit of a Phalanopsis.*

*A. Lasioptetalum, Welld. Sp. Pl. iv. 130, is undeterminable.

*A. Lepidum, Reichb. f. in Gard. Chron. 1885, i. 466; leaves oblong-acute 2-lobed, flowers white ascending, sepals and petals subequal oblong apiculate, tips 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.*

*A. Mendallii, Jenning's Orchid. under t. xxx., without description, is probably *A. falcum.*

*A. 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 cylindrical obtuse inflated longer than the pedicelled ovary, column white.—Burma (Hort. Feltch.).

*A. Rigida, Ham. ex. Smith in Rees Cyclop. xxxix. No. 12, is undeterminable.*

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**59. RENANTHERA, Low.**

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, oblong-lanceolate or spatulate, 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 Malay.


Tenasserim; at the Moscots Isds., opposite Tavoy, Parish.—Distr. Cochin China.

Stem 1-3 ft., stout. Leaves 2-4 in., distant, oblong or shortly lorate. Peduncle 2-3 ft., erect; branches long, divericate, 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.


SINGAPORE, Wallnich. PERAK, Scortechini, &c. MALACCA, Griffith (Kew Distr. 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, cylindrical, 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.


PERAK; on Gunong Bata Pateh, Wray.

STEM as thick as a goose-quill. Leaves 4–5 by ½–¾ in., linear, recurved. Scape long, sparingly branched; pedicel with ovary 1–1½ 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-fl., sepals and petals unequally ligulate obtusely acute, lip 3-fl., side lobes triangular, midlobe ligulate acute with two incumbent triangular or quadrate lamelle at its base, spur short conic.—Singapore? or Malacca?; Hort. Day. Flowers yellow purple spotted and margined, lips white, side lobes spotted with purple, spur orange, column yellow and purple.—The first species with acuminate leaves.—Description from Reichb. 1. 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 sacculate 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.


* Leaves terete. Scape few-fl. See also Aérides cylindricum.


LOWER BENGAL; at Seeb Sagur, Clarke. ASSAM, Silhet, the Khasia Hills, Chittagong and Upper Burma, Roxburgh, Wallis, &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, ½ in. diam., white or VOL. VI.
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. 1888, t. 484; Orchidoph. 1886, t. 158; Reichenbachia, li. t. 74. Warner Orchid.: Alb. t. 73, 1882.

PERAK, S. crenata; 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 carmine; 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 channelled and keeled. Scape usually many-fld.

† Flowers ¼-½ in. diam. (See also V. Bensoni.)


WESTERN HIMALAYA; Kumaon, Atakmunda river, alt. 3-4000 ft., Edgeworth. NEPAL, Wallich. ASSAM, Mann. BURMA, Berkeley. WESTERN PENINSULA; from the Concan to Travancore. Ceylon, Walker, &c.

Stem 4-6 in. Leaves 4-8 by ¼-½ in., unequally obtusely 2-lobed. Peduncle and rachis stout; pedical with ovary 1-¼ in.; side lobes of lip small, ovate. Capsule 1-1¼ in., long pedicelled, clavate.


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

4. V. auriculata, Griff. Notul. iii. 352; in Plant. Asiat. t. 331; raceme drooping, flowers 1-½ 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. Bot. 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 Prone, alt. 1500 ft., Benson.

Stem 6 in. Leaves 6-10 by ½ in., much broader in cultivation, acutely 2-fld or 3-fld. Peduncle with racemes 1 ft. or less; pedicel with ovary 1-½ in.; flowers variable in colour, from blue to nearly white (var. Bozallii, R. f. and Lowiana, R. f.); spur and column blue.

5. V. spatulata, Spreng. Syst. Veg. iii. 719; leaves short, peduncle very tall, raceme terminal few-fl., flowers 1½ 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

WESTERN PENINSULA; from Malabar to Travancore and CEYLON.


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


Khasia and Jnyeka 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 ovate 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 ovate, petals spathulate broadly ovate, 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. 188; 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. brunnnea (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-fl.d.; 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. 1889, 713; 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. *pupurea*, N. E. Br. in Gard. Chron. 1883, 307, the sepals and petals are mauve-purple with white bases, and the lip bright mauve.


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


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-fl.d.; 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. tessellatoidea*, by the former having the lip with the sides incurred 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.


The two species of this section (the following and V. violacea) have been referred to Saccolabium, Vanda, and one of them to Rhynchochilos. 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 Rhynchochilos; and the spur is hardly that of Vanda, but rather of Saccolabium.

12. V. densiflora, Lindl. in Puxt. Fl. Gard. under t. 42; Fol. Orchid. 2; leaves truncatey excised, lip cuneate tip shortly obtusely 3-lobed, base with 2 pubescent ridges descending into the spur. Fl. des Sérres, t. 1765; Rechb. 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, Walllich. RANGOON, Benson.

Stem short, as thick as a child's wrist; roots ½–1 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 1½ 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. CRISATAE. Racemes shortly peduncled, few-fld.; pedicels decurred. 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. 43; Fol. Orchid. 10; sepals and petals narrow yellow or green, side lobes of lip erect triangular, midlobe subpanduriiform golden striped with purple, tip with 2 dilabiate, side lobes of lip acute truncate or toothed, midlobe as long as the sepals; spur short, obtuse. Capsule 2½ in., narrowly clavate.

TROPICAL HIMALAYA; from Kumaon to Bhotan, Walllich, &c. SILVER, J. D. H. & T. T.

Stem 3–6 in., very stout. Leaves 3–5 in., rigidly coriaceous, recurved, keeled, truncate 3-toothed. Raceme equaling or shorter than the leaves; bracts very short, broad; pedicel 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 2½ in., narrowly clavate.


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. Capsules 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. pulmila, 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. Fld. Orchid. 10.

Sikkim and Bhutan 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. Xer. Orch. 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 semitundrum, midlobe ligulate 2-lobed retuse, spur acutely conical.—Moullineix, 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. Parisii, p. 51.)

V. Stangeana, Reichb. f. in Bot. Zeit. xvi. (1858) 351; allied to V. fusco-viridis, Lindl. (of Java), auricles of the lip semi-ovate divergent, blade gradually narrowed from a broad semicordate base, lip slightly 2-lobed, a pair of small cali before the mouth of the spur, dorsal sepal cuneate-ovate about equalling the petals, lateral sepals larger.—Sepals and petals golden green tessellated 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-fl., 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, Vipani.

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-fl., 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 racemmed 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 cylindrical, small lateral lobes and a small midlobe; sac or spur not septicum 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.
Saccolabium. [ OXLVII. ORCHIDEÆ. (J. D. Hooker.) 55

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

Sect. I. Micranthes. Leaves flat terete or channelled. Flowers small, often minute, in simple or panicked 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 abdinate crest or flumbrate midlobe which is warty or ochinate 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 warty reniform or ovate midlobe (spur cylindric in S. ochraceum). Column very short; strap of globose pollinia linear. (Acampe, Lindl.) (Sp. 28-34.)

Sect. IV. Platynema. Stem 0, or very short; roots very long, flattened. Leaves lorate, flaccid. Flowers racemose. Lip very small, spur sacate or conicol, midlobe small reniform. Column very short; strap of globose pollinia linear, gland large. (Micropoera, Dals.) (Sp. 35-36.)

Sect. V. Distichorchis. Stem tufted very slender pendulous, leafy throughout. Leaves uniform, distichonic, lanceolate. Flower small, in very short racemes. Lip small, spur sacate. Column very short, strap of pollinia slender, gland agglutinate. (Sp. 37-38.)

Sect. VI. Species. 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 Bridges sect. II.; but there is no foot to the column. (Sp. 39-41.)

Sect. VII. Uncifera. 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 margin; gland large, linear, or agglutinate. Uncifera, Lindl. (Sp. 42, 43.)

Sect. I. Micranthes. (See p. 54.)

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


Eastern Himalaya, alt. 3-5000 ft.; Bhutan Griffith; Sikkim J. D. H. Khasia and Jynnea Hills, alt. 2-4000 ft., common.

Stem 6-12 in., curved, rooting at the base. Leaves 2-4 in., fleshy, ½-1 in. diam. Panicles longer than the leaves, branches spreading; bracts small, acute, flowers ½ 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 ½-1 in. long, oblong, curved.


Ceylon; in the Central Province, alt. 3-4000 ft., Walker, Thwaites.

Stem stout; 1-4 in., curved. Leaves 2-4 in., fleshy, ½-1 in. diam. Panicles longer than the leaves, branches spreading; bracts minute, acute; flowers ½ 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 $\frac{1}{3}$ in., oblong.—Gardner (n. 872) has a form with much broader leaves, $\frac{1}{3}$ in. diam., and stouter scapes.


**Malabar** and **Travancore**; on the Nilgiri hills, at Needawuttura and Pyeera, Wight; Pulney and Anamallay hill, Cotton, &c. **Ceylon**; Central Province, alt. 4-6000 ft., Walker, &c.

**Stem** 6-10 in.; internodes $\frac{1}{2}$-2 in. Leaves 2-6 in., as thick as a sparrow-quill or more slender. **Racemes** $\frac{1}{2}$-2 in., stout, subesiile, often deflexed; bracts lanceolate; flowers $\frac{1}{2}$ 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 $\frac{1}{2}$ in., pyriform, pedicelled.—Flowers rose coloured in Wight’s plant, orange with red stripes in the Ceylon plants.


**Singapore**; at Sungai Buloh, Ridley.

**Stem** 3-5 in., as thick as a sparrow’s-quill, rigid. Leaves 1-1$\frac{1}{2}$ in., subsecund. **Racemes** $\frac{1}{2}$-3 in.; racis stout; flowers $\frac{1}{3}$ 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 (io. in Herb. Calcutt.).

**Stems** 6-8 in. long, interlaced, flexuous, as thick as a duck’s-quill; internodes $\frac{1}{3}$ in. Leaves rather more slender, slightly curved, but not falcate. **Flowers** $\frac{1}{2}$ 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 heaked; 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.)

Saccoclabium.]

OCLVIII. ORCHIDÆ. (J. D. Hooker.) 57


Silhet, Wallach.

Roots very many, slender, tortuous. Leaves 2–3 by \( \frac{1}{3} \) in., fleshy, thin when dry. Racemes slender; bracts ovate, membranous; flowers \( \frac{2}{3} \) 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 \( \frac{1}{3} \) 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. In. 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 (In. in Herb. Calcutt.)

Stem flexuous, internodes \( \frac{1}{3} \) in. Leaves 2\( \frac{1}{3} \)_3–3 by \( \frac{1}{3} \) in. thick, nerve strong beneath. Racemes 1–1\( \frac{1}{3} \) in., fruiting decurved; bracts subulate; flowers \( \frac{3}{5} \) in., puberulous, white edged with yellow and a little pink; column short; strap of globose pollinia elongate, spatulate, gland small. Capsules \( \frac{1}{3} \) in. long. oblong, sessile, crowded, reflexed.

8. S. Helpéri, Hook. f. In. Plant. ined.; stem short, leaves lorate 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. Helpéri (Kew Distrib. 5256). Moulmein, Parish; Mergui, Griffith.

Stem 1–3 in. Leaves few, close set, 2\( \frac{1}{3} \)_3–3\( \frac{1}{3} \) by \( \frac{1}{3} \) in., sheaths short, black. Panicle about equalling the leaves, slender; bracts minute, acute; flowers \( \frac{1}{3} \) in.; dorsal sepal much smaller than the lateral; blade of lip shorter than the spur; column very short; anther short, broad; pollinis 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 oval acute, side lobes 0. Thwaites Enum. 304.

Ceylon; Central Province, alt. 3000 ft. Macrae, &c.

Stem 2–8 in., often zigzag, internodes \( \frac{1}{3} \) to \( \frac{1}{3} \) in. Leaves 2\( \frac{1}{3} \)_4–4 by \( \frac{1}{3} \) in., straight or falcate, narrowed at base and tip, midrib obscure. Racemes 4–6 in. erect; bracts minute, subulate; flower \( \frac{1}{3} \) in. long, white; mouth of spur very oblique; column short; anther short, broad, strap of globose pollinia very slender. Capsule globose, \( \frac{1}{3} \) in. diam., pedicelled.


S. virescens, Gardn. mss.

Ceylon; Central Province common, Macrae, &c.

Stem 6–10 in., internodes \( \frac{1}{3} \) in. or less. Leaves 1\( \frac{1}{3} \) by \( \frac{1}{3} \) in., fleshy, midrib obscure. Racemes 1 in., recurved; bracts very minute; flowers \( \frac{1}{3} \) in. long, roese-
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. Bentham in Gen. Plant. iii. 579 errs in referring Bel. tenera to this; it is my Clesiostruma tenerum.


Ceylon; Central Province, up to 5000 ft., common; Maorae, &c.

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


**Tenassemiria**; at Moulmein, Parish.

**Stem** 6 in., stout. *Leaves* 4–5 by $\frac{1}{2}$ 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 $\frac{1}{2}$ in.; bracts small, recurved; flowers $\frac{1}{2}$ in. diam., pale yellow; column short, broad; rostellum large, 2-lobed, apparently fleshy.—A remarkable species with the pollinia approaching that of sect. *Undifera* (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 sepal in the spur. Reichenbach has (on the drawing) named it Saecolabium, 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, p. 938). It closely resembles Sarcanthus Parishii, but the flowers are yellow. There is no midlobe of the lip and no sepal in the spur.


**Tenassemiria**; at Moulmein, Parish.

**Stem** $\frac{1}{2}$ in. *Leaves* 5–8 by 1 in., bases closely imbricate, deeply channelled. **Raceme** as long as the leaves; flowers about $\frac{1}{2}$ 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.


Stem stout, rigid, internodes § in. Leaves 3–5 by §–3 in., fleshy, 5-nerved. Raceme with long slender peduncle 5–6 in., laxly many-fld.; bracts subulate; flowers § in. diam., yellowish; sepals 3-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 paradum 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, Duckie; 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 §–1 in., narrowed to the base. Raceme equaling the leaves; bracts small, broad; flowers about § 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 § in., subfusiform.

16. S. rostellatum, Hook. f. In. Plant. ined.; stem very short, leaves 4–7 in. lorate flat unequally 2-fld., raceme much shorter than the leaves, bracts minute, sepals broadly ovate-oblong obtuse, lip infundibular 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 §–3 in. diam., nearly straight. Peduncle with 8–10-fld. raceme 2 in.; slender; flowers § in. long from the tip of the dorsal sepall to that of the spur; petals oblong, obtuse, smaller than the sepals; column very short; rostellum subulate; pollinia large, globose, cleft.

17. S. minimiforum, Hook. f. In. 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 equaling 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 ½ in. long or broad; lip larger than the rest of the perianth, its base-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 "something membranous white 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 ½ in. Racemes much longer than the leaves; bracts ovate, acuminate; flowers ½ in. long; column short; anther broad; pollinia with a short strap and large narrow gland.—Described chiefly from Wight.


TENASSEME; at Moulmein, Parish, Scott.

Stem very stout. Leaves 3–4 by 1–1½ in., thickly coriaceous, keeled. Spike with long appressed sheaths, simple or branched; spikes 4–7 in.; bracts ½ in., large, ovate, acuminate, spreading or reflexed; flowers ½ 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, saccate, strap long slender dilated and forked above, each arm aplyphate 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.


TROPICAL HIMALAYA; from Garwhal to Bhotan, Assam, Sylhet and the KHASIA HILLS. TENASSEME; Parish, PETAK. DISTRIBUTION. Java.

A very common plant, and, if two species are not included, very variable. Stem very short. Leaves in Wallich's 7342 A from Nepal 6–12 by ½–3 in., strongly falcate. His B from Sylhet (which is the common form elsewhere) is a much smaller plant, with nearly straight leaves 4–5 by ½–3 in. Peduncle ½–1½ in.; pedicels ½–1 in.; flowers ½–1 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 ½–1 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 Saccobbl. No. 2, 3 and 4 of Notul. iii. 356, 357, and his Ic. Plant. Asiat. t. 333, 334.


NILGIRI HILLS; on the banks of the Kaitairy river and at Quelin, Wight. Stem short. Leaves 5–10 by ½–3 in., flexuous, lobes very unequal, obtuse, often
Saccolabium.} \hspace{1em} \textbf{CXLVII. ORCHIDEE.} \hspace{1em} (J. D. Hooker.) \hspace{1em} 61

divaricate, the longer sometimes 1 in. long. \textit{Flowers} \(\frac{1}{2}\) in. diam.,; perianth strongly
incurved. \textit{Capsule} \(\frac{1}{2}-\frac{3}{4}\) in.—United with \textit{S. calceolare} by Lindley (in Journ. Linn.
Soc.), but I think as different as any other of this section.

Frontisp. No. 2; \textit{in Journ. Linn. Soc.} iii. 33; stem elongate, leaves acute
or acuminate, blade of lip erose, disk naked or very sparingly tubercol.
latum, Wall.} \textit{mss.}

\textit{Sikkim Himalaya}, alt. 3-5000 ft. \textit{Khasia} \textit{Mts., Gibson.}

Usually a larger plant than the small states of \textit{S. calceolare}, with longer stems
(4-8 in.) and larger leaves, 4-6 by \(\frac{3}{4}-1\frac{1}{2}\) in. broad, never 2-fid., but very variable.
\textit{Perianth} whole-cold. and yellowish red, or more yellow or greenish and mottled
with brown; lip white, centre yellow often speckled with red. \textit{Capsule} in Sikkim sp.
3 in. long.—Paxton’s \textit{S. denticulatum} has greenish yellow flowers speckled
with brown, and the lip is described as erose. Lindley refers it to \textit{S. acutifolium}. The lip
of the \textit{Bot. Mag.} plant, apparently derived from the same source, is not erose, but with
a broad thick white fringe of long papillae.

33; stem rather long, leaves very narrow acuminate or 2-toothed, blade of
t. 333.

\textit{Bhotan Himalaya, Griffith. Khasia Hills}, alt. 3-5000 ft., Griffith, Gibson,
\textit{J. D. H. \& T. T.}

Perhaps a small form of \textit{S. acutifolium}, but the stem is more slender, the leaves
narrower, and the flowers and capsules (\(\frac{1}{2}\) in.) much smaller.

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

\textit{Burma, Boxall.}

This resembles a large state of \textit{S. calceolare}, the flowers are 1-1\(\frac{1}{2}\) in. diam.,
bright yellow with large purple blotches.

223; \textit{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,
\textit{Vanda obliqua}, Wall. \textit{mss.}

\textit{Burma; at Taingdong, Wallich. \(\text{\&} \text{Khasia Hills, J. D. H. \& T. T.}

Leaves 6-8 by 1-3 in.; flowers 1 in. diam.; sepals and petals narrow, whole-cold.,
all (in \textit{Ic. Wallich}) pale yellow, with the lip white speckled with yellow. The
Khasia specimens have the shorter leaves of \textit{bigibbum}.

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.

\textit{Rangoon, Benson, Gilbert. Psarak, Scortechini.}

Probably a small state of \textit{S. obliquum}, but the leaves are shorter and broader,
3-4 by 1-1\(\frac{1}{2}\) in., and the large bracts seem to be wanting. \textit{Flowers} whole-cold.,
pale straw-cold, in a drawing by Mr. Gilbert, bright yellow in \textit{Bot. Mag.}

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

Ceylon, Macrae; at Hantani, Gardner.

Leaves 5–6 by \( \frac{1}{2} \) in. Peduncle and pedicels very short, \( \frac{1}{2} \) in, stout; flowers \( \frac{1}{2} \) in. diam., apparently very fleshy.—Possibly a form of \( S. \) milagricum, 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.


Stem 1–2 ft. Leaves 7–9 by 1–1½ in. Panicle longer or shorter than the leaves, branches distant lax-fl.; flowers \( \frac{1}{2} \)–\( \frac{3}{4} \) 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. ii. 581, misled by a mixture of specimens of different species, errs in referring \( S. \) lineolatum to Cleisostoma maculatum; it is clearly this plant.

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


Tropical Sikkim Himalaya (Ic. in Hort. Calcutt.). Upper Assam, Mann. Tenasserim, Wallich, &c.—DISTRIB. China.? Siem 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, \( \frac{1}{2} \) in. diam., golden yellow banded with red on both surfaces. The dorsal plate in the cavity of the lip recalls Cleisostoma.


Western Ghats; from the Conan southward. Ceylon, Gardner, &c.

Stem 12–18 in. Leaves \( \frac{2}{3} \)–1½ in. br.-ad. Scape very stout; bracts very broadly ovate, acute; flowers \( \frac{3}{4} \)–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.

WESERN PENINSULA; in the Circars, Roxburgh; the Coccu, Law.

Apparently near S. Wightianum, but more slender, leaves narrower, lip deeply lobed, very complicate, flowers small, papillose all over, ½—⅜ in. diam. Capsule 2½ in.


BENGAL and the lower HIMALAYA Mts., from Sikkim eastwards. Assam, the GANGETIC DELTA, the CIRCARS and TANASSERIM.

Stem 2–3 ft., as thick as a goose-quill. Leaves obliquely notched. Scape closely scarred to the base; flowers ½ in. diam.; ovary very short. Capsule 1½ in., fusiform.—The lip is broader in Lindley’s figure than in Sylhet specimens, in which they are oblong-ovate.


SILHET; H. f. & T.

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


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. 1019/1839) have curved leaves 8–10 by 1–1½ in.

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


The SOUTHERN CONCA; in the Western Ghats, Law, Dalzell. CEYLON, near Kandy (Lc. in Herb. Kew).

Leaves ½–¾ in. broad. Raceme 3–5-fl.; bracts short, broad, obtuse; flowers
Sect. VI. SPECIOSÆ. (See p. 54.)

39. **S. ampullacea**, Lindl. in Wall. Cat. 7807; 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. 5695; **Warner Orchid. Alb.** t. 191. **Ærides ampullaceum**, Roeb. Fl. Ind. iii. 476.


**Stem** short, stout. **Leaves** 2–6 in., deeply channelled. **Racemes** shorter than the leaves, cylindrical; bracts minute; flowers ¾ in. diam., rose-red; sepals and petals broadly obovate, wide spreading; spur longer than the blade of the lip.
Capsule 1 in., subclavate, angles acuta, pedicel $\frac{1}{2}$ in.—Lindley in Journ. Linn. Soc. by oversight probably, refers his S. rubrum to this instead of to curvifolium.


**ASSAM**; **Ic. in Hort. Calcutt.** **BURMA**, **Wallach, Griffith, &c.—DISTRIB. JAVA.**

Very closely allied to *S. ampullaceum*, but the leaves are twice as long, much narrower 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.


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

Stem 1–3 ft. Leaves $\frac{2}{3}$–1 in. broad. Racemes 3–5 in., lax-fld., shortly peduncled; pedicel with ovary $\frac{1}{2}$ in., sigmoid; sepals linear-oblong, acute and broader shorter petals yellowish-white with a rose-cold. midrib; lip yellowish or rose-cold, speckled with pick; spur $\frac{1}{3}$–$\frac{2}{3}$ 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.


Stem 2–4 in., as thick as a goose-quill; roots very many and long. Leaves flat, 4–6 by $\frac{1}{2}$–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 $\frac{1}{2}$ in.; flowers $\frac{1}{2}$–$\frac{3}{4}$ in. diam., pale lemon-coloured, at first greenish; limb of lip shorter than the obvate-oblong, obscurely nervèd 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 spatulate strap, the margins of which are recurved, gland very long.


**SIKKIM HIMALAYA**, alt. 6–7000 ft., Gamble. **KHASIA HILLS**, Griffith (Kew Distrib. 5237), &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,

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but spur not so long or so much incurved, gland of the pollinia smaller. *Capsule* ½-1 in., narrowly fusiform, shortly pedicelled.

**DOUBTFUL AND IMPERFEKTLY KNOWN SPECIES.**

S. clavatum, Lindl. Gen. & Sp. Orchid. 223. (Epidendrum clavatum, Retz Obs. vi. 60. Limodorum clavatum, Wildl. Sp. Pl. iv. 126; caulescent, pendulous, leaves linear clavate 2-toothed, spikes leaf-opposed, lip inflated bearded.—East Indies, on tree.—It is impossible to say what this is; it had better be suppressed.


S. Pehé, Reichh. f. in Gard. Chron. 1887, i. 447; leaves very broad 7 by 2 in. ligulate obtusely 2-lobed, raceme few-fl., flowers as in Sect. Calceolaria, as large as *S. bellum*, 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, Reichh. 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 ("lineatæ apice lobosis"), disk warty all over.—The rest as in *A. dentata*, Lindl.—Bhotan, Griffith.


65. **Sarcanthus**, Lindl.

Characters of *Saccalabium*, 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 *Saccalabium*. The only character whereby its species can be distinguished is the more or less sepaate cavity of the spur, often a very obscure one, and almost inappreciable when the septum is reduced to a mere ridge.

* Leaves elongate, filiform.


Sikkim Himalaya, Griffith's Collector. Khasia Hills, Lobb. Tenasserim, Parish.

Stem pendulous, as thick as a duck's quill, terete. Leaves distant, ½ 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.

TENASSEIUM; at Moulmein, Parish. ANDAMAN ISLANDS, Berkeley. Stem nearly as thick as a goose-quill. Leaves ¼ in. diam., curved, obtuse. Racemes 6–8 in., slender, sometimes branched; bracts ovate-lanceolate; flowers ¼ 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).


TAVOY, Wallach. TENASSEIUM; at Moulmein, Griffith, Parish. Stem as thick as a duck’s quill, rigid. Leaves ½ in. diam., obtuse. Racemes 1–2 in.; bracts minute; pedicel 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.


SILHET, Wallach. UPPER ASSAM, Griffith. Leaves ½–1 in. broad, rigid, 5-nerved; sheaths ½–1 in., deeply grooved when dry. Racemes shorter than the leaves, peduncle and rachis slender; bracts minute, pedicel with ovary ½ 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 ½–3 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 ms.; and that Lindley inadvertently transferred that name to No. 16.

The Deccan Peninsula; on the Ghat from the Cuncan to Travancore.
Ceylon; in the Saffragam district.

6. S. insectifer, Reichb. f. in Bot. Zeit. 1857, 159; leaves many
½ by ¾ in. oblong amplexicaul, spikes very short stout few-fl., sepals ovate-
oblong obtuse, petals oblong, side lobes of lip rounded, midlobe large triangular-
oveate fleshy, spur short broadly conical.

BHAR; at Burkutta, J. D. H. CACHAR, MANN. CHITTAGONG (Ik. in Hort.
Calcutt.). TENASSERIM, PARISH.

Stem a foot and upwards, robust, scendent, thicker than a goose-quill. Leaves
subimbricate, obliquely obtusely 2-lobed with sometimes an intermediate spiculus,
thickly coriaceous. Spikes ¼ in., sessile; bracts small, deciduous; flowers ¼ in.
diam., greenish-yellow striped with red-brown; lip white and pink or purple, mid-
lobe acute or acuminate, spur semisepate 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. Scortechini, Hook. f.; leaves 3–5 by 1¼ in. subpetioloed
oblong-lanceolate acute flat, spike about equalling the leaves very stout
many-fl., sepals oblong acute, petals half as broad, side lobes of lip ob-
solate, midlobe hastately deltoid, spur longer than the sepals conical obtuse
curved.

PERAX, Scortechini; on rocks, Wray.

Stem elongate, robust, as thick as a goose-quill. Leaves very thick. Spikes
2–6 in., flowers ½ in. diam.; sepals and petals lurid purple with green midrib and
margins; lip ½ in., yellowish, spur 2-celled, dorsal callus large; column short; anther
obtusely besked; pollinia 4, broadly oblong, strap linear. Capsules 1 in.,
linear-oblong, deflexed.—Described from fruiting specimens and a drawing by
Scortechini.

Soc. iii. 39; leaves 10–14 in. lorate flat, panicle very large copiously
branched laxly many-fl., sepals and smaller petals oblong obtuse, side
lobes of lip triangular acuminate, midlobe a small incurved ovate acute
fleshy beak, spur a cylindrical obtuse sac. S. racemifer, Reichb. f. in Walp.
Ann. vi. 881. S. tricolor, R. f. in Bonpland, ii. 214. Saccolabium racemi-

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 ½ in.; flowers ¾ in. diam.; sepals and petals dark purple edged
with yellow; lip white, spur thin walled, about as long as the sepals, semisepals
longitudinally, dorsal callus 2-celled; 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.
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†† Stem short or 0.


Tenasperim; at Moulmein, Parish.

Stem short, as thick as the little finger.  Leaves close set, 2–3 by ½ in., recurved, coriaceous.  Racemes 4–6 in., rachis slender purple; bracts minute; flowers ¼ in. diam.; pedicel with ovary ½–¼ in.; side lobes of lip with acute outer angles, spur with a sinusus 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.


Tenasperim; 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-fl.; 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-fl., racemes or panicles elongate many and lax-fl.; 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.

Tenasperim; 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 ¾ in. diam., golden yellow; sepals and petals striated with red; spur seate 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. Umefera of Saocolabium), gland minute.


Tenasperim; 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 epicateum; but the flowers are smaller, yellow, and the spur distinctly sepalate within.


TENASSERIM; at Moulmein, Parish.

Stem short. Leaves thickly coriaceous, margins recurved, narrowed to both ends. Raceme 4-6 in.; bracts minute, acute; flowers \( \frac{1}{2} \) in. diam., dull purple, with yellow disk and margins; spur large, obtuse, sepalate below the middle, dorsal calyx large lobed; column rather long, rostellum minute; anther acuminate, pollinia didymous, strap very slender, gland minute.—Very near \textit{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. 1. c.) says that \textit{oxyphylus} is nothing but a narrow leaved var. of the Chinese \textit{S. rostratus}, but as noted under \textit{S. secundus} there has been a misapplication or transference of Wallich's name of \textit{oxyphylus} by Lindley or Wallich.

SPECIES UNKNOWN TO ME.

S. ARIETINUS, Reichh. 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-fld., side lobes obtuse-angled plaited in the middle, midlobe triangular acute yellowish, spur retorse with an erect lamellate grooved calyx 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. ASPERUS, Reichh. f. in Hamb. Gartenzeit. 1865, 297; near St. Parishii; leaves ligulate broadly 2-toothed, peduncle long slender, flowers racemed equalling \textit{S. paniculatus}, sepals green, lip purple-spotted, sepals ovate apiculate, petals spur curved with a longitudinal septum, side lobes semi-ovate involute surcided at the isthmus and at the base, midlobe sessile triangular.—Burma, Hort. Soc.

S. CHRYSOMELAS, Reichh. f. in Gard. Chron. 1869, 662; leaves broadly lorate unequally 2-lobed, panicule simple, bracts triangular much shorter than the pedicelled ovaries, flowers yellowish, disk of sepals and petals blackish-purple, sepals and sub-equal petals oblong, side lobes of lip triangular with an ascending awn, midlobe triangular, spur straight conical, sepium running from the posticus base of the spur along the anticus and excurrent on the midlobes, calyx under the column bicurial, column slender, base puberulous.—Tenasserim, at Moulmein, Benson (Hort. Veitch.) \textit{S. paniculatus} has a 3-fld midlobe of the lip; \textit{S. racemifer} (Saccotela. racemiferum and \textit{Sarcanth. pallidus}, Lindl.), has a totally different column anther, calyx, and different side lobes of lip.

S. MACRodon, Reichh. f. in Gard. Chron. 1872, 1556; leaves short oblong-ligulate with 2 triangular forciate teeth, raceme elongate laxly many-fl., bracts most minute, pedicelled ovary and cylindrical spur equal, sepals and petals oblong straight ribbed on the back, lip 3-fld., side lobes subquadrate anticus 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, Reichh. f. in Gard. Chron. 1878, ii. 300; leaves 5 \( \frac{1}{2} \) by \( \frac{3}{4} \) in. ligulate 2-fld., lobes ligulate obtuse, panicule \( \frac{1}{2} \) 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-fld., side lobes short erect oblong acute, midlobe triangular horizontal, spur cylindrical semicurved grooved sepalate, dorsal calyx forked, strap of pollinia oblong bent over the compressed androchiumum, pollinia blue on a forked appendage of the strap.—Burma? (Hort. Hobart).—Near S.
Sarcanthus. CLXVIII. ORCHIDÉE. (J. D. Hooker.)

Parishii, with even more remarkable pollinia. [The strap of the stipitate pollinia must resemble that of Saccolab. sect. Uneifera, J. D. H.]

CLEISOSTOMA, Blume.

Diffsers 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).


PRAK, Wray, (Ic. Scortechnii); 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 ½ 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 Lodgingg, and agrees in characters with C. fusum, of which Lindley himself says it is probably only a form of latifolium.

2. C. andamanicum, Hook. f.; leaves 4-6 by 3-½ in. lorate, peduncle equaling or exceeding the leaves, side lobes of lip short truncate, midlobe very short reniform, spur cylindric.

SOUTH ANDAMAN ISLANDS, KURT.

* 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 ½ 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.

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 pollinaria linear, gland small. Capsule ½ in, narrowly clavate.—Benthum (Gen. Plant. iii. 580) erroneously unites Thuwaites's Saccolabium lineolatum, C.F. 2741 (S. ochraceum, Lindl.) with Lindley's C. maculosum.

4. C. crassifolium, Lindl. in Part. 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 cylindrical 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 ½ in. diam.; sepals oblong, obtuse, and petals green and spotted; lip rose-culd., mouth of spur closed by the thickened ridge, disk of midlobe thickened; dorsal callus compressed, decurved; column very short; anther acuminate, pollinaria 4, subglobose, strap linear, gland small.

** Stem short. Peduncle slender; flowers scattered on the slender branches of the panicle.


Sikkim Himalaya; in hot valleys, J. D. H. Lower Bengal and the Sunderbunds, Wallach, Clarke. Burma; on the Assam River, Wallach; Moulmein, Parish.

Stem 1-3 in. Leaves 3-5 by ½-½ in. Panicle erect; bracts minute; flowers ½ 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, pollinaria (4, 2 very small, Clarke), strap dilated upwards and suddenly contracted at the tip. Capsule ½ in., fusiform.—Wallach's specimens from Burma have very narrow leaves.

*** Stem usually elongate. Peduncle slender or stout rarely branched, usually shorter than the leaves.


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,
Cleisostoma.]

CXLVIII. ORCHIDAE. (J. D. Hooker.)


Nilghiri Hills; in woods near Nedubetta, 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 ½-3 in., woody; basal sheaths cupular; bracts cymbiform; flowers ½ 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, ellipsoid-oblong or periformal.-Erroneously referred to Saccolabium brevifolium in Gen. Plant. (iii. 579). I have seen no Nilgiri specimens.

8. C. bipunctatum, Hook. f.; stem slender scandent, leaves 4-6 by ½-3 in. subacute, peduncle very short, 1-2 fld. side lobes of lip small sublanceolate, midlobe large ovate-lanceolate, spur very small incurved obtuse, saccate. Saccolabium bipunctatum, Par. & Reichh. f. in Trans. Linn. Soc. xxx. 145.

Tenasserim; at Mouluen, Parish.

Stem about as thick as a duck's quill. Leaves lorate, laterally notched towards the tip; costa stout beneath. Flowers about ½ 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 ½ in. diam., sepals and petals subimilar 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, (Je. in Hort. Calcutt.) ; alt. 5000 ft. Gamble. Assam, (Hort. N. Company.)

Stems tufted, 8-12 in., as thick as a goose-quill, internodes ½-3 in., rugulose. Leaves erecto-patent, sessile, ½ in. diam., flat, hard, tip micronate. Spike 1-½ in.; basal sheaths short, annular, and bracts brown; ovary ½ 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 1-½ 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.


Stem 1–1 ½ in., roots fascicled. Leaves unequally obtusely 2-lobed, often falcate, sheath very short, flattened, midrib beneath strong. Raceme ½–1 in.; bracts minute; flowers ½ 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 ½ in. long, linear-oblone.

11. C. uteriferum, Hook. f.; stemless, leaves 6–8 by 1 ½ in. lorate tip broad rounded or retuse margins undulate, spike stoutly peduncled shorter than the leaves dense-fld., sepals obovate-oblone undulate tip rounded, petals smaller and narrower, side lobes of lip truncate, midlobe very small ova late fleshy, spur a large inflated subglobose sac sulcate in front, neck contracted.

Perae, Kunstler (Hort. Bot. Calc.).

Leaves flat, base hardly contracted. Spike with peduncle 3 in.; rachis very stout, strict; bracts minute; ovary very short, ½ in.; flowers ½ 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.


Cachar; Keenan. Tenasserim, Parish. Andaman Islands, Berkeley.

Stem 1–1 ½ in., very stout, roots fascicled. Leaves coriaceous, 2-lobed, nerveless, midrib beneath slender. Raceme or panicle 4–6 in.; bracts obscure; flowers ½ in. broad, yellow, papillose; spur very short broad truncate, dorsal scale semicircular erose; column very short, rostellum heaved; anther broad, strap of globose pollinia linear, gland small. Capsule (in Cachar) 1 in., linear-oblone.—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-oblate, spur short inflated.
ASSAM, Mann.  SIKKIM? (Io. 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-fid., sepals and petals ovate or oblong-ovate, lip broader than long entire, spur short broad gibbose. *C. maculolusum*, 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 Peridieni Herbarium represents the stem 1½ in. long, the leaves 5–6 by ¼–1 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 ½ 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 ½ by ½ in. and a few inches of a branched panicle, the flowers not ½ 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-fld, raceme lax-fld. much shorter than the leaves, sepals orbicular-ovative obtuse, petals oblong-ovative, 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 (Io. in Hort. Calcutt.).

**Stem very short.** Leaves flat, narrowed towards the base, lobes very acute, often unequal, the longer ¼ 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 indubibular 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. DISCOLOE, 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-fld, 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 ½ 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. LORATUM, 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.

ECHILOGLOSSUM 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 hastily triangular, tip acutely 2-toothed, callus below the column ligulate, strap of pollen linear, gland very large, lipcrepiform. Sikkim Himalayas (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, racemose or panicled. Sepals spreading, subequal, lateral obliquely obovate. Petals linear. Lip much larger than the sepals, clawed, side lobes subquadrate, midlobe clawed indented 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 obscure.—Species 1 or 2, Indian and Chinese.


TROPICAL HIMALAYA: from Garwhal? Falconer, to SIKKIM, and the KHASIA HILLS, alt. 4-5000 ft. TENASSIREM; at Moulean, Paris.—DISTRIBUTION. China.

Stem 4-½ in., 2-3-leaved. Leaves 3-7 by 1-½ in., obliquely elliptic-oblong, acute, sparsely nerved, base not narrowed. Racemes simple or sparingly branched, 6-12 in., lax-fl. ; bracts small, subulate; flowers ¼-½ 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. TÉNIOPHYLLUM, 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, epicate. 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, Malayas, Australian and Pacific.

There are several Perak plants in Scortechini collections that are probably Tenio-phyllum; but the species are obscure, minute, and very imperfectly known, and there are no doubt many to be discovered.

Tæniophyllum.] CXLVIII. ORCHIDEÆ. (J. D. Hooker.)

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Ceylon; in the Ambagamowa district, De Alwis.

Roots fleshy. Peduncle ½ 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.—Descriptive 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 Cottayam, Johnson.

Roots about ½ in. diam., compressed. Peduncle 2-3-fld.; bracts broad; flowers sessile, ⅛ 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 scerotiform.

Perak; at Larut, King’s Collector.

Roots stout, ⅛ in. diam. Spikes ½-1 in.; bracts concave, obtuse; flowers about ⅛ in. diam., reddish-yellow; sepals lanceolate, obtuse and narrower petals with one thick nerve; side lobes of lip incurved; column very short, papillos. Capsule ¾-1½ in., trigonous.

69. MICROSACTACUS, Blume.

Small densely tufted epiphytes; stems densely leafy. Leaves distichous, narrow or scalpelliform, fleshy. Flowers minute, sub sessile 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, Malay.


Tenaseerm; at Mergui, Griffith (Kew Distrib. 5344), Helfer (Kew Distrib. 5384). Parish. Perak, Scortechini.—Distrib. Malay Islands, Cambodia.

Stems 2-4 in., curved, ½ in. diam. across the leaves. Leaves broadly ovate, obtuse, somewhat recurved, wrinkled when dry. Flowers ⅛ in. diam., almost concealed by the leaves, cellular, white; bracts scarious, sheathing; sepals lanceolate; petals rather narrower; lip obtusely 3-lobed. Capsule ⅛ 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.


Perak, Scortechini.—Distrib. Java, Borneo.

Stems 4-8 in., very stout, strongly incurved. Leaves 1½ by ½ 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 obsolete 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, sub-equal 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.


**Nilgherry and Travancore, Wight, &c. Ceylon,** in the Central Province.

**Stem** 2–6 in., densely leafy. Leaves linear, keeled, 1/4–1 in. broad, unequally obtusely 2-fid, recurved. Panicule with peduncle 5–9 in.; flowers 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 1/2 in., clavate.

2. **D. congestum, Wight Jr. 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 1/4–1 1/2 in. broad, deeply unequally 2-lobed, lobes obtuse. Peduncle with dense-fld. spike 4–6 in., rachis very stout; bracts minute, acute; flowers about 1/4 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 3/4–1 in., flat, narrowed to the acuminate apex, rigid, many-nerved. Scapes many, shorter than the leaves, very slender, rigid,
Mystacidium.] CXLVIII. ORCHIDÆ. (J. D. Hooker.) 79

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 ⅛ in., pedicelled, narrowly ellipsoid, ribs slender.—I have seen only different specimens, from which the pollen was gone. Dr. Trimen informs me that it is found in several parts of Ceylon.

71. ACRIOPSIS, Reinw. dt.

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, spatulate-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 lamellae on the mesial line. Column incurved with 2 styliform horizontal or decurved processes on each side of the stigma, and a cuculate 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 Malay.

In Herb. Calcutta is a fine drawing of what may be a new species from Moulmein, with a large quadrate clawed pseuscent lip; it may be intended for A. javanica.


MALACCA, Griffith, Maingay,—Distrib. Java, Philippines.

Pseudobulbs ⅓–⅝ in., oblong or ovoid. Leaves 4–6 by ⅓–⅞ in., 2-dentate. Scape 6–18 in., simple or branched; pedicels ⅝ in., capillary; sepals ⅜–⅝ in., white with purple tip and central broad or narrow band; petals subsimilar; lip white with a purple band and lamella. Capsule ⅝ 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. lc. t. 1748 (bad); lip oblong subpanduriform tip rounded, lamellae 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 biotched 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, lamellae 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, lamellae 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, racemose 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 ½-3 in. broad. Leaves ½-3 in., many nerved. Peduncle short, decurved; bracts ovate-lanceolate; flowers ½ in. long; dorsal sepal broad, 5-nerved, lateral subacute; petals broadly obovate, acute, 3-nerved; mentum saccate; base of lip broad. Capsule ⅜ in.—The lip resembles that of an Appendicula; I doubt its being articulate and mobile.


CEYLON; Central Province, alt. 3-6000 ft., common.

Habit of P. cultratus, but stems longer, 6-12 in. Rostellum with an involute top, round which the capillary tails of the pollinia are curved, gland minute. In 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 ⅛ 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; WYMBRAD jungles, Drew. TRAVANCORE, Johnson.

Stem 3-5 in., fleshy, ½ in. across the leaves. Leaves ½ 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.

Ceylon; Hantani and Ambagamowa districts, Macroe, Thwaites.

Stems 2-3 in., fleshy. Leaves \( \frac{3}{2} \) in. Peduncle terminal, \( \frac{1}{2} \) in., drooping, few-fld.; bracts ovate, smaller than the yellow flowers; lip red in the middle; lateral sepals obtuse; petal obvate-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. uncinatus, Hook. f. In. Plant. ined.; leaves \( \frac{3}{4} - 1 \) by \( \frac{1}{2} - \frac{3}{4} \) 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 \( \frac{1}{2} \)-amplexicaul, shining, tip minutely mucronately toothed. Peduncle longer than the leaves, erecto-patent, flexuous, with scattered acicular sheaths; raceme terminal, capillary, 1-2-fl.; bracts orbicular; flowers \( \frac{1}{2} \) in. long; dorsal sepal broad, 3-nerved, lateral acuminate; mentum cylindrical; 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 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 \( \frac{1}{2} - \frac{3}{4} \) 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., flexuus, rarely branched. Leaves articulate on the sheaths, 7-9-nerved. Flowers \( \frac{1}{2} \) 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, \( \frac{1}{2} - \frac{3}{4} \) the length of the blade, concave or margined convolute; rostellum narrow; anther lanceolate, acute. Capsule \( \frac{1}{2} \) 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.


Silhet, Wallich. Khasia Hills; at Amwoe, 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 \( \frac{1}{2} \) 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.

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Tenasserim; at Mergui, Helfer, Parish.—Distr. Sumatra, Java, Borneo.

Stems 4-8 in., rigid. Leaves black when dry, opaque, many-nerved. Spike $\frac{1}{2}$-1 in., flexuous, flowering to the base; bracts $\frac{9}{10}$ in., strongly nerved; flowers $\frac{1}{10}$ in. diam.

9. **P. acicularis**, Hook. f. Fl. Plant. ind.; stems densely tufted filiform, leaves $\frac{1}{2}$-$\frac{3}{4}$ in. acicular, spike very short 3-4-fld., lip broadly oblong or ovobate 3-nerved, base cordate with an incurved horn on each side.

Penang, Maingay (Kow Distrib. 1653/2). Perak, Scortechni, &c.

Stems 6-8 in., flexuous, diffuse. Leaves suberect, finely acuminate. Flowers $\frac{1}{2}$ in. long, white; bracts very minute; sepals obverse 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-fld.; each pair of pollinia half enclosed in a calyptriform calicle which is attached by a slender stipule 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-fld.; 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.

† Lip of lip with a large calyx on the disk.


Cachar, Keenan. Tenasserim, Helfer. Singapore, Ridley.—Distr. 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 $\frac{1}{2}$ in. long; sepals obtuse; petals ovobate-oblong, 3-nerved; lip calceolar at the base, that is having a horse-shoe membrane within the border, slightly constricted beyond the middle, calyx on its disk globose or oblong, entire;
arms of column obliquely truncate or 2-lobed. Capsule \( \frac{1}{2} \) in. long, turbidly ellipsoidal.—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:—


†† Lip without a median callus on the disk.


**TENASSERIM, Griffith, Parish. PENANG, Walker, &c. PEAK, Scortechini, &c.**

—**DISTRIA. 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 \( \frac{1}{2} \) 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.


**PENANG, Maingay (Kew Distrib. 1616). Curtis. PEAK, Scortechini, Wray. SINGAPORE, Wallich.**

Stem 6-18 in., unbranched, flattened, \( \frac{1}{2} \) in. broad. Leaves rather distant and membranous; sheaths 1 in. long. Racemes axillary and terminal, 1-1 \( \frac{1}{2} \) in., many-fid.; bracts small, ovate-lanceolate, reflexed; flowers about \( \frac{1}{2} \) in. long, yellow-green; sepals acute; petals elliptic, 1-nerved; claw of lip saccate throughout its length to the foot of the column; column without arms. Capsule \( \frac{1}{2} \) 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. incd.*; leaves 1 by \( \frac{1}{2} \) in. oblong obtusely bidentate, spikes very short incurved few-fid., mentum obscure, foot of column very short, lip ovate-cordate 3-nerved with a semilunar ridge towards the base.

**PEAK, Scortechini.**

Stem (of the only specimen) 7 in., unbranched. Leaves rather membranous,
apiculate between the teeth, sheaths \(\frac{1}{4} - \frac{3}{4}\) in. Spikes \(\frac{3}{4}\) in., 3-4-fld.; bracts sheathing the rachis, erect during flowering, then reflexed, strongly nerved; flowers about \(\frac{1}{4}\) in. long, dotted; sepals ovate, obtuse, 1-nerved, base of lateral gibbous; petals large, obovate, 1-nerved; column unarumed; 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. Jc. Plant. ined.; leaves \(\frac{3}{4}\) by \(\frac{1}{4}\) in. oblong-lanceolate obtuse and minutely obtusely 2-fld., 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 \(\frac{1}{4}\) in. Racemes \(\frac{3}{4}\) in., decurved; rachis slender, flexuous; bracts lanceolate, reflexed after flowering; flowers \(\frac{1}{4}\) in. long; sepals ovate, acute, and elliptic petals 1-nerved; lip saccate at the base; column unarumed.—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 Heyce) plants of both Indian Peninsulas, none can be assumed.

6. A. torta, Blume Bijdr. 308; leaves \(\frac{3}{4}\) 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 sacculate concave terminal lobe. Lind. Gen. & Sp. Orchid. 230; Reichh. f. Xen. Orchid. ii. 117, t. 138.

PERAK, Scortechini.—Distrib. Java, Borneo.

Stem 6-18 in., simple or branched, compressed, \(\frac{3}{4}\) in. broad. Leaves close-set, shining, thin, base rounded; sheaths \(\frac{3}{4}\) in. Bracts of spike membranous, forming a terminal flattened colored crest as broad as the rest of the branch, and ceterminous with it; flowers \(\frac{3}{4}\) in. long, quite sessile; lateral sepals erect, aristately acuminate, midrib very stout; petals oblong-lanceolate, strongly 3-nerved; column unarumed, rostellum slender, deeply 2-fld.—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, Reichh. f. in Serm. Fl. Viti 299; leaves \(\frac{3}{4}-\frac{1}{4}\) by \(\frac{3}{4}\) 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 2-3 in., suberect; bracts oblong-lanceolate, membranous, obtuse, 5-nerved; flowers \(\frac{3}{4}\) in. long; sepals greenish tips purple; petals elliptic, obtuse, 3-nerved; lip concave, yellow and purple; column unarumed; anther short. Capsule \(\frac{3}{4}\) in., slender.

8. A. lancifolia, Hook. f. Jc. Plant. ined.; tall, leaves 3-4 by \(\frac{3}{4}\) 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; racis stout; bracts ½ in., oblong, obtuse, coriaceous, recurved, strongly nerved; flowers ½ 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 created on either side."


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 ½-⅔ in., deflexed, then incurved, coriaceous, subacute, 5-ribbed; flowers ⅔ 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.


PERAK; lower camp in Gunong Batu Pateh, alt. 3400 ft., Wray.

Stem 4-6 in., slender but rigid; internode ½ in. Leaves semi-amplexicaul, pale, opaque, rather waved; tip rounded, obscurely 2-fid. with incumbent teeth; upper base usually reflexed, like an ear. Capsule⅔ in. long; turgie.—A very remarkable species.

A. LONGIFOLIA, Blume Bijdr. 304; Lindl. Gen. & Sp. Orchid. 230? Thwaites Enum. 506. 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 ⅔ in., retuse, mucronate." Can the Ceylon plant be an Agrostophyllum or Phreatica?


A. sp., Griff. Notul. 359; Ic. Plant. Asiat. 335, fig. 1, analysis only, from Afghanistan, cannot (as Lindley in Hook. Kew Journ. vii. 36 observes) be an Appendixa.

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. Scapes 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.


**Pseudobulbs** ½–1⅓ in. diam. **Scape** very slender, curved; spikes ¼–½ in. long; bracts ovate, acuminate; flowers ⅔ in. long; dorsal sepal ovate-lanceolate acute, lateral linear-oblong; lip 3-nerved, with rounded sides from the middle to the base; rostellum 2-fld.—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.


**PERAK, Sotsotuhini.**—**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 ⅔ 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.**

Khasia Mts., Lobb.

_Pseudobulb_ ½ in. diam. _Leaves_ 3½ by 1¼ in., spreading, base contracted. _Spike_ 2 in.; bracts broadly ovate, obtuse; flowers ½ in. long; sepals broad, obtuse; petals ovate-oblong, 1-nerved; lip obscurely 5-nerved, broadest in the middle; rostellum very long, acuminate, entire.


Khasia Mts., alt. 3–4000 ft., Lobb, J. D. H. & T. T._

_Pseudobulbs_ ½–1½ in., depressed-globose. _Leaves_ 2–4 by ¼–3 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. pygmaea_, but a much larger plant, without keel or wing on the sepals.


Khasia Mts. _J._ D. H. & T. T._

Differs from _T. khasiana_ in being very much larger, and in the acute lip. _Pseudobulb_ 2–1½ in. diam., depressed-globose. _Leaf_ sometimes falcate, ¾–1½ in. broad; flowers ½ in. long.

Sect. II. Oxyanthera, Bronn._ (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 1–1½ in. tip rounded, _spike_ equalling or exceeding the leaves, _raceme_ long slender lax-fld.

Peak, on decayed wood, King’s Collector.

_Rootstock_ as thick as the little finger. _Leaves_ few, sheaths 2–2½ by ¼ in., compound, 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, veination 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 obvoid.—Near _T. carinata_, Bl. (of which I have seen no flowers), but the leaves are very much longer, the _spike_ 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, _spike_ 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_ ½–3 in. broad. _Scape_ shorter than the leaves, filiform, flexuus, sheaths 1–2 lanceolate; raceme ½ in.; pedicels ¼ in., longer than the oblong bracts; flowers ½ 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.
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. decursa, and is nearer to the Moluccan O. micrantha, Brong. (in Duperrey Voy. Bot. 198, t. 37 B.) than to T. carinata.

Tribe III. NEOTTIEAE. (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, convivert 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.


Rootstock elongate, very stout, 1-1½ in. diam., tortuous, dark pink; roots very stout simple fibres. Stem 2-3 ft., glabrous, with short ½-amplexicaulis obtuse sheaths below, brown purple. Panicle loosely branched, branches horizontal, and yellow flowers furfuraceousy tomentose; bracts small; perianth subglobose, 1 in. diam.; petals broadly ovate, tip obtuse, crenate; lip nearly hemispheric, margins and short expanded rounded limb erossed fimbriate, glabrous without, almost bearded within. Capsule 5-6 by ½ in., fusiform, subacute, obtusely trigonous, red-brown, tardily dehiscing.


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. 433; Reichb. f. Xen. Orchid. ii. 76, t. 120.

Assam, Masters (Io. in Hort. Calcutt.)—DISTRIB. JAVA.
Stem a span high from branching tubers. Flowers ½ 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 root-stock, with several short tubular basal sheaths and two open ones higher up 3-fl., 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.

Peru; 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 1½ 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 hypocreipiform?; 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.


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 crosely 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 mitriiform. Capsule linear, 3–10 in. long, acuminate, valves membranous.


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.


Sikkim Himalaya (*Io. 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 1–1⅓ in. diam., the lip not nearly as concave as in G. Hydra, yellow with red veins.—A remarkable plant, very unlike its congener, 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 subequall, spreading. Lip with the claw adnate to the column, which is braced 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. Walkeriae, Wight in Wight Cat. 2091; stem very stout, flowers 2 in. long, sepals obovate, petals broadly 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-fl.; 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. Walkeriae.

3. V. Parishii, Reichb. f. Otia Bot. Hamb. 39; flowers 1–1⅓ in. long, sepals linear-oblong, tips dilated cuspidate, petals broadly obovate acuminate, lip trumpet-shaped, epichile small ovate or rounded crispate with a thick belt of long hairs down the centre and a dense brush at the base, side lobes with long scattered hairs within.

Tlenaesserim, 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- or 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-fl.; 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.
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5. **V. albida**, Blume Bijdr. 422, t. 34; Rumph. i. 197, t. 67; leaves ovate lanceolate elliptic or oblong cuspidate or acuminate, lip oblong sub-panduriform 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, Retioch. f. in Bongland. ii. (1854), 88. Vanilla, sp. Griff. Notul. iii. 207; Ed. Plant. Asiat. t. 281. Vanilla, Wall. Cat. 7401.

**Penang, Wallich, Curtis. Pshak, Singapore, and Malacca, Griffith, &c.—Distelb, Java.**

Climbing to 50 ft. Leaves very variable, 3–7 by 1½–4 in., sessile or shortly petiolate. **Spike** 2–3 in., very many- and dense-fld.; bracts ½ in., oblong; flowers waxly white; sepals ½ 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 fo. 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 ob lanceolate-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 Trevandum, 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 panicules. 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-fld.; stigma erect, transverse, succulent; 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.


**Sikkim Himalaya; in tropical ravines, J. D. H. Assam, Griffith, Jenkins, Chittagong, J. D. H. & T. T. Andaman Islands, King’s Collector. Malay Peninsula, Mainay, &c. Malabar; the Nilgiri Hills and Courtallam, Wight. Ceylon; Maturatte, Moon.—Distripl. Java, Sumatra, Borneo.**

Stem ½ 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 ½ in., ovate-lanceolate; flowers greenish white; column long. Capsule, in f. 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 oblancoate, blade of lip orbicular cuspidate.

Perak, Scortechini, King's Collector. Malacca, Maingay (Kow Distr., 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 oblancoate, petals oblancoate 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 ½ in. long.

Perak; on limestone rocks, King's Collector.

Stem 1–2 ft., slender. Leaves 7-nerved, 2–3 in. broad. Panicles few-fl. 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, subacute; 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 lamellae; column short or long; rostellum long; erect, at length 2-fl.; stigma antinous; anther erect, acute or acuminate, cells contiguous; pollinia 2, clavate, 2-cleft, caducous long or short, gland small. Capsule cylindric-oblong.—Species 6–8, Indian, Malay, and Chinese.


Stem 8–12 in. Leaves 3–5 by 2–3 in., base rounded or cordate. Peduncle short; spike 1–2 in.; bracts ½–⅝ 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, midnervé very
Tropidia.]  

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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, candicle long slender, gland minute.—I have examined Lindley's specimen of *T. semitibia*, 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.


**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, cuneate-acuminate, 5-nerved. Spikes ½-2 in., erect or decurved; bracts imbricate, ½ 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 ⅞ in. long.—Bentham in Flora of Hong Kong has referred Schauer's *Psychochilus 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. Wallis'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 lamellae 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 ½ in. long, 1-2-fld.; bracts ½ in., about equaling the ovary; flowers ½ 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 lamellae extending from the base nearly to the acute tip.  

**Malay Peninsula**; on Mount Ophir, Maingay.  

Stem 12-18 in. Leaves 4-6 by 2-1 in., elliptic-lanceolate, acuminate, 5-nerved. Peduncle 1½-2 in., flexuous, sheathed; spike short; bracts very variable, lower 1½ in., upper smaller; flowers ½ 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 furaceous, the sepals are 5-nerved, and the intramarginal lamelle 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 1/2-3 in., narrowly linear-lanceolate, acuminate, 3-5-nerved. Peduncle 1 in., naked; spike 1/2 in.; bracts rather longer than the smooth ovaries; flowers 1 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 1/2-2 1/2 in. elliptic-lanceolate caudate-acuminate 5-nerved, spike terminal sessile 1/2 in. long, bracts crowded lanceolate lower narrower 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 1/2 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 1/2 broad, and small fruit 1/2 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 anticus, prominent; anther erect, 2-celled; pollinia 2, clavate.—Species about 20, Asiatic and American.


Silhet, Wallich. CEYLON; in the Central Province, Macrae, &c.—Distrib. Java.

Stem 1-2 ft., slender, glabrous below. Leaves scattered, 2½-3 in., petioled, obliquely ovate or subcordate, acute, 3-nerved. Scape pubescent; sheaths distant, finely acuminate; spike 2-5 in., villous; sepals 1/2 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.


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. ANECTOCHILUS, 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 S, Indian and Malayan.

*Claw of lip deeply fimbriate.*


**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 ¼ in. long, ovate, subacute, green; petals broadly falcate, white; fimbriae of white lip as long as the claw, spur inflated, tip subacute notched; column with 2 vertical lamellae 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. setacea*.—Var. inornata, Hook. Bot. Mag. t. 5208 is a variety with whole coloured coppery-purple leaves.


**TROPICAL HIMALAYA**; from Simla to Bhotan. ASSAM, SILHEST, and MUNNIPORE.—Distrib. China.

Very near *A. regalis*, and leaves similarly netted with golden nerves, and has a variety (var. B. Lobhiana, Blume i. 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.

**NILGIRI HILLS**; near Walla Ghaut, M’Ivor.

*Leaves* 1½ in. diam., orbicular-ovate, shortly petioled. *Scape* 12 in.; spike 3–4 fld.; bracts ⅔ in., broadly ovate-lanceolate; flowers much larger than in *A. Roxburghii*; lip ⅔ in. long, fimbriae 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.

much shorter than the sepals, terminal lobes obtusely hatchet-shaped, claw of lip very short, fringes few. A. abolineatus, Par. & Reichb. f. in Trans. Linn. Soc. xxx. 141. Dossinia marmorata, Lindl. in Journ. Linn. Soc. i. 185 (not of Morren).


Leaves ovate, green with a white mesial band and golden nerves, red beneath. Spike as in A. Reinsvardtii; sepals and petals green tinged with pink; lip white; column very large with a forciate appendage projecting from the base.

** Claw of lip entire or nearly so.

6. A. Griffithii, Hook. f. Ic. Plant. ined.; claw of lip entire or with a membranous toothed margin and a trapeziform base, terminal lobes hatchet-shaped lobulate or toothed.


Leaves 1¼-1½ in., orbicular-ovate, apiculate. Scape 4-6 in.; spike 10-20-fld.; lobes of lip equaling or longer than the claw; column short with a broad folded appendage in front and a flap over the mouth of the very short sacate 2-fld spur; anther short.—The margin of the claw of the lip is broader and more toothed in the only Naga specimen I have seen.


Munnipore; at Ecurring, 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-ovate, terminal pair smallest; column with broad auricles in front that terminate in a 2-fld membrane overhanging the mouth of the very short conical obtuse spur; anther lanceolate, acuminate.

81. VRYDAGZNEA, Blume.

Terrestrial, leafy herbs; stem below creeping, roots fibrous. Leaves petiolated, 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, Malay 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 stipes 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.


Lower Bengal; Luckemore, on the Megua, Clarke.—Distr. ? Java.

A span high. Leaves 1¼-2 in., ovate to ovate-lanceolate, acute, membranous, shortly petioled. Scape 1-1½ in.; spike few-fld., rachis pubescent; bracts ½ in. and
sheaths membranous; flowers ½ 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. Etetaria 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 ½–2 in. long, ovate or elliptic, subacute. Scrape slender, 1–3 in.; sheaths broadly acuminate, membranous; spike very many-fl.; bracts ½ in. long, exceeding the pale green flowers; sepals ½ 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. 73, 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 Hornh, Scortechini.—Distrib. Sumatra.

Whole plant 3–8 in. high, simple or branched, glabrous. Leaves ½–1 in., petioled, ovate or ovate-cordate, subacute. Scrape very short; spike few-fl.; papillose; sepals ½ 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.


Perak, Scortechini.—Distrib. Java.

Stern a span long, leafy above. Leaves ½–1½ in., petioled, ovate, obtuse or subacute, margins entire or crenulate. Scrape and short raceme puberulous; sheaths lanceolate, acuminate; bracts equalling the ovary; flowers ½ 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, umberonate; 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. Scrape with

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A terrestrial leafy herb; stem stout, erect. Leaves ovate-lanceolate, petiolated, 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 anticos; 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.


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 ½-1 in long. Leaves 2-3 in., membranous, shortly petiolated. Spike 1-2 in., pubescent; bracts ½-⅓ in., ovate-lanceolate; flowers with ovary rather longer, suberect, pale pink; sepals ½ in. long, 5-nerved, and shorter petals obtuse; lip shorter than the sepals, subpanduriform, reflexed from the middle, strongly 5-nerved, disk with 2 flatish 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 lamellae in the spur, which is longitudinally grooved or infolded at the back.

**84. ODONTOCHILUS;** Blume.

Habit and character of *Anactochilus*, but sac or small spur of the lip hidden between the more or less sonnate 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. *Myrmecis*, Blume, is only distinguishable by the fewer often erect flowers and stem with numerous small leaves.

* Stem stout, leafy. Flowers solitary or very few. (*Myrmecis*, Bl.)


**Persia, Soretochini;** on Maxwell's Hill, Wray.

Stem 2-3 in., from a nodose procumbent base. Leaves ¾ in., shortly petiolated. 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 cali small; limb shortly exerted; column very short, frontal appendage erect lanceolate; rostellar arms very long, slender; anther linear-lanceolate; pollinia clavate, united cumbides long slender, gland elongate.—Resembles *Myrmecis glabra*, Blume of Java, but the narrower flowers, long anther, pollen and rostellar arms at once distinguish it.
2. **O. calcaratus**, Hook. f. *Jc. 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 cylindrical or incurved spur.

**Perak, Scortechini**; alt. 3900 ft., Wray.

Stem 3–5 in., slender, flexuous, leafy. *Leaves* $\frac{1}{2}$–$\frac{1}{2}$ in., sessile or petiolated, 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 $\frac{1}{2}$ in. long, spur half as long as the sepals, with a columnar caruncle enclosed, tip straight or incurved; column short; rostellum 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 *Myrmecis* with the claw of lip of *Odontochilus*.


**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 subglobe, $\frac{1}{2}$ 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.

**S**

**Stem elongate. Leaves 1 in. or more long. Spikes few- or many-fl.,**

(ODONTOCHILUS, Bl.).


**Sikkim Himalaya**, alt. 5–6000 ft., Jc. Cathcart, Clarke. **Khasia Hills**; at Surureem, alt. 5000 ft., Clarke.

Stem slender, elongate below the 2–4 leaves. *Leaves* $\frac{1}{2}$ in., petiole $\frac{1}{2}$–1 in. *Spike* 4–8-fl., rachis and ovate-lanceolate bracts pubescent; lateral sepals $\frac{1}{2}$ in. long, dorsal much smaller; petals dimidiate-ovate, falcate, acuminate; claw of lip exceeding the sepals, slender; 2-winged limb $\frac{1}{2}$ in. diam., white; sac minute, didymous, enclosed caruncle large; column and rostellum 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. *Jc. Plant. ined.*; stem leafy, leaves ovate acute, spike few-fl., laxly villous, bracts as long as the ovary, claw of lip pectinate, limb lanceolate or broadly 2-winged, sac globose, rostellum arms long.

**Perak, alt. 3–4000 ft., King’s Collector; Maxwell’s Hill, Wray.**

Stem 6–12 in. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ in., light green, thick, fleshy, petiole $\frac{1}{2}$–$\frac{1}{2}$ in. *Spike*...

**Perak**; on Gunung 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 ½ 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; rostellars 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 caudicles are a good deal like those of *O. crispus*.


**Sikkim Himalaya**, alt. 4-6000 ft., Clarke, *King*. **Khasia Hills**; on Shillong, alt. 6100 ft., Clarke. *MunniFires*; 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, connate very thick; pollinia broadly clavate, grains flat, caudicles 0, gland linear.—This and *O. grandiflorus* have lamellate ecaudicate 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 equaling 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. *Anastochilus* 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 3 in., pink, slightly pubescent; lateral sepals ½ in., falcate 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 ½-⅔ 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.

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-fl.; bracts ½ in., pink, pubescent; lateral sepals ½ in., broadly ovate-oblong, pink, 1-nerved, dorsal and petals coherent in a small deeply cordate pink cuneipetalous 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-fl.; 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. Ancocthicilus lanceolatus, Lindl. Gen. & Sp. Orchid. 499; in Journ. Linn. Soc. i. 179. A. luteus, Lindl. in Journ. Linn. Soc. i. c.

**Sikkim Himalaya**, alt. 5–6000 ft., Griffith’s Collectors (Kew Distrib. 5345, 5354), &c. Khasia Mts. Mack, Griffith (Kew Distrib. 5352), &c.

Stems with the spike 6–8 in., few or many-leaved. Leaves green. Spike 2–3 in.; bracts ½–1 in., usually broader and whiter than in other species, nearly glabrous; lateral sepals ½ 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 ¼ in. diam.; column very short indeed, frontal appendages obscure; rostellum broad, 2-cuspitate; 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 *A. luteus* from his *lanceolatus*. According to native drawings *A. luteus* should have much the largest flowers.

85. **HAEAMARIA**, Lindl.

Terrestrial herbs; caudex creeping. Leaves petioled. Flowers racem. 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, sub-horizontal, cells distinct; pollinia 2, clavate, sulcate, granular, attached by a fleshy gland to the forked rostellum.—Species 4, Malayan and Chinese.


**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, colored; perianth ½-⅔ in. diam.; petals pinkish, broadly ovate, apiculate, 1-nerved, nerve with flexuous nerves; sepals linear, 1-nerved; lip longer than the sepals, recurved; see 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 Aneactochilus; it may or may not be his var. Dawsonianus, Gard. Chron. 1872, p. 321 (Aneactochilus 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 Aneactochilus brevilabris (see p. 85).

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 connate 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 anticus, 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.


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 Nigbris.—DISTRIB. Afghanistan, 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 ½-⅔ 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


Western Himalaya; at Lohoo Ghat, Thomson (Fl. May).—Distrib. Afghanistan, Caucus to the Atlantic.

Root of 2 fleshy fusiform or subcylindric tubers \( \frac{1}{2} - 1 \frac{1}{2} \) in. long. Leaves 1-1\( \frac{1}{2} \) 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 Caucus and Afghanistan. Boissier errs in describing the tubers as napiform. In Europe it flowers in October to December; in India and Afghanistan 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. l. 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.


**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 \( \frac{1}{2} - \frac{3}{4} \) in., sheathing, membranous, as long as the erect pedicels; flowers \( \frac{1}{2} \) 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 \( \frac{1}{4} \) 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, racemose. 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.


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 \( \frac{1}{2} \) in.; flowers \( \frac{1}{4} \) in. long, greenish; sepals ovate; petals linear; lip twice as long as the sepals, very narrow, 2-fld. Capsule \( \frac{1}{2} \) in. long, globose-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., pubescent; bracts ovate, acute, membranous; pedicels short; flowers \( \frac{1}{4} \) in long; 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 deciduous, \( \frac{1}{2} \) 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 sub-radical 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 \( \frac{1}{2} \) in. pedicels; flowers very minute, \( \frac{1}{2} \) 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, racemoid. 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, caducile short, gland oblong.—Species about 8, Indian and Malayan.
* Appendages of column as long as the rostellum.


**Khasia Hills**, alt. 4–5000 ft., Wallich, &c.

***Stem*** 3–5 in., prostrate below, often moniliform from the swollen internodes. Leaves ½–1 in., scattered, acute acuminate or aristate; petiole short. *Scape* 1–3 in.; sheaths and bracts oblong-lanceolate, ciliate; flowers inclined, ½ in. long; sepals pink, obtuse; petals spathulate; lip white, base shortly saccate, nerves with a few fleshy setae 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 pusillus*, and was confounded with it by Lindley.


**Tnaassseirim**; on Zwaksabin, 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.


***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 setae within; claw short. *Capsule* ½ in., pedicelled, pyriform.


**Ceylon**; Ambaganowa district rare, *Thwaites*.

A span high. Leaves 2–3 about the middle of the slender stem, ½–1½ in., ovate-lanceolate, acuminate. *Scape* slender, puberulous; raceme 8–10-fld.; bracts as long as the short pedicels; sepals ½ in. long, glabrous, pink; petals oblong-ovate, obtuse, white; lip with a subacute 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 Jc. v. 16; scape glandular-pubescent, flowers subcoorymbose, limb of lip suborbicular deeply 2-cleft, lobes sub 5-fld,

Bhotan Himalaya, Griffith. Tenasserim, Parish. The Concæn, 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 – iii. 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-fl.; perianth ½ 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, spicata. 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 candelie.—Species about 20, tropical Asia and Africa.

I refer to Zeuxine those species of Heteraria 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.


Throughout India, in the plains and lower hills, from the Punjab and Scinde to Assam, Chittagong, and southward to Ceylon. - Distrib. Afghanistan, Java, China, Philippines.

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.


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 equaling the glabrous ovary; sepals ½ in. long, dorsal ovate, acute, lateral lanceolate 1-nerved; petals falcate, very obtuse; lip wholly included, coriaceous, with 2 short spurs within; rostellars 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.

Pekah, 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 ½ in., lanceolate, hyaline; sepals ½ in. long, membranous, ovate, obtuse, 3-nerved; petals ½ 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,

ASSAM, LOWER BENGAL and CHITTAGONG, Clarke. WESTERN GHATS; in the S. Concan, Stocks, and Travancoro, 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 ½ in. long, broad, obtuse, green; lip twice as long, sac with 2 spurs within, wings toothed on the outer margin, variable in breadth; anther heaped; 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 ½ in. long, very obtuse; lip with a short saccate base; anther broadly ovate, beaked; pollinia clavate, pendulous from the small oblong gland, appendages 0.


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 1-5 in., lax or dense-fld.; bracts equalling the ovary; sepals ½ in. or less, green or purplish; anther didymous, apiculate; pollinia and their appendages as in Z. reini-formis.—The Ceylon habitat cited by Thwaites is an error.

7. Z. flavum, 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. Etaria flavum, 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 ½ 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

Sikkim Himalaya; in the Terai, Gamble. Khasia Hills, alt. 5000 ft., Griffith, &c. Burma; at Taong Dong, Wall. Tenasserim; at Moulmein, Lobb, Parish, Penang, Mainagay.

Very like Z. flavo, but the flowers are much larger, and much more numerous, the sepals ½ in. long, and the pollinia are pyriform, attached by an elastic candelie to the oblong gland.


Nepal, Wall. Khasia Hills, alt. 4-5000 ft., J. D. H. & T. T.

Whole plant 1 ft. Leaves 2½ in., many nerved; petiole ½ 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-fld.; anther ovate, obtuse; pollinia elongate, clavate, lamel late 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. Eteria 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-ceiled 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-fld; 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 transzeiform sides two caruncles within towards the base and a flattened uncinate one on the midrib, claw beyond the lobe narrow rigid, wings flabellate lacerate. Heteria 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 in., many-nerved, midrib stout; petiole 1-1½ in.; sheaths short. Spike 7 in.; flowers very obliquely gibbous, not secund; bracts ovate-lanceolate; ovary

Zeuxine.] cxlviii. Orchideae. (J. D. Hooker.) 109
25 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, con- nivent. Sepals acuminate, dorsal with the petals forming a hood; lateral very broadly ovate, concave. Petals falcate or subpathulate. 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.


**SINGAPORE, Wallisich. MALACCA, Griffith (Kew Distrib. 5337). PERAK, Scor-techini.—DISTRII. 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 ½ in., equalling the flowers; sepals 3-nerved; petals falcately lanceolate, acute.


**PERAK, Scor-techini.—DISTRII. 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 dimidately 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 subscaccate, 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.


**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 pubes-cent; bracts equaling the subglobose whitish fragrant flowers, which are 1 in. diam.; sepals broadly ovate, obtuse, 1-nerved; petals spathulate; lip not longer than the column; pollinia broadly pyriform, sessile on the gland. *Capsule* 3 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 setae, column long slender, anther lanceolate, pollinia powdery narrow-ed into one slender caudicle.


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 ½ 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; rostellum 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.


**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 equaling the greenish-red flowers, lower sometimes elongate; sepals ½-1 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 setae.


Temperate Himalaya, alt. 8–11,000 ft., from Simla eastwards to Sikkim.—Distr. 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 ½ in., ovate, acuminate, 1-nerved, dorsal narrow; petals linear, falcate; rostellum 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 second pubescent, bracts exceeding the flowers, lip deeply saccate with a decurved beak strongly ridged within, column very short, another very small stipitate didymous. Ætherea fusca, Lindl. in Journ. Linn. Soc. i. 184. Cystorchis fusca, Benth. in Gen. Plant. iii. 599.

Subalpine Himalaya; Harung, Munro; Garwal, 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, 1–½ in., subacute, coriaceous; petiole very short and broad. Spike very many- and dense-fld.; sepals ½ 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; another 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 second 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, another acuminated.

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 in., thick, acute, nerveless, not reticulate, narrowed into the broad petiole. Spike 3 in. long; flowers completely seconded; sepals ½ 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, ¾ in. long.


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 nervet, 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, Sourettechina.

Whole plant 8–10 in. high; stem slender, with 2–3 distant lanceolate sheaths.
Goodyera.]

Leaves 1-1½ in., obtuse or apiculate, nerves obscure, not reticulate, margins minutely crenulate. Spike ½-1 in., few-fl., twisted; flowers crowded; sepals ½ 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; rostellum 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 crenulate.

†† Lip within setose and tubercled.


**Sikkim Himalaya**, alt. 5-6000 ft., J. D. H., &c. **Assam**, the **Khasia and Nagas** hills, ascending to 5000 ft., common. **Burma**, Griffith. **Pekak**, alt. 7000 ft., Wray.

Stem 6-12 in., rather slender. Leaves 1½-2½ in., oblique, acute, green, 3-5-nerved, not reticulate; petiole ½-½ in., sheath short. Spike 2-3 in.; bracts ½-½ 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 cælicides.—Distinguished from all other species of this section by the elongate and leafy stem, except **G. vittata**, which has a glabrous spike.


**Khasia Hills**, alt. 4-5000 ft. Griffith, &c. **Munnipore**, alt. 9000 ft., Watt.—**Distrib.** China (Herb. Lindl.).

Stem strict, with spike 6-10 in., submentosely glandular above. Leaves 1½-2 in., rarely elliptic, acute, petiole ½-½ in. Spike 2-3 in.; flowers all secund, pubescent, white; sepals 1-nerved, lateral 4½ in. long, ovate, acute, dorsal much narrower; petals subinfundibulate, crenate on the outer edge, 1-nerved; lip setose on the 5-7 nerves within.


**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 ½ in. long, and the petals are clawed, gibbously spatulate 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 VOL. VI.

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.


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 *secundiflora*. It is nearer *G. secundiflora*.

—Whole plant only 5 in. high. *Leaves 2 in., whole-coloured, not reticulate; spike twisted; flowers white; sepala 1-nerved, lateral ½ 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.


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 ½ in. long, 3-nerved, subequal, ovate-lanceolate, obtuse; petals dimidiate-ovate, 2-8-nerved; column stout, with projecting cheeks; rostellary 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 setae within the lip are clavellate.


Temperate Western Himalaya, alt. 4-6000 ft. Nepal, Wallach; Garwhal, Edgeworth; Sinal, 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.; sepala 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, rostellary arms and anther very long and slender. Capsule nearly 1 in. long.

94. **HETHERIA**, Blume. (*Eteria*).

*Eteria*, *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.


**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; staminal 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.


**Sikkim Himalaya**, alt. 1500—3000 ft., J. D. H., Clarke. **Assam, Munn. Upper Burma, Griffith** (Kew Distrib., 5341 and 5342).

Rather stout, 10-18 in. high. Leaves 4-5 by 1½—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; staminal arms minute, pollinia pyriform, sessile on the gland; stigmatic lobes large, staminal 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 ½ in. long, subequal, ovate-oblong, obtuse, hairy, 1-nerved; lip small; column short with 2 membranous wings in front, and very short staminal arms; staminal ovate-cordate.

**MALAY PENINSULA, Herb. Finlayson.**

* Stem with scape and racemes 18 in., lower half leafy. *Leaves* 2–3 in., membranous, lower obtuse; petiole ½–⅔ in., slender; lower sheaths hyaline, inflated. *Scape* with distant lanceolate sheaths; raceme 4 in.; bracts ¼ in., lanceolate; sepals ½ 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; rostellars arms subulate; anther ovate-cordate; pollinia subglobose, caudicles as long slender, gland rather large, oblong.

6. **H. clata**, Hook. *f. in Plant ined.;* spike dense-fld., flowers minute, lip minute acuminate, base within with 2 large callics on each side and with a thickened incurved transverse fold towards the apex which is tipped with a small obicular membranous appendage, column very short, another obtuse.

**PERAK, Saretechina;* 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 ⅛ in. long is difficult to make out, it is no larger than the column.

**DOUBTFUL SPECIES.**


**UPPER ASSAM** in the Tingree Tea forests, Griffith. A foot and a half high. *Leaves* petioled, 5-nerved. *Buds* posticus; 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 anticus 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, graps elongate scale-like.—Description from Griffith, who adds a notice of deformities of the column, the stigma being posticus, i.e. facing the anther, &c.

95. **APHYLLORCHIS**, Blume.

Terrestrial leafless herbs, caudex tuberos (or of fascicled fibres?); stem simple, sheathed. *Flowers* small, racemose 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 Linnae, 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. Apatura montana, Thuwaites Enum. 301 (not of Lindl.).

? Khasia Mts., alt. 3500 ft., and Sikkim Himalaya, Griffith. Ceylon; Ambagamowa district, rare, Thuwaites.

Stem 2 ft., with 8–10 loose stout basal sheaths, and a few distant higher up; yellowish tinged with purple. Racemes 4–8 in., lax-fld.; bracts 1½ in., lanceolate, acuminate; pedicel with ovary ½–1 in.; sepals 1½ in., and petals straw-coloured, backs and tips purple; lip broader than the sepals, base contracted into the sub-saccate short claw, nerves with diverging nerves; column very slender.—I find no sufficient character whereby to separate the Sikkim and Khasia specimens, but these latter are quite insufficient for identification.


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.


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 ½ 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 germ, 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.

Pahak, 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 ¼–½ 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 (Jc. Scortechini) pyriform (in Jc. Blume, reniform).

96. CRYPTOSTYLIS, Br.

Terrestrial herbs; caudex short, stout. Leaves basal, long petioled; membranous. Scape leafless. Flowers loosely racemose or subscapate. 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 acuminata; pollinia
pyriform, free, or fixed to the rostellum.—Species 7, Indian, Malayan, and Australian.


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. Scapo 8-18, slender; sheaths acuminate. Raceme 4-5 in.; bracts convolute, acuminate, equaling the ovary; pedicel with ovary decurved; sepals ½-¼ in., greenish, acuminate, margins revolute; petals rather shorter, reflexed; lip as long as the petals, acuminate, purple, mottled. Capsule ¾ 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 Khastic.

97. **Corysanthes**, Br.

Very small, terrestrial, 1-leaved, 1-fld. herbs. Leaf suborbicular. Flowers large, red-purple. Dorsal sepal falcate; laterals and petals subform, 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.


Perak; near the top of Tambak Batak, Scortechni.—Distr. Java.

Stem 1-2 in., base scaly. Leaf terminal, ovate, deeply cordate, acuminate, margins waved. Flower sessile, bracts ½ 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-fld 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, Scortechni.—Distr. Java.

Stem 4-2 in. Leaf ½-3 in., ovate-cordate, margin not waved. Flower sessile; bracts ½ in., subulate-lanceolate; claw of dorsal sepal ½ in., blade spatulate, 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.


Terrestrial tuberous 1-leaved herbs, leafing after flowering. Leaf very
broadly cordate or orbicular, strongly plicate. Flowers solitary, few, or many, racemose, 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 subditipitate; 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.


   Lower Bengal, the CONGAN & MYDORI, 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 ob lanceolate, acuminate, greenish; lip embracing the column, sides convoluted, 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, Jordan.

   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 narrowly ob lanceolate, 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 oblong 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. Ind. &c. Epipactis Juliana, Roxb. Fl. Ind. iii. 455.

   Assam (Ic. in Herb. Caloutt.). Silhet, Clarke. Lower Bengal, Roxburgh, Clarke. CEYLON; in the Doombea 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 ob lanceolate, 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 glibbously clavate.


**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 ½ 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 *celutina*, but very distinct in the rather broader sepals, and shape of the remarkable lip which exceeds the sepals.


**Tenasserim;** at Moulinein, 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 ½ in., narrowly oblancoolate, green; lip equaling 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-ordate acuminate glabrous, margin waved, sepals and connivent petals spatulately oblancoolate acute, lip saccate at the base, hypochile narrow much longer than the orbicular 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 9–12 in., stout; bracts ½–¾ in., reflexed; sepals and petals 1 in. long, conniving, concave, pink; lip greenish-white or yellowish, as long as the sepals.


**Sikkim Himalaya;** at Darjeeling (*em Reichb.*). *Chittagong;* at Sectakoon (Ic. in *Herb. Calcutt.*). *Burma, Griffith.*

Leaf 6 in. diam., abruptly acuminate, green, margin subundulate; petiole 12 in., very stout. Flowering stem dark brown, with raceme 18 in.; bracts ¼ in., reflexed; flowers horizontal, almost gigantea 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.*

**PLAINS OF INDIA**; from Rohilcund to Lower Bengal, and the **DECCAN PENINSULA**. Pegu, Kurs.

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*.


**TROPICAL HIMALAYA**; from Garwhal, alt. 4–5000 ft., Falconer, &c., eastwards. ? TENASSEM, Parish.—**DISTRI.** Marianne Islands, Timor.

Leaf 4–10 in. diam., cuspidate, margin waved; petiole 4–8 in. Flowering stem stout, 6–12 in.; raceme lax-fl.; flowers pale green; sepals ½ in. long, linear-lanceolate, acute; petals rather narrower, obtuse; lip shorter than the sepals, like that of *P. carinata*, but white, and glabrous.—Differes 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-fl., flower 1 in. long, sepals linear-lanceolate acuminate pale purplish-brown, petals narrower, lip white 3-lobed, side lobes rounded-oblong denticulate, midlobe ovate 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.


(LEUCORCHIS, Blume.)

Slender (parasitic?) leafless, tuberous herbs. Scape simple, flexuous; flowers few, small, racemcd; pedicels greatly elongate in fruit. Sepals dorsal and petals connate forming a 3-fl. upper lip, lateral connate into an entire or 2-fl. 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 callus. 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.

LOWER BENGAL; from the foot of the Sikkim Himalaya to Calcutta. Kurz; in bamboo jungles, Jordan. Perax, Scortechini, Wray.

Root branching and tuberous; stem 4–6 in., sheaths loose. Racemes terminal, 4–8 in.; bracts broadly ovate; flowers shortly pedicelled, dull yellow-white, perianth ½ 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 alabatic, transversely or obliquely oblong, membranous, with 3-median nerves between which the disk is papillose. Capsule 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 cucundate, free.—Species 7, Asiatic, Malayan and Australasian.


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 ft., usually very stout; sheaths short, loose, truncate. Raceme loosely many-fl.; bracts oblong, acute, variable in size; flowers suberect, pedicels short; ovary turgid; perianth ½–¾ in. long, ventricose, base gibbose, lobes very short obtuse, sepaline rather longer than the petaline; lip longer still, sessile, ovate, obtuse, recurved. Capsule ½ 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.—DISTR. 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 Chumki 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.

Ceylon; near Ratnapoors, &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.

**Perae**, Jo. Scortechini.—**Distr. Java.**

Without specimen either of Blume’s or Scortechini’s plants identification is impossible.

5. **G. exilis**, Hook. f. Jo. 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** ½–⅔ in., oblong; stem 6–12 in., filiform. **Racemes** few and lax-fld.; braacts ovate; flowers (with ovary) ½–⅔ 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, midlobe triangular, side lobes erect; stigma concave, transverse; anther long-beaked, 2-celled; pollinia 4, pulpy, sectile, attached in pairs to a viscid gland.


**Munnipoiæ**; crest of Bareil range (S. W. of Japoo), alt. about 7000 ft., and on Kohima, Prin.—**Distr. Japan.**

Brownish-white, glabrous. **Rootstock** stout, branched. **Stern** 3–6 in., tortuous in the Munnipore plant, erect in the Japanese, as thick as a goose-quill; sheaths ½ in., shortly rounded; raceme short, 4–6 ftd.; braacts like the sheaths; pedicel with ovary 1–1½ in.; sepals ⅔ 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.


Terrestrial leafless brownish herbs; root tuberous or corallloid; stem erect, sheathed. Flowers laxly racemted. **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 papillae. **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.


**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 turbid; sepals 3–½ 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.


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, 3–½ in. long; lip entire, disk with 2 or 3 glandular ridges.


Terrestrial herbs, leafless and tuberous rooted, or with leafy stem and fibrous roots. **Leaves** sessile, plicate. **Flowers** suberect, spiked or racemted. **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 anticus; anther erect; pollinia 2, 2-partite. **Capsule** erect. —Species about 10, north temperate regions.

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 obtuse, acute or obtuse, upper linear. Raceme laxly 6—20-fl., glabrous; bracts ovate, acute; flowers ½—2 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 Linn. 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 papillae between the posticus laciniae.—Sikkim, T. Thomson, 1857. C. cucullata, Boiss. Held. differs in the shorter hypochile with short quite entire lacinia, in the median nerves of the epichile keeled to the lip, in the keels not lamelliform, and in the conico-cylindric spur being threec 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 anticons; rostellum broad, prominent; anther erect, obtuse, cells contiguous; pollinia 2, 2-paritite, 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.


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—¾ in. diam, in those crowded bractate racemes, green variegated with yellow white or purple. Column very short.

Var. herbacea; smaller, leaves elliptic acute, raceme dense-fl., flowers ½ in. diam, glabrous pale greenish white. E. herbacea, Lindl. in Boyle 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 in 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 a starved state of E. latifolia, with which it grew.


Western Temperate Himalaya; from Peshawur and Kasmir 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 Dou's E. consimilis to E. latifolia. A drawing by Jerdon of a plant grown on limestone rocks, overhanging water at Sangor in Malwah closely resembles this.


Temperate Himalaya; from Kashmir, alt. 7000 ft. to Sikkim, alt. 8-12,000 ft.—Distrib. Samarcan? N. America.

Stem 1-2 ft. Leaves from lanceolate to orbicular, 4-7 by 1-1½ in., margins eciliate. 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 Cep. Royleana, and gives Samarcan as a locality.

Tribe IV. Ophrydæ. (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 scipate. 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 pollina. 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-fl., bracts green
acuminate usually much exceeding the flowers, lateral sepals ovate reflexed,
lip oblong or rhomboid crenate entire or very obtusely 3-lobed sides de-
flexed, spur stout equalling or shorter than the ovary pendulous. Bois.
Fl. Orient. v. 71; Reichb. R. Fl. Germ. xiii. t. 50. O. latifolia, 3 indica,
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 ½ 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 speci-
mens 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 dis-
posed 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-fl. spike, and bracts
equaling 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. Gymna-
deria 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. K., &c.

Very variable in height and stoutness, 3-18 in., flexuous. Tubers oblong,
etire. Leaves 1-3, rarely more, 3-6 by ½-½ in., almost filiform in very alpine
forms. Spike 2-4 in., 2-many-fl.; bracts ½-½ in., lanceolate, acuminate; flowers
½-½ 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
retruse; spur thin-walled, slightly incurved, tip sometimes clave; anther-cells
parallel.

3. O. spathulata, Reichb. f. mes.; leaf solitary radical elliptic,
spike few-fl., bracts much larger than the flower, sheaths leafy, sepals
subequal lateral suberect, lip obvate not longer than the sepals entire or
obscurely 3-lobed, spur shorter than the ovary stout. Hook. f. Tc. Plant. ind.
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. Stracheyi, 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.


ALPINE HIMALAYA and WESTERN TIBET, alt. 10-13,000 ft., from Kashmir to Sikkim.—DISTIB. 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, ½ 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-fl., bracts equalling the ovary or shorter, flowers decurved, petals linear very narrow 1-nerved, lip linear equalling the sepals in length or longer narrower 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. 48; Royce 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.—District. 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, ½-1 in. diam., green; sepals oblong, obtuse; petals membranous, acute; lip from aa 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 ½ in., erect, oblong, turgid.—Has in Sikkim an extraordinary range in altitude.


Alpine and Sub-Alpine Himalaya, alt. 7-12,000 ft., from Garwal 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. Spike naked; spike 2-5 in., lax or dense fl.; lower bracts ½ in. or less, lanceolate; ovary ½-⅓ in., shortly beaked; sepals ⅓ 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 ½ 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, 5-13 in. high. Leaves 3-5 by ¾-1 in., obtuse acute or acuminate. Spike 1-4 in.; flowers ½ 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 ¼ in., turgid, curved, almost beaked; perianth ¼ 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; another 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.


**Alpine Himalaya**; Nepal, Wallich; Sikkim, alt. 11-16,000 ft., J. D. H. *Distrib.* Alentian Islds.

*Stem* 6–18 in., leafy towards the base or upwards. *Leaves* 3–6 by ¼–¾ in. *Scape* rather stout, naked above; spike 2–4 in.; ovary short, gibbous, longer than the ovate bracts; flowers ½–¼ in. diam.; dorsal sepal orbicular, lateral broadly oblong; petals ovate, equaling 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* ½ in. erect, twisted.


**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, ¼–¾ in. broad. *Scape* rather stout; bracts very small; flowers minute, 1/8 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 ½ in. diam.; sepal 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.


**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 ½ in. diam.; dorsal sepal oblong or broadly ovate, lateral ovate obtuse spreading; petals as long as the sepals, oblong, thick; lip flat, with a concave base, variable in breadth, slightly saccate beneath; anther-cells parallel, pollinia subglobose, candelae short, glands large, shining coraceous 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 racemose. **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; candelae 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 400, 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. Plunt.) 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 Ophrydeae and Vandee.
The structure of the stigma has been compendiously described by Bentham in the Journal of the Linnaeæan 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 styloform processes, attached either to the anther or base of the column, as in Diphylææ and Dithrisia.

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 Ophryææ.

**KEY TO THE SECTIONS.**

A. Lateral sepals spreading deflexed or reflexed.

In some small-flowered species of Sect. V. Peristylius, 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. *Trimerglossa.* Petals entire. *Lip* 3-partite, side lobes very narrow, entire, usually filiform (lip entire in *Peloria* forms of *H. Manderseii* and *reniformis*). (Sp. 35-66.)


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. *Peristylius.* 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, claved, 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.)


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.


PREU; at Rangoon, Wallach. TENASSERIM, at Moulemein, 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 ½ 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.


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* ½ in. long, linear-oblong.


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 setaceous acuminate. *Racemes* elongate, lax-fld.; flowers subsecund, ¼ 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, trisegular.
** 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 equaling 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, 1½ 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 equaling the ovary; anther-cells narrow, parallel, tubes nearly as long as the cells; caducies of pollinia slender, glands small; stigmatic processes elongate, clavate; rostellum large, triangular, erect. **Capsule** 1½ 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.


Travancore; on the Anamalay 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 laciniae, side lobes of lip palmately multifid, midlobe linear 3-fld, 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 1½ in., very slender; sepals ¾ in. long; laciniae 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 equaling the ovary. **Dalz. & Gibbs. Bomo.**


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 ½–⅔ in. broad, green; segments of petals variable in length, sinus between the segments narrow or rounded; midstipe of lip shorter or longer than the side lobes; spur subulate, sometimes inflated, with an erect ligule at the mouth; anther-cells parallel, tubes short upcurved; glands of pollinia minute; stigmatic processes clavate; rostellum short erect, triangular. Capsule shortly pedicelled, ⅛ in., fusiform, ribs thick.


Stem slender, 12–18 in. Leaves 1–2 in. Raceme 3–5 in.; bracts as long as the beaked ovary or longer; flowers ½–⅔ in. diam.; dorsal sepul 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. In. Plant. ined.; very stout, leafy, leaves linear-oblong, raceme few-st., 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 Kyeswnr and at Kandalla, Gibson.

Stem 8–12 in. Leaves 4–6 in., base sheathing. Raceme short, 6–8-st.; bracts 1–1⅓ 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-st., 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 sepal, 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, and naked below, and with only sheaths for the upper half. Leaves 3—6 in., base contracted. Raceme 3—4 in., very dense-fld.; pedicles filiform; bracts ½—1 in., lanceolate; flowers ½ in. diam.; sepals 3-nerved; lip not longer than the sepals, spur equaling the ovary, tip clavate; anther-cells divaricate below, tubes as long as the cells; pollinia narrow, glands minute; stigmatic processes clavate, 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—¾, ovary with pedicel ½—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.


The Concan; on the Ghats at Belgaum, Mahabaleshwar, &c., Heyne, &c.  

Leaf 1—2 in. Scapes 3—6 in., naked or with 1—2 sheaths, 2— or more-fl.; 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. raridiflora**, 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
Habenaria.]  OXVIII. ORCHIDEE. (J. D. Hooker.) 137


The Decan Peninsula; on the Ghats, ascending to 6000 ft., from Canara to Travancore.

Leaves very variable, in small specimens 2-3 by 4-5 in. and linear, in others 3-4 by 1 in. and elliptic-oblong, in some cauline 3-5 by 6-7 in., or ovate complicate and recurved. Spike 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 sepals 6-7 in. broad, lateral 5-nerved; upper segment of petals 3-4-nerved; spur 1-3 in., upcurved; anther large, spicate, cells parallel, tubes short upcurved, glands of pollinia orbicular; stigmatic processes clavate; rostellum erect slender.—In Dalzell's H. uniflora the segments of the petals are described as subequal.

Sect. II. Plantaglossa. (See p. 132.)

* Side lobes of the lip lacerate to the middle or inner margin, midlobe linear.


Tropical Himalaya, from Garwhal eastwards; the Khasia, Naga and Munnipore Hills, Burma and the Decan Peninsula to Travancore.—Distrib. China, Malay Islands.

Spike 2-4 ft.; tubers 3-4 in. long. Leaves 2-6 in., imbricating up to the flowers, upper eucumulate. Raceme 8-15 ft.; 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 caudicles; stigmatic surfaces obsolete; 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.


Temperate Himalaya, from Simla, alt. 5-8000 ft., eastwards, ascending to 9000 ft. in Sikkim. Khasia Hills.

Spike 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 1-2 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 ½ 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 sepalas gibbously dilated on the outer (lower) margin, spur rather longer than the ovary. H. pectinata, Lindl. Gen. & Sp. Orchid. 341; Wall. Cat. 7029 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 sepalas, spur twice as long as the ovary. Lindl. Gen. & Sp. Orchid. 322; Wall. Cat. 7030; Reichh. J. 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-fl.; bracts broad, equalling the ovary; flowers 2 in. diam., white or greenish; lateral sepalas 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-fl., bracts shorter than the long-decurred narrow ovary, lateral sepalas ovate-oblong or -lanceolate acuminate puberulous, petals linear falcate acuminate, lip longer than the sepalas, side lobes capillaceo-multifid, spur longer than the ovary.

Burma, at Taongdong, Wallich; Moulinein, Parish; Attran, Brandis (in Herb. Calcutt.).

Stem 8–18 in. Leaves few, 3–6 in., 5–7-nerved. Raceme 4–10-fl.; ovary 1 in., sessile; lateral sepalas 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 candsicles, 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 sepalas.

Habenaria.] OXLVIII. ORCHIDÆ. (J. D. Hooker.) 139


Stem 1–2 ft., stout. Leaves 2–6 in., sessile, oblong-lanceolate. Spike 4–20-fl.; bracts as long as the ovary; flowers ½–1 in. long, white; lateral sepals ½ in.; lip often ¼ in. broad; spur subclavate below the knee; anther-cells broad, divaricate, tubes elongate, upcurved, glands of pollinia small; stigmatic processes, clavate, incurved, margined at 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-fl., sepal ovate acuminate glabrous, petals gibbously triangular subacute, lip cuneate strongly nervèd, side lobes narrow deeply toothed, spur stout twice as long as the beaked ovary.

Nilgiri and Travancone 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-fl.; bracts large, lanceolate, shorter than the curved ovaries, which are ½ in. long; flowers obscurely puberulous, about ½ 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. 322; stem short stout closely sheathed above, leaves short broad, spike dense-fl., lateral sepals obliquely ovate and shorter broad gibbous petals and lip scurfily pubescent within, lip cuneately obvolute, side lobes fimbriate, spur shorter than the beaked ovary. Wight Ic. t. 1711.

Nilgiri and Travancone Hills, alt. 7–8000 ft., Wight.

Habit and foliage of H. Richardiana, but stouter, stem more densely sheathed, and flowers smaller, crowded in a cylindrical 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-fl., 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.

Nilgiri Hills, Wight, &c.

Stem 8–10 in., leafy to the top; tubes large. Leaves 2–3 in., sheathing, upper cymbiform. Spike 3–4 in., lax- or dense-fl.; flowers ½ in. diam.; bracts cymbiform; sepal 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-fl., bracts shorter than the ovary, lateral sepals ovate acute glabrous, petals lanceolate or linear-oblong, lip tripartite, side lobes recurred 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.

The Decan Peninsula; from the Conan and the Circars to Travancore.

Leaves 3–6, appressed to the earth, fleshy, 3–5 in. long, and as broad or narrower. Spike 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 crenate, spur sometimes twice as long as the ovary, mouth funnel-shaped, with a short tooth; anther-cells divergent, tubes long, pollinaria glands small; stigmatic processes subglobose; rostellum short triangular.


Malay Peninsula (i.e. Pinayson in Herb. Kew).

Leaves 5–6 by 2–2½ in., membranous, almost petioled, many-nerved. Spike 12 in.; bracts ¾ in., linear-lanceolate, membranous; ovary 1½ in.; flowers white, spur green; dorsal sepal broadly ovate, acuminate, reflexed, lateral ½ in. long, subfuscate, 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 Pinayson (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 subsradical linear or linear-oblong acuminate, scape slender, spike few-fld., flowers second, bracts longer than the ovary narrowly cymbiform acuminate, sepals subequal, petals as long but broader, lip cuneately falcate, side lobes broad, midlobe as long narrow, spur as long as the curved beaked ovary, tip subulate. Dalz. & Gibbs. Bomb. Fl. 288 (excl. syn.).

The Conan; between Vignorla and Malwan, rare, Dalzell.

Leaves 4–6 by ½–1½ in., rather thick. Spike 6–12 in., often flexuous; sheaths 1–3 in.; bracts ¾ in. long, finely acuminate, herbaceous; flowers 3–6, ½ in. broad, white, jasmine-scented; dorsal sepal orbicular-ovate, obtuse, lateral subfuscate, 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; pollinaria 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.


**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 ½-1 in.; ovary ½-3 in., curved; flowers white; lateral sepals ½ in., oblong-lanceolate, 3-nerved, dorsal smaller; petals 3-nerved, as long as the dorsal; lip ½-⅔ 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.


**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. Scapae 8-12 in., slender; sheaths small, acuminate; spike 2-3 in.; flowers subsecund, white; bracts setaceous or lanceolate; ovary ½ in., curved; sepals ½ in. long, subequal, acute, 3-nerved, dorsal ovate-oblong, lateral falcately oblong; lip ½-¾ in. broad, twice as long as the lateral sepals, puberulous, spur 1-⅞ 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.


The DECCAN PENINSULA; on the Western Ghas, 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 ½-1 in.; ovary 1 in., suberect, its pedicel sometimes as long; sepals ⅔ in. long, 3-nerved; lip ⅔-1 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. longicornis*, but much more slender, leaves longer, flowers much larger, lip longer than the sepals, its side lobes broader, and spur very much longer.


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, ⅓–⅓ in. long; dorsal sepal orbicular, subacute, lateral broadly ovate; lip much longer than the sepals, as it were 4-lobed, the lobes closed; spur with a long erect ligule at the mouth; anther tubes long, straight; caudicles of pollinia winged as in *H. longicalcarata*, glends minute; stigmatic processes clavate, adnate to the mouth of the spur; rostellum very short, obtuse.


**Western Himalaya;** Kusum, 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 sepal 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 bigbose; spur slightly thickened at the tip, mouth funnel-shaped; anther very broad, quadrate, truncaete, 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.


**Temperate Himalaya;** Garwhal, alt. 8-9000 ft., Duthie; Kusum, Wallich; Sikim, 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 ¼ in. long, incurved, subrostiate; flowers ⅓–⅓ in. diam., pink, odoriferous, perianth spreading;
dorsal sepal oblong; lobes of strongly nervcd lip very short, obtuse, equal or the midlobe longest and broadest; anther short, broad, cells parallel contiguous, tubes 0, pollinium 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, ½ in. long, broadly ellipsoid or subglobose.—A very anomalous member of the section.

34. H. monophylla, Collett & Hemsl. in Journ. Linn. Soc. inded.; 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 ½ 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 pollinium contiguous orbicular.—Closely allied to H. Orchis. 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.


Tropical Western Himalaya; Kumaon, alt. 3500 ft., Royle, Strachey & Winterbottom. The Concan and Canara, Stocks, Low, &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 ½–⅝ in. diam., white, incorsor; mid segment of lip deflexed, scabrous, 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, bead twice as long as the body.

36. H. malleifera, Hook. f.; tall, stout, leaves clustered large ob-lanceolate acute, spike long many-fld. furfuraceous, dorsal sepal orbicular cucululate 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 Senulah, 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 ½–1 in., shorter than the ovary, ovate-lanceolate; flowers greenish, about ½ in. diam.; ovary ½–1 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 recurved, tubes very long decurved; pollinia clavate, caudicle very long, glands minute; stigmatic processes very long; rostellum obscure.

37. H. Murtoni, Hook. f.; leaves peltioed crowded towards the base of the stem ob lanceolate, 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. Singap or, Murtoni.  
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 peltioed, spike puberulous, dorsal sepal obovate cumulate 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 ½ 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, Krauslein 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
sepalis tripartite, segments linear obtuse central broadest, spur slender as long as the curved beaked ovary tip acuminate.

**Western Himalaya;** Kumaon or Garwhal, *Royce, 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 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, subpetioloed. *Scape* as long; sheath sub-solitary; 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 acuate 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.


**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, ½–¾ in. diam.; lateral sepals deflexed, subacute; spur 1½ in., cylindrical, 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 \(\frac{1}{3}-1\frac{1}{3}\) in. *Raceme* 4-6 in.; bracts ovate, acuminate; flowers \(\frac{3}{4}\) in. diam., green and white, sweet scented; pedicel with ovary \(\frac{3}{4}-1\) in., nearly straight; lateral sepals reflexed, margins revolute; spur thickened below; tubes of anther-cells divericate; pollinia much shorter than their slender caudicles; glands small; stigmatic processes short, clavate, adnate to the mouth of the spur; rostellum short, broad. *Capsule* \(\frac{1}{3}\) in., shortly pedicelled, straight, fusiform, beak short.

45. *H. Mandersii*, Hemsl. & Collett in *Journ. Linn. Soc.* ined.; tall, lower leaves linear-oblong narrow lanceolate, raceme glabrous, bracts as long as the slender pedicelled long-beaked ovaries, dorsal sepal ovate obtuse as long as the oblong ovate lateral, petals as long as the sepals linear-oblong obtruncate, 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, 1-1\(\frac{1}{3}\) in. *Raceme* 4 in.; bracts 1 in., ciliate, lanceolate; ovary narrowly winged; sepals \(\frac{1}{3}\) in., 3-nerved, lateral subfalcate; petals usually straight, 3-nerved; margins of midlobe of lip revolute, spur 1-2 in., mouth with a large ovate 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 \(\frac{3}{4}-\frac{9}{10}\) in. *Spike* 2-4 in.; bracts very slender, ciliate, longer than the ovary; flowers yellow spotted with brown, about \(\frac{3}{4}-\frac{9}{10}\) 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.* in *c.* 325 (excl. *hub. Ceylon*).
Habenaria.  

**Platanthera acuifera, Lindl. in Wall. Cat. 7045. P. rostrata, Lindl. in Wall. Cat. 7051.**

**Khasia Hills**, alt. 4–5000 ft., common. **Naga Hills, Prain.** **Tavoy, Wallich.**—**DISTRIBUTION.** **China.**

Stem 10–18 in., flexuous. Leaves 2–4 by ½–8 in., erect, base sheathing, upper and linear lanceolate ciliolate bracts very finely acuminate; ovary ½–3 ½ in., rugose, beaked for half its length; flowers golden, ½ 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, glinda 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 incurred below the middle with a large clavate ellipsoid tip.**

**Tenasserim;** at Moulmein, Lobb, Parish. **Shan States, alt. 4400 ft., Collet.**

Leaves ½–8 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-fl., 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 ½–8 in., upper short sheathing, erect or incurved. Spike 2–4 in., cylindric; bracts finely acuminate; flowers greenish-white, about ½ in. diam.; perianth thick subpuberulous; sepals 3-nerved, dorsal ciliolate almost orbicular, lateral ovate-oblong; petals ½ 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-fl., 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-fid., 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.

*Krana 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-fid.; bracts slender, lanceolate; ovary ⅜–⅞ in., slightly curved; sepals ¼ in. long, membranous, 3-nerved; petals as long, 1-nerved; anther oblong, cells contiguous, tubes short divericate; 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. fusifera*, and the petals and spurs from *fusifera*.

52. *H. avana*, Hook. f.; leaves linear-lanceolate acuminate, spike many-fid., bracts longer than the flowers, dorsal sepals 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-fid.; lower bracts ⅛ in.; ovary ¼ 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.


The DECCAN PENINSULA; on the Ghats, from the Coucan southwards, ascending to 7500 ft. on the Nilgirias.

*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 ⅛ in., not beaked; flowers greenish-yellow; sepals ¼–⅔ 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.—Torus black in drying.

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.


**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 petiolated. **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 ⅔ as long as the body.

56. **H. affinis**, Wight Ic. t. 1707; leaves large elliptic-lanceolate acuminate, spike elongate cylindrical, bracts equalling or exceeding the curved beaked ovary, sepals subequal or dorsal largest 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, Reddome (in Herb. Calcutt).

**Stem** stout, 1–2 ft. above the leaves with many erect lanceolate sheaths. **Leaves** 4–6 by 2–2½ in., hardly petiolated, not margined. **Spike** 4–10 in., rachis stout; bracts ⅓–½ in.; flowers green; ovary ½ in., beak short; sepals ⅔ 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 Gbts; from the Concan to the Nilghiris.

**Tall**, 1–2 ft. **Leaves** 2–3, 6–8 by 2–4½ in., sessile or subpetiolate, acute or acuminate. **Scape** with a leafy sheath below and slender ones above the leaves; spike 10 in. and under; flowers distant, ⅔ 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.

**Western Himalaya**; from Kashmir to Kumson, alt. 5-7000 ft. Behar and **Bengal** (wild in Bot. Garo. Calc.). **Burma**, **Wallach**. The **Deccan Peninsula**, common on the Western Ghats.

Leaves \( \frac{4}{5} \) in. **Scape** 4-10 in.; sheaths many, erect, lanceolate, broad or narrow. **Spike** 2-6 in., cylindric; bracts ciliolate; flowers \( \frac{4}{5} \) 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** \( \frac{4}{5} \) 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.


**Lower Bengal**, Griffith, Clarke. The **Deccan Peninsula**; in rice fields, **Heyne**, &c. **Ceylon**, alt. 5-7000 ft., **Walker**, &c.

Tubers ovoid, \( \frac{4}{5} -1 \) in. long. Leaves many, 2-4 by \( \frac{4}{5} -\frac{1}{5} \) in., acuminate, nerves obscure. **Scape** 4-14 in., slender, sheaths many and bracts lanceolate; raceme rather close-fld.; flowers \( \frac{4}{5} \) in. diam., greenish-yellow; sepals 3-nerved, lateral reflexed; segments of lip variable in length; ovary \( \frac{4}{5} \) in. long; anther-cells short, divaricate, tubes short upcurved, caudicles rather shorter than their pollinia; stigmatic processes clavate; rostellum short, broad. **Capsule** \( \frac{4}{5} \) in., fusiform, straight or curved, beak short, pedicel \( \frac{4}{5} \) in.

Var. **Dalzellii**; leaves radical linear 3-5 in., scape very slender wiry, flower rather smaller, spur longer than the ovary slender incurved. **Caloglossum luteum**

**Khasia Hills**; in grassy places, alt. 4-5000 ft., common.

*Leaves* 3-4 by \( \frac{1}{3} \) in., acut-ascuminate. *Scape* with elongate raceme 8-12 in.; sheaths very few and bracts lanceolate; ovaries \( \frac{1}{3} \) 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, \( \frac{1}{3} \) in. long; another broad, cells sub-parallel, tubes short; candelioe 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-fléd., 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-fléd. raceme 2-4 in.; sheaths few, membranous; bracts \( \frac{1}{3} \) in., ovate-lanceolate; flowers few, \( \frac{1}{3} \) in. broad; ovary \( \frac{1}{3} \) 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.


The Deccan Peninsula; from the Concan to the Nilghiris, common.

*Leaves* 2-3, 1-1\( \frac{1}{2} \) in. diam. *Scape* 6-12 in., stout; sheaths many, finely acuminate. *Spike* 6-8 in. narrow; bracts ovate-lanceolate, sheathing; flowers \( \frac{1}{2} \) 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 Reichcnbach 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-fléd., bracts much shorter

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 ½ in., acute; flowers about ½ in. diam.; ovary ½ in., hardly beaked; dorsal sepals 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 cupuliate, scape tall, spike elongate, flowers subsecond 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.; Kumson, alt. 9–12,000 ft., Duthie; Sikkim, alt. 10–11,000 ft., J. D. H.—Distrib. Afghanistan.

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 ½ in., acute or acuminate; flowers ½ 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 incurved; 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. 114.—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.—Hemminum reniforme, Lindl. in Wall. Cat. 7067. Aopla reniformis, Lindl. in Bot. Reg. under t. 1701; Gen. & Sp. Orchid. 304, 457; Benth. Fl. Hongk. 368. Listera reniformis, Don Prodr. 28.


Leaves ¾–2 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 ½ 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 divericate 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 Hemminum 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.


**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 ½-⅓ in., curved; flowers yellow-green, ½-⅓ in. diam. or more; sepalis 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.


**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.; racis stout; bracts ½-⅔ in., finely acuminate; ovary ½ in., stout, curved, shortly beaked; flowers erect, ⅔ 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 \( \frac{1}{2} - \frac{3}{4} \) in., obtuse or subacute. *Spikes* 1½–4 in. lax-fl.d.; bracts spreading, lower \( \frac{1}{4} - \frac{1}{2} \) in., green, upper gradually smaller, uppermost hardly exceeding the short sessile curved ovary; sepals \( \frac{1}{4} \) in. long, oblong or oblong-lanceolate, subacute, obscurely 3-nerved, subcilindrate; 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. leptocauleon**, Hook. *f.*; stem slender, with 2–3 narrow distant sheaths above the linear-oblong acute leaf, spike slender few-fl.d., 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 \( \frac{1}{2} \) in.; sheaths above the leaves 1–4½ in., linear-lanceolate, erect. *Spikes* 3–8-fl.d., 1–2 in., racem slender; bracts \( \frac{3}{4} - \frac{1}{2} \) in., erect, slender; sepals \( \frac{1}{4} \) 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-fl.d., bracts herbaceous much longer than the sepals, petals 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* broached; roots thick, fleshy. *Stem* 4–6 in., as thick as a goose-quill or less. *Leaf* 2½–3½ by \( \frac{1}{2} - \frac{1}{2} \) in., thick, obtuse; sheaths 1–1½ in., lanceolate. *Spikes* 1½–2 in.; bracts 2–1 in., many-nerved; flowers purple; ovary \( \frac{1}{2} \) 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. nematocauleon**, Hook. *f.*; stem very slender naked or with one or two sheaths above the small oblong subacute leaf, spike very slender lax-fl.d., 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. *Spikes* 2–4 in. long; bracts membranous; ovary \( \frac{1}{2} - \frac{3}{4} \) in., hardly beaked; flowers \( \frac{1}{4} \) 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* \( \frac{1}{2} \) 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 longer than the large flowers, dorsal sepals 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-fl.; lower bracts 1-1¼ in., linear-lanceolate; ovary 1½ in., hardly beaked, curved; sepals ½ in. long, dorsal cuculate, 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 *Trimernoglossa*. 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 lax-fl., bracts herbaceous longer than the large flowers, petals as large as the sepals triangular-lanceolate, lip as long as the sepals linear, spur rather longer 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 1½ in., spreading and reflexed; ovary ½ 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. In. Plant. ined.*; small, stem many-leaved, leaves small sessile erect ovate or oblong, spike many-fl., 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-fl.; bracts ½ in., ovate-lanceolate, acute; ovary ⅔ in., suberect; dorsal sepals 3-nerved, ovate, obtuse; lateral ½ 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-fl., 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 Distr., 5859), 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 ½ in. subacute, reflexed; lip elongate, liguliform, obtuse; anther broad, cells distant divergent, tubes hardly any; pollinia shorter than their stout cædicles, 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), seyalica.

Sect. VI. Peristylus. (See p. 132.)

* 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 ½ 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, cædicles 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.


SiKKIM HIMALAYA, King (Herb. Calcutt.), the Khasia Hills, Tenasserim, and the Deccan Peninsula, from the Concan Southward.—Distr. 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 ½ in. diam.; bracts ½–¾ in., broadly ovate-lanceolate, finely acuminate; ovary ½ in.; sepals ½ in. long, subequal, concave, lateral suberect, at length spreading, nerve very thick, produced into a point under the apex of the sepals; lip with a large excava 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 pollina.—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 *tenus*. That of *periptyloides* 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 sub-radical, 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, Lindn. Fl. Zeyl. 320.

The **Khasia Mts.**, **Tenasserim, Parish, &c. Ceylon**; Hermann, at Pasoon Corle, Thwaites.

**Stem** with the slender spike 1–3 fт. **Leaves** 2–6 in., sessile, flat, nerves obscure. **Spike** 8–12 in.; bracts ovate-lanceolate, acuminate, lower ¼ in.; ovary ¼ in., erect, tip decurved; sepals ⅓ 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; anter 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. Coeloglossum 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 *comelinifolia* (not microantha, 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. 199; 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 Moulemin, Parish.

**Stem** 1–2 ft., with appressed sheaths below the leaves, and 1–2 lanceolate ones above them. **Leaves** 5–8 by 2–1 in., clustered about the middle of the stem, membranous, sessile. **Spike** 6–10 in.; flowers erect, small, distant; bracts ½–⅓ in.; ovaries as long, straight; sepals ⅓ in. long, 1-nerved, dorsal ovate-oblong broad or narrow, lateral erect; lip divided close to the narrow concave claw; anter minute, cells parallel, tubes 0, pollinia clavate, caudicles very short, glands oblong; stigmatic processes marginal 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, sepal subequal linear obtuse, petals broader oblong membranous, lip longer than the sepals 3-partite lateral segments longest filiform or capillary, spur clavate or fusiform allunging 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.


Stem with spike 18–20 in. Leaves 2–3 in., clustered around the middle of the stem, sessile or subpetiolated. **Scape** with a few narrow sheaths; bracts ½ in., ovate-lanceolate; flowers distant. ½ in. diam., greenish; ovary ½ in., erect; sepals and petals membranous, 1-nerved, ½ in. long; lip with a retrorse spur over the concave claw, lateral segments broad at the base sometimes very long and circuminate, 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. Gardeneri**, 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, ½–¾ in.; sepals ½ 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. aristatus** 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-fld, spur as long as the sepals straight or incurred subclavate.

**The Conoon 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 petiolated. **Spike** 3–6 in.; lower bracts often ½ in. long, finely acuminate; ovary ½–¾ in. curved; flowers ½ 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-fld.—Very like **H. Lawii**, but spur quite different.

**Spur much shorter than the sepals, globose or ellipsoid.**
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† Stem leafy, leaves scattered or subimbricate.

88. **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 subflabelliform, 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 1/3–1 in., bases sheathing, nerves very slender. Spike (young) 1 in.; bracts lanceolate, finely acuminate; ovary 1/3 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-fld, concealing the small pollinar glands.—A very anomalous species, the flowers are too young for satisfactory analysis. Thwaites describes the lip as having a minute midlobe.

88. **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.

Nilgiri, and Bababudan Hills in Canara, Heyne, Perrottet, Stocks.

*Stem rather stout, 6–12 in. Leaves 1–2 1/4 in., bases sheathing, nerves very slender. Spike 2–4 in., rather dense-fld.; bracts herbaceous, lower 1/3–1/4 in. or longer, often twice as long as the flowers, ovate-lanceolate, acuminate, sheathing; ovary 1/4 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-fld rostellum; stigmatic processes clavate.—Habit of *H. peristyloides* & concina.

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 distinct 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 Travan core, Wight, 30. Ceylon, in the Central Province, alt. 4–7000 ft.

*Stem with the spike 6–18 in., often flexuous. Leaves 1–2 1/4 in., obtuse acute or acuminate, nervesless, passing into the sheaths of the scape. Spike 2–4 in., rachis often flexuous; bracts 1–1/2 in., lanceolate, acuminate; flowers decurved, greenish white; lateral sepals reflexed, 10–1/2 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-fld.—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.

**Habenaria.**

**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 ½–1 in.; flowers nearly horizontal; sepals ¼–½ 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.


**Malabar; in the Bababudan Hills, Heyne. Nilgiri Hills, Perrottet, Lob. Travanooka; 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 ½ in. long, nearly straight; lateral sepals ½ in., 1-nerved, reflexed; petals nearly as long, 2–3-nerved; lip 2-nerve 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 ms. name of *P. persimilis.*


**Nepal; in the Mofuing, Hamilton. Sikkim Himalaya, Griffith's Collectors (Kew Distrib. 5356). Khasia Mrs.; 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 ½–⅓ in., or broader, sometimes overtopping the spike, nerves obscure. Spike 3–5 in.; bracts ½–⅔ in., often tortuous (when dry); ovary ⅔–¾ in., slender, suberect; sepals ⅔ 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 $\frac{1}{2}$ in. long lanceolate acuminate, petals as long gibbously ovate obtusely acuminate, lip as long as the sepals obtusely trid lobes subparallel, spur very shortly oblong.

**Perak;** in the Eatoong 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 $\frac{1}{2}$ in., lanceolate; ovaries $\frac{1}{2}$ in.; flowers pale green; sepals 1-nerved, $\frac{1}{2}$ in. long, dorsal linear-oblong, obtuse; petals with feebly 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 lobes; stigmatic processes large, clavate, adnate to the sides of the lip; rostellum small. **Capsule** $\frac{1}{2}$ in., sessile, linear-oblong, oblong, 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 sub-second, bracts equalling or exceeding the ovary, lateral sepals $\frac{1}{2}$ in. linear or ovate-oblong obtuse, petals gibbously ovate, lip as long as the sepals trid, spur minute. **Peristylus goodyeroides**, Lindl. Gen. & Sp. Orchid. 299; Dals. & Gibs. Bomb. Fl. 270: Boyle Ill. t. 87, f. 2. P. grandis, Blume Bijdr. 405. Herminium goodyeroides, Lindl. in Wall. Cat. 7066.

**Subtropical Himalaya;** from Kumaon to Bhutan, alt. 2–5000 ft. The **Khasia Mts.** and Khet, Munnfop, Tenasserim and the Andaman Islands. The Deccan Peninsula, from Bebar (on Paraunath) and the Coccon 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 $\frac{1}{2}$ in. diam., very variable in size, yellowish green; sepals $\frac{1}{2}$ 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** $\frac{1}{2}$ in., sessile, fusiform, acute.—The Ceylon habitat given by Thwaites no doubt refers to H. Wightii, which has been confounded with this.


**—Stem** with spike 2–3 ft. **Leaves** 4–6 by 2$\frac{1}{4}$–4 in., narrowed at the base or broadly petioled. **Spike** 4–8 in.; bracts large; flowers yellowish; sepals $\frac{1}{2}$–$\frac{3}{2}$ 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 ovate; rostellum 2-ft., 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, **Vol. VI.**

Tennasserim; at Moulemein, 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 ½-1 in. with filiform tips and flowers appressed to the rachis; ovary ½ in.; sepals ½ 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.


The Concan, Nimmo; Malwan, Dalzell, &c. Travancore; at Paul Ghat, Wight. Ceylon, Maerue.

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 4-6 in.; bracts ½ in., lanceolate; ovary 1½-1 in.; flowers greenish white; sepals 1-nerved, lateral ½ 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-fld., spur small globose or clavate. Peristylus Lawii, Wight Jc. t. 1695; Dalz. & Gibs. Bomb. Pl. 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., subpetioloë, acute. Spike narrow, strict, 2-3 in., lax-fld.; bracts ½ in., ovate-lanceolate, membranous; ovary ½ in., straight or curved, almost beaked; flowers ½ in. diam., yellow; sepals ½ in., 1-nerved, at length spreading; petals thick; lip broad with a concave claw; anther-cells parallel, tubes 0, pollinia clavate, caudiole 0, glands small, stigmatic processes clavate; rostellum short, acute.—Wight’s figure is of a very indifferent few-fld. specimen.

97. H. Brandisi, 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.).
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Stem with spike 20 in. Leaves 3–5 in., membranous, upper smaller. Spike 8 in., very slender; bracts \( \frac{1}{4} \) in., ovate-lanceolate; flowers \( \frac{1}{4} \) 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-fl.; bracts narrow longer than the erect very small flowers, lateral sepals linear-oblong obtuse, lip equaling 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. Colloglossum lacertiferum & acuminatum, Lindl. Gen. & Sp. Orchid. 302. Peristylus chloranthus, Lindl. in Kew Journ. Bot. vii. (1855) 37. Gymnadenia? tenuiflora, Lindl. in Wall. Cat. 7055. Cheiradoplectron Spiranthæ, Schauer in Pl. Meyen. 436. t. 13 C.

**Khasia, Naga** and **Munntpore Hills**, alt. 2–4500 ft., Texasserrim, Tavoy and Penang, Wallîch.—**Distrib.** Hong Kong.

Stem 6–10 in.; sheaths 1–1 in., lanceolate. Leaves few, 1–2 in., spreading, acute or obtuse. Spike 3–10 in., slender, lax- or dense-fl.; lowerbracts often \( \frac{1}{4} \) in.; ovary \( \frac{1}{2}–\frac{3}{4} \) in., slender, erect, not beaked; sepals \( \frac{1}{2}–\frac{3}{4} \) 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, tubus 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 \( \frac{3}{4} \) in., sessile, oblong, obtuse.—Both this and the following var. are found in Penang. Lindley errs in giving "Nepal, Wallîch," 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 \( \frac{3}{4}–1 \) in., spike very long many-fl., lateral segments of lip slender exerted much longer than the middle one.—Penang, Wallîch, Mainay (Kew Distrib. 1662, *Spiranthæ*), 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. Colloglossum Mannii, Reichb. f. in Linnaea xii. 54.

**Khasia Hills**, alt. 4–5000 ft., on grassy hills, common. **Munnpore, Clarke**.

Stem 6–16 in., with a few subulate sheaths. Leaves 1–3 by \( \frac{3}{4}–\frac{3}{2} \) in., alternate, acuminate. Spike 2–6 in.; flowers \( \frac{1}{2} \) in. apart; bracts \( \frac{1}{2} \) in.; ovary \( \frac{1}{2} \) in.; sepals \( \frac{1}{2} \) 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-fl.) 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 \( \frac{1}{2} \) 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-

WESTERN HIMALAYA; Nepal, Wallich; Kunson, Blinkworth, alt. 7000 ft., Strachey & Winterbottom. CENTRAL INDIA; Hawaiiagh, Clarke.—DISTR. 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-obovate or lanceolate, lower twice as long as the pale purple flowers, upper shorter; ovaries ½ 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 Jc. t. 1693.—Travancore, on the Pulney Mts., Heyne, 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. jantho, Benth. in Gen. Plant. iii. 626; leaves imbricate ovate or lanceolate amplexical acuminate, flowers ½ in. diam., lip broadly flabelliform or orbicular-ovate retuse crenulate, spur very short conical obtuse. Platanthera jantho, Wight Jc. 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. obovata. 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 ½ 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. obovata.


Helfer, Parish.

Stem 12–18 in., rather stout; tubers oblong. Leaves 4–8 in., sessile, acuminate, base narrowed. Flowers shortly pedicellated; 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 ½ in., linear-oblong, sessile, erect, ribs thick.—Reichenbach describes the lip as broad or narrow.

Sect. VII. PLECTOGLOSSA. (See p. 132.)


Travancore; as the Pulney Mts. amongst long grass, Wight. Nilghiri Hills, Perrottett.

Stem 1–2 ft., very stout; clothed with short imbricating amplexical 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 ½ in. long, erect, slender, beaked, narrowly winged; sepals erect, ½ 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, subcalvate; anther broad, bases of cells shortly upcurved; pollinia large, pyriform, grains large, cladicles short, glands small orbicular.—The stigmatic processes differ from those of any other Indian Habenaria. A. Richard figures them as clavate as in most Habenaria, 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.)


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 seccund, ½–¾ 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, clictiles very short.

Sect. IX. DIPYLA. (See p. 133.)


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-fl.; flowers seccund, pink; bracts linear-lanceolate, lower ½–¾ in. longer than the flowers; ovary ½ 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, infl. apex subacute; anther membranous; pollinia clavate, grains very large, clictiles short, glads 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.)


North-West India; Edgeworth, alt. 3000 ft.; Lahul, alt. 4–5000 ft., Thomson.—Distrib. Afghanistan, Griffith, (Kew Distrib., 5326.) Kurram Valley, Aitchison No. 322.

Tubers small, obtong. 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 subpetiolute, upper sessile, bases sheathing. Spike 1–2 in.; flowers close-set, decurved; bracts ovate-lanceolate, longer than the ovary, membranous; ovary ½–¾ 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
Habenaria.

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 stamnadia long escaped detection. Resembles a small Spiranthes of the S. astivialis type, with which it was confounded in Griffith's Herbarium.

**Imperfectly Known Species.**


**H. Caranjensis,** Dalz. in Hook. Journ. Bot. ii. (1850) 262; Dals. & Gibbs. Bomb. Fl. 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 trilabiate, midsegment oblong rather obtuse, lateral shorter cuneate truncate, spur clavate shorter than the ovary.—The Concæ; Island of Caranajah, Dalzell.

**H. Gracilis,** Coleb. in Hook. Exot. Fl. t. 135, a Silhét 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 Cataglossum brevifolium (H. cubitalia, 6). It is possibly a bad drawing of H. peristyloides.

**H. Lombhi, Reichb. f. in Linnæa, xli. 50;** leaf cuneately oblong ligulate acuminate, raceme 2 ft. lax-fid., bracts half as long as the pedicellated ovary oblong acuminate, dorsal sepal ovate apiculate cuneulate 3-nerved, lateral triangular retorse 3-nerved, petals linear falcate 1-nerved, lip trilabiate, lateral segments linear retorse, midsegments twice as long linear obtusely acute, spur filiform shorter than the pedicellated 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. 2736 (a Brazilian species).

**H. Longibracteata; Hook. f.**; stem stout leafy 2–3 ft., leaves 6 by ¾ 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 Irrawaddy at Seendya, Wall. 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. Modista, Dals. in Hook. Journ. Bot. ii. (1850) 262; Dals. & Gibbs. 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 Concæ, at Salette, Dalzell.** Description from Dalzell, who does not appear to have seen leaves; it is, perhaps, H. stenostachya.

**H. Peloroides,** 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-fid., bracts large, equaling the ovary ciliate, 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 ⅔ in. long. **Spike** 2–3 in., many-fid.; sepals ⅔ 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** ⅔ in., sessile, fusiform.—An anomalous plant, clearly a Peloria form. I have seen but one different specimen.


107. **Diplomeris, Don.**

Terrestrial small 2-fid. 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.


Khasia Hills, alt. 4-5000 ft., Roxburgh, Wallich, &c.

Rootstock creeping, subtuberous and fibrous; stem short. Leaves usually 2, erect, 3½ by 1½ in., acute. Scape about equaling the leaves, naked, 1-odd; bract cymbiform, green, acuminate; flower 1-1½ in. diam., white; sepals ovate-lanceolate, acute; petals much larger, broadly ovate rounded or ovate-oblong; lip ½ in. diam., sinus cuspitate; spur 1½ in., incurved or upcurved, thickened beyond the middle, lip 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.


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, spicate 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.


Western Temperate Himalaya; alt. 4-500-7000 ft., from Nepal, Wallich, to Simla, Gamble.

Tubers oblong. Leaf 2-4 in., amplicodial, acute, many-nerved. Scape with few or many-flld. racemes, 4-10 in.; bracts shorter than the ovary; flowers ¼-½ 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.

**Tsenasserim.** 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 distinct, ½ 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 spatulate caudicles.

109. **SATYRIUM,** Swartz...

Terrestrial leafy erect herbs, tubers undivided. Leaves broad or narrow. **Flowers** in dense spikes. **Sepals** and **petals** subsemilunar, 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, *candicles* recurved, glands large naked sometimes connate.—Species 50, African and Indian.


**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 Cenac to Travancore. **Ceylon,** alt. 4-6000 ft. **Burma; Shan states,** alt. 4000 ft; **Mandera.**

茎 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, ½ 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 oblong, 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. Wighti-


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
pallinia; anther oblong, obtuse, completely 2-celled; grains of pallinia 3-4-seriate, second on the rachis, cuneiform, caulescences rather long, twisted, glaids 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) without hesitation.


_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* 3-1 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_ Lc. t. 1719; lateral sepals strongly waved, petals lunate cuspidately acuminate.

_Nilgiri 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 1-6-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 Seapigerous 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., _Fantling_. Eastern Tibet; *North of Phari, King's Collector*.

_Step_ 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.


**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 1 1/2-2 in., longer than the lip, theconnate lateral entire or split at the apex; column yellow. Capsule 1 1/2 in., erect, ciliate.

As Lindley observes, this is not distinguishable except by colour from the European *C. calceolus*, which extends from Britain to Dauria. It would be well to compare living specimens before uniting them.


**ALPINE HIMALAYA**; from Garwhal to Sikkim, alt. 11,500-14,000 ft.—**Distrib.** Northern and Subarctic Europe and Asia to Japan.

Stem 1-1 1/2 ft., usually very stout, pubescent. Leaves 3-6 by 2-4 in., ovate or oblong, acute, puberulous. Flowers 1-2, 1 1/2-2 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 1/2 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, 1 1/2 by 3/4 in., the petala 2 by 3/4 in., oblong-lanceolate, both white striped with red.

** ** Leaves radical, distichous, oblong or lorate, ciliate, not plaited. Scape 1-3-fld., pubescent or villous.

a. Petals as broad as the dorsal sepal, short, ciliate, broadly oblong, margins not undulate nor warted.

4. **C. concolor**, Bateman. in Bot. Mag. t. 5513; leaves oblong or linear-oblong tesselated, scape short 1-2-fld., sepals suborbicular and elliptic-oblong petals yellow ciliate, sac of lip subcylindric, staminode subhomboidly ovate apiculate. Ill. Hortic. 1865, t. 444; Gartenfl. 1874, t. 803; Fl. des Serres, t. 2321; Williams Orchid. Alb. t. 302; Reichb. f. in Gard. Chron. 1865, 628; 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.—Reichh. 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. 264) with unspotted sulphur coloured flowers. Other vars. are *tonkinensis*, *Lindenia*, ii. t. 77, and *Regneri*, Orchidoph. 1886, 226.—The *C. Godsefreyi* of Siam is very closely allied, but has dorsal sepals and petals broader than long, copiously spotted, and a 3-toothed staminode.


Strata of Malacca; Langkawi Islands, south of Penang.—Distrib. Tambilian 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 warded.


Tanasskrim; 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. Boxallii* is a var. with black spots on the dorsal sepal and more tessellated petals. Var., *aura* (Gard. Chron. 1883, i. 374) has a bright yellow-green dorsal sepal margined with white and golden yellow petals and lip.


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 warded, mouth green within; staminode green, base white.
y. 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. Drurii, Beddome Jo. Plant. Ind. Or. 23, t. 112; leaves ligulate glabrous not tessellated, scape tall 1-2-fld. pubescent, bract much shorter than the ovary, dorsal sepal broadly ovate ciliolate arched, petals linear-oblong obtuse surface warted and hisrate 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. 426; 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 margin.


Khasia Hills, alt. 4-5000 ft., Wallich &e.
Leaves 8-12 in., acute, pale green. Scape 12 in., 1-2-fld. and large oblong compressed bracts and ovary pubescent; flowers 4-6 in. diam., glossy; dorsal sepal apple-green, purple-spotted, tip white, lateral smaller, paler; petals rather longer than the sepals, margin 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, xx. 72; Orchidoph. 1885, 36; Williams Orchid. Alb. vi. t. 278; Gard. Chron. 1882, ii. 717, fig. 127.

Var. Muralei, 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. Sanderae; 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 hisrate sides strongly recurved below, petals shorter deflexed ligulate margins undulate and crisped, lip helmet-shaped mouth dilated, staminode orbicular. Bot. Mag. t. 6480; Ill. Hort. 1883, t. 473; the Garden 1883, t. 375; Williams Orchid. Alb. iii. t. 119; Bcog. 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.

5. Petals narrower than the dorsal sepal, very long in C. Parishii, margins bearded or hirsute and warded.


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 purpleish, 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, white sepals, and larger and more scattered warty 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 Mon. 24, with fig.

Assam, Tronsen (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-fld in front, side lobes acute incurved, midlobe as long, straight acute.

MALAY PENINSULA; Mt. Ophir, Lobb. 
Leaves 5–7 in., pale or dark green with dull blotches. **Scape** 9–12 in., 1-fld.; flowers liliate, 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, warty.

14. **C. barbatum**, Lindl. in Bot. Reg. 1841, Misc. 53; 1842, t. 17; leaves oblong to linear-oblong acute tessellate, **scapes** 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 Horto.** xxxii. 96, t. 7; **Warner Sel. Orchid.** Ser. 3, t. 11 (var. Warneri); **Veitch Mon.** 12. **Gard. Chron.** 1886, ii. 308, f. 63. C. purpuratum, Wight &amp; White, t. 1760 (not of Lindl.). C. Warinerianum, Reichb. in Gart. Zeit. 1883, fasc. ix. C. orumb, Reichb. in Gard. Chron. 1887, ii. 773. C. Crossii, Belg. Horto. xv. 227; **Veitch Mon.** 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 sepal much narrower; petals greenish brown towards the base, purple towards the lip; 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. Warnerianna and orba, and 2, **Obrieni**, with leaves paler, spots smaller, petals and lip deeper coloured.—**C. orbium** 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-fld. 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 warty below, lip helmet-shaped, staminode obovate-oblong obtusely 2-fld., 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 Mon.** 41. **Selenipedium Parishii,** Rev. Hort. 1885, 132.

**TENASSERIM;** at Moulmein, Parish.
Leaves 9–15 by 1½–2½ in., glossy green. **Scape** 12–18 in., pale green, hairy; bracts and bisrute 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, lip 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 nervet. **Flowers** small, in terminal or axillary simple or panicked 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; Miguel Fl. Ind. Bat. iii. 748; Thwaites Enum. 315; Rolfe in Journ. Linn. Soc. xxv. 237, t. 48, f. 22-24. Mesodaedylus deflexa, Wall., ex. Pl. As. Rar. i. c. 74.


Stem 1-2 ft. Leaves 4-8 in. Panicle decurved, 4-10 in.; bracts subulate; flowers subsecund, ¼ in. diam., yellow; ovary ¼-½ in. Capsule ½-¾ in.


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 petioloed 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 ½ in. curved; flowers very small.

113. **NEUWIEDIA**, Blume.

Terrestrial herbs, with a short caudex and leafy stiff stems. Leaves elongate, petioloed, 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-fi. and flowers puberulous, bracts 1-1½ in. membranous, erect and recurved.

**Penang**, Curtis.—**Dist.** Borneo.

Stem very short, stout. Leaves many, 1-2 ft. by 2-3 in., oblanceolate, membranous, many-nerved, stoutly petioloed. 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 \(\frac{1}{2} - \frac{3}{4}\) in. erect.

**Penang**; on West Hill, alt. 2000 ft., Curtis.—Distr. 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 \(\frac{1}{2} - \frac{3}{4}\) in.

Stem very short. Leaves 4-10 in., elliptic-lanceolate, finely acuminate, many-nerved, petiolated. *Raceme* 2-3 in.; flowers white, very shortly pedicelled, \(\frac{1}{2}\) in. long, decurved. *Capsule* \(\frac{1}{2}\) in. long, turdig, trigonous.

**SUPPLEMENT TO ORCHIDÉE, WITH ADDITIONS AND CORRECTIONS.**

During the elaboration of the *Orchidées* 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 ms., 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 Malaxiæ.** I have departed from Bentham, in including *Liparieae* and *Malaxiæ* under one sub-order. The essential character of *Liparieae*, the incumbent anther, falls 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* (*isiiformis*, Lindl.) at first accumbent; and in these and others he describes them as "accumbent-incipient." Added to this the habit of *Microstylis*, which is placed in *Malaxiæ*, is that of *Liparis*; and of *Oberonia*, which is placed in *Liparieae*, is that of *Malaxis*. The clineandrium 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 *Oberonia* are variously described and figured as 2 or 4. I think
that 4 is the rule, but one of such pair is often much smaller, and I suspect sometimes suppressed.

In line 3 of the character of subtribe Malaxeae for not incumbent, read incumbent or incumbent.

P. 667. Subtribe Eriæ. 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 Cypripediæ 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 Cypripediæ, 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 Cypripedia, which in the "Genera" is referred to Cypripedium, in Eulophieæ, and as I find no character by which Plocoglottis, the only other Indian genus of Bentham's Cypripediæ, can be excluded Eulophieæ, I propose as a character—

Subtribe Eulophieæ. Terrestrial, never epiphytic. Stem rarely pseudobulbous. Lip usually spurred or saccate or forming with the lateral sepals a mentum.

39. Eulophieæ. 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 Cremastro, which has to be added.

Suborder Vanilleæ. The free often hippocrepiform pollinia, without caudicle or gland, distinguish the Indian species from Corymbææ and Spiranthææ.

Subtribe Corymbææ, differs from all other Indian Neottieæ in the hard almost woody stem, and rigid leaves, in which respect the species resemble Apostasia.

Tribe Ophryieæ. In 4th line insert "long or" before short.

Subtribe Euphrisyieæ. If I am correct in my analyses of the rostellum in some of the smaller Habenariae, it may prove difficult to separate this subtribe from Habenariae. Under any circumstances the modifications of the rostellum are so great in both, that I doubt its forming a subtribal character.

After Subtribe Disæ should follow (as at p. 675)—

Subtribe Corycìæ, to include 110 Disperis. This genus and Satyrium are the solitary Indian representatives of the extensive S. African Subtribes Disæ and Corycìæ, 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 Cypripediæ. This tribe I think includes two subtribes, if not two tribes; namely—

Cypripediæ. Flowers very irregular. Lip inflated. Anthers 2, one on each side of a large dilated rostellum. Staminode very large.

Apostasiaæ. 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.


9/1. Henosis, see Vol. v. p. 771, and for amended characters p. 189 of this volume.

P. 670. After 18. Chrysoglossum, insert—

Vol. VI.
18/2. COLLAUBUM. Scape tall, raceme long. Lip jointed at 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. CIADERIA. 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. IPSHA. Scape leafless. Flowers large. Sepals spreading. Column elongate, foot 0. Pseudobulb 1-2-leaved.

28. For JOSEPHIA read JOSEPHIA.

29. GLORIEMA. Cancel this genus. (See Vol. v. p. 823.)

P. 671. EULOPHIA. See remarks under Subtribes EULOPHIÆ, at p. 177 of this volume. The character of "petals like the dorsal sepals," is subject to many exceptions.

41. CYPEROBIS, 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, second.

Subtribe 3. CYRTOPODIÆ 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 Vanda. 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. DIPLOBOA. Sepals and broader petals spreading. Lip with the sides adnate to the sides of the column, cymbiform, with a compressed bicanditate tip. Stipes of pollinia short, narrow. Raceme very shortly peduncled.

P. 672. 53. PHASENOPIS. Add to character of lip, disk with a forked callus or plate, and after foot short, add—or long or 0.

54. DORIS. 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. SARCOCHELIS 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. ABRIDES. 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 Vanda, and those of Section II. ** resemble Saccolabium. The stipes of the pollinia is sometimes short and broad.

60. VANDA. See above under 58. Abridæ, 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. SACCOLOBIUM. 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. SCHECHERICH. As stated at p. 54 of this volume this genus was inserted by oversight, Saccolobium filiforme having been mistaken for it by Thwaites.

63. UNGUIFERA and 64 ACAMPER I have been obliged to include under SACCOLOBIUM. See remarks under the latter genus in this volume, p. 54.

65. SARCANTHUS and 66. CLEISOSTOMA, are separated from Saccolobium, 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. SPIRANTHAE. 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 fleshly 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 SPIRANTHAE.**

* Spur or sac of the lip exposed beyond the base of the lateral sepals. (See also a few species of Goodyera.)

79. PHYSTESUS. Lip not clawed beyond the spur, limb broad abruptly contracted at the base; spur eglandular within; column not appendaged in front; stigma antisous.

80. ANECTOCHILUS. Lip clawed beyond the spur, limb 2-winged; spur 2-glandular within; column appendaged in front; stigmatic lobes lateral.

81. VESTDAGYNEA. 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 antisous.

83. HEPYSMA. Lip adnate to the sides of the column, limb spreading; spur long, naked within; column not appendaged in front; stigma antisous.

** Lip if spurred, with the spur or sac covered by the bases of the lateral sepals (except in a few Goodyerae).

† Lip clawed beyond the spur or sac.

84. ODONTOCHILUS. Lateral sepals connate at the base; claw of lip crenate toothed or fringulate, limb usually 2-winged; sac 2-glandular within; column appendaged in front; stigmatic lobes lateral.

85. HEMARIA. Sepals free; lip adnate to the sides of the column, claw winged, limb 2-winged; sac 2-glandular within; column large, clavate; stigma antisous.

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. ZEUXINIA. 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 antisous.

93. GOODYERA. Lip cymbiform or subsaccate, naked or setose within; column not appendaged in front; stigma antisous.

94. HETERIA. 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 Goodyera.)

87. **Spiranthis**. Leaves several.

88. **Neottia**. Leafless herbs.

89. **Listera**. Two-leaved herbs.

P. 674. After 100. **Gastrodia**, insert—


P. 675. 105. **Herminium**. The Herminia will have 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. Io. Plant. t. 2004; stem 0, leaves 2–4 in. ensiform straight narrow 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.

**Perek**; at Larut, King’s Collector. 

**Leaves** ½ in. broad, coriaceous, acute, shortly sheathing. **Scape** minutely bracteate; bracts with subulate tips, minutely erose; flowers about ¼ 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, eusiform leaves narrowed from the base to the tip, and longer lip.


**Singapore**; at Selitan, Ridley.—**DISTRI. Java**.

**Leaves** 3–5 by ½–1½ 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 ¼ 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.


19/1. **O. rosea**, Hook. f. Io. 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. **Perek**; Gunong Batu Pateh, Wray; Larut, alt. 3–4000 ft., King’s Collector.

**Stem** sometimes flexuous. **Leaves** 2–3½ by ½–1½ in., slightly curved, acuminate. **Scape** rather stout, naked; flowers about ¼ 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. Io. 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.
JUNTEA HILLS, north of Silhet, alt. 3000 ft., Mann.

Stem 2-4 in. Leaves alternate, 1 in. long, 1 4 in. at the base. Spike 2 in.; flowers 3 10 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. 28. O. PACHYRACHIS, add to habitats—Khasia Hills, alt. 4-5000 ft., Mann.

P. 682. 29. O. CAULSCLENS, 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. 683. 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 Kruing, Ridley.

Stem 1 4–3 in., 3 2 in. broad across the base of the leaves. Leaves erecto-patent, 1-1 1/2 by 3-4 in., straight, rather broadest at the base, not very coriaceous. Scape shorter than the leaves; spike 2–3 in.; flowers hardly whirled, 3 10 in. diam., shortly pedicelled, sparsely hairy externally, as are the bracts and young fruit. Capsules pedicelled, 3 10 in. long, turgid, thickly 3-winged.

After * Sides of the lip produced upwards into large auricles, add—(CREPIDIUM, Blume).


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.


21/1, L. WRAYII, Hook. f.; leaves 2–4 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 truncate-2 lobed, lobes fimbrately toothed.

Uppper 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 1 1/2 in.; flowers 3 2 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.


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

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.

TENASSERRIM, Lobb, Parish. UPPER BURMA, Herb. Calcutt.

Leaves 2–3 in. Scope 6–8 in., naked, few-fld.; bracts $\frac{1}{2}$ in.; pedicels $\frac{1}{2}$ in.; ribs of ovary not wrinkled; flowers $\frac{1}{2}$ in. diam.; sepals spreading, dorsal longest; petals deflexed, margins revolute; lip thick, minutely rose 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, Fl. Plant. t. 2009. L. robusta, Hook. f. Fl. 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, PERN (Wray).

P. 701. After 41. L. OBSCURA, insert the two following:—

41/1. L. TORTA, Hook. f. Fl. Plant. t. 2014; pseudobulbs small, leaf sessile elliptic-lanceolate acute 9-nerved, scope terete, bracts half as long as the long recurved 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.

KHAISTA HILLS, alt. 3000 ft., Mann.

Pseudobulbs $\frac{1}{2}$ in., conical-ovoid. Leaf 4–5 by $\frac{1}{4}$–$\frac{1}{3}$ in., thinly coriaceous. Scope rather stout, with few lanceolate bracts, sometimes flexuous; bracts $\frac{1}{2}$–$\frac{1}{3}$ in., lanceolate, membranous, spreading; pedicel with ovary $\frac{1}{2}$ in.; sepals $\frac{1}{2}$ in.; lip $\frac{1}{4}$ in. broad.—A very distinct species, perhaps nearest to L. bootanemisis, but differing in the 1-nerved sepals and the wings of the column not being hooked.

41/2. L. TENUIFOLIA, Hook. f. Fl. Plant. t. 2013; pseudobulbs small narrow, leaf elongate very narrowly linear-oblong-lanceolate, scope naked with the elongate raceme as long as the leaf, bracts sessilaceous squallling 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 $\frac{1}{3}$–$\frac{1}{4}$ in., narrowly pyriform. Leaf 6–8 by $\frac{1}{4}$–$\frac{1}{2}$ in. at the broadest part, narrowed downwards, 1-nerved. Scope and raceme very slender; bracts $\frac{1}{3}$ in., as long as the pedicel and ovary; flowers pale, $\frac{1}{3}$ 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. Fl. Plant. t. 2011; pseudobulbs narrow, leaves 2 oblong-lanceolate, scope 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 hirsut and toothed with a minute entire obtuse interposed tooth, calli obscure or 0.

PERAZ, 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 ½ in.; flowers distant, about ½ in. diam., pale green; margins of sepals not recurved; lip shorter than the sepals, con- cave 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. DOLARELLA, Hook. f. Ic. Pl. t. 2010; pseudobulbs narrow, leaves 2 narrow oblong lanceolate, 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., Manu.

Pseudobulbs 1–2 in. Leaves 6–14 by ½–1 in., acute, subpetiolated, 5–7-nerved. Scape with raceme shorter than the leaves; pedicels ½ in., longer than the bracts; flowers ½ 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 Nilgiri 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 DECURSIYA. 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 Loddegea’ 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 lip rounded, add or acute. Add at end, Ic. Plant. t. 2016.


P. 709. ORCHIS INDICA; at end of character dele (not of Dene).

P. 710. In character of Sect. 1. SARCOPODUM after “Leaves 2” insert in brackets (Leaf solitary in D. longicolfie).

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. inauditus Reichh. 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 Sarcoodia, and approaches Bulbo- phyllum.


P. 713. 7. D. MACROPODUM, add Ic. Plant. t. 2020; and for “pedicels very short” read “pedicels with ovary very long.”


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. 6703 ft., has close-set polished pseudobulbs ½ in. long, and leaves only ½–1 in., scape 1½ in.; another has a 3-leaved pseudobulb nearly 1 in. long, and petioled leaves 6 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 2–2.5 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 1–2 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 pseudobulbs are very membranous, red-brown.

10. D. FUMILUM. “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. quadrangularis.” Ridley in litt.

P. 714. 12. D. MACRACI, in line 2, for peduncled read pedicelled.


P. 724. 52. D. ATROPUPUREUM. “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. STRONGYLL. Dele “Flowers terminal.”

59. D. KENTSEPHYLLUM. Add Ic. Plant. t. 2021, and in line 2 for flowers terminal, read “terminal or lateral.”


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.


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. TENICUARE, 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 cylindrical 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 1 in. broad, acute. Bracts minute, pedicel with ovary slender ½ in.; flowers ½–¾ in. long, very white; petals as long as the dorsal sepal; mentum trumpet-shaped lip 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. BOLSEPLOUM. 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 Bhotia Himalaya, Assam.


SINGAPORE, Ridley in litt. China.

79/2. D. FLAVIDULUM, Ridley mas.; stems slender pendulous, leaves linear-lanceolate, racemes on the leafless stems short, bracts subacute, dorsal sepal ovate-oblong obtuse, lip 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-fld. beyond the middle, lobes ciliate, midlobe thickened.

SINGAPORE; at Kranji, in Mangrove swamps, common, Ridley.

Stems 12-15 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 ½ in.; flowers ½ 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 Bhotia). 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 spatulate, 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, 1½-2½ in.; flowers 1½ 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.


After 89, D. **Perula**, insert—

89/1. D. **Panduriformum**, Hook. f.; stems elongate cylindric grooved, leaves (on young stems only) lanceolate, racemes short 6–8-fl., dorsal sepals 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 (Io. in Herb. Calcutt.).

Stems 2–3 ft., narrowed at the base; internodes 1–1½ by ½ in., nodes often rosetting; sheaths membranous, white, young green and speckled. Leaves few, 1–1¾ in., acuminate. **Racemes** 1–2 in.; bracts small; pedicel with ovary § 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; another stipitate on the top of the column.—Nearly allied to **D. tropicolliformum**. 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 *panduriformum*, 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. **Tropicolliformum**, Hook. f.; stem flexuous thickened upwards deeply grooved, leaves linear-oblong, raceme slender 6-fl., dorsal sepals 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 Lartnt, Kunstler (Io. in Herb. Calcutt.).

Stems a foot long, incurved, internodes ½–1 in., the thickest ½ in. diam. Leaf 2½ by ¾ in., acute. **Raceme** 2 in., rachis pink; bracts minute; pedicel with ovary § in., green; flowers 1 in. long; sepals and petals ⅔–1 in. long, dark red-purple; mentum ¾ 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 *panduriformum* and probably other species of Sect. *Pedilolum*). The flowers very much resemble in form those of *Tropaeolum 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*. **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 *Roeb.* or of *Bot. Mag.*

131. D. **Dalhousianum**, 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 **Dalhousianum** (also a native of Silhet) except the drawing of the lip, which is too obcordate, and does not represent the villous tip, or the persistent 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 *Dalhousianum* and to no other species at all like it.
In short, as with Calanthe 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 Loddiges' pulchellum, (Bot. Cab. t. 1835, & 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 Denominatum.

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. dizianthum. At the end of the specific character add La. Plant. t. 2033.

P. 748. 146. D. CHRYSEUM, as stated at vol. v. p. 751, this name must give place to D. aurantiacum, R.f.

P. 752. D. HUGHII. Dele, said to be a form of D. crumenatum; and add to species UNNOWN 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.


P. 754. After 4. B. MEGALANTHUM, add—

4/1. B. PATENS, King miss.; scape very short 1-ftd., 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, Kastri (La. in Herb. Calcut.)

Rhizome stout, crinete at the nodes; pseudobulbs 1-1½ in., ellipsoid. Leaf 6-8 in. by 2-2½ in., acute, narrowed into a short petiole. Scape 2½-3½ in., close to the pseudobulb, clothed with short imbricate scales; pedicel 1½-2 in., yellowish specicled with red; sepals and petals yellowish, closely mottled with red-purple, 8-1 in. long, dorsal erect and incurved, linear-lanceolate, lateral ovate-lanceolate; lip ½ in. long, obtuse, base truncate; column very short.—Described from the drawing in Herb. Calcut., 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, (La. in Herb. Calcut.)


P. 757. 19. B. MEDUSA. 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.


P. 758. 24. B. CAULIFLORUM " " 2036.

25. B. PROTACTUM " " 2037.

P. 759. 29. B. MODESTUM " 2038 B.

29/1. B. CONCINNUS, Hook. j. La. Plant. t. 2038 A; scape shorter than the oblong leaf slender few-ftd., 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 spur slender.

SINGAPORE, at Chang Chin Rang. Ridley.

Ehiasome very slender, sheathed; pseudobulbs ½-¾ 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 ½ 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.? Gamble. 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 *med.*

P. 761. Under 37. B. **Cupreum.** Dele the synon. var. stenopetalum. 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. *rufinum,* a plant referred by me by oversight to 58. B. **Conchiperum** (which has no pseudobulb and no auricles to the lip). The following are the characters of the two species:—

37. B. **Cupreum,** Lindl. *l. v.*; pseudobulb 1 in. subglobose, scape slender inlined 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 curved, 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. **Conchiperum,** dele B. *rufinum,* &c. See above, No. 37/1.


62. B. **Whayi** " " t. 2044.

P. 767. 63. B. **Deptosepalum** " " t. 2045.

64. B. **Hymenanthum** " " t. 2046, and after it place—


**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.

Singapori; at Kranji, Ridley.

Rhizome as thick as a sparrow’s quill; pseudobulbs 0. Leaf 1½–1¾ in., narrowed into a short petiole. Scope with the spikes 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.


P. 768. 71. B. Migranthum " " " t. 2018.

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. Sillemianum, should be Sillemianum.

After B. Sillemianum, add—

B. strigillum, 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.

Singapori, on trees, Char Chu Raang, Ridley.

Pseudobulbs hardly ½ in. long. Leaf erect, 2 by ½ in. Scape hardly longer than the pseudobulb, 1-2-sheathed at the base; pedicel 1½ 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 capitulate section.

9/1. Hengosis. 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 border 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 Bulbo-

phyllum it should be to the racemose section with pseudobulbs and glabrous eiliate 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—

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 Jc. 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. Jc. Plant. t. 2060 B.; very small, rhizome slender, pseudobulbs conico-ovoid, lateral sepals ½ in. linear-oblong nearly flat, twice as long as the ovate ciliate long-ciliate dorsal, petals as long as the dorsal sepals ovate-lanceolate 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; petals 5-nerved; petals 5–nerved.

P. 775. 15. CINNIPHEPALUM ELATUM, after Jc. Plant. insert—t. 2052
P. 777. 20. C. ANDERSONI, " " " t. 2055
21. C. BREVIFLORA, " " " t. 2055
22. C. AUREUM, " " " t. 2051 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. ELEPHANTHIS. 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. 784. 2. CHRYSOGLOSSUM ERRATICUM, after Jc. Plant. insert—t. 2062
3. ASSAMICUM, " " t. 2063

COLLIABUM WRAYI, After Jc. Plant. insert—t. 2055
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 Jc. Plant. insert—t. 2066
19. " IRIDIFOLIA, " " t. 2067
20. " LONGIFOLIA, " " t. 2068
P. 795. 38. " ANDERSONI, " " t. 2069
P. 797. 46. " RECIPRICA, " " t. 2070
48. " SACIFERA, " " t. 2071
P. 798. 50. " MAINGAYI, " " t. 2072
P. 801. 63. " ANDAMANICA, " " t. 2073

64. E. FULCELLA. 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. fulcella, 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 coriaceous coriaceous bracts.

E. fulcella 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. 804. After 72. E. PANNEA, insert—

73/1. E. CALAMITIFOLIA, 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 ½ 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 ½ 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 PYGMEEA, After Ic. Plant.—t. 2074 B

76. " LANTICIFOLIA, " " " t. 2075

P. 805. 78. " CRASSIOAULIS, " " " t. 2076

79. " LEPTOCARPA, " " " t. 2077

P. 806. 83. " GRACILIS, " " " t. 2078

P. 807. 84. " CIGANtha, " " " t. 2079

87. " TUBEROSA, " " " t. 2080

P. 808. 89. " APOBEA, " " " t. 2081

P. 809. 93. " SCORTECHINII, " " " t. 2082

P. 810. CLADERIIA VIREDFLORA, " " " t. 2083

P. 811. 4. PHRAGMATA NANA, " " " t. 2084


3. S. WRAYI, after Ic. Plant. insert t. 2086.

P. 814. 4. S. BENSONI, " " " t. 2087.

5. S. LOMBII, 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, S. Khasia. The specimens in Kew Herbarium are from Tenasserim, on rocks at Ayah, Birsish.

6. S. PURESCENS, 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 wigs cuneately oblong and truncate.

P. 816. 1. PHAJSUS WALLICHII. Add after Walp. Ann. vii. 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 habitat 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, leucophaeus and Carronnii, of F. Muell) under that species.


3/1. P. nanus, Hook. f. Jc. Plant. t. 2088 ined.; leaves 4–5 in., scape very short closely sheathed, raceme dense-fl., 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, sepals 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. albida. Var. Bensoniae, after description insert Phajus Beunsoniae, Herms. 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 Bensonia, alba and Marshalliana as specifically distinct; he distinguishes Bensonia 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.


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-fl., bracts slender, lip elongate narrowly subpanduriform, side lobes small acute, midlobe transversely oblong reutuse 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 petioloed, upper sessile; sheath short, membranous. Scape 6 in., with a basal and median tubular appressed sheath nearly 1 in. long; bracts ½ 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-fl., flowers 1 in. diam., lip oblong, side lobes small obtuse, midlobe ovate tip rounded, disk with 3 keels from base to apex.

Perak (Jc. Scortechini). Malaya, Kunstler (Jc. in Herb. 'Calcutt.).

Leaves 8–5 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.


7. T. Khasiana, after Ic. Plant. insert t. 2090
8. T. Minor, " " t. 2091
9. T. Hasta, " " t. 2092
10. T. Maculata to be cancelled; it is Chrysoglossum maculatum, p. 784.
11. T. Latililungu, 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 cor- date, 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 lamellae reaching nearly to the apex.

Siikkim 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. Scrape with raceme 2 ft.; raceme laxly many-fld.; bracts ½ in., lanceolate, shorter than the ovaries; sepals and petals ¼ 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, lanceolate large conical.

P. 824. 3. Agrostophyllum glumaceum, after Ic. Plant. insert t. 2095
4. A. Majus, " " t. 2096
5. A. Fauciflorum, " " t. 2097

P. 825. 2. Cerastostylis malaccensis
3. C. clathbata

P. 826. 4. C. Fendula
5. C. Himalaica
6. C. Lancifolia

P. 827. 7. C. Robusta

33. Trichosma suavis, for 1841 Misc. 83, read 1842, t. 21.

P. 828. 34. Célogyne. After the publication of Vol. V. of this work, Veitch's Manual Pt. vi. appeared, containing the cultivated species of Célogyne with good descriptions, and with figures of several British Indian ones, which are cited below.


7. C. Massangeana, add " " 48, 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 petiolo, 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 lamellae 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. Scrape 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 VOL. VI.
¾ in. long, as long as the pedicle 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 curvatures of the scape is not mentioned by Reichenbach or Veitch.

P. 832. 16. C. OCCULTATA, insert after Is. Plant. 2104.
P. 834. After 21. C. CYNOCHES, insert—

21/1. C. LONGIBRACATA, 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 cylindrical 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. salomonicolor, 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, TESSEREBIM, at Moulmein, Lobb.

P. 835. 28. C. FANDURATA, in line 1 for 78 read 791, and add to citations, Veitch, Man. Orchid. Pt. vi. 47, with fig.


P. 836. 33. C. MICRANTHUM should beMICRANTHA.

P. 837. “34. C. TREUTLERI, after Is. Plant. insert t. 2105.


87. C. STENOCHILA, after Is. Plant. insert t. 2106.

P. 838. 38. C. CARSEA, after Is. 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 Is. Plant. insert t. 2108.

P. 839. 42. C. BABBATA, add Veitch Man. Orchid. Pt. vi. 32, with fig.

P. 840. 47. C. ACNEPS. After Is. Plant. insert t. 2109.

48. C. PRECOX. In line 1, before Fol. Orchid. insert Gen. & Sp. Orchid. 43, and to syno. add Cymbidium precox, 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. birmanica 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.


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. Hookeri-ana is, as stated at p. 528, the only species in which the leaves persist after flowering.

55. C. PURPURASCENS, after Jc. Plant. insert 2109.

P. 848. C. Rossiana. See ante p. 192.


P. 847. 11. PHOLIDOTA, for Micrantha, read Paryphora.


P. 849. 5. C. DIPLOXYPHION. After Jc. Plant. insert t. 2111.


16/1. C. RUBENS, Ridley in Gard. Chron. 1890, i. 576; pseudobulbs 6 by 1\(\frac{1}{2}\) in. conical silvery, scale 2 ft. woolly, sheaths about 5, raceme 14-fld. flowers piuch smaller than in C. vestita, bracts 1 in., pedicel with ovary 2 in., sepals subsimilar dorsal \(\frac{1}{2}\) in. slender lanceolate mucronate, lateral longer-mucronate, petals shorter more spatulate, 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 \(\frac{1}{2}\) in. filiform curved, column as in C. vestita.

Langkawi Island, north of Penang, Curtis.—I have seen no specimen.


P. 855. After 31. C. GRACILIS, add—

31/1. C. LONGIPES, Hook. f.; stems tall, scale 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.

Steam as thick as the little finger. Leaves not seen. Scale 10–12 in., with 2–3 inflated sheaths; raceme 8–10-fld.; flowers 4 in. diam.; sepals 5-nerved and 3-nerved petals subequal, elliptic, acuminate; lpy 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. LABROS, for Hook. f. substitute Reichb. f. in Gard. Chron. 1883, 44.

P. 858. 7. ABUNDINA CANTLEYI, after Jc. Plant. insert t. 2112.
P. 6. After E. 

20/1. E. HOLOCHILA, Coll. & Hemsl. in Journ. Linn. Soc. xxvii. 182; raceme lax-fl., flowers large, bracts about equaling the ovary, scape robust, sepals oblong obtuse, petals ovate-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 2 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.


CYTTOPEA RUSA, Thwaite. 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. 80 (C.P. 3958). Dr. Trimen has kindly lent me the Herb. Peradeniya species of this; it is E. graminacea, L.

To the species of Eulophia "UNKNOWN TO ME" add? Rletia bigallosum, Don Prodr. 30 (Limosodorum bicellatum, H. m. m.), from Nepal, thus described by Don.

—Scape 1½ ft. erect terete scaly, raceme 6-8-fl., flowers pale, lip 3-lobed subun- guiculate 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 Rletia, under which genus he includes an Arrundina, a Calanthe and a Eulophia.

P. 32. After 2. DORIS WIGHTII insert—


SIKIM 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-fl.; bracts minute, triangular; peduncle with ovary 3-1 in., decurved; flowers 1 in. diam.; sepals ovate-oblong; ob-tuse, 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. tomentalis than to Wightiana, differing in the many-fl. long remarkable stout scape and much larger flowers with yellow sepals and petals and a longer spur-like mentum.

P. 40. After 26. SARCOCILIS MERGUENSIS, insert—

26/1. S. (Fornicaria) fuzionifolia, Hook. f. Ic. Plant. ined.; stemless, peduncle about equaling the few elongate-subulate recurved deeply channelled leaves, bracts suberect, lip sessile on the foot of the column saccate truncate 3-lobed ciliate.

CYEVA; at Varuniya, in the N. Central Province, Trimen.

Leaves 2-3 by ½ 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. 44. On last line of description of SARCOCILIS PILIFORMIS, for S. Trimen read S. viridiflorum. I had proposed the former name for the latter plant before discovering (whilst the description was passing through the press) that it was Zehrides viridiflorum, Thw.

P. 44. To habitats of 3. E. CYLINDRACERUM, add Ceylon.
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P. 55. For I. S. GEMINATUM read GEMMATUM.

P. 60. Under the citations for 20, S. CALCICOLAE; in line 2, for Bot. Reg. 1833, Misc. 130, read 1838, Misc. 75.


P. 88. 3, G. JAYANICA, add to habitat, Ceylon, on roots of coffee trees in the Central Province, Thwaites.


P. 116. 5, H. elongata, add to syns. Rhamphidia elongata, Thwaites Enum. 313; and to habitat, Ceylon, alt. 4000 ft., Thwaites.

P. 141. 30. Habenaria longiscalcarata. Two species are confounded here, having been mixed up in Wight’s descriptions, Icones and Herbarium; they are—

30. H. LONGICALCARATA, A. Rich. (Wight Lc. t. 925, Dals. & 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. 927, 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 longiscalcarata.

P. 147. 48. H. chlorina, insert Par. & before Reichb. f.


P. 155. 10/3. H. DECIPiens. This name being confirmed for Wight’s plant (see above) must be replaced by H. GRiffITHIL.

INDIAN ORCHIDÆ 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 König’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 König should not have identified any of them with Rheede’s plates.


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<td>Saracocillus complanatus</td>
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Epidendrum hexandrum, Keii. in Rev. Obs. Pt. vi. 45 = Appendicula Keiiigi, H. f.; ante p. 84.

" liliiflorum " " " " 61 = Limodorum liliiflorum, Wld.

" longiflorum " " " " 55 Malacca, on Mangostin bark.

" lycopodioides " " " " 55 Malacca, near Tsug, on top branches of loftiest trees.

" nudum " " " " 52

" ophrydis " " " " 46


" plantaginifolium " " " " 60 Malacca, near Tsug, on top branches of loftiest trees.

" pusillum " " " " 49 = Sarcocellus Wrightii, H. f.; ante p. 37.

" sessile " " " " 60 = Bulbophyllum clandes- tium, L. ante v. p. 758.

" spatulatum " " " " 43 = Vanda spatulata, Spr. ante p. 50.


" Supplex minima " " " " 47 = Dendrobium atropurpureum, Miq. ante v. p. 724.

" tomentosum " " " " 53 = Eria tomentosa, Lindl. ante v. p. 803.

" variegatum " " " " 44

Serapias Epidendrea " " " " 65 = Eulophia virens, Bl. ante p. 1.

Order CXLIX. SCITAMINAE. (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 panicu- late, irregular, bermaphrodite (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 styloides 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, Rarenala madagascariensis, Sonnerat (Urania speciosa, Wall. Cat. 5765), is frequently planted, especially near Singapore. It has much the leaves of a Musa but they are distinct.
* Ovary 1-celled; placentas 3, parietal.

1. Mantisia. Scape leafless; corolla-tube long; lateral staminodes filiform or spatulate, in the middle of the elongate filament, opposite, spreading.

2. Globba. Stem leafy; corolla-tube long; lateral staminodes petal-like; filament slender.


** Ovary 3-celled; placentas axile.

† Lateral staminodes broad.

§ Connective spurred at the base.

4. Roscoea. Flowering stem leafy; bracts 1-fld.; filament long; capsule subdehiscent.—Flowers purple or white.

5. Cauleya. Flowering stem leafy; bracts 1-fld.; filament long; capsule dehiscent with recurved valves.—Flowers yellow.

6. Curcuma. Flowering stem leafy or not; bracts cuculate, several-fld., 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. Kempteria. Flowering stem leafy or not; filament very short; connective broad.

9. Hitchenia. Flowering stem leafy; filament long, complicate; connective broad not crested.—Inflo. as in Curcuma.

§§§ Connective very narrow, neither spurred nor crested.


†† 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. Ziniber. 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 author or longer and dilated.

19. RHYNCHANTHUS. Spike terminating a leafy stem; filament long, connective not dilated.

Tribe II. MARANTACEAE. 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) anticus; 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. PHYRIUM. Stem with one broad leaf, and a lateral head or spike of flowers, or spike radical; bracts and bracteoles persistent.

Tribe III. CANNAE. 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. MUSEAE. 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. SCAPHE 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 exerted 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.


Chittagong, Rangpur, 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 in., lower flowerless. CALYX campanulate, lilac, ¾ in.; lobes suborbicular. COROLLA-tube twice as long as the calyx; segments ovate, lilac, ½ in., central rather larger and clasping the filament. STAMINODES ½ in.; lip yellow, cuneate, deeply lobed; wings of anther suborbicular. Capsule purple, the size of a small cherry.

**Silhet**, Bowburch; **Chittagong**, Lister.

Habit and foliage of *M. saluatoria*, 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; placenta 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.


* Leaves glabrous beneath (or slightly pubescent in *G. racemosa*).


**Central and Eastern Himalaya**, ascending to 6000-7000 feet in Kumaon.

Leaves stems 1½-2 ft. Leaves 6-9 in., oblong or oblong-lanceolate, subacute, sometimes slightly hairy beneath on the ribs towards the base. Panicle ½-1 ft.; rachis glabrous; branch-bracts and flower-bracts caducous. Calyx ½ in., yellowish, shortly lobed. Corolla bright yellow; tube 2-3 times the length of the calyx; segments ½ in., reflexed; filament 2-3 times the length of the segments. Capsule ½ in. —The name *racemosa* is a misleading one.


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.


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 Roeb.*

**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, \( \frac{1}{5} \) in. Corolla pale yellow; tube 2–3 times the length of the calyx; segments reflexed, \( \frac{1}{8} \) in., upper concave; filament yellow, \( \frac{3}{8} \) in., bearing the small lip a short distance above its base. **Capsule** \( \frac{1}{8} \) 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.


**Travancore Heyne; Anamalay hills, &c., Wight, Jordan. 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* \( \frac{1}{8} \) in., broadly funnel-shaped, pale green; teeth broad, ovate. *Corolla* pale yellow; tube 3 times the length of the calyx; segments \( \frac{1}{8} \) in., ovate; lip twice the length of the segments, lobes longer and narrower than in others of the section. **Capsule** \( \frac{1}{8} \) 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, \( \frac{3}{8}–1 \) ft. *Panicle* \( \frac{3}{8}–1 \) 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 \( \frac{1}{8} \) in.; filament \( \frac{1}{8} \) in.; anther \( \frac{1}{8} \) in., sometimes obscurely margined.

8. **G. subtrigosa, 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, Gallaty.**

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 oblong-lanceolate-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 warped.

**Sikkim Himalaya**, alt. 1500–2500 ft. (Hk. fl. & 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 ½ in.; filament nearly 1 in.


**Arracan**; forests of the low sandstone hills, Kurz.


**Sect. II. Careyella**, Horan. Anther with a narrow entire border.


*Pegu*, Carey, &c.

**Leafy stem** 1–½ 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 scarious spreading or ascending bracts. *Calyx* ⅓–⅔ in., narrowly funnelf-shaped. *Corolla* yellow; tube 2–3 times the length of the calyx; segments ⅔ in.; filament yellow, ⅓–⅔ in.; anther cuspitate, margin very narrow. *Capsule* globose, warted, the size of a large pea.


**Malay Peninsula**; Johore, King.

Habit of *G. multiforma*, 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-ft.; bracts small, deciduous. *Calyx* ⅓ in. *Corolla* pale yellow; segments oblong, ½ in.; anther narrowly margined at the sides and base; lip inserted above the base of the filament. *Ovary* glabrous.


**Penang**, King. **Malacca**, Cuming, Griffith (Kew Distrib. 5652), &c.—Distrib. Malay isles.

separated from *Aplanthera*. Neither Miquel’s description, nor his type specimen, indicate the structure of the anther in the Malay *G. ubignosa*.

Sect. III. *Ceratanthera*, Lestib. (gen.) Anther with a membranous spur from the base or side of each cell.

14. **G. Kingii**, Baker; panicle narrow subspiculate, bracts small deciduous, bulbils 0, corolla-segments oblong, staminodes linear-oblong, lip small inserted above the base of the filament.

**Singapore, King.**


15. **G. stenothyrsus**, Baker; panicle erect subspiculate, lower nodes bearing bulbils, bracts deciduous, corolla-segments oblong, staminodes linear-oblong, lip small emarginate inserted above the base of the filament.

**Tenasserim; Moulemin, 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, ¼ in. Corolla bright yellow, tube ½ in., segments ⅛ in.; staminodes scarcely longer; filament nearly 1 in.; spurs mauve, as long as the anther-cells. Var.? *Cumingii*; bulbils 0, author 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 ⅛ in. Corolla-segments suborbicular; ⅛ in., tube ⅛ in.; filament 1 in.; lip with 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 subsessile, bulbils 0, corolla-segments oblong, staminodes longer linear-oblong, lip small emarginate. *G. expansa*, Wall. Cat. 6536 D.

**Tavoy, Walter; Tenasserim, Griffith, Helfer; Upper Burma, up to 4000 ft., King.**


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, ⅛ in.
Corolla greenish-yellow; segments \( \frac{1}{4} \) in.; lip pale yellow, \( \frac{3}{4} \) in.; filament above \( \frac{1}{4} \) in.; anther-spurs from the sides of the cells.


TAVOY, TENASSEM 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 oval, not longer than the buds. Calyx funnel-shaped, \( \frac{1}{4} \) in. Corolla greenish-yellow; tube 3 times the length of the calyx; segments \( \frac{1}{4} \) in. Staminodes linear-oblong; lip not longer than the corolla-segments; anther oblong, spurs linear-subulate, longer than the cells. Ovary glabrous, 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-fl.d. 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, 757.

**Stem** 9-12 in. Leaves oblong, caudate, 2-3 in. long, finely pubescent beneath. Panicle 1-1\( \frac{1}{4} \) in.; branches ascending, 1-2-fld. Calyx \( \frac{1}{4} \) in. Corolla pale yellow; segments oblong, \( \frac{1}{4} \) in.; lip with two spreading lobes at the base. Ovary glabrous.

21. **G. pauciflora**, King *ms.*; panicle very lax few-fl.d., 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 \( \frac{1}{4} \)–1 ft. Leaves oblong, caudate, 2-3 in. long, minutely pubescent beneath. Panicle short, erect; lower branches 1 in., ascending, 1-2-fld. Calyx glabrous, \( \frac{1}{4} \) in. Corolla pale yellow; segments \( \frac{1}{4} \) in. Capsule glabrous.


MALAY PENINSULA, Roxburgh. From Pegu to Singapore, Roxburgh, and Penang. *South ANDAMANS, Kurz*.

**Stem** 1-1\( \frac{1}{4} \) ft. Leaves 4-8 in., oblong, caudate. Panicle 3-6 in.; racis and branches very slender, lower 2-3 in., flowering only in the upper half. Calyx green, \( \frac{1}{4} \) in. Corolla yellow or tinged with lilac; tube \( \frac{1}{4} \) in.; segments half as long as the tube; filament yellow, \( \frac{1}{4} \) in.; anther-wings 1, deeply bifid, yellow, quadrate, deflexed. Capsule smooth, \( \frac{1}{4} \) 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.

**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 quadrato yellow deeply bifid anther-wings spread horizontally from the sides of the cells.*


**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-fl., most of the flowers replaced by long narrow acuminate bulbils, calyx green narrowly funnel-shaped ½ in., corolla-tube more than twice as long as the calyx, corolla-segments oblong ½ in.—Canara, Law.

27. **G. platystachya**, Baker; leaves large and thin, panicle short lax and very broad, lower branches 2–4 in. cading in a bullil and bearing numerous close flowers shortly pedicilled towards the end each subtended by a small persistent ovate acutely-keeled bract, calyx green broadly funnel-shaped ⅛ in., corolla-tube 3 times the length of the calyx, segments oblong yellow ⅛–⅓ in.—Canara, Law. (Hk. i. & 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, sub-globose. Capsule small, 1-celled, 3-valved. Seeds conical, aril white.


**Khasta Hills, Mann.** Peg, Martaban and Tenasseem, Kurz. Habit of *Gastrochilus*. Rhzizome white, hypogeous. Leaves few, oblong, acute. Peduncle with spike $\frac{1}{2}$–1 ft., very pubescent, as are the raciss and calyx. Spike dense upwards; bracts small, lanceolate, deciduous. Calyx funnel-shaped, reddish-brown, $\frac{1}{4}$ in., eleft below the middle. Corolla-lobes reddish-brown; staminodes about $\frac{1}{2}$ 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.


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 oblong-cylindric, petaloid, erect; lip large, cuneate, deflexed, 2-fld. or emarginate; filament short; erect; anther-cells linear, contiguous, connective produced at the base into a forked appendage. Ovary 3-celled, cylindrical or oblong; ovules very numerous, superposed; style erect; stigma turbinate, margins ciliate. Capsule cylindrical or clavate, membranous, tardily 3-valved. Seeds ovoid, minute, arillate.—One species in Cochín China, and the following.


**Temperate Central and Western Himalayas; from Kashmir to Nepal**, ascending to 11,000 ft.

Whole plant 4–6 in. high. Leaves 3–4 in., 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-cuspitate, erect, $\frac{1}{2}$–$\frac{3}{4}$ in. long and broad; lateral $\frac{1}{4}$ in., linear-oblong, deflexed. Staminode oblong-spathulate, half as long as the upper segment; fertile stamen as long as the staminode; lip obvolute-cuneate, $\frac{1}{2}$–$\frac{3}{4}$ in., bifid about one-third of its length.


**Central and Eastern Himalaya; from Kumaon to Sikkim**, ascending to 10,000 ft. Assam. the Khasta Hills, and Burma.

Leafy stem $\frac{1}{2}$–1 ft. long. Leaves 6 by $\frac{1}{2}$–1 in. at flowering time; sheaths broad, imbricated. Bracts oblong, hidden in the sheaths of the upper leaves. Calyx green, $\frac{1}{2}$ 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 oblong-cylindric, half as long as the upper


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 cylindrical 1⅛ 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 dehiscent to the base with recurved lobes exposing the seeds in a columnar mass.—Species, the following.


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 ⅛ in. Calyx red, above ½ in., minutely toothed, slt deeply down one side. Corolla-tube slightly exserted; limb bright yellow; upper segment ⅛-⅜ in., lower as long, oblong-cuneate, deflexed. Staminode nearly as long as the upper segment, bases minutely spurred on the inner side; lip ⅛ 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 scarious aril. Roscoea spicata, Smith in Trans. Linn. Soc. xiii. 461; Wall. Cat. 6530; Horan. Prod. 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 1-1 1/2 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, ob lanceolate-oblong. Capsule small, red, globose. Seeds 1/2 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, 1/2 in. diam. Seeds ovoid or compressed, forming a dense mass 1/2 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 peti lota, Royle mss.

Garewha Himalaya; between Dehra and Landour, alt. 7000 ft., Royle.

Stem 1 ft. or more. Leaves 6 by 1 1/4-2 1/4 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 corolla-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 aestival, distinct

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from the leaves, and usually developed before they appear; peduncle sheathed by scarious bract-leaves.

1. **C. angustifolia**, Roxb. in Asiat. Res. xi. 333, t. 3; Hort. Beng. 1 Fl. Ind. i. 31; dwarf, rootstock small globose, leaves lanceolate plain green shortly petiolar, 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 Oudoor.**

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 satival, 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., Callett, Train, and in Munnipore, alt. 5000 ft. Watt.


**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. Spike 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.


**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 4-5 in., oasulate, 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 latter 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 Sci. 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; Graham. Cat. Pl. Bomb. 209;
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Eastern Himalaya, wild; cultivated throughout India.—Distrib. Malay Islands.

Rootstock ovoid, tubers many, some 1 in. diam., sessile, cylindrical, 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 ½ 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.

Burm, 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 ½ 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. mas. 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 & aromaticia. Leafy tuft 8-12 ft.; blade 3½ 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. leucorrhiza**, 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 & aromaticia. 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. caesia**, 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. aruginosa*.

Leafy tuft about 3 ft.; blade 1½-1½ 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.—


11. **C. aruginosa**, 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; Salsibr. 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, 5-8 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.


**Bengal**, Carey.

Rootstock very large, yellow in the centre, aruginosa towards the outside. Leafy tuft 3 ft.; blade 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.

**Bengal, Rostburgh.**

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.


**Bengal, Rostburgh.**

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. pilcata*, *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, ⅓ in. diam.; upper lobe ovate; lip obscurely 3-lobed, midlobe emarginate.

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.


Widely cultivated in Bengal and other parts of India. Clarke considers it to be indigenous on Parasamuth, in Behar, alt. 4-5000 ft., Clarke.—DISTRICT. 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.


Concan and the Circars, Rooburgh, &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. Kunthoor, Royle Ill. 359 (name only), which is cultivated on the hills above the Dobra Dooon, is said to be nearly allied. A flowerless specimen from Muscorie, 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.

PROV. Kunstleri (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 obvolute-cuneate, rather longer than the corolla-segments, yellow throughout, emarginate.—Near C. montana.

21. C. reclinata, Roeb. 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 eoma 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 annual, oblong, 3-4 by 2 in. diam.; bracts 1 in.; those of the coma oblong, ascending to flower-bracts in colour. Flowers small, dull red, except the yellow orbicular emarginate lip.


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 eusalival, 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, 6-9 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 ½ in. broad, shallow, omarginate, 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 annual, from the centre of the tuft of leaves; bracts very obtuse, adnate at the sides and spreading at the tip.


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, cuspitate, 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 ½-1 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.


**Peku**; 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 ⅔ in., broad, obscurely emarginate, both primrose-yellow.


**Burma**, *Peku*, 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 ⅓ ft. by 2 in. diam.; flower-bracts ⅔ 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.


**Burma** and *Peku*, Wallich.

*Rootstock* without sessile tubers, but with many small ones at the end of the fibres. *Leaves* 6–8 to a tuft; petioles ¼–1½ ft.; blade 6–12 in., cuspidate, bright green, darker along the veins. *Peduncle* short, hidden by the sheathing petioles; spike 5–8 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 ⅓ in. diam., segments oblong, subequal; limb ⅔ 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. Audaman *Lds*. 
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 second. *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.


Sikim 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, oblanceolate. *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, oblanceolate, sometimes 1 in. broad, more or less tinged with red and crisp 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.

*Pernak, 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.


*Pegu, Wallich; Tavoy, Gomez; Tenasserim, Helfer, Lobb, Parish; Pernang, Mainagya.*

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.

*Terax*; 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* 1⁄2–1 in., whitish, similar to the corolla-segments in shape and size; lip orbicular-cuneate, 1⁄3 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 cadate 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.
Leaves 1–3 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, 1⁄3 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 1⁄2–2 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, 1⁄4 in.; lip 1⁄2 in., obovate-cuneate; stamen arcuate half as long as the lip. Habit of a *Kempferia* of the *Sineorus* section.

IMPERFECTLY KNOWN AND UNDESCRIPTED SPECIES.

G.? *tillefolia*, Baker; annual, root-fibres slender fascicled, leafy stem short, leaves 4–5 by 3 in. distinctly petioled ovate cuneipatate, base oblique, spike 4–5 in., terminal, sessile dense-fld., bracts 1–1 1⁄2 in., oblong-lanceolate scarious imbricate, corolla-tube as long as the bract, segments lanceolate under an inch, staminodes not longer than the segments, lip oblong-cuneate 1 1⁄2 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. *Jenkinsii*, Wall. *s.s. l. c.—Assam. (See under *G. longiflora*.)

8. *KEMPFERIA*, Linn.

Rootstock often tuberous, fibres various. *Stem* short or 0. Leaves few. *Flowers* spicate, on radical scopes, 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.*

* Anther crest 2-lobed, 2-fid, or toothed.


In the plains throughout British India.—Distelb. 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.


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.


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 petioloed, spike sessile, corolla-segments
large linear, staminodes oblong white, lip lilac deeply cut into two obvate emarginate lobes, anther-crest 3-4-dentate, **Roscoea Scit. Pl.** t. 95; Wall. Cat. 6583; Horan. **Prodr.** 21. K. diversifolia, **Link. in Dietr. Sp. Plant.** i. 57; Horan. **Prodr.** 1. c. K. Parishii, **Hook. f. in Bot. Mag.** t. 5763.— **Trilophis, Lestib. in Ann. Sc. Nat. ser. ii. xv. 341.**

**Tenasserim, Parisi; Malacca, Tarquhar.—** **Distrib.** Siam.

**Rootstock tuberos;** 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-fl., sometimes produced before the leaves; bracts inbicate, 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, inbicate, bright lilac; anther-crest large, quadrate, usually trifid.—Connects the sections *Sincorus* and *Potanthium*, 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 partial white, corolla-tube very long, segments ovate, staminodes large obovate, lip patent broader than long bifid.

**Burma (L. in Hort. Cact.)**

**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, Rosco. in Asiat. Res. xi. 328, t. 2; Hort. Beng. 1; Pl. 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. **Roscoa Scit. Pl.** t. 96; **Bot. Reg.** t. 173; Wall. Cat. 6586; **Grah. Cat. Pl. Bomb.** 208; **Dals. & Gibs. Bomb. Pl. Suppl. 87; Thw. Enum. 316; Horan. **Prodr.** 21. K. ovata, **Rosco. in Trans. Linn. Soc. viii. 351.** Cucumaria rotunda, **Linn. Sp. 2.—Rheedie, Hort. Mal. xi. t. 10; Rumph. Amboin. v. t. 69, fig. 2. **

**Concan and Guzerat, Graham. South Andaman Isld., Kurs. Tenasserim, Heter, Ceylon, Thuwales.—Distrib.** Malac. Islds.

**Rootstock** perennial, tuberos, 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, inbicate, 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 sub-sessile variegated black and green; flower entirely white; corolla-segments

**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 ¾ 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*.


**BURMA;** banks of the River Attra, 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* 1½ 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.


11. **K. Andersonii,** Baker; leaves oblong acne shortly petioled ascending, flowers several in a head surrounded by large oblong green bracts, staminodes small obvate, lip orbicular emarginate, anther-crest orbicular entire.


*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* subcriaceous, 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, ¾ in.—Habit of *K. pandurata*.


Throughout India from the Himalayas to Ceylon and the Malay Peninsula, often cultivated.—DISTRI. Malay Islands.

**Rootstock** tuberous; **root-fibres** many, very thick. **Leaves** erect, petiolo 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 4-1 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.


**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, petiolo 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; petiolo 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 exerted from the upper bract; segments ½ in., oblong-lanceolate, greenish.


**Pegu**, Martaban, Tayoy, 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; petiolo 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 ⅔-1 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 ⅓ 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 ¼-⅓ in.; staminodes as long as the corolla-segments; lip about ⅔ 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 Bhutan 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, ⅔ in. long. Corolla-tube slender, an inch long; segments ¼ in. long.—Very near *K. linearis*.


**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 1-⅓ in., oblong-lanceolate, green, moderately firm. Calyx much shorter than the bract. Corolla-tubes 1½-2 in.; segments ⅔-⅔ 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.**

Subgen. IV. Stachyanthes, Benth. Leafy stem produced. Flowers many in a terminal spike. Lip bifid; anther-crest quadrate entire.


Concan; on the banks of rivulets, Graham, &o.

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 ovoid, 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 obovoid-trigonal, finally dehiscent. Seeds ovoid, arillate.—All Indian.


Burma, Wallisch.

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.


The Concan; abundant on the table-land of Mahabaleshwar.

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, 1¼ in.; expanded limb 1 in. diam.; staminodes oblong, ¼ in.; lip ½ in. diam., deeply bifid; stamen shorter than the corolla-segments.


**EASTERN HIMALAYA**, subtropical region. **KHASIA HILLS**, **ASSAM, CACHAR, Sylhet** and **MANIPUR**.

Stem ½ 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 ¼ in., cuneate, with a long claw and a small bifid cusp; filiform filament ½ in. Capsule small, green, oblong-trigonoous.—Resembles *H. glauca* in habit, but differs so much in structure that probably it should form a different genus.

**IMPERFECTLY KNOWN SPECIES.**


Rootstock horizontal, tuberous; root-fibres not much thickened. Stem elongate, leafy. Leaves distichous, oblong or lanceolate. Flowers subsolitary or in terminal spikes; bracts oblong, subcoriaceous, one- or more-fld. **Corolla** 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**, Känig 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 Asiatic Res.** xi. 325; Hort. Beng. 1; Fl. Ind. i. 10; Ed. Wall. & Carey, i. 9; Rose. in Trans. Linn. Soc. viii. 543, t. 20, f. 6; Sei. Pl. t. 51; Bot. Mag. t. 708; Smith Exot. Fl. ii. t. 107; Blume Enum. Fl. Java. i. 56; Wright i. t. 2010; Wall. Cat. 6539, in Kew Journ. v. (1853), 325; Thw. Enum. 519. H. spicatum, Lodd. Bot. Cat. 653, not of Hamilt. H. Gandasulium, Prophetae and album, Herb. Hamilt.—Hedygium, 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.—Distr..—Malay Islands.

Rootstock 1 in. thick. Stem 4–6 ft. Leaves often above a foot by 3–5 in., usually pubescent beneath. Spike 1⁄2–1 ft.; outer bracts 1 1⁄2–2 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 1 1⁄2 in. by about 1⁄4 in.; lip 1 1⁄2–2 in. broad, narrowed suddenly to a short claw, short lobes rounded; filament red; anther about 1⁄4 in. Capsule oblong, glabrous, orange inside. Seeds with a crimson aril.


Var. H. maximum, Rosc. Scit. Pl. t. 52 (sp.); leafy stem taller than in the type, flowers pure white larger, staminodes 2–1 in. broad, lip 2–2 1⁄2 in. broad. Lindl. in Bot. Reg. t. 1022; Horan. Prodr. 24.


2. H. Elwesi, 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., Elwesi.

Leaves 1 ft. or more, by 3 in. Spike 1⁄2 ft.; bracts green, subcoriaceous, 2–2 1⁄2 in., rather diverging, not so closely imbricate as in H. coronarium. Corolla-tube 2 1⁄2 in.; segments above 1 in.; staminodes resembling the segments in size and shape; lip 1 1⁄2 in. broad, narrowed suddenly to a broad claw; filament bright red; anther linear, 1⁄4 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. 4600 ft. Clarke; Griffith (5680), without locality.

Leaves 1 ft. by 1 1⁄2–2 in., pale beneath. Spike 3–4 in.; bracts 1 1⁄2–2 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 1⁄2–1 1⁄4 in. broad.


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.


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 spike. Corolla-tube 2–2½ in.; segments 1 in., linear; staminodes 1 in., lanceolate; lip ¾–1 in. broad, not at all clawed, lobes 2 rounded; filament pale red; anther linear, ½–1 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. i. 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, Rusc. Sci. 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. 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 cylindrical, about 1 in. Corolla-tube 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 narrow 2-fld. 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 ½ in. longer than the calyx; segments linear-convolute, 2 in. long; staminodes and lip about 1 in.; filament bright red, 2 in.; anther larger, linear.

8. **H. longicornatum**, 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 oblong-lanceolate 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 to ¾ in. beyond the bract. **Corolla-tube** protruded ½ 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.


**Tawoy, 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.


**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.
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(1853) 329; Cat. 6545 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. *Rose Scit. Pl.* t. 54; *Horan. Prodr.* 25.

**Nepal, Silhet, Assam, Khasia Hills, Munsifur**, alt. 4000-6000 ft.

*Leaves* sometimes 1 ft. 2-4 in. broad, glabrous beneath. *Spikes* ½-1 ft.; racemes very stout and hairy; bracts pale green, ⅓-1 in. *Calyx* about ⅓ in. *Corolla-tube* longer than the calyx; segments linear, 1-⅓ in.; staminodes like the corolla-segments; lip 1 in. or more; filament ⅓-⅔ in., bright red; anther much shorter than in any other species.

Var. *Tenuiflorum*, Wall. Cat. 6546 C.; flowers much smaller than in the type, corolla-segments staminodes and lip ¼ in.—Assam, Silhet and Khasia.

†† *Leaves* more or less pubescent beneath.

12. **H. aureum**, Clarke & Mann ms.; 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 bised 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. *Spikes* 1½-2 in.; bracts cylindric, green, glabrous, ¼ in. *Calyx* about as long as the bract. *Corolla-tube* ⅓-⅔ in.; segments linear, ⅓-⅔ in.; staminodes as long as the corolla-segments; lip ⅓-⅔ 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.


**Khasia Hills and Chittagong**, Roxburgh, Wallisich.

Leafy stem 2-3 ft. *Leaves* 5-6 by 1½-3 in., thin, caudate, finely pubescent beneath. *Spikes* 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.


**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 1–1 1/2 in., rolled tightly round the calyx, calyx and corolla glandular. Corolla-tube 2–3 in.; segments 1 in., linear. Stamnodes nearly as long as the corolla-segments; lip 1 in. long; filament bright red, 1–1 1/2 in.; anther large, linear. Capsule globose, glabrous, 1/2 in. diam.—Nearly allied to H. speciatum.

Var. glanduligerum, Clarke. Leaves glabrous beneath. Whole plant especially the flower very glandular.—Khasia Hills.


TROPICAL HIMALAYA; from KUMAO 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, 1 1/2 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, 1 1/2–2 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, 1–1 1/2 ft. Leaves 5–6 by 2 in., thin, glabrous, caudate, base cuneate. Spike 1–2 in., resembling that of Globba bulbifera, few-fld.; bracts 1/2 in., oblong, laxly imbricate, green, glabrous. Calyx 1/2 in. Corolla-tube a little longer than the calyx; segments linear, 1/4 in.; staminodes as long as the corolla-segments; lip nearly as long, distinctly clawed; filament 1/2–1/4 in.; anther 1/4 in. Capsule globose, glabrous, 1/2 in. diam.

17. H. Gardnarianum, Rosc. Sci. 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 oblong-clawed, lip obovate-cuneate, tip 2-fld 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; Reichh. Exsul. 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 1–1 1/4 ft. by 4–6 in., white pulverulent beneath, as are the young bracts and rachis of the spike. Spike 1–1 1/2 ft.; bracts 1 1/2–2 in., rolled tightly round the flowers, glabrous. Corolla-tube a little longer than the bract; segments greenish, reflexing, 1 1/4 in. Stamnodes above 1 in. by 1/2–1/3 in. broad; lip 1 in. or more, 3/4 in. broad, narrowed gradually to a short claw; filament bright red, 2–2 1/2 in.; anther linear, 1 1/2 in. Capsule-valves ovate, orange-red within, persistent, 1/2 in. Seeds brownish-crimson.

Hedychium.]


Siliqueta, Gomes.

Leaves above 1 ft., 3-4 in. broad, glabrous beneath. Spike ½-1 ft.; lower bracts 1½ in., ¼ 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 ½ in. broad; filament bright red, twice as long as the lip; anther linear, yellow, ¾ in.


Assam, Khasia, the Nagá 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, ¾ 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-fl.d., 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. 55; Wall. Cat. 6548; Reichb. Jc. 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 f.).

Leaves 1 ft. or more, 1½ in. broad, base rather rounded, narrowed gradually from the middle to the point. Spike 1 ft.; bracts green, 1-1½ in. Corolla-tube scarcely longer than the bract; segments 1 in., linear, reflexing; staminodes under 1 in., ½-¾ in. broad; lip above ½ in. and broad; filament 1½ in.; anther linear, ¾-½ in.—The type was described and drawn from a plant in the Calcutta Garden.


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. augustifolium, Roxb. Hort. Beng. 1; Cor. Pl. iii. 248, t. 251; Fl. Ind
232

CXLIX. SCITamineae. (J. G. Baker.)

[Hedychium.]

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 $\frac{1}{2}$ in. and broad. *Rosc. Sciit. Pl.* t. 60; *Bot. Mag.* t. 2078; *Kern. Hort.* t. 807.—Chittagong and Silhet, always at low levels.

Var. *H. carnatum*, *Rosc. Sciit. Pl.* t. 57 (sp.); leaves 1$\frac{1}{2}$–2 in., flowers white tinged with pale red, lip orbicular $\frac{1}{2}$–$\frac{3}{4}$ in. long and broad, filament pale red 1$\frac{1}{2}$–2 in. *Bot. Mag.* t. 2637; *Lodd. Bot. Cab.* t. 693.


Kumaon and Nepal, alt. 5000 ft. or more. Leaves 1–1$\frac{1}{2}$ ft. by 2–3 in., narrowed gradually to the base, glabrous beneath. Spike $\frac{1}{2}$–1 ft.; bracts oblong, green, glabrous, 1–1$\frac{1}{2}$ 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, $\frac{3}{4}$ in.—The affinity is stronger with some forms of *cocineum* than with *Gardnerianum*.

22. *H. luteum*, Herb. Calcut.; leaves oblong-lanceolate, spike short dense-fl., 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-fl., 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.

Khasta Hills, Wallich. Leafy stem long and stout. Leaves above 1 ft., 3 in. broad. Spike $\frac{1}{2}$ ft.; bracts 2–3 in. *Corolla*-segments linear, 1$\frac{1}{2}$ in.; staminodes 1 in., narrowed to the base; lip 1 in. broad, narrowed suddenly to a short claw.—Differs from *cocineum* by its whitish flowers and shorter stamens. Described from a drawing in the Calcutta collection.


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$\frac{1}{4}$ in., $\frac{3}{4}$ in. broad. *Calyx* cylindric, 1–1$\frac{1}{2}$ in. *Corolla*-tube a little longer than the bract; segments linear, 1$\frac{1}{2}$ in.; staminodes 1–1$\frac{1}{2}$ in.,
distinctly clawed; lip rounded at the base to a distinct claw, \( \frac{1}{2} \)-1 in. broad, white, with a patch of dull red in the centre; filament pale red, 2 in. or more; anther \( \frac{1}{2} \)-\( \frac{3}{4} \) in.—This and *H. aurantiacum* are so difficult to distinguish when dried from some of the forms of *cocineum*, 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-fl., 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 divericate, 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.

**TAVOT**, Gomes.

Stem slender, 2–3 ft. Leaves 6 by 1 in. Spike 1 in.; bracts \( \frac{1}{2} \)-\( \frac{3}{4} \) in. Calyx \( \frac{3}{4} \) in. Corolla-tube rather longer than the calyx; segments \( \frac{3}{4} \) in. linear-oblong; lip rather longer than the corolla-segments. Anther-cells short, glabrous.


**CEYLON**; forests in the Ambaganowa district.

Leafy stem 3–6 ft. or more. Leaves subcoriaceous, 18–24 by 3–5 in. petioled. Peduncle 1–1 1/2 ft.; bract-leaves sheathing, obtuse. Spike 2–3 in. long and broad; flowers very numerous; bracts dark red, outer 1 1/2 in. long and broad. Flowers pale ochraceous yellow. Corolla tube \( \frac{3}{4} \) in.; segments and lip much shorter than the tube. Fruit small, oblong, smooth.


**CEYLON**; forests in the Reigam and Pasdoon Corles.

Rootstock slender. Leafy stem 2–4 ft. Leaves firm, 6–15 by 1 1/2–2 in. Spike 1–1 1/2 in.; peduncle decumbent, shorter than the spike; bracts glabrous, outer \( \frac{3}{4} \)-\( \frac{5}{8} \) in., inner lanceolate. Corolla-tube under 1 in., segments short, oblong, obtuse. Lip yellow, copiously veined with purple; midlobe smaller, bifid. Capsule globose, \( \frac{3}{4} \) in. shortly beaked.

4. **A. involucratum**, Bentham. 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.
Leaves 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-trigonal, smooth.


* Lip not, or hardly longer than the corolla-segments.


Nicobar Islands, Kurz.
Leaves 6-7 ft. Leaves thin, 2-3 ft. by 2½-3 in., green and glabrous on both surfaces. Spike very dense-fl., 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, Helper (Hook. & 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.

PENANG, Malacca, (Kew Distrib. 1581).
Leaves 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, Malacca (Kew Distrib. 1581).
Leaves 3 in. 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.

MALACCA, Griffith (New Distrib., 5758). Penang, on Government Hill, Curtis, 1580.

Leaves 1-1½ ft. by 1½ in., bright green. Spike 2 in. long and broad; peduncle arculate, as long as the spike; outer bracts bright red, 1½ in.; inner as long, lingulate. Calyx 1 in., spatheaceous, cylindric; teeth minute, densely pilose. Corolla-tube as long as the calyx; segments 1 in. oblong, glabrous. Lip scarlet, with a small obtuse 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 (New 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-lingulate, 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. Aachasma macrocheilos, Griff. Notul. iii. 429; t. 1. Plant. Asiat. t. 357.

MALACCA, Griffith.


EASTERN TROPICAL HIMALAYAS; Sibhet, 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. Coromandel. t. 276. Elettaria linguiformis, Schult. Mant. i. 24; Horan. Prodr. 31.

EASTERN HIMALAYA, Tropical region, Sikkim, J. D. H. KHARIA HILLS (Hook. f. & Thoms. Herb. Ind. Or., 10), King. BENGAL, Roxburgh.

Rhzome stout, copiously stoloniferous. Leafy stem 4-6 ft. Leaves thin,
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.


**Malacca**; foot of Mount Ophir, *Griffith*.

Leafy stem stout, 12-16 ft. Spike 3-4 in.; outer bracts 1½-2 in. Calyx spathaceous, cylindrical, 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.


**Malayan Peninsula**; Kiuta, *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, ½ 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,** Malacca (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.

MALACCA, Kœnig; dense woods at Rhim, Griffith.
Leaves 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-trigonoous.


20. A. triorgyale, Baker; leaves oblong-lanceolate pubescent beneath, spike oblong sub sessile, outer bracts large suborbicular not reticulated, lip as long as the corolla-segments.

PERAK, King's Collector.
Nearly allied to A. scyphiferum. Leaves 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 veins. Corolla-tube 2 in.; segments and lip shorter than the tube.


* Anther-crest entire or crenate.
† Anther-crest lunate.


Cost of Tenasseim; island of Junk Seylan, Kœnig.
Leaves 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 ciliate 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-creeeping. Leaves 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.)


24. A. masticatorium, Thw. Enum. 317; leaves lanceolate glabrous beneath, spike globose shortly peduncled, bracts small obovate pubescent, lip broad 3-lobed, anther-crest semi-lunar, 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, scarious 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 ½ in. diam., greenish-black.—Rootstock a native condiment.

† Anther-crest orbicular or transversely oblong.

25. A. pacificorum, Baker; spike sessile 1–2 ft., 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.


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 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 Singhberajab forest.

Rootstock slender. Leafy stem 2–4 ft. or more. Leaves about 12 in. under 1 in. broad, firm, linear, very acuminate. Spike few-fl.; peduncle 1–2 in., bract-leaves many, small, oblong, scarious, 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, ¾ in.; crest as long as the cells.


Ceylon; Reigem 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 ciliolate with whitish hairs. 
*Corolla-tube* much shorter than in *A. fulvicaps*; segments \( \frac{1}{4} \) 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. & Thoms. Herb. Ind. Or. 4).

Leaves 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, \( \frac{1}{4} \) in.

30. **A. xanthoideus**, Wall. Cat. 6557; leaves lanceolate glabrous, spike globose shortly peduncled, outer bracts small oblong, lip coelocarpiform bifid longer than the corolla-segments, anther-crest short broad entire, capsule ciliolate.


Leaves 5-6 ft. Leaves 1-1½ ft. by 1½-3 in., firm, bright green. Spike 1 in., few-st.; peduncle arcuate, slender, 2-3 in.; outer bracts \( \frac{3}{2} \) in., acute, glabrous. *Corolla-tube* under 1 in.; segments oblong, \( \frac{3}{4} \) in. *Lip* with an orbicular blade \( \frac{1}{2} \)–\( \frac{3}{4} \) in. broad, narrowed suddenly to a broad claw; anther-crest anuricled 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.

Leaves 5-6 ft. Leaves taller than a man Leaves 1 ft. Outer bracts orbicular-cordate; inner linear-lanceolate, white; tip ciliolate. *Corolla-segments* unequal; upper erect, oblong; lower lanceolate, approxinate. *Lip* coriaceous, bright orange; margins crisped; recurved lip bidentate; stamen half as long as the lip. *Capsule* oblong-trigonous.—I have seen no specimens.


**Eastern Himalayas**; **Sikkim**, **Khasia Hills**, Silhet, **Eastern Bengal** and **Chittagong**. (Hk. & Thoms. Herb. Ind. Or. 5.) Roxburgh, &c.

Leaves 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-acute, \( \frac{1}{4} \) 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. 48 (sp.); leaves silvery white beneath; anther-crest larger, capsule ovoid.—Sikkim, Khasia and cachar. (Hk. & 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. *Leaves* 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.


**Nilghiri Hills**: Wight, Gardner.

*Leafy stem* 4-6 ft. *Leaf* 12 by 2½ in. *Spikes* 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; Pl. 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.


** Anther-crest 3-4-lobed.

† *Spikes* 2-3-fld.


**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.


**Malacca**: Griffith, Kew Distrib. 5763, Maingay (K. d. 1673.)

to a rootstock; bracts 1 in., reddish, membranous. Corolla-tube 2 in., very slender; segments \( \frac{1}{2} \) in., linear-oblong, membranous. Lip white, suboceolate, 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, 1–1\( \frac{1}{2} \) in.; peduncle as long as the spike. Corolla-tube 1 in.; segments oblong, obtuse, nearly as long as the tube. Lip \( \frac{1}{2} \) 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 Prat. Fl. 206.

Malay Peninsula; Ruput 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 recurved-ascending cymbiform blade.—Descrip. 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, Maligay (Kew Distrib. 1585).

Leafy stem long, robust. Leaves above 1 ft. Spikes 2–2\( \frac{1}{2} \) in. and broad; peduncle about as long; outer bracts reddish, 1\( \frac{1}{2} \) 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.


Eastern Himalayas, tropical region; Nepal, Wallis; Sikkim, Khasia Hills, Silhet, & Northern Bengal; Roxburgh, &c.

Leafy stem 3–4 ft. Leaves 4–1 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...
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 globbose; bracts 1 1/2 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 globbose shortly peduncled, bracts oblong acute glabrous, lip short broad, anther-crest broad 3-lobed, capsule small echinate.

Ceylon; Reigam Corle, Thwaites.


44. **A. aculeatum**, Roxb. in Asiat. Res. xi. 344, t. 6; Fl. Ind. i. 40; leaves oblong-lanceolate glabrous beneath, spike globbose 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, 1–1 1/2 ft. by 2–4 in. Spike 2 in. diam.; bracts brown, acute, 1–1 1/2 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.


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 1 1/2–2 in. diam.; peduncle stout, 1/2 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.

Surgery. V. Cenolophon, Horan. (gen.). Spike terminal on the leafy stem. (Sect. 46–48.)


Ceylon; Ambagomowa district, alt. 3000 ft.

Leafy stem 1 1/2–2 ft. Leaves 1/2–1 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 reteus.

1847, t. 52; leaves oblong, spike dense-fld. globose lip orbicular twice as long as the corolla-segments. Centolophon vitellinum, Horan. Prodr. 36.

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 tridif 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.

Pekak; 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 coriaceae base. Spike 3–4 in.; peduncle long, erect, enveloped in the sheath of the topmost leaf; bracts caduceous. Ovary densely villous. Calyx loosely tubular, ½ 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, Adams.

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 dehiscent. 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, Rosc. 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; Rangpore, 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.


**Northern Circars, Rosborough.**

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. *Stamen* arching over the lip and equalling it in length; beak as long as the anther, as in the other species.


**Congo;** common in the mountains, Nimmo, Dalzell.

Leafy stem 4-5 ft. Leaves 1-1½ ft., 6-13 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 obvate-cuneate, faintly emarginate. *Capsule* the size of a pigeon’s egg.—Nearly allied to *Z. panduratum*.


**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 *Dymecwicia*.


**Burma, Wallisich. Peru, 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 ⅔–1 in.; upper segment larger than the two side ones, concave. Lip ⅔ 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. 6688; Horan. Prodr. 28.

** Leaves glabrous beneath.

8. Z. ligulatum, Roxb. in Asiat. Res. xi. 348; Hort. Beng. 1; Fl. Ind. i. 51; Coromandel. Fl. 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.

** Leaves glabrous beneath.


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.

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.

** Leaves glabrous beneath.

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.

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, ⅔ 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.
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 ovate-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 scariosse bract-leaves.—Species 12-21.

* Leaves glabrous beneath.

12. Z. intermediate, Baker; spikes globose, bracts lanceolate, corolla-segments pale red, lip orbicular reddish-black finely spotted, basal anicles oblong.

North Khasia Hills; at Bhorasa, 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 heal.—Spikes 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 Prain in the Naga hills has obovulate-oblong leaves above a foot long, a slender erect peduncle as long, and bracts rather longer than in Clarke’s plant.


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 3-1 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 1 ft. 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 864 from Mount Obir 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.


From the Himalayas to Ceylon and the Malay Peninsula.—Distri.

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 1½-4 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 ⅔ in. broad. *Stamen* pale, as long as the lip. *Capsule* oblong, above 1 in.—I cannot from the description distinguish *Z. americana*, Blume; *Miq. Fl. Ind. Bat.* iii. 598.

**Leaves more or less pubescent beneath.**

17. Z. cylindricum, Moon *Cat. Ceyl. Pl.* 1; leaves oblong-lanceolate pubescent beneath, spike oblong-cylindric, bracts ovate pale or reddish, corolla-segments green, lip yellowish-white unspotted obovate, basal auricules small obtuse. *Thwaites Enum.* 315.

Ceylon; in forests of the central province. *Leafy stem* 3-6 ft. and more. *Leaves* 6-12 by 1-2 in. *Spikes* 3-4 in., 1½ in. diam.; peduncle 6 in.; bract-leaves obtuse, imbricate; bracts about 1 in., closely imbricate, upper subsulate, lowest obtuse. *Corolla-tube* as long as the bract; segments lanceolate. *Capsule* subglobose red. *Seeds* black, aril white.


Hills of the Concan, Graham, &c.

*Stem* reddish, pubescent. *Leaves* dark green, 12-18 by 1½-3 in. *Spikes* ½-1 ft., 1½ in. diam.; peduncle elongate, with large obtuse sheathing scarious bract-leaves; bracts 1½-3 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.


Malacca, *Griffith (Kew Distrib.* 5762), *Malangay (K. d. 1567).* Perak; Larut, King’s Collector.

*Leafy stem* long and stout. *Leaves* 9-12 by 2-3 in. *Spikes* ½-1 ft., 2½ in. diam.; bracts 1½-5 in. long and broad, more coriaceous and more spreading than in the
other species, resembling those of *Hitchclla glauca*; peduncle sometimes 1 ft. Corolla-tube $\frac{1}{2}$ 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.


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., $\frac{1}{2}$-2 in. diam.; peduncle 3-12 in.; bracts 1-1$\frac{1}{2}$ 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 unsotted midlobe $\frac{7}{4}$ 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 1-1$\frac{1}{2}$ in., thin, bright green. **Spike** 2-4 in., 1$\frac{1}{2}$ 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.)


SIKKIM HIMALAYA; alt. 3000-5000 ft., *Hook. J. Thom. (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-ld. 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.) Spike terminal on the leafy stem. (Sp. 23, 24.)

23. **Z. capitatum**, Roxb. in *Asiat. Res.* xi. 348; *Fl. Ind.* i. 55; leaves

**Central and Eastern Himalayas, from Kumaon to Sikkim** *the Khasia Hills & Silhet.*


**Khasia Hills**; Umwai, sit. 3000 ft., Clarke.

Leafy stem 3–4 ft. *Leaves* 4–6 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*, Bumph. Hort. Amboi. v. 148 tab. 64, fig. 2.

**Imperfectly Known Species.**


**13. Costus, Linn.**

Rootstock tuberous, horizontal. Leafy stem long. Leaves oblong; sheaths broad. *Spike* dense-fld., globose or ovoid, usually terminal, rarely produced directly 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, supradosed; 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.


Throughout India from the CENTRAL and EASTERN HIMALAYAS, ascending to 4000 ft. to Ceylon and Malacca.—DISTRIBUTION. Malay islands.

Leafy stem 6–9 ft. stout. Leaves ½–1 ft. or more, oblong, acute, thinly silky beneath. Spike very dense-flowered 2–4 in.; bracts ovate, bright red, 1–1½ in. Calyx 1 in.; segments 3, ovate cuneate. 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. Aryophyllus, Wall. Cat. 6555 G, H.; leaves more densely silky and paler beneath, spikes globose, bracts pubescent.—Pogu and Penang.


MALACCA, Malingay (Kow Distrib. 1578).—DISTRIBUTION. Java.

Leaves 6–8 by 2½–3 ob lanceolate-oblong, narrowed gradually from the middle to the base. Peduncle about 2 in. curved; bract-leaves ½ 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 directly from the rootstock, bract-leaves larger oblong, corolla-segments villose.

PERAK; Larnt, King’s Collector, 2104.

Leaves 6–8 by 3–3½ in., ob lanceolate-oblong, subcoriaceous, broadest above the middle, narrowed gradually to the base. Peduncle 4–5 in. stout; bracts 1 in., densely imbricate, oblong, scarioso. 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 cylindrical, minutely 3-toothed, silt down one side. Corolla-tube cylindrical; segments linear-oblong, subequal. Lateral staminodes obsolete; lip orbicular-reiniform, 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.

Ceylon; forests of the central province, alt. 3000 ft.

Leaves 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 racis. Calyx under 1 in. Corolla-tube rather longer than the calyx; segments under an inch long. Lip 1½ 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 directly from the rootstock, long, flexuous, decumbent; bracts 2—3 ft.; flowers shortly pedicelled, bracteolate. Calyx cylindric, membranous, shortly lobed. Corolla-tube cylindric; mid-segment oblong, convex; lateral narrower. Lateral staminodes minute teeth; lip ovate-cuneate; filament very short; anther-cells contiguos, not crested. Ovary 3-celled; ovules many; style filiform; stigma small, turbinate. Capsule globose or oblong, coriaceous, indehiscent. Seeds small, angled by pressure.


Malabar; on the Western Ghats, from Kurl southwards (wild or cultivated). Ceylon (cult.).

Leaves 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 ovate-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:

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 ⅛ in.; bracts lanceolate. Calyx 1 in. Corolla-tube 2½-3 in., cylindrical, rather dilated towards the top; segments ½ 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 ⅛ in., very slender; segments ⅛ in. Lip deflexed, twice as long as the corolla-segments.

3. E. serpentina, Baker; spike decumbent, second, corolla-segments linear-oblong, tube twice as long as the calyx-limb.

Penang, alt. 1000-1500 ft., King’s Collector.

Rhzome 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, cylindrical, 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, Owing, 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 1½ in., green, lingulate, erecto-patent, obtuse, involute in the lower half. Calyx ⅛ in. Flowers white. Corolla-tube under 1 in., slender, cylindrical; segments shorter than the tube. Lip under 1 in. Stamens porrect, shorter than the lip. Capsule ⅛ 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 cylindrical, 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 incurred 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
indeciscent. Seeds globose or angled by pressure.—Species 30, in the Tropics of the Old World.


Chittagong and the Malay Peninsula to Malacca.—Distrib. Siam, Cambodia.

Leaves 3–4 ft. Leaves 1–1 ft. by 2–3 in. **Panicle 6–9 in.**; rachis pubescent; lower branch often elongate, the others short ascending; bracts small, brown, scarious, ovate. **Calyx** 1–2 in.; mouth oblique, obscurely 3-denticate. **Corolla-tube** scarcely longer than the calyx; segments 1/2 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.

Leaves *elongate*. Leaves *shortly petioloed*, 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-fl.d.; bracts minute, **Calyx** 1/2 in., minutely 3-denticate. **Corolla-tube** twice as long as the calyx; segments 1/2 in. **Lip** scarcely longer than the corolla-segments. **Capsule** globose, 1/4 in. diam., 1–2 seeded.


Throughout India from the foot of the Himalayas to Ceylon and Malacca.—Distrib. Malay islands and widely cultivated.


4. **A. Allughas**, Rosc. *in Trans. Linn. Soc.* viii. 346; *Seit. Pl.* t. 67; leaves oblong-lanceolate glabrous beneath, panicle narrow copiously com-

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, about ½-1 ft.; branches pubescent, fewer and more ascending than in A. Galanga; flowers crowded, shortly pedicelled; bracts small, ovate-amplexicaul. Calyx pubescent, ½-1 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 globe, black, ½ in. diam.


Southern Malay Peninsula, the Concan, and Ceylon.—Distrib. China, and widely cultivated.


6. A. wrayi, King MSS.; leaves lanceolate glabrescent beneath, peduncle scarcely leafy, panicle short slightly compound, flowers middle-sized, corolla-segments oblongate, 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 ¼ in., narrowly funnel-shaped. Corolla-tube as long as the calyx; segments ⅛ 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 glabrescent beneath, panicle slightly compound, flowers large, corolla segments oblong white, lip suborbicular variegated red and yellow, base not spurred, margins much incurved. Roesc.
Alpinia.] CXLIX. Scitamineae. (J. G. Baker.) 255


8. A. petiolata, Baker; leaves oblong-lanceolate petioloed glabrous beneath, raceme simple, bracts large, flowers large, lip obovate-cuneate.


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 obovate green bract; pedicels very short; flower-bracts small, persistent, orbicular, subcoriaceous. Calyx funnel-shaped, bright red, ¼–½ in. Corolla-segments concave, ½–1 in. Lip ½–1 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.


East Himalayas, Bengal, Assam, Cachar, Burma, the Shan States and Malacca.


EASTERN HIMALAYAS and MALAY PENINSULA.—DISTRIBUT. Malay is.lands.


Var. A. asperica, 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. 597), Maingay (K. d. 1574). PEARAK, 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 sericose bracta. Capsule globose, 1 in. diam.


The DECCAN PENINSULA, in swamps, König.

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, tristrons.—Known only from König'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**; Larut, alt. 3,400 ft., King's Collector.

Leaves 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 peduncled within the bracteole. **Calyx** ½ in., spathaceous. **Corolla-tube** as long as the calyx; segments linear-oblong, ½ in. Lip ovate, 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. 3,400 ft., King's Collector, 8047.

Nearly allied to **A. decurveda**, 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. Racemes simple, lax-fld., secund, deflexed; pedicels cernuous, ½ in.; bracteoles under 1 in. **Calyx** cylindrical, spathaceous, ½ in. “**Flower** light yellow. **Fruit** deep red.”

**19. RHYNCHANTHUS**, Hook. f.

**Rootstock** tuberous; fibres stout, hairy. **Stem** leafy. Leaves oblong-lanceolate. **Spine** terminal. **Calyx** cylindrical, 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, tarbinate. **Capsule** and seeds not seen.


**Burma** (Hort. Low).

**Rootstock** croid, green, 1-1½ in. diam. **Leafy stem** 1½-2 ft. Leaves 6-8 by 1½-2 in. **Spine** 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.


**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, **Vol. VI.**
1-3-seeded. Seeds subglobose, aril lacerate; embryo curved.—Species 7-8; tropics of Old World.


**Eastern Bengal and the Malay Peninsula.—Distel. 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 2½ in.; outer bracts lanceolate, 1½ in. Flowers white, 1 in. Sepals lanceolate. Petals obovate, spreading in the upper half. Staminal tube as long as the largest lobes; lip flat. Fruit ½ in. diam.


**Tenasserim, Malacca, Perak, Singapore, and the Andaman Islands.—** Distel. 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, ¾–½ 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 ii. 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.


**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. xii. 325, t. 1; Hort. Beng. 1; Fl. Ind. i. 8; Wall. Cat. 6619; Wight &t. t. 2016; Thun. Enum. 320.** Phyllodes Placentaria, Laur. Fl. Cochín, ch. 17. Maranta Placenta-ria, *A. Dietr. Sp. i. 30.*—Rheed Hort. Mal. xi. t. 34.

**Eastern Himalayas, Malay Peninsula, Malabar, Travancore, Ceylon.**

Distr. Malay isids.

**Rootstock** perennial, tuberous. **Leaves** oblong, 1–1½ ft. by 6–3 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-fl. **Sepals** large, linear. **Corolla-segments** linear-oblong purple. **Capsule** turbinate, 3-lobed, the size of a gooseberry, smooth, 3-valved.


**Eastern Himalayas and Malay Peninsula, and the Concang.**

**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-fl. **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 *parviforum*. **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. parviforum.** **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.

**Preu, Wallich.** **Tavoy, Gomes.** **Tenasserim, Holser.**

**Rootstock** short, with copious slender fibres. **Leaves** nearly 4 by 3–4 in., thin oblong; candate; 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. mucaceum, Wall. Cat. 6612 C, from the Trogii 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.**

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 cylindrical tube. Larger staminal lobes obovate, as long as the corolla-segments. Seeds ¥ in., dull brown, triquetrous on the inner face.—An allied plant, with subequal crowded lanceolate bracts 1½-2 in., collected by Griffith and Helper 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.


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.


Ceylon; in the central province, rare; Thwaites.

Habit exactly of P. spicatum. Leaves oblong, candate, ¥ 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, ¥ 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-ovulé; 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:


Throughout India from the Himalayas to Ceylon and Malacca.—Distrib. Malay isles, &c.

Var. PLATA, Rosc. Scit. Pl. t. 13; stature of the type, staminal segments plain bright yellow. C. flavescens, Link; Horan. Prodr. 41.


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. exigna, Boucôt; Horan. Prodr. 16. The American form to which Roscoe and Horaninow 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-fl. Fruit not pulpy and edible.


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 bisexual, 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 ½–1½ 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-fl. 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*.


*Pepu*; *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 \( \frac{1}{4} \) 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., \( \frac{1}{2} \) in. diam. *Seeds* smooth, globose, nearly black, \( \frac{1}{4} \) in. diam.

**Stoloniferous. Bracts many-fld. Fruit pulpy, edible.**


Indigenous in Bahr 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, 1–1\( \frac{1}{2} \) 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, \( \frac{1}{4} \) in. diam. The principal varieties and subspecies wild and cultivated in India are—

M. *daca*, *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 \( \frac{1}{4} \) in. long with a very thick skin.

M. *Champa*, *Hor*.; 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 spathe 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*, \( \frac{1}{4} \)–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. *simaire*, *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.—*Andamanas and Malacca, Kurz.*

M. *troglophytaeum*, *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 paridisaca.

M. textilis, Née in Cav. Ann. Ciência. Nat. iv. 123; leaves firmer in texture than in sapientium, 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.


Eastern Himalaya and the Concan. — Distria. Java.

Stem cylindrical, slender, 3–5 ft. Leaves linear-oblong, firmer in texture than in M. sapientium. Spike about \( \frac{1}{2} \) ft., drooping in the cultivated form; bracts oblong, about \( \frac{1}{2} \) ft., crowded; male fl. 5–6 in a cluster. Calyx about 1 in. Fruit and seeds as in typical sapientium.

6. M. sanguinea, Hook. f. in Bot. Mag. t. 975; stoloniferous, leaves petioled, spike erect or finally drooping, bracts ovate-lanceolate bright red, lower usually 3-fl.d., 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 \( \frac{1}{4} \) ft.; bracts crowded, imbricate, 3–6 in. Calyx \( \frac{1}{2} \) 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 interference distinguish this from M. sanguinea.

M. dystcarpa, 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. velutina, Wendl. and Drude in Regel Gartenfl. xxiv. 65, t. 823, braacts 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 petiols, 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 stigmatic apex. Fruit and seeds unknown. Orchidanthus, N. E. Br. in Gard. Chron. n. s. xxxvi. (1886) 519.—Also Borneo.

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, ⅓ 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. HEMODORACEAE.

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. Sansevieria.

1. Aletris, Linn.

Leaves radical, narrow. Scape leafless; flowers small, short, spicate, or racemose; bracts 1-fld. Perianth-tube short, subcampanulate, lobes subvalvate. Stamens 6, on the bases of the lobes, filaments very short; anthers ovate or subglobose. Ovary half-inferior, top conic, 3-celled; style 3-partite, or 3-fld.; ovules many, 2-seriate or elongate placentas. Capsule half superior, loculicidally 3-valved. Seeds minute, oblong.—Species 8, N. American and Asiatic.

Aletris littoralis, 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 globose or ovoid. Toefieldia 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.—DISTRIBUT. CHINA.

Leaves grass-like, 3-8 in. long, strongly nerved, rarely ¼ in. diam. Scape 4-12 in., nearly naked, glandular-pubescent or woolly above. Spike or raceme few or many-fl., 1-4 in.; tomentose flowers ½ in. long, greenish, sessile or pedicelled; bracts 1-2, close under the flower, linear, green, longer or shorter than the flowers, lower sometimes ¾ 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 globosey ovoid.

SIKKIM HIMALAYA; Lachen valley, alt. 9-12,000 ft. J. D. H.

A much larger plant than A. nepalensis, with short narrowed leaves ¼-½ in. broad, and a leafy scape with the raceme 1-2 ft. high, and with linear smaller and much narrower seeds.


KHASIA HILLS, alt. 4-6000 ft., common, Griffith, &c.

Leaves grass-like, 4-12 in., rarely ¼ in. broad, closely striately nerved. Scape 6-12 in., glandular-pubescent above. Flowers usually sessile, ½ 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, subpubescently 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-fl.d.


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 ¼-⅜ in. diam., purplish or bluish-green. Seeds as large as a pea, olive-blue.

**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; bracts long; flowers not seen. Seeds globose, about ½ in. diam.

**Bracts 1–rarely 2-fld. Flowers cernuous.**


**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 ½ 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, Loeb.


**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.


**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, ½ in., upper very short; perianth dark purple, ¾ in. diam. Seeds obturbinately ovoid.


**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.


**Penang, Malacca.**

Leaves about 3 in. long; petiole shorter than the blade or 0. Flowers about ½ in. diam.; segments of perianth green margined with white, obtuse and emargi-
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Peli. santhes.] CL. HEMODORAEE. (J. D. Hooker.)


Leaves 4-7 by 1-2 in., thin, subcaudately acuminate; petiole as long. Raceme hardly exceeding the petiole; pedicels sometimes ½ in. long, and lower bracts nearly ½ in.; perianth ⅓ in. diam., green or lurid purple (Clarke). Seeds small, obovate. — There are cultivated specimens in Wallich’s Herbarium from the Calcutta Botanical Garden under No. 5063 D.

9. P. albida, Baker in Bot. Mag. t. 7110; leaves stoutly petioled 5-8-nerved, scape very short, raceme very long many-fl., bracts subulate-lanceolate longer than the small white shortly pedicelled flowers.

PENANG; Curtis.

Leaves 13 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 ½-3½ in. diam.; outer segments broadly ovate, inner orbicular-ovobovate; anthers very small within the much contracted mouth of the low truncate staminal tube. Ovarian cells about 5-ovuled. Style short, columnar, stigma 3-toothed.

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 racemec; bracts scarious, usually many-fl. 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 Peli.
santhes, 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 Liliace. 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 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., geminus of Maximovich; the other is a continental garden specimen from Hrb. 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.


**Sikkim Himalaya, and the Khasia Hills**, alt. 4–6000 ft., *J. D. H.*

**Stems** prostrate, as thick as a goose-quill, closely joined, clothed at first with green sheaths that have broad scarios margins, rooting and with short tufts of leaves and flowery scapes. **Leaves** 3–6 in., including the petiole, 3⁄4–1½ in. broad. **Racemes** 2–3 in.; bracts shorter than the flower, which are solitary or fascicled, white or pale lilac, ½–¾ 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 secondly curved linear leaves which are 8–12 by ½ in., scape short few-fld., flowers ¾ 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 equaling 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 1⁄12–½ in., scape very short slender few-fld.

**Khasta Hills, at Nurtiung**, alt. 4–6000 ft. *J. D. H.* **Garroo 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** 4–½ 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.**


**Temperate and Subtropical Himalaya; from Kumaon eastward, alt. 6–9000 ft. **Khasta 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 distinctach and recurved, nearly quite smooth. **Raceme lax or dense-fld., sometimes cylindric, with leaves 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 Wallachian 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.


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-fl., flowers white about ½ in. diam., pedicels often ½-⅓ in.—Western Himalaya, Khasia hills and Munnipore.

Var. 2. macrantha; scape stout, raceme erect many-fl., flowers ½-⅓ in. diam. white.—Western Himalaya.

Var. 3. pauciflora; leaves very narrow secundly curved, scape very slender decurved, flowers ½-⅓ in. diam. white or pale purplish, pedicels very short.—Sikkim Himalaya, Khasia, and Munnipore hills.

Var. 4. pauciflora; leaves long ½-⅓ in. broad not secund, scape usually very long, raceme short decurved few-fl., pedicels short, flowers ½-⅓ in. diam. (Wall. Cat. 5139 C.)—Khasia hills, Munnipore, Western Ghats and Ceylon.

Var. 5. gracilipes; leaves long very slender ½-⅓ in. broad narrowed into almost filiform petioles, scape slender, raceme few-fl. cernuous, flowers ½-⅓ in. diam. white.

6. O. Malcolmsonii, Royle Ill. 382 (name only); leaves 6-1½ by ½ 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, McClleland, Kurs. Artran, Wallach.

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 ½ in. long, ellipsoid.—I assume this to be Royle's O. Malcolmsonii, a native of Rangoon, of which, however, I have seen no authentic specimen.

7. O. micranthus, Hook. f.; leaves 10-20 by ½-⅓ in. flaccid petioled, tip obtuse, scape rather stout long or short, raceme suberect elongate, flowers subsolitory ½ 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.


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 3/4 in. long, blue.


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 spines and a stout scape, with clusters of flowers about 3 in. diam. subtended by broad ovate bracts. It a good deal resembles Liriope.

DOUBLE 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.

Sansevieria. \textit{Cl. Hæmodoraceæ}. (J. D. Hooker.) 271


Leaves 1-1$\frac{1}{2}$ in. broad at the base, very thickly fleshy and hard, margins scarious.

\textit{Scapes} 1-2 ft., with distant scarious sheaths; bracts $\frac{3}{4}$ in. long; pedicels short; perianth 1$\frac{1}{2}$ 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.


Coromandel Coast, Roxburgh.

According to Roxburgh's drawing (at Kew) this is a very different species from \textit{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. \textit{IRIDÆ}.

Perennial herbs; rootstock various, \textit{Leaves} narrow, often distichous and equitant. \textit{Flowers} 2-bracteate. \textit{Perianth} superior, petaloid, segments 6-biseriate, imbricating. \textit{Stamens} 3, epigynous, or adnate to the outer perianth-segments; anthers often narrow, extrorse. \textit{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. \textit{Capsule} trigonous, 3-celled, loculicidal. \textit{Seeds} many, testa thin or coriaceous; embryo immersed in the albumen, short, cylindric.—Genera 57, species about 700, chiefly temperate.

Tribe I. \textit{Moreæ}. \textit{Stamens} opposite to and shorter than the petaloid style-arms.

\textit{Stigmatic} surface on the back of the petaloid style-arms . . . . 1. \textit{Iris}.

Tribe II. \textit{Sisyrienchieræ}. \textit{Stamens} alternating with the style-arms.

Rootstock a tunicate corm; stem 0; perianth-tube long slender . . . . . . . . . . . . . . . . . . . . . . . 1. \textit{Crocus}.

Rootstock creeping; stem erect; perianth-tube very short . 2. \textit{Belamcanda}.

1. \textit{Iris}, Linn.

\textit{Rootstock} bulbous or creeping. \textit{Leaves} equitant, ensiform. \textit{Perianth-tube} long or short, segments large, outer (sepals) largest, stipitate, reflexed, inner (petals) usually smaller, suberect or reflexed. \textit{Stamens} inserted at the base of the outer segments; anthers linear, basifixed. \textit{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. \textit{Capsule} coriaceous, 3- or 6-ribbed. \textit{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 Afghanistan, 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, occur in the Punjab. It is a native of Afghanistan. The character of bearded and crested sepal is artificial and inconstant in this genus.

* Rootstock a coated bulb or corm (Xiphion).


The **PANJAB**; Salt range, alt. 3000 ft., Vicary, Aitchison.—Distr. Afghanistan.


Var. **chrysanta**, Baker, has the stem 2 ft., and much stouter and flowers yellow.

** Rootstock stout, prostrate and creeping.

§ Sepals neither crested nor bearded.


**Western Himalaya and Western Tibet**, alt. 5–9000 ft., Royle, &c.—Distr. Temp. Asia.


Kashmir, alt. 6000 ft., Clarke.—DISTRIBUTION. Westward to Russia.

Stem 2-3 ft., sheathed. Leaves 1-1½ in. broad. Spathes 2-3 in., linear-oblong, firm, green. Flowers 2-3 in. diam.; bright lilac; sepal ½ in. broad, claw keeled; petals ½ 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.


**Western Himalaya**; Kashmir, Royce, Jacquemont.

Stem 3-3½ ft., stout, terete, with leafy sheaths. Leaves 1½-2 ft. by 1-1½ in. Spathes 3-4 in.; valves lanceolate, green. Flowers bright yellow; sepal 2½-3½ in., blade 1 in. broad; style-arms 1½-1¼ in. long, crests deltoid. Capsule 1½ in. long, oblong, 6-angled, beaked.—Differs from *I. spuria*, chiefly in the yellow flowers.


**Munnipoore**; summit of Kogni, 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 sepal ½ 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 sepal, “apparently not crested.”—Botan specimens from Griffith of this or an allied species have stout compressed grooved stems and firmer spatho-valves.

§§ Sepals crested.


**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 sepal 1½-2 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 (Panjeb 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 sepal oblong as long as the claw, crests narrow, petals oblong.

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TEMPERATE HIMALAYA; from the Panjab and Western Tibet eastwards, alt. 5–10,000 ft. KHABSA HILLS, alt. 5–8000 ft.

**Rootstock** with densely fibrous sheaths, and copious fleshy finger-like roots; stem 3–1 ft.; flower heads 1–2. _Leaves_ 6 in. long at flowering time, elongating to 24 by 3 in, streaked with purple lines and dots. _Spathes_ 1½–2 in. long, outer valves thin, green, persistent; pedicels very short. _Perianth-tube_ ⅓ in., limb 1–1½ in., pale lilac; blade of sepal ⅔ in. broad, crest yellow; petals ⅓ 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. xxvii. 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.


WESTERN TIBET; at Gilgit, alt. 12,000 ft., Giles.

_Stems_ tufted, 4–6 in., basal sheaths entire. _Leaves_ flaccid, 6–9 by ¼–½ in. _Spathes_ 1½–2 in., valves lanceolate green, margins pale. _Perianth-tube_ less than 1 in., limb 1½ in., bright lilac; blade of sepal ⅔ in. broad; petals clawed; style branches ⅔ in., crests small, deltoid.—Difers from _I. kumaonensis_ by the small blade of the sepal. A single specimen only seen.


WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 8–12,000 ft.

_Stems_ 2–12 in., crowded; outer basal sheaths fibrous. _Leaves_ 12–14 by ¼ in. _Spathes_ 2–3 in., valves lanceolate, ventricose. _Perianth-tube_ 2–2½ in.; limb 1½–2 in., bright lilac; blade of sepal ⅔ in. broad, blotched with darker lilac, beard of claw of yellow-tipped hairs on a white crest, blade of petals ⅔ in. broad; style-arms ⅔ in. long, crests deltoid acute. **Capsule** 1–2 in., narrowed at both ends, trigonous, angles obtuse.—Don describes the sepalus us blood-red with black-purple spots.


SIKKIM HIMALAYA, alt. 10–13,000 ft., J. D. H.

_Stem_ 6 in., 1-leaved, sheaths fibrous. _Leaves_ 6–8 by ¼ in. _Spathes_ 1 in. long, valves lanceolate persistent. _Perianth-tube_ ⅓–⅔ in.; blade of lilac; sepal ⅔ 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 sepal are strongly bearded.

11. **I. Duthiei**, *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 ovate 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 1½ by 1 in., trigonous. As in *kumaonensis* the flower precedes the mature leafing.

12. **I. Hookeriana**, *Foster in Gard. Chron.* 1887, i. 611; dwarf, leaves linear, flower-heads solitary, spathes three 2-fld., persistent perianth-tube short, blade of sepals obvate-cuneate gradually narrowing into the thickly bearded claw, blade of erect petals narrowly ovate, capsule small trigonous beaked.

**Western Himalaya; Labul (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 6 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 ¾ 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 ½–¾ 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 ½ in. broad in small fl. specimens.

**EQUIFOLI 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 (*Linol. Bot. Reg.* 1840, *Misc.* 25, 34; *Baker in Gard. Chron.* 1876, ii. 774 (in part). *I. germanica*, var. *nepalensis*, Herb. in Bot. Reg. i. 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 Kumaun). 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, Roye III. 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 Roye (Ill. Hist. 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. 318 (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 defecta.

I. NEPALENSIS, Wall. ex I. Don.; in Trans. Linn. Soc. xviii. 310. This is a mixture of Wallich's, Roye'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 lamellae. 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, basified. Ovary 3-celled; style filiform, arms slender subtentillum lobed or lacinate; 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 sublobate tips entire or lobulate. Maw Gen. Croc. t. 20. C. sativus var. kashmeriana, Royle Ill. 374, t. 91, f. 1; Stewart, Panjib Pl. 239; Boiss. Fl. Orient. V. 100; Reichb. Fl. Ger. t. 360; Benth. & Hook. 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 Tinnen.

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;


Very doubtfully wild in the HIMALAYA, ascending to 6000 ft. Cultivated all over INDIA; a native of China.

Order CLII. **AMARYLIDÆ.**

Rootstock bulbous 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; *stigmas* 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, Panjáh Plants, 232) and introduced elsewhere in India. *A. vivipara*, Linn. (Wight 1c. t. 2024) is naturalized in the Deccan. *Zephyranthes tubispatha*, Herb. a Peruvian plant, resembling a small *Pancratium*, but without a corona, is cultivated in gardens and found as an escape far from habitats.

Tribe I. **HYPOXIDÆ.** Rootstock tuberosus. Flowers spicate or racemose. *Ovary* not produced above the crown into a stipes. . . . . 1. **Hyphoxis**.

*Ovary* produced into a short or long stipes above the crown . 2. **Curculigo**.

Tribe II. **AMARYLLEÆ.** Rootstock bulbous. Flowers umbellated.

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, racemaded, 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. Cochín. 200; villous or hairy, leaves narrowly linear, scape slender 1-2-fld., ovary and perianth lobes externally hairy,

Subtropical Himalaya; from Kashmir eastwards, ascending to 7000 ft. in Sikkim. Khasia Hills, Bengal, Behar and Burma, and in the Western Ghats from the Cocon southward. (Not in Ceylon.)—DISTR. Java, China, Japan.

Diocious. Rootstock globose, or elongate and erect, crowned with fibrous remains of old leaves. Leaves 4-14 by \( \frac{1}{2} - \frac{3}{2} \) in., subcoriaceous, keeled. Scapes 1-4 in., filiform, hairy; bracts setaceous. Ovary clavate. Perianth-lobes 1-2 in., elliptic-lanceolate, yellow, outer green on the back. Capsule \( \frac{1}{2} - \frac{1}{2} \) in., clavate, at length 3-valved, crowned with the erect perianth-lobes, walls thin. Seeds black, tuberculate.

2. CURCULIGO, Geerth.

Rootstock tuberous, or a coated corm. Leaves lanceolate and plaited, or linear and flat. Scapes 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.


Tropical Himalaya; from Nepal eastwards. Bengal, Chittagong and Burma. Ceylon; at Saffrongram.—DISTR. 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 spataceous, lanceolate, villous; heads of flowers 2-4 in. diam., villous; flowers pedicelled. Ovary \( \frac{1}{2} - \frac{1}{2} \) in., villous; bracts 1-1/2 in.; cells about 10-ovuled. Perianth about \( \frac{1}{2} \) in. diam., outer segments villous on the back. Filaments very short; anthers cohering. Berry \( \frac{1}{2} - \frac{1}{2} \) in. diam. Stigmas sub 3-lobed, siniing. 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, Kurs 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 \( \frac{1}{2} - 1 \) in., short woolly scapes, few-fl. loose racemes, and flowers \( \frac{1}{2} \) in. diam. Sikkim specimens have stoutly petioled leaves 2-3 ft. by 44 in., and a robust scape 6-12 in. The var. Jamesoni, Baker t. c. 121; with leaves rigidly coriaceous flowers subsessile in a dense globose head I should refer to recurvata.

**Sikkim Himalaya,** J. D. H. **Khasia Mts.,** alt. 5-5000 ft., J. D. H. & T. T., Mann, Clark.

Leaves 2-3 ft. by 3-6 in., strongly closely plicate; petiole 1 ft. stout. **Scape** 2-3 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.


**Travancore and Malabar,** *Wight, &c.* **Ceylon**; central province, ascending to 5000 ft. Leaves 12-24 by 1-½ 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** ½-3 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.


**Subtropical Himalaya,** from Kumaon southwards, 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 ½-½ in. **Ovary** villous, the stipes and perianth alone epigaeous; stigma 3-cleft; cells 6-8 ovuled. **Capsule** ½ in., oblong, hypogeous, 1-4 seeded, beak slender; sepal spongy. **Seeds** ½ in. long, oblong, deeply grooved in wavy lines, black, shining. **Male fl.** with no ovary, style or stigma.

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-fl., (Penang, Malacca).—4. Leaves 8–12 by 2–3 in., quite glabrous, longer than their petioles, heads dense-fl., (Burma, Malacca, Borneo).

Var. villosa, Baker L. c.; leaves coriaceous cobwebby beneath, petiole very stout, heads dense-fl., bracts oblong obtuse and nearly glabrous. C. villosa, Wall. Cat. 5763 A; Kurz I. c. Singapore, Malay Islands.—Perhaps a distinct species.

3. CRINUM, Linn.

Rootstock bulbous. Leaves elongate, lorate or ensiform. Scape solid. Flowers large, umbelbed; 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; athers 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.


Throughout TROPICAL INDIA, wild or cultivated. CEYLON; common on the coast, Travancore.

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-

Swampy river banks throughout India. S Ceylon; in the hotter drier regions, Thes. Bulb with a fusiform stoloniferous base, neck cylindric. Flowers sessile, fragrant at night, tinged with red. Filaments bright red; anthers ½ in. Fruit subglobe, 1 in. diam., 1-2-seeded.


Banks of the Deccan rivers. Pegu, Carey.

I follow Roxburgh and Herbert in keeping this distinct from deflexum on account of the gradually acuminate leaves, as well represented by Rheed. Roxburgh's drawing named C. asiaticum (No. 1395) is clearly this and not his asiaticum (deflexum). 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., spathe deltoidly lanceolate, pedicles 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 1-½ in. linear flaccid, scape very slender 2-edged, umbel 4-6-fld., spathe 2 in. lanceolate, pedicels ½ 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 disposed 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 $\frac{1}{4}$ in. broad erect, linear acute, umbels few-fl., 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. deflexum*. The bulb is described as 4 by $\frac{3}{4}$ 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 subcyclindric, umbels 6-9-fl., 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 $\frac{1}{2}$ 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.


**Tropical Himalaya;** from Nepal eastwards, ascending to 6000 ft. in Sikkim. The Khazia 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 $\frac{1}{4}$ 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 obuse humifuse lacunose leaves.

9. **C. Stracheyi**, 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-fl., spathes lanceolate, pedicels $\frac{1}{4}$ 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.


**Plains of India and Burma.**

Bulb 4-5 in. diam., ovoid or spherical, neck 2-2½ in. *Leaves* 6-8, suberect or
deciuate. 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 2-3½ 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 ½ in., yellow.—Herbert and Baker include under C. pratense, the C. longifolium, Roxb. Fl. Ind. ii. 131, from Pegu, with weak spreading leaves 4-5 ft. long; C. elegans, Carey (Bot. Mag. t. 2582), 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 90-fld. umbels; C. canaliculatum, Carey, with leaves an inch broad, more channelled, rather glaucous, and about 10 flowers pale reddish externally.

Sect. III. Codonocrates. Perianth funnel-shaped, tube upcurved, lobes oblong or lanceolate. Stamens very long, deciuate.


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 2¼-3 in., anthers 4-5 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. 1397, 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 longistyllum.—Roxburgh describes both latifolium and zeylanicum as natives of Bengal, and thus distinguishes them. C. latifolium, Linn. (Am. ornata, Bot. Mag. t. 929); bulb spherical, leaves 3-5 in. broad lanceolate obtuse margins scabrous, scape 12-24 in. compressed green 10-20-fl., flowers almost white, authors


The *CONCANN; Woodrow, Stock.*

* Bulb as large as the fist, ovoid, neck very short. Leaves produced long after flowering, concave, not keeled. Scape 8-13 in.; spathe white, *flowers* fragrant, white; anthers yellow; style short, included in the tube.

Doubtful Species.

C. *brevifolium*, var. *a*, *Hort. Bengal*; *C. bracteatum*, *Bot. Reg.* t. 179; *Herb.* in *Bot. Mag.* under t. 2121, f. 4. "From Sundee 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 Sundee *Crinum* should be procured for the determination of this plant.

C. *canaliculatum*, *Herb.* in *Bot. Mag.* under t. 2121; *Amaryllid.* 258 (C. *canaliculatum*; *Carey*, *non* *Roxb.*), is altogether doubtful. (See under 10 *pratense.*)

C. *erithrophillum*, *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. sumatranaum*, *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 Herand.* Pl. l. 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 *pedunculaturn*, 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., spathe 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*. 

284 CLII. AMARYLLIDEE. (J. D. Hooker.)
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, subglobose 3-angled, loculicidal. Seeds angled, testa lax black.—Species about 12, S. European, Indian and African.

* Perianth-tube 1⅖-2 in. Staminal cup small.—Bulb without a neck.


Bulb globose, 1½-2 in. diam., neck 0. Leaves not bifarious, 8-12 by ¾-¾ in., lanceolate, acute. Scape 6-9 in., slender; spathes single or ovate, acute, pedicels very short. Flowers fragrant; tube 1½-2 in., throat dilated, lobes ½-1 in.; staminal cup ½ in. diam., with 2-fld teeth between the short filaments.


**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, sub-equally 12-toothed, teeth large; filaments 1-1½ in. longer than the cup; anthers ½ in.

**P**. **P. zeylanicum**. Bull 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, sub-equally 12-toothed, teeth large; filaments 1-1½ in. longer than the cup; anthers ½ in.

**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**. **SERBICUS**, Herb. Amaryllid. 208, t. 42, f. 2.

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**. **SERBICUS**, 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. Scaphe shorter than the leaves; spathe 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 ⅓ 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 biform, except that the leaves are acute and that he gives the habitat (according to the Banksian Herbarium) as the Moluccas; with P. verucundum 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.


Bulb globose, 1½–2 in. diam., neck long cylindric. Leaves 12 by ½–1 in. Scaphe 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, Dals. 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. Dals. & 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. Scaphe 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. verucundum, Wight i.c. t. 2023, from Travancore (Comoratouro). This which is referred to by Baker as the P. verucundum 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. Americano, 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-mânîl.)

ORDER CLIII. TACCACEÆ.

Rootstock tuberous or creeping. Leaves radical, simple lobed or lanci-niate, costate and penninerved. Scaphe leafless, flowers umbelled, greenish-
brown or lurid; involucrc 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 appended 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, tests appressed striate; albumen hard; embryo minute.—Species about 10, tropical.

1. **TACCA,** Forst.

**CHARACTER OF THE ORDER.**


The **CONCANS, and CENTRAL INDIA;** Hazarebagh, **Vicary;** Chota Nagpore, Clarke. **MALAYAN PENINSULA;** Malacca and Ceylon, Trincomalee.—**DISTRIB.** Australia, Malay 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-fld.; flowers drooping; invol. leaves lanceolate, recurved, striped with purple; filiform bracts very numerous. **Perianth** greenish, subglobose, ¼ in. diam., fleshy, lobes margined with purple. **Fruit** size of a pigeon’s egg; 6-ribbed, yellow.


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 plicate nerved, green, narrowed into a very stout compressed brown-purple petiole; flowers drooping, pedicels stout filiform; bracts 6-8 in., pendulous, pale. **Perianth** 1¼ 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

**Silhet, Chittagong and Tenasserim.**

*Bootstock* oblong, curved. *Leaves* 8–16 by 4–8 in., acuminate, strongly nervèd 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-fl.; 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.


**Brotan Himalaya, Griffith. Silhet, Roxburgh, Chittagong, Munnipore, and Tenasserim, S. Concan, Nimmo.—Distr.* Tonkin, Java.

*Bootstock* 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-fl.; invol. leaves 2 by 1 in., finely acuminate, many-nerved; bracts numerous filiform. *Flowers* pedicelled, blueish, greenish-grey or violet; perianth ½–1 in. diam.; outer lobes acute.

**Order CLIV. DIOSCOREACEAE.**

*Bootstock* various. *Stem* climbing, branched, rarely short erect. *Leaves* entire lobed or digitately 3–5-foliolate, costate and reticulate, petiole often angular and spaced at the base. *Flowers* small or minute, panicked racemose or spicate, rarely bisexual. *Perianth* superior, 6-cleft. *Male fl.* tubular or ureolate, 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. *Pistilode* 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-fl 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.


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.


Tropical forests throughout India, Burma, and the Malaya 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 cuneate-accinate, 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 woody; spikes ½–1 in., shortly peduncled, cylindric, dense-fl.; bracts shorter than the flowers; sepals orbiculiform, 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 truncate, 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.


The Deccan Peninsula, from Canna southwards. Ceylon.

Root (of long tuberous fibres, 1–2 ft. in. 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., terminal on the branches of a very slender exuus tomentose panicle; flowers ½ in. diam., sessile or pedicilled; perianth segments subequal; staminodes equaling the stamens, nearly as long as the sepals, tips dilated. Capsules 1 in., cuneately oblong, downy.

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-fl.; flowers sessile or pedicelled, ½–1 in. diam. fragrant; filaments and staminodes very short. Capsule 4–1 in., rounded at both ends or base cordate and tip apiculate, glabrous or pubescent. Seeds ½–1 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.


Temperate Himalaya, alt. 4–9000 ft. from Kashmir to Sikkim. The Khasia and Mongepore Hills, alt. 5–3000 ft.

Very near D. pentaphylla, but a plant of temperate regions, and more slender, with pinnate bulblets, more membranous narrower leaflets with long setaceous points, larger longer more pointed bracts, larger flowers 1½–1½ 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 ½ 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-foliate, leaflets finely acuminate glabrous, flowers much larger than in D. pentaphylla glabrous and short bracts both streaked with brown.

The Concanc, between Poona and Carli, Jacquemont; Belguma, 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.


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 ½ 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.—Dries 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. \textit{Capsule} (where known) broader than long. \textit{Seeds} orbicular, broadly winged all round.

* Male flowers in long simple or nearly simple axillary spikes, distant, or in distant clusters.

7. \textbf{D. spinosa}, Roxb. \textit{ex Wall. Cat. 5703 A, B, C, E, F}; glabrous or tomentose, leaves orbicular- or reniform-cordate, perianth subrotate, pistil-


TROPICAL INDIA, CEYLON, BURMA and the MALAY PENINSULA, cultivated.—

\textit{Distrib. Trop. America.} Tubers very large; base of stem with long woody rigid fibres bearing spines half an inch long. \textit{Stem} terete, very spinous at the base. \textit{Leaves} attaining 8 in. long and broad, acuminate or cuspidate, 5–7-nerved, rather membranous, basal lobes rounded. \textit{Male spikes} 6–18 in.; \textit{flowers} \( \frac{1}{2} \) in. diam., often in very dense cymes, sessile or shortly pedicelled; bracteoles very broad; perianth segments remote from the large oblong pistilode; anthers large. \textit{Fem. raceme} rather short. \textit{Capsule} 1 in. diam., broadly obovate. —I cannot adopt Roxburgh’s name of \textit{aculeata} for this, for it is not Linnaeus’s plant of that name, which is \textit{Rheedie’s} \textit{Katter Kalenga}, and which has panicked male spikes. Nor can I, as Kunth and \textit{Thwaites} have, take Linnaeus’ name of \textit{sativa}, though \textit{Rheedie’s} figure of it is cited by Linnaeus under his \textit{sativa}, because the plant figured in ‘\textit{Hortus Cliffortianus}’ must be accepted as \textit{sativa} Lin., it being cited by himself as his type.

8. \textbf{D. deltoidea}, \textit{Wall. Cat. 5110}; nearly glabrous, leaves hastately or subdeltoidly-cordate acuminate 7–9-nerved, perianth sub-rotate, pistil-

lode minute. \textit{Kunth Enum. v. 340}.

TEMPERATE HIMALAYA; from Kashmir to Bhotan alt. 6–1000 ft. \textit{Khasia Hills}, alt. 4–5000 ft.—\textit{Distrib.} Afghanistan. Branches very slender, terete, unarmed. \textit{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. \textit{Male spikes} very slender, rarely branched; \textit{flowers} \( \frac{1}{2} \) in. diam., solitary or clustered; perianth-segments nearly flat; stamens very short, anthers didymous. \textit{Capsule} very variable, orbicular, deltoid or obtusely quadrate, rarely broadly obovate, base rounded truncate or broadly cuneate; valves very thin. \textit{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 \textit{Hemsley and Collett} (\textit{Journ. Linn. Soc. xxviii. 137}) which is too imperfect for determination.


TRAVANCORE; Courtallam, \textit{Wight.}

In habit and foliage very like \textit{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. \textbf{D. spicata}, \textit{Both Pl. Nov. 571}; quite glabrous, leaves alternate shortly petioled linear-oblong or lanceolate \( \frac{3}{2} \)-rarely 5-nerved finely reticulate beneath, flowers globose, pistilode large conical. \textit{Kunth Enum. vi. 399}; \textit{Thwaites Enum. 326}. v 2
INDIA, Heyne. CEYLON, Walker, &c.

Branches very slender, terete, unarmed. Leaves 2-4 by ¾-2 in., obtusely acuminate, thin, obscurely margined, base cuneate or rounded rarely subcordate. Male spikes 3-8 in., rarely branched; bracts ovate; flowers \( \frac{1}{10} \) in. diam., solitary, sessile; segments erect, concave, elliptic, obtuse; filaments rather slender, anthers dicycous. Capsule \( \frac{1}{6} \) 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 1-1\( \frac{1}{2} \) in. spreading, anthers subsessile, pistillode minute.

**Tenasserim, Heffer (Kew distrb. 5538). SINGAPORE, Wallich. MALACCA, (not Philippine Islands), Cuming (No. 2314), Griffith (K. d. 5562), Maingay (K. d. 1705), Hershey.**

Branches terete, glabrous or puberulous. Leaves 2-4 by 1\( \frac{1}{2}-3 \) in., acuminate or cuspidate, base rounded or retuse, reticulate beneath; petiole \( \frac{1}{2}-1 \) in. Spikes glabrous; flowers \( \frac{1}{10}-\frac{1}{6} \) in. diam., globose; sepals orbicular-oblong; petals cuneate-obovate; anthers very small. Capsule broader than long, cordate at base and top. Seeds \( \frac{1}{4}-\frac{1}{2} \) 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 1\( \frac{1}{2}-2 \) 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.


Tropical India, from Assam, Silhet and Chittagong, southwards to Ceylon.

A large climber, branches terete, unarmed. Leaves 2-5 by 1-3 in., with a well-defined cartilaginous margin; petiole \( \frac{1}{2}-1 \) 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 \( \frac{1}{6}-2\frac{1}{2} \) in. diam., retuse or almost 2-lobed at the top, coriaceous, glabrous. Seeds \( \frac{1}{3}-\frac{1}{4} \) in. diam., wing very broad.
Dioscorea. | CLIV. DIOSCOREACEAE. (J. D. Hooker.) 293

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 Taungdong, 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 ½–1½ 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 ¼ 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 thralloled in stiff 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 ¼ in. diam.; sepals broadly ovate; petals oblong. Fem. fl. in long much branched lax-fld. perfectly glabrous panicles. Capsule 2 in. brosd, 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 thickened, and the large pistillode.

17. **D. obcuneata**, Hook. f.; very slender, leaves opposite cuneately ovate-obovate cuspidate 3-nerved membranous, petiole short very slender, male spikes ¼–1 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 ½ in. Male spikes spreading horizontally, rachis almost capillary, flowers scattered, globose, sessile, ¼ 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-flowered, spreading, pistillode large globose. *D. spinosa*, Wall. Cat. 5103 G, H.

**Tropical Himalaya**; from Nepal, Wallich, to Bhotan (*Kew distrib. 5548*). Assam, Sylhet, Cachar, Bengal, Chota Nagpur.

**Tubers columnar** (*Roxb.*). Leaves 3-5 by 2-5 in., rather thick, nerves strong beneath, nervules transverse; petiole 1½-3 in. Male *panicules* stout; spikes crowded, densely tomentose; flowers ⅓ in. diam.; sepals and petals very broad; anthers large. **Capsule** ⅓-1½ 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 ⅓-1 in. 5-6 nately whorled in long *panicules*, 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., orbiculate-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 *panicules* 6-10 in., terminal compound; whorls of spikes very numerous, sessile or shortly pedicelled; flower-buds ⅓ 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.


**Subtropical Himalaya**, alt. 3-5000 ft., from Simla to Sikkim, and southward 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, globose 8-lobed, often coarsely dotted. **Capsule** 1½ in. diam., very variable in shape, subquadrate broadly obconic or orbiculate, 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 *panicules*, 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 ⅓ in. diam., sessile, with a boss at the broad base opposite to the bracts.

**Sillier**, Cachar, Munnpore 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 1/5 in. diam.; sepals and petals suborbicular; stamens inserted under the pistillode; anthers small. Capsule 1 1/2 in. diam., emarginate at the tip. Seeds orbicular, broadly winged.—The very broad rounded long-petioled glabrous leaves and large pistillode are good characters.


**Sikkim, Assam, Cachar, Behar, Chota Nagpore, Malabar and Burma; in all ? cultivated.—Distr. St. Domingo (cult.).**

Branches slender. Leaves opposite and alternate, undistinguishable from those of *D. glabra*; petiole 1-2 1/2 in. Male spikes whorled on the branches of very slender elongate axillary and terminal panicles; flowers globose, 1/8 in. diam.; sepals broad; petals cuneate-ovobvate. Capsule 1-1 3/4 in. long, membranous, sides parallel, tip acute, base cordate.—The slender zigzag racis 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.


**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 1 1/2 - 1 3/4 in. long, fleshy; petals rather narrower; filaments much shorter than the perianth; anthers minute, didymous. Fem. spikes 4-10 in. long, pendulus; flowers 1 1/2 - 2 in. long; sepals as in the male. Capsule 1-3 1/2 by 3 1-2 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 citing 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. Cliftoniana to Linnaeus's plant, but figures (iii. t. 818) a very different one for it, rejecting the name sativa because he does not consider it to be the cultivated "ignarae." 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.


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 obovate, coriaceous. Seed orbicular, broadly winged all round.—Of Steudel's anguliflora from Cauara 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 curved, 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 verticillated, fem. axillary simple erect, flowers few very remote fragrant.—Cultivated by Hindoos, the most esteemed yarn by Europeans.
Dioscorea.]

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D. INTERMEDIA, Thwaites Enum. 326; glabrous, unarmed, stem terete, leaves 3 by 3-1½ in., opposite and alternate elliptic or oblong acuminata munronate 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.—Hottentot 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. PELATA, Jufs. in Pers. Syn. ii. 621; Kunth Enum. vi. 413; from Ceylon, is probably a Cocculus.

D. PULPEBA, Roxb. Pl. 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. SPIYATA, Roth; var. B. 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 1-1½ in. diam., valves semicircular. Seed orbicular, ½ in. diam., broadly winged all round.

2. TRICHOPUS, Gartn.

A small erect rigid, perennial herb. Stem short. Leaf terminal, petiolo, linear-lanceolate, ovate or triangular, 3-7-costate. Flowers small, fascicled at the base of the leaf, panicles filiform, bisexual. Perianth campanulate, subequally 6-fld. 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-fld.; ovules 2, superposed in each cell, anatropous. Fruit ovoid, tricuqetrous, indehiscent. Seeds oblong, rugose, grooved dorsally, testa thin embryo minute in a cartilaginous albumen.


TRAYANGORE, 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 ½ in. long, pedicel thickened at the top.

Order CLV. ROXBURGHIAEAE.

Rootstock tuberous or creeping; stem erect or climbing. Leaves alternate or opposite, petiolo, 3 or more-costate, cross nerves 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

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 snbracemose. Perianth segments 4, lanceolate, many-nerved. Stamens subhypogynous, filaments very short, more or less conuate 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.


Bengal, Sindhet, Chittagong, Assam, and the Northern Circars.—Distr. 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, ferdid. 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, adulate 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, 6–8-seeded.

2. S. minor, Hook. f.; stem twining leafing and flowering at the same time, leaves 1½–3 in. alternate, perianth ¼–1 in. long. Roxburghia gloriosoides var. minor; Thwaites Enum. 432. R. gloriosoides, Wight Ic. t. 2061.

Malabar; on the Pulicat Hills (?Paulghat) Wight. Ceylon; at Trincunalee, Glenis.

Smaller in all its parts than S. tuberosa, the leaves 1½–3 in. long, and much broader at the base; capsule ¼ 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 4 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.


BURMA: Ava, Martaban and Pegu; Griffith, Kurz. Rootstock stout, hypogeous. 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. Colpopodenum, Wall. ms. in Herb. Griffith.—Indeterminata, Wall. Cat. 9110.

KHASTIA Mts.; alt. 4-5000 ft. WALLACH, GRIFFITH, &c. Bengal, alt. LUCKNOW, J. D. H & T. T.

Stem 1-2 ft. Leaves 3-6 by 1½-2½ in., membranous, canadate-acuminates; nervules transverse, parallel; petiole of flower ¼ in. Peduncles ½-1 in., stiff; pedicels ¼ in.; flowers ½ in., yellow.—I follow Bentham in placing this curious plant in Rosburchiaceae, from which it differs in the nervation of the leaves. Until its fruit is known its position is doubtful. The order itself is heterogeneous, Stemonas and Croomia being sectionally different, and both might well rank as sections of the composite Order Liliaceae.

**ORDER CLVI. LILIACEAE.**

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.

*Muscaria* bootanense, Griff. Itin. Notes, 242; Notul. iii. 242; &c. Pl. Asiat. t. 280; (Baker in Journ. Linn. Soc. xi. 414), is an Afghan plant, as stated in the
Notulae, and no doubt *boothanense* is a misprint for *boolanense*, the plant being found near the Boolan pass.

**Series A. Rootstock not bulbous. Anthers bursting inwards. Fruit a berry.**


Perianth 6-partite: 1. *Smilax*.

Perianth ovoid or tubular, mouth very minute: 2. *Heterosmilax*.

**Tribe II. Asparagaceae.** *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. Polygonaceae.** *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. *Smilagina*.


Perianth subglobose, 6-partite: 7. *Therophogon*.


Stigma large, peltate; spike many-fl. 8. *Tupistra*.

Stigma small, 3-lobed; spike erect, many-fl. 9. *Goniocyphe*.

Stigma large, peltate, flower solitary: 10. *Aspidistreæ*.

**Series B. Rootstock stout or a bulb. Leaves radical or cauline. Anthers dorsi- or basi-fixed. Ovules anatropous. Fruit usually loculicidal.**


Flowers panicked, erect; perianth funnel-shaped: 10*. *Hemerocallis*.

**Tribe VII. Dracænæ.** *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 panicked. *Perianth* segments distinct. *Capsule* loculicidal (berried in *Dianella*).
Flowers racemose. Ovarian cells 2-ovuled; capsule 3-angled

Flowers racemose. Ovarian cells 4-6-ovuled; capsule 3-winged

Flowers racemose. Ovarian cells 4-6-ovuled; capsule 3-winged

Flowers in panicled cymes. Fruit a berry

Tribe IX. Allieae. 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

Tribe X. Scilleae. 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

Perianth campanulate, 6-partite; ovules many; seeds flattened

Tribe XI. Tulipae. Rootstock a bulb. Stem erect with one or more leaves. Flowers few, large, solitary or racem. Perianth segments distinct. Capsule loculicidal (in the Indian species).

Flowers large, nodding or pendulous; anthers versatile

Flowers large, nodding or pendulous; anthers basifixed erect

Flowers 1-2, small, suberect; anthers basifixed

Flowers large, solitary or few, erect or suberect

Flowers small, subumbellate, suberect

Series C. Rootstock a corm or bulb, or short. Leaves radical or radical and cauleine. Anthers dehiscing extrorsely or introrsely. Ovules anatropous. Capsule usually septicidal.


Perianth-tube entire; styles 3

Perianth-tube of the twining claws of the segments; styles 3

Tribe XIII. Angullariae. Rootstock a tunicate corm. Stem 1-or more leaved. Anthers dehiscing extrorsely. Styles 3


Stem twining. Leaves cirsrose. Capsule loculicidal

Stem erect. Capsule septicidal

Stem erect. Fruit a berry

Tribe XVI. Medeoleae. Rootstock short or creeping. Stem simple.
Leaves radical or whorled. Flowers solitary or umbelled. Anthers dehiscing extrorse.

Leaves radical or subradical; flowers solitary or umbelled. 33. CLONTONIA.
Leaves 3 in a whorl; flowers solitary. 34. TEILLIUM.
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-circular above the base. Flowers dioecious, small, 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; alburni 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 Malayal Floras is hopeless.


ASSAM, SIBBIET and the lower KHASIA HILLS, Wallich, &c. TENASSEERIM, Gallatly.—DISTRIB. China.
Branchlets slender, terete, smooth, unarmcd. Leaves rather thin, 3-costate to the rounded or cuneate base; petiole narrowly sheathing, unarmcd, cirrhsl very slender. Umbels many-fl.; peduncle ebracteate; pedicels \( \frac{1}{4} - \frac{1}{5} \) in. : bracteoles subulate; flowers very small, white; buds depressed-globose, deeply 6-lobed from the groove on the back of the obvate succulate 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 \( \frac{3}{4} - 1 \frac{1}{4} \) in. oblong-lanceolate acuminate 3-costate glaucous beneath base acute, petiole \( \frac{3}{4} - \frac{1}{4} \) in., sheath obscure, umbels few-fl. sessile on an axillary rachis, pedicels decurved. *A.D.C. Monogr. Smilax*, 60.

**Singapore and Perak**, Wallich, Cantley, Wray, King’s Collector; summit of Mt. Opbir, Hullett. Branchlets strict, terete, or slightly grooved, unarmcd. Leaves opaque, costa stout, reticulations faint; petiole joined 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 \( \frac{1}{5} - \frac{1}{4} \) 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 \( \frac{1}{4} \) in. diam., red. Fem. fl. not seen.

3. **S. peguana**, A.D.C. Monogr. Smilax, 62; leaves 1\( \frac{1}{2} \)-3 by \( \frac{3}{4} - 1 \frac{1}{4} \) in. elliptic oblong or ovate-oblong 5-7-costate white beneath, base acute or cuneate, petiole \( \frac{4}{5} - \frac{3}{4} \) in., sheath very obscure, male umbels axillary very shortly peduncled many-fl., pedicels very short, anthers subsessile.

**Burma**, Griffith (Kew Distrib. 5424); Taipe hills, Brandis; Moolyet, alt. 5000 ft., Gallaty. Branchlets slender, terete, unarmcd. Leaves shining above, laxly reticulate on both surfaces; petiole twisted, terete. Peduncle rarely longer than the petiole; bracteoles minute, broadly ovate; pedicels \( \frac{1}{8} \) in. ; flowers \( \frac{1}{10} \) 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.D.C. to *hypoglaucus*, is certainly *peguana*.


**Penang, Porter. Perak, Wray, King’s Collector.—Distrib. Java.**

Branches very smooth, unarmcd. Leaves 5-7 by \( 2-2 \frac{1}{4} \) in., thin when dry, translucent when fresh, nervules very delicately closely reticulate, base cuneate rounded or subcordate; petiole \( \frac{3}{4} \) in., cirrhsl slender. Male peduncle \( \frac{3}{4} \) in.; flowers \( \frac{3}{8} \) in. diam., subcapitate, rather fleshy; sepals broadly oblong, incurved; petals narrow; anthers ovoid. Berries \( \frac{1}{2} \) in. diam., 1-seeded; fruiting peduncles \( \frac{1}{10} - \frac{1}{4} \) 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 \( \frac{1}{8} - \frac{1}{4} \) in. long. Staminodes much shorter than the sepals; staminodes 1-3.
Branches and branchlets acutely angled.


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 setas (cirrhi ?), joined at the top. *Peduncle* short, ½-⅓ 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* ¼-⅓ 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 ½-⅓ in., articulate above the thickened broad base, peduncle few-fld., and pedicels very slender, sepals and petals subequal obtuse three or four times as long as the stamens.


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 ⅓-½ 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. glaciphylla*, *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* few- or many-flld.; 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 \( \frac{3}{4}-\frac{3}{4} \) in. elliptic-ovate or cordate obtuse acute or mucronate 5-7-nerved, petiole \( \frac{1}{2}-\frac{3}{4} \) in. very slender narrowly sheathing for \( \frac{1}{2} \) to \( \frac{3}{4} \) 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, Jaquemont, 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. Petioles and pedicels very slender; male umbel many-fl., fem. 1-fl.; 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 cirrh, and stamnodes 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. longibracteolata*, Hook. f.; stems slender, branches terete, leaves \( 2\frac{1}{2}–3 \frac{1}{2} \) in. ovate-cordate acuminate 5-costate, petiole 1 in. narrowly sheathing for half its length, tips of stamens acute, umbels long peduncled, bracteoles subulate rigid \( \frac{3}{4}-\frac{3}{4} \) 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, cirrh inserted above the cusps. Male umbels small, few-fl., shortly peduncled, pedicels \( \frac{1}{2} \) in.; bracteoles shorter than in the fem., subulate; sepals \( \frac{1}{2} \) in.; fem. peduncles naked at the base, inserted \( \frac{1}{2} \) above the axil of the leaf; pedicels \( \frac{1}{2} \) 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 \( 2\frac{1}{2}–4 \) in. ovate-lanceolate or linear-oblong acuminate membranous 5-5-costate base obtuse rounded or subacute, petiole \( \frac{1}{2}-\frac{3}{4} \) in., sheath oblong \( \frac{1}{2} \) of its length narrowed upwards, male umbels many-fl., sepals and petals subequal lanceolate 3-4 times longer than the stamens, fem. umbels very few-fl., 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 \( \frac{1}{2} \) in. long. Leaves pale beneath, nervules laxly reticulate; petiole articulate below the limb, cirrh 0. Pedunche of male umbel slender; pedicels \( \frac{1}{2} \) in.; buds globose. Berries \( \frac{1}{2} \) 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 *parviflora*.

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 \( \frac{1}{2} \) in. sheathing half way up or more, male and fem. peduncles and pedicels capillary, umbels few-fl., sepals ovate-oblong, petals ovate, anthers subsessile, ovary globose. *S. menispermoides*, *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...
**Flowers large or small; sepals rarely less than $\frac{1}{4}$ in. long. Stamens equaling or longer than the sepals; rarely $\frac{1}{2}$ shorter.

† Umbels many spicate on an axillary peduncle.


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. — DistriBS. 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 $\frac{1}{2}$–$\frac{3}{4}$ in. and nerves beneath often prickly; cirrii usually long. Spikes 2–6 in.; rachis slender smooth, umbel many-fl.; bracteoles minute; flowers white, sweet scented, buds longer than the pedicels; male sepals $\frac{1}{2}$ in. long, fem. rather smaller; staminodes 6; stigmas oblong, recurved. Berries $\frac{1}{4}$–$\frac{1}{2}$ in., bluish, 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 $\frac{1}{4}$–1 in. narrowly sheathing below the middle, male sepals $\frac{1}{2}$ 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.


Branches unarmed or aculate, sometimes closely. Leaves rounded or cuneate at the bases. Umbels many-fl., solitary or 2–3 on a common peduncle $\frac{1}{2}$ in. long, partial peduncle as long; buds clavate $\frac{1}{4}$ in. long; bracteoles obsolete; fem. recept. globose; pedicels $\frac{1}{2}$ in.; fem. fl. not seen. Berries nearly $\frac{1}{2}$ in. diam.—If this is Blume's S. odoratissima that is the earliest name.


Leaves coarsely reticulate, white beneath; petiole 1–1$\frac{1}{4}$ in.; male umbels very
many-fl.d., solitary and bracteate towards the base or two on a long common peduncle, special peduncles 2–3 in., very slender; pedicels ½ 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 petiolate 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 ⅓–2 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 ⅓ 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; cirrih 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 candeate 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 ⅓ 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 ⅘ in. broad coriaceous sheathing timidly 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 epinemat and clinoelate, marginal nerves very slender, nervules faint; petiole jointed at the sheath. Umbels from the young shoots only, of which the leaves are membranous subglaucoes beneath; pedicels rather stout, solitary, rarely 2-nate, 1–2 in. long or shorter; bracteoles ovate, acuminate sepals ⅓–⅔ in. long, ovate-oblong; petals similar; staminodes 3; ovary oblong, short styles, stout. *Berries* ½ 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. laevis**, 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 1½ 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).


Branches slender, terete, smooth. Leaves jointed suddenly at the narrowed base, finely reticulate. *Peduncle 3/8–1 in.; pedicels of male fl. very short; bracteoles obsolete; flowers 3/4 in. diam.; sepals linear-oblong; petals very narrow; stamens nearly as long as the sepals; staminodes 3; stigmas large recurved. Berries small, 1 in. diam., fruiting pedicels ½ in., very slender.—The Mt. Ophir specimens (var. ophiadense, *A.DC.*) have very strongly reticulated leaves.


Branches slender, suberecte, prickles few or 0. Leaves membranous, subcaudate, intra-marginal nerves very slender, punctulate and lincolate. *Male umbel 15–25-fl., pedicels ½ in., filiform, bracteoles ovate, acute; flowers ½ in. diam.; sepals and petals linear, subequal; anthers oblong, much shorter than the filaments. Fem. umbels subimbricate; peduncle stout, flattened; bracteoles very minute, subulate or 0; staminodes 3, ovary short, obtusely trigonous; stigmas short, obtuse, recurved. Berry about ½ in. diam.—The Chinese plant (var. opaca, *A.DC.*) has more rigid epunctate leaves. The leaves are subordinate in the Burmese specimens. A specimen, apparently of this from the Duphia hills has leaves 5–6 by 3½–4 in., broadly ovate deeply cordate, and fruiting peduncle 1½ in., with pedicels 1 in.


**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, lincolate, hardly punctulate, intramarginal nerves very slender. *Male umbel 15–30-fl., 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. lanceaefolia.* I have seen no fem. fl.


† Coste 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 ¾ in. narrowly sheathing for half its length, fem. umbels solitary or 2–3 on a
short common peduncle very many-flowered, pedicels rigid, flowers small, sepals linear-oblong, petals narrowly linear. *S. zeylanica*, Wall. Cat. 5130 D. E.

Khasia Hills, Griffith; alt. 4,000-6,000 ft. J. D. H. & T. T. Munji pore, alt. 5,500 ft., Clarke. Burma; Tavoy and Prome, Wall.ick.

A very remarkable species, at once recognized by the square unarm ed almost 4-winged sparsely prickly zigzag branches, and oblong thin leaves with callous-tipped curds; 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, ½ 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 ½ in. long; petals very narrow; filaments very slender.—I found only 1–3 staminodes, A. D. C. in a solitary imperfect flower though there were probably 6.

22. *S. Helferi*, A. D. C. 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 ½–1 in. sheathing to above its middle, male umbels many-flowered, sepals linear-oblong, petals much narrower, costa thick, stamens nearly as long as the sepals. *S. inzonensis*, Pers. Rel. Haeckl. i. 131.


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; cirri 0 or short. Male umbels usually solitary, peduncle ½–1 in., bracteate about the middle or lower; fruiting peduncle stout; receptacle globose, pitted; bracteoles minute, ovate; pedicels ½ in., slender; staminodes 3. Berries very small, about ½ in. diam.; seeds small.—De Candolle makes of Maingay’s plant a variety with the costa 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 Kasarleh 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 ½–2 in. narrowly sheathing to the middle, male umbels solitary or 2–3 on a short bracteate common peduncle many-flowered, pedicels very short, sepals linear obtuse, petals much narrower, stamens as long as the sepals. A. D. C. Monogr. *Smilax*, 179.

Penang, Wallach, Curtis, 1244.

Branches striate, unarm ed, 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; cirrhæ stout. Peduncle of umbels bracteate at the base; bracteoles minute, ovate; pedicels ½ in.; sepals ½ in.; staminodes 3.—*S. extensa*, Wall. 5126, A. is *S. myosotiflora* of A. De Candolle.

†† Costae 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

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 cordrose. Peduncle bracteate at the base, umbels 20–30-fld., male pedicels $\frac{1}{2}$ in., fem. $\frac{1}{2}$ in.; staminodes in few-fi. Berries $\frac{1}{2}$ 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.


TROPICAL HIMALAYA, from KUMAON (Herb. Strach. & Winterb. 8) Eastwards, ASSAM, BENGAL, CHITTAGONG, BURMA, the CENTRAL PROVINCES and CONCAN.

Stem stout, scandent, pricky, as thick as the thumb below. Leaves glossy above; cirrhii long. Male peduncles $\frac{1}{2}$–1½ in., slender; umbels many-fld.; pedicels $\frac{1}{2}$ in., shorter than the buds; stamens of fem. fl. 3. Ovary oblong; stigmas 3 sessile. Berries $\frac{1}{2}$–1½ in. diam., 1–2-seeded; pedicels short, stony. Seeds biconvex.—This is, I think, undoubtedly Roxburgh’s ovalifolia as well as his macrophylla. It is best distinguished from proliferæ, by the narrow sheath of the petiole, but both are so variable in foliage, that young shoots of proliferæ with undeveloped sheaths may be mistaken for macrophylla. De Candolle unites Roxburgh’s ovalifolia with proliferæ, 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 gurvatica,” which Roxburgh also gives. De Candolle’s S. ovalifolia must therefore take the name of S. proliferæ.

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 $\frac{1}{2}$ in. long and petals subequal linear hardly longer than the stamens. S. zeylanica, Wight, l. t. 2057–8.

NILGIRI HILLS, alt. 4–6000 ft., Wight, &c.
A lofty climber; branches terete, sparingly prickly. Leaves shining, acute or cuspidate, or young acuminate, base rounded or cordate, margins of petiolar sheath incurved. Common peduncle 1-1 1/2 in., stout, bracteate at the base; bracteoles subulate; pedicels 1-2 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 costa of the leaf as free to the base, and peduncles and pedicels 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-fl., fem. sepals ½ 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 ¾–1 in., strongly 3-costate with slender sub-marginal nerves; cirrh slender. Common peduncle very stout, partial (fruiting) ¾–1 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-nurcled sheaths below the middle, umbels solitary or 2-3 on a common peduncle many-fl., sepals ½ in. long, linear-oblong, stamens as long as the sepals. S. ocreata and orthoptera, A.DC. Monogr. Smilax, 193; S. macrophylla, var. caharensis, 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 Pars-nath).

Stems more or less prickly; branches smooth. Leaves on young shoots 6 by 1½–2 in., thin, lanceolate base acute, petiole ¾–1 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; costa in all united above the base; auricles in old leaves 1-⅔ 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-fl., pedicels ¼ in., slender; staminodes 3; stigmas long, recurved. Berries ½ in. diam., pedicels as long or longer. Seeds 2, hemispheric or solitary and globose, less than ⅛ 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 ⅔–1½ in., sheath short narrow, umbels many-fl., pedicels ¼ in. slender, sepals ⅛ in. long liguulate, petals very narrow, filaments very long slender, berry the size of a cherry 3-seeded, seeds lenticular.


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 costa unite, they are thin shining with finely reticulate nervules; the petiole is ½ in. long, sheathing about ½ way up, and articulate at the tip. In the Munting specimen the leaves are detached, 6 by 3 in., broadly oblong rounded at the tip, very coriaceous; the costae 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 ¼–1 in. stiff; pedicels 3–5, also stiff. Berries nearly 1 in. diam.; seeds 3, orbicular, ½ 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 specimen the male fl. branches are elongate, leafy upwards, and the upper umbels axillary, the lower arise from leafless scales; pedicels ¼–1 in.; bracteoles minute.

γ Umbels more than three alternate or whorled over the rachis of a common peduncle.


**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; costa 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-fl.; peduncles 3–1½ in., pedicels ½ in.; bracteole minute; flowers very small; sepals ½ 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. 8; 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, acuminate, with 3 costa meeting at the base, the petiolar sheaths form tumid auricles nearly ½ in. long and at basal the racemes are shorter, the flowers rather larger, and pedicels shorter than in true *prolifera*. Var. *parviflora*, *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 ¼ 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 *Kurs.* (n. 2636) with 8–9 stamens I know nothing; *S. ferow* is the only polystemon 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-fl., pedicels hardly longer than the sepals. A.DC. Monogr. Smilax, 200.

Penang; Griffith, Curtis; Preak, King's Collector.—Distrib. Malaya, Cochinchina.

Branches stout, quite smooth, more or less prickly. Leaves retuse acute or acuminate, nervules obscure. Inflorescence irregularly branched; peduncles of umbels 1½-3 in., bracteoles obscure; buds ⅜ 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 1-1½ in. S. perfoliata, Blume Enum. 18 (not of Low.).

Malacca, Maingay, at Ulu Bubon, King's Collector.—Distrib. Java.

Branches prickly. Leaves coriaceous, costa 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 ms.)."—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 2½-4½ 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-srate; peduncles ¼ in.; pedicels ¼ in.; sepals ½ in., narrowly ovate-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. F1. 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. singaporesis, 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 obate base of the more cupulidate 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,
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 ¼-1 in., subterete, sheathing base very short, connate. Pedunules solitary, axillary, ⅓-⅔ in., flattened; umbels many-fl., bracteoles minute, ovate, acuminate; pedicels ⅓-⅔ in.; flowers very many, obovate, male ½ in. long. Fruit ¼-⅓ 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 racemose, pendulous; pedicel united. 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.

* Leaves axillary, solitary clustered or umbelled, not racemose.

† Leaves not or rarely spinescent. Cladodes short straight or falcate.


**Temperate and Tropical Himalaya**, from Kashmir 4-7000 ft., eastwards, alt. 6-9000 ft., to Bhutan (except Sikkim). The **Khasia Hills** alt. 5-6000 ft. **Assam** and **Burma**.—Distr. China.

Stems flexuous, fistular, much branched, smooth, unarmed, lower branches spreading; upper internodes short. Cladodes ⅓-⅔ in. Pedicels 0 or ¼-⅔ in., jointed above the middle. Perianth ⅔-⅔ in., subcampanulate. Stamens short; anthers minute. Berry ¼-⅕ in. diam.—The following are marked forms.

A. **Filicinus** proper; cladodes ⅓-⅔ in., pedicels very slender ¼-⅕ in.—Central and Western Himalaya.

Var. **Brevipes**, Baker l. c.; cladodes ⅓-⅔ by ⅓ in., pedicels very short.—**Assam** and Khasia hills.
Clavatus.]  CLAVI. LILIACEE.  (J. D. Hooker.)  315

**Var. Brevifolia,** Baker l. c.; internodes very short, cladodes \( \frac{1}{2} - \frac{3}{4} \) in. — Khasia hills, at Syong, J. D. H. & T. T.

**Var. Lycopodina,** Baker l. c.; cladodes solitary or 3-nate \( \frac{1}{2} - \frac{3}{2} \) in., \( \frac{1}{2} - \frac{3}{4} \) in. broad. A lycopodinaeus, Wall. mss. A. Curillus, Wall. Cat. 5155 E. (not of Roxb.) — Mishmi, Griffth. Burma, Wallich, Parish. — In Chinese specimens the pedicels are nearly 1 in.

**Var. Microcolada,** cladodes very small \( \frac{1}{2} - \frac{3}{4} \) 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 dichotoma, lower rigid striate deflexed. *Cladodes* \( \frac{1}{2} - \frac{3}{4} \) in., terete, erect, ascending, cuscipitate. *Pedicels* in subcuscipitate clusters \( \frac{1}{2} - \frac{3}{4} \) in., jointed below the middle. *Perianth* \( \frac{1}{2} \) in. *Stamens* half its length; anthers very minute.

3. **A. capitatus,** Baker in Journ. Linn. Soc. xiv. 607; slender, much branched, subcaudant; 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. Nilgiri Hills; Wight.

A tall undershrub, branches slender, terete, smooth, lower divaricate or deflexed, upper internodes very short. *Cladodes* \( \frac{1}{2} - \frac{3}{4} \) in., cuscipitate. *Pedicels* \( \frac{1}{2} - \frac{3}{4} \) in., jointed about or below the middle. *Perianth* \( \frac{1}{2} \) in. long. *Anthers* very minute, oblong. — A variety? from Lahore (Thomson) has softer caudate cladodes \( \frac{1}{2} - \frac{3}{4} \) in. long. *Possibly a form of A. gracilis*” (Baker).

4. **A. dimumus,** Baker in Journ. Linn. Soc. xiv. 609; stem woody below strongly grooved, branches stout rigid, young leaves spinescent, cladodes \( \frac{1}{2} - \frac{3}{4} \) in. 3-8-nate linear stout mucronate channelled, flowers axillary and terminal 1-4-nate, perianth-segments oblanceolate.

**Scinde;** at Kurrahee, Stocks, Dalsell.

An excessively branched undershrub, 2 ft. high; branches pale, flexuous, divaricate or reflexed, ridges scaberulous; upper internodes \( \frac{1}{2} \) in. *Leaves* deltoidei cuscipulate. *Pedicels* \( \frac{1}{4} \) in., jointed below the middle. *Perianth* funnelf-shaped. *Anthers* very minute, subglobose. *Berry* \( \frac{1}{2} \) in. diam.

5. **A. Rottleri,** Baker in Journ. Linn. Soc. xiv. 611; tall, branches scaberulous furrowed, leaves not spinescent, cladodes 3-6-nate \( \frac{1}{2} - \frac{3}{4} \) in. slender ascending curved channelled, pedicels densely unbelled. *A floribundus,* Herb. Rottleri.

**Deccan Peninsula;** Rottleri.

Tall, shrubby branches, terete, branchlets decurved; upper internodes \( \frac{1}{2} - \frac{3}{4} \) in. *Cladodes* variable in length. *Pedicels* \( \frac{1}{4} \) in., jointed below the middle. *Perianth* \( \frac{1}{4} - \frac{3}{4} \) 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 subcaudant, branches grooved smooth, spines long straight, cladodes 6-12-nate \( \frac{1}{2} - \frac{3}{4} \) in. acicular triquetrous acuminate, pedicels solitary
OLVI. LILACÆÆ. (J. D. Hooker.) [Asparagus.


NILŽERI HILLS, Wight, Schmidtt.
A small erect or tall and variable bush, densely branched; branches flexuous; upper internodes very short. Spines $\frac{1}{2}$-$\frac{1}{4}$ in. Cladodes ascending, spreading and curved, rather stout, variable in breadth. Pedicels jointed above the middle. Perianth segments oblong-lanceolate; anthers oblong. Berries $\frac{1}{2}$ 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 $\frac{1}{4}$ 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 CONCA; between Poona and Carli, Jacquemontt.

Tall, much branched, branches spreading and decurved; spines $\frac{1}{2}$-1$\frac{1}{2}$ in. conical. Cladodes much longer than the internodes. Flowers $\frac{1}{2}$ 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 $\frac{1}{4}$-$\frac{1}{4}$ in. very slender acicular terete acuminate, flowers axillary solitary or umbellated, pedicels almost eqnailling 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. **

† 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 $\frac{1}{4}$ in. acicular spreading or ascending triquetrous acute, racemes short 1-3-nate sometimes branched below, perianth campanulate. A. Curillus, Wall. Cat. 5155, C.

NEPAL, Wallisch.
An excessively branched undershrub. Spines $\frac{1}{2}$-$\frac{1}{2}$ in., conical. Cladodes nearly straight. Racemes $\frac{1}{4}$ in.; bracts minute, lanceolate; pedicels jointed above the middle. Perianth $\frac{1}{4}$ in. diam.; anthers very minute, oblong, purple. Fruit $\frac{1}{4}$ in. diam.


Throughout TROPICAL and SUBTROPICAL INDIA and CEYLON ascending the
Himalaya to 4000 ft. from Kashmir eastwards.—**DISTRIEB. Tropical Africa, Java and Australia.**

A tall climbing excessively branched undershrub; roots tuberous. *Spines ½-1 in., straight or subrecurved. Cladodes 1 in., channelled beneath. Racemes 1-2 in.; pedicels ½ in., jointed in the middle. Perianth 1½-2 in. diam.; anthers minute, obovoid, purplish. Ovules 6-9 in each cell. Berry ½-1 in. diam.—Thwaites observes that the leaves are wide on specimens growing on the hills. Baker has the following varieties:—


Var. *subacerosa*, Baker l. c.; cladodes strict ½-1 in. stout, racemes small few-fld., rachis and pedicels capillary.—Sikkim, alt. 1-4000 ft., J. D. H.—A form approaching *A. acerosus*.


**CEYLON**, alt. 6000 ft., Walker; at Newera Elia, Gardner, Thwaites (Cp. 2299).

The stout triquetrous cladodes thickened in the middle, stout racemes, large flowers ½ in. diam., and large anthers seem to distinguish this from *A. racemosus*.


**WESTERN GHATS**, from the Concan southwards.

Differ 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 pedicel.


**BENGAL**, Roxburgh, Clarke, &c. CHITTAGONG (cult.), J. D. H. & T. T. Pegu, McLeodland. **BURMA**, Wallich, &c.—**DISTRIEB. N. Australia.**


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 ½-3 in. slender filiform terete suberect or curved, racemes many-fld., bracts minute, perianth-segments

BohleKund, the Western Himalaya, and the Punjab, from Murree eastwards to Kumaon; ascending to 5300 ft.—Distrib. Afghanistan.

Stem excessively branched, flexuose, and primary branches ashy white; internodes very short. Spines ½-⅓ in., stout, straight. Cladodes densely crowded, soft. Racemes copious, 1-2 in., often branched at the top and bearing cladodes; pedicels ⅓-⅓ in., jointed above or below the middle; flowers ⅜ in. diam. Owles many in each cell. Berry ⅓½ in. diam., 1-seeded.


Subtropical Himalaya, alt. 2-4000 ft., from Kumaon to Nepal, Hamilton, &c.

An excessively branched undershrub; branches spreading, angles obscurely scabrous. Spines ½-⅓ in., pungent curved. Cladodes obtusely 3-4-lobed, 1-3½ in., few-fld.; pedicels ⅜ in., jointed below the middle; bracts lanceolate; flowers ⅛ in. diam. Berry 3-seeded (Roxb.).

†† Cladodes linear, flattened.


Ceylon; common in the warmer parts.—Distrib. Trop. and S. Africa.


The Deccan Peninsula; from the Cauca southwards. Ceylon, Thwaites (Cp. 737).

An excessively branched undershrub; branchlets curved, green, strongly angled. Spines ¼-½ in. Cladodes ½ in. diam., narrowed to the acuminate tip, green. Racemes 1-3 in., often fascicled, sometimes connate; pedicels ⅓-⅓ in., jointed below the middle; flowers ⅛ in. diam.; anthers small.

Imperfectly known species.

A. rubricaulis, Baker in Journ. Linn. Soc. xiv. 616; subscandent, branches flexuose 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.  

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 sub sessile 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 sub globose, 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.


WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 6-9000 ft. —DISTRIBUT. Europe, N. Asia, Japan.

Stem 2-3 ft., arched. Leaves many, 3-6 in., narrowed at the base, glaucous beneath, subacute. Peduncles 1-3 in., rarely 1-fl.d. Perianth 1-3 in., white with green lobes; nerves within hairy. Stamens inserted above the middle of the tube. Berry ½ in. diam., blue-black. Seeds few.


Sikkim Himalaya, alt. 7-8000 ft., J. D. H., Clarke.


3. P. nervulosum, Baker in Journ. Linn. Soc. xiv. 557; stem flexuous, leaves 4-8 in. elliptic caudate-acminate, nerves strong, peduncles long slender, berries globose 2-4-seeded.

Sikkim and Bhutan Himalaya, alt. 9-10,000 ft., Griffith, J. D. H.


** Leaves most or all opposite.

Western Himalaya; Barung, alt. 11,000 ft., Murno.

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 ½ 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., Garwal, Duthie; Sikkim, at Lachen, J. D. H.

Stem 1-2 in. Leaves crowded, ½-3½ in., nerves slender. Flowers suberect, violet; pedicels ½-⅓ in. Perianth ½-1 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. greminifolium.


Western Himalaya, alt. 7-11,000 ft., from Kashmir to Kumaon.—Distrib. Afghanistan.

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 ½ in., ⅓ 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.


Eastern Himalaya; Mishmi hills, on Laim-planj-thaga, alt. 6000 ft., Griffith. Stem 3 ft., slender. Leaves distant, 3-6 in., green above, subglaucous beneath. Peduncles and pedicels ½-⅔ in. Perianth white, ⅔ in. long, lobes very short, deltoid, green. Stamens inserted at the mouth of the tube, filaments very short, naked; anthers minute, 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 ⅔ 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 ½-⅔ 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,
Polygonatum.]

OLVI. LILIACEAE. (J. D. Hooker.) 321


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 ½-⅔ in., all white, or tube with deltoid lobes greenish. Stamens inserted above the middle of the tube; filaments papillose; tips of anthers exerted. Style twice as long as the ovary. Berry ½ in. diam., broadly ovoid or ellipsoid, scarlet. Seeds many, globose.

Var. decipiens, Baker l. c.; leaves shortly petioled lower alternate lanceolate very acuminate 5-4 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.


Temperate Himalaya, alt. 5-8000 ft. from Nepal, Wallach, 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 ½-⅔ in. Perianth ½-⅔ in. Flowers white, spotted with lilac, lobes deltoid, green. Stamens inserted above the middle of the tube, filaments very short, glabrous. Style as long or 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.


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.—DISTR. Europe, N. Asia, Afghanistan.

Stem 2-4 ft., very slender, or stout, sometimes as thick as the middle finger. Leaves 3-6 by ½-⅔ in., green above, glaucous beneath, often ciliolate on the margins and nerves. Peduncles and pedicels ½-⅔ in. Perianth very variable in size, vol. vi.

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, glaucescent 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 1–1½ in. diam., excessively variable in size and in the number of seeds; in some specimens from Simla, the seeds are ½ 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. 1881, t. 21; very robust, leaves 5-nately whorled or 2–3-nate sessile coriaceous linear-lanceolate with a thick circinate apex, peduncles 1–3-ft., 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. inglæsii, 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 stigmatic tose within; cells many-ovuled. Berry subglobose. Seeds many, oblong, curved, striate; testa thin adnate; embryo cylindric.—Species 4, N. temp. regions.


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 ½ in. diam., 5–6-seeded.

*Rootstock short, or creeping. Stem simple, leafy above. Leaves alternate, subsessile, rarely petiolate, 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; tests thin, adnate; embryo about half the length of the seed.—Species about 20, Europe, temp. Asia and America.*

*Flowers racemose.*


**Sikkim Himalaya**; woods at Lachen, alt. 10-13,000 ft. *J. D. H.*


**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 ¾-1 in.; bracts deltoid. Perianth ½ in. long, purple or white. Filaments deltoid. Style very short.*

**Flowers in thyrsiform panicles.**


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-fl., branches flexuous, pedicels \(\frac{1}{2}–\frac{3}{4}\) in. \(\frac{1}{2}–\frac{3}{4}\) in. diam., segments serrulate. Filaments deltoid. Style very short, 3-cuspitate. Berry \(\frac{1}{4}\) 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 globose campanulate; segments subequal, broadly ovate, broadly imbricate. Stamens inserted at the base of the segments, included; filaments short, broadly ovoboid, fleshy, incurved; anthers bisasified between the lobes, ovoid, acute, cells spreading over the top of the filament, erect. Ovary sessile; style filiform, acute, stigma minute; cells 6–10-ovulated. Berry subglobose. Seeds few or several, subglobose, testa thin adnate; embryo straight or curved.


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 \(\frac{1}{2}–\frac{3}{4}\) in., solitaries, jointed under the perianth; bracts green, subulate. Flowers \(\frac{1}{4}\) in. diam., drooping, white suffused with pink. Berries \(\frac{1}{4}\) 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, indexxed; 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.


Sikkim Himalaya, alt. 1–5000 ft., J. D. H. Khasia Hills, alt. 2–4000 ft., Wallach, &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 \(\frac{1}{4}–\frac{1}{2}\) in. stout, decurved; spike 3–5 in.; bracts detold, scarious. Flowers \(\frac{1}{4}–\frac{1}{2}\) in. diam., tube hemispheric longer than the lobes. Berry \(\frac{1}{4}–\frac{1}{2}\) in. diam.

**Khasia Hills**, 3-4000 ft.; *Griffith, &c.*

Except by the characters given above I cannot separate this from *mutans*, and in the dried state they are indistinguishable.—*Griffiths* is a much exaggerated drawing.

3. **T. Clarkei**, *Hook. f.*; spike decurved or pendulous dense-fl., 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.


**Burma**; *Moulmein, Stoliczka*.

**Leaves** 2½-3 ft. by 4-5 in.; petiole 1-1½ ft. **Spikes** 1 ft., robust; peduncle 4 in. **Flowers** ½-⅔ in. diam.

**Bracts longer than the flowers.**


**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. **Spikes** erect, 1-1½ in. long. oblong, dense-fl.; bracts 1 in., lanceolate, spreading. **Flowers** ⅔ in. diam., yellow; perianth-tube hemispheric, lobes short nearly orbicular; style short, stigma large, 3-fl. **Berry** ⅔ in. diam., globose.


**Bhotan Himalaya**, *Griffith*. **Munnipore**, alt. 6-7000 ft., *Wall. Clarke*.

**Stem** stout, fleshy, 6-10 in., from a long fleshy prostrate rhizome. **Leaves** 4-12 by 1½-3 in. **Peduncle** very short, stout. **Spikes** 1-3 in., dense-fl.; bracts linear-lanceolate; flowers yellow. **Berry** 1½ in. diam., 1-seeded.


**Singapore**, *Wallich*.

**Stem** short, erect, as thick as the finger. **Leaves** 10-16 by 2-2½ in., erect; petiole 3-6 in., stout, ribbed. **Spikes** 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.


**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 ½–1 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 nerves. Scape radical, bracts elongate-subulate much exceeding the flowers; spike erect, cylindrical, crowned with a tuft of flowerless persistent bracts. Perianth-tube cylindrical; 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 Dupha hills, alt. 4500 ft., Booth, Lister.

**Rootstock long, fleshy. Leaves 1–2 ft. by 6–8 in., narrowed into a petiole 4 in. long, subterminally 10–12-nerved. Scape 8–9 in., stout, strict, terete, with basal scarious sheaths; spikes 3 in., dense-fl., cylindrical; 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-fl. 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 capitulate; cells many-ovuled. Capsule triquetrous, coriaceous, loculicidal. Seeds angled; testa thin, black, shining; embryo cylindric.—Species 5, Europe, temp. Asia and Japan.**

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, subglanecous beneath. Scapes 2-3 ft., panicle 6-12-ft.; pedicels short; bracts small, membranous. Flowers nodorous, 1-2 in. diam.; tube yellow-red; outer segments orange yellow, oblong, acute, inner very much broader.


11. DRACENA, Linn.

Shrubs or trees. Leaves alternate or crowded and subterminal, sessile or petioled, costate or not and many-nerved. Flowers in terminal racemes panicled 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.


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 ¼ in.; and angustifolia by the erect stiff panicle shorter than the leaves, bracts with a scarios border, filaments white.


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 ¼-1¼ in. diam. shortly pedicelled fleshy.

Malay Peninsula; Perak, King's Collector.

Stem 50-60 ft. by 18-20 in. diam.

**ANDAMAN ISLANDS**, frequent, Kurs.

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 scaberulous spreading, flowers shortly pedicelled ternately fascicled.

**Penang**; Monistil road, Curtis, 2802.

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 ⅓ in.—Described from one leaf and a portion of a panicle.

**D. porteri**, Baker in Trimen Journ. Bot. 1873, 262; in Journ. Linn. Soc. xiv. 529; shrubby, leaves 8–10 by 1–1 ⅔ in. sessile narrowly lanceolate or oblong-narrowly lanceolate costate towards the base, raceme shortly peduncled erect, flowers ⅔ in. long, pedicels very short, fruit pisiform. *D. maculata*, Wall. Cat. 5748 (not of Rwb.).

**Penang**, Porter, King's Collector; **SINGAPORE**, Wallich. MALACCA, Griffith (Kew Distrib. 5874), Marius (K. d. 1887).—DISTRIBUTION. 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 1 ⅓–2 in. very broadly petioled elliptic or broadly oblong-narrowly acuminate, raceme long or short simple or branched at the base, flowers fascicled very shortly pedicelled, fruit pisiform ⅓ in. diam., or 3-lobed and ⅔ 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**, Kurs.

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, Malacea, and the Congo River in Western Africa. Of these the Himalaya (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 oblong-narrowly 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 Malayan 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. Heynesiana; spike or panicle much shorter than the leaves. D. Heynesiana, Wall. Cat. 5754. D. terminalis, Wright I. c. t. 2054.—Western Ghata, from the Concan southwards, Heyne, &c.

Var. ? Thwaitesii; spike or panicle very short, flowers smaller ½ in. long. D. Thwaitesii, Regel Revis. Drae. 44; Baker I. c. D. elliptica, Thunb. & Dallim. 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.


Resembles a dwarf D. spicata. "Stem sometimes as thick as the little finger; leaves often blotched; flowers ½ 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.


Singapore, Wallich, Cantley. Malacca, Maingay (K. d. 1889).

Apparently arborescent. 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.


Malacca; at Pulio Bissom, Griffith (Kew Distrib. 5873), Maingay (K. d. 1689). 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.


**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, subsecise, branches slender curved; bracteoles ovate, scarious. Flower $\frac{1}{3}$ in. long, slender, 6-cleft to the middle, white purple or greenish; filament white. Berries orange red.—The short rather slender petiolo 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., oblanccolate, narrowed into a long broad petiole.—There may be more than one species under this name. Roxburgh's drawing of *atro-purpurea* represents the panicle as erect.


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.


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.

**Upper Assam**; near Kujoo, and at the Brama Khond, Griffith.

Apparently a very distinct species from the broad very long-petiolated leaves and long-peduncled panicles.

**Doubtful and imperfectly known species.**


**D. Linarifolia**, 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.* 1851, 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 ½ in. long, with lanceolate leaves 15 by 4½ in., suddenly narrowed into a petiole 1½ in. broad.

12. **Cordyline**, Commes.

Characters of *Dracaena*, 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.


**Tropical India**, from Bengal and Assam eastward and southward to Malacca.—Distrib. Eastward to the Pacific isles.

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 ¼ in. long, subsessile, or very shortly pedicelled, white or purplish. **Berry** ¼ in. diam., usually 1-seeded.—Kurz (for Fl. i. 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.* i. c.) has the following varieties:

**Var. 1. ferrea**; leaves narrower more oblongate 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. l. t. 448; Roxb. l. v.; Redouté Lil. t. 91; Lodd. Bot. Cat. t. 1224. Cordyline Jacquinii, **Kunth l. c. 23**.

**Var. 2. Sieberi**; leaves oblongate 12–18 by 2–3 in., raceme 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. 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.


Plains of India, in fields, from Bengal westwards to Guzerat and the Punjab. —DistriB. Westward to the Canary Ilands.

Leaves 6-12 in., erect, about \( \frac{3}{4} \) in. diam., acuminate. Scape 1\( \frac{1}{4} \)-3 ft., terete, often excessively scopariously branched. Racemes lax-fld.; pedicels \( \frac{3}{4} \) in. Perianth-segments \( \frac{1}{4} \) in. long. Capsule globose, \( \frac{1}{2} \) 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 1\( \frac{1}{2} \) in., peduncle very stout, racemes panicked dense-fld.

Labul, in the Rolang Pass, Jaeschke.

Habit of A. albus and ramosus. Leaves rather thick. Peduncle 2 ft.; pedicel 1 ft., pedicels \( \frac{3}{4} \)-\( \frac{1}{2} \) in., ascending, jointed below the middle; bracts \( \frac{1}{4} \) in., much longer, scarious. Flowers 1-1\( \frac{1}{4} \) in. diam.; segments linear-oblong, white with a green keel. Stamens \( \frac{1}{2} \) 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.


North-West India; Salt range, Mt. Sikka, alt. 4–5000 ft., Aitchison.—Distrib. Afghaun., Persia, Syria.


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.


The Deccan Peninsula, Heyne, &c.; Nilghiri hills, alt. 6000 ft. Clarke. Ceylon, common in the central province.


Sikki Himalaya, at the foot of the hills (fl. only), Clarke. The Concan, at Malwan, Daisel.


CLV. LILIACEAE. (J. D. Hooker.) [Chlorophytum.


Root-fibres cylindric. Leaves 6-18 by 1½-2 in., ob lanceolate, obtuse acut or acuminate, usually narrowed into a broad petiole. Scapo 6-20 in. stout; raceme 3-8 in.; bracts ½-1 in. or lower longer pedicels ½-1 in. jointed in the middle. Perianth-segments ½-1 in. lanceolate, white. Capsule ½ in. broad 2-lobed at the tip and base. Seeds ½ in. diam., suborbicular, flat, black.—In small specimens the leaves are narrower and broadest at the base.


The CONCAN; on the Ghats, rare, Dalzell, &c.


† Leaves linear or ensiform not or hardly contracted into a petiole.


The DECCAN PENINSULA and CENTRAL INDIA, common from the Northern Circars, and the Concan to Travancore. Burma; at Prome, Wallich.—Distrib. Abyssinias.

Root-fibres cylindric and tuberos. Leaves 8 in. to 2 ft. by 3-½ in. (to 4 in. Robh.), margins crisped. Scapo 6 in. to 3 ft. with a small sheath; raceme short, simple or shortly branched; bracts ½-1 in., white; pedicels ½ in., stout, jointed below the middle; perianth-segments ½-1 in. long, oblong; stamens much shorter than the perianth. Capsule ½-1 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.


Khasia Hills, alt. 3-600 ft. Griffith, &c.
Leaves 10-24 by ½-1 in., linear, flat. Scapo 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 \( \frac{1}{4} \) in. linear-oblong; anthers not recurved or revolute after flowering. Capsule \( \frac{3}{4}-\frac{1}{2} \) in. long. Seeds \( \frac{1}{16} \) 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.


The **Western Ghats**; from Canara southwards to Coimbatore. *Root-fibres* cylindric, often tuberous. *Leaves* 10–18 by \( \frac{1}{4}–\frac{1}{2} \) 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 \( \frac{1}{4} \) in. *Capsule* \( \frac{3}{8} \) in. broad.—Very small flowers with segments not \( \frac{1}{4} \) in. long occur amongst the others. That this is Roemer’s *Ornith. indicum* is proved by a specimen from Heyne in Herb. Bottler (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 which 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.*


**Western Ghats**, from Canara southwards. *Root-fibres* cylindric, fleshy. *Leaves* 6–12 by \( \frac{1}{4}–\frac{1}{2} \) in., usually narrowed from the sheathing base to the apex. *Scape* 3–4 in., curved, stont, raceme as long or shorter, bracts about as long as the flowers membranous, pedicels jointed above the middle. *Perianth* white, segments \( \frac{1}{4} \) in. long. *Capsule* \( \frac{3}{8} \) in. broad, tip deeply 2-lobed. *Seeds* \( \frac{1}{60} \) in. diam., flat, opaque.—Dalzell’s description of *Phalangium tuberosum*, as having small white flowers, and resembling his *Chlorophytum anthericoides*, probably applies to *C. malabaricum*.

**Raceme simple or branched, with the flowers remotely scattered, solitary or in pairs.**


**Subtropical Himalaya**, from Nepal, *Wallich*, to Sikkim, alt. 3–7000 ft. *Root-fibres* cylindric. *Leaves* 6–18 by \( \frac{1}{4}–\frac{1}{2} \) 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 \( \frac{3}{4}–1 \) in. apart; pedicels \( \frac{1}{4}–\frac{3}{8} \) in. joined at or below the middle. *Perianth* white, segments \( \frac{1}{4} \) in. long; anthers straight after flowering. *Capsule* \( \frac{3}{8}–\frac{1}{2} \) in. broad, top 3-lobed. *Seeds* \( \frac{1}{60} \) in. broad, angular, black.—Very variable in size, small specimens have simple scapes.

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 gaminate drooping; pedicels ½-1 in. jointed about the middle. **Perianth-segments** ½ in., white. **Capsule** ½ in. diam., broader than long, 2-lobed at the tip. **Seeds** solitary, orbicular or oblong, flat, opaque.


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 ½-3 in., grass-like or conduplicate or flat, rather rigid. Scape 1-12 in., suberect or arched; flowers ½-1 in. apart; bracts lanceolate, equaling the pedicels which are jointed in the middle. **Perianth** white, segments ½-1 in.; anthers green. **Capsule** ½ in. diam. **Seeds** angular, ½ in. diam.

**Doubtful and imperfectly known species.**

12. **C. acaule**, Baker in Journ. Linn. Soc. xv. 327; root fibres smaller, leaves 6-9 by ½-1 in. narrowly linear, flowers 2-5 in a sessile corymb at the bases of the leaves, fruiting pedicles erect ½-1 jointed, capsule ½ in. oblong emarginate, cells turgid 3-5 seeded, seeds rather tumid 'black opaque.—India, Jordn.—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.


**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 basifixid 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.


**Tropical Himalaya**, from Nepal eastwards, alt. 2-5000 ft., the *Khasta* Hills, *Munnipore*, and *Burma*. *Ceylon* ascending to 4000 ft.—Distrib. Eastwards to Australia and the Pacific, Mascarene Is.lds.

**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 spatheaceous; flowers indororous. **Perianth** white greenish or bluish, segments ¼-½ in.; 3 inner reflexed. **Anthers** linear, 2-porose. **Berry** dark purple, or blue, ½ in. diam., cells 1-3 or more seeded. **Seeds** ovoid, subsacute.

### 17. **ALLIUM**, *Linn.*

Foetid scapigerous herbs; bulbs coated. **Leaves** usually narrow, often fusciferous. **Flowers** capitate or umbel-like, 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** 3-6-merous, 3-celled: style filiform, stigma minute, cells few-ovulare. **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. ANPELOPHORAS**, *Linn.* A. Porrum, *Linn. Rosb.* l. c. ii. 141; *Wall. Cat.* 5074; stem leafy, leaves linear flat keeled shorter than the tall terete scape, head globose many-fid., pedicels longer than the campanulate white flowers, inner filaments 2-toothed.—The Leek.

- **A. CEPA**, *Linn.*; *Rosb.* l. c. 142; *Wall. Cat.* 5072. *A. Cumaria, Herb. Ham.*; leaves subdistichous fusciferous shorter than the inflated scape, head bearing flowers and bulbils, pedicels shorter than the stellate flowers, sepals linear-oblong, filaments exerted simple or the inner 2-toothed at the base.—The Onion.

- **A. SATIVUM**, *Linn.*; *Rosb.* 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. Schenoprasum. 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. Semonovii, Regel Enum. Pl. Semenoff, 126; All. Monogr. 85; leaves 2–3 stout about equaling the stout scape, sheaths very long, head subglobose dense-fid., pedicels shorter than the campanulate pale yellow flowers, sepals oblong-lanceolate acuminate, filaments included outer cupululate 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.


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 6–1½ in., stout or slender. Sepals ½–⅔ in., bearing the stamens near their bases. Capsule small, globose, cells 2-seeded.—Chives.


Western Himalaya; Kashmir at Gilgit, Tanner.—Distrib. Turkestan.

Bulb narrow, coats membranous at length fibrous. Leaves fistular, 8–12 by ½–1 in., linear, obtuse; sheath very long. Scape stout, fistular. Head ¾–1 in. diam.; spathes persistent. Perianth ⅔–1 in. long; segments united below; filaments subequal, inserted at ½ distance from their base, about ⅔ 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. Fedtschenkoanum, Regel All. Monogr. 82; leaves 1–2 much shorter than tall stout scape, head globose dense-fid., pedicels about equaling 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 O. Leaves 3–5 by ½ in., fistular, obtuse; sheath very long. Scape 2–3 ft. by ¾–½ in. diam. Head ¾–1 in. diam.; spathes persistent; pedicels stout. Perianth—segments ⅔–1 in., united below; filaments united at ½ distance from the base, connate, not ⅔ the length of the perianth. Capsule globose, style very short.—The dilated bases of the inner stamens are certainly 2-toothed.

The **Panjab and Western Himalaya**, alt. 1500–8000 ft.; from Kashmir to Kumaon.—DISTRIE. 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 ½–1 in. diam., spathe entire or 2–4-fid at length circumcisum. Sepals ½–½ 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 tenete to **A. Pallastii**, Bunge., which is described as having a long style; he retains as a species Boissier's **A. Griffithii**anum, which the latter author has reduced to a variety of *rubellum*.


**Var. g. parviflorum**, Ledeb. Fl. Ross. iv. 171; flowers smaller, sepals ½ in. long. A. santamantium, C. Koch in Linn.ae, 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 or as longer than the campanulate small pale red flowers, sepals ovate or ovate-lanceolate acute or obtuse, filaments exerted 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. Scrape 8–10 in., fistular. Head 1–1½ in. diam.; spathe 2, acuminate; pedicels ½–½ in. Sepals ½ 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.


**Allium.** CLV. LILIACEAE. (J. D. Hooker.) 339
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 6-10 by 1½-2 in., ensiform, recurved, tip rounded. Scape 1-2 ft., terete, leafy below the middle. Head 1-1½ in. diam.; spathe ovate, obtuse. Sepals ½ in. long. Filaments much longer than the sepalis, 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, sepalis oblong obtuse, filaments simple free much exerted. 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 ½ in., tips rounded. Head 1 in. diam.; spathe small, deltoid; pedicels ½-1½ in., about as long as the sepalis. Filaments filiform, inserted on the bases of the sepalis. Ovary globose-trigousc, 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 sepalis. 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 sepalis. Style slender, far exerted.

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, sepalis oblong-lanceolate obtuse or subacute, filaments simple, bases dilated. Kunth Enum. iv. 453; Regel Monogr. All. 135; Ledeb. Pl. Ross. iv. 184 (excl. var. β).

Western Tibet; (var. β, only), Herb. Calcul. (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 falcates, Regel l. c.; leaves ligulate glansous 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, sepalis oblong-lanceolate acute, filaments simple filiform much exerted, 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 ½-1½ in., sheathing the lower third of the stout terete scape, which is 1-2 ft. long, tip rounded. Head 1-1½ in. diam.; spathe short, deltoid. Sepals ½ 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.


**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 1/3 in., shorter than the slender tetrate scape. *Head* few- or many-fld.; pedicels 1/2 in. *Sepals* 1/2 in. long, with the filaments on their bases. *Ovary* subglobose, style far exserted.

**Stamens equaling or shorter than the perianth.**


**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 1/3 in., margins erose, narrowed to an acute point. *Scape* 1-2 ft. *Head* 2-3 in. diam.; pedicels 1-1 1/2 in.; spathes caducous, as long as the pedicels. *Sepals* 1/2 in., obtuse; filaments inserted on their bases. *Capsule* turbinate.


**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 2-4 1/2 in., acute. *Scape* 1-2 ft.; heads 1 1/2 in. diam.; spathe with a long tail; pedicels 1/2-1 1/2 in., capillary. *Sepals* 1/2 in.; filaments inserted on their bases. *Capsule* obcordate; cells usually 1-seeded.


**Sikkim Himalaya**; in the inner ranges, alt. 11-14,000 ft., J. D. H., Elles.

**Bulbs** tufted, slender, cylindrical; outer scales of long parallel fibres. *Leaves* 2-3, 3-4 by 1/2-1 1/2 in. subacute. *Scape* 4-12 in. *Head* 6-15-fld.; pedicels 1/2 in.; spathe solitary, broadly ovate. *Sepals* 1/2 to nearly 1 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 *Schamoprasum.*

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 sub-globose, pedicels shorter or longer than the lilac campanulate flowers, sepals oblong-lanceolate obtuse or subacute, filaments exerted subulate inner with a dilated 2-toothed base. *A. juncemum*, Jacquem. *mes.; 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 **A** in. **Scape** 3-9 in. **Head** 1-1½ in. **diam.; spathes** 2, membranous; pedicels **A** † in. **Filaments** inserted much above the bases of the sepals, shortly exserted, inner obscurely toothed at the base. **Capsule** globose-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-fil., 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 **A** † in.; margins erose. **Scape** 12-18 in., strict. **Head** **A** † in. **diam.; spathes** 2-3, short, acuminate; pedicels **A** † in. **Sepals** **A** † in. **long; filaments** on the base of the sepals, outer rather shorter than the inner. **Outer** 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-fil., 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.* *Jc.* *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 pedicle. **Scape** terete below, angled above. **Head** 1-1½ in. **diam.; spathes** 2, shorter or longer than the flowers, pedicels **A** † in. **Sepals** **A** † in., spreading and reflexed; filaments inserted on the bases of the sepals, outer narrowly subulate, inner

Var. angustifolia; leaves 1/2-1 1/2 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.Calculat. (Regel.).—DISTRIB. Siberia.

Bulbs subcyldindric, inserted on a stout cylindric rootstock; outer scales densely fibrous, reticulate, brown. Leaves 3-4 below the middle of the scape, 1/3-1/2 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 1/3 in., shorter than the perianth, at length 3/4 in. Filaments unequal, outer linear-subulate, inner subulate from a lanceolate base. Ovary ovoid, 3-gonous; style at length very long, stigma capitulate.—I have seen no Himalayan specimen. Regel says it differs from the widely diffused A. strictum, Schrad. in the capitulate stigma.

** Stamens shorter than the perianth.

20. A. odorum, Linn. Mant. 62; leaves many basal very narrowly linear flatish 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 to the obovate-oblong mucronate or subacute sepal triangular-lanceolate, style included. Kunth Enum. iv. 155; Regel All. Monogr. 175; (excl. Syn. tuberosum, &c.) Baker in Journ. Bot. 1874, 291; Redouté Lit. t. 98; Bot. Mag. t. 1142. A. tataricum, All. 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 1/3-1 in., subacute. Scape terete or angled at the tip. Head 1-1 1/2 in. diam.; spathes short, mucronate; pedicels short, filiform, angled, flowering 3/4 in., fructing 1 1/2 in. Sepals 3/4 in., with usually a strong nerve. Filaments subequal, outer dilated at the base, inner ovate with a subulate tip. Ovary subglobose, trigonous. Capsule subglobose.


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 fleshly root-fibres; scales grey, fibrous. Leaves 6-12 by 1/3-1/2 in.; sometimes concave and twisted. Scape 1-1 1/2 ft. Head 20-40-fld., hemispheric, 1-1 1/2 in. diam., spathes 1-2 small; pedicels ascending, 1/3-1 1/2 in. Sepals 1/2-3/4 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 globose obovoid, deep 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, 283; Regel All. Monogr. 177*. A. humile, Kunth Enum. iv. 443; *Regel l.c. A. niveale, Jacquem. mus.*

**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, 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.** Soolangaria, Eastern Turkestan.

**Bulb** tufted, cylindric or elongate conic; outer scales rigid, appressed fibres strongly coarsely reticulated. Leaves 8-12 by 1-3 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 1-3 in., tips thickened. **Sepals** ½-1 in. long, midrib dark. **Filaments** inserted much above the bases of the sepals, ½ 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.


**Western Tibet**; Zalung-Karpo Pass, alt. 10-17,000 ft., *Stoliczka* (Regel).—**Distrib.** Soolangaria, Eastern Turkestan.

**Bulb** tufted, cylindric or elongate conic; outer scales rigid, appressed fibres strongly coarsely reticulated. Leaves 8-12 by 1-3 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 1-3 in., tips thickened. **Sepals** ½-1 in. long, midrib dark. **Filaments** inserted much above the bases of the sepals, ½ 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 ½-3 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 ½-3 in. **Sepals** ½ in., acuminate; filaments inserted near their bases, anthers large. **Ovary** subglobose; style included. **Capsule** broadly obcordate, ½ 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 distular 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. Fl. Germ. x. t. 505. 
A. robustum, Karel. & Kiril. Enum. Pl. Alt. n. 855; Kunth i. c. 446; 

Western Himalaya; from Kashmir, Falconer, to Kishwar, alt. 8-10,000 ft., 
Thomson.—Distrib. Westwards to Hungary, Tukeystan, Siberia.

Bulb subgloosely 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., spathe 2-4, spiculate; 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 subgloose or depressed; style short; stigma simple. Capsule 
gloose. —Afghan specimens have leaves 2½ in. broad.

26. A. lorum, Baker in Journ. Bot. 1874, 290; leaves 3-5 linear-
lanceolate flat flaccid ciliolate longer than the slender terete scape, head 
many and dense-fl.d., 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; Kishwar 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-fl.d.; spathe 2, 
navicular, acute; pedicels ½-1 in. tip thickened. Sepals ½-1 in.; midrib brown; 
filaments inserted on their bases. Ovary gloosey trigrostous; style very short. 
—Baker says that this, judging from the very imperfect specimens, closely 
resembles A. narcissiflorum, Linn., the handsomest of European species. Near A. 
atropurpureum, but the leaves are broader, and the head gloose, with much shorter 
pedicels and paler flowers.

27. A. macranthus, Baker in Journ. Bot. 1874, 293; leaves many 
linear gradually acuminate keeled, scapes many grooved and ribbed, head 
fl-d.; pedicels much longer than the large campanulate dark purple 
flowers, filaments filiform equalling the oblong obtuse sepals. Regel 
All. Monogr. 182; Bot. Mag. i. 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 ½-¾ in. Scape robust, 
1-2 ft., pedicels 1-2 in., stout. Sepals ½-¾ 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. 
Rhisaridium, but it is not known to have a rootstock.

18. DIPCADCI, Medic.

Tuberous scapigerous herbs. Flowers racemcd. Perianth cylindric, 
of 6 erect segments, the outer recurved from about the middle, the inner 
at the tips only. Stamens included. Capsule short, broad, tridympous, 
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.

Rohilkund; at Delhi, Vicary. The **Concan** and **Western Deccan**, Dalsell.

Bulb small. Leaves 4-6 in., subfleshy, filiform, semiterete, deeply grooved above. **Scape** 6-9 in., terete; raceme 6-12-fld.; pedicels ½-1 in., longer or shorter than the lanceolate bracts. **Perianth** white or greenish, ⅔ in., tubular-campanulate, lobes glandular at the tips. **Capsule** stipitate, ½ in. diam. **Seeds** ellipsoid, ⅛ in. long, flat.

2. **D. minor**, Hook.f.; racemes many-fld., bracts much shorter than the pedicels, perianth ½-⅔ in. long as long as the tube.

The **Concan**; Rocky places in Malvan, Dalsell.

The specimens are very indifferent and leafless; but the small size of the flowers at once distinguishes the species.


The **Concan**; Heward Plain, rare, Dalsell.

Bulb small. Leaves few, 6-9 in., fleshy, filiform, semiterete, deeply grooved above. **Scape** 6-12 in., terete; raceme 2-6-fld.; pedicels ½-⅔ in., **Perianth** 1½ in., white; lobes linear-oblong, obtuse, outer spreading, inner united to the middle, all glandular and papilllose at the tip. **Capsule** stipitate, didymous, ¼ in. diam. **Seeds** ½ in. long, oblong.

**Ovary sessile or subsessile.**


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 ½-⅔ in., acuminate. **Raceme** 4-6 in.; bracts about as long as the white or very pale pink flowers. **Flowers** ⅔-⅜ in. long, outer lobes of perianth revolute, inner erect with spreading tips. **Capsule** very variable, ½-⅔ 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-fl., perianth ¾ in. long green lobes subequal, three outer about equaling the tube, capsule ½½ in. broad.

SciDB; on the lower hills, Stocks.
A much smaller and stouter plant than D. serotinum with green flowers. Capsule quadrate, retuse above and below. Seeds ¼½ in. diam., orbicular.—Possibly a state of D. serotinum, but a very different-looking plant.


The Panjab, at Luckiana, 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.


* Flowers appearing before the leaves.


Bulb the size of an apple, bitter, nauseous. Leaves 6–18 in., subbilobares, linear, flat, acute. Scape erect, 12–18 in., brittle; raceme 6–12 in., erect; flowers very distant; pedicels 1–½ in. spreading or decurved. Perianth ½-¾ in. diam., greenish white, nerves green, tips rounded; filaments flattened below; style narrowly obovate. Capsule ½–½ in., subacute, cells 6–9-seeded. Seeds ¼ in. diam.

2. U. coromanediana, Hook. f. (not of Wight), leaves very narrow, flowers long-pedicelled drooping, bracts minute ovate acute persistent, sepal 1-nerved, inner bearded at the tips, style very short obovate. Scilla coromanediana, Roxb. Fl. Ind. ii. 147.

Coromanedel coast; on sand hills, Roxburgh.

Bulb globose, 1½ in. diam. Leaves 6–8 by ½–½ in. subacute. Scape 12–18 in.; pedicels 1–1½ in.; bracts ½ in. Flowers dull green and purplish; sepals ½ in. long, tips rounded; filaments clavate; style shorter than the ovary, narrowly obovate.—Described from Roxburgh's excellent drawing, and the characters given in his Flora Indica. U. coromanediana, Wight is Dipcadi 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

South Deccan, Heyne; sand hills at Tuticorin and Coimbatore, Wight.

Very near U. ooromandaliana, 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.


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 \( \frac{1}{2} \) in., suberect. Perianth \( \frac{1}{2} \) in. long, white and purplish; filaments flattened below broadly subulate, not longer than the linear oblong large anthers. Capsule \( \frac{1}{2} \) 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 \( \frac{1}{2} \) in., margins involute. Scape longer than the leaves, very slender; raceme terminal, 6-fl.; bracts \( \frac{1}{2} \) in., persistent; sepals \( \frac{1}{2} \) 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 Dipcode serotina.

20. Scilla, Linn.

Bulbous, scapigerous herbs. Flowers racemose. 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.


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. Scapes 2–6 in.; raceme cylindric, 30–50 fl., pedicels ¼–½ in.; bracts minute. Flowers greenish purple; filaments purple; ovary stipitate.—I can find no characters of L. maculata.


The Panjab; Ic. Falconer; Rawul Pindee, at Hussan, Achinson.—Distrib. Afghanistan, Persia.

Bulb ovoid, ¼–1 in. diam. Leaves 4–6, flaccid, 8–12 by ¾–½ in. Scapes 4–8 in., 6–12-fl.; 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 fl. herbs. Flowers axillary or in terminal racemes. Perianth infundibular, segments 6, usually narrowly nectariferous at the base. Stamens hypogynous, anthers large dorsifixum versatile. Style long, stigma globose (rarely 3-fl. as in Fritillaria). Capsule erect, coriaceous, loculicidal, very many-seeded. Seeds vertically compressed; testa pale, membranous, appressed.—Species about 50, N. temperate.


* Leaves petioled, broadly cordate.


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, pinninerved; 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 recurved at the tip; anthers ¼ in., yellow. Capsule 2–3 in., obtusely angled; carpels retuse, septa pectinate. Seeds 1–½ 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

**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 subtilor, horizontal, sweet-scented, pedicel long; tube greenish outside; segments subequal, ob lanceolate, 2 in. broad; style recurved at the top; stigma conoidal. Capsule 1½-2 in.


**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, 8-5 by ⅜″-1 in., and the perianth tube even longer.


**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 ½ 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 ob lanceolate tip rounded apiculate, margins furfuraceous puberulous.—Description from a single specimen as given by Hemslcy 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
OLY LIILACEAE. (J. D. Hooker.) 351


WESTERN HIMALAYA, from Nepal to Simla, alt. 7-8000 ft.

Bulb unknown. Stem 2-3 ft., slender. Leaves 3-4 by ½ -1½ in., 5-7-nerved. Flowers solitary or few and racemous or subumbellated, 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 ob lanceolate subacute, inner much broader, tips rounded; filaments bright red, rather spreading; style exerted.—The colours of the flower probably vary. A supposed variety with deep crimson green-tipped sepal 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 umbellated long-pedicelled, perianth 5-6 in. funnel-shaped segments subequal, the upper half revolute, stamens exerted rather shorter than the perianth, anthers ½ in. brown, style much longer than the stamens. L. neilgherrense, Hemsl. & Collett in Journ. Linn. Soc. xxviii. 188. L. clatponense, 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, ob lanceolate-oblong.—Described from Mr. Baker’s account of a specimen that flowered with Messrs. Low & Co.


UPPER BURMA, Hort. Low.

Bulb large, globose. Stem 6-7 ft. Leaves very many, 3-4 by ½ in.; bulbs 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).


WESTERN TEMPERATE HIMALAYA; alt. 6-12,000 ft., from Kumson to Kashmir, Royle, &c.—DISTR. Afganistan.

Bulb narrow, of few long narrow subequal fleshy scales. Stem 3-4 ft., slender. Leaves 4-5 in., many-nerved, lower sometimes whorled, margin 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, \( \frac{1}{4} \) in. broad; style very declinate.


**Western Himalaya**, alt. 5–7000 ft.; from Kumaon to Kashmir.—Distrib. Afghanistan.

Bulb 2–2½ in., formed of lanceolate fleshy inner scales (bulbils) covered by dark brown loose scariosus longitudinally undulate scales. Stem very stout. Leaves 8–12 by \( \frac{1}{4} \) in., falcate, 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.


**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. **Notolirion** was taken up as a genus by Boisier 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-fld.—Western Himalaya, Hoffmeister. (Translated from Klotzsch, I.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-fld 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-

*Western Himalaya; Kunwar, Royce; Kunmaon, alt. 12,500 ft., Strachey & Winterbottom; Garwhal and W. Nepal, alt. 10–11,000 ft., Duthie.*

*F*.* Bulb 2 in. long; scales few, subequal, lanceolate, acuminate, outer membranous, inner fleshy. Stem 12–18 in., stout. Leaves 1+3 by ½ 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.


*Temperate Himalaya; Kumso, Strachey (Hort. Kew); West Nepal, alt. 12–13,000 ft., Duthie; Sikkim, alt. 9–10,000 ft., J. D. H.*

*Bulb as in *F. oxypetalata,* but much smaller. Stem 6–12 in., slender. Leaves 4–6 by ½–1 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.


*Temperate Himalaya; Central Nepal, Wallisch; Western Nepal, alt. 12–13,000 ft., Duthie.*

*Bulbs as in *F. Stracheyi.* Stem slender. Leaves 2–6 by ½ in. Flowers more infundibular than in the preceding species, with narrower segments, which are obtuse and only ¼ in. long. Style rather longer than the ovary.

**Flowers few or many. Perianth broadly campanulate. Stigma trifid, lobes spreading truncate.***


*Western Temperate Himalaya;* from Kumso 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, obvoid, obtusely angled.*


*Central and Eastern Himalaya; Nepal, Wallisch; Sikkim, alt. 11–16,000 ft., J. D. H.*

Very nearly allied to *F. Roylei,* and perhaps, as Wallisch believed, a variety of that plant, the leaves are however larger and narrower and the uppermost have cirrhose tips.

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, Gärtn. 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.—**DISTRI. Westward to Kurdistan.**

**Bulb large, globose, of broad obtuse gibbose fleshy yellowish scales, strongly smelling. Stem 3-4 ft., robust, naked below. Leaves crowded, 6-10 in 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 ½-1½ in. broad. Filaments flattened below. **Capsule** 2 in. long, obovoid, almost 6-winged, umbonate.—Crown Imperial.

**23. Lloydia, Salisb.**

Small slender bulbous herds. **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 basified. **Ovary** triquetrous; style columnar, sigma capitale, obscurely 3-lobed; cells many-ovulate. **Capsule** loculicidal. **Seeds** compressed and angled, tests appressed, brown or white.—**Species** 2 or 3, Northern.


**Alpine Himalaya and Tibet;** from Kashmir to Sikkim, alt. 12-17,000 ft.—**DISTRI. 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 ¼-2½ in., oblanceolate or spathulate, broad or narrow; nectary very small, green. **Stamens** ½-2½ shorter than the perianth; filaments glabrous pubescent or villous; anthers minute, very variable in shape. **Style** as long as the ovary. **Capsule** ½-1½ in., obovoid or obcordate. **Seeds** triquetrous, foveolate.—I am unable to find any character whereby to distinguish the yellow from the white fl. 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 ¼-1½ 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 basified, erect. **Ovary** oblong; stigmas 3, subsessile, recurved; cells 3, many-ovuled. **Capsule** loculicidal. **Seeds** flattened, tests membranous, pale, appressed.—**Species** about 50, temp. Europe, N. Africa and N. Asia.

The **Panjab, Jacquotmont; Salt Range, Fleming.**—**Distrib.** Afghanistan, Central Asia and N. Persia.

Bulb ½-1 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 Beluchistán.


**Temperate Western Himalaya,** alt. 5-8000 ft.; from Kumaon westwards.

Bulb ½-1 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, subspathulate oblongate. **Anthers** about as long as the very short glabrous filaments. **Ovary** with a narrow neck, stigmas small.—Roxburgh’s drawing of *T. 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.


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, basifixid. **Capsule** membranous, loculicidal. **Seeds** many, flat or angled, testa membranous.—**Species** about 20, north temp. regions.


**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 ½-⅔ in.; cauline subimilar. 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 ⅔ in. long obtuse, capsule nearly as long

**Western Himalaya;** from Kunawur to Kashmir, alt. 5–8000 ft., Roeyle, &c.—Distr. Westwards to Persia, Turkestan.

*Bulb solitary in the coate. Radical leaf 4–6 by ¾–⅜ in. Stem 4–6 in., glabrous, very slender. Cymes 1–2 in., often with bulbins 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.


The **Panjab Plains;** ascending the Western Himalaya, Salt Range, &c., to 5500 ft.—Distr. Westwards to Greece and N. Africa, Turkestan.

*Bulb densely fribilliferous. Stem 2–3 in., stout or slender. Leaves 4–8 in., cauleine 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, septical. Seeds subglobose; testa appressed brown.—Species about 30, Europe, N. Africa and temp. Asia.


**Western Temperate Himalaya;** Kashmir, alt. 4–7000 ft., Thomson, &c., Chamba, Ellis, &c.—Distr. Afghanistan, Turkestan.

*Corm gibbously ovoid, coats dark brown. Leaves few, lorate, short at the flowering time, at fruiting 6–12 by ½–⅜ 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 $\frac{1}{2}$ 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. Afghanistan, 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, equaling 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.


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, $\frac{1}{2}$ in. diam., neck 1–2 in, sheaths brown. Stem 3–10 in., flexuous. Leaves few, 6–8 by $\frac{1}{2}$–$\frac{1}{2}$ in., upper smaller. Flowers few or many, reddish or purplish; bracts linear, leafy; pedicels 1–2 in. Perianth $\frac{1}{2}$–$\frac{1}{4}$ in. long; segments clawed, spreading and reflexed. Capsule $\frac{1}{3}$ in., obovoid or oblong, most variable in size.—A sportive plant. Prominent specimens are nearly 1 ft. high, very robust and broadish leaved.


The Concan; Ritchie, &c., on the Ghats at Mahabaleshwar, and Belgaum.

Probably a var. of indica, with smaller narrower leaves and bracts, white flowers with much broader segments and shorter pedicels.

29. TOFTIELDIA, Huds.

Rootstock creeping. Leaves radical, equitant, ensiform. Scape slender; flowers small green or white, spicate or racemose; 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 ½–¾ in. **Fruiting raceme** 4–8 in.; lower pedicels ½–¾ in. **Perianth** ½ in. long, greenish white; segments narrowly oblanceolate, 1-nerved. **Capsule** ½ in., obvoid; styles very slender, ½ 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, introrse stigmatic; cells many-ovuled. **Capsule** large, coriaceous, septical. **Seeds** subglobose, testa spongy; embryo cylindric.—Species 3, tropical Asiatic and African.


Throughout **Tropical India**; from the N. W. **Himalaya** to Assam, Burma, Malacca and Ceylon, ascending to 5000 ft.—**Distrib.** Trop. Africa, Malacca, Cochinchina.

**Rootstock** a clump of fleshy arched tubers, budding from the convexity above. **Stem** 10–20 ft., terete, herbaceous. **Leaves** 6–8 in., sessile or shortly pedicled, 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 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 convining in a tube below, spreading above; anthers dorsi-


_Temperate Himalaya_; Nepal, Wallisch; 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 sub-sessile, 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 _Disporum_ 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 exerted (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.


_Temperate Himalaya_; from Nepal, Wallisch, eastwards, alt. 5–8000 ft. _Khasia_ Mts., _Munnipore_ and _Burma_, alt. 3–5000 ft.

**Temperate Himalaya**; from Garwhal eastwards, alt. 4–8000 ft. **Khasia** and **Munnipore Hills**. **Behar**, or Parusath. — **Distrib.** Sumatra, Java, China.

**Stem** 2–4 ft., sometimes robust, or branched. **Leaves** 2–6 in., ovate-oblung 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 ½–1 in. long, with narrow lanceolate acuminate sepals, and filaments about twice as long as the anthers.


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. umhels. **Perianth** ½ in. long; segments obtuse, obscurely
clivii. Nerves subglobose, to style flowers leaves anthers T-leaves 8–11,000. Ovary segments or Perianth cells subequal. 361 Trillidium testa from bracts T. Sikkim, longer. style albumen anthers ciliate. Disporum. [figure so of that of other. Iteschenaultia imm hard cells dorsifixed, Stamens linear 6–24. Smilacina acuminate, 3, shortly stigmatose i-J Stamens 12,000 and 4-9. 33. Clintonia, Rafin. Rootstock creeping. Leaves subradical, narrow, costate. Scrape 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, subexserts. 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; tests appressed, brown or pale; albumen hard; embryo minute.—Species 8, Temperate Asiatic and N. American.


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 stigmatic at within; cells many-ovuled. Berry fleshy. Seeds ovoid, with a lateral pulpystrophydite, 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 subrhomboidaly ovate or orbicular cuspidately acuminate, sepals green oblong-lanceolate, petals similar dull purple.

STELM 8-12 in. LEAVES 2-3 in. broad and long or narrower. PEDUNCLE \( \frac{1}{2} \) in. FLOWERS \( \frac{3}{4} \)-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 REAS CYCLOP.; LEAVES 4-9 petioled oblong or oblanceolate acuminate, SEPSALS 4-6 ovate-lanceolate acuminate, petals as long or longer filliform, 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. CATH. T. 24. P. DAINIA, HERB. HAM. P. IMPERIALIS, JACQUAM. MSS. EUTHYA, SALISB. GEN. PL. FRAGM. 61.

TEMPERATE HIMALAYA; from SIMLA to BHOUTAN, ALT. 6-10,000 FT.—DISTRI. 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 \( \frac{1}{2} \) IN. OR LESS. SEPSALS 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 SEPARATE, AXIX. FRUIT GREEN, SMOOTH, 2\( \frac{1}{2} \) IN. DIAM., OR LESS, CORIACEOUS, LOCULICIDAL. SEEDS \( \frac{1}{2} \) IN. LONG, OR LESS, OVOLD, SCARLET.—EXTREMELY VARIABLE IN THE NUMBER AND SIZE OF ALL PARTS.

ORDER CLVII. PONTEDERIACEAE.

FRESH-WATER AND MARSH HERBS. LEAVES ERECT OR FLOATING, NERVES PARALLEL. FLOWERS, BISEXUAL, IN SPIKES OR RACEMES FROM THE SHEATH OF THE UPPERMOST LEAF; BRACAS SHEATHING IRREGULAR. PERIANTH UNEQUALLY 6-PARTITE, WHITE OR BLUE, MARCESCENT. STAMENS 1-6, INSERTED AT THE BASE OF THE LOBES; ANTHERS ERECT OR VESICULAR, 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 ANATROPIC. CAPSULE MEMBRANOUS, LOCULICIDAL 3-VALVED. SEEDS SMALL, ALBUMEN HORNY OR FLOURO; EMBRYO CYLINDRICAL.—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 CAMPAUNELATE, 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. HANK. II. 128; ROOTSTOCK CREEPING; LEAVES LONG-PETIOLED SAGITTATE HASTATE OR CORDATE, FLOWERS RACEMED OR SUBUMBELLATE LONG-PEDICELLATE. KUNTH ENUM. IV. 133; MIGUEL FL. IND. BAT. III. I. 548. M. hastata, SOLMS LAUB. IN A.D.C. MONOG. PHANEROG. IV. 523. M. dilatata & sagittata, KUNTH L. C. 134. PONTEDERIA HASTATA, LINN. FL. ZEYL. 129; MAN. 363; ROEB. 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
Monochoria.]

CLVII. PONTEDERIACEÆ. (J. D. Hooker.)


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, 3–1 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 1 in. diam., subglobose or oblong.

2. M. vaginalis, Pers. Relig. Hânk. ii. 128; rootstock short, leaves long-petaled, from linear to ovate or ovate-cordate, flowers short-pedicelled subspicate. Kunth Enum. iv. 134; Solms Laub. in A.DC. Monogr. Phanerog. iv. 524; Miguel Fl. Ind. Bat. iii. 548. Pontederia vaginalis, Linn. Mant. 228; Roxb. Fl. Ind. ii. 121; Cor. Fl. i. t. 110; Wall. Cat. 5096; Dalz. & Gibbs. Bomb. Fl. 243.—Bhooede 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. hastafolia, but few-nerved. Inflorescence centripetal, few- or many-fl.; flowers blue, sprinkled with red, very variable in size, pedicels shorter than the perianth. Filaments and anthers as in M. hastafolia.—A most variable plant.


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 sepal, small, petaloid. Ovary free, 3-celled, or 1-celled with 3 projecting parietal many-ovuled placenta; 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.


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, $\frac{1}{2}$ in. diam. Sepals hairy, many-nerved, margins subinvolute in bud. Stamens 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, chalaça black, funicle short pale.

**Order CLIX. Xyridæ.**

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 (sepal?) 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 capitale 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 $\frac{1}{2}$–$\frac{3}{4}$ in. broad, scape stout deeply grooved, spike ovoid or globose, bracts orbicular or cuneately obovate. Vahl Enum. ii. 204; Roarb. 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.—Rheed. 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 $\frac{1}{2}$–$\frac{3}{4}$ in.; bracts $\frac{1}{2}$ in. broad, few or many, dark red brown, shining, broader than long, margins scarious; bracteoles linear-spathulate, smooth. Petals orbicular, erose.


Silhert; Wallisch.

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 $\frac{1}{10}$–$\frac{1}{8}$ in. broad rigid twisted much shorter than the flattened or 2-edged grooved
scape, margins smooth or scaberulous, spike ovoid-oblong, bracts orbicular

Sandy places, often near the sea. BURMA, Griffith. SINGAPORE and MALACCA, Maingay. SOUTH DECCAN PENINSULA and CEYLON, Wight, &c.—DISTRIEB. Borneo, &c.

Densely tufted. Leaves 6-12 by \( \frac{1}{4}-\frac{1}{2} \) in., very rigid, pungent, strongly grooved on both faces, pale green. Scape 1-2½ ft., slender, rigid. Spike \( \frac{1}{4}-\frac{1}{2} \) 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 \( \frac{1}{4}-\frac{1}{2} \) 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. Asiatic. t. 161 C.—Wall. Cat. 6083 C.

KHASIA HILLS, alt. 4-6000 ft., Wallich, &c. BURMA, at Mouineim, Lobö.

A slender flaccid loosely tufted species. Leaves few, often falcate, bright pale green, faintly striate. Scape usually filiform, rarely stout. Spike \( \frac{1}{4}-\frac{1}{2} \) in.; bracts rich brown with pale midrib and margins; bracteoles subequal, red-brown, with green midrib and pale margins; lateral spatheolate oblong, obtuse, quite glabrous. Petals oblong, suberemate. Style very long.

** Leaves usually less than \( \frac{1}{4} \) in. broad, not distinctly flattened (except in forms of X. pauciflora).


NEPAL, Wallich. KHASIA and NILGIRI HILLS, alt. 4-6000 ft., common. CEYLON, ascending to 6000 ft.—DISTRIEB. China.

Leaves 2-10 in., slender, \( \frac{1}{4}-\frac{1}{2} \) in. broad, tapering from the base to the tip. Scape 1-2 ft., stout. Spike \( \frac{1}{4}-\frac{1}{2} \) in. diam.; bracts almost rounded, back brown, keeled towards the rounded tip; lateral bracteoles oblong, 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 equaling 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. Bar. iii. 29; Cat. 6083 A, B (C & D, in part), and 6086 B; Miquel Fl. Ind. Bat. iii. 529; Steud. Syn. Pl. Cyp. 287. X. oryzetorum, Miqu. 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.—DISTRIEB. Malaya, China and Australia.
Leaves 3-8 in., rarely ½ in. broad, strongly nerved, scaberulous on the surface or margin or neither. Spike 4-½ in. long and broad, rarely ovoid. Lateral bracteoles oblong-ovate, acuminate, keeled, hyaline, quite glabrous.—Part of Wallich's 6083 D is _Embrystylis tetragona_, Br. Small specimens with small spikes resemble _X. bancana_, and there are Mergei specimens collected by Griffith and Lobb with leaves 6-10 by ½-1 in. and scape 6-2½ 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.

_Malacoa_, in sandy places near the sea, Griffith, Mainay; Pahang, Ridley.—Distrib. Borneo.

Resembles a small form of _X. paniciflora_, but much more slender and rigid, with filiform scape. Leaves ½ in. broad, grooved. Spikes ½-1½ 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; Skend. 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, Reutier, 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. Commelinaceae.**

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. Pollieae.** Fruit indehiscent, crustaceous.

Panicle terminal, of scorpioid cymes . . . . . . . . . 1. Pollia.

**Tribe II. Commelineae.** 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. Anilema.

Tribe III. Tradecantiiæ. 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.


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 ½ in. diam., bright blue, shining.


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.


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. Aclista.*—The Indian forms occur under two varieties.


**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, ciliate-acuminate, scaberulous on both surfaces. **Panicle** puberulous; bracts small; bracteoles amplexicaul, persistent, glabrous. **Sepals** rounded, glabrous, enclosing the globose blue fruit which is $\frac{1}{4}$ 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$\frac{1}{2}$ in., shortly-petioled, ciliate-acuminate, elliptic, acute, at both ends, slightly scaberulous above and puberulent beneath. **Peduncle** pubescent with deflexed hairs, subumbellate; bracts oblong; bracteoles imbricate, obovate, 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 larger. **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 posticus falls away. Seeds ellipsoid or angled, reticulate pitted or rugose.—Species about 90, all tropical and subtropical.

*C. calescis*, Willd., a handsome robust pubescent or tomentose large-flowered 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, posticus 1-ovuled or obsolete.

Sect. I. Eutcommelina. Capsule 3-celled, two anticous cells loculicidal, each usually 2-seeded; the posticus 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.


Throughout the hotter parts of India from the Panjab to Ceylon and SIngapore.—Distrib. tropica and subtropica.

Stem creeping and rooting at the nodes or subscandent. Leaves 1¼-3 by ¼-½ in., glabrous scaberulous or puberulous, ciliate. Spathes ½-1 in., acute, base rounded or cordate, glabrous or pubescent, striate; peduncle ½-¾ in., cyme 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 pedunculated ovate-lanceolate complicate, seeds pyramidal rugose.

**Sikkim Himalaya**, alt. 2-4000 ft. J. D. H. and Khasia Hills, alt. 3-4000 ft., Griffith.


The Deccan Peninsula, Heyne, Wight, &c.—Distrib. Trop. Africa.

Stem erect from a fibrous root, simple or branched. Leaves 1-3 by ½-¾ in., acuminate, tips often hooked, nearly glabrous; sheaths very short, glabrous or villously ciliate. Spathes ½ in. long, scattered or clustered, acute, pubescent, base

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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.


From Assam and Bengal, southward and westward to the Concan and Coromandel.—Distr. Java? Hong Kong.

Stem slender, diffuse, with long internodes. Leaves 3-6 by ¼–½ in., nearly glabrous, sheaths ciliate. 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-paniculate 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, or Mt. Abhe, Dathie.

Stem much branched, scabrid or glabrate. Leaves 1–3 by ¼–½ in., subacute or obtuse, sheaths short, glabrous or sparsely ciliate. Spathes ¼–½ 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.

** Spatho funnel-shaped or hooded.


Throughout India; ascending to 6000 ft. in the Himalaya.—Distr. trop. Asia and Africa.

Stem creeping and rooting below. Leaves 1–3 by ½–1½ in., sessile or petiolated, base suddenly contracted or rounded; sheaths pubescent or villous, often bearded or ciliate. Spathes ½–1½ 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 valve 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. 168; 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 &c. t. 2067.

The DECCAN PENINSULA; Belgaum, Ritchie; Nilgiri hills ascending to 6000 ft. Wight, &c.

Stem 6-12 in., erect, branched from the base. Leaves 2-3 by 1½-3 in., acute or acuminate, more or less hirsute on both surfaces. Spathes ½-1 in., hirsute or villous, acuminata, 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 &c. 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 1½-3 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.


The DECCAN PENINSULA; in the Concan, Jacquemont, &c.—Distrib. Afric. trop.

Stem diffuse, rooting at the nodes. Leaves 1½-2 by 1½-3 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-coloured, appendage 0.—Leafless suckers bear deformed capsules that ripen underground.

Sect. III. DISSECCARPUS, 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.


DECCAN PENINSULA, from the Concan southwards, ascending to 6000 ft. in the Nilghiris. CYRINTH COMMON.—Distrib. Java.

Stem 1-3 ft., sparingly branched. Leaves ½-3 by ½-3 in., acuminate, base narrowed. Spathes 1½-3 in., glabrous or pubescent, shorter than their peduncle base rounded; cymes on long capillary pedicels. Petals lilac. Capsules usually 2, oblong-quadratce, constricted in the middle. Seeds 4, nearly black, two low, often imperfect.—Possibly a variety of C. nudi flora, differing in the absent or empty dorsal cells of the capsule.

Var. B. Hohenackeri, Clarke 1. c.; leaves oblong subacute, spathes smaller tip acuminate—Nilgiri (Hohenack. No. 1066).


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. *b. geniculata,* Clarke l. c. leaves narrowly oblong-lanceolate. — *C. communis var. geniculata,* **Wall. Cat., 8978** N. Burma, at Seguin.—Mixed in Wallis’s distribution with *obliqua* and *Kurzii.*


**BENGALESE CENTRAL INDIA,** and the **DECCAN PENINSULA** in dry places common. **CEYLON,** Walker.

Stems 12–18 in., taunted, much branched, rather slender. **Leaves** 1–2 by 1–1 ½ in., obtuse or subacute, often complicate and usually recurved. **Spathes** ½–1 ½ in., acute or ciliate-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-colored, 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.


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 ciliate-acuminate, glabrous pubescent or villous beneath; sheaths ¾ in., margins often bearded. **Spathes** ½–1½ 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 1–1 ½ by ½–¾ in.

14. **C. paleata,** *Hassk. Pl. Jungh.* 139; stem stout, leaves elliptic or broadly lanceolate, spathes shortly peduncled scattered broadly ovate

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* $\frac{1}{2}$ 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*.


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 (*C. setosa*) with elongate leaves 4–5 by $\frac{1}{2}$–$\frac{3}{4}$ 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.


*SOIND, Stocks*, &c.—**Distrib. Beluchistan, Arabia, trop. Africa.**

Stem 1–2 ft., thickened at the base, glabrous. Leaves 2–3 by $\frac{1}{2}$–$\frac{3}{4}$ in., margins white, often waved. *Spathes* $\frac{1}{2}$ in. long and broad as folded, glabrous or sparingly hispid; raceme usually simple. *Petals* blue. *Seeds* black, spotted with dull yellow.


The **Southern Deccan Peninsula**, Malabar and the Nilghirs, *Rottleri, &c.*

Stem 1–2 ft., hairy or glabrate. Leaves 2–6 by $\frac{1}{2}$–$\frac{3}{4}$ in., acuminate, sheaths ciliate. *Spathes* recurved, solitary or clustered, $\frac{1}{2}$ 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 (b. glochidea Koén. mss. Wall. Cat. 8981 B. (in part)
has elliptic-lanceolate scarious or nearly glabrous leaves.

18. C. appendiculata, Clarke Comm. & Cyrt. Beng. 18; 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 \( \frac{1}{4} \) in., narrowed at both ends,
nearly glabrous. Spathes 2-3 in., glabrous without, hairy within, striate, culminate,
bare base; raceme 2-fd. 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
Comm. Ind. 11.

Tropical India from Nepal, Sikkim and Bengal to Central India and the
Malay Peninsula.—Distrib. Malay Isds.

Stem branched, nearly glabrous. Leaves 3-14 by \( \frac{1}{2} \) 2 in., acuminate; sheaths
auredicate. Spathes \( \frac{1}{4} \) \( \frac{1}{2} \) in. long and broad, longer than their peduncle, paniced
or clustered, acute or obtuse, villous; raceme simple, 6-12-fd. Petals white or
blue. Seeds straw-corded, 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. Pl. Austrail. vii. 88 (in part). C.
striata affinis, Edgew. in Trans. Linn. Soc. xx. 90.

Deccan Peninsula, Rottler, &c. Ceylon, Walker, &c.—Distrib. Australia.
Stem 12-18 in., slender. Leaves 2-4 by \( \frac{1}{2} \) 3 in., glabrous, or with deciduous
hairs, or villous. Spathes \( \frac{1}{2} \) \( \frac{1}{2} \) in., glabrous or hairy, base truncate on one margin,
hooked at the other; raceme simple.

Doubtful and Indeterminate Species.

C. Avenepolia, Grah. Cat. Bomb. Pl. 224; leaves sparsely hairy, sheaths hairy,
spathes truncate.—Bombay, near Kandalla.

C. Nimmoniana, Grah. I.c.; small, leaves linear acuminate discoloured.—
Bombay, on Malabar hill and near Rosa and Ellora.

C. Zeylanica, Falckenb. in Just. Jahresb., iv. 406, 408, name only.

C. Communis, Linn. and C. Bengalesis, 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-superoosed in each cell.

  **Travancore**; on the Tinnevelly hills, Beddome. **Ceylon**, Thwaites (C. P. 3977).


  **Temperate and Tropical Himalaya**; from the upper Gangetic plain eastwards to Bhotan, and westwards to **Travancore** and **Tenasserim**, **Ceylon** and the Shan hills.


  **Tenasserim**, Wallich, *Heifer (Kew Distrib.* 5528), &c.—**Distrib. Siam, Malay Islds., China.**

  Root of fascicled elongated tubers. Leaves all radical, 6-16 by ¾-1 in., suberect, margins smooth or ciliate only. Scape stout and panicle longer than the

b. Flowering stem leafy, flowers corymbose or panicoled.


**Stem** 1-2 ft., erect. Leaves 6-10 by 2-3 in., glabrous or scaberulous, peninerved above the base. Panicle 3-6 in., glabrous, branches spreading widely in fruit, bracts ciliate. Sepals glabrous. Petals purple. Stamens 3 fertile, unilateral; staminodes 3, sometimes polleniferous, filaments naked. Capsule ¼-1 in. Seeds shortly cylindrical, black, with white powder.


**Tropical and Sub-tropical Himalaya**; from Chamba, alt. 6000 ft., Clarke, eastwards to Sikkim. **Khasia Hills**, alt. 4-5000 ft. Upper Burma, Anderson.


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 narrowly 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.


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 subglobose, 3-4-seeded, seeds smooth. 

**A. esculentum**, Wall. Cat. 5208; root tuberous, stem suberect, leaves linear compound, panicle glabrous spreading, bracts oblong or the lower 1-2 foliaceous, capsule ellipsoid, cells 3-5-seeded. 


**A. spiratum**, Br. Prodr. 271 (in note); root fibrous, stem branched decumbent, leaves small sessile flat oblong, base obtuse or cordate, capsule small leafy below, bracts ovate, capsule oblong or subglobose, cells 3-7-seeded, seeds smooth or minutely scaberulous. 

**Tropical India**; from Sikkim, Bhutan and the Khasia hills, alt. 2-4000 ft., to Burma. Western Ghats from the Conan 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 ⅔ in. diam., mucronate. Seeds reticulate, glandular-puberulous. 

**A. esculentum**, Wall. Cat. 5208; root tuberous, stem suberect, leaves linear compound, panicle glabrous spreading, bracts oblong or the lower 1-2 foliaceous, capsule ellipsoid, cells 3-5-seeded. 


**MADRAS**; in rice fields, Heyne, Wight. **CEYLON,** Walker.—**Distrib**. Australia, China. 

**Root of ciliate tubers, crown with imbricating scariosus 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 ⅔ in. Seeds dark brown, obscurely secedr or pitted.—Probably the same as the Australian A. gramineum, Br.


**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. 

**A. esculentum**, Wall. Cat. 5208; root tuberous, stem suberect, leaves linear compound, panicle glabrous spreading, bracts oblong or the lower 1-2 foliaceous, capsule ellipsoid, cells 3-5-seeded, seeds smooth. 


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 glabros puberulous or ciliate, from oblong to ovate-lanceolate, subsutate 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 ⅜ in., acutely trigonous. Seeds straw-colr.


Malabar and Travancore, Wight (Kew distrib. 1179).—Distrib. Macassar.


The Concan and Malwan, Stocks, Dalzell, Ritchie.


Silhet, Wallich.—Distrib. China.


** Cells of ovary 2-ovuled, of capsule 2-seeded (3-seeded in A. nudiforum, var. compressa).

15. A. nudiforum, 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. & Gibbs. Bomb. Fl. 253; Wall. Cat. 5224 (excl. A); Hassk. Commelin. Ind. 29. A. radicans, Don Prodr. 45 (in part). A.

Throughout India; from the N.W. Himalaya ascending to 6000 ft. eastwards and southwards to the Khasia hills, Burma, the Deccan, Travancore and Ceylon.—

Distr. China, Malay Islands.

Stem and branches slender, diffuse, complicate or not. Leaves 2-5 by 1/4 to 1 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 1/4 in., acute at both ends.


The DECCAN PENINSULA; from the Concan southward, and Ceylon, Wight, &c.—Distr. China, Malay Islands, Africa.

Roots of elongate tubers. Stem 1-2 ft. Leaves 6-12 by 1/4 to 1/2 in., cauleine and tufted at the base of the ascending leafy flowering stem, glabrous or puberulous. Panicles lax; bracts large, caducous, branches scarred. Petals blue. Capsule 1/4 in. diam. Seeds brown.


ASSAM and the KHASIA HILLS, ascending to 4000 ft. TENASSERIM, the DECCAN PENINSULA, CEYLON and the NICOBAR ISLANDS.—Distr. Malay Islands, China, Australia, Africa.

Roots fibrous. Stem 1-3 ft. Leaves 6-12 by 1/4 to 1/2 in., glabrous or nearly so. Panicles sparingly branched; branches very closely scarred; bracts caducous.
Petals blue. Staminodes with glabrous or bearded filaments. Capsule ⅓ in. long, mucronate, valves hard polished.


* Flowers axillary, solitary or clustered, pedicels jointed in the middle.


Upper Gangetic Plain to Assam, in marshes; Chota Nagpore, Clarke.—Distr. Java.


Var. minor, Clarke i. c. 214; stems shorter, seeds about 30 in each cell, nearly smooth.—Dichaespermum repens, Clarke Comm. & Cyrt. Beng. t. 28 (not of Wight).—Assam, Hamilton.


The Deccan Peninsula; from the Concan southwards. Tenasserim, Griffith, Helder.


20. A. *lanuginosum*, Wall. Cat. 5221; hisrate 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 Nilghiries to 6000 ft.


** Flowers panicked.

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 ⅔ in., pale yellow. Seeds 15-16 in each cell, small, yellow, neither rugulose nor reticulate.


The Deccan Peninsula; from the Concan southwards in hilly places. Root fibrous. Stems densely tufted, tuberous and sheathed at the base. Leaves 2-½ by ⅓ to ⅔ 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 ½ in. long. Seeds about 6-8 in each cell, pale yellow.—Habit of a Juncus.

Sect. III. DICHESPERMUM. Cells of ovary 1-ovuled, of capsule 1-seeded or empty.

* Capsule glabrous.


Throughout Tropical India; Bengal, Assam and the Deccan Peninsula. Ceylon; in rice fields and wet places.—Distrib. China.


24. **A. montanum, Wight in Wall. Cat. 5203;** stem erect, leaves large petioled elliptic-lanceolate glabrous or seaberulous, panicle terminal, branches long lax few-fl. pubescent, stamens 3 perfect, filaments naked, staminodes 0, capsule globose, glabrous pedicels suberect, cells 1-seeded,


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 ½ in. diam. Seeds floury.


Stem 1-2 ft., creeping and rooting below. Leaves as in A. montanum, from which conspicuum differs in the pyramidal many-fl. panicle.


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 ½ in. diam.


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 ½ in. diam., and the 2 stamens (Wight figures 3).


The **Tropical Eastern Himalaya** and the **Khasia Hills**; from Nepal to Bhutan. **Travancore, Wight. Ceylon, Walker, &c.—Distrib. Malay Islands.**

Subfruticose 2–3 ft. high. **Leaves** 3–6 by 4 1/2 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** ½ in. diam., style long, persistent. **Seeds** plano-convex, glaucous, black.

**EXCLUDED SPECIES.**

A. **EQUINOCTIALE**, Kunth Enum. iv. 72; Clarke Monogr. 221. Amelina Wallichii, Clarke Comm. & Cyt. Beng. 6, 26, is an African species of which the locality was not determined when it was included in "Comm. & Cyt. 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 oblong-cordate sparsely hairy above villous beneath, capsule oblong or elliptoid 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 distr. 5485), Maingay (K. d. 1712).—Distrib. Sumatra, Java.**

**Stem** 3–4 ft., as thick as the thumb, glabrous hairy or shaggy-hispid. **Leaves** 6–18 by 2–3 in., subpetioled, acute, base acute; sheaths glabrous or hirsute. **Panicle** a sessile dense-fl., globose head, 2–3 in. diam. **Capsule** ½ in. long, rusty villous. **Seeds** subellipsoid, obscurely rugose.

2. **F. Griffithii**, Clarke Monogr. 236; leaves oblong-lanceolate fulvous 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 2 1/2 in., shortly acuminate; petiole shaggily; sheath glabrous, mouth villous. **Sepals** ½ in., oblong; sparsely hairy. **Capsule** ½ in. long.

SINGAPORE and PENANG, Wallich, Walker. MALACCA, Maingay (Kew distrib. 1874).—Distrib. Sumatra, Java.

Stem 2-3 ft., as thick as the thumb. Leaves 10-30 by 1½-3 in., subandately acuminate; sheaths puberulous, glabrous or hirsute. Flower heads 1½-2 in. diam. Sepals ½ in. long.

Var. rostrata, Clarke l. c.; leaves narrower more candate-acuminated, flowers fewer. F. rostrata, Hassk. in Flora, 1864, 631; Commelin. Ind. 94.—Mishmi hills, Gommel. (Kew distrib. 5486), Java.

4. **F. Hookeri**, Hassk. in Flora, 1864, 629; Commelin. Ind. 92; 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; Clarke. Differs from F. marginata in the glabrous leaves, smaller few-fld. heads, and the beaked capsules ½-2 in. long, much exceeding the sepals.


Tropical Sikkim Himalaya, Munnipore, Bengal, Assam and Tenasserim.—Distrib.—Sumatra, Java, Tonkin.

Differs from F. Hookeri in the short narrow capsule ½ in. long.

5. **CYANOTIS**, Don.

Herbs, usually prostrate or creeping. Leaves small. Flowers in axillary and terminal scaploid cymes, formed of large imbricating biseriate, second 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, loculicolial, 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.

* Values 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 subeniformly falcate acute ciliate, capsule oblong, seeds smooth or obscurely pitted. Clarke Monogr. 246; Wight Ic. t. 2069; Wall. Cat.
Cyanotis.]  OLX. COMMELINACEÆ. (J. D. Hooker.) 385


The Deccan Peninsula; from the Concan southwards, in rocky places.

Annual. Stem 4-6 in., branched from the base. Leaves 1-1 1/2 by 1 1/2-2 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 Jo. t. 2089.—Malabar.

2. C. vaginata, Wight Jo. 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.


** Capsule with no free central column after dehiscence.


Throughout Tropical India in hilly districts. BURMA, MALACCA, CEYLON.

Distrib. Malay Islands, Mauritis, trop. Africa.

Stem 6-18 in., slender, branched. Leaves rather distant, 2-4 by 1/2-3 in., sessile, obtuse or acute, glabrous or hisrate, ciliate or not. Bracts twice as long as the cyme. Bracteoles 1/2 in., ovate, falcate, acute, striate and striolate. Sepals lanceolate. Petals blue. Filaments simple, bearded. Style thickened at the tip. Capsule 1/2 in., obtuse.

Var. Griffithii, Clarke l. c. 248; seeds smaller not pitted.—Mergui, Griffith (Kew distrib. 5503, 5517).


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Stems slender, branched, tufted, sometimes bulbiferous. Leaves 1–2 by ½–1 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 glabrerrima 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 cylindrical tubers, radical leaves ensiform cauline narrowly oblong, cymes in the axil of a short leafy bract, terminal or axillary, bracteoles villous ovate falcate, filaments bearded, tip falcately ovate at the tip, seeds obscurely rugose. Clarke Monogr. 249; Wall. Cat. 8991; Dalz. & Gibs. Bomb. Fl. 256; Hassk. Commelin. Ind. 100. C. concanensis, Thomson & Stockii, Hassk. l. c. 144, 133, 118. Tradescantia tuberosa, Roeb. Cor. Fl. ii. t. 108; Fl. Ind. ii. 19.—Cyanotis sp., No. 8, 9, Herb. Ind. Or. Hs. & 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 cauleine, 6–10 by ½–1 in., sessile, often purple beneath, scaberulous. Cymes villous, or densely hirsute; bracts ovate or lanceolate, falcate, shorter than the cyme; bracteoles ½–3 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 Jc. 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 Jc. t. 2084.

SOUTH DECCAN PENINSULA; Nilghiri and Travancore hills, Wight.

Stem branched, 2–3 ft. high. Leaves attaining 6–18 by ½–1¾ in., but usually much smaller, narrowed from the base to the tip, ciliate; sheaths short loose. Bract usually much longer than the cyme; bracteoles ¾ in., ciliate. Capsule oblong, not half so long as the sepals.


The DECCAN PENINSULA; Nilghiri hills, Wight (Kew distr. 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 1½–2 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 *f.* t. 2083; Clarke Monogr. 251; Hask. Commelin. Ind. 99; Wall. Cat. 8992; Cyanotis sp. 11, Herb. Ind. Or. H. f. & T. Tridescantia pilosa, Heyne mss.

The Deccan Peninsula; Nilgiri hills, Heyne, Wight, &c. Ceylon; in the higher parts of the island.

Habit of *C. arachnoidea*, from which it differs in the hairiness and quadrate capsule and seeds. The Ceylon are the only good specimens, and they are nearly glabrous.


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 prolific at the nodes. Leaves 3–5 by ¾ in., sessile, shining, green, silky ciliate. Bract twice as long as the cyme; bracteoles ⅓ in. long. Capsule obtuse.


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.


*Trnasserim,* Helfer.—Distr. Java, China.


The **Decan 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 ½–½ 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 *gliadrescens* (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 divericate branches, to which belongs *Tradescantia rupestris, Law*, and which appears to be intermediate between *C. arachnoidea* and *fasciculata*. *Wight describes rosea, Lawiana and dichotrica* 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.*


**Travancore**; on the Myhendra Mts, alt. 3-4000 ft., *Beddome.* **Stem and branches 6-10 in., pendulous, with ascending tips, rooting below. Leaves 1½ in., rather fleshy, green and convex above, hairs rufous when dry, sheaths ¾ 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.**


**The Concan**; in the Syhadri hills, on trees, *Law, Dalzell.* **Rootstock small with tufts of pilsé radical leaves 3–5 by ½–½ 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, obtuse, acute; pedicels and sepals villous. Petals white, connate to the middle; style filiform, naked. Capsule ¼ in. long, ob lanceolate. Seeds cylindric, smooth.**

**Sect. III. Ochreapflora.** *Flowers axillary in the sheaths of the leaves; bracteoles small slender not imbricating.* (See also *C. villosa.*)

15. **C. axillaris, Boem. & 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, see is subcylindric punctate. Clarke Monogr. 244;**

Throughout India; in the plains from the upper Gangetic valley to Assam and southwards to Ceylon.—Distrib. E. Asia, trop. Australia.

Stems 6-18 in., annual, stout or slender, branched. Leaves 2-6 by 1-5 in., acuminate, sheats ciliate, base broad or narrowed. Petals long-clawed, blue. Ovary glabrous; style ovoid below the tip. Capsule 1/2 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 Camba to Malabar.

Habit and characters of C. 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, obtuse leaves, denser spikes, and larger flowers.

C. karliana, Hassk. l. c. 146; "stems creeping 8-12 in. glabrous, leaves 1-2 by 1-5 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-villos, peduncles 5-nate," (cymes?) "umbellately crowded at the top of a common peduncle, bracts" (bracteoles?) 7-20 falcate lanceolate acuminate, flowers woolly-villos, style hairy thickened below the tip.—Asia, Hugel.

6. STREPTOLIRION, Edgew.


Temperate Himalaya; from Garwhal to Bhotan, alt. 5-9000 ft. Upper Assam, on the Patkoy hills, and Munnifore.—Distrib. China.

Stems 6 or more, glabrous or sparsely hairy, climbing over bushes, terete, branched, often rooting at the nodes. Leaves 3-6 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 1/2 in. diam., white, upper often barren. Filaments with yellow hairs. Capsule 1/2 in. long, glabrous or pubescent.—The Khasian specimens (var. khasiana, Clarke) are more hairy than the Himalayan with villons capsules and a penicilate stigma.
7. **Floscopa**, Lour.

Erect or subscandent herbs. **Leaves lanceolate.** **Flowers** in terminal or axillary thyrsoid panicles. bracteate; cymes secund-flowered (not scorpionid). 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.


Throughout tropical India, in swamps from E. Nepal, Sikkim and the Khasia Hills to Travancore, Malacca and Ceylon.—Distributed Eastern Asia and tropical Australia.

**Stem** stout, erect, creeping below. **Leaves** 2–6 by ½–1½ in., sessile or petioloated; sheaths lax, short, glabrous or hisrate; mouth ciliate. **Panicles** shortly pedunculated, pyramidal, with long erect or ascending many-fld. branches. **Flowers** small, sub-globose, racemose, lower bracteate upper ebracteate; sepals villous; petals white, lilac or rosy. **Capsule** ½ in. long, orbicular, or ellipsoid, acute, compressed, shining. **Seeds** glaucous.

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**Order CLXI. Flagellariaceae.**

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 basified, 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** dioecious. **Berry** 1–3-seeded . . . . 2. **SusuM**.

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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:—
**Flagellaria.** OLXI. FLAGELLARIAE. (J. D. Hooker.)

**F. indica**, Linn. Sp. Pl. 333; leaves sessile lanceolate with sheathing bases. Kunth Enum. iii. 370; Roxb. Fl. Ind. ii. 154; Dalz. & Gibbs. Bomb. Fl. 255; Wall. Cat. 5198; Bent. 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 \( \frac{1}{10} \) in. long, white, subscarios. 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 \( \frac{1}{4} - \frac{1}{2} \) in., panicle 1–3 in. broad. F. minor, Blume in Roem. & Sch. Syst. vi. 1493; Mag. 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 dioecious, 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. Pistilodes 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 eccentric.—Species 2, Indian and Malayan.


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 nerves; petiole 1–3 ft., base sheathing. Panicle erect, shortly stoutly peduncled, decompound, rachis and branches stout. Flowers about \( \frac{1}{2} \) 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.


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. Juncaceae.

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, tests 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.


Northern India; from the plains to 18,000 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 flexuose; bracts scarious; flowers ⅓–½ 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, obvoid, 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 decomposed cyme and then erect and pungent; bases closed with rigid leafless sheaths. Leaves 0, or terete like the stem. Flowers usually distinctly pedicelled.


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 ⅓–½ 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* \( \frac{1}{2} \)-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.


**Western Himalaya,** alt. 6-9000 ft., from Kashmir to Nepal; the **Nilgiri Hills and Ceylon.** —Distr. 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**.


Sandy shores of **Sind**, Stocks, &c. —Distr. Afghanistan 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 \( \frac{1}{2} \)-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.


**Assam,** Griffith. —Distr. Europe, Asia, 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, \( \frac{1}{2} \) in. long; anthers shorter than their filaments; style very short. *Capsule* mucronate. *Seeds* obvoid or oblong, spiculate. —Possibly introduced into Assam, as the species is spreading out of Europe.


**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 anuricled. *Cyme* 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.


**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-anuricled. *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 ½ 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* ½ 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 exerted.


**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 ¾–1 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-flowered, 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*.

Stems as thick as packthread. Leaves squarrose or exceeding the stem, strongly or faintly (sometimes externally; obscurely) sepatate. Cymes 1/2-5 in. diam.; lower bracts produced and filiform or not; flowers sessile; sepals 1/2 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.**


**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 sepatate. Cyme decumbent; branches divaricate; bracts short, pungent, floral hyaline acuminate; flowers brownish, sessile or shortly pedicelled; sepals 1/2-1 in. long; glaucous; stamens about 1/2 shorter than the sepals, filaments rather longer than the anthers; style long. Capsule prismatic, apiculate. Seeds costate and reticulate.


**North West India; Labore, Thomson; Jhelum river, Jaquemont, Himalaya and Western Tibet, alt. 7-14,000 ft.; very common from Kashmir to Kandur.**—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 1/4-1 in. long, bearing small heads at the forks and tips; lower bracts leafy, floral ovate-lanceolate, mucronate; heads 1/4-1/2 in. diam.; hemispheric; sepals 1/2 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 or compressed, leaves filiform or broader soft compressed or terete 1- or many-tubular indistinctly externally distantly sepatate, cymes irregularly compound, heads densely 6-10-flowered, 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 obvoid 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...

Plains of Bengal and the Panjab; ascending the Himalayas to 10,000 ft. The Khasia hills, and Deccan Ghats; Burma; Ceylon.—Distrib. Eastern Asia, Australia.

Very variable, cespitose, rootstock very short. Stems 18-24 in., sometimes decumbent and rooting at the nodes, leafy, not separte. Leaves 2-10 by \( \frac{3}{2}-\frac{1}{2} \) 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 \( \frac{1}{2} \) in. long, glaucous; stamens very short, anthers oblong, style very short, stigma 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 unilatubular, 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, separtate, acuminate. Cyme branches erect, stiff; lower bract leafy, floral hyaline, awned; flowers reddish, prismatic; sepals \( \frac{1}{3} \) in. long, very narrow, rigid, acuminate, margins narrowly membranaceous; filaments rather longer than the anthers. Capsule 1-celled. Seeds fusiform, pointed at one end, testa close.—A taller plant than J. prismaticus, 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, sepa 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.


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, separtate, acuminate. Cyme branches erect, stiff; lower bract leafy, floral hyaline, awned; flowers reddish, prismatic; sepals \( \frac{1}{3} \) in. long, very narrow, rigid, acuminate, margins narrowly membranaceous; filaments rather longer than the anthers. Capsule 1-celled. Seeds fusiform, pointed at one end, testa close.—A taller plant than J. prismaticus, less leafy, with a much shorter cyme the branches of which are more erect, and with narrower seeds.

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* Cyme a solitary sessile head. Leaves solitary or few, all at or near the base of the stem. Anthers included, or exserted.


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 \( \frac{1}{2} \) in.

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, 2/3–1 in. long; inner with membranous margins; anthers rather shorter than the filaments; style and stigmas short. Capsule 1-celled. Seeds 2/10 in. long.—I cannot distinguish J. Thomson except by its dark chestnut colored 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 exerted, style long, capsule included beaked, seeds shortly tailored.

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 1/4 in. broad, upper bracts rather membranous, brown, equalling the slightly pedicelled flowers; sepals 1/5 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 exerted, linear.


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 1/4–1 in. diam., bracts ovate-oblong, acute, lowermost equalling the flowers, sometimes produced to 1 in.; flowers shortly pedicelled; sepals 1/5 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.


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, suruled. Cyme 8-24-flowered; lower bracts variable, floral ovate-lanceolate, hyaline; flowers shortly pedicelled; sepals nearly \( \frac{1}{2} \) 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 \( \frac{1}{2} \) in. in. long, tail longer than the nucleus. J. sphenostemon appears to me to be only a poor small state of membranaceus, the authors are not certain, 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 (\( \frac{1}{2} \) in. long and upwards). Stamens included.


ALPINE HIMALAYA; from Kashmir to Sikkim, alt. 12-16,000 ft.—DISTRIBUT: Affghan, Turkestan.

Stems 8-15 in., tufted, smooth, fistular; stolons as thick as a crow-quin. Leaves strict, obtuse or acute, unistabular, obscurely sepalate. Cyme with the heads usually distant, sessile or peduncled; floral bracts lanceolate, acuminate; sepals \( \frac{1}{2} \) in. to nearly \( \frac{1}{2} \) in. long, thinly glumaceous, tips finely acuminate, of inner hyaline; anthers included, about equaling the filaments. Capsule dark brown, obtuse, mucronate, 3-septate. Seeds \( \frac{1}{2} \) in. long, tails very slender.


ALPINE and SUBALPINE HIMALAYA; alt. 7-14,000 ft.; from Kashmir and Western Tibet to Bhutan.

Stems 8-20 in., erect, leafy below, 1-leaved above, hollow. Leaves tubular, channelled above, obscurely sepalate; auricles obscure. Cyme irregularly branched; branches sometimes an inch long and spreading; bracts \( \frac{1}{2}-\frac{1}{2} \) in. diam.; flowers shortly pedicelled, brown; sepals \( \frac{1}{2} \) in. long, glumaceous, lanceolate, acute obtuse or mucronate; petals more oblong, obtuse, margins broadly scarious; anthers linear,
½ shorter than the filaments; style slender, stigmas long. Capsule nearly twice as long as the sepals, tip conical beaked, dark brown, shining. Seeds nearly ½ 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. Schlagenthewii (Sp. Buchen. in Nachr. Koen. Ger. Wiss. Goett. 1889, 255); stouter, with leaves cylindrical below and subulate above, and more narrowly margined inner sepals.

21. **J. sikkimensis**, Hook. f. in Hook. f. 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 ¼–1 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 ¼–½ 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 ½ 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 ¼–½ in. long, sepals ½ in.—Lachen valley, Sikkim, alt. 12,000 ft.

†† Coesiptose, not stoloniferous. Stem more or less leafy. Flowers small (about ½ in. long). Anthers exserted.


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, subulate. Leaves few, variable, filiform or involute, many-tubular; sheath membranous. Cyne with erect or spreading branches; heads ½–½ in. diam., at length spherical; lowest bract elongate, slender, or like the floral short and membranous; flowers sub-sessile, white or yellowish; sepals ½ 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 \( \frac{1}{2} \) 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, \( \frac{1}{2}-\frac{3}{2} \) in. diam., quite white; bracts 3-4, ovate, acute, rarely finely acuminate and exceeding the sessile flowers; outer sepals \( \frac{1}{2} \) in. long, keeled, inner rather longer; anthers linear; style slender, exserted, stigmas short. **Capsule** 1-celled. **Seeds** \( \frac{1}{2} \) in. long.—The long narrow capsules distinguish this at once from *J. concinnum*.

24. **J. nematocaulon,** Hook. f. in Hook. Ic. Pl. inde.; 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, 1-1\( \frac{1}{2} \) 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 \( \frac{1}{2} \) in. long, 1-nerved. **Capsule** with the beak \( \frac{1}{2} \) 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. concinnum* 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.


**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, \( \frac{1}{2}-\frac{1}{2} \) in. broad, flat, grooved. **Cyme** with sessile heads \( \frac{1}{2}-\frac{1}{2} \) in. diam.; flowers subsessile; sepals \( \frac{1}{2} \) in. long; petals rather broader; anthers smaller, much shorter than the filaments; ovary ovoid; style and stigmas short. **Capsule** rarely half as long again as the sepals, dark brown, shining. **Seeds** \( \frac{1}{2} \) in. long, tests 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 globe 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** \( \frac{1}{2}-\frac{1}{2} \) in. broad, finely acuminate, flaccid; sheaths membranous. **Cyme** with heads \( \frac{1}{2}-\frac{1}{2} \) in. diam.; flowers pedicelled; sepals \( \frac{1}{2}-\frac{1}{2} \) in. long, outer lanceolate, inner more oblong; anthers linear, about \( \frac{1}{2} \)
shorter than the filaments; style long, slender, stigmas short. Capsule membranous, pale, shining. Seeds 1/4 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.**


**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, 1/2–1 1/2 in. broad, glabrous or sparingly ciliate with very long hairs. **Branches of cyme capillary, very unequal, divaricate, few-fl.; bracts scarious, much shorter than the flowers. Sepals 1/10–1/4 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 panicularly 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. 9000 ft., Clarke.

Perennial, 12–24 in. high. Leaves linear, 1/2–1 1/2 in. broad, glabrous or sparingly ciliate below. **Cyme long-peduncled; branches 1–3 in. long; bracts ovate, acute, brown. Sepals 1/2–1/3 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 1/2 in. broad, and a closer inflorescence, with shorter capsules; the seeds appear to be diseased.**


**TEMPERATE and ALPINE HIMALAYA,** alt. 10–14,700 ft., from Kashmir eastwards. **The Khasia, Nilgiri and Anamallay Hills,** alt. 5–7000 ft.—**Distrib. N. temp. regions.**

Perennial, 6–18 in. high. Leaves 1/2–1 1/2 in. broad, glabrous or ciliate. **Branches of cyme very unequal, 1/2–1 1/2 in. ; heads 1/2–1 1/2 in. diam.; bracts very short, scarious. Flowers sessile. Sepals 1/3–1/2 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 carunculated at the base. **Buchen. in Engl. Bot. Jahrb. v. 197; xii. 127; Boiss. Fl. Orient. v. 348; Reichb. Fl. Germ. ix. t. 379.**

**VOL. VI.**
Alpine Himalaya; from Kashmir to Kumaon, alt. 12-14,500 ft., Ryle, &c.—


Perennial, 2-10 in. high. Leaves densely fascicled, radical 1-4 in. long, \( \frac{3}{4} \) in. broad, channelled, ciliate or not. Cyme \( \frac{1}{2} \) 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 \( \frac{1}{4} \) in. long, ovate-lanceolate, aristate, very dark brown. Stamens 6. Capsule obovoid, 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. Palmeae.

By Dr. O. Beccari & J. D. Hooker.

Shrubs or trees, solitary or gregarious, naked or prickly, rarely pubescent. Stem erect scendent 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 spikles 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, adnate 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 150, 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 Malay 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 in 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 Malay 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. Areceae. Leaves pinnatisect; leaflets free with reduplicate sides, or confluent as a plaited limb. Flowers monocious or dioecious. 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. Euareceae. Male fl. unsymmetric; sepals small; petals imbricate. Stigma in the fruit terminal.—Spadix androgynous; flowers usually ternate, the middle one female.

* Ovule basilar, erect.

<table>
<thead>
<tr>
<th>Description</th>
<th>Species</th>
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<tbody>
<tr>
<td>Male fl. minute, solitary or 2-nate towards the tips of the branches, 3- or 6-androus; fem. larger solitary. Albumen ruminate</td>
<td>1. Areca</td>
</tr>
<tr>
<td>Male fl. one on each side of a fem., stamens 6 or more. Albumen ruminate</td>
<td>2. Pinanga</td>
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** Ovule parietal.

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<th>Species</th>
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<tr>
<td>Male fl. 6-androus; sepals equaling or longer than the petals; fem. sepals and petals broadly imbricate. Albumen ruminate</td>
<td>3. Nenga</td>
</tr>
<tr>
<td>Male fl. 9-12-androus; fem. petals with valvate tips. Albumen-ruminate</td>
<td>4. Loxococcus</td>
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Subtribe 2. Ptychospermieae. 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.


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<th>Description</th>
<th>Species</th>
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<tr>
<td>Seeds deeply grooved along the raphe</td>
<td>5. Ptychosaphis</td>
</tr>
</tbody>
</table>

Subtribe 3. Oncospermieae. Male fl. symmetric or not; sepals imbricate; stigma in fruit lateral or basilar.


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<tr>
<td>Stamens 6-15. Albumen ruminate</td>
<td>7. Oncosperma</td>
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B. Spadix interfoliar (flowering while the leaf in whose axil it is formed is still green) or infrapoliar in some Caryotideae.

Subtribe 4. Iguanureae. Spadix androgynous; fem. fl. between two males; male sepals broadly imbricate. Ovules basilar or parietal. Stigma in fruit lateral or basilar.


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<tr>
<td>Stamens 6-9. Ovules parietal</td>
<td>8. Iguanura</td>
</tr>
</tbody>
</table>

Subtribe 5. Geonomeae. Spadices unisexual; flowers sunk in cavities of its branches; perianth glumaceous; sepals imbricate. Stigma in fruit basilar or lateral.

Filaments free. Leaflets acutuminate.

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<tr>
<td>Filaments free. Leaflets acuminate</td>
<td>9. Bentinckia</td>
</tr>
</tbody>
</table>

Subtribe Caryotideae. Spadices unisexual; flowers solitary, or ternate with the fem. placed above the others. *Petals of both sexes valvate.*

D d 2
404  CLXIII. PALMEÆ. (Beccari & Hook. f.)

* 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. DIDYMOGUSPERMA.
Male sepals 3. Stamens many. Albumen equable ... 12. ARENGA.
Male sepals 3. Stamens many. Albumen ruminate ... 13. CARTOTA.

** 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. Phoenixæ. Leaves pinnatisect; leaflets with induplicate sides. Spadices interfoliar; spathe solitary. Flowers dioecious. Ovary of 3 free carpels, one only ripening. Seed ventrally grooved; embryo usually dorsal.

16. PHENIX.

TRIBE III. Coryphææ. Leaves flabelliform, orbicular or cuneiform, plaited, lobes or segments with induplicate sides. Spadices interfoliar; spathes solitary. Flowers usually bisexual. Ovary entire or 3-lobed, or of 1-3 smooth carpels. Fruit smooth, except Pholidocarpus. Seeds with a small hilum; raphe 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. DEMONORHOPS.
Stem short or 0. Spathes many, persistent ... ... ... 25. ZALACCA.

†† Leaflets rhomboid cuneate or ob lanceolate, toothed; nerves flabellate.

Stem short or 0. Spathes many, persistent ... ... ... ... 26. KORTHALSTA.
Stem scudent. Spathes solitary, deciduous ... ... ... ... 27. CERATOLOBUS.
** Monocarpic palms, flowering once and then dying.

† *Spadices axillary from the uppermost leaves.*

Stem scandent. Spadix with long omentiform 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.*


**Tribe V. Borassae.** *Leaves flabelliform.* *Spadices interfoliar; spathes numerous, sheathing.* Flowers dioecious; 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. Cocoeineae.** *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 infrafoliari, 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 crescent; 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 ruminata, embryo basilar.—Species about 24, tropical Asia and Australia.*


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
confuent, quite glabrous. *Spatha* glabrous, compressed. *Spadix* much branched, racemose stout compressed, branches with filiform tips bearing more or less distinct, minute male fl. *Fem.* fl. solitary at the bases and axils of the branches; sepals \( \frac{1}{2} \) in., ovate, obtuse; petals subsimilar; stamens 6, connate. *Fruit* 1\( \frac{3}{4} \)–2 in., smooth, orange or scarlet.—Betel nut.


**Ceylon.** Reigam and Pasdoon Corles, Thwaites.

*Trunk* 8–12 ft., 1\( \frac{1}{4} \)–1\( \frac{1}{2} \) in. diam., green. *Leaves* about 7, 3–3\( \frac{1}{2} \) ft. long; subglabrous, leaflets 2 ft. long. *Spadix* and flowers as in *A. Catechu*. *Fruit* 1\( \frac{3}{4} \) in. long; umbo-nate, reddish yellow.


**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).


**Chittagong, Martaban, Tenasserim, the Andaman Islands, and the Malayan Peninsula.**

*Stems* 12–25 ft. by 1–1\( \frac{1}{2} \) in. diam., green, sending out basal offshoots. *Leaves* 4–6 ft.; petiole slender; leaflets 1\( \frac{1}{2} \)–3 ft., lateral sometimes as well as the terminal confluent. *Spatha* 1 foot or more. *Spadix* and flowers as in *A. Catechu*, but triandrous. *Fruit* the size of an olive, orange-colored, at length scarlet, tip truncate.

2. **PINANGA**, Blume.

*Stem* erect, annulate. *Leaves* pinnate with the upper leaflets confluent. *Spadices* infrafoliaceous, stamynous; *spadix* solitary; flowers 3 together (a fem. between 2 males) clusters in 2–4 or 6 series. **Male fl.** obliquely trigonous; sepals acute, keeled, not imbricate; petals ovate or lanceolate, valvate; stamenus 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 ellipsoidal, pericarp fleshy. *Alumen* 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.


**Pegu**; in marshy forests, Kurz.

*Stems* 25–30 ft. by 1\( \frac{1}{2} \) in. diam. *Leaves* 3–5 ft., sheaths and short petiole scaly; leaflets 1–1\( \frac{1}{2} \) ft., many, narrow, linear, subulate, 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.


**Sikkim and Brotan Himalaya**, alt. 2–3000 ft., J.D.H. Assam, the **Khasia Hills**, and **Chittagong to Tenasserim**, *Boxb. &c.*

Stems 6–20 ft. by $\frac{1}{3}$ 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 prunose many-ribbed. *Spathe* solitary, 2–6-fld. *Spadix* white or scarlet, glabrous. *Male* fl. broad, flat, imbricating; calyx minute; petals broad, cuspidately acuminate. *Fruit* $\frac{1}{2}$ in. long, scarlet or orange, tapering to the tip, smooth.


**Khasia Hills**; *Griffith.*

Stem apparently very slender. *Peduncle of spadix* 2 in., branches 3–5, spreading, not compressed. Fruit rather more than $\frac{1}{4}$ in. long by $\frac{1}{3}$ diam., narrowed at the base, mammillate, pericarp thin, albumen deeply ruminated.—*Beccari* (Males. i. c.) has founded his *P. Griffithii* on the spadix with tetrasstichous 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," 1. c.) there is no description of the leaves, but the author has added in pencil "pinnatisect, segments unequal and 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 refraacted after flowering simple or 2–3-partite, branches short, fl. 3–4-seriate, fruit small ellipsoid or obvoid subaestucate, base narrowed.

**Malay Peninsula**; Singapore, *Lobb*; Perak, alt. 3–4000 ft., *Scortechini* (n. 345 n.), *King's Collector* (n. 8072). Stems solitary, $\frac{1}{3}$–$\frac{1}{5}$ 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 $\frac{1}{2}$ by $\frac{1}{3}$–$\frac{1}{2}$ in., tipped by the stigma; black, shining; (dark yellow *King's Collector*) pericarp thin. Seed obvoid; albumen densely ruminated. The fruits in some specimens are ellipsoid and narrowed at both ends, girt with a thickened rug at about $\frac{1}{3}$ 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 ft. 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 obovoid-oblong.

**Malay Peninsula**; Perak, *Scortechini*, alt. 3000–4000 ft., *King's Collector*.


B. **Orthostichanthem**, Becc. *Flowers* in 2 series on the spadix or its branches.

* Leaves entire or sparingly divided.

7. **P. disticha**, Blume (fd. 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.


**Penang**, Roxburgh, Curtis (No. 391); Perak alt. 100–800 ft. *Herb. Calc.* (Nos. 2536, 4423.)

Stems 2–6 ft. by ½–1 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 ½ 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 flexuons, fruit narrowly ovoid or ellipsoid apiculate.

**Malay Peninsula**; Perak, alt. 100 ft., *Herb. Caicutt.* (No. 7797); *King's Collector* (No. 1968). *Penang*, alt. 1500–2000 ft., *King's Collector*. 

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*[Pinanga]*
Pinanga.]

**OXLIII. PALMEÆ. (Beccari & Hook. f.)**

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Stem 2-6 ft. by ½ in.; internodes 2-2½ in., brown-scurfy. Leaves 9-12 by 4-5½ in., glabrous; petiole 6-10 in., subterete; sheath ½ in., tubular, scurfy; ligule scarios, fimbriate. Spadix with its stout peduncle ½ in. long, branches sinuous, few-fld. Fruit about ½ by ¾ in., red. Seed narrowed at the tip; raphe with 5 branches; albumen very faintly ruminate.

**Leaves much divided.**

† Spadix large, much branched.

9. P. Manili, Becc. Males. iii. 178; trunk tall stout, leaves large, leaflets very many strongly 1-3-nerved, spadix reflexed stoutly peduncled, branches fimbriiform 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. xiii. ii. 200. excl. all synons.

Nicobar Islands, Man. South Andaman Islds., Kurz.

Trunk 50 ft. by 5½ in. diam. Leaves 6½ ft.; leaflets eusiform, straight, longest (middle) about 30 in. by 1½-3½ broad, 2-3-partite, pale beneath. Spadix 19-20 in. long; shortly pedunculated, branches 45-50 spirally arranged; flowers 2-seriate. Fruit 1½ by 1½-1½; pericarp thin. Seed with reticulate raphe, albumen densely ruminate.


South Andaman Islands, Kurz.—Distr. Sumatra, Java.

Stem subterete, 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.


Western Ghats; on the Nilgiri and Travancore hills, alt. 2500 ft.

Trunk 16-18 ft. by about 2 in. diam. Leaves 4 ft., forked; leaflets sessile,
12-24 by \( \frac{3}{4} \) in. Spathe simple. Spadix with the branches stout, densely clothed with imbricating flowers. Male fl. sepal subulate, petals rather longer, ovate-cordate, tips tapering; stamens very numerous; filaments very short; pistilode 0. Fem. fl. sepal reniform; petals similar; staminodes 6, clavate, tips penicillate. Fruit about \( \frac{3}{4} \) in. long by \( \frac{3}{4} \) in. diam.


Stem 8-12 ft., \( \frac{3}{4} \) in. diam., internodes generally subclavate. Leaves 5-8 ft. long, spreading; leaflets 1½-2 ft. by \( \frac{3}{4} \) in., finely acuminate, upper cuneate bipartite, lobes pruinose; petiole 1½-1¾ 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 1½ by \( \frac{3}{4} \) in., narrowed at both ends, blackish purple, stigmatic. Seed ovoid, raphe about 7-branched; albumen deeply ruminate.

13. P. pectinata, Becc. mss.; stems 7-15 ft., coespitose, 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. 5600 ft. (n. 4393).

Stems 2½-3½ in. diam. Leaves 3-4 ft.; leaflets 10-15 by 1½-1¾ in. Spadix with branches 4-5 in. long. Fruit \( \frac{9}{10} \) in. long by \( \frac{9}{10} \) in. 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 scoutry, 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 2½-3½ ft.; leaflets 18-20 by \( \frac{3}{4} \) in., inserted at an angle of 45°, bright green, paler beneath; petiole 10-12 in., terete; sheath 8 in. squamulose; ligule \( \frac{3}{4} \) in. Spathe elliptico-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 \( \frac{9}{10} \) long by \( \frac{9}{10} \) in. diam., purple-black. Seed conform to the fruit, raphe simply branched; albumen densely ruminate.

Pinanga.]  CLXIII. PALMÆ. (Beccari & Hook. f.)  411

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-ft.; petiole 6 in. Spathe ½ in., oblong. Spadix 3-4 in.; branches compressed, flexuose, flowers crowded. Male. calyx membranous 3-toothed; petals very unequal; stamens about 15; pistilode 0. Fem. fl. sepals and petals subequal; staminodes 0; stigma large, discoid. Fruit about ½ in. long by ½ 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, spadix slender 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 racis 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 Moulein, Lobb.

Stem as thick as a goose-quill; internodes long. Leaves 12-14 by 4-5 in.; leaflets 3-4 by ½-¾ 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 ½ in., ellipsoidally fusiform, erect, quite membranous, subhyaline. Spadix as long as the spadix, flowering to the base. Male fl. closely imbricating, ½ 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.


MALACCA; foot of Mt. Ophir, Griffith. PERAK, alt. 3-4000 ft., Scortechini (4273, 2413); on Gunung Batu, Wray.

Stem 3-6 ft., very slender, ½ 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 ½-¾ broad; petiole 1-½ ft., very slender and racis scurfy; terminal lobe deeply forked, toothed; sheath long, deeply striate. Fruit spadix 2-2½ in. long, slender, nearly glabrous; peduncle short. Fruits distichous, ½ in. long by ½ broad, red; albumen equable.

DOUBTFUL SPECIES.

OLXIII. PALMÆ. (Beccari & Hook. f.)

[Pinanga.]

Ind. Bat. iii. 28, and Suppl. 253; in Journ. Bot. Natuml. i. 7; De Palm. Archip. Ind. 23; stems tufted slender 6-7 ft. high ½-1 in. diam., leaflets few, rarely many, broad, distant, sigmoidly lanceolate and falcate from a narrowed base caudate-acuminate 2-3 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 ½-½ in. long ¼-¼ in. diam.—Perae, on Ulu Lubong, King's Collector 10702). Sumatra, Borneo.—The above description is chiefly from Sumatran specimens. The Perae have internodes 2½-3½ in. long, 1 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.


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 (Anacclamus) pulimila, Griff. in Calcut. Journ. Nat. Hist. v. 456; Palms of Brit. Ind. 151.

Var. malaccensis, Ching forest, Malaca, Griffith. Perae, 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 ft. sepals ½ in. in. long, triangular-subulate, finely acuminate; petals ovate-oblong, cuspidate, stamens 6; pistillode 0. Fem. ft. sepals and petals rounded; staminodes 0. Fruit 1 in. by nearly ½ in. broad, orange-colord.—An abnormal form in which the male ft. has 3 sepals, and 6 petals; 2 rows (var. malaccensis hexapetala, Becc. Males. iii. 183), was found at Perae 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 spineless.

Perae; on Maxwell hill, alt. 3200–5300 ft., Scortechini (No. 547a, 302b); Goping, King's Collector (4775), on Gunong Batu Patheh, Wray (930).

Stem solitary, 6–10 ft. Leaves 3–4 ft.; leaflets 18–30 pairs, rigid, acuminate, lower narrow 1-nerved, 16–20 by 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 ft. stamens 6; pistillode of 3 tubercles. Fem. ft. sepals ciliate 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; spathe 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, ospadately beaked, stigmas terminal; albumen ruminant; embryo subbasilar.


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. ½ in. diam.; filaments about equalling the anthers; pistillode minute, 3-fld. at the tip. Fruit about 1 in. long, globose-ovoid. Seed globose.

5. **PTYCHORAPHIS, Becc.**

Stem slender, annulate. Leaves pinnatisect, leaflets narrow, caudate-acuminate. Spathe 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.


SINGAPORE; Matangai (Kew dist. 1536). JOHORE; on Gunong Pulai, Hullett (6000), Kunstler (230).

Stem 6–12 ft. by 1½ in. diam., subobiferous. 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.

**Nicobar Islands**; in woods in Kamorta, Kurz.


Stems slender, coespitose, annulate. *Leaves* pinnatisect; leaflets linear-lanceolate, acuminate, 1-costate. *Spadix* 2, complete, caduous. *Spadix* infrafoliari, 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; pistilode 2-fid. *Fem.* fl.; 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 basal.—Species 2, Malayan.


**Singapore**; in humid jungles.—**Distrib.** Borneo.

A slender tall soboliferous Palm. *Leaves* about 4 ft.; leaflets about 20 by 1–1¼ in., upper shorter obtuse or toothed, green above, ashy grey beneath; sheath red. Fruit 4 in. long, by about 1½ ft. diam.—Very near *O. 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. *Spadix* 2, complete. *Spadix* infrafoliari, 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; pistilode 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.

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. Spadix 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.


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. Spadix 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. tiligartiis, but very distinct in the spadix and fruit.


CEYLON; in the Central Province, ascending to 5000 ft.


8. IGUANURA, Blume.

Slender unarmed palms. Leaves terminal, entire or pinnatisect, with broad acute or preñomere leaflets. Spadix 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 dorsifix; pistilode 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.


MALACCA. Rather common in forests, Griff. (Kew distrib. 6406, 6407), on Mt. Ophir, Hutton (851).
Spathes spathaceous; sepals sessile, in pairs, rather more than 1 in. long, loosely covered with flowers; fruiting 1–1½ ft. nodding; flowers inserted in pits with membranaceous 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 in. diam., black-purple. Seed erect; albumen ruminate.

2. *I. malaccensis*, Becc. Males. iii. 102; stem slender, leaves pinnate, leaflets about 5 pairs, lower falcate, acuminate; upper broader, petiole pubescent, spadix simple filiform, finely pubescent.

MALAY PENINSULA; Selangore, F. Keheding; Perak, Larut, *King's Collector* (1869, 2994).

Closely allied to *I. geonomceformis*, differing in the fewer leaflets and simple not furrowed, but finely pubescent spadix.

**Spadix interfoliar, long peduncled, with few subtended short simple or forked branches or spikes.**


*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 ½–¾ in. diam., red when ripe. The following varieties are from Perak:

Var. *a major*, Becc.; stem 10–12 ft. by 2½–3½ in. diam., leaves 2–4 ft. undivided or pinnatisect, fruit about 1½ by ⅔ in.—*King's Collector* (431, 8227, 3127).

Var. *b 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.***


*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 subcuneate; 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 1½ in. long; sepals orbicular; petals broadly oblong, obtuse, very coriaceous; stamens 6, filaments inflexed, anthers linear-oblong; pistillode columnar, capitulate.

****Spadix infrasfoliar, 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 1–1 1/2 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.

*Stems* 3–7 ft. *Leaves* oblong, 14–16 by 8–10 in.; leaflets 10–14 on each side,
obliquely præmorse and toothed, 4–5-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 3/4–1 in. by 1/2 in. diam., others 1/2 by 1/2 in., ovoid or elliptic-ovoid.—
Scortechini (318b).

**Var. canina,** Becc. i. c. 190; spadix with 7–9 branches, flowers alternate
subdistichous, male ovoid acute, fem. petals twice as long as the sepals, fruit 1/2 by
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).

*Stems* very slender, 3–4 ft., by 1/2 in. diam. or less; interodes 3/4–1 1/2 in. *Leaves*
10–12 by 8–8 in.; leaflets 5–6, spreading like a butterfly’s wings 3 1/2–4 by 1–1 1/2 in.,
upper margin produced into a tail, 3–4-nerved, furfuraceous beneath along the
tails; petiole slender, 3–4 1/2 in., rusty furfuraceous, as is the sheath. *Spadix*
about a foot long, including the peduncle of 3–4 in.; spike rusty scory; flowers sub-
spirally disposed; males very small. *Fruit* granulate, 3/2–2 1/2 by 1/2 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.

*Stems* 3/2 in. diam. *Leaves* 8–10 by 3 in.; petiole 2–2 1/2 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 1/2 in. diam.; interodes 3/2–1 1/2 in. *Leaves* 12–16 by
4–6 in., leaflets 2–4 pairs, with a deeply bifid terminal; petiole 3–4 in., glabrous,
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sheath as long, tubular, mouth truncate. *Spadix* 4–3 in., peduncle ½–1¾ in., branches 3–6 in., scattered, filiform; flowers minute. *Fruit* ½ by ½ in.


Unarmed Palms. *Leaves* terminal, equally pinnatisect. *Spathes* many, 2 lower short incomplete, upper 2-fld. *Spadix* interfoliar, branched; flowers minute, mucousious 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 ft. sub-symmetric, 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. ft. ovoid; sepals broad, obtuse, imbricate; petals longer, convolute; staminodes 6, minute. *Ovary* 3-celled, 1-ovuled; stigmas minute. *Fruit* small, sub-spherical; stigmas subbasiliar. *Seed* pendulous from the top of the cavity, sinuately grooved or ridged; albumen equable.—Species 2.


*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-fld.; 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.


*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. ft.*; 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**, *Rowb.*

Soboliferous palms. *Leaves* pinnatisect; leaflets linear or oblong, irregularly toothed, base cuneate, unicostrate, nerves flabellate. *Spathes* very many, tubular, clothing the peduncle of the spadix, upper large cymbiform. *Spadices* interfoliar, mucousious or polygamous; male ovoid, excessively branched and dense-fld.; fem. looser-fld. *Male ft.* 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. ft.* much smaller, subglobose;
sepals orbicular, coriaceous, imbricate; petals triangular valvate; stam-nodes 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.


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. Spadixes purple. Spadixes 12-18 in. long, branches of fem. very stout; flowers in many spiral series; male yellow, solitary, or the lower in pairs with an intermediate fem.; filaments adnate to the petals; fem. purple; calyx very short, corolla-lobes obtuse. Fruit about ½ in. long, dull purple.


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.)


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 † spiral.

**e e 2**
Small low palms. *Leaves* terminal, unequally pinnatisect; leaflets few, trapezoid, erose, uni-costate, nerves flabellate. *Spathes* many, sheathing the peduncle of the spadix. *Spadix* interfohar, stout and simple, or slender and branched; monococious or ?dicious; flowers rather large. *Male fl.* symmetric; calyx cupular, 3-fld, imbricate; petals coriaceous valvate; stamens 10–30, anthers linear, erect; pistillode 0. *Fem. fl.* subglobe; 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 anastate at the base, spadix filiform.

**Malay Peninsula**; Perak, Scortechini, No. 229b. 186b.) King's Collector (n. 2446).

*Stem* 8–4 ft., solitarily or tufted, 4–3 in. diam. *Leaves* extremely variable, 12–30 in. long; petiole slender; sheath furfuraceous. *Spadix* about 8 in. long, sheathed with 5–6 spathes; flowers spirally disposed in clusters of 3; *male fl.* oblong, sub-clavate, top rounded. *Fruit* unripe, globose.


**Malacca**, at Selangore, F. Keoheding. **Perak**, Larut, King's Collector (3125).

*Stem* 3 ft., solitarily 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.* ½ 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 anastate bases; petiolule 1 in. and more.


**Assam** and the **Khazia Hills**, ascending to 4000 ft.


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: Daphia hills, Booth.

Stem 2 ft., about as thick as a duck's quill. Leaves 8-18 in., rachis and petiole very slender; leaflets 1-3¼ 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 ⅜ in. diam. rather curved. Seed ⅝ 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 premorse, unicostate, base 1-2-auricled. Spathes many, clothing the peduncle of the spadix. Spadixes interfoliar, large, much branched, peduncle short decurved, branches slender pendulous; male and female 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 ovovoidly globose, 2-3-seeded; stigmas terminal. Seeds compressed or plano-convex; albumen equable; embryo dorsal.—Species about 10, trop. Asia, Malaya and Australia.


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, sub sessile, 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 bifarous linear narrowed and truncate 2-lobed or toothed at the tip white beneath, base 1- or ex-a uricled, male buds acute. Mig. 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. 193; Mig. l. c. 37. Saguerus Langkab, Blume Rumph. ii. 131, t. 96, 125. Gomutus obtusifolius, Blume mas.


Very nearly allied to A. saccharifera, distinguished by the arrangement of the leaflets, which according to Griffith are bifarous 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.


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, globose, 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, premorse or rounded at the tip, petiolors or bases swollen at the insertion. **Spathes** 3-5, incomplete, tubular. **Spadices** interfoliar, shortly peduncled, much fastigiatly branched; branches slender, pendulous; flowers solitary and male, or 3-nate with the intermediate fem. **Fem.** ft. symmetric; sepals rounded, imbricate; petals linear-oblong, valvate; stamens very many, filaments very short, anthers long. **Fem.** ft. 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 uminate; embryo dorsal.—Species about 10, tropical Asiatic, Malayan and Australian.


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 ciliate; petiole very stouter. **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.


**Upper Assam**; Mishmi Mts., alt. 3-4000 ft., Griff. 

422  CLXIII. PALMEAE. (Beccari & Hook. f.)  [Arenga]
Caryota.]  OLXIII. PALMEÆ.  (Beccari & Hook, f.)  433

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. aquatorialis, Becc. mss.; pinnales 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.


BURMA; from Assam southwards, and the MALAY PENINSULA, PENANG and the Andaman Islands.—DISTRIB. Malay Islands.


14. ORANIA, Zippel.

Tall, stout, unarmed palms. Leaves terminal, equally and regularly pinnatisect; leaflets linear, tips obliquely lobed or torn, strongly unicoate; petiole stout, sheath short. Spathes 2, lower short, tubular, compressed; upper large, clavate, cleft longitudinally. Spadix interfoliar, elongate, shortly peduncled, branches slender fastigiately; flowers minute, upper or all male, lower or all 3-nate, a fem. between 2 males. Male fl. subsymmetric; calyx minute, 3-sid; petals oblong or lanceolate, valvate; stamens 3 or 6, filaments subulate, anthers erect slits extrorse; pistilode conic. Fem. fl. larger, ovoid; calyx membranous, 3-sid; petals ovate, obtuse, valvate; staminodes 3 or 6; ovary 3-locous, 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 Malay.


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 2½ 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 monoecious, 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-seeded 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.


From the Sunderbunds, southwards to the Malay Peninsula. Ceylon.—Distrib. Malay Archip. and Australia.

Trunk or rootstock very stout. Leaves 15–30 ft.; leaflets 4–5 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. PHENIX, Linn.

Low or tall dioecious 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 sub-ruminato, embryo dorsal or subbasilar.—Species 10 or 11, African and Asiatic.

The following attempt at diagnosing the Indian species of Phénix 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).

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. Spathes 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 aculeata. The Elate *sylvestris* of Linnæus includes this and a Ceylon palm (see *P. zeylanica*).—Griffith observes that Rheed’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.


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, ½ in. diam. Seed nearly as long, with the groove dilating into a canal of various forms.—(Trimen’s appropriate name should replace Gartner’s misleading one, even if Gartner had been right in assuming his plant to be the “*Palma dactylifera aculeata miniima*” of Plum. Gen. Amer. 3, which he cites doubtfully as a synonym, and which is an American plant.—J. D. H.)


**Sikkim Himalaya**, alt. 460–1400 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 $\frac{1}{2}$-$\frac{3}{4}$ 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 subglanuous, spathes 6-8 in., rigid, spadix and its peduncle very short, and branches erect very stout, fruit $\frac{1}{2}$ in. long. Ham. in Trans. Linn. Soc. xv. 87; Kuth 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. & Gibbs. Bomb. Fl. 278; Brandis, For. Fl. 555; Becc. Males. 349, 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.; pinnales $\frac{1}{2}$-$\frac{3}{4}$ in. long, 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. $\frac{3}{4}$-$\frac{1}{2}$ in. long. Fruit elliptic-oblong, mucronate, bright red to blue black. Seed $\frac{1}{4}$-$\frac{1}{2}$ in. long, groove broad.


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. Spathe leathery smooth, marcescent. Spadix 8-12 in., much branched; male fl. $\frac{1}{2}$ 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. Steavenson observes that the foliage is so spinous that it is impossible to walk through clumps of this species.


Hilly districts of India; from Kumaon eastwards to Burma, and southwards to Malabar.—DISTR. China, Cochih Chiana.

Neither the published description nor available collections suffice 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. s, P. Hanseana, of China, and his remarkable Parusnath var. robusta, which I discovered in 1848, and which cannot, I think, be included.—J. D. H.
Var. a, typica, Becc. I.c. 347, 379, t. 44, and ii. f. 22-24; stem short or moderately long, leaflets elongate pale green in usually remote fascicules, fruiting peduncle usually very long, fruit rather long, groove of seed very short. P. humilis, Royce l.c. P. Ouaseleyana, Griff. in Calo. 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. Ouaseleya.—Griffith describes P. Ouaseleyana, from an Assam specimen, as having the ovoid bulbous stem of P. acaulis, a foot long by 6 in. diam., leaves 2 1/2-3 ft., leaflets very narrow indeed and strongly conduplicate 1 ft. long by (owing to the conduplication) 1/2 in. broad, lower spinescent, male spadix 1 ft. rather longer than the spathe, fem. spadix 2-2 1/2 ft. much longer than the spathe with few terminal long flexuous spikes, male fl. 1/2 in. long (in Sikkim specimen). The seeds examined are from Sikkim, 1/2 in. long, with a broad groove.

Var. b, Loureitii, Becc. l.c. 348, 379, t. 44, ii. f. 16, 17; stem short or very short; leaflets subglauaceous often approximate mostly falciform, fruiting peduncle elongate, fruit ovoid. P. Loureitii, Kunth Enum. iii. 257. P. pusilla, Loure. Fl. Cochinch. 614 (non. Garren.). P. Rochelini, O'Brien, in Gard. Chron. 1889, ii. 475, 758, fig. 68.—Assam Hills, the Khasia Hills, Burmah, Munnipore, Cochin China.

Var. d, pedunculata, Becc. l.c. 379, 387, t. 44, f. 13-15, 18-21, 25-27; stem short, pinnae subglauaceous more or less fascicled, spathes 8 in. long, margi 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 Nilgiri 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 1 1/2 in. by 1 1/4 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 1/2 in. long. Specimens, presumably of this var., sent by Mr. Talbot from N. Cannar, have spathes 8 in. long, with a deep brown fringe of matted woolly hairs; fruit black; seeds 1/2 in. long groove narrow hardly dilated within.

** Embryo basilar.


Aestuarial shores from Bengal to Burma and the Andaman Islands—Distrit. Siam, Cochii 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 1 ft., compressed; spadix as long, scurfy; fem. spathes shorter; male fl. 1/2 in. long; fem. subglobose with 6 staminodes. Fruit 1/2 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 quadricharious strict,
strongly conduplicate, fruiting peduncle 2 ft. P. humilis, var. robusta, Becc. Males. 343, 384.

Behar; on Parusath, 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 dactyleria, 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. Pedals 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.


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, arced. Spadix about 1/2 the height of the trunk, much narrower in span than the foliage, supra- or sub-compound; spathes many. Flowers in scattered fascicles on the rather stout spreading branches of the spadix; calyx 3-toothed, petals reflexed; ovary suddenly contracted into the short style. Drupe very shortly stipitate, olive colored, 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.


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;

**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 *imboculifera*, the central 3–3½ ft.; petiole 5–10 ft., not spirally arranged, biarticled, 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. *Drupe* 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**, *Bec. mss.*; panicle hemispherical, branchlets pendulous, petiole armed with small strong black spines, calyx broadly 3-lobed, ovary cosco-ovoid narrowed into the short style, drupe on a stipites ½ in. long.

**Burm.; Mergui?** (Hort. Calcutt.).


18. **NANNORHOPS, H. Wendel.**


**Sind., and the Western Punjab; on the Salt Range and at Attok, Aitchison.—Distri.** *Afghanistan.*

*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 interpolated fibres; petiole 6–12 in.; margins serrulate. *Spadix* pyramidal, 2–3 ft., branches ascending and recurved, branches slender; flowers in pairs within a membranous spathe, 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 1/2-3/4 in. long.


**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 1/2-2 in.; very variable in length and breadth, obtusely 2-fld.; petiole 3-4 ft. stout. *Spathes* tubular, 6-12 in. long by 1/4-3/4 in. broad, mouth irregularly toothed or lobed. *Spikes* of tall stout spadix distant, 6-10 in., pendulous, fulvous-tomentose; flowers stipitate. *Calyx* campanulate, siliky pubescent, shortly lobed. Petals 1/2-1 in. long, lanceolate, very coriaceous. *Fruit* 1/2 in. long, ellipsoid, narrowed equally at both ends, orange-colrd. *Seed* with the intruded hilar process dilated within.

B. Flowers much less than 1 1/4 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.* 113, t. 221, A, B, C; leaves flabelliform or orbicular 7-9-partite, lateral segments deeply acutely 3-4-lobed, the rest truncate 4-8-lobed, petiole unarmed above, flowers minute glabrous, petals very short. *Becc.* *Males.* iii. 74.
Malacca; Griffith. Perax, Soro-techni, King's Collector, 7359, 8534.—Distr. 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. Spathe \( \frac{3}{4} \) in. broad, mouths lacerae. Spadix very stout; branches 4-8 in., spreading and recurved; flowers sessile. Calyx cup-shaped, \( \frac{1}{13} \) in. broad. Petals ovate. Fruit spherical, \( \frac{3}{4} \) 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.


Tenasserim; forests in Mergui. Malaoca, Griffith, Kurz.

Leaves 3-4 ft. diam.; petiole 4-5 ft., trigonous, deeply channelled above, glabrous; spines very variable in size and number, but never long. Spathe 8-6 in. long by \( \frac{3}{4} \) in. broad, compressed, deeply lacerae 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.


Malaoca, Griffith. Andaman Islands, Kurz, Mon.—Distr. 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. Spathe very long, scurfy, \( \frac{3}{4} \) in. diam., mouths lacerae. 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 obvoid, \( \frac{3}{8} \) 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., $\frac{1}{4}$ diam. Leaves about 3 ft. diam.; petiole 5–6 ft., slender, Spathes narrow, 4–6 in. long by $\frac{1}{3}$ in. broad, subfurfuraceous; lower acutely keeled, mouth shortly lacerate. Spadix $\frac{2}{3}$–3 ft., branches spreading and curved or flexuous; flowers inserted in small tubercules which (in the dried state) are sunk in the lobulate base of the calyx. Staminal cup deeply lobed. Fruit $\frac{1}{2}$ 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 staminial 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 or notched; petiole 2 ft., not $\frac{1}{2}$ in. broad; spines $\frac{1}{4}$ in. Spathes $\frac{1}{4}$–2 in. long by $\frac{1}{3}$–$\frac{1}{2}$ in. diam., mouth split. Spadix a foot long, very slender, branches short, flowers $\frac{1}{16}$ 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 furfuraceous tomentose, flowers sessile, calyx cupular, petals very small.

**Singapore**, Gaudichaud, Lobb. **Perak**, at Sungti, 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 hack, young villously furfuraceous along the margin between the short stout spines. Spathes 4–6 in. long by $\frac{1}{3}$–2 in. broad, compressed, 2-keeled, mouth lacerate. Spadix very stout, with stout rusty-tomentose branches 6–8 in. long; flowers sessile, $\frac{1}{16}$ in. diam., rusty pubescent. Calyx very short, lobes rounded. Fruit $\frac{1}{2}$ 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-fld, 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 (552). **Perak**; on Gunung Batu Pateh, alt. 3–4000 ft., King’s Collector (8148); Scortechini (3199, 593°).
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 semi-circular, 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. 3300 ft.; Larut, King's Collector (1945, 1951, 1953, 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 globose-obovoid, about ½ in. long, pedicellate by the calyx.—Difficult to distinguish from *actifida*.

10. **L. Kunstleri**, Becc.; stem robust, leaves long-petioled, mid-segment not petiolulate, petiole armed at the base, spathe much compressed furrowaceous mouth not lacerate, branches of spadix very scurily and rustily hairy, flowers pedicellate 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 pedicellate flowers. Allied to *actifida*, differing in the robust stem, much broader leaf-segments, and longer floral pedicels.


**Penang**, Lewis. *Oxley*. **Singapour**, 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 palescomeously scurfy, 2-lobed, 4–6 in. long by ½ in. diam., silky or silverly palesomeous. 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 ½ 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

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tooth, mouth of spathes lacerate, spadix nodding compressed, branches 3 simple subtomentose, flowers sessile, calyx campanulate pubescent, fruit very small pisiform.

**Pebak;** at Sembi, King’s Collector (3028).

Closely allied to *L. triphylla*, but leaf-segments more numerous, mid-segment not petiolate, 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.**


**Pebak; 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-fid. spike, calyx campanulate hairy, staminal cup 6-toothed, ovary glabrous.

**Pebak;** at Goping, Kunstler (471).


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, fruited pendulous, loosely panicked; 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.


**Malaccia, Griffith. Penang, Lewis.—District. Cochín China.**


**Assam, common, Jenkens.**

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* pale ½–1 in. diam., leaden blue.

3. **L. speciosa, Kurz in Journ. Beng. As. Soc. xliii. ii. (1874), 196, 204, t. 13, 14; For. Fl. i. 525; leaves 6–7 ft. diam. palmately flabellate divisions very shortly 2-toothed, teeth lanceolate acuminate converging, drupe obovoid ⅓–1 in. long.

**Begu 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; sepal and petals about ⅔ in. *Drupes* ½ 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 ⅔ in. long. *Spadix* much branched, branchlets subulate slender. *Drupes* smooth, peculiarly fleshy, endocarp glumous and tessellated.

21. **Trachycarpus, H. Wendel.**

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-monoeious. *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.

**Temperate Himalaya**, alt. 6-8000 ft., from Nepal eastwards, the Khasia Hills, alt. 4000-5000 ft. Munnpore, *Watt. Burma*, alt. 4-6500 ft., *Kurs.*

**Trunk** 20-50 ft., slender; clothed beneath the crown with persistent leaf sheaths; young parts softly furfuraceous hairy. Leaves 4-5 ft. diam., subglabrous 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, blemish, "dirty blue" (*Kurs.*) "yellow lepidote" (*Watt.*)


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.


**Malayan Peninsula**; Klang, near Selangore, Keheding.

Nothing further of this species is known; it differs from the *P. Ithur* 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. Spadices tubular or open, persistent, sheathing the peduncle and branches of the spadix and passing into bracts and bracteoles (spathes and spathellules). Flowers small, polygamo-dioecious, 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 jexplanate. 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 mes. 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 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 pedicellar 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 infected). Sp. 10–12.


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

**GROUP VI.** *Rachis* of leaves not flagelliferous; leaf-sheath flagelliferous. *Spathe* 1st tubular, coriaceous, narrow, not split or lacerate. *Spathellule* of fem. fl. exerted beyond the spathes, and as it were supported on a pedicel. *Fruiting perianth* pedicelliform. *Seed* superficially furrowed; albumen ruminate; embryo basilar. Sp. 42-43.


**GROUP VIII.** *Rachis* of leaf not flagelliferous; leaf-sheath flagelliferous. *Spathe* 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 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. *Spathe* 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 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 $\frac{1}{2}$ in. long. Mart.

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 $\frac{1}{2}$ in. and upwards. Spadices 1–2 ft.; spikes 6–10 in. by $\frac{1}{2}$ in. across the imbricating coriaceous spathels. Calyx acutely 3-toothed; corolla twice 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. j. COLLINA, Becc.; smaller, petiole with solitary or sparingly clustered spines, spadices shorter often depannumerate shortly peduncled, tip not or slightly cirrhiferous, fruit ellipsoid. C. collinus, Griff. in Calcut. Journ. Nat. Hist. v. 51; Palms Brit. Ind. 39 (exul leaf), t. 186 (spadix only).—Khasia bills.

Var. g. MACROCARPUS, Becc., fruits larger. C. macrocarpus, Griff. in Mart. l. c. 333, t. 176, f. x. Griff. Palms Brit. Ind. 40, t. 186, A. i. ii. Walp. ll. cc. 484, 380.—Sikkim, &c.


SIKKIM HIMALAYA, ASSAM, SILHET, and the KHASIA HILLS, ascending to 4000 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 $\frac{1}{2}$ in. long, recurved. Calyx 3-fid to the middle. Corolla twice as long. Stamen free. Fruit 1 by $\frac{1}{2}$ 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.

PALO ; in marshy places, Griffith.

Stem 15-20 ft., 2 in. diam.; internodes 7 in., crown densely leafy. Leaves 5-6 ft., decurved leaflets 8-18 in. by 1-1¾ 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. Spadix longer than the leaves, very graceful; spikes 4-6 in. long, long on across the flowers, which are nearly ¼ in. long, curved. Calyx triset 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 costae beneath remotely pricky, petiole very stout and short, sheaths armed with very unequal scattered solitary or 2-3-nate rather short straight stout flattened pale spines, spadix erect or nodding very stout nearly unarmed, male decompound, spathes very short and broad. Mart. Hist. Nat. Palm. iii. 331; Walp. Ann. iii. 482; v. 829; Miqu. Fl. Ind. Bat. iii. 112.

MALACCA, Griffith, Mainay (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 1-2¼ in., very dark green, young scurfy beneath; petiole as thick as the little finger, rounded with a channelled upper surface. Spathes generally unarmed. Spadix 2-3 ft., male panicked, 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 ft. ½ in. long. Calyx triset to the middle. Petals hardly longer. Stamens inflexed in bud. Fem. ft. larger. Fruit 1 in. long, ellipsoïd, embraced at the base by the erect perianth; strongly beaked, scales in 24-26 rows, minute, dark brown.


MALACCA, Griffith. PERAK, King’s Collector (3040, 3048).

Probably only a form of castaneus.


Stem upwards of 1 in. diam. Leaves 4-8 ft., rachis not flagelliferous; leaflets 1½-2
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 tufted 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.


Stem slender, scandent. Leaves 3-4 ft.; leaflets 8-10 by ½-⅓ in., thin, pale green; rachis armed with simple recurved spines. Spathe very slender, tubular. Spadix 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 ½ in. diam.; flagellum of spadix very long, armed with 1-3-fid recurved claws. Spathelets cupular, acute membranous. Male fl. ½ 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 costae 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 ½-⅓ in., broader and more coriaceous than in C. longisetus; rachis scurfy. Spathe very obliquely cup-shaped, coriaceous. Male fl. crowded, calyx trifid to the middle. Petals and stamens stipitate. Fam. A.
larger, less crowded. Fruit \(\frac{1}{2}\) 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. **Calamus pachystemonius**, Thw. Enum. 431 (in part.); stem slender scendent, leaves pinnately 4-7-foliolate, leaflets elliptic acute or acuminate 3-5-costate, margins and costa 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 *Calamus pachystemonius* including the fruiting specimens are *C. digitatus*, which differs in the longer petioles, few terminal longer ob lanceolate leaflets and smaller curved male flowers.

11. **C. digitatus**, Becc. mss.; leaflets digitately 2-4-foliolate ob lanceolate 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, scendent. **Leaflets** at the end of the short petiole, 8-12 by \(\frac{1}{2}\) 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 \(\frac{1}{2}\) in., fem. 1-2 in. **Lower spathe** elongate, cylindrical; upper very slender, mouth truncate, entire; spathes cupular, truncate. **Male ft.** \(\frac{1}{2}\) in. long; corolla very narrow, curved, twice as long as the calyx. **Stamens** 2-4-serial, filaments thickened upwards. **Fruit** \(\frac{1}{2}\) in. diam., subtended by the spreading perianth; scales pale yellow, very broad with narrow brown margins.

12. **Calamus 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, scendent. **Leaflets** 8-12 by \(\frac{1}{2}\) in., thin, midrib beneath and margins quite without bristles or spines; petiole 2-3 in. with scattered short recurved spines. **Spathe** few, very long and slender. **Peduncle** of spadix 2-3 ft. long, as slender as a sparrow-quill; spiken \(\frac{1}{2}-\frac{3}{5}\) in. long; spathes cup-shaped, not densely imbricate, deeply striate. **Fruit** \(\frac{1}{2}\) 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. **Calamus 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 subglobose ovoid shortly beaked, scales in 17-18 series. ?C. penicillatus, Hook. Fl. Ind. iii. 781.

PENANG and the MALAY PENINSULA; Perak, alt. 300-3500 ft., King's Collector (1896). 2678 c.

Stem 10–25 ft., with the leaf-sheaths as thick as the little finger, scandent. Leaves 1½–2 ft.; leaflets 8–10 by 1½–2¼ in., often opposite, the upper pair free or confluent, margins and costa 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, ½ in. across the flowers; spathes densely imbricate, shallow, acute, striate and subscabrid; flowers ½ 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 (657b); King's Collector (6812).

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 elliptico-chovoid moderately beaked, scales more than 15-seriate.—Perak, summit of Gunong Tambang Batok, Scortechini (648b).

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.


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, spathe scabrid.

Perak; Scortechini.

Stem with the sheaths ½ in. diam. Leaflets 7–8 by about ½ in., concolorous, setuloso on the margins and 3 costae above and only on the median beneath, petiole 5–7 in., margins acute; sheath gibbous above, larger spines flat, others minute and seriate. Spathe 2, lower prickly, upper and spathe 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
costae 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 spathelets finely scabrid, spathelets very
long.

**Perae; Socorechini (4688);** Goping, King's Collector (3171).
A lofty climber; stem with the sheaths 1-1½ 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
scabrous with a fuscous 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.

stem rather stout, leaflets many inequidistant or fascicled 3-costate, margins and
coxae beneath spinulose, floccose rachis and petiole with scattered
long straight spines, sheath and flagellum with scattered short hooked spines,
spadix very long clothed with long spathes, tip flagelliferous, branches
paniculate, spikes 4-5 in., lower spathe compressed with subulate spines,
upper prickly, fruit small globose beaked. C. fasciculatus, Roeb. Fl. Ind.
iii. 779 (excl. cit. Rhodee); Kunth Enum. iii. 208; Mart. Hist. Nat. Palm.
Hist. v. 52; Palms Brit. Ind. 62, t. 195 B (excl. A. Roxburghii), t. 190 A,
f. ii.; Mig. Fl. Ind. Bot. iii. 127; Palm. Archip. Ind. 27; K urz in Journ.
As. Soc. Beng. xlii. ii. 210, t. 27 B; For. Pl. ii. 517. C. extensus, Mart.
l. c. iii. 210, Ed. 1, partly, t. 116, f. iv. (reduced in Ed. 2 to fasciculatus).
C. Pseudo-Rotang, Mart. l. c. 209, Ed. 1, t. 116, f. vi. (reduced in Ed. 2 to
53; Kunth Enum. iii. 207.—Wall. Cat. 8603, 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
3-½ in., pale green, young and rachis and sheath white-floccose, petiole short and
rachis very stout, spines slender ½-1½ in. long, pale hardly flattened. Spathes
coriaceous, mouth obliquely truncate; flagellum with hooked 2-3-fid claws. Spadix
and its spreading branches rather stout, internodes (and truncate spathelets) ½-3 in.
Fruit ½-3 in. diam.; scales pale yellow, obscurely channelled down the middle.

18. C. concinnus, Mart. Hist. Nat. Palm. iii. 332; erect or stem-
less?, leaflets many subequidistant linear-lanceolate acuminate glossy
above 3-costate, margins and costae beneath setulose, rachis and spadix
rusty tomentose sparingly armed with short stout straight deflexed spines,
spadix stout decompound, spathe loose coriaceous armed with short spines,
secondary lax membranous long acuminate, spathelets annular, fruit small
globose beaked. Kunth Enum. iii. 207; Walp. Ann. iii. 488, v. 829; Griff.

**Tenasserim, Wallach;** 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.


ASSAM, SIKHET 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 inequidistant linear-lanceolate minutely setulose on the margins setose or not on the 3 costa 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 decomposed, spikelets very short decurved, male flowers and spathellules minute quite glabrous, fruit small ovoid strongly beaked. C. tenuis, Thuw. 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 ½–1 in., upper free; rachis rather stout; petiole short; sheath ¼ 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. 1½ in. long, shining, not striate. Fruit ¼ 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 Marnagow, Bombay, seems a very different plant, has black tipped claws on the rachis of the leaf and spathe 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 costae 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-fl.; spathels and spathellules scabridly pubescent, fruit small beaked ovoid.

PERAK; at Thaiping and Larut, King's Collector (8434, 5527).

Stem scandent, 1½–1¼ in. diam. with the sheaths. Leaflets rigidulous, larger 15–18 by about ¾ 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 ¾ 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 acminate with 3 strong costae beneath, terminal pair
shortly adnate below, margins and costae beneath more or less setulose,
spathe closely armed with long flat horizontal unequai spines, spadix very
long ending in a flagellum paniculately branched, lower spathe tubular
strictly sheathing spiny on the outer side, upper smooth striate, fruit
globosely ovoid.

Perau, summit of Gunong, Scortechini; Malacca and Larut, King’s Collector
(2547, 6284, 6400, 7203).

Stern slender, scoundant. Leaflets 14–16 by 1½ 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. G. delicatulus, Thw. Enum. 330, 431; leaflets very many equi-
distant linear-lanceolate finely acuminately margins and 3 costae setose,
petiole very short shortly spiny, rachis brown-scurfy when young clawed,
spathe densely armed with short and long slender black flattened spines;
spadix very long filiform decompound, spathe unarmèd long-acute
at the tip, spikes very slender, flowers rather distant very minute.

Ceylon; at Galle and Hialdoon 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 ½ in. diam., scales pale
with a very narrow brown border.—Very near G. Helferianus, but the leaflets are
not aggregate, the spikelets more slender, and flowers smaller.

Fl. 521; leaflets many scattered inequidistant in series of 2–8 on a side,
narrowly linear finely acuminately 3 costate margins and lateral costae above
and median beneath setulose, rachis slender 3-gonous armed with short
scattered recurved spines, spadix long very slender compound glabrous,
spathe narrow tubular compressed and truncate partial sparingly shortly
spiny or unarmed, spikes 1½–3 in., male spatheilkules very short crowded,
fem. more remote, corolla twice as long as the stamens not striate.

Tenasserim (or the Andaman Islands), Helfer (6389 2, 6392 2).

Sparingly armed. Stem slender, scoundant. Leaves without flagelli, leaflets
8–12 by ½–¾ in., concolorous, uppermost quite free, costae 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 panicked, males short armed and more slender. Lower spathe long, narrow,
compressed, with a short erect limb and short spines on the keels, partial 1½–1 in. long.
Spatheilkules of male fl. very short and crowded, of fem. ½ in. long. Male fl. 2½–2½ in.
long, calyx 3-4d. Fruit unknown.

25. G. nicobaricus, Becc.; leaflets very many equidistant linear-
ensiform long-acuminately sarspase setose on the median costa only on both
surfaces lateral costae slender naked, petiole channelled above armed with
long straight marginal spines and short claws on the back, sheath very
pale at first sparsely densely armed with very unequal long flat spines and
short claws.

Nicobar Islands, E. H. Mars.

A very slender species, with varnished internodes ¾–1 in. diam. Leaflets 7–8½
by about ½ in., shining above. Spadix and fruit unknown. Flagelli exceedingly
slender.—Appears to be allied to G. delicatulus, from which it is distinguished by
the leaflets being setose only on the median costa.—I have seen no specimen.
J. D. H.
26. **C. tenuis**, Roxb. Fl. Ind. iii. 780; leaflets very many equidistant uppermost gradually smaller linear-lanceolate acuminate 3 costa 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, spathellae 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; Mig. Fl. Ind. Bat. iii. 118; Kurz in Journ. As. Soc. Beng. xlii. ii. 212, t. 31 B; For. Fl. ii. 520. C. Boyleanus, Griff. Ill. cc. 40 and 53, t. 191; Mart. l. c. 335; Walp. l. cc. 485 and 830. C. amarus, Lour. i. 210. C. Heliotropium, Herb. Ham.; Mart. l. c. 211, 334; Kunth l. c. 210; Griff. l. cc. 51 and 61; Walp. Ann. l. cc. 484 and 830.

**Tropical Himalaya, from Kumaon eastwards, Bengal, Assam, Silhet, Chittagong and Burma.—Distrib. Cochinn.**

Stems very long, scendent; internodes not thicker than a goose-quill. Leaves 1½–2 ft.; leaflets approximate, lower 8–12 by ¾–¾ in., margins minutely setulose or spinulose, bristles on costa ½ in.; petiole pale, stout; spines with broad laterally compressed conical bases; flagelliform. Lower spathes 8–10 in. by nearly ¾ in. diam., upper shortly scurfy. Lower spikes panicked, 1½–4 in. long. Male ft. ½ in. long, not distichous and spreading but secund in 3–4 series, imbricating, suberect. Fruit ¾ in. diam., mucronate; scales pale with a shallow median channel and very narrow discoloured margins.

27. **C. diffusus**, Bec. mss.; leaflets many equidistant rigidulous upper shorter narrowly linear-lanceolate very long-acuminate margins naked slightly thickened, costa 3 setose above the median spinulose beneath, rachis armed throughout with half whors of hooked spines or 3-ßd 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, spathes short broad, flowers rather distant, calyx campanulate striate, corolla twice as long.

**Singapore; Lobb.**

Leaves apparently 2–3 ft.; leaflets 10–12 by ¾–¾ in. Male spikelets 1–2 in.; flowers crowded, distichous, ¾–¾ in. long; spathellae 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 ¾–1 in. recurved, spathellae 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;
29. **C. Brandisii**, Becc. *mss.*; stem scandent, leaflets few fascicled lanceolate ensiform naked beneath sparsely setose above on the 3 costae, petiole slender with 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 decomposed 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 4-6 in. diam. *Leaves* rather short, about 3 ft. 3 in. long; sheath 4-4½ in.; ochrea very short, truncate; leaflets 6-8, the larger 8-12 by 2-2½ in., terminal free. **Male spadix** 1½ in. *Fruit* about ½ in. by ¾ in., base 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 *acanthospatus*, but very distinct by the opaque not channelled scales of the fruit.

31. **C. acanthospatus**, Griff. in *Calc. Journ., Nat. Hist.* v. 39; *Palms Brit. Ind.* 50, t. 190 B (excl. *A*, f. 1); leaflets few large inquisit-ant 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, partia

EASTERN NEPAL, SIKKIM and BHOTAN HIMALAYA, ascending to 6000 ft., J. D. H., &c. Khasia Hills, alt. 2-4000 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 costa 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 1-½ in., strongly recurved. Lower spathe 1 ft., scurfy, as thick as the thumb; uppermost glabrous. Fruit ½ in. diam., pericarp thin; scales chestnut brown, obscurely channelled, shining; fruiting calyx large, cupular, ½ 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 costa 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, spathelles very shallow, flowers distichous pointing forwards, fruit pisiform apiculate. Griff. in Col. Journ. Nat. Hist. v. 42; Palms Brit. Ind. 54; Kunth Enum. iii. 210; Kurz in Journ. As. Soc. Beng. xiii. ii. 214; For. Fl. ii. 622. C. Mastersianus, Griff. ii. cc. 76 and 84. t. 206, Daemonorops Guruba, Mart. i. c. 330; Walp. ii. cc. 479 and 628; 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. Spathe with terete tubular bases and long flat thinly coriaceous obtuse brown lamina, of the lower 12-18 long by 1-½ broad, flagellum very stout and stoutly armed. Male spikes 2-3 in., flexuous; spathelles very small membranous cups. Flowers ½ in. long, calyx striate; corolla twice as long, polished. Fruit ½ 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, costa 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 Col. Journ. Nat. Hist. v. 49; Palms Brit. Ind. 59; Miq. Fl. Ind. Bat. iii. 117; Walp. Ann. iii. 484; v. 330; Wall. Cat. 8009.

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 ½ 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

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**TENASSERIM. at Tavoy, Gomez.**

Leaflets 10–12 by 1–1 ½ in., rigid, margins bristly towards the apex, young pale softly scurfy beneath, margins thickened with obscure distant asperities. *Upper spathes* 3–4 by ½–⅔ in., flat. Inflorescences of male spadix as long as their spathes, very compound; spikelets ½–¾ in. Flowers ½ in. long, pale, close-set, pointing forwards. *Calyx* sharply toothed, striate. *Fem. spadix* and fruit unknown.

35. **C. paspalanthus**, Becc. *mas.*; leaflets equidistant close-set very narrow finely acuminate 3-costate costae closely spinulose beneath more remotely above, margins nearly smooth, petiole very long white armed below with flat appressed long and short spines, rachis brown scurfly 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 lanceate spathes, spikes erect very dense-fld., spathellules closely imbricating lunate very strongly nerved, flowers minute.

**PERAK**; at Gopio, King's Collector (577).—**DISTRIBUTION. BORNEO.**

Leaves not flagelliferous; leaflets 4–10 by ½ in., shining, strict; petiole about 2 ft., white, but unlike with a fine brown scurf when young; sheath flagelliferous. *Spadix* quite unlike any other, from the upright branches and spikes, and dilacerate short membranous spathes. *Spikes* ½–2 in., strict, like those of some *Panicum*; spathellules very peculiar, flabellately nerved. *Male fl.* distichous, spreading horizontally, ⅓ 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 Lobl, 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 costae 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. Daemonorops ramosissimus, *Mart. Hist. Nat. Palm. iii. 330; Mig. Fl. Ind. Bat. iii. 100; Walp. Ann. iii. 479, v. 828.

**MALACCA.** Griffith. **PERAK**; Larut, on Gunong Tjuk, Scortechini (51 b, 1235); alt. 2500–3500 ft., King's Collector (2617, 2910, 6842, 7181).

Stem 20–30 ft., scendent, 1–1 ½ in. diam. *Leaves* 6–8 ft., dark green, glossy; leaflets 12–24 by 1½–2 in., 7–13-costate, almost plicate; rachis as thick as the little finger, plano-convex, spines ½–¾ 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-
resences of male spadix 10–12 by 3–4 in., furfuraceous; peduncle as thick as the little finger, compressed; branches fastigate, strict, suberecct; spikes distichous, 1–1½ in.; spatheoles very shallow; flowers close-set, pointing forwards, ¼ in. long; Calyx shortly tubular, obliquely acutely trifid, striate. Corolla twice as long, smooth. Fem. spadix sessile; spikes 1½–2½ in., brown scaly, ½ 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 costae 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 spriukled with white cottony tomentum, spathes unarmed much compressed shorter than their respective partial inflorescences, fem. spadix not very decompound, flowers cylindric.

Perak, Scortechini (3179).
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 spinous with unequal spines 1 in. long and less, fem. spadix small short, peduncle slender spinous, spathes oblong-lanceolate, spatheal tubular small distant, flowers distichous, calyx ¼ in. shortly 3-lobed, corolla twice as long segments acute. Daemonorops hypoleucus, Kurz in Journ. As. Soc. Beng. xliii. ii. 208 (partim), t. xviii. (excl. t. xix.).

Burma; on Thongyseen, 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 costae beneath, margin obscurely aculeolate, rachis dorsally rounded shortly spinous, male spadix very long slender sparsely spinous, spatheal tubular truncate, inflorescences laxly decompound, branches very slender, spike ½–1 in. in zigzag almost filiform, spatheoles minute, flowers minute pointing forward closely imbricate, calyx acutely 3-lobed striate, corolla twice as long acute estriate. Daemonorops 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 20 by 2 in., very thin and pale beneath, with indistinct cross nerves. —Beccari has identified with it the plate xii. 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 costae 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 ob lanceolate acuminate thin, costa 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 decomposed, fem. with simple distichous spikes, upper spathes and spathes tubular obliquely truncate, spathelluses short acute, calyx strongly striate, corolla striate twice as long.—Rheedee Hort. Mal. xii. t. 64.

Deccan Peninsula; from Malabar to Travaunco, Wight, Beddome.

Stem very slender, scendent. Leaves 18-2+ in.; leaflets 4-5 by ½-¾ in., broadest about or above the middle and hence 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 scurfy. Spadix flagelliferous, 2-3 ft.; peduncle short, flattened, young white scurfy, margins shortly scurfy. Lower spathes tubular, compressed at the base, with shortly scurfy angles, produced into a long membranous sheathing lamina; upper with unarmed tubes. Inflorescences about 2 in. long, in idea with spreading very slender branches bearing short flexuous almost capillary spikes of flowers ½ in. long; fem. with simple recurved spikes and rather larger flowers.—Rheedee'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. Demonorops Rheedei, Mart. Hist. Nat. Palm. iii. 330; Mig. Fl. Ind. Bat. iii. 100; Walp. Ann. iii. 479, v. 828.—Rheedee 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 ¾ in. long by ½ 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.


Nilgiri Hills; alt. 5-6000 ft., at Sisparah, Wight, &c.; at Naduvatam, Gamble.
Apparantly a stout scandent species. Leaflets 12-16 by ½-1 in., tips spinelosely olliate, margins below obscurely aculeate, 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 ½-⅓ in. diam., very shortly beaked; scales subacute, with fimbriate margins, not channelled; fruiting calyx nearly ½ in. diam.; petals yellow acute deeply channelled.

43. C. Gambeli, Bec. mes.; leaflets as in C. Huegelianus, but with shorter scattered bristles on the 3 costae 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.

Nilgiri Hills; Makurti forests, alt. 5000 ft., Gambel. A very distinct species differing from Huegelianus by the longer leaflets, 2-⅔ 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 Becarri.

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 elliptico-lanceolate acuminate 3-7-costate, costae 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, spathes not imbricate, fruiting calyx sessile shortly cylindric, lobes very short, fruit oblong, scales very pale ripe channelled. Mart. Hist. Nat. Palm. iii. 338; Kurz Enum. iii. 239; 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. 51 C; For. Fl. ii. 520; Chittagong, Kurz.

The Khasia Hills, ascending to 4000 ft.; Upper Assam, Marn. Cachar, Keenan. Chhatagong, 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; spathes unarmed. Corolla three times as long as the calyx. Fruit ⅔ in. long; scales straw-cold with or without a narrow brown border; fruiting calyx pedicelliform. Seed wrinkled.—Descripit. chiefly from Kurz.


Scandent. Leaflets 6-13 by ⅛ in., upper 2-3 in., shining, tips sparingly bristly or naked. Corolla hardly longer than the (fruiting) calyx-lobes. Fruit ⅔ 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**, Mig. 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, costa 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.


**Stem** 20–30 ft., stout, scendent. **Leaves** 3–4 ft.; leaflets 18–20 by 3–4 in., straight, upper smaller; spines of sheath 1–3 in. long. **Fruiting spadix** 10–12 ft., slender. **Fruit** 1 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 bracteoles, and basal embryo.

47. **C. singaporenensis**, Becc. mss.; leaflets many rather distant narrowly linear finely acuminate 3-costate, tips setose, margins and costa on both surfaces unarmored 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 laminae 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 ½–¾ in., margins hardly thickened.

**Group VIII.** See p. 438.

48. **C. exilis**, Griff. Palms Brit. Ind. 51 (exilis, 35); leaflets many equidistant narrow finely acuminate copiously setulose on the margins, costa 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. Bot.** iii. 116.

**Malacca**; on Gunong Ladang, Fernandez. **Perak**, Larut and Ulu Bubong, alt. 4000 ft., Scortechini (657b), King’s Collector (2734, 6243, 8457) 10,259, *Herb. Calc.*.

**Stem** 15–20 ft., ½ in. diam. **Leaves** 3–3½ ft.; leaflets 8–10 by ½–⅔ in., cross nervules strong; petiole scabridulous, 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 pedicellate and pedicelliform, cannaulate; 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 ruminated; 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 nerv'd, margin crisp'd or waved.

**Perak, Scortechini** (431b); alt. 2500–3000 ft., King's Collector (5332, 6993).

Stem 20–40 ft., ½–3 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 flabellate; sheath unarmed, ochrea annular very coriaceous, acute posteriorly; petiole short, very stout, suberete, armed with few distant 3-fld short claws; flagellum 8–10 ft., ending in a long filiform prickly tip, armed with strong 3-fld 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 subcannaulate spathelets.—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-fld, margos minutely setulose or naked, costae 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 funnell-shaped truncate, branches of male spadix 6–10 in. clothed with short broad imbricate spathelets, spikelets very many distichous, spathelets extremely short and densely imbricate, fem. spikes and spikelets much longer and laxer, fruit globose long-beaked. O. rudentum, Thw. Enum. 330 (excl. syn.) (non Lour.); Hance in Journ. Bot. 1874, 262.

**Ceylon, Walker;** Saffragam 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-fld claws beneath; flagellum very stout, with very broad claws of 3–6-nate recurved black spines. Male spadix with long working branches clothed with short spathelets and bearing short broad flat spikelets ½–1 in. long and ½ broad of most densely imbricate short spathelets and small flowers ⅛ in. long. Fem. spadix; branches and spikes much longer; calyx sessile, very short, deeply 3-lobed; fruiting calyx sub-pedicellate; petals as long, both striate. Fruit ⅜ in. diam., dull yellow; scales deeply channelled, margins scarious pale. Seed globose; albumen deeply ruminated, embryo lateral.

51. *C. latifolius*, Roxb. Fl. Ind. iii. 7751; leaflets few large scattered or 2-nate elliptic or elliptic-lanceolate 3–9-fld, margos aculeolate, costae naked on both surfaces, rachis flagelliferous very stout variously armed with scattered spines, sheath densely covered with very short broad whorled spines and a few very large flat solitary or whorled ones, spadix decompound, spathelets short subcompressed sparsely

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 flagellately clustered or connate at the base; cross nerves very many and close; petiole short or long, sometimes bearing the leaflets only far up the flagellum; base sometimes ¼ in. broad, smooth, biconvex, spines 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, shinning, 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 ¼–1 by ¼ 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 Tambung Batak, *Scortechini* (432). Differs from all other known species in the few divisions of the spadix.—I have seen no specimen. *J.D.H.*


**Perak**, *Scortechini.*—**Distript.,** Borneo.

A lofty climber. Leaves 2–3 ft.; leaflets 12–14 by 2–2½ in. Fruit unknown.—Appears to be allied to *C. melanalaoma* of Java. I have seen no specimen. *J.D.H.*

55. **C. axillaris**, Becc. *mss.*; leaves shortly petioled, leaflets numerous very inquidistant above oblongoellate 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 scorioid, 3rd spathe infundibular, limb open truncate margin fimbriate, spatheals and spathellules striate margins ciliate, flowers distichous, calyx finely striate.

Perak, Scortechni.

Described from a single specimen which I have not seen. The fruit, and hence the position of the species, is unknown. J.D.H.

55. C. pallidulus, Becc. mss.; leaves subsessile, leaflets inequidistant hardly fascicled ensiform acuminate, costae 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, spatheals armed with short stout scattered simple conical spines, fruit spherical shortly beaked pale, seed deeply pitted, albumen ruminate.

Perak; at Taiping, Wray (2392, 3017). Leaflets 8–10 in. The upper spatheals are naked with much dilated obliquely truncate mouths. The fem. spikes 2–2½ in., strongly recurved; spatheals strongly muriate. Fruit ⅓ in., diameter, very pale; scales obscurely channelled, margins hardly scarios, beak cylindric; fruiting calyx pedicelliform. —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 petioloed, leaflets equidistant broadly linear alternate 3-costate tip bristly, margin thickened smooth, costae sessile 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 spatheals 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 ½–¾ in. long, strongly beaked, scales pale greyish yellow, strongly channelled, narrowly margined with orange-brown.—Described from Trimen i. 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 costae sessile, 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 whors of capillary black and broad flat black spines, spadix decom-pound nodding, spathe 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 chestnut-brown, rather flat, not furrowed, tips prolonged into a lancinolate pale brown opaque acute ciliolate membranous appendage, longer than the scale itself. Seed semiconvex, grooved; albumen equable.—(The above from Kurz.)


Stems 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 bifurcantly decompound, elongate, drooping. Fruit about ½ in. long, scales slightly biconvex, hardly channeled, pale brown with a blackish border. Seed almost semi-covex; grooved and irregularly wrinkled.—(Descrip. from Kurz.)

** Fruiting perianth more or less pedicelliform.


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 \( \frac{1}{2} \) in. diam., with channeled scales and deeply sinnately 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 found 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 \( \frac{1}{2} \) in., membranous, linear-lanceolate, finely acuminate, setaceous pointed, with 3 slender costae 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 \( \frac{1}{2} \) in. long, ellipsoid, scales dull pale yellow with broad scarios brown margins and tips, not channeled, 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, costae 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 (316b); 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, costae 5 setose above naked

**Malacca, Fernandez, Osyld.—Distrib. BANCA?**

Stem with the sheaths about 1 in. diam. Leaves 10–11 ft. long exclusive of the long flagellum; leaflets 1 ft. by ½ in.; petiole about 2 ft.; its lower part armed like the sheath; sheath with a very oblique mouth.—Description from Griffith.

**GROUP XII.** See p. 438.


**Penang; Gaudichaud.**

Stem scendent. 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 sheath. *Male spadix* decompound, lower spathes subterete faintly 2-keeled and rachis armed with short scattered spines, upper unarmed, spikes slender spreading equaling 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, coste 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 cylindrical copiously armed with uniform short straight conical-based spines, *fem. spadix* slender flagelliferous, spathes slender terete armed with short hooked spines, fruiting calyx pedicelliform short contracted sessile, base broadly truncate, fruit (young) long-beaked very pale.

**Malacca, Lobb, Hervey.**

Stem scendent; 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 forefinger, 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) ½ in. long, shortly oblong or ellipsoid with a long cylindrical beak; scales very pale straw-colored, faintly channelled.

Var. robusta, Becc.; spadix much larger, very stout.—Perak, Geelong-Malacca, King’s Collector (7136).

MALACCA, Fernandes. PERAK, Scortechini.

Stem scendent, as thick as a goos-equil, 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.


SILHET, Roxburgh.

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 Renv. & Sch. Syst. vii. ii. 1326; Rumphia, iii. t. 148; Mart. Hist. Nat. Palm. iii. 208, t. 116, f. 2:—


MALACCA, Fernandes. PERAK; Scortechini (587b) (Herb. Calc. 3931).—

DISTRIBUT. Malayan Islands.

Stem robust; 50–50 ft., 1½ in. diam. without the sheaths; sheaths about 2 in. diam. Leaves 12–15 ft.; leaflets 2–2½ ft. by 2½ 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 ¾ in. long; sheath copiously armed with whorled flat appressed often imbricating spines 1 in. long, and ¼–½ in. broad at the base. Spadix 16–18 ft.; branches 2½ ft. apart; spathes tubular, armed like the sheaths; spikes 2–3 in.; spathes smooth, bracts and spatellules ciliate. Male spikes recurved, flattened, ¾ in. across the distichous large spreading spatellules; male β, broadly ovoid, terete, obtuse; calyx sessile, hemispheric, petals twice as long. Calyx oblong, shortly 3-toothed, fruiting pedicelliform. Fruit 2 in. long, obvoid; scales rusous, argusian pale, lacerate. —Descript. chiefly from Griffith; of the fruit from Martius.—Beccari regards the Malacca plant as a var. (horrida) with glabrescent sheaths, serate 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, costa and margins unarmed, petiole long and rachis armed with short spines, sheath very stout woody smooth densely armed with very broad flat long scattered or seriate spines and short scattered ones, male spadix supradecomound, branches close together, spathes tubular shorty spiny, fruiting calyx pedicelliform, fruit large ellipsoid-ovoid, acute.
PERAK; Scortechini.

Apparently scendent, 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 G. ornatus, but more robust, and more densely armed; abundantly distinct in the non-flagelliferous spadix, longer branches, and armed secondary spatheas.—I have seen no specimen. J.D.H.

70. G. scorpionum, Lour. Fl. Cochinch. i. 210; leaves not flagelliferous, leaflets numerous firm equidistant upper gradually smaller elongate-lanceolate or subensiform acuminate tips bristly, costae 5-7 naked on both surfaces or sparsely acuminate 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 spathe 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 Cale. Journ. Nat. Hist. v. 39; Palms Brit. Ind. 43; Miqu. Fl. Ind. Bat. iii. 138. C. mioranthus, 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)—Distr. 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 cylindrical; spathelets 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; spatheblades 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) ¼ in. long, scales brown shining tumid hardly channelled, with broad pale scarious margins. Seed (young) sub-obovoid, alveolate, embryo basilar.

GROUP XIII. See p. 438.

71. G. conirostris, Becc. mss.; leaf long-petioled shortly flagelliferous, leaflets numerous equidistant narrowly ensiform tips slender strongly setulose, costae 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 suborditary 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, 5508).

Stem 15-20 ft., 1-1½ in. diam. Leaves 6-8 ft. glossy; leaflets 10-18 ft. by ¼-1 in.; upper smaller, membranous; petiole as thick as the middle finger, concavo-convex, back sparsely shortly armed; upper spines of sheath 4 in. long, acicular. Fruit 1½ in. long by ¾ in. diam., very smooth; scales flat, brown-black, quite smooth and polished, closely imbricating, the basal concealed part yellow; fruiting calyx ½ in. diam., cupular, not pedicelliform; lobes large broad appressed; petals very small. Seed ovoid, rough; albumen cancellate throughout.
72. C. Lobbianus, Bosc. mss.; leaflets equidistant linear-lanceolate candate-acuminate membranous, clothed beneath with an appressed white substance (as if coated with lime), costae 3 all naked or with a very few bristles beneath, spadix slender and rachis and upper spathes aculate, male spikes crowded very short and broad with densely crowded distichous large flowers.

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. Rumilis, Roxb. l. c. 773, is possibly 51, latifolius.

C. Metziatus, Schliecht. in Linn. xxvi. 727 from Ceylon (= 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. favens, Bl.


24. DEMONOROPS, 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.

Demonorops 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. Cymbospatheae. 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, costae 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 spineous 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.

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 ½-¾ in.; petiole 5–6 in.; spines of rachis many, short, scattered; of sheath 1–1½ in. long. Outer spathes 1–2 ft., spines ½–¾ in.; inner 12–15 in., lanceolate, long acuminate, quite smooth. Male spadix thyrsiform, dense-fid.; 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 ½ in. diam., pale yellow brown; scales deeply channelled, margins narrowly scarios. Seed subglobose, smooth; albumen puncate, or the surface ruminated by very slender channels.

2. D. Manii, Bec. mss.; leaflets very many and narrow naked beneath setulose on the 3 costae 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, costae 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. xlii. 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 1½–1½ 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 spathes cymiform, scurfy, inner unarmed. Fruit ½ in. diam., pale brownish yellow, scales deeply channelled, margins brownish with a very narrow scarios 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.


MALACCA, Griffith. PERAK, Scootechini.
Stem very stout, scendent, sheaths 2 in. diam. Leaves 15–16 ft.; leaflets 18–20 by 1½ in.; petiole about 2 ft. Lower spathes 14–15 in. long, inner included, unarmed, rustily scurfy. Male spadix 15–18 in., decumbent, spikes about
5. D. hygrophilus, Mart. Hist. Nat. Palm. iii. 204, t. 177, f. 11; robust, leaflets very many and narrow equidistant linear tip filiform, margin and 3 costa 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. Palm. Brit. Ind. 96, t. 213 C.

MALACCA, Fernandez. PERAK, Scortechni.

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.—Descrip. from Griffith. 1 have seen no specimen. J.D.H.

6. D. angustifolius, Mart. Hist. Nat. Palm. iii. 329; leaves shortly petioloed, leaflets very many narrow and close set equidistant narrowly linear-lanceolate tip filiform, costa 3 all and margins setulose or with the median only beneath, bristles very long, rachis 3-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 ½–3 in.; petiole 3–4 in. Outer spathe about 1½ ft. long, the beak half its length, flat; 2d spathe sparsely scurfy. Male spadix with a slender sparingly armed peduncle; branches crowded, erect; spikes 1 in., flexuose, 8–10-fl.; flowers small, oblique; calyx cylindric-oblong, teeth small; petals twice as long.—Descrip. 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 cuonave above at the base. J.D.H.

7. D. intermedius, Mart. Hist. Nat. Palm. iii. 377, t. 175, f. viii.; leaves long-petioloed, leaflets opposite or scattered linear-lanceolate acuminate, margins and 3–5 costa 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, Scortechni, King's Collector (7135).

Stem 15–20 ft., ½ in. diam. Leaves 4–6 ft.; leaflets 18–20 by 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 thyrsiform. Fruit ½ 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 granites, 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 costae 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.

**Pernak**, alt. 3–4000 ft., King's **Collector** (4133); on Gunong Tambang, Scortechni (4330).

**Stem** 20–30 ft., ½–¾ in. diam. **Leaves** 6–8 ft.; leaflets 8–12 by ½–2 in.; spines of sheath ¼ in. long, mixed at the juncture with the petiole with more slender shorter black ones. **Fruit** ¾ 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 costae 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.

**Pernak**; alt. 300 ft., King's Collector (7975); Scortechni.

**Stem** 10–15 ft., nearly ¾ in. diam. **Leaves** 3–4 ft.; leaflets inequidistant, dark green, ½–¾ in. broad; petiole 15–18 in., armed on the back and margins. **Fruit** ¾ 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 costa 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** scendent with the sheaths about 1 in. diam. **Peteiole** about 1 ft, base much swollen and then armed with scattered short deflexed spines, and above with spines ¼ in. long; leaflets 13–15 by ½–1 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 subscendent, upper leaves alone with flagella.

11. **D. monticulus**, Mart. **Hist. Nat. Palm.** iii. 328, t. 175, f. v.; leaves petioled, leaflets equidistant alternate linear-subulate acuminate, costa 8 all bristly above naked beneath except the median at the apex, **vol. vi.**

**Malay Peninsula;** on Goomong Miring, a spur of Mt. Ophir, alt. 1500-2030 ft., and Penang Hill, half way up, *Griffith.*

**Stem** about 8 ft. Petiole 10 in.; leaflets 10-11½ 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 channeled and with a dark brown integumental line; fruiting calyx explanate, lobes broad; petals twice as long, ovate. *Seed* with a fleshy covering.—*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.


**Malaccan, *Griffith.***

**Stem** erect. *Leaves* 4-5 ft., exclusive of the 5-7 ft. petiole; leaflets 15-17½ in. *Spathe* 4-5 in., narrowly fusiform, scurfy, beak ⅔ in. 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 cylindrical 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 narrow tips spinulose, costa 3 setulose above and on the median beneath, margins setulose, petiole subcylindrical 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 ⅔ in. *Spathe* 6 in., its beak 3 in. *Fruit* ⅔ in. diam., pale straw-coloured, suddenly narrowed at both ends; scales channelled, tips dark-coloured; fruiting calyx subpedicellate, 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 costa 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, crinate all over with long slender pale bristles, 2nd and 3rd bearded chiefly along the middle, male spadix much branched, margins of pedicels bearded,

**Macaco,** Griffith. **Perae,** Scortechini.

* Stem erect or subdecandent, with the sheaths 1 in. diam. Leaves 6-8 ft., upper small, with long flagella; leaflets 12-13 by \( \frac{1}{2} \) in.; petiole 1 ft., base not gibbous or puckeret. Outer spathe 12-16 in., spines and hairs 1-1\( \frac{1}{4} \) 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, \( \frac{1}{2} \) in. diam., tawny, scales with a dark marginal band, deeply channelled; fruiting calyx exlanate, 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. *ms.*; leaflets alternate or distantly subopposite linear-lanceolate candiate-acuminate, costae 3 minutely setulose on both surfaces, as are the margins, petiole very gibbous and transversely puckeret at the base slender 2-edged bioconvex 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 glabrons armed with very short deciduous prickles, at length murinate. Calamus 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).

**Macaco,** Griffith.

The only specimen seen is of a leaf with a cylindrical 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 \( \frac{1}{2} \) in., with very long filiform bristly tips.

16. **D. propinquus,** Becc. *ms.*; leaflets numerous equidistant linear-lanceolate, costae 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 globose ovoid strongly beaked red brown, scales deeply channelled. Calamus Draco, Griff. in Calc. Journ. Nat. Hist. v. 65; Palms Brit. Ind. 75 (ectl. Syn. Roxb.), t. 201 A, B; Mart. Hist. Nat. Palm. iii. 175, f. 10, 3-8.

**Penang,** Griffith, Lowes. **Perae,** Scortechini.—Distrib. Sumatra.

* Stem stout, erect, at length scendent. Leaflets 12-18 by \( \frac{1}{2} \) in.; petiole 4-terete, 1 in. diam. *Fruit* \( \frac{1}{2} \) in. diam., exuding dragon’s-blood copiously, stoutly

\[ Hh2 \]
17. **D. didymophyllus**, Beco. mss.; leaflets in distant opposite or alternate pairs broadly ensiform or elliptic, costae 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.—Distr. Sumatra.**

*Stem* 20–30 ft.; scandent. *Leaves* 5–7 ft.; leaflets 8–16 by 1–3 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-fld claws; sheaths scurfy, armed with very broad flat spines, mouth oblique naked. *Spadix* 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* ¾ in. diam., cuspidate, red brown, and explanate calyx as in *D. propinquus*.


**Malacca, Griffith.** **Perak, King's Collector** (4774, 5919); Scortechini.

*Stem* scandent, 20–30 ft., sheaths about 1 in. diam. *Leaflets* 15–16 by ¾–1 in., tip capillary bristly, rachis as thick as the thumb, subicaceous; petiole about 2 ft., triconus; lower spines 1 in. and upwards. *Spadix* coriaceous, lower 8–10 in., lanceolate, open, tip flat broad; upper open much longer than their inferences. *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 spathelles, 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.*

Daemonorops.] CLXIII. PALMEE. (Beccari & Hook. f.)


MALACCA, Griffith; at Ager Punnus, Malacay. PERAK, Scortechini, King's Collector (951).—DISTRIN. Java, Sumatra.

Stem scendent, with the very stout sheaths 1½ in. diam. Leaves 7-10 ft.; rachis flagelliferous; leaflets 10-18 by ½-⅔ in., tips very slender, setulose costae 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 ¼-⅛ 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 ¾ in. long by ½ in. diam., pale brown, not shining, shortly mammillate; scales obtuse, channelled, margins of channels rather elevated. Seed oblong, pitted, pits resinous; albumen deeply ruminuate; embryo basilar.—The enormous spines of the leaf-sheaths are a remarkable character.

Var. minor, Bec. mss.; stem 2-3 ft., with the sheaths ⅓-⅔ in. diam., leaves 1-½ ft., leaflets 5-10 in., fruit much smaller.—Perak 300-1500 ft., King's Collector (5097, 5142, 5486).

20. D. Kunstleri, Bec. mss.; leaflets many equidistant linear setulose on the 3 costa 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 ⅙-⅓ 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 scarios and hardly discoloured; fruiting calyx small, explanate. Seed subglobose.—I have seen only a portion of a leaf and of a fruiting spadix.


Perak; alt. 4000-5000 ft., King's Collector (4129).

Stem scendent, sheaths ½ in. diam. Leaflets 14 by ⅝ 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 spicula. Sheath of leaf with a spinulose membranous collar or ring. Spadix elongate before flowering, then paniculate.

22. D. Sabut, Bec. 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 costa 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. *ms*.; leaflets 10–12 in distant fascicles elongate-oblanceolate with setulose tips, costae 3 nearly naked on both surfaces, sheath densely filamentously scurfy, internodes with 2–3 membranous strongly nervesd nerves appressed to the sheath and densely crinite, petiole biconvex margins obtuse rather closely armed with claws.

**Pereak, Scortechni.**

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 by 4–5 in. with 7–8 acute naked costae, petiole 2 ft. biconvex, armed with 2–3-fid spines, sheaths $\frac{3}{4}$–$\frac{3}{4}$ in. diam. with 3–4 membranous collars.

**Pereak; Scortechni.**

Founded on a single flowerless specimen, which I have not seen.—J.D.H.


**Malacca, Griffith.** *Pereak, Scortechni*; at Larut and Goping, *King's Collector* (576, 638).

**Stem** 20–40 ft. scandent, sheaths about 1$\frac{1}{2}$ in. diam. **Leaves** 5–15 ft.; leaflets 10–18 by $\frac{3}{4}$–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 compound black-tipped bristles confluent into stiff laminate $\frac{1}{2}$ in. deep. **Lower spathe** 2–3 ft., with a long narrow point; bristles $\frac{3}{4}$–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 $\frac{3}{4}$–1 in. spathelike cupular, acute. Flowers distichous, horizontal, most densely packed; calyx cupular, obscurely toothed; petals twice as long. Fem. spikes 3–4 in. **Fruit** $\frac{3}{4}$ 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.

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PENANG. Leaves. PERAK, alt. 2-3500 ft., King’s Collector (2931, 2735, 6306, 7849). SINGAPORE. Lobb.

Stems stout 20-25 ft.; scandent; nodes swollen. Leaves 10-14 ft.; leaflets 16-20 by ⁵⁄₈-¹ in., margins quite smooth, long tips setose; petiole stout, spines on lower portion often terminate 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 ¹/₈-¹ in., spreading, with the flowers ⁴⁄₈ in. broad. Male flowers most densely imbricate, horizontal in two series, ½ in. long and narrow; spathellae quite entire; calyx shortly cylindric, striate; corolla terecate, four times as long, smooth, not striate, very narrow. Fruit ¾ in. long, shortly pedicelled; sometimes almost ellipsoid, pale dull yellow-brown; scales with a shallow channel and brown margin.—There may be more than one species included here, the fruiting spadices of Nos. 756 and 7849 look very different. No. 576 from Gaping 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.


MALACCA, Fernandes, Maingay, Hervey.—DISTRIN Sumatra, BACCA.

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 decom-pound; spikes ¹/₈-¹ in., very slender and zig-zag, spathellae (or bracts?) very minute. Flowers ³/₄ in. long, erecto-patent; calyx obtusely toothed, quite glabrous, striate; petals hardly twice as long, not striate. Fruitting spadix large, very broad, much branched; branches not stout, scurfy; spikes 3-6 in. Fruit ¼ in. apart, ¾ in. long; calyx very shortly pedicelled, broadly campanulate, 3-lobed to the middle lobes pressed 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 costae of the leaflets probably very 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 trid; corolla-lobes lanceolate, valvate; staminodes 3 or 6; ovary 3-celled, stigmas 3, subulate; ovules basal. 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.


**Upper Assam, Mann; in the Mishmi Mts., Griffith.**

A very imperfectly known species, of which Grifith 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 costa 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 *Eugeissonia*; the pericarp thin, clothed with spreading and ascending subulate-lanceolate recurved brown scales ½ 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 ½ in. diam. or less.


**MALACCA, Griffith. PERAK, at Larut, King's Collector (3448).—DISTR. Sumatra.**

**Leaves** 12–13 ft.; petiole half the length, slender, armed with long slender spines, leaflets fascicled, 18–20 by 2½ in.; costae slender, acute beneath. **Male spadix** about 1½ ft.; spathes imbricate laceraete. **Spikes** ½–¾ in.; bracts membranous, 2-fid;
bracteoles penicillate. Fruit 2½ by 1½ in., cuspidately mammillate; scales closely imbricate, chestnut brown. Seeds 1–3, plano-convex.—Descr. chiefly from Griffith.


MALACCA, Griffith.—Distr. 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-acute, tip and margins setose, costae of upper leaflets briskly on the upper surface. Spadix 8–12 in., crowded with cylindrical spikes 6 in. long; male 2 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 briskly costae and slender short white spines and crowded thysiform fruiting spadix.—Descr. from Griffith.


BURMA, Kurz. MALACCA; at Ching, Griffith. PENANG and SINGAPORE.—Distr. Siam, Banca.

Stems very short or 0. Leaves 15–20 ft.; leaflets approximate in groups of 2–4, and alternate, 2–3 ft. by 1½–2 in., spinulose ciliate above the middle, upper con- fluent; petiole 8–10 ft. and rachis copiously armed with broken spirals of strong subreflexed spikes. Spadices several feet long, rachis woolly. Spikes cylindrical, villous, 1½–2 in. long; flowers small, rose-cold. Spathes variably ruptured, floral terminated by dense tufts of rose-cold, palseaceous 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 monoeceous 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 neutral, and with two densely tomentose bracteoles.”—Beccari, Griffith's Z. macrostachya referred to Wallichiana by Beccari (mss.) is a much stouter form, with oblanccolate 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 filiform, 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.
CLXIII. PALMÆE. (Beccari & Hook. f.) [Zalacca.

Penang, Leuew, 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. Spadix 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. ft. large, oblique. Ovary strigose with erect stout hairs, ovoid. Fruit (accompanying Wray's specimen) globose, 1 in. diam., suddenly contracted into a columnar beak ¾ 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 biliform, margins sparsely setose, costa 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 setae almost throughout their length, mid-costas stout, lateral slender; bristles ½–1½ in. long, black; very young leaflets pale beneath with very long slender pale bristles on the costa. 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 ¾ in. long; sepal and petals subequal, broadly ovate, acute. Fruit (much broken) apparently small; scales pale chestnut, with broad bases and paler recurved spinescent 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 Z. echinometra); rachis flagelliform; 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; sepal and petals oroblong; 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 ochrea of the first section form nidí for ants. The species are very imperfectly known.

* Ochrea inflated.

1. Z. 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. 459b).—Distrib. Borneo.
Stem about \( \frac{3}{8} \) 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.


MALACCA, Griffith. PERAK, King's Collector (6833, 8144).—**Distrib.** Sumatra.

Stem slender, \( \frac{1}{2} \)–\( \frac{3}{4} \) in. diam. Leaves 2\( \frac{1}{2} \) 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 \( \frac{1}{3} \), boat-shaped, closely half embracing the next sheath; petiole roundish, back armed with claws.—**Descr.** from Griffith.

3. **K. Scortechni**, Becc. mss.; ochrea elongate armed with short scattered spines, leaflets linear or cuneately oblanceolate 8–10 times longer than broad.

PERAK, Scortechni.

Leaflets 14–16 by 1\( \frac{3}{4} \)–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.


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 \( \frac{1}{2} \) in. diam.; lateral pedicels plano-convex, bearing a long spathe about the middle, which reaches the base of the spike; bracteae broad, longer than the dense wool.

**Ochrea not inflated.


BURMA, the ANDAMAN and NICOBAR ISLANDS.

Stem slender, \( \frac{1}{2} \) in. diam. Leaves 2–4 ft.; leaflets subopposite, 4–7 in. long, terminal broadest, fugaciously white tomentose beneath; petiole 1\( \frac{1}{2} \)–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, obvoid, 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 seamy.

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.


**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, ferruginosus woolly, shortly petiolulate, 6 by 3 in.; rachis and flagellum armed with claws, young rusty-pubescent; ochrea short, truncate. *Spadices* from the terminal axis, 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. ochrigr. 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 oblongulate 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.


**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 bracteate, 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-seeded, 1-seeded, pericarp as in *Korthalsia*. **Seed** globose, erect; testa fleshy; albumen ruminated; embryo basilar.—Species Malayan.


**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 ½–⅓ 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, ⅔ 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 ¾ in. diam. Leaves 3–4 ft.; leaflets 6–9 by 3–4 in., lower half triangular-lanceolate; 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 muricate and ridged, unarmred, 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 ¾ in. long, narrowly oblong; calyx minute, capular; petals narrow thrice as long, both deeply grooved. **Fruit** ½–⅔ in. diam., brown, scales hardly channelled. **Seed** nearly smooth. Fruiting calyx minute; petals broadly ovate.


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 spathes 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-fld., 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.


KHAZA 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 spathelets, which are ½ in. long, oblong, white with broad green acute or acuminate tips and a broad brown interposed band. Spikelets 1 in., many-fld. Staminens 8–12. Fruit 1–¼ in. diam., globose, abruptly beaked.


SIKKIM HIMALAYA, alt. 4–7000 ft.

Stem 1 in. diam. Leaves 6–8 ft. including the flagellum; leaflets 12–16 by 1–½ in., with 5 slender costa, margins aculeolate, rachis scurfy and flagellum armed with recurved claws; petiole unarmed or margins spiny; sheath tubular, scurfy, spines whorled. Spathe conduplicate, scurfy. Spadices erect; branches 2–3 ft., drooping; spathelets 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.


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., deciduous; rachis and flagellum armed as in other species. Spadix very large, branches many, 2–3 ft. Spathelets 1½ in. broad. Fruits 3–5 in each spathe, “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.


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.; spathe 1½ 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 furrowaceous beneath, tip not thread like, costae slender, branches of fruiting spadix very stout scurfy, spathe 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.


Leaves very large; leaflets 18-24 by 2-2½ in., lateral costae 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 spathes; rachis rusty tomentose. Spikelets 8-10 ft. Male calyx cupular, 3-toothed; petals lanceolate, ½-3 in. long. Fruiting sepals broadly ovate, ½ 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 spathes, brown mealy externally, ovate-lanceolate female sepals ½ in. long and petals narrowly lanceolate ½ in. long; the very young fruit is clothed with recurved lacerate scales.

6. **P. elongata**, Mart. in Roem. & Sch. Syst. vii. 1833; Hist Nat. Palm. 199, t. 114 and 116, f. 1; leaflets sparsely white furrowaceous beneath tip not filiferous, costae 3 very slender, branches of spadix very long, spathe 1½ in. sub-3-lobed acute glabrous, flowers very small, calyx of male minute 3-toothed, petals ¼ in. obliquely oblong-ovate acute, calyx of female 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, Wollich; alt. 2500 ft., Curtis.—Distrik, Sumatra, Java.

Leaves very large; petiole stout; leaflets 1-1½ ft. by 2 in. broad, rather membranous, lateral costae marginal. Branches of spadix 3-4 ft., 2-3 in. across the spreading spathe, which have acutely angled sides.

29. **PLECTOCOMIOPSIS**, Becc. mss.

Characters of *Plectocemia*, but upper leaves reduced to sheaths with long flagella, and no leaflets, spathe 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-ft., fruit sub-turbinate with more than 35 rows of minute scales. Calamus geminiflorus, Griff. ex Mart. Hist. Nat. Palm. iii. 338; Palms Brit. Ind. 70, t. 189 A. Plectocemia geminiflora, H. Wendl. mss.

Malay Peninsula; Malacca, Fernandez; Perak, Scortechini (No. 2839).
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. Spadix many, from the uppermost leaf-sheaths, which bear a simple armed flagellum and no leaflets; lower 4–5 in., with 4–6 pendent spines each 6–8 in. long. Spathe short, tubular, like the secondary spathes of Calamus. Spike flexuous, rusty-pubescent; flowers 2-bracteolate, outer bracteole minute, inner auriculifer. Fruit immature; pericarp spongy; scales brown, with whitish limbate margins.

2. **P. Wrayii**, Becc. mss.; leaves petioled, fruit globose or ovoid shorty 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.


**Bornean, 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. Spathe tubular, smooth, obliquely truncate and acuminate; spathe shorter, but much smaller, distichously imbricated; bracts spreading, glabrous. Fem. fl. and fruit unknown.


Characters as far as known of *Plectocomioiopsis*, 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. 457b).

Leaves unknown. Fem. fl. solitary in the spathee; calyx 3-lobed; corolla rather longer. Fruit globose; scales acuminate, tips not recurved; mesocarp between spongy and corky. Seed globose; albumen horny, equivale.—Differs from the Bornean species (*M. triguerter*, Becc., *Calamus triguerter*, Becc., Malesia, iii. 62) in the obtusely angled trigonous sparsely spinous leaf-sheaths. The specimens are very imperfect.

31. **HUGHISSONIA**, Griff.

Tufted monocarpic spinous palms. Leaves pinnatisect; leaflets lanceolate; rachis armed, not flagelliferous. Spadix terminal, erect, thyrsoform, clothed below with reduced flagelliferous leaf-sheaths; branches erect, clothed with subdistichous obtuse spathe 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, basifixet. 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 obstate beak, 1-celled, 1-seeded, scales minute; endocarp osseous. Seed ovoid, 6–12-grooved; albumen equable; embryo basilar.—Species about 6, Malayan.
Eugeissonia.] OLXIII. PALM. (Beccari & Hook, f.) 481


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 briskly 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 lubricating. Fruit the size of a hen’s egg, beard clothed to the tip with scales.

32. **METROXYLON**, Rotb.

Stout monocarpic palms. Leaves equally pinnatisect, leaflets opposite. *Spadix* very large, panicled, 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* ft. calyx 3-fid, funnel-shaped, nerved; corolla segments oblong, valvate; stamens 6, authors dorsifixed; pistillode 3-partite. *Fem. ft.* like the males, perianth hardly accrescent; staminodes a membranous cup; ovary oblong, retroflexly scaly, imperfectly 3-celled; style conic, 3-toothed, ovules 3, basilar. Fruit ellipsoid or subglobose, 1-celled, 1-seeded, pericarp tessellated with reversed scales; endocarp spongy. Seed erect, subglobose, rough; albumen ruminate; embryonic ventral. Species 6? Malayan and Pacific.


**MALACCA** (wild or cult.) **Jack**, &c.—**DISTRIBUTION** Malacca 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. **Inf.** 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.


**MALACCA** (wild or cult.)—**DISTRIBUTION** Malacca 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 dioecious palm; trunk stout, unarmed. *Leaves* terminal, vol. VI.
fan-shaped, plicately multifid; petiole spinous, ligule short. *Spadices* very large, simply branched; peduncle sheathed with open spathes, males with stout cylindrical 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, second 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, obvolute-spatulate, 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.


Cultivated throughout the plains of India, Burma and Ceylon.—Distrib. Malay.; Afr. trop.


34. COCOS, Linn.

Unarmed, monoeious 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.
Cultivated in the hot damp regions of India, Burms, and Ceylon, especially near the sea (indigenous in the Cocos Isld. and N. Andaman, Kurz).—Distain.

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. Drupes 4–10 in. long, trigonously obvoid or sub-globose, 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 *Linnaea* 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 *Corypheae.* It may be recognized by its almost stemless habit, and enormous erect elongate-rhombic plaited leaves.

**ORDER CLXIV. PANDANACEAE.**

Small dioecious 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 spathe; flowers small, crowded on a catkin-like spadix or its branches, bracts and bracteoles. Perianth 0. Male fl. staminodes many, filaments free or connate; anthers erect, basifixed; pistil 0 or small. Fem. fl. staminodes 0 or small; ovary 1-celled, free or connate with those of contiguous flowers; stigmas sessile, papillode; 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 Mascarenian 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 spinose style.

1. **P. feœtidus,** Roxb. *Fl. Ind.* iii. 742; shrubby, leaves 4–6 ft. by 3–4 in., strongly spinous-toothed, anthers very long slender, fruit sub-solitary oblong or sub-globose, crown of drupes smooth or nearly so. *Kunth*

Assam and the Khasia Hills, and Eastwards to Burma. The Concan?

A densely branched shrub. Leaves with large strongly incurved usually distant marginal spines. Spathe pale yellow. Anther ½ in. long. Fruit very variable in size, from a hen's egg to a man's fist, red when ripe.


Malacoa, Griffith.—Distrib. Malay Islds.

Apparently closely allied to fastidus, and like it with fadid yellow spathes, differing in the spicate dark coloured or even blackish fruits and mucrate crowns of the drupes. I have seen no specimens. I do not cite Rumph. Herb. Amh. 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.

Males. fl. of many anthers umbellate on the connate filaments. Drupes with a low crown and subulate or flattened simple or forked stigma.

++ Male fl. of many anthers umbellate on the connate filaments. Drupes with a low crown and subulate or flattened simple or forked stigma.


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 ½–1 in. long, flattened, lower curved. Spathe 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. Drups rather fleshy, 5–6-angled; style shining. In specimens from Churna 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 Linnaea, xiii. (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. fatidus*, but the anthers are very different, about 15 in. long.


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., distichid, 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.**


Throughout the hotter moister parts of India, and much planted for fences.—Distr. 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, 1-2 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 xiii. t. 95 A appears to differ in the very small fruit and obtuse anthers. Possibly some of the plates of Rheede's "Perio Khaida Taddi," and especially t. 8, may belong to a different species, its carpels are all free; it is the *P. unipapillatus* of Denst. Schluss. *Hort. Mal.* 23.


** Andaman Islds., Kurz.**

Habit of a gigantic *P. furcatus*; fruit as large as the human head or smaller,
orange yellow. Drupes 2 ½-3 in. long, usually in groups of 3-5 in. one series but often more, epicarp fleshy.—Descr. from Kurz.

**Imperfectly known and undescribed species.**


3. **P. Humilis**, Thouettes Enum. 327 (excl. syn.); leaves 7 ft. by 1-1½ in., very coriaceous, with stout marginal spines, filaments very short, anthers very slender ½-1 in. long, fruit globose spicate and drupes like those of *P. furcatus*—Ceylon, Thouettes; OP. 3740 (used for fencing).

4. **P. Houlzeltii**, Carriere in Rev. Hortic. 1868, 210, f. 23; leaves 6 ft. 6 in. by 3-3½ in. abruptly caudate-acuminata reddish green above coppery red beneath, marginal spines distant incurved, mature spadix 16 in. long, spikes 2½-4½ in., spathes coppery rose-ocred, stamens in compact bundles.—Singapore.


—I do not find this name in Loureiros Fl. Cochinch. or elsewhere.


7. **P. Laniaris**, Ramph.; 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. adratissimus*, but margins and midrib of the white spathes quite unarmed, stamens racemously coenata, anthers mucronate, fruit unknown. ? Wall. Cat. 8598 B.—Burma, cultivated, Kurz; ? Tavoy, Wallach.—Descr. from Kurz.


9. **P. Linnezii**, Gaud. Voy. Bonite Bot. t. 22, f. 1-8; Solms l. c. 67.—India.—Of this Solms remarks, cf. *P. fascicularis*. 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-acuminata acutely serrate, fruit solitary terminal long peduncled cylindric glaucous surrounded by very short scale-like spathes, drupes unripe small oblong densely crowded but not confluent in groups, crown polygonal glaucous narrowed into a spathulate slender incurved style with a linear stigma. Solms l. c. 11. *Bisqueia 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 1½ in. 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 ½ in., gradually narrowed into fine points, and small globosely obtuse terminal
fruits 2 in. by 1\frac{1}{2} in. diam.; drupes with conical crowns passing into an upcurved subulate style. Fisquetia ovata, Gaud. Bot. Bonite Voy. t. 4, f. 1.—Malacca, Gaudichaud; Kedah Peak, Lt.-Col. Lowe.

12. P. polycephaalus, 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. fatidus, carpels not in groups, but drupes with rather longer spinescent crowns.—Burma, at Amherst, Walki.—Lamarck's description of P. polycephaalus, founded, may apply to this.


14. P. Yvani, Solms in Linnæa, xlii. (1878) 20; leaves linear-lanceolate candeate-acuminate more than 12 in. long serrulate, teeth pale, spathe concaue elongate ovate, fem. fl. minute densely crowded narrowed into a simple upcurved shining spine.—Malacca, Yvani (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 1\frac{1}{2}–1\frac{3}{4} in. flat ensiform rather abruptly candeate acuminate finely spinulose-serrate with erect spines 1-nerved, fruit terminal solitary young globose \frac{3}{4} in. diam. drupes not aggregate crown conical narrowed into a stout incurved spine.—Malacca, Griffith, Kew Distrib. 6873.—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.


TAYOY, Gomes; PENANG, SINGAPORE and MALACCA, Wallich, &c.—DISTRIB. Malay Ialda.

Dicocious. Stems climbing, as thick as a goose quill. Leaves grass like, costa very slender, nerves close set. Spadices 3–5, racemose on a short peduncle, males \frac{1}{2}–1 in. by \frac{1}{2}–\frac{3}{4} in. diam., very dense-fld., fem. \frac{3}{4}–\frac{3}{4} in. diam. staminodes minute; stigmas 3–4; spathe ovate-lanceolate, finely acuminate.


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 \frac{3}{4}–\frac{3}{4} in. long, and their greater size; males \frac{3}{4}–\frac{3}{4} by \frac{1}{2} in. diam., fem. \frac{3}{4}–\frac{3}{4} by \frac{3}{4}–\frac{3}{4} 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 \frac{3}{4}–\frac{3}{4} in., spadices few in sessile umbels, fem. very stoutly pedicelled oblong, anthers subsessile.

CEYLON, Walker, Thwaites, CP. 2333. PANDANAM 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 ½ in. diam.; pedicel as long.


MALACCA, Malangay (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 ½–1 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. Jav. 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, radicula 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.

Marshes from N.W. *India* to Assam and southwards.—*Distri*br. 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 \(\frac{1}{5}\) in. diam.; flowers mixed with clavate pistillodes; bracteoles with fasciate tips much longer than the hairs, which are shorter than the stigmas.


*Ceylon*, *Thyasites*, &c.—*Distri*br. *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 \(\frac{1}{5}\)-\(\frac{1}{3}\) in. diam. *Anthers* \(\frac{1}{5}\) in.


*Northern India*, from *Kashmir* to *Munnipore* and southwards to *Scinde* and *Coromandel*.—*Distri*br. *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.


*Kashmir*, alt. 9000 ft., *Thomson, Giles*.—*Distri*br. *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 *Körner*, has bracteoles.

2. *SPARGANUM*, 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.


**NORTH WEST INDIA**; from the plains to 5200 ft. in Kashmir. *Burm*., *Griffith.* —Distr. N. temp. regions.

- Stems 1–4 ft. Leaves 2–5 ft., 1 in. broad or less; margins concave. Male heads olive-brown, \( \frac{1}{2} \) in. diam., deciduous; fem. 1 in. diam. in frt.; scales linear, tips spatulate. Drupe \( \frac{3}{4} \) in. long, angled; stigma linear.


**Order CLXVI. Aroidae.**

Perennial herbs with radical leaves, or scanty 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, variably 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 monocious (rarely dioecious in Arisema).**

**Perianth** 0.

- Tribe 1. **Arieeae.** Spadix with a flowerless top (appendage) or 0 in *Pistia* and *Cryptocoryne*. Stamens free; anther-cells larger than their connective. Fem. ft. 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. **Arisema**.
    - Leaves pedatipartite, appearing after the flowering;
      - ovules basal .................................. 5. **Sauromatum**.
OLXVI. AROIDEAE, (J. D. Hooker.)

Leaves undivided; ovules parietal 6. Arum.
Leaves various and flowers coetaneous; ovules basal 7. Typhonium.
Leaves pedatifid; ovules basal and apical 8. Theriophonum.

Tribe II. Pythoniæ. 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-serial, 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. Flissmonium.

Tribe III. Colocasiiæ. 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. Aziophis.
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. Philodendree. Spadix without an appendix, 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. Aglonema.
Spathe wholly persistent; ovary 2-4-celled 21. Homaloloma.
Limb of spathe deciduous; ovary 1-celled 22. Schismatoglottis.

Series B. Flowers hermaprodite, a few rarely unisexual. Perianth 0.


Spadix stipitate; ovule 1 basal; berries free 23. Anadenhron.
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. OBONTIEE. Spadix without an appendage.

* Spadix flowering downward; ovary 1-celled.

Prickly rigid herbs; spathe many times longer than the sessile spadix

Prickly rigid herb; spadix stipitate

Prickly rigid herbs; spathes twice as long as the spadix

Unarmed herbs; leaves membranous, pinnate

** Spadix flowering upwards; ovary 1–3-celled.

Stem scendent; leaves distichous

Stemless; leaves ensiform; spathe 0

1. CRYPTOLOGYNE, 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 vermiciform; 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. Griffissii).

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; Wright 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. Asiatic. t. 170, 171 (alata). C. drymorhiza, Zipp. in Miq. Ann. Mus. Bot. i. 122. Ambrosia ciliata, Roxb. Cor. Pl. iii. 90, t. 294; Fl. Ind. iii. 491.

Bengal, in ponds, &c. (in salt marshes, Kurs). MALACOA, Griffith.—DISTRIBUT. Malay Islds.


CEYLON, Walker.

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 Aroideae 265 & l. c. ined. No. 16. Ambrosinia retrospiralis, Roxb. Fl. Ind. iii. 492.

**BENGAL, BURMA, CENTRAL INDIA and the DECCAN.**

Leaves 3–12 by 1½–4 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; Prod. 16; leaves oblong-lanceolate finely acuminate, petiole long, limb of spathe ovate long-caudate glabrous not twisted. Engler Aroideae 266.

**The DECCAN PENINSULA, Perrottet, &c.**

Leaves 4–6 by 1½–1 in., midrib stout. *Spathe* about equalling the petiole, its tail about three times longer than the blade.

5. *C. cordata*, Griff. Notul. iii. 138; l. c. 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 Aroideae 266 & l. c. ined. No. 6; in Boccari 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.


**MALACCA, Griffith.**

Leaves coriaceous, obtuse, base very various, rarely rounded sometimes 2-arilicled, green above purple beneath, nerves obscure; petiole 6–8 in. *Spathe* 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.**


**MYSORE, Wight.**

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.

**Prehak, Scortechini** (586, 586b).

Leaves 1–2½ in. by ¼–1 in., subacutens, purplish beneath, 5–7-nerved, margin sub-crenate; petiole 1–3 in. Spathe 2½–3 in. with the peduncle lengthening after flowering, limb narrowly lanceolate dark-purple. **Appendage of spadix sessile, ovid. 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 Linnaea**, 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; Schnitz. **Iconogr.** 1, t. 72; Engl. Arocid. 628. Ambrosinia spiralis, Rozx. **Fl. Ind.** iii. 492. Arum spirale, Retz Obs. i. 30; Bot. Mag. t. 2220; Loddi. Bot. Cat. t. 525.

**Bengal, the Deccan Peninsula, &c.**

Leaves 3–8 by ½–½ 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 elliptico-oblong leaf-blade, spathe shortly peduncled, tube very short cylindric, limb linear-lanceolate long-accuminate, ovaries 4–2-ovuled. **Engl. Arocid.** 628.

**East Indies, Huegel in Herb. Vienna.**

1 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. Arocid.** 629.

The **Concan**, Law, &c.

Leaves 6–10 by 1–½ 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.


**Northern Ceylan and the Concan.**

Leaves 8–12 by ½–3 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; Lc. 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, 1¼ in. long, limb obovate, 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 base cordate, spathe long-peduncled, limb broadly lanceolate not twisted three times as long as the obovate ovoid tube narrowed into a long tail. Engler Arac. 630.

—Aroid. Wall. Cat. 9958.

Sillet, Gomez.

Leaves 2-3 by 1-1½ in., base often unequal-sided, tip obtuse acute or rounded. Tube of spathe ¾—½ in., limb 1½—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 Larnt, 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 1¼ in. obtuse fleshy, brown beneath; petiole 2—3 in., sheath short. *Spathe* with the peduncle hardly lengthening in fruit; tube white, 1¼ 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 limb oval; petiole thicker, lateral nerves 4 on each side ascending, fruit ovoid 5-gynous, seeds biseriate 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.


The South Concana, 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.
dism. ; carpels in many cycles, free, about \( \frac{1}{2} \) 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 \( \frac{1}{2}-\frac{3}{4} \) in., base acute or rounded; petiole 2–6 in., rather slender, sheath short. *Spathe* \( 1\frac{1}{2}-2 \) 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 \( \frac{1}{2}-1\frac{1}{2} \) 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. Koenigii**, 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 Le. ined. No. 15. Cryptocoryne Koenigii, Schott in Bonpland. 1858, 81; Prodr. 16.

**Ceylon** ; in the Singhe-rajah forest, Thwaites.

*Leaves* 1–2 ft. by \( \frac{1}{4}-\frac{3}{4} \) in., dotted with white beneath; costa stout below evanescent above; petiole reduced to a short sheath. *Spathe* 3–3\( \frac{1}{2} \) 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 candate.

**Ceylon** ; Pasdun Korle, Trimen.

*Leaves* 12 by 3–4 in., closely dotted beneath. *Spathe* stoutly peduncled, tube \( 1\frac{1}{2}-2 \) in.; limb 4–6 in. broad, drooping, crisped and undulate, membranous, purple with white veins (like an *Arisema*).

3. **PISTIA**, Linn.

A floating, gregarious, stemless, stoloniferous herb. *Leaves* sessile, obovate-ovate, 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 sub.laternal. *Fruit* membranous, few-seeded. *Seeds* oblong or obovoid, albuminous, testa at length rugose; embryo minute, apical, cuneiform.
4. ARISÉMA, 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 ft. many, stipitate (sessile and connate in a continuous stratum in A. flavum), anthers 2–5 oblong or subglobose. Fem. ft. 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 dioecious 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 dioecious.

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 J. t. 784.

PENANG, Roxburgh; on Govt. Hill, alt. 2000 ft., Curtis. PERAK, Scortechini, Kunster.—Distrib. Java (Jc. Horfield.)

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.

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 crenate (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. Arisema, 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 ¼-1 in. Peduncle about as long as the petiole. Spathe 3-4 in., tip filiform, margins 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 candeate, tube of spathe equalling the lanceolate acuminate limb contracted at the base, appendage slender cylindrical 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 2½-3½ 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 candeate-acuminate limb, appendage long-stipitate stout cylindrical 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., ½ in. diam., stipes ½ in.


Strats of Malacca, Larut Hills., 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 1½ 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 dioecious.


**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.


**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. *Tuber of spathe* 3–5 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*.


**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

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reticulated. Appendage as in A. Griffithii, of which Clarke (Journ. Linn. Soc. xxi. 386) considers it a trilling 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 pedicules and paler greener spathes. All my specimens are 1-leaved, but two are represented in the reduced figure of the Bot. Mag. drawing.

b. Limb of spathe lanceolate acuminate, or caudate.—Dioecious, except A. Frazeri.

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 cylindrical or fusiform at the often inflated base, narrowed into a very long filiform tail, base not truncate or disciform. Blume Rumph. 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 Kumson, to Sikkim, alt. 7,000 ft., and Bhotan 9–10,000 ft., Griffith.

Rosetstock 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; petiole 1–2 in. Peduncle much shorter than the petiole. Spadix 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 Oestr. Bot. Zeitsehr. (1875), 357; Syst. Aroid. 30, simply a gigantic specimen with the spathe 8 in. long; and A. mirabile, Schott l. e. 386 and 81, with an abnormally inflated base of the appendage. Wallich's Arisema, 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 Aroc. 540. A. Stracheyanum, Schott in Oestr. Bot. Zeitsehr. (1857), 533; Prodr. 27; Engl. l. c. and Tr. ind. No. 11. A. dolosum, Schott in Bonpland. (1839) 26; Prodr. 28.

Temperate Western Himalaya., alt. 7–9,000 ft., from Simla to Kumson. 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, limo 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 2-8 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.


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, irrigate with pink purple and green. Peduncle about equalling the petiole. Spathe very like Wallichium 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 caduate-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 Aroc. 541.


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 ¾ in. broad. Mate fl. very small, sub sessile. Ovaries minute, contracted into a short style with disciform stigma.—A few male fl. occur on the stipe 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 incurred 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 1–1 ½ in. **Peduncle** much shorter than the petiole. **Spatha** 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 exerted bearing many neuters.


_Langkawi_ Isles., north of Penang (Hort. Sander), *Curtis*.

**Rootstock** tuberous. **Petiole** 6–10 in.; leaflets 5–7 in., nerves deeply sunken. **Peduncle** as long as the petiole. **Spatha** 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 Isl. locality recorded in *Gard. Chron.* is probably an error.

_B. Pedatisecta._ Leaves pedatisect. (Sp. 18–22.)

* Appendage of spadix elongate, far exerted.


_Temperate and Subtropical Himalaya_, alt. 8000 ft., from Simla to Bhotan. The Khasia Hills, Munnpore, 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. **Spatha** 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 monocious or dioecious flowers. In **A. Stendelii** 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 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 petiole 1-27 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 exerted.

20. A. decipiens, Schott in Öestr. Bot. Zeitsehr. (1857) 373; Prodr. 34; dioecious, leaves 2, leaflets 5-7 elliptic-lanceolate cundate-acuminate, lateral sessile on a common petiole, median long-petiolulate, tube of spathe as long as the lanceolate spadix incurred limb, as tall 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.; petiole of median 1-1½ in.; lateral divericate. 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, cylindrical, erect, rather thickened towards the base; male fl. subsessile.—The Javan habitat is an error.


Temperate Himalaya and Western Tibet, alt. 5-9000 ft., from Kashmir to Kumaon. Chumsi; N.E. of Sikkim, King's Collector.—Distrib. Afghanistan, 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 sub sessile 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.; dioecious, leaf solitary, leaflets 3-5 lanceolate acuminate, lateral sub sessile, median petiolulate, tube of spathe cylindrical, limb ovate or ovate-lanceolate erect, tip shortly filiform, 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 Boupland. (1859) 26; Prodr. 36; monœcious, leaflets 4–7 sessile elliptic or ob lanceolate cuspisately acuminate, tube of spathe cylindrical 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 Nilgiri hills, alt. 6000 ft. Ceylon; in the south part of the island, Theatres, Hugel.

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.

† Dioecious (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 ob lanceolate acuminate, tube of spathe elongate, limb elliptic-ovate base dilated into two broad rounded recurved auricles, appendage erect subcylindrical 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., cylindrical, 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 stipitately, much shorter than the spathe, contracted in the middle. Varieties obvoid, 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 ob lanceolate acuminate serrulate, tube of spathe cylindrical as long as the suberect cymbiform long cunate-acuminate limb, appendage stout cylindrical 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, Dals. & Gbs. Bomb. Fl. 268. A. Hnegeli, 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
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broaded with red and brown; leaflets 4–6 by 1½–2½ in. Spathe 3–9 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 stigitate; neuter fl. few short.

26. A. consanguineum, Schott in Bonpland. (1859), 27; Prodr. Aroid. 52; leaflets about 15 (10–20) narrowly linear-lanceolate with long capillary tips, spathe green, limb about equaling the tube broadly ovate or ovate-lanceolate incurved with a long filiform tip margin recurved at the base, appendage stout cylindric obtuse.—Arisaema, 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., ½–2 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. 60; leaflets 7–11 subsessile narrowly lanceolate or oblanceolate acuminate, tube of spathe elongate cylindric, limb broadly ovate narrowed into a very longrecurved 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 l. c. 28, 27; 45–51.—Arisaema, 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 monoeious; 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 oblancoelate cuspidate, tube of spathe elongate cylindric below infundibular and gaping above, limb broadly ovate suddenly narrowed into a recurved 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, subglaceous 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.

** Dicneous. Neuters 0.

29. A. Jacquemontii, Blume Bumph. 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 stigmate narrowed from the conical or truncate base to the slender forward curving tip. Decne. in Jacquem. Voy. Bot. 168, t. 188; Kunth Enum. iii.
16; Schott Syn. Aroid. 31; Syst. 43; Engl. Arac. 555. A. cornutum, Schott in Bonpland. (1859), 27; Prodr. 48; Engler i. 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 2-8 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 incurred 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.—Arisaema, 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.—Arisaema, 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 incurred rather broader limb. Appendage hardly exerted 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. Asiatic. 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 exerted; appendage stipitate, contracted in the middle, white streaked with purple, base rather swollen rounded, tip green.
33. *A. filicudatum*, N. E. Br. *in Journ. Linn. Soc.* xvi. 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 Kole, alt. 3000 ft., Thwaites.

Leaves solitary; petiole 1 ft.; leaflets petioluate, 6 by 2-2½ in., very thin. _Peduncle_ about equaling 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. _Griffin._

_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 candate acuminate limb margin below recurved, appendage stipitate slender, narrowed from a conical base to the tip. _A. Jacquemontii_ (in part), _Engler_ _Arac._ 555.

_Nilgiri_ _Hills_, Wight, King.

_Tuber_ spherical. _Petiole_ 8-12 in.; leaflets 4-5 by 1½-2 in., sessile or shortly petiolulate. _Spathe_ 4-5 in., apparently striped white and purple, limb rather broader than the tube, gradually narrowed into a tail ½ 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.

***Monocious 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) incurred lower margins dilated round the mouth of the tube, appendage curved narrowed from the base to the tip included or exserted. _Dals._ _&_ _Gibs._ _Bomb._ _Fl._ 258; _Schott_ _Syn._ 31; _Prodr._ 44; _Engler_ _Arac._ 552; _Fl._ des _Serres_, t. 1322. _Arum Murrayi_, Grah. _Cat._ _Bomb._ _Fl._ 229.
The **Concan**; in the Ghats, **Gibson, &c**.

**Tuber large.** Leaf solitary, maturing after the flowering; petiole 10–14 in., and subequal to the cuneately ovate lanceolate rather abruptly narrowed into a very long subulate tail, margins below recurved, appendage rather short not thickened below included.

The **Concan**, **Stocks (In. 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. **Peduncles** 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 cylindrical short, margins connate below; limbs very long, reflexed, narrow, open. **Spadix** sessile, very long; male and female inflorescence widely distant, short, dense fl., with a few large clavate scattered neuters close above the female; appendage slender, as long as the spathe. **Anthers** sub sessile, 4-celled. **Ovaries** oblong, 1-celled; stigma sessile; ovules 1–2, basal, erect. **Berries** obpyramidal, 1-seeded.—Species tropical Asiatic and African.


The **Panjab**, **Upper Gangetic Plain**, and the **Himalaya**, from Nepal to Simla, ascending to 5000 ft.? The **Concan**, **Herb. Stocks**.

**Tuber larger.** Petiole stout, 12–15 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* an long as the spathe or nearly so; fem. infl. ½ in.; neuter ½ in. long, spreading; male infl. 3 in. above the fem., ½ in. long; anthers densely packed; appendage 2–8 in., cylindric and obsolete, 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.


N. W. India, Jacquemont. Kashmir; Gilgit, alt. 6–7000 ft., Giles.—Distrib. Afghan.


7. **TYPHONIUM**, Schott.

Tuberous herbs. Leaves entire, 2–5-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; embryonic axile.—Species about 13, tropics of the Old World.

*Limb of spathe broadly ovate, open, narrowed into a long point.*


LOWER BENGAL, BURMA, the EASTERN and WESTERN PENINSULA and CRYLON.—Distrib. Siam, Malay Islds.
Typhonium.

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.


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; t. Arac. ined. No. 130.

MALACCA, Herb. Wight; Malacca. 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 Fl. t. 790; Blume Rumph. i. 130, t. 95; Kunth Enum. iii. 26; Schott Aroid. i. 12, t. 18; Gen. Aroid. t. 17; Syn. 17; Prodr. 106; Engler Arac. 611 (excl. vars.) t. ined. No. 128; So-Mokou Zoussets, Ed. 2, xix. t. 4. Arum divaricatum, Linn. Sp. Pl. Ed. 2, 1369; Rozb. Fl. Ind. iii. 503; Wall. Cat. 8930; Grab. Cat. Bomb. Pl. 228. A. trilobatum, Bot. Mag. t. 359 and 2324.—Rheeede Hort. Mal. xi. t. 20.


** 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 ovateae base obtuse. Schott Jc. 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 (Bistr. Bot. Zeit. (1857) 261; Gen. Aroid. t. 18; Prodr. 110. H. Huegeliana, Schott l. c. ; N. E. Br. in Gard. Chron. (1879) ii. 76.—Arisema? Wall. Cat. 8929 in part.
Typhonium. [ CLXVI. AROIDAE. (J. D. Hooker.)

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 Buitan.

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.


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 ½-3 in. Spathe with a tumid ellipsoid tube ½ 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 equaling the spathe filiform base rounded or cuneate. Schott Prodr. 106; Engler Arac. 611; Journ. ined. n. 129; Dalz. & Gils. Bomb. Fl. 258.

SOUTHERN CONCAN, Stocks, &c.

Tuber ½-1½ 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).


PEGU, McLelland.

Leaves about 4 in. broad; segments 7, linear-lanceolate, acuminate, about 4 by ⅓ in., outer smaller, Peduncle 1½ in. Spathe 2½ 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. falcatum, N. E. Br., a native of Java.

9. T. cuspidatum, Blume Cat. Hort. Buit. 101; Rumph. i. 133, t. 10, f. 1-3; leaves sagittate-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 equaling the spathe base conical. Deane Descr. Herb. Timor. 39; Kunth Enum. iii. 29; Schott Jc. 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.
CLXVI. ARIOIDEÆ. (J. D. Hooker.) [Typhonium.


LOWER BENGAL, the MALAYAN PENINSULA and BURMA.—Distrib. Malay Isds.

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. Pediole 6-13 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. Pl. Ind. iii. 505; Wight Ic. t. 793; Grab. Cat. Bomb. Pl. 228. * Arisema gracile, Kunth Enum. iii. 21.—Rheedee Hort. Mal. xi. t. 21.

SILHET, Roxburgh; KHASIA HILLS, Griffith (Kew Distrib. 6000).—The PANJAR; Jhelum river, Aitchison.

Tuber globose. Leaves 4-6 in. broad across the segments, which are sessile or petiolate, 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 4-½ in. MQ. Pl. Ind. Bot. iii. 196; Schott in Oestr. 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. Kleini, Schott in Oestr. Bot. Zeit. 1858; t. 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; Grab. Cat. Bomb. Pl. 228.

The DECCAN, CONCAN and CARNATIC, Hayne, &c.

Tuber small. Leaves 3-4 in. long and often as broad, orbicular baseate 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 cylindrical, dark-purple.


The CARNATIC, Wight.

Very near T. crenatum. Leaves sometimes 3-lobed.—Specimens indifferent.

CEYLON; common in the hotter parts of the island, Thuawtes. 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.**


The Southern CONCAN and Northern CAMARA, 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.


MALABAR (Rheedes); 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.


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 fol., 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.


**Plains of India, from the Panjat to Bengal, the Deccan, and Ceylon.**

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Tuber a depressed bulbiliferous sphere 8–10 in. diam. Leaves 1–2, 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 subulate; 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 Rumphi, 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 Rumphi, 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.—DISTETER, 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. subseisile 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; Prod. 130; Bot. Mag. t. 5187; Engler Arac. 310. Dracconium polyphyllum, Denst. Clav. Hort. Mal. 38 (not of Linn.).—Hort. Mal. xi. t. 18.

Malabar (Rheede), Ceylon, Thowees. Leaves as in A. campanulatus; petiole green with pale blotches. Peduncle very short; sheaths equalizing 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-fd.—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 Jc. ind. No. 156. Arum bulbiferum, Roxb. Fl. Ind. iii. 510; Bot. Mag. t. 2072, 2508; Grab. Cat. Bomb. Pl. 229; Wall. Cat. 8935, 8936 (spathe). A. occultatum and taccoides, Herb. Ham. Pyitonium 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, forked, 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. ½–1¼ 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-ovate, 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.

PEEU, 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,
stricate; wrapped at the base by short sheaths. *Spathe* (perhaps immature) 3 in., dark green, blue at the sides with red margins. *Spadix* 8 in.; infl. cylindrical, 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 stam., appendage rather longer but not broader than the infl. stam. elongate concoidal tip rounded.

*Pcura*, the ISRAWAdy and Strang 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 $\frac{1}{4}$–$\frac{1}{2}$ 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* 2$\frac{1}{2}$–3 in., infl. cylindrical, 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.

*Peraik*; 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 1$\frac{1}{4}$ in., oblanceolate, acuminate. *Peduncle* 1–2$\frac{1}{4}$ in., sheaths longer, linear. *Spathe* 5 in.; tube 1$\frac{1}{4}$ in., pale red-brown spotted with purplish-brown. *Spadix* 3$\frac{1}{4}$ in. *Anthers* minute, very short. *Ovaries* small, globose, style very short, stigma capitata.

†† *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 concoid.

*Andaman Isls.*; on Cocos Islands, Prain.

*Tuber* depressed, 5–9 in., diam., bulbilliferous. Leaf 3$\frac{1}{2}$ 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-lobe.—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 subcylindric base truncate, limb short orbicular-ovate margins waved, spadix very stout, exserted appendage very large conoid smooth much longer and broader than the infl.


*Tuber* 6–10 in. diam., not bulbilliferous. *Leaves* 4 ft. broad, leaflets 4–8, lanceolate, ciliate-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. sub-turbinate, fem. about as long, appendage 6–8 in. by 2–3 diam. cream-colord. smooth. *Anthers* linear. *Stigma* 2-lobe.—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 ½ in. long. Spadix 3-6 in., male infl. 1-2 in., fem. ½-2 in.; appendage ½ in., anthers short, prismatic. Ovaries depressed-globose, with a short stout style, stigma large, quite entire.—Tuber and leaf wanting.

13. *A. haematospadix*, 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 ½ in. diam. at the thickest part. Anthers very short. Ovary globose, narrowed into a short rather slender style, stigma small, capitata.

14. *A. clatus*, 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 ½ in. diam. in the thickest part, dark and light blue; male infl. 3 in.; fem. 1½ in. Anthers small, very short. Ovaries globose; style very short, stout, stigma capitata.—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 *Denst. Clav. Hort. Mol.* and *Rheed Hort. Mol.* should be struck out.

*A. lyratus*, Engler Arac. 319 (Arum lyratum, Romb. Fl. Ind. iii. 508, Conophallus lyratus, Schott Syn. 35; Prodr. 180) is according to Roxburgh’s drawing *Taccia pinnatifida*, with the detached berry of an *Arisema*?

*A. tuberculiger*, Engler Arac. 317; tuber small, leaf 3-sect., branches 1-2 in. pinnatifidly or pinnatifidly 3-5-foliolate, segments 3-4 by 1-½ in. sessile elliptic-lanceolate caudate-acuminate; petiole 10-12 in. bearing a pisiform bulbl 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 *Amorphophallus*, but male and fem. infl. distant, with oblong depressed interposed neuters.
RHAPHIOPHALLUS, Schott Gen. Aroid t. 27; Syn. 125; Engler Aroc. 321, would appear from the characters given not to be separable from Synantherias. It was founded on a Canara plant collected by Hoehnacker, 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.


The DECCAN PENINSULA, from the northern Circars to the Cocong, 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; inflexed; male narrow; neuter sub 2-seriate, quite flat, petioately adnate, yellow-brown. Male ft. of scattered or fascicled minute sessile oblongulate 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.


TROPICAL HIMALAYA; Nepal, Wallich; Sikkin, alt. 2-6000 ft., J. D. H. ASSAM, Hamilton. KHASIA HILLS, alt. 1-5000 ft.

Tuber 4-5 in. diam., not bulbiliferous. Leaf 12-18 in. diam. or more; leaflets 3-5 in., ovate or oblong-lanceolate, cuneate-acuminate; petiole 18 in. and very stout. Peduncle light green blotched with much darker, sheaths pink. Spathe 18-23 by 3-6 in., oblong-cymbiform, shortly narrowly convolute at the base, erect, green. Spadix 3-10 in., exserted, very stout; male infl. 2-5 in., fem. 2-4 in.; appendage 3-4 in. and as long or shorter than the male infl., cylindric, green changing to yellow, top rounded. Anthers 3-5, subaperturate, compressed, 2-celled, pollen verrucose. Ovaries globose, 2-celled; style stout; larger than the cells, uncurved, stigma discoid; obscurely lobed; ovule 1, basilar, erect, anatropous. Fruit?

T. Hookeri, Engler Aroc. 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 Arisema) is altogether doubtful. There is a drawing in Herb. Kew of a curious state of T. nepalensis, with a fun-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 margaritferus, Kunth Enum. iii. 34. Arum margaritifer, Roeb. Fl. Ind. iii. 512; Wight in. t. 795. Caladium discuetum, Herb. Ham.—Wall. Cat. 8937 A.

HINDOSTAN: Rossburgh. Bengal, at Dacca, Clarke.

Tuber 6 in. diam., or less, bulbiliferous 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 spathes; male inf. 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. t. c.) founded on a very imperfect spathe and spadix from Pegu (McLelland) is distinguished by its author 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.


Western subtropical Himalaya, from Nepal to Sikkim, alt. 4-6000 ft. Burma; in the Karen Hills, Kurr. Western Ghats; from the Concan to Travancore, Hayne, &c.

Tubers small, clustered. Leaves 1-6 in. diam., ovicular 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. STEUDBNERA, 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-fid.; male infl. clavate or capitulate;
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.


**INDIA, Hort. Bull.**

Stem short, stout, clothed with brown sheaths. Leaves dark green above, paler with dark blotches beneath. Spadix ½ in., pale; staminodes 4–5, clavate.


**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 ½ in.; male infl. cylindric.—Wallich's specimen is without locality.


**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 ½ in.; male infl. cylindric.—Wallich's specimen is without locality.


**UPPER BURMA**, Griffith, at Nauntuseek (Kew Distrib. 5970).

Caudex prostrate, elongate, clothed with fibres, as thick as a swan's quill. Leaves deep green above, glaucous-white beneath. Spadix ½ in., male infl. cylindric.


**SIKKIM HIMALAYA, King (Ic. in Herb. Calcutt).** SITIET, 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, Kurs (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_ equaling 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 _Estr. Bot. Wochenbl._ (1857), 85; _Prodr._ 162; leaves oblong-sagittate basal lobes narrow obtuse more than half as long as the anticus, spathe acuminate; _Engler_ _Aroci._ 489; _Kurs_ in _Journ. As. Soc. Beng._ xlii. ii. (1873), 109, t. 9. **Hapale**, Schott _Gen. Aroci._ t. 44.—_Aroci._ _Wall._ Cat. 8953 A.

**BURMA**; banks of the Attral river, Wallich. _Pegu_ and Martaban, in dry forests, _Kurs._

_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 ½ the length of the anticus, spathe oblong apiculate.

**MALAY PENINSULA**; Qeadah, 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.)


Tuberous _herbs_, flowering and leafing in alternate years? bearing long radical bulbiliferous 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 neuter; 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. Aroci._ t. 36; _Prodr._ t. 137; in _Ann. Gand._ (1846), t. 66; bulbiliferous shoots very stout suberect or ascending simple or very shortly branched, limb of spathe

Subtropical Himalaya; alt. 2-3000 ft. from Kumaon to Sikkim. The Khasia Hills and Burma. Behà, on Parasmat, 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 crisate. 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.


Temperate Himalaya; Simla to Sikkim, alt. 4-7000 ft.

Tuber as in R. vivipara. Leaves ovate-oblong, cordate, caudate-acuminate beneath 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 bulbiliferous 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.


Temperate Himalaya; from Kumaon to Sikkim, alt. 4-6500 ft. Khasia Hills, alt. 4-6000 ft.

Tuber small and slender branched shoots with the small crisate bulbils of Remusatia Hookeriiana. Leaves peltate, acuminate, dark green above; petiole 4-8 in. Peduncle 2-3 in. Spathe 6-10 in. long, tube ¼-⅔ 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, stigis a disciform area. Berries yellow. Seeds on long funicles, oviod; testa rough, with a fleshy yellow coat.


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 bulbiliferous 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 O. **Ovaries** and **ovules** as in *Remusatia*. Berries oblong or oblong. Seeds oblong, sulcate, albumen copious; embryo axile.

—Species 6 or 7 tropical Asiatic.


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 nymphasifolia, 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 nymphasifolia, 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., stigmas sessile disciform. Engler Arac. 492. Colocasia, No. 3, Herb. Ind. Or. Hf. & T. Alocasia Jenningsii, Veitch in Ill. Hort. (1869), t. 586; Gard. Chron. (1869), 136; Flora des Serres, xvii. 1818.—Aroid. Wall. Cat. 8952 B.


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 petals; appendage slender, narrowed to the tip, golden yellow.—
In a fine drawing of this species in Herb. Calcutta, 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 spathae
4–6 times shorter than the lanceolate limb, fruiting subspheherical, style
Wall. Cat. n. 8952 A.

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. Spathae and spadix much as in
affinis, but usually with fewer petals between the male and fem. inflo.
Anthers stellately crenate in both.

4. C. virosa, Kunth Enum. ii. 39 (in part); leaves large ovate sub-
undulate and re pand, basal re tuse, 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, Roeb. Fl. Ind. iii. 517; Wight Ic. t. 988.

Bengal and the lower Provinces of India, Roxburgh.

Stem short, simple, cylindric. Leaves 1–2 ft. by 8–15 in.; petiole about as long,
terete, smooth, green. Peduncles clustered. Spathae 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; placenta 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
infl. 1 in. intermediate space ½ in.; male 1½–1¾, 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 Estr. Bot. Wochensbl. (1857), 34; Prodr. 141
(excl. syn. pruinipes).

Perak, Scortechini.—Distrib. Cochinchina, Java.

Leaves 18–20 by 14–18 in., base deeply cordate, margin re pand; nerves 8–10
pairs, very stout; lobes 6–8 in., rounded, sinus open; petiole 2–3 ft. Peduncle very
stout, tall. Spathae 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, ter-
minating 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 Östr. Bot. Wochenbl. (1854), 410; Syn. 49; Prodr. 156; leaves subpeltate broadly ovate-cordate nerves 6-7 pairs, petiole very long, peduncles shorter sub solitary. **Engler Arac. 498.**


**BENGAL, Roxburgh (cultivated Clarke). The Khasia Hills, alt. 4000 ft.**


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.


**NORTHERN CIRCARS, Roxburgh. — Distr. 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.


Pęgu, Carey.

Differ, 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.**


**TROPICAL ASIA; native and cultivated.—Distr. 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, *Rozeb.*) shorter than the petioles. *Spathe* 8-12 in., pale yellow-green. **Spadix** equalling the spathe; appendage longer than the infl. Orary 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 anticus 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 haste leaf with divericate lobes, the other more sagittate with approximate lobes as long as the terminal.

*** Leaves peltate, basal lobes connate for \( \frac{1}{10} \) to \( \frac{1}{3} \) (rarely \( \frac{1}{2} \)) their length.


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 cuspitate at the top. *Spathes* nearly as long as the spathe; appendage nearly equalling the infl., cylindrical, 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 cuspitate, posticous lobes half the length of the anticus united for \( \frac{1}{4} \) to \( \frac{1}{2} \) their length, petiole long slender, peduncles long, tube of spathe shorter than the oblong cymboform acuminate limb, style short, stigma capitate entire.

PEQU, McLelland. ANDAMAN ISLBDs., Prain.
*Leaves* 9–18 by 4–9 in.; *lobes* 7 in., ovate-oblong, sinua broad open; nerves 6–7 pairs; petiole 2–3 ft. *Peduncles* 12–24 in. *Spathe* \( \frac{1}{3} \) in., tube \( \frac{1}{2} \) in.; appendage? *Ovaries* globose. **Fruiting** tube of spathe ellipsoid or pyriform, 1–1 ½ in. **Seeds** \( \frac{1}{2} \) in. diam.

8. **A. fornicata**, Schott in *Estr. Bot. Wochenbl.* (1854), 410; *Syn.* 47; *Prodr.* 157; leaves ovate-lanceolate sagittate basal lobes much shorter than the anticus connate \( \frac{1}{4} \) or \( \frac{1}{2} \) their length obtuse or subacute sinus narrow acute, tube of spathe about half as long as the oblong cymboform 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. 601; *Wight* *Ec.* 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 ¼-1¼ in., about as long as the infl. Seeds ½ in. diam., globose.


**Khasia Hills**, alt. 1-4000 ft.—J. D. H. & T. T.

Stem short. Leaves 8-18 by 5-9 in., cuspidate; basal lobes 3-7 in., much shorter than the anticus, 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, ½ 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 anticus connate from ¼ to 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 ½ in. diam., globose.—Near **A. decipiens**, but seeds larger, and stigma very different, basal lobes of many-nerved leaves approximates. It is probably nearer **A. fornicata**.


**Singapore** (Herb. DC), Wall. 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 ¼-½ in. diam.

***** Leaves peltate, basal lobes connate for half or all their length.

12. **A. acuminata**, Schott in Bonpland. vii. (1859), 28; leaves elongate-robmost candelate-acuminate contracted opposite the basal lobes which are longer as long as the anticus and connate for ½ their length. Engler Arac. 450.—Colocasia? Wall. Cat. 8946.

**Chittagong, J. D. H. and T. T.; Pegu, Kurz. Upper Burma, Anderson; Saluen river, Wall.**

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 candelate-acuminate narrowed to the basal lobes which are connate throughout their length and ¼-½ as long as
the anticus, tube of spathe as long as the cymbiform limb, appendage as long as the infl. A. perakensis, *Hemsel. in Journ. Bot. xvii. (1887), 205.

**Perae; Wray, Scortechni.**

Stem subscandent, rooting, as thick as a swan’s quill. Leaves thickly coriaceous or fleshy, nerves 3–4 pairs, slender, depressed, posticus lobes parallel; petiole 3–5 in., slender, sheath very short. Peduncles as long as the petiole. Spathe 2½ in., white or green, tube oblong; appendage cylindrical, obtuse. Ovaries scattered, obovoid; style long, stigma disciform, 3-lobed. Seeds globose, ½ in. diam.

**DOUBTFUL AND EXCLUDED SPECIES.**

*A. Alba*, Schott in *Ostr. 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. fornicatea* (Caladium), *Rozb. of Wight Ic. t. 789* (not of Fl. Ind. & Wight Ic. t. 782).—Ic. Rozb. n. 1655.

Stem as thick as the wrist, annulate. Leaves ovate-cordate, acuminate, 6–7 by 5 in., basal lobes connate for ¼ of their length, sinus very acute, nerves 5–8 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. 1542, 1549)* may both be new, but are not in a good state, and may be referable to Malayan species unknown to me.


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*).


*Malacca, Griffith (Kew Distrib. 5991).—Distrib. Sumatra.*


2. **A. oblongifolium**, Schott in *Wien. Zeitschr.* iii. (1829), 892 (ex *Linnaea* vi. (1831), *Littré* 53); leaves 8–24 by 2–4 in. linear-oblong acu-

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. mahacute. Ovary 1-celled; stigma tabular, much broader than the ovary (ex Is. Scortechini).

3. A. Helferi, Hook.f.; leaves 6-10 by 2-2$\frac{1}{2}$ in. oblong-lanceolate base acute, petiole 5-6 in. sheathing for the lower third, peduncles 2-3 in., spathe 1 in. oblong-lanceolate acute.

Tenasserim, Helfer (Ken 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-acuminat base acute, petiole 8-9 in. slender sheathing at the base only, peduncle 5-6 in., seeds $\frac{3}{4}$-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 $3\frac{1}{2}$-4$\frac{1}{2}$ 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 $1\frac{1}{2}$-2 in. oblong cuspiped. Engler Arac. 438; N. E. Br. in Gard. Chron. (1882) iii. 333.


Caudex elongate, $\frac{1}{2}$ 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 $\frac{1}{4}$-1 in. long, cylindric.

6. A. birmanicum, Hook. f.; leaves 8-10 by $2\frac{1}{2}$-3$\frac{1}{2}$ in. elliptic-oblong or -lanceolate caudate-acuminat, base rounded, primary nerves about 10 pairs erecto-patent slightly curved, petiole 2-5 in. sheathing to about the middle, peduncle very short, spathes $1\frac{1}{2}$ in. linear-oblong caudate-acuminat.

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 $\frac{3}{4}$-1 in. Spathe greenish, Spadix white.—The less curved nerves and narrow caudate spathe are quite unlike any allied species.

565; leaves 8–12 by $\frac{1}{2}$–$\frac{3}{2}$ in., oblong acuminate or subcaudate, base acute rounded on cordate sometimes unequal-sided, primary nerves 9–12 pairs, petiole sheathing to $\frac{1}{2}$–$\frac{3}{2}$ its length, peduncles short, spathe $\frac{1}{2}$ in. oblong cuspidate. *Schott Prodr.* 303; *Engler Arac.* 440. A. longecuspidatum, *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** $\frac{1}{2}$ 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 $\frac{1}{2}$ in. oblong acuminate.

**Niicobar 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. Scortechini, Hook. f.;** leaves ovate to elliptic-oblong acuminate, primary nerves 6–7 pairs arched strong beneath secondary few obscure, petiole $\frac{1}{2}$–1 in. sheathing at the base only, spathe terminal, peduncle $\frac{1}{2}$–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, $\frac{1}{2}$ by $\frac{1}{2}$ 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 $\frac{1}{2}$ in. oblong apiculate, peduncle slender nearly as long as the petiole. **Aroid. Wall. Cat. 8960 B.**


**Caudex** probably as thick as a goose-quill, rooting. **Leaves** thinly coriaceous, primary nerves sometimes undistinguishable from the secondary. **Seed** $\frac{1}{2}$ 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** $\frac{1}{2}$–$\frac{3}{2}$ 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 $\frac{2}{3}$ in. oblong beaked.

**PERAK;** in dense Bamboo forests, alt. 4–600 ft., *King's Collector.*

**Stems** 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 $\frac{1}{4}$ 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 (Rott. Veitch).
Leaves 2½–3 in. broad, dark green, costa stout, base rather unequal-sided; petiole $\frac{1}{4}$ in. diam., terete, sheath basal. Spathe light green, subacute. Spadix very large, the protruding male part $\frac{1}{2}$ in. long, $\frac{1}{4}$ 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, cylindrical; 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 $\frac{1}{2}$-anatropous. Berries few- or many-seeded. Seeds small, ovoid, albuminous. Embryo axile.—Species about 30, tropical.

Chamaeclados, 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 spadix 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. P. H. propinqua, Schott in Ann. Mus. Lugd. Bat. i. 280; Engler l. c. 33.

Perak; Scortechini, Wray, alt. 2500–3000 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 stroeg; petiole 1–1½ ft., sheathing to the middle. Peduncle 6–9 in. Tube of spathæ 1–1½ in., limb 2–3 in. by 1 broad, white, pink when young. Spadix stipitâte. Male infl. 3 in. by $\frac{1}{4}$ 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, 8-7 in. when flowering, elongating to 12 in. Spathe white, striped with pale green. Spadix stout, stipitate, male infl. rather slender, about equaling 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. Chamaeleon sanguinolentum, Griff. l. c. 147; Schott Prodr. 316.

MALACCA, Griffith (Kew Distrib. 5989, 5990).

Habit of Calla aromatico (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, margioa 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.


SIEKIM 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 ½ its length. Peduncles several, 3-4 in., stout. Spathe 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 carulescens 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.


ASIAM; 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. cerulescens**, Jungh. ex Schott Prodr. 310, leaves deltoidly ovate acute or acuminate, base subfastigate or cordate with a broad shallow sinus, rarely sagittately cordate, lobes rounded at the tip, spathe 2½-3½ in. subacute pale yellow white within. 

**Engler Arc.** 339, i.e. *in.*** No. 87. H. minus and majus, **Griff. Notul.** iii. 152, 153; Schott Syns. 119, Prodr. 312; **Engler l. c.** 343. H. Wallichii, Schott in Bonpland. (1859), 30; Prodr. 311; **Engler l. c.** 355. Caladium amboinense, *Herb. Ham.*—Aroid. Wall. Cat. 8951.

**Penang, Wallich. Perak, Scortechini. Malacca; Griffith (Kew Distrib. 5965, 6011). Mainain (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 ¼ or ½ 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. pontederifolia**, 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 Panus, 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 ½ 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 ¾–1½ in. narrowly linear-lanceolate acuminate at both ends coriaceous, nerves few straight nearly parallel to the margin, peduncle very short, spathe ¾–1½ in. oblong apiculate ribbed. **Chamæladon angustifolium, Schott in Bonpland.** (1859), 369; Prodr. 313; **Engler Arc.** 344; *i.e. 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 ½ their length. **Peduncles** ½–1 in. **Spadix** thin. **Spadix** with the fem. infl. ½ the length of the male.


**Perak, Scortechini.**

**Rootstock** suberect, rooting. *Leaves* rather coriaceous, nerves raised above; petiole 6–10 in., sheathing ¼–½ its length. **Peduncles** 1½–2 in. slender. **Spadix** 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.

or acuminate, base rounded or cuneate, nerves 5–8 pairs erecto-patent arched, petiole slender sheathing half way up or less, spadices many very short, spadix elliptic acuminate or cuspidate, fem. inflo. ¼–½ the length of the male. Chamæcladon humile, Miq. Fl. Ind. Bat. iii. 213; Engler Arac. 345; *Lec.* ined. No. 104. Calla humilis, *Jack in Mal. Misc.* i. No. 1, 22.—Aroid. Wall. Cat. 8959 (in part).

**Pernado, Wallisch, 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 ariate. Spadix sessile, ⅜ in. long, obtuse; fem. inflo. about ½ in. with or without staminodes.—Engler figures the nerves as very numerous, but describes them correctly as 5–8 pairs.

11. **H. velutina**, Scortechini _mss._; leaves 2⅓–5 by 1⅓–2½ in. broadly oblong or obovate-oblong acute, base rounded cuneate or cordate at the petiole, nerves 10–15 pairs strong beneath, petiole sheathing ⅓ to ⅓ of its length, peduncles many very short, spathes ⅔–⅞ in. narrow with a recurved cusp, spadix sessile, fem. inflo. 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 1⅓–2 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 papilae) and the undersurface 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 1½–2 in. more or less obliquely elliptic-oblong or oblong-lanceolate tip curved subacaudate acuminate base rounded or cuneate, nerves 4–5 pairs erecto-patent slightly arched, petiole slender sheathing ¾ the way up, peduncles many very short, spathes ⅔–1½ in. ovoid acuminate or rostrate, spadix stipitate. Chamæcladon Griffithii, Schott in Bonpland. (1858), 369; _Prodr._ 315; Engler Arac. 346; *Lec.* 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 *inf*., rather longer than the fem. acuminate; fem. with many capitate staminodes amongst the ovaries.

13. **H. Scortechini**, 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 way up, peduncles 2–3 in., spathe 1–1½ 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. inflo. 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 subtrun-
cate or subcordate, nerves 6-10 pairs, petiole slender sheathing $\frac{1}{2}$-2 way up, peduncles very short, spathe $\frac{3}{2}$-in. oblong cuspidately beaked, spadix sessile, fem. infl. half as long or nearly as long as the male. Chamaelodon obliquatum, Schott in Bonpland. (1858), 369; Prodr. 315; Engler Arac. 347; Wall. Cat. n. 8963.

Penang, Phillips, Wallich; Malacca, Moingtay.

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 $\frac{3}{4}$-2 in. Stigma disciform. Seeds many, faintly sulcate, red brown.—Closely resembles H. Griffithii, but the spadix of that plant is stiptate.

15. H. Kingii, Hook. f.; leaves 4-5 by 2-2$\frac{1}{4}$ in. oblong or ovate-
oblong acute and mucronate, base rounded or subacute, nerves 4-5 pairs, petiole stout sheathing from $\frac{1}{4}$-1 way up, peduncles short, spathes $\frac{3}{4}$-1 in. oblong cuspidately beaked, fem. infl. nearly as long as the male.

Singapor; 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 $\frac{1}{2}$-1$. Berries about 15-seeded. Seeds red-brown.

16. H. truncata, Hook. f.; leaves 3-4 by 1-1$\frac{1}{4}$ in. oblong or triangular- or oblong-lanceolate acuminate from a broad truncate or sub-
hatate base, nerves very slender, petioles slender sheathing from $\frac{1}{4}$-1 their length, peduncles half as long as the petioles or shorter, spathes 1-1$\frac{1}{4}$ in. oblong cuspidately beaked, fem. infl. half as long as the male or more, with many staminodes intermixed and below the infl. Chamaelodon 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 narrow and few-fltd. at the base but hardly stiptate. Stigma capitata. Seeds very many, striate.—The Bornean specimen included by Schott has identical leaves, but a larger narrower falcate finely acuminate spathe, a distinctly stiptate spadix, no (or obscure) staminodes, and furrowed seeds.

17. H. pumila, Hook. f.; leaves 1$\frac{1}{4}$-2 in. elliptic-ovate obovate or oblong subacute apiculate membranous nerves very faint, petiole very slender sheathing at the base, peduncles short slender, spathe $\frac{3}{4}$-3 in. linear oblong cuspidately beaked, spadix sessile, fem. infl. $\frac{1}{2}$ the length of the acute male, staminodes few.

Singapor, Maingtay.

Rootstock creeping and copiously rooting, rather slender. Leaves green; nerves 3-5 pairs, arching. Peduncles $\frac{1}{2}$-1 in. Seeds few in the berries, pale spotted with black.—Very near the Javan and Bornean H. purpureascens (Chamaelodon, 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 4-5 by 2-2$\frac{1}{4}$ 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.

Brisome 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. *Spathe* rather turgid. *Spadix* about half the length of the spathe. *Ovaries* ovoid; stigma large, pulvinate; staminodes 0?—The spadix 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 1½-2 in. subfalcate elliptic-ovate acute or acuminate hardly mucronate many-nerved base cuneate, petiole slender sheathing for ¼ to ¼ its length, peduncles elongate, spathe ½-1 in. linear-oblong cuspidately beaked, spadix shortly stipitate, fem. infl. not ⅔ the length of the male with intermixed staminodes.

PERAK; along watercourses, *Scortechinii.*

*Rootstock* creeping, as thick as a swan’s quill. *Leaves* more or less unequal-sided, coriaceous; nerves 7-9 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. Chamecladon ovatum, *Schott in Bonpland.* (1859), 30; *Prod. 315; Engler Aroac. 348.—Aroid. *Wall. Cat.* n. 8964.

SINGAPORE; *Wall. Dec.*; HERB. *Delessert.*

*Rootstock* as thick as the middle floger. *Leaves* rather coriaceous, base unequal or not, nerves 5-6 pairs slightly arched, rather strong beneath, secondary obscure; petiole not very stout. *Spathe* 1-1½ 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 candate-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; *Scortechinii, 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 archèd; petiole 6-14 in., slender. *Peduncles* 2-3 in., stout. *Staminodes* 0 or few and clavate. *Stigma* disciform.

22. **H. deltoides**; 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, *Scortechinii.*

*Rootstock* as thick as the little floger. *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 ⅔ its length. *Peduncles* several. *Spathe* not constricted above the fem. infl., much longer than in *H. trapezifolia*, and spadix stouter. *Stigma* discoid.—1 have seen only one specimen.
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, petioles clouded sheathing half-way up, red at the base, spathe green without white within.—Singapore.

22. SCHISMATOGLOTTIS, Zoll. & Morritz.

Stotoniferous, herbs; stem short. Leaves entire, intramarginal nerve strong. Spathe cylindrical, convolute, hardly constricted, limb deciduous. Spadix sessile, included in the spathe, appendage 0, with barren organs in the middle or top. Inflorescences contiguus or nearly so; male cylindrical or clavate; stamens 2–3, distinct, filament flat; anthers truncate, prismatic or compressed, cells with large pores, connective warded at the tip; pollen vermiform. Fem. Infl. cylindrical 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; Malacca.

Leaves 1½–2½ 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 areole 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 \( \frac{1}{2} \) of its length, peduncles very short, spadix 2–2\( \frac{1}{2} \) 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 2\( \frac{1}{2} \)-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* 1\( \frac{1}{2} \)-2 in. *Ovaries* turbinate, the top covered by the flat circular stigma.

4. **S. brevipes**, *Hook.*; 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 1\( \frac{1}{2} \) 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 1\( \frac{1}{2} \)-2 in., tip not apiculate, nerves 8–12 pairs. *Tube* of spathe 4 in., ellipsoid. *Spadix* 1\( \frac{1}{2} \) in., sessile; fem. infl. about as long as the sterile portion of the male. *Ovaries* turbinate; stigma pulvinate.

5. **S. minor**, *Hook.*; 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 \( \frac{4}{5} \) 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* 2–2\( \frac{1}{2} \) by 1–1\( \frac{1}{2} \) in., pale beneath, tip not apiculate, costa and nerves (7–8 pairs), papillosse beneath; petiole 3–4 in. *Peduncle* 2–2\( \frac{1}{2} \) in. *Tube* of spathe \( \frac{3}{2} \) in., limb ovate. *Spadix* with the fem. infl. adnate for nearly half its length to the spathe. *Ovaries* scattered below, globose, few-ovuled; placents 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 \( \frac{1}{2} \) or \( \frac{2}{3} \) its length, peduncles several, spadix \( \frac{3}{2} \)-5 in. very narrow acuminate tip recurved slightly constricted much below the middle, spadix with the fem. and male infl. about equal each \( \frac{1}{2} \) 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 4–5\( \frac{1}{2} \) 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 1\( \frac{1}{2} \) 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.

leaves cordately ovate or ovate-lanceolate cuneate-acuminate membranous many-nerved, petiole sheathing for $\frac{1}{3}$ or $\frac{1}{4}$ 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.

**PERAX, 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 micro, 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 $\frac{1}{2}$-1 in. Ovaries oblong; stigma pulvinate, obscurely lobed.—Reduced to $S$. calytrata, Zoll. and Morr. (Syn. Verz. Zoll. 83), by Engler, which is founded on Calla calytrata, 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.

**PERU YOMAH, Kurs.**

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. (Rhyncoptyle, Engler.)**


**PERAX;** 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 micro; 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 branch- ing. 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 obovate-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 exalbminous, testa thick; embryo macropodal.—Species 4 or 5, Malayan.
* Leaves entire.


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 ½–1 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** pinniform.

Var. *longirostra*; beak of spadix as long as the body.—**Perak, Wray.**—Borneo.


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 ½–1 in. broad, 2-saucirced at the tip; knee short. Peduncles 3–5 in. Spathe 1½–2½ in. long, as in *A. montanum*, white on pale yellow. **Perianth** annular.

3. **A. latifolium**, Hook. f.; leaves drying greenish broadly oblong cuspidedly acuminate base acute, petiole rather slender; sheath very narrow.

**Peraak; 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 ¾ its length. Peduncle 3–5 in. Spathe 2–3½ in., white within, greenish without; beak ½ the length of the body. Spadix 1–2 in., shortly stipitate. **Perianth** annular.

**** Leaves pinnatifid.


**Peraak, 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-col'd. 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 macrosporal 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 petals, which I do not find in any other *Anadendrum*.


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 24-6 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. 481; Wight i. 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.


*Pera*; *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 muricate, 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.

*Pera*; *Scortechini*, alt. 3-4000 ft., *King's Collector*; on Maxwell's Hill, Wray.

* Stem scendent, 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 ¾ way up. Peduncle much shorter than the petiole. Spathe yellowish on both surfaces. Spadix much shorter. Berries about ¾ in. diam. across the crown.

**Perak; Scortechini, King’s Collector. Malacca; Griffith, Mainay.—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 spathe* 3–4 in., white. Berries about 1/4 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, spathe (after flowering) 3–5 in. cylindric or subcylindric.

**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 indistinguishable above, nerves trabeculate; petiole sometimes 1 in. across the opened sheath. **Peduncle** 3–4 in. Spathe not seen. *Fruiting spathe* nearly 1 1/2 in. diam.; carpels slatey blue, 1/2 diam. across the crown. Seeds lenticular, 1/6 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; *Jc. 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* 1/2 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 4–5 1/2 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 3–3 1/2 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 1 1/2–2 in. diam.; leaves dark glossy green; spathe waxy white; spatix cream-coloured. The ovaries are very narrow and laterally compressed, not 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

**Nicobar Islds.** (Jellinck 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.


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 axial.—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 the smooth epidermis. *Spathe* thickly coriaceous, cream-colord. *Ovaries* ¼ 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 spathe. 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. Mainagayi**, *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, *Mainagay.

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 \( \frac{1}{3} \) in. thick). *Ovaries* narrow, \( \frac{1}{10} \) in. across the crown.

3. **R. Wrayi**, Hook. *f.*; leaves 7-12 by \( \frac{1}{4} \)–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* \( \frac{1}{4} \)–2 in. peduncled cylindrical 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 \( \frac{1}{4} \)–1 in., surface striate. *Leaves* drying greenish-brown and quite opaque; nerves erecto-patent, \( \frac{1}{10} \)–\( \frac{1}{4} \) in. apart with anastomosing nerves; petiole slender, stiff. *Peduncle* \( \frac{1}{4} \)–14 in. *Spathe* terete, walls very thick, green, cream-colr. within. *Fruiting spadix* oblong, \( 2\frac{1}{2} \) in. long by 1 in. diam. *Stamens* 2. *Berries* \( \frac{1}{3} \) in. across the crown.

4. **R. Lobbii**, Schott in Bonpland. v. (1857), 45; *Prodr.* 379; leaves 3–8 by \( \frac{1}{3} \)–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 1–2\( \frac{1}{2} \) in. channelled up to the knee or limb, spathes small (1–1\( \frac{1}{2} \)) peduncled oblong beaked, stigma raised. *Engler* *Arac.* 241.


*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 \( \frac{1}{4} \)–1\( \frac{1}{2} \) 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, spathes peduncled 2–3 in. beak long slender, stigma raised pulvinate.


*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–\( \frac{1}{2} \) in., yellowish. *Spathe* coriaceous, apparently red, beak ending in a very slender point. *Spadix* cylindrical. *Ovaries* \( \frac{1}{10} \) in. diam. across the crown. *Berries* \( \frac{1}{3} \) in. diam.

6. **R. Schottii**, Hook. *f.*; leaves 8–14 by 2–\( 4\frac{1}{4} \) in. falcately lanceolate or oblong-lanceolate or oblongate caudate-acuminate coriaceous base acute, nerves very many and slender uniform erecto-patent raised on both surfaces, petiole 1\( \frac{1}{2} \)–3 in. stout channelled to the middle of the knee, spathes 3 in. ovoid acuminate, spadix peduncled very stout, stigma raised pulvinate. *R. Peeplia* (*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, \( \frac{1}{4} \) 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
very greatly in length.—Near R. Peepa, but a very much stouter plant, with larger, longer and narrower leaves.

7. R. Scortechini, Hook. f.; leaves 10-12 by 3-4 in. ovate-lanceolate unequal-sided cuneate-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 $\frac{1}{2}$ 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 cuneate 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; Musters in Gard. Chron. (1874), ii. 611; fig. 124.

The Khasia Hills and Munntpore; 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 $\frac{1}{2}$ 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. Peepa, 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 Peepa, Schott Melet. i. 21; Kunth Enum. iii. 62. Pothos Peepa, Roxb. Fl. Ind. iii. 454; Wright t. 780 (not of Wallich). Monstera Peepa, Schott (ex Linden), 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, $\frac{1}{2}$ 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. Peepa is R. pertusa.

10. R. gracilipes, Hook. f.; leaves 6-8 by 2 ½ 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, Vol. vi.
grooved channelled up to the limb, spathe 3–4 in. cylindrical long-beaked, stigmas raised pulvinate.

**Perak; Larut, Scottechini, 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. **Pedicel** 1–2½ in. **Spathe** yellow, cream-colrd., or tinged with pink within. **Spadix** shorter than the spathe. **Ovaries** ½ in. diam.; stigmas orbicular.—In form the leaves closely resemble *K. Peepua*, 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. cylindrical 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. **Pedicel** 1–3 in., very stout. **Spathe** white, thick walled. **Ovaries** ½ in. diam., stigma minute.—The spathe is one of the longest in the genus.


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** ½ 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 candeate-acuminate 1–many-nerved lobes, petiole 6–10 in. of young leaves broadly winged, peduncle 4–8 in., spathe 3–4 in. cylindrical acuminate, stigmas orbicular or oblong raised. Epipremnum Beccarii, Engler in Bull. Soc. Tosc. Ort. 1879, 269.—**Wall. Cat.** 4438 B.

**Perak, Scottechini, King's Collector.—** **Distrib.** Siam, Borneo.

**Rootstocks** 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 Scottechini 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 8–15 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

The **DECCAN PENINSULA**; Coromandel, Malabar, and southward to **CEYLON.**—**DISTRICT 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 surcised at the top. *Spathe* shortly peduncled. *Spathe* yellow. *Ovaries* 4-angled; *stigma* sessile, pulvinate.


*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.


**TROPICAL HIMALAYA**; *Kumisom*, 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 stem. *Spathe* orange-yellow, outside and in. *Spadix* shorter than the spathe, white.

Sikkim Himalaya, alt. 2-5000 ft., J. D. H. Khasia Hills, alt. 4-0000 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 unicoast leaflets.


Penang, Maingay (Kew Distrib. 1555). Perak, Scortechini, King's Collector.

Distrib. Java.

Stem 30-40 ft., 2-3 in. diam., branching above, densely crinate 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, placents each 2-ovuled.

Perak, Scortechini.

Stem 4½ in. diam., fleshy, terete, rooting at the nodes, which are 3-½ in. apart. Leaves often very unequal-sided; lobes 1-2, broad, acute, 1-2-costate; petiole channelled up to the knee. Peduncles 1-2 in., very stout. Spathe white. Spadix subclavate. Stigma a raised furrow on the top of the ovary. Berries full of intercellular needls.-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.


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.


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 ½ in. thick.—A closely allied flowerless plant in Herb, Wallich (No. 4442, from Singapore), has leaves 18 in. long by 5½ broad.


MARTABAN and TENASSEERIM, 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, ¾ 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."


PENANG, Mainay (Kew Distrib. 1560.) PERAK, Curtis, Scootechini.—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, flabby, twisted, base convolute, deciduous. Spadix short, cylindrical, dense-fl., flowering downwards. Sepals 4–6, obovate, tips truncate incurved. Stamens 4–6, filaments short, flat; anther-lobes parallel, slits extrorse. Ovary ovoid, 1-celled; ovules 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.


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-col., opening at the base only. Spadix about 1 in., claret-col., 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 exerted beyond the sepals.

P. stipitata, N. E. Br. in Gard. Chron. 1882, ii. 70.

PERAK, Scortechnia, 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, 3–4 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 ½ as long as the spathe, red; stipes ½–1½ in. Berries ½ 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-fl., 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 funicules 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; Ip. Pl. Asiatic. t. 169; leaves sagittate, lobes candate-acuminate, petiole and peduncle prickly, flowers 6-merous, ovules 2. Schott Gen. t. 84; Prodr. 403; Englerr Arac. 270; Ip. Ined. No. 89.—Wall. Cat. 4447.

**Perak**; in marshes, Scortechini, King's Collector. Malacca, Griffith. Singapor, Gaudichaud, &c.—DISTREIB. Borneo.

Rootstock stout. Leaves like those of *Lasia*, 2½-3 ft., basal lobes as long as the median, costa and nerves prickly beneath; petiole 2-3 ft., sometimes as thick as the middle finger. Peduncle shorter than the petiole. *Spathe* 1-5 in., lengthening to 3 in. fruit, open to the base, flat, ovate or lanceolate, candate-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. 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.

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 Islands.—Distrib. Malay Islands, China.

Stem as thick as the little finger, much branched; internodes $\frac{1}{4}$—1 in. Leaves very variable, $\frac{1}{2}$—2 in. broad, acute apiculate or acuminate; base cuneate or rounded; petiole 1—3 by $\frac{1}{4}$—$\frac{3}{4}$ in., base $\frac{1}{4}$—amplexicaul. Peduncles equaling or exceeding the bracts, which are $\frac{1}{4}$—$\frac{3}{4}$ in. long. Spathe $\frac{1}{4}$—$\frac{3}{4}$ in. long, divided, yellow, about as long as its stipes. Berries $\frac{1}{2}$—$\frac{3}{4}$ 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. i. 22, t. 36; Prodr. 565; characters of *P. scandens*, but bracts much larger, $\frac{1}{2}$ in. long and broad, spadix larger erect inclined or deflexed. Engler Aroc. 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, Wallach.

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. Cathcartii**, Schott Aroid. i. 22, t. 44, 45; Prodr. 565; leaves 3—6 in. ovate oblong or lanceolate acute or acuminate, peduncle very stout $\frac{1}{4}$—$\frac{3}{4}$ in., bracts large concave, spathe orbicular, spadix stoutly stipitate suberect or decurved oblong or globose. Engler Aroc. 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, Munnipok and Burma.

A very much larger plant than *P. scandens*, or *Vriesianus*, with thickly coriaceous bracts, the inner sometimes $\frac{1}{2}$ in. long, a spathe sometimes nearly an inch broad, and spadix $\frac{1}{2}$—$\frac{3}{4}$ in. diam., on a stipes $\frac{1}{2}$—$\frac{3}{4}$ in. long. Berries $\frac{1}{2}$—$\frac{3}{4}$ in. long, obvoid or oblong, scarlet.

4. **P. angustifolius**, Presl. Epimel. 242; leaves 1$\frac{1}{2}$—2 by $\frac{1}{4}$—$\frac{3}{4}$ in. linear apiculate, peduncle very short, bracts small, spathe lanceolate, spadix suberecet minute globose or ellipsoid. Schott Aroid. i. 21, t. 31; Prodr. 559; Engler Aroc. 81.

Tenasserim, Hefier, &c.

Stem much branched; branches short, as thick as a crowd-quill; internodes $\frac{1}{4}$—$\frac{3}{4}$ in. Leaves $\frac{1}{4}$—$\frac{3}{4}$ in. broad; nerves parallel; petiole $\frac{1}{4}$—$\frac{3}{4}$ in. Spathe $\frac{1}{4}$ in. long. Spadix $\frac{1}{4}$—$\frac{3}{4}$ in. diam.

5. **P. Hookeri**, Schott Aroid. i. 23, t. 46; Prodr. 566; leaves 3—4 in. lanceolate acuminate, peduncle 1$\frac{1}{2}$—2$\frac{1}{4}$ in. decurved, bracts ovate acute, spathe cymbiform acuminate, spadix oblong. *P. scandens*, Hook. IC. Pl. t. 175. *P. scandens*, var. Hookeri, Engler Aroc. 84.
Ceylon, Walker.

Stem and foliage as in the common state of *P. scandens* and *Vrieseanus*. Peduncle often longer than the petiole. *Spathe* $\frac{1}{2}$-3 in. *Spadix* $\frac{1}{4}$-4 in., its stipes about as long.

6. *P. macrocephalus*, Scort. *mass.;* leaves lanceolate apiculate, petiole as long as the blade, peduncle 1$\frac{1}{2}$-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 $\frac{1}{2}$-1 in. *Leaves* 2$\frac{1}{2}$-3$\frac{1}{2}$ by $\frac{1}{2}$-3 in.; rather broader than the petiole. *Peduncle* rather stout; bracts very variable, sometimes few with the longest only $\frac{1}{2}$ in., at others many, and $\frac{1}{2}$ in. long. *Spathe* $\frac{1}{2}$-3 in. diam., white; occasionally a second smaller superior spathe occurs. *Spadix* $\frac{1}{2}$ in. diam., or less, yellow.—This differs from *P. Junghunianus* and *macrophyllus*, de Vriese (in Plant. Jungh. 1. 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-flatt.; flowers not in clusters.

7. *P. Kingii*, Hook. *f.*; stout, leaves 6-10 by 3-4 in. oblong or oblong-lanceolate caudate-acute, base narrowly rounded, bracts 1$\frac{1}{2}$-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 unequally-sided, shining on both surfaces; petiole $\frac{1}{2}$ in.; sheath 3-4 in., margins membranous, at length fleshy, tip 2-auncicled. *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 1$\frac{1}{2}$-1$\frac{1}{2}$ 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 cundate; petiole $\frac{1}{2}$ in., sheath 2-3 in., by $\frac{3}{4}$-1 in. broad, biauncicled. *Peduncle* deflexed, 1-1$\frac{1}{2}$ in. *Spathe* $\frac{1}{2}$-1 in., acuminate. *Spadix* as long, sessile. *Stigma* pulvinate, sessile.


Pennang, Porter, Curtis; Perak, Scortechini.

Very similar to *B. Barberianus* in foliage, but a more slender plant, with the spreading leaf-sheaths not $\frac{1}{2}$ in. broad, the peduncle 1$\frac{1}{2}$-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 *mass.*
10. **P. lancifolius**, Hook. f.; leaves 4-7 by 1-1.5 in. narrowly oblong-lanceolate candate-acuminate base cuneate sheath divergent from the branch, peduncle terminal, bracts 0, spathé 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 $\frac{3}{4}$-1 in., sheath slender, tip bifid. *Peduncle* 1-1.5 in., spreading or deflexed. *Spathe* 1½ in., furid purple, striate. *Spadix* 1-1¼ in., subsessile, cylindric, obtuse, $\frac{1}{2}$ in. long. *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, spathé linear from a rounded base, tip emarginate mucronate in the sinns much shorter than the stipitate spadix.

**PERAK; Larnt, 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 $\frac{1}{2}$-1 in., sheath 3-4 in. *Peduncle* deflexed or sigmoid. *Spathe* 2½ in., pale green, reflexed, 5-nerved, macro $\frac{1}{2}$ 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, spathé 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 $\frac{1}{2}$-1 in. *Leaves* coriaceous, drying brown; nerves widely spreading, slightly arched; petiole $\frac{1}{2}$ in.; sheath 2½-3 in. *Peduncle* 1½-2 in., usually tortuous. *Spathe* imperfect. *Spadix* 3 in., stipes $\frac{1}{2}$ in. *Stamens* very short.

13. **P. Curtisii**, Hook. f.; leaves 5-7 by 1½-2 in. oblong-lanceolate or linear-oblong acuminate base cuneate or rounded, sheath divergent from the branch, peduncles terminal, spathé 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 spate is 2-2½ in. long.

14. **P. Kunstleri**, Hook. f.; leaves 8-12 by 2-3½ in. unequal-sided oblong or subfalcate oblong-lanceolate candate-acuminate, base cuneate or rounded, sheath divergent from the branch, peduncle terminal, spathé 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 pointet 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. Ir. 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 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); Mig. 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 ½-1½ in. long. Peduncle 1-1½ in., erect, decurved, or slender. Spathe ½-2½ in., striate, base rounded. Spadix 1-2½ in.

C. Petiole very short, base semi-amplexicaul (sheath 0).

16. P. Thomisonianus, Schott Aroid. i. 24, t. 51; Prodr. 571; leaves 4-6 by 1½-2 in. elliptic- or oblong-lanceolate caudate-acuminate, base cuneate, peduncles lateral and terminal, spathe small oblanceolate, spadix subsessile cylindrical dense-fld.

The CARNATIC; G. Thomson. Branches as thick as a duck's quill. Leaves thinly coriaceous, rather unequal-sided, dry loq yellowish; petiole ½ in. Peduncle 1 in., decurved. Spathe ½ in. Spadix ½-1 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.


Throughout India and Ceylon, in marshes, wild or cult., ascending the Himalaya to 6000 ft. in Sikkim. Distrib. north, temp. and warm regions.


**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 bulblets, 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.**

Filaments 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*.


Throughout India? Western Tibet, to 9500 ft., Thomson.—Distrib. Cosmopolitan.

*Frond* 1–2 in. long; young sessile on the old, but soon detached, green above, epidermal cells with flexuous walls. Root-sheath not appennaged, 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. Thet as the only Asiatic habitats.


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, appennaged root-sheath, acute root-cap, and erect orthotropous seed.

Lemna.]  CLXVII. LEMNACEÆ. (J. D. Hooker.)  557


Still waters throughout India, ascending to 7000 ft. in the Himalaya.—Distrib. Cosmopolitan.

Frons ½–1 in. diam., opaque, young sessile, cells beneath very large, epidermis with flexuous walls. Root-sheath elongate, cylindrical, root-cap acute. Stamens 2. Utricle circumsic. Seeds erect, anatropous, albumen scanty or 0.


PANJAB, Stewart. BENGAL, The CONOAN, MUNNEPORE, and BURMA.—Distrib. Temp. and trop. regions.

Frons ½–1 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.


Common throughout India and Ceylon.—Distrib. Temp. and trop. regions.

Frons ½–1 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.


BENGAL, Kurz, and elsewhere in India.—Distrib. Trop. Asia, Australia, Polynesia.

Frons ½–1 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.


Common, probably throughout India and Ceylon.—Distrib. Cosmopolitan.

Of this Kurz distinguishes two Indian varieties, a larger, Delitti (Grantia globosa, Griff.), and a smaller with more cylindric fronds, the Lemma globosa, Roxb.


**Bengal, Griffith.**

Known only through Griffith’s description and drawings.

**ORDER CLXVIII. TRIURIDAE.**

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 pl. Stamens** 2–6, hypogynous or perigynous, anthers free or immersed in a thick disk, cells 2, confluent, slits extrorse; pistillodes 3, subulate, or 0. **Female pl. Staminodes** 0 or few. **Carpel** 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.


**Ceylon**; in shady woods at Gallée, Champion; Colombo, Ferguson.

**Stem** 3–4 in. **Flowers** ½ in. diam., pale greenish purple, speckled with red streaks; pedicels ½ in.


**Ceylon**; forests near Sittawake, Thuwaites.

**Stem** 6–14 in., purplish; bracts broad, acute. **Flowers** monocious, pedicel ½–¾ in.; perianth about ½ in. diam. **Anthers** sessile, transversely oblong, white.


**Travancore**; Tinnevelly, Beddome. **Ceylon**; in damp forests, Champion.
Stem 4–8 in.; bracts about \( \frac{1}{8} \) in. Flowers alternate, opposite and whorled, mono- or dioecious, pedicel \( \frac{1}{2}–1 \) in.; male \( \frac{1}{2} \) in. diam., fem. \( \frac{1}{2} \) 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 pistilodes, 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** dioecious, racemose, male \( \frac{1}{16} \) in. diam., fem twice as large and longer pedicelled; bracts of male minute, of fem. \( \frac{1}{2} \) in. subulate; **perianth** papillate. **Anthers** very large, globose 4-lobed, white, dehiscence transverse; pistilodes erect, subulate, purple. **Carpeis** many, papillate. **Achene** 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. ALISMACEAE.**

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. **Carpeis** 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 I. ALISMACEAE.** **Fruit** of 3 or more achenes.

- **Flowers** bisexual. **Stamens** 6–9. **Receptacle** flat . . . . . 1. ALISMA.
- **Flowers** polygamous. **Stamens** 6. **Receptacle** flat . . . . . 2. LIMONOPHYTON.
- **Flowers** unisexual. **Stamens** many. **Receptacle** globose or oblong . . . . . 3. SAGITTARIA.
- **Flowers** monoecious. **Stamens** 3 . . . . . . . . . . . 4. WISNEIA.

**Tribe II. BUTOMEE.** **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 panicked 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.

Marashe, &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. Scapes 1-4 ft. Flowers in panièled whorls, % 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.


Marashe, &c., throughout the plains and low country of India, ascending the hills to 5000 ft. (not in Ceylon).—Distrib. Australia.

Leaves coriaceous, 1%-4 in. (up to 7 in. broad), often broader than long, tip rounded or emarginate, nerves very fine and close. Scapes 1-3 ft. Flowers white, % 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 keeled keels tumbered, 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.

Marashe, &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 heraceous, lower 1-3 in. long, lanceolate. Flowers of L. Plantago.


An erect succulent marsh plant, with the characters of *Alisma*, except that the flowers are polygamous.


The DECCAN; from the Oncan southwards, in tanks, &c. CEYLON, Thwaites.—Distrib. Trop. Africa, Madagascar.

Usually very robust, but sometimes dwarf. Leaves 6-12 by 4-8 in., reniformy sagittate or triangular, with long tapering spreading lobes, many-nerved; petiole 2-3 ft. Scapes 2-4 ft, stout, angled. Flowers many, %-% in. diam., white, upper mostly male. Sepals reflexed after flowering. Petals obvate. Stamens 6, filaments of the male enlarged at the base. Achenes numerous, turbinate, turgid, epicarp fleshy; style ventral, stigma capitale.
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 papilllose; 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.


In tanks, &c., throughout the plains of INDIA from the Panjab to Bengal and Munnipore.—**DISTRIA.** Europe, N. Asia, N. America.

Leaves obtuse or acute, 2–8 in. long, very rarely elliptic or lanceolate, lobes more or less diverging; pediole 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* ½ in. diam.; petals white, claw often purple. Achenes obliquely obovate, apiculate, wings broad entire or suberect.


In tanks and marshes, throughout the plains of INDIA, to BURMA and the MAILE PENINSULA, but not very common; (not in Ceylon).—**DISTRIA.** 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; pediole long or short. *Scape* 6–18 in., stout. *Flowers* ½ in. diam., white, in few approximate irregular whorls; pedicels short, very stout; flowers of the lower whorls usually ternate, bisexual, 9–12-androes, of the upper more numerous, male, 6–10-androes. 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 oblong lanceolate. Flowers minute, monocious, in remote involucrate whorls on a very slender rachis; involucres campanulate, truncate, membranous. Sepals 3, equal or one larger, persistent. Petals 2–4, equalling or smaller than the sepal. Male Fl. Stamens 3. Filamentodes 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, hippocrepic.—Species 3, Trop. Asia, Africa, and Madagascar.

The CONGAN; in water holes, Malwan, Stocks.

Leaves with the petiole 9–16 in., narrowly linear-spathulate obtuse, ½–1 in. broad, midrib stout, penant-nerved, lateral nerves slender submarginal. **Scape** shorter than the petiole. Flowers ternate, very shortly pedicelled, white; sepals linear-oblong; petals much longer, 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; unbranched.

B. umbellatus, Linn.; Kunth Enum. iii. 164; Reichb. F. 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.


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, fagacious, white. Stamens 8–12; anthers oblong. Follicles, 6–7, erect; membranous. Seeds very many, minute, smooth.


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. **NAYADACEAE**.

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. **Stamens** 2. **Carpels** stipitate . . . . . . 4. **Bippia**.

Aquatics. **Stamens** 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, alis extrorse. **Carpels** 6, 1-celled, 1-ovulsd, 3 alternate often imperfect; styles short, often connate, stigmas pendunculate; ovules basal, 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.


**TEMPERATE and ALPINE HIMALAYA,** and **WESTERN TIBET,** alt. 8-15,000 ft.—**DISTRIBUT.** N. temp. regions and S. America.

Stem 6-24 in., tuberous and stoloniferous. **Leaves** 2-12 in., flaccid. **Scapes** slender; raceme elongating after flowering, pedicels short. **Perianth** green, margins purplish. **Anthers** purple. **Fruit** ½ in. long, appressed to the rachis; carpels dorsally terete.


**TEMPERATE and ALPINE HIMALAYA,** and **WESTERN TIBET,** from 12,000-16,000 ft.—**DISTRIBUT.** N. temp. regions.

Larger, stouter, and more tuberous at the base than **T. palustre**. **Scapes** stout, curved; raceme longer, but not elongating so much in fruit; flowers larger; fruit ½ in., not appressed to the scape, carpels grooved on the back.
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-ovule; style short, stigmatic diskoid or decurrent persistent; ovules basilar, anatropous. Fruit of 3 or more coriaceous follicles. Seeds erect; embryo straight.—Species about 20, Asiatic, and Australian.


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-nerves as in A. crispum.


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 monostachyum," 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-nerves 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. despermum. Wight says it quite resembles A. monostachyum, 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. monostachyum, apart from the enlarged 6-seeded follicles of that plant, 3 others carpels which are strongly echinate end 2-seeded, and to which be 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.


Bhutan 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 ½ 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 ¼ 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. Petianth-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 *Potamogoton* 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.


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.

The Panjab, Thomson. Kashmire, alt. 5000 ft., Jacquemont, &c.—Distrib. widely diffused especially in temp. climates.


The more membranous leaves, shorter stipules, very slender peduncle and spike, smaller flowers and minute drupelets not 1/8 in. long, distinguish this from P. natans.


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 1½-1½ in.; blade twice as long as the petiole or longer Spike 1½ in.; flowers very small, in interrupted whorls; peduncle as long or longer. Sepals orbicular-ovate. Drupelets 1/8 in., turgid, beak stout.

** Leaves all submerged, ovate oblong or broadly linear, translucent.


Western Himalaya; from Kashmir to Kumaon, alt. 4-5000 ft. Western Tibet, alt. 8-14,000 ft.—Distrib. N. temp. regions, Anaralaya.


Plains of India and Tempesate Himalaya; from Kashmir to Bhotan, alt. 4-6000 ft. Munnipore, Watt.—Distrib. N. and S. temp. and subtrp. 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-flld.; flowers very small. Drupelets ½ in., obliquely ovoid, compressed, ribs entire or toothed.


KASHMIE, 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 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 cuspitate membranous many-nerved base acute or obtuse, stipules much longer than the petiolate lanceolate conate, 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 Dinajpore and Kuins and Kurna, Hamilton.—DISTRIB. Borneo Philipp. Islds.

Leaves 3–5 by 1/2–3 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 subhurcular, 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.


Plains of INDIA, the Himalaya, and Western and Eastern Tibet, alt. 12–17,000 ft. CEYLON, Thwaites.—DISTRIB. most regions.


KASHMIE, alt. 5000 ft., Thomson.—DISTRIB. N. and S. temp. regions.


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 subtropical.


Throughout India and in Ceylon, in brackish water.—Distrib. Europe temp. and trop. Asia.

Stem 2 ft. and upwards. Leaves 1–3 in. Fruit peduncle 1–6 in. Achenes 1/2 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. FEDICELLATA; male peduncle short, achenes 2–4 subsessile, back crenate or tubercolated, 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. t. l. c. c. t. 16 and t. 759. Ic. Fl. Germ. viii. 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 achenes; b, from the Panjab and Behar; flowers sessile, achenes stipitate smooth or tubercolated 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, monoeocious or dioecious. 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.


Throughout India, in fresh and brackish water, ascending to 8000 ft. in Western Tibet. **CEYLON.**—**DISTRIB.** Europe, Asia, Africa.


Throughout **INDIA** in still fresh water, and **CEYLON.**—**DISTRIB.** the Old World generally.

Stem 1–2 ft. *Leaves* 3/4–1 in., usually whorled, broader, more transparent and more acutely toothed than is *N. minor*.


Throughout **INDIA** and **CEYLON**, in still sweet water.—**DISTRIB.** Old World generally.

Stem very slender, much branched. *Leaves* spreading, or the upper recurved, 3/4 in. or less, hardly 3/4 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 Tuticorren, *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. HETEROMORPHA, Griff. ev 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, König.

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 PL. Anthers 2, elongate, connate, stipitate, slits extrorse; pollen conervoid. FL. FEM. Carpels 2, sub sessile, 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 index ed.—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 Hydrocharideae, there are to be added at p. 663 of vol. v., Halophila Becconii, Asch., and Thalassia Hempichii, Asch.


ANDAMAN ISLDS. Frain. Ceylon, Gardner, Harvey.—DIST. of the genus.

Stem or rhizome 3-12 in., woody, branched, covered with annular scars. FL. and fr. unknown.


CEYLON, Thwaites (C.P. 3056).—DIST. of the genus.

I have seen no Ceylon flowering or fruiting specimens.


SOUTH CARNATIC; at Tuticoreen, Wight. Ceylon, Harvey, Glenie.—DIST. of the genus.


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. tatifolita, as provisional only.

ORDER CLXXI. **ERIOCAULACEAE.**

Marsh or aquatic scapigero herbs. *Leaves* narrow. *Flowers* very minute, in involucrate heads, bracteate, unisexual, usually monoeccious; perianth inferior. **Male fl.** *Sepals* 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 dorsifixed. *Pistillode* minute or 0. **Fem. fl.; sepals** 2–3, caducous. *Petals* 3 (rarely 2 or 0) persistent, spatulate or oblong, 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 end 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 nervature; as do the scales 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 anticus 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 find 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 striations. 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.)


*Stem* 2–3 ft., stout or slender, flexuous. *Leaves* 1½–2 in., flexuous, 1-nerved. *Peduncles* very many, slender, 1½–3 in.; *sheath* ½–1 in., tip membranous. *Heads* ½ in. diam. *Male petals* obscure; *stamens* 6; *female petals* 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; *Mars. in Wall. Pl. As. Rar.* iii. 29; *Kœrn. in Linnsea*, xxvii. (excl. *syn. Linn.*).


Closely resembles *E. setaceum* in habit, foliage, &c. In the Burmese and Khasian specimens the *female petals* are ciliate with long hairs, in the *Concan* and *Cochin Chin*e they are nearly glabrous.


*KHASIA HILLS*; at Myrung, alt. 5000 ft. *Griffith*.—*DISTRI. 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 *female 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.*


*NILGIRI HILLS*; alt. 6000 ft., *Wight*, &c.

*Rootstock* often as thick as the thumb. *Leaves* 1–9 by ½–3 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* ½–3 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; *female fl.* with the ovary and petals stipitate above the sepals, stipites villous.—Much the stoutest Indian species.

5. *E. caulescens*, Hook. *f.* & *Thoms. Herb. Ind. Or.*; caulescent, scape sub solitary from the stem or its branches, invol. bracts oblong outer
obtuse inner acute black shining; fem. fl. subsessile, sepals and petals villously bearded. \( \text{E. stratum, } \beta \text{ major, } \text{Thw. Enum. 341.} \)

**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 \( \frac{3}{4} - \frac{1}{2} \) in., narrowed from the base to the obtuse tip, rigid, quite opaque; nerves very many, close, obscure. *Scapes* stout or slender. *Heads* \( \frac{4}{5} - \frac{3}{4} \) in.; invol. bracts sub-3-seriate, scarious; receptacle flat, villous; fl. bracts oblongolate, 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 \( \frac{1}{4} \) in. diam. or less.

§ *Receptacle villous.*


**CEYLON;** Newera Ella, 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 \( \frac{3}{4} - \frac{1}{2} \) in., erect, very many-nerved, quite smooth on both surfaces; sheath slightly woolly at the base. *Scapes* 12 in., slender. *Heads* \( \frac{3}{4} - \frac{1}{2} \) in. diam., depressed spherical, pale; male and fem. sepals 2 concave, 1 flat, all bearded; fem. petals oblongolate villous; ovary villous at the base. *Seed* sub-globe, 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 obvolute scarious blackish, floral cuneate tip black rounded toothed and with a long black cusp, fem. fl. pedicelled, petals oblongolate ciliate with the ovary long-stipitate. \( \text{E. cristatum, var. } \text{Thw. Enum. 341.} \)

**CEYLON,** Thwaites (C.P. 1002 in *Herb. Kew; 789 in *Thw. Enum.*).

*Rootstock* as thick as a swan's quill. *Leaves* 2-2\( \frac{1}{2} \) 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* \( \frac{1}{2} \) in. diam., the black cusps of the fl. bracts contrasting with the white small petals; receptacle hemispheric; male fl. on slender pedicles; 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 obvolute scarious blackish shining, floral oblongolate 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 \( \frac{1}{2} - \frac{3}{4} \) in., lower recurved, very many-nerved, narrowed to the acuminate tip, rather glossy. *Scapes* 30 or more, 5-20 in. *Heads* \( \frac{1}{2} - \frac{1}{2}, \) 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 oblongolate, ciliate with long soft hairs.—A very handsome species, closely allied to \( \text{E. longicuspis, but very much larger with many scapes.} \)

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 ½–1 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**, *Korn. in Linnaea*, xxvii. 610; leaves very slender linear obtuse opaqu e; scape long solitary, invol. bracts cuneately obvate black shining inner acute, floral black shortly bearded outer orbicular-obvate very shortly cuspidate inner narrow cuneate acute, fem. fl. sessile, petals ob lanceolate villous.

**Ceylon**; Gardner (n. 973).

Densely tufted. Leaves 4–6 in., erect or spreading from an erect base, ½–1 in. broad, sheaths woolly at the base, nerves very many, close. Scapes 1 ft. and under. Heads ½ in. diam., hemispheric; invol. bracts convex, rigid, incurved; inner floral black above the middle; recept. hemispheric, densely villous; male fl. pedicelled, stamens 6; fem. sub sessile; 2 sepals of fem. concave, narrow flat; ovary sessile, base hairy.—I am rather doubtful of this being *Kornickei* *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 obvate edged with black, floral dark broadly obtuse acute very shortly bearded, fem. fl. shortly pedicelled, petals narrowly ob lanceolate villously ciliate, ovary sessile. *Korn. in Linnaea*, xxvii. 609.

**KHASIA HILLS**; alt. 4–5000 ft., common.

Leaves ½–1 in. broad, narrowed to the obtuse tip; sheaths short, not woolly at the base. Scapes rigid, deeply grooved. Heads ½–1 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. *Pl. 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.


**NIGHTIES HILLS**, Heyne, Schmidt. **ARRAKAN**, King.

Leaves translucent, recurved, more opaque in Schmidt's specimen; sheath glabrous at base. Scapes strongly grooved. Head ½ in. diam. black and white;
invol. bracts at length reflexed abutting; 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. abramum in which the recept. is villous, and the odd petal of male fl. not protruded. The specimens are few and poor, except King's. Kerner's describes the recept. as villous, but it is decidedly glabrous in Wallich's specimen.

13. **E. mitophyllum, 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 ovate obtusely very shortly bearded, fem. fl. sessile, petals oblanceolate obtuse villously ciliate.

**Khasia Hills;** Myrung, alt. 5000 ft. Griffith (Kew Dist. 5578, 5580); Jaintes, alt. 4000 ft., Clarke.

Leaves flaccid, 5-7-nerved; sheath not woolly at the base. Sheath of scape not lacerate at the mouth. Heads 1⁄2-1⁄2 in. diam., white and black; invol. bracts 3-4-seriate, at length lacerate, not abutting; receptacle globose; sepals of male 3, free; truncate tips bearded; odd petal shortly exerted; 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, Kbr. in Linnaea, 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 spatulate villous. **E. cristatum,** Mart. in Wall. Pl. As. Barr. 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. Heads 1⁄4-1⁄4 in. diam., grey-white; fl. bracts concolorous with 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. Colletti, 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 pales, 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 11⁄2 by 1⁄2 in., narrowed from the base to the tip, opaque, striate. Scapes several, 6-grooved; sheaths rather short. Heads 1⁄2-1⁄4 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, Kbr. in Linnaea, 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.
** 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. Ran.* 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 oblongaceolate acuminate strongly cuspidate villous, male petals small subequal, fem. fl. sessile, sepals narrow concave, bearded, petals obovate or oblongaceolate villous with very long hairs, ovary sessile. *Kunth Enum.* iii. 563; *Steed. Syn. Pl. Cyp.* 271; *Kœrn. in Linnœa*, xxvii. 658 (excl. syn.) *E. sexangulare, Herb. Heyne.*

**TENASSEEM, Wallach, &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 ½ 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 corymbose at the base; receptacle convex villous; flowers pedicelled; male petals minute in the Tenasserim specimens, small subequal in the Concan; stamens 6. *Seeds* globose oblong, dark red-brown, papillose.—Fem. fl. sometimes 4-merous.

18. **E. Brownianum**, Mart. *in Wall. Pl. As. Ran.* iii. 25, t. 248; Cat. 6066; tall, slender, leaves narrowly linear or ensiform acuminate glabrous or hairy, scapes solitary very tall, heads ¼ 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; *Steed. Syn. Pl. Cyp.* 271; *Kœrn. in Linnœa*, xxvii. 663. *E. nilagirense, Steud. l. c.; Kœrn. l. c.* 661.

**KHASIA HILLS, alt. 4–6000 ft., common. MUNNIPORE, Watt. NILGIRI HILLS, Wright, Gardner.** Ceylon, Gardner, ascending to 7000 ft., Thwaites (C.P. 377, 1001).

*Rootstock* stout. *Leaves* 6–18 by ½–½ in., many-nerved, and scapes glabrous pubescent or copiously hairy. *Scapes* 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 ¼–½ in. long, equaling the flowers; receptacle flat or convex; male sepals free or connate, tips bearded, petals subequal; fem. sepals cymbiform, dorsally hisrate, acute or cuspidate. *Seeds* oblong or subglobose, papillose and striate.—The hairs of the fem. petals are much longest in the Khasian plant.

**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; invol. 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: globose orbiculately oblong, papillose.—I have no doubt as to the specific identity of *sericans* with *gracile*; Köhnke 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.


The **Concan** and **Canara**, *Mets., Stocks*.

Rootstock small. Leaves 1–2½ by ¾ 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.


**Throughout India**; from Kashmir to Assam and Burma, and southward to *Chylo*. (C.P. 795).—**Distrib.** China, Japan, Mt. Philipp.

Annual. Leaves 2–4 in., 3–5-nerved, rarely ¾ in. broad, opaque or translucent. Scapes slender; sheath short. Heads ½ in. diam., pale whitish or purplish; invol. 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 Linneus 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 ½ in. diam. broadly ovate or hemispheric, invol. bracts spreading oblong obtuse scarios 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 ½–3 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. alpestris, Hook. f. & Thoms. Herb. Ind. Or.; leaves broadly or narrowly subulate, scapes very many short stout, heads broadly obconic few-fl., invol. bracts suberect as long as the flowers cuneiform coriaceous, floral obvate-oblong, fem. fl. sessile, sepals oblong cymbiform obtuse glabrous, petals 3 subequal obvate 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.—Districts. W. China, Japan.

Leaves very many, 1–5 by ½–3 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 ½ in. diam. or less; invol. 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.


Assam, Bengal, Burma, and southward to Malacca and Ceylon (C. P. 793).—Districts. Malay and Philippine Islands, China.

Leaves ⅓ in. broad at the base or less, acuminate, few- or many-nerved. Scapes 1–4 in. Heads glistening; invol. 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 Kwaia Pohang, Ridley.—Possibly a different species.

§§ Receptacle more or less villous.
25. *E. ozytorum*, 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 scarios hyaline, invol. oblong obtuse passing into the cuneate-ovobovate cupulately densely imbricate floral, fem. fl. shortly pedicelled, petals slender. Kunth. Enum. iii. 552; Steud. Syn. Pl. Cyp. 270; Kœrn. in Linnaea, 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 1–2 in., spongy, very many-nerved, narrowed to a truncate coriaceous tip. Scapes 8–18 in. (shorter in dwarf states), soft, flexuons. Heads 1–2 in. diam., straw-colord., 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 ob lanceolate, 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 *ozytorum*.

26. *E. stellulatum*, Kœrn. in Linnaea, 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 ob lanceolate ciliate with long hairs, ovary with petals sessile.


Leaves 1–2 in. by 1–2 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 1–2 in. diam., perfectly glabrous except the conical receptacle and ciliate fem. petal; 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 ob lanceolate, ciliate. Seeds dark chestnut, 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 sub sessile flowers, ovary with petals stipitate. Kunth Enum. iii. 568; Steud. Syn. Pl. Cyp. 272; Kœrn. in Linnaea, xxvii. 519.

TavoY; Mergui, Gomes, Griffith.—Distribution. Tonkin, China.

Leaves many, 3–1 in., erecto-patent, spongy. Scapes rather stout, 1–5 in., terete, shining; sheath short. Heads 1–2 in. diam., straw-colord.; 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 sub globose few-fld. pale, invol. bracts erect ovate-lanceolate acuminate scarios, floral ob lanceolate acute or cupulately, fem. fl. sub sessile, sepals falcate winged or keeled, petals 1–3 very slender or 0, ovary with petals sessile or stipitate.


P p 2
Densely tufted. Leaves $\frac{1}{2}$-3 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 sparingly 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.—Removes E. achiton, but invol. bracts very different.

††† Involucral bracts glabrous, floral bearded villous or pubescent.

§ Receptacle glabrous or sparingly hairy.


Tenasserim, southward to Malacca; and the Deccan Peninsula, from Canara southwards. Ceylon, Macrae, &c. (C.P. 220).—Dist. Tropical Asia, Madag.

Rootstock as thick as the little finger or less. Leaves 4-12 in., ½-3 in. broad at the base, flat, narrow 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 $\frac{1}{2}$ 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 incurred acute dorsally winged or not, 3rd linear, narrow. Seeds subglobose or oblong, the ridges papillose.—In some Concan specimens from Dalzell the leaves are $\frac{3}{4}$-1 in. broad, linear, flaccid, quite translucent, and the heads very small. The Australian E. australis, Br., hardly differs.

Var. longifolium; more slender, leaves often longer, fem. fl. dimerous, petals sparingly hairy from the middle upwards. E. longifolium, Nees in Herb. Wild. ex Kunth l. c. 567; Steud. l. c.; Kern. l. c. 690. E. sexangulare, Willd. Herb.—Tenasserim, Malacca, the Andaman Islands, and Ceylon.

30. E. Dalzellii, Kern. in Linnw., xxvii. 605; rhizome elongate, leaves very slender finely acuminate, scapes many, heads hemispheric white villous, invol. bracts scarios obovate- or cuneate-oblong, floral hyaline ob lanceolate subacute, fem. fl. pedicelled, sepals 2 linear slender, petals 3 narrowly ob lanceolate ciliate with flexuous hairs, ovary with petals stipitate. E. rivulare, Dalz. in Hook. Kew Journ. iii. (1851) 280; Dalz. & Gibbs. Bomb. Fl. 280.

South Concan; in the Malwan Province, in streams, Dalzell.

Rootstock elongate, prostrate, densely clothed with tortuous capillary rootslet. Leaves in a terminal tuft, 4-10 by $\frac{1}{10}$-1 in., flexuous, flattened, opaque, 7-nerved. Scapes 7-18 in., 10-grooved. Heads $\frac{1}{10}$ 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 subsaual; 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.


The southern Concan; between Vingerla and Malwan, Dalzell.
Leaves 1-4 by 18-24 in., erect and recurved. *Scapes* few or many, 6-10 in., soft, shining, obscurely furrowed; sheath much longer than the leaves, tips membranous. *Heads* 18-24 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.


Temperate Himalaya; from Garwhal, alt. 5-6000 ft., to Sikkim, alt. 4-5000 ft. The Khasia Hills, alt. 4-6000 ft.
Roustock small. Leaves 2-3 by 18-24 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. *Heads* 18-24 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. luzulalefolium* but the invol. bracts of the fully formed head are recurved, the receptacle is glabrous. The ligulate leaved specimens look different.

33. **E. gregatum**, Kärn. 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 ob lanceolate obnubate 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 ob lanceolate densely villous, ovary with petals sessile.

Khasia Hills; alt. 5-6000 ft., or rocks in streams, Griffith, &c.
Roots of capillary fibres. Leaves 1-18 by 18 in. *Scapes* slender, often flexuous, deeply 4- or 5-grooved; sheaths with membranous tips. *Heads* 18 in. diam., white above the black involucre; receptacle columnar, glabrous; male sepals 3, free or connate; petals minute, obvolute, subequal, villous; stamens 2-5; fem. petals with large black glands. *Seeds* broadly oblong, yellow.—Allied to *E. milophyllum* 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 subinated tip rounded, head 16 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:** Kunmao, 3-4000 ft. and Garwhal, alt. 8-9000 ft., Duthie.

Leaves \(\frac{1}{2}-\frac{3}{4}\) in., spongy, opaque, green. **Scapes** 1-1\(\frac{1}{2}\) 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. achaton*, 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; *Schinz. Icon.* t. 46, f. 2, 5; *Steed. Syn. Pl. Cyp.* 270; *Kern. in Linnae. 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 \(\frac{1}{2}-\frac{3}{4}\) in., narrowed from the base to the tip, opaque, rarely translucent. **Scapes** 3-12 in., slender; sheath obtuse. **Heads** \(\frac{1}{2}\) in. diam., pale; invol. bracts coriaceous 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.—Difficulty to distinguish at sight from *E. trilobum* and *quinquangulare.*


Throughout India; from the Upper Gangetic plain to Burma, and southward to Ceylon (C.P. 729).

Leaves 1-4 by \(\frac{1}{2}-\frac{3}{4}\) 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** \(\frac{1}{2}-\frac{3}{4}\) 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
Eriocaulon. 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, invol. bracts small linear-oblong reflexed, floral spathulate oblongoaceate obtuse or subacute, male petals minute, fem. fl. subsessile, sepals 3 with broadly cymbiformly oblongoaceate petals narrowly oblongoaceate sparingly ciliate, ovary with petals sessile or subsessile. E. quinquenulum, Wall. Cat. l. c.; Kœrn. in Linnaea, 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 much smaller, much darker in colour, the invol. 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 invol. bracts radiating and longer than the head; the fem. sepals too are narrower, these are accompanied with specimens in which the invol. 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, invol. bracts obovate-oblong scarious spreading or at hemispheric 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 ½-⅓ in., translucent. Scapes 4-9 in., flexuous, young glabrous or hairy below; sheath acuminate. Heads ½ in. diam., softly tomentose; receptacle densely villous; invol. bracts much shorter than the floral, which are much longer than the flowers; male fl. pedicelled; sepals concave, tip hooded; stamina 4-5; fem. petals remarkably broad, unequal. Ovary sessile. Seeds minute, dark red-brown, strongly striate and papillosa.

39. E. Walkeri, Hook. f.; densely tufted, leaves narrowly subulate or linear few-nerved tips obtuse, heads globose snow-white, invol. bracts shorter spreading outer quadrate or cuneiform inner oblong, floral oblongoaceate acute or mucorane, fl. fem. sessile, sepals narrowly oblong obtuse, petals oblongoaceate 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 Cultura, Maccas; in paddy fields, Thwaites (C.P. 3582).

Leaves 1-2 by ½-⅓ in., glistening, opaque. Scapes 6-8 in., very slender. Heads ⅓-½ in. diam. or less; invol. 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; calaza 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 Linnaea, xxvii. (1854), 627; leaves linear subulate or ensiform acuminate many-nerved, scapes many twice as long, head hemispheric dark sparsely mealy, involucrue as broad as the heads,
braacts spreading and incurved obovate-oblong shining, floral obovate-oblong 
acute tips hoary, male sepals glabrous, fem. fl. pedicelled, sepals cymbiform, 
petals short filiform penicillate above the middle with long spreading hairs, 
with ovary sessile.

Nilgiri Hills; Schmidt. Ceylon, Walker, Thwaites (C.P. 790, in part).

Leaves 1-2½ by 1¼-½ in., few- or many-nerved, opaque. Scapes flexuous; tips 
of sheath acuminate, not membranous. Heads ½-¾ in. diam.; receptacle convex, densely 
 villous; fl. bracts greenish-brown scarios; male sepals 3 (2 connate) glabrous or 
 nearly so, petals very small, stamens 6; fem. sepals nearly glabrous, dorsally rounded 
or subcarnate. Seeds oblong with papillose striae.—Well marked by the slender 
 fem. petals, much like those of E. sexangulare. The Nilgiri 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. braacts small, outer very short 
cuneate-obovoid, floral obovate-oblong spathulate acutum or capidate dorsally hoary or the outer glabrous, male petals 3 small one often 
largest and exserted beyond the sepals but not beyond the braacts, fem. 
fl. pedicelled, sepals 2 cymbiform 3rd flat, petals narrowly obovate-oblong 
ciliolate, ovary and petals sessile or shortly stipitate. *E. luzulifolium*, Thw. 
Enum. 341.

Nilgiri 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 1¼-½ in., obtuse, compressed, 1-9-nerved, 
opaque or translucent. Scapes 1½-12 in., rigid, flexuous; sheath stout, equalising or 
shorter than the leaves, tip obtuse membranous. Heads ½ in. diam.; invol. braacts 
scarios, 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 sub-
equal.—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*, Korn. in Linn. xxvii. (1854), 630; small, leaves 
subulate, scapes twice as long, heads very small hemispheric few-fl., invol. 
braacts erect cuneiform pale, tip truncate or rounded, floral obovate-oblong 
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 1½-½ in. diam.; invol. braacts 
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 convolute towards the hairy 
tips, petals in the most developed heads 3, narrowly obovate-oblong, ciliolate. Seeds 
oblone, 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. 6054; dwarf, leaves subulate acuminate, scapes twice as long stout, 
heads broadly obconic, invol. braacts erect, outer much longer than the floral 
obovate-oblong, floral obovate-oblong or obovate-oblong tips hirsute, 
fem. fl. subsessile, sepals 2 narrow tips ciliolate, petals 3 narrowly obovate-

ciliolate, ovary with petals shortly stipitate. Kunth Enum. iiii. 555. 
in Hook. Kew Journ. iii. (1851), Dalz. & Gibbs, Bomb. Pl. 280. *E. xeranthe-

Tufted, annual. Leaves ½–1½ in., many-nerved, often recurved. Scapes striate, hardly grooved; sheath tumid, tips membranous. Heads ½–1 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, papillate 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. dioecious? 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, channelled, flaccid; sheath dilated, cottony within. Scapes rather shorter than the leaves; sheath not dilated, tip acute. Head ½ 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. Daleielli.

E. ceylanicum, Kœn. in Linnaea, xxvii. 667; a foot high, stem very short, leaves 2–3½ in. tufted linear suddenly mucronate, scapes solitary 1 in., heads rather large cylindrical-globose woolly white 4 in. long, invol. bracts obturate at length hidden under the head, floral cuneate-chovate submembranous pale, receptacle hairy, male sepals obtuse membranous, anticus petal much largest, fem. fl. sessile, sepals free acute like those of the males, petals 3 spathulate obtuse spongy anticus much the largest far longer than the sepals.—Hairs of bracts and perianth obtuse. Ceylon, Herb. Berlin.—Evidently near E. atratum, but leaves mucronate.

E. Eurycephon, Kœn. 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 1½–2½ 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. neesianum, Kœn. 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, Kœn.

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 0; anthers linear, basified on the flattened filo-
ments. Ovary (in Cariceae 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 Cyperaceae, and takes no account of exceptions to it, which occur in extra-Indian species.

I am indebted to Mr. O. B. Clarke, F.R.S., for the following account of the Indian Cyperaceae. 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 Stendel (and of Bott 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 clavus.—J. D. H.

A. CYPEREE. 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. EUCYPEREE. 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. PYREUS.
Rhachilla of spikelet persistent. Nut dorsally compressed . . 3. JUNCCELLUS.

** 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. SCIRPEE. 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 umbellated.
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. FURENA.
Hypogynous scales 2, hyaline, elliptic, enclosing the nut . . . 13. LIPOCARPHA.

Tribe III. RHYNCHOSPOREE. 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-fld.**

Lowest fertile gl. somewhat distant from the one above it.  **15. Schegenia.**

Spikelets panicled, 1-7-fld., lowest fl. alone perfect.  **16. Cladium.**

Spikelets 3-4-fld., uppermost fl. alone perfect.  **17. Microschegenia.**

Spikelets 1-2-fld., uppermost fl. alone perfect; hypog. scales long.  **18. Lepidospersma.**

Spikelets 1-2-fld., 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. HEPOLYTEM. Spikelets with one terminal fem, flower, two basal opposite male glumes, and 0-9 intercalated monandrous or empty spirally arranged glumes.

Spikelets corymbose; style 2-fld.  **21. Hypolytrum.**

Spikelets corymbose; style 3-fld.  **22. Thoracoschachyum.**

Spikelets congested; style 3-fld.  **23. Mapania.**

Spikelets in an oblong panicle.  **24. Scirpocephalum.**

Spikelets in a unilateral dense spikeform panicle.  **25. Lepironia.**

C. SCLERIEM. 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. CARICEAE. Spikelets uni- or bisexual, monoeocious or dioeocious. Nuts enclosed in an entire or 2-fld sac (utricle).

Utricle split down one side.  **27. Kobresia.**

Utricle entire or 2-fld at the tip only.  **28. Carex.**

1. KYLLINGA, Rothb.

Stem erect, simple, leafy below only, terminated by 1-3 sessile capitate spikes. Spikelets ovoid or cylindric, dense, with numerous small compressed spikelets. Glumes 4-5, distichous, rachheola disarticulating above the two lowest which are empty; gl. iii. bisexual; gel. iv. male or empty, rarely fertile; gl. v. rudimentary or 0 (rarely additional upper glumes occur). Stamens 1-3, anterior; anthers linear-oblong, muticus 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. **R. triceps**, Rothb. 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 whitish, nut ultimately yellow-brown. Roxb. FL. Ind. 1, 181; Nees in Wight Contr. 91; Thw. Enum. 345; Boeck. in Linn., xxxv. 413 (excl. var. 3). K. moncephala, Nees in Wight Contr. 91 (not of Rothb.). 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, ½-¾ in. broad. Head ½-¾ in. in diam.; bracts 3-4, up to 2-3 in. Spikelets 2½-3½ in.
Fertile glume ovate, keel smooth green subexcurrent, sides 3-4-striate, straw-colord. Stamens usually 2. Nut ½ 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-colord., nut yellow-brown ultimately black. Boeck. in Linnaea, xxxv. 415.—Kyllinga, Wall. Cat. 3442, partly, 3443 D, partly.


Stems 4-12 in. Leaves ½-1 in. broad, usually much shorter than stem. Head often of 3 spikes, median cylindric ½ in. long, lateral much shorter, subovoid; bracts 3-4, up to 2-3 in. Spikelets ½-1 in. long. Fertile glume ovate, keel green scarcely excurrent, sides not glandular-papillose. Nut ½ length of glume, ellipsoid, obtuse.


Rhizome about 1 in. Stems 20 in., sharply triquetrous at top. Leaves often 4 by ½ in., always much shorter than stem. Spike ½ by ½ in., thicker than in K. cylindrica; bracts up to 2-4 in., leaf-like. Spikelets ½ in. long, usually with 1 rarely 3 nuts. Fl. glume ovate, acute, keel green scarcely scabrous, sides 3-4-striate fuscos. Stamens often 3. Nut ½ length of glume, oblong-obovoid.


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 ½-2 in. curved). Leaves ½-1 in. broad, longer than the stem or very much shorter. Head ½-1 in. diam., green or brownish; spikes often 1; if 3, median ovoid, scarcely cylindric; bracts 3-4, up to 4 in. Spikelets ½-1 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 ½ or 3½ the length of glume, ellipsoid, obtuse; style as long as half the nut.

**Nut-bearing glume winged in upper half of keel.**

5. **K. monoecophala**, Roth. 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 Linnaea, xxxv. 427. K. triceps, 
iii. 293 (partly, not of Kunth). K. gracilis, Zoll. Verz. Ind. Archip. ii. 63 
lotes, 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 Mediterra-
nean.

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-hearing 
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 Linnaea, xxxv. 431. 
Kumaon, 74 (not of Rottb.).

Western India; Kashmir, Thomson. GrewhaL up to 5500 ft., Duthie. Mt.

Stems tufted (annual), 2–12 in. Leaves often longer than stem, ½ in. broad. 
Head ½ in. in diam., green or brown. Spikelets ½ 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 
oblóng 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 Linnaea, ix. 283; annual, slender, umbel 
simple or reduced to 1 head, bracts spreading, spikelets linear ⅓ in. wide 
yellow or pale, nut obovate compressed shining black hardly half as long 
as the glume. Cyperus flavescens, Linn. Sp. Fl. 68 (not of Linn. Herb.); 
Kunth Enum. ii. 5; Reichb. Jc. Fl. Germ. viii. 31, t. 278, figs. 662–664; 
Boeck. in Linnaea, xxxv. 438, and in Journ. Linn. Soc. xviii. 104; Clarke, 
t. c. xxxi. 36; Boiss. Fl. Orient. v. 364 (excl. Cabul sp.).

Punjab; Kurrum Valley, Aitchison, s. 964.—Distrib. N. temp. regions.

Stems 1–12 in. Leaves often ⅔ length of stem, ⅓ 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. 
C. coromandelinus, Boeck. in Linnaea, xxxv. 480 (not of Spreng.). C. fili-
formis, Heyne; Wall. Cat. 3320 (partly).
Throughout India, except the drier country, frequent, alt. 0-3000 ft.; from Khasia, H. f. & T. T. T., to Ceylon and Tavoy.

Roots aromatic (J. D. Hooker). Spikelets 15-40-fl., or often long, even up to 70-fl.


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, ½ in. wide, sometimes 0. Spikelets stouter than in P. flavescens, 20-60-fl. Nut with longitudinally oblong cells.—Strackey’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 ½ its length by leaf-sheaths.


Throughout India, ascending to 10,800 ft.; from Kashmir to Assam, Ceylon, and Singapore.—Distr. 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, ½ in. wide. Spikelets shortly spicate or clustered, ½ by ½ in., 6-24-fl. 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 Cyperaceae have nodes (and sheath 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.


Throughout India, alt. 0-6000 ft., frequent; from the PUNJAB to ASSAM, CEYLON, and SINGAPORE.—DISTRIBUTION. Warm regions of the Old World.

Annual. Stems tufted, 1-12 in. Leaves often as long as stem, \( \frac{1}{3} \) in. wide, weak. Umbel rays 1-6 in. up to 2-4 in. long, usually shorter. Spikelets 5-30 in a spike, \( \frac{1}{3} \) by \( \frac{1}{3} \) in., 8-14-fl.; 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 \( \frac{1}{3} \) as long as the glume.


MADRAS; in rice-fields, Wight, Leith.—DISTRIBUTION. Timor.

Stems 2-8 in. Leaves as long as stem, \( \frac{1}{3} \) in. wide, weak. Umbel rays 3-7, up to 2 in. long. Spikelets 4-12 in a spikelet, not clustered, \( \frac{1}{3} \) by \( \frac{1}{3} \) in. Glumes almost glistening on their pale or yellowish nerveless sides. Nut obtuse, ashy-black, more than \( \frac{1}{3} \) length of glume.

7. **P. capillaris**, Nees in Linnaea, ix. 283 and in Mart. Fl. Bras. ii. pars. 1, 9; umbel apparently simple or condensed into 1 head, (see var. \( \gamma \)) spikelets clustered linear many-fl. much compressed straw-colord., brown or black, nut small ellipsoid compressed apiculate chestnut-black. Cyperus globosus, All. Fl. Pedem. Auctuar. 49; Rothke. t. Fl. Crit. iii. 26, t. 229, and t. Fl. Germ. viii. 32, t. 279, fig. 665; Boeck. in Linnaea, xxxv. 455; Clarke in Journ. Linn. Soc. xx. 279 and xxxi. 47. C. flavidus, Decne. in Novv. Ann. Mus. iii. 359 (not of Retz. or Roxb.). C. capillaris, Koenig. ms.; Roxb. Fl. Ind. i. 194; Nees in Wight Contrib. 76; Dalz. & Gibs. Bomb. Fl. 283. C. Lamarckianus, Schultes in Rom. & Sch. Syst. ii. Munt. 105; Kunth Enum. ii. 9. C. vulgaris, Sieber ms.; Kunth l. c. 4. C. mucronatus, Moritz Verz. Zoll. Pfl. 95 (not of Rotth.). C. flaves-

N. INDIA; alt. 0–6000 feet, from KASHMIR TO CHOTA NAGPORE AND ASSAM.—DISTRIBUT. Temp. and trop. old world.

Glabrous. Stems tufted, 4–24 in. Leaves 4–12 by ½ in., weak. Umbel rays up to 2½ in., usually very short; bracts 4–8 in. Spikes subglobose. Spikelets 5–60, ½ by ½ in., 40-fl. Glumes ovate, obtuse. Stamens 2; anthers small, muticous. Nut ½ 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, rigidly imbricated.


Var. B. stricta, C. B. Clarke, l.c.; spikelets narrower straw-colord or yellow less compressed frequently short 6–12-fl. sometimes curved or twisted, glumes closely packed but loosely imbricated. Cyperus strictus, Lam. Ill. i. 146; Rott. Fl. Ind. i. 200; Kunth Enum. ii. 12; Mich. Fl. Ind. Bat. iii. 258. C. tortuosus, Koenig ms.; Rott. 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.—DISTRIBUT. Asia, Afr.


Near the coast of INDIA FROM SIND TO SINGAPORE; common. SILHET, Hook. f. & T. T.—DISTRIBUT. all warm especially maritime regions.

Glabrous. Stems 12–30 in., sometimes 0. Leaves overtopping stem or much shorter, ½ in. broad, weak. Umbel rays 1–7, up to 0–2 in.; spikelets compound of 10–50 spikelets; bracts 3–6, spreading, up to 4–15 in. spikelets ½ by ½ in., 20–50-fl. Glumes boat-shaped, ovate, muticous, papery, not rigid. Stamens 2 (usually); anthers small, oblong. Nut compressed, biconvex, black, ½ length of glume.


The DECCAN, and MALAY Peninsulas, and CEYLON, frequent.—DISTRIBUT. all hot regions.


Bengal; up to 5000 feet, alt. frequent. Anamalaiy Mts.; Badome. Pegu; Kurs. Tenasserim; Helder (Kew Distrib. n. 6209, 4).—DISTR. Afr. trop. Malay.

Slender. Spikelets up to 40–50-fld. Narrow edge of nut much flattened against the rachela.

††† Robust, spikelets larger, yellow brown or red, leaves close to base of stem.


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.


**Concan and Malabar; G. Thomson, &c. Rangoon; R. Scott, Kurse. — Distr. Tropics.**

Glabrous, annual. Stem erect at base, subsolitary, 1-3 ft. Leaves often ½ length of stem, ½ in. broad. Umbel rays sometimes 11, up to 7 in. long, sometimes 2-3, only 1 in, long. Spikelets often large, 1 by ½ in.

**Indeterminable species.**

C. Kamphveeneri, Boeck. Cyp. Nov. i. (1888), 5; rhizome tuberous, style but little exserted shortly 2-fid.—Nicobar Isla.; Kamphveener.

### 3. Juncellus.

Stem erect, simple, leafy only near base. Inflorescence umbellate or capitulate. Spikelets linear or oblong, compressed; rhachela 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 rhachela; 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 Boekeler and others as forms with 2-branched styles of corresponding species of *Cyperus*.

* Inflorescence umbelked.

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, 4-6 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 capitulate; bracteoles short. Spikes of 8-40 spikelets. Spikelets 3-4 by 1/2 in., 12-30-fld. (or shorter 6-8-fld.), turgescent; gluma ochraeola robust, tetragonous, excavated, scarcely winged. Glumes approximate; margins narrowly scarious, in dried ripe examples incurved. Stamens 3; anthers scarcely apiculate. Style short; branches about as long as nut. Nut obvoid, obtuse, smooth, dark-brown.—Much confounded 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. stylisus**, C. B. Clarke; stem at top trigonous slender, and leaves and bracts rather short, glumes not striate towards their margins, style-branched very long, nut (not quite ripe) small; otherwise as *J. serotinus*. Cyperus Monti, var. ? stylisus, C. B. Clarke in Journ. Linn. Soc. xxi. 78.

**Khasia Hills; Griffith.**


**Bengal; in swamps, from Sylhet to the sea, frequent.**—DISTRIB. China.

Rhachis of spikes glabrous, 1-2 in., spikelets often 4-5 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 puncticulosus*.


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, 4-6 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 1-1 5 by 2 in. Spikelets 4-5 in., lanceolate, compressed. Glumes muticous or muconulate. Stamens 3; anthers muticous. Nuts plano-convex, finally ashy-black (many imperfect pale); style as long as nut, branches longer, shortly exerted.—United by Boeckeler with 9 q 2.
Cyperus exaltatus, Retz; but separated by the very crowded spikes and 2-fld style.

** Stem with one head of spikelets.


From Kashmir to Burma and Ceylon. All warm regions (excl. Europe).

Glabrous. Stems coespitose (often very many), 1-10 in. Bracts 3-6 in., spreading. Head ¼-½ in. in diam. Spikelets often 100,½ in., 8-24-fl., greenish-white, finally pale brown. Glumes close-packed, boat-shaped. Stamens 2-½; anthers small, linear-oblong, mucous. Nut elliptid, brown, top pyramidal; style shorter than nut; branches shortly exerted.—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. pygmaeus are ripe, and the glumes (except a few of the top infertile) have fallen away, the scars on the rhachela (and therefore the glumes and nuts) are seen to be exactly distichous; whilst the rhachela 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 Fimbriystylis argentea, Vahl.

6. J. laevigatus, C. B. Clarke; rhizome creeping, leaves short or long, lower bract as though continuing stem, head lateral, spikelets 1-20 linear 16-40-fl. somewhat tubid, glumes close-packed obtuse, nut ⅓-⅔ length of glume. Cyperns laevigatus, Linn. Mont. 179; Rotb. Descr. et Jc. 19, t. 16, fig. 1; Mig. Fl. Ind. Bat. iii. 260; Boeck. in Linnaea, xxxv. 456; 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, Rotb. l. c. 19, t. 8, fig. 4; Roxb. Fl. Ind. i. 185; Nees in Wight Contrib. 72; Kuthn Enum. ii. 17; Reichb. Fl. Ger. viii. 32, t. 278, fig. 661. C. lateralis, Forsk. Fl. Aeg. Arab. 13; Rosb. l. c. 186; Nees in Wight Contrib. 73 (not Linn.f.); C. Roxburghianus, Prest. in Oken Isis, xxi. 271. C. pleuranthus, Nees l. c. 73. C. acuminatus, Rosb. ms. C. mucronatus and C. nivens, Herb. Heyne; Wall. Cat. 3311. Pycrens lavigatus, Nees in Linnaea, 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, ½ 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, ½ in. broad, usually short, occasionally obsolete (i.e. sheaths terminated by a lanceolate process not green). Spikelets closely clustered, ¼-½ in., rigid, often curved, straw-colored, or tinged with chestnut or chestnut-red; rhachela 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.

\[ \text{Var. } \beta \text{ juncoformis; rigid, spikelets 1-6 rigid shining chestnut or black. } C. \text{ distachyos, All. Fl. Fedem. Actuar. 46, t. 2, fig. 5; Boiss. Fl. Orient. v. 367. C. juncoformis, Desfont. Fl. Atlant. i. 42, t. 7, fig. 1; Boiss. t. c. C. levigatus, var. juncoformis, C. B. Clarke in Journ. Linn. Soc. xxi. 79.} \]

Peshawur; Stewart. Sind; Stocks.—DISTURB. Oriental.

### 4. CYPERUS, Linn.

Stem erect, simple, leafy only near base. *Inflorescence* umbellate or capitulate. *Spikelets* linear or oblong, compressed; rhachela persistent. *Glumes* distichous, 2 lowest empty, 4-∞ succeeding bisexual eariithmatic deciduous, uppermost 1-3 sterile or empty. *Stamens* 3-2, rarely 1; anther linear or oblong, sometimes crested. *Nut* triquetraceous, trigonous or plano-convex, plane face flat against rhachela; *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.


From BENGAL to MADRAS AND BURMA.—DISTURB. China, Malay, Austral.

Glabrous, floating in tanks; stolons slender. Stems 4-16 in. Leaves 2-5, as long as ½ stem, ⅔ in. broad. Bracts 3-5 up to 4-8 in., leaf-like. Heads ⅔-⅔ in. diam. Spikelets 10-70, ½-½ by ⅔ in., compressed, rigid, often bent, 10-36-fl.; 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 ⅔ length of glume, ovoid, unequally trigonous (i.e. somewhat plano-convex) passing gradually into the linear style ⅔ length of nut.—In the *Cyperaceae* which float in tanks that are never dry, a coryck 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 capititate; 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.)

From Bengal and Burma to Ceylon and Penang.—Distrib. Malays, 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 $\frac{1}{2}-\frac{1}{3}$ in. broad, coarse, cutting, nerves many, strong. Umbel 1-10 in. diam.; bracts 8-18 in., leaf-like, somewhat corystomous. Spikelets 5-1300, 1-6-together digitate, $\frac{1}{2}$ by $\frac{1}{3}$ in., 20-40-fld., brown pale or reddish; rachilla persistent, scarcely winged. Glumes very close-packed, boat-shaped, back with 3 green nerves. Stamens 3; filaments ligulate; anthers linear-oblong, created with a small linear-lanceolate red mucro. Nut ellipsoid, $\frac{1}{3}$ 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.)


Glabrous. Stems cespitose, 2-8 in. Leaves $\frac{1}{3}$-$\frac{1}{2}$ length of stem, $\frac{1}{2}$ 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 $\frac{1}{3}$ by $\frac{1}{3}$-$\frac{1}{2}$ 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 $\frac{1}{3}$ length of glume (mucro excluded). Roeb. Pl. Ind. i. 195; Nees in Wight Contrib. 79; Kunth Enum. ii. 21; Thw. Enum. 343; Boeck. in Linn. Soc. xxxv. 496 (excl. Wall. 3376 B); C. B. Clarke in Journ. Linn. Soc. xxi. 87. C. squarrosum, Trim. 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 $\frac{1}{2}$-6 in. Leaves as long as stem, $\frac{1}{3}$ 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, $\frac{1}{3}$ by $\frac{1}{3}$ in., 15-70-fld. Glumes boat-shaped, back 3-nerved, keel excurrent greenish-yellow. Anthers small, short-oblong. Nut red-black, side 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-obvoid $\frac{1}{2}$

Throughout India; from Kashmir and Assam to Ceylon and Penang.—Distrib. All warm regions.

The older botanists referred the chestnut-colord 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. Haspæan 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.)


Kashmir and N.W. Himalaya, alt. 6000 ft., Thomson, &c.—Distrib. Westward to Britain.


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 Il. 24, t. 9, fig. 2; Robb. Fl. Ind. i. 195; Nees in Wight Contrib. 88; Kunth Enum. ii. 38; Dalz. & Gibb. Bomb. Fl. 282; Miq. Fl. Ind. Bat. iii. 269; Boeck. in Linnæa, xxxv. 586; Thw. Enum. 344; King in E. J. Atkinson Gaz. n. (1876) 328; Boiss. Fl. Orient. v. 370; C. B. Clarke in Journ. Linn. Soc. xx. 290, and xxii. 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 rice-fields; Mexico (introduced?)

Glabrous. Stems 4–20 in., acutely triquetrous at top. Leaves usually somewhat shorter than stem, ¼–½ 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 ¼–½ in. in diam., globose. Spikelets ½–¾ by ⅓ in., somewhat turgid, 10–30-fld. Glumes close-packed, concave, very obtuse, straw-colord, sides more or less red. Stamens 1, rarely 2; anther small, oblong, muticus. Nut subesejale, 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-fl., glumes ovate-oblong, nut oblong-ovoid ⅓-⅓ 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 subtriangular. Otherwise resembling *C. differens*.—Seldom collected, but not rare.


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-growing but plant often flowering in first year, spikelets 2-6-digitate small linear, stamens 3-2, nut small ovoid or obvoid ⅔-⅔ length of obtuse glume. *Roscoe Fl. Ind.* i. 210; Nees in Wight Contrib. 80 (partly); *Kunth Enum.* ii. 34; Dalz. & Gibbs. *Bomb. Fl.* 282; *Thw. Enum.* 343; Boeck. in Linnæa, xxxv. 574, var. a partly, and var. b; C. B. Clarke in Journ. Linn. Soc. xx. 287, and xxi. 119. C. graminifolius, Poir. in Lam. Encycl. vii. 267; Kunth l. c. 96. C. pes-avium, Bertol. Misc. Bot. viii. 30, t. 3, fig. 1. Cyperus gracilis, Herb. Heyne, Wall. Cat. 3369, D, E, F, 3372.—Scirpus, Rotth. Descr. et Icon. 58, t. 17, fig. 3 (excl. *Syn. Linn.*).

Throughout India; abundant, especially in kicked rice-fields.—DISTRIBUTION. All warm regions.

Glabrous. *Rhzome* in typical form creeping, 6 in. and upwards, covered by ovate triangular scales and with distant solitary stems; but stems often cespitose 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 struggling with few spikes, or dense with innumerable spikes; bracts short or long and fur overtopping umbel, (in Khasia examples) long, ⅔ in. broad, tip triangular-lanceolate. *Spikelets* ⅓-⅓ by ⅓-⅓ in., 10-40-fl., varying much in development. *Glumes* close-packed, ovate, obtuse, obscurely (or not) macronate. *Anthers* linear-oblong, often bristle 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 Cyperaceae 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

Throughout INDIA, abundant in rice-fields.—*Distr.* Warm regions of the Old World.


Sect. 4. *Nivei.* Rhizome woody, very short; rootlets wiry. *Inflorescence* of one head. (Sp. 12-14.)


Glabrous, whole plant usually more or less red; stolons 0. Stems 2-11 in. Leaves usually ½ length of stem, ½-½ in. broad, weak; sheaths broad, usually scarious, inflated. Bracts 2, lower 1-½ in. Spikelets 3-20 in 1 head, ½ by ½ in. Glumes close-packed, much imbricated at base, 9-15-serial, keel very acute excurrent conspicuously. Stamens 3; anthers nearly muticous. Nut obovoid, triquetrovus 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. Teneriffae,* 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 *Teneriffae.* 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,* auctornum.

13. *C. niveus,* Retz. *Obs.* v. 12; culus at base nodose closely uniseriate, spikelets 3-12 in one head strongly compressed linear-oblong 20-40-fl. white or cinnamomous, glumes muticous, nut oblong-obovoid ½ length of glume. *Roeb. Fl. Ind.* i. 191; *Nees in Wight Contrib.* 78; *Kunth Enum.* ii. 45; *Mig. Fl. Ind.* Bat. iii. 271; *Boeck. in Linnaea,* xxxv. 550; *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.—Distr.* Cabul, China.

Glabrous, Rhizome woody, almost wholly constructed of the nodose bases of
stems. Stems 8–16 in., slender. Leaves ½ length of stem, ½–1 in. broad, weak. Bracts 2–3, up to 1–1½ in. Spikelets commonly ½ by ½ 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.


Scattered from MONGHIE, Wallich, to MYSORE, Law, and MARTABAN, Wallich; (seldom collected).—DISTRIB. Tropics generally.


Sect. 5. **Conglomerati**. Rhizome woody, creeping; rootlets thick, often woolly. Inflorescence umbelalled or with 1 head. (Sp. 15–19.)


Seacoast from SIND to CRYLON and ORISSA. PUNJAB PLAIN; Atichison, Duthie.—DISTRIB. Persia, Arabia.


SIND; LACE.—DISTRIB.; Westwd. to N. Africa.

Glabrous. Rhizome sometimes elongate, ½–1 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.

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*, Rothb.


SIND; Pinewill.—DISTRIB. Westld. to N. Africa.

Spikelets 1-1 by 1-1-1 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. Atkinsonii**, 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: Bimahur, 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.)

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, ¾–½ in. broad, flat, green, 3-nerved. Umbel 4–12 in. in diam., decom- pound (depanned examples with few spikes occur); bracts 4–10, up to 1–2 ft., leaf-like. Spikelets 3–9 together, digitate, ¾–½ by ½ in. (sometimes much longer). Glumes boat-shaped, green, back 3–5-nerved; wings of rachilla narrow, not deci- duous. 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 exerted.—One of the commonest of the genus, best known as C. elegans, Linn., but not part of Linneus’s elegans, whose type, his figure cited, and his description, are all of C. viscosus, Alton. Nor can his description include C. diffusus, Vahl. Kunth, in transferring the name C. elegans, Linn., to this plant, followed Swartz and Wildenow.


From Assam and Burma to Perak and Ceylon.—Distrib. Malay Ilands.

Differs, uniformly, from large examples of C. diffusus, Vahl in the tightly-packed glumes (even in fruit); but might be treated as a var.


Burma; Chappedong River, Wallich. Pegu; Kurz. Mergui; Griffith (Kew Distrib. 6140). TENASSERIM or ANDAMANS; Helfer (Kew Distrib. 6140).


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 Keena’s about half solitary half 2–3 together digitate. Glumes in fruit with upper margins imbricated.


ANDAMAN ISLES; Phasesa, 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


Cyperus.]  CLXXII. CYPERACEAE. (C. B. Clarke.)  609

heads (otherwise as C. diffusus). Scirpus trialatus, Boeck. in Linnaea, xxxvi. 721.—Isoplepis, 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.


MALAY PENINSULA. TENASSERIM, Helfer (Kew Distrib. 6209); SINGAPORE, Wallich.—Distrib. China, Malaya.

Glabrons. Rhizome very short; stolons 0. Stems frequently less than 1 in. Leaves much exceeding stem, ½ in. broad, rigid, not 3-nerved, often becoming brown. Rays of umbel always remarkably long (13 in. in Maingay, n. 1721). Spikes ⅔-⅘ in. in diam., sometimes globose, dense with 10-30 spikelets, sometimes in clusters of 2-5 spikelets, or occasionally spikelets mostly solitary pedicelled. Spikelets ⅔ by ⅔ in., 6-12-fl.; rhachilla not winged. Glumes closely imbricate, green usually marked with red, mucilaginous. 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. Inf. umbellate, spikes often more or less corymbed; spikelets (sometimes very shortly) spicate. Style-branched 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.)


Throughout India; from the Punjab and Assam to Ceylon and Singapore.—Distrib. All warm countries (except Australia).
Glabrous. Stems cespitose, 4–16 in., or (in the form C. pectiniformis, Nees) 0–2 in. Leaves often nearly as long as stem, ½–1 in. broad. Umbel rays 0–6 in.; bracts often longer than umbel, leaf-like. Spikelets ½–1 by ½–1 in. (in form pectiniformis up to 1½ in. and 20–60-fld.). Glumes densely, not rigidly, imbricated, ovate, many-nerved, mucro scarcely recurved. Stamens 3; anthers linear-oblong, scarcely apiculate. Nut ⅜ length of glumé, very broad; style shorter than nut, branches linear shortly exsert.

28. C. glaber, Linn. Mant. 179; umbels contracted, spikelets very closely spiral more or less red-tinged, glumes muticous or very nearly so, not obovoid obtuse minutely conic-apiculate (otherwise as C. compressus). Reich. Lc. Fl. Germ. viii. 32, t. 280, fig. 669; Boeck. in Linnæa, xxxv. 517; C. B. Clarke in Journ. Linn. Soc. xxvi. 104; Boiss. Fl. Orient. v. 371. C. patulus, Kitab. ex Host Gram. Austr. iii. 49, t. 74; Kunth Enum. ii. 24; Lede. Fl. Ross. iv. 240 (not of Bieb.).

SIND—Pinwill.—DISTRIBUT. Westward to Sicily.

Umbel rays ½–1½ in. Glumes nearly always reddish on the sides (green in C. compressus).

29. C. aristatus, Rothb. Deser. et Jc. 23, t. 6, fig. 1; small, umbel nearly simple or reduced to 1 head, spikelets densely spiral 6–30-fld., glumes ovate-lanceolate many-striate over nearly their whole breadth acuminate into a recurved bristle, nut oblong or narrow-obovoid ⅜ length of glume (bristle inclusive). Roxb. Fl. Ind. i. 190; Kunth Enum. ii. 23 (excl. syn. Burm.); Strachey Cat. Pl. Kumaon 74; Mig. 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, Linna. 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.—DISTRIBUT. Tropics.


INDIA, general in rice-fields.—DISTRIBUT. Old world.

A glabrous short-lived weed. Stems cespitose, 4–20 in. Leaves often nearly as long as stem, ½ 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 umbellate. Spikelets very loosely spiral, rachis ½–2 in. Spikelets 5–20, obliquely erect, yellow or brown (not red nor chestnut), ½ by ⅓ in.; rachela obtusely 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.—*Rheed Hort. Madal. xii. 105, t. 56, cited by Linnaeus, &c., is *C. inundatus*, Roxb.


From Kashmir to Ceylon and the Andamans.


KASHMIR; Sonamurg, alt. 6500 ft., Thomson.—DISTRIB. From Italy to China and Japan.


Sect. 2. Rhizome becoming woody; elongate stolons frequent. Large (or middle-sized). (Sp. 32–39.)


From the Himalaya, alt. 0–3000 ft., to Ceylon and Singapore.—DISTRIB. All warm regions.

Glabrous. *Stolons* up to 2 by ⅙ in. clothed by dark brown elliptic acute scales. *Stems* 1–3 ft. *(depauperated less than 1 in.)*. *Leaves* often as long as stem, ½–⅔ in. broad. *Umbel* 8–12 in. in. diam., from a single head 2⅔ 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* ½–1 by ⅛ 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 rhachela 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.

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 \( \frac{3}{4} - \frac{1}{2} \) by \( \frac{1}{2} \) in., pale or testaceae, scarcely becoming red or chestnut-brown as in *C. distans* and *nudans*, to which species it is closely allied.

35. **C. Thomsoni**, Boeck. in Linnaea, 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 \( \frac{1}{2} - \frac{1}{2} \) 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. Touk.**

Glabrous. Stems 12-20 in., robust. Leaves often as long as stem, \( \frac{1}{3} - \frac{1}{2} \) in. broad, strong. Umbel (in *Hooker *... 263 (“type” of Boeckler) \( \frac{1}{2} \) in. in diam., but often much larger (primary rays up to 7 in.); bracts exceeding umbel. Spikelets dense, rhachis \( \frac{1}{4} - \frac{1}{2} \) in.; glabrous. Spikelets 20-40 nearly 1 by \( \frac{1}{2} \) in., moderately compressed; wings of rhachela very narrow, persistent. Glumes with 7-9 very close dorsal nerves, sides nerveless. Stamen 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.

Cyperus.]

OLXXII. CYPERACEÆ. (C. B. Clarke.) 609

Wight Contrib. 83 (part of Wall. n. 3342 C. with trifid style). C. spanio-
phyllum, Steud. Cyp. 21; Miq. Fl. Ind. Bat. iii. 287. C. tegetiformis,
Benth. Fl. Austral. vii. 279 mostly (not Roxb.). C. Pangorei and Pan-

On brackish mud banks, from Bengal to Singapore. Sind; Pinwill.—

Glabrous. Stolons long, \( \frac{1}{2} \) in. diam., clothed by broad lax black-chestnut
scales 1 in. long, hardening into woody creeping rhizomes. Stems 18–36 in., at
top \( \frac{1}{2} \) in. in diam. with 3 concave faces. Leaves usually few, topmost 2–6 in.
erect, green, sword-shaped, shortly cuneate. Umbel 2–6 in. in diam., simple com-
 pound or congested; bracts 3–5, up to 6 by \( \frac{1}{2} \) in., lowest usually erect (till fruit-
time). Spikelets of 4–10 spikelets, rachis glabrous. Spikelets \( \frac{1}{2} \)–\( \frac{3}{2} \) by \( \frac{1}{2} \)–\( 3 \) in.
Glumes about \( \frac{1}{2} \) in., very concave, in dry examples loosely imbricated. Stamens
3; authors linear-oblong, not crested. Nut trigonous, becoming black; style \( \frac{1}{2} 
length of nut; branches linear, slightly exerted.—This perhaps from its short leaves
is more nearly allied to C. tegetiformis, Roxb., but differs in the very narrow wing
to rachilla. Easily recognized, when dry, by the glumes (though closely packed)
being forced apart by their edges being crisply incurved all round.—Cyperus,
Rottb. Descr. et ic. p. 40, t. 11, fig. 3, is adduced here by various authors; but 1
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, second umbels closely corymbed, rachis of spikes
scabrous-pileote (or in form C. marginellus and var. \( \gamma \) glabrous); spikelets
linear 10–20-fl., nut ellipsoid apiculate \( \frac{1}{2} \) length of glume. Kunth Enum.
ii. 80; Strachey Cat. Pl. Kumaon, 74; Thw. Enum. 344; Boeck. in Linnae.
xxxv. 598; Dutchie in E. T. Atkinson Gaz. x. 620; C. B. Clarke in Journ.
Linn. Soc. xxi. 148 and xxxv. 81. C. paniculatus, D. Don Prodr. 39 (ef.
imbriatus, Nees in Wight Contrib. 86; Kunth l. c. 100; W. Jap. 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. 32; Nees l. c.
83 (partly, not Rottb.). C. honestus, Kunth l. c. 74. C. venustus, Moritzi Verz.
Zoll. Pfl. 96 (not Br.). C. subalatus, paniciflorus, and hebes, Steud.
63 and Syn. Cyp. 40. C. Heyneanus, Boeck. in Flora, xlii. 440 bis. C.
truncatus, Franch. et Savat. Pl. Jap. ii. 105 (not of Tuxor). C. Griffithianus,
Boeck. in Linnae, xxxv. 601. C. Wallichii, Wight ms. (not Nees).—Cyperus,
Wall. Cat. 3343, 3348, 3355 (partly).

Throughout India, alt. 0–5000 ft., abundant.—Distrib. Trop. As., Afric., and
Austral.

Glabrous, except the rachis of spikes. Stolons scarcely \( \frac{1}{20} \) in. diam., with
distant nodes and scales \( \frac{3}{4} \) 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 \( \frac{1}{2} \) length of stem,
\( \frac{1}{2} \) in. broad; bracts overtopping umbel, leaf-like. Rachis of spikes in most
examples definitely pilose, often only more or less scabrous subpilose, in the form
marginellus microscopically glabrous. Spikelets (commonly) \( \frac{1}{8} \) by \( \frac{1}{2} \) in., compressed,
reddish or brown or straw-colr., close or remote, when ripe spreading at right
angles; rachis obscurely (or not) winged. Glumes ovate, muticosis, scarcely
keeled, 3–7-nerved on back, ultimately loosely imbricated. Stamens 3; anthers
linear-oblong, muticosis. Nut acutely trigonous, black; style shorter than nut;
branches linear, moderately exerted.—Of all Cyperus 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, Rothb., and in both of these the rhachis of spikelets is occasionally scabrous-pilose.

Var. \( \beta \) obliqua, C. B. Clarke l. c. 151; spikelets with fewer (sometimes only 5-6) flowers, often pale and very far apart. \( \beta \) obliquus, Nees in Wight Contrib. 86; Kunth Enum. ii. 60; Boeck. in Linnae, xxxv. 611; W. Wats. in E. T. Atkinson Gaz. x. 388. C. quinqueflorus, Hochst. ms.; Steud. Syn. Cyp. 37 (partly).—INDIA; widely scattered, but very much less common than the type.—Java.

Var. \( \gamma \) polyantha, C. B. Clarke l. c.; umbel rays \( 2 \frac{1}{2} \) 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-spikelets, 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 \( \frac{1}{2} \) glume (otherwise as C. pilosus).—Boeck. in Linnae, xxxv. 521. C. Babakan, Steud. Syn. Cyp. 6 (wrongly placed in Cyperus). C. bengalensis and pilosus, var. \( \delta \) 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.—DISTRIBUT. JAVA.

Rays of umbel 3-6, lowest much longer than the others, erect, stout. Spikes 2 by \( 1 \frac{1}{2} \) in. very dense. Spikelets \( \frac{3}{4} \) by \( \frac{1}{2} \) in., 14-40-fld., red-brown; rhachela stout.

39. C. procerus, Rothb. Descr. et l. c. 29, t. 5, fig. 3; stout, glabrous (but see var. \( \beta \)), secondary umbels loosely corymbed of 1-5 spikes, spikelets remote large 20-40-fld., glumes broad obtuse, nut obovoid \( \frac{3}{4} \) length of glume (otherwise nearly as large C. pilosus). Nees in Wight Contrib. 83 (excl. syn.); Roeb. Fl. Ind. i. 203 (excl. cit. Bheede) and Kunth Enum. ii. 72; Thou. Enum. 343; Boeck. in Flora, lvi. 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 Linnae, 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.—DISTRIBUT. Amoy, Tonkin, Java.

Very like large forms of C. pilosus, but with open inflorescence, distant larger spikelets, often 1 by \( \frac{3}{4} \) 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. \( \beta \) 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 tunioted bulbils.—Closely allied to Mariscus Sect. Bulbocaulis. (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. & Gibb. Bomb. Fl. 284; Boeck. in Linnæa, xxxvi. 300; Trimen in Journ. Bot. xiii. (1884), 358. C. jeminicus, Retz. Obs. iv. 11 (jeminicus); Roeb. 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 Rothb.). C. geminatus, Koëng ms.; Ainslie Mat. Med. Hind. (1813), 250; Moon Cat. Fl. Ceylon, 6 (not of Schrader). C. olaraceus, Roeb. 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).


Glabrous. Stolons 1–2 1/2 in., thread-like; bulbils ovoid-conic, at first 1/2 in., white, edible, ultimately larger with thick black coat. Stems 4–12 in., slender. Leaves numerous, subhastal, up to 1 1/2 in. broad, tip long-candate. Umbel sometimes evolute, rays up to 2 in., usually contracted 1–1 1/4 in. in diam. interruptedly subcorymbose; bracts overtopping inflorescence, similar to leaves. Spikelets 3–20 reddish, up to 1 1/2 by 1 1/4 in., 8–26-fl.; wings of rhachilla elliptic, persistent. Glumes boat-shaped, ovate, obtuse, 11-nerved. Stamens 3; anthers linear, muticus. Nut obovoid, obtuse, triquetrous, black, hardly 1/2 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 1/2 length of stem. Glumes approximate, closely imbricate. (Sp. 41–44.)


BENGAL to Ceylon.—Disteir. All warm regions.

Glabrous. Stolons 1/2–1 in. diam., clothed by ovate-lanceolate striate brown-black scales 3/4 in. long. Stems 3–6 ft., often 2–4 in. apart on the thick woody rhizome, at top 1–1 1/2 in. in diam., terete or scarcely trigonous, when dry usually with false nodes 1/2 in. apart; upper sheaths usually terminated by a subspathaceous lanceolate-cord. limb, rarely by a small green leaf. Umbel rays usually 10, up to 2–6 in.; bracts 1/2–3/4 in., ovate, striate, subserif at base hardly keeled, concave, margins not reflexed. Spikelets 5–15 together, shortly spicate, 1/2–1 1/2 by 1/2 in., 12–50-fl., straw-cord., afterwards dusky. Glumes even in fruit imbricate, ovate, obtuse, concave, scarcely keeled, obscurely 3–5-nerved on back; wings of rhachilla oblong or elliptic, scarios, ultimately deciduous. Stamens 3; anthers linear-oblong, muticus. Nut trigonous, acute at either end, black; style shorter than nut; branches linear, shortly exerted.

r r 2

**Bengal and Assam, Madras and Bundleund.**—Distrib. China, Japan.

This has been confused with *C. malaccensis*, Lam., which differs by the very narrow wing to rachilla 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 \( \frac{1}{2} \) 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. biphyllus, Retz Obs. v. 11; Kunth Enum. ii. 54; Boeck. in Linn. Z. 182. To 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. 50; Kunth l. c. 55 (not of Moritz.). C. enodis, Boeck. l. c. 271. Papyrus Pangorei, Nees l. c. 88 (partly).—Fimbrylistylis, Wall. Cat. 3525 E.

**From Kumaon, Wallis, to Assam, Burma, Ceylon.**—Distrib. As., Afric., and Amer.

Stems 2–3 ft., when dry often more or less transversely separte. 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.


44. **C. scariousus**, 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. 169. C. pertenennis, Roxb. Fl. Ind. i. 198; Nees in Wight Contrib. 33. C. rotundus, Thw. Enum. 343 (partly); Boeck. ms. partly, not of Linn.

**Bengal; Soondraebun, C. B. Clarke, common. Pegu, Kurs ms., 683, 684 (Herb. Calculo).**—Distrib. Australia.

Glabrous. Stolons \( \frac{1}{2} \) by \( \frac{1}{3} \) in., clothed by elliptic acute lax striate concolorous scales \( \frac{1}{3} \) in. long. Stems 16–36 in., at top \( \frac{3}{4} \)–1 in. in diam. Leaves (in the Indian as in Brown’s examples) variable, usually short (less than \( \frac{1}{2} \) stem), sometimes much longer, sometimes 0, narrow, weak. Umbel thin; rays slender, sometimes up to 3 in. long, sometimes not \( \frac{1}{4} \) in.; bracts nearly always as the leaves, i.e. hardly any when leaves short, exceeding inflorescence when leaves longish.—N’t very near *C. rotundus*; differs little from *C. tegetiformis*, but in the extreme slenderness of stem and umbel.

**Sect. 5. Subimbricatae.** 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 Brevifoliatae and Rotundae). (Sp. 45-47.)


On rocks in rivers. **Pegu, Kurr, n. 671. CHITTAGONG, C. B. Clarke. CENTRAL INDIA; Dutchie, 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 ½-2 in., leaf-like, Spikelets ½ by ½ in.; wings of rachilla narrow-oblong, hyaline, disappearing. Glumes somewhat remote, in fruit not imbricate, ovate-oblong, 3-5-nerved, back green, sides brown nervless. Stamina 3; anthers linear-oblong muticus. Nut trigonous, ashy-black; style shorter than nut; branches linear, long.—Somewhat resembling slender forms of *C. tegetum*, but the narrow evanescent wing of rachaeola 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 rachilla strong caducous, glumes somewhat remote in fruit obliquely spreading, nut oblong-obovoid 1/2 length of glume. **Wall. Cat. 3332 A, 3352 mainly; C. B. Clarke in Journ. Linn. Soc. xxi. 160 (excl. syn. C. Schimperiarius, and African plants), and xxv. 81. C. corymbosus, Kautor ms.; Rottb. in New. Schr. Gesell. Freunde, Berlin, iv. 219 in Obs.; Boeck. in Linneea, xxxvi. 276 (mostly); Dutchie in E. T. Atkinson, Gaz. x. 620 (not of Rottb.). C. dehiscens, Nees in Linneea, ix. 286; Kunth Enum. ii. 56 (excl. syn. Roxb.); Trimen Cat. Fl. 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. subcultatus, Herb. Hayne; Wall. Cat. 3330. Papyrus dehiscens, Nees in Wight Contrib. 89. P. Pangorei, Nees i. c. 88 (mostly). P. corymbosus, Nees l. c. 89 (excl. syn. Rottb.).

Throughout INDIA, alt. 0-6000 ft., from KASHMIR to CEYLON and BURMA.—

**DISTRIIt.** Cult. in Mauritius (C. textile, Bojer).

Glabrous. *Rhizome horizontal, stout, woody. Stems 3 ft. Leaves uppermost usually 4-8 by ½ in.; often 0, occasionally 16 in. Umbel usually 4-12 in. in diam.; umbellules corymbose, spikes numerous. Spikelets ½ by ½ in., 10-20-fld., usually fine-brown or reddish. Glumes elliptic-oblong obtuse, 3-5-nerved, scarcely keeled. Wings of rachaeola ovate, acute, finally yellow or red-brown separating by a clean cut. Stamens, nut, and style much as in *C. macer*.

Var. β ambiguus, C. B. Clarke l. c. (1884) 162; spikelets 1½ in., glumes ½ in., wings of rachaeola narrow hardly separating. Madras Peninsula, Wallieck, n. 3329 F, in Herb. Kew (not Herb. propr.), and one of the two examples of n. 3330, in herb. propr. 


Throughout moist India, alt. 500–5000 ft., plentiful, from NEPAL, Wall., and ASSAM, SHOEB. to Ceylon, THWAITES, and MALACCA, GRIFF. —DISTRIB. Trop. As., Afric., and Austl.

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 ½ stem, ½ in. broad. Umbel in well-developed examples large, straggling, rays 4–10 up to 9 in. with radicles of secondary umbels up to 3 in., but small 1-headed examples are frequent; bracts as long as umbel or greatly overtopping it. Spikes large, open, rhachis glabrous. Spikelets 3–16, often 1 by ½ in., 20-fl., 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, mucous. Nut triquetrous, obtuse; style shorter than nut, slender; branches linear, slender.


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-fl., nut ellipsoid ¼–½ length of glume. Kunth Enum. ii. 60; Boeck. in Linncea, xxxvi. 279, var. a; Boeck. 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.


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, ½ in. in diam. Stems 2½ ft., triquetrous, at base erect somewhat bulbous. 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 bulbous thickening, and the spikelets rectangular spreading.

Var. β indica; lowest bract suberect very long, spikelets ferruginous brown. C. longus, Linn., var. gracilis, Boeck. in Linncea, xxxvi. 281. C. denudatus, HEYNE, in Wall. Cat. 3349, 3329, F.—DECAN PENINSULA, Wallach.

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). Ramb. Hort. Beng. 5, and Fl. Ind. i. 197; Kunth Enum. ii. 58 (excl. C. bulbosus, Vahl, and others); Boeck. in Linncea, xxxvi.
Cyperus.] \hspace{1cm} \text{CLXXII. CYPERACEÆ.} (C. B. Clarke.) \hspace{1cm} 615


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 \(\frac{1}{2}\)–1 in. in diam., not (or very obscurely) zoned. Stems subsolitary, 4–32 in., at top triquetrous. Leaves long, often overtopping stem, \(\frac{1}{2}\) in. broad. Umbel frequently compound, primary rays 2–3 in., spikelets 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 indistinguishable from \(C.\) longus.

Var. \(\beta\) centifolia, C. B. Clarke in Journ. Linn. Soc. xxi. 171; spikelets elongate many-fl., often curved or twisted. Monghyr, Wall. Cat. 3373 (right-hand example). The Deccan, G. Thomson, n. 258.—In this (n. 258) the spikelets are \(3\frac{3}{4}\) in., with 118 flowers, but all forms intermediate between this and \(C.\) rotundus.


Shores of India, especially in sea sand; from Sind to Ceylon, Coromandel, and the Malay Peninsula.—Nilgirith Ms., Foulkes. DISTRIB. Mauritius, China, Malaya, Australia.

Stolons long, hardening into the creeping rhizome, not producing tunicated bulblils. Stems 4–8 in. Umbel rays 0–1 in.; bracts usually 3, varying in length as do the leaves. Spikelets \(\frac{1}{2}\) by \(\frac{1}{2}\) in., 8–20-fl.; glumes more closely packed than in \(C.\) rotundus, their margins often glistening hyaline.

52. \textbf{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. ochroides, Steud. l. c. 34. C. tenuiflorus, Balfour Socotra, 305 (not of Rothb.). C. longus var. pallida, Boeck. l. c. 290 (excl. \(C.\) mitis, not of Boiss.). C. longus, vars. \(\beta\) pallescens and \(\epsilon\) 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 \(\frac{1}{2}\)–\(\frac{1}{4}\) in. diam. Leaves often nearly as long as stems, \(\frac{1}{2}\) 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
—*Cyperus*, *Wight in Wall.* Cat. n. 3316.

**Deccan Peninsula; Wallich. Nilgiri Hills; alt. 2000 ft., Gamble.**

Stem 20 in., at top less than ½ in. in diam., at base oblique nodosely thickened
then abruptly contracted into a long slender rhizome. Leaves somewhat shorter
than stem, ¼–½ in. Broad. Umbel rays 0–½ in. *Spikelets* slender, ferruginous-
brown.

& Fl. *Ind. i*. 199; *Kunth Enum.* ii. 50 (in small part); *Boeck. in Linnæa*,
86 (not of *C. B. Clarke*). *C. rotundus*, Benth. *Fl. Austral.* vii. 279
rotundus*, var. *acuta*, *Boeck*. l. c. 230. *C. tenuiflorus*, *Boeck*. l. c. 199; *Nees
in Wight Contrib.* 82 (Indian plant); Dalz. & Gibbs *Bomb. Fl.* 284; W.
Wats. in E. T. *Atkinson Gaz.* x. (1876), 393; *Trimen in Journ. Bot.* xxii.
140; *C. B. Clarke in Journ. Linn. Soc.* xx. (1883), 193 and xxi. 174 (not
Rothb. or Boeck.). *C. procerula*, *Nees in Wight Contrib.* 82; *Kunth
*C. hexastachyus*, *Nees l. c. (partly).* C. *Roestelii*, *Kunth l. c. 58. C.
*C. procerus*, *Herb. Roxb.*; *Wall. Cat.* 3329, A.

**Ceylon; Thawites, no. 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 Konig, 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 complica-
tion to accept his identification, rather than to separate further the *C. tuberosus* of
Rottler (and others) from that of Rottboel.

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.
Tenori, Presl.; Reichh. *Ic. Fl.* *Germ.* viii. 32, t. 281, fig. 670. *C. pumilus*
and *C. jenkinsi*, *Herb. Heyne*; *Wall. Cat.* 3354.
From the Punjab, T. Thomson, to Nilghiri Mts., Hohenacker, scattered, not common.—Distr. S. Europe, Afric, America.

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. Rachilla of spikelets conspicuously winged. Anthers apiculate, not rarely crested. Style (with its 3 branches) small. Nut small, ashy black. (Sp. 58–61.)


From Agra, Munro to Penang, Curtis; plentiful in Bengal.—Distr. As., Afric, Amer.

Glabrous. Stems 1–3 ft. Leaves often ½ stem, ¾ in. broad. Umbel simple or compound; spikes 1 by ½ in., very dense. Spikelets commonly 3½ by ¾ in., usually dull-corded, not bright yellow or red-brown. Glumes broad ovate, keeled, obtuse, 3–5-nerved on back, muticous or sometimes mucronate. Nut ovoid, ¾–1 length of glume; style ¾ as long as nut, branches 3 linear small.


From the Punjab to Assam and Ceylon; common.—Distr. 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 divericate rigid; ripe spikelets rigid hard spreading at right angles somewhat turged, style 3-fl. C. dives, Delile Fl. Egypt, 5, t. 4, fig. 3; Kunth Enum. ii. 71; C. B. Clarke l. c. 293. C. alopecuroides, Boeck. in Linnaea, 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 curved, nut small yet nearly $\frac{3}{2}$ 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.


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, $\frac{1}{2}$-3 in. broad. Umbel 8-24 in. in diam.; bracts usually longer than umbel. Secondary umbels usually conspicuously bracteolate; spikes corymbose, shortly peduncled. Spikelets often $\frac{1}{4}$ by $\frac{1}{16}$ 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. $\beta$ Hookeri (sp.) Boeck. in Linnaea, xxxvi. 308; spikelets somewhat broader rigid very densely spicate ultimately bright brown, nut a little more acuminate at top. C. Neesis, Thow. Enum. 344; C. B. Clarke in Journ. Linn. Soc. xxi. 189 in Obs. (scarce 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 suberection spikelets, spikelets linear 14-fld., wings of rhachilla lanceolate yellow caducous, anthers narrow oblong, crest $\frac{1}{2}$-3 length of anthers, nut $\frac{1}{2}$-3 length of glume. C. B. Clarke in Journ. Linn. Soc. xxi. 189. C. race- mosus, Retz Obs. vi. 20?; Nees in Wight Contrib. 85; Kunth Enum. ii. 100; Boeck. in Linnaea, xxxvi. 310.—Cyperus, Wall. Cat. 3341, A.

**Deccan PENINSULA**; Wight. **PENANG**; Wallich.—**Distrib. Malaya.**

Stem 3-4 ft. Leaves nearly as long, $\frac{1}{2}$ in. broad. Primary rays of umbel 6 in.

Var. $\gamma$ macromus, C. B. Clarke l.c. 190; larger, with still larger umbel, nut nearly as long as glume.—Bengal; Comilla, C. B. Clarke.—Leaves $\frac{1}{2}$ in. broad, two lateral nerves above strongly marked, keel beneath scabrous cutting. Primary rays of umbel 10 in.

61. **C. platyphyllus**, Boem. & Sch. Syst. ii. 876; very large, leaves
and bracts very long broad, umbel very large, spikes long linear-cylindric, spikelets linear suberete suberect dirty straw-colour, wings of rhachela broad-lanceolate yellow separating, crest of anthers $\frac{1}{2}$–$\frac{3}{2}$ length of cells. 


Decan 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, whiteish underneath, often scabrous on keel. Primary rays of umbel 8–10 in. Spikes 4 in.

Residuary species.

C. Brunnesoens, Boeck. Cyp. Nov. ii. 3; robust, wholly brown-fuscous, umbel simple 6–8 in. diam., spikelets oblong obtuse, glumes 8–10-striate with recurved macro, style very slender deeply 3-fid. Singapore; Voigt.


C. cylindricus, Boeck, in Flora, xlii. 437 his.—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, rhachela narrowly winged.—Himalaya; Bulwascher Valley, alt. 2000 ft., and Jubbulpore, alt. 1000 ft., O. Kunth ("Near Cyp. chilenis," Boeck.);

C. Fusillus, Vahl Enum. ii. 308, i.e. C. pygmaeus, Royle, 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. Kunth. —Perhaps C. digitatus or C. Oatesii.

C. tener, Vahl Enum. ii. 299.—Ind. Orient.—"Isolepida sp. 2." Kunth.

C. trisculus, Don Prodr. 39.—Nepaul.

C. umbellatus, Burm. Fl. Ind. 21, t. 9, fig. 1. (not Roxb.).—Perhaps grass.


Leaves and bracts grass-like. Glumes persistent, 2 lowest empty, 1–12 succeeding bisexual nut-bearing; rhachela disarticulating above the 2 lowest empty glumes leaving a knob.—Otherwise as Cyperus.—Sp. 160, warm regions.

Subg. I. Bulboscaulis. Base of stem oblong thickened by the turgid membranous coloured sheaths. (Sp. 1–2)


Glabrous. Stems 4–16 in., at top triquetrous, rather slender; lowest persistent as torn fibrils. Leaves often as long as stems, \( \frac{13}{15} \) in. broad, weak; sheath dilated, ferruginous or reddish. *Inflorescence* \( \frac{1}{2} \) in. diam.; bracts 3–5, up to 4–6 in. long, leaf-like. Spikelets numerous, \( \frac{1}{5} \)–\( \frac{1}{2} \) in. long, nearly terete; nodes of rhachilla short with elliptic wings. *Nut* bearing *glume* ovate, biunc, triangular, 14–19-nerved. *Stamens* 3–2; anthers linear-oblong, mucinotic. *Nut* oblong or somewhat chovoid, trigonous, ashy black, \( \frac{3}{4} \)–\( \frac{3}{4} \) length of *glume*; *style* shorter than *nut*; branches linear, somewhat long.—*Cyperus dubius*, *Rottb. Descr. et Icon.* 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-fld., in *Mariscus* always 3-fld.


**DECCAN PENINSULA,** *Rottler, Heyne*; Palavarum to Permacol, in the hills, *Wight*; N. Canara, *Young*.

Glabrous. Stems 3–9 in., thickish, trigonous, striate; stolons elongate, \( \frac{1}{7} \) in. in diam., clothed by oblong striate pale-brown scales. Leaves as long as stem, \( \frac{1}{3} \)–\( \frac{1}{4} \) in. broad; lower sheaths much inflated, striated, brown. *Spikes* about 7, on rays 0–\( \frac{1}{2} \) in., up to \( \frac{3}{4} \) by \( \frac{1}{4} \) in.; bracts 5–7, up to 4–7 in., leaf-like. Spikelets \( \frac{3}{4} \)–\( \frac{3}{4} \) in., spreading at right angles. Nut-bearing *glume* ovate, acute, 11–17-striate, straw-colour. *Nut* ellipsoid, trigonous, black-chestnut, \( \frac{3}{4} \) length of *glume*.

Subgen. II. **EU-MARISCUS**. Base of *stems* not oblong thickened by much dilated leaf-sheaths (though often shortly nodose). *Rhacheoila* 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 ebractate, spikelets small 1-fld., in fruit broad-lanceolate trigonous curved more or less recurved. *Nees in Wight Contrib.* 89;

From Lower Bengal to Ceylon.—Distrib. Mauritius.

Glabrous, slender. Stolons 2–3 by \(\frac{1}{2}\) in., clothed by lanceolate striate rich-brown scales. Stems 4–12 in., trinogons, nodose at base. Leaves often as long as stem, \(\frac{3}{4}\)–\(\frac{1}{2}\) in. broad, flaccid. Rays of umbel 0–1\(\frac{1}{2}\) in.; bracts often 4 in., leaf-like. Spikelets \(\frac{1}{2}\) by \(\frac{3}{4}\) in., exactly cylindrical, ultimately pale. Spikelets (ripe) \(\frac{1}{2}\) by \(\frac{1}{2}\) in., apparently 4-glumed; 2 lowest glumes empty, persistent; 3rd glume nut-bearing, ovate, deciduous, its upper margins broad scarious nerves less enclosing nut; 4th glume (really the rhachela of the upper suppressed flower), lanceolate, tip rudimentary glume elongated. Nut oblong, trigonous, black, \(\frac{3}{4}\) length of glume.

Var. \(\beta\) Ramburghiana; larger, stems up to 2 ft., rays of umbel up to 2 in., bracts 5–7, spikelets larger \(\frac{3}{4}\) in. long (1-fld.). M. cyperinus, Nees in Wight Contrib. 90, var. \(\alpha\) (not of Vahl). Kyllinga umbellata, Ramb. Ic. Ind. t. 191. Scirpus ecbinatus, 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.


Glabrous. Rhizome perennial, hardly \(\frac{3}{4}\) in. Rays of umbel 5–10, rigid, acutely triquetrous. Spikelets \(\frac{1}{2}\) by \(\frac{1}{2}\) in., ebracteate. Spikelets \(\frac{1}{2}\) by \(\frac{1}{2}\) in., in fruit obliquely erect, dusky reddish-green.—Otherwise as **M. panicus**.

Var. \(\beta\) 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 \(\frac{3}{4}\)–\(\frac{1}{2}\) in. in diam. Spikelets \(\frac{1}{2}\) by \(\frac{1}{2}\) 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, rhachela very short. Cyperus pictus, Wallich ms. C. umbellatus, Thwaites Enum. 345 (partly). C. panicus, Boeck. in Linnæa, xxxvi. 327 (partly). C. umbellatus, var. a typical (partly), C. B. Clarke in Journ. Linn. Soc. xxi. 200 (not var. \(\gamma\) picta, 201).—Mariscus, Wall. Cat. 3435 A (partly).

Decan Peninsula, Heyne, &c.

Remakes **M. cyperinus** or **panicus** \(\beta\), but differs much in the structure of
the spikelet; the nut is formed as usual in the 3rd glume, the rhachis 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 rhachis.


Stolons scarcely $\frac{1}{3}$ 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. panicus*, but from the structure of the spikelets it must be more closely allied to *M. pictus*.


From **North-West Himalaya**, alt. 0-6000 ft., and **Assam** to **Ceylon** and **Singapore**.—**Distrib.** Warm regions of Old World.

Glabrous. Stems 1-2 ft. Leaves often nearly as long as stem, $\frac{1}{4}$-$\frac{1}{6}$ in. broad, rather weak. Umbel 1-5 in. in diam.; rays ultimately very straight (not curved as in *M. cyperinus*). Spikelets solitary (see, however, var. $\gamma$), often 1 by $\frac{1}{3}$ in.; bracteoles inconspicuous. Spikelets sometimes 1-sometimes 2-3d., varying in length accordingly. Nut trigonous, chromosome-cord., $\frac{3}{4}$-length of glume.—*M. umbellatus* is *Kyllinga umbellata*, Rottb. Descr. et l. 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. $\beta$ evolutior; spikelets linear bearing 2-4 nuts. *M. corymbosus*, Boeck. in Flora, xii. 493? *Cyperus umbellatus*, var. $\epsilon$ cylindrostachys, C. B. Clarke, Journ. i. c. 301 (chiefly). C. biglumis, C. B. Clarke l. c. 199 (partly), (scarcey Mariscus biglumis, Gaertner).—Through India (except Madras?).—**Distrib.** Tropics.

Var. $\gamma$ subcomposita; spikes often digitate on the rays bracteolate. *C. biglumis*, Gaertn. Fruct. i. 12, t. 2, fig. 8; C. B. Clarke l. c. 190 (partly).—Kumasan, alt. 5000 ft., Strachey. **Madras Peninsula** (?), Wall. Cat. n. 3437 E.—Japan, Polynesia.—Rheedee 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.? 3 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, rhachiscolia very narrowly winged, nut oblong-ellipsoid ½ length of glume. Cyperus ischnos, Schlcht. in Bot. Zeit. vii. 99; Boeck. in Linnea, xxxvi. 280.

**Nighiri and Kurg Hills**, G. Thomson (the single Old World example).—**Distrib. Trop. America.**


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 ½ in. Umbel 1½ in. in diam.; rays 0–⅜ in.; bracts 4, up to 6 in. **Spikelets ½ by ⅛ in.** Nut-bearing glumes obtuse, with 9–11 strong nerves. **Nut trigonous; style-branches 3, linear.**


From Bengal to Ceylon, and Mergui.—**Distrib. Trop. Afric.**

Glabrous. **Stems 3–8 in., caespitose. Leaves often as long as stems, ⅛ 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 ¾ in. 6–8-fl., sometimes nearly 1 in., 26-fl.; rhachilla dehiscing from a pulvinus above the two lowest empty glumes. Stamen 1. Nut about ½ length of glume (excl. its long arista).—Resembles Cyperus aristatus, Rotb., with which it was mixed by Linnaeus, and by many authors since.

Sect. 3. **Turgiduli.** Spikelets oblong or subovoid, hardly compressed. Umbels compound. Robust plants with coarse leaves. (Sp. 11.)

Veget. Andamans, 54; Boeck. in Linnæa, xxxvi. 340.—Cyperus, Wall. Cat. 3359 (mainly).—Rheed. Hort. Mal. xii. 103, t. 55.

From Bengal to Ceylon and Singapore.—Distrib. Trop. Afric., Malaya, Australia, Polynes.—mostly near the sea.

Stems 1–3 feet. Leaves often nearly as long as stem, ½ in. broad. Rays of umbel often 4 in. Spikes cylindric or ovoid, cinnamonous-red or brown or straw-colour.


Throughout India, alt. 0–3000 ft.; from Mussooriee and Assam to Ceylon and Penang.—Distrib. Mauritius, China, Malaya.


Subg. III. **Torulium** (Gen. Desv.). Spikelets bearing several nuts; rhachela finally breaking up into joints each containing 1 nut.


Bengal; Furidpore, C. B. Clarke. PEGU, Kurs, 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, ½ in. broad; but small examples occur. Umbel very variable, from ¾–24 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 ¼ in. in carrying about 20 spikelets which ultimately spread at right angles. Spikelets commonly ½ by ½ 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.

Glumes persistent, 2 lowest empty, 1–3 succeeding (in the Indian species) bisexual nut-bearing winged on keel; rhachela disarticulating above the two lowest empty glumes. Otherwise as *Mariscus*.—Species 2 or 3, in Africa, Madagascar, India.


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, ½ in. broad, nearly smooth. *Umbel* rays 2–10, 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* ½–1 in. in diam. *Spikelets* ⅔ in. *Glumes* bost-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 cylindrical 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* 3–5, rarely fewer (in *E. atropurpurea*, often small or 0). *Stamens* 3–1, anterior; anthers linear-oblong, not trigonous. *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* obvoid, plano-convex (when style bifid) or trigonous (when style trifid).—Species 113, cosmopolitan.

Sect. I. **LIMNOCLOA**, 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, quadrato-hexagonal, inconspicuous). *Style* 2–3-fid.


From SIND, SAHARUNPORE and ASSAM to CEYLON and the MALAY PENINSULA. —DISTRIBUTIONS. Tropics of Old World.

Stolon long, \( \frac{1}{3} \) in. diam. Stems 1-3 ft., \( \frac{1}{4} \) in. diam.; slender (S. plantagineus, Roxb.), or stout (S. tumidus, Roxh.); sheaths membranous, soon torn. Spikelet \( \frac{1}{2}-1 \) by \( \frac{1}{2} \) in. (in some Madagascar examples \( \frac{3}{2} \) in. long). Glumes \( \frac{1}{2} \) 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, \( \frac{1}{4}-\frac{1}{3} \) of glume, biconvex or obscurely trigonous; style-base depressed conic, brown-black. The American plants referred to plantaginea by Boeckeler are very distinct (E. intertextina, Br.) (see Benth. Fl. Austral. vii. 292).

2. E. equisetina, Presl. Rel. Hb. x 195; stems slender terete transversely separtate when dry, spikelet fuscous straw-coir'd. wider than the stem, style 2-fid.

CEYLON; Walker, Thwaites (C.P. 3777). —DISTRIBUTION. N. Caledonia, Philippines.

Stems 1 foot, \( \frac{1}{3}-\frac{1}{2} \) in. diam.; uppermost sheath close-fitting, firm, terminated on one side by an oblong-triangular tooth. Nut obovate, 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 separtate, glumes suberect laxly imbricate red-brown near their margin, bristles 7 retrorsc scabrous about as long as the cancellate nut. Heliocharis variegata, Boeck. in Linneae, xxxvi. 470. — Mascarene Isls.

Var. laxiflora, stems more slender, subtrigons under narrower spikelet, glumes fuscous green not red brown near margin, bristles longer than finely trabeculate nut. Scirpus laxiflorus, Thu. Enum. 485. — Heliocharis, Wall. Cat. 3454, B (partly).

ASSAM; Simons, Sillet; J. D. Hooker. CEYLON; Thwaites, MALAY PENINSULA, frequent to SINGAPORE, Kurz.—DISTRIBUTIONS. Malaya, China, Polynesia.

Stems 8-16 in.; uppermost sheath membranous, on one side ovate, subacute at top. Spikelet nearly 1 by \( \frac{1}{2} \) in. Glumes \( \frac{1}{2} \) 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 separtate many barren intermixed, spikelet slender scarcely broader than the stem, glumes suberect laxly imbricate dusky green, style 3-fid. Heliocharis subulata, Boeck. in Flora, xi. 412.

MALACCA; Griffith. SINGAPORE; Ridley.—DISTRIBUTIONS. Java, Borneo.

Stems 8 by \( \frac{1}{6}-\frac{1}{4} \) in. Spikelet less than \( \frac{1}{6} \) 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 separtate triquetrous under the spikelet, spikelet

From NEPAL and ASSAM to BURMA and CEYLON.—Distrib. Tropics generally.

Stems 1-3 ft. by $\frac{1}{4}$ in. Spikelet scarcely broader than the stem, dusky green. Glumes $\frac{1}{4}$ in., suberect, obovate, rather laxly imbricate, dirty straw-coird. Nut as long as $\frac{1}{4}$ 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 sepatate triquetrous under spikelet, spikelet $\frac{1}{3}$-1 in. obtuse, glumes obtuse subtранcature, bristles much shorter than ciliate nut irregular smooth. Thw. Enum. 352 (excl. syn. media). Scirpus spiralis, Roth. 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 $\frac{1}{4}$-in. Spikelet $\frac{1}{4}$-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-fld. Bristles slender from $\frac{3}{2}$-4 the length of the glume, half-obscote. 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. ELEOGONTS, 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-fld.—Eleocharis (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-fld 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. Eleocharis atropurpurea, Boeck. in Linnaea, xxxvi. 454 (excl. var. γ).—Isolopis, Wall. Cat. 3429.

WEST HIMALAYA, alt. 3000 ft., to ASSAM and CEYLON.—Distrib. Tropics generally, except MALAYA.

Stems 2-6 in. Spikelet $\frac{1}{4}$-in., many-fld. Glumes broad, obtuse, black-chest-nut, 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 $\frac{1}{4}$-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-fld base small depressed s s 2

BEHAR AND BENGAL TO CEYLON AND SINGAPORE, not common.—Distrib. Most warm countries.

Stems 2-14 in. Spikelet ½-½ in., pale. Bristles 7, or fewer. Nut as long as ⅔ glume, compressed, obvoid.—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).


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.


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 ½-⅔ in. diam.; uppermost sheath truncate, on one side sometimes triangularly produced. Spikelet ½-1 by ½ in., chestnut or straw-cord. Glumes obtuse, persistent, keel green, lowest empty about ⅔ surrounding or (in form uniglumis) almost wholly surrounding stem. Bristles 5, 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 bicovex, obvoid, 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-fld.—Limnochaia, Lestib. Essai Cyp. 41 (not of Nees.)

*Aciculares. Nut tuberculata i.e. its outer transversely-oblung 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-fld, nut oblong-lanceolate straw-

MALABAR PENINSULA; Rotillier (Herb. Kew).—Distrib. Europe, N. & E. Asia, America.


** Chaetariae. Nut coarsely prominently cancellate, i.e. its outer subquadrate large cells prominent.


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 ½ in., with 1–4 nuts. Glumes subdistichous, upper spiral. Bristles 6, as long as nut, retrorse scabrous, pale, occasionally smaller or obsolete. Nut as long as ⅔ of the glume, the acute angles sometimes excrurrent at its shoulder, outer cells in each face in 6–10 series, sometimes perforated, style-base depressed-conic.

*** Leiocharis. Nut smooth, i.e. outer cells quadrate-hexagonal or shortly longitudinal oblong obscure so that the nut is neither distinctly striated nor distinctly reticulated.


KHASIA HILLS; alt. 4–5000 ft. C. B. Clarke; NILGIRI HILLS (fide Boeckeler).—Distrib. Madagascar.

Roots fibrous, or (fide Baker) slender stolons sometimes present. Stems 4–16 in.; uppermost sheath truncate. Spikelet ½–⅔ 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 ⅔ of 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.


Throughout *India*, alt. 3-4500 ft. (except Bengal). *Kashmir*, C. B. Clarke; *Nepal*, Wallich; *Chota Nagpore*, C. B. Clarke; *Nilgiri Hills*, Perrottet; *Ceylon*; *Thottam*.

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 ½ in. long excrurent horizontally below the margin then curving upwards.—Otherwise as *E. 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.


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* ½-3 in., often a fine brown. Retrorse hairs of the bristles much longer more densely placed than in other species, in evolute examples bristles quite plumose. *Nut* ½ length of glume, trigonous, obovoid, yellowish, narrowed at top; style-base equalling 1-½ length of nut, ovoid, fuscons, sabrous.


Stems tufted, roots fibrous or woody, short; stolons 0 (except in *F. stolonifera* & *Pierottii*). 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. *Dristites* 0. *Style* long or longish, often villous, 3- or 2-fid, deciduous (leaving no button), or persistent; *style*-based 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.

**Conspicuous of the sections** (exceptions omitted).


Sect. II. *Dichelostylis*. Style 2-fid.


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. 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.


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 ½–3 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 ½–1½ 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).

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 ½-¾ 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 ½-1 glume, biconvex, with 4-7 strong transverse ridges.


S. BURMA, Kurz. SINGAPORE, Kurz, Ridley.—Distrib. Amboyna, N. Australia.

Stem 4-6 in. Spikelet ½ by ½ in. Glumes pale, thin, almost (except keel) hyaline. Difference from F. acuminata by its slenderness and very small nut.

Var. brevifolia (sp.) Steud. l. c. 72 (sub Abidgaardia); leaves more or less developed, sometimes nearly as long as stem.—Philippines, Australia.


Stem 8-20 in. Spikelet ½ by ½ 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).


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 ½ by ½ in. Glumes many, densely inarticulate 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 ½ 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 ½ in.—BENGAL; Soondrebum, Kurz. MADRAS; Nellore, Gamble.

6. F. tenuicula, Boeck. in Linnaea, xxxviii. 385; stem bristle-like, sheaths hairy, spikelet cylindric-lanceolate, glumes ovate obtuse minutely
macronate, style 2-fid, nut smooth brown obscurely white-scaly on shoulders.

**Sylhet, C. B. Clarke. Tenasserim, Holger.**

Stem 4-8 in. Spikelet ½ by ½ 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. polystichoides*; outermost cells larger, in about 15 longitudinal rows on each face of nut.—Otherwise as *F. polystichoides*, from which it differs chiefly in its narrower acentured spikelet.

**Style 3-fid; nut trigonous.**


From Mergui, Griffith, to Singapore, Wallach.—DISTRIBUTION: 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 ½ by ½ in. Glumes ovate, imbricate (somewhat loosely) on all sides, erect, concave, adpressed, white, subscarios, with rusty spots on the back, all falling; rhachela scarcely hispid. Stamens frequently 2. **Style** below trifurcation nearly glabrous, deciduous together with its narrowly-pyramidal style-base. Nut as long as ½ glume; outermost cells small, obscure.


**Nilghiri Hills**, alt. 6-8000 ft.

Rhzome very short. Stems 4-12 in., tufted. Leaves as long as ½ to stem, narrow, hairy. Spikelet ½ in., terminal, erect, terete, dense-fid. 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 ½ glume, trigonous; outermost cells small, subquadrate, lax, subpapillose, scarious.—Near the Australian *F. monandra*, F. Mueller.


**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 ½ stem), bristle-like. Spikelet ½ 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 ½ glume, obtuse, scarcely stalked, trigonous; outermost cells transversely oblong white not vertically superimposed in regular series; nut thus not longitudinaly striate but irregularly conspicuously trabeculate.—This may be *F. sub-bulbosa*, Boeck. Cyp. Nov. ii. 39 (non Flora xli. 596) 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 Dicholestis [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. P). 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.


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 ¾-2½ stem (occasionally longer than stem), narrow, edges incurved (when dry) most minutely scabrous. Spikelets ½-1½ 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 ¾-1 in.; all caducous, serial, leaving the rhachilla minutely hairy by the ragged edges of the arroles. Stamens 3, rarely 2; anthers not crested. Style long, flattened, villous nearly to base; branches short. Nut as long as ½-1½ glume; outermost cells very small, subquadrate obscure.—The large Khasi form, with rusty-brown spikelets ½ in. long, is by Boeckeler added (perhaps rightly) to F. sub-bispicata.


Orissa; Poosree, W. S. Atkinson.—Distrib. China, Japan.

Stems 8-20 in. Spikelets up to 1 by ½ 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. schoenoides 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 1) spikelets occur.]
Fimbristylis.]} CLXXII. CYPERACEAE. (C. B. Clarke.) 635

† Nut linear-cylindric, curved.


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 ½ in. diam., subglobose, dense with aristate glumes. Glumes elliptic, pale, nerve green long excurrent into a curved tail. Stamines 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. 1389 (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 Bulbo-

stylis.

† Style-base with many long pendent hairs.


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 ½–½ stem. Umbels often 2–4 in. diam., with many spikelets; bracts usually short, sometimes as long as umbel. Spikelets ½–½ by ½ in. Glumes fuscos, keel 3–5-nerved, excurrent into a curved tail. Stamine 2. Style small, hairy below bifurcation; from the margin of style-base hang 10–18 unicellular slender linear trichomes, as long as ½–½ 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 obvoid, conspicuously longitudinally striate, trabeculate (by reason of the transverse short-oblong cells between the striaions).

14. F. dichotoma, Vahl Enum. ii. 287; umbel compound or decom-

posed, spikelets many solitary oblong angular, glumes ovate acute gla-

brous, style 2-fid, nut 5–9-striated on each face straw-colord. or rarely discoIord. black-brown. Nees in Wight Contrib. 101; Boeck. in Linnaea,

Throughout India, alt. 0-4000 ft., especially in rice-fields.—Distr. 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 ½ by ½ 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 and 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. diphyllos, in which the spikelets are terete, the glumes being much less keeled than in F. dichotoma.


Throughout India, alt. 0-6000 ft.; common.—Distr. 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 1–3 in. diam.; bracts 2–4, sometimes short suberect, sometimes spreading much longer than umbel. Spikelets commonly ½-½ in. Glumes concave, glabrous (rarely minutely ciliate on margins), brown or reddish, rarely chestnut-colored, hack 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, obvoid, 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, glaucid, with few spikelets.—C. B. Clarke (n. 44119) from Assam, has a long slender stem, with a single lateral spikelet, overlapped by most slender leaves; recedes from the type *F. diphylla* more than does the Australian *F. depauperata*.

**Var. 3. FLORISTRIATA**, **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.) *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*.—Fimbrystilis, Wall. Cat. 3503, A, B (part) C.

**Khasia Hills**, alt. 2-5600 ft., common. **Muneypoor**; Wall. 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** subcreamy, 1-2 ft., slender. **Leaves** as long as 1/2 stem, erect, very narrow, tip obtuse, hairy or glabrate. Umbel nearly simple, sometimes depauperated with few spikelets. **Spikelets** 1/2 by 1/ in.

**Var. lucens**; style-branches 3 or 4.—Khasia; alt. 6-7000 ft., C. B. Clarke.

+++ Nut obovoid, smooth, reticulate (not conspicuously striate longitudinally.)


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 1/2 stem. **Spikelets** 1/ by 1/ 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 1/ 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 Linnaea, xxxviii. 409 (not xxxvii. 13.)—Fimbrystylis, Wall. Cat. 3507, C.

SYLNET; Wallieh.

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, ½ by ¾ in., 5-8-fid., acute, chestnut-brown. Glumes ovate, acute, adpressed-incurved. Stamens 3. Style long, scarcely compressed, nearly glabrous; branches long. Nut as long as ¾ 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.


From the W. Himalaya to Upper Assam and Dacca; Chota Nagpore, C. B. Clarke; Khasia, H. f. et T. T. (Fimbrystylis n. 33); &c.—Distr. Malay, China, Marianne Isen.

This is F. podocarpa, Munro ms. and Herb. Hook. f.; the type example of F. podocarpa in Wight named by Nees' band 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. fusculina, 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 ¾ stem, rigid, tip subobtuse. Umbel often 6 in. diam. Spikelets all solitary, ovoid, ½-¾ 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 Menga, J. D. Hooker; Upper Assam, Jenkins.

Stems 12-20 in. Leaves long, nearly glabrous. Umbel once or twice compound, pedicels long. Spikelets ½-¾ 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. Egypt, 10, t. 6, fig. 3; Nees in

Throughout India, alt. 0-3000 ft., abundant near the sea. —Distrib. All warmer regions.

This nome none or hardly any. Stems 8-30 in., tufted, base slightly thickened, often clothed by aching hard rusty scales. Leaves usually hardly any, sometimes 4-6 in., very narrow. Umbel usually 5-10 spikelets, sometimes with 20 spikelets, rarely with 1-3 spikelets. Bracts shorter than umbel, often very short. Spikelets ½ in. Glumes obtuse scarcely mucronate, brown, tip incurved, keel green. Stamens 3 or 2; filaments liguulate; anthers not crested. Style longer than nut, flattened, villous below bifurcation. Nut as long as a ¼ to ½ glume, shortly stalked; outermost cells small, in practically 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. Delawert).—Leaves 1-6 in., very slender. Bracts ½ in. Spikelets ½ in., ellipsoid. Glumes with obscure round red glands. Nut as of F. farruginea.—This looks like a distinct species, but only known by one sheet of specimens.

23. F. compressa, Boeck. in Linnaea, xxxviii. 387 (not of Roem. & Sch.).—Stems long base slender, leaves longish, umbel twice or thrice compound, spikelets cylinrdrical, glumes dusky-brown puberulous, style 2-fid, nut obovoid smooth dusky-brown. F. tenuifolia, Nees ms. F. gracilis, Arnott ms. Scirpus fuscus, Roxb. ms.


Stems 8-20 in., 8-9-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 ½ in. long, glumes very densely imbricate. Otherwise as F. farruginea, to which it is specifically very near.


SINGAPORE; Pahang, Ridley. —Distrib. —Malaya, China, Japan. (The American F. spadicea is hardly separable).

Leaves as long as ½ stem, stout, flat. Umbel 1-3 in. diam.; branches suberect; lowest bract overtopping umbel. Spikelets ½ by ½ 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 ½ 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.


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 ½–4 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.


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 ½–4 by ½ in., cylindric or ellipsoid, up to 60 in an umbel. Glumes ovate, concave, incurved, margins scarios. Stamens usually 2. Style somewhat shorter than nut, often glabrous. Nut as long as ½ 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*, juncoformis, &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.


From BENGAL and CENTRAL INDIA to CEYLON.—Distrib. Mauritius, fide Boeckeler.
Stems annual, tufted, trigonous, 4-8 in. (or in Duthie n. 9880, stem 0, spikelets basal). Leaves usually shorter than stem, narrow, glabrous. Spikelets 4-20 in the head, \( \frac{3}{2} \) by \( \frac{1}{2} \) in., densely-fld.; bracts 2-4, much overtopping head. Glumes ovate, silver-grey, keel green. Stamens 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.


**Clusters of spikelets subumbellately corymbed.**

29. **F. Hookeriana**, *Boeck. in Linnaea*, xxxvii. 22; nearly glabrous, spikelets clustered and solitary linear-lanceolate, style 2-fid, nut obovoid yellow-brown squamose-tuberculate.


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 \( \frac{1}{2} \) 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 \( \frac{1}{2} \) 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.


Orissa; Poori, W. S. Atkinson; Ganjam, Lawson. *Singapore*, Ridley.—Distr. E. Asia, Malay, 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 \( \frac{1}{2} \) stem, rigid, curved, \( \frac{1}{2} \) \( \frac{1}{2} \) in. broad. Umbel 3-3 in. diam., simple or compound; bracts \( \frac{1}{2} \) in. Spikelets 2-6 in a cluster, \( \frac{1}{2} \) by \( \frac{1}{2} \) in., somewhat densely-flowered. Glumes erect adpressed, ovate, keeled, scarcely acute, striate, dusky purple-green, pubescent by minute white hairs, margins scarios white. Style about as long as nut, slightly villous below bifurcation, deciduous with style-base. Nut as long as \( \frac{1}{2} \) glume, biconvex, scarcely stalked.

Sect. III. Trichelostylis (Geuus), 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.


**DECCAN PENINSULA, Wight.—DISTRIBUTION. Trop. Africa.**

*Roots fibrous. Stems tufted, 4–5-angular under umbel, base sometimes thickened. Leaves as long as \( \frac{2}{3} \) stem, \( \frac{2}{3} \) 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 \( \frac{1}{2} \) by \( \frac{1}{12} \) in., about 10–fid. Glumes adpressed, boat-shaped, chestnut-red, margins scarious. Stamen often 2. Style longer than nut, glabrous, deciduous with pyramidal style-base. Nut as long as \( \frac{1}{3} \) glume, round-trigonous. Described from *Nees'* type in Herb. Wight.*


Var. *? obtusa*; leaves numerous \( \frac{1}{3} \) in. broad obtuse, glumes glabrate not mucronate, nut verrucose yellow-brown (spikelets sometimes clustered).—Lower Bengal, Wallich, *Kurs.* Singapore, *Ridley*.—Borneo.


**SOUTH MADRAS AND CEYLON; CANNABORE, Campbell. NILGIRI HILLS, Hohe-nacker, Anamallays, Reddome.**

*Leaves bristle-like, margin (when dry) incurved. Umbel 1 in. in diam., with 4–8 spikelets; rays ultimately recurved deflexed. Nut as long as \( \frac{2}{3} \) glume, acutely trigonous; outermost cells transversely oblong, in 12–15 irregular vertical series.—Otherwise as *F. tenera*.**


**MALAY PENINSULA; Mergui, Griffith; Tenasserim, Helfer (Kew Distrib. 6330).**

Glabrous. *Roots fibrous. Stems tufted, obscurely 3–4-angular under umbel, Leaves as long as \( \frac{2}{3} \) stem, narrow, flat, tip obtuse. Umbel 1–3 in. in diam., with 12 spikelets; bracts scarcely \( \frac{1}{3} \) in. Spikelets nearly \( \frac{1}{2} \) by \( \frac{1}{12} \) 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 \( \frac{1}{3} \) glume, trigonous, minutely mucronate.*

34. **F. Pierotti**, *Mig. in Ann. Mus. Lugd. Bat. ii. 145*; stoloniferous, glabrous, stems 1 ft. somewhat slender, umbel simple or once compound, style 3-fid, nut obvoid straw-colord. laxly reticulate smooth or somewhat tubercled. *Boeck. in Linnaea*, xxxvii. 32. **Trichelostyliis sp.**, n. 20, *Herb. Ind. Or. H.f. & T. T. (partly).*
**N. W. Himalaya, alt. 4-9000 ft. Simla, T. Thomson, Gamble. Kumaon, Duttie.—Distrib. Japan.**

Stolons up to 2 in., densely clothed by lanceolate striate scales, finally hardening into a woody rhizome. *Leaves* as long as \( \frac{1}{2} \) stem, flat, acute. *Umbel* 1-3 in. in diam., with 5-14 spikelets; bracts short. *Spikelets* \( \frac{1}{2} \) by \( \frac{1}{2} \) in., ellipsoid-lanceolate, 10-fld. *Glumes* adpressed, boat-shaped, ovate, shortly acuminate, chestnut or testaceus, usually with round glands in upper half; margins scarious. *Style* long, glabrous, deciduous with narrow style-base. *Nut* as long as \( \frac{1}{2}-\frac{1}{2} \) glume, tip sub-pyramidal.

**Stem** with many spikelets (at least in fairly developed examples).

† *Nut* slenderly trabeculated (outermost cells transversely oblong).

35. **F. Arnottiana**, Boeck. *In Linnaea*, xxxvii. 28; stems a foot (at least), umbel compound, spikelets cuboid-ellipsoid one-cord., glumes ovate obtuse brown hardly keeled, style 3-fld, nut obovoid yellow-brown transversely lineate obscurely tuberculated.

Deccan Peninsula; Cannanore, Campbell (Herb. Wight propr., n. 1884, right-hand plants only).

Stems somewhat slender, 4-5-angular under umbel. *Umbel* 3-4 in. diam., glabrous, with 30 spikelets; bracts 3-4, up to \( \frac{1}{2} \) in. long, very narrow. *Spikelets* \( \frac{1}{2} \) by \( \frac{1}{2} \) in., obtuse, 10-fld., 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 \( \frac{1}{2} \) 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 Linnaea*, xxxvii. 32; stems 2 ft. quadrangular, leaves long narrow convolute or 0, umbel compound and supra-compound, spikelets ellipsoid acute, style 3-fld, nut obovoid straw-yellow smooth obscurely transversely lineolate.—Trichelostylis sp., n. 14, Herb. Ind. Or. H. f. & T.

Sikhtm Terai; Dulkajhar, alt. 500 ft., C. B. Clarke. Khasia Hills; Churria, 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 \( \frac{1}{2}-2 \) in. *Spikelets* \( \frac{1}{2} \) by \( \frac{1}{2} \) 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 \( \frac{1}{2} \) 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-fld style, but in the long linear style-branches.


Ceylon, Thwaites, &c. From Tavoy, Wallisich, 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

T t 2
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-fld, nut obvoid transversely lineolate pale or brownish more or less tuberculate. *Thw. Enum.* 349; *Dalz. & Gibbs* *Bomb. Fl.* 287; Boeck. in *Linnæa*, xxvii. 42 (excl. *F. Salbundia*).

F. Salbundia, Boeck. in *Linnæa*, xxxvii. 44 (mostly, not of *Kunth*).


Throughout India, alt. 0–4000 ft., Ceylon, and Malayan Peninsula.—Distrib. Malayana, 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 \( \frac{1}{2} \) stem, very variable in development. Umbel often 4–8 in. in diam. with 100 spikelets, sometimes small with 15–5 (larger than usual); bracts \( \frac{1}{2}–1 \frac{1}{2} \) in. Spikelets \( \frac{1}{2}–1 \) in. long, more acute than in *F. miliacea*, suberete (not polygonal as in *F. Salbundia*, Kunth). Glumes ovate, subacute, 3-nerved. Style longer than nut, slender, vilius below trifurcation, deciduous with the narrow pyramidal style-base, branches long. Nut small, as long as \( \frac{1}{2} \) glume.—Hardly separable from *F. miliacea* (see Arnott in *Wight Contrib.* 105).


Throughout India, alt. 0–6000 ft., abundant.—Distrib. All warm regions. Hardly separable from *F. quinquangularis*, but by the obtuse 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


Glabrous. \textit{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 \(\text{1 in.} \) in. \textit{Spikelets} \(\frac{1}{2} \text{ by } \frac{1}{2} \text{ in.} \), dense-fld., dusky-brown. \textit{Glumes} concave, incurved, 3-nerved. \textit{Stamens} often 2. Style as long as nut, deciduous with the narrowly pyramidal style-base; branches linear. Nut as long as \(\frac{2}{3} \text{ glume}, \) 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.

\textbf{Var. Torressiana (sp.)}, Gaud. in Frayc. Voy. Bot. 413; style 2-fid, nut biconvex. Assam, Masters. Bengal, J.D.H.—Marianne Islands.—No 3-fld styles could be found; the examples have the uppermost sheath leafless as in typical \textit{F. globulosa}.

\textbf{Var. Vicarii} ; lower sheaths with long leaves, uppermost sheath with a green leaf \(\frac{1}{2} \text{ in.} \) long, central sessile spikelet usually deficient. \textit{Trichelostylis} sp., n. 16, \textit{Herb. Ind. Or. H. J. }\& T.—Banks of the Cheuab, Thomson; Dehra Doon, Vicary.


\textbf{Ceylon, Thwaites.}—Distrib. Borneo, China.

Glabrous. \textit{Rhizome} short, descending. Stems obscurely 4-5-angular under umbel. Leaves several, as long as \(\frac{1}{2} \text{ stem}, \) narrowish, flat, tip suddenly narrowed. Umbel \(1\frac{1}{4}-3\frac{1}{4} \text{ in.} \) diam., sometimes simple with 4-5 spikelets; bracts 2-3, less than \(\frac{3}{4} \text{ in.} \) long. Spikelets \(\frac{1}{2} \text{ by } \frac{1}{2} \text{ in.} \), hard, acute. Glumes \(\frac{1}{2} \text{ in.} \), boat-shaped, acute submucronate, brown-chestnut. Stamens 3. Style long, villous, white, tardily deciduous with the narrowly pyramidal style-base. Nut as long as \(\frac{3}{4} \text{ glume}, \) triquetrous with concave faces, obtuse almost emarginate.


\textit{Ceylon, up to 6000 ft.}, \textit{Gardner, Thwaites.} Deccan Peninsula, \textit{Wight} (n. 2904, in \textit{Herb. Colcutt}).

\textit{Rhizome} short, horizontal, woody. Stems somewhat thickened at base; sheaths hard, yellow-brown. Umbel 2-5 in. diam., with sometimes 40-85 spikelets. Spikelets \(\frac{1}{4} \text{ by } \frac{1}{4} \text{ in.} \), chestnut-colord. Glumes adpressed, ovate, scarcely acute. Stamens often 2. Style long, glabrous, deciduous with the narrowly pyramidal style-base. Nut as long as \(\frac{1}{2} \text{ glume}. \) Easily recognized by the hairy stem.

Throughout *India* in the warm region.—*Distrib.* All warm regions.

Glabrous. *Rhizome* hardly any, sometimes very short horizontal. *Leaves* often 4-8 by ½ in. *Umbel* often 4 in. in diam., compound and supr adequate, sometimes with 180 spikelets; bracts 2, shorter than umbel (often suberect), similar to leaves, almost premorse. *Spikelets* ½ by ½ in. *Stamens* usually 3. *Style* longer than nut, glabrous; branches linear, long. *Nut* about ⅓ length of glume; outermost cells short chloph transverse, in vertical series but obscure (i. e. nut scarcely striate).


This species admitted by *Bentham*, comes between *F. complanata*, *Link*, and *F. autumnalis*, *Roem. & Sch.*, species which *Boeckeler* unites.

**Var. Kraussiana**, (ap.) *Hochst. in Flora*, xxviii. 767; stems slender obscurely flattened under umbel, umbel more compact less compound often with 10-30 spikelets.


**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. 2993).—*Roots* fibrous. *Stems* 12-16 in., tufted, conspicuously flattened at top. *Leaves* as long as ⅔ stem, ⅓ in. broad, tip subobtuse. *Umbel* and bracts nearly as in *F. complanata*, typ. *Spikelets* ½ by ⅓ in., many-fid.


N.E. *India*, alt. 500-4000 ft., from *Sikkim*, *Assam* and *Chota Nagpore* to *Martiab* and *Man 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* ½ by ⅓ in. *Nut* as long as ⅔ 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*).


SILHET; Wallisch. Khasia Hills, Griffith. Amherst; Wallisch 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 1/2-1 in., angular, about 10-fld. Glumes ovate obnute, margins broadly scarios.—Has been greatly confused with the leafless form of F. guinguangularis, from which it is easily known by the testaceaous spikelets, polygonal by reason of the acutely keeled glumes.

Series D. Spikelets clustered (some solitary often added).


CEYLON; Thwaites. MALACCA; Griffith.—Distrib. Borneo, China.

Annual, glabrous. Leaves as long as 1/2 stem (or all stem) 3/4-1 1/2 in. broad. Umbel 3-4 in., often congested into a head; bracts hardly 1/2 in. Spikelets usually 3-5 in., ellipsoid, obtuse. Stems often 1. Style as long as nut, glabrous, deciduous with the shortly pyramidal style-base; branches linear. Nut as long as 1/3 glume, round trigonous.

47. F. paupercula, Boeck. in Linnæa, xxxviii. 396; stems 1 ft. slender, clusters of spikelets in a simple umbel, style 3-fld, nut obovoid with many longitudinal striations finally black.

DECCAN PENINSULA; Pulney Mts.; Wight (n. 2396).

Nearly glabrous. Rhizome short, obliquely descending. Stem under umbel 5-angular, minutely scabrous pilose. Leaves as long as 1/2 stem, narrow. Umbel rays 4-5, 1 in. long; bracts hardly 1/3 in. Spikelets 2-7 to a cluster, 1/2 in. long, ellipsoid, brown, about 6-fld. Glumes ovate, keel slightly excurrent as a macro, glandular upwards, sometimes puberulous. Nut as long as 1/3 glume, trigonous, 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.


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 1/2 stem, 1/3-1 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, \( \frac{1}{4} \text{ to } \frac{1}{2} \text{ in.}, \) brown or chestnut-colr., many-fld. Glumes ovate, obtuse, margins conspicuously scarios. Stamens 3. Style longer than nut, slender, slightly villous below triferication, deciduous with the small pyramidal style-base; branches long. Nut as long as \( \frac{1}{2} \) 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. latifolia (sp.) Kunth l. c. 239; leaves \( \frac{1}{2} \) to 2 by \( \frac{1}{2} \text{ in.} \) flat curved and twisted, spikelets rather many (rarely all) solitary. F. falcata, Boeck. in Linnæa, xxxvii. 49. F. torta, Kunth l. c. 24; Boeck. l. c. 31. Trichestylis 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 obvoid yellow-brown verrucose or nearly smooth. F. subtetraestachya, Boeck. in Linnæa, xxxvii. 50. F. pyonostachya, Hance in Journ. Bot. xv. 338. Abildgaardia Eragrostis, Boeck. l. c. 55 (partly, not of Nees & Meyen).—Fimbristylis, Wall. Cat. 3623.—Trichestylis sp. n. 20, Herb. Ind. Or. H. f. & T.

**Khasia Hills**, alt. 3–5000 ft. MUNYETOOG; alt. 3500 ft., Watt. DECCAN PENINSULA; Courtallum, Wight. NICOBARS. Ceylon, Thwaites, &c.—DISTRI. Cambodia.

Glabrous. Rhizome hardly any. Leaves as long as \( \frac{1}{2} \text{ to } \frac{3}{2} \) stem, by \( \frac{1}{2} \text{ to } \frac{3}{2} \text{ in.} \) broad. Umbel \( \frac{1}{4} \text{ to } \frac{1}{2} \text{ in.} \) diam.; bracts about \( \frac{1}{4} \text{ in.} \); spikelets in the common Khasia form 2–10 to a cluster, in the Ceylon form solitary. Spikelets \( \frac{1}{2} \) by \( \frac{1}{2} \text{ in.} \), or sometimes much smaller. Glumes ovate, acute, keeled, adpressed. Stamens generally 2. "Style as long as nut, slightly villous below triferication. Nut as long as \( \frac{1}{2} \) glume." This species might perhaps be arranged in Sect. Abildgaardia.


**Nilghiri Hills**; alt. 6–7000 ft., Perrottet, &c. Leaves as long as \( \frac{1}{2} \text{ to } \frac{3}{2} \) stem, by \( \frac{1}{2} \text{ to } \frac{3}{2} \text{ in.} \) 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.


**BOMBAY**; Dalzell. **CANADA**; Law, Young; Belekerri, Talbot.

Glabrous. Leaves as long as \( \frac{1}{2} \) stem, bristle-like. Bracts 2–1, shorter than head. Spikelets \( \frac{1}{2} \) by \( \frac{1}{2} \text{ in.} \), 6–18-fld. Glumes ovate-oblong, scarcely acute, keeled, eaffy, nearly \( \frac{1}{2} \) cold. Style nearly as long as nut, glabrous, deciduous, with small pyramidal style-base, branches linear. Nut as long as \( \frac{1}{2} \) glume, sessile, round-trigonal, 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.


Throughout warmer India.—Distrib. All warm regions.

Glabrous. Rhizome 0, or very short. Stems 2–16 in., tufted, slender, angular. Leaves as long as 3 stem, narrow. Spikelet quasi-terminal (bract hardly any) ½ by ½ 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-colr. or yellow. Stamen 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.


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.


**Ceylon**; *Walker, Thwaites* (n. 679).

Stems tufted. Umbel nearly as in *F. fusca*, or sometimes more loose, with pale-cinnamon long-pedicilled spikelets; bracts ligulate scabrous. Spikelets $\frac{3}{2}$ in. broad, i.e. often rather broader than in *F. fusca*.


**N. Australia, Philippine, Caroline Isles.**

Stems about 1 ft., slender (base thickened by hairy sheaths) closely approximate on a very short rhizome. Leaves as long as $\frac{3}{2}$ 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 $\frac{1}{2}$ by $\frac{1}{3}$ 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 $\frac{3}{2}$ glume, round trigonous.—California (Presl.) is an error for Manila.


**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 glumes head ½–1 in. diam.; bracts 0–½ in., setaceous. Spikelets $\frac{1}{2}$ in., usually 2-fid., lower flower alone perfecting a
**Fimbrystylis.**] **CLXXII. CYPERACEAE.** (C. B. Clarke.) 651

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.


58. **F. disticha,** Boeck. in Linnaea, 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 tuberculatu.

**Tavoy;** Wallich. Moulmein; Parish. Mergui; Griffith.—**Distrib.** Cochin China.


Var. Kurzii: stouter, umbel denser, rays hairy, spikelets stouter, glumes distichous densely minutely hairy.—Sikkim Terai; Titaliya, Kurz.

**DOUBTFUL SPECIES OF Fimbrystylis.**


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 Fimbrystylis 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.


Throughout INDIA, alt. 0–4000 ft., from KASHMIR and AASAM 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 ½–⅔ in. diam.; bracts shorter, or much longer, than head. Spikelets ½–⅓ 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 ½ 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 Linnaea, xxxviii. 380,—Isolepis, Wall. Cat. 3480, B. 3481 C.—South Madras. Pondicherry; Perrottet; Tuticorin; Wight n. 2981, 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 ½ stem. Spikelets nearly ½ 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.


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 ½–2/3 stem, bristle-like, nearly glabrous; sheaths with needle-like hairs at least in their throat. Umbel very variable; in form denues (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, ⅔ 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 ½ 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

DECCAN PENINSULA, Wight. CEYLON; Thwaites n. 834. MERGUI; Griffith. MALACCA; Kunstler. SINGAPORE; Burbidge.—DISTRIB. Trop. Africa, Malaya and Cochin China.

Very near B. capitatus; 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 ½ in. long.

10. SCIRPUS, Linn. (partly).

Herbs of very various habit, all glabrous (or the inflorescence slightly hairy). Spikelets usually many-fl. (lower glumes spirally imbricated) sometimes few-fl. (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-fl. or 2-fl., 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 scirpid species left after the neighbouring genera have been taken out. Eleocharis and Fimbristylos differ by the enlarged style-base (separated from the nut by a constriction or a line); Fuirrena and Bulbosulae 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.


Khasia Hills; alt. 1–3000 ft. NILGIRI HILLS; Pervotte, &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 ½–2½ in., very narrow. Peduncles 1–4 in. Spikelet ½–3½ in. many- or few-fl.; bract usually shorter than the spikelet, or 0. Glumes ovate, obtuse, concave. Nut as long as ½–3 glume; outermost cells small quadrate-hexagonal obscure (i.e. nut smooth or obsolete reticulate).

2. S. submersus, Sauvalle Fl. Cuba, 175; stem weak elongate branched leafy upwards, bristles 6 overtopping nut, style 2-fl., nut (only
one in each spikelet) plane-convex lanceolate-ovoid smooth pale. S. con-
fervoides, Poir. Encyc. vi, 755 (non Boeck.); Kunth Enum. ii. 173 partly (the
xiv. 31, t. 1344; Trimen Cat. Ceylon Pl. 103 and in Journ. Bot. xxiii. 140.
Ceylon; Thwaites (C.P. 3936); Colombo, Beckett.—Distrib. Sporadic, tropical.

Floating. Stems 10-20 in. Leaves 2-4 in., clustered, capillary. Spikelet 
\[\frac{1}{2}\] 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-colored. Nut half as long as its glume, itself style and style-base 
extactly as in S. jutons, but much larger.

3. S. pauciflorus, Lightf. Fl. Scot. 1078; leafless, spikelet quasi-
terminal few-fld., bristles 6-3, style 3-fld, nut trigonous obovoid smooth 
pale or somewhat brown; Reichb. Ic. Fl. Germ. viii. 38, t. 299; Boeck. in 
Linnea, xxxvi. 478. S. Beothryon, Ehrh. Phytoph. n. 31; Linn. J. Suppl.
103.

West Tibet; Thomson. Kasahmir; 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 \[\frac{1}{2}\] in., subbracteate, bearing about 
5 nuts. Glumes ovate, obtuse, dusky chestnut. Bristles about as long as nut, 
retrorse-scabrous, straw-colored. Nut as long as \[\frac{1}{2}\] the glume; style-base narrowly 
pyramidal continuous with nut; outermost cells of nut small, subhexagonal, withering 
(i.e. nut smooth, lead-colored, 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-fld, nut trigonous obovoid glistening 
300; Boeck. in Linnea, xxxvi. 480; Boiss. Fl. Orient. v. 378. S. caespi-
tosus, Boeck. in Linnea, xxxvi. 488 (the Asiatic examples and syns). 
Isolepis pumila, Roem. & Sch. Syst. ii. 106. I. oligantha, C. A. Meyer Cyp.
Nov. 3, t. 1.

Kasahmir; 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 \[\frac{1}{2}\] in., setaceous, green. Spikelet scarcely \[\frac{1}{2}\] 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-fld.

5. S. setaceus, Linn. Sp. Pl. 73 (partly); small, stem bearing 1-3 
spikelets in a quasi-lateral head, style 3-fld, nut longitudinally striate and 
transversely trabeculate between the striations, Reichb. Ic. Fl. Germ. viii.
39, t. 301. Boeck. in Linnea, xxxvi. (excl. var. \(\beta\) & \(\gamma\)). Isolepis setacea, 
Br. Prodr. 222; Nees in Wight Contrib. 107; Strachey Cat. Fl. Kumaon, 
72 (excl. syn. pygmea).
CerrMus, almost in. 655 H. 293. bract I Boeck. Spikelets outer-Sikkim. S. the a Beiehb. Holosohoemis the very Stems outermost in lowest Hazara, suppose distant single Scirpus.'

6-20-fld, about Nut reticulate except in Fl. minutely laterally produced Leaves nnumerons Germ. lateral withering Stamens — anthers Ic. in herbaria, MhizomS Temp, Punjab BMzome a


PUNJAB; Hazara, alt. 4000 ft., Stewart. SIND; Pinwill.—DISTRIB. Enrop., 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 ½ in., ellipsoid, dense-fld. Glumes ovate, keel subcurrent, tip hairy (rarely glabrous). Stamens 3; anthers red-crested. Nut small, as long as ½-5 glume, subtriquetrous, obtuse, minutely apiculate; outermost cells minute, quadrated-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 longitudinally 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-fld (or in S. debilis 2-fld.)

7. S. supinus, Linn. Sp. Pl. 73(partly); stems medium terete, spikelets in a single lateral head (in var. heads few closely umbel); glumes ovate keeled with suberect micro, bristles 0, style 3-fld, nut obovoid trigonous obtuse transversely scabrous-undulate black. Romb. Fl. Ind. i. 217; Reichb. Ic. Fl. Germ. viii. 40, E. 302; Boeck. in Linnæa, xxxvi. 699 (excl. var. β and γ). S. melanospersnum, A. C. Meyer, Cyp. Nov. t. 2. Isolepis supina,
Br. Prod. 221; Nees in Wight Contrib. 107; Mig. Fl. Ind. Bat. iii. 309. Schoenus juncoides, Wild. 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.

Rocks 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 in., many-fld., sub-pentagonal. Nut as long as half glume, acutely triquetrous, or slightly compressed.


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 i.e. 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.


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 ⅓ 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.


NORTHERN INDIA, from Rawul Pindee, Aitchison, SIND, Pinwill, and CENTRAL INDIA, King, to Assam, Wallich & Griffith.—DISTRIBUTION. 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).


Throughout INDIA, alt. 0–6000 ft.—DISTRIBUTION. 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 3–4 in., as though a continuation of the stem, trigonous. Spikelets 1–1½ in., pale or (especially in the hills) chestnut-coloured. Glumes keeled, many-ribbed, not notched at top, margins glabrous or minutely scabrous-hairy. Bristles retrorse scabrous, two longer ones nearly as long as nut. Nut somewhat compressed, as long as ½ glume.


WESTERN INDIA; SIND, Pinwill. MOUNT ABOO and GOONAH, King. JUBULPORE, Beddome. HYDERABAD, Campbell. BANGALORE, Wallich.—AFRICA, MADAGASCAR.

Rhizome 2–4 in., horizontal. Stems approximate, 3 ft., at base ½ in. in diam. Umbel simple or compound, rays usually short sometimes 5 in. long; lowest bract 3–4 in., suberect, hardly simulating a continuation of stem. Spikelets 1–1½ 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.**

**Kashmir and Baltistan**, 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* ½–3 in. long, or hardly any. Lowest *bract* ½–2 in., triquetrous, as though continuing stem. Rays of *umbel* ½–2 in. with 2–3 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, inoucrc over its shoulders, scabrous with short white reflexed teeth (not plumose). *Stamens* 3, anthers with short red cresta. *Style* fide Boeckeler sometimes 3-fid. *Nut* less than ½ 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. *sagregata*; ultimate rays of the umbel all (or nearly all) with one spikelet, bristles 3 (sometimes 2). ? *S. subulatus*, *Prain in Journ. As. Soc. Beng.* ix., part 2, 335.—*Lower Bengal*, especially the *Sonindraceuss*, C. B. Clarke.—New Guinea.—*Stelona* 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.


*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* ½–½ in. glume, plane-convex.—In *type* *S. lacustris*, the stem is terete, the style 3-fid; var. *Tabernemontani* differs in *style* bi-fid; var. *carinata* in stem obscurely trigonous.—(*S. lacustris* of S. America is *S. riparius*, Preal.).


From Kashmir, Jaquemont, Kishgar, 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 1½-5 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 ½ in. in diam. Glumes erect, fine brown or chestnut-colord. (but see var.); margins often subfimbriate. Bristles usually somewhat shorter than the nut, rigid, often unequal. Stamina 3; anthers red-crested. Style long. Nut very variable in size and shape at top; in the Indian form hardly more than ¼ length of glume.

Var. affinis (sp.), Roth. Nov. Pl. Sp. 30; spikelets capitulate usually 3-1, large ovate lancelolate, glumes straw-colord, 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. Anmvr. 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 Rarely reduced 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 ½ by ½ in.


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 decomposed, often 4 in. diam.; branches suberect. Lowest bract 1-3 in. (sometimes 6 in.), erect. Spikelets up to ½ by ½ in., subcylindric. Glumes ovate, obtuse, notched at top, mucronate in notch by excurrent green keel, rusty or brown, usually almost scarious. Bristles (or scales) ligulate (sometimes broad), plumose by spreading monoliform hairs, in the Indian plant often 4, somewhat longer than nut. Stamina 3 or 2; anthers red-crested. Nut ½ glume, compressed.—Easily recognized among the Indian Scirpi by the plumose bristles.

17. S. grossus, Linn. s. 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 scarious (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 Linnaea, xxxvi. 723. S. maximus, Roxb. v u 2

Throughout India (except the N.W.), alt. 0-2000 ft.; from SIND and ASSAM to CEYLON and MALACCA.—DISTRIBUT. Malaya, Tonkin, Philippines.

Glabrous, or glumes with pedicels minutely puberulous-sacbrons. Stem 3-9 ft., thick at base, roots fibrous often in water or mud; stolons not rarely added. Leaves often \( \frac{1}{2} \) length of stem, stout, broad, keeled, serrate-edged. Corymb often 8-16 in. in diam., supradecomposed; bracts several, divaricate, lowest up to 3 ft., leaf-like. Spikelets sessile and pedicelled, \( \frac{1}{2} \) in. long, ovoid, brown, dense-fid. Glumes ovate, obuse with a minute muco. 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 cested. Style long. Nut scarcely \( \frac{1}{4} \) glume, minutely beaked by style-base confluent with nut.


Sect. 4. BLYSMUS (Genus), Panzer in Boem. & Sch. Syst. Mant. ii. 41. Medium or slender plants. Spikelets closely spiculate. Style long.

* Stem with leaf-bearing nodes above the base, style 2-fid.


W. HIMAPA and W. TIBET, alt. 7-15,000 ft.; from LIEH, Stolitska, to KUMAON, Duthie. PHAREE (N.E. Sikkim), G. King.—DISTRIBUT. 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. long; lowest bract short, or much overtopping spike. Spikelets usually distichous, sometimes on all sides the rhachis (lowest sometimes remote) \( \frac{1}{2} \) in. long, 6-9-fid., brown. Glumes ovate-triangular, subacum, concave, several-nerved. Rachilla of spikelet compressed at base, somewhat zigzag, lowest fl. somewhat distant from next above nearly as in Schoenus. Bristles slender, minutely retrorse-sacbrons, red-brown. Stamens 3; anthers with a linear-lanceolate red crest. Style long, slender. Nut \( \frac{1}{4} \) glume, compressed or plano-convex; outermost cells small, obscure.

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. disseita (sp.), Duthie in Saharupore Report, 1885; stem 1½ in. bearing two long-peduncled distant spikes, spikelets densely panicked not distichous, nut sessile ellipsoid margins near its base thickened by large corky cells.—Kumaon; Kütz, alt. 12,500 ft., Duthie.—Very unlike the ordinary S. Caricis.


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 Linneae. xxxvi. 704.


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 ½ in., many-fid., 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 papillossehaurous. Stamens 3; anthers created. Style long; branches 3, long. Nut ½ glume, regularly trigonous, exactly oblong, shortly pyramidal at base and apex, ripe shortly acuminate at apex; outermost cells, minute, quadrato-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 Sylvaticce.

Sect. 5. Sylvaticce. 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.


Glabrous, except pedicels. Stems 2-6 ft. Leaves up to 1½ by ½ inch. Bracts several, often longer than inflorescence. Umbel 4-12 in. in diam. Spikelets ½ in., many-fid., 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, ½-3 glume, shortly beaked.


Glabrous, except ultimate rays of umbel. Stems 2-7 ft., solitary, in swamps often stoloniferous. *Leaves* long, often overtopping stem, ⅔ in. broad, scabrous on margins and keel. *Umbel* long, often overtopping stem, ⅔ in. broad, scabrous on margins and keel. *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. **Micheliania**. 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.


Glabrous. *Stems* 4-10 in., slender, base thickened, sometimes with slender long stolons. *Leaves* ½-3 in., stem, very narrow, green. *Head* ½ 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* ½ glume, equally trigonous or subcompressed, minute apiculate; outermost cells subhexagonal, ultimately often punctate.—Essentially from the next species by its small head of very small spikelets, but is very like a small *Kyllinga*.


Throughout **British India**; from Kashmir to Tenasserim, common.—Distr. Europe, Asia, Algeria.

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 pygmaeus.


Glabrous. Stems ½–1 in. Leaves 1–2, ½–1 in., linear. Spikelet ½–1 in., rectangularly divericate, 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. Stamina 1, lateral. Style less than ½ nut, deciduous, style-base not dilated. Nut a little shorter than glume, biconvex.


Throughout Eastern Peninsula, Punjab, alt. 0–6000 ft., and Assam to Ceylon.—Distrib. Trop. Africa, Madagascar, Java, China.


Doubtful species of Scirpus.

S. quadranugulus, Don Prodrc. 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 involucres; 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 *Sylvatica* 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. *Sylvatica* they are 6; and in their ligulate structure (see Fl. Dan. Suppl. t. 8) they differ greatly from *Scirpus*. Also, in *Scirpus* Sect. *Sylvatica*, 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.


**Kashmir**; alt. 13,000 ft., Lance; C. B. Clarke.—**DISTRIBUT.** 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. **Spikelets** ½ in., broad ellipsoid. **Glumes** ovate, scarios, and black. **Bristles** white, or ultimately brownish: **Anthers** not crested. **Style** longer than nut, very slender; branches 3, long. **Nut** ½ glume, trigonous, cylindric ellipsoid or subovoid.


**Very common; from Sind and the Himalaya**, alt. 0–10,000 ft. to *Saugor*, *Chittagong*, and *Burma*.—**DISTRIBUT.** 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** 4–½ in., narrowly ellipsoid, many-fid. **Glumes** acute or obtuse, green on back. **Anthers** with lanceolate scarios high-red crest. **Style** shorter than nut. **Nut** ½–⅔ glume, oblong-ellipsoid, trigonous, heaped, 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*.

ALPINE HIMALAYA, alt. 8-15,000 ft.; head of Jumna Valley, Jacquemont; Nynee Tal, Thomson; Chapcha in Bhotan, Griffith.
This may be regarded as a depauperated alpine form of E. comosus; 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) battle-fore-shaped. Stamens 3 anticus, 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 Sylvestica section of Scirpus, from which Fuirena is known by its strongly aristate glumes.

Sect. I. PSEUDO-SCIRPS. 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 Linnaea, xxxvii. 104 (excl. all Indian syns. and specimens). Scirpus pubescens, Lam. Ill. i. 139; Desf. Fl. Atlant. i. 52, t. 10. Carex pubescens, Poir. Voy. en Barb. ii. 254. C. Poiri etii, Linn. Syst. [ed. Gmelin] ii. 140. Isolepis pubescens, Roem. & Sch. Syst. ii. 118.

PUNJAB; Thomson (Herb. Brit. Mus.).—DIST. S.W. Europe, all Africa.
Rhizome creeping, short. Stems 12-20 in., triquetrous, glabrous except at top. Leaves 2-8 by ½ in., glabrous or hairy. Spikelets in clusters of 5-1, ovate-oblong, ½ in. long; bracts as long as spikelets (occasionally very much longer). Glumes lurid black or glaucous, 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 striae. F. cuspidata, Kunth l. c. 187; Dalz. & Gibs. Bomb. Fl. 286. F. pubescens, Boeck. in Linnaea, xxxvii. 104 (all Indian syns. and specimens, not of Kunth). Scirpus cuspidatus, Roth. Nov. Fl. Sp. 31.—Fuirena, Wall. Cat. 5645.

N.W. INDIA. Hurdwar, Wallich; Sutlej 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 ½-2 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, _Dutch_ (n. 4919).

Sect. 2. _Fuirena_ proper. Three inner hypogynous bristles (petals) obovate or subquadrate, broad-headed.


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, ½ by ½ 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_ triquetrost; head cylindric, sometimes minutely hispid.


_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.

_Deevan 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 arista. _Petals_ as long as nut, their head at top semicircular entire, their two lower angles long-produced downwards, cuspidate.

6. _F. umbellata_, _Rottl._ _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.
Throughout India, except the drier North-west, alt. 0-3000 ft.—

**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. Squamellae 2, an anticous and posticus, 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. Micrantha; from which it only differs in the squamellae standing fore and aft, not laterally. These squamellae are hyaline, cling to the nut, and are difficult to see.


From the Western Himalaya, alt. 0-6000 ft.; and Assam to Ceylon and Singapore.—Distrib. Trop. and sub-trop. Old World.


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 squamellae and style.


SINGAPORE; Ridley.—Distrib. S.E. Asia, Australia.


14. RYNCHOSPORA, Vahl.

Plants varying much in size and habit. Leaves long, narrow. Spikelets in 1 or more heads, or paniced, 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.


Division I. CAPITATE. Spikelets in a single terminal head. Stems with leaves only near the base.


Throughout INDIA (except the North-west) alt. 0–5000 ft., common; from
Nepal and Assam to Ceylon, Nicobaris, Kurz and Malacca.—

Stems tufted, 4-24 in., trigonous, striate, smooth; stolons 0. Leaves several, \( \frac{1}{2} \) stem, \( \frac{1}{2} \) in. broad, flat, minutely scabrous, glabrous or sometimes hairy. Spikelets 20-50 in a head, \( \frac{1}{2} \)-\( \frac{1}{2} \) in. diam.; bracts 3-8, 1-3 in., glabrous or villous-ciliate. Glumes 6-7; 3 (or 4) lower 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 \( \frac{1}{2} \) glume; beak narrow conic, \( \frac{1}{2} \)-\( \frac{1}{2} \) nut, pale, smooth or rarely scabrous.


Madras Peninsula, from Poona, Jacquemont and Chunna, Duthie, to Ceylon, Wight.—Dist. Cochin China. (Also a var. in Brasil.)

Stems tufted, 4-24 in., slender, trigonous, glabrous; stolons 0. Leaves several, \( \frac{1}{2} \)-\( \frac{1}{2} \) stem, \( \frac{1}{2} \) in. broad, glabrous, or scarcely ciliate. Spikelets numerous, in a dense rusty brown head \( \frac{1}{2} \) in. diam.; bracts 3-6, 2-6 in., ciliate on margins near base. Glumes 6-7; 3 (or 4) lower 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 \( \frac{3}{2} \) glume, sometimes ornamented by scattered papillae; beak \( \frac{1}{2} \) nut, pale, decurrent on margins of nut.


Burma; Prome, Wallich n. 3423; Karenia and Pegu, Kurz; Nummayan, R. Scott.—Dist. 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 (sepalis) densely plumose. Nut nearly \( \frac{1}{2} \) in., often minutely bristly on shoulders; beak \( \frac{1}{2} \) nut, conic-oblong, not decurrent on nut. [There are several closely allied Australian species included under R. longisetis both by Bentham and Beeckeler.]

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 Cephaloschoenus 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; globe spikes 2–6 distant spiked or racemae, spikelets 1-fld., hypogynous bristles 5–6 twice as long as nut capillary smooth, style very shortly 2-fld, nut obovoid smooth chestnut-cord. beak narrowly conic pale.

MALAY PENINSULA; Malacca, Griffith (Kew n. 6358); Singapore, Ridley.—Distrib. Borneo.

Stems nearly 2 ft. Leaves often overtopping stem, ⅓ in. broad, glabrous or scabrous pilose; bracts all similar to leaves, lowest sometimes ¼ in. from the next. Spikes ¼–⅔ in. diam. of about 15 spikelets. Spikelets ¼ in., constructed as in R. Wallichiana. beak nearly as long as nut, smooth, base narrow.

Division III. PANICULATE. Paniculate. Spikelets solitary or clustered. Stem robust, with nodes and leaves (or bracts) far above base.—Calyptrostylis (Genus), Nees in Linnaea, ix. (1834), 295, is part of this Division.


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 ⅓–1 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 ⅓ 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 ⅓–⅔ in., ½ glume, smooth, reticulated or transversely wavy; beak pale, flattened, more or less grooved longitudinally on each face, rough, hardly exerted 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.


CEYLON; Thwaites n. 3036, Macra.—Distrib. Tropical America.

Stolons rather slender, clothed by ovate striate straw-cord. scales. Stems, leaves,
spikelets as in *R. aurea*, but more slender; spikelets more clustered, less numerous, in a more straggling open panicle. *Nut* hardly $\frac{1}{2}$ in., brown, smooth or microscopically transversely muricate; beak at base very narrowly pyramidal, much narrower than nut.


N.E. India; alt. 0–300 ft. Assam; Seebassur, 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* $\frac{1}{2} \times \frac{3}{4}$ in. long, surmounted by the minute neck also chestnut-colord.; beak greenish-straw-colord.


**Ceylon**; *Thwaites* n. 3818. **Khasia**; J. D. Hooker. **Nicobars**; *Kurz*—**Distr.** Hongkong.

*Roots* fibrous. *Stems* 2 ft. *Leaves* 4–12 in., setaceous. *Panicle* 12 by 3 in., with 18 spikelets. *Spikelets* $\frac{1}{8}$ by $\frac{3}{4}$ in., dusky brown. *Glumes* 7–8, obtuse, 3 or 4 lowest empty shorter. *Style* long slender, branches 2 as long as style. *Nut* $\frac{1}{2}$ glume, pale ash-colour; beak as broad as nut, becoming black, saddle-shaped.


**Khasia** and **Nilghiri Hills**, alt. 4–6500 ft., Nepal; Wallich. **Ceylon**, *Thwaites* C. P. n. 2396, &c.—**Distr.** 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* 8–30 by $\frac{1}{4} \times \frac{3}{4}$ in., nearly smooth. *Panicle* 12 by 1–2 in.; axillary corymbs often 2–3, distant, peduncled, $\frac{3}{4}$ in. diam. *Spikelets* shortly pedicelled or somewhat clustered $\frac{1}{4}$ 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* $\frac{1}{4} \times \frac{3}{4}$ 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 Schenian gracilis. But Swartz says his Schenian 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. $\beta$ chinensis (sp.) Boeck. l. c. 586 (not of Nees & Meyen); spikelets longer up to ¼ in. often bearing 2 nuts, beak longer often equalling ½ 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. laxe, Thwaites Enum. 352 (not of Tahl).—CEYLON; Thu. (C.P. 677, &c.). TENASSERIM; HEIFER (Kew Distr. n. 6303), Griffith (Kew Distr. 6302).—DISTRICT. Sea-coasts of Madagascar, Borneo, China, Sandwich Isles. A maritime form.

10. R. Griffithii, Boeck. in Linneae, xxxviii. 404, nut narrowly obovoid ellipsoid rounded at top, beak ½ 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. $\beta$ 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 Bocckeler's alliance of it with the sea-coast R. chinensis is not satisfactory.

11. R. sikkimensis, C. B. Clarke; glabrous, panicle narrow, corymb 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 ¼ in., fine brown, with 12–18 glumes and 3–8 pistilliferous flowers.—This plant may be the R. chinensis described by Boeck in Linneae, 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 Rass. 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. Fimbriatyla mollis, Kuns. Enum. ii. 245.

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. SCHÆNUS, Linnae (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 \( \frac{1}{3} \) nut or nearly obsolete, style 3-fld, nut sessile ovoid smooth marble-white. **Boiss. Fl. Orient.** v. 393; **Aitch. in Journ. Linn. Soc.** xviii. 104. Chetospora nigricans, **Kunth Enum.** ii. 323; **Boeck. in Linneea** xxxvii. 290.

**PUNJAB; Kururm Valley, Aitchison. SIND; Pinwill.**—**DISTRIB.** Nearly cosmopolitan, except S. E. Asia and Australia.

Almost glabrous. **Rhzome** horizontal, woody; stolons 0. **Stems** 4-24 in., suberect. **Leaves** 4-12 in., often half stem, very narrow with incurved margins. **Spikelets** 1-15, \( \frac{1}{2} \) 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** \( \frac{1}{2} \) in. 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 panicked, hypogynous bristles \( \frac{1}{3} \) nut white, style 3-fld, nut ovoid slightly tubercular or wrinkled chestnut-black. **Benth. Fl. Austral.** vii. 363. Chetospora calostachya, **Br. Prodr.** 233. Cyclocampe waigouensis, **Steud. Syn. Cyp.** 156. Cyclocarpa waigouensis, **Miq. Fl. Ind. Bat.** iii. 339.

**SINGAPORE; Ridley.**—**DISTRIB.** Malaya, Australia.

**Rhzome** short, horizontal, woody. **Stems** 1-2½ ft., rigid, rather slender, suberect. **Lower leaves** 4-12 by \( \frac{1}{2} \) in., glabrous; sheaths at their mouth scarious, scarcely pubescent. **Panicle** 8-16 in. long, with 8-14 spikelets; lowest 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; 3-3 following nut-bearing, distant on zigzag rhachilla. **Nut** \( \frac{1}{2} \) in., subsessile, trigonous, curved.

16. **CLADION, P. Browne.**

Stout perennials, glabrous or inflorescence minutely hairy. **Stems** round or flattened, leathry or leafless. **Leaves** equitant, xiphoed or trigonous at top, or flat. **Spikelets** panicked, 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 umboent, or indistinguishable from nut, or reduced to a speck.—Species 44; one cosmopolitan; the rest insular or maritime, in both hemispheres.

Subgenus I. **Eucladion**, 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-fld, the lower flower nut-bearing.

1. **C. Mariscus**, **Br. Prodr.** 236; **Stems** 3-8 ft., leaves \( \frac{1}{2} \) in. broad scabrous, glumes brown subobtuse, hypogynous bristles 0, style 3-fld, nut ovoid acute shining chestnut-colrd. **Boeck. in Linneea** xxxviii. 293. **O. vol. vi.**
germanicum, Schrad. Fl. Germ, i. 75, t. 5, fig. 7. C. jamaicense, Crantz

KASHMIR; Lake, alt. 6200 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; corymb distant, several
times corymbose divided; lower bracts leaf-like. Spikelets usually in globe
clusters of 4–12. 2–3 in., young lanceolate, ripo 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 ½ in., hard; style-
base ovoid, large, fused into nut, of which the cavity is carried up into style-base.

Subgenus II. MACÆRINA (Genus), Vahl Enum. ii. 238. Clusters
panicked, mostly sessile at the angles of zigzag branches. Hypogynous
bristles small. Nut more or less stalked, rostrate.

2. C. Malangayi, C. B. Clarke; stems stout flattened, basal leaves
equitant ½ 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. 4950 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 ½ in., ovoid, usually bearing 2–4 nuts. Glumes ovate, tip triangular
scarcey acute; 2–3 lowest empty. Hypogynous bristles 6, their upper half thinly
clothed with short upward-pointing hairs. Nut ½ in. long, on a short obpyramidal
stalk.—Very near the West Indian MACÆRINA restioides, Vahl.

3. C. undulatum, Thw. Enum. 353; stem long round-trigonomons,
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 Linnsea, xxxviii. 232. Tricostnlaria
in Linnsea, v. 38, 267.

CEYLON, Rotter, 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 ½ 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, ½ in. long, ellipsoid, 1–2-fid.; lower flower perfect,
nut-bearing. Glumes not distinctious; two lowest smaller, empty. Hypogynous
bristles 6, hardly ¼ nut, scutaceous, base dilated white. Nut scarcely ½ in., smooth;
beak depressed, pyramidal or umbonate, not ½ 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 Aus-
tralian plants here united as three species.

Subgenus III. BAUMEA (Genus), Gaud. in Freycinet Voy, Bot. 416, t. 29.
Clusters of flowers panicked, 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 Linnsea, xxxviii.
246.
Cladium.] 675. CYPERACEÆ. (C. B. Clarke.)

West Australia.

Stolon long, densely clothed by lanceolate striate dirty-straw-coloured scales. Stems 3 ft., trigonous, under panicle flattened biconvex. Basal leaves often as long as stem, hardly \( \frac{1}{2} \) 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 \( \frac{1}{2} \) in. long; secondary branches flexuose, minutely scabrous-puberulous. Spikelets in clusters of 1-5, \( \frac{3}{2} \) 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 \( \frac{3}{4} \) in., sessile, brown; beak \( \frac{1}{4} \) nut.

Var. crassos; 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; Sondhreebun, C. B. Clarke. Khasia, alt. 5000 ft., Shilling, 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, Bentham. typ.


Singapore, Ridley.—Distrib. China, Japan, Austral., and N. Zealand.

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 \( \frac{1}{2} \) in. long, hardly leaf-like. Spikelets 1-3 together (clusters often themselves clustered), \( \frac{1}{2} \) in., rusty-brown, 2-4-fld. bearing 1 (rarely 2) nut. Fl. glumes ovate acute, keel upwards scabrid, margins conspicuously thinly villous.

17. MICROSCHEGENUS, 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, conjoined 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, Tibri, 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 \( \frac{1}{2} \) in., ellipsoid; lowest bract similar to leaves; upper bracts gradually shorter, passing into glumes. Glumes ovate-oblong, concave scarcely keeled, chestnut-red, hardly scarios 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.


*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 tubescents; flowers 3–2, lowest sterile, upper perfect nut-bearing. Hypogynous bristles scarcely ½ 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-fid., 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 ½ length of uppermost keeled empty glume) subquadrate, scarcely nervet, 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. xvii. 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.


MALAY ISLANDS; from Sumatra to Fiji.

Nearly glabrous. Stem often 3 ft., terete. Leaves often nearly as long as stem, 1½ 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 ½ 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, ⅙ as long as the uppermost keeled glume. Stamens in lower flower 4, in the upper 3; filaments persistently 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.


The flower is here really axillary, the continuation of the axis suppressed at an early stage. The plant is allied to the Rynchospora, as Bentham has it.


Sea-coasts. CANARA; Talbot. TENASSERIM; Helfer; MALACCA, Griffith; NICOBARS, KURS; &C. CYLON; Thuwites (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., subtrigonomous, 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 3 spikelets, dirty straw-colord. Spikelets ⅛ in., ellipsoid. Nut ⅛ glume, chestnut-colord.; outermost cells minute, round-hexagonal, often porose (i.e nut punctulate.)


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
OLXXII. OYPERACEAE. (C. B. Clarke). [Hypolytrum.

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 Hypolytrum (see p. 587), or Mapaniae, 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-glummed 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 wheeled, 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 (squamellae), 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 squamellae and the pistil shows that this flower is really an inflorescence, as in Euphorbia. The species are sometimes polygamo-dioecious, 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 1–3 in. broad, style 2-fid, nut (fertile) wrinkled brown or chestnut, beak small conical pale (large when nut is barren). Thaw. Enun. 346 (3 and part c); Kurz in Journ. As. Soc. xxxviii. part 2, 72 (partly); H. giganteum, Wall. Cat. 3404 (partly); Nees in Wight Contrib. 93 (partly); Boeck. in Linnea, xxxvii. 131. H. scheenoides, Nees in Linnea, ix. 288. H. myrianthum, Mis. 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. Albikka scirpoides and scheenoides, Presl. Rel. Hong. i. 185, t. 34, 35.—Hypolytrum, Wall. Cat. 3402, 3403, 3404 (mainly).

Sikkim and Assam to Singapore, Travancore, Ceylon, Nicobar and Andaman Isles.—Distrib. Malayia, China, Austral., Polynesia.

Rhzomes perennial, short; roots thick, smooth, very tough. Stem 1–3 ft., smooth or slightly scarios, bearing nodes and leaves above the base, often above the middle. Leaves often 6–13 in. long, scarios on margins. Panicle 2–6 in. diam. pyramidal, compound-corymbose or as if depressed-umbellate, often dense, sometimes decompound with few spikes; branches divaricate, scarios, very rigid. Spikelet nearly all solitary, young 1–1 in. oblong-obovoid, fruiting 3 in. subgloboso. Glumes (i.e. bracteoles) closely spirally imbricate, scarcely 1 in. long, concave, elliptic, obtuse, membranous, 1-nerved, brownish. Squamella 3 glume. Nut (without beak) a little longer than glume, sessile; beak about 1 in. 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 (Linnea, xxxvii. 130) calls the Indian H. mauritianum.—It is possible to refer the Mauritayan 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 Linnea, xxxvii. p. 130; stems stout, leaves long 1–3 in. broad, panicle compound dense, style 2-fid, nut (fertile) straw-colored or pale, beak conical pale 1 in. H. giganteum, Nees in Wight Contrib. p. 93 (partly).—Iheede Hort. Malab. xii. t. 58.
3. **H. turgidum**, C. B. Clarke; stem stout, leaves long $\frac{3}{2}$-$\frac{3}{4}$ in. broad, panicule 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 squamelleae are lateral (as in all the *Mapanica*); the third extra glume is flat concave thin without keel on the anterior side of the spikelet within the squamelleae. A similar extra glume occurs frequently in several of the large American *Hypolytrum*; thus indicating an approach to *Thoracoestachyum*.

4. **H. penangense**, C. B. Clarke; stem stout, leaves long $\frac{1}{2}$-$\frac{3}{2}$ in. broad, panicule compound of 100 spikes, young spikes $\frac{7}{10}$ in. linear cylindric.

**Penang**; Mainay (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 $\frac{1}{2}$-$\frac{1}{8}$ 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. But. 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* 1-1$\frac{1}{2}$ in. diam., with 25 spikes. *Spikes* in fruit scarcely $\frac{1}{2}$ 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 Linnaea, xxxvii. 126; stem somewhat slender, leaves $\frac{3}{2}$-$\frac{1}{2}$ 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-$\frac{1}{2}$ in. diam., with 20 spikes. Young spikelets $\frac{7}{10}$ in. in. cylindric, glistening white (broad scarious margins of bracteoles covering up the brown bases). *Spikelets* in fruit $\frac{1}{2}$ 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., corym rigid, bracteoles hard subacute, one (or more) squamelle often interposed between the two basal male squamellae 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 Linnaea, xxxvii. 126. *H. latifolium* × minor, Kurz l. c. 74 (partly, not of L. O. Rich.).

**Ceylon**; Thwaites (C.P. 3463).

*Stolon* 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, \( \frac{3}{4} \) in. broad, gradually narrowed at both ends; margins scabrous. Corymb \( 1 \frac{1}{2} \) in. diam., with 12–20 spikes; bracts often 6 in., resembling the leaves. Spikes \( \frac{1}{4} \) in., ellipsoid, dirty straw-colored. Bracteoles (glumes) ovate, striate, falling with nuts. Lateral third glume to spikelet monandrous or sterile. Nut scarcely \( \frac{1}{16} \) in., subglobose, olivaceous, wrinkled.

22. THORACOSTACHYUM, Kurz.

Leaves flat, 3-nerved, narrowed gradually at each end. Spikes panicked, 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 obovate, shining; beak conic acute (not seen in *T. hypolytroides*).—Species 5, in Ceylon, Seychelles, Malaya, Australia.


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, \( \frac{3}{4} \) in. broad; margins (at least near tips) scabrous. Corymb 1–2 in. diam., with sometimes 50 spikes; bracts often 6 in., leaf-like. Spikes \( \frac{1}{2} \) in. diam., ultimately \( \frac{1}{4} \) in., beaks of persistent nuts spreading on all sides. Bracteoles hardly \( \frac{1}{16} \) in., ovate, obtuse, striate, horny. Nut about \( \frac{1}{16} \) in., beak none, or rather completely fused with nut; grooves very narrow spathulate.

Var. *longispica*: spikes \( \frac{1}{2} \) in. oblong smutted, nuts perfect—Malacca; Griffith, *Kew Distrib.* n. 6357).—The abnormal elongation of the spikes is supposed due to the *Usitago*.


MALAY PENINSULA; Jobore, Ridley n. 4098.—Distrib. N. Guinea, Queensland. Stem 3–5 ft. Bracts 82 by 1 in., 3-nerved. Panicle 12 by 8 in. Spikes solitary \( \frac{1}{2} \) 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. Spurs 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 ¼ in. 3-5-striate, style 3-fid, nut ovoid much narrowed at base almost stalked. Pandanophyllum palustris 8 silhetana, Kurz in Journ. As. Soc. Beng. xxxviii. pt. ii. 79 (partly)—Cyperaceae, Wall. Cat. n. 4474.

**Upper Assam**; alt. 300 ft., Jenkin, C. B. Clarke. **Stylhet**; Wallich.

**Rhizome** long, nearly ¼ in. diam. Leaves 1-3 ft., margins scabrous. Scape robust, sheathed at base by some very scales, naked upwards. Spurs ¼ in., ellipsoid; bracteoles ¼ in., chaffy, elliptic-oblong, dirty straw-colour, persistent. Squamellae 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.


**Singapore**; Ridley.—**DISTRIBUTION.** Malaya.

**Rhizome** long, nearly ¼ in. diam. Leaves 3-4 ft., margins scabrous. Scape robust, sheathed at base by some very scales. Heads 1½-2 in. diam. Spurs ¼ in., ellipsoid, bracteoles chaffy, persistent. Squamellae and glumes linear-oblong, nearly as long as bracteoles, 3rd lateral glume sterile. Nut ¼ in., ashy-black, beak small conic.—Pandanophyllum palustris, Hassk. (in Tydsc. 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 Cephaloscyrpus, 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 aculate on keel beneath, bracteoles ⅛ in. strongly 13-striate reddish-brown.

**Malacca**; Griffith (New 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, acutulate. Inflorescence 1 in diam., rigid; bracts short, ovate, brown. Spurs ¼ in., ellipsoid, brown. Bracteoles ovate, obtuse, rigid, incurved, entire at apex. Squamellae 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 ⅛ in.

ANDAMAN ISLDS.; Helfer (Kew Distrib. 6298), Kurz.

Stolons 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. Inf. of M. Kurzii, but much less rigid; bracteoles loosely imbricate. Nut not seen.—Closely allied to M. palustris.


SINGAPORE; Ridley.—DISTRIB. Java.

Head very much smaller than in the preceding species, about 1/5 in. diam. when young. The species appears more allied to Sect. Pandanophyllum, but the spikes are distinct in the head.

Sect. III. **PANDANOXYLUM** (Genus), Hassk. in Tydsc. 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 1/3 its length with scales, inflorescence a dense head 1–1 1/2 in., ovoid or ellipsoid, partial spikes all containing one spikelet only. Pand. palustre ("inflorescentia 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 1/3 in., margins aculeolate. Bracts ovate-oblong, obtuse, thick, shorter than infl. Bracteoles 1/2 in., elliptic, obtuse, chaffy, tough. Squamellae and glumes a little shorter than bracteole, narrow-oblong. Nut 1/2 in., ovoid, ashy-black, beak hardly any.

7. **M. zeylanicum**, Benth. in Gen. Pl. iii. 1056; scapes 4–12 in. with few scales close to base, leaves aculate on margin to base, mature inf. 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 Linnaea, xxxvii. 188. 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 1/2 in., aculate on keel beneath, long-attenuate linear, margins aculeolate. Inf. in frt. rather more than 1/2 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 1–2 1/2 in. clothed throughout by lanceolate leaf-like scales, leaves (except tip) only slightly

**Ceylon, Thuaisiis (C.P. 3319).**  
Leaves numerous, equitant, 2½ ft. by ¼ in., tip caudate. Upper scales of scape up to 1–2½ in. long, linear-lanceolate; lower bracts similar to upper scales often overlapping 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 aculate 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).** J ohn, Ridley.—Distrib. Sumatra.  
Similar to *M. zeylanica*, but infl. and spikes smaller. Leaves numerous, equitant, up to 2½ ft. by ¼ in., long attenuate at both ends, aculate on midrib beneath. Inflorescence (in fruit) hardly ½ in. in diam. *Squamelle 6, ½ 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 aculate nearly throughout, keel beneath smooth except towards tip. *Infl.* in fruit ½ by ½ in.; bracts much shorter than infl. *Nut* ½ by ½ 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.**


**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, aculate on margins and on keel beneath at least at top; quasi-petiole 2–12 in., dilated at base. *Scape* axillary in the lower leaves, rather stout, smooth trigonous upwards; basal scales ovate-lanceolate, hard, striate, green with brown-accurious 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 ½ in., ovate, obtuse, striate. *Squamella* 6, hardly shorter than bracteole, linear, brownish. *Anthers* linear-oblong, yellow, not crested. *Style* long; branches 3. *Nut* ½ 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.**


**CEYLON, KING, Trimen.** **PENANG and SINGAPORE, Wallich. MALACCA, Griffith (Kew Distr., n. 6134).—Distr. Java, Austral., Samoa.

Rhizome woody. Stem 1–2 ft., at top ½ in. in diam. trigonous, smooth. Panicle 4–6 in. long; branches clustered, thick, short; lower bracts leaf-like, upper very short. Spikes ½ in. long; spikelets ¼–½ in.; bracteole (outermost glume) as long as spikelet, ovate, obtuse, striate, chalky, dirty straw-colord. *Squamellae*, two outer not much shorter than bracteole, hairy on keel; inner narrower, rather shorter. *Nut* ½ in. long, ½ in. in diam., woody, with succulent epicarp (eaten in Samoa by natives).

25. **LEPIRIONIA, L. C. Rich.**

*S. costatum,* Kurz.

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.


**MALACCA, Gaudichaud, Griffith. SINGAPORE, Lloyd. CEYLON, Thwaites, &c.—Distr. Madagascar, Malaya, Queensland, Viti (China cult. only, fide Hance).

Rhizome horizontal, woody, clothed by ovate subscale strate ferruginous scales. Stems approximate, ½ 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 ¼–1 in. long, occasionally much larger, brown or chestnut, lowest bract often 1–2 in. Bracteoles (apparently flower-glumes) spirally imbricated, ½ in., ovate, obtuse, rigid, not striate, ultimately deciduous with nut. Two outer *squamellae* scarcely shorter than glume, hairy on keel. *Nut* ¼–½ in., obscurely longitudinally striate; linear style-base persistent.
28. 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 Linn.aa, ix. 303, character widened. Bisexual spikelets many.


Widely scattered from GURWHAL, alt. 5600 ft., Duthie, to SYLHET, Wallich. BEHAR, KURZ. CHOTA NAGPORE, T. Anderson. DECCAN PENINSULA, Wight. CEYLON, Thwaites.—DISTR. TROP. AF.ICA.

Stem 10-20 in. Leaves 4-10 by ¼ in. Spike 2-6 in.; clusters of 2-5 sp’kelets ¼-½ in. apart; bract ovate-lanceolate, hardly longer than clusters. Bisexual spikelets scarcely ¼ 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 75 in. in diam., ovoid, trigonous, base narrow trigonous.—Dr. Trimen writes: “The lemon-scented leaves are used to drive away mosquitoes.”


Throughout INDIA (except the West arid area), alt. 0-3000 ft., common, from SIKKIM to CEYLON and MADAGASC. ANDAMANS and NICOBARS, KURZ.—DISTR. All warm regions except Continental Africa.

Rhizome elongate, horizontal. Stems 1½-3 ft., not tufted. Leaves 6-12 by ¼ 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 $\frac{1}{2}$ 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. $\beta$ (Roxburghii), Thw. Enum. 354; rather stouter, nut rather larger with pyramidal subacute apex, transversely wrinkled by ferruginous glands (at least when young). Hydropoporum 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.


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. *Inf.* 1-2 fl. by 4-6 in.; lower peduncles exserted 1-4 in., rigid. *Spikelets* $\frac{1}{2}$ in. long, nearly all bisexual, clustered and solitary, usually brown or straw-coloured, sometimes more or less chestnut-coloured, constructed nearly as in *S. lithosperma* but stouter; stamens often 3. *Nut* nearly $\frac{1}{2}$ in. long, ellipsoid, subtrigonal, 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, panicule of few small very distant axillary coryms, style 3-fid, nut white smooth apiculate, disc very small.

*Singapore*; Pular Burn, Ridley (n. 1641).—Distrib. Hongkong.

*Rhizome* horizontal, $\frac{1}{2}$ in. in diam., clothed by small ovate striate dark-red scales. *Stem* 2 ft., $\frac{1}{16}$ in. in diam., triquetrous, scabrous; sheaths very narrowly winged; ligule almost truncate, margin narrow scarious hardly hairy. *Leaves* 12 by $\frac{1}{2}$ 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. *Tessellatae*. Slender (sometimes tall) plants. *Roots* fibrous, or the rhizome very short not thick. *Leaves* not candate-setaceous at tip. *Panicle* narrow, the lower axillary panicles often remote, reduced to spikes, sometimes very short.

* Nut tessellated.


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 1⁄2 in., lancolate, 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 evolve more rigid subpyramidal. Fem. spikelets 1⁄2 in. long, ferruginous-green, glabrous. Nut scarcely 1⁄2 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 1⁄4–1⁄4 height of nut.

6. S. biflora, Roxb. Fl. Ind. iii. 578; slender, nearly glabrate, roots fibrous, panicle elongate thin lower branches remote, style 3-fid, nut tessel- late, lobes of disc-margin lanceolate acute or subulate erect stout ferruginous-brown. S. Steudelliana, Miq. Fl. Ind. Bat. iii. 344; Boeck. in Linnaea, xxviii. 475. S. tesselata, Benth. Fl. Hongk. 399; Thw. Enum. 354, a (not β); Kunth Enum. ii. 343 (partly).—Scleria, Wall. Cat. 3405 B.


Usually glabrous except the (so-called) ligule of leaf. Fem. glume scabrid on its keel upwards, or smooth. Lobes of disc-margin reaching to 1⁄4–1⁄4 height of nut.—This may be regarded as a var. of S. tesselata (which it altogether resembles), only differing in the lobes of the disc-margin.

7. S. Stocksiana, Boeck. in Linnaea, xxxviii. 474; nearly glabrous, panicle elongate thin lower branches remote, style 3-fid, nut tesselate, lobes of disc-margin short ovate ferruginous their edges reflexed auriculate. S. tesselata (part), Herb. Ind. Or. Hook. f. & T.

Bombay, Low.

The examples show only panicles, without leaves or roots. Nut rather larger and more glabrous than of S. tesselata. Disc dark red, glandular.—May have a horizontal rhizome, and be more nearly allied to S. juncoformis.

** 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 Linnaea, xxxviii. 456. Hypoporum annulare, Nees ms. (fide Kunth).


Roots fibrous, dark-red. Stems 1–2 ft., slender or medium; sheaths 3-winged, hairy or glabrous. Leaves 4–8 by 1⁄2 in., lancolate, tip subobtuse. Panicles axillary, often 1 by 1⁄2 in., subsipicate, secondary bracts conspicuously exserted. Spikelets glabrous, very like those of S. tesselata. Nut 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. tesselata.

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


Stems 1 ft., connected at base on a very short slender ligneous rhizome Leaves with scattered slender needle-white hairs or glabrecescent, tip lanceolate sub-obtuse (not seacaceous-caudate). Spikelets small, as of S. tessellata. Nut scarcely 1/2 in. in diam., dried young reticulate, mature osseous smooth or nearly so. Disc-margined coloured, glabrous, not (or obscurely) 3-lobed.—S. lasa, 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 polished gloandular.

Assam (in Seebasgur), C. B. Clarke. Pegu, Kurs.

Stems flaccid, 1-2 ft. Leaves ½ in. broad, lanceolate, subobtuse at tip. Panicles axillary, ½ in. long. Spikelets small, all unisexual, fem. ½ in. long usually containing the deapaperated sterile apex of the spikelet as a lateral compressed rudiment (of two glumes) about ½ 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.


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 ½-½ in., lanceolate, tip obtuse; sheaths trigonous, not winged. Primary bracts (floral leaves) altogether leaf-like tuft usually of very small sessile clusters just exerted from their sheaths, but in evolute examples, lower clusters are sometimes paniculate with branches 1 in. long. Spikelets all unisexual, fem. ½ 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 ½ 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 Cryptangiacae.

*** 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),

**Ceylon, Macrea, &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 $\frac{1}{3}$ in. long, ferruginous; female glume mucronate. *Nut* about $\frac{1}{3}$ 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. *Elatae.*** 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. multiflora*].

*Sheaths* (of middle stem-leaves) winged (sometimes in *S. elata*, and *S. chinensis* obscurely).


Throughout *India* (except the N.W. arid region), alt. 0–5000 ft., and *Ceylon*, common.—*DistriB.* Malay, China, Japao, Australia, Polynesia.

*Rhizome* $\frac{1}{3}$ 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. *Paniele* 1 ft. long, oblong; partial panicles usually thin of few spikelets, but sometimes stouter pyramidal, their bracts often much exert conspicuous, but sometimes short. *Spikelets* all unisexual; fem. $\frac{1}{3}$ in., slightly scabrous scarcely hairy; fem. glume mucronate; superior sterile rudiment usually present. *Nut* $\frac{1}{2}$ in. long, ovoid, obscurously trigonous, narrowed at apex, straw-coind, or brown, nearly always obliquely reticulated, margins of reticulations microscopically brown-tipped, or finally glabrate almost shining. Lobes of disc margin as much as $\frac{1}{2}$–$\frac{1}{3}$ height of nut.


Rhizome \frac{1}{2} 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 rachis of the panicles.

15. S. alta, Boeck. in Linnaea, xxxviii. 485; robust, glabrous (even rachis 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.


Very near S. Thompsoniana, except the lobes of disc-margin; secondary bract longer, more conspicuous.


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 \frac{1}{2} in. in diam., glabrous. Leaves 1–2 ft. by \frac{1}{2} 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 \frac{1}{4} in.; partial panicles 4 by 3 in., branches rectangularly divaricate, red, hairy. Spikelets numerous, all unisexual, male and female scattered in all parts of infl.; panicle dense, but spikelets scarcely clustered. Fem. spikelets \frac{1}{2} in.; fem. glume shortly mucronate, glabrous, sterile superior glumes tabescuit (generally present). Nut \frac{1}{2}–\frac{3}{16} in., as of S. hebecarpa, and similarly becoming glabrate ultimately, white or dusky; lobes of disc-margin scarcely attaining \frac{1}{2} height of nut, ferruginous or red.—Thwaites says of his S. elata "sheaths not winged," whereas Boeckeler puts it in his section having "trilate sheaths." The explanation is that Thwaites described S. elata mainly from C.P. n. 825 (which is S. chinensis, Kunth, var. \beta), 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 arc glumes.—Sikkim, Khasia, Munpeor, 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}{4}–\frac{1}{2} in. long. Boeck. in Linnaea, xxxviii. 486. S. ciliaris, Nees in Wight Contrib. 117 (not of Mich.). S. acroeciculata, 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 oblongate, scarious margin of ligule shorter (\frac{1}{4}–\frac{1}{2} 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).

**MALAY PENINSULA.** Perak, alt. 300 ft., King's Collector (n. 1929).—**DISTRIBUTION.** Hongkong.

Closely allied to robust forms of *S. elata*, Thwaites, but differs by being very scabrous, by the rhachis and rhenoeole being scabrous (scarcey hairy), and by the nut being smooth (scarcey tessellate).

19. **S. psilorrhiza**, B. C. 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. Kow “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, 1/8 in. in diam., clothed by distant ovate striate red scales. Stems 2 ft., scabrous. Leaves 1 ft. by 1/4 in.; sheath 3-winged; ligule ovate, obtuse glabrous. Panicle 2-2 1/2 by 1/4 in., stout, rhachis somewhat hairy; lower branches 0-1 1/2 in., secondary bracts 1-1 1/2 in. filiform. Spikelets all unisexual, as of *S. hebescarpa* and *S. elata*; fem. glume aristate. Nut 1/4 in. long, ovoid, scarcely at all trigonous or hairy; disc obpyramidal, rigid, purpureous, margin very narrow with rigid yellowish lobes.—Quite unlike the five last sp., and is perhaps more allied to *S. Stockstiana*.


**S.E. INDIA;** from Assam to Ceylon and to Malacca.—**DISTRIBUTION.** Zanzibar, Malaya, Philippines, Australia.

Stolons long, terete, 1/4 in. in diam., usually without scales (because in water). Stems 3-6 ft., scabrous. Leaves up to 3 ft. by 1/4 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 spike. Fem. spikelets 1/4 in.; fem. glume scarcely mucronate. Nut 1/4 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. Hookeriiana**, Boeck. in Linnaea, xxxviii. 498; robust, more or less hairy, partial panicles 1-3 lanceolate or ovoid branches erect, spikelets chestnut-corded, 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. ct T T.
Khasia and Naga Hills, and Muneypoor, alt. 4-6000 ft., J. D. H. & T. T., C. B. Clarke, Watt.

Rhzomes 3/4-1 in. in diam., covered by small ovate striate black-red scales. Stems 3 ft., glabrous. Leaves up to 1 ft. by 1/4 in., tip setaceous, glabrous or hairy; sheath usually wioless or occasionally distinctly 3-winged. Spikelets nearly as in S. elata. Nut 1/4 in. long, young white shallowly tessellate, mature smooth shining.—Most easily known from the S. elata by the panicle-branches ascending (not rectangularly divercate). 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. Hookerianna, 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 1/10 in. long, ultimately reticulated hairy; tails of lobes of disc-margin reaching to 3/8 height of nut.—S. khasiana, Boeck., is S. Thomsoniana.


Ceylon; Reingan Corle, Thwaites (C.P. 3225).

Rhzomes 1/2 in. in diam., contorted. Stem nearly 3 ft., rather slender. Leaves up to 18 by 1/2 in., tip lanceolate subobtuse. Panicle very slender; lowest partial panicle (spike-like) 1 in., nodding on a slender peduncle 2-4 in. Spikelets nearly 1/2 in., furrigious, almost glabrous, no bisexual spikelets seen. Nut 1/4 in. long, as of S. tessellata.—Approaches S. tessellata by its subobtuse leaves and infl., but the rhizome differs.

24. S. melanostoma, Boeck. in Linnaea, xxxviii. 514; nearly glabrous except rhachis of panicle, leaves at nearly regular distances, sheaths not winged, ligule short narrowly scarios-marginined, partial panicles distant pyramidal, nut tessellated pale or often becoming fuscous-black, disc-lobes very short depressed ovate. S. Hasskarliana and S. Pleinii, Boeck. in Engler, Jahrb. v. 511, 513. S. melanoposphera, 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.—Disteb. 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 (false) opposite or ternate.

**TENASSERIM, Kurs. MALACCA, Griffith. SINGAPORE, Wallich.—Distrib.** Borneo, Tawkin. Rhizome woody, ½–1 in. diam. Stems 2–4 ft. Leaves (upper approximated in pairs) 12–18 by ½ in., tip lanceolate subobtuse; sheaths 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* ½ in. diam., white or straw-colrd., minutely hairy, ultimately glabrata; lobes of disc-margin reaching to ¾ height of nut, adpressed, pale.


**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 scarious cutting the hand; sheaths not winged. Nut-bearing *spikelets* somewhat obvoid. *Nut* ½ 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. *Verr. 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. ophiiren*is;** panicles fuscous, lower peduncles long, male spikelets narrow, lobes of disc-margin shorter (than in *S. multiflora* 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.


**S. BENGAL to SINGAPORE, frequent. NICOBARS, Kurs. PENANG, Wallich. Ceylon.—Distrib.** Java.

Resembles *S. multiflora*, Boeck., and most easily distinguished by the broad rounded base of the fruiting spikelets.—Secondary bracts 1 in., filiform, often conspicuous. *Nut* ½ in. diam., mature glabrata, pale or brown, or often dark red shining. Lobes of disc-margin sometimes nearly enveloping the nut, truncate sometimes crenulate undulate.


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 ½-1 in. in diam., depressed-globose, somewhat trigonous; lobes of disc-margin somewhat thick, white with green nerves, at tip entire or slightly eremate-toothed.

Sect. 3. Schizolepis (Genus), Nees in Mart. Fl. Bras. ii. (pars. 1) 158, 186 (char. extended). Character of Elatae, 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 Linnea, xxxviii. 515. Macrolomia bracteata, Nees l. c. 182, t. 24.

Tropical America, abundant.

Var. a 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.


27. Kobresia, Wallid.

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 paniced spikes. Spikelets (apparently often simple) 1-sexual, or 2-sexual (when fem. spikelets inferior). Spikelets male, or fem. 1-fid., 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-fid. 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. Hemicarpy (Gen.) Benth. in Gen. Pl. iii. 1072 (chiefly). Stem with 1 apparently simple linear or oblong spike. Fem. spikelets 1-fid., with sometimes the rudiment of rhachilla within fem. glume. Style 3-fid.
1. **K. seticulmis**, Boeck. in Linnaea, xxxix. 3 partly (char. reform.); stems slender 2-8 in., vernal leaves flat linear-lanceolate tipped, spikes ¾-1 in. linear fem. or fem. at base male at top, fem. glume deeply split, style 3-fid, nut (including exserted beak) ½ in. Hemicarex Hookeri. C. B. Clarke in Journ. Linn. Soc. xx. 383 (partly). Carex (better Kobresia) mutans, Booth 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 cespitose. Vernal leaves 2 by 1/8 in., summer 5-9 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 rachilla is sometimes within it. Nut linear-oblong, brown, as long as glume; beak ½-⅓ length of nut, exsert.—Boeckeler united with *K. seticulmis*, *Jiticina*, and his description of *seticulmis* is mainly drawn from *Jiticina* (he had only a scrap of *K. seticulmis*.)

2. **K. Hookeri**, Boeck. in Linnaea, 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) 1¼-1½ in. linear, narrower interrupted at base, fem. glume deeply split, style 3-fid, nut (including exserted beak) ½ in. Carex essenbeckii? Booth 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 ¼ 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; Namde, alt. 12,000 ft., Pantling.—Male spikes 2 by ½ 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 dioecious 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 ¼-⅓ 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 dioecious) male linear-oblong fem. linear with distant bracteoles, style 3-fid, nut linear-oblong, beak ½ length of nut.

**Sikkim**; Lachen Valley, at Monay, alt. 15,000 ft., J. D. H.

Stems covered up to ⅓ their length by scarious flaccid sheaths. Leaves 2-6 in., at base scarcely ⅛ in. broad. Male stems about as long as female. Male spikes ⅓ by ½ 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 Linnaea, xxxix. 548, in note; stems 2-8 in. rather slender, summer leaves very long not long-caudate, spikes (usually dioecious) fem. 2½ in. linear, male bracteoles elliptic-oblong obtuse

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 1\(\frac{1}{2}\) ft. in. flat. Male spikes 3-1 by 1\(\frac{1}{2}\) ft. 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-candate. It hardly differs from Carex linearis, Boott, but by the "utricile" being split \(\frac{3}{4}\) the way down to base.

6. K. foliosa, C. B. Clarke; dioecious, stems 20 in. somewhat robust, summer leaves 20 by \(\frac{1}{2}\) in. not candate-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., Dutchie (nn. 57, 4944).

Rhizome oblique, 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 1\(\frac{1}{2}\) in. not candate-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., Dutchie (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 Dutchie under the same number appears not to belong to this species (possibly K. foliosa).

8. K. pygmaea, C. B. Clarke; stems \(\frac{1}{2}\) to \(\frac{1}{2}\) in. leaves \(\frac{1}{2}\) to \(\frac{1}{2}\) in. setaceous, spikes \(\frac{1}{2}\) to \(\frac{1}{2}\) in. oblong, style 3-fid, beak of nut very short, hardly exerted from glume. Hemicarex pygmaea, C. B. Clarke in Journ. Linn. Soc. xx. 383.

—Elyna sp. n. 7, Herb. Ind. Or. H. f. et T. T.


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 \(\frac{1}{2}\) ft. 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 utricile in Carex) split down to base.]


—Elyna sp. n. 1, Herb. Ind. Or. H. f. & T. T.

N.W. Himalaya, alt. 10,000 ft.; Simla, Thomson; Kumaon, Dutchie.

Stems 2-10 in. Leaves 4-6 by \(\frac{1}{2}\) in. tip candate. Spikes very slender, \(\frac{1}{6}\) in. broad, green ultimately brown. Upper bracteoles \(\frac{1}{6}\) in. elliptic-lanceolate, acute.
Lower spikelets mostly 2-fl., i.e. lower fem., upper male. Nut nearly as long as glume; beak $\frac{1}{2}$ length of nut.


**Kumaon**, alt. 11-16,000 ft.; **Duthie** (un. 3461, 6093, 6094) and **Gurwhal** (n. 5016).

Stems densely cespitose, 4-8 in., stricate; lower sheaths tight, not lacerate. Leaves many, $\frac{1}{4}$-$\frac{1}{2}$ length of stem, $\frac{1}{2}$ in. broad, flat, tip caudate. Spikelets 1 by $\frac{1}{4}$ in., very rigid; bracteoles $\frac{1}{15}$ in. ovate, closely spirally imbricated. Spikelets mostly 2-fl., upper flower male. Nut, including beak, about as long as glume; beak $\frac{1}{2}$ length of nut.


**Kashmir** to **Gurwhal**, alt. 10-12,000 ft., frequent, **Jacquemont, T. Thomson**, 30. **Kurrum Valley**; alt. 12,500 ft., **Aitchison**.

Stems 2-12 in. Spikelets $\frac{1}{4}$-1 by $\frac{1}{4}$-$\frac{1}{2}$ in., brown chestnut-colour or yellow; bracteoles $\frac{1}{15}$ in. Spikelets mostly 3-4-fl. Nut shorter than glume.—Very near the European K. scirpina, Willd., but is a finer plant, with a brighter thicker spike.


**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., $\frac{1}{8}$-$\frac{1}{4}$ in. diam. Leaves as long as stems, to scarcely $\frac{1}{2}$ of stem, $\frac{1}{15}$-$\frac{1}{2}$ in. broad. Spikelets $\frac{1}{4}$-1 by $\frac{1}{2}$ in.; bracteoles chafy, loosely imbricated, suberect. Spikelets 1-5-fl., lowest fl. fem., or towards top of spike wholly male. Nut $\frac{1}{15}$ 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 $\frac{1}{15}$ in. ovate obtuse shining, style 3-fl., 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. Spikelets $\frac{1}{4}$ by $\frac{1}{2}$ in. Bracteoles shining chestnut-colour, paler on back, margins often white-scarios. Nut $\frac{1}{15}$ in., very like that of K. schonoides.
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. uncinoidea. Style 3-fid.—Trilepis, Nees in Edinb. N. Phil. Journ. xvii. 267 (as to type species).


Alpine Himalaya, alt. 10-16,000 ft.; from W. Tibet, Thomson, to Sikkim, J. D. H., frequent.—Distr. 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 (½-3 in.). Spikelets (in Royle's) ½ by ½ in.; in Thomson's up to 2 in., panicked, branches sub erect with many spikelets, ferruginous brown. Lower spikelets ½ in., often 3-4 flid. Nut ½ 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 spikelets.

15. K. uncinoidea, C. B. Clarke; robust, ind. 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 uncinoidea, Bootl Carex, i. 8, t. 23; Boeck. in Linnnea, xxxix. 109.—Triticoides, Griff. Illn. Notes, 140.

Sikkim; alt. 10-16,000 ft., J. D. H., &c. Bhutan; Griffith.—Distr. Tibet.

Glabrous. Rhizome 3 in. by ½ in. diam., woody, densely scarred. Stems 1-2 ft., striate. Leaves sub-basal, very much shorter than stem. Infl. 3 by ½ in., straw yellow, somewhat interrupted at base. Glume to fem. spikelet ½ in. by ½ 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 utricule 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 kakanica, Regel (Desv. Pl. fasc. 8. 23) except in its larger size.

Sect. 4. Hemicarex (Genus), Benth. in Gen. Pl. iii. 1072 (partly). Spike loosely panicled; lowest bract long, leaf-like. Style 3-fid.


Alpine Himalaya, alt. 6500-12,000 ft.; from N.W. Kashmir, Giles, to Sikkim, J. D. H.
Rhizome creeping, short. Leaves as long as stem, \(1/2\) 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 \(1/4\) length of nut; branches 3, linear very long.


Sikkim; Tungu, alt. 13,000 ft., J. D. H.
Leaves as long as stem, \(1/3\) in. broad. Panicle 1 by \(1/3\) in.—Resembling, and closely allied to, *K. laxa*.

Sect. 5. **Pseudokobresia**. Style 2-fld. Nut flat.


W. Tibet; Nubra, Schlagintweit (n. 2424) and Ladak (n. 1344).—Distrib. Central Asia.

Rhizome short. Stems caespitose, 2–7 in. Leaves many, \(1/3\) length of stem, \(2/3\)–1/6 in. broad, flat; sheaths pale, not torn. Spike \(2/3\) by \(1/3\) in. Bracteoles \(1/2\) in., ovate-oblong, obtuse, nearly flat, brown with green back. Fem. glume elliptic-oblong, obtuse, coneave, open (nowise utricle-like.) Nut \(1/8\) in., obovoid, obtuse, brown; style linear, \(1/3\) 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 *Cariceae* are not homologous with the fl. glumes of *Scirpeae*. 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. **Vinea**. Style 2-fld.

Sect. 1. **Muricata**. Terminal spike fem. at base, male at top.
* Spikes short, ovoid or oblong (*C. muricata*, &c.) . . . sp. 1–10
** Spikes linear-cylindric (*C. brownia*, &c.) . . . sp. 11–14

Sect. 2. **Remota**. Terminal spike male at base, fem. at top.
* Spikes short, ovoid or oblong (*C. remota*, &c.) . . . sp. 15–19
** Spikes linear-cylindric (*C. teres*, &c.) . . . sp. 19–23

Sect. 3. **Vulgaris**. Terminal spike wholly male (*C. vulgaris*, &c.) . . . . . . . sp. 23–33
Subgenus II.  **Eucarex.**  Style 3-fid.

Sect. 4.  **Rara.**  Stem with 1 spike, fem. at base (C. rara, &c.) sp. 34–39

Sect. 5.  **Indices.**  Terminal spike fem. at base, male at top; or, when spike very numerous many male at top, terminal spike sometimes wholly male.

* Subcapose, basal leaves long (C. cryptostachys, &c.). sp. 40–42
** Spikes short, very numerous (C. cruciata, &c.) sp. 42–46
*** 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. polyeophala, &c.) sp. 74–84

Sect. 6.  **Atrata.**  Terminal spike male at base fem. at top (C. atrata, &c.) sp. 92–98

Sect. 7.  **Propria.**  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. britella, &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.  **Muricate.**  Terminal spike (and usually some or many of the others) fem. at base male at top.  [Spikelets in *C. faviatilis* all or mostly 1-sexual, monocious or dioecious.]

* Spikes short, ovoid or oblong, sessile or nearly so; inf. a dense or interrupted compound spike.  [The series of species proceeds from the dense to the more interrupted.]


N. W. Himalaya, from Kunswur and Kasmir to the Karakorum, alt. 11–15,500 ft., Thomson, &c.—Distribs. Mountain and cold regions.

Stems up to 6 in. (in Indik), often several clustered on top of ascending rhizome.  Leaves sometimes as long as stem, narrow, often (when dry) incurved sometimes flat.  Inf. about $\frac{1}{4}$ in. diam.; lowest bract $\frac{1}{2}$ 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 $\frac{1}{2}$ utricle, plano-convex, obtuse, shining-chestnut.  Style $\frac{1}{2}$ 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-
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N. W. HIMALAYA, and W. TIBET from Piti and Kashmir to the Karakorum, alt. 8—14,000 ft.—*Distr*ib. Mountain and cold North-rn 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 glistering 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. 288 in Herb. Kew) the ripening spikes are elongate, the lowest spike ½ 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*.


W. HIMALAYA (*Boott.*)—*Distr*ib. 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. *Inf.* 2 by ½ in., interrupted at base (in well-developed examples). Lowest bract usually ½ 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 ariate at all; in *C. nubigena* strongly multiseriate; 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. vulpinaria*, *Nees*, but *C. divisa*, *Huds.* is almost certain to occur within British India.

KUNAWUR; Royle n. 73. GURWHAL; alt. 11,000 ft., Duthie (n. 55). LAGHUL; Schlagintweit (n. 2813). KASHMIR; Baraunala, Jacquemont (n. 338, 362).—Distrib. Cabul.

Leaves ½ in. broad. Inf. 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 Brett. C. divisa, Hudson, the other C. stemphylla, Wahl.?


KASHMIR; Barzil; alt. 10,500 ft., C. B. Clarke. Lower Karaksh, alt. 14,000 ft., Henderson n. 367.—Distrib. Central Asia.

Very like large states of C. stemphylla; stems 8–10 in., stouter, leaves broader; margins of glumes less shining scarios. Ripe utricles very convex, hardly inflated, yellowish, nerveless on the plane face, very obscurely nerveless on the convex face. This plant is (as C. A. Meyer states) near C. fatidica, Allioni. The C. curaica of Turczan., Maxim, and others is largely (or wholly) founded on C. pyegostachya, 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 incurred 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; Brett. Carex, i. 1. t. 2; Boech. in Linn. Soc., xxxix. 96. C. fallax, Steud. in Zoll. Ver. Ind. Archip. ii. 60 and Cyp. 150; Boech. l. c.—Carex, Wall. Cat. 3386.

HIMALAYA; alt. 5–13,000 ft., abundant. KHASIA to MUNETPOOR, alt. 4–6000 ft., abundant. SIND; Pimwill. NILGIRI; Aamallaya, and CEYLON; alt. 5–8000 ft., common.—Distrib. Cabul, Malaya, China, Japan.

Stems 6–30 in., campitose on a tough perennial rhizome. Lower leaves long. Inf. from ½ in. dense, ovoid, to 5 in. linear interrupted, greenish becoming brown; lowest bract usually much overtopping inf., sometimes not ½ in. Spikes ½ in., dense. Fem. glumes ovate scarcely apiculate, shorter than utricle. Anthers linear-oblong, very shortly apiculate. Style occasionally 3-fid, axe Boech. 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. Strang. Petersb. 1. 217, t. 9, a Central Asian plant, differs only by the leaves being rather broader,
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flat when dry, and by the utricles having in their upper half only many larger orange-red glands. Though kept distinct by Boots 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 oviod androgyneous male at top forming an oblong or intertupted linear compound spike or very narrow panicle, style 2-fid, utricle oviod narrowed into a narrow conic beak, nerveless on plane face. Schik. Riedgr. i. 20, tt. E. 22, and Ee. 91; Kunth Enum. ii. 384; J. Gay in Ann. Sc. Nat. ser. 2, x. 355; Reichb. Fl. Pl. Germ. viii. 9, t. 215; Boot Carex, iv. 192; Boeck. in Linn. xxxix. 96. C. divulsa, Gooden. in Trans. Linn. Soc. ii 160; Schik l. c. tt. Dd. 89 and Ww. 89; Kunth l. c. ii. 385; Reichb. Fl. i. Fl. Germ. viii. 11, t. 220. Vigneea 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 $\frac{1}{2}$ in. broad, flat when dry. **Inf.** 2-5 in. by $\frac{1}{2}$ in., consisting of 4-8 globose spikes, lower shortly distant. **Anthers** with a linear crest. Utricle large, $\frac{1}{2}$ in. long, yellowish, with a few irregular nerves on convex face, otherwise nerveless, beak bifid $\frac{1}{2}$ 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 inf. and general aspect nearer the subjoined var.

Var. 3 foliosa (sp.) D. Don in Trans. Linn. Soc. xiv. 327 and Prodr. 42; indorescence pale of many spikelets at base often subcompound, utricle smaller. **Nees in Wight Contrib. 121; Boot Carex i. 1, t. 3; Kunth l. c. 384; Strachey Cat. Pl. Kunmaon, 73; Boeck. l. c. 88. C. nubigena, Nees l. c.; Kunth l. c. 388. C. Wallischiana, Spreng. Syst. iii. 812 (not of Prescott). C. muricata, var. indica, Boot Carex, iv. 193.—Carex, Wall. Cat. 3387.—Himalaya; alt. 6-9000 ft., from Kashmir to Upper Sikkim frequent. **Sind**; Pinwill. **Khasia hills**; alt. 9000 ft., Griffith. **Pulney and Nilghiri Hills**; Wight.—Resembles shorter examples of the European C. divulsa. Boot finally reduced the whole series under C. muricata, Linn. The Indian var., foliosa has the created 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**, Boot Carex, i. 1, t. 1; stem lignescent with many nodes, spikes ellipsoid androgyneous male at top forming a close linear compound spike long overtopped by leaves, style 2-fid, utricle oviod-triangular thinly obscurely many-nerved with numerous red glands throughout. **Boeck. in Linn.** xxxix. 93.

HIMALAYA and KHASIA, alt. 1-5000 ft., from Kunmaon, Thomson, to UPPER BURMA, Griffith, frequent, only on river margins.—DISTRIB. Tonkin.

**Stems** 1 ft., densely cespitose, 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 inf. **Inf.** 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 shorty-notched beak.—The younger examples have been mixed with C. nubigena, Don, which has the inf. sometimes dense and regular; but in C. nubigena the inf. is less overtopped by leaves, and the utricle is more narrowed into the beak.

9. **C. fluviatilis**, Boot Carex, iv. 172, t. 582; leaves long narrow equaling the green stem, spikes ellipsoid androgyneous 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; Wallaboom in Hookroom, Griffith (Kew Distrib. n. 6103).—Distrib. China, Japan.

Rhizome woody. Stems 1-2 ft. Infl. 4-6 by \( \frac{1}{2} \) in., dense, of 40-70 spikes; lowest bract scarcely 1 in. Spikes nearly \( \frac{1}{2} \) in., straw-colored. 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. thomsonii) but much less rigid; the infl. in fruit resembles that of Sétaria italica. It is sometimes completely dieious; 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-fld, utricle small stalked slightly spongy ovoid conical-beaked gibbosus few-nerved on convex face, margins of beak serrate subhyaline almost winged. Schk. Biedgr. i. 30, tt. D. 19, & T. 69; Kunth Enum. ii. 390; Boeck. in Linnæa, xxxix. 104. C. teretiuscula, var. B major, Boott Carex, iv. 145, t. 466. C. mitis, Boeck. i. c. 104.

Kashmir, alt. 6-7000 ft., Thomson. Bhutan, 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 gibbosus face, exactly as in European C. teretiuscula. Thomson’s Kashmir plant has numerous stema closely placed on an intricately branched short weak rhizome; the young utricles are stalked and show the subulate 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-fld, utricles green or fully ripe yellowish. Nees in Wight Contrib. 124; Kunth Enum. ii. 418; Drejer Symb. Cacte. 24, t. 10; Boott Carex, iv. 190, f.c. Ined. t. 644; Boeck. in Linnæa, s. 376 (not of Thwaites).—Carex. Wall. Cat. 3383.

Nepal, Sikkim, and Khasia, alt. 4-12,000 ft., common.—Distrib. China.

Rhizome short, woody, divided. Stems 6-24 in., slender. Leaves \( \frac{1}{2} \) in. the stem, \( \frac{1}{2} \) in. broad. Cauline sheaths distant, lowest often near base of stem. Lowest peduncle usually exerted 2-3 in. (but see var. \( \gamma \)), 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 subamnicous. Fem. glumes ovate, acuminate, mucro produced into a rough bristle often overtopping utricle. Utricules 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. \( \beta \);) beak narrowly oblong, deeply bifid, lobes lanceolate erect, scabrous or rarely glabrous on margins. Nut much flattened, \( \frac{1}{2} \) utricle (with beak), ovoid, obtuse, dark brown; style little thickened, exert branches shorter than utricle.

Var. \( \beta \) 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.
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C. Carex. 23, t. 9; Kunth Enum. ii. 391. — Carex, Wall. Cat. 3388 (largely). — Nepal, Wall. — 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. \*dissitiflora; stouter with broader leaves and longer utricles, lowest peduncle usually very shortly exerted, spikes elongate very slender the lower utricles solitary, distant. — Nilghiri, alt. 6-7000 ft., Wight, C. B. Clarke. Amamalayas, Beddome. Khasia, alt. 5-6000 ft., C. B. Clarke.— Perhaps a distinct sp., according to Drejer Symb. Carex. 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. \*dissitiflora to typical C. longipes.

12. C. brunnea, Thunb. Fl. Japon. 33; infl. long lax, lowest peduncle often several-spiked often 2 or more from one sheath, fem. glumes acute or scarcely mucronate, style 2-fld, ripe utricle brown ellipsoid much flattened pilose (in Indian examples) striate, beak linear, exert portion of stigmas about as long as utricle. Schk. Tr. Edyr. ii. 16, t. X. fig. 111; Kunth Enum. ii. 392; Boeck, in Linnaea, xxxix. 145. C. gracilis, Br. Prodr. 242; Boot Carex, i. 59, pl. 154, 155, 156 [excl. syn. C. lachnoesperma, Wall.]; Thw. Enum. 355. C. flexilis, Don Prodr. 43, 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. xxxv. 82, not of Spreng.


Rhizome oblique. Stems 1-3 ft., slender. Leaves ½ stern, ½ in. broad. Cauline sheaths somewhat distant, lowest usually above middle of plant. Peduncles often several from each sheath, lowest exert 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 ferrugineous-brown. Utricle rather small, not parallel-sided, 9-15-nerved on each face, minutely hairy on nerves, suddenly narrowed into a beak about ½ utricle; beak shortly bised, 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. — Limbs 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, Boot 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 bised, style 2-fld branches longer than utricle. Boeck, in Linnaea, 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. longitecturis, Nees in Wight Contrib. 124; infl. long lax, peduncles often 2 or more from one sheath bearing 1 or few spikes, fem.

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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, exerted portion of style-branches fully as long as utricle. Kunth Enum. ii. 417; Boeck. Carex, i. 59, t. 157; Boeck. in Linn. xxxix. 148. C. longipes, Thw. Enum. 355.


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. Remote. 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.


N. Temperate Hemisphere.


Var. ϒ Rochebruni (sp.), Franck. et. Savat. Pl. Japonii. 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. remotia.


Kashmir, alt. 6-12,000 ft., C. B. Clarke.—Distri. Cooler parts of globe.
Glabrous. **Rhizome** short, slender, without stolons. **Stems** clustered, 2 ft. **Leaves** ½ stem, ¾-2 in. broad. **Inf.** 2-6 in., lower spikes solitary, 1 in. apart; **lowest bract** scabrous, about 1 in. long. **Spikes** ½-¾ 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 Linnea, xxxix. 126. *C. Brizopyrum, Kunze Suppl. 169, t. 43.*

**Khasia:** Molim, alt. 5800 ft., C. B. Clarke. **Muneyfoor,** alt. 5-6050 ft., Watt. —Distrib. Java.

Altogether resembles a large *C. remota*. **Leaves** and **bracts** up to ¾-½ in. broad. **Spikes** often ¾ in., cylindrical. **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 subtentire beak nerveless smooth.

**Khasia Hills; Griffith.**

Glabrous. **Rhizome** slender, creeping, divided. **Stems** 6 in., slender. **Leaves** 4 by ¼ in. **Spikes** ½ in. apart, upper ½ by ¼ in., lower rather smaller female. **Glumes** as long as utricles, ovate, obtuse, brownish with scarios margin upwards. **Utricle** ¾ 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. praepalonga**, 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 subtentire 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 ¾ in. **Lowest spike** ¾-3 in. distant; peduncle ¾-3 in. long; bract overtopping infl., not sheathing. **Spikes** 4 by ¼ 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** ¾ in., ovobev 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 augustior;** stems 12-18 in. slender more scabrous, leaves scarcely ¾ 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 Linn. xii., 393.

Sikkim, alt. 8-9000 ft.; Sinchul, J. D. H.; Tonglo and Sundukphoo, C. B. Clarke, &c. Glaubers, tufted, lower sheaths shining brown. *Stems* 3 ft. *Leaves* 18 by ⅛ in. Lowest spike 3–4 in. distant; peduncle 2–4 in. long; bract overtopping infl., not sheathing. *Spikes* 5 by ⅛ 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. prolonsa*, 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 ⅛ 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 macrate, black-purple, back pale yellow. *Utricle* ⅛ in., stalked, not glandular; beak oblong from a conical base, glandular-scabrous; stigmas exsert ⅛ the length of utricle. *Nut* ellipsoid, ⅛ the length of whole utricle.—Not closely allied to the preceding species; it has the utricle identically of *C. noha* 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 subsaccous 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 ⅛ in. broad. Lowest spike 1–2 in. distant; peduncle ⅛–⅝ 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 indistinguishable from utricle with no (or hardly any) linear termination.—In *C. prolonsa* 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 papilla. *C. cernua* appears really nearer *C. phacota* than *C. prolonsa*, but differs from both in the densely packed utricles.

Sect. 3. *Vulgares*. Terminal spike male, the others fem. or male at top, solitary.

24. **C. pruinosa**, Boot 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 $\frac{1}{2}$ in. long, obscurely 3–5-nerved; otherwise as *C. phacota*, of which Boeckeler esteems it a form.


Boott (Carex, iv. 198, t. Ined. 667) has brought here his *C. piota* 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*. 


**Ceylon**; elevated parts of Central Province, Walker, Thwaites.


**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 muticus; if a small muero 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 $\frac{1}{2}$ in., with round or linear, yellow or brown, scattered sunk glands; beak slightly notched, minutely granular.—Otherwise as *C. phacota*. 

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**Carex.**

CLXXII. CYPERACEAE. (C. B. Clarke.) 709
27. **C. fucata**, Boot ms.; spikes dense blackish, styles 2-fid exsert about \( \frac{1}{2} \) 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, thick 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*, Boot in Perry Exped. Japan, ii. 327, not of Bunge.


Glabrous. **Rhzome** woody, short. **Stems** clustered, 1-2 ft. **Leaves** numerous, often as long as culm, scarcely \( \frac{1}{2} \) in. broad. Spikes 2-3 by \( \frac{1}{2}-\frac{3}{4} \) 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, mucious 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.


**Nepal**, Wallich. *Khasia Hills*, alt. 4500 ft.; Myrung and Nunklow, *J. D. H.*


Glabrous. **Stems** 1½-2½ ft. **Leaves** nearly as long as stem, up to \( \frac{1}{4} \) in. broad. Lowest **spike** 1-5 in. distant, peduncle \( \frac{1}{2}-2 \) in.; lowest bract equalling infl., not sheathing; terminal spike 2½ in. by \( \frac{1}{2} \) in., male, with a short second male spike often added. Fem. **spikes** nodding, wavy, \( \frac{1}{3} \) in. broad, yellow brown in fruit. Fem. **glumes** about as long as utricles with a short excurrent tip or obtuse. **Utricle** scarcely \( \frac{1}{4} \) in., slightly inflated, irregularly 3-5-nerved on each face, with a very few scattered suck obscure glands, suddenly narrowed at top to a small entire mouth, hardly microscopically a beak.—Very near *C. praelonga*, 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), Boot mixed this with *C. sandwicensis*, Boeck. (C. Prescottiana, *H. Mann*) from the Sandwich Isles of which the utricles differs materially. I think it probable that *C. Prescottiana*, Boot, was *C. heterolepis*, Bunge, Enum. Pl. Chin. Var. [1831] 69 (not of Boot); for Bunge says his *C. heterolepis* resembled *C. pendula*, but had a bifid style.

30. **C. cespititita**, Nees in Wight Contrib. 127; spikes 4-10 lowest subesessile or erect on a short peduncle cylindrical 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 Linnse, xl. 437.—*Carex*, Wall. Cat. 3392.

**Styler**, Wallich, C. B. Clarke.

Glabrous, 2 ft. high, habit of *C. rigidia*, 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 ½ in.,
only 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,
buts 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. rigid.

31. **C. rigid**, Gooden. in Trans. Linn. Soc. i. 193, t. 22, fig. 10;
stems 4–8 (rarely 10–12) in., leaves (dried) or margins near base slightly
recurred, spikes 3 or 4 close together cylindric short dense, bracts not
overlapping the infl., styles 2–4, utricle ellipsoidal flattened smooth
nearly nerveless apiculate by minute entire beak. Schk. Riedgr. i. 56, &
tt. 26, p. 71; Reichh. Oc. Fl. Germ. viii. 12, t. 225, fig. 578; Boeck. in
Linnæa, xii. 414. C. saxatilis, Schkk. l. c. 54, & ii. 25, tt. i., fig. 40, & tt. fig.
49; 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.

**ALPINE HIMALAYA and W. TIBET,** alt. 9–13,000 ft., from Gilgit, Giles, to
Sikkim, J. D. H.—**DISTRIBUTION.** Cooler parts of the World.
Stoloniferous. Leaves often curved. Spikes ½–½ by ½–½ 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. 158, & Summ. Veg. 230;
stems often 10–20 in., leaves (dried) conduplicate, spikes less close longer, utricle
more or less slenderly nervat, otherwise as C. rigid. Reichh. Oc. Fl. Germ.
viii. 13, t. 226, 222; Boott Carex, iv. 166, tt. 557–567; Boeck. in Linnæa,
xii. 416. C. cespitosa, Schkk. Riedgr. i. 57, & ii. 27, figs. A a, t. 88, a, b, &
B b, t. 86, c, d, e; Kunth Enum. ii. 431.

N.W. **HIMALAYA and W. TIBET,** alt. 10–13,000 ft., from Gilgit, Giles, to Lahoul,
Jaoeekhy, frequen.—**DISTRIBUTION.** 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.
rigid, Gooden.

Var. β *distrecta*; spikes less close, lowest 2–7 in. distant.—Kashmir; Gurasie,
alt. 8000 ft., C. B. Clarke.—Altogether unlike any European form, J. G. Baker.

33. **C. eroseota,** Boott ms.; utricles ovoid compressed beakless,
otherwise as C. rigid, Strachey Cat. Fl. 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.

Subgenus II. **Carex proper.** Style-branches 3 (see also 2. C. steno-
phylla).

**Sect. 4. BARE.** Stem with 1 spike (see also 42. C. radicalis), fem. at base.
Spike (i.e. rudiment of the suppressed upper part of spikelet) often present within
utricles. Bract hardly longer than fem. glumes.

34. **C. microglochin,** Wall. in Handl. Kong. Akad. Stockh. 140, &
Fl. Lapp. 224; spike ½–½ in., style-branches 3, utricles lancediate acu-

N.W. Himalaya and W. Tibet, alt. 11-15,000 ft.; from the Karakorum, Thomson, to Kusawur, Jacquemont, frequent.—DISTRIBUT. N. Europe, Asia, Greenland.

Glabrous. Rhizome slender, very short. Stems 6-12 in., slender. Leaves scarcely 1/2 length of stems, setaceous. Spike pale brown, in flower hardly 1/2 in. broad. Fem. glumes ovate, obtuse, obscurely nerved, shorter than utricule. Utricle about 1/2 in. (including exsert rigid sets often more than 1/2 in.); beak terete, mouth entire. Nut oblong-ellipsoid, brown, about 1/2 utricule.—In fruit the seta hardens into a straight smooth yellow linear cone filling the mouth of the utricule; 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 2'-3 in., style-branches 3, utricles lanceolate acuminate long-beaked glabrous utricles, ripe deflexed with seta included. Kunth Enum. ii. 419; Boot. Carex, i. 56, t. 418; Boeck. in Linn. 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.—DISTRIBUT. Central Asia.

Resembles C. microglochin, but stouter in all its parts. Spike brown or chestnut. Fem. glumes ovate, acute, lower aristate, lowest empty sometimes 1/2 in. (a bract). Utricle usually 1/2 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.


HIMALAYA, alt. 11-14,000 ft.; from Kashmir, Levising, to Sikkim (Lachen), J. D. H.

Glabrous. Rhizome short, woody. Stems densely tufted, clothed at base with testaceous or subtestaceous sheaths becoming torn and filamentate; stems ultimately 1-2 ft., in flower often only a few inches. Leaves in flower often 2 or 3 in., subsequently 1 ft., testaceous. Spike nearly always bisexual, 1/2 in. broad, loose at base. Fem. glumes elliptic-oblong, greenish then pale brown, obtuse, lower distant aristate bract-like. Utricle 1/4 in. long, thin, passing into the beak. Nut filling utricule, exactly oblong, trigonous, pale brown, one angle pressing against posticus face of utricule.—Confounded by Boot originally with C. Esenbeckii (i.e. Kobresia trinervis, Boeck.), and by Beetham and myself. Boot'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 bead 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 fimbriate sheaths. Leaves nearly as long as stems, setaceous. Spikes seen wholly fem., about ½ in. broad, denser, more rigid, than in *C. linearis*. Fem. glumes ovate, obtuse, brown, yellow-backed, lowest hardly aristate. Utricle with beak ½ 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.


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 Khasia 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 ½-⅜ by ½-⅜ in. dense, style 3-branched, utricle ovoid-pyramidal many-ribbed glabrous. *Boeck.* in *Linnsea*, xxxix. 37.

Sikkim, alt. 9-12,000 ft., *J. D. Hooker*, &c. Bhutan, Griffith.—DISTR. 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. INDICE. 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. 613; **Moritz Verz. Zoll. Pfl.** 98; **Boott Carex.** ii. 103, t. 310; **Boeck. in Linn.** xl. 327.—**Carex.** Wall. Cat. 3383.

**Penang; Wallich. Penak; alt. 3500 ft. King's Collector, Singapore, Ridley.—Distrib. Malay, China.**

Glabrous, except utricle. Rhizome horizontal, thick. Leaves many, subradical, 1-2 ft. by ½-⅓ in., flat, tough, many-nerved. Scapes numerous, 4-9 in., with sheaths and peduncles nearly throughout their length; bracts 0-⅓ in., linear; peduncles exert 0-1 in., 1-5-spiked. Spikes ½ by ½-⅓ in. Fem. glumes ovate, acute, scarcely mucronate, shorter than utricle. Utricle ½ in.; beak scarcely notched. Style with its 3 branches short, style-base linear. Nat “distorted by depressions,” **Boott**, gymnophore 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 Linn.** xl. 365; basal leaves long up to 1 in. broad, scabe with 4–6 distinct peduncles each carrying one dense ovoid-cylindric pale head, infl. minutely hairy, style 3-fid, utricle ovoid triquetrous beak linear ½ utricle.

**Tenasserim; Helfer (Kew Distrib. 6111, 2).**

Rhizome stout. Leaves 20 in., flat, sub 3-nerved. Scapes 10-14 in.; bracts 2-3 by ⅓ in., sub lanceolate; peduncles exert, 4-1, minutely hairy. Spikes ½-⅜ in., oblong or (fruiting) ovoid, 4-1-nutted, fergusous. Fem. glumes ovate, bristle exceeding beak of utricle. Utricle ½ 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. **(?) 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 1-⅛ in., flat, straited, glabrous, as though petioled, petiole dilated at base. Scapes stout, 9 in., branches 2-3 in., minutely hairy. Spikes ¼-⅔ by ⅜ in.; bracteoles ⅜ in. stellate. Glumes closely imbricated on all sides, chestnut-colored, 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 sub basal very long, infl. elongate, of distant peduncled pyramidal compound panicles, young spikes ⅝-⅜ in. linear pale long-bracteoleoed, 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 Linn.** xl. 347 (excl. Wallich n. 3420, not **Kunth,** or Nees.) **C. Moritzii, Steud. in Zoll. Verz. Ind. Archip.** ii. 60; **Boeck. in Linn.** xl. 350. **C. longiaristata,** **Boott ms.; Kurz in Journ. Asiat. Soc. Beng.** xlv. (pars. 2), 160. **C. fissa, Boott ms.**

**Eastern Peninsula; from Sikkim Terai (Dulkajhar) C. B. Clarke, & Cachar,**
Glabrous, except secondary panicle-branches. Rhizome coarse, woolly, with harsh black bristles (remains of sheaths). Stems 2½ ft. Leaves numerous, 2-3 ft. by ¾ in., coarse, margins secraceous, 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) ½ in. diam., distant, in fruit divericate, pale brown with about 6 divericate utricles. Utricle fusaceous green, obscurely inflated, 20-30-nerved; beak oblique, sometimes sparingly setose, ¾ in. utricle, mouth small oblique scarcely bifid. Nut ellipsoid, trigonous; style-base somewhat bulbose.—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. diversicata, Wall. Cat. 3533 from Saluen River, very young, has been supposed to be C. indica, but it wants the characteristic setaceous bracteoles.

Var. ? β, lastebrunnea; spikes ½ in. fine brown, male glumes scarcely aristate young brown, utricles ripe brown obliquely erect not divericate, style-base or ripe nut not bulbous. C. Thwaitesi, Booth ms. (not Hance). C. bengalensis, Thwaites. Enum. 385 (not Boetz). C. indica (partly), Boeck. in Linn.aa, x1 347; Booth Carex, t. 251.—CAYTON: Thwaites (C.P. n. 2628).?

Var. MÜLNEI (sp.) Booth ms.; slenderer with narrower leaves, spikes ¾ 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 ¾ 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 in. linear-oblong solitary brown slenderly bracteate, fem. glumes truncate aristate, style 3-fid. C. fissilis, Booth ms. (not Booth Carex).

ASSAM; Herb., Kev. Habit and infl. of C. indica, Linn. Partial panicles compound but lax, spikes mostly ½ in. apart, early divericate; 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 Booth’s C. fissilis from Ameteum, of which the type figured is in Herb. Booth.


SIXXIM; alt. 4-6000 ft., J. D. H., &c. Brotan; alt. 6000 ft., Griffith. KHASIA; alt. 0-5000 ft., frequent. Cacham; 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, ⅔ 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. Inf. 12–20 in.; lower peduncles often 2–3 in. exsert, bracts usually as long as inf., 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, lineately marked. Utricle ½ 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, subspititate, pyramidal at top; style-base scarcely dilated.

Var. \( \beta \) nagporensis; secondary panicles with suberect branches scarcely pyramidal sometimes very slender, ripe utricle scarcely inflated fusco-green often with black or red dots in upper half, beak subacute at base \( \frac{1}{2} \) utricle.—Chota Nagpore; alt. 2–4000 ft., common from the Kolhan to the summit of Paharnath.—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 longico-conic points.

Var. \( \gamma \) 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 Limnea, xl. 346 (partly). \( C. \) vacca 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 fusco-green utricles much less conspicuously ribbed, is supposed a plains form of var. argocarpus. Most of the glistening-white utricles are fusco in the herbarium.

46. \( C. \) parviglumia, 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 \( \frac{1}{2} \) utricle.

Assam; Luckimpore, alt. 1500 ft., C. B. Clarke.

Glabrous, except panicle-branches. Rhizome horizontal, woody. Leaves 2–3 ft. by \( \frac{1}{3} \) in. Stem including infl. 5–8 in. Inf. 3 by \( \frac{1}{2} \) 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 Kutch); leaves very long, infl. elongate of distant peduncled oblong panicles, spikes \( \frac{1}{2}–\frac{3}{2} \) in. clustered ferruginous 3–6-nutted, style 3-fid, utricle narrow-ellipsoid trigonous irregularly ribbed not inflated, beak \( \frac{1}{4} \) length of utricle 2-fid. Boott Carex, ii. 86, tt. 247, 248; Duthie in E. T. Atkinson Gaz. x. 616. \( C. \) bengalensis, Boeck. in Limnea, 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; Pinuwall. 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 nervet (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; inf. irregularly panicled, spikes rarely clustered, style 3-fid, utricle small narrow-ellipsoid trigonous irregularly ribbed not inflated, beak \(\frac{3}{4}\) utricle with narrow bident mouth (otherwise as *C. condensata*). *Boeck. in Linnaea*, xl. 345. *C. diffusa*, Boott ms.—*Carex*, *Wall. Cat. Cat. 3400 B.

Sikkim Himalaya; alt. 4000 ft., C. B. Clarke. Brotan; Griffith. Khasia Hills, alt. 4–6000 ft., very common.

Leaves rarely \(\frac{1}{4}\) 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. Inf. (in dried plants) usually rich-brown, sometimes paler, cinnamonous. —Handy separable from *C. condensata*.

Var. \(\beta\) paniculata; inflorescence a compound loose rich-brown panicle, utricle \(\frac{1}{3}\) 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, inf. 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 bident 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 over-topping stems, \(\frac{3}{4}\)–\(\frac{1}{2}\) in. wide, tough. Inf. 4–8 by \(\frac{1}{2}\) in., scarcely interrupted at base; bracts long, overtopping inflorescence. Spikelets 2–\(\frac{1}{2}\) in., 3–7-nutted, numerous and close together, not clustered as in *C. vesiculosa*. Utricle \(\frac{1}{2}\) in., narrow, brown, with 15–20 regular close strong nerves.—The utricle is not unlike that of *C. vesiculosa*, the inf. is different, somewhat resembling small forms of *C. cruciata*, with which latter Boott arranged it.


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 \(\frac{3}{4}\)–\(\frac{1}{2}\) in. broad. Panicle often 12–16 in., linear-oblong; partial peduncles compound, lower distant; spikes fascièd, resembling those of *C. condensata*. Utricle \(\frac{1}{2}\) 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 stellate bracteoles of *C. indica* are wanting.

51. *C. ficilina*, *Nees in Wight Contrib.* 123; leaves very long, inf. 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; Bootz Carex, iii. 105 (vars. a and γ) tt. 311, 312; Boeck. in Linnaea, 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, Thun. Enum. 355 (partly.) C. nilagirica, Hochst.; Stered. Syn. Cyp. p. 207.

Throughout the Khasia and Naga Hills, alt. 1500–6000 ft.; Nilgiri and Pulney Hills; alt. 4–7000 ft. Ceylon; Thwaites (C. P. 820, partly), &c.—DISTR. 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 $\frac{3}{4}$ in. and more) flat, thin. Panicle usually more than $\frac{1}{4}$ 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 $\frac{3}{4}$ 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, a, of Nees and Bootz, and the Khasia var. γ pallida of Bootz 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 $\frac{3}{4}$ to $\frac{1}{4}$ utricle. Duthie in T. E. Atkins. Gaz. x. 616; Bootz Carex iii. tt. 313–316. C. meiogyna (sp.) Nees in Wight Contrib. p. 123 (only Royle, n 82). Cyperus caricosus, Don Prodr. 39.—From N. and Himalaya to Biiton, alt. 3–9000 ft., very common.—Considered here as a stouter form of this (as by Bootz dubiously and Boeckeler) with the same distribution is C. cruciata, Nees in Wight Contrib. 123 (a only); Strachey Cat. Pl. Kumaon, 73; Bootz Carex ii. 319, 320; Duthie in T. E. Atkins. Gaz. x. 616, also marked by Bootz = C. ramosa, Schls. (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, Bootz Carex, iii. 10; tt. 317, 318; leaves very narrow, spikes small pale densely clustered, glumes ferruginous, utricle very small, beak hardly $\frac{1}{4}$ 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. ? a microgyna; leaves very narrow, spikes very slender, glumes very small ovate obtuse dark brown, utricle very small fuscous, beak hardly $\frac{1}{4}$ utricle.—Carex, Wall. Cat. 3399. Kurk and Ceylon. Chittagong; Armaoao 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 $\frac{1}{4}$ 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 Samiculothah 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.
alongate, partial panicles distant long-peduncled pyramidal compound thin,
spikes $\frac{1}{3}$ in. distant 3-6-nutted, style 3-fid, utricle very distant ellipsoid
tapering-lanceolate much recurved strongly-nerved glabrous greenish,
beak linear conic $\frac{3}{4}$ utricle.
Munetipoor; Watt (n. 6728.)
Glabrous (panicle branches minutely scabrous hairy). Stems 2-3 ft., stout.
Leaves as long as stem, $\frac{1}{2}-\frac{2}{3}$ in. broad, harsh, two lateral nerves conspicuous.
Inf. 1-1½ ft.; lowest peduncle exsert, 6 in.; partial panicles 3 by 2½ in.; bracteoles $\frac{1}{4}$ in.,
filiform. Young spikelets linear, pale-brown; ripe spikelets rather wide from the
strongly divericate utricles. Fem. glumes elliptic-lanceolate, mostly bristle-pointed.
Utricles $\frac{1}{3}-\frac{3}{4}$ in. apart, $\frac{3}{4}-\frac{5}{6}$ in. long, slender (not well ripe).—From the remote
utricles this species does not resemble any of the other allies of C. cruciata, Wabl.

54. C. mercarensis, Hochst. ms.; Stend. Syn. Cyp. 194; partial
panicles oblong or scarcely pyramidal, fem. glumes aristate ferruginosus
(otherwise as C. filicina). C. cruciata, var. $\beta$ Nees in Wight Contrib. 124.
C. amoenus, Boot Carey, iii. 106, t. 321; Boeck. in Linnaea, xl. 354. C.
ramosa, Boot Carey, iii. 105, t. 322 (excl. Maurit. pl., not Schkuhr). C.
Lindleyana, Herb. Ind. Or. H. f. & T. (partly). C. glauca, Boeck. in
Linnaea, xl. 353 excl. Hohen. n. 629 (which Boeckeler never saw).

Nilgiri and Pulney Mts.; frequent, from Courtaulun, Wight, to Ooty,
alts. 8000 ft., C. B. Clarke.
A nearly glabrous form, branches of panicle only minutely scabrous on angles.
Utricle nearly $\frac{1}{4}$ in., ellipsoid-trigonal, 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 ferruginosus-green colour, the rather larger
utricles, and (especially) the definitely aristate female glumes. C. ramosa, Schkuhr,
a Mauritius plant, with which Boot combined it, has hairy utricles and distant
spikelets laxly panicled.

Var. $\beta$ major, Stend. Syn. Cyp. p. 194; spikelets ½-4 in. linear with 6-10 distant
scabrous-hairy utricles. C. ramosa, Schkuhr.—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. glauca, Boeck.,
and "written up" accordingly. But Boeckeler's C. glauca is founded on Wight,
n. 1293 = Boot, 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; Boot Carey, ii. 85, t. 244; Boeck. in Linnaea, xl. 363
(raphidocarpa).

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 Linnaea, 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. 6600 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 $\frac{1}{3}$ in.,
ellipsoid-trigonal, 15-nerved, minutely hairy in upper part, tapering into an chique
linear beak \( \frac{2}{3} \) 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 \( \frac{2}{3} \) in. often 6-8-nutted pale suberect in fruit, bracteoles inconspicuous, style 3-fid, utricle ellipsoid-trigonous many-nerved greenish scabrous-hairy, beak linear \( \frac{2}{3} \) utricle. *Kunth Enum.* ii. 512; Boott *Carex*, i. 11, t. 30 (excl. *Khasia* plant); Boeck. in *Linnava*, xl. 366. *C. meigyna*. 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**; Courtallam, *Wight*.

Glabrous, except panicle-branches and utricles. *Rhizome* stout, horizontal. Stems 2-2½ ft. Leaves often as long as stem, \( \frac{2}{3} \) in. broad. Infl. often 12 by 3 in.; lower panicles in fruit 2 by \( \frac{3}{4} \) in. Young spikes linear, green, somewhat ferruginous. Fem. glumes ovate, acute, pale, often shortly aristate. *Utricles* \( \frac{2}{3} \) 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**, 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 \( \frac{2}{3} \) utricle.

**East Assam**; Jakpho Summit, alt. 9900 ft., 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**, B. Clarke; panicles very distant small pyramidal, spikelets \( \frac{2}{3} \) in. 4-nutted pale divaricats in fruit, bracteoles long conspicuous, utricle narrow-ellipsoid many-nerved pale glabrous, beak linear curved \( \frac{2}{3} \) utricle (otherwise as *C. Wightiana*). *C. Wightiana*, Boott *Carex*, i. 11 (var. perignynis glabris, Boott, *ms*. i.e. the Khasian plant).


60. **C. perakensis**, 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 \( \frac{2}{3} \) utricle.

**Perak**; Wray.

Glabrous (panicle branches minutely scabrous scarcely hairy). *Rhizome* stout, woody. Stem 2 ft. Leaves rather longer than stem, \( \frac{3}{4} \) in. broad, tough, sub-3-nerved. Infl. 8 by 1½ in.; lowest pedunde 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 \( \frac{3}{4} \) in., beak shortly blid.

both ends minutely scabrous hairy, beak scarcely \( \frac{1}{4} \) utricle. Boeck. in Linnae, x. 374; Boiss. Fl. Orient. v. 406.

W. HIMALAYA; alt. 3000-6000 ft.; Kunnar, Royle; Hazara, Stewart; Murree, Fleming, Trotter.

Glabrous (panicle branches minutely scabrous, hardly hairy). Rhiosome woody, branched, with several approximate stems. Stems including infl. 8-18 in. Leaves numerous, scarcely \( \frac{1}{4} \) in. broad. Infl. often occupying \( \frac{3}{4} \) the plant; lower peduncles exert; bracts finely ciliate, shorter or longer than inflorescence. Spikes \( \frac{4}{5}-\frac{4}{5} \) in., 4-8-nutted, comose from the long red style-branches. Fem. glumes ovate-triangular, not aristate, much shorter than utricle. Utricle \( \frac{1}{5}-\frac{1}{10} \) in., narrowed at both ends, red-marked, obscurely nerves. Nut stipitate, narrowed into the linear persistent style-base.—The expert 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.


Assam; Gowbatty, Boott. KRASIA HILLS; N. f.ii.e; alt. 2-3000 ft.; frequent, C. B. Clarke. MUNEOPOOR; Watt. PATEOYE MTS.; Griffith.—DISTIN. Toukin, Java, Philippines.

Glabrous (except utricles). Rhiosome 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 \( \frac{1}{2} \) in., not ciliate. Infl. 6-10 by scarcely \( \frac{4}{5} \) in.; upper bracts about as long as infl. Heads of spikes \( 1-4 \) in. diam., usually only one on each peduncle, but peduncles often 2 from one sheath. Fem. glume ovata-lanceolate, brown, often mucronate; male glumes mucronate. Utricle fascious 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 bident \( \frac{1}{2} \) utricle. Kunth Enum. ii. 512; Boeck. in Linnae, x. 362. C. thyrsiflora, Boott Carex, i. 12, t. 34. C. cruciata, Thw. Enum. 355 (partly).

NILGIRI HILLS; alt. 6-8000 ft., Wight, frequent. CXYLON; alt. 5-8000 ft., Thw. (C.P. 3161, &c.)

Stems 1-2\( \frac{1}{2} \) ft Leaves \( \frac{1}{2} \) in. broad, not overtopping infl., not ciliate. 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 \( 1 \) by \( \frac{1}{2} \) 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. 23; leaves very long narrow, infl. elongate depapillated, 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 \( \frac{3}{4} \) utricle. Thw. Enum. 355; Boeck. in Linnae, x. 369.

SOUTH DECCAN; Courtallum, Wight. CXYLON; not rare up to 2000 ft. Thwaites (C.P. 2631, &c.).

Stems 1-2 ft., rather slender. Leaves overtopping infl., \( \frac{1}{2} \) in. broad. Lower VOL. VI. 3 A
peduncles often 6-8 in. distant, exert 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) ½ in., nerves 20 not strong; beak rather deeply bifid, very little conico-dilated at base.

65. *C. malacensis*, C. B. Clarke; heads pyramidal rigid ½ 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. 1699).

Bracts under terminal head ½ by ½ 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 panicked fuscous, lower peduncles 1-2 in. distant, partial panicles oblong interrupted, style 3-fid, utricle ellipsoid trigonous many-nerved hairy, beak oblong scarcely ½ utricle. *Kunth Enum.* ii. 512; *Boott Carex*, i. 10, t. 29; *Thw. Enum.* 355; Boeck. in *Linnaea*, x. 368.

CEYLON; "Central Province up to 6000 ft.," Thwaites (C.P. n. 822), &c.

Stems 1-1½ ft. Leaves overtopping infl., ½-1½ in. broad. Inf. 3 by 1 in.; partial panicles ½ by ½ in., dense. Spikes in fruit ovoid, 4-nutted. Fem. glumes ovate, often aristate, shorter (including bristle) than utricle. Utricle ½ in., browned; beak scarcely notched.

Var. 8 minor, Thw. i. c. 355; very slender, infl. 1½ by ½ in. E. Gardener, *Boott ms.*—CEYLON (C.P. n. 824), Gardener. Stems 8-10 in., almost capillary. Leaves scarcely ½ 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 ½ in. diam.—CEYLON (C.P. 2629).

Var. δ rostrata, Boeck. in *Linnaea*, x. 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. prastans.*]


SIRKITM 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. Inf. 12-18
by 3–4 in. (small examples occur); bracts much overtopping inf.; lowest peduncle usually distant, exsert; partial panicle often 2–5 by 1–2 in. Spikes 1½ by ½ 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 ½ 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-trigonal, pyramidal at both ends, black, much narrower than utricle; style-base linear.

**Var. ? B. stoechadactus:** 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. baccaus (an var. an sp. nova?) Booth Carex, t. 237.—Khasia; near Cherra, alt. 3500 ft., J. D. H., C. B. Clarke.—Appears nearer C. Myosurus, &c., than C. baccaus; 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 nearly slightly hairy, beak short slightly notched nearly straight. Kunth Enum. ii. 507; Booth Carex, ii. 87, t. 229, 230, 232; Boeck. in Linn. xx, 384. C. macrophylla, Hochst, ms. ex Steud. Syn. Cyp. p. 207. C. sequesta, Nees ms.—Carex, Wall. Cat. 3384 B.

**Nilgiri & 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, ½–3 in. broad, scabrous, ciliate. Panicle 1 foot, lax (see remarks under var. β); branches scabrous, scarcely hairy. Spikes 3 by ½ in., many male 1½ in., pale or more rarely deep brown. Fem. glumes ovate, often cuspidate, sometimes muticous. Utricle exceeds ½ in. in Nilgiri 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 Bhutan.—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 Nilgiri plant; in C. eminens, Nees, the common Himal. plant the beak is deeply bifid; in some Sikkim and Bhutan plants (C. floribunda, Boeck.) the beak is not more notched than in the Nilgiri plant (the utricle is much broader). In Wallich, n. 3384 A, the whole of the upper part of the infl. is male.

**Var. γ ratonensis**; 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. baccaus,” Booth ms.—Upper Sikkim, alt. 6–8000 ft., Ratang Valley, J. D. H.—Is taken here as an extreme high level state of C. Myosurus, Nees (forma floribunda (sp.) Boeck.).

69. **C. praestans**, 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 ½ 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. Inf. 2 ft. long;
lowest peduncle exert 5 in. Partial panicles 4 by 1½, appearing as if simple with distant whorls of sessile spikes. Spikes 1½ 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.** Booth 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 Hills,** 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.—Booth says separable from C. Myosurus by the glabrous utricles, but in Booth's own material the utricle is more or less hairy—just as in C. Myosurus.

Var. nobilis (sp.) Booth Carex, i. 4, tt. 9, 10, 11; infl. large compound, ripe utricle more spreading their short beaks somewhat recurved. C. pandata, Booth ms.—Jaintea Hills; alt. 5500-5000 ft., J. D. H., C. B. Clarke.—This local form is very striking, and is named C. nobilis by Booth in Herb. Hook.; but the C. nobilis Booth, tt. 9, 10, 11, appear large forms of C. spiculata, leading on to the Jaintea plant.

71. **C. composita.** Booth Carex, i. 3, t. 8; leaves long narrow, panicle long narrow, spikes in fruit dense, fem. glumes brown-margin and cuspitate often overtopping beak of fruit, style 3-fid, utricle small obovoid pyramidal-compressed at top hairy nearly or quite nerveless beak very small. **Booek. in Linn.** xL. 328; C. B. Clarke in Journ. Linn. Soc. xxv. 82. C. Myosurus, Booth ms. (partly).

From Bhutan, 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 ¼ in. diam. Stems 2 ft. Leaves usually (with bracts) overtopping stems, ¼ in. broad, cuspidate-setaceous rough-tipped. Inf. 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.** Booth 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 cuspitate, style 3-fid, utricle large ellipsoid trigonous nerve glabrous, beak linear ⅘ 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, ¼ in. broad; lower spikes 3-6 in. apart, long peduncled. Spikes 1½ by ¼ in., lax, ferrugious green. Utricle (including beak) ⅘ in., ferrugious or brown-red, beak sparsely scabrous with 2 small teeth.—Booth 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. Indices.

73. **C. scitula.** Booth Carex, iv. (1887), 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 Linnaea.** x. 385.

**Mishmee Hills;** Faden Pence (Khosha's). **Griffith** (Kew Distrib. 6097).

Glabrous. Stolons long, slender, becoming woody. **Stems** 6-10 in. **Leaves** ⅛ in. broad. **Spikes** ½ by ⅛ in. **Fem. glumes** ⅛ in., brown-red. Utricle nearly white, narrowed into beak, beak included much shorter than glume. **Style-branches** 3, exert part much longer than utricle, persistent.

***Spikes long cylindric. Peduncles often several from one sheath.***

74. **C. insignis,** **Boott Carex,** i. 5, t. 14; caulin 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 ⅔ utricle. **Boeck. in Linnaea.** x. 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 ⅛-⅜ in., flat. **Inf.** often 12 by 2 in.; lower bracts similar to the leaves, not overtopping infl. **Spikes** 1½-2 in. by ½-⅜ in., mostly shortly male at top, terminal one sometimes wholly male. **Fem. glumes** ovate, obtuse, cuspidate, shorter (cusp included) than utricles. **Utricles** (beak included) ⅛ 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 Linnaea.** x. 333.

**Sikkim Himalaya;** alt. 7-10,000 ft., **J. D. H.,** &c.

Glabrous. **Rhizomes** stout; stolons elongate. **Stems** 12 18 in., robust. **Leaves** exceeding infl. ½-⅓ in. broad. **Inf.** 10 by 2-3 in. **Spikes** numerous, solitary (many long-pedicilled), ⅞ by ⅜-½ in.; terminal spike (always as seen) female at base. **Fem. glumes** acute-triangualar, scarcely mucronate, 1-nerved, bright straw-colrd. **Utricles** ⅛ in. (or rather more), green finally black, not inflated, nerves 6-8, suddenly narrowed at top; beak smooth, short 2-fld. **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 Linnaea.** x. 333.

**Nigihiri Hills;** alt. 5-7503 ft., frequent, C. B. Clarke. **Ceylon;** alt. 7000 ft., Thwaites (C. F. n. 2751), &c.—**Distrib. Java.**

Glabrous. **Stems** 2-3 ft. **Leaves** often ⅜ stem, ¼-⅜ in. wide. **Inf.** 20 by 2-3 in.; lowest bract often not reaching halfway to its top. **Spikes** 2 by ⅛ in., dark-brown in Ceylon examples, pale ferruginous-green in Nigihiri; terminal and upper spikes often wholly male or with only 1 or 2 utricles at base. **Fem. glumes**, cusp included, shorter than utricles. **Utricles** ¼-¼ 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 utricule. Boeck. in Linnea, 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., ½-3 in. broad, coarse. Inf. 18 by 3 in.; lower peduncles sometimes 8 in. exert, 6 in. long, 6-spiked. Terminal spike with a few fem. at base, or sometimes 6-10 top spikes wholly male 1½ by ⅛ in. Fem. glumes ½-½ in., dark-red, scarious-edged, lower often distant. Style long, base conic, branches 3 long. Utricles ½-½ 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 ½ in. long and clusters of wholly male spikes has been taken for a distinct species.

78. **C. arriden**, 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.

Pezu; Nattung, 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. Inf. 12 by 2 in; lower peduncles distant, exert 2 in., stout, erect. Spikes ½-½ in., rather stout. Male glumes oblong-obovate, obtuse, scarcey 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, brownish, 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 cuspitate, style 3-fid, utricle small narrow ellipsoid trigonous nerveless hairy, beak oblong-linear ⅔ the length of utricle. Boeck. in Linnea, 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, ½ in. broad, stout, striate. Inf. 18 in. by 6; peduncles in lowest sheath sometimes 6-20, 7 in. long, slender. Spikes 2 by ½ 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. inaequalis**, Boott ms.; medium sized, leaves long very narrow, infl. long compound, peduncles clustered, spikes linear, glumes shortly cuspitate, 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 ½ in. broad. Inf. 7 by 1½ in. Spikes ½ by ½ 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 10 spikes whereof 6 terminal wholly male, peduncles clustered, fem. glumes elliptic acute pale, style 3-fid, utricle ellipsoid trigonous nerveless hairy, beak bifid \( \frac{1}{4} \) length of utricle. C. setigera \( \varphi \) 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 \( \frac{1}{2} \)-\( \frac{3}{2} \) in. broad, rather rigid. Infl. 6 by 1 in.; peduncles shortly exserted, little divided. Terminal 6 spikes male, 1 by \( \frac{1}{6} \) in.; glumes pale brown, acute, not cusetipate, margins white shining. Lower spikes \( \frac{1}{4} \) by \( \frac{1}{4} \) 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 cusetipate, style 3-fid, utricle small narrow ellipsoid trigonous nerveless glabrous red-brown, beak conic-linear \( \frac{3}{4} \) length of utricle shortly bifid. Boeck. in Linnwaa, xl. 386.

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 \( \frac{1}{2} \) in. broad, 1 or 2 cauline often present. Infl. \( \frac{1}{4} \) 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 \( \frac{1}{12} \)-\( \frac{1}{12} \) in., much slenderer than in C. inaequalis or Daltoni. Fem. glumes \( \frac{1}{2} \) 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-colord., fem. glumes elliptic triangular-tipped, styles 3-fid, utricle ellipsoid-trigonal nerveless glabrous green-yellow, beak \( \frac{1}{4} \) utricle nearly entire. Boeck. in Linnwaa, xl. 383.

Sikkim Himalaya, alt. 10-14,000 ft., J. D. H., &c., frequent.

Glabrous. Stolons slender. Stems 10-18 in., very slender. Leaves \( \frac{1}{2} \)-\( \frac{3}{2} \) 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), \( \frac{1}{2} \) by \( \frac{1}{2} \) in. Utricle \( \frac{1}{12} \)-\( \frac{1}{12} \) in.—Closely allied to C. pulchra, Boott; spikes and utricles larger (though small). Rhaeaola not rarely developed inside utricle. Possibly a form of C. Stracheyi; the utricles are rather smaller, glabrous, the terminal spike usually fem. at base.


N. W. Himalaya; Kumaon, alt. 8000 ft. (Mudhuri Pass), Strachey & Winterbottom (n. 18). Guwhal, alt. 12-13,000 ft., Duthie.

Glabrous. Stems 12-18 in. Leaves as long as the stems, \( \frac{1}{2} \) 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) ⅓ by ⅔ in.; two upper male (in one case with a disjunct fem. at base) ferrugious, the others fem. often shortly male at top. Fem. glumes ovate, acute, (lower often macronate), pale, shorter than utricle. Utricle small, less than ⅖ in., yellow-green, obscurely nerv'd, 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, trigonous, brown.—Very like C. munda, Boott.

**** Species of Sect. “INDICE” not easily placed in any one of the preceding four subsections.

85. C. curvata, Boott Carex, i. 2, t. 5 (non Knafl); 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 Linnaea, xxxix. 110.

Sikkim Himalaya; Tunglo, 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. Inf. 1½ by ⅔ in., lowest bract often overtopping it. Lowest partial panicle subsessile (peduncle included in the short sheath), nearly ⅔ in. with 2-6 spikes. Spikes ⅔ in., nearly entirely fem. Fem. glumes ovate, acute, scarcely macronate, yellow, back green, about as long as utricle. Utricle ⅔ in., sessile, almost concavo-convex, yellow with 3 green longitudinal bands; beak bifid, nerves of utricle running up into its teeth. Rudiment of the spikelets usually present, as long as utricle, flat, green, 3-striate, applied to the posterior 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 ⅜-⅜ 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, ⅓ ft. (and upwards) by ⅔ in.—Out of 17 terminal spikes 2 are wholly male, 15 fem. (usually only a few distant utricles) at base. Spikes solitary ⅓ by ⅔ in.; male glumes dark red. Fem. glumes ovate-lanceolate, macronate, 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 ¼-⅓ utricle. Boeck. in Linnaea, 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 ⅔ 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 ⅔ in. with 10 fems. at base; sometimes 6-8-fid., very slender the 2 or 3 basal fems. distant. Fem. glumes elliptic, 3-nerved, emarginate, often muticos. 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. muniporensis**, 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).


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 muticus, utricle ovoid-pyramidal many-striate green puberulous hardly beaked. *Boot Carea*, i. 58; *Boeck. in Linneae*, x1. 558; C. B. Clarke in *Journ. Linn. Soc.* xxv. 82. C. *concolor*, *Nees in Wight Contrib.* 125 (not R. Br.). *C. peduncularis*, Waterms. *C. courtallensis*, *Nees ms.*; ex. *Boot Carea*, i. 52. t. 188.

Widely distributed in *India*. alt. 1–7000 ft.; from Nepal to Sikkim, and Khasia Hills to Munepoor; also Rajmahal, Parasnath, and Mus. of S. India.—Distr. Borneo.


90. **C. radicalis**, *Boot Carea*, i. 56, t. 147; leaves subradical many exceeding the slender stems, spikes 2–1 very remote broad ovoid ⅛ in. diam., style 3-branched, utricle ovoid many-ribbed hairy. *Boeck. in Linneae*, xxxix. 40.

*Sikkim Himalaya*; Lachen, alt. 10–11,000 ft., J. D. H.


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 ⅜ in. and upwards elongate-lanceolate nerveless glabrous, beak ⅜ as long as utricle.

*Sikkim Himalaya*, alt. 10–12,000 ft., common, C. B. Clarke.

Glabrous. *Stems* 1–2 ft. *Leaves* rarely more than ⅛ in. broad. *Infl.* 1½–2½ in. long. *Fruiting spikes* 2–3½ in. long; *glumes* ⅛ in. apart, ⅛ in. long. *Utricle* altogether resembling that of *C. decora*, but sometimes ⅛ in. long.—Closely allied to *C. decora*, but the infl. is uniform and very different.
Sect. 6. **Atrate.** Spikes few (1–3), terminal male at base, female at top. Glumes dark-chestnut or black except keel.

[See also *C. melanantha*, *C. ustulata*, and *C. alopecuroides* in the next section.]


**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 (½ in.), weak, nearly smooth; not rarely a node with leaf is added 1–2 in. below the infl. Spikes ½–1 in. long, often sessile in a head, lowest scarcely ¼ in. distant; lowest rarely 1 in. distant, then on a peduncle ½–1 in.; lowest bract usually about as long as infl. Glumes dense, ½ in., ovate, triangular-tipped, yellow keel very variable in width, often 0. Utricle about ½ in., yellow or ultimately pale brown, nerveless or irregularly obscurely few-nerved, loose subinflated but fitting nut; oblong part of beak cylindrical, short or scarcely any, granular, quite smooth or very sparsely scabrid; style-branches 3, protrudd part about half length of utricle.—*C. Vahl*, *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. *B. erosastra*, *Boott*, l. c. 71, t. 194, fig. 2; beak of utricle 0.—*Kumawur, Royte*, *Tibet*, alt. 15,000 ft., *Strachey & Winterbottom*.

Var. *γ gracilenta* (sp.), *Boott ms.*; *Strachey, Cat. Pl. Kumaon*, p. 73; very slender, leaves rarely ½ in. broad, spikes small. *Boeck*. l. c. 185; *Duthie* l. c. 618. *C. alpina, B. infuscata* (partly), *Boott Carex*, iii. 113, t. 359; *Boeck*. l. c. 394; — *Kumawur, alt. 10,000 ft., Strachey & Winterbottom* (n. 20). *Sikkim*; *Lachen, alt. 11–14,000 ft., J. D. H.*—**Stems** 2–16 in. Spikes ½ by ½ 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*.


**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 trigonous, scabrous, but not rarely slender nearly as in *C. alpina*. Utricle scarcely ½ 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 cylindrical approximate short-peduncled erect dense, style 3-3½, utricle oblong narrowed to each end trigonous granular yellow smooth, beak pyramidal scabrid emarginate, nut nearly felling utricle. Kunth Enum. ii. 515; Strachey Cat. Pl. Kumaon, 78; Boott Carex, i. 70, t. 192; Boeck. in Linnea, xl. 395. C. infuscata, Nees in Wight Contrib. 125 (partly). C. hæmatostoma, Herb. Jacq. em. 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, ½ 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, ½ by ½ 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 ½ in. as long as glume, less than ½ 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 Rayle’s, n. 118 (C. hæmatostomas, Herb. Jacq. em.), which is C. obscura, Munro and Boott, but was C. infuscata of Nees. C. parvibraeostata, Nees, referred here by Boott (Carex, iii. 108), is = C. pyrolophila, 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 cylindrical dense lowest peduncled nodding, glumes ovate acuminata, style 3-3½, utricle large ovoid or ellipsoid inflated yellow-brown smooth beakless nearly nerveless, nut sessile much smaller than utricle. Schlumbergeria, i. 52, & ii. 42, t. X. fig. 77; Kunth Enum. ii. 432; Reichb. Jc. Pl. Germ. viii. 16, t. 237; Boott Carex, iii. 114, tt. 363–364; Boeck. in Linnea, xl. 398. C. atrata, Hoppe in Sturm Fl. Deutsch. [xxi. 3] 12; Kunth l.c. 434; Reich. l.c. t. 236. C. canescens, Stev. in Mon. 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, ½–½ in. broad. Spikes ⅔–1 by ½–½ in.; lowest ⅔–2 in. distant, sometimes compound; lowest peduncle 1–2½ in., rather slender; lowest bract usually overtopping infl. Glumes ½–⅔ in., fem. often nearly uniformly black except margin, sometimes with yellow keel, male paler usually with yellow keel. Utricle ½ by ½ 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.
CLXXII. CYPERACEA. (C. B. Clarke.) [Carex.

GURWAL; 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 \( \frac{1}{3} \) the breadth, so that the nut though smaller than that of C. atrata, nearly fills it. The lowest peduncle is usually less than \( \frac{1}{4} \) in., the glumes are acuminate to a long linear obtuse black point preceding the utricles.

Var. \( \beta \) glacialis; stems 2–6 in., leaves much shorter than stems, spikes very small (sometimes \( \frac{1}{4} \) by \( \frac{1}{3} \) in.), utricles small very little inflated. C. atrata, var. glacialis, Boot, Carex, iii. 114, t. 365.—N. Sikkim; alt. 15–17,000 ft., J. D. H.


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, i. 13) that he finally doubted whether this was distinct from C. atrata, and it is certainly not, unless Boot’s sorting is altered. In C. nivalis, the utricle has concavo-convex very acute margins; its texture is very thin becoming often scarios 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, Turczaninow, &c., must have included this under C. atrata.—C. Griffithii, Boot 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 Boot. Subsequently Boot 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 (decisely) 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 as frequently female at top as wholly male. In his “III. Carex” Boot 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; Boot Carex, i. 70, t. 191 (excl. Royle, n. 112); Boeck. in Linnæa, xl. 402. C. asperula, Nees l. c. 124; Kunth l. c. 438 (not of Turcz.). C. parvibracteata, Nees l. c. 125; Kunth l. c. 438. C. celsa, Boot 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 \( \frac{1}{3} \) to as long as stems, \( \frac{1}{4}–\frac{1}{2} \) in. wide, weak. Spikes \( \frac{1}{2}–2 \) by \( \frac{1}{2}–\frac{1}{4} \) in. (fruit), dense; terminal spike nearly always fem. at top, occasionally wholly male; lowest spike often 1–2 in. distant, on a peduncle \( \frac{1}{2}–\frac{1}{4} \) in. Glumes small, ovate, triangular-tipped, chestnut, with or without a yellowish keel. Utricle small, obscurely nervet, thin; nut black, nearly filling utricle; erect part of the 3 style-branches much shorter than utricle (beak included), beak about \( \frac{1}{3} \) 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. parsivibracteata_, Nees (which is _C. psychrophila_) to _C. obscura_, Nees.

Sect. 7. _Propria_. 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.


_Kashmir_; alt. 9–12,000 ft., Thomson, &c., C. B. Clarke.—_DISTR._ Central Asia, Cabul.

Stoloniferous. _Stems_ 6–24 in. _Leaves_ numerous, often nearly as long as the stem, \( \frac{1}{2} \) in. broad; lower sheaths very pale brown. _Infl._ usually 1–2 in., longer than lowest bract. _Spikes_ \( \frac{1}{2} \) by \( \frac{1}{2} \) in. _Glumes_ nearly uniform black red or with a narrow pale keel. _Utricle_ shorter than glume, slightly scabrous on shoulders, trigonous, slightly winged; exert 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 _Turcz. a._ 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. melanocaphala_, _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 acuminate 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._ _Strackey Cat._ _Pl._ _Kumoon._ 73; _Boeck._ in _Linnœa._ xli. 179. _C. melanantha_, _β_ _bacalensis_, _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._—_DISTR._ 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. melan- antha_, the dull black-red tops of utricles are concolorous with glumes. _C. Moor- croftii_ is sometimes nearly 2 ft. high, with spikes \( \frac{1}{2} \) in. in diam.

101. _C. supina_, Wahl. _in_ _Handl._ _Vet._ _Acad._ _Stocch._ 158; small, rhizome slender creeping, spikes approximate sessile small, one terminal

KUMAON, alt. 14–15,000 ft.; Bugdwar, Strachey & Winterbottom (n. 17); Kutti Yangti Valley, Duthie (n. 6098).—Distrib. Central Asia, Alpine Europe.

Glabrous. Stems 3–6 in. Leaves 3–6 by 1⁄4 in. Terminal spike ½ in., very slender; fem. spikes ¾ in. in diam. Fem. glumes ovate, triangular-tipped, chestnut-col. 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 cylindrical peduncle, utricle distinctly nerved on their posticus 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. f. Fl. Germ. viii. 22, t. 250, fig. 615; Boot Carex, i. 70, 71, t. 193, figs. 1, 2, and t. 194, fig. 1; Boeck. in Linnaea, xli. 260. C. atro-fusca, Schkuhr Biegr. 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, Fischer). Leaves usually 2–3 length of stem; a node, with a leaf 1–3 in., often occurs 1–4 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 1–2 by 1–1½ in., short-cylindrical 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; Boot Carex, ii. 75, t. 201, 202, 203; Boeck. in Linnaea, 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 murcrouate. Utricle longer narrower than those of C. ustulata, less inflated, more or less red-black.—Generally easily recognized, but many
small specimens Booít could not sort between C. oruenta and C. ustulata. These are very near C. fuliginosa, Schkdr, which looks different by reason of its paler utricles. C. oruenta no doubt extends to Central Asia, but it is not known under what name the Russian botanists record it.


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 \( \frac{1}{2} \) in. broad). Fem. spikes nearly 1 in. by \( \frac{1}{2}-\frac{3}{4} \) 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 \( \frac{1}{3} \) in., narrow triangular, sub-3-nerved, pale brown with a green centre. Utricles unequally trigonous, 5-8-nerved on each face. Nut sessile, \( \frac{3}{4}-\frac{8}{9} \) utricle.

105. C. vicinalis, Booth Carex, iv. 193, 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 \( \frac{3}{4} \) in., pale bright brown, close together. Fem. spikes 1½ by \( \frac{1}{2}-\frac{1}{3} \) in., erect; lowest peduncle 2 in.; lowest spike 3 in., distant. Fem. glumes elliptic, obtuse, dark purple with green back. Utricle (unripe) \( \frac{1}{8} \) in. long, dusky grey, obscurely 3-5-nerved on convex face, triangular at either end; style-branches hardly \( \frac{1}{4} \) length of utricle.—Booth compares this species with C. caespitiosa, Nees; but the style in C. vicinalis appears generally 3-fid. The only specimen consists of the top of one stem, as figured by Booth.

** Utricle glabrous, beak long.

106. C. Jackiana, Booth 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. MIg. Fl. Ind. Bat. iii. 353. C. instabilis, Booth ms. ex Boeck. in Linnaea, xli. 246. C. papulosa, Booth 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, \( \frac{1}{2} \) in. broad. Spikes 1 by \( \frac{1}{2} \) 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, scariosus, acute or mucronate. Utricle \( \frac{1}{3} \) in., subtrigonal, slightly inflated, very strongly nerves; 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-fl.; ovoid, utricle ovoid slightly nervd suddenly narrowed into a linear beak. C. Jackiana, Thuw. Enum.

**Temperate Himalaya**; Mussoorie, Royle, n. 88; *Kumaon*, alt. 7000 ft., *Strachey & Winterbottom*. Sikkim; Lechen, alt. 10–12,000 ft., *J. D. H.*

Glabrous. *Stems 1–1½ ft.* Leaves 12 by ½ 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 ½–¾ in.*, slender, green, inconspicuously 10-nerved; beak as long as utricle, with a few microscopic sebaceous points, notched. *Nut* ellipsoid, filling the utricle, pale; style branches shortly exert.—*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 Linnaea*, xli. 247.

**Sikkim Himalaya**, alt. 9–12,000 ft., frequent, *J. D. H.*, *C. B. Clarke*.

**District.** 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 ½ in. wide, spikes fewer about 1 in., utricles rather smaller.—*Khasia Hills*, Vale of Rocks, alt. 4500 ft., *C. B. Clarke* (n. 43,875).—*Stems 8–12 in.* Leaves much shorter than stems. This appears more different from *C. finitima* than is *C. fusiformis*.

109. **C. brevisscapa**, *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*, brevicalimis, *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 ½ in., tough, many-nerved. *Inf.* narrow; lower peduncles 1½ inch, erect, carrying 2–4 spikes; bracts overtopping. *Fem. spikes* 1 by ½ in.; male ¼–¾ in., very slender. *Fem. glumes* much shorter than utricle, elliptical, yellowish with green back. *Utricles* ½ 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**, *Thw. Fl. Japon.* 38; stolons long slender, stems medium almost 3-winged, spikes about 5 close together uppermost one male


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; $\frac{1}{4}$ to 1 in. broad. Fem. spikes $\frac{1}{4}$ to 1 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 utricule. Utricles $\frac{1}{2}$ in., very close-packed, obliquely ascending, trigonous, 8-nerved, beak narrow, naked, glabrous or most minutely scabrous. Nut ellipsoid, subaequate at both ends, filling the utricle.—None of the Khasian specimens match the original C. japonica, described by Thunb. "spica ovatis," and figured by Schkuhr (= C. aphanolopis, Franch. et Savat.). The Indian C. japonica is C. chlorostachys, Don, which is near the following var.

Var. $\beta$ alopecuroides (sp.) Don in Trans. Linn. Soc. xiv. 382 & 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; Boek. in Linnea, xli. 172. C. emodorum, Spreng. Syst. iii. 818; Kunth Enum. ii. 516. C. japonica, Boott Carex, ii. 88, t. 257 (excl. var. $\beta$); Boek. l. c. 283. C. Doniana, Drejer Symb. 26, t. 13. Carex, Wall. Cat. 3395 A (partly) B.


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.


N. Kashmir; Indus Valley, alt. 7650-9000 ft., frequent, C. B. Clarke. Kumawur; 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 $\frac{1}{2}$ length of stems $\frac{1}{4}$ in. broad, sometimes 20

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by \( \frac{1}{2} \) in.; bracts similarly varying. Lower spikes always distant, peduncle sometimes hardly exert 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 \( 3\frac{1}{2}–4\frac{1}{2} \) in., pale brown, glumes hardly mucronate. Fem. spikes commonly \( \frac{1}{4} – 1 \) by \( \frac{1}{2} \) in., dense, not rarely slenderer (in Kunawur hardly \( \frac{1}{4} \) in. wide, much looser). Fem. glumes shorter than utricle, ovate, thin, pale brown, linear-triangular back green in a scabrous cusp. Utricle \( \frac{1}{2} \) in., trigonous, irregularly nerved, herbaceous, often "punctate" with ferruginous dots (often missing in Europ. and Cent. As. examples); oblong portion of beak about \( \frac{1}{4} – \frac{1}{3} \) length of utricle, glabrous or slightly minutely scabrous. Nut filling utricle, obovate-ellipsoid, trigonous.—The identification of C. punctata, Gaunid, with C. diluta, M. Bieb., is due to Trevirianus (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, Gaunid.

112. C. Munroii, 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-fld, 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 \( \frac{1}{2} \) in., flat. Lowest peduncle 2 in., distant 11 in. from the next. Spikes \( 3\frac{1}{2} – 4\frac{1}{2} \) by \( \frac{1}{4} \) in., drooping, rather lax. Fem. glumes shorter than utricle, ferruginous brown, green 3-nerved on back. Utricle \( \frac{1}{4} \) 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 bairy 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.


KASMMIR; 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, \( \frac{1}{2} – 1 \) in.; bracts sheathing. Glumes (male and female similar) castaneous-red with green backs, often mucronate. Utricle quite glabrous in the Indian example (as in Scopolii's description and in Schkuhr's C. Mielichhoferi); beak lanceolea-linear triangular, plane, subconcave on posterior face, glabrous but very scabrous on edges.—C. Scopoliana, Schk. Riedigr. ii. 77. t. Nonn, fig. 199 has utricle hispid somewhat subovoid suddenly narrowed into a small oblong beak. This is united (perhaps rightly) with C. ferruginea, Scoo. (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 female distant peduncled suberect, fem. glumes ovate hardly mucronate, style 3-fld, utricle ellipsoid trigonous glabrous fulvous-hispid on angles suddenly narrowed into linear shortly-notched beak. Kunth Enum. ii. 465. C. sempervirens, Villars, var. \( \gamma \), Boott Carex, iv. 218; Boeck. in Linnea, xli.

N. KASHMIR to the KARAKORUM; alt. 13-15,000 ft., C. B. Clarke.—DISTR. Central Asin.

Glabrous. Stolons 0. Stems 1-2 ft., rather slender, trigonous. Leaves rarely \( \frac{1}{2} \) the stem, \( \frac{3}{4} \) in. broad. Spikes chestnut-purple, fam. \( \frac{1}{2} \) by \( \frac{1}{2} \) in.; lowest peduncle often 3-5 in. distant, erect 2-4 in.; bracts not overtopping infl. Fem. glumes chestnut with scarios edges, shorter than utricle; keel green-yellow or coeciocorus. Utricle \( \frac{1}{2} \) in. (beak excluded), green, prominently 8-nerved; beak \( \frac{4}{5} \) length of nut, compressed, sectes-scabrous on margins. Nut filling utricle, shortly-stalked, style scarcely microscopically pubescent.


KASHMIR; alt. 6-11,000 ft., Jacquemont, Thomson, &c.—DISTR. N. temp. regions, Tasmania (?).

Glabrable. Stolons 0. Stems caespitose, 1½-20 in. Leaves often \( \frac{1}{2} \) length of stem, \( \frac{1}{2} \) 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 \( \frac{1}{2} \) by \( \frac{1}{2} \) 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, muticus 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. Öderi. 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.


N. KASHMIR; alt. 8-10,000 ft., C. B. Clarke.—DISTR. Cabul, Central Asia, Mandschuria.

Glabrous. Rhizome short, horizontal, woody. Stems 1-2 ft. Leaves often \( \frac{1}{2} \) stems, \( \frac{1}{2} \) 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 \( \frac{1}{2} \) in. Fem. spikes 1½ by \( \frac{1}{2} \) in., or smaller. Fem. glumes pale or brown with green back, margins usually scarious white. Utricle often more than \( \frac{3}{4} \) in., ellipsoid (as long as in C. nutans, Host) but typically shorter, remarkably truncate, sessile; teeth of beak deep, spreading curved. Nut long, ellip- soid, pyramidal at both ends, trigonous, dark-brown.—If Beeckeler be followed in treating C. songorica as a var. of nutans, Host, all the Indian (and neighbouring) material will belong accurately to that var.

**Kashmir**; *Jaecquemont*, alt. 10-11,000 ft., *Thomson*, alt. 8-13,000 ft., *C. B. Clarke.* *Lahoul*; *Jaenschke*.—*Distrib.* Cool Northern regions.

Glabrous. Stoloniferous. *Stems* 2-3 ft., robust. *Leaves* often ½ the stem, ¼ in. broad, scabrous near tip. *Male spike* ½ by ½ in. *Lowest fem. spike* 1-½ by ½ 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) ½ 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 ½ as long as utricles linear-conic, in fertile utricles much shorter, shortly 2-fid with erect teeth. *Nut* (perfect) very small, not ½ 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"."


*Male spikes* 2½ in., and up to 1½ in. apart (in the Kashmir examples). *Fem. spikes* up to 3 by ½ in., both glumes and utricles pale stramineous.—*Atkinson’s* collection is copious, though not fully ripe; *Mr. Baker* says it is "satisfactory vesicaria."


**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, ½-½ in. broad, flat. *Spikes* 1-3 in. long, lowest 1-3 (rarely 4-6) in. distant. *Utricles* ½ 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.


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-colord. male spikes, the suberect (not divaricate) ripe utricles, the fusous lurid grey colour of utricles with shorter beak.—In Jaeschke’s Lahaul 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 fusous glabrous suddenly narrowed into a conico-linear shortly-notched beak. *Boeck. in Linnaea, 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. *Sect.* 12–18 in. Leaves longer than stem, ½–1 in. broad. Terminal spike 2 in., very narrow, pale. Lower spikes fem. 2–3 by ½ in., ripe fruits obliquely suberect. Fem. glumes narrow-lanceolate, 3-nerved, stramineous, shorter than utricle, aristate or muticous; bracts much overtopping ind. Utricle ½ in., not inflated, thin, obscurely nervd. as long as utricle its lower half conic. Nut obvoid-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.


Sikkim; Terai, J. D. H. Assam, alt. 300–1000 ft., frequent, C. B. Clarke, &c. CACHAR, Kesan.—Distrib. Java, Japan.

Taller and stouter than C. tumida, Boott; leaves in Hooker’s examples up to ½ in. broad. Stolons long.—Terminal spike 2–4 by ¾ in., glumes obtuse purple with green keel. Fem. spikes (not quite ripe) up to 7 by ½ 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-cord. 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 Linnaea, xli. 244.* C. Arnotttiana, Boott in Proc. Linn. Soc. i.

Ceylon, Gardner, &c., alt. 6-7000 ft., Thwaites.

Glabrous. Stems 2-3 ft., rather stout. Leaves often overtopping stem, ½ in. broad. Spikes very close together, subsessile; lowest sometimes 1½ in. distant on a 1 in. peduncle; bracts very long. Fem. spikes 2 by ½-½ in., rigid. Utricle ½ in., spreading, hardly deflexed, longer than glumes, thin but somewhat succulent; beak concorlons less than ½ length of utricle. Nut ellipsoid, trigonons, sub sessile, pyramidal at top, shortly apiculate, dark-brown.


Sikkim Himalaya; Lachen, alt. 9-12,000 ft., J. D. H. Bhetan; 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; Luckimore, alt. 300 ft., C. B. Clarke.

Glabrous, stoloniferous. Stems 15 in., rather stout. Leaves overtopping stem, scarcely ½ 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 ½-½ in.; glumes 3-nerved, rather shorter than utricles, scabrous-pointed. Utricle nearly ½ in., conically narrowed at base, somewhat inflated; exserted part of style-branches hardly ½ utricle.

*** Utricle hairy, or minutely setulose.


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 ½ stem, ½ in. broad, harsh. Fem. spikes 1½ by ½ in., dense in fruit; male spikes often longer 1½ in. in Sind examples. Lowest spike short-peduncled, erect, or if very remote long-peduncled long-sheathed; bracts usually about as long as inf. Utricle small, about ½ 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 Linn. xii. 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, \( \frac{1}{16} \) in. in. diam. **Stems** 1-2 ft. **Leaves** nearly as long as stem, \( \frac{1}{4}-\frac{1}{2} \) in. broad. **Spikes** 1¼-2 in. long (in the typical *C. hymenolepis*, hardly half as much in the var. *chronolepis*, Drejer), fem. up to \( \frac{1}{2} \) in. broad (but not more than \( \frac{1}{2} \) 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** \( \frac{1}{10}-\frac{1}{16} \) in., brown-green, very hispid, nerveless, strongly 2-edged, the concave face only obscurely ridged by the angle of nut, margined by the incurred 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. Schlaglantweitiana**, 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. \( \beta \) minor, *Boott Carex, i. 2, t. 6, fig. 1 (not fig. 2).


**Stolons** numerous, long. **Stems** 4-10 in., slender. **Leaves** overtopping stem, \( \frac{1}{16} \) in. broad. Fem. **spikes** (in fruit) \( \frac{1}{4} \) by \( \frac{1}{16}-\frac{1}{16} \) in., weak. **Utricles** hardly \( \frac{1}{16} \) in. long.—Otherwise as *C. setigera*, Don, from which this differs mainly in *pike*.

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, \( \beta \) minor, *Boott Carex, i. 2, t. 6 (mostly, i. e. fig. 2). C. setigera, \( \gamma \) humilis, *Nees in Wight Contrib. 126. C. setigera, var. fascicularis, *Strachey Cat. Pl. Kumaon, 73. C. setigera, Kunth Enum. ii. 515 (partly).—Carex sp. (Rogey, n. 129), *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 offsets not from elongate stolons. **Stems** 2-15 in., slender. **Leaves** overtopping stem, narrow. **Bracts** very long, conspicuously overtopping infl. **Spikes** (in fruit) \( \frac{1}{4} \) by \( \frac{1}{16} \) in., dense, grey-green, upper often fascicled, lowest sometimes a little distant, short-peduncled, occasionally carrying 3-4 spikes. Fem. **glumes** frequently muticus, the midrib sometimes slightly 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. kashmiriensis**, C. B. Clarke; spikes 3-6 short-cylindric approximate, terminal 1-3 male, fem. **glumes** ovate muticus, 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., Thomesin, frequent, C. B. Clarke.

Resembles generally C. praeos or C. pisidifera, but has an oblong beak to utricule ending in two narrow lanceolate teeth. Rañime short, creeping, divided. Stems 8-16 in., slender. Leaves all nearly basal, ½ length of stem, ½ in. broad, flat, inf. usually 1-½ in.; bracts not (or scarcely) overtopping inf. Spikes very close, nearly sessile; lowest fem. occasionally 1-½ in. distant, then shortly peduncled. Spikes ½-3 in., ferruginous; fem. with 8-20 utricules. Utricle ⅓ in. long (much smaller than in C. hirtella), greenish, about 8-ribbed. Nut filling utricle, dark brown, oblong-ellipsoid; style microscopically scabrous-pilose, exerted branches about as long as utricle.—The preceding C. iixinis, 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-oblung deeply 2-fid hairy, nut stalked, style hairy. Kunth Enum. ii. 514; Strachey Cat. Pl. Kumaon, 73; Boeck Carez, i. 72, t. 196; Boeck. in Linnea, xli. 302. C. macrogyina, Boott l. c. 7, t. 22; Boeck. l. c. 223 (not of Turcz).


Glabrous, except spikes. Rañime short; no stolons seen. Stems 8-30 in., unusually terete. Leaves 4-20 by ⅓ in., weak, flat when dry. Spikes sometimes 2½ by ½ in. (or in some high-level Sikkim examples ⅔ by ½ 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 ½-½ in., with few obscure nerves, usually browner upwards. Nut oblong-obovoid, trigonous, obtuse, with short oblong apiculus.

132. C. hirtella, Drejier Symb. Caric. 21; leaves very narrow enrolled when dry, utricle ellipsoid-lanceolate very long—otherwise as C. hæmatostoma, Nees. Boot Carez, i. 11, t. 31; Boeck. in Linnea, xli. 209, & in Journ. Linn. Soc. xviii. 106. 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., Dutchie (n. 62).

The full form has utricles ½-½ in. long and is very marked; but eastern examples have smaller utricles, and are hardly distinguishable from C. hirtella by their very narrow involuted 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 glistering margins of the glumes are sometimes very prominent, sometimes not more so than in C. hæmatostoma and many sp.


N.W. HIMALAYA, alt. 8-11,000 ft., frequent; from Kumaon to Kashimir.—Distrib. Cabul.

Glabrous. Stems 6-18 in., cespitose on a tough short rootstock. Leaves often nearly as long as stem, ½0 in. broad, flat. Lowest fem. spike in fruit 1 by ⅛ 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** ½ in., shorter than glume, round-trigonous, obscurely nerves; beak hardly notched. **Nut** obovoid, trigonous, filling utricle; style very short, base slightly swollen, branches as long as utricle.


**Sind, Pinwill. — Distrib.** Westward to Europe. Also (subspecies) in N. America.

Glabrous. **Stems** 6–12 in., cespitose on a harsh short rhizome. Leaves usually many, often as long as stem, scarcely 1/6 in. broad. Terminal male **spike** ½ by ½ 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. laeta**, *Boott Carex*, i. 69, t. 188; slender, spikes 2–3 distant cylindric, terminal 1 male, fem. glumes broadly obovate chestnut-purple, style 3-fld., utricle obovoid-ellipsoid trigonous pilose tip short-triangular beakless. *Boeck. in Linnwae*, xii. 199.

**Sikkim Himalaya; Tungu, alt. 12–13,000 ft., J. D. H.**

Glabrous. **Stems** 4–6 in., cespitose on a small tough woody rootstock. Leaves 1½ stem, 1/6–1 in. broad, flat. Lowest fem. **spike** ½ by ½ in., on peduncle 1½ in.; bract sheathing, its free extremity very short. Fem. **glumes** very broad, tip depressed-triangular, keel narrowly green. **Utricle** scarcely 1/6 in., terminated by a small round hole. **Nut** obovoid, triangular, filling utricle; style short.—Boeckeler cites this as "C. pellucida, Hook. f. et 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. Kiriłowii* [Fl. Baical-Dahur, ii. (pars. 1) 275]; it is very near indeed to *C. laeta* 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-fld., utricle oblong-obovoid trigonous setose narrowed rather suddenly into a short oblong scarcely-notched beak. *Boeck. in Linnwae*, xii. 303.

**Himalaya, alt. 10–12,000 ft. Sikkim, J. D. H., &c. Gurwhal, Duthie. — Kashmir, C. B. Clarke.**

Glabrous. **Stems** cespitose on a woody horizontal rhizome, 8–12 in., medium in the Sikkim plant, filiform in the Kashmir. Leaves hardly 1½ stem, 1/6–1 in. broad, flat. Terminal male **spike** more than 1 in. in the Sikkim plant, ½–1 in. in the Kashmir, pale. Fem. spikes 2 by ½ in. (in the Sikkim type) dense, on a 2–3 in. erect peduncle; in the Kashmir plants, fem. spikes ½–1 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 setae 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 Kasmir. The Kashmir plant, both in the truncate glumes and utricles, is near Carex cardiocarpa, Nees, but the spikes and utricles are much slenderer.

137. **Carex 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, 7/10 in. broad, flat. **Spikes** 1/3–3/4 in., terminal one male often with a fem. close to its base or may be termed “androgy nous male at top.” Lowest fem. **spike** 1–2 in. distant, on a 1–1½ slender peduncle; bracts shorter than inf. **Utricle** (beak included) 2–4 in., trigonous, about 8-ribbed, brown-green; beak 3/7 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.


Glabrous, except utricles. **Rhizome** creeping. **Stems** cespitose, 4–16 in. **Leaves** often 3/3 stem, 1/3 in. broad, flat. **Spikes** usually approximate, sub sessile; lowest fem. sometimes 6 in. distant on 2 in. peduncle; fem. ripe spikes 3/7 by 3/11 in. **Style** at base dilated green, sometimes forming a button as in the nuts of Eleocharis.

139. **Carex nemostachys**, Steud. in **Flora**, xxix. 23 and **Cyp.** 218; robust, stolons long, spikes 3–8 approximate long-cylindrical very dense, terminal one male, style 3-fid, female glumes linear-caudate, utricle ovoid trigonous somewhat hairy beak long conic-linear. **Mtg.** in **Ann. Mus. Lugh.** Bat. ii. 150, 211; C. excursa, Boott Carex, i. 57, t. 150; Boeck in **Linnœa**, xli. 245. C. Zollingeri, Boeck. l. c. 242.—Carex sp., **Griff. Fl. Hin. Notes**, 86 (n. 1256).


Glabrous, except utricles. **Stolon** very long, stout. **Stems** 3–1 ft., at top triquetrous scabrous. **Leaves** often as long as stem, 1/5 in. broad, flat, margins scabrous, cutting; sheaths often flabellate. Male **spike** sometimes 4½ by 4½ in., always long; fem. spikes erect (peduncles hardly 1/3 in.) 3 by 3½ 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 1/3 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 Linnaea*, 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 Pindi, Aitchison, to BURMA, Griffith, and from DELHI CANAL, alt. 800 ft., Edgeworth, to Sikkim, alt. 9000 ft., King.—Distr. Cabul.

Stems 6-30 in. Leaves often \( \frac{3}{4} \) stem, \( \frac{1}{4} \) in. broad, sheaths often imbricate. Spikes often 1½ in.; terminal males pale rather thick, often 3-2, sometimes 6-4, rarely 1; fem. \( \frac{1}{2} \) in. thick, ashy, lowest often 3-7 in. distant on erect peduncle; bracts usually overtopping infl. Fem. glumes ovate, acute, often mucronate, fuscos, shorter than utricles. Utricle (beak included) \( \frac{3}{4} \) 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 utricle rather more acuminate into a longer beak.—*C. Wallichiana*, Boeck., was founded partly on Falconer's n. 1164 which is *C. ligulata*, Nees.


**KASHMIR**; Falconer to NEPAL, Wallich, alt. 5-7000 ft. **Khasia Hills**, alt. 5-6000 ft., Griffith, C. B. Clarke. **Nigriti Hills**; alt. 5-7000 ft., C. B. Clarke. *Ceylon*; alt. 4-5000 ft., Thwaites.—Distr. 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 spikes \( \frac{3}{4} \) by \( \frac{1}{6} \) in., brown. Fem. spikes \( \frac{1}{2} \) by \( \frac{1}{8} \) in., erect on short peduncles, pale or fuscos. Fem. glumes ovate, acute, mostly mucronate, shorter than utricles. Utricle (beak included) \( \frac{1}{8} \) in.


**NEPAL**; Wallich. **Muneyoors**; alt. 5800 ft., C. B. Clarke.

Beak of utricle rather longer and slenderer than in *C. ligulata*, Nees.

Var. \( \beta \) lachinosperma (sp.) *Nees in Wight Contrib.* 124 (exot. sym.) leaves close together \( \frac{1}{2} \) in. broad, fem. spikes dense \( \frac{3}{4}-\frac{1}{4} \) io. broad. *Kunth l. c.* 505; *C. Kunthii*, Dreger Symb. Carol. 22. *C. gracilis*, *Boott Carex*, i. 69 (partly). *C. Maubertiana*, *Boott l. c.* 45, t. 114. *C. ligulata*, Nees, var. minor and augustinifolia, *Boott ms.*
NEPAL; Wallich. Khasia Hills; alt. 4500 ft., Griffith (Kew Distrib. 6063), J. D. H. MUNKYOOR; alt. 4000-5000 ft., C. B. Clarke.—DISTRIBUTION. Cochinchina.

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 Munkypoors, 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-fld.

**UNDETERMINED INDIAN CAREX.**

1. C. Aitchisoni, Boeck. in Flora, lxxii. 456. Kurram Valley (British Afghanistan); Aitchison. Allied to C. microlepis, Boeck. & C. punctata, Gaud., fide Boeckeler.


3. C. Dimorpha, Boeck. l. c. 45. W. Himalaya; Schlagintweit n. (4175). Allied to C. alpina, 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.


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.


15. C. UNCINIFORMIS, 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 Linnaea, xxxviii. 542), referred by its author to Cyperaceae, is, as pointed out in Gen. Plant. (iii. 1043) identical with Ericacaulon. The description of the only Indian species, L. brevifolia, is too incomplete for identification with any previously described Ericacaulon, but answers to several common ones.
INDEX OF GENERA, SPECIES AND SYNONYMS.

The Synonyms and Species incidentally mentioned are printed in italics.
INDEX OF GENERA, SPECIES AND SYNONYMS.

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