

diam., outer bracts dark brown, spreading, usually shorter than the sessile flowers; sepals $\frac{1}{2}$ – $\frac{3}{4}$ in.; inner rather broader, tips membranous; style and stigmas short. Seeds $\frac{1}{10}$ in. long, including the long white tails.

15. **J. leucomelas**, Royle ex Don in Trans. Linn. Soc. xviii. 320; stem filiform naked, leaves 1–2 filiform very short, cyme a 3–8-fld. white head, bracts brown lower usually produced, sepals linear-oblong obtuse membranous, anthers very long exserted, capsule ovoid-oblong shortly exserted, seeds long-tailed. Buchen. in Engl. Bot. Jahrb. vi. 211; xii. 391. J. Thomsoni, Buchen. in Bot. Zeit. xxv. (1867) 148; in Engl. Bot. Jahrb. xii. 390.

WESTERN HIMALAYA and WESTERN TIBET; from Kashmir to Sikkim, alt. 12–16,000 ft.—DISTRIB. Mongolia.

Stems tufted, 2–6 in., not stoloniferous, hollow. Leaves 1–2-tubular. Cyme solitary; upper bracts pale, membranous; sepals subequal, $\frac{1}{2}$ – $\frac{3}{4}$ in. long; inner with membranous margins; anthers rather shorter than the filaments; style and stigmas short. Capsule 1-celled. Seeds $\frac{1}{10}$ in. long.—I cannot distinguish *J. Thomsoni* except by its dark chesnut colrd. flowers, a very variable character.

16. **J. bracteatus**, Buchen. in Engl. Bot. Jahrb. vi. 220; xii. 397; stem very slender (rarely 1-leaved?), leaves few short filiform, cyme a solitary 3–5-fld. hemispheric head much exceeded by the horizontal filiform lower bracts, flowers pale or dark, sepals oblong-lanceolate membranous obtuse, anthers exserted, style long, capsule included beaked, seeds shortly tailed.

SUBALPINE HIMALAYA, alt. 12,000 ft.; Garwhal, Duthie; Sikkim, J. D. H.

Stems tufted, 6–8 in., fistular; basal sheaths soft. Leaves subcompressed tubular. Cyme $\frac{1}{2}$ in. broad, upper bracts rather membranous, brown, equalling the shortly pedicelled flowers; sepals $\frac{1}{2}$ in. long; anthers linear, as long as the filaments. Capsule ovoid, 1-celled. Seeds scobiform, testa shortly produced at each end.—Buchenau places this in the group with a leaf on the stem, this may occur occasionally, but I think that specimen of *J. leucanthus* may have been mixed with *bracteatus*. On the other hand the absence or presence of a stem leaf in the species of this section is I fear far from a good one, and *J. bracteatus* is perhaps only a form of *leucomelas*.

** Cyme a solitary sessile head. Stem with one or more leaves above the middle. Anthers exserted, linear.

17. **J. leucanthus**, Royle ex Don in Trans. Linn. Soc. xviii. 318; stem slender, basal sheaths hard brown, leaves filiform, cyme solitary 6–10-fld. pale yellow, bracts short brown, sepals oblong-lanceolate subacute membranous, capsule and long style exserted beaked with the long style, seeds with very short tails. Buchen. in Engl. Bot. Jahrb. vi. 218; xii. 395.—Wall. Cat. 9002 B and 3480 in part.

ALPINE HIMALAYA; from Kumaon to Sikkim, alt. 11–13,000 ft.

Stem 6–8 in., tufted, at length hollow. Leaves very slender, uppermost equalling the stem, unitubular, subacute. Cyme $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., bracts ovate-oblong, acute, lowermost equalling the flowers, sometimes produced to 1 in.; flowers shortly pedicelled; sepals $\frac{1}{2}$ in. long; anthers half as long as the filaments; style long, slender, stigmas short. Capsule obovoid-oblong, cuspidately beaked, 3-septate. Seeds obliquely ovoid, testa loose shortly produced at each end.—Buchenau has a var. *alpina* (l. c. xii. 395), from Jongri in Sikkim (alt. 13,000 ft., Clarke), smaller with brown cymes and smaller flowers.

18. **J. membranaceus**, Royle ex Don in Trans. Linn. Soc. xviii.

320; stem tall slender 1-3-leaved, leaves filiform acute, cyme many-fld. white exceeded or not by the lower bract, sepals oblong-lanceolate obtuse membranous inner longer, capsule usually far exserted long-beaked, seeds with very long tails. *Buchen. in Engl. Bot. Jahrb.* xii. 397. *J. Hoffmeisteri*, *Klotzsch in Bot. Reis. Pr. Waldem.* 60, t. 98; *Buchen. l. c.* vi. 220. *J. benghalensis*, *Kunth Enum.* iii. 360; *Buchen. l. c.* vi. 211; xii. 400. *J. sphenostemon*, *Buchen. l. c.* xii. 401. *J. concinnus*, in part *Herb. Hook. f. & T. Isolepis* sp. *Wall. Cat.* 348 A.

TEMPERATE and SUBALPINE HIMALAYA, alt. 6-13,000 ft., from Kashmir to Sikkim.

Stems 5-20 in., tufted, stoloniferous, at length fistular; basal sheaths membranous. *Leaves* slender, channelled, or flattish above, tubular; sheath long, auricled. *Cyme* 8-24-fld.; lower bracts variable, floral ovate-lanceolate, hyaline; flowers shortly pedicelled; sepals nearly $\frac{1}{2}$ 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* $\frac{1}{10}$ in. long, tails longer than the nucleus. *J. sphenostemon* appears to me to be only a poor small state of *membranaceus*, the anthers are not cuneate, but almost exactly linear; its seeds are not ripe. *J. benghalensis* was founded on a Wallichian specimen of *membranaceus* with a false locality.

*** Cyme compound of several heads.

† *Stoloniferous*. *Flowers* large ($\frac{1}{2}$ in. long and upwards). *Stamens* included.

19. ***J. sphacelatus***, *Decne. in Jacquem. Voy. Bot.* 172, t. 172; stem stout terete leafy, leaves involute, cyme of 2-5 clustered or distant and superposed erect dark brown 2-5-fld. heads, lower bract elongate, sepals narrowly lanceolate much longer than the stamens and prismatic beaked capsule, seeds long-tailed. *Buchen. in Engl. Bot. Jahrb.* vi. 225; xii. 404. —*Juncus*, *Wall. Cat.* 9001 in part.

ALPINE HIMALAYA; from Kashmir to Sikkim, alt. 12-16,000 ft.—DISTRIB. Affghan, Turkestan.

Stems 8-16 in., tufted, smooth, fistular; stolons as thick as a crow-quill. *Leaves* strict, obtuse or acute, unitubular, obscurely septate. *Cyme* with the heads usually distant, sessile or peduncled; floral bracts lanceolate, acuminate; sepals $\frac{1}{2}$ to nearly $\frac{1}{2}$ in. long, thinly glumaceous, tips finely acuminate, of inner hyaline; anthers included, about equalling the filaments. *Capsule* dark brown, obtuse, mucronate, 3-septate. *Seeds* $\frac{1}{2}$ in. long, tails very slender.

20. ***J. himalensis***, *Klotzsch & Garcke in Bot. Reis. Pr. Waldem.* 60, t. 97; stem tall stout rigid, leaves filiform or involute, cyme of 2 or more dark brown 3-8-fld. heads, lower bract elongate, outer sepals lanceolate inner linear-oblong with broad membranous margins and tip rather longer than the stamens and the ovoid long-beaked capsule, seeds long-tailed. *Buchen. in Engl. Bot. Jahrb.* vi. 229, t. 3; xii. 405. *J. scirpoides*, *Jacquem. mss.* *J. castaneus*, *Herb. Ind. Or. Hook. f. et Thoms. Juncus* No. 7.—*Juncus*, *Wall. Cat.* 9001, in part.

ALPINE and SUBALPINE HIMALAYA, alt. 7-14,000 ft.; from Kashmir and Western Tibet to Bhotan.

Stems 8-20 in., erect, leafy below, 1-leaved above, hollow. *Leaves* tubular, channelled above, obscurely septate; auricles obscure. *Cyme* irregularly branched; branches sometimes an inch long and spreading; bracts $\frac{1}{2}$ to $\frac{3}{4}$ 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,

$\frac{1}{2}$ shorter than the filaments; style slender, stigmas long. Capsule nearly twice as long as the sepals, tip conical beaked, dark brown, shining. Seeds nearly $\frac{1}{2}$ in. long, tails very slender.—Very near *J. castaneus*, of which it may be considered a large more robust form, with more membranous sepals, and filaments longer in proportion to the anthers. Buchenau makes two varieties; *genuina*, with slender stem and leaves, very long stigmas, and an ovoidly prismatic obtuse mucronate capsule, and var. *Schlagentweitii* (Sp. Buchen. in Nachr. Koen. Ger. Wiss. Goett. 1869, 255); stouter, with leaves cylindric below and subulate above, and more narrowly margined inner sepals.

21. *J. sikkimensis*, Hook. f. in Hook. Ic. Pl. ined.; rootstock very stout creeping, stem stout base clothed with red brown rigid sheaths, leaf solitary or few terete or compressed equalling the stem, cyme of two dark brown unilateral sessile 4-6-fld. heads, lower bracts foliaceous sheathing longer than the heads, sepals glumaceous outer lanceolate finely acuminate, inner linear-oblong obtuse, anthers included much longer than the very short filaments, capsule included, seeds with short stout tails.

SIKKIM HIMALAYA; Lachen valley, alt. 12-14,000 ft. *J. D. H.*

Rootstock as thick as a small quill; sheaths of stem $\frac{1}{2}$ -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 $\frac{1}{2}$ - $\frac{1}{4}$ in. long; smooth, shining, very dark brown, inner with membranous tips; stamens half the length of the sepals, anthers linear, at length twisted. Ovary small; style very slender, exserted, stigmas long. Capsule hardly exceeding the sepals, obovoid, acute, shortly beaked, dark brown, shining, 3-septate. Seeds $\frac{1}{8}$ 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 $\frac{1}{2}$ - $\frac{3}{4}$ in. long, sepals $\frac{1}{2}$ in.—Lachen valley, Sikkim, alt. 12,000 ft.

†† Coespitose, not stoloniferous. Stem more or less leafy. Flowers small (about $\frac{1}{6}$ in. long). Anthers exserted.

22. *J. concinnus*, Don Prodr. Fl. Nep. 44; in Trans. Linn. Soc. xviii. 321; stem slender, leaves flat or channelled, cyme branched of 2-7 very pale 6-10-fld. heads, sepals oblong-lanceolate acute membranous, inner rather shorter obtuse, anthers far exserted, much shorter than their filaments, capsule ovoid, beak stout exserted, seeds very minute shortly produced at one end. Buchen. in Engl. Bot. Jahrb. vi. 215, t. 2; xii. 406. *J. elegans*, Royle ex Buchen. in Bot. Zeit. 1867, 146.—*Juncus*, Wall. Cat. 9002 B.

TEMPERATE and ALPINE HIMALAYA, alt. 7-13,000 ft., from Kashmir to Sikkim. KHASIA HILLS, alt. 5-6000 ft.

Stems tufted on a tuberous rootstock, 4-8 in. high, hollow, sulcate. Leaves few, variable, filiform or involute, many-tubular; sheath membranous. Cyme with erect or spreading branches; heads $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., at length spherical; lowest bract elongate, slender, or like the floral short and membranous; flowers subsessile, white or yellowish; sepals $\frac{1}{6}$ 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 exerted $\frac{1}{2}$ 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, $\frac{1}{2}$ - $\frac{2}{3}$ 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, exerted, stigmas short. Capsule 1-celled. Seeds $\frac{1}{10}$ in. long.—The long narrow capsules distinguish this at once from *J. concinnus*.

24. *J. nematocaulon*, *Hook. f. in Hook. Ic. Pl. ined.*; stems capillary grooved flexuous, leaves capillary channelled, cymes of 1-3 distant 1-3-fl. 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 exerted much shorter than the very slender filaments, style long, stigmas short.

ASSAM; on the Naga hills, Jakpho, alt. 9900 ft., *Clarke*.

Stems tufted, 1-1½ in., 1-leaved above, sometimes with only one terminal flower, and a capillary bract. Leaves few, flexuous; sheaths very short, membranous. Flowers sessile, floral bracts membranous about as long as the pale sepals which equal the petals and are $\frac{1}{2}$ 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. concinnus* and *khasiensis*, differing from both in the capsule much longer than the sepals. Seeds not seen.

Sect. VI. Perennial. Leaves flat or with involute margins, grass-like, strongly nerved. Cymes of several capitate clusters.

25. *J. minimus*, *Buchen. in Bot. Zeit.* 1867, 145; *in Engl. Bot. Jahrb.* vi. 209; xii. 412; stem short stout, leaves chiefly basal, cymes of 1-2 3-6-fl. dark chesnut sessile heads, lower bract usually foliaceous, sepals lanceolate glumaceous finely acuminate, petals shorter acute, stamens included, capsule exerted turgid obtuse or retuse, seeds very minute, testa forming an oblong very loose sac.

SIKKIM HIMALAYA, alt. 16-18,000 ft., *J. D. H.*

Rootstock short, stout; stems 2-4 in., densely tufted, naked or 1-leaved, grooved. Leaves shorter than the stem, $\frac{1}{2}$ - $\frac{1}{2}$ 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 small, much shorter than the filaments; ovary ovoid; style and stigmas short. Capsule rarely half as long again as the sepals, dark brown, shining. Seeds $\frac{1}{12}$ in. long, testa white, rounded at both ends.—Imperfect flowers, or even cymes, occur amongst the basal leaves.

26. *J. Clarkii*, *Buchen. in Engl. Bot. Jahrb.* vi. 210; xii. 413; stoloniferous, stem slender many-leaved, leaves longer than the stem soft, flat, grass-like, cyme of 1-5 globose peduncled 4- many-fl. straw-colrd. heads, lower bract leafy, sepals lanceolate membranous, stamens exerted, capsule much exerted 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 $\frac{1}{2}$ - $\frac{2}{3}$ 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 $\frac{1}{8}$ in. long, including the very long tails.—Leaves often involute and very slender as in *J. concinnus*, but seeds very different.

2. *LUZULA*, DC.

Leaves grass-like, hairy. Perianth-segments glumaceous. Stamens 3 or 6. Ovary 1-celled, 3-ovuled.—Species about 30, temperate and Asiatic.

1. *L. plumosa*, E. Meyer in *Linnaea*, xxii. (1849) 387; cyme subumbellate, branches very slender, flowers solitary, testa produced into a horn-like appendage. Buchen. in *Engl. Bot. Jahrb.* vi. 195 and xii. 85. *L. pilosa*, var. *plumosa*, C. A. Meyer ex Franch. in *Nouv. Arch. Mus. Paris*, x. (1887) 100. *L. Forsteri* Herb. Ind. Or. H. f. & T. *Juncus plumosus*, Wall. mss.—Wall. Cat. 9003.

TEMPERATE HIMALAYA, alt. 9–10,000 ft.; from Kumaon eastwards. KHASIA HILLS; alt. 6000 ft., Clarke.—DISTRIB. China.

Perennial, 6–18 in. high. Leaves linear, acuminate, $\frac{1}{8}$ – $\frac{1}{4}$ in. broad, glabrous or sparsely ciliate with very long hairs. Branches of cyme capillary, very unequal, divaricate, few-fl.; bracts scarious, much shorter than the flowers. Sepals $\frac{1}{10}$ – $\frac{1}{8}$ in., lanceolate, acuminate, pale brown. Stamens 6. Capsule oblong, obtuse or apiculate, about as long as the sepals.

2. *L. effusa*, Buchen. in *Engl. Bot. Jahrb.* vi. 196; xii. 106; cyme very laxly paniculately branched, branches divaricate very long and slender, flowers solitary sessile or pedicelled, testa with a terminal boss.

SIKKIM HIMALAYA, alt. 9–10,000 ft., J. D. H., Clarke. MUNNIPORE; on Jakpho, alt. 9900 ft., Clarke.

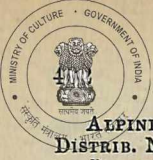
Perennial, 12–24 in. high. Leaves linear, $\frac{1}{8}$ – $\frac{1}{2}$ in. broad, glabrous or sparsely ciliate below. Cyme long-peduncled; branches 1–3 in. long; bracts ovate, acute, brown. Sepals $\frac{1}{12}$ – $\frac{1}{10}$ in. long, ovate-lanceolate, acuminate, pale or dark brown. Stamens 6. Capsule oblong, rather longer than the sepals, obtuse, mucronate.—The Munnipore specimens have leaves $\frac{1}{2}$ in. broad, and a closer inflorescence, with shorter capsules; the seeds appear to be diseased.

3. *L. campestris*, DC. Fl. Franc. iii. 161; cyme subumbellately branched, flowers in peduncled capitate clusters, testa apiculate at the tip caruncled at the base. Buchen. in *Engl. Bot. Jahrb.* v. 198; xii. 155; Boiss. Fl. Orient. v. 349; Reichb. Ic. Fl. Germ. ix. t. 375, 376. *Juncus campestris*, Linn. Sp. Pl. i. 329.

TEMPERATE AND ALPINE HIMALAYA; alt. 10–14,000 ft., from Kashmir eastwards. The KHASIA, NILGIRI and ANAMALLAY HILLS, alt. 5–7000 ft.—DISTRIB. N. temp. regions.

Perennial, 6–18 in. high. Leaves $\frac{1}{8}$ – $\frac{1}{2}$ in. broad, glabrous or ciliate. Branches of cyme very unequal, $\frac{1}{4}$ – $\frac{1}{2}$ in.; heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; bracts very short, scarious. Flowers sessile. Sepals $\frac{1}{12}$ – $\frac{1}{10}$ in. long, pale or dark brown, ovate-lanceolate, acuminate. Stamens 6. Capsule shorter than the sepals, broadly oblong or subglobose, obtuse or mucronate.—I have described above only the Indian form (which is a common European one) of this widely diffused and variable plant.

4. *L. spicata*, DC. Fl. Franc. iii. 161; cyme a solitary oblong drooping or nodding bracteate head, testa rounded at the tip, caruncled at the base. Buchen. in *Engl. Bot. Jahrb.* v. 197; xii. 127; Boiss. Fl. Orient. v. 348; Reichb. Ic. Fl. Germ. ix. t. 379.



ALPINE HIMALAYA; from Kashmir to Kumaon, alt. 12-14,500 ft., Royle, &c.—
DISTRIB. North Alpine and Arctic regions.

Perennial, 2-10 in. high. *Leaves* densely fascicled, radical 1-4 in. long, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, channelled, ciliate or not. *Cyme* $\frac{1}{2}$ - $\frac{3}{4}$ in. long; lower bract leafy, usually elongate, floral as long as the flowers, lanceolate, aristate; bracts brown with broad white membranous ciliate margins and tip. *Sepals* $\frac{1}{2}$ in. long, ovate-lanceolate, aristate, very dark brown. *Stamens* 6. *Capsule* oblong, obtuse, shorter than the sepals.

DOUBTFUL SPECIES.

L. sp. ?; Sikkim Himalaya, alt. 10-11,000 ft., J. D. H., *Pantling*; referred by Buchenau doubtfully to the European *L. parviflora*, var. *subcongesta*, but in much too young a state for identification. The bracts are ciliate, the sepals ovate acuminate and the stamens are 3 only.—There are other Himalayan species in too imperfect a state for determination.

ORDER CLXIII. PALMÆÆ.

By Dr. O. Beccari & J. D. Hooker.

Shrubs or trees, solitary or gregarious, naked or prickly, rarely pubescent. *Stem* erect scandent or decumbent, rarely branched above. *Leaves* alternate, plaited in bud, pinnatisect or palmate, rarely simple or bipinnate; petiole sheathing. *Flowers* 1- or 2-sexual, small, in panicles or spikes that are enclosed in one or more large sheathing bracts (spathes), usually 3-bracteate. *Perianth* inferior, segments 6 in two series (sepals and petals) usually all free, imbricate or valvate. *Stamens* 3 or 6, rarely more; anthers versatile. *Ovary* 1-3-celled or of 3 1-celled carpels; stigmas 3, usually sessile; ovules 1-2 in each carpel, 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 ruminant; embryo small, in a small cavity near the surface of the albumen.—Genera about 130, species about 1100, chiefly tropical.

I am deeply indebted to Dr. Beccari for the generous loan of the mss. of his most valuable researches on the Palms of British India, which form the materials for an elaborate treatise on all the Asiatic and Malayan genera and species of the Order, of which fragments have appeared in his (now abandoned) admirable work, "Malesia." The mss. include materials for framing more or less complete descriptions of most of the Indian Palms, with notes on others; and are very voluminous, many closely written foolscap pages being often devoted to a single species. This, and the fact of the whole being in Italian, and in an orthography that is not always legible, requires me to crave Dr. Beccari's and my readers' indulgence, if in the framing of diagnoses and descriptions I have in any case misinterpreted his statements or views.

It was, indeed, a great disappointment to me, that Dr. Beccari declined to undertake the completion of his work, and the drawing up of specific diagnoses in the form adopted in the Flora of British India, a task which he is so good as to assure me it would have gratified him to have accomplished, had he not definitely given up the further study of botany. This has compelled me to associate my name with his as joint author, which I do with great reluctance, for he is not only more familiar than I am with the genera through his long journeys in the Malayan Archipelago, but had collected together and examined, for the purpose of his work, the materials contained in all the principal European and Indian Herbaria. It remains to add that, after having examined all available specimens at Kew, I have throughout adopted Dr. Beccari's systematic disposition of the species, and his names for those previously undescribed.



TRIBE I. **Areceæ**. *Leaves* pinnatisect; leaflets free with reduplicate sides, or confluent as a plaited limb. *Flowers* monœcious or diœcious. *Seeds* with ventral raphe and dorsal embryo.

A. Spadix infrafoliar (that is flowering after the fall of the leaf in the axil of which it was formed).

Subtribe 1. **EUARECEÆ**. *Male fl.* unsymmetric; sepals small; petals imbricate. *Stigma* in the fruit terminal.—Spadix androgynous; flowers usually ternate, the middle one female.

* *Ovule basilar, erect.*

Male fl. minute, solitary or 2-nate towards the tips of the branches, 3- or 6-androus; fem. larger solitary. Albumen ruminant

1. **ARECA**.

Male fl. one on each side of a fem., stamens 6 or more.

2. **PINANGA**.

Albumen ruminant

** *Ovule parietal.*

Male fl. 6-androus; sepals equalling or longer than the petals; fem. sepals and petals broadly imbricate. Albumen ruminant

3. **NGENGA**.

Male fl. 9-12-androus; fem. petals with valvate tips. Albumen ruminant

4. **LOXOCOCCUS**.

Subtribe 2. **PTYCHOSPERMEÆ**. *Male fl.* symmetric; sepals broad, rounded, imbricate. *Stigma* in the fruit terminal. *Ovule* parietal or pendulous from the tip of the cell.—Spadix androgynous, flowers usually ternate, the middle one female.

Stamens 6. Albumen ruminant. Leaflets acuminate.

5. **PTYCHORAPHIS**.

Seeds deeply grooved along the raphe

Stamens 6-15. Albumen equable. Leaflets entire or obliquely 2-toothed

6. **CYBTOSTACHYS**.

Subtribe 3. **ONCOSPERMEÆ**. *Male fl.* symmetric or not; sepals imbricate; stigma in fruit lateral or basilar.

Male sepals small, acute. Stamens 6-12. Albumen ruminant. Armed palms; leaflets acuminate

7. **ONCOSPERMA**.

B. Spadix interfoliar (flowering while the leaf in whose axil it is formed is still green) or infrafoliar in some *Caryotidææ*.

Subtribe 4. **IGUANUREÆ**. Spadix androgynous; fem. fl. between two males; male sepals broadly imbricate. *Ovules* basilar or parietal. *Stigma* in fruit lateral or basilar.

Stamens 6-9. *Ovules* parietal. Stigma in fruit basilar or subbasilar. Leaflets obliquely truncate

8. **IGUANURA**.

Subtribe 5. **GEONOMEÆ**. Spadices unisexual; flowers sunk in cavities of its branches; perianth glumaceous; sepals imbricate. *Stigma* in fruit basilar or lateral.

Filaments free. Leaflets acuminate

9. **BENTINCKIA**.

Subtribe **CARYOTIDÆÆ**. Spadices unisexual; flowers solitary, or ternate with the fem. placed above the others. *Petals* of both sexes valvate.

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. DIDYMOSPERMA.
Male sepals 3. Stamens many. Albumen equable. . . . 12. ÆENGA.
Male sepals 3. Stamens many. Albumen ruminant . . . 13. CARYOTA.

** *Spathes 2; flowers unsymmetric; stigma in the fruit basilar.*

- Male calyx minute. Stamens 3 or 6, extrorse. Albumen
equable 14. ORANIA.

ANOMALOUS GENUS.

- Male fl. in catkin-like branches of a drooping androgynous
spadix; fem. capitate at the apex of the spadix . . . 15. NIPA.

TRIBE II. **Phœniceæ.** *Leaves pinnatisect; leaflets with induplicate sides. Spadices interfoliar; spathe solitary. Flowers diœcious. 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 many. 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 ruminant; embryo basal.*

- Fruit small, smooth 21. TRACHYCARPUS.
Fruit large, tuberculate or tessellate 22. PHOLIDOCARPUS.

TRIBE IV. **Lepidocarpeæ.** *Leaves pinnatisect, leaflets with reduplicate sides. Spadices interfoliar or terminal; spathes usually many. Ovary 1-3-celled. Fruit clothed with reflexed shining closely imbricating appressed scales.—Leaves copiously and strongly armed, except Metroxylon.*

* Polycarpic palms, flowering annually.

† *Leaflets acuminate, quite entire, nerves parallel.*

- Stem elongate. Spathes tubular, persistent 23. CALAMUS.
Stem elongate. Spathes cymbiform or open, deciduous . . . 24. DÆMONORHOPS.
Stem short or 0. Spathes many, persistent 25. ZALACCA.

†† *Leaflets rhomboid cuneate or oblanceolate, toothed; nerves flabellate.*

- Stem short or 0. Spathes many, persistent 26. KORTHALSIA.
Stem scandent. Spathe solitary, deciduous 27. CERATOLOBUS.



** Monocarpic palms, flowering once and then dying.

† *Spadices axillary from the uppermost leaves.*

- Stem scandent. Spadix with long amentiform branches clothed with large closely imbricating inflated spathels that conceal the spikelets of flowers 28. PLECTOCOMIA.
- Stem scandent. Spadix much branched, the branches bearing small infundibular spathels, each containing a small spikelet. Scales of fruit distinct 29. PLECTOCOMIOPSIS.
- Stem scandent. Spadix as of the preceding; scales of fruit most minute 30. MYRIALEPIS.

†† *Spadix very large, terminal.*

- Stems short, tufted. Leaves armed 31. EUGEISSONIA.
- Stem stout, erect. Leaves unarmed 32. METROXYLON.

TRIBE V. **Borasseæ**. Leaves flabelliform. *Spadices* interfoliar; spathes numerous, sheathing. *Flowers* 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. **Cocoinæ**. Leaves pinnatisect, leaflets with reduplicate sides. *Spadices* interfoliar, unisexual or androgynous; spathes 2. *Ovary* 3-celled, stigmas terminal. *Fruit* a drupe with a fibrous pericarp and terminal stigmas; endocarp woody or stony, with 3 terminal pits of which two answer to arrested cells, the third is immediately over the position of the embryo in the subjacent albumen. *Seed* adherent to the endocarp by the diffuse reticulations of the raphe, which ramifies all over the seed.

34. COCOS.

1. ARECA, Linn.

Stem erect, annulate. *Leaves* pinnate. *Spadices* infrafoliar, branched; MALE FL. many, minute; sepals small; petals obliquely lanceolate, valvate. *Stamens* 3 or 6; anthers basifixed, erect. FEM. FL. much larger, few at the base of the branches; perianth acrescent; sepals and petals orbicular, imbricate, the petals with acute valvate tips; ovary 1-celled; stigmas 3, sessile; ovule basal, erect. *Fruit* ovoid or oblong, stigmas terminal. *Seed* with a truncate base, albumen ruminant, embryo basilar.—Species about 24, tropical Asia and Australia.

1. **A. Catechu**, Linn. *Sp.* Pl. 1189; hexandrous, trunk tall, fruit ovoid. *Roxb. Cor. Pl.* i. 54, t. 75; *Fl. Ind.* iii. 615; *Mart. Hist. Nat. Palm.* iii. 169, t. 102; *Kunth Enum.* iii. 184; *Blume Rumph.* iii. 65, t. 102 A. et t. 104; *Griff. in Calc. Journ. Nat. Hist.* v. 153; *Palms of Brit. Ind.* 47; *Miq. Fl. Ind. Bat.* iii. 8; *Kurz For. Fl.* ii. 536; *Gamble Man. Ind. Timb.* 421; *Scheff. Arc.* 9; in *Ann. Jard. Bot. Buitenz.* i. 144, t. i. v. iii. f. 2. *Areca* Faufel, *Gartn. Fruct.* i. 19, t. 7, f. 2. *A. hortensis*, *Lour. Fl. Cochinch.* 568.—*Rheede Hort. Mal.* i. t. 5-8.

Cultivated in the hot damp regions of ASIA and the MALAYAN ISLANDS.

Trunk solitary, 40-100 ft. *Leaves* 4-6 ft.; leaflets numerous, 1-2 ft., upper



confluent, quite glabrous. *Spathæ* glabrous, compressed. *Spadix* much branched, rachis stout compressed, branches with filiform tips bearing more or less distichous minute male fl. *Fem. fl.* solitary at the bases and axils of the branches; sepals $\frac{1}{2}$ in., ovate, obtuse; petals subsimilar; staminodes 6, connate. *Fruit* $1\frac{1}{2}$ –2 in., smooth, orange or scarlet.—Betel nut.

2. **A. concinna**, *Thw. Enum.* 328; hexandrous, trunk short slender, fruit subfusiform.

CEYLON, Reigam and Pasdoon Corles, *Thwaites*.

Trunk 8–12 ft., $1\frac{1}{2}$ – $1\frac{3}{4}$ 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* $1\frac{1}{2}$ in. long, umbonate, reddish yellow.

3. **A. nagensis**, *Griff. in Calc. Journ. Nat. Hist.* v. 156; *Palms Brit. Ind.* 149; triandrous, trunk tall, fruit narrowly ovoid.

ASSAM, in the Naga hills, *Jenkins*.

Trunk 30–40 ft. *Leaves* 7 ft.; leaflets 19–20 in. *Spadix* 1 ft., branches stout, flexuose. *Fruit* 1 in., narrowed at both ends.—Description from Griffith, who states that the leaves were imperfect and open to doubt from their resemblance to *A. gracilis* (*Pinanga gracilis*).

4. **A. triandra**, *Roxb. Hort. Beng.* 68; *Fl. Ind.* iii. 617; triandrous, stems tufted slender, fruit ellipsoid. *Ham. in Mem. Wern. Soc.* v. 310; *Mart. Hist. Nat. Palm.* t. 149; *Griff. in Calc. Journ. Nat. Hist.* v. 154; *Palms Brit. Ind.* 148, t. 230 A.; *Kurz For. Fl.* ii. 537.

CHITTAGONG, MARTABAN, TENASSERIM, the ANDAMAN ISLANDS, and the MALAYAN PENINSULA.

Stems 12–25 ft. by 1– $1\frac{1}{2}$ 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. *Spathæ* 1 foot or more. *Spadix* and flowers as in *A. Catechu*, but triandrous. *Fruit* the size of an olive, orange-colrd., at length scarlet, tip truncate.

2. PINANGA, Blume.

Stem erect, annulate. *Leaves* pinnate with the upper leaflets confluent. *Spadices* infrapetiole, androgynous; spathe 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; stamens 6 or more, anthers subsessile, basifixed, erect. FEM. FL. much smaller, ovoid or globose; sepals and petals orbicular, broadly imbricate; ovary 1-celled, stigmas 3; ovule basilar erect. *Fruit* ovoid or ellipsoid, pericarp fibrous. *Albumen* ruminant; embryo basilar.—Species about 24, tropical Asiatic and Malayan.

A. SPIRANTHÆ, Becc. *Flowers* in 3 or more spiral series on the spadix or its branches.

1. **P. hexasticha**, *Scheff. in Ann. Jard. Bot. Buitenz.* i. 148; stems slender gregarious, leaves pinnate, petiole scaly, spadix simple reflexed, male fl. in 5–6 series, fruit fusiform. *Kurz For. Fl.* ii. 539; *Becc. in Ann. Jard. Bot. Buitenz.* ii. 80, 86; *Males.* iii. 122. *Areca hexasticha*, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 201, t. 12.

PEGU; in marshy forests, *Kurz*.

Stems 25–30 ft. by $1\frac{1}{2}$ in. diam. *Leaves* 3–5 ft., sheaths and short petiole scaly; leaflets 1– $1\frac{1}{2}$ ft., many, narrow, linear, subfalcate, 2–3-ribbed, lower acuminate,

upper truncate, toothed. *Spadix* about 1 ft. long; rachis as thick as the finger, fleshy; flowers sessile, rows spirally arranged. *Fruit* narrowed at the top.

2. ***P. gracilis***, *Blume, Rumph.* ii. 77; stems slender usually gregarious, leaves sparingly pinnate, petiole scurfy, spadix simple reflexed, male fl. in 3 rows, fruiting spadix pendulous, fruit ellipsoidly fusiform. *Kurz For. Fl.* ii. 538; *Becc. in Ann. Jard. Bot. Buitenz.* ii. 81, 86; *Males.* iii. 122. *Pinanga patula* β . *gracilis*, *Scheff. in Natuurk. Tijdsch. Ned. Ind.* xxxii. 178. *Seaforthia gracilis*, *Mart. Hist. Nat. Palm.* iii. 185 (*Ed.* 2, 184) 313; *Kunth Enum.* iii. 191. *Areca gracilis*, *Roxb. Fl. Ind.* iii. 619; *Griff. in Calc. Journ. Nat. Hist.* v. 460; *Palms Brit. Ind.* 154, t. 232 A, C, f. 2 (not B) *Kurz in Journ. As. Soc. Beng.* xliii. ii. 201. *T. Anders. in Journ. Linn. Soc.* xi. 5. *Nenga gracilis*, *Becc. Males.* i. 25. *A. triandra*, *Roxb. P. Wall. Cat.* 8599.

SIKKIM and BROATAN HIMALAYA, alt. 2-3000 ft., *J.D.H.* ASSAM, the KHASIA HILLS, and CHITTAGONG to TENASSERIM. *Roxburgh, &c.*

Stems 6-20 ft. by $\frac{1}{4}$ - $\frac{1}{2}$ 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 prænorse many-ribbed. *Spathe* solitary, 2-fid. *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.

3. ***P. Griffithii***, *Becc. Males.* iii. 117; stem? leaves pinnatisect leaflets numerous, spadix peduncled reflexed subdigitately branched, branches 4 spreading, male calyx shorter than the petals, fruits spirally disposed in 4 series ovoid narrowed at the mamillate tip. *Areca* sp. *Griff. in Calc. Journ. Nat. Hist.* v. 461 (under *A. gracilis*, fruit only); *Palms Brit. Ind.* 55, t. 232 (*spadix* only).

KHASIA HILLS; *Griffith.*

Stem apparently very slender. *Peduncle of spadix* 2 in., branches 3-5, spreading, not compressed. *Fruit* rather more than $\frac{1}{2}$ in. long by $\frac{1}{4}$ diam., narrowed at the base, mamillate, pericarp thin, albumen deeply ruminant.—*Beccari* (*Males.* 1. c.) has founded his *P. Griffithii* on the spadix with tetrastichous fruits described by Griffith, but regards the leaves (only supposed by the latter author to belong to it, and which are simple and forked) to belong to another plant. In the diagnosis of *P. Griffithii* ("Malesia," 1. c.) there is no description of the leaves, but the author has added in pencil "pinnatisect, segments numerous 3-many-costate."

4. ***P. polymorpha***, *Becc. Males.* iii. 172; stem slender, leaves short subentire forked or more or less pinnatifid, petiole very slender, sheath not grooved, spadix slender refracted after flowering simple or 2-3-partite, branches short, fl. 3-4-seriate, fruit small ellipsoid or obovoid subacute, base narrowed.

MALAY PENINSULA; Singapore, *Lobb*; Perak, alt. 3-4000 ft., *Scortechini* (n. 345 a.), *King's Collector* (n. 8072).

Stems solitary, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., internodes $2\frac{1}{2}$ -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 $\frac{1}{4}$ - $\frac{1}{2}$ in., tipped by the stigma; black, shining; (dark yellow *King's Collector*) pericarp thin. *Seed* obovoid; albumen densely ruminant. The fruits in some specimens are ellipsoid and narrowed at both ends, girt with a thickened ring at about $\frac{1}{2}$ 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 $1\frac{1}{2}$ –2 in. diam., leaves $1\frac{1}{2}$ –2 ft. long, petiole and costa of blade nearly as thick as the little finger, spadix and its branches very stout.

MALAY PENINSULA; Perak, on the top of Gunong Booboo, alt. 3–5300 ft. *King's Collector* (No. 7372).

Evidently allied to *P. polymorpha*, but the specimens are insufficient for a fuller description.

6. **P. Scortechini**, Becc. *Males* iii. 170; stem solitary, young internodes scurfy, leaves pinnatifid, leaflets distant long narrow, petiole long slender, branches of spadix 5–6 ascending digitate, flowers spirally arranged in 4-series, fruit ovoid or obovoidly-oblong.

MALAY PENINSULA; Perak, *Scortechini*, alt. 3000–4000 ft., *King's Collector*.

Stem 6–15 ft., $\frac{3}{4}$ – $1\frac{1}{4}$ in. diam. Leaves 3–4 ft. long; sheaths scurfy; leaflets numerous, $1-1\frac{1}{2}$ ft. by $1-1\frac{1}{2}$ in., rather rigid, 2–5-ribbed, finely acuminate, base hardly narrowed. Spathe elliptic-oblong. Spadix stoutly peduncled, depressed, $\frac{3}{4}$ – $1\frac{1}{4}$ in. long, with a large triangular deciduous bract; branches $2\frac{1}{2}$ –4 in. long. Male fl. sepals triangular, cuspidate, petals rather longer acuminate. Sepals of fem. fl. cuspidate, ciliolate; petals rather larger. Fruit $\frac{3}{4}$ in. long, black, shining, tip rounded or subacute; albumen densely ruminate.

B. ORTHOSTICHANTHÆ, Becc. Flowers in 2 series on the spadix or its branches.

* Leaves entire or sparingly divided.

7. **P. disticha**, Blume (fid. H. Wendl. in Kerch. *Palm.* 253); stem very slender short, leaves small cuneately obovate simple and deeply forked or with a few broad lateral leaflets, spadix small simple refracted villous, male petals much longer than the calyx, fruit ovoid or fusiform acuminate. Becc. *Males* iii. 123. *P. bicolor*, Blume in Bull. Néerl. 1838, 65; Rumphia, ii. 92, t. 113, f. 2; Kunth Enum. iii. 641. *Areca disticha*, Roxb. Fl. Ind. iii. 620; Griff. in Calc. Journ. Nat. Hist. v. 461 (partly as to descript. & local.); Palms Brit. India 155 (partly). *A. humilis*, Roxb. Ic. pict. ined. *Areca curvata*, Griff. Ic. Pl. Ind. Or. t. 248 (non Notul. iii. 164.) *Seaforthia disticha*, Mart. Hist. Nat. Palm. 184; Kunth l. c. 190. *Ptychosperma disticha*, Miq. Fl. Ind. Bat. iii. 28 et Suppl. 253. 590; Journ. Bot. Néerl. i. 7; De Palm. Arec. 24.

PENANG, Roxburgh, Curtis (No. 391); Perak alt. 100–800 ft. Herb. Calc. (Nos. 2536, 4423.)

Stems 2–6 ft. by $\frac{1}{4}$ – $\frac{1}{2}$ 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 $\frac{1}{2}$ in. long, narrowed at both ends, but most so above, orange-red. Seed ovoid; albumen according to Roxburgh's description, and his drawing (copied by Griffith, t. 233) solid, but there are a few streaks of rumination in No. 4423 from Perak.—The leaves are often mottled with pale yellow green.

8. **P. subruminata**, Becc. *Males* iii. 174, stem very slender, leaves cuneately obovate forked, lobes truncate doubly-toothed 12–15-nerved, petiole long slender, sheath deeply closely grooved, spadix piercing the sheath of the old leaf very short reflexed bipartite glabrous, branches flexuous, fruit narrowly ovoid or ellipsoid apiculate.

MALAY PENINSULA; Perak, alt. 100 ft., Herb. Calcutt. (No. 7797); *King's Collector* (No. 1963). PENANG, alt. 1500–2000 ft., *King's Collector*.

Stem 2-6 ft. by $\frac{1}{2}$ in.; internodes 2-2 $\frac{1}{2}$ in., brown-scurfy. *Leaves* 9-12' by 4-5 $\frac{1}{2}$ in., glabrous; petiole 6-10 in., subterete; sheath 4 in., tubular, scurfy; ligule scarious, fimbriate. *Spadix* with its stout peduncle $\frac{3}{4}$ in. long, branches sinuous, few-fld. *Fruit* about $\frac{1}{2}$ by $\frac{1}{4}$ in., red. *Seed* narrowed at the tip; raphe with 5 branches; albumen very faintly ruminate.

** Leaves much divided.

† *Spadix* large, much branched.

9. **P. Manii**, Becc. *Males.* iii. 178; trunk tall stout, leaves large, leaflets very many strongly 1-3-nerved, spadix reflexed stoutly peduncled, branches filiform pendulous, male sepals about as long as the petals, fruit small ovoid from an acute base, seed subglobose. *Areca costata*, Kurz in *Journ. As. Soc. Beng.* xliii. ii. 200. *excl. all. synons.*

NICOBAR ISLANDS, *Man.* SOUTH ANDAMAN ISLANDS., Kurz.
Trunk 50 ft. by 5 $\frac{1}{2}$ in. diam. *Leaves* 6 $\frac{1}{2}$ ft.; leaflets ensiform, straight, longest (middle) about 30 in. by 1 $\frac{1}{2}$ -3 $\frac{1}{2}$ broad, 2-3-partite, pale beneath. *Spadix* 19-20 in. long, shortly peduncled, branches 45-50 spirally arranged; flowers 2-seriate. *Fruit* $\frac{4}{10}$ by $\frac{2}{10}$ - $\frac{3}{10}$; pericarp thin. *Seed* with reticulate raphe, albumen densely ruminate.

10. **P. Kuhlil**, Blume in *Bull. Néerl.* 1838, 65; *Rumph.* ii. 82, t. 111 et β t. 111, f. 11-13; stems tufted slender, leaves pinnate, leaflets many falcate linear to linear-lanceolate finely acuminate strongly 2-3-ribbed upper confluent, petiole subscurfy, spadix refracted shortly peduncled robust simply branched glabrous, branches elongate, fruit obovoid or ellipsoid shortly apiculate. *Kunth Enum.* iii. 641; *Miq. Pl. Jungh.* 57; *Scheff. in Natuurl. Tijdsch. Ned. Ind.* xxxii. 182; in *Ann. Jard. Bot. Buitenz.* i. 152; *Becc. Males.* iii. 138. *P. costata*, Bl. in *Bull. Néerl.* l. c.; *Rumphia* l. c. 80, t. 109 et β t. 109 C.; *Kunth* l. c.; *Miq. l. c.* 156; *Kurz, For. Fl.* ii. 538. *Seaforthia*, Kuhlil, *Mart. Hist. Nat. Palm.* iii. Ed. 2, 185, 313. *S. oryzæformis*, *Mart. l. c.* Ed. 1, 185 (*excl. all. syns. but Gärtn.*); *Kunth l. c.* 191. *S. costata*, *Mart. l. c.* 313. *Ptychosperma*, Kuhlil, *Miq. Fl. Ind. Bat.* iii. 21; *De Palm. Archip. Ind.* 23. *P. costata*, *Miq. l. c.* 25, 23. *Areca oryzæformis*, *Gärtn. Fruct.* i. 20, t. 7, f. 2, 6 (*not of Rumph.*).

SOUTH ANDAMAN ISLANDS, Kurz.—DISTRIB. Sumatra, Java.

Stem soboliferous, 20-30 ft. (Kurz), (10 ft., Becc.). *Leaves* 3-4 ft.; leaflets 1-2 ft.; petiole variable in length. *Spadix* 1 ft. *Fruit* nearly $\frac{1}{2}$ in. long. *Seed* adherent to the pericarp; albumen deeply ruminate.—The above is chiefly from Kurz's *P. costata* in *For. Fl.* It may be the *P. coronata* mentioned by Kurz in his Andaman Report as abundant in the South Andaman Islands.

†† *Spadix* with few distichous branches.

11. **P. Dicksonii**, Blume *Rumph.* ii. 85; trunk solitary tall, leaves pinnate, leaflets numerous elongate broadly linear præmorse 5-7-nerved, uppermost confluent, spadix refracted branches 4-8, male sepals subulate nearly equalling the petals, stamens 20-30, fruit ovoid or oblong. *Scheff. in Natuurl. Tijdsch. Ned. Ind.* 174; in *Ann. Jard. Buitenz.* i. 149; *Becc. Males.* i. 138. *Areca Dicksonii*, Roxb. *Fl. Ind.* iii. 616; *Griff. in Journ. As. Soc. Beng.* v. 458; *Palms Brit. Ind.* 153, t. 231. *Seaforthia Dicksonii*, *Mart. Hist. Nat. Palm.* iii. 184, 313; *Kunth Enum.* iii. 190.

WESTERN GHATS; on the Nilghiri and Travancore hills, alt. 2500 ft.

Trunk 16-18 ft. by about 2 in. diam. *Leaves* 4 ft., forked; leaflets sessile,

12-24 by $\frac{3}{4}$ -1 in. *Spathæ* simple. *Spadix* with the branches stout, densely clothed with imbricating flowers. *Male fl.* sepals subulate, petals rather longer, ovate-cordate, tips tapering; stamens very numerous; filaments very short; pistillode 0. *Fem. fl.* sepals reniform; petals similar; staminodes 6, clavate, tips penicillate. *Fruit* about $\frac{1}{2}$ - $\frac{3}{4}$ in. long by $\frac{1}{4}$ in. diam.

12. **P. malaiana**, Scheff. in *Natuurk. Tijdsch. Ned. Ind.* xxxii. 175; stem slender, leaves pinnate, leaflets numerous linear acuminate glaucous beneath 2-nerved, upper confluent, spadix refracted branches 3-5, male sepals lanceolate acuminate much smaller than the petals, stamens about 40, fruit ovoid. *Becc. Males.* iii. 137. *Areca hæmatocarpa*, Griff. *Notul.* iii. 165; *Palms Brit. Ind.* 153. *A. malaiana*, Griff. in *Calc. Journ. Nat. Hist.* v. 457; *Palms Brit. Ind.* 252, t. 230 C. *Seaforthia malaiana*, Mart. *Hist. Nat. Palm.* iii. 184, Ed. 2, 183, 313, t. 158, f. 3; *Kunth Enum.* iii. 190. *Ptychosperma malaiana*, Miq. *Fl. Ind. Bat.* iii. 23; *de Palm. Arch. Ind.* 23.

MALACCA, Griff. PENANG, Herb. Hort. Calc. (3190). PERAK, *King's Collector* (8120).—DISTRIB. Sumatra.

Stem 8-12 ft., $\frac{3}{4}$ -1 in. diam., internodes generally subclavate. *Leaves* 5-8 ft. long, spreading; leaflets $1\frac{1}{2}$ -2 ft. by $\frac{1}{4}$ - $\frac{3}{4}$ in., finely acuminate, upper cuneate bipartite, lobes præmorse; petiole $1\frac{1}{4}$ -1 $\frac{1}{2}$ ft.; sheath as long. *Spathæ* 10 in., cuspidate. *Spadix* 6 in., blood red in fruit; branches 3-5, flowers crowded. *Male fl.* flat, sepals membranous, lanceolate; petals much larger; filaments very short. *Fem. fl.* sepals and petals very short; staminodes 0; stigma discoid. *Fruit* 1-1 $\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{3}{4}$ in., narrowed at both ends, blackish purple, mamillate. *Seed* ovoid, raphe about 7-branched; albumen deeply ruminant.

13. **P. pectinata**, Becc. *ms.*; stems 7-15 ft., cæspitose, robust, leaflets numerous elongate acuminate 1-5-ribbed straight much contracted at the base, glaucous beneath, spadix with 3-9 short branches, male calyx shorter than the petals, fruit elongate ovoid tipped with the conical stigma.

PERAK, *King's Collector*; Goping, alt. 5800 ft. (n. 4393).

Stems 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ in. diam. *Leaves* 3-4 ft.; leaflets 10-16 by $1\frac{1}{4}$ -1 $\frac{3}{4}$ in. *Spadix* with branches 4-5 in. long. *Fruit* $\frac{9}{10}$ - $\frac{7}{10}$ in. long by $\frac{3}{10}$ - $\frac{2}{10}$ diam. *Seed* ovoid, obtuse, base truncate.—Fruit much smaller than in *P. malaiana*.

14. **P. perakensis**, Becc. *Males.* iii. 175; stems short grezarious, internodes short the upper scurfy, leaves long-petioled, leaflets numerous stiff straight linear or ensiform acuminate 1-2-costate, spadix short subdigitately 5-7-branched, male calyx much shorter than the petals, fruit ovoid or oblong crowned with the minute stigma.

PERAK; alt. 1200-1500 ft., *Scortechini*, on Maxwell hill, Wray.

Stems 3-4 ft. by 2-3 in. diam. *Leaves* 2-2 $\frac{1}{2}$ ft.; leaflets 18-20 by $\frac{1}{4}$ -1 in., inserted at an angle of 45°, bright green, paler beneath; petiole 10-12 in., terete; sheath 8 in, squamulose; ligule $\frac{1}{4}$ -1 $\frac{1}{4}$ in. *Spathæ* elliptic-oblong, apiculate, 2-keeled. *Spadix* 4-6 in., shortly peduncled; branches compressed; flowers subremote, 2-seriate. *Male fl.* calyx 3-toothed; stamens numerous. *Fem. fl.* globose; sepals and petals similar; stigma capitate. *Fruit* $\frac{1}{2}$ long by $\frac{1}{10}$ in. diam., purple-black. *Seed* conform to the fruit, raphe simply branched; albumen densely ruminant.

15. **P. Hookeriana**, Becc. *Males.* iii. 141; stem slender, petiole and rachis of leaves scurfy, leaflets numerous narrowly linear-lanceolate subfalcate acuminate 2-3-costate, spadix with a slender peduncle and 4-5 slender branches, male calyx much shorter than the petals, fruit ellipsoid apiculate. *Areca* sp. Griff. in *Calc. Journ. Nat. Hist.* v. 462, in footnote.

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* $4\frac{1}{2}$ ft.; leaflets opposite, 1 ft. long, much obliquely acuminate, 3-4-keeled above, terminal lobe 2-fid; petiole 6 in. *Spathe* 4 in., oblong. *Spadix* 3-4 in.; branches compressed, flexuose, flowers crowded. *Male fl.* calyx membranous 3-toothed; petals very unequal; stamens about 15; pistillode 0. *Fem. fl.* sepals and petals subequal; staminodes 0; stigma large, discoid. *Fruit* about $\frac{1}{2}$ in. long by $\frac{1}{4}$ diam., narrowed at the top. *Seed* of the same shape.—This is the plant alluded to by Griffith (*Calc. Journ. Nat. Hist.* l. c. 462), and described as probably a form of *A. gracilis* collected by Major Jenkins and himself in the Khasia hills and Assam, and of which he says, in a footnote, "*Stem and leaves much the same as in A. gracilis*, spadices 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 rachis of leaves slender scurfy, leaflets very numerous falcately very narrowly ensiform finely acuminate unicostate, spadix very short, spathe fusiform terete acuminate membranous, male fl. flat imbricate.

BURMA; at Moulmein, Lobb.

Stem as thick as a goose-quill; internodes long. *Leaves* 12-14 by 4-5 in.; leaflets 3-4 by $\frac{1}{4}$ 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* $1\frac{1}{2}$ in., ellipsoidly fusiform, erect, quite membranous, subhyaline. *Spadix* as long as the spathe, flowering to the base. *Male fl.* closely imbricating, $\frac{1}{4}$ in. diam., trapezoidly orbicular; dorsal sepals twice as long as the others, apiculate; stamens 9, unequal; filaments very short, anthers linear. *Fem. fl.* minute, globose; ovary ovoid, stigma pulvinate, ovule erect.—A very distinct species remarkable for its membranous spathe and very elegant foliage.

17. *P. paradoxa*, Scheff. in *Natuurk. Tijdsch. Ned. Ind.* xxxii. 31: stem slender, leaves entire or pinnatisect with few broad 3- or more-nerved leaflets, spadix short decurved, fruit very narrow tapering from above the base to the obtuse tip often curved. Becc. *Males.* iii. 129, in note. *Areca curvata*, Griff. *Notul.* iii. 164, partly, as to the descr. (not *lc. Pl. Asiat.* t. 248). *A. paradoxa*, Griff. in *Calc. Journ. Nat. Hist.* v. 463; *Palms Brit. Ind.* 156, as to descr. of fruit, and fig. of fruit, t. cccxxxvii. C, f. 11. *Kentia paradoxa*, Murt. *Hist. Nat. Palms.* 111, 312. *Nengella paradoxa*, Becc. *Males.* i. 32. *Ophiria paradoxa*, Becc. in *Ann. Jard. Bot. Buitenz.* ii. 128. *Cladosperma*, N.G. Griff. *Notul.* iii. 165.

MALACCA; foot of Mt. Ophir, Griffith. PERAK, alt. 3-4000 ft., Scortechini (427^b, 2413); on Gunong Batu, Wray.

Stem 3-6 ft., very slender, $\frac{1}{4}$ in. diam.; internodes 1-2 in. *Leaves* 1 ft. long, entire and oblong, or with 3-6 pairs of sigmoidly linear-lanceolate acuminate leaflets with a broad base, 4-5 in. long by $\frac{1}{4}$ - $\frac{1}{2}$ broad; petiole 1- $1\frac{1}{2}$ ft., very slender and rachis scurfy; terminal lobe deeply forked, toothed; sheath long, deeply striate. *Fruiting spadix* 2-2 $\frac{1}{2}$ in. long, slender, nearly glabrous; peduncle short. *Fruits* distichous, $\frac{3}{4}$ in. long by $\frac{1}{4}$ broad, red; albumen equable.

DOUBTFUL SPECIES.

18. *P. PATULA*, Blume in *Bull. Néerl.* 1838, 65; *Rumphia*, ii. 86, 87, t. 115; *Kunth Enum.* iii. 641; *Kurz in Journ. As. Soc. Beng.* xlii. ii. 201; *Scheff. in Natuurk. Tijdsch. Ned. Ind.* xxxii. 176 (partly and excl. all vars.); in *Ann. Jard. Bot. Buit.* i. 150 (partly as to descr.), t. 18, f. 4, t. 13; *Becc. Males.* iii. 139. *Sesforthis patula*, Mart. *Nat. Hist. Palm.* 323. *Ptychosperma patula*, Mig. *Fl.*



Ind. Bat. iii. 26, and *Suppl.* 253; in *Journ. Bot. Néerl.* i. 7; *De Palm. Archip. Ind.* 23; stems tufted slender 6-7 ft. high $\frac{1}{4}$ -1 in. diam., leaflets few, rarely many, broad, distant, sigmoidly lanceolate and falcate from a narrowed base caudate-acuminate 2- many-nerved, terminal broader 7-9-nerved truncate and deeply doubly toothed, spadix refracted, branches 2-5, fruit elliptic-ovoid, narrowed and acute at the tip, about $\frac{1}{4}$ - $\frac{3}{8}$ in. long $\frac{1}{8}$ - $\frac{1}{4}$ diam.—Perak, on Ulu Bubong, *King's Collector* 10702). Sumatra, Borneo.—The above description is chiefly from Sumatran specimens. The Perak have internodes $2\frac{1}{4}$ - $3\frac{1}{4}$ in. long, $\frac{6}{10}$ in. diam., covered with white scurf, a 4-branched spadix, and the leaves minutely puberulous beneath. A very similar plant collected by Helfer in Burma (n. 6427) without flowers, in fruit, has broader leaflets with the nerves puberulous beneath.

3. **NENGA**, *H. Wendl. & Drude.*

Characters of *Pinanga*, but sepals and petals subequal, subulate, and ovule parietal.—Species few, Malayan.

1. **N. Wendlandiana**, *Scheff. in Ann. Jard. Bot. Buitenz.* i. 153 (partly), t. 9-10; leaves pinnate, leaflets alternate ensiform finely acuminate, spadix about 4-branched, flowers tetrastichous, male sepals subulate rather longer than the petals, fruit ovoid mamillate, stigma conical, seed ovoid acute. *Becc. Males.* i. 25; in *Ann. Jard. Buitenz.* ii. 83. *N. pumila*, *Wendl. in Kerchov. Palm.* 251. *Pinanga Nenga*, *Blume Rumphia*, ii. 77, t. 107 (excl. var. *pachystachya*). *Areca Nenga*, *Blume in Mart. Hist. Nat. Palm.* iii. 179; *Scheff. in Natuurk. Tijdsch. Ned. Ind.* xxxii. 166 (excl. var. γ). *Areca pumila*, *Blume in Mart. l. c.* 177, t. 153, f. 1-3; *Miq. Fl. Ind. Bat.* iii. 14 (excl. var. γ); *De Palm. Arch. Ind.* 23.

Var. *malaccensis*, *Becc. Males.* iii. 182; petiole very short, fruit broadly ovoid about 1 in. long, seed broadly truncate at the base cuspidate and spinous at the tip. *Areca (Anacasmus) pumila*, *Griff. in Calc. Journ. Nat. Hist.* v. 456; *Palms of Brit. Ind.* 151.

Var. *malaccensis*, Ching forest, Malacca, *Griffith. PERAK*, Larut, *King's Collector* (4022).—DISTRIB. (of the species) Sumatra, Java.

Stem 10-20 ft. by 2-3 in. diam. *Leaves* 8-9 ft., pinnate nearly to the base, leaflets alternate $2\frac{1}{2}$ ft. by $\frac{1}{2}$ - $1\frac{1}{2}$ 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 $1\frac{1}{2}$ in., branches 8-12 in., level-topped, pendulous, fruiting very thick; flowers about 4-ranked, yellowish white. *Male fl.* sepals $\frac{1}{2}$ - $\frac{1}{2}$ in. long, triangular-subulate, finely acuminate; petals ovate-oblong, cuspidate, stamens 6; pistillode 0. *Fem. fl.* sepals and petals roundish; staminodes 0. *Fruit* 1 in. by nearly $\frac{1}{2}$ in. broad, orange-colrd.—An abnormal form in which the male fl. has 3 sepals, and 6 petals; 2 rows (var. *malaccensis herapetala*, *Becc. Males.* iii. 183), was found at Perak by *Scortechini*.

2. **N. macrocarpa**, *Scortech. mss. ex Becc. Males.* iii. 180; leaves pinnate, leaflets sigmoidly falcate, spadix 3-4-branched, flowers hexastichous, male sepals subulate hardly longer than the petals, fruit elongate ellipsoid, crowned by the large deeply 3-lobed stigma, seed broadly ovoid abruptly spinescent.

PERAK; on Maxwell hill, alt. 3200-5300 ft., *Scortechini* (No. 547^a, 302^b); *Goping, King's Collector* (4775), on Gunong Batu Pateh, *Wray* (930).

Stem solitary, 6-10 ft. *Leaves* 3-4 ft.; leaflets 18-30 pairs, rigid, acuminate, lower narrow 1-nerved, 16-20 by $1\frac{1}{2}$ in., upper longer broader and 2-nerved; petiole 4-12 in.; sheath as long, smooth or subscaly. *Spathe* glabrous, purplish. *Spadix* at first erect, then spreading; peduncle short, stout; branches 7-12 in. *Male fl.* stamens 6; pistillode of 3 tubercles. *Fem. fl.* sepals ciliolate and petals suborbicular;

staminodes 6 minute teeth. *Fruit* about $1\frac{1}{2}$ in. long by $\frac{1}{2}$ in. diam., ellipsoid; stigmas 3, broad, triangular.

4. **LOXOCOCCUS**, *H. Wendl. & Drude*.

Stem erect, annulate. *Leaves* pinnatisect, leaflets obliquely truncate. *Spadix* infrafoliar, branched; spathes 2; flowers 3 together (a fem. between 2 males) clusters spirally arranged. *Male fl.* Sepals 3, rounded, imbricate; petals 3, much larger, ovate, valvate; stamens 9-12, filaments very short, anthers subversatile. *Fem. fl.* smaller, subglobose; sepals rounded, broadly imbricate; petals ovate, base broad imbricate, tips valvate; ovary 1-celled, stigmas 3, minute; ovule parietal. *Fruit* subglobose, cuspidately beaked, stigmas terminal; albumen ruminant; embryo subbasilar.

L. rupicola, *H. Wendl. & Drude in Linnæa*, xxxix. 185; *Hook. f. Bot. Mag.* t. 6358. *Ptychosperma rupicola*, *Thw. Enum.* 328. *Caryota mitis*, *Willd.?*; *Moon Cat. Ceyl. Pl.* 64.

CEYLON; in forests of the Southern and Central Provinces.

Trunk 30-40 ft. by 4-5 in. diam. *Leaves* 6-8 ft., spreading; leaflets 12-20 pairs, 2 ft. by $2\frac{1}{2}$ 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.* $\frac{1}{2}$ in. diam.; filaments about equalling the anthers; pistillode minute, 3-fld. at the tip. *Fruit* about 1 in. long, globosely ovoid. *Seed* globose.

5. **PTYCHORAPHIS**, *Becc.*

Stem slender, annulate. *Leaves* pinnatisect, leaflets narrow, caudate-acuminate. *Spathes* 2, complete, caducous. *Spadix* infrafoliar, paniculately branched; flowers spirally disposed, male only towards the tips of the branches, a fem. between 2 males towards the base. *Male fl.* symmetric; sepals suborbicular; petals valvate; stamens 6, anthers versatilis; 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 ruminant; embryo basilar, oblong.—Species 3, Malayan.

1. **P. singaporensis**, *Becc. in Ann. Jard. Bot. Buitenz.* ii. 90, t. 126; *Males.* iii. 109; stem slender, leaflets about 1 ft. long very numerous, spadix slender 5-7-branched, rachis rusty furfuraceous, fruit ovoid. *Ptychosperma singaporensis*, *Becc. Males.* i. 61. *Rhopaloblaste singaporensis*, *Hook. f. in Gen. Pl.* iii. 892. *Drymophloeus singaporensis*, *Hook. f. in Kew Gard. Rep.* (1882) 1884, 55.

SINGAPORE; Maingay (*Kew dist.* 1536). JOHORE; on Gunong Pulai, *Hullett* (6000), *Kunstler* (230).

Stem 6-12 ft. by $1\frac{1}{2}$ in. diam., soboliferous. *Leaves* 3-6 ft., regularly pinnatisect; leaflets very many, alternate, straight, about 8 by $1\frac{1}{2}$ 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 $\frac{3}{4}$ in. long by $\frac{1}{4}$ in. diam., ovoid or elliptic-ovoid, tip conical, slightly excentric. *Seed* free, elliptic-ovoid, rounded at both ends, raphe branches descending to the base.



2. **P. augusta**, Becc. in *Ann. Jard. Bot. Buitenz.* ii. 90; *Males*. iii. 110; trunk very tall, leaflets numerous 2-3 ft., spadix decomposed, fruit elliptic-oblong. *Areca augusta*, Kurz in *Journ. Bot.* 1875, 331, t. 170.

NICOBAR ISLANDS; in woods in Kamorta, Kurz.

Trunk slender, 80-100 ft. by 1 ft. diam. Leaves 8-12 ft.; leaflets sessile, narrowly linear, acuminate, 3-costate; petiole very short; rachis flat above, furfuraceously tomentose. Spadix decomposed, $2\frac{1}{2}$ -3 $\frac{1}{2}$ ft. Male fl. bracts broad smooth; sepals broadly ovate; petals oblong, obtuse. Fem. fl. sepals and petals nearly alike, concave, imbricate. Fruit 1 in. long, elliptic-oblong, scarlet. Seed oblong.

6. CYRTOSTACHYS, Blume.

Stems slender, cæspitose, annulate. Leaves pinnatisect; leaflets linear-lanceolate, acuminate, 1-costate. Spathes 2, complete, caducous. Spadix infrafoliar, shortly peduncled, broadly paniculately branched; branches 1-2 ft. long, stout, spreading; flowers in spirally disposed clusters of 3, a fem. between 2 males. Male fl. symmetrical; sepals orbicular, imbricate; petals valvate; stamens 12-15, exserted; anthers short, versatile; pistillode 2-fid. Fl. fem.; sepals orbicular; petals longer, broadly imbricate, tips valvate; staminodes forming a membranous cup; ovary narrowly ovoid; stigmas subulate; ovule pendulous from the tip of the cell. Fruit small, ovoid, stigma terminal. Seed adherent to the endocarp, globose, hilum apical; albumen equable; embryo basilar.—Species 2, Malayan.

1. **C. Lakka**, Becc. in *Ann. Jard. Bot. Buitenz.* ii. 141; fruit conico-ovoid gradually narrowed to the tip, seed ovoid. *C. Lakka* var. *singaporensis*, Becc. l. c.

SINGAPORE; in humid jungles.—DISTRIB. Borneo.

A slender tall soboliferous Palm. Leaves about 4 ft.; leaflets about 20 by 1-1 $\frac{1}{4}$ in., upper shorter obtuse or toothed, green above, ashy grey beneath; sheath red. Fruit $\frac{1}{10}$ in. long, by about $\frac{2}{10}$ diam.—Very near *C. Rendak* of Sumatra, which has an ovoid fruit abruptly constricted at the tip, and a globose seed.

7. ONCOSPERMA, Blume.

Prickly palms. Leaves terminal, pinnatisect. Spathes 2, complete. Spadix infrafoliar, branched; branches with solitary male flowers above, and ternate flowers below (a fem. between 2 males). Male fl. asymmetric; sepals suborbicular, acute; petals obliquely ovate, valvate. Stamens 6-12; anthers elongate; pistillode columnar, 3-fid. Fem. fl. globose; sepals and petals orbicular, imbricate; staminodes 6; ovary obliquely ovoid, 1-3-celled; stigmas minute; ovule parietal. Fruit small, globose, stigmas lateral or basal. Seed suborbicular, raphe broad; albumen deeply ruminant.—Species 5-6, Malayan.

1. **O. filamentosa**, Blume, *Rumphia* ii. 97, t. 82, 103; stoloniferous, leaflets subequidistant drooping, male fl. hexandrous, fruit spherical $\frac{1}{10}$ in. diam. *O. cambodianum*, Hance in *Journ. Bot.* (1876) 261. *Areca tigillaria*, Jack in *Mal. Misc.* ii. vii. 88 (in *Calc. Journ. Nat. Hist.* iv. 12); Griff. in *Culc. Journ. Nat. Hist.* v. 423; *Palms Brit. Ind.* 157, t. 133 B. A. Nibung, Mart. *Hist. Nat. Palm.* iii. 173, 311, t. 153.

MALAY PENINSULA; in swamps.—DISTRIB. Borneo, Cochin China.

Trunk 30–40 ft., armed with long black spines. *Leaves* many, 10–12 ft., drooping; leaflets 2 ft., narrow, acuminate, pendulous, coriaceous, many-nerved, scurfy beneath; petiole armed, scurfy. *Spathes* boat-shaped, 2-keeled, outer armed, inner velvety. *Spadix* shortly produced, peduncle slightly armed, branches many, long, flexuous, upper simple; fruiting 1–2 ft., pendulous, red-purple. *Male fl.*; sepals cuspidate, keeled; petals suddenly acuminate, tip setiferous; filaments short; anthers deeply bifid below. *Fem. fl.*; sepals and petals fleshy.

2. *O. horrida*, Scheff. in *Natuurk. Tijdsch. Ned. Ind.* xxxii. 189; in *Ann. Jard. Buitenz.* i. 159; stoloniferous, leaflets subequidistant spreading, male fl. hexandrous, fruit spherical $\frac{3}{4}$ –1 in. diam. *Areca horrida*, Griff. in *Calc. Journ. Nat. Hist.* v. 465; *Palms Brit. Ind.* 158, t. 233 C; *Mart. Hist. Nat. Palm.* iii. 312.

MALAY PENINSULA, Griffith.—DISTRIB. Borneo.

Trunk 30–40 ft., armed. *Leaves* few, spreading, 14–16 ft.; leaflets 2–3 ft., very narrow, acuminate, spreading, coriaceous. *Spathes* 2 complete, acutely margined, outer 1–1½ ft., armed, inner cuspidate. *Spadix* with the stout peduncle armed below; branches 1–2 ft., pendulous, flexuous; fruiting with pendulous branches 2–3 ft. long. *Fruit* purplish black.—Griffith, from whom the above descriptions are taken, says of this allied to *A. tillgaria*, but very distinct in the spathes and fruit.

3. *O. fasciculata*, Thw. *Enum.* 328; stoloniferous, leaflets fascicled tips drooping, flowers enneandrous, fruit $\frac{1}{2}$ in. diam. Scheff. in *Ann. Jard. Buitenz.* i. 160. *Caryota horrida*, Moon Cat. *Ceyl. Pl.* 64.

CEYLON; in the Central Province, ascending to 5000 ft.

Trunk 30–40 ft. and more, 5–6 in. diam., armed. *Leaves* 18 ft.; leaflets 12–18 by 1–1½ in., lanceolate, long-acuminate, costa scaly beneath; sheath 2½ ft., armed and scurfy. *Spathes* sparingly scurfy, unarmed. *Spadix* 2 ft., unarmed, paniculately branched, dense-fld. *Male fl.* $\frac{1}{4}$ in. long. *Drupe* black-purple.

8. IGUANURA, Blume.

Slender unarmed palms. *Leaves* terminal, entire or pinnatisect, with broad acute or præmorse leaflets. *Spathes* 2, persistent, short. *Spadix* inter- or infra-foliar, branches spreading; flowers spirally disposed, 3-nate (a fem. between 2 males), or the upper on the branches males. *Male fl.* symmetric; sepals orbicular, imbricate; petals connate below, ovate or lanceolate, valvate; stamens 6 or 9, anthers dorsifixed; pistillode trigonous. *Fem. fl.* subglobose; sepals and petals orbicular; staminodes of 6 teeth; ovary ovoid or oblong, 1–3-celled; stigmas sessile; ovule solitary, parietal. *Fruit* small, oblong ovoid or elongate conical, stigmas subbasilar. *Seed* suberect, hilum lateral; albumen equable or ruminant.—Species 8–10, Malayan.

* *Spadix* interfoliar, very long and long peduncled, simple or with 2–3 long equal pendulous branches.

1. *I. geonomæformis*, Mart. *Hist. Nat. Palm.* iii. 229, 178; stem slender, leaves pinnate, leaflets 6–8 pairs obliquely acuminate or præmorse and erosely toothed, spadix furfuraceous, branches thick, fruit obovoid-oblong. *Slackia geonomæformis*, Griff. in *Calc. Journ. Nat. Hist.* v. 469; *Palms Brit. Ind.* 162, t. 234.

MALACCA, rather common in forests, Griff. (Kew distrib. 6406, 6407), on Mt. Ophir, Hallett (851).

Stem 2-4 ft. by $\frac{1}{2}$ in., annulate. *Leaves* 3-3 $\frac{1}{2}$ by 1-1 $\frac{1}{2}$ ft., linear-oblong; leaflets linear, 1 ft. by $\frac{1}{4}$ -2 in., 2- or more-keeled, terminal forked, lobes erose-dentate; petiole 1 ft., base scurfily pubescent; sheath a span long. *Spathes* subcoriaceous, lowest 2-keeled, upper conduplicate and spadix brown-pubescent. *Spadix* with a long slender erect peduncle, and 2 or more pendulous spongy spikes or branches 6-10 in. long, loosely covered with flowers; fruiting 1-1 $\frac{1}{2}$ ft. nodding; flowers inserted in pits with membranous margins. *Male fl.* in pairs; sepals oblong, striate; petals ovate-lanceolate; filaments inflexed in bud; pistillode stout, tip 3-lobed. *Fem. fl.* towards the base of the spike; sepals of the male; petals broad; ovary gibbous. *Fruit* over $\frac{1}{2}$ in. long by $\frac{1}{2}$ diam., black-purple. *Seed* erect; albumen ruminant.

2. ***I. malaccensis***, Becc. *Males*. iii. 102; stem slender, leaves pinnate, leaflets about 5 pairs, lower falcate caudate-acuminate upper broader, petiole pubescent, spadix simple filiform, finely tomentose.

MALAY PENINSULA; Selangore, *F. Keheding*; Perak, Larut, *King's Collector* (1869, 2994).

Closely allied to *I. geonomæformis*, differing in the fewer leaflets and simple not furfuraceous but finely tomentose spadix.

** *Spadix interfoliar*, long peduncled, with few subterminal short simple or forked branches or spikes.

3. ***I. Wallichiana***, Hook. f. in *Gen. Plant.* iii. 908; leaves simple or pinnatisect, fruit globosely obovoid. *Areca Wallichiana*, Mart. in *Wall. Cat.* 8600; *Hist. Nat. Palm.* iii. 178, 312; *Becc. Males*. iii. 100.

PENANG, Porter. SINGAPORE, Lobb.

Stem solitary, 2-12 ft., straight, slender. *Leaves* very variable in size, 10 in.-2 ft. long, simple and forked or more or less pinnatisect, with long narrow leaflets. *Spathes* 2, lower 2 $\frac{1}{2}$ 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 $\frac{1}{2}$ in. long by $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., red when ripe.—The following varieties are from Perak:—

Var. α *major*, Becc.; stem 10-12 ft. by 2 $\frac{1}{4}$ -3 $\frac{1}{2}$ in. diam., leaves 2-4 ft. undivided or pinnatisect, fruit about $\frac{9}{10}$ by $\frac{4}{10}$.—*King's Collector* (431, 8227, 3127).

Var. β *minor*, Becc.; stem 18-30 in., leaves about as long simple or pinnatisect, fruit rather smaller.—*King's Collector* (454, 7941, 7996, 7999).

*** *Spadix interfoliar*, very shortly peduncled.

4. ***I. brevipes***, Hook. f.; leaves pinnate, leaflets distant broadly trapezoidly cuneate or subquadrate præmorse many-nerved coarsely toothed, spathe long deeply grooved, spadix laxly paniculate, branches divaricate lax-fld.

PERAK, Larut, 3-4000 ft., *King's Collector* (2029).

Stem thicker than a swan's quill. *Leaf* 15 in., leaflets 5 pairs, 5-6 in. long by 1 $\frac{1}{2}$ -3 broad, inserted by a contracted but very broad base, upper margin subcaudate; rachis glabrous; sheath 5 in., many-ribbed. *Spadix* with the peduncle wholly included in the leaf-sheath, quite glabrous; primary branches 3-4, 3-4 in. long, sparingly again divided, rather slender, angled (when dry). *Male fl.* scattered, about $\frac{1}{10}$ in. long; sepals orbicular; petals broadly oblong, obtuse, very coriaceous; stamens 6, filaments inflexed, anthers linear-oblong; pistillode columnar, capitate.

**** *Spadix infrafoliar*, peduncle shorter than the spathe or shortly exceeding it.

5. ***I. diffusa***, Becc. *ms.*; leaves large, leaflets numerous equidistant

Iguanura.

CLXIII. PALMÆ. (Beccari & Hook. f.)

narrow, spadix with 8-10 very spreading slender branches of which the lower are twice or thrice forked, peduncle closely embraced by the spathe.

PERAK; on Gunong Tjok, *Scortechini*.

One of the largest of the genus. Leaves about 3-4 ft.; leaflets very numerous, alternate and opposite, 12-15 in. by 1-1½ in., obliquely præmorse, rachis glabrous. Spadix about 20 in., including the 10 in. peduncle, which is closely sheathed by the persistent spathe; branches 6-10 in., filiform, divaricate.—The specimen which is very imperfect may be a luxuriant state of *I. polymorpha*.

6. *I. polymorpha*, Becc. Males. iii. 189; leaves pinnatisect, leaflets trapezoid subfalcate præmorse, spadix erect, peduncle sheathed by both the spathes with 3-9 simple branches at the apex, fruit ovoid or elongate conic straight or curved.

PERAK, *Scortechini*.

Stem 3-7 ft. Leaves oblong, 14-16 by 8-10 in.; leaflets 10-14 on each side, obliquely præmorse and toothed, 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 ¾-¾ in. by ½ in. diam., others ½ by ½ in., ovoid or elliptic-ovoid.—*Scortechini* (318^b).

Var. *canina*, Becc. l. c. 190; spadix with 7-9 branches, flowers alternate subdistichous, male ovoid acute, fem. petals twice as long as the sepals, fruit ¾ by ¾ in. elongate conical curved.

7. *I. corniculata*, Becc. Males. iii. 187; leaves pinnatisect, leaflets all similar cuneately trapezoid 3-5-nerved, tip very obliquely præmorse toothed, base constricted, spadix slender undivided, peduncle closely embraced by the very slender tubular spathe, spike furfuraceous, fruit narrow elongate conical tip incurved or involute.

PERAK, alt. 3-400 ft., *Kunstler* (3131).

Stem very slender, 3-4 ft., by ¼ in. diam. or less; internodes ¾-1½ in. Leaves 10-12 by 6-8 in.; leaflets 5-6, spreading like a butterfly's wings 3½-4 by 1-1½ in., upper margin produced into a tail, 3-4-nerved, furfuraceous beneath along the folds; petiole slender, 3-4½ in., rustily furfuraceous, as is the sheath. Spadix about a foot long, including the peduncle of 3-4 in.; spike rusty scurfy; flowers subspirally disposed; males very small. Fruit granulate, ¾-¾ by ½ in.—The fruit is in shape unique in the order.

8. *I. parvula*, Becc. mss.; leaves small oblong tip forked margin undulate, spadix filiform sparingly branched, peduncle about as long as the petiole more than half embraced by the spathes.

PERAK, *Scortechini*.

Stem ½-¾ in. diam. Leaves 8-10 by 3 in.; petiole 2-2½ in.—Described from a single specimen. Possibly a very small form of *I. polymorpha*.

9. *I. bicornis*, Becc. Males. iii. 188; leaves pinnatisect, leaflets sigmoidly trapezoid, spathes deciduous, spadix erecto-patent very shortly peduncled, branches 5-8 slender diffuse, fruit oblong base narrowed tipped by 2 obtuse unequal bosses.

MALAY PENINSULA; Perak, *Scortechini* (n. 1188), at Larut, alt. 12-1300 ft.; King's Collector (6375), alt. 3-4000 ft.

Stems tufted 5-8 ft. by ½ in. diam.; internodes ½-1½ in. Leaves 12-16 by 4-6 in., leaflets 2-4 pairs, with a deeply bifid terminal; petiole 3-4 in., glabrous,

sheath as long, tubular, mouth truncate. *Spadix* 4-3 in., peduncle $\frac{3}{4}$ -1 $\frac{1}{4}$ in., branches 3-6 in., scattered, filiform; flowers minute. *Fruit* $\frac{1}{2}$ by $\frac{1}{8}$ in.

9. BENTINCKIA, Berry.

Unarmed Palms. *Leaves* terminal, equally pinnatisect. *Spathes* many, 2 lower short incomplete, upper 2-fid. *Spadix* interfoliar, branched; flowers minute, monœcious or polygamous, solitary or 3-nate with the intermediate female, clustered in spirally arranged pits on the branches; bracts forming a 2-lipped mouth to each pit; bracteoles 2. *Male fl.* subsymmetric, glumaceous, often reduced to ciliate scales; sepals oblong, obtuse, connate below, imbricate; petals longer, connate below into a stipes, valvate; stamens 6, anthers versatile; pistillode conical. *Fem. fl.* ovoid; sepals broad, obtuse, imbricate; petals longer, convolute; staminodes 6, minute. *Ovary* 3-celled, 1-ovuled; stigmas minute. *Fruit* small, subspherical; stigmas subbasilar. *Seed* pendulous from the top of the cavity, sinuately grooved or ridged; albumen equable.—Species 2.

1. **B. Coddapanna**, Berry, in *Roxb. Fl. Ind.* iii. 621; stem slender 10-20 ft., fruit subspherical. *Mart. Hist. Nat. Palm.* iii. 165, 228, t. 139; *Kunth Enum.* iii. 228; *Griff. in Calc. Journ. Nat. Hist.* v. 467; *Palms Brit. Ind.* 160; *Append.* xxvi.; *Wight in Madv. Journ. Nat. Sc.* ii. 385. *Keppleria*, *Mart. mss. ex Endl. Gen. Pl.* 25.

TRAVANCORE, Wight, &c.

A slender palm; stem 1 in. diam. or more, annulate. *Leaves* 3-4 ft.; leaflets 2 ft. or more by 1 in. broad, close together, linear, 2-keeled, keels palaceous, tip usually 2-fid; lobes 2-4 in., triangular. *Spathes* membranous, lower truncate, upper complete. *Spadix* 1-2 ft., male scarlet, fem. lilac or violet; peduncle 2-3 in.; branches few, again branched, ultimate 6-10 in.; bract at the base broad; pits on the branches 3-4-fld., flowers emerging and opening singly, the upper first. *Fruit* rather compressed, about $\frac{1}{2}$ in. diam.

2. **B. nicobarica**, Becc. in *Ann. Jard. Bot. Buitenz.* ii. 165; trunk tall 60-70 ft., fruit obovoidly oblong tip rounded. *Orania nicobarica*, *Kurz in Journ. Bot.* xiii. (1875) 331, t. 171, f. 19-25.

NICOBAR ISLANDS; Kamorta, Kurz, *E. H. Man.*

Trunk annulate, 9 in. diam. *Leaves* 5-8 ft.; leaflets $\frac{1}{2}$ -2 ft., sessile, linear, coriaceous, tip obtusely 2-lobed; petiole short and rachis glabrous. *Spadix* 1 $\frac{1}{2}$ -2 ft., decomposed, glabrous, branches and branchlets inserted in woolly grooves of the rachis; bracteoles densely villous within. *Fem. fl.*; sepals and petals subsimilar, broadly ovate, obtuse, shining. *Fruits* tristichously arranged, globose (sub-ovoid when dry), the size of a cherry. *Seed* ovoid-oblong, ventrally flat, dorsally convex rugosely ribbed; albumen equable; embryo lateral and apical.

10. WALLICHIA, Roxb.

Soboliferous palms. *Leaves* pinnatisect; leaflets linear or oblong, irregularly toothed, base cuneate, unicostate, nerves flabellate. *Spathes* very many, tubular, clothing the peduncle of the spadix, upper large cymbiform. *Spadices* interfoliar, monœcious or polygamous; males ovoid, excessively branched and dense-fld.; fem. looser-fld. *Male fl.* symmetric; calyx cylindric or cupular, membranous, truncate; corolla cylindric, deeply 3-lobed, lobes oblong, valvate; stamens 6, on the corolla-tube; filaments short, anthers large; pistillode 0. *Fem. fl.* much smaller, subglobose;

Wallichia.] CLXIII. PALMÆ. (Beccari & Hook. f.)

sepals orbicular, coriaceous, imbricate; petals triangular valvate; stamino-
 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.

1. *W. densiflora*, Mart. *Hist. Nat. Palm.* ii. 190, & *Suppl.* 315;
 leaflets oblong or linear-oblong sinuately lobed acutely toothed white
 beneath, fem. fl. crowded 2-bracteate, male corolla twice as long as the calyx,
 mouth of calyx quite entire, fem. corolla shorter than the ovary. *Kurz*
For. Fl. ii. 532; *Brandis For. Fl.* 549; *Bot. Mag.* t. 4584. *W. oblongi-*
folia, Griff. in *Calc. Journ. Nat. Hist.* v. 486; *T. Anders. in Journ. Linn.*
Soc. xi. 6. *Harina oblongifolia*, Griff. *Palms Brit. Ind.* 175, t. 237 A, B, C.
W. caryotoides, Wall. *Cat.* 8596 B.

TROPICAL HIMALAYA from Kumaon eastwards, ascending to 3000 ft. ASSAM,
 the KHASIA HILLS, and CHITTAGONG.

Stems very short or 0 (or often 8-15 ft. *Kurz*); trunk sheathed, scurfy, sheaths
 villous, resolving into strong fibres. *Leaves* 8-10 ft.; leaflets 1-2 ft., very many,
 alternate or the lower 2-4-nate, 1-costate and with many parallel nerves, bright
 green above; sheaths scurfy. *Spathes* purple. *Spadices* 12-18 in. long, branches
 of fem. very stout; flowers in many spiral series; male fl. yellow, solitary, or the
 lower in pairs with an intermediate fem.; filaments adnate to the petals; fem. fl.
 purplish; calyx very short, corolla-lobes obtuse. *Fruit* about $\frac{1}{2}$ in. long, dull
 purple.

2. *W. caryotoides*, Roxb. *Cor. Pl.* iii. t. 295; leaflets oblong or
 linear-oblong panduriformly excised and acutely toothed white beneath,
 fl. fem. distant 3-bracteate, male corolla half as long as the calyx, mouth of
 calyx 3-toothed, fem. corolla about twice as long as the ovary. *Mart.*
Hist. Nat. Palm. ii. 180, t. 136; *Wall. Cat.* 8596 A; *Griff. in Calc. Journ.*
Nat. Hist. v. 485; *Kurz For. Fl.* ii. 532; *Miq. Fl. Ind. Bat.* iii. 34.
Harina caryotoides, Ham in *Mem. Wern. Soc.* v. 317; *Griff. Palms*
Brit. Ind. 174, t. 237. *Wrightia caryotoides*, Roxb. *Hort. Beng.* 63; *Fl.*
Ind. iii. 621.

CHITTAGONG, and BURMA, in hill forests, ascending to 4000 ft.

Habit of *W. oblongifolia*, and very similar in foliage and inflorescence, but
 differing in the characters given above and in the fruit, which *Kurz* describes as
 being as large as a nutmeg, ovoid-oblong, rarely 2-seeded.—(*Roxburgh* says as
 large as a coffee bean.)

3. *W. disticha*, T. Anders. in *Journ. Linn. Soc.* xi. 6; trunk tall
 stout, leaves distichous, leaflets fascicled linear narrowed to the base præ-
 morse denticulate, male calyx cupular 3-lobed, corolla thrice as long,
 fem. corolla longer than the ovary. *W. Yomæ*, *Kurz For. Fl.* ii. 533.
Caryota mitis, *Herb. Calcutt.*

SIKKIM HIMALAYA, in tropical gorges, T. Anderson, and probably eastwards,
 PEGU; *Kurz*.

Trunk 10-15 ft. by 5-6 in. diam., naked, annulate. *Leaves* 6-10 ft., alternate
 erect; leaflets narrowing from near the truncate apex to the base and with a large
 tooth on each side about the middle, 1-2 ft., by 2-2½ in., glaucous beneath; petiole
 and sheath short, scurfy. *Male spadix* 3-4 ft., very narrow, linear in outline, with
 innumerable recurved slender crowded branches. *Fem. spadix* 6-8 ft., pendulous;
 branches stout, simple; flowers disposed in many spiral series, green. *Fruit* oblong,
 top obscurely 2-3-lobed, reddish.—*Kurz* describes the leaves as disposed in a $\frac{1}{2}$
 spiral.

11. **DIDYMOSPERMA**, *H. Wendl. & Drude.*

Small low palms. *Leaves* terminal, unequally pinnatisect; leaflets few, trapezoid, erose, uni-costate, nerves flabellate. *Spathes* many, sheathing the peduncle of the spadix. *Spadix* interfoliar, stout and simple, or slender and branched; monœcious or Dioecious; flowers rather large. *Male fl.* symmetric; calyx cupular, 3-fid, imbricate; petals coriaceous valvate; stamens 10-30, anthers linear, erect; pistillode 0. *Fem. fl.* subglobose; sepals rounded, coriaceous; petals thick, triangular, incurved, valvate; staminodes 0. *Ovary* depressed, 3-gonous, 2-3-celled, stigmas conical; ovules basilar. *Fruit* ovoid or oblong, 1-2-celled and -seeded, stigmas terminal. *Seeds* erect, oblong, plano-convex; albumen equable; embryo dorsal.—Species 6, Malayan and Indian.

1. **D. Hookeriana**, *Becc. Males.* iii. 186; stem slender, leaves small long-petioled white beneath, some oblong from a cuneate base, some entire or lobed, others pinnatisect with obovate oblong or trapezoid long-tailed leaflets shortly ansate at the base, spadix filiform.

MALAY PENINSULA; Perak, *Scortechini*, No. 229b. 136b.) *King's Collector* (n. 2446).

Stem 3-4 ft., solitary or tufted, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam. *Leaves* extremely variable, 12-30 in. long; petiole slender; sheath furfuraceous. *Spadices* about 8 in. long, sheathed with 5-6 spathes; flowers spirally disposed in clusters of 3; *male fl.* oblong, subclavate, top rounded. *Fruit* unripe, globose.

2. **D. hastata**, *Becc. Males.* iii. 99.; stem slender, leaf-sheaths scurfily hispid, leaflets 6-7 terminal trapezoid, lateral petiolulate trapezoid caudate-acuminate, base hastate and ansate, spadices filiform nodding.

MALACCA, at Selangore, *F. Keheding*. PERAK, Larut, *King's Collector* (3125).

Stem 3 ft., solitary or sparingly tufted. *Leaves* $1\frac{1}{2}$ -2 ft.; terminal leaflet $4\frac{1}{2}$ -6 in. by 1-2 in., lateral rather longer and broader, lower margin straight, anterior sinuate-toothed. *Spadix* 1 ft. long; *male fl.* $\frac{1}{2}$ in.—Habit, &c., of *D. Hookeriana*, but the leaf-sheaths are brown scurfy, as are the leaflets more or less beneath, and the latter have broadly cuneate more or less ansate bases; petiolule 1 in. and more.

3. **D. nana**, *H. Wendl. & Drude in Kerchov. Palm.* 243; leaves pinnatisect, leaflets about 5, terminal flabelliform, lateral opposite obliquely trapeziformly lanceolate acuminate not caudate irregularly lobed and toothed, pale beneath, spadices erect very stout simple or sparingly branched rustily scurfy dense-fid. *Hook. f. Bot. Mag.* t. 6836. *Wallichia nana*, *Griff. in Calc. Journ. Nat. Hist.* v. 488; *Mart. Hist. Nat. Palm.* 190, t. 315; *Miq. Fl. Ind. Bat.* iii. 34. *Harina nana*, *Griff. Palms Brit. Ind.* 176, t. 238 A, B.

ASSAM and the KHASIA HILLS, ascending to 4000 ft.

Stem 3-5 ft., clothed with rusty leaf-sheaths, petioles and spathes. *Leaves* 18 in. -2 ft.; leaflets 1-3 pairs, terminal flabellate, variously lobed, lateral 7-10 by 3-5 in., also variously lobed. *Fem. fl.* $\frac{1}{2}$ in. diam. *Fruit* $\frac{1}{2}$ in. long, oblong, white.

4. **D. gracilis**, *Hook. f.*; stem very slender leafy upwards, leaflets 6-8 lateral broadly cuneate below the middle above it triangular or 3-lobed or truncate and acutely toothed, fem. spadix slender erect 3-branched, fruit elongate ovoid obtuse base rounded, seed elliptic-oblong concavo-convex.

ASSAM; Daphla hills, Booth.

Stem 2 ft., about as thick as a duck's quill. *Leaves* 8-18 in., rachis and petiole very slender; leaflets 1-3½ in. long and broad, white beneath. *Spadix fruiting*, 8 in., sheathed below the middle with narrow long terete glabrous striate spathes; lateral branches (or spikes) 3 in., terminal 4 in. long. *Fruit* ¾ by ½ in. diam. rather curved. *Seed* ¾ in. long, equally narrowed at both obtuse ends; raphe very obscure; albumen equable.—Apparently a very distinct species, found by Mr. Booth, Mr. Nuttall's collector in Assam.

12. ARENGA, Labill.

Tall stout palms, flowering first from an upper leaf-axil, and successively from lower; trunk densely clothed above with fibrous remains of the leaf-sheaths. *Leaves* terminal, long, pinnatisect; leaflets long, linear, usually præmorse, unicostate, base 1-2-aucricled. *Spathes* many, clothing the peduncle of the spadix. *Spadices* interfoliar, large, much branched, peduncle short decurved, branches slender pendulous; male and fem. flowers usually solitary and in separate spadices, rarely 3-nate a fem. between 2 males. *Male fl.* symmetric; sepals orbicular, imbricate; petals oblong, valvate; stamens numerous, filaments short, anthers apiculate; pistillode 0. *Fem. fl.* subglobose; sepals accrescent; petals triangular, valvate; staminodes many or 0; ovary subglobose, 3-celled, stigmas conic. *Fruit* obovoidly globose, 2-3-seeded; stigmas terminal. *Seeds* compressed or plano-convex; albumen equable; embryo dorsal.—Species about 10, trop. Asia, Malaya and Australia.

1. *A. saccharifera*, Labill. in *Mem. Inst. Fr.* iv. 209; trunk tall very stout, leaflets 4-fariously fascicled linear lobed and variously toothed towards the tip, base 1-2-aucricled white beneath, male buds obtuse. *Mart. Hist. Nat. Palm.* 191, t. 108 and 161, f. 4; *Miq. Fl. Ind. Bat.* iii. 35; *Kurz For. Fl.* ii. 534; *Griff. in Calc. Journ. Nat. Hist.* v. 472; *Palms Brit. Ind.* 164, t. 135 A. *A. Griffithii*, *Seem. ex H. Wendl. in Kerchov. Palm.* 232. *Saguerus Rumphii*, *Roxb. Fl. Ind.* iii. 626. *S. saccharifer*, *Wurmb. Verh. Bat. Genootsch.* i. 350; *Blume, Rumphia*, ii. 128, t. 123-4. *Gomutus saccharifer*, *Spreng. Syst.* ii. 622. *Borassus Gomutus*, *Lour. Fl. Cochinch.* ii. 759.

ASSAM, PEGU, BURMA, and the MALAY PENINSULA.—DISTRIB. E. Asia and Malaya.

Trunk 20-40 ft. *Leaves* very many, 20-28 ft.; leaflets up to 115 on each side, 3-5 ft. long, subsessile, linear, coriaceous, costa stout, scurfy beneath; petiole scurfy. *Male spadix* 4-5 ft., simply branched, flowers oblong-clavate purple 1 in. long and less. *Fem. fl.* solitary, 1 in. diam. *Fruit* 2-2½ in. long, oblong-turbinate, base narrowed, top rounded or depressed.

2. *A. obtusifolia*, *Mart. Hist. Nat. Palm.* 191, t. 147, 148, 161; trunk tall very stout, leaflets bifarious linear narrowed and truncate 2-lobed or toothed at the tip white beneath, base 1- or ex-aucricled, male buds acute. *Miq. Fl. Ind. Bat.* iii. 36. *A. Westerhoutii*, *Griff. in Calc. Journ. Nat. Hist.* v. 474; *Palms Brit. Ind.* 166, t. 235 B, C, D; *Mart. l. c.* 192; *Miq. l. c.* 37. *Saguerus Langkab*, *Blume Rumph.* ii. 131, t. 96, 125. *Gomutus obtusifolius*, *Blume mss.*

PENANG, *Lewes*. MALAY PENINSULA, at Naning, *Westerhout*.

Very nearly allied to *A. saccharifera*, distinguished by the arrangement of the leaflets, which according to Griffith are bifarious with deflexed tips, the upper alone



auricled and only on one side, the acute male buds, and by the oblong fruit narrowed at both ends.

3. **A. Wightii**, Griff. in *Calc. Journ. Nat. Hist.* v. 475; *Palms Brit. Ind.* 167, t. 235 E; trunk short stout soboliferous, leaflets alternate crowded linear 2-auricled at the base, tip narrowed unequally 2-lobed and toothed white beneath, male buds acute.

The DECCAN PENINSULA; Coimbatore, *Wight*; Nilghiri hills, alt. 3000 ft., *Gamble*.

Trunk 3-8 ft. *Leaves* 12-28 ft.; leaflets linear-ensiform, 3-3½ ft. by 1½-2 in., margins sparingly toothed from the middle upwards; lower auricle very large, overlapping the petiole; petiole 6-8 ft. *Spadices* 4 ft., peduncle 2 ft. *Fruit* about the size of a crab-apple, globosely turbinate, broader than long.

13. **CARYOTA**, Linn.

Tall palms, soboliferous or not, flowering from the upper leaf-sheaths, and successively from lower (alternately male and fem.); trunk naked or sheathed. *Leaves* few, very large, broad, bipinnatisect; leaflets very obliquely dimidiately flabelliform, or cuneiform, præmorse or rounded at the tip, petiolules or bases swollen at the insertion. *Spathes* 3-5, incomplete, tubular. *Spadices* interfoliar, shortly peduncled, much fastigiately branched; branches slender, pendulous; flowers solitary and male, or 3-nate with the intermediate fem. *Fem. fl.* symmetric; sepals rounded, imbricate; petals linear-oblong, valvate; stamens very many, filaments very short, anthers long. *Fem. fl.* subglobose, sepals rounded, imbricate; petals rounded, valvate; ovary 3-celled, stigma 3-lobed, ovules erect. *Fruit* globose, 1-2-seeded, stigma terminal. *Seeds* erect; albumen ruminate; embryo dorsal.—Species about 10, tropical Asiatic, Malayan and Australian.

1. **C. urens**, Linn. *Fl. Zeyl.* 187; trunk stout tall not soboliferous, leaflets cuneiform very obliquely truncate acutely serrate-toothed, upper margin produced and caudate, male buds cylindric about 3 times as long as broad, stamens 40-45, fruit $\frac{3}{4}$ - $\frac{3}{4}$ in. diam., base apiculate, testa adherent. *Gærtn. fruct.* i. 20, t. 7; *Roeb. Fl. Ind.* iii. 625; *Mart. Hist. Nat. Palm.* 193, t. 107 and 108, and 162; *Griff. in Calc. Journ. Nat. Hist.* v. 479; *Palms Brit. Ind.* 160; *Thw. Enum.* 329; *Dalz. & Gibs. Bomb. Fl.* 278; *Miq. Fl. Ind. Bat.* iii. 41.—*Rheede Hort. Mal.* i. t. 11.

Throughout the HOTTER PARTS OF INDIA, from the Sikkim Himalaya and Assam southwards to Ceylon and Singapore—DISTRIB. Trop. Asia, Malaya.

Trunk 30-40 ft. 1 ft. diam., annulate. *Leaves* 18-20 by 10-12 ft., leaflets 5-6 ft., curved and drooping, pinnules 4-8 in., broadly cuneate, upper narrower, outer margin caudate; petiole very stout. *Spadix* 10-12 ft. long; spathes 1½ ft.; branches all reaching the same level; flowers 3-nate, a fem. between two males; male $\frac{1}{2}$ in. long, or more. *Fruit* reddish.

2. **C. obtusa**, Griff. in *Calc. Journ. Nat. Hist.* v. 480; *Palms Brit. Ind.* 170; glabrous, trunk tall stout not soboliferous, leaflets very obliquely cuneiform crenate, upper margin not caudate, male buds about as long as broad, stamens very many, fruit $\frac{3}{4}$ -1 in. diam., base not apiculate. *Mart. Hist. Nat. Palm.* iii. 195. *C. obtusidentata*, Griff. *Palms Brit. Ind.* 236 A, B.

UPPER ASSAM; Mishmi Mts., alt. 3-4000 ft., *Griffith*.

Habit and stature of *C. urens*, from which it differs in the more rounded and crenate apex of the leaflets, in the shorter unexpanded male flowers and slightly in the fruit.

Var. *æquatorialis*, Becc. mss.; pinnules more acute more deeply crenate or serrate, male fl. larger, stamens more than 100. ? *C. ochlandra*, *Hance in Journ. Bot.* 1879, 174.—Malay Peninsula; Perak, *Wray* (n. 1239). Malay Islands, China.

3. *C. mitis*, *Lour. Fl. Cochinch.* ii. 569; stem low soboliferous, petioles leaf-sheaths and spathes scurfily villous, leaflets very obliquely cuneiform erose and toothed, upper margin acute, spadix branches scurfy, male buds cylindric, stamens about 15–25. *Mart. Hist. Nat. Palm.* iii. 195; *Kunth Enum.* iii.; *C. sobolifera*, *Wall. Cat.* 8594; *Mart. l. c.* iii. 194, t. 107, f. 2; *Griff. in Calc. Journ. Nat. Hist.* v. 481; *Palms Brit. Ind.* 171, t. 236 C; *Miq. Fl. Ind. Bat.* iii. 41; *Kurz. For. Fl.* ii. 530. *C. urens*, *Jacq. Fragm.* 20, t. 12, f. 1. *C. nana*, *Wall. Cat.* 8595. *C. furfuracea*, *Blume in Mart. l. c.* 195; *Rumphia*, ii. 141 (*excl. var. caudata*). *C. propinqua*, *Blume in Mart. l. c.* 195, in *Rumphia l. c.* 138, t. 155 (*partim*) 162. *C. Griffithii*, *Becc. in Nuov. Giorn. Bot. Ital.* iii. 15.

BURMA; from Arracan southwards, and the MALAY PENINSULA, PENANG and the Andaman Islands.—DISTRIB. Malay Islands.

Stem 15–25 ft. by 4–5 in. diam. Leaves 4–9 ft., pinnules 4–7 in., irregularly toothed. Spadix as in *C. urens*, but much smaller, with fewer unequal scurfy branches, and much smaller flowers, the males about $\frac{1}{2}$ in. long. Stamens apiculate. *Staminodes* 3, tips glandular. Fruit $\frac{1}{2}$ in. diam., blueish black. Seed globose, testa loose.

14. *ORANIA*, Zippel.

Tall, stout, unarmed palms. Leaves terminal, equally and regularly pinnatisect; leaflets linear, tips obliquely lobed or torn, strongly uncostate; petiole stout, sheath short. Spathes 2, lower short, tubular, compressed; upper large, clavate, cleft longitudinally. Spadix interfoliar, elongate, shortly peduncled, branches slender fastigate; flowers minute, upper or all male, lower or all 3-nate, a fem. between 2 males. Male fl. subsymmetric; calyx minute, 3-fid; petals oblong or lanceolate, valvate; stamens 3 or 6, filaments subulate, anthers erect slits extrorse; pistillode conic. Fem. fl. larger, ovoid; calyx membranous, 3-fid; petals ovate, obtuse, valvate; staminodes 3 or 6; ovary 3-gonous, 3-celled, stigmas recurved; ovules pendulous. Fruit globose, 1–3-celled, stigmas basilar. Seed globose, testa spongy, adherent to the endocarp; albumen equable; embryo dorsal.—Species about 5, tropical Asiatic and Malayan.

1. *O. macrocladus*, *Mart. Hist. Nat. Palm.* iii. 186, t. 177, f. 1; flowers all 3-nate, a fem. between 2 males, more or less distichously arranged, stamens 6. *Becc. in Ann. Jard. Bot. Buitenz.* ii. 152, 164, t. 13. *Macrocladus sylvicola*, *Griff. in Calc. Journ. Nat. Hist.* v. 489; *Palms Brit. Ind.* 177, t. 239 A, B.

MALAY PENINSULA; Malacca, in the Ching forests, *Griffith.*—DISTRIB. Java.

Trunk 40 ft.; crown densely leafy, subhemispheric. Leaves 12–15 ft., subovate in outline; leaflets 2½–3 ft. by 2 in., white and scurfy beneath; petiole 5 ft. Spathes and spadix scurfy. Spadix paniculately branched, nodding, branches slender; flowers white. Fruit 1½–1¾ in. diam., smooth, whitish.

15. **NIPA**, Wurmbo.

A prostrate æstuarial gregarious palm; stem (or rootstock) branched. *Leaves* pinnatisect; leaflets lanceolate, plicate. *Spathes* many, sheathing. *Spadix* terminal, branched, erect, fruiting drooping; flowers monœcious, male in catkin-like lateral branches of the spadix, female in a globose terminal head, perianth glumaceous. *Male fl.* minute mixed with setaceous bracteoles; sepals linear, with broad truncate inflexed tips, imbricate; petals smaller; stamens 3, filaments cuneate, anthers linear basifixed; pistillode 0. *Fem. fl.* much larger; sepals 6, rudimentary, displaced; staminodes 0; carpels 3, tips free, each with an oblique stigmatic line; ovules 3, erect. *Fruit* large globose, syncarp of many obovoid hexagonal 1-celled 1-seeded carpels, with pyramidal tips and infra-apical stigmas, pericarp fleshy and fibrous, endocarp spongy and flowery. *Seed* erect, grooved on one side, testa coriaceous viscid within, and adherent to the endocarp, hilum broad; albumen equable, hollow; embryo basilar, obconic.

1. **N. fruticans**, Wurmbo. in *Verh. Bat. Genootsch.* i. 349; ex *Blume Rumph.* ii. 72; iii. 164, 165; *Mart. Hist. Nat. Palm.* iii. 305, t. 208; *Lam. Illustr.* t. 897; *Labill. in Mem. Mus. Par. v.* t. 21, 22; *Gaud. Voy. Bonite*, t. 67; *Kunth Enum.* iii. 110, 589; *Miq. Fl. Ind. Bat.* iii. 150; *Griff. Notul.* iii. 168; *Is. Pl. Asiat.* 244; *Roxb. Fl. Ind.* iii. 650; *Thw. Enum.* 327; *Kurz. For. Fl.* ii. 541.

From the SUNDERBUNDS, southwards to the MALAY PENINSULA. CEYLON.—DISTRIB. Malay Archip. and Australia.

Trunk or rootstock very stout. *Leaves* 15–30 ft.; leaflets 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 diœcious 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, uncinat; ovules erect. *Fruit* oblong, terete, 1-seeded, stigma terminal, pericarp fleshy, endocarp membranous. *Seed* oblong, ventrally grooved; albumen equable or sub-rotate, embryo dorsal or subbasilar.—Species 10 or 11, African and Asiatic.

The following attempt at diagnosing the Indian species of *Phoenix* is tentative, and awaits much further knowledge of the living plants before it can be accepted as trustworthy. The true Date, *P. dactylifera*, has been introduced into Sindh and N.W. India.—J. D. H.

* Embryo ventral.

† Stem tall, (or short in *P. zeylanica*).

1. **P. sylvestris**, Roxb. Hort. Beng. 73; Fl. Ind. iii. 787; trunk solitary stout, petiole spinous, leaflets 1-2 ft. fascicled 2-4-farious rigid glaucous green, male spadix 2-3 ft., fruit 1-1½ in. long, terete. Mart. Hist. Nat. Palm. iii. 276 (excl. syn. Linn. & Kaempf.) 326, t. 136. Kunth Enum. iii. 255; Wall. Cat. 8602; Griff. in Calc. Journ. Nat. Hist. v. 350; Palms Brit. 141, t. 228 A; ? Dalz. & Gibs. Bomb. Fl. 278; Brand. For. Fl. 554; Kurz, For. Fl. ii. 535; Becc. Males. iii. 347, 364, t. 43, f. 3. Elate sylvestris, Linn. Sp. Pl. 1189, in part. Katou Indel, Ham. in Trans. Linn. Soc. xv. 86.—Rheede Hort. Mal. iii. t. 22, 25.

Cultivated throughout the plains of INDIA and BURMA. Wild in the Indus basin, Aitchison.

Trunk 25-40 ft., clothed with the persistent bases of petioles. Leaves 10-15 ft., quite glabrous. Spathe 12-16 in., scurfy, petiole short. Spadices erect, fruiting inclined with spreading branches; branches of male filiform; male fl. ¼-½ in. long. Fruiting peduncle short, 6 in. or more. Fruit orange yellow, seed rounded at both ends, pale brown.—Very near *P. dactylifera* and possibly the origin of that plant, of which the leaflets point more forward and are of a brighter green, and the seeds are acute at both ends, but most variable in this respect and often imperfect. The Bombay Flora is cited above with doubt, as its authors imply that the leaflets are not fascicled. They say "Roxburgh says the leaflets are fascicled, this is surely a mistake." They mention another species as growing in the Hewra Garden, and brought from the Ghats, with a stem 6-8 ft. high, and leaves more slender and delicate than *sylvestris* and *acaulis*. The *Elate sylvestris* of Linnæus includes this and a Ceylon palm (see *P. zeylanica*).—Griffith observes that Rheede's figure represents the fruit as very much smaller and of a different shape from that of the Bengal plant. The whole subject wants a careful study.

2. **P. zeylanica**, Trimen in Journ. Bot. 1885, 267; Syst. Cat. Zeyl. Fl. 96; stem 14 ft. or less, leaflets subequidistant quadrifarious, bright green rigid, fruiting spadix with long slender spreading branches, fruit scarlet then dark purple. *P. zeylanica*, Hort; Hook. f. in Kew Report, 1882, 63. *P. sylvestris*, Thwaites Enum. 329. *P. pusilla*, Gertn. Fruct. i. 24, t. 9; Mart. Hist. Nat. Palm. iii. 273, 321, t. 136 (partly as to descr., and excl. figs. x, xi, in t. W., and 1-15 in t. 124). Elate sylvestris, Linn. Sp. Pl. 1189 (the Ceylon plant only).

CEYLON; in shady woods.

Stem 8-20 ft., rarely much shorter. Leaves rather short; leaflets very many, not fascicled, 7-10 in., pungent, spreading at right angles. Fruit ½ in. or rather more, ¼ in. diam. Seed nearly as long, with the groove dilating into a canal of various forms.—(Trimen's appropriate name should replace Gærtner's misleading one, even if Gærtner had been right in assuming his plant to be the "*Palma dactylifera aculeata minima*" of Plum. Gen. Amer. 3, which he cites doubtfully as a synonym, and which is an American plant.—J. D. H.)

3. **P. rupicola**, T. Anders. in Journ. Linn. Soc. xi. 13; trunk solitary slender naked, leaflets 1½ ft. bifarious and not fascicled flaccid bright green, fem. spadix 3-4 ft. long peduncled, fruit ¾ in. long. Becc. Males. iii. 348, 395. *P. Andersoni*, Cat. Hort. Calcut. No. 119 (1886-7), p. 29?; Gard. Chron. 1877, ii. 45, fig. 4.—Phœnicoidea, Griff. Journals, 46.

SIKKIM HIMALAYA, alt. 400-1400 ft., Anderson. ASSAM and the MISHMI HILLS, Griffith.

Trunk 15-20 ft. by 8 in. diam. Leaves 10 ft., quite glabrous; petiole compressed. Spadices elongated, much compressed, females with a few fascicled spikes on the acute margins near the apex; spathe 1 ft. long. Fruit oblong, shining,



yellow. Seed $\frac{1}{2}$ – $\frac{3}{4}$ 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 subglaucous, spathe 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; *Kunth Enum.* iii. 257; *Griff. in Calc. Journ. Nat. Hist.* v. 345; *Palms Brit. Ind.* 137, var. *melanocarpa*, *ll. cc.* 346, 138, t. 227; *Mart. Hist. Nat. Palm.* iii. 274, 321; *Dalz. & Gibs. Bomb. Fl.* 278; *Brandis, For. Fl.* 555; *Becc. Males.* 348, 397, t. 44, iv. f. 51–57; *Wall. Cat.* 8602 C.

NORTHERN and CENTRAL INDIA; from Kumaon eastwards to the KHASIA HILLS and BURMA.

Stem 6–10 in. diam., densely clothed with sheaths and bases of petioles. Leaves 2–6 ft.; pinnules $\frac{1}{2}$ – $1\frac{1}{2}$ ft., very rigid; marginal nerve very strong; petiole 1 ft. or more with many spines. Spadix 6–10 in., compressed, rather longer than the lanceolate obtuse spathe, branches very stout; male fl. $\frac{1}{4}$ – $\frac{1}{2}$ in. long. Fruit elliptic-oblong, mucronate, bright red to blue black. Seed $\frac{1}{4}$ – $\frac{1}{2}$ in. long, groove broad.

5. *P. farinifera*, Roxb. *Cor. Pl.* i. 55, t. 74; *Hort. Beng.* 73; *Fl. Ind.* iii. 785; stem very short, leaflets subopposite 4-farious ensiform rigid pungent dark green, fruiting spadix 8–12 in., branches spreading, drupe small black. *Mart. Hist. Nat. Palm.* iii. 274 (excl. syn. *pusilla*); *Griff. in Calc. Journ. Nat. Hist.* v. 348; *Palms Brit. Ind.* 140 (excl. syn.); *Brand. For. Fl.* 556; *Stevens. in Proc. Agric. Hort. Soc. Madras, N.S.* iv. (1886) 346. ♀ *P. pusilla*, *Trim. in Journ. Linn. Soc.* xxiii. 173; *Becc. Males.* 349, 402, t. 44, f. 28–37.

COROMANDEL coast, not far from the sea. CEYLON, in the north part of the island.

Shrubby; stem at most 4 ft., thickly clothed with old leaf sheaths. Petiole with one or more pairs of spines. 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. Stevenson observes that the foliage is so spinous that it is impossible to walk through clumps of this species.

6. *P. humilis*, Royle *Ill.* 394, 397, 399; stems short tufted (and bulbiform?) rarely elongate, leaves subglaucous, leaflets scattered interruptedly fasciated, fruiting spadix long-peduncled, branches spreading rather slender, fruit oblong, pericarp thin. *Becc. Males.* iii. 347, 373.

Hilly districts of INDIA; from Kumaon eastwards to Burma, and southwards to Malabar.—DISTRIB. China, Cochin China.

Neither the published description nor available collections suffices to distinguish this satisfactorily by habit and foliage from *P. acaulis*, though it is doubtless a different species, and easily recognized when in flower and fruit. According to Royle (who gives no description) both inhabit Kumaon, as both do the Khasia hills. The following forms are referred to it by Beccari, besides the var. ϵ , *P. Hanceana*, of China, and his remarkable *Parusnath* var. γ , *robusta*, which I discovered in 1848, and which cannot, I think, be included.—J. D. H.

Var. *a*, *typica*, Becc. l.c. 347, 379, t. 44, and ii. f. 22-24; stem short or moderately long, leaflets elongate pale green in usually remote fascicles, fruiting peduncle usually very long, fruit rather long, groove of seed very short. *P. humilis*, Royle l.c. *P. Ouseleyana*, Griff. in Calc. Journ. Nat. Hist. v. 347; *Palms Brit. Ind.* 139. *P. sylvestris*?, Wall. Cat. 8602 B.—Outer Himalaya, alt. 1-5000 ft., from Kumaon eastwards. Assam (Jenkins), the Khasia hills and Central India; at Chota Nagpore, Cal. Ouseley.—Griffith describes *P. Ouseleyana*, from an Assam specimen, as having the ovoid bulbous stem of *P. acaulis*, a foot long by 6 in. diam., leaves 2½-3 ft., leaflets very narrow indeed and strongly conduplicate 1 ft. long by (owing to the conduplication) ¼ in. broad, lower spinescent, male spadix 1 ft. rather longer than the spathe, fem. spadix 2-2½ ft. much longer than its spathe with few terminal long flexuose spikes, male fl. ¼ in. long (in Sikkim specimen). The seeds examined are from Sikkim, ½-¾ in. long, with a broad groove.

Var. *β*, *Lourierii*, Becc. l.c. 348, 379, t. 44, ii. f. 16, 17; stem short or very short, leaflets subglaucous often approximate mostly falciform, fruiting peduncle elongate, fruit ovoid. *P. Loureirii*, Kunth Enum. iii. 257. *P. pusilla*, Lour. Fl. Cochinch. 614 (non. Gærtn.). *P. Roebelinii*, O'Brien, in Gard. Chron. 1889, ii. 475, 758, fig. 68.—Assam, the Khasia Hills, Burma, Munnipore, Cochin China.

Var. *δ*, *pedunculata*, Becc. l.c. 379, 387, t. 44, f. 13-15, 18-21, 25-27; stem short, pinnæ subglaucous more or less fascicled, spathe 8 in. long, margin fringed, fruiting peduncle very long, fruit small oblong-ovoid black, groove of seed usually dilating into a canal. *P. pedunculata*, *Palms Brit. Ind.* 139. *P. acaulis*, Miq. Pl. Hohen. Nilg. No. 1243.—Western Ghats, from the Concan southwards, ascending to about 6000 ft. on the Nilghiri hills, Wight, &c.—Griffith describes this as soboliferous, with leaves 4-5 ft., leaflets 1 ft., petiole bearing solitary or fascicled spines, male spadix about a span long, fem. a little longer, with a very long fruiting peduncle, fruit ½-¾ in. by ¼-½ in. diam.—Mr. J. Steavenson (in Journ. Agric. Hort. Soc. Madras, N.S. (1866), 337), observes that this is a graceful pale green palm, with the stem never more than a foot or so high. The seeds described above are from Nilghiri specimens and are ½-¾ in. long. Specimens, presumably of this var., sent by Mr. Talbot from N. Canara, have spathes 8 in. long, with a deep brown fringe of matted woolly hairs; fruit black; seeds ½-¾ in. long groove narrow hardly dilated within.

** Embryo basilar.

7. *P. paludosa*, Roeb. Hort. Beng. 75; Fl. Ind. 789; gregarious, subarborescent, leaflets opposite and alternate bifarious ensiform with filiform tips whitish or farinose beneath, branches of spadix spreading, fruit ovoid black. Mart. Hist. Nat. Palm. iii. 272, 320, t. 136; Kunth Enum. iii. 256; Wall. Cat. 8603; Griff. in Calc. Journ. Nat. Hist. v. 353; *Palms Brit. Ind.* 144, t. 229 A, B; Kurz in Journ. As. Soc. Beng. xliii. ii. 202; For. Fl. ii. 536; Brandis, For. Fl. 556; Gamble, Man. Ind. Timb. 419. *P. siamensis*, Miq. Palm. Archip. Ind. 14.

Aestuarial shores from BENGAL to BURMA and the ANDAMAN ISLANDS—DISTRIB. Siam, Cochin China.

Trunks 8-25 ft., often inclined, soboliferous, annulate, 12-18 in. diam. Leaves 8-10 ft., leaflets 1-2 ft.; petiole 3-5 ft., slender, scurfy, with many long spines, sheath fibrous. Male spadix with its peduncle 1½ ft., compressed; spathe as long, scurfy; fem. spathe shorter; male fl. ¼ in. long; fem. subglobose with 6 staminodes. Fruit ½ in. long, mucronate, black purple when fully ripe.

IMPERFECTLY KNOWN SPECIES.

8. *P. robusta*, Hook. f.; trunk 15-20 ft. as thick as a man's body closely clothed and appearing tessellated from the sheaths of the fallen leaves, leaves about 3 ft. long, leaflets fascicled quadrifarious strict,

strongly conduplicate, fruiting peduncle 2 ft. *P. humilis*, var. *robusta*, Becc. Males. 348, 384.

BEHAR; on Parusnath, alt. 4000 ft., *J. D. H.*, &c.

A very remarkable species from the great bulk of the trunks, and their tessellated appearance, due to the comparatively small size of the appressed old leaf-sheaths, of which, judging from excellent photographs procured for me by Mr. Clarke, there must be very many in a plane cutting the diameter of the trunk; they give to the trunk the appearance of a *Cycas*. The figure of *P. cycadifolia*, Regel, Gartenfl. 1879, 131, t. 974, a plant referred to *dactylifera*, strongly resembles *robusta* in the bulk and marking of the trunk.

17. CORYPHA.

Tall stout unarmed palms, dying after once flowering and fruiting. Leaves very large, orbicular or lunate, flabellately multifid; petiole spinous. Spadix very large, terminal, erect, paniculate; spathes many, tubular. Flowers small, bisexual. Calyx cupular, 3-fid. Petals 3, connate below in a stipes, ovate, acute, imbricate or subvalvate. Stamens 6, filaments subulate, anthers dorsifixed. Ovary 3-lobed, 3-celled; style short, subulate, stigma minute. Fruit of 1-3 globose fleshy drupes, styles basilar. Seed erect, globose or oblong; albumen equable; embryo spiral. —Species about 6, tropical Asiatic.

1. *C. elata*, Roxb. Fl. Ind. ii. 176; trunk spirally ridged, leaves lunate, petiole with black margins and curved spines, panicle rounded ovoid, branches spreading, drupe about 1 in. diam. stipitate. Mart. Hist. Nat. Palm. 233; Kunth Enum. iii. 236. Griff. in Calc. Journ. Nat. Hist. v. 314; Palms Brit. Ind. 112, t. 220 D. C. Gebanga, Kurz For. Fl. ii. 525, an *Blume*?

BENGAL and BURMA.

Trunk straight, 60-70 ft. high by 2 ft. diam. Leaves 8-10 ft. diam., 80-100-fid to about the middle; lobes ensiform, obtuse or 2-fid; petioles 6-12 ft., spirally arranged, auricled. Spadix about $\frac{1}{2}$ the height of the trunk, much narrower in span than the foliage, supradecompose; spathes many. Flowers in scattered fascicles on the rather stout spreading branchlets of the spadix; calyx 3-toothed, petals reflexed; ovary suddenly contracted into the short style. Drupe very shortly stipitate, olive 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.

2. *C. umbraculifera*, Linn. Sp. Pl. Ed. ii. 1657; trunk annulate, leaves sublunate or circular palmately pinnatifid conduplicate above the middle, panicle pyramidal, primary branches piercing the spathes, drupes $1\frac{1}{2}$ in. diam. Gærtn. Fruct. i. 18, t. 7 (seed inverted); Kunth Enum. iii. 236; Roxb. Fl. Ind. ii. 177; Mart. Hist. Nat. Palm. iii. 232, t. 108, 127 (partim); Griff. in Calc. Journ. Nat. Hist. v. 319; Palms Brit. Ind. 116. Thw. Enum. 329; Dalz. & Gibs. Bomb. Fl. Suppl. 94; Kurz For. Fl. ii. 525; Brand. For. Fl. 549; Wall. Cat. 8615. —Rheede Hort. Mal. iii. t. 1-12.

MALABAR COAST and CEYLON.

Trunk 60-80 ft. diam. Leaves 6 ft. long by 13 broad, 80-100-fid to about the middle, segments obtusely 2-fid; petiole 7 ft., spines often in pairs. Spadix attaining 20 ft., pyramidal, branches spreading. Calyx broadly 3-lobed. Ovary suddenly contracted into the style. Drupe shortly stipitate.

3. *C. Talliera*, Roxb. Cor. Pl. iii. 251, t. 255, 256; Fl. Ind. ii. 174;

Corypha.]

CLXIII. PALMÆ. (Beccari & Hook. f.)

trunk obsoletely annulate, leaves subrotund complicate above the middle subglaucous, basal lobes overlapping, panicle pyramidal, branches axillary to the spathes spreading, secondary forked, drupes $1\frac{1}{2}$ in. diam. *Kunth Enum.* iii. 236; *Mart. Nat. Hist. Palm.* iii. 231; *Griff. in Calc. Journ. Nat. Hist.* v. 317; *Palms Brit. Ind.* 114, t. 220 E, F, *Wall. Cat.* 8616. *Talliera bengalensis Spreng. Syst.* ii. 18. *T. Tali, Mart. in Roem. & Sch. Syst.* vii. 1306.

BENGAL, Roxburgh.

Trunk about 30 ft., dark brown, rather rough. Leaves 6 ft. long by 15 broad, 90-100-fid, lobes deeper and broader than in *umbraculifera*, the central 3-3 $\frac{1}{2}$ ft.; petiole 5-10 ft., not spirally arranged, bicauricled, 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 ISLANDS, Kurz.

IMPERFECTLY KNOWN SPECIES.

5. *C. MARTIANA*, Becc. mss.; panicle hemispherical, branchlets pendulous, petiole armed with small strong black spines, calyx broadly 3-lobed, ovary conico-ovoid narrowed into the short style, drupe on a stipes $\frac{1}{6}$ in. long.

BURMA; Mergui? (*Hort. Calcutt.*).

6. *C. UMBRACULIFERA*, Linn.; *Wall. Cat.* 8615; branchlets of panicle about 2 ft., as in *C. Talliera*, calyx distinctly 3-lobed, ovary gradually narrowed into a short style.—*Hort. Carey* 1828, *Wallich*.

18. **NANNORHOPS**, H. Wendl.

A gregarious tufted low-growing glabrous palm, with prostrate branching robust rhizomes or stems. Leaves cuneately flabellate, rigid, plicate, split into curved 2-fid segments; petiole short. *Spadix* interfoliar, much branched; spathes tubular, sheathing, spathelets ochreate; flowers polygamous. *Calyx* tubular, membranous, unequally 3-lobed. *Corolla* 3-partite, segments valvate. *Stamens* in hermaph. fl. 6, in male about 9. *Ovary* trigonous; style short, stigma 3-toothed; ovules basilar. *Drupe* small, globose or oblong, 1-seeded, style basilar. *Seed* free, erect, ventrally hollowed; hilum small, albumen equable; embryo dorsal or subbasilar.

1. *N. Ritchieana*, H. Wendl. in *Bot. Zeit.* 1879, 148; *Aitchis. in Journ. Linn. Soc.* xix. 140, 141 and 187, t. 26. *Chamærops Ritchieana*, Griff. in *Calc. Journ. Nat. Hist.* v. 342; *Palms Brit. Ind.* 135; *Brand. For. Fl.* 547; *Gard. Chron.* 1886, 652, fig. 128, 129; *Mart. Hist. Nat. Palm.* iii. 252.

SINDH, and the WESTERN PANJAB; on the Salt Range and at Attok, Aitchison.—DISTRIB. 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 interposed fibres; petiole 6-12 in.; margins serrulate. *Spadix* pyramidal, 2-3 ft., branches ascending and recurved, branchlets slender; flowers in pairs within a membranous spathelets, 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. *Drupe* 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 $\frac{1}{2}$ – $\frac{3}{4}$ in. long.

1. ***L. peltata***, Roxb. *Fl. Ind.* ii. 179; leaf orbicular 12–30-partite, petiole armed throughout with strong curved spines, spadix with many superposed branches tomentose and flowers tomentose. *Ham. in Mem. Wern. Soc.* v. 313; *Griff. in Calc. Journ. Nat. Hist.* v. 325; *Palms Brit. Ind.* 120, t. 222. *Mart. Hist. Nat. Palm.* 234, t. 162; *Kunth Enum.* iii. 238; *Wall. Cat.* 8617; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 204; *For. Fl.* ii. 527; *T. Anders. in Journ. Linn. Soc.* xi. 13; *Gard. Chron.* 1872, 1657, fig. 350.

SIKKIM HIMALAYA, ASSAM, the KHASIA HILLS, SILHET, BURMA and the ANDAMAN ISLANDS.

Stems 8–15 ft., usually gregarious. *Leaves* 3–5 ft. diam., segments variously connate, many-toothed at the apex, teeth $\frac{1}{2}$ –2 in.; very variable in length and breadth, obtusely 2-fid; petiole 3–4 ft., stout. *Spathes* tubular, 6–12 in. long by $\frac{1}{2}$ – $\frac{3}{4}$ in. broad, mouth irregularly toothed or lobed. *Spikes* of tall stout spadix distant, 6–10 in., pendulous, fulvous-tomentose; flowers stipitate. *Calyx* campanulate, silkily pubescent, shortly lobed. *Petals* $\frac{1}{4}$ – $\frac{1}{2}$ in. long, lanceolate, very coriaceous. *Fruit* $\frac{1}{2}$ in. long, ellipsoid, narrowed equally at both ends, orange-colrd. *Seed* with the intruded hilar process dilated within.

B. Flowers much less than $\frac{1}{2}$ in. long.

I: Spathes tubular, with entire or lacerate mouths.

* Spadix with 8–10 superposed branched inflorescences arising from special spathes.

2. ***L. paludosa***, *Griff. in Calc. Journ. Nat. Hist.* v. 233; *Palms Brit. Ind.* 118, t. 221, A, B, C; leaves flabelliform or orbicular 7–9-partite, lateral segments deeply acutely 3–4-lobed, the rest truncately 4–8-lobed, petiole unarmed above, flowers minute glabrous, petals very short. *Becc. Males.* iii. 74.

MALACCA; Griffith. PERAK, *Scortechini*, *King's Collector*, 7339, 8534.—
DISTRIB. Siam.

Stem 4–10 ft. 3–9 in. diam., smooth. *Leaves* 3 ft. diam.; petiole 1–2 ft., spines few short, recurved; sheaths very fibrous. *Spathes* $\frac{3}{4}$ in. broad, mouths lacerate. *Spadix* very stout; branches 4–8 in., spreading and recurved; flowers sessile. *Calyx* cup-shaped, $\frac{1}{10}$ in. broad. *Petals* ovate. *Fruit* spherical, $\frac{1}{4}$ 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.

3. ***L. longipes***, *Griff. in Calc. Journ. Nat. Hist.* v. 330; *Palms Brit. Ind.* 125, t. 224 A, B; stem very short, leaves orbicular about 20-partite, segments cuneate crenate lateral obliquely truncate terminal about 11-toothed, crenatures 2-fid crenulate, petiole shortly armed, spathes short broad, spadices much shorter than the petioles, branches spreading and flowers glabrous or pubescent, calyx cylindric, base truncate, petals cordate-lanceolate, ovary villous. *Kurz in Journ. As. Soc. Beng.* xliii. 204; *For.* Fl. ii. 528.

TENASSERIM; forests in Mergui. MALACCA, *Griffith*, *Kurz*.

Leaves 3–4 ft. diam.; petiole 4–5 ft., trigonous, deeply channelled above, glabrous; spines very variable in size and number, but never long. *Spathes* 3–6 in. long by $\frac{1}{2}$ in. broad, compressed, deeply lacerate at the mouth. *Spadix* stout and flowers sparsely or sometimes densely pubescent; branches stout, curved and spreading; flowers sessile. *Calyx* shortly lobed, lobes 2-fid. *Petals* very short. *Ovary* villous. *Fruit* seated on the pedicel-like perianth.—The cylindric calyx with a broad truncate base is a good character.

** Spadix with 3-6 digitately branched or forked inflorescences.

† Branches of spadix and flowers pubescent or scurfy.

4. ***L. spinosa***, *Wurm. in Verh. Bot. Genootsch.* ii. 469; leaves orbicular-reniform sub 18-partite, lateral segments obliquely premorse 3-4-lobed or 2-partite, median 10-11-lobed, petiole armed throughout, spadix with many finely pubescent dense-fld. spikes and flowers, fruiting calyx campanulate, petals very small, ovary glabrous, fruit obovoid. *Roeb. Fl. Ind.* ii. 181 P (*excl. syn. Rumph.*); *Griff. in Calc. Journ. Nat. Hist.* v. 321; *Palms Brit. Ind.* 119; *Blume Rumph.* ii. 39, t. 82, 88; *Mart. Hist. Nat. Palm.* iii. 235, 318, t. 135, l. 2; *Miq. Fl. Ind. Bat.* iii. 53; *Suppl.* 254. *Becc. Males.* iii. 74. *L. paludosa*, *Kurz in Journ. As. Soc. Beng.* xliii. 528; *For. Fl.* ii. 528. *L. ramosa*, *Bl. in Schult. Syst.* vii. 1303; *Rumphia*, ii. 39. *L. horrida*, *Blume Rumph.* ii. 41, t. 89, f. 1; *Mart. l. c.* 237, 318.

MALACCA, *Griffith*. ANDAMAN ISLANDS, *Kurz*, *Man.*—**DISTRIB.** Malay Islands.

Stems 8–10 ft., stout, 2–4 in. diam., densely tufted, rough with scars of fallen leaves. *Leaves* 4 ft. diam.; petiole obtusely trigonous, spines stout curved; ligule 1–1½ in., scarious. *Spathes* very long, scurfy, $\frac{3}{4}$ in. diam., mouths lacerate. *Spadix* rather longer than the leaves; branches 7–10, adnate to the rachis up to the mouth of the spathes; lower compound, spreading, generally secund; flowers 2–3-nate. *Calyx* lobed to the middle. *Petals* broadly lanceolate, acuminate. *Fruit* obovoid, $\frac{1}{2}$ 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., $1\frac{1}{4}$ diam. Leaves about 3 ft. diam.; petiole 5-6 ft., slender. Spathes narrow, 4-6 in. long by $\frac{1}{2}$ in. broad, subfurfuraceous; lower acutely keeled, mouth shortly lacerate. Spadix $2\frac{1}{2}$ -3 ft., branches spreading and curved or flexuous; flowers inserted in small tubercles which (in the dried state) are sunk in the lobulate base of the calyx. Staminal cup deeply lobed. Fruit $\frac{1}{2}$ 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 staminal cup deeply divided into large lobes.

6. *L. triphylla*, Griff. in *Calc. Journ. Nat. Hist.* v. 352; *Palms Brit. Ind.* 126, t. 225; stem very short, leaves few flabelliform 3-9-partite, segments broadly crenate, median narrowed into a petiolule, petiole very long and slender sparingly armed with small spines, spathes very slender, spadix short slender, branches few slender few-fld. and flowers puberulous, calyx turbinate, petals minute, fruit pisiform.

MALACCA; forests Ayer Punnus, *Griffith*. PERAK, *King's Collector* (2860, 3007).

Stem 3-4 in. Leaves with segments 8-10 in. long, of very various breadth, the tips of the central crenate with very short rounded notched lobes, the lateral obliquely premorse and notched; petiole 2 ft., not $\frac{1}{2}$ in. broad; spines $\frac{1}{2}$ in. Spathes $1\frac{1}{2}$ -2 in. long by $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., mouth split. Spadix a foot long, very slender, branches short, flowers $\frac{1}{10}$ in. long, scattered, subsessile. Petals minute, acute. Seed with a curved internal process.

7. *L. ferruginea*, Becc. mss.; leaves orbicular 3-7-partite, segments broadly crenate, the central subpetiolulate, petiole very long armed almost throughout furfuraceous or glabrate, spathes large broad flattened furfuraceous, spadix and its branches very stout thickly furfuraceous tomentose, flowers sessile, calyx cupular, petals very small.

SINGAPORE, *Gaudichaud*, *Lobb*. PERAK, at Sunki, 100-800 ft., *King's Collector* (3041).

Leaves 3 ft. diam., young furfuraceous towards the base below, segments merely notched as in *L. triphylla*; petiole 3-4 ft. with concave face and sides, and rounded back, young villously furfuraceous along the margin between the short stout spines. Spathes 4-6 in. long by $1\frac{1}{2}$ -2 in. broad, compressed, 2-keeled, mouth lacerate. Spadix very stout, with stout rusty-tomentose branches 6-8 in. long; flowers sessile, $\frac{1}{10}$ in. diam., rusty pubescent. Calyx very short, lobes rounded. Fruit $\frac{1}{2}$ 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*, *Hullott* (852). PERAK; on Gunung Batu Patch, alt. 3-4000 ft., *King's Collector* (8148); *Scortechini* (319^b, 593^b).

Stem 3-4 ft., 1-1½ in. diam. *Leaves* 2-3 ft. diam.; petiole 4-5 ft., plano-convex. *Spathes* 3-6 in. narrow, cylindric, the lower a little compressed, mouth oblique bifid, tips quite entire. *Spadix* 4 ft. (in King's specimens), perfectly glabrous throughout, rachis quite smooth, furrowed when dry; branches 4-6 in., divaricate; flowers subsessile. *Calyx* obscurely 3-lobed. *Petals* twice as long, acuminate. *Young fruit* ellipsoid, narrowed at both ends, keeled, ½ in. long, stipitate by the calyx tube and spreading petals, tipped by the remains of the abortive carpels.

II. *Spathes* compressed, split on one side (tubular in *L. Kingii*).

* *Spadix* with 2 or more superposed simple or branched inflorescences.

9. ***L. modesta***, Becc. *Males*. iii. 195; stem elongate, leaves 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, 1983, 2420, 3243).

Stem 2-10 ft. *Leaves* palmately multifid; segments 2-3 nerved; petiole 3-4 ft., spines short recurved. *Spathes* 4-6 long by ½ in. broad, flat, glabrescent. *Spadix* 16-30 in.; branches spreading; flowers seated on small tubercles; calyx campanulate, lobes very short tipped with hairs; corolla rather longer; styles subulate. *Fruit* globose obovoid, about ½ in. long, pedicelled by the calyx.—Difficult to distinguish from *acutifida*.

10. ***L. Kunstleri***, Becc.; stem robust, leaves long-petioled, mid-segment not petiolulate, petiole armed at the base, spathe much compressed furfuraceous mouth not lacerate, branches of spadix very scurfy and rusty hairy, flowers pedicelled pubescent.

PERAK; on Ulu Bubong, *Kunstler* (10,205).

Stem 4 ft. by 4-5 in. diam. *Calyx* campanulate, base narrowed, pubescent; petals rather longer.—Only a solitary imperfect specimen seen, well characterized by the pedicelled flowers. Allied to *acutifida*, differing in the robust stem, much broader leaf-segments, and longer floral pedicels.

11. ***L. acutifida***, Mart. *Hist. Nat. Palm.* iii. 236, t. 135, f. 3, 4 (excl. Syn. Roxb.); stem slender, leaves many long-petioled, segments 15-20 very narrow terminating in long narrow bifid lobes, median petiolulate, petiole very slender shortly armed and furfuraceous towards the base, spadix spathes and flowers furfuraceous velvety, flowers seated on a rather prominent pedicel, calyx obconic. *Griff. in Calc. Journ. Nat. Hist.* v. 327; *Palms Brit. Ind.* 122, t. 222 A, B; *Wall. Cat.* 8618.

PENANG, *Lewis, Oxley*. SINGAPORE, *Lobb*.

Stem 15-20 ft., 1-2 in. diam. *Leaves* 1-2 ft. diam., segments 1-3-costate; terminal lobes ½-1 in.; petiole 18-48 in.; ligule elongate. *Spathes* paleaceous scurfy, 2-lobed, 4-6 in. long by ½ in. diam., silkily or silverily paleaceous. *Spadix* 12-18 in.; spikes 3-5 in., simple or forked, adnate to the rachis, lower flowers 2-nate, upper solitary; calyx obtusely 3-fid, pubescent; petals striate. *Ovary* obovoid, smooth; style filiform. *Fruit* ¾ in. diam., stipitate by the calyx. *Seed* pisiform.

12. ***L. pusilla***, Becc. *Males*. iii. 194; stemless, leaves palmately 9-fid, segments very narrow, median 3-fid on 3-partite shortly and obtusely toothed, lateral with very oblique tips having several short and one long



tooth, mouth of spathe lacerate, spadix nodding compressed, branches 3 simple subtomentose, flowers sessile, calyx campanulate pubescent, fruit very small pisiform.

PERAK; at Semhi, *King's Collector* (3028).

Closely allied to *L. triphylla*, but leaf-segments more numerous, mid-segment not petiolulate, and branches of the spadix simple. *Fruit* (dried) $\frac{1}{4}$ in. diam.—I have seen no flowers. *J. D. H.*

**** Spadix bearing a solitary simple or digitately branched inflorescence.**

13. **L. Scortechini**, *Becc. Males.* iii. 192; leaves semicircular sub 17-partite, segments with long 2-fid teeth, mid-segments 9 lateral 1-3-nerved, spathes 2 acutely 2-keeled inflated above acute, spadix and flowers fulvously pubescent, branches 4-5 filiform digitately branched, calyx obconico-campanulate truncate, petals pubescent striate, staminal cup 6-toothed, ovary glabrous.

PERAK; *Scortechini*.

Described from a single leaf and flowering spadix.

14. **L. Kingiana**, *Becc. Males.* iii. 193; stem slender, leaves small semicircular 5-partite, segments broad obtusely obliquely toothed, median broadest sessile cuneiform, petiole very slender, spathes 2, outer tubular acuminate split at the side, upper very narrow mouth lacerate, spadix terminating in a solitary dense-fid. spike, calyx campanulate hairy, staminal cup 6-toothed, ovary glabrous.

PERAK; at Goping, *Kunstler* (471).

Stem about 5 ft. by 1 in. diam. *Leaves* 10-12 in. diam.; segments all cuneiform, many-toothed; teeth $\frac{1}{4}$ - $\frac{1}{2}$ in., obtuse, entire or 2-fid; petiole 18-20 in., armed from the lower third with small straight or recurved spines. *Spathes* very slender, $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., nearly glabrous. *Spadix* 6-10 in., erect, and spike (2-4 in.) tomentose. *Calyx* irregularly lobed. *Petals* broadly ovate, finely pubescent, not striate. *Ovary* turbinate, glabrous; style subulate. *Fruit* not seen.

20. LIVISTONA, Br.

Tall palms, trunk annulate. *Leaves* orbicular, flabellately plicate, split to the middle into 2-fid narrow lobes; petiole long, margins spinous. *Spadices* interfoliar, long peduncled, erect, fruiting pendulous, loosely panicle; 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. *Drupe*s 1-3, globose oblong or ellipsoid; style subterminal. *Seed* erect, ventral face hollowed; albumen equable; embryo dorsal.—Species about 13, tropical Asiatic and Australian.

L. chinensis, Br. (*L. sinensis*, Mart.;) *Griff. Palms of Brit. Ind.* 131, t. 226 D; *Wall. Cat.* 8620, a Chinese and Japanese species, is cultivated in India, and may be recognized by its reniformly flabellate leaves with long pendulous deeply bipartite divisions and the olive-like drupe.

1. **L. cochinchinensis**, *Mart. Hist. Nat. Palm.* iii. 242; leaves 9-10 ft. diam. orbicular, lobes 2-partite, segments very long linear pendulous, tips filiform, drupe globose $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Becc. Males.* iii. 69. *L.*

spectabilis, *Griff. in Calc. Journ. Nat. Hist.* v. 336; *Palms Brit. Ind.* 130, t. 226 C. *Corypha Saribus*, *Lour. Fl. Cochinchin.* i. 212. *Saribus cochinchinensis*, *Blume Rumph.* ii. 49.

MALACCA, *Griffith*. PENANG, *Lewis*.—DISTRIB. Cochin China.

Trunk 50–60 ft., smooth. *Leaves* about 90-fid, divisions ensiform, central $2\frac{1}{2}$ –3 ft.; petiole obtusely trigonous, spiny throughout its length, spines stout compressed recurved. *Spadices* 4–5 ft., nodding; branches $1-1\frac{1}{2}$ ft., spreading, much divided; spathes coriaceous, brown. *Flowers* sessile. *Calyx* cupular obtusely 3-toothed to the middle, corolla a little longer. *Carpels* cohering by their styles. *Drupe* pale blue; endocarp suboceanous.

2. **L. Jenkinsiana**, *Griff. in Calc. Journ. Nat. Hist.* v. 334; *Palms Brit. Ind.* 128, t. 226 A, B; leaves 5–6 ft. diam. reniformly flabellate glaucous beneath, divisions very narrow straight shortly obtusely 2-toothed, drupe reniformly globose, $\frac{3}{4}$ –1 in. diam.

ASSAM, common, *Jenkins*.

Trunk 20–30 ft. by 6–7 in. diam. *Leaves* 5–6 ft. broad, 70–80-fid; petiole spinous throughout its length. *Spadices* 2–3 ft., branches dichotomous, simple or compound; spathes 2 ft., woody, scurfy. *Flowers* clustered on small tubercles, small, greenish, ebracteate; calyx cupular, base truncate intruded; corolla twice as long. *Drupe* $\frac{3}{4}$ –1 in. diam., leaden blue.

3. **L. speciosa**, *Kurz in Journ. Beng. As. Soc.* xliii. ii. (1874), 196, 204, t. 13, 14; *For. Fl.* ii. 526; leaves 6–7 ft. diam., palmately flabellate divisions very shortly 2-toothed, teeth lanceolate acuminate converging, drupe obovoid $\frac{3}{4}$ –1 in. long.

PEGU and TENASSERIM; *Kurz, Brandis*.

Trunk 50–70 ft. *Leaves* as broad as long, divisions linear; petiole with very strong sharp long recurved flattish black spines throughout its length. *Spadix* 2–4 ft., paniculate; spathes brown, smooth. *Flowers* solitary or in pairs on small tubercles; sepals and petals about $\frac{1}{2}$ in. *Drupe* $\frac{3}{4}$ 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 $1\frac{1}{2}$ –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 2–2 $\frac{1}{2}$ in. broad; petiole 6 ft., armed throughout its length with sigmoidly flexuous very large stout spines like shark's teeth and $\frac{3}{4}$ in. long. *Spadix* much branched, branchlets subulate slender. *Drupe* smooth, peculiarly fleshy, endocarp grumous and tessellated.

21. TRACHYCARPUS, H. Wendl.

Tall unarmed palms. *Leaves* suborbicular or reniform, plicately multi-fid, 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-monoecious. *Sepals* 3, ovate. *Petals* 3, broadly ovate, valvate. *Stamens* 6, filaments free; anthers short, dorsifixed. *Carpels* 3; stigmas 3, recurved; ovules basilar. *Drupe* 1–3, globose or oblong, style subterminal. *Seed* erect, ventrally grooved, hilum basilar; albumen equable; embryo dorsal.—Species 2 or 3, Himalayan, Chinese and Japanese.

1. **T. Martiana**, *H. Wendl. in Bull. Soc. Bot. Fr.* viii. (1861) 429; trunk for the most part naked annulate, fem. fl. solitary sessile, drupe oblong equally rounded at both ends, seed grooved throughout its length embryo opposite the middle of the groove. *T. khasiana*, *H. Wendl. l. c.*; *Hook. f. Bot. Mag.* t. 7128. *Chamærops Martiana*, *Wall. Cat. n.* 8621; *Mart. in Wall. Pl. As. Rar.* iii. 5, t. 211; *Hist. Nat. Palm.* iii. 251, 320; *Royle Ill.* 394, 7-9; *Griff. in Calc. Journ. Nat. Hist.* v. 339; *Palms Brit. Ind.* 133. *C. Griffithii*, *Lodd. Cat. Palm.* 1841; *Hort. Par. ex Rev. Hortie.* 1879, 212, f. 43, ed. 1881, 143. *C. khasyana*, *Griff. in Calc. Journ. Nat. Hist.* v. 341; *Palms Brit. Ind.* 134, t. 227 A, B, C; *Brand. For. Fl.* 546; *Kurz in Journ. As. Soc. Beng.* xliii. 204; *For. Fl.* ii. 526; *Gamble Man. Ind. Timb.* 418; *Houllet in Rev. Hortie.* 1879, 272 (with woodcut).

TEMPERATE HIMALAYA, alt. 6-8000 ft., from Nepal eastwards, the KHASIA HILLS, alt. 4000-5000 ft. MUNNIPORE, *Watt.* BURMA, alt. 4-6500 ft., *Kurz.*

Trunk 20-50 ft., slender; clothed beneath the crown with persistent leaf-sheaths; young parts softly furfuraceous hairy. *Leaves* 4-5 ft. diam., subglaucous beneath, cut about half way down into linear 2-lobed segments; rigidly coriaceous; petiole $1\frac{1}{2}$ -2 $\frac{1}{2}$ ft., margins denticulate; sheath leaving stiff erect fibres. *Spadix* 1-1 $\frac{1}{2}$ ft., nodding, glabrous; basal spathes 1 ft., coriaceous, split. *Flowers* yellow, ovaries villous. *Drupe* 1-3, $\frac{1}{2}$ in. long, blueish, "dirty blue" (*Kurz*) "yellow lepidote" (*Wall.*).

2. **T. excelsa**, *H. Wendl. in Bull. Soc. Bot. Fr.* viii. 429; trunk clothed throughout with old leaf-sheaths, flowers clustered 2-4 on a tubercle, drupe reniform, deeply hollowed on one side, embryo opposite the umbilicus. *T. Fortunei*, *Wendl. l. c.* *Chamærops excelsa*, *Thunb. Fl. Jap.* 130 (not var. β); *Mart. Hist. Nat. Palm.* iii. 251. *Miquel Probus. Fl. Jap.* 329. *J. Gay in Bull. Soc. Bot. Fr.* viii. 410; *Franch. & Sav. Enum. Pl. Jap.* ii. 1; *Carrière in Rev. Hortie.* 1877, 223. *C. Fortunei*, *Hook. Bot. Mag.* t. 5221.

UPPER BURMA, Yunan, *T. Anderson*.—DISTRIB. China, Japan.

T. excelsa closely resembles *T. Martiana*, except in the trunk being clothed with old leaf-sheaths.

22. PHOLIDOCARPUS, Blume.

Trunk tall. *Leaves* orbicular, 4-5-partite; petiole spinous. *Fruit* globose or ovoid with a tessellated pericarp. *Seed* laterally inserted, hilum oval; albumen ruminant; embryo basilar.—Species 5, Malayan, all very imperfectly known.

1. **P. macrocarpa**, *Becc. Males.* iii. 90, 92, t. 9, f. 1-3; fruit globose obovoid 4-4 $\frac{1}{2}$ in. diam. distinctly tessellate, endocarp globose densely fibrous, fibres elongate. ?*P. Ihur*, *Miq. Fl. Ind. Bat.* 591 (non *Blume*). ?*Livistona Diepenhorstii*, *Teysm. fid. Miq. l. c.*

MALAYAN PENINSULA; Klang, near Selangore, *Keheding*.

Nothing further of this species is known; it differs from the *P. Ihur* of Amboyna in the larger more deeply tessellated fruits, and the long fibres of the outer coat of the endocarp.

23. CALAMUS, Linn.

Armed, erect or scandent, tufted palms. *Leaves* alternate, pinnatisect; leaflets acuminate, nerves parallel, rachis often produced into an armed



flagellum; sheath armed, produced into a ligula or ochrea, and with or without a lateral armed flagellum. *Spadices* axillary, usually elongate, much branched, sometimes produced into a flagellum. *Spathes* tubular or open, persistent, sheathing the peduncle and branches of the spadix and passing into bracts and bracteoles (spathels and spathellules). *Flowers* small, polygamo-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 explanate. *Calyx* of the male. *Corolla* tubular below, 3-fid, valvate. *Staminodes* forming a cup. *Ovary* incompletely 3-celled, clothed with retrorse scales; style short or rather long, stigmas 3; ovules basilar, erect. *Fruit* globose or ellipsoid; style terminal; pericarp thin, clothed with appressed deflexed closely imbricating polished scales. *Seed* subglobose or oblong, smooth or pitted; albumen equable or ruminant; embryo ventral or basal.—Species about 160–170 trop. Asiatic, Malayan, Australian and a few trop. African.

The following arrangement of the groups and species is taken from Beccari's mss. The diagnoses and descriptions of the species are from his rough notes and the works of Roxburgh, Griffith, Martius and Kurz, in all cases aided by specimens when I had access to them.—J. D. H.

GROUP I. *Leaves* with many equidistant leaflets. *Spathe* 1st, elongate-tubular, dilated and lacerate above; 2nd, tubular, infundibular. *Spadix* with the partial infl. and spikelets provided with a pedicellar portion included in their respective spathes. *Fruiting perianth* explanate. *Spathellule* of fem. fl. short, not pedicelliform. Sp. 1–9.

GROUP II. *Leaves* with very few radiating or digitate leaflets, rachis not flagelliferous; leaf sheath flagelliferous. *Spathe* 1st very long, tubular, mouth lacerate; 2nd, thick, inflated, lacerate. *Spadices* male and fem. simply decomposed; partial infl. and spikelets with a pedicelled portion inserted at the mouth or back of their respective spathes. *Fruiting perianth* explanate. *Spathellules* of fem. fl. short, not pedicelliform. *Fruit* scales more than 12–15-seriate. *Seed* not ruminant; embryo basilar.—(Slender scandent species; stamens 2-seriate, filaments thickened at the base, tips not inflected). Sp. 10–12.

GROUP III. *Leaves* paripinnate, leaflets equidistant; rachis not flagelliferous, leaf-sheath flagelliferous. *Spathe* 1st, elongate-tubular, closely sheathing. *Partial* infl. and spikelets (inserted at the mouth and back of the spathe). *Fruiting calyx* explanate or hardly callous and pedicelliform. *Spathellules* of fem. fl. not pedicelliform. *Seeds* not dorsally ruminant-alveolate; embryo basilar. Sp. 13–31.

GROUP IV. *Rachis* of leaves not flagelliferous; leaf-sheath flagelliferous or not. *Spathe* 1st very long, at first tubular closed, at length longitudinally split open, loriform, laminar or foliaceous. *Seed* not superficially alveolate; albumen equable. Sp. 32–39.

GROUP V. *Rachis* of leaves not flagelliferous; sheath flagelliferous. *Spathe* 1st submembranous, at first elongate tubular at length longitudinally more or less split and partly sublaminar. *Fruiting calyx* more or



less pedicelliform. *Spathellules* of fem. fl. pedicelliform. *Seed* dorsally alveolate; albumen subruminate; embryo basilar. Sp. 40, 41.

GROUP VI. *Rachis* of leaves not flagelliferous; leaf-sheath flagelliferous. *Spathe* 1st tubular, coriaceous, narrow, not split or lacerate. *Spathellule* of fem. fl. exerted beyond the spathels, and as it were supported on a pedicel. *Fruiting perianth* pedicelliform. *Seed* superficially furrowed; albumen ruminant; embryo basilar. Sp. 42-43.

GROUP VII. *Rachis* of leaves not flagelliferous; leaf-sheath flagelliferous. *Spathes* tubular, strictly sheathing. *Spathellules* not pedicelliform. *Fruiting calyx* pedicelliform; albumen deeply ruminant. Sp. 44-47.

GROUP VIII. *Rachis* of leaf not flagelliferous; leaf-sheath flagelliferous. *Spathes* strict, tubular; spathellules distinctly pedicelliform. *Fruiting-perianth* subpedicelliform. *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 ruminant; embryo basilar. Sp. 49.

GROUP X. *Rachis* of leaves flagelliferous; leaf-sheath not flagelliferous. *Spathe* elongate, tubular, narrow. *Spathellule* of fem. fl. not pedicelliform. *Fruiting calyx* pedicelliform. *Albumen* ruminant or not, embryo basilar or lateral. Sp. 50-56.

GROUP XI. *Rachis* of leaves flagelliferous; sheath not flagelliferous. *Spathe* narrow, elongate, tubular. *Spathellules* of fem. fl. not pedicelliform. *Fruiting-perianth* pedicelliform or not. *Albumen* not ruminant; embryo basilar. Sp. 57-63.

GROUP XII. *Rachis* of lower leaves or leaves of young plant not flagelliferous, of the adult plant or its upper leaves shortly flagelliferous; leaf-sheath flagelliferous. *Spathes* elongate, tubular, narrow; spathellules of fem. fl. not pedicelliform. *Fruiting calyx* distinctly pedicelliform. *Seed* strongly dorsally alveolate, at least superficially ruminant? embryo basilar. —Leaflets large or in any case with not fewer than 3 primary nerves. Sp. 64-70.

GROUP XIII. *Leaves* imparipinnate, subflagelliferous; sheath flagelliferous. *Spadix* contracted. *Spathes* tubular at the base, open dilated and auriculiform above; spathellules of fem. fl. not pedicelliform. *Fruiting-perianth* explanate. *Albumen* deeply ruminant; embryo basilar, excentric. Sp. 71, 72.

GROUP I. See p. 437.

* *Albumen* ruminant, embryo basilar.

1. *C. erectus*, Roeb. *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, spathe cymbiform acute, flowers $\frac{1}{3}$ in. long. *Mart. Hist. Nat. Palm.* iii. 332; *Griff. in Calc. Journ. Nat. Hist.* v. 35; *Palms Brit. Ind.* 43; *Walp. Ann.* iii. 438, v. 829; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 209, t. 23, 24 (excl. longisetus); *For. Fl.* ii. 516. C. schizospathus, *Griff. ll. cc.* 32 & 41, t. 187; *Mart. l. c.* 332; *Walp. ll. cc.* 482, 829; *T. Anders. in Journ. Linn. Soc.* xi. 7.

SIKKIM HIMALAYA, ASSAM, SILHET, CHITTAGONG, the KHASIA HILLS, MUNIPORE 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 spathe. *Calyx* acutely 3-toothed; corolla thrice as long. *Stamen* free, filaments broad, erect. *Fruit* about 1 in. long, ovoid-oblong, subtended by the spreading perianth; scales trapezoid, dark brown with a yellow base.

Var. β. COLLINA, Becc.; smaller, petiole with solitary or sparingly clustered spines, spadices shorter often depauperate shortly peduncled, tip not or shortly cirriferous, fruit ellipsoid. C. collinus, *Griff. in Calc. Journ. Nat. Hist.* v. 31; *Palms Brit. Ind.* 39 (excl. leaf), t. 186 (spadix only).—Khasia hills.

Var. γ. MACROCARPA, Becc., fruits larger. C. macrocarpus, *Griff. in Mart. l. c.* 333, t. 176, f. x. *Griff. Palms Brit. Ind.* 40, t. 186, A. f. i. ii. *Walp. ll. cc.* 484, 380.—Sikkim, &c.

2. **C. flagellum**, *Griff. in Mart. Hist. Nat. Palm.* iii. 333, t. 176, f. ix.; stem stout at length scandent, leaflets subopposite linear-lanceolate concolorous margins and midrib beneath remotely setulose, petiole furfuraceous rachis and peduncle of the spike and upper spathes armed with short recurved spines, leaf-sheaths scurfy bearing a clawed flagellum armed with long and short spines and bristles. *Griff. Palms Brit. Ind.* 48; *Walp. Ann.* iii. 484, v. 830; *Anders. in Journ. Linn. Soc.* xi. 8. C. Jenkinsianus, *Griff. l. c.* 40, t. 186 A., f. iii. (not 89). PC. polygamus, *Roxb. Fl. Ind.* iii. 780.

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; spathe very like C. erectus. *Flowers* $\frac{1}{2}$ in. long, decurved. *Calyx* 3-fid to the middle. *Corolla* twice as long. *Stamens* free. *Fruit* 1 by $\frac{3}{4}$ in., ovoid-oblong, cuspidately beaked, subtended by the spreading perianth; scales deeply furrowed, pale with a dark band down the middle.

** Albumen equable.

† Erect or scandent. No flagellum on leaf-sheath or spadix.

3. **C. arborescens**, *Griff. in Calc. Journ. Nat. Hist.* v. 33; *Palms Brit. Ind.* 42, t. 188 A, B, C; stem erect tufted stoloniferous, leaflets equidistant linear-lanceolate white beneath margins closely setulose, midrib beneath and sometimes above setose, petiole scurfy, armed with whorls or half whorls of long flat black spreading spines, spadix very long pendulous, spathe very short closely imbricate truncate. *Mart. Hist. Nat. Palm.* iii. 332; *Walp. Ann.* iii. 483, v. 829; *Miq. Fl. Ind. Bat.* iii. 113; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 208, t. 22; *For. Fl.* ii. 516. C. hostilis, *Hort. Calc.*



PEGU; in marshy places, *Griffith*.

Stem 15–20 ft., $2\frac{1}{2}$ in. diam.; internodes 7 in., crown densely leafy. Leaves 5–6 ft., decurved leaflets 8–18 in. by $1-1\frac{1}{2}$ broad; petiole naked except for the long usually very black spines $\frac{1}{2}$ –2 in. long. Lower spathes with many half-whorls of short black spines; upper short, unarmed. Spadices longer than the leaves, very graceful; spikes 4–6 in. long by $\frac{3}{4}$ in. across the flowers, which are nearly $\frac{1}{2}$ in. long, curved. Calyx trifold to the middle. Petals oblong-lanceolate, acute. Stamens shortly monadelphous.

4. *C. castaneus*, *Griff. in Calc. Journ. Nat. Hist.* v. 28; *Palms Brit. Ind.* 37, t. 185 A, B, C; stem very short stout, leaves very long, leaflets very many equidistant linear 3-costate margins and costæ beneath remotely prickly, petiole very stout and short, sheaths armed with very unequal scattered solitary or 2–3-nate rather short straight stout flattened pale spines, spadices erect or nodding very stout nearly unarmed, male decompound, spathels very short and broad. *Mart. Hist. Nat. Palm.* iii. 331; *Walp. Ann.* iii. 482; v. 829; *Miq. Fl. Ind. Bat.* iii. 112.

MALACCA, *Griffith, Maingay* (Kew Distrib. 1533); PERAK at Gopung, *King's Collector* (5880).

Stem 3–5 ft., with the sheaths 3–4 in. diam. Leaves with the petiole 12–15 ft.; leaflets 12–24 by $1-2\frac{1}{2}$ in., very dark green, young scurfy beneath; petiole as thick as the little finger, rounded with a channelled upper surface. Spathes generally unarmed. Spadices 2–3 ft., male panicle, elongate flexuous, fem. shorter, nearly as broad as long, simply branched; spikes of male 2–3 in., of fem. much larger, scorioidly recurved, $\frac{1}{2}$ in. broad. Male fl. $\frac{3}{4}$ in. long. Calyx trifold to the middle. Petals hardly longer. Stamens inflexed in bud. Fem. fl. larger. Fruit 1 in. long, ellipsoid, embraced at the base by the erect perianth; strongly beaked, scales in 24–26 rows, minute, dark brown.

5. *C. Griffithianus*, *Mart. Hist. Nat. Palm.* iii. 332; closely allied to *C. castaneus*, and dwarf like it, in the leaflets spadices, &c., but the petioles are described as terete, and the fruits are larger more globose with fewer (18–20) rows of larger scales. *Walp. Ann.* iii. 482; v. 829; *Miq. Fl. Ind. Bat.* iii. 112. *C. castaneus* (partly) *Griff. in Calc. Journ. Nat. Hist.* v. 29. *C. castaneus*, var. *a* *Griff. Palms Brit. Ind.* 38.

MALACCA, *Griffith*. PERAK, *King's Collector* (3040, 3048).

Probably only a form of *castaneus*.

†† Scandent, stout. Leaf-sheath flagelliferous. Spadix long, often flagelliform. Spikelets much flattened.

6. *C. longisetus*, *Griff. in Calc. Journ. Nat. Hist.* v. 36; *Palms Brit. Ind.* 44, t. 189 A, B; scandent or erect? glabrous, leaflets lanceolate concolorous, lower fascicled 3-costate, margins and midrib above and beneath and lateral nerves beneath setulose, terminal connate, petiole and its sheath and lower spathes densely armed with whorls and half whorls of straight black flattened spines intermixed with scattered shorter ones, male spadices decompound nodding, upper spathes unarmed, spathels densely imbricate truncate, fruit ovoid-oblong narrowed into a very stout beak. *Mart. Hist. Nat. Palm.* iii. 333; *Walp. Ann.* iii. 483; v. 830; *Miq. Fl. Ind. Bat.* iii. 114. *C. tigrinus*, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 211, t. xxiv. xxvi.; *For. Fl.* ii. 519.

PEGU, *Hort. Bot. Calc., Griff.* (Kew Distrib. 6392), *McLelland*; BURMA, and the ANDAMAN ISLANDS, *Kurz*.

Stem upwards of 1 in. diam. Leaves 4–8 ft., rachis not flagelliferous; leaflets $1\frac{1}{2}$ –2

ft. by $\frac{1}{2}$ –2 in.; petiole and rachis pale, smooth, except for the spines; sheaths very strongly armed. *Male spadix* slender, branched, *fem.* much stouter and shorter. *Lower spathes* elongate, tubular, compressed, strongly armed, upper short, lacerate; *spathels* densely imbricate, scurfy, truncate, often lacerate. *Fruit* 1 in. stipitate by the erect perianth; scales $\frac{1}{4}$ in. long and broad, flat, thin, yellowish with a very broad lunate brown band across the middle and fimbriate margins (the whole fruit banded like a tiger-skin).—Griffith describes *longisetus* as erect, and Kurz *tigrinus* as scandent.

7. **C. Thwaitesii**, Becc.; differs from *C. longisetus* in the rachis of the petiole bearing very stout recurved claws with black tips, the upper spathes bearing scattered spinescent tubercles, and in the smaller fruits with fewer paler tumid scales erose or the margin channelled down the centre and with a narrow brown marginal band. *C. longisetus*, Thw. Enum. 330 (not of Griff.).

CEYLON; in the Central Province, Thwaites. CANARA, Ritchie, Talbot.

A Canara plant collected by Ritchie and Talbot, probably belongs here, the fruit is exactly similar to that of the Ceylon plant.

††† Scandent, slender. Leaf-sheaths flagelliferous. Spikelets short, scorpioid.

8. **C. leptospadix**, Griff. in Calc. Journ. Nat. Hist. v. 49; Palms Brit. Ind. 60, t. 194 A, B, C; leaflets very many close-set narrowly linear acuminate, margin and sometimes the 3 costæ beneath setulose or aculeolate, petiole terete and scurfy rachis with distant straight flattened spines and a few short claws at the base, sheath short scurfy sparingly armed, spadices very long slender pendulous, with very many distichous short recurved spines, lower spathes long slender densely armed with flat thin spikes and minute recurved ones upper shorter unarmed, flowers small, fruit small globose mucronate. Mart. Hist. Nat. Palm. iii. 335, f. ii.; Walp. Ann. iii. 485; v. 483. T. Anders. in Journ. Linn. Soc. xi. 8.

SIKKIM HIMALAYA, J. D. H., &c.; KHASIA HILLS, Griffith, &c.; MUNNIPORE and NAGA HILLS, Watt.

Stem slender, scandent. Leaves 3–4 ft.; leaflets 8–10 by $\frac{1}{2}$ – $\frac{3}{4}$ in., thin, pale green; rachis armed with simple recurved spines. Spathes very slender, tubular. Spadices several feet long, branched, below and armed with hooked short spines, branches very long and slender, with 20–40 recurved spikelets $\frac{1}{2}$ –1 in. long, and $\frac{1}{2}$ in. diam.; flagellum of spadix very long, armed with 1–3-fid recurved claws. Spathels cupular, acute membranous. Male fl. $\frac{1}{2}$ in. long; calyx 3-fid to the middle; petals twice as long. Fruit $\frac{1}{2}$ in. diam., subtended by the spreading perianth; scales very small, broad, yellow with a red-brown margin.

9. **C. rivalis**, Thw. ex Trimen in Journ. Bot. xxiii. (1885), 268; (Err. typ. nivalis); habit of *C. leptospadix*, leaflets numerous equidistant linear-lanceolate setulose on the margins and three costæ beneath, sheaths copiously armed with straight flat pale spines, rachis with recurved ones, spadices very long slender armed with short recurved spines and terminated by a clawed flagellum, spikes very many short distant recurved, lower spathes or all armed with very short prickles, fruit small ovoid beaked. *C. rudentum*, Mart. Hist. Nat. Palm. iii. 340 (non Lour.).

CEYLON; Walker, &c.

Leaves about 3 ft long, leaflets 12–18 by $\frac{1}{2}$ – $\frac{3}{4}$ in., broader and more coriaceous than in *C. longisetus*; rachis scurfy. Spathels very obliquely cup-shaped, coriaceous. Male fl. crowded, calyx trifold to the middle. Petals and stamens stipitate. Fem. fl.



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. **C. pachystemonus**, *Thw. Enum.* 431 (in part.); stem slender scandent, leaves pinnately 4-7-foliolate, leaflets elliptic acute or acuminate 3-5-costate, margins and costæ beneath setulose, petiole short and rachis armed with solitary stout recurved spines, sheath striate sparingly tubercled and armed with flat pale spines, ochrea very short truncate, spadices very slender elongate decompound, spikes very many recurved, male corolla slender.

CEYLON; *Walker*; near Galle, *Thwaites*.

The greater part of *Thwaites C. pachystemonus* including the fruiting specimens are *C. digitatus*, which differs in the longer petioles, few terminal longer oblanceolate leaflets and smaller curved male flowers.

11. **C. digitatus**, *Becc. mss.*; leaflets digitately 2-4-foliolate oblanceolate cuspidately acuminate 3-5-costate, petiole slender, sheath armed with long strong straight flat spines and conical short ones, ochrea ligulate, spadices very slender elongate decompound, spikes very many recurved, male corolla slender, fruit small globose. *C. gracilis*, *Thwaites Enum.* 330 (not of *Roxb.*).

CEYLON; in the southern parts of the island, *Thwaites* (*C. P.* 2334 in part). *Stems* very slender, scandent. *Leaflets* at the end of the short petiole, 8-12 by 1-2 in., concolorous, many-nerved; petiole 6-8 in., unarmed or with a few solitary recurved spines and small prickles; sheath copiously armed. *Spadices* 3-4 ft., branched below, male spikes $\frac{1}{2}$ in., fem. 1-2 in. *Lower spathe* elongate, cylindric; upper very slender, mouth truncate, entire; spathelets cupular, truncate. *Male fl.* $\frac{1}{2}$ in. long; corolla very narrow, curved, twice as long as the calyx. *Stamens* 2-seriate, filaments thickened upwards. *Fruit* $\frac{1}{2}$ in. diam., subtended by the spreading perianth; scales pale yellow, very broad with narrow brown margins.

12. **C. radiatus**, *Thw. Enum.* 431; leaflets 6-7 subradiately disposed at the apex of a shortly spinous petiole linear acuminate, sheath densely armed with short straight spines and long bristles, spadices very long slender branched armed with small recurved spines, spikes many short recurved.

CEYLON; in the southern parts of the island. *Walker*, *Thwaites*.

Stems very slender, scandent. *Leaflets* 8-12 by $\frac{3}{4}$ -1 in., thin, midrib beneath and margins quite without bristles or spines; petiole 2-3 in. with scattered short recurved spines. *Spathes* few, very long and slender. *Peduncle* of spadix 2-3 ft. long, as slender as a sparrow-quill; spikes $\frac{1}{4}$ - $\frac{3}{8}$ in. long; spathelets 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. **C. javensis**, *Blume Rumph.* ii. 137, iii. 62, var. *PENINSULARIS*, *Becc. mss.*; leaflets 3-6 inequidistant elliptic or oblong-lanceolate 7-9-costate,



basal pair reflexed on the sheath, petiole very short and rachis armed with short scattered recurved spines, sheath with short straight spines, spadix very long slender, fruit small subglobose ovoid shortly beaked, scales in 17-18 series. ?*C. penicillatus*, *Rowb. Fl. Ind.* iii. 781.

PENANG and the MALAY PENINSULA; Perak, alt. 300-3500 ft., *King's Collector* (1996 ♀, 2673 ♂).

Stem 10-25 ft., with the leaf-sheaths as thick as the little finger, scandent. *Leaves* 1½-2 ft.; leaflets 8-10 by 1½-2½ in., often opposite, the upper pair free or confluent, margins and costæ beneath quite smooth; sheaths and their short spines pale. *Spadices* very long and slender and long slender spathes armed with small hooked spines; spikes 2-3 in., slender, ¼ in. across the flowers; spathelets 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 Gunung Tambang Betall, *Scortechini* (657^b); *King's Collector* (6312).

Subvar. *intermedius*, Becc.; as above, but more slender, and with fewer inequidistant leaflets.—Perak, *Scortechini* (236).

Subvar. *tenuissimus*, Becc.; very slender, leaflets fewer (3-4) remote longer, petiole longer, fruit elliptic-obovoid moderately beaked, scales more than 15-seriate.—Perak, summit of Gunung Tambang Batok, *Scortechini* (648^b).

Subvar. ?*purpurascens*, Becc.; like the type, but leaflets few large basal much reflexed, sheath moderately spiny.—Penang, *Curtis*. Perak, *King's Collector* (7932).

Subvar. ?*penangiana*, Becc.; as in *purpurascens*, but sheath with strong spines.—Penang.

14. *C. filipendulus*, Becc. mss.

PERAK; *Scortechini*, 232^b; *King's Collector* (5659, 5773, 8019).

I have seen no specimens of this species, and fail to draw up a diagnosis of it as distinguished from *C. javensis*, from Beccari's notes, except as regards the fruit which he describes as ovoid-conic about ½ in. long, gradually narrowed into a very slender acute beak terminated by the recurved stigmas and with the scales in only 12 series. The terminal pair of leaflets are confluent, as they are sometimes in *C. javensis*.

†† *Leaflets many, narrowly ensiform; upper distinct or hardly connate at the base.*

15. *C. rugosus*, Becc. mss.; stem very slender, leaves long-petioled, leaflets very many equidistant narrowly lanceolate finely acuminate 3-costate, upper pair quite free, petiole rachis and spadix very slender armed with few scattered short recurved spines, sheath armed with short straight spines, spadices filiform, branches very distant with few slender spines, spathelets scabrid.

PERAK; *Scortechini*.

Stem with the sheaths ½ in. diam. *Leaflets* 7-8 by about ½ in., concolorous, setulose on the margins and 3 costæ above and only on the median beneath, petiole 5-7 in., margins acute; sheath gibbous above, larger spines flat, others minute and seriate. *Spathes* 2, lower prickly, upper and spathelets scabrid.—I have seen no specimen.—*J. D. H.*

16. *C. radulosus*, Becc. mss.; stem slender, leaves sessile, leaflets very many narrowly ensiform equidistant concolorous, margins naked, 3-costate



costæ beneath armed with rigid bristles, the central alone sparsely setulose above, rachis armed beneath and at the margins with short hooked scattered spines, sheath densely armed with scattered flat spines, lower spathe densely armed upper and spathels finely scabrid, spadices very long.

PERAK; *Scortechini* (468^b); Goping, *King's Collector* (8171).

A lofty climber; stem with the sheaths 1-1½ 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 scurfy with a lacerate mouth. *Spadix* with the partial inflorescences very long, bearing many recurved spikelets. *Fruit* small, pisiform, long-beaked.—Well characterized by the armature of the sheath, the naked margins of the leaflets, and the scabridity of a portion of the spadix.

17. *C. viminalis*, Willd. *Sp. Pl.* ii. I. 203; var. *fasciculatus*, Becc. mss.; stem rather stout, leaflets many inequidistant or fascicled 3-costate, margins and costæ beneath spinulose, floccose rachis and petiole with scattered long straight spines, sheath and flagelli with scattered short hooked spines, spadix very long clothed with long spathes, tip flagelliferous, branches paniculate, spikes 4-5 in., lower spathes compressed with subulate spines, upper prickly, fruit small globose beaked. *C. fasciculatus*, Roxb. *Fl. Ind.* iii. 779 (excl. cit. Rheede); *Kunth Enum.* iii. 208; *Mart. Hist. Nat. Palm.* iii. 338, t. 116, f. iv.; *Walp. Ann.* 488, v. 831; *Griff. in Calc. Journ. Nat. Hist.* v. 52; *Palms Brit. Ind.* 62, t. 195 B (excl. A. Roxburghii), t. 190 A, f. ii.; *Miq. Fl. Ind. Bat.* iii. 127; *Palm. Archip. Ind.* 27; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 210, t. 27 B; *For. Fl.* ii. 517. *C. extensus*, Mart. l. c. iii. 210, Ed. 1, partly, t. 116, f. iv. 1 (reduced in Ed. 2 to *fasciculatus*). *C. Pseudo-Rotang*, Mart. l. c. 209, Ed. 1, t. 116, f. vi. (reduced in Ed. 2 to *fasciculatus*); *Griff. in Calc. Journ. Nat. Hist.* v. 42; *Palms Brit. Ind.* 53; *Kunth Enum.* iii. 207.—*Wall. Cat.* 8608, 8611.

LOWER BENGAL, ORISSA, and the CARNATIC, CHITTAGONG, BURMA, the ANDAMAN ISLANDS and PENANG, *Wall.*—*DISTRIB.* Cochin China. (Of the type Malay Islands.)

A stout scrambling and climbing species. *Leaves* 2-3 ft.; leaflets 4-10 by 3-4 in., pale green, young and rachis and sheath white-floccose, petiole short and rachis very stout, spines slender ½-1¼ in. long, pale hardly flattened. *Spathes* coriaceous, mouth obliquely truncate; flagelli with hooked 2-3-fid claws. *Spadix* and its spreading branches rather stout, internodes (and truncate spathels) ½-¾ in. *Fruit* ¾-1 in. diam.; scales pale yellow, obscurely channelled down the middle.

18. *C. concinnus*, Mart. *Hist. Nat. Palm.* iii. 332; erect or stemless?, leaflets many subequidistant linear-lanceolate acuminate glossy above 3-costate, margins and costæ beneath setulose, rachis and spadix rusty tomentose sparingly armed with short stout straight deflexed spines, spadix stout decompound, spathes loose coriaceous armed with short spines, secondary lax membranous long acuminate, spathels annular, fruit small globose beaked. *Kunth Enum.* iii. 207; *Walp. Ann.* iii. 483, v. 829; *Griff. in Calc. Journ. Nat. Hist.* v. 49; *Palms Brit. Ind.* 59; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 214, t. 20 C.—*Wall. Cat.* 8607.

TENASSERIM, Wallich; at Mergui, Helfer (*Kew distrib.* 6388, 6394, 6395).

Leaflets in the only specimens I have seen 10-18 by 1-1½, very shining on both surfaces. *Fruit* ½ in. diam.

19. *C. floribundus*, Griff. in *Calc. Journ. Nat. Hist.* v. 56; *Palms*

Brit. Ind. 66, t. 197; leaflets few inequidistant linear-lanceolate acuminate uppermost crowded at the end of the rachis and often connate, margins and costæ beneath setulose, petiole lower spathe and rachis armed with very short stout and long scattered flattened pale spines, sheath densely armed with needle-like setæ and spines, spadix elongate decompound, internodes sheathed by truncate ciliate spathels, spikes short spreading and recurved, lower spathe very long keeled, fruit globose shortly beaked. *Mart. Hist. Nat. Palm.* iii. 337; *Walp. Ann.* iii. 487, v. 831. *C. mishmiensis*, *Griff. U. cc.* 55 and 65; *Mart. l. c.*; *Walp. Ann. U. cc.* *C. multiflorus*, *Mart.*—*Wall. Cat.* n. 8613.

ASSAM, SILHET and the KHASIA HILLS, *Wallich*, &c. MISHMI HILLS, *Griffith*.

Stem as thick as the middle finger. *Leaflets* bright green, 10–18 by 1–1½ in.; spines of rachis ½–1 in. long, rather flattened and deflexed. *Lower spathe* 18 in., coriaceous, terete, mouth very oblique. *Spathels* acuminate, and flowers almost floccose with long white hairs, striate. *Flagelli* with short or long simple or compound recurved claws and spines. *Fruit* ½ in. diam.; scales very pale yellow, channelled down the back.

20. *C. pseudo-tenuis*, *Becc. mss.*; leaflets many equidistant linear-lanceolate minutely setulose on the margins setose or not on the 3 costæ beneath, rachis (young brown scurfy) armed with strong flattened straight and short recurved spines, sheath densely armed with flattened spreading pale spines, spadix very long decompound, spikelets very short decurved, male flowers and spathellules minute quite glabrous, fruit small ovoid strongly beaked. *C. tenuis*, *Thw. Enum.* 330 (not of Roeb.).

CEYLON; in the hotter parts of the island. DECCAN PENINSULA; on the WESTERN GHATS; from Canara southwards.

Stem slender. *Leaflets* 10–18 by ¾–¾ in., upper free; rachis rather stout; petiole short; sheath ¾ in. diam. *Spathes* flattened, lower 2-edged; spathels elongate. *Spadix* 2–3 ft., branches 6–10 in.; spikes of male fl. very short, of fruits 4–6 in. *Male fl.* ¼ in. long, shining, not striate. *Fruit* ½ 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 Marmagao, Bombay, seems a very different plant, has black tipped claws on the rachis of the leaf and spadix and flagellum, and curved male flowers ½ in. long.—*J. D. H.*

21. *C. densiflorus*, *Becc. mss.*; leaves very shortly petioled, leaflets many equidistant linear-ensiform finely acuminate concolorous upper gradually smaller terminal very short margins setulose costæ 3 all spinulose above and sparsely setulose on the middle one only beneath, sheath strongly armed with pale flat horizontal spines, spadix very long, spikes elongate dense-fl., spathels and spathellules scabridly pubescent, fruit small beaked ovoid.

PERAK; at Thaiping and Larut, *King's Collector* (8434, 5527).

Stem scandent, 1¼–1½ in. diam. with the sheaths. *Leaflets* rigidulous, larger 13–14 by about 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 ½ in. diam.; scales scarcely channelled, pale margined with brown.—I have seen no specimens. *J. D. H.*

22. *C. luridus*, *Becc. mss.*; leaflets rather numerous equidistant remote

elongate ensiform acuminate with 3 strong costæ beneath, terminal pair shortly adnate below, margins and costæ beneath more or less setulose, sheath closely armed with long flat horizontal unequal spines, spadix very long ending in a flagellum paniculately branched, lower spathes tubular strictly sheathing spiny on the outer side, upper smooth striate, fruit globosely ovoid.

PERAK, summit of Gunong, *Scortechini*; Malacca and Larut, *King's Collector* (2647, 6284, 6400, 7203).

Stem slender, scandent. *Leaflets* 14-16 by $1\frac{1}{4}$ in.; *petiole* 4-6 in. *Spadix* 8-12 in.; *spikelets* $1\frac{1}{2}$ - $2\frac{1}{2}$ in. *Calyx tube* short, *corolla* rather longer. *Fruiting perianth* very shortly pedicelliform, strongly striate.—I have seen no specimens. J. D. H.

23. *C. delicatulus*, *Thw. Enum.* 330, 431; leaflets very many equidistant linear-lanceolate finely acuminate margins and 3 costæ setose, petiole very short shortly spiny, rachis brown-scurfy when young clawed, sheath densely armed with short and long slender black flattened spines, male spadix very long filiform decompound, spathes unarmed long-ciliate at the tip, spikes very slender, flowers rather distant very minute.

CEYLON; at Galle and Hinidoon Pattoo, *Thwaites*.

Leaves 2-3 ft. *Leaflets* 8-10 by $\frac{1}{2}$ in., concolorous, shining, upper smaller, tips filiform; flagellum very long, slender, clawed. *Fruit* about $\frac{1}{2}$ in. diam., scales pale with a very narrow brown border.—Very near *C. Helferianus*, but the leaflets are not aggregate, the spikelets more slender, and flowers smaller.

24. *C. Helferianus*, *Kurz. in Journ. As. Soc. Beng.* xliii. ii. 213; *For. Fl.* 521; leaflets many scattered inequidistant in series of 2-8 on a side, narrowly linear finely acuminate 3-costate margins and lateral costæ above and median beneath setulose, rachis slender 3-gonous armed with short scattered recurved spines, spadix long very slender compound glabrous, spathes narrow tubular compressed and truncate partial sparingly shortly spiny or unarmed, spikes $1\frac{1}{2}$ -3 in., male spathellules very short crowded, fem. more remote, corolla twice as long as the stamens not striate.

TENASSERIM (or the Andaman Islands), *Helfer* (6389 ♂, 6392 ♀).

Sparingly armed. *Stem* slender, scandent. *Leaves* without flagelli, leaflets 8-12 by $\frac{1}{2}$ - $\frac{3}{4}$ in., concolorous, uppermost quite free, costæ 3-5 strong beneath; rachis with naked intervals sometimes 4 in. long, on one or both sides; sheath not seen. *Spadix* several feet long, flexuous, as thick as a sparrow-quill; upper spike simple, lower panicle, males shortest and more slender. *Lower spathe* long, narrow, compressed, with a short erect limb and short spines on the keels, partial $1\frac{1}{2}$ -1 in. long. *Spathellules* of male fl. very short and crowded, of fem. $\frac{1}{2}$ in. long. *Male fl.* $\frac{1}{2}$ - $\frac{1}{3}$ in. long, calyx 3-fid. *Fruit* unknown.

25. *C. nicobaricus*, *Becc.*; leaflets very many equidistant linear-ensiform long-acuminate sparsely setose on the median costa only on both surfaces lateral costæ slender naked, petiole channelled above armed with long straight marginal spines and short claws on the back, sheath very pale at first scurfy densely armed with very unequal long flat spines and short claws.

NICOBAR ISLANDS, *E. H. Man*.

A very slender species, with varnished internodes $\frac{1}{2}$ - $\frac{1}{4}$ in. diam. *Leaflets* 7-8½ by about $\frac{1}{4}$ in., shining above. *Spadix* and fruit unknown. *Flagelli* exceedingly slender.—Appears to be allied to *C. delicatulus*, from which it is distinguished by the leaflets being setose only on the median costa.—I have seen no specimen. J. D. H.

** Fruiting perianth distinctly pedicelliform.

26. *C. tenuis*, *Roxb. Fl. Ind.* iii. 780; leaflets very many equidistant uppermost gradually smaller linear-lanceolate acuminate 3 costæ all setose above, the median only below, petiole short margined with straight spines and rachis armed with one row of short recurved spines, sheaths flagelliferous sparingly armed with short flat spines, spadix very long decompound flagelliferous, spathes elongate tubular lower with a short limb and scattered recurved spines, partial short unarmed young scurfy, spathellules densely crowded cymbiform, flowers very small, fruit subglobose. *Kunth Enum.* iii. 211; *Mart. Hist. Nat. Palm.* iii. (Ed. 1, 212), 335; *Griff. in Calc. Journ. Nat. Hist.* v. 46; *Palms Brit. Ind.* 57, t. 193 A, B, C; *Walp. Ann.* iii. 485, v. 830; *Miq. Fl. Ind. Bat.* iii. 118; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 212, t. 31 B; *For. Fl.* ii. 520. *C. Royleanus*, *Griff. ll. cc.* 40 and 53, t. 191; *Mart. l. c.* 335; *Walp. ll. cc.* 485 and 830. *C. amarus*, *Lour. i.* 210. *C. Heliotropium*, *Herb. Ham.*; *Mart. l. c.* 211, 334; *Kunth l. c.* 210; *Griff. ll. cc.* 51 and 61; *Walp. Ann. ll. cc.* 484 and 830.

TROPICAL HIMALAYA, from Kumaon eastwards, BENGAL, ASSAM, SILHET, CHITTAGONG and BURMA.—DISTRIB. Cochín.

Stems very long, scandent; internodes not thicker than a goose-quill. *Leaves* 1½–2 ft.; leaflets approximate, lower 8–12 by ½–¾ in., margins minutely setulose or spinulose, bristles on costæ ½ in.; petiole pale, stout; spines with broad laterally compressed conical bases; flagelli filiform. *Lower spathes* 6–10 in. by nearly ¾ in. diam., upper shortly scurfy. *Lower spikes* paniced, 1½–4 in. long. *Male fl.* ⅙ in. long, not distichous and spreading but secund in 3–4 series, imbricating, suberect. *Fruit* ½ in. diam., mucronate; scales pale with a shallow median channel and very narrow discoloured margins.

27. *C. diffusus*, *Becc. mss.*; leaflets many equidistant rigidulous upper shorter narrowly linear-lanceolate very long-acuminate margins naked slightly thickened, costæ 3 setose above the median spinulose beneath, rachis armed throughout with half whorls of hooked spines or 3-fid claws, male spadix diffusely supra-decompound, branches of partial infl. spirally inserted, lower spathe tubular green smooth coriaceous armed with hooked spines on the outer surface, upper tubular-infundibular unarmed, spathels short broad, flowers rather distant, calyx campanulate striate, corolla twice as long.

SINGAPORE; *Lobb.*

Leaves apparently 2–3 ft.; leaflets 10–12 by ½–¾ in. *Male spikelets* 1–2 in.; flowers crowded, distichous, ½–¾ in. long; spathellules and calyx strongly ribbed; corolla twice as long as the calyx, not striate.—*Fem. fl.* and fruit unknown, position hence uncertain.

28. *C. Rotang*, *Linn. Sp. Pl.* Ed. 1, 325; Ed. 2, 463 (the Ceylon plant only); leaflets many equidistant linear-ensiform rarely subaggregate upper smaller, margins spinulose, petiole very short or 0, rachis armed beneath with short stout uniseriate claws, sheath armed with short straight conical based scattered spines, male spadix slender decompound, spikelets ½–1 in. recurved, spathellules short, flowers crowded, corolla deeply striate, fem. spikelets much stouter and longer, flowers distant, fruit globose very pale. *Willd. Sp. Pl.* iii. 202 (*excl. Syn. Lour.*); *Lamk. Ill.* t. 770, f. 1; *Schult. f. Syst. Veg.* vii. ii. 1322 (*excl. all cit. but Linn. & Willd.*); *Roxb. Fl. Ind.* iii. 777; *Mart. Hist. Nat. Palm.* iii. 334, t. 116, f. 8; *Kunth Enum.* iii. 207; *Blume Rumph.* iii. 33; *Walp. Ann.* iii. 484, v. 830;



Miq. Fl. Ind. Bat. iii. 117. *C. Roxburghii*, *Griff. in Calc. Journ. Nat. Hist.* v. 43; *Palms Brit. Ind.* 55, t. 195 A (under *fasciculatus*) (and t. 112 *P. monoicus*, Roxb.); *Thw. Enum.* 330. *C. monoicus*, Roxb. *Fl. Ind.* iii. 783; *Mart. l. c.* (209, Ed. 1) 334 (excl. descr.) *Wall. Cat. n.* 8604?; *Griff. ll. cc.* 48 and 58; *Kunth l. c.* 208; *Walp. ll. cc.* 484 and 830. *C. scipionum*, Lam. (in part) *Encycl. vi.* 304 (excl. *Syn. Lour. & Rheede*).

THE DECCAN PENINSULA AND CEYLON.

Stem scandent, very slender. *Leaves* 2-3 ft.; leaflets 8-10 by $\frac{1}{2}$ - $\frac{3}{4}$ in., median costa unarmed on both surfaces or armed beneath only, lateral unarmed on both surfaces; in Madras specimens there is often a strong solitary spine above the base of the leaflet on the midrib beneath; sheath in Madras specimens with horizontally flattened spines. *Spadix* and its slender tubular spathes unarmed or nearly so. *Male fl.* biseriate, but not distichous, densely crowded, $\frac{1}{2}$ - $\frac{1}{3}$ in. long; spathellules acuminate. *Fruit* $\frac{3}{4}$ - $\frac{1}{2}$ in. diam.; scales with an obscure sometimes discoloured channel, margins not or faintly narrowly discoloured.

29. **C. Brandisii**, *Becc. mss.*; stem slender, leaflets few fascicled lanceolate ensiform naked beneath sparsely setose above on the 3 costæ, petiole slender with few very long slender straight spines, rachis with long stout solitary straight and recurved spines, sheath armed with solitary or aggregate slender flattened straight spines mouth with very long needle-shaped spinules, male spadix elongate shortly flagelliferous with few partial inflorescences, spathes narrow tubular upper funnel-shaped unarmed embracing the bases of the spikelets, flowers 4-seriate in bud.

TRAVANCORE; at Courtallam, alt. 3-5000 ft., *Brandis*.

I have seen no specimen of this species, which appears from a photograph to be remarkable for the long straight very slender spicules at the mouth of the leaf-sheath.—*J. D. H.*

30. **C. Feanus**, *Becc. mss.*; stem scandent, leaflets few remote subequidistant elliptic-lanceolate or oblanceolate 7-9-costate, petiole very short and rachis armed with short hooked spines, sheath flagelliferous coriaceous green marbled with black scurfy spots strongly armed with scattered long spreading or deflexed and short stout reflexed spines, male spadix compound 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 $\frac{1}{2}$ - $\frac{1}{3}$ in. diam. *Leaves* rather short, about 3 ft. 3 in. long; sheath $\frac{1}{2}$ - $\frac{3}{4}$ in.; ochrea very short, truncate; leaflets 6-8, the larger 8-12 by 2-2 $\frac{1}{2}$ in., terminal free. *Male spadix* 1 $\frac{1}{2}$ in. *Fruit* about $\frac{1}{2}$ in. by $\frac{1}{4}$ diam., beak conical acute; scales about 15-seriate, not channelled on the back, where they are opaque and as if pulverulent with a broad rather discoloured band. *Seed* deeply pitted.—Near *acanthospathus*, but very distinct by the opaque not channelled scales of the fruit.

31. **C. acanthospathus**, *Griff. in Calc. Journ. Nat. Hist.* v. 39; *Palms Brit. Ind.* 50, t. 190 B (excl. A, f. 1); leaflets few large inequidistant elliptic-lanceolate strongly 5-7-costate usually unarmed on both surfaces, rachis and long petiole very stout scurfy and armed with 2-3 series of very stout recurved spines, sheath stout densely armed with long flattened and short stout straight or recurved spines, spadices very stout flagelliferous, peduncle armed with unequal subulate spines, lower spathe very stout tubular compressed with a lanceolate limb, back armed with conical based spines, upper spathes clavate unarmed, partial

inflorescence sheathed up to the spikelets, fruit obovoid or globose shortly beaked brown. *Mart. Hist. Nat. Palm.* iii. 333, t. 176, f. vi.; *Walp. Ann.* iii. 484, v. 830. *C. montanus*, *Anders. in Journ. Linn. Soc.* xi. 9.

EASTERN NEPAL, SIKKIM and BHOTAN HIMALAYA, ascending to 6000 ft., *J. D. H., &c.* KHASIA HILLS, alt. 2-4000 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 costæ of the upper surface; flagellum of the sheath 10-12 ft. *Spadix* 4-6 ft., erect, armed with short recurved spines; branches of fruiting spadix very stout; spikes 1-4 in., strongly recurved. *Lower spathe* 1 ft., scurfy, as thick as the thumb; uppermost glabrous. *Fruit* $\frac{3}{4}$ in. diam., pericarp thin; scales chesnut brown, obscurely channelled, shining; fruiting calyx large, cupular, $\frac{1}{2}$ in. diam., lobes very short. *Seed* deeply pitted.

GROUP IV. See p. 437.

32. *C. Guruba*, *Ham. in Mart. Hist. Nat. Palm.* iii. 206 and 330, t. 175, f. 1; leaflets alternate equidistant narrowly linear, margins and 3 costæ above setose midrib usually alone setose beneath, long slender petiole and rachis armed with long brown recurved and short conical spines below and on the margins, sheaths flagelliferous covered with long flattened spines and crowded smaller ones, spathes glabrous tube of lower compressed margins with long spines back with short ones, limb recurved, upper spathes nearly unarmed, male spadix elongate very slender decompound, spikes spreading very slender, spathellules very shallow, flowers distichous pointing forwards, fruit pisiform apiculate. *Griff. in Calc. Journ. Nat. Hist.* v. 42; *Palms Brit. Ind.* 54; *Kunth Enum.* iii. 210; *Kurz in Journ. As. Soc. Beng.* xliii. ii. 214; *For. Fl.* ii. 522. *C. Mastersianus*, *Griff. ll. cc.* 76 and 84. t. 206. *Dæmonorops Guruba*, *Mart. l. c.* 330; *Walp. ll. cc.* 479 and 828; *Miq. Fl. Ind. Bat.* iii. 100.

BENGAL, ASSAM, the KHASIA HILLS, SILHET, CHITTAGONG and BURMA.

Tall, scandent, stem without the sheaths very slender. *Leaves* 5-6 ft.; leaflets 12-15 by $\frac{1}{2}$ - $\frac{3}{4}$ in., upper smaller free, sometimes quite naked on both surfaces; sheath with a long membranous lucerate ligule. *Spathes* with terete tubular bases and long flat thinly coriaceous obtuse brown laminae, of the lower 12-18 long by 1-1 $\frac{1}{4}$ broad, flagellum very stout and stoutly armed. *Male spikes* 2-3 in., flexuous; spathellules very small membranous cups. *Flowers* $\frac{1}{2}$ in. long, calyx striate; corolla twice as long, polished. *Fruit* $\frac{1}{4}$ in. diam., abruptly beaked; scales very pale, obscurely channelled, margin brown.

33. *C. nitidus*, *Mart. Hist. Nat. Palm.* iii. 334; leaflets equidistant rigidulous close-set linear-lanceolate acuminate shining margins thickened, costæ 3 setulose on both surfaces or on the upper only, rachis with simple or compound recurved spines, spadices decompound, spathes glabrous, fruit globose, scales brown in the middle 17-18-seriate. *Kunth Enum.* iii. 211; *Griff. in Calc. Journ. Nat. Hist.* v. 49; *Palms Brit. Ind.* 59; *Miq. Fl. Ind. Bat.* iii. 117; *Walp. Ann.* iii. 484; v. 830; *Wall. Cat.* 8609.

TENASSERIM, *Wallich, Helfer (Kew distrib.* (6390, 6396, 6398).

Very near to and probably not distinct from *C. Guruba*, but the leaflets are shorter 6-7 by $\frac{1}{2}$ - $\frac{1}{4}$ in., and the flowers smaller, about $\frac{1}{16}$ in. long.—The specimens are very insufficient.

34. *C. platyspathus*, *Mart. Hist. Nat. Palm.* iii. 210; leaflets few scattered alternate ensiform acuminate strongly 5-7-costate, margins

costæ almost unarmed, rachis armed with straight and recurved strong solitary and binate spines with swollen bases, sheath armed with close-set straight subulate spines, male spadix long very slender sparsely shortly armed, inflorescences short subsessile paniculately branched, spikelets very short few-fld. upper spathes with very short sheaths and flat linear-oblong laminae, spathellules very short acute, corolla twice as long as the calyx not striate. *Griff. in Calc. Journ. Nat. Hist.* v. 75; *Palms Brit. Ind.* 83; *Kurz in Journ. As. Soc. Beng.* xl. 214. *C. polyspathos*, *Wall. Cat.* 8610. *Dæmonorops platyspathus*, *Mart. l. c.* Ed. 2, 206, 329; *Miq. Fl. Ind. Bat.* iii. 99; *Walp. Ann.* iii. 479, v. 828.

TENASSERIM, at Tavoy, *Gomez*.

Leaflets 10-12 by 1-1½ in., rigid, margins bristly towards the apex, young pale softly scurfy beneath, margins thickened with obscure distant asperities. Upper spathes 3-4 by ½-¾ in., flat. Inflorescences of male spadix as long as their spathes, very compound; spikelets ¼-½ in. Flowers ⅓ in. long, pale, close-set, pointing forwards. Calyx sharply toothed, striate. Fem. spadix and fruit unknown.

35. *C. paspalanthus*, *Becc. mss.*; leaflets equidistant close-set very narrow finely acuminate 3-costate costæ closely spinulose beneath more remotely above, margins nearly smooth, petiole very long white armed below with flat appressed long and short spines, rachis brown scurfy rounded beneath with short recurved single and trifid spines, lower spathe very long tubular armed with short spires, male spadix stout erect decomposed with erect branches and very short lacerate spathels, spikes erect very dense-fld., spathellules closely imbricating lunate very strongly nerved, flowers minute.

PERAK; at Goping, *King's Collector* (577).—DISTRIB. BORNEO.

Leaves not flagelliferous; leaflets 4-10 by ½ in., shining, strict; petiole about 2 ft., white, but covered with a fine brown scurf when young; sheath flagelliferous. Spadix quite unlike any other, from the upright branches and spikes, and dilacerate short membranous spathels. Spikes ¾-1 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 Lobb, which Beccari says are identical with those from Perak (which I have not seen). He adds that its affinities are uncertain, and it is perhaps allied to *C. leptospadix*.

36. *C. ramosissimus*, *Griff. in Calc. Journ., Nat. Hist.* v. 78; *Palms Brit. Ind.* 87, t. 207; leaflets very large scattered ensiform or elliptic-lanceolate acute coriaceous many-costate, margins and costæ smooth, petiole very stout armed below with scattered very long straight flat and many small spines, rachis very stout back rounded armed with broad short recurved solitary and 2-3-nate claws, male spadix ovoid decomposed erect densely branched, peduncle very stout tomentose, branches and spikes erecto-patent, spathes very large blade thickly coriaceous lower with a spinous tube, upper open, fem. spadix furfuraceous with very stout simple spikes, spathellules of both sexes very short. *Dæmonorops ramosissimus*, *Mart. Hist. Nat. Palm.* iii. 330; *Miq. Fl. Ind. Bat.* iii. 100; *Walp. Ann.* iii. 479, v. 828.

MALACCA? *Griffith*. PERAK; Larut, on Gunong Tjuk, *Scortechini* (51^b, 1235); alt. 2500-3500 ft., *King's Collector* (2617, 2910, 6342, 7181).

Stem 20-30 ft., scandent, 1-1½ in. diam. Leaves 6-8 ft., dark green, glossy; leaflets 18-24 by 1½-2 in., 7-13-costate, almost plicate; rachis as thick as the little finger, plano-convex, spines ¼-½ in. long, recurved, longer spines on lower part of petiole 1½ in., on sheath 2-3 in. Blade of lower spathe 1-2 ft. by 1-2 in. Inflo-

rescences of male spadix 10–12 by 3–4 in., furfuraceous; peduncle as thick as the little finger, compressed; branches fastigiate, strict, suberect; spikes distichous, 1–1½ in.; spathellules very shallow; flowers close-set, pointing forwards, ½ in. long, *Calyx* shortly tubular, obliquely acutely trifid, striate. *Corolla* twice as long, smooth. *Fem. spadix* sessile; spikes 1½–2½ in., brown scurfy, 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 costæ above and only on the median beneath, petiole long armed with long stout horizontal marginal spines, male and fem. spadices subsimilar strict erect more or less sprinkled with white cottony tomentum, spathes unarmed much compressed shorter than their respective partial inflorescences, fem. spadix not very decompound, flowers cylindric.

PERAK, *Scortechini* (317^b).

The above description is from Beccari's notes, who adds that it is a very distinct species, somewhat allied to *C. ramosissimus*.—I have seen no specimen. *J.D.H.*

38. **C. hypoleucus**, *Kurz For. Fl.* ii. 523; leaflets alternately and interruptedly approximate by twos on each side oblong-lanceolate acuminate ciliate towards the apex white beneath many-costate, petiole short armed with long and short conical straight and recurved spines, rachis with scattered recurved spines, sheaths densely spiny with unequal spines 1 in. long and less, fem. spadix small short, peduncle slender spinous, spathes oblong-lanceolate, spathels tubular small distant, flowers distichous, calyx ¼ in. shortly 3-lobed, corolla twice as long segments acute. *Dæmonorops hypoleucus*, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 208 (*partim*), t. xviii. (excl. t. xix.).

BURMA; on Thoungyeen, *Brandis*.

Stem slender, scandent, as thick as a goose-quill without the sheaths. *Leaves* 2–3 ft., not flagelliferous; sheaths flagelliferous; leaflets 6–9 in. long. *Fem. spadix* 12 in. long; peduncle about 1 in. Male fl. and fruit unknown.—Description from *Kurz*. I have seen no specimen. *J.D.H.*

39. **C. myrianthus**, *Becc. mss.*; leaflets very long narrowly elliptic-lanceolate many-costate pale almost white beneath smooth on both surfaces or with minute bristles on the costæ beneath, margin obscurely aculeolate, rachis dorsally rounded shortly spinous, male spadix very long slender sparsely spinous, spathels tubular truncate, inflorescences laxly decompound, branches very slender, spike ¼–½ in. zigzag almost filiform, spathellules minute, flowers minute pointing forward closely imbricate, calyx acutely 3-lobed striate, corolla twice as long acute estriate. *Dæmonorops hypoleucus*, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 208 (*partim*) t. xix.

TENASSERIM; at Mergui, *Helfer* (*Kew distrib.* 6397).

The only materials for this species seen by me are Helfer's specimens, consisting of a portion of the rachis of a leaf with two leaflets, and portions of a male spadix; the leaflets are 30 by 2 in., very thin and pale beneath, with indistinct cross nervules.—Beccari has identified with it the plate xix. of *Kurz's C. hypoleucus* on the faith of some specimen supposed to be of *Kurz's* plant communicated by Dr. Brandis. That figure represents much shorter and broader leaflets than those of Helfer's plant, with distinct bristles on the margins and costæ beneath.—There is no evidence of Helfer's plant belonging to this section. *J.D.H.*

GROUP V. See p. 437.

40. **C. travancoricus**, *Beddome mss.*; leaflets in distant opposite groups of 3-5 narrowly oblanceolate acuminate thin, costæ 3 very slender naked above sparsely setulose beneath, rachis and petiole very slender armed with small straight and recurved spines, sheath armed with slender straight flattened prickles, spadix long slender flagelliferous, inflorescences shorter than the membranous flat spathes, male decoumpound, fem. with simple distichous spikes, upper spathes and spathels tubular obliquely truncate, spathellules short acute, calyx strongly striate, corolla estriate twice as long.—*Rheede Hort. Mal.* xii. t. 64.

DECCAN PENINSULA; from Malabar to Travancore, *Wight, Beddome*.

Stem very slender, scandent. *Leaves* 18-24 in.; leaflets 4-6 by $\frac{1}{2}$ – $\frac{3}{4}$ in., broadest about or above the middle and thence tapering to a capillary point, shining above; rachis scurfy when young; petiole 4-6 in., dorsally rounded, margins acute much compressed towards the base and there chiefly spiny. *Spadix* flagelliferous, 2-3 ft.; peduncle short, flattened, young white scurfy, margins shortly spiny. *Lower spathes* tubular, compressed at the base, with shortly spinous angles, produced into a long membranous sheathing lamina; upper with unarmed tubes. *Inflorescences* about 2 in. long, males with spreading very slender branches bearing short flexuous almost capillary spikes of flowers $\frac{1}{2}$ in. long; fem. with simple recurved spikes and rather larger flowers.—*Rheede's* figure is very good for its time.

41. **C. Rheedel**, *Griff. in Calc. Journ. Nat. Hist.* v. 73; *Palms Brit. Ind.* 36, 83; leaflets in very distant groups of 3 on a long rachis armed with scattered short recurved spines linear-lanceolate acuminate, fruiting spadix with the flat open acute spathes longer than the ovoid dense clusters of ellipsoid or oblong fruit. *Dæmonorops Rheedii*, *Mart. Hist. Nat. Palm.* iii. 330; *Miq. Fl. Ind. Bat.* iii. 100; *Walp. Ann.* iii. 479, v. 828.—*Rheede Hort. Mal.* xii. t. 65.

MALABAR, *Rheede*.

Of this species nothing is known beyond *Rheede's* rude plate, which is very inferior to that of *C. travancoricus*, from which it differs in the much longer leaf the leaflets being grouped in threes, one of each group apparently on one side of the rachis and 2 on the other; four leaflets terminate the rachis. The fruits are represented as $\frac{3}{4}$ in. long by $\frac{1}{2}$ in. broad and very shortly beaked. *Beccari* thinks that a *Calamus* fruit sent from Malabar to Kew by Major Campbell exactly corresponds to *Rheede's* figure.

GROUP VI. See p. 438.

42. **C. Huegelianus**, *Mart. Hist. Nat. Palm.* iii. 338; leaflets many equidistant elongate ensiform acuminate strongly 3-costate, margins smooth unarmed above beneath pale and with a very few long bristles on the lateral costæ, petiole stout young scurfy back rounded with very stout short recurved spines, sheath armed with very stout scattered long and short spines, fem. spadix stout erect, spathes sparingly armed with stout claws narrowly tubular truncate, fruiting branches 6-10 in. very stout, spikes recurved, calyx pedicelled cupular with spreading lobes, fruit globose black shining. *Walp. Ann.* iii. 488, v. 831. *C. Wightii*, *Griff. Palms Brit. Ind.* 102, t. 216 *C. melanolepis*, *H. Wendl. in Kerch. Palm.* 237. *Dæmonorops melanolepis*, *Mart. Hist. Nat. Palm.* iii. 331, t. 175, f. xi.; 342 under *C. dioicus* and tab. 116, f. xi.; *Walp. ll. cc.* 481, and 829.

NILGIRI HILLS; alt. 5-6000 ft., at Sispara, *Wight, &c.*; at Naduvatom, *Gamble*.

Apparently a stout scandent species. *Leaflets* 12–16 by $\frac{3}{4}$ –1 in., tips spinelously ciliate, margins below obscurely aculeolate, pale green, not shining, almost white beneath, the very distant bristles on the lateral nerves beneath sometimes absent, at others nearly $\frac{1}{2}$ in. long; rachis and petiole pale. *Fruit* $\frac{3}{4}$ – $\frac{1}{2}$ in. diam., very shortly beaked; scales subacute, with fimbriate margins, not channelled; fruiting calyx nearly $\frac{1}{2}$ in. diam.; petals acute.

43. **C. Gamblei**, *Becc. mss.*; leaflets as in *C. Huégelianus*, but with shorter scattered bristles on the 3 costæ of the lower surface and a few on the upper, fruiting spikes of the spadix recurved, calyx cupular long-pedicelled, lobes very short, fruit globose or broadly obovoid, scales pale yellow acute deeply channelled.

NILGHIRI HILLS; Makurti forests, alt. 5000 ft., *Gamble*.

A very distinct species differing from *Huégelianus* by the longer leaflets, 2–2½ ft., the more slender spathellules, longer pedicel of the more campanulate calyx which has shorter lobes, and by the pale fruit with deeply channelled scales.—A variety with spherical fruit is mentioned by Beccari.

GROUP VII. See p. 438.

44. **C. gracilis**, *Roxb. Fl. Ind. iii. 781 (excl. Syn. Hort. Mal.)*; leaflets few in opposite groups of 3–5 on each side of the slender rachis elliptic-lanceolate acuminate 3–7-costate, costæ very slender more or less setose above, petiole short and rachis and sheath armed with short hooked spines, fem. spadix elongate slender drooping flagelliferous spathes tubular acuminate sparingly spinous, upper unarmed, spathels not imbricate, fruiting calyx sessile shortly cylindric, lobes very short, fruit oblong, scales very pale ripe channelled. *Mart. Hist. Nat. Palm. iii. 338*; *Kunth Enum. iii. 209*; *Griff. in Calc. Journ. Nat. Hist. v. 54*; *Palms Brit Ind. 64, t. 196*; *Walp. Ann. iii. 488, v. 831*; *Kurz in Journ. As. Soc. Beng. xliii. ii. 212, t. 31 C*; *For. Fl. ii. 520*.

The KHASIA HILLS, ascending to 4000 ft.; UPPER ASSAM, *Mann. Cachar, Keenan. CRITTAGONG, Kurz*.

Slender, scandent; naked stem not thicker than a quill. *Leaves* 2–3 ft.; leaflets 5–7 in., margins obscurely bristly except at the tip where the bristles are long; petiole very short and rachis fugaciously scurfy; sheaths green, glabrous. *Spathes* fugaciously brown-scurfy; spathels unarmed. *Corolla* three times as long as the calyx. *Fruit* $\frac{3}{4}$ in. long; scales straw-cold, with or without a narrow brown border; fruiting calyx pedicelliform. *Seed* wrinkled.—*Descript. chiefly from Kurz*.

45. **C. melanacanthus**, *Mart. Hist. Nat. Palm. iii. 333, t. 116, f. 13 (in part)*; leaflets many equidistant membranous linear with capillary tips 3-costate upper much shorter, shortly setose or naked on the costæ beneath, rachis with a single row of short recurved black spines, sheath with sub-whorled spines, fem. spadix decomposed ending in a flagellum, spathes shortly sparsely spinous upper nearly unarmed, fruiting calyx sessile campanulate pedicelliform, fruit ellipsoid shortly beaked, scales very pale channelled, embryo lateral. *Kunth Enum. iii. 211*; *Griff. in Calc. Journ. Nat. Hist. v. 49*; *Palms Brit. Ind. 59*; *Walp. Ann. iii. 484, v. 830*; *Miq. Fl. Ind. Bat. iii. 119*; *Palm. Archip. Ind. 27*; *Kurz in Journ. As. Soc. Beng. xliii. ii. 215, t. xx. B.—Wall. Cat. 8606 B*.

TENASSEERIM; at Chappedong, *Wallich*.

Scandent. *Leaflets* 6–13 by $\frac{1}{2}$ in., upper 2–3 in., shining, tips sparsely bristly or naked. *Corolla* hardly longer than the (fruiting) calyx-lobes. *Fruit* $\frac{3}{4}$ in. long, greyish yellow with very narrow brown margins; lobes very short. *Albumen*



deeply ruminant; embryo in the middle of the side, a very unusual position in the genus.—The specimens examined are of the portion of a leaf and of a fruiting spadix.

46. **C. Diepenhorstii**, *Miq. in Journ. Bot. Neerl. Ind.* i. 21; *Palm. Archip. Ind.* 27; *Fl. Ind. Bat.* 594; leaflets very many equidistant long narrow finely acuminate 3-costate, costæ naked or very sparsely setose above, margins thickened smooth, petiole very long armed with straight scattered spines, rachis angular armed with one row above and two below of short recurved spines, sheath copiously armed with long flat straight deflexed black spines, spadices very long supradecomound, fruiting calyx very short sessile cupular, fruit obovoid shortly beaked, embryo basal. *C. melanacanthus*, *Mart. (partim)*.—*Wall. Cat.* 8606 A.

PENANG, *Wallich, Curtis* (765). PERAK; on Gunong Tambang Batok, alt. 500–2000 ft., *Scortechini* (647^b). Larut and Gunong Malacca, *King's Collector* (7201, 2552).—DISTRIB. Sumatra.

Stem 20–30 ft., stout, scandent. *Leaves* 3–4 ft.; leaflets 18–20 by $\frac{3}{4}$ – $\frac{1}{2}$ in., straight, upper smaller; spines of sheath $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Fruiting spadix* 10–12 ft., slender. *Fruit* $\frac{3}{4}$ in. diam., orange-yellow when ripe (*King's collector*); fruiting calyx very short, sessile, lobes obscure; scales channelled, very narrowly bordered with brown.—Very distinct from *melanacanthus* in the much stouter petiole and rachis, long flat spines on the sheath, long leaflets with thickened margins, very long fem. spadix, with very long branches, and basal embryo.

¶ 47. **C. singaporensis**, *Becc. mss.*; leaflets many rather distant narrowly linear finely acuminate 3-costate, tips setose, margins and costæ on both surfaces unarmed or nearly so, upper part of rachis slender angled with 1–2 rows of short recurved black spines, male spadix very slender flagelliform decomound, spathes very slender tubular lower shortly spinous, upper ending in flat laminæ uppermost with oblique membranous mouths, spikes 1 in., spathellules densely imbricate short striate, flowers very young.

SINGAPORE; in the forest near the Bot. Garden, *Murton*.

Apparently a very slender species of doubtful position, known only by an upper portion of a leaf and young male spadix. *Leaflets* 10–12 by $\frac{1}{4}$ – $\frac{1}{2}$ in., margins hardly thickened.

GROUP VIII. See p. 438.

48. **C. exilis**, *Griff. Palms Brit. Ind.* 51 (axilis, 35); leaflets many equidistant narrow finely acuminate copiously setulose on the margins, costæ and often the intermediate nerves above and beneath, rachis scurfy setose and armed with a single row of hooked spines, petiole long flattened 2-edged with marginal straight slender spines, sheath scabrid and armed with short straight flattened spines, fem. spadix decomound scabrid all over as are the spathes, fruit linear oblong sharply beaked. *Mart. Hist. Nat. Palm.* iii. 333, t. 176, f. 7; *Walp. Ann.* iii. 484, v. 830; *Miq. Fl. Ind. Bat.* iii. 116.

MALACCA; on Gunong Ladang, *Fernandez*. PERAK, Larut and Ulu Bubong, alt. 4000 ft., *Scortechini* (657^b), *King's Collector* (2734, 6245, 8457) 10,259, *Herb. Calc.*).

Stem 15–20 ft., $\frac{3}{4}$ in. diam. *Leaves* 3–3 $\frac{1}{2}$ ft.; leaflets 8–10 by $\frac{1}{4}$ – $\frac{1}{2}$ in., cross nervules strong; petiole scaberulous, with distant dorsal hooked spines and many marginal; sheath with coarse matted hairs at the mouth. *Lower spathes* 12–14 in., compressed and 2-edged with slender marginal spines below and smaller ones above, mouth oblique, upper spathes 4–6 in., tubular, armed with small scattered spines.

Branches of fem. spadix 6-8 in., coarsely scabrid, bearing short alternate few-fl. spikes; fruiting calyx pedicelled and pedicelliform, campanulate; lobes as long as the tube and as the petals. *Fruit* nearly 1 by $\frac{1}{2}$ in. diam., dirty yellow; scales margined with brown. *Seed* linear-oblong, transversely grooved; albumen not ruminate; embryo in the middle of the back.

GROUP IX. See p. 438.

49. **C. tomentosus**, *Becc. mss.*; sheath, rachis and flagellum softly almost flocculently white-tomentose, leaflets few distant or in distant pairs elliptic acuminate coriaceous strongly nerved, margin crisped or waved.

PERAK, Scortechini (431b); alt. 2500-3000 ft., *King's Collector* (5332, 6993).

Stem 20-40 ft., $\frac{1}{2}$ - $\frac{3}{4}$ 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, subterete, armed with few distant 3-fid short claws; flagellum 8-10 ft., ending in a long filiform prickly tip, armed with strong 3-fid claws at about equal distances, towards the base the surface of the petiole is granulate when dry. A portion of a flowerless and fruitless spadix is terete with tubular spathes and bears distant spreading spikes 4 in. long, with rather distant coriaceous subcampanulate spathels.—A remarkable plant of which the specimens are very imperfect. The description of the stem and colour of the leaflet is from notes by King's Collector; the rest from his specimens, one of which (5332), with smaller leaves is from Larut, "within 300 ft.," perhaps meant for 3000 (as in n. 6993).

GROUP X. See page 438.

50. **C. zeylanicus**, *Becc. mss.*; leaflets many long equidistant ensiform long acuminate 4-5-costate, margins minutely setulose or naked, costæ very sparingly setose above naked beneath, rachis very stout, male spadix decomposed, lower spathe acute armed with very short scattered prickles, upper striate smooth or sparsely aculeate, uppermost funnel-shaped truncate, branches of male spadix 6-10 in. clothed with short broad imbricate spathels, spikelets very many distichous, spathellules extremely short and densely imbricate, fem. spikes and spikelets much longer and laxer, fruit globose long-beaked. *C. rudentum*, *Thw. Enum.* 330 (*excl. syn.*) (*non Lour.*); *Hance in Journ. Bot.* 1874, 262.

CEYLON, Walker; Suffragam district, *Thwaites* (CP. 2874).

Stem very stout. *Leaves* probably 4-5 ft. long; leaflets $1\frac{1}{2}$ -2 ft. by 1-1 $\frac{1}{2}$ in., smooth; rachis pale, finely scurfy, with short appressed marginal spines above and lower down with 3-fid claws beneath; flagellum very stout, with very broad claws of 3-6-nate recurved black spines. *Male spadix* with long spreading branches clothed with short spathels and bearing short broad flat spikelets $\frac{1}{2}$ -1 in. long and $\frac{1}{2}$ broad of most densely imbricate short spathellules and small flowers $\frac{1}{2}$ in. long. *Fem. spadix*; branches and spikes much longer; calyx sessile, very short, deeply 3-lobed; fruiting calyx sub-pedicelliform; petals as long, both striate. *Fruit* $\frac{3}{4}$ in. diam., dull yellow; scales deeply channelled, margins scarious pale. *Seed* globose; albumen deeply ruminate, embryo lateral.

51. **C. latifolius**, *Roxb. Fl. Ind.* iii. 7751; leaflets few large scattered or 2-nate elliptic or elliptic-lanceolate 3-9-costate tips setose, margins aculeolate, costæ 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 straight flat solitary or whorled ones, spadix decomposed, spathes short subcompressed sparsely



spinous mouth oblique, spathels short, male spikes densely imbricate, fruiting calyx sessile, pedicelliform broadly campanulate lobes short, fruit subglobose pale. *Mart. Hist. Nat. Palm.* iii. 339, t. 160, f. 5; *Griff. in Calc. Journ. Nat. Hist.* v. 60; *Palms Brit. Ind.* 68, t. 198 (excl. cit. *Hort. Malab.*); *Kurz in Journ. As. Soc. Beng.* xliii. ii. 210 (excl. t. 31 A); *For. Fl.* ii. 518 (*partim*). *C. macracanthus* et *inermis*, *T. Anders. in Journ. Linn. Soc.* xi. 10, 11; ? *C. humilis*, *Roxb. Fl. Ind.* iii. 773.

From the SIKKIM HIMALAYA and ASSAM, ascending to 2000 ft., to TENASSERIM. Stem stout, 1-2 ft., as thick as the thumb. Leaves with the flagellum 10-15 ft.; leaflets 1-2 ft. by 1-2½ in., upper sometimes flabellately clustered or connate at the base; cross nervules very many and close; petiole short or long, sometimes bearing the leaflets only far up the flagellum; base sometimes ¾ in. broad, smooth, biconvex, spines very various always scattered. Spadix very large; spathes and branches usually armed with scattered very short broad spines. Fruit (not quite ripe) nearly 1 in. long, rather narrower, pale dull yellow; scales convex, deeply channelled, shining, margin very narrowly scarious.—*C. humilis*, *Roxb.*, is probably founded on a very young plant of *C. latifolius* with undeveloped flagella.

52. *C. Doriaei*, *Becc. mss.*

BURMA; on Mt. Karin, *L. Fea.*

Only a portion of a spadix with fruit known. It appears to be nearly allied to *C. latifolius*, from which it is distinguished by the elongate fruit ¾-1 by ½ in.—I have seen no specimen. *J.D.H.*

53. *C. simplex*, *Becc. mss.*; leaves flagelliferous, leaflets very few large elliptic 3-6-costate, spadix supra-axillary quite simple elongate not flagelliferous bearing at every primary spathe a solitary simple spikelet or at most two from the lowest spathe, fruiting calyx callous shortly pedicelliform, fruit rather large broadly ovoid, seed globose, albumen deeply ruminate, embryo subbasilar.

PERAK; on Gunong Tambang Batak., *Scortechini* (432).

Differs from all other known species in the few divisions of the spadix.—I have seen no specimen. *J.D.H.*

54. *C. caesius*, *Blume Rumph.* iii. 57; leaves subsessile flagelliferous, leaflets very inequidistant in distant fascicles of 5-7 oblanceolate cuspidately acuminate glaucous or farinose beneath acutely 4-costate above and setulose, margins setulose acute, rachis armed with solitary and subwhorled spines, sheath not flagelliferous very gibbous above fugaciously scurfy armed with scattered long horizontal spines with broad callous bases and small acute tubercles. *Mart. Hist. Nat. Palm.* iii. 340; *Walp. Ann.* iii. 490, v. 832; *Miq. Anal. Bot. Ind.* i. 6; *Fl. Ind. Bat.* iii. 129; *Palm. Archip. Ind.* 28. *C. glaucescens*, *Blume, l.c.* 65; *Mart. l.c.* 339; *Walp. ll. cc.* 489, 830; *Miq. ll. cc.*

PERAK, *Scortechini*.—DISTRIB. Borneo.

A lofty climber. Leaves 2-3 ft.; leaflets 12-14 by 2-2½ in. Fruit unknown.—Appears to be allied to *C. melanoloma* of Java. I have seen no specimen. *J.D.H.*

55. *C. axillaris*, *Becc. mss.*; leaves shortly petioled, leaflets numerous very inequidistant above oblanceolately ensiform, margins smooth, rachis unarmed below armed above with scattered simple and ternate claws, spadix not flagelliferous elongate with several erect partial inflorescences, spathes 1st and 2nd fugaciously scurfy unarmed or the lower scarcely armed,

spikelets short scorpioid, 3rd spathe infundibular, limb open truncate margin fimbriate, spathe and spathe-lules striate margins ciliate, flowers distichous, calyx finely striate.

PERAK, *Scortechini*.

Described from a single specimen which I have not seen. The fruit, and hence the position of the species, is unknown. *J.D.H.*

56. **C. pallidulus**, *Becc. mss.*; leaves subsessile, leaflets inequidistant hardly fascicled ensiform acuminate, costæ 3 unarmed on both surfaces, margins sparsely spinulose, rachis strongly armed with uniform short black tipped 3-fid claws, sheath with scattered short straight spines, spathe armed with short stout scattered simple conical spines, fruit spherical shortly beaked pale, seed deeply pitted, albumen ruminant.

PERAK; at Thaiping, *Wray* (2392, 3017).

Leaflets 8-10 in. The upper spathes are naked with much dilated obliquely truncate mouths. The fem. spikes 2-2½ in., strongly recurved; spathe strongly muricate. Fruit ¾ in. diam., very pale; scales obscurely channelled, margins hardly scarious, 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. ovoides**, *Thw. ex Trimen in Journ. Bot.* 1885, 269; leaves petioled, leaflets equidistant broadly linear alternate 3-costate tip bristly, margin thickened smooth, costæ setose beneath, rachis fugaciously scurfy, margins prickly back rounded with solitary hooked spines, sheath densely armed with rings of flat deflexed often lacerate black spines, lower spathes armed with short broad flat reflexed spines, fruiting spadix with very stout recurved spikelets, fruiting perianth stellate, fruit obovoid strongly beaked.

CEYLON; Saffragam district, *Thwaites* (CP. 3925).

Stem stout, scandent. Leaves 14 ft. and more including the flagellum; leaflets 10-14 by ¾-1 in., bright green above, duller beneath. Fruit ¾-¾ in. long, strongly beaked, scales pale greyish yellow, strongly channelled, narrowly margined with orange-brown. —Described from Trimen l. c.

58. **C. andamanicus**, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 211, t. xxvii. A, xxviii.; *For. Fl.* ii. 519; leaflets alternate equidistant linear subulate-acuminate 3-costate, margins thickened and costæ setose, petiole and rachis armed with stout recurved spines, petiole with blackish tuberous-based ones mixed with long black spines, sheath red brown covered with seriate whorls of capillary black and broad flat black spines, spadix decom-pound nodding, spathes subcompressed armed with strong reflexed solitary and ternate spines, partial unarmed, fruit elliptic-ovoid acuminate, scales with long fimbriate tips.

ANDAMAN and NICOBAR ISLANDS, *Kurz, Man.*

Stem lofty, scandent, as thick as the arm (with the sheaths on). Leaflets 2-2½ ft. by 1 in. broad. Fruit distichous, uniformly brown, about ½ in. long; scales rhomboid, greenish, bordered with chesnut-brown, rather flat, not furrowed, tips prolonged into a lanceolate pale brown opaque acute ciliate membranous appendage, longer than the scale itself. Seed semiconvex, grooved; albumen equable. —(The above from *Kurz*.)

59. **C. palustris**, Griff. in *Calc. Journ. Nat. Hist.* v. 62; *Palms Brit. Ind.* 71, t. 199; leaves shortly petioled, leaflets alternate the median approximate in pairs broadly elongate-lanceolate acuminate with bristly tips 3-costate and many-nerved, margins not thickened and costæ smooth, petiole with 1-2 rows of short very broad fascicled or simple hooked spines with swollen bases, sheath green sparingly armed with short black or broad hooked spines, spathes tubular obliquely truncate armed with recurved spines, spathe glabrous, fruiting perianth stellate, fruit ellipsoid-oblong, scales obtuse. *Mart. Hist. Nat. Palm.* iii. 339; *Miq. Fl. Ind. Bat.* iii. 131; *Walp. Ann.* iii. 490, v. 831. *C. latifolius*, Kurz (not Roxb.) in *Journ. As. Soc. Beng.* xliii. ii. 210, t. 31 A; *For. Fl.* ii. 518 (partly).

TENASSERIM, Griffith. PERAK, *Scortechini* (50b). ANDAMAN ISLANDS, Kurz, Man.

Stem scandent, everywhere glabrous, with the sheaths on 2-3 in. diam. Leaves 8-12 ft.; leaflets 1-2 ft. by 3-5 in., rather thin, uniformly green. Spadix bifariously decompound, elongate, drooping. Fruit about $\frac{1}{2}$ in. long, scales slightly biconvex, hardly channelled, pale brown with a blackish border. Seed almost semi-convex; grooved and irregularly wrinkled.—(Descript. from Kurz.)

** *Fruiting perianth more or less pedicelliform.*

60. **C. unifarius**, H. Wendl. in *Bot. Zeit.* xvii. (1839) 158; var. Pentong, Becc. mss.

NICOBAR ISLANDS. E. H. Man.

The plant referred as above consists of a leaf and a portion of a spadix with the fruit wanting. *C. unifarius* is a Javan plant, described as having rather few inequidistant lanceolate or oblong-lanceolate acuminate 7-costate leaflets; the fruit is subglobose about $\frac{1}{10}$ in. diam., with channelled scales and deeply sinuately furrowed seeds with a basal embryo.—I have seen no specimen. J.D.H.

61. **C. neglectus**, Becc. mss.

MALACCA, Griffith (Kew Distrib. 6399 bis).

This species is founded in the flagelliferous apex of a leaf and a portion of a fruiting spadix. The flagellum is very slender; the leaflets subequidistant, 4-6 in. by $\frac{1}{2}$ in., membranous, linear-lanceolate, finely acuminate, setaceous pointed, with 3 slender costæ and thickened setose margins; spathes coriaceous, tubular, obliquely truncate, armed with short scattered straight stout spines; fruiting calyx subpedicelliform, with broad spreading obtuse lobes; young fruit $\frac{1}{2}$ in. long, ellipsoid, scales dull pale yellow with broad scarious brown margins and tips, not channelled, beak stout.—I have seen no specimen. J.D.H.

62. **C. viridispinus**, Becc. mss.; leaf flagelliferous, leaflets in very distant fascicles variously grouped ensiform finely acuminate, costæ 3 strong sparingly setose above naked beneath, rachis trigonous smooth with few solitary very short hooked spines on the lateral angles, spadix elongate filiform, fem. spikes elongate with alternate remote horizontal flowers, young fruit oblong strongly beaked, fruiting calyx pedicelliform, petals small, albumen solid.

PERAK, *Scortechini* (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. Orleyanus**, Teyssm. & Binnend. *Cat. Pl. Hort. Bogor.* 1886, 75 (name only) erect, leaflets very many in subopposite distant fascicles linear-lanceolate acuminate, tip bristly, costæ 5 setose above naked

*Calamus.*]

beneath, petiole long stoutly armed, sheath excessively armed with large seriate straight or deflexed spines and scattered short ones. *Miq. Palm. Archip. Ind.* 17, with fig. C. Fernandezii, H. Wendl. in Kerchov. *Palm.* 236. *Dæmonorops fasciculatus*, Mart. *Hist. Nat. Palm.* iii. 330; *Walp. Ann.* iii. 480, v. 829; *Miq. Fl. Ind. Bat.* iii. 101.—Rotang Pajare, Griff. in *Calc. Journ. Nat. Hist.* v. 89; *Palms Brit. Ind.* 95.

MALACCA, Fernandez, Oxley.—DISTRIB. Banca?

Stem with the sheaths about 1 in. diam. *Leaves* 10–11 ft. long exclusive of the long flagellum; leaflets 1 ft. by $\frac{3}{4}$ 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.

64. **C. Martianus**, Becc. mss.—*C. paniculatus*, Mart. *Hist. Nat. Palm.* iii. 334 (not of Roxb.).

PENANG; Gaudichaud.

Stem scandent. *Leaflets* 4–5 in., equidistant, alternate, lanceolate, tip shortly acuminate and bristly 7–9-costate, margins and surfaces unarmed, petiole very short, rachis and slender flagellum armed with short spines, sheath with a short obliquely truncate ochrea. *Male spadix* decomposed, lower spathes subterete faintly 2-keeled and rachis armed with short scattered spines, upper unarmed, spikes slender spreading equalling or twice as long as their spathes.—Description from Martius, neither Beccari nor have I seen specimens.—J.D.H.

65. **C. spathulatus**, Becc. mss.; leaflets very few alternate distant uppermost pair connate at the base elliptic obtuse convex above, costæ 5–9 and margins quite smooth, petiole very short and slender, rachis copiously armed with large solitary and 2–3-nate recurved black-tipped spines, sheath flagelliferous elongate cylindric copiously armed with uniform short straight conical-based spines, fem. spadix slender flagelliferous, spathes slender terete armed with short hooked spines, fruiting calyx pedicelliform short contracted sessile, base broadly truncate, fruit (young) long-beaked very pale.

MALACCA, Lobb, Hervey.

Stem scandent; very slender. *Leaves* probably 2–3 ft. long; leaflets 4–7 by 2–2½ in., coriaceous, shining above, base acute, cross-nervules very many and close; petiole and rachis subterete, flagellum very slender; sheath as thick as the 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 $\frac{1}{2}$ in. long; spikes 1–1½ in., spreading and recurved; spathellules very short. *Fruit* (young) $\frac{1}{2}$ in. long, shortly oblong or ellipsoid with a long cylindric beak; scales very pale straw-cold., faintly channelled.

Var. *robusta*, Becc.; spadix much larger, very stout.—Perak, Geelong-Malacca, King's Collector (7136).

66. **C. insignis**, Griff. in *Calc. Journ. Nat. Hist.* v. 58; *Palms Brit. Ind.* 69; leaflets few distant alternate uppermost pair connate at the base elliptic-oblong or -oblanceolate cuspidately subacute convex 7–9-costate margins thickened recurved and both surfaces quite smooth, rachis slender and terete petiole shortly very sparingly prickly, sheath long slender polished very sparingly armed with tubercular spines or conical tubercles, Mart. *Hist. Nat. Palm.* iii. 338; *Walp. Ann.* iii. 488, v. 831; *Miq. Fl. Ind. Bat.* iii. 128.



MALACCA, Fernandez. PERAK, Scortechini.

Stem scandent, as thick as a goose-quill, shining; internodes 2 in. Leaves 12-18 in.; leaflets 3-6 by 1-1½ in., polished above, cross-nervules very many and close set; petiole 3-5 in.; sheath not so thick as the little finger, very long, cylindric and smooth.—The leaflets resemble those of *C. spathulatus* but are smaller.—I have seen no Perak specimens, of which Beccari says that they are more robust, and have rather larger and more numerous leaflets with more distant transverse nerves. J.D.H.

67. *C. quinquenervius*, Roxb. *Fl. Ind.* iii. 777; scandent, leaves flagelliferous, leaflets alternate remote equidistant narrowly lanceolate, spines in belts slender, fruit spherical. *Kunth Enum.* iii. 209; *Mart. Hist. Nat. Palm.* iii. 339; *Griff. in Calc. Journ. Nat. Hist.* v. 61; *Palms Brit. Ind.* 72.

SILHET, Roxburgh.

Climbing. Stem exclusive of the leaf-sheaths, about as thick as the middle finger, internodes 6-8 in.—Probably a well-known species, but not identifiable by the character given, nor recognized by Beccari or myself.

68. *C. ornatus*, Blume in *Ræn. & Sch. Syst.* vii. ii. 1326; *Rumphia*, iii. t. 148; *Mart. Hist. Nat. Palm.* iii. 208, t. 116, f. 2:—

Var. HORRIDA, Becc. mss. leaves petioled not flagelliferous, leaflets large equidistant narrowly ensiform acute 3-5-costate glaucous beneath, margin and costæ beneath caducously setulose, petiole and rachis shortly armed, sheaths with long flat spines, fem. spadix very long flagelliferous, spathes tubular armed with very long spines, branches few erect, spathels smooth, male spikes close set recurved very stout, spathellules broadly imbricating. *C. ornatus*, *Griff. in Calc. Journ. Nat. Hist.* v. 37; *Palms of Brit. Ind.* 46; *Miq. in Journ. Bot. Neerl. Ind.* i. 21; *Fl. Ind. Bat. Suppl.* 256. *C. ovatus* and *C. aureus*, Reinw. ex *Mart. l. c.* 208, 241.

MALACCA, Fernandez. PERAK; Scortechini (587^b) (*Herb. Calc.* 3931).—
DISTRIB. Malayan Islands.

Stem robust; 50-80 ft., 1½ in. diam. without the sheaths; sheaths about 2 in. diam. Leaves 12-15 ft.; leaflets 2-2½ ft. by 2¼ in. broad, tip rather obtuse often 2-fid, bristly; mid-costa above with stout bristles towards the tip; petiole 3 ft., 1½ in. diam., somewhat flattened, rusty-pubescent, much armed with broad strong flattened spines ¼ in. long; sheath copiously armed with whorled flat appressed often imbricating spines 1 in. long, and ½-¾ in. broad at the base. Spadix 16-18 ft.; branches 2½ ft. apart; spathes tubular, armed like the sheaths; spikes 2-3 in.; spathels smooth, bracts and spathellules ciliate. Male spikes recurved, flattened, ⅔ in. across the distichous large spreading spathellules; male fl. broadly ovoid, terete, obtuse; calyx sessile, hemispheric, petals twice as long. Calyx oblong, shortly 3-toothed, fruiting pedicelliform. Fruit 2 in. long, obovoid; scales rufous, margins pale, lacerate.—Descript. chiefly from Griffith; of the fruit from Martius.—Beccari regards the Malacca plant as a var. (*horrida*) with glabrescent sheaths, seriate spines, and adult leaflets 3- or sub 5-costate and scarcely spinulose.

69. *C. giganteus*, Becc. mss.; very robust, leaves large flagelliferous, leaflets many equidistant broadly ensiform acuminate plicately sub 5-costate, costæ and margins unarmed, petiole long and rachis armed with short spines, sheath very stout woody smooth densely armed with very broad basal flat long scattered or subseriate spines and short scattered ones, male spadix supradecomposed, branches close together, spathes tubular shortly spiny, fruiting calyx pedicelliform, fruit large ellipsoid-ovoid, acute.

PERAK; *Scortechini*.

Apparently scaudent, leaf-sheaths 2-3 in. diam. Leaves 8-10 ft. long; petiole 3 ft.; leaflets 2 ft. by $1\frac{1}{2}$ -2 in. Fruit above an inch long, suddenly contracted into a conical point; scales shining, straw-cold.—Very near *C. ornatus*, but more robust, and more densely armed; abundantly distinct in the non-flagelliferous spadix, longer branches, and armed secondary spathes.—I have seen no specimen. J.D.H.

70. *C. scipionum*, Lour. *Fl. Cochinch.* i. 210; leaves not flagelliferous, leaflets numerous firm equidistant upper gradually smaller elongate-lanceolate or subsensiform aculeolate tips bristly, costæ 5-7 naked on both surfaces or sparsely aculeolate beneath, margins nearly smooth, uppermost pair connate at the base, rachis and petiole armed with very stout conico-subulate scattered recurved spines, spadices very long flagelliferous, lower spathes very long tubular unarmed or their keels armed, fruiting calyx very small pedicelliform, fruit small ovoid or globose abruptly mammillate brown. *Lam. Encycl.* vi. 304 (*non Illustr. & excl. syn.*); *Mart. Hist. Nat. Palm.* iii. 342; *Kunth Enum.* iii. 206; *Walp. Ann.* iii. 342; v. 832; *Griff. in Calc. Journ. Nat. Hist.* v. 35; *Palms Brit. Ind.* 43; *Miq. Fl. Ind. Bat.* iii. 138. *C. micranthus*, *Blume Rumph.* iii. 53 (*leaf only*), t. 157 (*excl. spadix & anal. fl.*).—Ching, *Griff. l.c. c.c.* 37 and 46.

MALACCA, Griffith. PERAK, *Scortechini* (501^b); at Gunong-Malacca, *King's Collector* (7171)—DISTRIB. BORNEO.

Stem 40-60 ft., sheath 2-3 in. diam. Leaves 4-5 ft.; flagellum 10-12 ft.; larger leaflets 18-20 by $1\frac{1}{2}$ -2 in., rather coriaceous, tips not produced; rachis as thick as the little finger, smooth except from the scattered spines, obtusely trigonous. *Male spadix* 20 ft.; fem. about 10 ft. long; lower spathe compressed, upper cylindric; spathels 1 in., tubular, truncate, smooth, unarmed, or with a few conical tubercles; branches of fem. spadix long; spikes 2-4 in., rather distant, spreading and recurved, stout; spathellules and bracts very short imbricate; fem. fl. sessile. *Fruiting calyx* small, broadly urceolate, base truncate intruded, mouth much contracted, lobes very short; petals rather longer, broadly ovate. *Fruit* (young) $\frac{1}{2}$ in. long, scales brown shining tumid hardy channelled, with broad pale scarious margins. *Seed* (young) sub-obovoid, alveolate, embryo basilar.

GROUP XIII. See p. 438.

71. *C. conirostris*, Becc. mss.; leaf long-petioled shortly flagelliferous, leaflets numerous equidistant narrowly ensiform tips slender strongly setulose, costæ 3 more or less setulose above the median only beneath, rachis and flagellum armed with stout recurved 3-5-fid claws, petiole very stout, margins densely armed with subsolitary stout straight erect and spreading spines, sheath armed with very long and slender spines, spathes copiously armed with subseriate straight spines, fem. spadix very stout, spathels densely spinous, spikes very short and stout, bracts large densely imbricate cupular, fl. large, fruit narrowly ovoid narrowed into a stout beak black.

PERAK; at Goping, alt. 500-1000 ft., *King's Collector* (4593, 5808).

Stem 15-20 ft., 1-1 $\frac{1}{4}$ in. diam. Leaves 6-8 ft. glossy; leaflets 10-18 ft. by $\frac{1}{2}$ -1 in.; upper smaller, membranous; petiole as thick as the middle finger, concave-convex, back sparsely shortly armed; upper spines of sheath 4 in. long, acicular. *Fruit* $1\frac{1}{2}$ in. long by $\frac{3}{8}$ in. diam., very smooth; scales flat, brown-black, quite smooth and polished, closely imbricating, the basal concealed part yellow; fruiting calyx $\frac{1}{4}$ in. diam., cupular, not pedicelliform; lobes large broad appressed; petals very small. *Seed* ovoid, rough; albumen cancellate throughout.



22. C. Lobbianus, Becc. mss.; leaflets equidistant linear-lanceolate candate-acuminate membranous, clothed beneath with an appressed white substance (as if coated with lime), costæ 3 all naked or with a very few bristles beneath, spadix slender and rachis and upper spathes aculeate, male spikes crowded very short and broad with densely crowded distichous large flowers.

SINGAPORE, Lobb, G. Panti (210 Herb. Calcutta).

A small palm, stem 18 in., 6-8 in. diam. Leaves 5-6 fl.; leaflets 12-14 by 1-1½ in., rachis of the portion seen unarmed. Spathes (upper?) with a short keeled sheath and acuminate limb, armed with straight slender spines ¼-½ in. long on the sides and keel; branch of male spadix 3 in. long, oblong; spathellules most densely imbricate, ¼ in. diam. Male fl. nearly ½ in.; calyx cupular, with broad triangular lobes, not pedicelliform; petals twice as long, the lobes narrowly lanceolate.—I have seen only the branch of a male spadix and a fragment of a leaf with 7 leaflets, both from G. Panti. J.D.H.

DOUBTFUL SPECIES.

C. EXTENSUS, Roxb. Fl. Ind. iii. 777. Probably *C. palustris*.

C. HUMILIS, Roxb. l. c. 773, is possibly 51, *latifolius*.

C. METZIANUS, Schlecht. in Linnæa, xvi. 727 from Canara (? = *C. rivalis*, Thw.).

C. PENICILLATUS, Roxb. Fl. Ind. iii. 781. If for 30-40 pair of segments in Roxburgh's description, 3-4 be substituted, this might apply to *C. javensis*, Bl.

C. POLYGAMUS, Roxb. Fl. Ind. iii. 780; Mart. Hist. Nat. Palm. 210; Griff. in Calc. Journ. Nat. Hist. v. 48; Palms Brit. Ind. 58, is not recognisable.

24. DÆMONOROPS, Blume.

Characters of *Calamus*, but outer sheaths or spathes cymbiform, deciduous, at first enclosing the inner; flowers often more pedicellate.—Species about 80. Distrib. as of *Calamus*.

Dæmonorops differs so little from *Calamus*, and by sectional rather than generic characters according to Griffith, Kurz and others, that it was united with the latter in the "Genera Plantarum." As, however, Beccari, the latest and best authority on Indian Palms, keeps them apart, and as the elaboration of the species no less than their nomenclature in this work owes so much to him, I think it right to follow his lead. The difficulty of separating them in practice, working upon herbarium specimens, is shown by the synonymy of various species of both.

Sect. I. **Cymbospathæ**. Spathes cymbiform, beaked, two outer completely enveloping the inner. Male spadix fusiform before flowering.

* *Stem scandent*.

1. **D. Jenkinsianus**, Mart. Hist. Nat. Palm. iii. 327; leaflets equidistant linear finely acuminate, costæ 3 all sparsely setose above with very long bristles, the central only beneath, margins setulose, petiole rachis and flagellum with many marginal and dorsal hooked spines or 3-5-fid claws, sheath armed with very long flat deflexed and shorter more slender spines, spadix elongate decompound, outer spathe flattish 2-keeled armed with flat spines narrowed into a long spinescent beak, fruiting calyx nearly flat, fruit globose apiculate. Walp. Ann. iii. 475; v. 827. D. nutantiflorus, Mart. l. c. 326; Walp. l. l. c. c. 474, 827. *Calamus Jenkinsianus*, Griff. in Calc.

Journ. Nat. Hist. v. 81; *Palms Brit. Ind.* 89 (excl. fruit. & t. 186 A. f. 3 (=C. Flagellum), *T. Anders. in Journ. Linn. Soc.* xi. 11. C. nutantiflorus, *Griff. in Calc. Journ. Nat. Hist.* v. 79; *Palms Brit. Ind.* 88, t. 208.

THE SIKKIM HIMALAYA, ASSAM, the KHASIA HILLS, BENGAL and CHITTA-GONG.

Stem very stout, with the sheaths $1\frac{1}{2}$ in. diam., young parts grey-pubescent. *Leaves* large; leaflets 2 ft. by $\frac{3}{4}$ – $\frac{1}{2}$ in.; petiole 5–6 in.; spines of rachis many, short, scattered; of sheath $1\frac{1}{2}$ in. long. *Outer spathe* 1–2 ft., spines $\frac{1}{2}$ – $\frac{3}{4}$ in.; inner 12–18 in., lanceolate, long acuminate, quite smooth. *Male spadix* thyrsiform, dense-fld.; 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* $\frac{3}{4}$ in. diam., pale yellow brown; scales deeply channelled, margins narrowly scarious. *Seed* subglobose, smooth; albumen punctate, or the surface ruminate by very slender channels.

2. **D. Manii**, *Becc. mss.*; leaflets very many and narrow naked beneath setulose on the 3 costæ above, spadix very long slender, peduncle compressed hardly armed, outer spathe very long gradually narrowed into a long pale dorsally-keeled beak, spines few large flat, inner lanceolate acuminate, fruiting spadix erect glabrous, fruit globose shortly mammillate scales pale slightly channelled margins pale, tip not discoloured.

ANDAMAN ISLDS., *E. H. Man.*

Allied to *C. Jenkinsianus*.—I have seen no specimen. *J.D.H.*

3. **D. Kurzianus**; stem and petioles very stout, leaflets very many equidistant elongate ensiform acuminate margins minutely aculeolate, costæ 3–5 naked or with a few long bristles above, rachis semi-terete very stout flat above with short scattered spines on the margins, outer spathe with seriate spines inner linear, fruiting spadix erect branches very stout, fruiting calyx explanate, fruit globose very shortly beaked pale yellowish. *D. grandis*, *Kurz in Journ. As. Soc. Beng.* xliii. ii. 208 (not of Mart.). *Calamus grandis*, *Kurz For. Fl.* ii. 523 (not of Griffith).

SOUTH ANDAMAN ISLDS., *Kurz.*

Stem with the sheath as thick as the arm. *Leaves* shortly petioled; leaflets 1–2 ft. by $1\frac{1}{4}$ in., tips ciliate; rachis enormously stout, $1\frac{1}{2}$ in. diam., dorsally convex and unarmed, ending in a clawed flagellum; petiole armed below with long flat and short recurved spines; sheath with whorled spines. *Outer spathe* cymbiform, scurfy, inner unarmed. *Fruit* $\frac{3}{4}$ in. diam., pale brownish yellow, scales deeply channelled, margins brownish with a very narrow scarious edge; fruiting calyx with a very short base and broad striate lobes; petals twice as long, striate. *Seed* subcompressed, albumen as in *C. Jenkinsianus*.—I have seen only a portion of a leaf with the enormous rachis described above, imperfect leaflets, and a very old fem. spadix with fruit. *J.D.H.*

4. **D. grandis**, *Mart. Hist. Nat. Palm.* iii. 327, t. 173; leaves and leaflets as in *D. Kurzianus*, but pale and subglaucous, costæ beneath naked or sparsely ciliate as are the margins, spathe as in *D. Kurzianus*, calyx subentire villously ciliate, fruit globose. *Miq. Fl. Ind. Bat.* iii. 88; *Teyssm. & Binn. Cat. Hort. Bogor.* 74; *Walp. Ann.* iii. 476, v. 827. *Calamus grandis*, *Griff. in Calc. Journ. Nat. Hist.* v. 84; *Palms Brit. Ind.* 91, t. 210 A (PB et C.), t. 216, f. iii. *Miq. Palm. Archip. Ind.* 28.

MALACCA, *Griffith.* PERAK, *Scortechini.*

Stem very stout, scandent, sheaths 2 in. diam. *Leaves* 15–16 ft.; leaflets 18–20 by $1\frac{1}{4}$ in.; petiole about 2 ft. *Lower spathes* 14–15 in. long, inner included, unarmed, rustily scurfy. *Male spadix* 15–18 in., dcompound, spikes about

CLXIII. PALMÆ. (Beccari & Hook. f.) [*Dæmonorops*.

$\frac{1}{2}$ in., flexuous. *Calyx* oblong, shortly 3-toothed. *Fem. spadix* very stout, scurfy, branches ascending; spikes short. *Flowers* shortly pedicelled, calyx striate; petals $\frac{1}{3}$ longer. *Fruit* the size of a large marble. *Seed* erect, abounding in dragons' blood; albumen ruminant; embryo basilar.—Descript. chiefly from Griffith l.c.

5. **D. hygrophilus**, Mart. *Hist. Nat. Palm.* iii. 204, t. 177, f. 11; robust, leaflets very many and narrow equidistant linear tip filiferous, margin and 3 costæ above bearing long bristles and a few on the mid costa beneath, sheath armed with long flat spines, outer spathe gradually narrowed into a long beak as long as the body dorsally armed with broad flat scattered spines and a few longer ones. *Miq. Fl. Ind. Bat.* iii. 90; *Walp. Ann.* iii. 476, v. 827. *Calamus hygrophilus*, Griff. *Palms Brit. Ind.* 96, t. 213 C.

MALACCA, Fernandez. PERAK, Scortechini.

Stem stout, sheaths $1\frac{1}{2}$ in. diam. *Leaflets* 12 by $\frac{1}{2}$ in.; petiole forming a thick ring around the sheath, armed with scattered spines below and with stout recurved ones above and on the rachis, young rusty woolly. *Spadix* nearly 2 ft. *Outer spathe* 2-keeled, inner unarmed.—Descript. from Griffith. I have seen no specimen. J.D.H.

6. **D. angustifolius**, Mart. *Hist. Nat. Palm.* iii. 329; leaves shortly petioled, leaflets very many narrow and close set equidistant narrowly linear-lanceolate tip filiform, costæ 3 all and margins setulose or with the median only beneath, bristles very long, rachis $\frac{1}{2}$ -terete armed with straight and recurved trifold claws, petiole with small scattered flat spines, sheath armed with scattered flat spines, outer spathe narrow long-beaked armed like the sheaths, spadix thyriform 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 5-5 $\frac{1}{2}$ ft., flagelliferous; leaflets 8-10 by $\frac{1}{4}$ - $\frac{1}{2}$ in.; petiole 3-4 in. *Outer spathe* about 14 in. long, the beak half its length, flat; 2nd spathe sparsely spinous. *Male spadix* with a slender sparingly armed peduncle; branches crowded, erect; spikes 1 in., flexuous, 8-10-fld.; flowers small, oblique; calyx cylindric-oblong, teeth small; petals thrice as long.—Descript. from Griffith, who describes it as in all respects a very distinct species, but I do not see how he distinguishes it by his description from *D. hygrophilus*. I have seen leaves only of which the flat spines of the leaf and brown scurfy sheath are erect, white, and closely appressed; the petiole is concave above at the base. J.D.H.

7. **D. intermedius**, Mart. *Hist. Nat. Palm.* iii. 377, t. 175, f. viii.; leaves long-petioled, leaflets opposite or scattered linear-lanceolate acuminate, margins and 3-5 costæ on both surfaces more or less setulose, petiole armed with scattered and flattened spines, sheath with seriate black flat spines, outer spathe ovoid very long and stoutly beaked, its spines long slender deflexed, beak longer than the body. flowers and fruit as in *D. grandis*, but scales tipped with black. *Miq. Fl. Ind. Bat.* iii. 88; *Walp. Ann.* iii. 476, v. 827. *Calamus intermedius*, Griff. in *Calc. Journ. Nat. Hist.* v. 86; *Palms Brit. Ind.* 93, t. 211 A, B.

MALACCA, Fernandez. PERAK, Scortechini, King's Collector (7135).

Stem 15-20 ft., $\frac{3}{4}$ in. diam. *Leaves* 4-6 ft.; leaflets 18-20 by 1-1 $\frac{1}{2}$ in., membranous, dark green, median costa stout lateral very slender; rachis $\frac{1}{2}$ -terete, sparingly armed; petiole 1 ft. *Outer spadix* 18 in., beak twice as long as the body. *Spadix* thyriform. *Fruit* $\frac{3}{4}$ 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 ruminant.—Griffith says "with difficulty distinguishable from *granlis*, and chiefly by the very slender more numerous deflexed spines of the spathe."

8. **D. Sepal**, *Becc. mss.*; leaflets rather numerous equidistant narrowly linear finely acuminate setulose on the 3 costæ above and margins, rachis armed with 3-fid claws, petiole dorsally compressed armed with scattered and clustered short straight flattened spines, sheaths with sub-seriate flat spines their mouth with long spines, outer spathes long-beaked dorsally armed with flat slender and shorter clustered spines, fruiting spadix nodding or pendulous, fruit obovoid.

PERAK, alt. 3-4000 ft., *King's Collector* (4133); on Gunong Tambang, *Scortechini* (433^b).

Stem 20-30 ft., $\frac{1}{2}$ - $\frac{3}{4}$ in. diam. *Leaves* 6-8 ft.; leaflets 8-12 by $\frac{1}{2}$ - $\frac{3}{4}$ in.; spines of sheath $\frac{1}{2}$ in. long, mixed at the juncture with the petiole with more slender shorter black ones. *Fruit* $\frac{3}{4}$ in. long, abruptly beaked, light brown, glossy; scales deeply channelled, margins brown; fruiting calyx pedicelliform, lobes broad; petals twice as long.

9. **D. Pseudosepal**, *Becc. mss.*; leaflets not numerous very long and narrow setiferous on the 3 costæ above and median beneath, petiole with scattered very short spines except at the base where longer and more slender, sheath with very long elastic flat seriate spines, mouth nearly naked, fem. spadix short, fruit globose with a short broad mucro.

PERAK; alt. 300 ft., *King's Collector* (7975); *Scortechini*.

Stem 10-15 ft., nearly $\frac{1}{2}$ in. diam. *Leaves* 3-4 ft.; leaflets inequidistant, dark green, $\frac{3}{4}$ - $\frac{1}{2}$ in. broad; petiole 15-18 in., armed on the back and margins. *Fruit* $\frac{3}{4}$ in. diam., pedicelled, dirty yellow; scales few, channelled, margins narrowly scarious, tips discoloured; fruiting calyx not pedicelliform.—Affinity doubtful from want of spathes.

10. **D. Lewisianus**, *Mart. Hist. Nat. Palm.* 327, t. 175, f. iv.; leaflets equidistant approximate linear bristle-pointed costæ 3 setulose above nearly naked beneath, margins appressedly setulose, petiole dorsally armed with hooked spines and long flat straight whorled and solitary ones, margins with shorter conical spines, sheath armed with solitary or seriate black flat spines, outer spathe shortly beaked armed with weak deflexed long black spines, inner with 2 rows of slender spines, spadix as in *D. intermedius*, but branches more slender and less scurfy, fruiting spadix erect, fruit spherical. *Calamus Lewisianus*, *Griff. in Calc. Journ. Nat. Hist.* v. 87; *Palms Brit. Ind.* 94, t. 212 A.

PENANG; *Lewis*.

Stem scandent with the sheaths about 1 in. diam. *Petiole* about 1 ft., base much swollen and then armed with scattered short deflexed spines, and above with spines $1\frac{1}{4}$ in. long; leaflets 13-15 by $\frac{1}{2}$ -1 in. *Outer spathe* 3-9 in.; peduncle armed with flat spines, beak one-third the length of the body. *Male* and *fem. spadix* as long as the spathe; flowers scurfy, males most so. *Male calyx* obtusely toothed, margins bearded; fruiting petals twice as long. *Fruit* pale yellowish; scales in 15 rows, blackish towards the margin.—Descript. chiefly from *Martius* and *Griffith*.

** *Stems erect or subscandent, upper leaves alone with flagella.*

11. **D. monticolus**, *Mart. Hist. Nat. Palm.* iii. 328, t. 175, f. v.; leaves petioled, leaflets equidistant alternate linear-subulate acuminate, costæ 3 all bristly above naked beneath except the median at the apex, VOL. VI. H H

margin bristly, rachis unarmed, petiole armed with stout hooked spines, sheaths scurfy armed with long flat black deflexed seriate spines, outer spathe long-beaked dorsally armed with weak long deflexed flat spines, spadix unarmed scurfy, fruit globose cuspidate. *Miq. Fl. Ind. Bat.* iii. 90; *Walp. Ann.* iii. 4771, v. 827. *Calamus monticolus*, *Griff. in Calc. Journ. Nat. Hist.* v. 90; *Palms Brit. Ind.* 97, t. 214 A, B, C.

MALAY PENINSULA; on Goonong Miring, a spur of Mt. Ophir, alt. 1500–2000 ft., and PENANG HILL, half way up, *Griffith*.

Stem about 8 ft. *Petiole* 10 in.; leaflets 10–11 by $\frac{1}{2}$ in. *Outer spathe* very open, 16–17 in. long; beak 9–10 in., flat, sparingly armed except towards the apex. *Fruit* the size of a marble, tawny; scales channelled and with a dark brown intro-marginal line; fruiting calyx explanate, lobes broad; petals twice as long, ovate. *Seed* with a fleshy covering.—*Descript.* from *Griffith*. The Penang plant has much coarser spines on the spathe and the fruit is more narrowed into a beak; Beccari doubts its being conspecific with the Malaccan. I have seen only very imperfect specimens.

12. *D. petiolaris*, *Mart. Hist. Nat. Palm.* iii. 326; slender, scurfy, leaves long-petioled, leaflets very long crowded equidistant very narrowly linear tips spinulose, costæ 3 setulose above the median only beneath, margins setulose, petiole armed below with seriate spines above with dorsal hooked spines, sheaths crinitely clothed with long close-set ascending slender seriate spines, outer spathe shortly beaked densely armed with long slender spines, spadix short fusiform, branches tomentose, male calyx cylindric 3-toothed. *Miq. Fl. Ind. Bat.* iii. 87; *Walp. Ann.* iii. 475, v. 827. *Calamus petiolaris*, *Griff. in Calc. Journ. Nat. Hist.* v. 93; *Palms Brit. Ind.* 101, t. 216, f. vii.; ? *Miq. Palm. Archip. Ind.* 28.

MALACCA, *Griffith*.

Stem erect. *Leaves* 4–5 ft., exclusive of the 5–7 ft. petiole; leaflets 15–17 by $\frac{1}{2}$ – $\frac{3}{4}$ in. *Spathe* 4–5 in., narrowly fusiform, scurfy, beak $\frac{1}{2}$ – $\frac{3}{4}$ the length of the body, or longer. *Petals* narrowly lanceolate.—*Griffith* says that probably two species are included here, differing in the length of the leaves; one with an unarmed rachis of the leaves, longer more tomentose spadices and longer spikes and a cylindric acutely shortly toothed calyx, but his definition of the two is not very clear.

13. *D. tabacinus*, *Becc. mss.*; sheaths rachis and petiole of leaf and branches of spadix brown-furfuraceous, leaves long-petioled, leaflets very many equidistant narrowly linear tips spinulose, costæ 3 setulose above and on the median beneath, margins setulose, petiole subcylindric and sheath armed with small flat pale spines, outer spathe narrowed into a beak as long as the body or longer, crinitely clothed with long straight slender spines, fruit subglobose pale, beak conical.

PERAK; *King's Collector* (2537).

Stem erect, 2–3 ft. *Leaflets* 12–14 by $\frac{1}{2}$ – $\frac{3}{4}$ in. *Spathe* 6 in., its beak 3 in. *Fruit* $\frac{1}{2}$ in. diam., pale straw-cold, suddenly narrowed at both ends; scales channelled, tips dark-cold; fruiting calyx subpedicelliform, lobes broad; petals twice as long.—Distinguished from *D. petiolaris* by the long beak of the spathe.

14. *D. calicarpus*, *Mart. Hist. Nat. Palm.* iii. 326, t. 175, f. vi.; leaflets equidistant very many linear bristle-pointed, 3 costæ above setulose median or all beneath, margins setulose, petiole armed with long straight and short hooked spines, sheaths scurfy armed with long slender subseriate flat erect spines, outer spathe moderately beaked, crinite all over with long slender pale bristles, 2nd and 3rd bearded chiefly along the middle, male spadix much branched, margins of pedicels bearded,



spikes scurfy, fruit globose tawny. *Miq. Fl. Ind. Bat.* iii. 87; *Walp. Ann.* iii. 475, v. 827. *Calamus calicarpus*, *Griff. in Calc. Journ. Nat. Hist.* v. 92; *Palms Brit. Ind.* 99, t. 215 A, B, C, D, t. 116, f. v. vi.

MALACCA, *Griffith*. PERAK, *Scortechini*.

Stem erect or subsucculent, with the sheaths 1 in. diam. Leaves 6-8 ft., upper small, with long flagella; leaflets 12-13 by $\frac{1}{2}$ - $\frac{1}{2}$ in.; petiole 1 ft., base not gibbous or puckered. Outer spathe 12-16 in., spines and hairs 1-1 $\frac{1}{2}$ 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, $\frac{3}{4}$ in. diam., tawny, scales with a dark marginal band, deeply channelled; fruiting calyx explanate, lobes broad; petals rather longer. Seed globose; albumen deeply ruminate; embryo basilar.—Descr. chiefly from *Griffith*. Beccari says of it, very difficult to distinguish from *petiolaris* and *monticolus* in the absence of complete specimens of all.

Sect. II. **Piptospathæ**. Outer spathe not completely enclosing the inner. Spadix diffusely branched.

* Spathes at first tubular, then open; all deciduous or the outer alone more persistent, armed with short stout spines. Spadix narrow and elongate before flowering, then paniculate.

† Mouth of sheath naked or armed with scattered spines pointing variously. Fruit resiniferous except *D. leptopus*.

15. **D. micracanthus**, *Becc. mss.*; leaflets alternate or distantly subopposite linear-lanceolate caudate-acuminate, costæ 3 minutely setulose on both surfaces, as are the margins, petiole very gibbous and transversely puckered at the base slender 2-edged biconvex armed with long rather distant small curved prickles on the back and here and there on the sides and on the rachis, sheath long slender glabrous armed with very short deciduous prickles, at length muriculate. *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*).

MALACCA, *Griffith*.

The only specimen seen is of a leaf with a cylindric pale sheath a foot long, covered with scattered or subseriate minute tubercles; a rather slender petiole, 6 in. long, dilated at the base and gibbous, with small very scattered spines; the rachis more flagelliferous, very slender and smooth; the leaflets 8-10 by $\frac{1}{2}$ in., with very long filiform bristly tips.

16. **D. propinquus**, *Becc. mss.*; leaflets numerous equidistant linear-lanceolate, costæ 3 all sparsely setulose above the median alone beneath, margins setulose, rachis very stout with large flat solitary straight spines, petiole with stout dorsal and very long scattered lateral flat spines as has the sheath, spathes many imbricating almost woody with obtuse points and recurved margins outer armed with seriate deflexed spines, spadix erect fruiting nodding, fruit globosely ovoid strongly beaked red brown, scales deeply channelled. *Calamus Draco*, *Griff. in Calc. Journ. Nat. Hist.* v. 65; *Palms Brit. Ind.* 75 (*excl. Syn. Rowb.*), t. 201 A, B; *Mart. Hist. Nat. Palm.* iii. 175, f. 10, 3-8.

PENANG, *Griffith*, *Lewes*. PERAK, *Scortechini*.—DISTRIB. Sumatra.

Stem stout, erect, at length scandent. Leaflets 12-18 by $\frac{1}{2}$ - $\frac{3}{4}$ in.; petiole $\frac{1}{2}$ -terete, 1 in. diam. Fruit $\frac{3}{4}$ in. diam., exuding dragon's-blood copiously, stoutly

pedicelled; scales naturally whitish but incrustated with red gum. *Seeds* rarely 2, subconical, dorsally alveolate and tubercled with a deep lateral cleft.—The Perak fruits are accompanied by ensiform leaflets 2 ft. long by 2 in. broad with aculeolate margins. Beccari doubts their belonging to the same species as the fruits.—The seeds of Griffith's plant are globose and smooth. J.D.H.

17. *D. didymophyllus*, Becc. mss.; leaflets in distant opposite or alternate pairs broadly ensiform or elliptic, costæ and margins quite smooth, fruit as in *D. propinquus*, but with less resin.

PERAK, *Scortechini*; alt. 2500–3000 ft., King's Collector (2593, 5704, 6313). JOHORE, Kurz.—DISTRIB. Sumatra.

Stem 20–30 ft., scandent. Leaves 5–7 ft.; leaflets 8–16 by 1–2½ in., acute, many-nerved, quite smooth on both surfaces, as are the margins; petiole 2–3 ft., and rachis semiterete, both armed with scattered small short stout nearly straight spines and tubercles; rachis armed with distant solitary spines and 3-fid claws; sheaths scurfy, armed with very broad flat spines, mouth oblique naked. *Spathes* coriaceous, flat, lower 6–10 in., transversely armed with many series of confluent short irregular spines; upper persistent, smaller. *Spadix* erect; peduncle armed with strong straight flat scattered spines; spikes densely fascicled, slender, erect, flexuous. Fruit ¾ in. diam., cuspidate, red brown, and explanate calyx as in *D. propinquus*.

18. *D. leptopus*, Mart. Hist. Nat. Palm. iii. 206, 329; leaves long-petioled, leaflets many equidistant narrowly linear-lanceolate caudate-acuminate, costæ 3 all naked, or setulose beneath near the margins, rachis very stout armed with short stout simple and 2–3-fid claws, petiole armed with short solitary spines, sheath swollen at the petiole armed with fascicled or seriate flat spines, outer spathe with revolute margins towards the open tip, keels 2 armed with stout spines, fruit ovoid or ellipsoid. Mig. Fl. Ind. Bat. iii. 99; Walp. Ann. iii. 479, v. 818. Calamus leptopus, Griff. in Calc. Journ. Nat. Hist. v. 73; Palms Brit. Ind. 87, t. 205, A, B.

MALACCA, Griffith. PERAK, King's Collector (4774, 5919); *Scortechini*.

Stem scandent, 20–30 ft., sheaths about 1 in. diam. Leaflets 15–16 by ¾–1 in., tip capillary bristly, rachis as thick as the thumb, subbiconvex; petiole about 2 ft., trigonous; lower spines 1 in. and upwards. *Spathes* coriaceous, lower 8–10 in., lanceolate, open, tip flat broad; upper open much longer than their inflorescences. *Spadix* 3–4 ft., very slender; peduncle stoutly armed, branches erect, unarmed spikes 1½–3 in., flexuous, flowers unilateral. Calyx rather large, teeth acute, corolla ventricose. Fruit ¾ in. long, pedicelled by the calyx and spathellules, cinnamon brown, scales deeply channelled. Seed with a hard resinous coat, chalaza grooved; albumen ruminant; embryo basal.—The young spadix resembles *D. propinquus*, the mature is more like *D. Hystrix*.—Descript. chiefly from Griffith.

†† Mouth of leaf-sheath armed with long flat erect spines; fruit not or sparingly resiniferous.

19. *D. Hystrix*, Mart. Hist. Nat. Palm. iii. 205, 328, t. 176, f. 4, 3–4; leaflets very many equidistant narrow setaceous acuminate, margins and 3 costæ setulose on both surfaces, rachis clawed, petiole armed with scattered long straight and short spines, sheath swollen armed with very long (1 foot long) flat erect and shorter spines, lower spathe small elliptic thickly armed upwards with strong long spines, fruiting spadix with spreading branches and spikes, fruit ellipsoid long-pedicelled. Mig. Fl. Ind. Bat. iii. 91; Walp. Ann. iii. 477, v. 828. *D. hirsatus*, Blume Rumph. iii. 21 (excl. descr. fruit), t. 135, f. A, B, C (excl. D, E oblongus); Mig. l. c.

Suppl. 593. *Calamus Hystrix*, *Griff. in Calc. Journ. Nat. Hist.* v. 71; *Palms Brit. Ind.* 80, t. 204, A, B, C; *Miq. Palm Archip. Ind.* 28.

MALACCA, *Griffith*; at *Ager Punnus, Maingay*. PERAK, *Scortechini, King's Collector* (951).—DISTRIB. Java, Sumatra.

Stem scandent, with the very stout sheaths $1\frac{1}{2}$ in. diam. *Leaves* 7–10 ft.; rachis flagelliferous; leaflets 10–18 by $\frac{1}{2}$ – $\frac{3}{4}$ in., tips very slender, setulose costæ sometimes 5; petiole 1–2 ft.; sheath woody, scurfy, obliquely crossed with half-whorls of close set flat spines, of which the lower series are $\frac{1}{2}$ – $\frac{1}{2}$ 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 $\frac{3}{4}$ in. long by $\frac{1}{2}$ in. diam., pale brown, not shining, shortly mammillate; scales obtuse, channelled, margins of channels rather elevated. *Seed* oblong, pitted, pits resinous; albumen deeply ruminant; embryo basilar.—The enormous spines of the leaf-sheaths are a remarkable character.

Var. minor, *Becc. mss.*; stem 2–8 ft., with the sheaths $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., leaves 1–4 ft., leaflets 5–10 in., fruit much smaller.—Perak 300–1500 ft., *King's Collector* (5097, 5142, 5486).

20. **D. Kunstleri**, *Becc. mss.*; leaflets many equidistant linear setulose on the 3 costæ above and median beneath, margins setulose, petiole robust scurfy margins armed with long stout spreading spines, sheath with many oblique series of long stout flat spines alternating with shorter setiform ones, mouth with a few very long ones, lower spathe coriaceous softly scurfy keel spinous, peduncle of spadix long slender armed with whorls of spines, fruit globose top conical not beaked.

PERAK; *Scortechini* (652), *King's Collector* (10,204).

Stem erect, 2–3 ft., sheaths 3 in. diam. *Leaflets* 14–18 by $\frac{3}{4}$ – $\frac{1}{2}$ in., rachis armed with 3-fid. claws. *Peduncle* of spadix 8–10 in. *Fruit* $\frac{3}{4}$ in. diam., tawny, top suddenly contracted into a low cone; scales few, channelled, broad, margins not scarious and hardly discoloured; fruiting calyx small, explanate. *Seed* subglobose.—I have seen only a portion of a leaf and of a fruiting spadix.

21. **D. vagans**, *Becc. mss.*

PERAK; alt. 4000–5000 ft., *King's Collector* (4129).

Stem scandent, sheaths $\frac{3}{4}$ in. diam. *Leaflets* 14 by $\frac{3}{4}$ in., very narrow straight and finely acuminate. *Fruit* as in *Kuntsleri* but smaller.—I have seen only a portion of a leaf and fruit without calyx.

** Outer spathes at first tubular, then open, all deciduous or the outer more persistent, hardly spinous, but densely clothed with rigid needle-like spiculæ. Sheath of leaf with a spinulose membranous collar or ring. Spadix elongate before flowering, then paniculate.

22. **D. Sabut**, *Becc. mss.*; leaflets in fascicles of 9–10 in., the lower part of the rachis and 4–6 on the upper elongate oblanceolate suddenly narrowed to a setulose tip, margins and 3 costæ setulose above the median alone beneath, petiole very stout stoutly armed with short and long single and compound spines, sheath with a toothed setulose and spinular mouth.

PERAK, *Scortechini* (653b).

Internodes 6–8 in., with a reversed membranous collar. *Flagellum* of rachis very short.—I have seen no specimen. J.D.H.

23. **D. oligophyllus**, *Becc. mss.*; leaflets 10-12 in distant fascicles elongate-oblancoelate with setulose tips, costæ 3 nearly naked on both surfaces, sheath densely filamentously scurfy, internodes with 2-3 membranous strongly nerved collars appressed to the sheath and densely crinite, petiole biconvex margins obtuse rather closely armed with claws.

PERAK, *Scortechini*.

Founded on two flowerless specimens, neither of which have I seen.—*J.D.H.*

24. **D. macrophyllus**, *Becc.*; leaflets 4 in 2 very distant pairs oblong-lanceolate 20 by 4-5 in. with 7-8 acute naked costæ, petiole 2 ft. biconvex, armed with 2-3-fid spines, sheaths $\frac{2}{3}$ - $\frac{3}{4}$ in. diam. with 3-4 membranous collars.

PERAK; *Scortechini*.

Founded on a single flowerless specimen, which I have not seen.—*J.D.H.*

25. **D. verticillaris**, *Mart. Hist. Nat. Palm.* iii. 329, t. 175, iii. t. 72, f. vi., vii.; leaflets many equidistant ensiform setaceously acuminate, margins and costæ very sparingly setulose, sheath armed with whorls of very long flat weak spines alternating with whorls of confluent black bristles, lower spathe thinly coriaceous densely crinite with series of fascicled black bristles, male spadix slender, spikes sub-erect slender, flowers minute densely crowded in two collateral series, fruit small sessile globose. *Miq. Fl. Ind. Bat.* iii. 99; *Walp. Ann.* iii. 478; v. 828. *Calamus verticillaris*, *Griff. in Calc. Journ. Nat. Hist.* v. 63; *Palms Brit. Ind.* 73, t. 200 A, B, C, D.

MALACCA, *Griffith*. PERAK, *Scortechini*; at Larut and Goping, *King's Collector* (576, 6388).

Stem 20-40 ft. scandent, sheaths about $1\frac{1}{2}$ 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 compacted black-tipped bristles confluent into stiff lamina $\frac{1}{2}$ in. deep. *Lower spathe* 2-3 ft., with a long narrow point; bristles $\frac{1}{2}$ -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.; spathe cupular, acute. *Flowers* distichous, horizontal, most densely packed; calyx cupular, obscurely toothed; petals twice as long. *Fem. spikes* 3-4 in. *Fruit* $\frac{1}{2}$ in. diam., top conical, scales whitish faintly channelled, margins brown. *Seed* globose, albumen deeply ruminate.

*** Outer spathe acutely 2-keeled, keel alone setose. Leaf sheaths armed with flat spines confluent in an annular spinulose crest.

26. **D. geniculatus**, *Mart. Hist. Nat. Palm.* iii. 329; leaflets scattered or in groups of 3-7 elongate ensiform tips filiform very long, costæ 3-5 smooth or more or less setulose, margins smooth, petiole stout armed towards the base with simple and compound very long white flat stiff spines, mouth of sheath with a few similar spines and a brush of needle-like bristles below which is a thick ring of confluent bristles, outer spathe lanceolate, spadix much branched, male fl. densely crowded in collateral series, fruit subglobose shortly stoutly beaked. *Miq. Fl. Ind. Bat.* iii. 93; *Walp. Ann.* iii. 478, v. 828. *Calamus geniculatus*, *Griff. in Calc. Journ. Nat. Hist.* v. 67; *Palms Brit. Ind.* 77, t. 202, A, B; *Miq. Palm. Archip. Ind.* 28.

PENANG, *Lewes*. PERAK, alt. 2-3500 ft., *King's Collector* (2931, 2735, 6306, 7849). SINGAPORE, *Lobb*.

Stem stout 20-25 ft., scandent; nodes swollen. *Leaves* 10-14 ft.; leaflets 16-20 by $\frac{3}{4}$ -1 in., margins quite smooth, long tips setose; petiole stout, spines on lower portion often ternate with the central 6-7 in. long and slender but stiff. *Spathes* all deciduous, upper thinly coriaceous, unarmed. *Spadix* (geniculate, *Griff.*) 3 ft.; peduncle 6-12 in., flattened, with marginal spines, not 2-edged; spikes $\frac{1}{2}$ - $\frac{3}{4}$ in., spreading, with the flowers $\frac{1}{2}$ in. broad. *Male flowers* most densely imbricate, horizontal in two series, $\frac{1}{3}$ in. long and narrow; spathellules quite entire; calyx shortly cylindric, striate; corolla terete, four times as long, smooth, not striate, very narrow. *Fruit* $\frac{2}{3}$ in. long, shortly pedicelled; sometimes almost ellipsoid, pale dull yellowish brown; scales with a shallow channel and brown margin.—There may be more than one species included here, the fruiting spadices of Nos. 576 and 7849 look very different. No. 576 from Goping Perak has the slender fruiting spadix, with distant fruits, as in Griffith's figure. No. 2735 from Perak is a male plant and has the mouth of the sheath with needle-shaped spines. No. 2931 from Perak has the very long spines on the petiole. No. 7849 from Perak has the branches of the fruiting spadix as broad as long with very short stout internodes and stout spikes 4-6 in. long; it most resembles the Penang form.

**** Outer spathe lanceolate, slenderly 2-keeled, wholly deciduous after flowering. Leaf sheaths armed with isolated or confluent spines, not annular crests. Spadix elongate.

27. **D. longipes**, *Mart. Hist. Nat. Palm.* iii. 329, t. 176, f. v. 2, 3, leaflets equidistant linear-lanceolate or ensiform subulate-acuminate margins and tips bristly 3 costæ setulose above or on both surfaces, petiole convex below and armed with long irregular spines, channelled above, with toothed margins, rachis triangular with solitary short dorsal teeth, sheath armed with broad stout flat solitary or seriate spines mixed with bristles, spathes narrowly lanceolate long acuminate unarmed, spadix very long long-peduncled, spikes flexuous, fruit ovoid-oblong shortly stipitate, beak conical. *Miq. Fl. Ind. Bat.* iii. 93; *Walp. Ann.* iii. 478, v. 828. *D. strictus*, *Blume Rumph.* iii. 19, t. 163 A, B; *Mart. l. c.* 326. *Miq. l. c.* 86; *Suppl.* 255; in *Journ. Bot. Neerl.* i. 18; *Walp. l. c.* 474, 827. *Calamus longipes*, *Griff. in Calc. Journ. Nat. Hist.* v. 68; *Palms Brit. Ind.* 78, t. 203 A, B (excl. syn. *Rumph.*). *C. strictus*, *Miq. Palm. Archip. Ind.* 28.

MALACCA, *Fernandez, Maingay, Hervey*.—DISTRIB. Sumatra, Banca.

Leaves with the flagellum about 12 ft.; petiole 2 ft., young floccosely scurfy; leaflets 12-14 by $1\frac{1}{4}$ 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 decomposed; spikes $\frac{1}{2}$ -1 in., very slender and zig-zag, spathellules (or bracts?) very minute. *Flowers* $\frac{1}{2}$ in. long, erecto-patent; calyx obtusely toothed, quite glabrous, striate; petals hardly twice as long, not striate. *Fruiting spadix* large, very broad, much branched; branches not stout, scurfy; spikes 3-5 in. *Fruit* $\frac{1}{4}$ in. apart, $\frac{3}{4}$ in. long; calyx very shortly pedicelled, broadly campanulate, 3-lobed to the middle lobes appressed to the base of the fruit; scales pale yellow-brown, shining, concolorous, faintly channelled. *Seeds* oblong; albumen strongly ruminant; embryo basal.—Griffith describes *Calamus longipes* as having equidistant leaflets, his specimens are too imperfect to show this character. In Maingay's specimen they are inequidistant as described by Blume in his *D. strictus*. As in other species the costæ of the leaflets probably vary much as to being more or less setulose on one or both surfaces.

IMPERFECTLY KNOWN SPECIES.

Besides enumerating the above more or less imperfectly described species,



Beccari has indicated the existence of about 7 other new Malayan Peninsula ones, but these are in far too imperfect a condition to render it advisable to register here the names he has given them.

25. **ZALACCA**, Reinw.

Stemless, soboliferous, armed palms. *Leaves* pinnatisect, not flagelliferous; leaflets narrowly linear-lanceolate. *Spadix* interfoliar, pendulous, flowering branches catkin-like. *Spathes* persistent; lower sheathing, incomplete; bracteoles cupular, 2-celled; flowers coriaceous, densely crowded, polygamous. *Male fl.*, calyx tubular, 3-fid.; corolla tubular, segments valvate; stamens 6, anthers short. *Fem. fl.* larger; perianth accrescent; calyx trifid; corolla-lobes lanceolate, valvate; staminodes 3 or 6; ovary 3-celled, stigmas 3, subulate; ovules basilar. *Fruit* globose or obovoid, 1-3-seeded, clothed with reversed or spreading scales. *Seeds* 1-3, erect, top excavated, testa crustaceous, outer coat fleshy; albumen equable; embryo subbasilar.—Species 9 or 10, chiefly Malayan.

The species are for the most part imperfectly known. The Malayan *Z. edulis*, Reinw., not hitherto found in the Malayan Peninsula, has the leaflets white beneath.

1. **Z. secunda**, Griff. in *Calc. Journ. Nat. Hist.* v. 12; *Palms Brit. Ind.* 14, t. 177; leaflets straight concolorous acutely 3-costate margins setulose above the middle, costæ spinulose on the under face, male spadix compact, spikes much longer than their spathes peduncled, fem. spadix paniculately branched, spikes tomentose, fruit clothed with spreading lanceolate scales. *Becc. Males.* iii. 673. *Calamus collinus*, Griff. *Palms Brit. Ind.* t. 186 (leaf only).

UPPER ASSAM, Mann; in the Mishmi Mts., Griffith.

A very imperfectly known species, of which Griffith describes only the male spike. Mann's specimen consists of a leaflet, and young fruit; he describes the leaf as 30 ft. long; the leaflets as 33 in. long by nearly 3 broad, coriaceous, with three stout costæ acute on both surfaces and spinulose beneath.—Fruits received quite recently at Kew from Mr. Mann are unfortunately in too broken a condition to determine their form; they appear to have been ovoid, 2 in. ? long, ending in a stout cone as in *Eugeissonia*; the pericarp thin, clothed with spreading and ascending subulate-lanceolate recurved dark brown scales $\frac{1}{4}$ in. long and under; there is no appearance of a succulent endocarp. *Seeds* (1-3?) 1-1 $\frac{1}{4}$ 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 $\frac{1}{4}$ in. diam. or less.

2. **Z. affinis**, Griff. in *Calc. Journ. Nat. Hist.* v. 9; *Palms Brit. Ind.* 12, t. 176, A, B, C; leaflets concolorous strongly falcate costæ 3 and margins not setulose, male spadix elongate, spikes small tomentose shortly exerted from the sides of their long spathes, fem. spadix compact with short interrupted spikes much shorter than their spathes, fruit ovoid smooth. *Becc. Males.* iii. 67.

MALACCA, Griffith. PERAK, at Larut, King's Collector (3448).—DISTRIB. Sumatra.

Leaves 12-13 ft.; petiole half the length, slender, armed with long slender spines, leaflets fascicled, 18-20 by 2 $\frac{1}{4}$ in.; costæ slender, acute beneath. *Male spadix* about 1 $\frac{1}{2}$ ft.; spathes imbricate lucerate. *Spikes* $\frac{3}{4}$ - $\frac{1}{2}$ in.; bracts membranous, 2-fid.;

bracteoles penicillate. *Fruit* $2\frac{1}{2}$ by $1\frac{1}{4}$ in., cuspidately mammillate; scales closely imbricate, chesnut brown. *Seeds* 1-3, plano-convex.—Descr. chiefly from Griffith.

3. **Z. conferta**, *Griff. in Calc. Journ. Nat. Hist.* v. 16; *Palms Brit. Ind.* 19, t. 180, A, B, C; leaflets linear-ensiform concolorous straight or slightly falcate, fem. spadix large copiously branched from the base very compact, spikes densely crowded much longer than their spathes, fruit turbinate not spinous. *Mart. Hist. Nat. Palm.* iii. 201, t. 173, 174; *Becc. Males.* iii. 67.

MALACCA, *Griffith.*—DISTRIB. BORNEO.

Stems stout, less tufted than in others, forming an impenetrable jungle. *Leaves* 18-20 ft.; petiole half the length of the blade, stout, flattened above; spines short, white, fascicled; leaflets equidistant, alternate, 2 ft. by $2\frac{1}{2}$ in., subulate-acuminate, tip and margins setose, costæ of upper leaflets bristly on the upper surface. *Spadix* 8-12 in., crowded with cylindric spikes 6 in. long; male fl. in pairs; bracteoles villous. *Fruit* crowded in a formless mass; scales quite smooth, aspect waxy and shining, margins denticulate, tawny greenish; mesocarp white spongy. *Seed* broadly turbinate.—Distinguished by habit, direction of the leaflets their bristly costæ and slender short white spines and crowded thyriform fruiting spadices.—Descr. from Griffith.

4. **Z. Wallichiana**, *Mart. Hist. Nat. Palm.* iii. 200, 325, t. 118, 119, 136; leaflets inequidistant falcate oblong-lanceolate with very long filiform setulose tips, costæ naked, male and fem. spadices very long fastigiately branched, spikes very distant much shorter than their spathes, fruit obovoid shortly imbricate, scales with long reflexed points. *Kurz in Natuurk. Tijdschr. Ned. Ind.* xxvii. (1864) 216; *For. Fl.* ii. 511; *Becc. Males.* iii. 66. *Z. edulis*, *Wall. Cat.* n. 5000; *Pl. As. Rar.* iii. 14, t. 222-224; *Z. Rumphii*; *Griff. in Calc. Journ. Nat. Hist.* v. 8; *Palms Brit. Ind.* 10, t. 175. *Blume Rumphia*, ii. 159. *Z. macrostachya*, *Griff. ll. cc.* 13, and 15, t. 178 A, B, C; *Becc. l. c.* 66.

BURMA, *Kurz.* MALACCA; at Ching, *Griffith.* PENANG and SINGAPORE.—DISTRIB. Siam, Banca.

Stem very short or 0. *Leaves* 15-20 ft.; leaflets approximate in groups of 2-4, and alternate, 2-3 ft. by $1\frac{1}{2}$ -2 in., spinulosely ciliate above the middle, upper confluent; petiole 8-10 ft. and rachis copiously armed with broken spirals of strong subreflexed spines. *Spadices* several feet long, rachis woolly. *Spikes* cylindric, villous, $1\frac{1}{2}$ -2 in. long; flowers small, rose-cold. *Spathes* variously ruptured, floral terminated by dense tufts of rose-cold, paleaceous hairs. *Fruit* in dense heads, 1 in. long or more, 1-3-celled; scales brown, tips terminating in a reflexed brittle bristle.—Descr. from *Kurz For. Fl.* l. c.—“Spadices dimorphic, one male only, with densely tomentose spikes; the other monœcious very dense-fld. and difficult to make out; each bract I find to correspond to a cluster of 3 flowers, a female between 2 males or neuters, and with two densely tomentose bracteoles.”—*Beccari.* *Griffith's Z. macrostachya* referred to *Wallichiana* by *Beccari* (mss.) is a much stouter form, with oblanceolate leaflets and spikes 3 in. long and nearly 1 in. diam. In *Griffith's* figure of the whole plant (Tab. 178 C) the leaves have not the long tapering filiform tips of *Z. Wallichiana*.

5. **Z. glabrescens**, *Griff. in Calc. Journ. Nat. Hist.* v. 14; *Palms Brit. Ind.* 17, t. 179; leaflets close set slightly falcate concolorous, tips subulate filiferous, male spadix much branched, spikes much longer than their spathes, fem. spadix reduced to few branches each bearing a very large solitary long peduncled nodding glabrous spike clothed with broad glabrous imbricating bracts.

PENANG, *Lewes, Wray* (2435).

Leaves 12–15 ft.; petiole slender, trigonous, apparently armed with a simple row of spines on each face; leaflets equidistant, 20–22 by $2\frac{1}{2}$ in., margins setose towards the tips. *Spadices* much branched, less covered than usual in the genus by the primary spathes; branches entirely covered by loosely sheathing spathes; young spikes slender, looking as if annulate by the broad shallow bracts, glabrous externally. *Males* 3–4 in., slender, bracteoles obsolete or nearly so. *Fem. fl.* large, oblique. *Ovary* strigose with erect stout hairs, ovoid. *Fruit* (accompanying Wray's specimen) globose, 1 in. diam., suddenly contracted into a columnar beak $\frac{1}{2}$ in. long, clothed (including the beak) with small very dark brown scales in vertical series, each with a short recurved setose tip, and an obtuse keel on the back.—“Erroneously referred to *Z. edulis* in Malesia iii. 64.”—O.B.

6. **Z. Beccarii**, *Hook. f.*; leaflets strict concolorous elongate-ensiform acuminate, tips shortly filiform, margins spinulosely setose, costæ 3 with few scattered long bristles beneath, rachis with short hooked black claws, fem. spadix very long, rachis brown woolly, lower spathes very long, upper twice as long as the large stout spikes, fruit-scales recurved spinescent.

RANGOON, *McLelland*.

Leaflets apparently equidistant, 18–24 by $1\frac{1}{2}$ in., shining on both surfaces, margins with strong straight setæ almost throughout their length, mid-costa stout, lateral slender; bristles $\frac{1}{4}$ – $\frac{1}{2}$ in. long, black; very young leaflets pale beneath with very long slender pale bristles on the costæ. *Fem. spadix* 3 ft. long or more; lower spathe 1 ft. long; upper 4–6 in. *Spikes* $2\frac{1}{2}$ in. long, $\frac{3}{4}$ in. diam.; bracts woolly; flowers $\frac{1}{2}$ in. long; sepals and petals subequal, broadly ovate, acute. *Fruit* (much broken) apparently small; scales pale chesnut, with broad bases and paler recurved spinous tips.—Very distinct from *Z. Wallichiana* in the long strict leaflets with long bristles, short tips, and margins armed throughout their length.

26. **KORTHALSIA**, *Blume*.

Scandent, spinous palms. *Leaves* pinnatisect; leaflets more or less cuneate or trapezoid and erose (except *K. echinometra*); rachis flagelliferous; petiole short, sheath often produced into a large ligule (ochrea). *Spadix* axillary, loosely branched, pendulous, sheathed with tubular persistent spathes; bracts membranous; bracteoles reduced to hairs. *Flowers* bisexual, crowded in cylindric catkin-like spikes; sepals orbicular or oblong; petals ovate or lanceolate, valvate; stamens 6 or more, filaments short, anthers linear; staminodes 6 or more; ovary imperfectly 3-celled; ovules basilar. *Fruit* globose or ovoid, 1-seeded; pericarp thin, tessellate with recurved shining scales. *Seed* erect, top hollowed, chalaza lateral; albumen ruminant; embryo ventral.—Species about 20, Indian and Malayan.

The swollen ochreae of the first section form nidi for ants. The species are very imperfectly known.

* *Ochrea inflated*.

1. **K. echinometra**, *Becc. Males*. ii. 66, t. vii.; ochrea narrow elliptic-lanceolate armed with long flattened black spines, leaflets very narrowly linear-lanceolate finely acuminate mealy-white beneath more or less toothed towards the tip.

PERAK, *Scortechini* (n. 458b).—DISTRIB. Borneo.

Stem about $\frac{3}{4}$ in. diam. *Leaves* flagelliferous; leaflets opposite, 12–15 in. long, 6–8 broad, acuminate, green and shining above, 3–4-nerved; petiole about 20 in.; spines short; rachis with stout claws; sheath armed with short flattened spines almost enveloped by the ochrea, which is 5–6 in. long, and armed with scattered spines 2–3 in. long.—*Flower* and fruit unknown.

2. **K. scaphigera**, Mart. *Hist. Nat. Palm.* iii. 211; ochrea cymbiform lanceolate armed with short conical spines, leaflets rhomboid-ovate or -cuneate acuminate erosely lobulate above the middle. *Miq. Fl. Ind. Bat.* iii. 750; *Palm. Archip. Ind.* 26; *Becc. Males.* 67, t. 5. K. Lobbiana, H. Wendl. in *Bot. Zeit.* xvii. 174; *Miq. ll. cc.* K. rostrata, Blume, *Rumph. ii.* 168. ? *Calamosagus scaphigera*, *Palms Brit. Ind.* 30, t. 184 A; *Kurz For. Fl.* ii. 513. *C. wallichiaefolius*, Mart. *Hist. Nat. Palm.* Ic. 211.

MALACCA, Griffith. PERAK, King's Collector (6833, 8144).—DISTRIB. Sumatra.

Stem slender, $\frac{1}{2}$ – $\frac{3}{4}$ in. diam. *Leaves* 2½ ft.; leaflets distant, sessile, glaucous beneath; sheath armed with a few scattered conical prickles and generally split along the back into a fibrous network; ochrea forming the upper $\frac{3}{4}$, boat-shaped, closely half embracing the next sheath; petiole roundish, back armed with claws.—*Descr.* from Griffith.

3. **K. Scortechinii**, Becc. mss.; ochrea elongate armed with short scattered spines, leaflets linear or cuneately oblanceolate 8–10 times longer than broad.

PERAK, Scortechinii.

Leaflets 14–16 by $1\frac{1}{2}$ –2 in., alternate and subopposite, equidistant, oblanceolate, white beneath, 5–7-nerved, acutely toothed; sheath and ochrea (6–8 in. long) armed.—Distinguished from *Z. scaphigera* by the much longer ochrea, and more numerous narrower leaflets.

4. **K. wallichiaefolia**, H. Wendl. in *Kerchoff Palm.* 248; leaflets many broadly cuneately obovate obtusely erosely toothed as long or twice as long as broad. *Becc. Males.* ii. 75. *Calamosagus wallichiaefolius*, Griff. in *Calc. Journ. Nat. Hist.* v. 24; *Palms Brit. Ind.* t. 184. *C. harinaefolius*, Griff. l. c. in text p. 29.

MALACCA (from the interior), Griffith.

A very little-known plant. Griffith describes the leaves as resembling those of *Z. laciniosa*, but with less deep more obtuse incisions; the spadix as covered with long smooth spathes with lacerate mouths; spikes (immature) a span long by $\frac{1}{2}$ in. diam.; lateral pedicels plano-convex, bearing a long spathe about the middle, which reaches the base of the spike; bractæ broad, longer than the dense wool.

** Ochrea not inflated.

5. **K. laciniosa**, Mart. *Hist. Nat. Palm.* iii. 212; leaflets rhomboid ovate or trapezoid about as long as broad acutely erosely toothed, ochrea dilacerate sparingly armed, spikes tomentose. *Kurz in Journ. As. Soc.* xliii. pl. ii. (1874) 207; *Becc. Males.* ii. 74 (excl. pl. Salangore). *K. scaphigera*, *Kurz l. c.* 206 (excl. all syns.) t. 20, 21; *For. Fl.* ii. 513 (not of Mart.). *K. andamanensis*, *Becc. Males.* ii. 76. *Calamosagus laciniosus*, Griff. in *Calc. Journ. Nat. Hist.* v. 23, t. 1; *Palms Brit. Ind.* 27, t. 183.

BURMA, the ANDAMAN and NICOBAR ISLANDS.

Stem slender, $\frac{1}{2}$ in. diam. *Leaves* 2–4 ft.; leaflets subapproximate, 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* $\frac{1}{2}$ in. long, obovoid, mucronate; scales with a broadly lacerate pale brown membranous border.—Descr. from Kurz (of his *scaphigera*) in *For. Fl. l. c.* referred here by Beccari.

6. *K. ferox*, Becc. *Males*. ii. 73; leaflets shortly petiolulate trapezoid about as long as broad pale beneath obtusely erosely toothed, sheath and ochrea thickly armed especially on the petiolar side with short spines, above fibrous-reticulate glabrous or finely scurfy.

Var. *malayana*, Becc. mss.; spines of the sheath and ochrea shorter, and covering the ventral face of the latter.

Var. *malayana*, PERAK, at Larut (Hort. Calc. 6563); at Gunong Tjick, Sept., 1844, Scortechini.

I have seen no specimen. The type is Bornean.

7. *K. polystachya*, Mart. *Hist. Nat. Palm.* iii. 210, t. 172, f. 1; leaflets cuneiform or obliquely trapezoid glaucous beneath obtusely toothed, sheath and ochrea unarmed, spikes long slender flexuous. *Miq. Fl. Ind. Bat.* iii. 77; Becc. *Males*. ii. 74. *Calamosagus polystachyus*, Griff. ex Mart. l. c. 211. *C. ochriger*, Griff. *Palms Brit. Ind.* p. x. t. 216, f. 1.

MALACCA, Griffith.

Stem very slender, about $\frac{1}{2}$ in. diam., including the sheaths. *Leaves* about 2 ft., including the flagellum, sessile; leaflets 10-12, irregularly alternate, ferruginously woolly, shortly petiolulate, 6 by 3 in.; rachis and flagellum armed with claws, young rusty-pubescent; ochrea short, truncate. *Spadices* from the terminal axils, together forming a panicle 3-3 $\frac{1}{2}$ 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- $\frac{1}{2}$ in., and filled with stout wool.—Descr. from Griffith's *C. ochriger*. Beccari thinks that Kurz is mistaken in uniting this with *K. rigida*, Blume.

8. *K. tenuissima*, Becc. *Males*. ii. 275; very slender, leaflets 3-6 obovate or oblanceolate acuminate subacutely toothed pale beneath, sheath sparingly armed, ochrea unarmed, spikes few, spathes tubular inflated dilated above.

MALAY PENINSULA; Perak, at Larut, King's Collector (4057).

Leaves with a very slender petiole; leaflets 1-4 in. long by 1-1 $\frac{1}{2}$ broad; petiole very short, base callous swollen. *Spikes* apparently glabrous from the bracts exceeding the calyx.

9. *K. flagellaris*, *Miq. in Journ. Bot. Neerl.* 15; *Fl. Ind. Bat. Suppl.* 255, 591; leaflets numerous narrow elongate-cuneate rusty pubescent beneath acutely erosely toothed, sheath armed dorsally unarmed on the petiolar side, ochrea armed only ventrally, spikes tomentose. *K. angustifolia*, *Miq. Palm. Archip. Ind.* 15, 26 (excl. sp. from Borneo and var. β) (not of Blume).

MALAY PENINSULA; Perak, Scortechini; at Assam Kumbung, Wray (n. 3127).

Resembles in the form of its leaflets and their colouring beneath *Z. rubiginosa*, which has longer straighter less cuneate leaflets with short not subulate teeth.

27. CERATOLOBUS, Blume.

Palms with the habit and foliage of *Korthalsia*, but with flagelliferous leaves. *Spadix* very slender, loosely paniced; branches filiform; peduncle very long, pendulous, prickly, usually adnate to the sheath of the leaf opposite; spathe small, solitary, membranous, narrow, flattened, beaked, at length split down the ventral face; flowers polygamous, in pairs, the upper ebracteate, the lower bracteate and bracteolate. *Male fl.* Calyx small, 3-fid; lobes triangular, valvate; stamens 6, on the bases of the petals, anthers linear; pistillode minute. *Fem. fl.* Calyx of the male; corolla 3-fid, valvate; ovary ovoid; ovules 3, basilar, erect. *Fruit* small, 1-celled, 1-seeded, pericarp as in *Korthalsia*. *Seed* globose, erect; testa fleshy; albumen ruminant; embryo basilar.—Species Malayan.

1. *C. lævigatus*, Becc. mss.; leaflets in inequidistant groups of 2-3 pairs narrowly linear- or ob-lanceolate acuminate suddenly contracted into a long straight point naked on both surfaces and margins, spadix shortly peduncled, fruit spherical broadly beaked. *Calamus lævigatus*, Mart. Hist. Nat. Palm. iii. 339; *Miq. Fl. Ind. Bat.* iii. 129. *Calami* sp. Griff. in Calc. Journ. Nat. Hist. v. 72, & *Palms Brit. Ind.* 72 (last 5 lines).

PERAK, *King's Collector* (575, 971, 5916); on Waterfall hill, Wray (2919).

Stem 15-20 ft., about $\frac{1}{2}$ in. diam. *Leaves* 18-30 ft.; leaflets concolorous, dark green, 5-9 by $\frac{1}{2}$ - $\frac{3}{4}$ in., thin; rachis slender, sparsely armed with solitary recurved spines; petiole very short, base tumid; sheath strongly ribbed, armed with scattered simple flattened spines. *Spadix* 4-8 in., very shortly peduncled, erect, narrow; branches slender, sparsely pubescent. *Spathe* 6-10 in., linear-lanceolate, coriaceous, smooth. *Male fl.* sessile, subglobose, $\frac{1}{2}$ 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 $\frac{1}{2}$ 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 $1\frac{1}{2}$ in. diam. *Leaves* 3-4 ft.; leaflets 6-9 by 3-4 in., lower half triangular-cuneate; rachis stout armed with short solitary and 2-5-fid. claws; petiole 6-8 in., more or less muricate and armed with scattered short simple and compound spines; sheath transversely muricately ridged, unarmed, young white furfuraceous. *Spadix* 8-10 in., erect, narrow; branches short, glabrous. *Spathe* 8-12 in., elongate-oblong, flat, thinly coriaceous, quite smooth. *Male fl.* sessile, about $\frac{1}{2}$ in. long, narrowly oblong; calyx minute, cupular; petals narrow thrice as long, both deeply grooved. *Fruit* $\frac{3}{4}$ - 1 in. diam., brown, scales hardly channelled. *Seed* nearly smooth. *Fruiting calyx* minute; petals broadly ovate.

28. PLECTOCOMIA, Mart.

Scandent monocarpic spinous palms, stem very long. *Leaves* flagelliferous; leaflets linear lanceolate. *Spadix* simply branched; branches very long, pendulous, clothed with closely imbricating distichous inflated coriaceous persistent spathelets 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.

1. **P. khasyana**, Griff. in *Calc. Journ. Nat. Hist.* v. 106; *Palms Brit. Ind.* 106, t. 218; leaflets strongly 3-costate finely furfuraceous beneath tip not filiferous, rachis of spadix glabrate, of spikelets white-tomentose, spathels rusty-puberulous, male petals $\frac{1}{2}$ in. long elongate-lanceolate, fruit-scales ciliate and with deciduous recurved fimbriate tips. *Mart. Hist. Nat. Palm.* iii. 199. *P. assamica*, Hook. *Bot. Mag.* t. 1505 (*excl. syn.*).

KHASIA HILLS, alt. 4-5000 ft., Griffith, &c.

Stem 60-80 ft., as thick as the arm. *Leaves* 30 ft. including the flagellum; leaflets 8-16 by 2-3 in., broadly lanceolate; rachis armed beneath with very short digitate spines. *Male spadix* branched from the base; branches 3 ft. long by 2 ft. across the spathels, which are $1\frac{1}{2}$ in. long, oblong, white with broad green acute or acuminate tips and a broad brown interposed band. *Spikelets* 1 in., many-fld. *Stamens* 8-12. *Fruit* 1- $1\frac{1}{4}$ in. diam., globose, abruptly beaked.

2. **P. himalayana**, Griff. in *Calc. Journ. Nat. Hist.* v. 100; *Palms Brit. Ind.* 108, t. 218; leaflets concolorous tips filiform, spadix and spikelets scurfily tomentose, male petals $\frac{1}{2}$ in, fruit-scales fimbriate tips appressed. *Mart. Hist. Nat. Palm.* iii. 129; T. Anders. in *Journ. Linn. Soc.* xi. 12. *P. montana*, Herb. Ind. Or. Hook. f. & Thoms.

SIKKIM HIMALAYA, alt. 4-7000 ft.

Stem 1 in. diam. *Leaves* 6-8 ft. including the flagellum; leaflets 12-16 by 1- $1\frac{1}{2}$ in., with 5 slender costae, margins aculeolate, rachis scurfy and flagellum armed with recurved claws; petiole unarmed or margins spiny; sheath tubular, scurfy, spines whorled. *Spathes* conduplicate, scurfy. *Spadices* erect; branches 2-3 ft., drooping; spathels 1-2 in., rhomboid, acute; spikelets 3-7-fld. *Calyx* (male and fem.) cupular, 3-toothed, petals ovate-lanceolate. *Fruit* $\frac{1}{2}$ in. diam., depressed-globose; scales very small.

3. **P. Griffithii**, Becc. mss.; very stout, leaflets glaucous beneath, spathels glabrous or scurfy towards the tips, male spikelets sparsely scurfy sessile, fem. fl. pedicelled, scales of fruit fimbriate and toothed. *P. elongata*, Griff. in *Calc. Journ. Nat. Hist.* v. 96; *Palms Brit. Ind.* 104, t. 217 A, B, C (*not of Blume*).

MALACCA, Griffith.

A gigantic species. *Stem* as thick as a man's leg. *Leaves* with the flagellum about 20 ft.; leaflets distant, 2-3 ft. by 2-3 in., decurved; rachis and flagellum armed as in other species. *Spadix* very large, branches many, 2-3 ft. *Spathels* $1\frac{1}{2}$ in. broad. *Fruits* 3-5 in each spathel, "size of a carbine bullet," in diam.—Allied to *P. elongata*, differing in the more numerous flowers of the fem. spikelet, and by the much smaller fruit, the scales of which are not striated.—I have seen no specimen. J.D.H.

4. **P. macrostachya**, Kurz in *Journ. Beng. As. Soc.* xliii. pt. ii. 207, t. 16, 17; *For. Fl.* ii. 514; leaflets white beneath, rachis of spadix scurfy, spathels acute glabrous, male spikelets scurfy, flowers shortly pedicelled, margins of calyx-teeth densely tomentose.

TENASSERIM; on the Bithoko hills, alt. 3000 ft., Kurz, Brandis.

A lofty climber. *Leaflets* approaching in pairs, 12–18 in. long, linear-lanceolate, finely acuminate; petiole and rachis spinous, spines straight. *Branches of spadix* 4–5 ft.; *spathels* 1½–2 in. long, blackish towards the upper border. *Fruit* unknown. —I have seen no specimen. J.D.H.

5. *P. assamica*, Griff. in *Calc. Journ. Nat. Hist.* v. 97; *Palms Brit. Ind.* 107, t. 218 a.a.; leaflets white and finely furfuraceous beneath, tip not thread like, costæ slender, branches of fruiting spadix very stout scurfy, *spathels* 2½ in. long, sepals broadly ovate ¼ in. long, petals lanceolate ½ in. long, fruit villous from the deeply ciliate split recurved points of the scales. *Mart. Hist. Nat. Palm.* iii. 199, t. 176, f. 11.

ASSAM; *Hort. Bot. Calc.*

Leaves very large; leaflets 18–24 by 2–2½ in., lateral costæ marginal; petiole 1½ in. broad, with short stout marginal spines and short seriate scattered clusters of more slender dorsal ones. *Branches of fruiting spadix* 4–5 ft. long by 4–5 in. across the large subacute nearly glabrous *spathels*; rachis rusty tomentose. *Spikelets* 8–10 fld. *Male calyx* cupular, 3-toothed; petals lanceolate, ¼–½ 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 Debraghar to the Calcutta Gardens, has narrower *spathels*, brown mealy externally, ovate-lanceolate fem. sepals ½ in. long and petals narrowly lanceolate ¾ in. long; the very young fruit is clothed with recurved lacerate scales.

6. *P. elongata*, Mart. in *Roem. & Sch. Syst.* vii. 1333; *Hist. Nat. Palm.* 199, t. 114 and 116, f. 1; leaflets sparsely white furfuraceous beneath, tip not filiferous, costæ 3 very slender, branches of spadix very long, *spathels* 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 fem. larger urceolate 3-toothed, petals small linear-lanceolate, fruit 1 in. diam., densely villous from the long lacerate spreading tips of the scales. *Kunth Enum.* iii. 202; *Blume, Rumphia*, iii. 68, t. 158 and 163 A. *Calamus maximus*, Reinw. ex *Blume Cat. Hort. Bogor.* 59.

PENANG, Jack, Wallich; alt. 2500 ft., Curtis.—DISTRIB. Sumatra, Java.

Leaves very large; petiole stout; leaflets 1–1½ ft. by 2 in. broad, rather membranous, lateral costæ marginal. *Branches of spadix* 3–4 ft., 2–3 in. across the spreading *spathels*, which have acutely angled sides.

29. PLECTOCOMIOPSIS, Becc. mss.

Characters of *Plectocomia*, but upper leaves reduced to sheaths with long flagella and no leaflets, *spathels* small, infundibular, and fruit clothed with very minute almost microscopic scales, arranged in vertical series. *Seed* globose, smooth; albumen equable; embryo basilar.—Species 3, Malayan.

1. *P. geminiflorus*, Becc. mss.; leaves sessile, leaflets very many and narrow equidistant finely acuminate, spadices with long pendulous spikes, the lower branched, spikelets very short 2–3-fld., fruit subturbinat with more than 35 rows of minute scales. *Calamus geminiflorus*, Griff. ex Mart. *Hist. Nat. Palm.* iii. 338; *Palms Brit. Ind.* 70, t. 199 A. *Plectocomia geminiflora*, H. Wenll. mss.

MALAY PENINSULA; Malacca, Fernandez; Perak, Scortechini (No. 283b).



OLXIII. PALMEE. (Beccari & Hook. f.) [*Plectocomiopsis*.]

Stem slender, attaining 80 ft. *Sheaths* striate, sparsely prickly, uppermost unarmed. *Leaves* 6-10 ft.; leaflets 5-10 by $\frac{1}{2}$ in., finely acuminate, keel sparsely bristly above, smooth beneath. *Spadices* many, from the uppermost leaf-sheaths, which bear a simple armed flagellum and no leaflets; lower 4-5 in., with 4-5 pendulous spikes each 6-8 in. long. *Spathes* short, tubular, like the secondary spathes of *Calamus*. *Spikes* flexuous, rusty-pubescent; flowers 2-bracteolate, outer bracteole minute, inner auricular. *Fruit* immature; pericarp spongy; scales brown, with whitish fimbriate margins.

2. **P. Wrayii**, Becc. mss.; leaves petioled, fruit globosely ovoid shortly narrowed at the top with about 23 rows of scales.

MALAY PENINSULA; Perak, Wray (2421 ♀); *Herb. Hort. Calcutt.* (5282 ♀, 3447 ♂).

Very near *P. geminiflorus*; distinguished by the longer petiole and fruit.

3. **P. paradoxus**, Becc. mss.; leaves shortly petioled, leaflets lanceolate scattered in distant pairs shortly acuminate, spadices bifariously decomposed, spathels tubular, male spikelets exserted recurved. *Calamus paradoxus*, Kurz in *Journ. As. Soc.* xliii. (1874) ii. 213, t. 29, 30; *For. Flor.* ii. 521.

MARTABAN, Kurz.

Stem with the sheaths 1-2 in. diam. *Leaves* 5-7 ft.; leaflets 1-1 $\frac{1}{2}$ ft. by 1 in., in alternate pairs, thin, obscurely remotely appressedly ciliolate; petiole armed, sheath with pectinate spines; flagellum very long. *Spathes* tubular, smooth, obliquely truncate and acuminate; spathels similar, but much smaller, distichously imbricated; bracts spreading, glabrous. *Fem. fl.* and *fruit* unknown.

30. **MYRIALEPIS**, Becc. mss.

Characters as far as known of *Plectocomiopsis*, but the minute scales of the fruit are disposed without order.—Species 2, a Bornean and the following.

M. Scortechini, Becc. mss.

MALAY PENINSULA; Perak, Scortechini (n. 457^b).

Leaves unknown. *Fem. fl.* solitary in the spathels; calyx 3-lobed; corolla rather longer. *Fruit* globose; scales acuminate, tips not recurved; mesocarp between spongy and corky. *Seed* globose; albumen horny, equable.—Differs from the Bornean species (*M. triqueter*, Becc., *Calamus triqueter*, Becc., Malesia, iii. 62) in the obtusely angled trigonous sparsely spinous leaf-sheaths. The specimens are very imperfect.

31. **EUGEISSONIA**, Griff.

Tufted monocarpic spinous palms. *Leaves* pinnatisect; leaflets lanceolate; rachis armed, not flagelliferous. *Spadix* terminal, erect, thyriform, clothed below with reduced flagelliferous leaf-sheaths; branches erect, clothed with subdistichous obtuse spathes passing into bracts and bracteoles. *Flowers* large, coriaceous, solitary or 2-3-nate, 1-2-sexual. *Male fl.* calyx cupular, 3-fid; petals elongate-lanceolate, pungent, valvate; stamens about 12, anthers elongate, basifix. *Fem. fl.* larger; perianth accrescent; calyx of the male; petals with a dilated base and transverse crest of hairs; ovary oblong, 3-celled, stigmas flattened. *Fruit* ovoid, narrowed into a very broad obtuse beak, 1-celled, 1-seeded, scales minute; endocarp osseous. *Seed* ovoid, 6-12-grooved; albumen equable; embryo basilar.—Species about 6, Malayan.

[*Eugeissonia*.]

E. tristis, *Griff. in Calc. Journ. Nat. Hist.* v. 101; *Palms Brit. Ind.* 109, t. 220 A; *Mart. Hist. Nat. Palm.* iii. 212, t. 179, 180; *Becc. in Nuov. Giorn. Bot. Ital.* iii. 28.

MALAY PENINSULA and PENANG, *Griffith*, &c.

Stems densely tufted, very short or 0. *Leaves* 15–20 ft.; leaflets many, 2–2½ ft., narrow-lanceolate, subulate, acuminate, midrib bristly above; petiole 7–10 ft., armed with flat brown spines. *Spadix* 4–6 ft., sheaths and spathes armed; flowers 1–1½ in. long, terminal on the flexuous branches of the spadix; bracts many, closely imbricated. *Fruit* the size of a hen's egg, beak clothed to the tip with scales.

32. METROXYLON, *Rottb.*

Stout monocarpic palms. *Leaves* equally pinnatisect, leaflets opposite. *Spadix* very large, paniced, clothed with coriaceous spinous spathes; spikes sessile, catkin-like, short, distichous, recurved; bracts broader than long, bracteoles cupular. *Flowers* polygamous, densely crowded; perianth coriaceous. *Male fl.* calyx 3-fid, funnel-shaped, nerved; corolla segments oblong, valvate; stamens 6, anthers dorsifixed; pistillode 3-partite. *Fem. fl.* like the males, perianth hardly accrescent; staminodes a membranous cup; ovary oblong, retrorsely scaly, imperfectly 3-celled; style conic, 3-toothed, ovules 3, basilar. *Fruit* ellipsoid or subglobose, 1-celled, 1-seeded, pericarp tessellate with reversed scales; endocarp spongy. *Seed* erect, subglobose, rough; albumen ruminant; embryo ventral. *Species* 6? Malayan and Pacific.

1. **M. Sagus**, *Rottb. in Nye Saml. K. Dansk. Vid. Skrift.* ii. 527; spathes unarmed. *Miq. Fl. Ind. Bat.* iii. 147; *Becc. in Nuov. Giorn. Bot. Ital.* iii. 29. *M. inermis*, *Mart. Hist. Nat. Palm.* iii. 215. *Sagus lævis*, *Rumph. Herb. Amb.* i. 76; *Blume Rumphia*, ii. 147, t. 86; *Griff. in Calc. Journ. Nat. Hist.* v. 20; *Palms Brit. Ind.* 24 (no t. 182). *S. Rumphii*, *Blume l. c.* t. 126, 227. ? *S. Koenigi*, *Griff. ll. cc.* 19 and 22, t. 181. *S. inermis*, *Roxb. Fl. Ind.* iii. 623.

MALACCA (wild or cult. ?) *Jack*, &c.—DISTRIB. Malay Islds.

Trunk about 20 ft. with many basal offshoots, as stout as that of the cocoa-nut, annulate, clothed above with old leaf sheaths. *Leaves* as in the cocoa-nut, but more erect, unarmed; leaflets linear, acute, keeled, smooth. *Infl.* appearing when the plant is about twenty years old. *Spadices* several, terminal, alternately branched, spikes 5–8 in. *Flowers* minute, sunk in rusty wool, hardly larger than a grain of mustard seed, bisexual. *Fruit* (takes three years to mature) globose, size of a small apple, scales shining, channelled.—Desc. from *Jack* in *Mal. Misc.*, but according to *Griffith* the Indian *Metroxylon* bears no resemblance to a Cocoa-nut Palm.—The Sago Palm.

2. **M. Rumphii**, *Mart. Nat. Hist. Palm.* iii. 213, 313, t. 102, 159; spathes armed with long spines. *Miq. Fl. Ind. Bat.* iii. 140; *Becc. in Nuov. Journ. Bot. Ital.* iii. 30; *Malesia*, i. 91. *Sagus Rumphii*, *Willd. Sp. Pl.* iv. 404; *Roxb. Fl. Ind.* iii. 623. *S. genuina*, *Blume Rumphia*, ii. 150. *S. farinifera*, *Gærtn.* ii. 186, t. 120, f. 3.—*Rumph. Herb. Amb.* i. 75, t. 17, 18.

MALACCA (wild or cult.).—DISTRIB. Malay Islds.

There appears to be great confusion in the synonymy of the two common species of this genus, and that here given may be open to correction. *Beccari* states that *M. Rumphii* is much less cultivated than *M. Sagus*.

33. BORASSUS, *Linn.*

A very tall 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 cylindric branches that are densely clothed with closely imbricating bracts, enclosing spikelets of flowers which hence appear as if sunk in cavities of the branch; fem. spadix sparingly branched, bearing few scattered solitary flowers. *Male fl.* small, mixed with scaly bracts, secund in two series in a small spikelet, and protruding one by one from the cavities of the branch of the spadix, as the rachis of the spikelet elongates; perianth glumaceous; sepals 3, narrowly cuneate, tip inflexed truncate, imbricate; petals shorter than the sepals, obovate-spathulate, imbricate; stamens 6, anthers subsessile large oblong; pistillodes of 3 bristles. *Fem. fl.* larger, globose; perianth fleshy greatly accrescent; sepals reniform, imbricate; petals smaller, convolute; staminodes 6-9; ovary globose, subtrigonus, entire or 3-4-partite, 3-4-celled; stigmas 3, sessile recurved; ovules basilar, erect. *Fruit* a large subglobose drupe with 1-3-obcordate fibrous pyrenes; pericarp thinly fleshy, stigmas terminal. *Seeds* oblong, top 3-lobed; testa adherent to the pyrene; albumen equable hollow; embryo subapical.

B. flabellifer, Linn. *Sp. Pl.* 1187; *B. flabelliformis*, Murr. *Syst. Ed.* xiii. 827; Roxb. *Cor. Pl.* i. 50, t. 71, 72; *Fl. Ind.* iii. 790; Griff. *Notul.* iii. 167; Mart. *Hist. Nat. Palm.* iii. 221, t. 108, 121, 162; Kunth *Enum.* iii. 222; Thw. *Enum.* 329; Brand. *For. Fl.* 544; Kurz *For. Fl.* ii. 529; Blume *Rumph.* ii. 88; Miq. *Fl. Ind. Bat.* iii. 45. *B. dichotomus*, White in Grah. *Cat. Bomb. Pl.* 226. *B. æthiopum*, Mart. *l.c.* 221. *Lontanus domestica*, Rumph. *Herb. Amb.* i. t. 10. Ham. in Mern. Wern. *Soc.* v. 314; Gærtn. *Fruct.* i. 21, t. 8.—Rheede *Hort. Mal.* i. t. 9, 10.

Cultivated throughout the plains of INDIA, BURMA and CEYLON.—DISTRIB. Malaya; Afr. trop.

Trunk 60-70 ft., very rarely branching, often swollen above the middle. *Leaves* 6-10 ft. dian., palmately fan-shaped, rigidly coriaceous; segments 2-4 ft., linear, 2-fid, margins spinulose. *Spadix* male and fem. several feet long and very stout. *Male fl.* small; fem. 1 in. diam. *Drupe* broadly obovoid, brown, 8 in. diam.

34. **COCOS**, Linn.

Unarmed, monœcious palms. *Leaves* pinnatisect; leaflets narrow. *Spadix* erect, at length drooping, simply paniced; 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 trigonus, 1-seeded, style terminal; pericarp thick, fibrous; endocarp bony or stony, with 3 basal pores, the remains of the 3 cells. *Seed* cohering with the endocarp; albumen solid or hollow, or merely lining the endocarp with a thick hard coat; embryo opposite one pore.—Species about 30, all American, one of them cosmopolitan in the tropics.

C. nucifera, Linn. *Sp. Pl.* 1188; Mart. *Hist. Nat. Palm.* iii. 123. t. 62, 75, 88; Kunth *Enum.* iii. 285; Roxb. *Cor. Pl.* i. 52, t. 73; *Fl. Ind.* iii.



614; *Thw. Enum.* 330; *Brand. For. Fl.* 556; *Kurz For. Fl.* ii. 540; *Blume Rumph.* iii. 82; *Miq. Fl. Ind. Bat.* iii. 64; *Hook. Journ. Bot.* ii. (1850), t. 1. *C. nana*, *Griff. Notul.* ii. 166.—*Rheede Hort. Mal.* i. t. 1-4.

Cultivated in the hot damp regions of India, Burma, and Ceylon, especially near the sea (indigenous in the Cocos Isld. and N. Andaman, *Kurz*).—DISTRIB. All tropical shores.

Trunk 40-80 ft., flexuous, annulate, base thickened. *Leaves* 12-18 ft.; leaflets 2-3 ft., coriaceous, flaccid; petiole 3-5 ft. stout. *Spadix* 4-6 ft., branches flexuous; lower spathe 2-3 ft., oblong, hard, splitting lengthwise; male fl. small; fem. 1 in. long, 2-bracteolate, disk annular. *Drupe* 4-10 in. long, trigonously obovoid or subglobose, green or yellowish; albumen lining the endocarp. *C. nana* is a small low var. grown in the Maldivé Islds. and Ceylon.

ADDENDUM TO PALMS.

TEYSMANNIA ALTIFRONS, *Reichb. f. & Zoll. in Linnæa* xxviii. 657; *Miq. Fl. Ind. Bat.* iii. 749.—Mr. Ridley (Singapore) informs that this noble Sumatran Palm is also a native of the Malay Peninsula. The genus is of doubtful affinity, but most probably belongs to the Tribe *Corypheæ*. It may be recognized by its almost stemless habit, and enormous erect elongate-rhombic plaited leaves.

ORDER CLXIV. PANDANÆ.

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 spathes; flowers small, crowded on a catkin-like spadix or its branches, bracts and bracteoles 0. *Perianth* 0. *Male fl.* stamens many, filaments free or connate; anthers erect, basifixed; pistillode 0 or small. *Fem. fl.* staminodes 0 or small; ovary 1-celled, free or connate with those of contiguous flowers; stigmas subsessile, papillose; ovules solitary and suberect, or many and parietal. *Fruit* a globose oblong mass of free or connate 1- ∞ -celled woody or fleshy angular drupes. *Seeds* minute, testa striated, albumen hard fleshy; embryo minute.

Stem erect or prostrate. Stamines in fem. fl. 0. Carpels 1-ovuled. 1. PANDANUS.

Stem usually climbing. Stamines of fem. fl. hypogynous. Carpels many-ovuled 2. FREYCINETIA.

1. PANDANUS, *Linn. f.*

Characters as above.—Species numerous, all tropical, chiefly Mascarene and Malayan.

I am compelled to be brief with the characters of the Indian species, very few of which are fully described; and of the Malayan especially, the available specimens are most unsatisfactory. I omit many usually cited references, and some synonyms which appear to me to be doubtful, and am by no means confident as to the value of much that remains.

* Carpels not united in groups.

† Male fl. of free stamens with very short filaments. Drupes with a pyramidal crown produced into a straight or curved spinescent style.

1. **P. foetidus**, *Rowb. 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 subglobose, crown of drupes smooth or nearly so. *Kunth*



Enum. iii. 98; *Kurz in Seem. Journ. Bot.* v. (1867) 101, t. 62, f. 4, 5, 6; & *For. Fl.* ii. 506; *Solms in Linnæa*, xlii. (1878) 8. *Frisquetia macrocarpa*, *Gaud. Voy. Bonite Bot.* t. iv. f. 2-8.—*Pandan. Wall. Cat.* 8591.

ASSAM and the KHASIA HILLS, and Eastwards to BURMA. The CONCAN?

A densely branched shrub. *Leaves* with large strongly incurved usually distant marginal spinules. *Spathes* pale yellow. *Anther* $4\frac{1}{2}$ in. long. *Fruit* very variable in size, from a hen's egg to a man's fist, red when ripe.

2. **P. caricosus**, *Spreng. Syst.* iii. 897; shrubby, leaves 5-8 ft. by 2-2½ in. spinulose-toothed, spinules minute white, anthers very long slender, fruits spicate subglobose obovoid or broadly oblong, crown of drupes muricate. *Kunth Enum.* iii. 98; *Hassk. in Flora*, 1842, ii. *Beibl.* 13 & *Cat. Hort. Bogor.* 60; *Miq. Fl. Ind. Bat.* iii. 163, & *Ann. Mus. Lugd. Bat.* ii. 54; *Kurz in Seem. Journ. Bot.* v. (1867) 100, t. 62, f. 1-3 & in *Journ. As. Soc. Beng.* xxxviii. ii. (1869) 146, in *Flora* (1869) 450; *Solms in Linnæa* xlii. (1878) 7; *Carriere in Rev. Hort.* (1878) 405, with ic. of male spadix. *P. atrocarpus*, *Griff. Notul.* iii. 160.

MALACCA, *Griffith*.—DISTRIB. Malay Islds.

Apparently closely allied to *fetidus*, and like it with fætid yellow spathes, differing in the spicate dark coloured or even blackish fruits and muricate crowns of the drupes. I have seen no specimens. I do not cite *Rumph. Herb. Amb.* iv. 154, though it is the authority for the species, the description and plate not being sufficiently explicit. Nor are others of the authorities cited quite dependable.

** *Male fl. of many anthers umbellate on the connate filaments. Drupes with a low crown and subulate or flattened simple or forked stigma.*

3. **P. furcatus**, *Roxb. Fl. Ind.* iii. 744; arboreous, leaves 15-20 ft., subglaucous beneath spinously toothed, spines curved, fruits solitary or racemed ellipsoid or oblong, drupes obconic crown convex, style very short flattened entire or 2-3-fid. *Spreng. Syst.* iii. 898; *Kunth Enum.* iii. 98; *Miq. Fl. Ind. Bat.* iii. 162, t. 37 male fl.; *Hassk. Pl. Jav. Rar.* 163; *Kurz in Seem. Journ. Bot.* v. (1867) 102, in *Journ. As. Soc. Beng.* xxxviii. ii. (1869) 147, in *Miq. Mus. Lugd. Bat.* ii. 54; in *Flora* (1869) 450, & *For. Fl.* ii. 507; *Solms in Linnæa*, xlii. (1878) 13; *Regel, Gartenfl.* 1878, 298; *Carr. in Rev. Hort.* 1879, 290, with fig., and 1881, 174. *P. crassipes*, *Wall. mss.* *P. caricosus*, *Miq. Analect. Ind.* ii. 16. *P. spinifructus*, *Dennst. Schluess. Hort. Malab.* 23. *Ryckia furcata*, *De Vriese in Verhandl. Kl. Acad. Wet.* (1854); in *Tuinb. Fl.* i. 161, & in *Hook. Kew Journ.* vi. (1854) 268. *Barrotia diodon*, *Gaud. Voy. Bonite Bot.* t. xiii. f. 15-24.—*Pandan. Wall. Cat.* 8951.

SIKKIM HIMALAYA, alt. 2-5000 ft. *J.D.H.* ASSAM, KHASIA and NAGA HILLS, and SILHET, alt. 0-4000 ft., CHITTAGONG and BURMA.—DISTRIB. Malay Islds.

Stem 30-40 ft., with aerial roots towards the base, as thick as the arm or leg, sparingly dichotomously branched above. *Leaves* 4 in. broad, marginal spines $\frac{1}{2}$ -1 in. long, flattened, lower curved. *Spathes* inodorous, $1\frac{1}{2}$ -2 ft., golden yellow, very coriaceous. *Stamens* 8-14, filaments united in a fleshy tube longer than the anthers, tips free or variously cohering. *Fruit* 6-9 in. long or less, very variable in size, red brown. *Drupes* rather fleshy, 5-6-angled; style shining.—In specimens from Churra in the Khasia and from Sikkim, the column of filaments is much broader and the free portion is much shorter than in those from Silhet.

4. **P. ceylanicus**, *Solms in Linnæa*, xlii. (1878) 16; stems tall tufted very slender, leaves elongate margins with strong recurved spines, anthers very short crowded on a very short fleshy tube, fruit broadly oblong, crown conical narrowed into a nearly straight spinescent style notched at the tip. *P. furcatus*, *Thw. Enum.* 327.

CEYLON, Thwaites.

According to a photograph of this plant as growing in the Ceylon Botanical Gardens, it has the habit of *P. furcatus* but with a much more slender stem, more erect branches, and narrower leaves. In the dried specimens, the spathes are much smaller, with long slender tips, the anthers much shorter, and the combined filaments very short. The fruit resembles *P. foetidus*, but the anthers are very different, about $\frac{1}{10}$ in. long.

5. **P. minor**, *Ham. in Wall. Cat.* 8592; dwarf, stem prostrate slender, leaves ensiform flat margins spinulose tips abruptly caudate, spathes navicular apiculate, filaments in palmate clusters, anthers minute, fruit solitary broadly oblong, drupes smooth, crown hemispheric with a small concave central claw-like style. *Solms in Linnæa*, xlii. (1878) 18. *P. unguifer*, *Hook. f. Bot. Mag.* t. 6347.

In hot valleys of the SIKKIM HIMALAYA, ASSAM, SILHET, CHITTAGONG and PEGU.

Stem 2-3 ft., as thick as the thumb. *Leaves* subdistichous, 18-24 by 1-2 in., flaccid, marginal spines distant. *Fruit* shortly peduncled, as large as the fist, yellow. *Drapes* obovoidly clavate, very smooth; style red.—In young fruit, the style is flattened and often forked, much as in *P. furcatus*. *Male fl.* unknown.

** Carpels connate in groups. Stigmas sessile, peltate or reniform. Filaments connate, anthers apiculate or aristate.

6. **P. fascicularis**, *Lam. Encycl.* 372, t. i.; shrubby, rarely erect, densely branched with copious aerial roots, leaves 3-5 ensiform caudate-acuminate, margin with ascending spinules, anthers interruptedly spicate, fruit large drupes obconic. *Kunth Enum.* iii. 98; *Solms in Linnæa*, xlii. (1878) 38. *P. odoratissimus*, *Roxb. Cor. Pl.* i. 65, t. 94-96; *Fl. Ind.* iii. 738; *Kunth l. c.* 94, excl. some syn.; *Griff. Notul.* iii. 159; *l. c. Pl. Asiat.* t. 174; *Kurz For. Fl.* ii. 508; *Presl. Epimel.* 239. *P. Candelabrum*, *Kurz in Journ. Bot.* v. (1867) 127 [*non Beauv.*]. *P. odoratus*, *Salish. Prodr.* 3. *P. verus*, *Kurz in Seem. Journ. Bot.* v. (1867) 125, in *Flora*, 1869, 453. *P. Rheedii*, *Gaud. Voy. Bonite, Bot.* t. 22, f. 12. *P. leucacanthus*, *Hassk. in Flora*, 1842, ii. *Beibl.* 14.—*Pandanus*, *Wall. Cat.* 8590. *Hasskarlia leucacantha*, *Walp. Ann.* i. 753.—*Rheede Hort. Mal.* ii. t. 1-8.

Throughout the hotter moister parts of INDIA, and much planted for fences.—**DISTRIB.** MALAY ISLDS. and Mauritius, China, Polynesia.

Stem sometimes erect and 10-12 ft., usually much lower and branching from the base. *Leaves* drooping, glossy green. *Spathes* white, fragrant. *Fruit* 6-8 in. diam., orange yellow or brown. *Drapes* confluent in groups of 5-20 rarely fewer, very woody, $1\frac{1}{2}$ -2 in. long, top rounded or sublobate with a depressed centre bearing a depressed small variously lobulate stigma.—I have given only a selection of the citations and synonyms of this widely diffused species. The *P. odoratissimus* of Vidal, *Fl. Forest. Filip.* Atlas xlii. t. 95 A appears to differ in the very small fruit and obtuse anthers. Possibly some of the plates of Rheede's "Perin Khaida Taddi," and especially t. 8, may belong to a different species, its carpels are all free; it is the *P. unipapillatus* of Dennst. *Schluss. Hort. Mal.* 23.

7 **P. andamanensium**, *Kurz. in Journ. As. Soc. Beng.* xxxviii. ii. (1869) 148; in *Flora* 1869, 452; *For. Flor.* iii. 507; trunk 60-70 ft. as thick as the human body, leaves 15-18 ft. by 4-5 in., marginal spines slender, fruit solitary large globose, drupes with a flat or depressed crown and an oblique lamelliform depressed style pungent when dry. *Solms in Linnæa*, xlii. (1878) 59. *P. Leram*, *Kurz in Seem. Journ. Bot.* v. (1867) 105.

ANDAMAN ISLDS., *Kurz.*

Habit of a gigantic *P. furcatus*; fruit as large as the human head or smaller,

orange yellow. *Drupes* 2½–3 in. long, usually in groups of 3–5 in. one series but often more, epicarp fleshy.—Descr. from Kurz.

IMPERFECTLY KNOWN AND UNDESCRIBED SPECIES.

1. *P. ALBUS*, *Hort. ex Steud. Nom. Ed. 2*, ii. 251.—“Ind. Or.”
2. *P. GRAMINIFOLIUS*, *Kurz in Seem. Journ. Bot. v.* (1867) 104; *For. Flor. ii.* 507; leaves 12–18 by ½–¾ in., margins with minute straight spinules, young fruit erect ellipsoid, stigma sessile trigonous. *Solms in Linnaea*, xlii. (1878) 50.—Tenasserim, *Helfer*.
3. *P. HUMILIS*, *Thwaites Enum.* 327 (excl. syn.); leaves 7 ft. by 1–1½ in., very coriaceous, with stout marginal spines, filaments very short, anthers very slender ½–¾ in. long, fruit globose spicate and drupes like those of *P. furcatus*.—Ceylon, *Thwaites*; CP. 3740 (used for fencing).
4. *P. HOULLETII*, *Carriere in Rev. Hort.* 1868, 210, f. 23; leaves 6 ft. 6 in. by 3–3½ in. abruptly caudate-acuminate reddish green above coppery red beneath, marginal spines distant incurved, male spadix 16 in. long, spikes 2½–4½ in., spathes coppery rose-colored, stamens in compact bundles.—Singapore.
5. *P. INTEGRIFOLIUS*, *Lour. ex Steud. Nom. Ed. 2*, ii. 251.—“Ind. Or. China.”—I do not find this name in Loureiros Fl. Cochinch. or elsewhere.
6. *P. LAIS*, *Kurz in Nat. Tijdschr. Ned. Ind.* xxvii. (1864) 218; in *Ann. Mus. Bot. Lugd. Bat.* ii. 54; habit of *P. furcatus*, fruit solitary or racemed, crown flat or depressed, stigmas more slender incurved bifid. *Solms l. c.* *P. horridus*, *Reinw.* (fld. Kurz). *P. furcatus*, *Hassk. Pl. Jav. Rar.* 163; ? *Miq. Analect. Ind.* ii. 10, t. 11, pl. 3? *P. furcatus* β *malesica*, *Kurz in Seem. Journ. Bot. v.* (1867) 102.—Singapore (*Kurz*), Sumatra, Java, &c.
7. *P. LAEVIS*, *Rumph.*; *Kurz For. Fl.* ii. 508; arboreous or shrubby much branched 20–25 ft., branches rooting, leaves elongate linear glaucous green 2–4 ft. by 2–2½ in. very acuminate without spines, male spadix very scented exactly as in *P. adratissimus*, but margins and midrib of the white spathes quite unarmed, stamens racemously connate, anthers mucronate, fruit unknown. ? *Wall. Cat.* 8588 B.—Burma, cultivated, *Kurz*; ? *Tavoy, Wallich*.—Descr. from Kurz.
8. *P. LERAM*, *Jones in As. Research.* iii. (1799) 163, with two plates; a tall tree 40–50 ft., with the habit of *P. furcatus*, but very slender, and with much larger fruit, drupes aggregate. *Voigt Hort. Suburb. Calcutt.* 683; *Kurz in Journ. As. Soc. Beng.* xxxviii. (1869) 452; *For. Fl.* iii. 507; *Solms l. c.* 66. *P. Leram*, var. macrocarpa, *Kurz in Seem. Journ. Bot. v.* (1867) 106. *Roussinia indica*, *Gaud. Voy. Bonite Bot. t.* 21.—Nicobar Islds., *Fontana*; Andaman Islds., *Kurz*.
9. *P. LINNÆI*, *Gaud. Voy. Bonite Bot. t.* 22, f. 1–8; *Solms l. c.* 67.—India.—Of this *Solms* remarks, cf. *P. 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-acuminate acutely serrate, fruit solitary terminal long peduncled cylindric glaucous surrounded by very short scale-like spathes, drupes unripe small obconic densely crowded but not confluent in groups, crown polygonal glaucous narrowed into a spiniform slender upcurved style with a linear stigma. *Solms l. c.* 11. *Fisquetia ornata* and *militaris*, *Gaud. Voy. Bonite Bot. t.* 5; *Solms l. c.* 65.—Malacca and Singapore, *Gaudichaud*, *Griffith*.—Described chiefly from *Solms*, who examined *Gaudichaud*’s specimen and drawing. There are young fruits of it in the Kew Museum, from *Griffith*; they are spicate, cylindric, 3–4 in. long by 1–1½ diam., and remarkable for their glaucous surface.
11. *P. OVATUS*, *Kurz in Journ. As. Soc. Beng.* xxxviii. (1869) 147; in *Flora*, 1869, 451; a small species according to *Gaudichaud*’s figure, with leaves 18–24 by ½ in., gradually narrowed into fine points, and small globose oblong 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*; Keddah Peak, *Lt.-Col. Low*.

12. *P. POLYCEPHALUS*, *Lam.*; *Wall. Cat.* 8588 A; leaves gradually finely acuminate, margins with stout distant incurved marginal spines in one specimen, and smaller closer ones in another, fruits spicate resembling those of *P. fœtidus*, carpels not in groups, but drupes with rather longer spinescent crowns.—Burma, at Amherst, *Wallich*.—Lamarck's description of *P. polycephalus*, founded, may apply to this.

13. *P. TURBINATUS*, *Lodd. ex Steud. Nom. Ed. 2, ii. 251.*—"Ind. Or."—Probably an undescribed plant of Loddige's Catalogue.

14. *P. YVANI*, *Solms in Linnæa*, xlii. (1878) 20; leaves linear-lanceolate caudate-acuminate more than 12 in. long serrulate, teeth pale, spathes concave elongate ovate, fem. fl. minute densely crowded narrowed into a simple upcurved shining spine.—Malacca, *Yvan (Herb. Delessert)*.—The above characters (from Solms) are worthless for the identification of a *Pandanus*.

15. *PANDANUS* sp.; dwarf, stem about as thick as a swan's quill, leaves 12–18 by $1\frac{1}{4}$ – $1\frac{1}{2}$ in. flat ensiform rather abruptly caudate acuminate finely spinulose-serrate with erect spinules 1-nerved, fruit terminal solitary young globose $\frac{1}{2}$ in. diam. drupes not aggregate crown conical narrowed into a stout incurved spine.—Malacca, *Griffith, Kew Distrib.* 6373.—Apparently a very well marked species, closely resembling *ovatus* in fruit, but with very different leaves, and which more resemble those of *P. minor*. In the present chaotic condition of the genus I do not name it.

2. FREYCINETIA, Gaud.

Characters, see p. 483.—Species Malayan, Australian and Polynesian.

1. *F. angustifolia*, *Blume Rumph. i. 159, t. 43*; leaves linear 12–18 by $\frac{1}{2}$ – $\frac{3}{4}$ in. finely acuminate margins smooth or minutely serrulate, spadices racemose, fem. cylindric, filaments very short conic. *Kunth Enum. iii. 587*; *Miq. Fl. Ind. Bat. iii. 17*; *Kurz in Seem. Journ. Bot. v. 134 in part*; *Solms in Linnæa*, xlii. (1878) 81. *F. Brunoniana*, *Wall. Cat. n. 3660*. *F. Debregeana*, *Gaud. Voy. Bonite Bot. t. 37, f. 1–11.*—Pandanæ, *Wall. Herb. n. 9124 (not distributed)*.

TAVOY, *Gomes*; PENANG, SINGAPORE and MALACCA, *Wallich, &c.*—DISTRIB. Malay Islds.

Diœcious. Stems climbing, as thick as a goose quill. Leaves grass like, costa very slender, nerves close set. Spadices 3–5, racemed on a short peduncle, males $\frac{1}{2}$ –1 in. by $\frac{1}{10}$ – $\frac{1}{8}$ in. diam., very dense-fl., fem. $\frac{1}{2}$ –1 by $\frac{1}{4}$ – $\frac{1}{2}$ in. diam.; staminodes minute; stigmas 3–4; spathes ovate-lanceolate, finely acuminate.

2. *F. pycnophylla*, *Solms in Linnæa*, xlii. (1878) 91; stem and leaves as in *F. angustifolia*, spadices in sessile umbels, fem. oblong, filaments elongate. *F. angustifolia*, *Kurz in Seem. Journ. Bot. v. 134 in part*.

CEYLON, *Walker, Thwaites (CP. 366)*.

Very similar to *F. angustifolia*, but at once distinguished by the larger spathes, oblong male and fem. spadices forming a sessile umbel or stout pedicel $\frac{1}{2}$ – $\frac{3}{4}$ in. long, and their greater size; males $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{1}{4}$ in. diam., fem. $\frac{1}{2}$ – $\frac{3}{4}$ by $\frac{2}{3}$ – $\frac{1}{2}$ 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 $\frac{1}{2}$ – $\frac{3}{4}$ in., spadices few in sessile umbels, fem. very stoutly pedicelled oblong, anthers subsessile.

CEYLON, *Walker, Thwaites, CP. 2333*. ? ANDAMAN ISLANDS, 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. $1\frac{1}{2}$ –2 by $\frac{3}{4}$ –1 in. diam.; pedicel as long.

4. **F. Gaudichaudii**, Bennet, *Pl. Jav. Rar.* 31, t. 9; leaves 5–6 by $\frac{3}{4}$ –1 in. strict linear-lanceolate serrulate towards the caudate tip, spadices umbellate stoutly shortly peduncled, fem. stout cylindric, spathes short fleshy. *Kunth Enum.* iii. 102; *Miq. Fl. Ind. Bat.* ii. 170; *Kurz in Seem. Journ. Bot.* v. (1867) 134; *Solms in Linnæa*, xlii. (1878) 86.

MALACCA, Maingay (*Kew Distrib.* 1537).

Stem as thick as a swan's quill. *Leaves* coriaceous, flat; sheaths short, membranous. *Spathes* $1\frac{1}{2}$ –2 in., cymbiform. *Fem. spadix* $1\frac{1}{2}$ by $\frac{1}{2}$ 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 $1\frac{1}{2}$ –3 ft. by $\frac{3}{4}$ –1 in., acuminate spinulose-serrate on the margins and midrib beneath, spadices 2–3 peduncled erect, outer spathes greenish inner red, fruit 2–4 in. elongate-oblong green, berries free at the conical 3–5-cornered apex, stigmas 3–1 horse-shoe shaped. *Kunth Enum.* iii. 586; *Miq. Pl. Jung.* i. 166; *Fl. Ind. Bat.* iii. 170; *Kurz For. Fl.* ii. 509.

ANDAMAN ISLANDS, Kurz.—DISTRIB. Java.

A lofty sparingly branched climber.—I have seen no specimens; the characters are from Kurz.

ORDER CLXV. TYPHACEÆ. By J. D. Hooker.

Aquatic or marsh perennial herbs. *Leaves* linear, erect or floating. *Flowers* small or minute densely crowded in globose or cylindric unisexual bracteate spikes the upper of which are males; perianth of green scales or fine hairs. *Male fl.* Stamens 1–7, filaments free or connate, anthers basifixed. *Fem. fl.* Ovary superior, 1–2-celled, cells 1-ovuled, styles persistent, stigmas laterally papillose; ovule pendulous from the top of the cell. *Fruit* small, membranous or drupaceous. *Seed* pendulous, albumen fleshy or floury; embryo axile, cylindric, radicular end thickened, plumule in a lateral slit.—Genera 2, species about 15, cosmopolitan.

Perianth of slender hairs 1. TYPHA.
Perianth of green scales 2. SPARGANIUM.

1. TYPHA, Linn.

Marsh herbs. *Leaves* erect, spongy. *Flowers* in very dense superposed cylindric spikes (catkins), often intermixed with capillary bracteoles (hairs with dilated tips). *Perianth* of capillary hairs, or 0 in the male. *Stamens* 1 or more, tip of connective thickened. *Ovary* (often reduced to a clavate tipped hair) very minute, on a long capillary stipes, narrowed into a capillary style with a clavate or filiform stigma. *Fruit* very minute; pericarp membranous, indehiscent or laterally dehiscent; albumen floury.—Species about 10, temp. and trop.

In all the Indian species the male spike is more or less distant from the fem. I am very doubtful as to their limits and synonyms. I am indebted to the works referred to under the species of Rohrbach and Korner for indications of some minute characters. The male fl. are sometimes replaced by clavate bodies.



1. **T. elephantina**, *Roxb. Fl. Ind.* iii. 566; stem 6–12 ft., leaves 1–1½ in. broad trigonous above the sheath, margins often undulate above the middle, flowers bracteolate, pollen 4-globate, stigma lanceolate. *Kunth Enum.* iii. 92; *Schnizl. Typha*, 26; *Kærner in Verh. Zool. Bot. Ges. Wien.* xxxix. 165, t. 5, f. 10; *Kurz in Journ. Bot.* v. 95; in *Journ. As. Soc. Beng.* xxxviii. i. 146. *T. latifolia*, *Edgew. in Proc. Linn. Soc.* vi. (1862) 194; *Kurz l. c.* *T. Märesii*, *Balland. in Bull. Soc. Bot. Fr.* 1887, 389.

Marshes from N.W. INDIA to ASSAM and southwards.—DISTRIB. Algiers.

Male spike 8–12 in., rachis clothed with short often forked hairs; bracts 3 or more; anthers 1–5, $\frac{1}{10}$ in. long. Fem. spike much stouter 6–10 by $\frac{1}{4}$ –1 in. diam.; flowers mixed with clavate pistillodes; bracteoles with fasciate tips much longer than the hairs, which are shorter than the stigmas.

2. **T. javanica**, *Schnizl. in Zolling. Verz. Ind. Arch. Pfl.* 77; stem 4–6 ft., leaves $\frac{1}{2}$ – $\frac{3}{4}$ in. broad biconvex above the sheath, hairs of male fl. simple forked or toothed, bracteoles with subspathulate tips and hairs shorter than the linear stigmas, fem. fl. mixed with pistillodes, pollen simple. *Rohrb. in Verh. Bot. Ver. Brandenb.* 1869, 98; *Kærner in Verh. Bot. Zool. Ges. Wien.* xxxix. 157, t. v. f. 6. *T. angustifolia*, *Thw. Enum.* 331. *T. latifolia*, *Moon Cat. Ceyl. Pl.* 81.

CEYLON, *Thwaites*, &c.—DISTRIB. Ms. Mascarene and Malay Islands.

A smaller plant than *T. elephantina*, from which it differs in the form of the base of the leaf, simple pollen and linear stigma. Fem. spike 5–6 by $\frac{1}{5}$ – $\frac{2}{3}$ in. diam. Anthers $\frac{1}{4}$ in.

3. **T. angustata**, *Chaub. & Bory Exped. Scient. Morée Bot.* 338; stem 6–10 ft., leaves $\frac{3}{4}$ –1 in. broad, semicylindric above the sheath, bracteoles of fem. fl. subspathulate equalling the linear stigmas, both longer than the hairs, fem. fl. mixed with clavate-tipped pistillodes, pollen simple. *Rohrb. in Verh. Bot. Ver. Brandenb.* 1869, 81; *Boiss. Fl. Orient.* v. 50; *Aitchis. in Trans. Linn. Soc. N.S.* iii. 120; *Kærner in Verh. Bot. Zool. Ges. Wien.* xxxix. 159, t. iv. f. 6, v. f. 1. *T. angustifolia*, *Kurz in Journ. Bot.* v. 95 (*excl. syn.*); *Roxb. Fl. Ind.* iii. 567; *Aitchis. in Journ. Linn. Soc.* xix. 188; *Wall. Cat.* 4989.

NORTHERN INDIA, from KASHMIR to MUNNIPORE and southwards to COINDE and COROMANDEL.—DISTRIB. N. Asia and westward, N. Africa and S. Europe.

Closely resembles the common European *T. angustifolia*, *Linn.*, which is distinguished by the bracteoles shorter than the stigmas.

4. **T. Laxmanni**, *Lepech. in Nov. Act. Acad. Petersb.* 84, 355 (*excl. syn. DC.*), t. 4; dwarf, 2–3 ft. high, leaves slender semicylindric at the sheath, male spikes 1–2 in., fem. $\frac{3}{4}$ –1 in. by $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., fem. fl. ebracteolate mixed with pistillodes, hairs very short much shorter than the subobtusate stigmas, pollen simple. *Kærner in Verh. Zool. Bot. Ges. Wien.* 167, t. iv. f. 3, v. f. 15. *T. minima*, *Kurz in Journ. Bot.* v. 96. *T. Martini*, *Aitchis. in Journ. Linn. Soc.* xix. 188. *T. stenophylla*, *Rohrb. in Verh. Bot. Ver. Brandenb.* 90; *Boiss. Fl. Orient.* v. 50.

KASHMIR, alt. 9000 ft., *Thomson, Giles*.—DISTRIB. N. Asia and westwards to Russia.

At once distinguished from all the previous species by its small size and slender leaves, but very closely allied in the European and Oriental *T. minima*, which, according to *Kærner*, has bracteoles.

2. SPARGANIUM, *Linn.*

Flowers in globose unisexual heads, subtended by leafy bracts.

Perianth of 3-6 membranous scales. *Stamens* 2-3, connective hardly produced at the tip. *Ovary* 1- rarely 2-celled; style very short, persistent, stigma unilateral; cells 1-seeded. *Drupe* obovoid, spongy; endocarp bony, tip perforated. *Seed* adherent to the endocarp.—Species about 6.

1. **S. ramosum**, *Huds. Fl. Angl.* 401; erect, leafy, leaves linear triquetrous at the base, heads sessile on the branches of a panicle, drupes sessile shortly beaked. *Kunth Enum.* iii. 89; *Boiss. Fl. Orient.* v. 48. *S. erectum*, *Kurz in Journ. Bot.* v. (1867) 96. *S. stoloniferum*, *Ham. in Wall. Cat.* 4990. *S. carinatum*, *Ham. ex Royle Ill.* 408.

NORTH WEST INDIA; from the plains to 5200 ft. in Kashmir. BURMA, *Griffith*. —DISTRIB. N. temp. regions.

Stems 1-4 ft. *Leaves* 2-5 ft., 1 in. broad or less; margins concave. *Male heads* olive-brown, $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., deciduous; fem. 1 in. diam. in frt.; scales linear, tips spatulate. *Drupe* $\frac{1}{2}$ in. long, angled; stigma linear.

2. **S. simplex**, *Huds. Fl. Angl.* 401; erect, leafy, leaves linear triquetrous at the base rarely floating, fem. heads racemose, male spicate, drupe shortly stipitate long-beaked. *Kunth Enum.* iii. 89; *Boiss. Fl. Orient.* v. 48. *S. erectum*, var. β *Linn. Sp. Pl.* 971; *Kurz in Journ. Bot.* v. (1867) 96.

SIKKIM HIMALAYA, alt. 7-9000 ft., J.D.H. KHASIA HILLS, alt. 5-6000 ft., *Griffith*, &c. BURMA, *Griffith*. —DISTRIB. N. temp. regions.

Stem 1-2 ft. *Leaves* narrower than in *S. ramosum*, margins flat. *Male heads* yellow. *Scales* linear-oblong, tips toothed. *Drupe* fusiform, simple linear.

ORDER CLXVI. AROIDEÆ.

Perennial herbs with radical leaves, or scandent shrubs. *Leaves* alternate. *Flowers* 1-2-sexual, sessile on a spadix which is more or less enclosed in a green or coloured spathe; if unisexual the males usually towards the apex and fem. at the base of the spadix, with often neuters between them and above the males; perianth 0 or of scales. *Anthers* 2-4-celled, dehiscence dorsal or by pores; pollen various. *Ovary* sessile, 1-3-celled, style short or long, stigma discoid or lobed; ovules 1 or more, variously inserted. *Fruit* baccate. *Seeds* 1 or few, rarely many, often imbedded in pulp; testa various; albumen 0 or copious; embryo axile, or in exalbuminous genera, thick with the plumule in a lateral slit.—Genera about 100, species about 1000, for the most part tropical.

I am indebted to the studies of Mr. N. E. Brown for valuable notes on many of the Indian species entered in the Kew Herbarium, and for aid in the preparation of the following descriptions:—

SERIES A. *Flowers* monœcious (rarely diœcious in *Arisæma*). *Perianth* 0.

Tribe I. ARINÆÆ. *Spadix* with a flowerless top (appendage) or 0 in *Pistia* and *Cryptocoryne*. *Stamens* free; anther-cells larger than their connective. *Fem. fl. Staminodes* 0. *Ovary* 1-celled, ovules orthotropous.

Submerged or marsh herbs. Ovaries in one whorl 1. CRYPTOCORYNE.

Marsh herbs. Ovaries spirally disposed 2. LAGENANDRA.

Floating stemless herb 3. PISTIA.

Terrestrial tuberous herbs:

Leaves compound; ovules basal 4. ARISÆMA.

Leaves pedatipartite, appearing after the flowering;
ovules basal 5. SAUROMATUM.



- Leaves undivided; ovules parietal 6. ARUM.
Leaves various and flowers coetaneous; ovules
basal 7. TYPHONIUM.
Leaves pedatipartite; ovules basal and apical . . . 8. THERIOPHONTUM.

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-sect, segments pinnatifid.

- Appendage naked; neuters 0 9. AMORPHOPHALLUS.
Appendage slender, naked; neuters below the males . . 10. SYNANTHERIAS.
Appendage covered with conical neuters 11. THOMSONIA.
Appendage 0; neuters very large 12. PLESMONIUM.

Tribe III. COLOCASIEÆ. *Spadix* with or without an appendage, usually shorter than the spathe. *Anthers* sessile, densely crowded, prismatic or broad, free or connate, connective very thick. *Leaves* undivided, often peltate.

* *Tube of spathe not enclosing the fruit. Fem. infl. partially adnate to the spathe.*

- Ovary many-ovuled; stigma 4-6-cleft 13. ARIOPSIS.
Ovary many-ovuled; stigma discoid 14. STEUDNERA.
Ovary 1-ovuled; stigma discoid 15. HAPALINE.

** *Tube of spathe enclosing the fruit. Spadix wholly free from the spathe.*

- Limb of spathe refracted, open; ovules parietal . . . 16. REMUSATIA.
Limb of spathe refracted, convolute; ovules basal . . 17. GONATANTHUS.
Limb of spathe erect; ovules many parietal 18. COLOCASIA.
Limb of spathe erect; ovules few basal 19. ALOCASIA.

Tribe IV. PHILODENDREÆ. *Spadix* without an appendage, usually shorter than the spathe. *Stamens* free, rarely connate in a prismatic body; connective usually broader than the cells. *Fruit* enclosed in the tube of the spathe.—Perennial herbs, flowering and leafing at the same time.

- Spathe deciduous; ovary 1-2-celled 20. AGLAONEMA.
Spathe wholly persistent; ovary 2-4-celled 21. HOMALONEMA.
Limb of spathe deciduous; ovary 1-celled 22. SCHISMATOGLOTTIS.

SERIES B. *Flowers* hermaphrodite, a few rarely unisexual. *Perianth* 0.

Tribe V. CALLEÆ. *Spadix* without an appendage. *Stamens* distinct; filaments flat, anther-cells terminal. *Ovary* truncate, stigma central.—Mostly climbers.

- Spadix* stipitate; ovule 1 basal; berries free 23. ANADENDRON.
Spadix sessile; ovule 1-basal; berries free 24. SCINDAPSUS.
Spadix sessile; ovary 1-2-celled, many-ovuled; berries
confluent 25. RHAPHIDOPHORA.
Spadix sessile. *Ovary* 1-celled; ovules 2 or more
(rarely 1) basal 26. EPIPREMNUM.

CLXVI. AROIDEÆ. (J. D. Hooker.)

SERIES C. *Flowers* hermaphrodite. *Perianth* of 4-6 segments.

Tribe VI. ORONTIÆ. *Spadix* without an appendage.

* *Spadix* flowering downward; *ovary* 1-celled.

- Prickly rigid herbs; spathe many times longer than the sessile spadix 27. LASTIA.
Prickly rigid herb; spadix stipitate 28. PODOLASIA.
Prickly rigid herbs; spathes twice as long as the spadix 29. CYRTOSPERMA.
Unarmed herbs; leaves membranous, pinnate 30. ANAPHYLLUM.

** *Spadix* flowering upwards; *ovary* 1-3-celled.

- Stem scandent; leaves distichous 31. POTHOS.
Stemless; leaves ensiform; spathe 0 32. ACORUS.

1. **CRYPTOCORYNE**, Fisch.

Aquatic or marsh herbs, with creeping rootstock and short stem or 0. *Leaves* broad or narrow. *Tube of spathe* with connate margins and a transverse septum within. *Spadix* very slender, its tip adnate to the septum of spathe; male infl. cylindric; anthers 2-celled, cells with conical perforate tips, pollen vermiform; fem. infl. a single whorl of connate 1-celled many-ovuled ovaries with a few neuters; styles short, recurved; ovules erect, orthotropous. *Fruit* of coriaceous connate 2-valved many-seeded carpels. *Seeds* oblong, albuminous; embryo axile.—Species about 25, tropical Asiatic.

* *Tube of spathe* narrow, longer than the limb (or as long in *C. Griffithii*).

1. ***C. ciliata***, Fisch. ex Schott Melet. 16; leaves linear-oblong or lanceolate, limb of spathe oblong densely fimbriate. *Kunth Enum.* iii. 12; *Schott Aroid.* 7; *Syn.* 2; *Prodr.* 15; in *Bonpland.* (1857), 222; *Wight Ic.* t. 775; *Wall. Cat.* 8914; *Griff. in Trans. Linn. Soc.* xx. t. 10-12; *Blume Rumph.* i. 86; *Engler Arac.* 624, and in *Beccari Males.* i. 297; *N. E. Br. in Journ. Linn. Soc.* xviii. 245. *C. elata*, *Griff. Notul.* iii. 134; *Ic. Pl. Asiat.* t. 170, 171 (alata). *C. drymorrhiza*, *Zipp. in Mig. Ann. Mus. Bot.* i. 122. *Ambrosinia ciliata*, *Rowb. Cor. Pl.* iii. 90, t. 294; *Fl. Ind.* iii. 491.

BENGAL, in ponds, &c. (in salt marshes, Kurz). MALACCA, *Griffith*.—DISTRIB. Malay Islds.

Tuberous, stoloniferous. *Leaves* 6-16 in., lower half sheathing, midrib stout. *Scape* very short. *Tube of spathe* 4-10 in.; limb 2-3 in., oblong, cuspidate, fimbriae purple. *Ovaries* 5-7. *Fruit* long-peduncled, globose, 1 in. diam.; cells 6-8-seeded. *Embryo* polyphyllous, germinating in the fruit.—Javan specimens have leaves 14 by 3½ in.

2. ***C. Walkeri***, Schott in *Bonpland.* (1857) 221; *Prodr. Aroid.* 15; leaves long-petioled oblong or oblong-lanceolate base cuneate or rounded, limb of spathe linear-lanceolate strongly twisted glabrous. *Engler Arac.* 625. *C. spiralis*, *Thw. Enum.* 334.

CEYLON, *Walker*.

Leaves 2-3 in., acute, thin; petiole 6 in., very slender. *Scape* very short. *Tube of spathe* 2 in.; limb 1½ in. *Ovaries* 4-5.

3. **C. retrospiralis**, *Kunth Enum.* iii. 12; leaves lanceolate to narrowly linear, tube of spathe and glabrous limb both closely twisted. *Wight Ic.* t. 772; *Schott Aroid.* 8; *Syn.* 2; *Prod.* 18; in *Bonpland.* (1857) 222; *Engler Arac.* 625 & *Ic. ined.* No. 16. *Ambrosinia retrospiralis*, *Roxb. Fl. Ind.* iii. 492.

BENGAL, BURMA, CENTRAL INDIA and the DECCAN.

Leaves 3-12 by $\frac{1}{4}$ - $\frac{3}{4}$ 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; *Prodr.* 16; leaves oblong-lanceolate finely acuminate, petiole long, limb of spathe ovate long-caudate glabrous not twisted. *Engler Arac.* 626.

The DECCAN PENINSULA, *Perrottet*, &c.

Leaves 4-6 by $\frac{1}{4}$ -1 in., midrib stout. *Spathe* about equalling the petiole, its tail about three times longer than the blade.

5. **C. cordata**, *Griff. Notul.* iii. 138; *Ic. Pl. Asiat.* t. 172; leaves long-petioled broadly ovate or oblong-ovate base cordate or emarginate, tube of peduncled spathe very long, limb small lanceolate not twisted glabrous. *Schott Syn.* 2; *Prodr. Aroid.* 14; in *Bonpland.* (1857) 220; *Engler Arac.* 626 & *Ic. ined.* No. 6; in *Beccari Males.* i. 298; *N. E. Br. in Journ. Linn. Soc.* xiii. 242.

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

Leaves 3-4 in., petiole usually much longer. *Spathe* very variable in length (according to depth of water); tube 10-12 in.; limb $1\frac{1}{4}$ in., purplish green, base contracted, peduncle 2-3 in. *Ovaries* 6-8; ovules many.

6. **C. Griffithii**, *Schott Syn. Aroid.* 1; *Prodr. Syst. Aroid.* 14; leaves broadly oblong or orbicular ovate subcordate petiole very long and slender, tube of spathe a little longer than the ovate cuspidate limb. *Engler Arac.* 631; *N. E. Br. in Journ. Linn. Soc.* xviii. 244. *Cryptocoryne*, sp. *Griff. Notul.* iii. 139; *Ic. Plant. Asiat.* t. 173, f. 3 (ovules).

MALACCA, *Griffith.*

Leaves coriaceous, obtuse, base very various, rarely rounded sometimes 2-auricled, green above purple beneath, nerves obscure; petiole 6-8 in. *Spathe* 2-2 $\frac{1}{2}$ in., dark livid red and papillose within, and having a dimidiate hollow cone descending from the base of the convolute portion and enclosing the male fl. *Fruit* ovoid, rugose, reddish, few-seeded.

7. **C. Beckettii**, *Thw. ex Trim. in Journ. Bot.* xxiii. (1885) 269; leaves long-petioled oblong-lanceolate undulate base cordate, tube of small sessile spathe narrow straight about twice as long as the small tailed blade.

CEYLON; Matale east, *Beckett.*

Leaves 2 $\frac{1}{2}$ -4 in., subacute, 5-7-nerved; petiole 4-8 in. *Spathe* not 1 in. long, limb shortly tailed. *Stipes* of male infl. shorter than it. *Carpels* 5.—Descr. from *Trimen.*

8. **C. Wightii**, *Schott Prodr. Syst. Aroid.* 17; leaves narrowly linear narrowed at both ends strongly crisped and waved, tube of long-peduncled spathe very long, limb lanceolate acuminate not twisted glabrous. *Engl. Arac.* 627. *C. unilocularis*, *Schott in Bonpland.* 1857, 223 (not of *Kunth*).

MYSORE, *Wight.*



Leaves 6-10 by $\frac{1}{2}$ in.; petiole shorter. Tube of spathe 5-6 in., limb $1\frac{1}{2}$ -2 in.; peduncle 2-2 $\frac{1}{2}$ in. Ovaries 6-7, stigmas orbicular.

9. *C. affinis*, N. E. Br. mss. leaves petioled oblong-ovate base rounded or emarginate strongly bullate, spathe peduncled, tube about as long as the twisted limb, base inflated.

PERAK, *Scortechini* (586, 586b).

Leaves 1-2 $\frac{1}{2}$ in. by $\frac{1}{2}$ -1 in., subacute, purplish beneath, 5-7-nerved, margin subcrenate; petiole 1-3 in. Spathe 2 $\frac{1}{2}$ -3 in., with the peduncle lengthening after flowering, limb narrowly lanceolate dark-purple. Appendage of spadix sessile, ovoid. Carpels 6-7, very many-ovuled; stigmas oblong.

** Tube of spathe shorter than the limb.

† Limb of spathe transversely rugose or plicate within.

10. *C. spiralis*, Fisch. mss. ex Wydder in *Linnæa*, v. 428; leaves linear-lanceolate, spathe sessile, tube very short obconic, limb linear-lanceolate, strongly twisted at first. *Kunth Enum.* iii. 12; *Blume Rumph.* i. 84, t. 36 C.; *Wight. Ic.* t. 773; *Schott Melet.* 16; *Syn. Aroid.* 2; *Gen.* t. 1; *Prodr.* 18; *Aroid.* 8, t. 13; *Schnitz. Iconog.* 1, t. 72; *Engler Arac.* 628. *Ambrosinia spiralis*, Roxb. *Fl. Ind.* iii. 492. *Arum spirale*, Retz *Obs.* i. 30; *Bot. Mag.* t. 2220; *Lodd. Bot. Cat.* t. 525.

BENGAL, the DECCAN PENINSULA, &c.

Leaves 3-8 by $\frac{1}{2}$ - $\frac{3}{4}$ in., acute or acuminate, narrowed from the middle to both ends, costa slender, nerves parallel; petiole long or short. Spathe 3-5 in. long, at first twisted, transversely lamellate within. Ovaries 5-6, several-ovuled; stigmas broadly elliptic.

11. *C. Huegelii*, Schott *Aroid.* 8, t. 12; *Prodr.* 18; petiole as long as the elliptic-oblong leaf-blade, spathe shortly peduncled, tube very short cylindric, limb linear-lanceolate long-acuminate, ovaries 4-2-ovuled. *Engl. Arac.* 628.

EAST INDIES, *Huegel in Herb. Vienna*.

I have seen no specimen of this species.

†† Limb of spathe smooth within.

12. *C. cognata*, Schott in *Bonpland.* 1857, 222; *Prodr.* 16; leaves oblong-lanceolate or linear-oblong margins undulate, limb of spathe much longer than the tube narrowed into a very long twisted tail. *Engl. Arac.* 629.

The CONCAN, Law, &c.

Leaves 6-10 by 1-1 $\frac{1}{2}$ in., narrowed and acute at both ends; midrib very broad; petiole very stout, shorter than the blade. Spathe 7-8 in., shortly peduncled, tube 2-2 $\frac{1}{2}$ in., limb 5-6 in.

13. *C. Roxburghii*, Schott *Prodr.* 18; leaves narrowly linear acuminate, spathe about as long as the leaves, limb much longer than the cylindric tube very slender closely twisted. *Engl. Arac.* 629. *C. Roxburghii*, Dalz. & Gibs. *Bomb. Fl.* 257. *C. unilocularis*, Wight. *Ic.* t. 774; *Kunth Enum.* iii. 13. *Ambrosinia unilocularis*, Roxb. *Fl. Ind.* iii. 493. *Arum spirale*, Grah. *Cat. Bomb. Pl.* 228.

NORTHERN CIRCAES and the CONCAN.

Leaves 8-12 by $\frac{1}{2}$ - $\frac{3}{4}$ in., ecostate, nerves parallel. Tube of spathe about $\frac{2}{3}$ in., blade 6-8 in. Ovaries 4-5, stigmas orbicular or oblong, close to the stipes of the spadix; ovules very many. Fruit conical, 5-celled, many-seeded.

14. **C. Thwaitesii**, Schott in Bonpland. 1857, 221; Prodr. 14; leaves broadly ovate or subobovate base cordate or emarginate, tube of spathe cylindric one-third shorter than the linear hardly twisted limb. Engler Arac. 630; Ic. ined. No. 7; Thw. Enum. 334.

CEYLON, in forests, Thwaites.

Leaves 2-2½ by 1¼-1½ in., densely papillose above, petiole rather shorter than the blade, margin undulate. Spathe subsessile, 1½ in. long, limb oblong, gradually narrowed into a slender tail, tube hardly swollen at the base. Ovaries 6; styles rather long, stigmas oblong.

15. **C. Gomezii**, Schott in Bonpland. 1857, 221; Prodr. 14; leaves long-petioled ovate or ovate-oblong obtuse base cordate, spathe long-peduncled, limb broadly lanceolate not twisted three times as long as the oblong ovoid tube narrowed into a long tail. Engler Arac. 630. —Aroid. Wall. Cat. 8958.

SILHET, Gomez.

Leaves 2-3 by 1-1½ in., base often unequal-sided, tip obtuse acute or rounded. Tube of spathe ½-¾ in., limb 1¼-2 in., broad below and concave.

16. **C. elliptica**, N. E. Br. mss.; leaves orbicular- or ovate-cordate, tube of peduncled spathe 2-2½ times as long as the lanceolate limb, which is twisted and bent forward at the apex.

PERAK; at Larut, King's Collector.

Allied to *C. Griffithii*, but leaves smaller not so deeply cordate, and limb of spathe much smaller narrower and not papillose within. Leaves 1-1½ by 1½ in. obtuse fleshy, brown beneath; petiole 2-3 in., sheath short. Spathe with the peduncle hardly lengthening in fruit; tube white, 1¼ in., base slightly inflated; limb ¾-¾ in., black within. Fruit 6-celled, stigmas small.

DOUBTFUL SPECIES.

C. DALZELLII, Schott. in Bonpland. 1857, 221; Prodr. 15; leaves lanceolate margin erosely serrulate, lateral nerves 4 on each side ascending, fruit ovoid 5-gynous, seeds biseriate oblong subtrigonal. —Bombay, Dalzell.

2. **LAGENANDRA**, Dalzell.

Habit and characters of *Cryptocoryne*, but the fem. inflor. consists of a spiral row of many free ovaries, with peltate or discoid stigmas, and the fruit is baccate and indehiscent. —Species 4, Indian.

1. **L. toxicaria**, Dalzell in Hook. Journ. Bot. iv. (1852) 289; v. (1853) t. 4; petiole as long as the oblong or elliptic-oblong obtuse or acute leaf, nerves very slender divergent from the stout costa, spathe lanceolate caudate-acuminate slightly twisted, tube much shorter than the long-tailed limb. Dalz. & Gibs. Bomb. Fl. 257; Schott Syn. Aroid. 3 (excl. syn.); Engler Arac. 621. L. ovata, Thwaites Enum. 334. *Cryptocoryne ovata*, Schott Melet. i. 16; Blume Rumph. i. 86; Kunth Enum. iii. 12, *Caladium ovatum*, Vent. in Roem. Arch. ii. 357. C. montanum, Herb. Heyne. Arum ovatum, Linn. Sp. Pl. 967. —Rheede Hort. Mal. xi. t. 23. —Aroid. Wall. Cat. 8966.

The SOUTH CONCAN, and BELGAUM, in marshes, Dalzell. CEYLON; common in the central provinces.

Rootstock creeping. Leaves with petiole 8-36 by 2-5 in., coriaceous, base acute or rounded; sheath of petiole elongate. Spathe longer than the compressed peduncle, 3-8 in. long; tube broad, limb lanceolate. Syncarp globose, 1½-2 in.

diam. ; carpels in many cycles, free, about $\frac{1}{2}$ 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 $\frac{3}{4}$ -1 $\frac{1}{2}$ 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 $\frac{3}{4}$ -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 *l.c. ined.* No. 15. *Cryptocoryne Koenigii*, *Schott in Bonpland.* 1859, 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 caudate.

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 *Arisæma*).

3. **PISTIA**, *Linn.*

A floating, gregarious, stemless, stoloniferous herb. *Leaves* sessile, obovate-cuneate, together forming an erect cup. *Spathe* small, shortly peduncled, tubular below, open above. *Spadix* adnate to back of the tube of the spathe, free above. *Male infl.* of few sessile connate stamens beneath the apex of the spadix, slits vertical, with a ring of confluent minute neuters below them. *Fem. infl.* a solitary conico-ovoid 1-celled ovary ; style conical, stigma discoid ; ovules many, orthotropous, basal or subparietal. *Fruit* membranous, few-seeded. *Seeds* oblong or obovoid, albuminous, testa at length rugose ; embryo minute, apical, cuneiform.

P. Stratiotes, Linn. *Sp. Pl.* 963; *Roxb. Cor. Pl.* iii. 63, t. 269; *Fl. Ind.* iii. 131; *Griff. Notul.* 12, 211; *Ic. Plant. Asiat.* t. 260, 261; *Dalz. & Gibs. Bomb. Fl.* 281; *Bot. Mag.* t. 4564.—*Rheede Hort. Mal.* t. 32.

Throughout INDIA, and CEYLON; in still sweet water.—DISTRIB. tropics generally.

Roots of tufted simple white fibres clothed with fibrillæ. *Leaves* 1½–4 in. long in Indian forms, apex rounded or retuse, undulate, pubescent above and beneath; nerves raised beneath, flabelliform, converging within the margin. *Spathe* white, obliquely campanulate, ½ in. long, tomentose externally, gibbous and closed below, contracted about the middle, dilated and nearly circular above.

4. **ARISEMA**, Mart.

Tuberous herbs. *Leaves* 3-sect, pedatisect, or leaflets whorled. *Spathe* deciduous, tube convolute, limb often acuminate or tailed, usually incurved. *Spadix* included or exserted, appendage various often excessively long and filiform. *Male fl.* many, stipitate (sessile and connate in a continuous stratum in *A. flavum*), anthers 2–5 oblong or subglobose. *Fem. fl.* densely crowded; ovary 1-celled; style short or 0, stigma disciform; ovules 2 or more, basilar, orthotropous. *Neuters* 0, or a few above the males or females, or on the appendage, subulate. *Berries* 1–few-seeded. *Seeds* albuminous; embryo axile.—Species about 50, temp. and trop. Asia, and N. America.

The characters taken from the plants being mono- or diœcious are not absolute but very constant, as are those of leaves one or two.

A. TRISECTA. *Leaves* trifoliate (Sp. 1–17).

* Appendage much shorter than the limb of the spathe.—Usually all diœcious.

1. **A. Roxburghii**, Kunth *Fnum.* iii. 18; leaves 2, leaflets ovate-lanceolate caudate-acuminate lateral subsessile median petiolulate, limb of spathe ovate-lanceolate acuminate incurved or involute, appendage very slender acute naked or with a few basal neuters. *Schott Syn. Aroid.* 27; *Prodr.* 33. *A. cuspidatum*, Engler *Arac.* 536. *Arum cuspidatum*, Roxb. *Fl. Ind.* iii. 506; *Wight Ic.* t. 784.

PENANG, *Roxburgh*; on Govt. Hill, alt. 2000 ft., *Curtis*. PERAK, *Scortechini, Kunstler*.—DISTRIB. Java (*Ic. Horsfield*.)

Rootstock horizontal, rooting all over. *Petiole* elongate sheathing the scape, 14–18 in., and peduncle mottled-green and pink; leaflets 4–10 by 1–5 in. *Spathe* pale yellow-green, tube 4 in., longer than the limb, margins not recurved around the mouth of the tube in *Roxburgh's* drawing, but distinctly in one of *Scortechini's*, which represents a much broader strongly incurved limb of the spathe with a caudate tip. *Male spadix* very slender, tapering into the short filiform appendage which bears a few subulate neuters.

2. **A. Kunstleri**, Hook. f.; leaf solitary, leaflets ovate or ovate-lanceolate subcaudately acuminate all or the median only petiolulate, limb of the green spathe suberect ovate-lanceolate acuminate about as long as the tube but broader, base dilated round the tube hardly recurved, male spadix very slender ending in a very slender naked finely acuminate appendage.

PERAK, *Kunstler (Ic. in Herb. Calcutt.)*. PENANG, *King's Collector* (1653), on Govt. Hill, alt. 2000 ft., *Curtis*. ? KHASIA HILLS; Nya Bungalow, alt. 2000 ft. *Clarke*.

Root tuberous. *Petiole* and *peduncle* 4–10 in., slender, green, obscurely mottled with red. *Leaflets* membranous, 3–6 in., lateral unequal at the base, median acute or cuneate at the base, margins sometimes obscurely erose (when dry). *Spathe* 2–3 in. long.—Very near *A. laminatum*, Blume of Java, which has a white tube of the spathe, and the green limb is contracted at the base, and is not carried round the mouth of the tube.

3. ***A. album***, *N. E. Br. in Journ. Linn. Soc.* xviii. 247; leaf solitary, leaflets petiolulate lateral dimidiate-ovate median elliptic base cuneate or acute, tube of white spathe about as long as the ovate-lanceolate acuminate limb, appendage filiform shorter than the spathe bearing towards the tip scattered subulate neuters. *Arisæma*, *Wall. Cat. n.* 8924.

KHASIA HILLS, alt. 4000 ft., *de Silva, Clarke*.

Tuber depressed. *Petiole* 10–12 in.; lateral leaflets about 8 by 4 in., base very unequal, tips filiform, median rhombic-ovate; petiolules $\frac{3}{4}$ –1 in. *Peduncle* about as long as the petiole. *Spathe* 3–4 in., tip filiform, margins below not revolute. *Spadix* (female) with scattered neuters on the base of the appendage, besides those towards its tip.

4. ***A. petiolulatum***, *Hook. f.*; leaf solitary, leaflets all petiolulate ovate or ovate-oblong abruptly cuspidately caudate, tube of spathe equalling the lanceolate acuminate limb contracted at the base, appendage slender-cylindric erect obtuse naked.

KHASIA HILLS, alt. 4–5000 ft., *J.D.H. & T.T., Clarke*. MUNIPORE, alt. 8800 ft., *Watt*.

Rootstock elongate, rooting all over. *Petiole* and shorter *peduncle* slender; leaflets subequal, 6–10 by $2\frac{1}{2}$ – $3\frac{1}{2}$ in., lateral cuneate or unequal-sided at the base, median with an acute base. *Spathe* with a funnel-shaped tube and purplish limb 5 in. long, twice as long as the slender male *spadix*.

5. ***A. Wattii***, *Hook. f.*; leaves 2, leaflets subsessile finely acuminate, lateral dimidiate-ovate median elliptic-oblong, tube of spathe longer than the orbicular-ovate caudate-acuminate limb, appendage long-stipitate stout cylindric naked top rounded.

MUNIPORE; at Mao, alt. 4000 ft., *Watt*.

Petiole 8–10 in., leaflets 5–8 in., lateral 2– $3\frac{1}{2}$ 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* $2\frac{1}{2}$ in., $\frac{1}{4}$ in. diam., stipes $\frac{1}{2}$ in.

6. ***A. anomalum***, *Hemsl. in Journ. Bot.* (1887) 205; leaves solitary, leaflets petiolulate ovate acuminate tips filiform, limb of spathe broad ovate acuminate strongly incurved broader and rather shorter than the tube, appendage slender narrowed upwards naked. *N. E. Br. in Gard. Chron.* (1890) i. 321; *Bot. Mag. t.* 7211.

STRAITS OF MALACCA, Larut Islds., *Curtis*. PERAK, alt. 2500–3500 ft., *Scortechini, King's Collector*.

Rootstock deformed, lobed; lobes bearing solitary leaves or peduncles or both. *Petiole* slender, green, leaflets 4–6 by $1\frac{1}{2}$ 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.

7. ***A. verrucosum***, Schott in *Estr. Bot. Wochenbl.* (1857) 341; *Prodr.* 29; leaf solitary, petiole sheath and peduncle warted, leaflets sessile rhomboidly orbicular or lateral ovate, limb of spathe very broad obcordate cuspidately acuminate decurved, base of appendage dilated into a lobed disc. *Engler Arac.* 537.

EASTERN TEMPERATE HIMALAYA, alt. 8–11,000 ft., J.D.H. Clarke.

Tuber large, depressed. *Petiole* 8–10 in., very stout, dull dark green, studded with minute warts; leaflets 2–7 in., dark-purple beneath, margins waved purplish, nerves stout beneath. *Peduncle* like the petiole. *Spathe* 5–7 in., tube white closely striped with dark purple; limb twice to five times as broad, reticulated with white and dark purple; apex $\frac{1}{2}$ –2 in. long. *Spadix* stout shortly stipitate, dark purple, base intruded, narrowed above it into a fusiform body that tapers into an exerted thread 12–18 in. long or more.—Very near to *A. utile*, from which the warted petiole and peduncle distinguish it. The colours are taken from a drawing of my own, and no doubt vary much.

8. ***A. Griffithii***, Schott *Syn. Aroid.* 26; *Prodr.* 54; leaves 2, leaflets sessile all rhombic-orbicular acuminate crenate, limb of spathe galeate many times broader than the tube which it overhangs deeply 2-lobed, with a long linear interposed tail that embraces the filiform tail of the appendage. *Engler Arac.* 538; *Clarke in Journ. Linn. Soc.* xxi. 386; *Bot. Mag.* t. 6491. *A. Hookerianum*, Schott in *Estr. Bot. Wochenbl.* (1857) 334; *Prodr.* 30. *A. Hookeri*, Schott *Gen. Aroid.* t. 6, f. 11–19. —*Pythonii Sp. Griff. Itin. Notes*, 201, No. 1179.

EASTERN TEMPERATE HIMALAYA; Sikkim, alt. 7–10,000 ft. BHOTAN, alt. 3–5000 ft., Griffith.

Tuber depressed, 3–5 in. diam. *Petiole* as thick as the middle finger, green, smooth; leaflets 6–10 in., sometimes broader than long, margins faintly yellow, nerves deeply sunk. *Peduncle* much shorter than the petiole. *Tube of spathe* 2–3 in., purple ribbed with white; limb 5–8 in. broad, incurved, head rounded, lobes forming two broad dull violet flaps, reticulate with green; sinus 2–3 in. deep; tail 2–4 in., purple. *Spadix* stout; appendage purple, stipitate, suddenly narrowed from a broad disciform lobed intruded base into a tortuous capillary tail 1–3 ft. long.—Variable in colour and size. Clarke observes that in ascending from 8000 to 12,000 ft. the spathe varies from 6–8 in. broad curved and ridged, to 1 in. broad scarcely dilated with obscure ridges; but possibly other species were confounded with *Griffithii*.

9. ***A. utile***, Hook. f. in Schott *Prodr. Aroid.* 30; *Bot. Mag.* t. 6474; leaves solitary, leaflets sessile rhombic-ovate or obovate crenate, limb of spathe broadly obcordate or obovate oblong retuse or 2-lobed with a short interposed tail that embraces the filiform tail of the appendage. *Engler Arac.* 537 and *l.c. ined.* No. 55.

TEMPERATE HIMALAYA, from Kashmir, alt. 7500 ft., Clarke, eastwards to Sikkim, alt. 9–13,000 ft., J.D.H., &c.

A smaller plant than *A. Griffithii* with the same habit, but with pale green leaves with undulate golden margins and a much narrower limb of the spathe 4 in. broad or less, which is not longer than the tube, is red brown or purplish and coarsely

reticulated. Appendage as in *A. Griffithii*, of which Clarke (*Journ. Linn. Soc.* xxi. 386) considers it a trifling variety. The Bot. Mag. figures, however, uphold the characters which I never failed to observe in Sikkim. Hybrids, of course, may occur. The Western specimens have longer petioles and peduncles and paler greener spathes. All my specimens are 1-leaved, but two are represented in the reduced figure of the Bot. Mag. drawing.

β. *Limb of spathe lanceolate acuminate, or caudate*.—Dioecious, except *A. Prazeri*.

10. **A. speciosum**, Mart. in *Flora* (1831), 458; in *Wall. Cat.* 8923; leaf solitary, leaflets all petiolulate acuminate lateral dimidiate cordate median ovate, nerves broadly reticulate, limb of spathe ovate-lanceolate incurved caudate-acuminate, appendage cylindric or fusiform at the often inflated base, narrowed into a very long filiform tail, base not truncate or disciform. *Blume 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 Kumaon, to Sikkim, alt. 7-8000 ft., and Bhotan 9-10,000 ft., *Griffith*.

Rootstock oblique, or shortly creeping and rooting; often 5 in. diam. *Petiole* very stout, green, smooth, often marbled with brown or purple; leaflets 16-19 in., edged with red or purple, median cuneate or rounded at the base; petiolule $\frac{1}{2}$ -2 in. *Peduncle* much shorter than the petiole. *Tube of spathe* 2-4 in., striped with purple; limb 2-6 in. long, banded white and purple. *Spadix* pink or yellowish tail 12-18 in., dark purple; base of appendage usually ovoid; anther-cells 4-5; ovaries ovoid, stigma sessile pulvinate.—Very variable in size and colouring. Schott made three species of it, reduced by Engler to two varieties, both founded on my drawings; they are *A. eminens*, Schott in *Æstr. Bot. Zeitschr.* (1875) 357; *Syst. Aroid.* 30, simply a gigantic specimen with the spathe 8 in. long; and *A. mirabile*, Schott l. cc. 366 and 31, with an abnormally inflated base of the appendage. Wallich's *Arisæma*, n. 8925 in fruit, from Tavoy, may be *speciosum*.

11. **A. intermedium**, *Blume Rumph.* i. 102; leaves 1 or 2, leaflets sessile lateral dimidiate-ovate or -cordate median elliptic base acute or cuneate nerves broadly reticulate, limb of spathe lanceolate incurved narrowed into a filiform cusp, appendage substipitate subcylindric narrowed from a dilated fusiform base into a very long fusiform tip. *Kunth Enum.* iii. 18; *Schott Syn. Aroid.* 27; *Prodr.* 28; *Engler Arac.* 540. *A. Stracheyanum*, *Schott in Æstr. Bot. Zeitschr.* (1857), 533; *Prodr.* 27; *Engl. l. c.* and *l. c. ined.* No. 11. *A. dolosum*, *Schott in Bonpland.* (1859) 26; *Prodr.* 28.

TEMPERATE WESTERN HIMALAYA, alt. 7-9000 ft., from Simla to Kumaon.

A smaller plant than *A. speciosum*, with more membranous sessile leaflets, the median of which is elliptic with a very acute base. From *Wallichianum* it differs in the elliptic median leaflet. The nervation at once distinguishes it from *A. costatum*. *A. dolosum* and *Stracheyanum* in no way differ from *intermedium*.

12. **A. Wallichianum**, *Hook. f.*; leaf solitary, leaflets sessile all rhombic-orbicular, bases cuneate, margins undulate, lateral subequal at the base, nerves broadly reticulate, limb of spathe oblong or lanceolate caudate-acuminate, appendage shortly stipitate, base dilated truncate or disciform narrowed into a very long filiform tail. *A. costatum*, *Wall. Cat.* 8922 non Mart. (not *Arum costatum*, *Tent. Fl. Nep.*).

TEMPERATE HIMALAYA; from Simla, alt. 6-8000 ft., to Sikkim, alt. 12-14,000 ft.

Tuber depressed. *Petiole* 6-12 in.; leaflets 3-8 in., and as broad, rather membranous. *Peduncle* shorter than the petiole. *Spathe* 3-8 in., narrow, striped with dark purple; limb suberect or slightly incurved, much longer than the tube, tip filiform.—The Sikkim specimens are much smaller than the Nepalese and western. A fine drawing of this made in Nepal by Wallich's native artists is in Kew Herbarium.

13. **A. propinquum**, Schott in *Æstr. Bot. Zeitschr.* (1857) 333; *Prodr. Aroid.* 29; leaves 2, leaflets sessile acuminate, lateral dimidiate-ovate, median rhomboidly orbicular base contracted subpetiolulate, nerves broadly reticulate, limb of spathe oblong or lanceolate caudate-acuminate, appendage stipitate fusiform above the dilated truncate lobulate base narrowed into a filiform shortly exserted tail. *A. intermedium*, var. *propinquum*, Engler *Arac.* 541.

SIKKIM HIMALAYA, alt. 12,000 ft., J.D.H., Clarke.

Rootstock depressed globose. *Petiole* very stout, 8 in. long, green, closely speckled and striate with dark green; leaflets 3-4 in. long and broad, succulent, shining, nerves strong beneath; basal sheaths long, irrorate with pink purple and green. *Peduncle* about equalling the petiole. *Spathe* very like *Wallichianum* and *speciosum*; limb suberect, striped with purple on the sides, reticulate towards the top. *Spadix* pink.—Described chiefly from a drawing of mine. The shortly exserted appendage seems to be a constant character and a great contrast to its allies. It has been regarded by Engler as a variety of *intermedium*, from which the two leaves and rhombic median leaflet distinguish it.

14. **A. costatum**, Mart. in *Flora* (1831) ii. 458; leaf solitary, leaflets sessile or subsessile lateral dimidiate-cordate median broadly ovate all caudate-acuminate, and with very close set parallel nerves, limb of spathe oblong-lanceolate incurved suddenly narrowed into a long filiform tip, appendage shortly stipitate subcylindric from a dilated lobulate base then narrowed into a very long filiform tail. *Blume Rumph.* i. 101; *Kunth Enum.* iii. 17; *Schott Syn. Aroid.* 26; *Prodr.* 29; *Engler Arac.* 541. *Arum costatum*, Wall. *Tent. Fl. Nep.* 28, t. 19.

NEPAL; Wallich.

Tuber depressed, 3-4 in. diam. *Petiole* 12-18 in., very stout, sheath embracing the stout green peduncle; leaflets 10-16 by 5-7 in., dark green. *Spathe* 4-6 in., white striped with dull purple.—Wallich's published figure in *Tent. Fl. Nep.*, and a fine coloured drawing made in Nepal, now in Kew Herbarium, from which it is taken, are the only authority for this species which in the nervation of the leaves differs from all its congeners.

15. **A. Prazeri**, Hook. f.; leaf solitary, leaflets ovate acute or acuminate, lateral subsessile median petiolulate, nerves very slender distant, tube of spathe short, limb much longer oblong-lanceolate acute contracted at the base, appendage slender twice as long as the spathe, base not swollen.

UPPER BURMA; Koni, J. C. Prazer.

Rootstock tuberosus. *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. *Male fl.* very small, subsessile. *Ovaries* minute, contracted into a short style with disciform stigma.—A few male fl. occur on the stipes of the appendage.

16. **A. galeatum**, *N. E. Br. in Gard. Chron.* (1879) ii. 102; leaf solitary, leaflets all petiolulate, lateral dimidiate-ovate or -cordate acuminate crenulate, median elliptic or ovate, tube of green spathe cylindric top incurved galeate much longer than the ovate-lanceolate acuminate pendulous limb the lower margins of which are recurved, appendage gradually narrowed from an elongate conic truncate base into a long thread. *Bot. Mag.* t. 6457.

SIKKIM HIMALAYA; *Gammie* (*Hort. Kew*).

Tuber small. *Petiole* 1-2 ft.; leaflets 7-14 in., median broadest, nerves broadly reticulate; petiolules 1-1½ in. *Peduncle* much shorter than the petiole. *Spathe* 4-5 in., striped with white; limb 1½ in., hanging half-way down the tube. *Spadix* white; appendage sessile in the fem., stipitate in the male, thread pale purple

†† Appendage of spadix far exerted bearing many neuters.

17. **A. fimbriatum**, *Masters in Gard. Chron.* (1884) ii. 680, f. 119; leaf solitary, leaflets subsessile broadly ovate caudate-acuminate, tube of purple spathe shorter than the large erect or incurved ovate-lanceolate limb, appendage filiform clothed with filiform neuters. *Regel Gartenfl.* (1886) 357, f. 40; *Bot. Mag.* t. 7150; *Journ. of Hortic.* 1886, f. 19.

LANGKAWI ISLANDS, north of Penang (*Hort. Sander*, *Curtis*).

Rootstock tuberous. *Petiole* 6-10 in.; leaflets 5-7 in., nerves deeply sunk. *Peduncle* as long as the petiole. *Spathe* about 6-7 in., tube 2½ in., striped green and white, limb striped purple and white. *Spadix* very slender throughout; appendage twice as long as the tube, pendulous, red-purple, base not swollen; neuters nearly 1 in., flexuous; male fl. with a few ovaries scattered amongst the lower flowers. —The Philippine Isld. locality recorded in *Gard. Chron.* is probably an error.

B. PEDATISECTA. *Leaves* pedatisect. (Sp. 18-22.)

* *Appendage of spadix elongate, far exerted.*

18. **A. tortuosum**, *Schott Meletem.* i. 17; *Syn.* 29; *Prodr.* 36; leaves 2-3, leaflets 5-18 sessile or petiolulate ovate- or linear-lanceolate subcaudately acuminate, tube of green spathe about as long as the large incurved broadly cymbiform acuminate limb, appendage narrowed from the base to the tip erect then porrect and again erect. *Kunth Enum.* iii. 19; *Blume Rumph.* i. 105; *Engler l.c.* 545, and *l.c. ined.* n. 58. *A. curvatum*, *Kunth l.c.* 20; *Schott Syn.* 29; *Prodr.* 37; *Dalz. & Gibs. Bomb. Fl.* 258; *Bot. Mag.* t. 5931; *Engler l.c.* 544, and *l.c. ined.* No. 57. *A. Steudelii*, *Schott in Bonpland.* (1839) 26; *Prodr.* 37; *Engler l.c.* and *l.c. ined.* n. 61. *A. helleborifolium*, *Schott Syn.* 29; *Prodr.* 36. *A. commutatum*, *Schott in Bonpland.* (1859) 26; *Prodr.* 35. *Arum curvatum*, *Roëb. Fl. Ind.* iii. 506; *Wight l.c.* t. 788. *A. tortuosum*, *Wall. Pl. As. Rar.* ii. t. 10. —*Arisæma*, *Wall. Cat.* 8926, 8927.

TEMPERATE and SUBTROPICAL HIMALAYA, alt. 8000 ft., from Simla to Bhotan. THE KHASIA HILLS, MUNNIPORE, the WESTERN GHATS, from the Concan to Malabar.

Tubers spheroidal, attaining 5 in. diam. *Petiole* 1-3 ft., green or with the sheaths mottled with purple; leaflets 8-18 in., distant or crowded, or almost radiately disposed. *Peduncle* 2-4 ft. *Spathe* 4-6 in., pale green or purplish, tube subcylindric, gaping, gradually dilating into the limb. *Spadix* uni- or bisexual; appendage like a rat's tail, quite smooth. —Very common and varying greatly in stature, the numbers and proportions and breadth of the leaflets, colour of the spathe, and monœcious or diœcious flowers. In *A. Steudelii* there are a few neuters above the male fl. The recorded Ceylon habitat is an error.

19. **A. Wrayi**, *Hemsl. in Journ. Bot.* (1887) 205; leaves 1-3, leaflets 5-9 petiolulate narrowly elliptic-lanceolate tips apiculate or filiform, tube of spathe open as long or longer, limb ovate obtusely acuminate dilated at the base with two large revolute auricles, appendage very long filiform pendulous. *N. E. Br. in Gard. Chron.* (1889) ii. 136; *Bot. Mag.* t. 7105.

PERAK, *Wray*; Larut, alt. 3-4000 ft., *Scortechini*.

Tuber subglobose, rooting all over. *Petiole* 12-18 in. and petiolules mottled green and white and dotted with red; leaflets 6-10 by 1-2 in., dark green, median longest with petiolule 1-2½ in. *Peduncle* taller than the petiole, slender. *Spathe* 5-7 in., erect; limb pale yellow green or lilac with darker stripes. *Spadix* very slender; fem. with scattered didymous bicuspidate anthers on long filaments on the base of the appendage. *Stigma* penicillate.

** *Appendage of spadix included or shortly exerted.*

20. **A. decipiens**, *Schott in Æstr. Bot. Zeitschr.* (1857) 373; *Prodr.* 34; dioecious, leaves 2, leaflets 5-7 elliptic-lanceolate caudate-acuminate, lateral sessile on a common petiolule, median long-petiolulate, tube of spathe as long as the lanceolate caudate incurved limb, tail as long as the rest of the spathe, appendage hardly longer than the tube subtruncate straight. *Engler Arac.* 542; *N. E. Br. in Journ. Linn. Soc.* xviii. 251.

KHASIA HILLS, alt. 5-6000 ft., *Griffith, &c.*

Rootstock horizontal, rooting, as thick as the thumb. *Petiole* 12-16 in., slender, sheaths very long, mottled; leaflets 6-10 in.; petiolule of median 1-1½ in.; lateral divaricate. *Peduncle* shorter than the petiole. *Spathe* 4-5 in., excluding the filiform tail which is 3-5 in., dull purple; lower margins not recurved. *Spadix* slender; appendage stipitate, cylindric, erect, rather thickened towards the base; male fl. subsessile.—The Javan habitat is an error.

21. **A. flavum**, *Schott Prodr.* 40; monœcious, leaves 2, leaflets 9-11, lateral sessile oblong or lanceolate acuminate, median sessile or petiolulate. spathe very short, limb ovate cuspidate or acuminate as long or twice as long as the subhemispheric tube, base not recurved, spadix included, appendix very short clavate. *Engler Arac.* 548. *A. abbreviatum*, *Schott in Æstr. Bot. Zeitschr.* (1857) 382; *Prodr.* 40; *Engler l. c.*, and *l. ined.* No. 7. *Dochafa flavo*, *Schott Syn.* 24; *Gen. Aroid. App.* *Arum flavum*, *Forsk. Fl. Ægypt. Arab.* 157.

TEMPERATE HIMALAYA and WESTERN TIBET, alt. 5-9000 ft., from Kashmir to Kumaon. CHUMBI; N.E. of Sikkim, *King's Collector*.—DISTRIB. 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 subsessile connate anthers, from the top of which emerges the appendage, which is about ½ in. long.—A highly curious plant, the spadix quite unlike that of any congener. I find no difference whatever between the Himalayan and Arabian specimens.

22. **A. Scortechini**, *Hook. f.*; dioecious, leaf solitary, leaflets 3-5 lanceolate acuminate, lateral subsessile, median petiolulate, tube of spathe cylindric, limb ovate or ovate-lanceolate erect, tip shortly filiferous, base dilated into two large rounded spreading auricles.

PENANG, *Curtis*. PERAK, *Scortechini*, *King's Collector*.



Rootstock horizontal, rooting all over. *Petiole* 2-6 in., slender, green; leaflets 4-6 in., dark green (with white along the middle in a drawing in Herb. Calcutt.), tips often shortly filiferous. *Spathe* 3 in., green; limb $1\frac{1}{2}$ in. long, erect, white towards the centre, auricles dull yellow-green. *Spadix* (male) dull purple, narrowly conical, tapering into the erect naked yellow obtuse appendage.

C. RADIATISECTA. Leaflets whorled. (Sp. 23 to end.)

* *Spadix* much longer than the spathe.

23. **A. neglectum**, Schott in *Bonpland*. (1859) 26; *Prodr.* 36; monœcious, leaflets 4-7 sessile elliptic or oblanceolate cuspidately acuminate, tube of spathe cylindric base swollen, limb about as long oblong-cymbiform acuminate top incurved, appendage twice as long as the spathe erect then porrect and again erect. *Engler Arac.* 554. *A. filiforme*, Thw. *Enum.* 334 (not of Bl.). *A. Wightii*, Bot. Mag. t. 5507 (not of Schott).

WESTERN GHATS; from the Concan to the Nilghiri hills, alt. 6000 ft. CEYLON; in the south part of the island, Thwaites, Huegel.

Tuber globose. *Leaves* 1 or 2; petiole green or clouded; leaflets usually broadest in the middle. *Spathe* 3-4 in., green; limb open, margins not recurved, base not dilated. *Spadix* rather stout, appendage sessile, remarkably like that of *A. tortuosum*.

** *Spadix* not longer than the spathe.

† *Diœcious* (rarely monœcious). *Fem. spadix* with neuters above the inflorescence.

24. **A. nepenthoides**, Mart. in *Flora* (1831), 458; in *Wall. Cat.* 8919; leaflets 5-sessile elliptic or oblanceolate acuminate, tube of spathe elongate, limb elliptic-ovate base dilated into two broad rounded recurved auricles, appendage erect subcylindric top rounded. *Schott Melet.* i. 17; *Syn.* 31; *Prodr.* 48; *Blume Rumph.* i. 94; *Kunth Enum.* iii. 16; *Bot. Mag.* t. 6446; *Engler Arac.* 551. *Arum nepenthoides*, Wall. *Tent. Fl. Nep.* 26, t. 18.

TEMPERATE HIMALAYA; alt. 9-11,000 ft.; Nepal, Wallich, Sikkim, J.D.H. &c.

Tuber globose, very large. *Leaves* 2; petiole peduncle and tube of spathe dull yellowish clouded with dark streaks. *Peduncle* shorter than the petiole. *Spathe* 6-8 in., tube 2-3 in., cylindric, base not swollen; limb 4 in., whitish within, yellow without; auricles nearly 1 in. broad-green spotted with brown and with a broad purplish-brown margin. *Spadix* whitish; appendage stipitate, much shorter than the spathe, contracted in the middle. *Ovaries* obovoid, contracted into a rather long style, stigma simple.—Lateral leaflets sometimes lobed at the outer base, showing a tendency to the pedate section.

25. **A. Leschenaultii**, Blume *Rumph.* i. 93; leaflets 5-11 oblanceolate acuminate serrulate, tube of spathe cylindric as long as the suberect cymbiform long caudate-acuminate limb, appendage stout cylindric or slightly clavate tip rounded. *Kunth Enum.* iii. 15; *Schott Syn. Aroid.* 30; *Prodr.* 51; *Engler Arac.* 552. *A. papillosum*, Steud. ex *Schott Prodr.* 46; *Thw. Enum.* 335; *Bot. Mag.* t. 5496 (excl. syn. *erubescens*); *P. A. erubescens*, Dalz. & Gibs. *Bomb. Fl.* 258. *A. Huegelii*, *Schott Syn.* 27; *Prodr.* 44.—*Arisæma*, Wall. *Cat.* 8921.

WESTERN GHATS, from the Concan southwards.

Tuber large, globose. *Leaf* solitary; petiole 1-2 ft., usually mottled and

banded with red and brown; leaflets 4-6 by $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. *Spathe* 3-8 in., green with broad dark purple bands; tube narrow; limb leaning forward, margins below hardly recurved, tip straight obtusely acuminate, very variable in length. *Spadix* 4 in., nearly cylindric throughout, hardly stipitate; neuter fl. few short.

26. **A. consanguineum**, Schott in Bonpland. (1859), 27; *Prodr.* 52; leaflets about 15 (10-20) narrowly linear-lanceolate with long capillary tips, spathe green, limb about equalling the tube broadly ovate or ovate-lanceolate incurved with a long filiform tip margin recurved at the base, appendage stout cylindric obtuse.—*Arisæma*, Wall. Cat. 8915.

TEMPERATE HIMALAYA, alt. 5-7000 ft. from Garwhal to Sikkim. KHASIA HILLS, alt. 4-6000 ft. MUNIPORE, 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., $\frac{1}{2}$ -2 in. broad, filiform tips 1-3 in. *Spathe* 3-7 in., excluding the filiform tip, margins more or less recurved below. *Spadix* hardly longer than the tube, appendage subsessile with a few neuters at the base.

27. **A. concinnum**, Schott in Bonpland. (1859) 27; *Prodr. Aroid.* 50; leaflets 7-11 subsessile narrowly lanceolate or oblanceolate acuminate, tube of spathe elongate cylindric, limb broadly ovate narrowed into a very long decurved tail margins below not or slightly recurved, spadix usually much shorter than the spathe, appendage very slender erect tip clavate truncate, base not thickened. *Engl. Arac.* 556; *Bot. Mag.* t. 5914; *N. E. Br. in Journ. Linn. Soc.* xviii. 254. *A. alienatum* & affine, Schott l. cc. 26, 27; 45-51.—*Arisæma*, Wall. Cat. 8920.

TEMPERATE HIMALAYA, alt. 6-10,000 ft. from Garwhal to Bhotan.

Tuber globose. *Leaf* solitary; petiole 1-2 ft. and peduncle green or mottled with brown or purple; leaflets 8-12 in. *Peduncle* shorter than the petiole. *Spathe* green or purple striped with white, tube 2-3 in.; limb as long or shorter, open. *Spadix* slender; sometimes monœcious; appendage exerted beyond the tube, fem. with a few neuters at its base.—Very near *A. Leschenaultii*, differing in the slender appendage. A small state from Sikkim, alt. 10-11,000 ft., has more cuneately obovate cuspidately caudate leaves.

28. **A. pulchrum**, N. E. Br. in Journ. Linn. Soc. xviii. 252, t. 6; leaflets 8-12 cuneately oblanceolate cuspidate, tube of spathe elongate cylindric below infundibular and gaping above, limb broadly ovate suddenly narrowed into a decurved tail as long as the tube margins below revolute, appendage stout cylindric erect rather thickened below, tip rounded.

INDIA (*Hort. Bull.*).

Tuber globose. *Leaf* solitary; petiole and peduncle stout, clouded and speckled with pale red-brown; leaflets 4-6 in., dark green above, subglaucous beneath. *Spathe* 3 in., purplish striped with green, limb 2 in. broad. *Spadix* much shorter than the spathe, shortly exerted beyond the tube; appendage with an elongate ovoid base, and a few scattered neuters.

** *Dioecious*. Neuters 0.

29. **A. Jacquemontii**, Blume Rumph. i. 95; leaflets 5-7 elliptic- or obovate-lanceolate acuminate, tube of spathe narrow green, limb as long or longer oblong- or ovate-lanceolate incurved narrowed into a long acuminate erect or drooping tail, appendage elongate stipitate narrowed from the conical or truncate base to the slender forward curving tip. *Decne. in Jacquem. Voy. Bot.* 168, t. 168; *Kunth Enum.* iii.



16; *Schott Syn. Aroid.* 31; *Syst.* 43; *Engl. Arac.* 555. *A. cornutum*, *Schott in Bonpland.* (1859), 27; *Prodr.* 48; *Engler l. c.* 557.

TEMPERATE HIMALAYA, from Kashmiri alt. 7-8000 to Bhotan, alt. 10-12,000 ft.

Tuber subglobose. *Leaves* solitary or 2; petiole $\frac{1}{2}$ -3 ft., stout or slender; leaflets 2-6 by 1-2 $\frac{1}{2}$ in., almost caudate-acuminate but not filiferous. *Spathe* 3-5 in., striped with white, margins narrowly recurved below, tip often thread-like $\frac{1}{2}$ -3 in. long. *Appendage* stipitate, sometimes with a truncate base, at others slender from an ellipsoid base.—Very variable in size. In a specimen apparently of this species from Sikkim and another from Kumaon (*Duthie*, 6063) the appendage is 4 in. quite as long as the limb of the spathe (without its long point). The spathe is incurved above the middle and terminates in a very long erect horn.

30. *A. exile*, *Schott in Bonpland.* (1859), 26; *Prodr.* 42; leaflets 5-11 narrowly oblanceolate finely acuminate, spathe very narrow, tube elongate, limb as long lanceolate narrowed into a long thread, appendage stipitate very slender filiform as long as the tube of the spathe. *Engler Arac.* 554.—*Arisæma*, *Wall. Cat.* 8918.

TEMPERATE HIMALAYA; Nepal, *Wallich*.

Tuber small. *Leaves* solitary or 2; petiole 8-26 in., very slender; leaflets 3-6 in., minutely erose. *Peduncle* longer than the petiole. *Spathe* 4 in., limb hardly broader than the tube, pale green striped with white, slightly incurved, margins hardly recurved below, filiform tip 1-3 in. *Spadix* very slender; appendage stipitate, base ovoid.

31. *A. erubescens*, *Schott Meletem.* i. 17; *Syn.* 30; *Prodr.* 53; leaflets 9-12 narrowly oblanceolate acuminate glaucous beneath, tube of pink spathe cylindric, limb oblong or ovate-oblong or -lanceolate incurved narrowed into a long filiform tail, margins below recurved, appendage stout erect subcylindric from an elongate ovoid base, tip rounded. *Blume Rumph.* i. 93; *Kunth Enum.* iii. 16; *Engler Arac.* 557. *A. vituperatum*, *Schott in Bonpland.* (1859), 28. *Arum erubescens*, *Wall. Pl. As. Rar.* ii. 30, t. 135.—*Arisæma*, *Wall. Cat.* 8917.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim 6-8000 ft., *J.D.H.*

Tuber subglobose. *Leaf* solitary; petiole 12-18 in., and peduncle pale rose-colrd., streaked with red in bars; leaflets 5-7 in., margins undulate, tips not filiferous. *Spathe* about 4 in., excluding the filiform tail, white striped with rose; tube longer than the incurved rather broader limb. *Appendage* hardly 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; *l.c. Pl. Asiat.* t. 163.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 9-11,000 ft.—*J.D.H.*; Bhotan, *Griffith*.

Tuber small, globose. *Leaf* solitary; petiole 10-18 in., and peduncle all green or streaked with red-brown, leaflets 6-12 in. *Spathe* 6-10 in., greenish, striped with white and brown, or purple within, tail longer than the limb and tube. *Spadix* hardly exerted; appendage stipitate, contracted in the middle, white streaked with purple, base rather swollen rounded, tip green.

33. **A. filicaudatum**, N. E. Br. in *Journ. Linn. Soc.* xviii. 253; leaflets 5-7 shortly petiolulate oblanceolate cuspidately acuminate, tube of spathe short cylindric, limb about as long very broadly ovate abruptly caudate, tail very long and slender tip clubbed, spadix very slender, appendage slender exserted erect hardly thickened at the base tip clavellate smooth.

CEYLON, at Morowe Korle, alt. 3000 ft., *Thwaites*.

Leaf solitary; petiole 1 ft.; leaflets petiolulate, 6 by 2-2½ in., very thin. *Peduncle* about equalling the petiole. *Tube of spathe* 1½ in., limb short, incurved, tail filiform 6 in.. *Spadix* unisexual; male fl. scattered, subsessile.—Only one specimen seen.

34. **A. fraternum**, Schott in *Bonpland.* (1859), 26; *Prodr.* 45; leaflets 7-9 elliptic-lanceolate finely acuminate, tube of green spathe cylindric shorter than the broadly ovate erect cuspidately acuminate (not caudate) limb, appendage sessile stout subclavate top rounded. *A. Leschenaultii* (in part), *Engler Arac.* 552.

KHASIA HILLS; Churra, alt. 4000 ft. *Griffith*.

Tuber depressed globose. *Leaf* solitary; petiole 6-12 in., reddish barred with duller streaks; leaflets 3-5 in., sessile, tips not filiferous. *Peduncle* shorter than the petiole. *Spathe* 4-5 in., suberect, limb recurved at the base. *Spadix* very stout, shortly exserted, of male sessile, green.—Griffith's are the only specimens that I have seen, but there is a fine drawing in *Herb. Calcutt.* without a habitat.

35. **A. Wightii**, Schott in *Bonpland.* (1859), 26; *Prodr.* 43; leaflets 5-8 cuneately obovate cuspidately acuminate, tube of spathe as long as the ovate-lanceolate caudate acuminate limb margin below recurved, appendage stipitate slender, narrowed from a conical base to the tip. *A. Jacquemontii* (in part), *Engler Arac.* 555.

NILGHIRI HILLS, *Wight, King*.

Tuber spherical. *Petiole* 8-12 in.; leaflets 4-5 by 1½-2 in., sessile or shortly petiolulate. *Spathe* 4-6 in., apparently striped white and purple, limb rather broader than the tube, gradually narrowed into a tail ¾-2 in. long. *Male spadix* 2 in.

36. **A. ochraceum**, Schott in *Bonpland.* (1859), 27; *Prodr.* 49; dioecious, tube of spathe cylindric rather swollen below as long as the ovate cymbiform erect shortly cuspidate limb, appendage stipitate stout cylindric contracted in the middle tip rounded base swollen lobulate truncate intruded. *Engler Arac.* 559.

SIKKIM HIMALAYA; summit of Tonglo, alt. 10,000 ft.—*J.D.H.*

Leaves radiatisect. *Peduncle* stout and tube of spathe pale red streaked with brown. *Spathe* 5½ in. long; limb yellowish with brown stripes, lower margin not revolute. *Fem. spadix* stout, appendage nearly as long as the limb of the spathe, yellowish; ovaries green with purple stigmas.—Founded on a drawing of mine of a female spathe and spadix, and note as to the leaves being radiatisect.

*** *Monœcious or rarely dioecious. Neuters 0 or few.*

37. **A. Murrayi**, Hook. *Bot. Mag.* t. 4388; leaflets 5-9 ovate- or oblong-lanceolate acuminate, tube of spathe broadly cylindric base almost truncate, limb as long or longer broadly ovate cymbiform acute (not caudate) incurved lower margins dilated round the mouth of the tube, appendage curved narrowed from the base to the tip included or exserted. *Dalz. & Gibs. Bomb. Fl.* 258; *Schott Syn.* 31; *Prodr.* 44; *Engler Arac.* 552; *Fl. des Serres*, t. 1322. *Arum Murrayi*, *Grah. Cat. Bomb. Pl.* 229.

The CONCAN; in the Ghats, Gibson, &c.

Tuber large. *Leaf* solitary, maturing after the flowering; petiole 10–14 in. and subequal p. duncle greenish mottled with red-brown; leaflets 4–6 in. *Spathe* 3–5 in., tube green striated, $\frac{3}{4}$ –1 in. diam.; limb rather broader, margins not recurved, except round the mouth of the tube. *Spadix*, narrowed from the base upward; appendage 1–1 $\frac{1}{2}$ in., sessile; male fl. scattered, with a few neuters above them.

38. **A. caudatum**, Engler Monog. Arac. 559; leaflets 7 cuneately elliptic acuminate with long capillary tips, tube of spathe elongate cylindric, limb incurved ovate-lanceolate rather abruptly narrowed into a very long subulate tail, margins below recurved, appendage rather short not thickened below included.

The CONCAN, Stocks (Ic. in Herb. Kew).

Tuber depressed globose. *Leaf* solitary; petiole stout, and peduncle irregularly barred and streaked; leaflets petiolulate, 5 by 2 in. exclusive of the thread-like tips which are 1–3 in. long. *Peduncle* very short. *Spathe* 6 in., exclusive of the 3 in. caudate tip. *Spadix* androgynous; appendage shorter than the flowering portion, tip rounded.—Described from a drawing by Stocks; I have seen no specimen.

UNRECOGNIZED SPECIES.

A ? PENTAPHYLLUM, Schott Meletem. i. 17; Syn. 28; Prodr. 59; Kunth Enum. iii. 20; Blume Rumph. i. 109; Engler Arac. 560. Arum pentaphyllum, Linn. Sp. Pl. 964.—Ind. Or.; China.

A ? HEPTAPHYLLUM, Blume Rumphia i. 109; Kunth Enum. iii. 20. Schott Syn. 31; Prodr. 59; Engler Arac. 560.—Ind. Or.

5. SAUROMATUM, Schott.

Tuberous herbs, leafing after flowering. *Leaf* solitary, pedatipartite. *Spathe* shortly peduncled, tube cylindric short, margins connate below; limb very long, reflexed, narrow, open. *Spadix* sessile, very long; male and fem. infl. widely distant, short, dense fld., with a few large clavate scattered neuters close above the fem.; appendage slender, as long as the spathe. *Anthers* subsessile, 4-celled. *Ovaries* oblong, 1-celled; stigma sessile; ovules 1–2, basal, erect. *Berries* obpyramidal, 1-seeded.—Species tropical Asiatic and African.

S. guttatum, Schott Meletem. i. 17; Prodr. 71; Blume Rumph. i. 126; Engler Arac. 570. S. pedatum, Schott Melet. l. c.; Gen. t. 11; Syn. 24; Prodr. 70; Blume l. c.; Kunth Enum. iii. 28; Engler l. c. 569; Bot. Mag. t. 4465; Regel Gartenfl. (1866), 3, t. 495. S. venosum, Schott Prodr. 71. S. sessiliflorum, Kunth l. c.; Schott l. c.; N. E. Br. in Journ. Linn. Soc. xviii. 256. S. similense, Schott in Estr. Bot. Zeitschr. (1858), i. 263; Prodr. 72; N. E. Br. l. c.; in Gard. Chron. (1880), ii. 134, 198. S. punctatum, C. Koch in Berlin Wochenschr. i. 263; N. E. Br. in Gard. Chron. l. c. Arum guttatum, Wall. Pl. As. Rar. ii. 10, t. 115. A. pedatum, Willd. Enum. Suppl. 54; Link. et Otto Ic. 19, t. 8. A. sessiliflorum, Roxb. Fl. Ind. iii. 507; Wight Ic. t. 800. A. venosum, Lindl. Bot. Reg. t. 1017. A. clavatum, Desf. Cat. Hort. Par. 385.

The PANJAB, UPPER GANGETIC PLAIN, and the HIMALAYA, from Nepal to Simla, ascending to 5000 ft. ? The CONCAN, Herb. Stocks.

Tuber large. *Petiole* stout, 12–18 in.; leaf 6–12 in. broad, segments or lobes 7–15, very variable, 2–15 by 1–3 in., lobes of young leaves sometimes rounded or the lateral dimidiate-ovate or cordate, when numerous oblong or lanceolate. *Peduncle* 1–2 in., very stout, green or spotted. *Spathe* 12–28 in., tube ovoid or subglobose;

limb linear-lanceolate, thick, green or yellowish with dark purple spots or blotches, margins usually purple and waved. *Spadix* as long as the spathe or nearly so; fem. infl. $\frac{1}{2}$ in.; neuters $\frac{1}{2}$ in. long, spreading; male infl. 3 in. above the fem., $\frac{1}{2}$ in. long; anthers densely packed; appendage 2-8 in., cylindric and obtuse, or narrowed from the base to a fine point, green or dark purple.—*S. guttatum* is confined to North-West India, except Stocks' specimens should prove to be from the Concan, of which there is no evidence.

6. ARUM, Linn.

Tuberous herbs. *Leaves* simple. *Spathe* deciduous or withering, tube convolute; limb cymbiform, erect. *Spadix* exserted, androgynous, with subulate suberect neuters between the male and fem. infl., and deflexed ones above the male; appendage subcylindric. *Anthers* sessile, pollen vermiform. *Ovary* 1-celled; stigma sessile; ovules many on 2-3 parietal placentas. *Berries* obovoid, many-seeded. *Seeds* albuminous, embryo axile.—Species about 20, Europe, N. Africa, W. Asia.

A. Jacquemontii, *Blume Rumph. i.* 118; leaves hastately sagittate or hastate, limb of spathe narrowly lanceolate acuminate or caudate. *Schott Prodr.* 99. *A. Griffithii*, *Schott Syn. i.* 15; *Prodr. l. c.*; *Boiss. Fl. Orient. v.* 38; *N. E. Br. in Journ. Linn. Soc. xviii.* 257.

N.W. INDIA, Jacquemont. KASHMIR; Gilgit, alt. 6-7000 ft., *Giles*.—DISTRIB. Affghan.

Tuber as large as a chesnut. *Leaves* 5-12 in.; petiole 5-16 in. *Peduncle* equaling or longer than the petiole. *Spathe* 3-7 in., white-greenish or purplish. *Ovaries* globose. *Berries* red.

7. TYPHONIUM, Schott.

Tuberous herbs. *Leaves* entire, 3-5-lobed or pedatisect. Tube of *spathe* short, convolute, mouth constricted, persistent; limb ovate-oblong lanceolate or linear, deciduous. *Spadix* exserted, male and fem. infl. distant with neuters above the fem. and sometimes below the males; appendage elongate, smooth. *Anthers* subsessile. *Ovaries* 1-celled; stigma sessile; ovules 1-2, basal, erect, orthotropous. *Berries* ovoid, 1-2-seeded. *Seeds* globose, albuminous; embryo axile.—Species about 13, tropics of the Old World.

* *Limb of spathe broadly ovate, open, narrowed into a long point.*

1. **T. trilobatum**, *Schott in Wien. Zeitschr. iii.* (1829) 72; *Aroid. i.* 12; *t. 16*; *Syn. 18*; *Prodr.* 108; leaves hastately 3-lobed or sub-3-partite, neuters above fem. infl. very many and long filiform curved, appendage stipitate base expanded truncate lobulate intruded. *Blume Rumph. i.* 132 (in part); *Kunth. Enum. iii.* 26 (in part); *Engler Arac. 614*; in *Bull. Soc. Tosc. Ort. iv.* 301; *N. E. Br. in Journ. Linn. Soc. xviii.* 261. *T. orixense*, *Schott in Wien. Zeitsch. l. c.*; *Wall. Cat. 8829*. *T. siamense*, *Engler l. c.* 615. *T. triste*, *Griff. Notul. iii.* 145. *Arum trilobatum*, *Linn. Sp. Pl.* 965; *Thw. Enum. 334*; *Grah. Cat. Bomb. Pl. 228*. *A. orixense*, *Roeb. Fl. Ind. iii.* 503; *Wight Ic. t.* 801; *Lodd. Bot. Cab. t.* 442; *Andr. Bot. Rep. t.* 356; *Bot. Reg. t.* 450; *Griff. Ic. Pl. Asiat. t.* 50 (anal.). ? *A. pumilum*, *Lamk. Engc. iii.* 8. ? *Aristema pumilum*, *Blume Rumph. i.* 107; *Kunth l. c.* 20; *Schott Syn. 27*; *Prodr.* 59.

LOWER BENGAL, BURMA, the EASTERN and WESTERN PENINSULA and CEYLON.—DISTRIB. Siam, Malay Islds.

Tuber subglobose. *Leaves* 5–12 in. diam.; lobes ovate, acute; petiole 1 ft. or shorter. *Peduncle* 1–4 in. *Spathe* 3–12 in. long; limb $1\frac{1}{2}$ –4 in. broad, red purple inside, nearly flat, tip not twisted. *Appendage* bright red, stout or slender.

2. **T. Roxburghii**, *Schott Aroid. i.* 12, t. 17; *Prodr.* 106; leaves hastate or cordately triangular or 3-lobed or 3-partite with 1 rarely 2 veins in the sinus, neuters above the fem. infl. subulate crowded spreading and decurved, appendage very slender stipitate base truncate. *Saunders, Refug. Bot. t.* 283. *T. divaricatum* γ and δ , *Engler Arac.* 612. *T. javanicum*, *Miq. Fl. Ind. Bat. iii.* 193; *Ann. Mus. Lugd. Bat. iii. t.* 3 B, in *Bot. Zeit.* (1856) 563; *Schott Prodr.* 107; *Engler Ic. ined.* No. 13. *Arum trilobatum*, *Roxb. Fl. Ind. iii.* 505; *Wight Ic. t.* 803.—*Arisarum amboinense*, *Rumph. v.* 320, t. 110, f. 2.

SINGAPORE, *Kunstler* (in *Herb. Calcutt.*), Ceylon, *Thwaites*.—DISTRIB. Java.

A smaller and more delicate plant than *A. trilobatum* with a very slender spadix and much shorter decurved neuters. The tip of the spathe is very slender and usually twisted in Ceylon specimens, as in *Roxburgh's* description; but not in *Saunders' figure*.

3. **T. Motleyanum**, *Schott Prodr.* 106; differs from *T. Roxburghii* in the presence of 2–3 veins in the sinus of the leaves which are considerably larger. *T. divaricatum* var. *Motleyanum*, *Engler Arac.* 612; *Ic. Arac. ined.* No. 130.

MALACCA, *Herb. Wight*; *Maingay*. PENANG, *King's Collector*.—DISTRIB. Borneo.

Very near *T. Roxburghii*, with similar neuters, but leaves with much more numerous nerves.

4. **T. divaricatum**, *Decne. in Ann. Nat. Hist. iii.* (1834); leaves hastate or deeply cordately sagittate entire or sub-3-lobed, tip of spathe twisted, neuters above the fem. infl. short linear suberect, base of appendage rounded or truncate. *Wight Ic. t.* 790; *Blume Rumph. i.* 130, t. 36; *Kunth Enum. iii.* 26; *Schott Aroid. i.* 12, t. 18; *Gen. Aroid. t.* 17; *Syn. 17*; *Prodr.* 106; *Engler Arac.* 611 (excl. vars.) *Ic. ined.* No. 128; *Somokou Zoussets, Ed. 2, xix. t.* 4. *Arum divaricatum*, *Linn. Sp. Pl. Ed. 2,* 1369; *Roxb. Fl. Ind. iii.* 503; *Wall. Cat.* 8930; *Grah. Cat. Bomb. Pl.* 228. *A. trilobatum*, *Bot. Mag. t.* 339 and 2324.—*Rheede Hort. Mal. xi. t.* 20.

DECCAN PENINSULA, *Mootaloor, Herb. Wight (ex Wall. Cat.)*. CEYLON; at Colombo and Peradenya.—DISTRIB. Malay Islds., Japan, China.

Tuber curved. *Leaves* 2–5 by 2–4 in.; petiole 4–8 in. *Peduncle* 1–2 in. *Spathe* 4–7 by $1\frac{1}{2}$ –3 in., red brown, narrowed into a long tail sometimes twisted at the tip.

** *Limb of spathe linear-oblong.*

5. **T. diversifolium**, *Wall. Cat.* 8933; leaves ovate-lanceolate cordate sagittate or hastate to 3–5-lobed or pedatisect lateral lobes or all triangular to linear, spathe acuminate, neuters above the fem. infl. with clavate tips, appendage shorter than the spathe slightly swollen at the cuneate base obtuse. *Schott Ic. Aroid. i.* 13, t. 20; *Engler Arac.* 617; *N. E. Br. in Journ. Linn. Soc. xviii.* 261. *T. Huegelianum*, *Schott l. c. t.* 19. *T. foliolosum*, *Engler l. c.* 618. *Heterostalis diversifolia* & *foliolosa*, *Schott in Estr. Bot. Zeit.* (1857) 261; *Gen. Aroid. t.* 18; *Prodr.* 110. *H. Huegeliana*, *Schott ll. cc.*; *N. E. Br. in Gard. Chron.* (1879) ii. 76.—*Arisæma* ? *Wall. Cat.* 8928 in part.

WESTERN HIMALAYA; Nepal and Kumaon, alt. 6-8000 ft., Wallich, &c. SIKKIM, alt. 7-10,000 ft. TEMPERATE HIMALAYA, alt. 6-11,000 ft., from Simla to Bhotan.

Tuber globose. *Leaves* extremely variable, 3-5 in. long, and as much across the lobes which vary from 3-7, from oblong to narrowly linear, and spread variously; petiole 3-12 in. *Peduncle* 2-9 in. *Spathe* erect, 2-8 in., acuminate, purplish. *Appendage* stout or slender.

*** *Limb of spathe narrowed from an ovate or lanceolate short base into a long tail.*

6. **T. brevipes**, Hook. f.; leaves pedately 5-7-partite, segments lanceolate long-acuminate, peduncle very short, spathe lanceolate produced into a narrow linear tail, neuters above the fem. infl. with clavate tips, appendage very long and slender, base not thickened. *T. pedatum*, Schott in *Æstr. Bot. Wochenbl.* (1857) 262 (in part).

SIKKIM HIMALAYA; near Darjeeling, alt. 7-8000 ft., on rocks and tree trunks, J.D.H., Clarke, Gammie.

Tuber depressed globose. *Leaves* membranous; segments 2-10 by $\frac{1}{4}$ - $1\frac{1}{2}$ in.; petiole 4-12 in. *Peduncle* $\frac{1}{2}$ - $\frac{3}{4}$ in. *Spathe* with a tumid ellipsoid tube $\frac{3}{4}$ in. long, limb $4\frac{1}{2}$ in. long by $\frac{1}{2}$ 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; *Ic. ined.* n. 129; Dalz. & Gibs. *Bomb. Fl.* 258.

SOUTHERN CONCAN, Stocks, &c.

Tuber $\frac{1}{2}$ - $\frac{1}{2}$ 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* 1-2 $\frac{1}{2}$ in. *Spathe* pale rose, 3-5 in., convolute. *Spadix* as long, slender, yellow; neuters in one series fleshy, rather incurved, yellow (acinaciform, Stocks).

8. **T. pedatum**, Schott. in *Æstr. Bot. Wochenbl.* (1857) 262 (in part); *Prodr.* 108 (non Engler); leaves pedatisect, segments lanceolate, spathe linear acuminate, neuters above the fem. infl. many crowded filiform erect, appendage slender, base not thickened. *N. E. Br. in Journ. Linn. Soc.* xviii. 260.

PEGU, McLelland.

Leaves about 4 in. broad; segments 7, linear-lanceolate, acuminate, about 4 by $\frac{3}{4}$ in., outer smaller, *Peduncle* $1\frac{1}{4}$ in. *Spathe* 2 $\frac{1}{4}$ in., longer than the spadix.—Founded on a single specimen. As pointed out by Mr. Brown, the Sikkim plant referred to this by Schott is another species (*T. brevipes*, H. f.), and that of Engler (*Arac.* 613) is *T. fallax*, N. E. Br., a native of Java.

9. **T. cuspidatum**, Blume *Cat. Hort. Buit.* 101; *Rumph.* i. 133, t. 10, f. 1-3; leaves sagittately cordately or hastately ovate oblong or lanceolate, limb of spathe with a short lanceolate base produced into a very long slender tail, lower neuters above the fem. infl. clavate upper subulate, appendage produced into a long filiform tail equalling the spathe base conical. Decne. *Descr. Herb. Timor.* 39; Kunth *Enum.* iii. 26; Schott *Ic. Aroid.* i. 12; *Syn.* 19; *Miq. Fl. Ind. Bat.* iii. 194; Engler *Arac.* 616; *N. E. Br. in Journ. Linn. Soc.* xviii. 262. *T. flagelliforme*, Blume in Wall.

Cat. n. 8931. Arum cuspidatum, Blume Cat. Hort. Buitenz. 101. A. flagelliforme, Lodd. Bot. Cab. t. 396; Roxb. Fl. Ind. iii. 502; Wight Ic. t. 791; Griff. Itin. Notes, 13, No. 193; Griff. Notul. iii. 144 (flagelliferum). A. angulatum, Griff. Notul. iii. 143.—Rheede Hort. Mal. ii. t. 20.

LOWER BENGAL, the MALAYAN PENINSULA and BURMA.—DISTRIB. Malay Islds. *Tuber* subglobose. *Leaves* 1-7 in., sometimes almost 3-partite and 6 in. across the linear or oblong lobes, at others quite simple with a rounded or cordate base. *Petiole* 6-12 in. *Peduncle* slender, long or short. *Spathe* 4-8 in., lurid red, papillose within. *Appendage* as long as the spathe or a little longer.

10. **T. gracile**, Schott *Aroid. i. 12; Prodr. 108*; leaves pedately 3-5-partite, segments elliptic-oblong acuminate lateral lobed at the outer base, spathe very long and slender from a lanceolate base, neuters above the fem. infl. filiform recurved or revolute, appendage sessile as long as the spathe narrowed from the base to the very slender tip. *Engler Arac. 613. Arum gracile, Roxb. Fl. Ind. iii. 505; Wight Ic. t. 793; Grak. Cat. Bomb. Pl. 228. ? Arisæma gracile, Kunth Enum. iii. 21.—Rheede Hort. Mal. xi. t. 21.*

SILHET, Roxburgh; KHASIA HILLS, Griffith (*Kew Distrib. 6000*).—THE PANJAB; Jhelum river, Aitchison.

Tuber globose. *Leaves* 4-6 in. broad across the segments, which are sessile or petiolulate, and from broadly oval to oblong or lanceolate, acuminate; petiole 6-12 in.; petiolules sometimes $\frac{1}{2}$ in. *Peduncle* 1-1 $\frac{1}{2}$ 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 $\frac{1}{2}$ - $\frac{1}{4}$ in. *Miq. Fl. Ind. Bat. iii. 196; Schott in Estr. Bot. Zeitschr. (1858) 2; Aroid. i. 15, t. 21; Prodr. 102; Engler Arac. 607 (excl. var. rostratum); N. E. Br. in Journ. Linn. Soc. xviii. 259. T. Kleinii, Schott in Estr. Bot. Zeit. 1858; l. c. 3; Prodr. 103. Typhonium crenatum, Schott Melet. i. 17. Wall. Cat. 8934. Arum crenatum, Wight in Hook. Bot. Misc. ii. 100; Suppl. t. 3; Grak. Cat. Bomb. Pl. 228.*

THE DECCAN, CONCAN and CARNATIC, Heyne, &c.

Tuber small. *Leaves* 3-4 in. long and often as broad, orbicular hastate or cordately sagittate; petiole 4-12 in. *Spathe* membranous, pale yellow-green; base of tube broadly truncate, intruded. *Spadix* half as long as the spathe; appendage cylindric, dark-purple.

2. **T. Wightii**, Schott in *Estr. Bot. Zeitschr. (1858) 3; Prodr. 103*; spathe 4-6 in. linear-oblong acute, anthers long-beaked, lower neuters $\frac{1}{2}$ - $\frac{1}{4}$ in. *N. E. Br. in Journ. Linn. Soc. xviii. 259. T. crenatum, var. rostratum, Engler Arac. 607 (excl. syn. arum crenatum). Typhonium minutum, Schott ex Wall. Cat. 8932 (not of Blume).*

THE CARNATIC, Wight.

Very near *T. crenatum*. *Leaves* sometimes 3-lobed.—Specimens indifferent.

3. **T. zeylanicum**, *N. E. Br. in Journ. Linn. Soc.* xviii. 258; spathe 2½–3½ in., anthers globose shortly beaked, lower neuters twice as long as the upper. *Arum divaricatum*, *Thw. Enum.* 334 (excl. syn.).

CEYLON; common in the hotter parts of the island, *Thwaites*.

Leaves hastate, 3½–7 in. long, lobes linear or median broader; petiole 4–12 in. Peduncle 1½–4 in. Spadix 1½–2 in. Ovaries few.

** Anthers not beaked, opening by pores. Lower neuters near the ovaries, upper few or 0.

4. **T. Dalzellii**, *Schott Aroid.* i. 15; *Syn.* 21; spathe 5–7 in. *Engler Arac.* 608. *Tapinocarpus Dalzellii*, *Schott Gen. Aroid.* t. 15; *Prodr.* 104. *T. indicus*, *Dalz. in Hook. Journ. Bot.* iii. (1851) 346.

The Southern CONCAN and Northern CANARA, *Stocks, Talbot*.

Tuber size of a walnut. Leaves 4–6 in., elliptic oblong or linear, base rounded hastate or sagittate; petiole 3–10 in., very stout. Peduncle stout; fruiting twisted and decurved to the ground. Spathe oblong-lanceolate, tube white; limb flat, dark purple. Appendage terete, twice as long as the infl.—Much the stoutest species.

5. **T. infaustum**, *N. E. Br. in Journ. Linn. Soc.* xviii. 260; spathe 1½–2 in. *T. Wightii*, *Engl. Arac.* 608 (not of Schott). *Calyptracoryne Wightii*, *Schott in Estr. Bot. Wochenbl.* (1857) 262; *Prodr.* 105; *Gen. Aroid.* t. 16. *Typhonium minutum*, *Blume Rumph.* i. 134; *Engler, l. c.* 609. *Arum minutum*, *Willd. Sp. Pl.* iv. 484; *Grah. Cat. Bomb. Pl.* 228. *A. mucronatum*, in part, *Spreng. Syst.* iii. 769.—*Rheede Hort. Mal.* xi. t. 17 (small figure).

MALABAR (*Rheede*); Paul Ghat, *Wight*.

Leaves as in *T. Dalzellii*, but smaller with the basal lobes usually rounded. Spathe narrowly lanceolate, acute, white or purplish. Appendage stipitate, base elongate conical.

9. AMORPHOPHALLUS, Blume.

Tuberous herba, flowering before leafing. Leaves 3-partite, segments pinnatisect. Spathe various; limb campanulate infundibular convolute or open, marcescent. Spadix exserted or included; appendage large, short or long; infl. cylindric, dense fld., male and fem. contiguous, neuters 0. Anthers 2–4, sessile, cells oblong, pores apical. Ovaries globose or obovoid, 1–4-celled; style short or long, stigma entire or 2–4-lobed; ovules solitary, subbasilar, anatropous. Berries subglobose or obovoid. Seeds exalbuminous; embryo macropodous.—Species about 30–40, tropics of the Old World.

* Style many times longer than the ovary.

1. **A. campanulatus**, *Blume ex Decne. in Ann. Mus. Hist. Nat. Par.* iii. (1834), 366 (excl. all syn. but Roxb.); peduncle very short and petiole rough, spathe campanulate limb suberect or recurved waved and crenulate, spadix hardly longer than the spathe, appendage globosely conoid or amorphous sinuously-lobed. *Thw. Enum.* 335. *Dalz. & Gibs. Bomb. Fl.* 259; *Engler Arac.* 309 (excl. many syns. & citations). *A. Chatty, André in Illustr. Hort.* (1872), 361. *A. virosus*, *N. E. Br. in Gard. Chron.* (1885) 759; *Bot. Mag.* t. 6978. *Candarum Roxburghii*, *Schott Melet.* i. 17. *Arum campanulatum*, *Roxb. Cor. Pl.* iii. 68, t. 272; *Fl. Ind.* iii. 509; *Wight Ic.* t. 785, and p. 782.

PLAINS OF INDIA, from the PANJAB to BENGAL, the DECCAN, and CEYLON.

Tuber a depressed bulbiferous 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 subturbinate; appendage dark-purple, sometimes 6 in. diam. *Berries* obovoid.—The geographical limits of this species are quite uncertain (owing to its being cultivated widely in the East for its tubers); and its synonymy is so mixed that I have withheld many supposed synonyms and all habitats but India. The name *campanulatus* first appeared under *Amorphophallus* in 1834, in Decaisne's paper cited above, as a Timor plant; and Roxburgh's *Arum campanulatum* is there given by Blume as its type, together with *Arum Rumphii*, Gaud. in Freyc. Voy. Bot. 127, t. 34, &c. Whether either of the above is the Timor plant has never been discovered, but the appended description applies to Roxburgh's species. In 1835 in Rumphia, Blume described, also as Roxburgh's *Arum campanulatum*, and giving the same diagnosis as in Decaisne) a very much larger Javanese plant, with a widely expanded spathe and longer spadix with a long conico-ovoid appendage. As Blume evidently all along believed that he was dealing with Roxburgh's Indian plant I think it best to name and limit the Indian species in accordance with his intentions and his and Roxburgh's diagnosis, and accept Dr. Prain's name for the Javanese plant (*A. Rex*) which, being also a native of the Andaman Islds., comes within the pale of the Brit. Ind. Flora. Wight gives copies of two drawings of Roxburgh's *A. campanulatus*, one, t. 785, the true plant; the other, t. 782, has a much larger broadly campanulate spathe, 15 in. diam., with recurved margins, more like that of *A. Rex*, but with a short broad appendage 8 in. diam. and about as tall. Of this Wight says he finds no description in Roxburgh's Flora; it is, however, no doubt to it that Roxburgh alludes in speaking of large plants with the appendage 6 in. diam.

2. *A. Rex*, Prain mss.; peduncle very short and petiole rough, spathe broadly campanulate with waved revolute margins, spadix much longer than the spathe, appendage elongate conoid sinuously waved. *A. campanulatus*, Blume Rumph. i. 139, t. 32, 33 (excl. syn.).

ANDAMAN ISLDS.; Narcondam Islds., Prain.—DISTRIB. Java.

A very much larger plant than *A. campanulatus*, with the depressed tuber attaining nearly a foot diam., the leaf blade 5 ft. diam., the alternate segments 6–10 in., the petiole attaining 5 ft., and stout peduncle 2–3 in. elongating to 30 in. in fruit. *Spathe* very broadly campanulate, 12–18 in. diam., with broad undulate revolute margins, sometimes produced on one side into a prolonged pendulous apex, pale red-purple. *Spadix*, &c., as in *A. campanulatus*, but much larger, with a sinuate appendage 10–14 in. long, that rises high above the spathe, is broadly conical and purple-brown or pale and spotted with brown.

3. *A. dubius*, Blume Rumph. i. 142; petiole rough, spathe 3–5 in. diam. subsessile campanulate with a rather long oblong tube and ovate waved quite entire suberect or spreading limb, spadix shorter than the spathe, appendage globosely ovoid quite smooth. Kunth Enum. iii. 32; Schott Syn. 38; Prodr. 130; Bot. Mag. t. 5187; Engler Arac. 310. *Dracontium polyphyllum*, Denst. Clav. Hort. Mal. 38 (not of Linn.).—Hort. Mal. xi. t. 18.

MALABAR (Rheede), CEYLON, Thwaites.

Leaves as in *A. campanulatus*; petiole green with pale blotches. *Peduncle* very short; sheaths equalling the tube of the spathe, oblong, retuse, apiculate. *Spathe* with the tube 3 in. long, green without and within; limb ovate in outline, disk dull dark purple with a bright green narrow waved border. *Spadix* 4 in., male infl. nearly 1 in. diam.; fem. $\frac{1}{2}$ in.; appendage $1\frac{1}{2}$ in. diam., chestnut-brown, anthers

Amorphophallus.] CLXVI. AROIDEÆ. (J. D. Hooker.)

linear-oblong; stigma 2-fid.—Described from the figure in Bot. Mag. Rheede's figure represents fem. infl. much shorter than in *A. campanulatus*.

4. *A. longistylus*, Kurz *Andaman Rep.* 50 (name); spathe long-peduncled, limb acute or acuminate hardly broader than the convolute ovoid tube, appendage cylindric narrowed to the tip many times longer than the infl. and spathe.

ANDAMAN ISLANDS.; Kurz.

Tuber a depressed sphere, not bulbiferous. *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 *l.c. ined.* No. 156. *Arum bulbiferum*, Roxb. *Fl. Ind.* iii. 510; *Bot. Mag.* t. 2072, 2508; *Grah. Cat. Bomb. Pl.* 229; *Wall. Cat.* 8935, 8936 (spathe). *A. occultatum* and *taccoides*, *Herb. Ham.* *Pythonium bulbiferum*, *Schott Melet.* i. 18. *Conophallus bulbifer*, *Schott Syn.* 34; *Gen. t.* 30; *Prodr.* 128.

EASTERN BENGAL, SIKKIM, the KHASIA HILLS, and BURMA, ascending to 5000 ft. The CONCAN, *Graham*.

Tuber globose. *Leaf* 12-18 in. diam., ultimately bulbiferous at the base, forks, and nerves above; leaflets 3-8 in., obovate or lanceolate; petiole 3-4 ft., and peduncle 8-10 in., green and pink streaked with green or black. *Spathe* 5-8 in., erect, pale pink or yellowish clouded with pink, rose-pink within. *Spadix* sessile; infl. 3 in. by ½ diam.; appendage 3-4 in., pale flesh-colrd. or white. *Anthers* short. *Stigma* 2-lobed.

6. *A. commutatus*, *Engler Arac.* 319; spathe long-peduncled erect ovate-lanceolate obtuse base shortly sheathing, spadix about as long as the spathe, appendage three or four times longer than the infl. but not stouter, tapering from the sessile base upwards. *Conophallus commutatus*, *Schott in Bonpland.* (1859), 28; *Prodr.* 128.

The CONCAN; *Stocks*.

Tuber and *leaf* unknown. *Peduncle* 1-3 ft. *Spathe* 6-10 by 1½-4 in., rough at the base within, tip obtuse. *Spadix* columnar, sessile; male infl. 1½-2 in., fem. ½-1½ in., both cylindric; appendage not contracted above the infl., smooth, tip obtuse. *Anthers* very shortly oblong. *Stigma* sessile, disciform.

7. *A. purpurascens*, Kurz *mss.*; leaflets elliptic-obovate, spathe small very long-peduncled cymbiform acute base shortly convolute, spadix shorter or rather longer than the spathe stout, appendage rather longer but little broader than the infl. stout elongate conoidal tip rounded.

PEGU, MARTABAN, and in the IRRAWADDY and SITTANG VALLEYS, *Kurz*.

Tuber small, 2 in. diam., not bulbiferous. *Leaf* small, 10 in. diam., 3-sect with segments 3-5 by 1-2 in., petiole 18 in., pale green. *Peduncle* 16 in., red-purple,



striate; wrapped at the base by short sheaths. *Spathe* (perhaps immature) 3 in., dark green, blue at the sides with red margins. *Spadix* 3 in.; infl. cylindric, stout, male the longest; appendage nearly 2 in., not contracted at the base, white. *Anthers* very short. *Stigma* sessile, disciform, lobulate.

8. *A. chlorospathus*, *Kurz mss.*; leaflets linear, spathe cymbiform erect base shortly convolute, spadix shorter than the spathe stout, appendage rather longer but not broader than the infl. stout elongate conoidal tip rounded.

PEGU, the IRAWADY and SITANG VALLEYS, *Kurz*.

Tuber a depressed sphere or hemisphere, 2 in. diam., not bulbiferous. *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. cylindric, male longest; appendage not contracted at the base, white. *Anthers* very short. *Stigma* sessile, discoid.

9. *A. sparsiflorus*, *Hook. f.*; spathe with an ovate-oblong suberect acute limb the basal margins revolute round the mouth of the infundibular tube, spadix much shorter than the spathe, appendage fusiformly conoid as long as the infl., male and fem. fl. scattered.

PERAK; Maxwell's Hill, *Wray* (No. 111), *Kunstler*.

Tuber orange-shaped. *Leaf* bulbiferous at top of petiole, green, shaded with red or brown; leaflets 7, shortly petiolulate, 6-8 by $1\frac{1}{4}$ in., oblanceolate, acuminate. *Peduncle* 1-2 $\frac{1}{2}$ in., sheaths longer, linear. *Spathe* 5 in.; tube $1\frac{1}{4}$ in., pale red-brown spotted with purplish-brown. *Spadix* $3\frac{1}{2}$ in. *Anthers* minute, very short. *Ovaries* small, globose, style very short, stigma capitate.

†† *Spadix much longer than the spathe.*

10. *A. oncophyllus*, *Prain mss.*; spathe long-peduncled tube ovoid dilating into a large orbicular-ovate limb the lower margins of which are revolute round the open mouth of the tube, spadix far exerted, appendage as long as the infl. elongate conoid.

ANDAMAN ISLES.; on Cocos Islets, *Prain*.

Tuber depressed, 5-9 in., diam., bulbiferous. *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-lobed.—A superb species, described from a drawing, dried specimen and a living plant at Kew.

11. *A. Prainii*, *Hook. f.*; spathe obliquely campanulate tube very broad subcylindric base truncate, limb short orbicular-ovate margins waved, spadix very stout, exerted appendage very large conoid smooth much longer and broader than the infl.

PERAK; Larut, *Scortechini*, *Kunstler*. PENANG (*loc. in Herb. Kew*).

Tuber 6-10 in. diam., not bulbiferous. *Leaves* 4 ft. broad, leaflets 4-8, lanceolate, caudate-acuminate; petiole 3-5 ft., green mottled with grey, or white and red. *Peduncle* 8-5 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-colrd. smooth. *Anthers* linear. *Stigma* 2-lobed.—Spathe and spadix more like *A. campanulatus* than are others with short styles.

Amorphophallus.] CLXVI. AROIDEÆ. (J. D. Hooker.)

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 $1\frac{1}{2}$ in. long. *Spadix* 3-6 in., male infl. 1-2 in., fem. $\frac{1}{2}$ -2 in.; appendage $1\frac{1}{2}$ in., anthers short, prismatic. *Ovaries* depressed-globose, with a short stout style, stigma large, quite entire.—Tuber and leaf wanting.

13. *A. hæmatospadix*, Hook. f.; spathe campanulate convolute below dilating above into an ovate or ovate-lanceolate obtuse erect limb with margins revolute all round the mouth of the tube nearly to the tip, spadix stout exserted, appendage cylindric-clavate three times as long as the infl. blood-red tip rounded.

PENANG? Curtis (Hort. Kew, 1892.)

Tuber shortly turbinate, $2\frac{1}{2}$ 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. $1\frac{1}{2}$ in., male 3 times as long as the few-fld. fem.; appendage $\frac{3}{4}$ in. diam. at the thickest part. *Anthers* very short. *Ovary* globose, narrowed into a short rather slender style, stigma small, capitate.

14. *A. elatus*, Hook. f.; peduncle very tall rough, spathe lanceolate acute erect sheathing for the lower half margins not revolute, spadix more than twice as long as the spathe very stout, appendage more than twice as long as the infl. narrowed from below the middle to the slender tip.

MALAY PENINSULA; Larut, Perak, Kunstler.

Tuber and *leaves* unknown. *Peduncle* 3-4 ft., and *petiole* variegated green brown white and red. *Spathe* 6 in., cream-colrd., membranous, appressed to the spadix, apparently mottled; tube $1\frac{1}{2}$ in. diam., base rounded. *Spadix* a foot long, rather narrowed towards the base, about $\frac{1}{2}$ in. diam. in the thickest part, dark and light blue; male infl. 3 in.; fem. $1\frac{1}{2}$ in. *Anthers* small, very short. *Ovaries* globose; style very short, stout, stigma capitate.—A stately species, the colours are taken from Kunstler's notes. The specimen is unique in Herb. Calcutta; its nearest ally is perhaps Blume's *A. variabilis*.

IMPERFECTLY KNOWN AND EXCLUDED SPECIES.

A. GIGANTEUS, Blume Rumph. i. 147, t. 34, is not British Indian; and the reference under it to *Denst. Clav. Hort. Mal.* and *Rheede Hort. Mal.* should be struck out.

A. LYRATUS, Engler Arac. 319 (*Arum lyratum*, Roeb. Fl. Ind. iii. 508, *Conophallus lyratus*, Schott Syn. 35; Prodr. 180) is according to Roxburgh's drawing *Tacca pinnatifida*, with the detached berry of an *Arisæma*?

A. TUBEROUIGER, Engler Arac. 317; tuber small, leaf 3-sect, branches 1-2 in. pinnatifidly or pinnatisectly 3-5-foliolate, segments 3-4 by 1-1 $\frac{1}{2}$ in. sessile elliptic-lanceolate caudate-acuminate; petiole 10-12 in. bearing a pisiform bulbil at the top. *Conophallus tuberculiger*, Schott, Bonpland. (1859), 78; Prodr. 129.—Khasia Hills, alt. 3-4000 ft. J. D. H. and T. T.—Described by Schott from leaves only. Engler has added a description of the spathe of *A. bulbifer*, from the drawing of a Sikkim specimen of that plant which he supposed to be the same.

10. *SYNANTHERIAS*, Schott.

Characters of *Amormophallus*, but male and fem. infl. distant, with oblong depressed interposed neuters.

RHAPHIOPHALLUS, Schott *Gen. Aroid. t. 27; Syn. 125; Engler Arac. 321*, would appear from the characters given not to be separable from *Synantherias*. It was founded on a Canara plant collected by Hohenacker, of which I have seen no specimen; and is described and figured as having a few gibbous neuters, and a slender subulate appendage shorter than the spathe. In other respects it agrees with *S. sylvatica*.

S. sylvatica, Schott *Gen. Aroid. t. 28; Prodr. 176; Engler Arac. 320; Ic. ined. No. 155; Bot. Mag. t. 7190*. *Amorphophallus sylvaticus*, Kunth *Enum. iii. 34; Dalz. & Gibs. Bomb. Fl. 259*. *A. zeylanicus*, Blume *Rumph. i. 148; Thw. Enum. 335; Engler Arac. 314*. *Brachyspatha sylvatica*, Schott *Syn. 35*. *B. zeylanica*, Schott *Syn. 35; Prodr. 127*. *Arum sylvaticum*, Roxb. *Fl. Ind. iii. 511; Wight Ic. t. 802*.

The DECCAN PENINSULA, from the northern Circars to the Concan, and southwards to CEYLON.

Tuber subglobose, bulbilliferous. *Leaves* 1 or 2, 1½–2½ ft. diam.; divisions 1–2-pinnatifid; leaflets 2–6 in., lanceolate, long-acuminate; petiole and peduncle 1–2 ft., and spathe clouded barred and streaked with green and pale pink. *Spathe* 2–4 in., tube broad convolute, base truncate; limb very short, ovate, acute. *Spadix* stipitate; infl. as long as the spathe, terminating in a brown flexuous appendage 5–6 times as long; infl. cylindric, male narrowed; neuters sub 2-seriate, quite flat, pelately adnate, yellow-brown. *Male fl.* of scattered or fascicled minute sessile obconate anthers. *Ovaries* globose, style very short; stigma capitate; ovules subbasilar.

11. THOMSONIA, Wall.

Characters of *Amorphophallus*, but appendage clothed below with depressed neuters and all over above with tubercles.

T. nepalensis, Wall. *Pl. As. Rar. 83, t. 99; Blume Rumph. i. 150; Engler Arac. 306*. *T. Hookeri*, Engler l. c. 307. *Pythonium Wallichianum*, Schott *Melet. i. 17; Syn. 36; Gen. t. 25; Prodr. 123; Kunth Enum. iii. 30*. *Arum grandiflorum*, Herb. Ham.—*Aroid. Wall. Cat. n. 8949*.

TROPICAL HIMALAYA; Nepal, Wallich; Sikkim, alt. 2–6000 ft., J. D. H. ASSAM, Hamilton. KHASIA HILLS, alt. 1–5000 ft.

Tuber 4–5 in. diam., not bulbilliferous. *Leaf* 12–18 in. diam. or more; leaflets 3–5 in., ovate or oblong-lanceolate, caudate-acuminate; petiole 18 in. and very stout. *Peduncle* light green blotched with much darker, sheaths pink. *Spathe* 12–18 by 3–6 in. diam., oblong-cymbiform, shortly narrowly convolute at the base, erect, green. *Spadix* 5–10 in., exserted, very stout; male infl. 2–5 in., fem. ½–2 in.; appendage 3–4 in. and as long or shorter than the male infl., cylindric, green changing to yellow, top rounded. *Anthers* 3–5, substipitate, compressed, 2-celled, pollen vermiform. *Ovaries* globose, 2-celled; style stout; larger than the cells, up-curved, stigma discoid; obscurely lobed; ovule 1, basilar, erect, anatropous. *Fruit?*

T. Hookeri, Engler *Arac. 307* (Allopythion, Hooker *Schott Gen. 24, t. 24; Prodr. 123*; founded on a very bad specimen of a Khasian plant (the leaf of which Mr. Brown thinks may be that of an *Arisæma*) is altogether doubtful. There is a drawing in Herb. Kew of a curious state of *T. nepalensis*, with a fan-shaped green foliaceous spathe, cut irregularly and deeply into lanceolate acuminate costate lobes.

12. PLESMONIUM, Schott.

Characters of *Amorphophallus*, but male and fem. infl. distant, with large obovoid pearl-like or turbinate neuters interposed, and no appendage.

P. margaritiflorum, Schott *Syn. 34; Gen. t. 26; Prodr. 124; Engler*

Arac. 303. *Amorphophallus margaritiferus*, *Kunth Enum.* iii. 34. *Arum margaritifer*, *Roxb. Fl. Ind.* iii. 512; *Wight Ic.* t. 795. *Caladium discretum*, *Herb. Ham.*—*Wall. Cat.* 8937 A.

HINDOSTAN; *Rosburgh*. BENGAL, at Dacca, *Clarke*.

Tuber 6 in. diam. or less, bulbilliferous all over. *Leaves* 1½ ft. diam., 3-sect; segments pinnatisect, lateral forked; leaflets few, 4-6 in., linear, acuminate; petiole 1½-2 ft., green. *Peduncle* 12-18 in., stout, pale green streaked with darker green. *Spathe* 5-6 in. by 4 broad, erect, broadly ovate, obtuse, concave, loosely convolute below the middle, pale yellow-green, flushed with pink within, dark purple at the base. *Spadix* very stout, stipitate, obtuse, as long as the spathe; male infl. much the longest; neuters as large as peas, white. *Anthers* crowded, very short, pores confluent. *Ovaries* scattered, globose, narrowed into a short style; stigma large, 2-3-lobed.—*P. dubium*, Schott (*Prodr.* 125; *Engler Arac. l. c.*) founded on a very imperfect spathe and spadix from Pegu (*McLelland*) is distinguished by its 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.

1. *A. peltata*, Nimmo in *Grah. Cat. Bomb. Pl.* 252; *Schott Syn.* 40; *Gen. t.* 85; *Prodr.* 135; *Bot. Mag. t.* 4222; *Engler Arac.* 528. *A. protanthera*, N. E. Br. in *Rep. R. Gard. Kew*, 1877, 57. *Remusatia vivipara*, *Wight Ic.* t. 900 (not of Schott). *Caladium? ovatum*, *Herb. Ham.*—*Aroid. Wall. Cat.* 8956, 8957.

WESTERN SUBTROPICAL HIMALAYA, from Nepal to Sikkim, alt. 4-6000 ft. BURMA; in the Karen Hills, *Kurz*. WESTERN GHATS; from the Concan to Travancore, *Heyne, &c.*

Tubers small, clustered. *Leaves* 1-6 in. diam., orbicular or cordate, tip rounded or acute, membranous, glaucous beneath; petiole 2-7 in., slender. *Peduncle* 1-4 in., very slender. *Spathe* 1 in., incurved, apiculate, violet with a green dorsal ridge, paler within. *Spadix* decurved; male infl. dark purple; fem. green, stigma yellow.—*A. protanthera*, owes its origin to the fact, that whereas all the Himalayan specimens then in Kew Herbarium from various collections showed that flowering had preceded leafing by a considerable interval; all those from the Western Ghats showed that those processes had been contemporaneous. Specimens of the Himalayan plant recently received from the Calcutta Herbarium, have invalidated the above character.

14. STEUDNERA, C. Koch.

Herbs; caudex stout. *Leaves* ovate, long-petioled, peltate. *Spathe* shortly convolute at the base, limb ovate-lanceolate, expanded, reflexed, marcescent. *Spadix* very short, dense-fid.; male infl. clavate or capitate;



fem. adnate below to the spathe. *Stamens* 3-6, connate in a peltate body with a flat crenulate crown; anther-cells globose. *Ovaries* mixed with clavate staminodes, subglobose, 1-celled; stigma 4-5-lobed; ovules many, parietal, orthotropous.—Species 6 or 8, Indian and Burman.

1. *S. discolor*, *Hort. Bull.* (*Cat.* 1875, No. 75); leaves 10-12 in. ovate acute with dark blotches between the nerves, base retuse, spathe $4\frac{1}{2}$ in. ovate acuminate golden yellow on both surfaces, base within purple. *S. colocasiæfolia*, *Hook. f. Bot. Mag. t.* 6076 (*copied in Fl. des Serres*, xxi. t. 2201). *S. colocasiæfolia*, var. *discolor*, *Engl. Arac.* 452.

INDIA, *Hort. Bull.*

Stem short, stout, clothed with brown sheaths. *Leaves* dark green above, paler with dark blotches beneath. *Spadix* $1\frac{1}{2}$ in., pale; staminodes 4-5, clavate.

2. *S. colocasiæfolia*, *C. Koch in Estr. Bot. Wochenschr.* (1862), 114; leaves 10-12 in. ovate acute concolorous, base retuse, spathe 6 in. lanceolate caudate-acuminate golden yellow without dark purple within. *Schott in Bonpland. x.* (1862), 222; *Regel Gartenfl.* (1869), 323, t. 633; *André Ill. Hort.* xix. 33, t. 90; *Bot. Mag. t.* 6762; *Engler Arac.* 452, and *l.c. ined.* No. 141 (excl. var. *discolor* and *Hab. Burma*, and *Syn. Gonatanthus*).

MAETABAN, and the Karen Hills, *Kurs.*

Closely allied to *S. discolor*, but a larger coarser plant, with stronger nerves, a longer differently coloured spathe, and fewer staminodes.

3. *S. assamica*, *Hook. f.*; leaves 7-8 in. ovate-oblong acute base rounded, spathe 3-3 $\frac{1}{2}$ in. lanceolate caudate-acuminate red purple on both surfaces. *Aroid. Wall. Cat.* 8953.

ASSAM; Duple Hills, *Lister (l.c. 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* $\frac{1}{2}$ -1 in.; male infl. cylindric.—Wallich's specimen is without locality.

4. *S. Griffithii*, *Schott in Bonpland.* (1862), 222; leaves 4-5 in. ovate-oblong acute or cuspidate base emarginate or shortly 2-lobed, spathe 2-3 in. ovate-lanceolate acuminate yellowish green on both surfaces brown purple below the middle within. *Gonatanthus Griffithii*, *Schott Prodr.* 143.—*Arum* sp. *Griff. Notul.* iii. 144; *l.c. Pl. Asiat.* t. 164, f. 1.

UPPER BURMA, *Griffith*, at Namtuseek (*Kew Distrib.* 5970).

Caudex prostrate, elongate, clothed with fibres, as thick as a swan's quill. *Leaves* deep green above, glaucous-white beneath. *Spadix* $\frac{1}{2}$ in., male infl. cylindric.

5. *S. colocasioides*, *Hook. f.*; leaves 9-24 in. broadly ovate acute base broadly retuse, spathe 5-9 in. narrowly lanceolate acuminate tube convolute limb creamy-yellow, fem. infl. half free. *Aroid. Wall. Cat.* 8944, 8947.

SIKKIM HIMALAYA, *King (l.c. in Herb. Calcutt.)*. SILHET, *De Silva*. CACHAR, *Keenan (Hort. Kew)*.

Caudex elongate, $1\frac{1}{2}$ 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 $3\frac{1}{2}$ -4 in. pendulous from the decurved peduncle lanceolate acuminate yellowish-brown without pale purple and striated within, male infl. globose.

BURMA; in evergreen forests, Tonkyaghet, Kurz (*Ic. in Herb. Calcutt.*).

Caudex as thick as the little finger, densely fibrous; sheaths 4 in. *Leaves* pale green above, paler beneath, nerves about 5 pairs, strong, arched; petiole 1 ft., slender. *Peduncles* many (4 in the drawing), 4-5 in., very slender. *Spadix* $\frac{1}{2}$ -1 in., fem. infl. very long.

15. **HAPALINE**, Schott.

Small tuberous herbs. *Leaves* membranous, cordate or sagittate. *Spathe* long-peduncled, tube cylindric, decurrent tightly convolute, limb lanceolate or linear-oblong, flat. *Spadix* equalling the spathe; male and fem. infl. remote; male elongate; fem. adnate to the spathe, of few uniseriate ovaries. *Male fl.* an elongate hexagonal peltate shortly stipitate body, with 4-6 minute globose anther-cells pendulous from its margin. *Ovaries* ovoid, 1-celled, 1-ovuled; stigma disciform; ovule erect, anatropous.

1. **H. Benthamiana**, Schott in *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 Arac.* 489; *Kurz in Journ. As. Soc. Beng.* xlii. ii. (1873), 109, t. 9. *Hapale*, Schott *Gen. Aroid.* t. 44.— *Aroid. Wall. Cat.* 8953 A.

BURMA; banks of the Attran river, Wallich. PEGU and MARTABAN, in dry forests, Kurz.

Tuber small. *Leaves* few, 3-4 in. long; sinus deep, narrow; petiole and peduncle slender. *Spathe* 2-3 in. long, membranous, white.

2. **H. Brownii**, Hook. f.; leaves ovate acuminate deeply cordate, basal lobes rounded $\frac{1}{3}$ rd the length of the anticus, spathe oblong apiculate.

MALAY PENINSULA; Quedah, alt. 100-500 ft. *King's Collector.*

Habit of *H. Benthamiana*, differing in the basal lobes of the leaf and form of the spathe.—Named after Mr. N. E. Brown, assistant in the Kew Herbarium. (See p. 490).

16. **REMUSATIA**, Schott.

Tuberous herbs, flowering and leafing in alternate years? bearing long radical bulbiferous shoots. *Leaf* solitary, entire, peltate. *Spathe* coriaceous; tube convolute, ovoid, accrescent over the fruit; limb broad or narrow, erect or spreading and reflexed, deciduous. *Spadix* very short, sessile, male and fem. infl. separated by neuters; appendage 0; male infl. clavate, of densely packed angular table-topped male fl. and neuters; fem. short, cylindric. *Stamens* with a fleshy connective bearing 2-3 small anther-cells opening by terminal slits. *Ovaries* ovoid, 1-celled; stigma sessile, disciform; placentas parietal; ovules many, orthotropous. *Berries* small. *Seeds* albuminous, embryo axile.

1. **R. vivipara**, Schott *Melet.* i. 18; *Syn.* 43; *Gen. Aroid.* t. 36; *Prodr.* t. 137; in *Ann. Gand.* (1846), t. 66; bulbiferous shoots very stout suberect or ascending simple or very shortly branched, limb of spathe

reflexed broadly orbicular-obovate cuspidate. *Kunth Enum.* iii. 36; *Miquel Fl. Ind. Bat.* iii. 205; *Dalz. & Gibs. Bomb. Fl.* 259; *Grak. Cat. Bomb. Pl.* 228; *Wall. Cat.* 8939; *Engler Arac.* 496. *Caladium viviparum*, *Lodd. Bot. Cab.* t. 281. *Colocasia vivipara*, *Thw. Enum.* 336. *Arum viviparum*, *Rozb. Fl. Ind.* iii. 496; *Wight Ic.* t. 798.—*Rheede Hort. Mal.* xii. t. 9.

SUBTROPICAL HIMALAYA; alt. 2-3000 ft. from Kumaon to Sikkim. The KHASIA HILLS and BURMA. BEHAR, on Parasnath, alt. 4500 ft., *Clarke*. The WESTERN GHATS, and CEYLON.—DISTRIB. Java.

Tuber size of a hazel or walnut, viviparous shoots 6-11 in., bulbils squamosely crinite. *Leaf* 5 by $3\frac{1}{2}$ 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* 1-1 $\frac{1}{2}$ in.

2. *R. Hookeriana*, *Schott in Astr. Bot. Wochenbl.* (1858), 133; *Prodr.* 187; bulbilliferous shoots slender prostrate or pendulous much branched, limb of spathe erect ovate-oblong acuminate. *Engler Arac.* 497.

TEMPERATE HIMALAYA; Simla to Sikkim, alt. 4-7000 ft.

Tuber as in *R. vivipara*. *Leaves* ovate-oblong, cordate, caudate-acuminate beneath the nerves; petiole 2-9 in. *Spathe* 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ in., limb $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, sometimes coppery, more or less convolute.

17. GONATANTHUS, Klotzsch.

Tuberous herbs, with the habit foliage and bulbilliferous shoots of *Remusatia*, but the shoots are branched and the spathe has a slender elongate convolute limb, there are no neuters between the male and fem. infl., and the ovules are numerous and basilar.

G. sarmentosus, *Klotzsch in Link & Kl. Ic. Pl.* i. 33, ii. 14; leaves ovate-cordate. *Kunth Enum.* iii. 36; *Schott Syn.* 44; *Gen.* t. 39; *Prodr.* 142; *Bot. Mag.* t. 5275; *Gartenfl.* (1868), 227, t. 588; *Engler Arac.* 571. *Caladium pumilum*, *Don Prodr.* 21. *Colocasia* ? *pumila*, *Kunth Enum.* iii. 40.—Aroid. *Wall. Cat.* 8952.

TEMPERATE HIMALAYA; from Kumaon to Sikkim, alt. 4-6500 ft. KHASIA HILLS, alt. 4-5000 ft.

Tuber small and slender branched shoots with the small crinite bulbils of *Remusatia Hookeriana*. *Leaves* peltate, acuminate, dark green above; petiole 4-8 in. *Peduncle* 2-3 in. *Spathe* 6-10 in. long, tube $\frac{1}{2}$ - $\frac{3}{4}$ 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* 1-1 $\frac{1}{2}$ in. long; stipes of male infl. angular and crown of anthers chocolate-brown; fem. infl. short, ovaries few closely packed, globose, stigma a disciform area. *Berries* yellow. *Seeds* on long funicles, ovoid; testa rough, with a fleshy yellow coat.

2. *G. ? ornatus*, *Schott in Astr. Bot. Zeitschr.* (1858), 121; leaves lanceolate or oblong-lanceolate base cordate.

SIKKIM HIMALAYA, Thomson. KHASIA HILLS, alt. 5000 ft., *J. D. H. & T. T.*

In the absence of inflorescence this is an altogether doubtful plant. It differs from *G. sarmentosus* in the much narrower leaves, 5-10 by 1 $\frac{1}{2}$ -3 $\frac{1}{2}$ in., which in the originally described Khasia specimens were of a fine coppery-purple between the green nerves and the broad green margin. In specimens apparently of the same plant from both Sikkim and the Khasia Hills, the leaves are green and concolorous. No bulbilliferous shoots have been seen.

18. **COLOCASIA**, Linn.

Tall coarse herbs, tuberous or with a stout short caudex, flowering and leafing together. Leaves stoutly petioled, peltate, ovate-cordate. Spathe stoutly peduncled; tube thick, accrescent, persistent, mouth constricted; limb erect, deciduous. Spadix shorter than the spathe, stout or slender; male and fem. infl. with usually interposed flat neuters; appendage cylindric subulate or 0. Ovaries and ovules as in *Remusatia*. Berries obconic or oblong. Seeds oblong, sulcate, albumen copious; embryo axile.—Species 6 or 7 tropical Asiatic.

1. **C. Antiquorum**, Schott Melet. i. 18; Syn. 40; Prodr. 38; leaves large ovate with a broad triangular basal sinus, tube of spathe oblong 2-4 times shorter than the narrow lanceolate limb, appendage very variable. Miquel Fl. Ind. Bat. iii. 202; Kunth Enum. iii. 37; Thwaites Enum. 335; Benth. Fl. Austral. vii. 155; Engler Arac. 491 and Icon. ined. No. 251. C. esculenta, and acris, Schott Melet. i. 18; Kunth l. c. C. nymphæifolia, Kunth l. c. C. Fontanesii, Schott in Estr. Bot. Wochenbl. (1854), 409. C. pruinipes, Koch & Bouché, Ind. Sem. Hort. Berol. (1854), 4. C. euchlora, C. Koch & Lindl. l. c. App. Caladium esculentum, Vent. Hort. Cels. 30; Willd. Sp. Pl. iv. 489; C. acre, Br. Prodr. 336; C. nymphæifolium, Vent. l. c.; Griff. Notul. iii. 144, t. 161 B. 2 (ovules). Arum Colocasia. Linn. Sp. Pl. 965; Roxb. Fl. Ind. iii. 494; Grah. Cat. Bomb. Pl. 228; Wight Ic. t. 786, f. 1. A. nymphæifolium, Roxb. & Grah. ll. cc.; Wight l. c. f. 2. A. peltatum, Lam. Encycl. iii. 13.—Colocasia, Wall. Cat. 8943—Rheede Hort. Mal. xi. t. 23.

Throughout the hotter parts of INDIA (up to 7600 ft. in the Himalaya) and CEYLON, in moist and dry places, wild or cultivated.—DISTRIB. cult. in all hot countries.

Leaves 6-16 in., dark green, dull, sometimes clouded with black; petiole stout, 3-4 ft., green or violet. Peduncles solitary or clustered and connate, much shorter than the petioles. Spathe 8-18 in., caudate-acuminate, erect, pale yellow. Spadix shorter than the spathe; fem. infl. as long as that of the staminodes, male infl. longer.—Very common and variable, Roxburgh distinguishes 3 varieties besides nymphæifolia, they are—1, a dark one from wet places in which the roots (base of stem?) never swell, but send out many suckers, and the leaves and petioles are more or less purple, it is much eaten; 2, one that grows on dry ground with dark purple or bluish clouds in the leaf; 3, one like the last but all green. Of nymphæifolia, which he describes as having repand leaves. He says that he doubts if it is anything but a large aquatic state, abundant wild on borders of lakes, with the subterraneous stem often as long and thick as a man's arm, reddish petioles peduncles and leaves, narrower leaves, and a short appendage; all parts are eaten.

2. **C. affinis**, Schott in Bonpland. (1859) 28; Prodr. 138; leaves ovate or orbicular-ovate base rounded retuse or cordate nerves very slender, tube of spathe cylindric 4-6 times shorter than the linear-lanceolate long acuminate limb, appendage as long or twice as long as the infl., stigma sessile disciform. Engler Arac. 492. Colocasia, No. 3, Herb. Ind. Or. Hf. & T. Alocasia Jenningsii, Veitch in Ill. Hort. (1869), t. 585; Gard. Chron. (1869), 136; Flora des Serres, xvii. 1818.—Aroid. Wall. Cat. 8952 B.

SIKKIM HIMALAYA, King. ASSAM, Hamilton. KHASIA HILLS, alt. 2-4000 ft. J. D. H. and T. T. BURMA; Prome Hills, Wallich.

Tuber small. Leaves 4-6 in. long and nearly as broad, membranous, green with dark blotches between the nerves, glaucous beneath, tip obtuse or acute; petiole slender, 6-8 in. Peduncle 3-5 in. Spathe 4-6 in., tube 1 in., tumid, green; limb primrose yellow. Spadix with a narrow neck between the male and fem. infl.

covered with flat neuters; appendage slender, narrowed to the tip, golden yellow.—In a fine drawing of this species in Herb. Calcutt. the stigma is represented as disciform.

3. *C. fallax*, Schott in *Bonpland*. (1859), 28; *Prodr.* 138; leaves orbicular-ovate base cordate or emarginate, nerves strong, tube of spathe 4-6 times shorter than the lanceolate limb, fruiting subspherical, style short, stigma disciform. *C. Wendlandii*, Engl. *Ic. ined.* No. 240.—Aroid. *Wall. Cat.* n. 8952 A.

SEKIM HIMALAYA, alt. 1-3000 ft., *Clarke*. KHASIA HILLS, alt. 1-4000 ft. *J. D. H.* and *T. T.*

Tuber small. *Leaves* 4-6 by 3-5 in., largest 8 by 7 in., much thicker in texture and with much stronger nerves than *C. affinis*. *Spathes* and *spadix* much as in *affinis*, but usually with fewer neuters between the male and fem. infl. *Anthers* stellately crenate in both.

4. *C. virosa*, *Kunth Enum.* iii. 39 (*in part*); leaves large ovate sub-undulate and repand, base retuse, tube of spathe oblong much shorter than (but hardly distinct from) the narrowly lanceolate blade, spadix four times shorter than the spathe, appendage 0. *Schott Syn.* 41; *Prodr.* 139; *Engler Arac.* 494. *Calla virosa*, *Roxb. Fl. Ind.* iii. 517; *Wight Ic.* t. 808. *Zantedeschia virosa*, *C. Koch Ind. Sem. Hort. Berol.* (1854), *App.* 9.

BENGAL and the lower Provinces of India, *Roxburgh*.

Stem short, simple, cylindric. *Leaves* 1-2 ft. by 6-15 in.; petiole about as long, terete, smooth, green. *Peduncles* clustered. *Spathes* nearly straight, subulate, convolute. *Spadix* 3 in., obtuse, lower third female. *Anthers* peltate, 8-12-celled; ovaries broadly ovoid 1-celled, stigma large sessile peltate; placentas 3-4.—Descript. from *Roxburgh*; nothing further being known of this plant.

5. *C. Mannii*, *Hook. f.*; leaves oblong-ovate base sagittate lobes very obtuse sinus broad acute, spathe narrowly oblong cymbiform, spadix half as long as the spathe sub-acute, appendage 0.

UPPER ASSAM; at Makum, *Mann*.

Leaves 8-12 by 4-7 in., nerves 6-7 pairs, not stout, basal lobes 4 in.; petiole 1-3 ft. *Peduncle* rather slender. *Spathes* 6-7 in., tube 1 in. *Spadix* 1½-4 in.; male 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. Wochenbl.* (1857), 34; *Prodr.* 141 (*excl. syn. pruinipes*).

PERAK, *Scortechini*.—DISTRIB. Cochinchina, Java.

Leaves 18-20 by 14-18 in., base deeply cordate, margin repand; nerves 8-10 pairs, very stout; lobes 6-8 in., rounded, sinus open; petiole 2-3 ft. *Peduncle* very stout, tall. *Spathes* 5-6 in., coriaceous; tube 2½ in., glaucous, limb erect. *Spadix* yellow, fem. infl. 1½ in. conic; neuter infl. 1 in. slender; male stout, cylindric, terminating in a rudimentary conic appendage. *Ovaries* very numerous, narrow, stigma very broad, covering the whole ovary; ovules parietal, scattered.—The ovaries are quite unlike those of its congeners.

19. *ALOCASIA*, Schott.

Characters of *Colocasia*, but ovules few, basilar, erect.—Species perhaps 20 or 30, tropical Asiatic.

* Leaves not or slightly peltate, lower nerves approximate and flabellately spreading.

1. **A. cucullata**, Schott Melet. 18; in *Æstr. Bot. Wochenbl.* (1854), 410; *Syn.* 48; *Prodr.* 156; leaves subpeltate broadly ovate-cordate nerves 6-7 pairs, petiole very long, peduncles shorter subsolitary. *Engler Arac.* 498. *A. rugosa*, Schott in *Wochenbl. l. c.*; *Syn.* 49; *Prodr. l. c.* *Colocasia cochleata*, Miq. *Epimel. Sem. Hort. Amstelod.* (1853). *C. rugosa*, Kunth *Enum.* iii. 41. *C. cucullata*, Schott Melet. i. 18; *Wall. Cat.* 8940; *Kunth l. c.* 38; *Thw. Enum.* 336. *Caladium cucullatum*, Pers. *Syn.* ii. 575. *Arum cucullatum*, Lour. *Fl. Cochinch.* 656; *Roxb. Fl. Ind.* iii. 501; *Wight Ic.* t. 787.

BENGAL, Roxburgh (cultivated Clarke). The KHASIA HILL., alt. 4000 ft. J. D. H. and T. T. PEGU, Kurs. CEYLON (native?) Thwaites.

Rootstock 1-2 ft., with many suckers, branched, inclined. Leaves 6-12 by 4-7 in., ½-circular, nerves very stout; petiole 1-3 ft., green. Spathe 6-12 in. fleshy, tube 2-4 in.; limb narrowly cymbiform, margins convolute. Spadix shorter than the spathe, appendage short.

2. **A. montana**, Schott in *Æstr. Bot. Wochenbl.* (1854), 140; *Syn.* 47; *Prodr.* 154; leaves broadly ovate-cordate repand, nerves 5-6 pairs, petiole short stout, peduncles many connate below. *Miq. Fl. Ind. Bat.* iii. 209; *Engler Arac.* 499. *Colocasia? montana*, Kunth *Enum.* iii. 40. *Arum montanum*, Roxb. *Fl. Ind.* iii. 497; *Wight Ic.* t. 796.

NORTHERN CIRCARS, Roxburgh.—DISTRIB. Java.

Rootstock tuberculoid, as thick as the wrist, with long suckers from the crown. Leaves 6-8 in., shining; petiole 8-10 in., sheathing half way up. Spathe 4-6 in., coloured, limb thrice as long as the tube. Spadix nearly as long as the spathe; appendage 2½ in. Stigma 3-4-lobed.—I have seen no specimen.

3. **A. rapiformis**, Schott *Prodr.* 157; *Engler Arac.* 510. *Colocasia rapiformis*, Kunth *Enum.* iii. 40.

PEGU, Carey.

Differs, according to Roxburgh, from *A. montana* in having a tuberous turnip-shaped root.—I have seen no specimen.

** Leaves not or hardly peltate, nerves pinnate.

4. **A. indica**, Schott in *Æstr. Bot. Wochenbl.* (1854), 410; *Syn.* 46; *Prodr.* 144; leaves large ovate deeply sagittately cordate repand, lobes rounded sinus narrow, tube of spathe many times shorter than the very long linear-oblong subtruncate cuspidate limb, stigma sessile 3-4-cleft. *Miquel Fl. Ind. Bat.* iii. 206; *Engler Arac.* 501. *Colocasia indica*, Kunth *Enum.* iii. 39. *Arum indicum*, Roxb. *Fl. Ind.* iii. 498; *Wight Ic.* t. 794.—*Aroid. Wall. Cat.* 8948.

TROPICAL ASIA; native and cultivated.—DISTRIB. tropics (cult.).

Stem attaining 8 ft., stout, 3-8 in. diam., emitting bulbiferous suckers. Leaves 2-3 ft., tip a deflexed cusp, basal lobes sometimes very shortly connate, nerves about 8 pairs; petiole stout, transversely clouded. Peduncles (always in pairs, Roxb.) shorter than the petioles. Spathe 8-12 in., pale yellow-green. Spadix equalling the spathe; appendage longer than the infl. Ovary 1-celled.

5. **A. denudata**, *Engler Arac.* 507; leaves triangular-sagittate, shortly acuminate about a third as broad as long, basal lobes nearly as long as the anticones with the costæ marginal, petiole and peduncle long slender. *A. singaporensis*, Linden in *Gartenfl.* xiv. 292.

SINGAPORE, *Gaudichaud*.

I have seen only two leaves of a cultivated specimen of *A. singaporensis* which so conform to the description and habitat of *A. denudata*, that I conclude they are referable to that species, one has a triangular ovate hastate leaf with divaricate lobes, the other more sagittate with approximate lobes as long as the terminal.

*** Leaves peltate, basal lobes connate for $\frac{1}{10}$ – $\frac{1}{3}$ (rarely $\frac{1}{2}$) their length.

6. *A. macrorrhiza*, Schott in *Estr. Bot. Wochenbl.* (1854), 409; *Syn.* 45; *Gen. t.* 40; *Prodr.* 146; leaves broadly ovate-sagittate repand basal lobes rounded connate for $\frac{1}{10}$ their length, sinus narrow, peduncles short, tube of spathe half as long as the coriaceous incurved cymbiform cuspidate limb, stigma subsessile disciform entire. *Miq. Fl. Ind. Bat.* iii. 205; *Engler Arac.* 502 & in *Mart. Fl. Bras.* iii. Pt. ii. 202, t. 46, 47. *A. odora*, C. Koch *Ind. Sem. Hort. Berol.* (1854), App. 5; *Engler Arac.* 503. *A. commutata*, Schott in *Estr. Bot. Wochenbl.* (1854), 409. *Colocasia macrorrhiza*, Schott *Melet.* i. 18; *Thw. Enum.* 336; *C. odora*, Brongn. in *Ann. Mus. Par.* iii. (1834), 145, t. 7; *Kunth Enum.* iii. 39. *C. odorata*, Hook. *Bot. Mag.* t. 3935. *C. mucronata*, Kunth l. c. 40. *Caladium macrorrhizon*, Br. *Prodr.* 336. *C. odorum*, Lindl. *Bot. Reg.* t. 641. *C. odoratis-simum*, C. Koch in *Berl. Allg. Gartenz.* (1857), 20. *C. glycirrhizum*, Fraser in Hook. *Bot. Misc.* i. (1830), 259. *Philodendron*? *peregrinum*, Kunth l. c. 51. *Arum macrorrhizon* and *peregrinum*, Linn. *Sp. Pl.* 965, 966. *A. odorum*, Roxb. *Fl. Ind.* iii. 499; *Wight Ic.* t. 797; *Lodd. Bot. Cat.* t. 416.—*Colocasia*, Wall. *Cat.* n. 8941.

TROPICAL and SUBTROPICAL INDIA, wild and cult. Cult. in the tropics generally.

Stem 6–16 ft., attaining 1 ft. diam. *Leaves* 2–4 by 6–18 in., nerves 10–12 pairs, very stout, basal lobes incurved; petiole 2–4 ft., base sometimes as thick as the arm. *Peduncles* 2 (or more?) in each axil, 6–8 in., stout. *Spathe* 6–10 in., limb hooded and cuspidate at the top. *Spadix* nearly as long as the spathe; appendage nearly equalling the infl., cylindric, obtuse, sinuously sulcate. *Ovary* incompletely 4-celled. *Berries* size of a cherry.

7. *A. decipiens*, Schott in *Bonpland.* vii. (1859), 28; *Prodr.* 28; leaves oblong sagittate twice as long as broad cuspidate, posticous lobes half the length of the anticus united for $\frac{1}{3}$ – $\frac{1}{10}$ their length, petiole long slender, peduncles long, tube of spathe shorter than the oblong cymbiform acuminate limb, style short, stigma capitate entire.

PEGU, McLelland. ANDAMAN ISLANDS., Prain.

Leaves 9–18 by 4–9 in.; lobes 7 in., ovate-oblong, sinus broad open; nerves 6–7 pairs; petiole 2–3 ft. *Peduncle* 12–24 in. *Spathe* 4 in., tube $1\frac{1}{2}$ in.; appendage? *Ovaries* globose. *Fruiting tube* of spathe ellipsoid or pyriform, 1– $1\frac{1}{2}$ in. *Seeds* $\frac{3}{8}$ – $\frac{1}{2}$ 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 $\frac{1}{3}$ their length obtuse or subacute sinus narrow acute, tube of spathe about half as long as the oblong cymbiform acuminate limb, ovary narrowed into a distinct style, stigma 3–4-lobed. *Engler Arac.* 506. *Colocasia*? *fornicata*, Kunth *Enum.* iii. 41. *Arum fornicatum*, Roxb. *Fl. Ind.* iii. 501; *Wight Ic.* t. 792 (not t. 789); *Griff. Notul.* iii. 130, 132, t. 167.—*Colocasia*, Wall. *Cat.* 8941, 8945.

BENGAL, SILHET, ASSAM and CHITTAGONG, Roxburgh, &c.

Stem 1-3 ft., inclined or prostrate, $1\frac{1}{2}$ in. diam. *Leaves* 8-12 by 4-5 in., acute or obtuse, slightly wavy, 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 $\frac{1}{2}$ - $1\frac{1}{2}$ in., about as long as the infl. *Seeds* $\frac{1}{2}$ in. diam., globose.

9. *A. navicularis*, Koch & Bouché Ind. Sem. Hort. Berol. (1855), App. 2; in Ann. Sc. Nat. Ser. iv. i. 338, leaves broadly oblong sagittate contracted opposite the triangular obtuse divergent posticous lobes which are united for $\frac{1}{2}$ - $\frac{1}{3}$ their length, tube of spathe half as long as the oblong cymbiform acute limb, style very short, stigma disciform obscurely lobed. Engler Arac. 505 (excl. syn. fallax); Ic. Arac. No. 124. *Colocasia navicularis* Koch & Bouché l. c. (1853), 13.

KHASIA HILLS, alt. 1-4000 ft.—J. D. H. & T. T.

Stem short. *Leaves* 8-18 by 5-8 in., cuspidate; basal lobes 3-7 in., much shorter than the 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, $\frac{1}{2}$ 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 $\frac{1}{4}$ - $\frac{1}{2}$ 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 2-2 $\frac{1}{2}$, ellipsoid or pyriform. *Seeds* $\frac{1}{2}$ in. diam., globose.—Near *A. decipiens*, but seeds larger, and stigma very different, basal lobes of many-nerved leaves approximate. It is probably nearer *A. fornicata*.

11. *A. longiloba*, Miq. Fl. Ind. Bat. iii. 207; in Bot. Zeit. (1856), 564 leaves oblong-lanceolate caudate-acuminate sagittate, basal lobes obtusely triangular more than half as long as the anticus connate from $\frac{1}{2}$ -1 in., sinus triangular obtuse. Schott Prodr. 153; Engler Arac. 506. *A. amabilis*, Hort. Bull. *Caladium heterophyllum*, Presl. Plant. Jav. Zolling. n. 601.

SINGAPORE (Herb. DC), ?Wallich, without name, number or locality.—DISTRIB. Java, Borneo.

Leaves 12-20 by 4-5 in. across the insertion of the petiole. Limb of *spathe* 4 in., lanceolate, acuminate. *Spadix* 3 in. *Seeds* $\frac{1}{10}$ - $\frac{1}{8}$ in. diam.

**** *Leaves* peltate, basal lobes connate for half or all their length.

12. *A. acuminata*, Schott in Bonpland. vii. (1859), 28; leaves elongate-rhombic caudate-acuminate contracted opposite the basal lobes which are half as long as the anticus and connate for $\frac{2}{3}$ their length. Engler Arac. 450.—*Colocasia*? Wall. Cat. 8946.

CHITTAGONG, J. D. H. and T. T.; PEGU, Kurz. UPPER BURMA, Anderson; Saluen river, Wallich.

Caudex horizontal. *Leaves* 6-12 by 3-5 in., membranous, costal nerves 3-4 pairs, lobes nearly parallel, sinus narrow, obtuse.

13. *A. Beccarii*, Engler Arac. Spicileg. Born. e Pap. 14; leaves coriaceous oblong-ovate or lanceolate caudate-acuminate narrowed to the basal lobes which are connate throughout their length and $\frac{1}{2}$ - $\frac{1}{3}$ as long as

the anticonus, tube of spathe as long as the cymbiform limb, appendage as long as the infl. *A. perakensis*, *Hemsl. in Journ. Bot.* xvii. (1887), 205.

PERAK; Wray, Scortechini.

Stem subscandent, rooting, as thick as a swan's quill. *Leaves* thickly coriaceous or fleshy, nerves 3-4 pairs, slender, depressed, posticous lobes parallel; petiole 3-5 in., slender, sheath very short. *Peduncle* as long as the petiole. *Spathe* 2½ in., white or green, tube oblong; appendage cylindric, obtuse. *Ovaries* scattered, obovoid; style long, stigma disciform, 3-lobed. *Seeds* globose, ¼ in. diam.

DOUBTFUL AND EXCLUDED SPECIES.

A. ALBA, *Schott in Æstr. Bot. Zeitschr.* (1852), 59; *Syn.* 48; *Prodr.* 149; is a Javan species, attributed to Ceylon on the faith of a specimen from Herb. Burmann (in *Herb. Delessert*.)

A. FORNICATA (Caladium), *Roxb. of Wight Ic.* t. 789 (not of *Fl. Ind. & Wight Ic.* t. 792).—*Id.* *Roxb. n.* 1655.

Stem as thick as the wrist, annulate. *Leaves* ovate-cordate, acuminate, 6-7 by 5 in., basal lobes connate for ⅓ of their length, sinus very acute, nerves 5-6 pairs; petiole 8-12 in., sheathing half way up. *Peduncles* binate, 6 in. *Spathe* 4 in., tube 1 in., ellipsoid, green; limb 1½ in. broad, obovate, cuspidate, open, yellow. *Spadix* as long as the spathe, pale yellow; appendage stout, conical, acuminate, as long as the infl. *Ovary* ovoid, narrowed into a style with a 3-fid stigma. *Seed* broadly ovoid.—I cannot identify this with any Indian species; it is probably one of Roxburgh's plants collected near Samulcottah in the Northern Circars.

A. ALOCASIA, sp. Malacca, *Griffith (Kew Distrib.* 6308, 6009), and *A. sp.*, Malacca, *Maingay (Kew Distrib.* 1549, 1549^a) may both be new, but are not in a good state, and may be referable to Malayan species unknown to me.

20. **AGLAONEMA**, *Schott.*

Herbs, caudex erect or prostrate. *Leaves* ovate or oblong. *Spathe* erect, deciduous, tube convolute, limb cymbiform gaping or base shortly convolute. *Spadix* equalling the spathe, or shorter, stipitate; male and fem. infl. usually contiguous, with rarely neuters interspersed; appendage 0. *Stamens* 2-4, distinct, subclavate; anthers short, cells remote with apical pores. *Ovaries* few, 1-rarely 2-celled, stigma large or small, discoid or cupular; ovules solitary in the cells, anatropous, subbasilar. *Berries* capitate. *Seeds* exalbuminous; embryo macropodal.—Species about 20, Tropical Asiatic and African.

* Nerves of leaf numerous, close, parallel, all uniform, very slender. (See also 10. *A. pumilum*).

1. **A. Griffithii**, *Schott Syn.* 123; leaves 12-16 by 3-4 in. linear-oblong obtuse, petiole 2-3 ft., stigma cup-shaped. *A. palustre*, *Teyss. and Binnend. in Naturk. Tijdschr. Ned. Ind.* xxv. (1863), 305; *Kurz in Journ. As. Soc. Beng.* xiv. pt. ii. (1876), 153. *Aglaodorum Griffithii*, *Schott Gen.* t. 58; *Prodr.* 306; *Engler Arac.* 443.

MALACCA, *Griffith (Kew Distrib.* 5991).—**DISTRIB.** Sumatra.

Leaves coriaceous; petiole very stout. *Peduncle* 12-18 in., very stout. *Spathe* 2 in., oblong, cuspidate. *Ovaries* 2-celled.

2. **A. oblongifolium**, *Schott in Wien. Zeitschr.* iii. (1829), 892 (*e. Linnæa* vi. (1831), *Litterb.* 53); leaves 8-24 by 2-4 in. linear-oblong acu



minate base acute, petiole 4-6 in. sheathing to near the top, spathe 2-4 in. oblong cuspidate. *Kunth Enum.* iii. 55. *A. integrifolium*, *Schott Melet.* 20. *A. nitidum*, *Kunth l. c.* 56; *Schott Syn.* 122; *Prodr.* 302; *Engl. Arac.* 438. *Calla oblongifolia*, *Roxb. Fl. Ind.* iii. 516; *Wight Ic. t.* 806. *C. nitida*, *Jack. in Mal. Misc.* i., No. 1, 24. *Arum integrifolium*, *Link. Enum. Hort. Berol.* ii. 394.—Aroid. *Wall. Cat.* 8965.

PENANG, PERAK, and SINGAPORE, *Wallich, &c.*—DISTRIB. Borneo.

Caudex 1-3 ft. *Leaves* coriaceous, dark green, shining. *Peduncles* 4-8 in. *Spathe* green, margins white. *Spadix* stout, nearly as long as the spathe; male infl. subacute. *Ovary* 1-celled; stigma tabular, much broader than the ovary (ex *Ic. Scortechini*).

3. *A. Helferi*, *Hook. f.*; leaves 6-10 by 2-2½ in. oblong-lanceolate caudate-acuminate base acute, petiole 5-6 in. sheathing for the lower third, peduncles 2-3 in., spathe 1 in. oblong-lanceolate acute.

TENASSEEIM, *Helfer (Kew Distrib.* 5994).

Caudex 6 in. and upwards, branched, as thick as a swan's quill, leafy upwards. *Leaves* thin, costa not very stout, nerves very slender. *Spadix* with the stipes nearly equal the infl. *Ovary* 1-ovuled, stigma disciform.

4. *A. Clarkel*, *Hook. f.*; scandent, leaves 7-9 by 2-3 in. elliptic-lanceolate caudate-acuminate base acute, petiole 8-9 in. slender sheathing at the base only, peduncle 5-6 in., seeds ¾-1 in., fusiform.

CHITTAGONG; at Kasalong, *Clarke*.

Near *Helferi*, but the petioles are much longer and more slender, the leaves of a firmer texture with stronger costa and nerves.

** Primary nerves much stronger than the intermediate or secondary.

† *Leaves* 8-12 in.

5. *A. Hookerianum*, *Schott in Bonpland.* vii. (1859) 30; *Prodr.* 301; leaves 8-11 by 3¼-4½ in. elliptic-ovate or -oblong acuminate, base rounded or cuneate and unequal-sided, primary nerves 6-8 pairs arching, petiole 6-8 in. stout sheathing to about the middle or beyond it, spathe 1½-2 in. oblong cuspidate. *Engler Arac.* 438; *N. E. Br. in Gard. Chron.* (1882) iii. 333.

KHASIA HILLS, alt. 2-3000 ft., *Griffith, &c.* CACHAE, *Keenan*. CHITTAGONG, at Seetakoond, *H. f. & T., Lister*. ABRAKAN; *Kurz*.

Caudex elongate, ½ in. thick, nodose. *Leaves* thinly coriaceous, dark green above; nerves very slender. *Spathe* cymbiform, dark green. *Spadix* long-stipitate. *Ovaries* few, flagon-shaped, narrowed into a conical style. *Seeds* ½-1 in. long, cylindric.

6. *A. birmanicum*, *Hook. f.*; leaves 8-10 by 2½-3½ in. elliptic-oblong or -lanceolate caudate-acuminate, base rounded, primary nerves about 10 pairs erecto-patent slightly curved, petiole 2-5 in. sheathing to about the middle, peduncle very short, spathe 1½ in. linear-oblong caudate-acuminate.

UPPER BUUMA; in low woods towards Nempuan, *Griffith*.

Caudex 2 ft., erect, probably as thick as the little finger, leafy at the top only; sheaths 1-2 in.; red. *Leaves* thinly coriaceous, primary nerves distinct. *Peduncle* ½-1 in. *Spathe* greenish. *Spadix* white.—The less curved nerves and narrow caudate spathe are quite unlike any allied species.

7. *A. Schottianum*, *Miq. Fl. Ind. Bat.* iii. 316; in *Bot. Zeit.* (1856), VOL. VI.

565; leaves 8-12 by $1\frac{1}{2}$ - $4\frac{1}{2}$ in. oblong acuminate or subcaudate, base acute rounded on cordate sometimes unequal-sided, primary nerves 9-12 pairs, petiole sheathing to $\frac{1}{3}$ - $\frac{1}{2}$ its length, peduncles short, spathe $1\frac{1}{2}$ in. oblong cuspidate. *Schott Prodr.* 303; *Engler Arac.* 440. *A. longe-cuspidatum*, *Schott l. c.* 304. *A. malaccense*, *Schott in Bonpland.* (1859) 30; *Prodr.* 302.—Aroid. *Wall. Cat.* 8961.

BURMA; from Pegu to Tenasserim, *Wallich*, &c. PERAK, *Scortechini*. MALACCA, *Griffith* (*Kew Distrib.* 5984, 5985).—DISTRIB. Java, Borneo.

Stem stout (climbing often 30-40 ft., *King's Collector*). *Leaves* subcoriaceous, usually 3 times as long as broad, with parallel sides, rarely ovate-lanceolate; lower nerves spreading and arching or nearly straight; petiole 3-7 in., stout. *Seeds* $\frac{1}{2}$ 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 $1\frac{1}{2}$ in. oblong acuminate.

NICOBAR ISLANDS, *Kurz*, *King's Collector*.

Stem probably as thick as the little finger. *Leaves* 8-10 by 3- $4\frac{1}{2}$ in., secondary nerves indistinct; petioles 3-5 in., rather slender.—The broad thin leaves with short points are very different from *birmanicum* and *malaccense*.

†† *Leaves* 3-4 in. long; petiole sheathing at the base only.

9. *A. Scortechinii*, *Hook. f.*; leaves ovate to elliptic-oblong acuminate, primary nerves 6-7 pairs arched strong beneath secondary few obscure, petiole $\frac{1}{2}$ -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- $4\frac{1}{2}$ in. ovate or ovate-lanceolate acuminate, base rounded, primary nerves very faint arched, petiole shorter than the limb, spathe $\frac{3}{4}$ in. oblong apiculate, peduncle slender nearly as long as the petiole. Aroid. *Wall. Cat.* 8960 B.

BURMA; Chappedong Hill, *Wallich*; Mergui, *Griffith*.

Caudex probably as thick as a goose-quill, rooting. *Leaves* thinly coriaceous, primary nerves sometimes undistinguishable from the secondary. *Seed* $\frac{1}{2}$ 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* $\frac{1}{2}$ - $\frac{3}{4}$ 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- $1\frac{1}{2}$ in., spathe $\frac{3}{4}$ in. oblong beaked.

PERAK; in dense Bamboo forests, alt. 4-600 ft., *King's Collector*.

Stem as in *A. minus*, but leaves much more coriaceous, with strong nerves,

secondary very indistinct. *Petiole* not half the length of the blade, slender. *Spathe* yellow-green. *Seed* $\frac{1}{2}$ in. long, linear-oblong.

13. **A. costatum**, N. E. Br. in *Gard. Chron.* 1892, i. 426; leaves 4-5 in. ovate acute or cuspidate, blotched with white base retuse or subcordate, primary nerves 7-9 pairs spreading and strongly arched, petiole stout, shorter than the blade, peduncle stout, spathe 1 in. obovoid, spadix protruding.

PERAK, Curtis (*Hort. Veitch*).

Leaves $2\frac{1}{2}$ -3 in. broad, dark green, costa stout, base rather unequal-sided; petiole $\frac{1}{2}$ in. diam., terete, sheath basal. *Spathe* light green, subacute. *Spadix* very large, the protruding male part $\frac{3}{4}$ in. long, $\frac{1}{2}$ in. diam.

21. **HOMALOMENA**, Schott.

Herbs, rhizome stout or 0. *Leaves* entire very variable in shape. *Spathe* usually erect, convolute, wholly persistent round the fruit. *Spadix* included; male and fem. infl. close together, cylindric; ovaries with or without clavate staminodes. *Stamens* distinct, in dense groups; anther-cells very short or oblong opening by pores or slits; connective thick. *Ovaries* ovoid or globose, perfectly or imperfectly 2-4-celled, stigma sessile; ovules 2-seriate or the placentas anatropous or $\frac{1}{2}$ -anatropous. *Berries* few- or many-seeded. *Seeds* small, ovoid, albuminous. *Embryo* axile.—Species about 30, tropical.

Chamaeladon, as constituted by Schott, cannot (as Mr. N. E. Brown had previously observed) be separated from *Homalomena* by the ovarian cells, or by any other character. A more natural generic division of the species of both would be into those with the spathe contracted above the fem. infl. and those with no such contraction; and I have adopted this as a sectional character. The further grouping of the species here described is artificial, and not very reliable, it is the best I could devise from Herbarium and often hardly sufficient specimens. *H. rostrata* differs from the generic character in having a vacant space in the spadix between the male and fem. infl.

* Spathe contracted above the female infl.

1. **H. sagittæfolia**, Jungh. ex Schott *Prodr.* 311; leaves ovately or deltoidly sagittate acuminate not much longer than broad, basal lobes usually spreading, sinus rounded at the base, spathes many 3-4 in. long, tube much shorter than the limb. *Miq. Fl. Ind. Bat.* iii. 212; *Engler Arac.* 334. ? *H. propinqua*, Schott in *Ann. Mus. Lugd. Bat.* i. 280; *Engler l. c.* 33.

PERAK; Scortechini, Wray, alt. 2500-3000 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 strong; petiole $1-1\frac{1}{2}$ ft., sheathing to the middle. *Peduncle* 6-9 in. *Tube of spathe* $1-1\frac{1}{2}$ in., limb 2-3 in. by 1 broad, white, pink when young. *Spadix* stipitate. *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, 6-7 in. when flowering, elongating to 12 in. *Spathes* white, striped with pale green. *Spadix* stout, stipitate, male infl. rather slender, about equalling the fem. *Ovary* 3-celled; stigma pulvinate, obscurely 3-lobed.

3. ***H. rostrata*, Griff. Notul. iii. 154 (err. typ. roshalum)**; limb of leaves 12-20 by 3-6 in. oblong-lanceolate acuminate, petiole as long sheathing to beyond the middle, spathes many 4-6 in. *Schott Syn.* 119; *Prodr.* 312. *Chamaeladon sanguinolentum, Griff. l. c. 147; Schott Prodr.* 316.

MALACCA, Griffith (Kew Distrib. 5989, 5990).

Habit of *Calla aromatica* (Griffith). *Leaves* coriaceous, dark green, undulate, base acute or cuneate; primary nerves many, faint. *Peduncles* crowded, blood-red, 8-12 in. *Spathes* constricted below the middle, fleshy, green, margins white; tube narrow, limb convolute. *Spadix* shortly stipitate, slightly curved; male infl. about twice as long as fem. with a short naked space intervening; staminodes capitate. *Ovaries* subglobose, 2-4-celled; stigma pulvinate.

** *Spathes* not contracted above the fem. infl.

† *Leaves* 6-12 in. broad, deeply cordate sagittate or hastate. *Spathes* 2-4 in. long.

4. ***H. rubescens, Kunth Enum. iii. 57***; leaves cordate or sagittately cordate acuminate, basal lobes semi-ovate or rounded approximate much shorter than the anticus, sinus narrow, spathes red. *Schott Syn.* 118; *Prodr.* 310; *Engl. Arac.* 336 (excl. *singaporensis*). *H. rubra, Hassk. ex Regel Gartenfl.* (1869), t. 634. *Zantedeschia rubens, C. Koch Ind. Sem. Hort. Berol.* 1854, app. *Calla rubescens, Roxb. Fl. Ind.* iii. 515; *Wight Ic.* t. 807.

SIKKIM HIMALAYA and KHASIA HILLS, J. D. H. CHITTAGONG, Buchanan.—**DISTRIB. Java.**

Caudez 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. *Spathes* 3 in., oblong, acute at base and top.—I am very doubtful as to the limits and habitats of this species, it being impossible to distinguish some forms of *cærulescens* from it. Roxburgh, perhaps by error, describes the petioles as 1-5 ft. long; he figures the sinus as more acute than in any of the specimens I refer to the species.

5. ***H. aromatica, Schott Melet. i. 20; Syn. 117; Prodr. 309***; leaves as in *H. rubescens* but lobes divaricate and spathe green. *Engler Arac.* 335. *H. cordata, Schott Melet. 20; Syn. 118; Prodr. 309; Kunth Enum.* iii. 57; *Miq. Fl. Ind. Bat.* iii. 211. *H. Gaudichaudii, Schott in Miq. Ann. Mus. Lugd. Bat.* i. 280. *Zantedeschia aromatica, cordata and foetida, C. Koch Ind. Sem. Hort. Berol.* (1854), app. *Calla aromatica, Roxb. Fl. Ind.* iii. 513; *Bot. Mag.* t. 2279; *Wight Ic.* t. 805. *C. occulta, Lodd. Bot. Cab.* t. 12.

ASSAM; Masters, Griffith (Kew Distrib. 5966, 5967). **CHITTAGONG, Roxburgh.**

This is no doubt a different plant from *H. rubescens*, as living specimens would show; but except the green more obtuse spathe, as shown in Roxburgh's drawing, I find no diagnostic characters given, and I have seen no authentic specimens. Roxburgh's character of basal lobes rounded and divaricate is contravened by one of the leaves in his drawing, which accord in its deeply cordate base and very acute sinus with *H. rubescens*.

6. *H. coerulescens*, *Jungh. ex Schott Prodr.* 310, leaves deltoidly ovate acute or acuminate, base subhastate or cordate with a broad shallow sinus, rarely sagittately cordate, lobes rounded at the tip, spathe $2\frac{1}{2}$ – $3\frac{1}{2}$ in. subacute pale yellow white within. *Miq. Fl. Ind. Bat.* iii. 212; *Engler Arac.* 339, *lc. ined.* No. 67. *H. minus* and *majus*, *Griff. Notul.* iii. 152, 153; *Schott Syn.* 119, *Prodr.* 312; *Engler l. c.* 343. *H. Wallichii*, *Schott in Bonpland.* (1859), 30; *Prodr.* 311; *Engler l. c.* 335. *Caladium amboinense*, *Herb. Ham.*—Aroid. *Wall. Cat.* 8951.

PENANG, Wallich. PERAK, Scortechini. MALACCA; Griffith (*Kew Distrib.* 5965, 6011). *Maingay* (*Kew Distrib.* 1542).—DISTRIB. Java.

Rootstock short, as thick as the thumb or thicker. Leaves 5–12 in., and often as broad as long, nerves very many and close; petiole 8–36 in., sheathing for $\frac{1}{2}$ or $\frac{3}{4}$ its length. Peduncles 6–10 in. Spadix shortly stipitate, very stout; fem. infl. about as long as the male.—In the usually divaricate basal lobes of the majority of the specimens, this accords with Roxburgh's character of *H. aromatica*, but the leaves are rather more membranous and the spathe usually larger. Living specimens are wanted to distinguish this, *aromatica*, and *rubescens*.

7. *H. pontederæfolia*, *Griff. mss.*; leaves 4–8 in. coriaceous hastately deltoid acuminate base truncate or subcordate, principal nerves strong, peduncles short stout, spathe $1\frac{1}{2}$ – $2\frac{1}{2}$ in. obtuse.

MALACCA; at Ayer Punus, in heavy forest, Griffith (*Kew Dist.*, 5964). PERAK, Scortechini, Hervey.

Stem short. Leaves nearly black when dry, principal nerves 6–7 pairs, intermediate very obscure; petiole 6–15 in., sheathing for $\frac{1}{2}$ 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 $\frac{1}{2}$ – $\frac{3}{4}$ in. narrowly linear-lanceolate acuminate at both ends coriaceous, nerves few straight nearly parallel to the margin, peduncle very short, spathe $\frac{3}{4}$ – $\frac{1}{2}$ in. oblong apiculate ribbed. *Chamæcladon angustifolium*, *Schott in Bonpland.* (1858), 369; *Prodr.* 313? *Engler Arac.* 344; *lc. 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 $\frac{1}{2}$ or $\frac{3}{4}$ their length. Peduncles $\frac{1}{2}$ –1 in. Spathe thin. Spadix with the fem. infl. $\frac{1}{2}$ the length of the male.

9. *H. lancifolia*, *Hook. f.*; leaves 6–9 by $1\frac{1}{2}$ – $2\frac{1}{2}$ in. narrowly elliptic lanceolate gradually acuminate at both ends, nerves many pairs erecto-patent, peduncles short, spathe $\frac{3}{4}$ in., linear-oblong cuspidately acuminate.

PERAK, Scortechini.

Rootstock suberect, rooting. Leaves rather coriaceous, nerves raised above; petiole 6–10 in., sheathing $\frac{1}{2}$ – $\frac{3}{4}$ its length. Peduncles $1\frac{1}{2}$ –2 in. slender. Spathe membranous, striate. Spadix with the fem. infl. nearly half as long as the male.—Near *Cham. consobrina*, *Schott*, of Sumatra, but a much stouter plant.

10. *H. humilis*, *Hook. f.*; leaves 4–6 by $1\frac{1}{2}$ –2 in. elliptic-oblong acute

or acuminate, base rounded or cuneate, nerves 5-8 pairs erecto-patent arched, petiole slender sheathing half way up or less, peduncles many very short, spathe elliptic acuminate or cuspidate, fem. infl. $\frac{1}{4}$ - $\frac{1}{2}$ the length of the male. *Chamæcladon humile*, *Miq. Fl. Ind. Bat.* iii. 213; *Engler Arac.* 345; *Ic. ined.* No. 104. *Calla humilis*, *Jack in Mal. Misc.* i. No. 1, 22.—Aroid. *Wall. Cat.* 8959 (in part).

PENANG, *Wallich, Porter*. PERAK, *Scortechini*.—DISTRIB. Borneo.

Rootstock 2-3 in., as thick as a swan's quill. *Leaves* rather thin, margins often minutely crisped when dry; petiole 5-6 in.; costa and nerves beneath slender. *Peduncles* $\frac{1}{2}$ -1 in. *Spathe* rather membranous, not striate. *Spadix* sessile, $\frac{1}{2}$ in. long, obtuse; fem. infl. about $\frac{1}{2}$ 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 $2\frac{1}{2}$ -5 by $1\frac{1}{4}$ - $2\frac{1}{2}$ in. broadly oblong or obovate-oblong acute, base rounded cuneate or cordate at the petiole, nerves 10-15 pairs strong beneath, petiole sheathing $\frac{1}{2}$ to $\frac{1}{3}$ of its length, peduncles many very short, spathes $\frac{1}{2}$ - $\frac{2}{3}$ in. narrow with a recurved cusp, spadix sessile, fem. infl. $\frac{1}{4}$ - $\frac{1}{2}$ 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* $\frac{1}{2}$ - $\frac{1}{2}$ 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 papillæ) and the under surface as dotted with white. Probably a form of *H. humilis*, distinguished by the more numerous nerves of the leaf.

12. *H. Griffithii*, *Hook. f.*; leaves 4-7 by $1\frac{1}{2}$ - $2\frac{1}{2}$ in. more or less obliquely elliptic-oblong or oblong-lanceolate tip curved subcaudate acuminate base rounded or cuneate, nerves 4-5 pairs erecto-patent slightly arched, petiole slender sheathing $\frac{1}{2}$ the way up, peduncles many very short, spathe $\frac{2}{3}$ - $1\frac{1}{2}$ in. ovoid acuminate or rostrate, spadix stipitate. *Chamæcladon Griffithii*, *Schott in Bonpland.* (1858), 369; *Prodr.* 315; *Engler Arac.* 346; *Ic. ined.* n. 113.

MALACCA, at Ayer Punus, *Griffith*.—DISTRIB. Borneo.

Rhizoma as thick as the little finger, copiously rooting. *Leaves* rather thin, base usually unequal-sided, costa and nerves slender, tip mucronate red-brown; petiole 4-6 in. *Peduncle* 1-2 in. *Spathe* green. *Male infl.* rather longer than the fem. acuminate; fem. with many capitate staminodes amongst the ovaries.

13. *H. Scortechinii*, *Hook. f.*; leaves 5-7 by 1-2 in. elliptic or oblong-lanceolate or oblanceolate acuminate base narrowed acute or obtuse, nerves 5-7 pairs erecto-patent arched very slender, petiole slender sheathing $\frac{1}{2}$ - $\frac{1}{2}$ way up, peduncles 2-3 in., spathe 1- $1\frac{1}{2}$ in. oblong with a curved beak, spadix sessile.

PERAK, *Scortechini*; on Mt. Bubong in bamboo forests, *King's Collector*.

Rootstock as thick as a swan's quill, rooting. *Leaves* rather thin, tip curved, base rarely unequal-sided; petiole 2-6 in. *Peduncle* rather slender. *Spathe* light green with a darker green center (*King's Coll.*); dark green "with (velvety gloss above," *Scortechini*). *Spadix* sessile, fem. infl. shorter than the slender male. *Ovaries* globose, stigma disciform.—Near *H. Griffithii*, but the leaves are narrower at the base, the peduncles much longer, the spathes larger, obtuse with a recurved beak, and the spadix is sessile.

14. *H. obliquata*, *Hook. f.*; leaves 4-6 by $1\frac{1}{2}$ -3 in. lanceolate or

ovate-lanceolate caudate-acuminate base obliquely acute rounded subtruncate or subcordate, nerves 6-10 pairs, petiole slender sheathing $\frac{1}{2}$ - $\frac{1}{2}$ way up, peduncles very short, spathe $\frac{1}{2}$ - $\frac{2}{3}$ in. oblong cuspidately beaked, spadix sessile, fem. infl. half as long or nearly as long as the male. *Chamæcladon obliquatum*, Schott in Bonpland. (1858), 369; *Prodr.* 315; *Engler Arac.* 347; *Wall. Cat.* n. 8963.

PENANG, Phillips, Wallich; MALACCA, Maingay.

Rootstock as thick as the thumb. *Leaves* very variable, usually broadest at the base with unequal rounded sides; nerves slender, nearly straight, except the basal where the base of the leaf is broad, tip with a thick long mucro. *Peduncles* $\frac{1}{2}$ -2 in. *Stigma* disciform. *Seeds* many, faintly sulcate, red brown.—Closely resembles *H. Griffithii*, but the spadix of that plant is stipitate.

15. *H. Kingii*, Hook. f.; leaves 4-5 by 2-2 $\frac{1}{2}$ in. oblong or ovate-oblong acute and mucronate, base rounded or subcuneate, nerves 4-5 pairs, petiole stout sheathing from $\frac{1}{2}$ - $\frac{1}{2}$ way up, peduncles short, spathe $\frac{3}{4}$ -1 in. oblong cuspidately beaked, fem. infl. nearly as long as the male.

SINGAPORE; in swamps, King.

Rootstock as thick as the little finger. *Leaves* thinly coriaceous, slightly unequal-sided; nerves erecto-patent, slightly arched, tip with a thick mucro; petiole rather stout. *Peduncle* 1 $\frac{1}{2}$ -1 $\frac{1}{2}$. *Berries* about 15-seeded. *Seeds* red-brown.

16. *H. truncata*, Hook. f.; leaves 3-4 by 1-1 $\frac{1}{2}$ in. oblong or triangular- or oblong-lanceolate acuminate from a broad truncate or sub-hastate base, nerves very slender, petioles slender sheathing from $\frac{1}{2}$ - $\frac{1}{2}$ their length, peduncles half as long as the petioles or shorter, spathe 1-1 $\frac{1}{2}$ in. oblong cuspidately beaked, fem. infl. half as long as the male or more, with many staminodes intermixed and below the infl. *Chamæcladon truncatum*, Schott in Bonpland. (1858), 369; *Prodr.* 314; *Engler Arac.* 347.

MERGUI, Griffith.—DISTRIB. BORNEO?

Rootstock as thick as a goose-quill. *Leaves* very membranous; nerves many, nearly straight, except the basal, base usually unequal-sided, tip mucronulate. *Spathes* slightly curved, narrowly oblong in flower, broader in fruit. *Spadix* narrowed and few-fld. at the base but hardly stipitate. *Stigma* capitate. *Seeds* very many, striate.—The Bornean specimen included by Schott has identical leaves, but a larger narrower falcate finely acuminate spathe, a distinctly stipitate spadix, no (or obscure) staminodes, and furrowed seeds.

17. *H. pumila*, Hook. f.; leaves 1 $\frac{1}{2}$ -2 in. elliptic-ovate obovate or oblong subacute apiculate membranous nerves very faint, petiole very slender sheathing at the base, peduncles short slender, spathe $\frac{1}{2}$ - $\frac{1}{2}$ in. linear oblong cuspidately beaked, spadix sessile, fem. infl. $\frac{1}{4}$ the length of the acute male, staminodes few.

SINGAPORE, Maingay.

Rootstock creeping and copiously rooting, rather slender. *Leaves* green; nerves 3-5 pairs, arching. *Peduncles* $\frac{1}{2}$ - $\frac{1}{2}$ in. *Seeds* few in the berries, pale spotted with black.—Very near the Javan and Bornean *H. purpurescens* (*Chamæcladon*, Schott) but the leaves are green, of a very much more delicate texture, the petiole much more slender, and the fem. infl. shorter.

18. *H. nutans*, Hook. f.; leaves 4 $\frac{1}{2}$ -5 by 2-2 $\frac{1}{2}$ in. elliptic acuminate at both ends tip mucronate, nerves very faint, petiole sheathing for half its length, peduncles short decurved above, spathe cernuous broadly ovate with a recurved cusp, spadix stout sessile much shorter than the spathe, fem. infl. half as long as the broadly ovoid obtuse male.

PERAK; at Larut, alt. 100–1000 ft., *King's Collector*.

Rhizome as thick as the little finger, elongate, rooting. *Leaves* seriate on the rhizome (not tufted) coriaceous, pale beneath, primary nerves inconspicuous straight; petiole rather stout. *Peduncles* 1–2 in. *Spathes* rather turgid. *Spadix* about half the length of the spathe. *Ovaries* ovoid; stigma large, pulvinate; staminodes 0?—The spathe exactly resembles Engler's figure of that of *Schismatoglottis elongata*.

§§ *Petiole longer than the leaf blade. Spadix stipitate in all.*

19. *H. elliptica*, *Hook. f.*; leaves 3–4 by $1\frac{1}{2}$ –2 in. subfalcate elliptic-ovate acute or acuminate hardly mucronate many-nerved base cuneate, petiole slender sheathing for $\frac{1}{3}$ to $\frac{1}{4}$ its length, peduncles elongate, spathe $\frac{1}{2}$ –1 in. linear-oblong cuspidately beaked, spadix shortly stipitate, fem. infl. not $\frac{1}{4}$ the length of the male with intermixed staminodes.

PERAK; along watercourses, *Scortechini*.

Rootstock creeping, as thick as a swan's quill. *Leaves* more or less unequal-sided, coriaceous; nerves 7–8 pairs, rather strong, impressed above, slightly arched. *Peduncles* few, 3–4 in. *Spathe* nearly straight.

20. *H. ovata*, *Hook. f.*; leaves 6–7 by 3–4 in. ovate acuminate base rounded few-nerved, petiole rather longer than the blade sheathing less than half way up, peduncle 2–3 in., spathe $1\frac{1}{2}$ in. linear-oblong acute, spadix stipitate, fem. infl. half the length of the male, staminodes 0. *Chamacladon ovatum*, *Schott in Bonpland*. (1859), 30; *Prodr.* 315; *Engler Arac.* 348.—*Aroid. Wall. Cat. n.* 8964.

SINGAPORE; *Wallich*. PENANG; *Herb. Delessert*.

Rootstock as thick as the middle finger. *Leaves* rather coriaceous, base unequal or not, nerves 5–6 pairs slightly arched, rather strong beneath, secondary obscure; petiole not very stout. *Spathe* $1\frac{1}{4}$ 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 $2\frac{1}{2}$ –4 in. trapezoidly or deltoidly ovate caudate-acuminate many-nerved, base cuneate or truncate and cuneate at the insertion of the long petiole which is sheathing $\frac{1}{4}$ – $\frac{1}{3}$ of its length, peduncle elongate, spathe 1 in. narrowly oblong acuminate, spadix stipitate, fem. infl. hardly half as long as the narrow male.

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

Rootstock creeping, as thick as the thumb. *Leaves* chartaceous, narrowed from a broad base with rounded angles to a fine slender curved apiculate tip, sides sometimes incurved; nerves about 10 pairs, rather strong, nearly straight, or the lower spreading and arched; petiole 6–14 in., slender. *Peduncles* 2–3 in., stout. *Staminodes* 0 or few and clavate. *Stigma* disciform.

22. *H. deltoidea*; leaves 6 by 4 in. deltoidly ovate or subhastate acuminate basal angles or lobes rounded, sinus very broad rounded not cuneate at the insertion of the petiole, peduncles short, spathe 2 in. narrowly ellipsoid narrowed into a long slender cusp.

PERAK, *Scortechini*.

Rootstock as thick as the little finger. *Leaves* chartaceous, very like those of *H. trapezifolia*, but not cuneate at the insertion of the petiole; nerves 4–5 pairs, with innumerable slender intermediates; petiole 12–14 in. sheathing for $\frac{1}{4}$ its length. *Peduncles* several. *Spathe* not constricted above the fem. infl., much longer than in *H. trapezifolia*, and spadix stouter. *Stigma* discoid.—I have seen only one specimen.

DOUBTFUL SPECIES.

H. SINGAPORENSIS, Regel Ind. Sem. Hort. Petrop. (1869), 18; in Gartenfl. (1870), 53; leaves 7-9 by 6-8 in., almost exactly deltoid acuminate, base truncate, basal angles rounded, petiole clouded sheathing half-way up, red at the base, spathe green without white within.—Singapore.

22. **SCHISMATOGLOTTIS**, Zoll. & Morritz.

Stotoniferous, herbs; stem short. *Leaves* entire, intramarginal nerve strong. *Spathe* cylindric, convolute, hardly constricted, limb deciduous. *Spadix* sessile, included in the spathe, appendage 0, with barren organs in the middle or top. *Inflorescences* contiguous or nearly so; male cylindric or clavate; stamens 2-3, distinct, filament flat; anthers truncate, prismatic or compressed, cells with large pores, connective warted at the tip; pollen vermiform. *Fem. Infl.* cylindric or conic; staminodes few, clavate, or 0. *Ovary* oblong, 1-celled; stigma discoid; ovules many, anatropous; parietal. *Berries* oblong, enclosed in the tube of the spathe, many-seeded. *Seeds* ellipsoid.—Species about 15, Malayan.

* Tube of spathe after flowering subcylindric.

† *Leaves rounded or if cordate not deeply lobed at the base.*

1. **T. Wallichii**, Hook. f.; limb of leaf 5-9 in. shorter or longer than the petiole lanceolate or oblong-lanceolate caudate-acuminate, nerves 8-10 pairs or more, petiole sheathing for $\frac{1}{2}$ its length, spathe long-peduncled narrowly linear-oblong acuminate, spadix with neuters in the middle and male at the top.—Aroid. Wall. Cat. 8962.

PERAK, *Scortechini*, King's Collector. SINGAPORE, Wallich. MALACCA; Maingay.

Leaves $1\frac{1}{2}$ -2 $\frac{1}{4}$ 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* 3-3 $\frac{1}{2}$ 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 3 $\frac{1}{2}$ -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 1 $\frac{1}{2}$ -3 in. oblong-ovate acuminate with a very short subulate cusp, nerves many spreading arching, intermediates few, petiole sheathing for half its length, peduncles short, spathe 3 in. long-acuminate, spadix nearly equalling the spathe, fem. infl. elongate followed by a short neuter portion, male infl. elongate its conical tip sterile.

PERAK, *Scortechini*.

Rootstock as thick as a goose-quill, elongate, trailing. *Leaves* membranous, deep green above, the intermediate nerves forming areolæ between the primary. *Peduncle* 1-3 in. *Spathe* greenish. *Ovaries* oblong, 2-3-lobed; stigma subsessile, disciform.

3. **S. Scortechini**, Hook. f.; limb of leaf about equalling the petiole

oblong or obovate obtusely acuminate not apiculate base rounded acute or subcordate, nerves many spreading and arched, petiole sheathing $\frac{1}{3}$ of its length, peduncles very short, spathe 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. f.; limb of leaf longer than the petiole coriaceous ovate or oblong acute base cordate, nerves spreading and arching, petiole sheathing beyond the middle, peduncles few very short, spathe 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 $\frac{3}{4}$ 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. f.; limb of leaf small shorter than the petiole membranous oblong or ovate acute base cordate, nerves very slender spreading and arching, petiole slender sheathing for $\frac{1}{3}$ - $\frac{1}{2}$ 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), papillose beneath; petiole 3-4 in. *Peduncle* 2-2 $\frac{1}{2}$ in. *Tube* of spathe $\frac{3}{4}$ in., limb ovate. *Spadix* with the fem. infl. adnate for nearly half its length to the spathe. *Ovaries* scattered below, globose, few-ovuled; placentas 2; stigma pulvinate, sessile. —The specimens are very scanty and contained but one spathe.

†† *Leaves deeply cordate at the base.*

6. **S. mutata**, Scortechini mss.; leaves ovate-cordate or subsagittate cuspidately acuminate membranous many-nerved, petiole sheathing for $\frac{1}{3}$ or $\frac{1}{2}$ its length, peduncles several, spathe $\frac{3}{4}$ -5 in. very narrow acuminate tip recurved slightly constricted much below the middle, spadix with the fem. and male infl. about equal each $\frac{1}{3}$ 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.

7. **S. longipes**, Miq. Fl. ind. Bat. iii. 214; in Bot. Zeit. (1856) 565;

leaves cordately ovate or ovate-lanceolate caudate-acuminate membranous many-nerved, petiole sheathing for $\frac{1}{3}$ 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.*

PERAK, *Scortechini*.—DISTRIB. Java, Sumatra.

Rootstock elongate, as thick as a swan's quill, rooting. *Leaves* 5-7 by 2-3 $\frac{1}{2}$ in., pale beneath, tip with a deciduous long mucro, costa stout; nerves 12-18 pairs, spreading and arching; petiole equalling or exceeding the limb. *Peduncles* 4-8 in. *Spathe* with an inflated acuminate limb, tube $\frac{3}{4}$ -1 in. *Ovaries* oblong; stigma pulvinate, obscurely lobed.—Reduced to *S. calyptrata*, Zoll. and Morr. (Syn. Verz. Zoll. 83), by Engler, which is founded on *Calla calyptrata*, Roxb. (Wight Ic. t. 799), an Amboyna plant with oblong leaves, short stout petioles and a capitate summit of the male infl.

8. **S. Kurzii**, *Hook. f.*; leaves 8-12 by 4-6 in. ovate deeply cordate many-nerved membranous, basalsinus very acute, petiole 12-14 in. broadly sheathed to the middle.

PEGU YOMAH, *Kurz*.

Resembles *S. mutata*, but a much larger leaved plant, with a very stout petiole. I have seen no spathe. It is interesting as the most northern species of the genus known in India.

** Tube of spathe after flowering broadly funnel-shaped. (RHYNCOPILE, *Engler*.)

9. **S. elongata**, *Engler in Bull. Soc. Ort. Tosc. iv. (1879) 298*; leaves elliptic-lanceolate or oblanceolate acute at both ends. Rhyncopyle elongata, *Engler in Beccari Males. i. 289, t. 23, f. 3-15; Ic. ined. n. 199.*

PERAK; sandy creeks, alt. 3000 ft., *Scortechini*.—DISTRIB. Borneo (or Sumatra).

Rootstock short. *Leaves* 4-8 by 1-2 $\frac{1}{2}$ in., coriaceous, pale beneath, tip with a tubular mucro; nerves 7-8 pairs, nearly straight and costa beneath strong; petiole sheathing at the base. *Peduncles* equalling the petioles or shorter. *Spathe* 1 $\frac{1}{2}$ -2 in., erect or inclined, green, oblong, acute or acuminate. *Spadix* sessile, much shorter than the spathe, stout; fem. infl. shorter than the male, narrowed below, with tabular neuters below it; male rounded at the top; connective broad, pubescent. *Berries* very small, turbinate; stigma a small sessile disc. *Seeds* fusiform, with a transparent fleshy coat which is produced into a long tail at top and base.—Engler figures the spathe exactly as in *Homalomena nutans*, namely, broadly ovate and cernuous on a decurved peduncle.

23. **ANADENDRUM**, *Schott*.

Scandent shrubs rooting on trees. *Leaves* distichous, entire or pinnatifid, petiole geniculate at the tip; primary nerves many, secondary branching. *Spathe* ovate acuminate, deciduous. *Spadix* stipitate, elongate, cylindric; flowers crowded, bisexual; perianth 0, annular, or cupular. *Stamens* 4-6, filaments very short, flattened; anthers terminal, cells erect subreniform. *Ovary* obconic, truncate, 1-celled, crown flat; stigma small, sessile, linear; ovule solitary (or 2 in *A. medium*), basilar. *Berries* small, scattered; pericarp without intercellular needles. *Seed* exalbuminous, testa thick; embryo macropodal.—Species 4 or 5, Malayan.

* *Leaves entire.*

1. ***A. montanum***, Schott in *Bonpland. v.* (1857); *Prodr.* 371; leaves drying black ovate-oblong or oblong-lanceolate, petiole slender, sheath very narrow. *Engler Arac.* 97; *l.c. ined.* No. 83. *Scindapsus montanus*, Kunth *Enum.* iii. 64; *Miq. Fl. Ind. Bat.* 184. *Pothos malayanus*, *Miq. l.c. Suppl.* 596. *P. elegans*, Wall. *Cat.* 4444. *Calla montana*, Blume *Cat. Hort. Buit. et in Flora* (1825), 147.

TENASSERIM; at Mergui, Helfer. PENANG, Wallich. PERAK, Scortechini-King's Collector. MALACCA, Griffith, Maingay.—DISTRIB. Malay Islands.

Stem as thick as a goose-quill, terete, smooth. *Leaves* 6-12 by $2\frac{1}{2}$ -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 $\frac{1}{4}$ - $\frac{1}{2}$ in. *Peduncles* 2-4 in., slender, rigid. *Spathe* $1\frac{1}{2}$ -2 in., beak long straight. *Spadix* 1-2 in.; stipes slender. *Perianth* cupular, nearly as high as the ovary. *Berries* pisiform.

Var. *longirostris*; beak of spathe as long as the body.—Perak, Wray,—Borneo.

2. ***A. marginatum***, Schott in *Östr. Bot. Wochenbl.* (1857), 117; *Prodr.* 390; leaves drying green oblong-lanceolate acute or acuminate, petiole very broadly sheathing up to the knee. *Engler Arac.* 96. *Pothos marginatus*, Wall. *Cat.* 4443.

PENANG, Porter. PERAK, Scortechini, King's Collector.—DISTRIB. Sumatra.

Stem stout. *Leaves* 6-12 by $2-3\frac{1}{2}$ in., base acute acuminate cuneate or rounded, usually unequal-sided; nerves very many, suberect or spreading; petiole 4-6 in., sheath $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, 2-aucicled at the tip; knee short. *Peduncles* 3-5 in. *Spathe* $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. long, as in *A. montanum*, white on pale yellow. *Perianth* annular.

3. ***A. latifolium***, Hook. f.; leaves drying greenish broadly oblong cuspidately acuminate base acute, petiole rather slender, sheath very narrow.

PERAK; Scortechini, King's Collector.

Stem as thick as a swan's quill. *Leaves* 10-13 by $4\frac{1}{2}$ -5 $\frac{1}{2}$ in., coriaceous; nerves about 12 pairs, strong, spreading and arched; petiole 7-10 in., narrowly sheathing for $\frac{2}{3}$ its length. *Peduncle* 3-5 in. *Spathe* 2-3 in., white within, greenish without; beak $\frac{1}{4}$ - $\frac{1}{2}$ the length of the body. *Spadix* 1-2 in., shortly stipitate. *Perianth* annular.

** *Leaves pinnatifid.*

4. ***A. medium***, Schott in *Bonpland. v.* (1857) 45; *Prodr.* 392; *Rhapidophora Huegeliana*, Schott *ll. cc.* 45, 384. *Scindapsus medius*, Zoll. and Moritz *Syst. Verz.* n. 82; *Miq. Fl. Ind. Bat.* iii. 186. *Epipremnum medium*, Engler *Arac.* 250. *Pothos pinnatus*, Wall. *Cat.* 4438.

PERAK, Scortechini, King's Collector. SINGAPORE, Wallich, Maingay.—DISTRIB. Malay Islands.

Stem 20 ft., less than 1 in. diam. *Leaves* 6-14 in. long and broad, or broader than long, membranous, deeply pinnatifid or pinnatisect, often perforate towards the costa; lobes 2-4 pairs, obliquely truncate, upper angle acute, basal lobes dimidiate-ovate; petiole channelled, sheathing towards the base. *Peduncle* 4-6 in. *Spathe* 2-3 in., cymbiform, pale green without, white or cream-colrd. within. *Spadix* shorter than the spathe, yellow, stipes $\frac{1}{2}$ in. *Ovary* 2-celled, according to Maingay, but Mr. Brown and I find but one cell with 2 erect basal ovules, and so it is represented in a drawing by Scortechini. *Berry* turbinate. *Seed* (judging by a figure of Scortechini) with a macropodal embryo.—Engler has referred this rather anomalous plant to *Epipremnum*, but the stipitate spadix, ovules, the want of



needles in the pericarp, and apparently macropodal embryo, all point to *Anadendrum*. There are needles in the tissue of the petioles, which I do not find in any other *Anadendrum*.

24. SCINDAPSUS, Schott.

Climbing shrubs with the characters of *Anadendrum*, but the spadix is sessile, there is no cupular perianth, and the pericarp of the berries abounds in intercellular needles.—Species about 10, tropical Asiatic, Australian and Polynesian.

See note under genus *Rhaphidophora*.

* *Leaves obliquely ovate elliptic or lanceolate.*

1. **S. officinalis**, Schott *Meletem.* i. 21; *Gen.* t. 81; *Prodr.* 395; branches wrinkled when dry, leaves 5–10 by 2½–6 in. ovate elliptic-ovate or nearly orbicular caudate-acuminate base rounded or slightly cordate, primary nerves distinct, petiole 3–6 in. broadly winged up to the knee, spathe 4–6 in. oblong subcylindrical beaked. *Kunth Enum.* iii. 63; *Miq. Fl. Ind. Bat.* i. 452; *Engler Arac.* 254. *Pothos officinalis*, Roeb. *Fl. Ind.* i. 431; *Wight Ic.* t. 778; *Wall. Cat.* 4436. *Calla ovata*, *Herb. Ham.*

TROPICAL HIMALAYA; from Sikkim eastwards. BENGAL, CHITTAGONG, BURMA, and the ANDAMAN ISLANDS.

Stem as thick as the little finger. *Leaves* dark green. *Peduncle* solitary, terminal, much shorter than the petiole. *Spathe* about 4–6 in. long, green without, yellow within, beak slender. *Spadix* equalling the spathe, elongating in fruit, greenish-yellow. *Stigma* elongate; fruiting hemispheric. *Berries*, few only ripening, fleshy. *Seed* ovate-cordate.—Fruiting spadix sometimes a span long.

2. **S. pictus**, Hassk. *Cat. Hort. Bogor.* (1841), 58; *Pl. Jav. Rar.* 159; branches angled and muriculate when dry, leaves 5–7 by 1½–5 in. falcately ovate-lanceolate to broadly ovate acute or acuminate, petiole 1–1½ in. winged to the knee, spathe 1½–2½ in. cymbiform beaked. *Miq. Fl. Ind. Bat.* iii. 183; *Schott Prodr.* 393; *Engler Arac.* 252. *S. pothoides*, Schott l.c. 394 (not of *Miq.*). *S. argyrea*, *Engler l.c.* 255.

PERAK; King's Collector.—DISTRIB. Java, Borneo.

Stem 6–8 ft., as thick as a goose-quill or more, 4–6-angled when dry through contraction of the tissues, and pale red-brown. *Leaves* thickly coriaceous, dull green; nerves very close and slender, primary and secondary hardly distinct. *Peduncles* equalling the petiole, very stout. *Spathe* white. *Spadix* green.—The leaves of young plants are orbicular-cordate, green blotched with white.

3. **S. Scortechinii**, Hook. f.; branches deeply wrinkled when dry not muriculate, leaves 3–6 by 1½–2½ in. ovate orbicular or falcately lanceolate, acute or acuminate, base rounded or subcordate, primary nerves very obscure, petiole 2–5½ in. broadly winged, spathe 1½–2½ in. ovate acute or acuminate.

PERAK; *Scortechinii*, alt. 3–4000 ft., King's Collector; on Maxwell's Hill, Wray.

Stem scandent, as thick as a swan's quill or less, pale, wrinkled, otherwise quite smooth. *Leaves* thickly coriaceous; nerves very many, primary hardly distinguishable from the secondary; petiole winged to the knee or ¾ way up. *Peduncle* much shorter than the petiole. *Spathe* yellowish on both surfaces. *Spadix* much shorter. *Berries* about ¼ in. diam. across the crown.

4. **S. hederacea**, Schott in *Bonpland.* v. (1857), 45; *Prodr.* 395; branches terete smooth, leaves 5-8 by 1-2½ in. falcately lanceolate acuminate base acute, primary nerves indistinct, petiole 2-4 in. broadly winged up to the knee, spathe 2-2½ in. narrow long-beaked. *Engler Arac.* 253; *l.c. ined.* No. 13 (*young plant*). *S. pothoides*, *Miq. Fl. Ind. Bat.* iii. 184 (*not of Schott*). *S. inquinatus*, Schott in *Miq. Ann. Mus. Lugd. Bat.* 283.

PERAK; *Scortechini*, *King's Collector*. MALACCA; *Griffith*, *Maingay*.—DISTRIB. Java;

Stem climbing, 30-40 ft., as thick as a goose-quill or more. *Leaves* rather thinly coriaceous; petiole with pale sheaths. *Peduncle* 1-2 in., stout. *Spathe* much narrower than in any of the previous species, terete, slightly curved, pale yellow. *Fruiting spadix* 3-4 in., white. *Berries* about ¼ in. diam. across the crown.—*Leaves* broadly ovate cordate in young plants.

5. **S. perakensis**, *Hook. f.*; branches stout terete smooth, leaves 8-12 by 2-3 in. oblong-lanceolate or falcately lanceolate acuminate thinly coriaceous, base acute or rounded, primary nerves distinct beneath, petiole 4-7 in. broadly winged up to the knee, peduncle 3-6 in. very stout, spadix (after flowering) 3-5 in. cylindric or subclavate.

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

Stem 30-40 ft., 2-3 in. diam. (*King's Coll.*), pale when dry. *Leaves* coriaceous, costa rather slender; primary and secondary nerves undistinguishable above, nervules trabeculate; petiole sometimes 1 in. across the opened sheath. *Peduncle* 3-4 in. *Spathe* not seen. *Fruiting spadix* nearly 1½ in. diam.; carpels slatey blue, ½ diam. across the crown. *Seeds* lenticular, ½ in. diam., black.

** *Leaves* broadly or narrowly oblong, rarely ovate or sub lanceolate.

6. **S. crassipes**? *Engler in Bot. Jahrb.* i. 182; in *Beccari Males.* i. 4; *l.c. ined.* No. 1; branches as thick as the thumb terete smooth, leaves 8-10 by 2-3 in. oblong acute base rounded densely coriaceous, costa very thick, primary nerves obscure, petiole 1-2 in. broadly thickly winged, peduncle very stout.

PERAK, *Scortechini*.—DISTRIB. Borneo?

I have seen only an imperfect specimen and drawing by *Scortechini*, in which the leaves are narrower and petiole shorter than in *Engler's* figure. In *Scortechini's* drawing and specimen the stem is very stout; petiole 1 in. across the thick coriaceous wings; peduncle 2 in.; young fruit 6 in. by 1 diam. *Berries* ½ in. diam. across the crown.

7. **S. Beccarii**? *Engler Bot. Jahrb.* i. 182; in *Beccari Males.* i. 277; branches very stout, leaves 12-18 by 4-5½ in. oblong or linear-oblong acuminate-coriaceous, base acute, petiole 6-12 in. winged to the knee, primary nerves distinct beneath, peduncle included in the leaf sheath, spathe 3-3½ in. oblong terete acute.

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

Differs from *Engler's* figures of *S. Beccarii*, in the petiole sheathing to the knee, and in the spathe emerging from the middle of the leaf sheath, and not from its apex. *King's Collector* describes the stem as 15-20 ft. and 1½-2 in. diam.; leaves dark glossy green; spathe waxy white; spadix cream-colored. The ovaries are very narrow and laterally compressed, not ⅓ in. across the crown.

8. **S. cuscutaria**, *Presl. Epimel.* 242 ♀ stemless, leaves 12-18 by 4-7 in. caudate-acuminate, base acute or rounded, nerves very many and close

uniform anastomosing, petiole as long as the blade or longer stout winged to the knee, peduncle very stout, spathe 3 in. cymbiform acuminate, spadix stout. *S. marantæfolius*, *Miq. Fl. Ind. Bat.* iii. 187. *Cuscuaria marantifolia*, *Schott Gen. t.* 80; *Prodr.* 398; *Engler Arac.* 251. *C. spuria*, *Schott in Bonpland.* ix. (1861), 367. *Aglaonema? cuscuaria*, *Miq. l. c.* 217. *C. Rumphii*, *Schott in Miq. Ann. Mus. Lugd. Bot.* i. 130.

NICOBAR ISLANDS.; (*Jelink. in Herb. Calcutt.*)—DISTRIB. Malay Islds.

Rootstock very stout. Leaves coriaceous, costa stout, base unequal-sided.—The only specimen is an imperfect one, but agrees so far with the Javan plant. I have taken the synonymy from Engler.

25. RHAPHIDOPHORA, Schott.

Habit and characters of *Anadendrum*, but spadix sessile, perianth 0, ovules many parietal; the many-seeded berries confluent and their tissue loaded with intercellular needles; seed albuminous, embryo axile.—Species about 30, tropical Asiatic, Australian and Polynesian.

I greatly doubt the value of characters taken from the stigmas of dried specimens of this genus, *Scindapsus* and *Epiprænum*, 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 $1\frac{1}{2}$ –2 in. subfalcately lanceolate acuminate thickly coriaceous base narrowed acute or rounded, nerves very obscure, petiole $1\frac{1}{2}$ –2 in. slender channelled up to the blade, peduncle very short, spathe 3 in. cylindric apiculate, stigma raised.

PERAK, *King's Collector.*

Stem 20–30 ft. as thick as a goose-quill or thicker. Leaves very dark grey and opaque when dried, with recurved margins; costa rather slender, nerves sunk in the tissue, most obscure above and there marked only by superficial wrinkles, absolutely concealed beneath under the smooth epidermis. Spathe thickly coriaceous, cream-colrd. Ovaries $\frac{1}{16}$ in. diam., with raised pulvinate central stigmas.—Closely resembles *R. angustifolia*, Schott, in form of foliage, but quite distinct in the texture and nervation of the leaves and in the large spathes. In the Calcutta collection of drawings is that of a plant named *Pothos ventricosa*, Wall. mss. from N. E. Bengal, which resembles this; the spathe is represented as purple.

2. *R. Maingayi*, *Hook. f.*; leaves 6–8 by 2–2 $\frac{1}{2}$ 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? $4\frac{1}{2}$ in. cylindric beaked, stigma circular depressed on the surface of the (dry) ovary.

MALACCA, on trees, *Maingay*.

The specimens are imperfect, the leaves being detached from a portion of apparently a tortuous branch as thick as the little finger. Leaves coriaceous, drying yellow brown, costa rather slender, the apparent difference between the nervation of the two surfaces is great, the nerves in the upper being raised through the shrinking of the tissues, whilst beneath the erecto-patent primaries are capillary, the secondaries

very obscure. *Spathes* remarkably thick-walled (at least $\frac{1}{4}$ in. thick). *Ovaries* narrow, $\frac{1}{10}$ in. across the crown.

3. **R. Wrayi**, *Hook. f.*; leaves 7-12 by $1\frac{1}{2}$ -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 $1\frac{1}{2}$ -2 $\frac{1}{2}$ in. peduncled cylindric or ovoid beaked spadix as long as the spathe, stigma raised pulvinate.

PEBAK; *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, $\frac{1}{10}$ - $\frac{1}{8}$ in. apart with anastomosing nervules; petiole slender, stiff. *Peduncle* $\frac{1}{4}$ - $1\frac{1}{2}$ in. *Spathes* terete, walls very thick, green, cream-colrd. within. *Fruiting spadix* oblong, $2\frac{1}{2}$ in. long by 1 in. diam. *Stamens* 2. *Berries* $\frac{1}{4}$ in. across the crown.

4. **R. Lobbii**, *Schott in Bonpland*. v. (1857), 45; *Prodr.* 379; leaves 3-8 by $1\frac{1}{2}$ -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, spathe small ($1\frac{1}{2}$) peduncled oblong beaked, stigma raised. *Engler Arac.* 241.

PEBAK; *Scortechini*, *King's Collector*. MALACCA; *Griffith*, *Maingay*. SINGAPORE; *Lobb*.—DISTRIB. Borneo, Java.

Stem 20-30 ft. much branched, as thick as a goose-quill or less. *Leaves* greenish brown and opaque when dry; 8-10 primary nerves very indistinct above, undersurface very smooth. *Peduncle* 1 in. *Spathes* 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 $1\frac{1}{2}$ - $1\frac{1}{4}$ in. elliptic-lanceolate acute or acuminate base acute or cuneate, primary nerves many slender erecto-patent raised on both surfaces, petiole 1-2 in. broadly channelled up to the blade, spathe peduncled 2-3 in. beak long slender, stigma raised pulvinate.

PEBAK; *Scortechini*. MALACCA; *Griffith* (*Kew Distrib.* 5988), *Maingay*.

Branches as thick as a goose-quill or less, soft, striate, and foliage pale yellowish brown, not shining when dry. *Leaves* thinly coriaceous; nerves slightly arching. *Peduncle* $1\frac{1}{2}$ in., yellowish. *Spathes* coriaceous, apparently red, beak ending in a very slender point. *Spadix* cylindric. *Ovaries* $\frac{1}{12}$ in. diam. across the crown. *Berries* $\frac{1}{4}$ in. diam.

6. **R. Schottii**, *Hook. f.*; leaves 8-14 by 2-4 $\frac{1}{2}$ in. falcately lanceolate or oblong-lanceolate or oblanceolate caudate-acuminate coriaceous, base acute, nerves very many and slender uniform erecto-patent raised on both surfaces, petiole $1\frac{1}{2}$ -3 in. stout channelled to the middle of the knee, spathe 3 in. ovoid acuminate, spadix peduncled very stout, stigma raised pulvinate. *R. Peepla* (in part), *Schott in Bonpland*. v. (1857), 45. *Engler Arac.* 242.

ASSAM; *Masters*. KHASIA HILLS; alt. 0-4000 ft., *J. D. H. & T. T.*

Stem as thick as the little finger, smooth, terete, purple except the young branches. *Leaves* thinly coriaceous, in young plants distichous 3-4 in. ovate acute, base very oblique. *Peduncle* 1-4 in. *Spathes* 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

vary greatly in length.—Near *R. Peepla*, but a very much stouter plant, with larger, longer and narrower leaves.

7. *R. Scortechinii*, Hook. f.; leaves 10–12 by 3–4 in. ovate-lanceolate unequal-sided caudate-acuminate base cuneate submembranous, primary nerves 14–20 pairs strongly raised on both surfaces spreading and arched, petiole 4–6 in. broadly channelled up to the limb, peduncle 3–4 in., spadix 2 by $\frac{1}{2}$ in., stigma elliptic sessile.

PERAK; *Scortechinii*.

Stem creeping or stones, nearly as thick as the little finger. Leaves subcoriaceous, yellow undulate and opaque when dry.—The above is chiefly from Scortechinii's drawing and notes attached to his specimens. The nerves of the leaves are at least 14–20 pairs, united by oblique nervules. Scortechinii 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 $1\frac{1}{2}$ –3 in. falcately-lanceolate or ovate-lanceolate acuminate or caudate membranous, base acute or rounded unequal-sided, nerves very many raised on both surfaces erecto-patent, petiole 4–7 in. channelled to the knee, spathe peduncled 3–4 in. ovate-oblong long beaked, stigmas raised pulvinate. Engler Arac. 241; Masters in Gard. Chron. (1874), ii. 611; fig. 124.

The KHASIA HILLS and MUNNIPORE; alt. 3–6000 ft., Griffith, Watt, &c.

Stem scandent, rooting, as thick as a goose or swan's quill. Leaves thinly coriaceous, adult greenish-brown when dry, not shining above; nerves with anastomosing nervules; petiole slender. Peduncle 1–4 in. Spathe thickly coriaceous, pale or darker red within. Spadix $1\frac{1}{2}$ –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. Peepla*, Schott in Bonpland. v. (1857), 45 (partly); leaves 5–8 by 2–4 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 2 in. lanceolate narrowed into a straight beak, stigmas raised. *R. calophyllum*, Schott l.c.; Prodr. 242; Engler Arac. 242. Scindapsus Peepla, Schott Melet. i. 21; Kunth Enum. iii. 62. Pothos Peepla, Roxb. Fl. Ind. iii. 454; Wight Ic. t. 780 (not of Wallich). Monstera Peepla, Schott (ex Linnæa), vi. (1831), Litterat. Ber. 52.

SIKKIM HIMALAYA and the KHASIA HILLS, alt. 4–6000 ft.; Roxburgh, Griffith (Kew Distr., 5959). BURMA; on the Karen Hills, Kurz.

Stem as thick as a swan's quill, smooth, terete. Leaves coriaceous, drying pale yellow-brown and shining above, nerves with rectangular nervules. Spathe greenish yellow. Ovaries creamy, $\frac{1}{2}$ 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. Peepla* is *R. pertusa*.

10. *R. gracillipes*, Hook. f.; leaves 6–8 by 2–4 in. broadly or narrowly oblong-ovate unequal-sided cuspidately acuminate submembranous opaque, base rounded or cuneate, primary nerves 14–16 pairs raised beneath widely spreading and arching, petiole 5–10 in. very slender,

grooved channelled up to the limb, spathe 3-4 in. cylindric long-beaked, stigmas raised pulvinate.

PERAK; Larut, *Scortechini*, *King's Collector*.

(*Stem* 20-40 ft. by 1-1½ in. diam., branches ½ in. diam., *King's Collector*). *Leaves* pale greenish or yellowish-brown and undulate when dry; petiole pale. *Peduncle* 1-2½ in. *Spathe* yellow, cream-cold., or tinged with pink within. *Spadix* shorter than the spathe. *Ovaries* ⅓ in. diam.; stigmas orbicular.—In form the leaves closely resemble *R. Peepla*, but their texture and nervature are very different.

11. **R. Kunstleri**, *Hook. f.*; leaves 10-16 by 2½-5 in. oblong or oblong-lanceolate acuminate rather membranous, base acute or cuneate, primary nerves many spreading and arched prominent beneath, petiole 10-15 in. grooved channelled up to the blade, spathe 6-8 in. cylindric with a long stout beak, stigmas raised.

PERAK, at **LARUT**, *Kunstler* (*King's Collector*).

(*Stem* 40-60 ft., 3-4 in. diam. *Kunstler*), branches 5½ in. diam. *Leaves* rigidly undulate, opaque and dirty-brown when dry, sometimes very unequal-sided at the base, deep green when fresh, crowded at the tips of the branches; nervules oblique; petiole slender, pale. *Peduncle* 1-3 in., very stout. *Spathe* white, thick walled. *Ovaries* ⅓ in. diam., stigma minute.—The spathe is one of the longest in the genus.

12. **R. Hookeri**, *Schott in Bonpland*. (1857), 45; leaves 7-24 by 2½-12 in. membranous oblong cuspidately caudate-acuminate, base unequal-sided cuneate rounded or cordate, primary nerves very many spreading and arched, petiole 3-12 in. channelled up to the knee, spathe 2½-3½ in. ovoid-oblong turgid, beak long slender, stigmas very broad orbicular pulvinate. *Pothos Peepla*, *Wall. Cat.* 4444 (*in part*).

SIKKIM HIMALAYA, alt. 1-4000 ft., *J. D. H. UPPER ASSAM, Griffith*. **SILHET** and **KHASIA HILLS**, alt. 2-3000 ft., *Wallich*, &c. **MUNNIPORE**, alt. 6000 ft., *Watt*.

A lofty climber; stem as thick as the thumb. *Leaves* the largest of the entire-leaved species, very thin in texture, dark green, drying a dull grey-brown, with a rather shining surface. *Petiole* pale, not deeply channelled. *Spathe* green, yellow within and along the outer margins, walls very thick, base rounded. *Spadix* short, stout. *Ovaries* 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 caudate-acuminate 1-many-nerved lobes, petiole 6-10 in. of young leaves broadly winged, peduncle 4-8 in., spathe 3-4 in. cylindric acuminate, stigmas orbicular or oblong raised. *Epipremnum Beccarii*, *Engler in Bull. Soc. Tosc. Ort.* 1879, 269.—*Wall. Cat.* 4438 B.

PERAK, *Scortechini*, *King's Collector*.—**DISTRIB.** Siam, Borneo.

Rootstock short, tufted, as thick as the little finger, creeping and rooting (or 15-20 ft., *King's Collector*). *Leaves* 10-15 by 4-8 in., unequal-sided, pale beneath; lobes very variable in breadth; petiole channelled up to the limb. *Spathe* dull cream-coloured.—The stigmas in a drawing by *Scortechini* are sessile, very small and oblong, but in his and other dried specimens they are large oblong or orbicular and often cupped. *Engler* figures them as oblong raised and cupped.

14. **R. pertusa**, *Schott in Bonpland*. v. (1857) 45; *Prodr.* 382; leaves 8-18 in. long and 6-10 in. broad, young small ovate entire, old pinnatifid to below the middle or perforate, base truncate or subcordate, lobes few

broad falcate acuminate, primary nerves 5-8 pairs, spathe 5-7 in. ovate-oblong beaked. *Miq. Fl. Ind. Bat.* iii. 185; *Engler Arac.* 244. *Scindapsus pertusus*, *Schott. Melet.* i. 21; *Kunth Enum.* iii. 62. S. *Peepia*, *Thw. Enum.* 336. *Pothos pertusus*, *Roxb. Fl. Ind.* i. 434, *Wight Ic.* t. 781. *P. officinalis*, *Wall. Cat.* 4436 G.—*Rheede Hort. Mal.* xii. t. 20, 21.

THE DECCAN PENINSULA; Coromandel, Malabar, and southward to CEYLON.—
DISTRIB. Malay Islands.

A tall climber. *Leaves* usually with oblong holes on one side; petiole about as long as the blade, deeply channelled, young winged, wings not auricled at the top. *Spathe* shortly peduncled. *Spathe* yellow. *Ovaries* 4-angled; stigma sessile, pulvinate.

15. **R. glauca**, *Schott in Bonpland.* v. (1857) 45; *Prodr.* 382; leaves 6-10 in. long and broad glaucous beneath pinnatisect, segments falcate linear or broader caudate-acuminate 2-7-nerved, petiole as long as the blade slender channelled up to the blade, spathe 4-6 in. oblong or lanceolate cuspidate. *Engler Arac.* 245; *Ic. ined.* 101. *Scindapsus glaucus*, *Schott Melet.* i. 121; *Kunth Enum.* iii. 61. *Monstera glauca*, *C. Koch ex Schott.* *Pothos glaucus*, *Wall. Pl. As. Rar.* ii. 45, t. 156; *Cat.* 4440.

TROPICAL AND SUBTROPICAL HIMALAYA; from Nepal, *Wallich*, eastwards to the KHASIA, NAGA, and MUNNIPORE HILLS, ascending to 7000 ft.

Stem as thick as the thumb, climbing lofty trees. *Leaves* of a fine glaucous blue beneath; young elliptic-ovate; segments 2-4 pairs, narrowed towards the base, 2-5-nerved; petiole 6-10 in. *Peduncle* 3-7 in. *Spathe* very variable in size, longer than the spadix, yellow on both surfaces. *Spadix* pale yellow. *Stigma* of fresh ovary a longitudinal slit, of the dried pulvinate and raised.

Var. ? *khassiana*; leaves 12-14 in., segments 3-7, 7-9 in. long.—Khasia Hills at Churra and Pomrang, *J.D.H. & T. T.*—Referred by Schott to *R. glauca*, with which it agrees in form of segments of leaf, and spathe and spadix, but the leaves are longer with more numerous and longer segments.

16. **R. eximia**, *Schott in Bonpland.* v. (1857) 45; *Prodr.* 387; leaves 1-2 ft. longer than broad oblong pinnatisect with 4-7 pairs of obliquely truncate acute 1-costate and many-nerved segments, petiole very stout, spathe a foot long oblong cuspidate, stigma raised on the conical top of the ovary. *R. grandis*, *Schott in Estr. Bot. Zeit.* 1858, 394; *Prodr.* 386.

TROPICAL HIMALAYA; Kumaon, alt. 4000 ft., *Strachey & Winterbottom*; Sikkim, alt. 2-5000 ft., and KHASIA HILLS, alt. 0-4000 ft., *Griffith, &c.*

A lofty climber; stem as thick as a child's wrist. *Leaves* bright green on both surfaces. *Peduncle* 6-10 in., as thick as the thumb. *Spathe* orange-yellow, outside and in. *Spadix* shorter than the spathe, white.

17. **R. decursiva**, *Schott in Bonpland.* v. (1857) 45; *Prodr.* 385; leaves 1-3 ft. longer than broad oblong pinnatisect base, broadly cordate, segments 8-15 pairs falcately ensiform acuminate costate and with several lateral nerves, petiole very stout, spathe 5-7 in. subcylindrically cymbiform yellow beaked, stigma raised on the conical top of the ovary. *Engler Arac.* 246 (*excl. many syns.*); *Bot. Mag.* t. 7282. *Scindapsus decursivus*, *Schott Meletem.* i. 21; *Kunth Enum.* iii. 62; *Wight Ic.* t. 779; *Miq. Fl. Ind. Bat.* iii. 186; *Thw. Enum.* 336; *Bot. Mag.* t. 7282. *Monstera decursiva*, *Schott in Wien. Zeitschr.* 1829 (*Linnaea* (1831) *Literat. Ber.* 52). *Pothos decursiva*, *Roxb. Fl. Ind.* i. 436; *Wall. Pl. As. Rar.* ii. 83, *excl. the Attrian plant*). *P. decurrens* (*error for decursivus*), *Wall. Cat.* 4437 A, *in part.*



SIKKIM HIMALAYA, alt. 2-5000 ft., J.D.H. KHASIA HILLS, alt. 0-4000 ft.

A lofty climber, stem as thick as a child's wrist. *Leaves* bright green on both surfaces, segments 6-18 by 1-2 in., tip sometimes almost truncate but always more acuminate than in *R. eximia*; petiole 1-2 ft., as thick as the little finger. *Peduncle* 3-6 in. *Spathe* bright yellow on both surfaces.

18. *R. affinis*, Schott in *Bonpland*. v. (1857) 45; *Prodr.* 385; leaves 1-2 ft. longer than broad oblong base broadly cordate pinnatisect or pinnate, segments many pairs falcately ensiform acuminate narrowed at the base 1-costate with very slender lateral nerves, spathe 5-6 in. oblong cymbiform purple cuspidate, stigma raised on the conical top of the ovary. *Engler Arac.* 247.

KHASIA HILLS, alt. 3-5000 ft., Griffith (*Kew Distrib.* 5952), &c.

Habit and characters of *R. decursiva*, and as robust, differing as far as my specimens and drawing tell, in the beautiful violet-purple spathe, and very slender lateral nerves of the narrower unicastate leaflets.

19. *R. Korthalsii*, Schott in *Miq. Ann. Mus. Lugd. Bat.* i. 129; leaves oblong 1-2½ ft. by 6-15 in. pinnatisect longer than their petioles, segments many pairs linear falcate truncate acute 2-4-costate and many-nerved, spathes crowded 6-8 in., stigmas slightly raised. *Engler Arac.* 247.

PENANG, Maingay (*Kew Distrib.* 1555). PERAK, Scortechini, King's Collector.—DISTRIB. Java.

Stem 30-40 ft., 2-3 in. diam., branching above, densely crinite below the uppermost leaves and inflorescences. *Leaves* dark green; segments 3-8 in., base not contracted; petiole as thick as the little finger, sheathed up to the knee. *Peduncles* 3-8 in., very stout. *Spadix* 6-7 in. cylindric. *Ovaries* very small.

20. *R. tetrasperma*, Hook. f.; leaves 5-7 in. long and broad broadly ovate or orbicular cordate sparingly pinnatifid lobes cuspidate or acuminate, petiole rather shorter than the blade, spathe 1½-2 in. turgidly cymbiform acute, placentas each 2-ovuled.

PERAK, Scortechini.

Stem ¼-½ in. diam., flexuous, terete, rooting at the nodes, which are 3-4 in. apart. *Leaves* often very unequal-sided; lobes 1-2, broad, acute, 1-2-costate; petiole channelled up to the knee. *Peduncle* 1-2 in., very stout. *Spathe* white. *Spadix* subclavate. *Stigma* a raised furrow on the top of the ovary. *Berries* full of intercellular needles.—Scortechini figures and describes the ovary as 2-celled, with an erect ovule in each cell; but Mr. Brown and I find 1 cell and 2 ovules on each placenta.

26. *EPIPHEMNUM*, Schott.

Characters of *Rhaphidophora*, but the ovules are 1-3 anatropous on a nearly basal placenta, and the berries are not confluent.—Species about 8, Malayan and Polynesian.

This genus had better be merged in *Rhaphidophora*.

1. *E. giganteum*, Schott in *Bonpland*. v. (1857) 45; *Prodr.* 389; leaves entire oblong obtuse base cordate, nerves very many and close horizontal, spathe 6-10 in. subsessile fusiform falcate woody. *Engler Arac.* 249. *Scindapsus giganteus*, Schott *Meletem.* i. 21; *Kunth Enum.* iii. 63. *Monstera gigantea*, Schott in *Wien. Zeitsch.* (1829), ex *Linnæa*, 1831, *Litter. Ber.* 53. *Pothos giganteus*, Roxb. *Fl. Ind.* i. 434.

PENANG, Roxburgh. PERAK, Scortechini, King's Collector.

A lofty climber, over 100 ft.; stem 2-3 in. diam. Leaves 12-24 by 6-12 in., bright green (drying yellow-brown) very coriaceous, shining above; costa very stout, nerves trabeculate by the rectangular nervules; petiole as long as the blade, winged throughout its length. Peduncle solitary. Spathe ending in a curved beak. Spadix as long as the spathe. Stigmas on a style that rises from the hollow crown of the ovary.—Roxburgh describes the spathe as dirty dull purple, but it is dull green in his drawing. King's Collector says of the Perak spathe, green outside and yellow within, its walls are about $\frac{1}{2}$ in. thick.—A closely allied flowerless plant in Herb. Wallich (No. 4442, from Singapore), has leaves 18 in. long by $5\frac{1}{2}$ broad.

2. *E. mirabile*, Schott Gen. Aroid. t. 79; Prodr. 338; leaves entire pinnatifid or pinnatisect, base cordate, segments ensiform falcate truncate acute or acuminate 1-3-costate base rounded or broadly cordate, spathe $\frac{2}{3}$ in. cymbiform. Engler Arac. 249; N. E. Br. in Gard. Chron. 1882, i. 180, and Journ. Bot. (1882) 332. Rhaphidophora caudata, Schott in Bonpland. v. (1857) 45. R. Wallichii, Schott Prodr. 383; Engler l. c. 245. R. pinnata and pinnatifida, Schott in Bonpland. l. c.; Prodr. 384. R. lacera, Hassk. Cat. Hort. Bogor. 58; Pl. Jav. Rar. 155. R. Cunninghamii, Schott in Bonpland. ix. (1861) 367. Scindapsus caudatus, pinnatifidus and pinnatus, Schott Meletem. i. 21; Kunth Enum. iii. 62-63. S. caudatus, Engl. l. c. 248. Pothos caudatus, Roxb. Fl. Ind. i. 436; Wall. Pl. As. Rar. ii. t. 192. P. decursivus, Wall. in As. Res. ii. 83, t. 192; Pl. As. Rar. ii. 83 (the Attran plant only). P. pinnatifidus, Roxb. Fl. Ind. i. 437. P. decurrens (error for decursivus), Wall. Cat. 4437 A (in part), B.—Monstera pinnatifida, Schott in Wien. Zeitschr. 1820; in Linnæa, vi. Litter. Ber. 52. Ramph. Herb. Amb. v. 489, t. 183, f. 2.

MARTABAN and TENASSERIM, Wallich, Falconer. PENANG, Roxburgh.—DISTRIB. Malaya, Australia, Polynesia.

A lofty climber; stem stout, 1 in. diam., clothed above with a network of the fibrous remains of the stipular sheaths. Leaves 12-20 by 7-12 in., always with small fenestrations or perforations along the region of the midrib, by which it may be distinguished from all allied plants; lobes 4-10 pairs, terminal trapezoid; petiole 8-15 in., knee 1-1 $\frac{1}{2}$ in. Spathe 4-4 $\frac{1}{2}$ in., green without, yellowish within. Spadix sessile, $\frac{2}{3}$ in. thick, obtuse, green. Ovaries 1-celled, placentas stretching half-way across the cell; stigma linear; ovules 1-3 at the base of the placentas.—Schott figures many arrested ovules which I do not find. Roxburgh says of the Penang plant growing in the Bot. Garden, that the extreme leafless shoots are long and pendulous, differing thus from all other species of Pothos known to him. This species (if the identifications are correct with the Pacific plant) is the Tonga drug, much lauded in cases of rheumatism. I am indebted to Mr. Brown for unravelling the intricate synonymy of *E. mirabile* and *Rhaphidophora decursiva*.

3. *E. humile*, Hook f.; dwarf, leaves entire ovate-cordate acuminate, nerves spreading and arched, spathe 1-1 $\frac{1}{2}$ in. cymbiform beaked. Anandryum humile, Schott in Miq. Ann. Mus. Lugd. Bat. i. 127; Engler Arac. 181; Ic. ined. No. 152.

PENANG, Maingay (Kew Distrib. 1560.) PERAK, Curtis. Scortechini.—DISTRIB. Sumatra.

Rootstock as thick as the little finger, creeping (climbing?). Leaves 4-7 by 3-4 $\frac{1}{2}$ 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, 1 $\frac{1}{2}$ -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. *Spathes* very long, narrow, fleshy, twisted, base convolute, deciduous. *Spadix* short, cylindric, 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, 1-ovuled; style stout; stigma depressed; ovule pendulous from the top of the cell, anatropous or semi-anatropous. *Berries* obpyramidal, 6-sided, top warted or muricate. *Seed* compressed, rugose, exalbuminous; embryo macropodal.

L. heterophylla, *Schott Melet.* 21; *Kunth Enum.* iii. 67; *Miq. Fl. Ind. Bat.* iii. 176. *L. Zollingeri*, *Jenkinsii*, and *Hermannii*, *Schott in Bonpland.* v. (1857) 125. *L. desciscens*, *Schott in Ann. Mus. Lugd. Bat.* i. 127. *L. Roxburghii*, *Griff. Itin. Notes*, iii. 155; *Notul.* iii. 155. *L. spinosa*, *Thw. Enum.* 336; *Engl. Monog. Arac.* 273. *Pothos Lasia*, *Roxb. Fl. Ind.* i. 438; *Wall. Cat.* 4447. *P. heterophylla*, *Roxb. l. c.* 437; *Wight Ic.* t. 777. *P. spinosa*, *Ham. in Wall. Cat.* 4447. *Dracontium spinosum*, *Linn. Sp. Pl.* 967.

From tropical SIKKIM HIMALAYA, ASSAM, BENGAL, and BURMA, southwards to SINGAPORE and CEYLON.—DISTRIB. Malay Ilds., 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. *Spathes* 8-14 in., claret-colrd., opening at the base only. *Spadix* about 1 in., claret-colrd., fruiting 4-5 in. and 1 in. diam.

28. **PODOLASIA**, *N. E. Br.*

Habit and characters of *Lasia*, and like it prickly, but the leaves are always entire, the spathe short, open to the base, the ovule is laterally attached towards the base of the ovarian cells, and the berries are globose, quite smooth, and entirely exserted beyond the sepals.

P. stiptata, *N. E. Br. in Gard. Chron.* 1882, ii. 70.

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

Rootstock as thick as the little finger or thicker, creeping. *Leaves* 8-14 in., broad or narrow, hastate or sagittate, 6-12 in. broad across the insertion of the petiole; basal lobes parallel divaricating or horizontal, $\frac{1}{2}$ -4 in. broad, acute or acuminate; petiole as long as the blade or shorter, slender. *Peduncle* shorter than the petiole, very slender. *Spathes* 3-5 in., narrowly cymbiform, deep red. *Spadix* about $\frac{3}{4}$ as long as the spathe, red; stipes $\frac{1}{4}$ - $\frac{1}{2}$ in. *Berries* $\frac{1}{2}$ in. diam., few on the spadix, red.

29. **CYRTOSPERMA**, *Griff.*

Perennial warted or prickly herbs. *Leaves* hastate. *Spathes* 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 funicles from near the middle of the cell. *Berries* crowded,

obovoidly globose, smooth, 1-7-seeded, scarcely longer than the accrescent sepals. *Seeds* compressed, crested; albumen scanty; embryo hooked.—*Species* about 10, tropical.

C. lasioides, *Griff. Itin. Notes* iii. 149; *Notul.* iii. 150; *Ic. Pl. Asiat.* t. 169; leaves sagittate, lobes caudate-acuminate, petiole and peduncle prickly, flowers 6-merous, ovules 2. *Schott Gen.* t. 84; *Prodr.* 403; *Engler Arac.* 270; *Ic. Ined.* No. 89.—*Wall. Cat.* 4447.

PERAK; in marshes, *Scortechini, King's Collector.* MALACCA, *Griffith.* SINGAPORE, *Gaudichaud, &c.*—**DISTRIB.** Borneo.

Rootstock stout. *Leaves* like those of *Lasia*, 2½–3 ft., basal lobes as long as the median, costa and nerves prickly beneath; petiole 2–3 ft., sometimes as thick as the middle finger. *Peduncle* shorter than the petiole. *Spathe* 1–5 in., lengthening to 8 in fruit, open to the base, flat, ovate or lanceolate, caudate-acuminate, many-nerved, white or yellow within, reddish-brown without striped with green. *Spadix* pink; stipes stout, dorsally adnate to the spathe. *Fruiting* spadix 4–6 by 1 in. diam. *Berries* closely packed.—Young plants are smaller in foliage and spathe.

30. **ANAPHYLLUM**, *Schott.*

A tall herb, with creeping rootstock. *Leaves* broad, membranous, pinnate or pedatipartite. *Spathe* large, broadly lanceolate, caudate, twisted, membranous, deciduous, base very shortly convolute. *Spadix* short, cylindrical, stipitate, flowering downwards, base adnate to the spathe. *Sepals* 4, large, obovate, truncate, incurved. *Stamens* 4, filaments flat; anther-cells saccate, pores terminal. *Ovary* ovoid or oblong, 1-celled, 1-ovuled; stigma sessile, disciform; ovule semianatropous, parietal. *Berries* obovoid.

A. Wightii, *Schott Gen. Aroid.* t. 83; *Prodr.* 404; *Engler Arac.* 275.—*Wall. Cat.* 8968.

TRAVANCORE; Courtallam. *Wight.*

Leaves 1–2 ft. long or more; leaflets 2–6 pairs, sessile or petiolulate, 8–18 by 2–4 in., acuminate, 1-costate, base cuneate rounded or acuminate, terminal lobe simple or divided; petiole 3–4 ft., quite smooth. *Peduncle* longer than the leaf. *Spathe* 6–12 by 2–4 in. *Spadix* 1 in.

31. **POTHOS**, *Linn.*

Climbing branched shrubs, branches rooting. *Leaves* distichous. *Peduncles* terminal or axillary or from lateral shoots. *Spathe* small, reflexed, cymbiform, or elongate, persistent. *Spadix* sessile or stipitate, flowering upwards, stipes often decurved or flexuous. *Sepals* 6, tips incurved. *Stamens* 6, filaments flat; anther-cells ellipsoid, slits extrorse. *Ovary* 3-celled; stigma small; ovules 1 in the inner angle of each cell, anatropous. *Berries* 1–3-seeded. *Seeds* exalbuminous; embryo macropodal.—*Species* about 20, tropical Asiatic, Australia and Pacific, with one Madagascar.

A. Leaves with a broad flat truncate petiole, and short entire sheath. *Spadix* (in the Indian species) very short, globose oblong or pyriform, stipes long.

1. **P. scandens**, *Linn. Sp. Pl.* 968; leaves 2–4 in. obovate or lanceolate, peduncles ½–¾ in., bracts very small, spathe cymbiform cuspidate, spadix globose ovoid or shortly oblong. *Bot. Reg.* t. 133; *Hook. Ic. Pl.* t.



175; *Schott Meletem.* i. 21; *Aroid.* i. 22, t. 33; *Prodr.* 563; *Roxb. Fl. Ind.* ii. 457; *Kunth Enum.* iii. 65; *Grah. Cat. Bomb. Pl.* 229; *Dalz. & Gibs. Bomb. Fl.* 257; *Wall. Cat.* 4435; excl. D, E, F; *Engler Arac.* 84 (excl. var. β). *P. exiguiflorus* and *cognatus*, *Schott l.* cc. 21, 22, t. 41, 48, and 561, 562. *P. fallax*, *Schott Prodr.* 560. *P. decipiens*, *Schott in Bonpland.* (1859), 165; *Prodr.* 562. *P. Roxburghii*, *De Vriese in Plant. Jungh.* i. 103. —*Rheede Hort. Mal.* vii. t. 40.

Throughout India, on walls and tree trunks, from BENGAL eastward to BURMA, and southward to SINGAPORE; and from the CONCAN to CEYLON, and the ANDAMAN and NICOBAR ISLANDS.—DISTRIB. Malay Islds., China.

Stem as thick as the little finger, much branched; internodes $\frac{1}{2}$ –1 in. *Leaves* very variable, $\frac{1}{2}$ –2 in. broad, acute apiculate or acuminate; base cuneate or rounded; petiole 1–3 by $\frac{1}{4}$ – $\frac{3}{8}$ in., base $\frac{1}{2}$ –amplexicaul. *Peduncles* equalling or exceeding the bracts, which are $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Spathe* $\frac{1}{2}$ – $\frac{1}{2}$ in. green. *Spadix* $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., 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.* 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 Arac.* 80. *P. Roxburghii*, *Schott Aroid.* l. c. t. 37 (not of de Vriese). *Engler l. c.* 81. *P. scandens*, *Wall. Cat.* 4435?

SIKKIM HIMALAYA, alt. 1–4000 ft., J. D. H. BHOTAN, Griffith; SILHET, Wallich.

Almost exactly intermediate between *P. scandens*, of which it has the foliage, &c., and *P. Cathcartii*; which has larger but quite similar spathes and spadix. De Vriese erred in supposing that Roxburgh's and Wight's plant differed from *scandens*.

3. ***P. Cathcarti***, *Schott Aroid.* i. 22, t. 44, 45; *Prodr.* 565; leaves 3–6 in. ovate oblong or lanceolate acute or acuminate, peduncle very stout $\frac{1}{2}$ – $\frac{3}{4}$ in., bracts large concave, spathe orbicular, spadix stoutly stipitate suberect or decurved oblong or globose. *Engler Arac.* 85. *P. scandens*, *Don Prodr.* 21; *Wall. Cat.* 4435, D, E, F.

TROPICAL HIMALAYA, ascending to 4000 ft. from Kumaon, Strachey & Winterbottom to BHOTAN, ASSAM, the KHASIA HILLS, MUNIPORE 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 $\frac{1}{2}$ – $\frac{1}{2}$ in. diam., on a stipes $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Berries* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, obovoid or oblong, scarlet.

4. ***P. angustifolius***, *Presl. Epimel.* 242; leaves $1\frac{1}{2}$ –2 by $\frac{1}{2}$ – $\frac{1}{2}$ in. linear apiculate, peduncle very short, bracts small, spathe lanceolate, spadix suberect minute globose or ellipsoid. *Schott Aroid.* i. 21, t. 31; *Prodr.* 559; *Engler Arac.* 81.

TENASSERIM, Helfer, &c.

Stem much branched; branches short, as thick as a crow-quill; internodes $\frac{1}{2}$ – $\frac{1}{2}$ in. *Leaves* $\frac{1}{2}$ – $\frac{1}{2}$ in. broad; nerves parallel; petiole $\frac{1}{2}$ – $\frac{1}{2}$ in. *Spathe* $\frac{1}{2}$ in. long. *Spadix* $\frac{1}{2}$ – $\frac{1}{2}$ in. diam.

5. ***P. Hookeri***, *Schott Aroid.* i. 23, t. 46; *Prodr.* 566; leaves 3–4 in. lanceolate acuminate, peduncle $1\frac{1}{2}$ – $2\frac{1}{2}$ in. decurved, bracts ovate acute, spathe cymbiform acuminate, spadix oblong. *P. scandens*, *Hook. Ic. Pl.* t. 175. *P. scandens*, var. *Hookeri*, *Engler Arac.* 84.

CEYLON, Walker.

Stem and foliage as in the common state of *P. scandens* and *Vriesianus*. Peduncle often longer than the petiole. Spathe $\frac{1}{2}$ – $\frac{3}{4}$ in. Spadix $\frac{1}{2}$ – $\frac{1}{4}$ in., its stipes about as long.

6. *P. macrocephalus*, *Scort. mss.*; 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 $\frac{1}{2}$ – $\frac{3}{4}$ in. Leaves $2\frac{1}{2}$ – $3\frac{1}{2}$ by $\frac{1}{2}$ – $\frac{3}{4}$ 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 $\frac{1}{2}$ – $\frac{3}{4}$ 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. i.* 103, 104) of Java and Sumatra solely in the narrower leaves and great length of the petiole. I suspect that all there may prove forms of one.

B. Petiole (knee only) very short; sheath very long, split to the base. Spadix long, sessile or stipitate.

* Spadix cylindric, dense-fl.; flowers not in clusters.

7. *P. Kingii*, *Hook. f.*; stout, leaves 6–10 by 3–4 in. oblong or oblong-lanceolate caudate-acuminate, base narrowed rounded, bracts $1\frac{1}{2}$ –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 unequal-sided, shining on both surfaces; petiole $\frac{1}{2}$ in.; sheath 3–4 in., margins membranous, at length fibrous, tip 2-auricled. Spathe dark purple within, pale without. Spadix half as long. Ovary oblong; style very short, stigma penicillate.

8. *B. Barberianus*, *Schott Aroid. 24, t. 53; Prodr. 573*; leaves 3–5 by $1\frac{1}{2}$ – $1\frac{1}{4}$ in. oblong- or ovate-lanceolate acuminate base rounded, sheath clasping the branch, peduncles terminal and axillary, spathe linear-lanceolate. *Engler Arac. 90.*

PERAK; on rocks, *Scortechini, King's Collector.*—DISTRIB. Borneo.

Stem slender, branches as thick as a crow-quill. Leaves thinly coriaceous, tip sometimes caudate; petiole $\frac{1}{2}$ in., sheath 2–3 in., by $\frac{1}{2}$ – $\frac{1}{4}$ in. broad, biauricled. Peduncle deflexed, 1– $1\frac{1}{2}$ in. Spathe $\frac{1}{2}$ –1 in., acuminate. Spadix as long, sessile. Stigmas pulvinate, sessile.

9. *P. Wallichii*, *Hook. f.*; leaves $3\frac{1}{2}$ –4 in. oblong-lanceolate acuminate, base cuneate or rounded, sheath divergent from the branch, peduncles axillary and terminal, spathe linear-lanceolate acuminate. *P. tenera*, *Wall. Cat. 4439, B. (not Wall. in Roxb. Fl. Ind. Ed. Carey). P. gracilis*, *Schott Prodr. 572. Engler Arac. 91 (not of Roxb.)*

PENANG, *Porter, Curtis*; PERAK, *Scortechini.*

Very similar to *B. Barberianus* in foliage, but a more slender plant, with the spreading leaf-sheaths not $\frac{1}{2}$ 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 mss.

10. **P. lancifolius**, *Hook. f.*; leaves 4-7 by 1-1½ in. narrowly oblong-lanceolate caudate-acuminate base cuneate sheath divergent from the branch, peduncle terminal, bracts 0, spathe ovate-lanceolate acuminate.

PERAK; *Scortechini*.

A large climber, branches as thick as a crow-quill. Leaves thinly coriaceous, pale when dry, and undulate within the margin, tip slender; nerves erecto-patent; petiole ½-¾ in., sheath slender, tip bifid. Peduncle 1-1½ in., spreading or deflexed. Spathe 1½ in., lurid purple, striate. Spadix 1-1½ in., subsessile, cylindric, obtuse, ½ in. diam. Sepals and stamens 6 each; filaments linear-oblong. Stigma minute.

** *Spadix slender; flowers in small spirally disposed or whorled clusters.*

11. **P. latifolius**, *Hook. f.*; leaves 5-7 by 2½-4 in. oblong or obovate-oblong acute or obtuse base rounded or cuneate, sheath divergent from the branch, peduncle terminal, bracts 0, spathe linear from a rounded base, tip emarginate mucronate in the sinus much shorter than the stipitate spadix.

PERAK; Larut, alt. 2-3000 ft., *King's Collector*.

Stem climbing, 10-15 ft.; branches rather stout, internodes 1-1½ in. Leaves coriaceous, nerves nearly horizontal, slightly arching; petiole ¼-½ in., sheath 3-4 in. Peduncle deflexed or sigmoid. Spathe 2½ in., pale green, reflexed, 5-nerved, mucro ½ in. long. Spadix 3-5 in., yellow, flowers in approximate equidistant whorls or spirally disposed.

12. **P. Maingayi**, *Hook. f.*; leaves 4-5 by 1-1½ in. narrowly oblong-lanceolate acuminate base cuneate or rounded, sheath divergent from the branch, peduncles terminal, spathe linear oblong? much shorter than the slender stipitate spadix, flowers very minute laxly distantly whorled.

MALACCA, *Maingay*. (*Kew Distrib.* 1538, *P. gracilis*).

Branches as thick as a crow-quill, internodes ½-1 in. Leaves coriaceous, drying brown; nerves widely spreading, slightly arched; petiole ½ in.; sheath 2½-3 in. Peduncle 1½-2 in., usually tortuous. Spathe imperfect. Spadix 3 in., stipes ¼ in. Stamens very short.

13. **P. Curtisi**, *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, spathe narrowly linear from a dilated rounded base shorter than the slender stipitate spadix, flowers in crowded spirals.

PERAK; *Scortechini*; *King's Collector*. PENANG; *Curtis*.

Resembles *P. Maingayi* so closely that I hesitate to describe it as specifically different, but the flowers are more than twice as large as in that plant, and densely clustered on the much longer (often 6 in.) spadix; and the stamens are much longer. The narrow reflexed spathe is 2-2½ in. long.

14. **P. Kunstleri**, *Hook. f.*; leaves 8-12 by 2-3½ in. unequal-sided oblong or subfalcately oblanceolate caudate-acuminate, base cuneate or rounded, sheath divergent from the branch, peduncle terminal, spathe linear apiculate, spadix very slender, flowers spirally whorled.

PERAK; *King's Collector*.

Stem climbing 10-15 ft. Leaves coriaceous, very variable, the older or lower (like those of *P. latifolius*) are up to 3 in. broad, acuminate, base rounded, the younger are as long but only 2-2½ in. broad, with very long pointed tips and acute bases; nerves spreading and arching, much more close in the older leaves; sheaths

2-3 in. *Peduncle* $1\frac{1}{2}$ in., decurved or tortuous. *Spathe* $1\frac{1}{2}$ by $\frac{1}{2}$ in., tip obtuse apiculate. *Spadix* 5 in.; flowers solitary or clustered.

15. **P. remotiflorus**, *Hook. Ic. Pl.* t. 133; leaves 3-6 by $\frac{3}{4}$ -2 in. unequal-sided linear or oblong-lanceolate or oblanceolate caudate-acuminate, base acute or obtuse, sheaths very slender divergent from the branch, peduncles terminal and axillary, spathe linear-lanceolate apiculate, spadix very slender zigzag, flowers solitary. *Kunth Enum.* iii. 65; *Schott Aroid.* i. 25, t. 54; *Prodr.* 573; *Thw. Enum.* 337; *Engler Arac.* 92. P. elliptica, *Moon Cat. Pl. Ceyl.* 10 (name only); *Miq. Fl. Ind. Bat.* iii. 182.

CEYLON; *Walker*; up to 4000 ft., *Thwaites*.

Stem as thick as a sparrow-quill, much branched. *Leaves* coriaceous, tips filiform; nerves erecto-patent, arched; petiole $\frac{1}{2}$ in., very slender, sometimes in a straight line with the sheath, which is $\frac{1}{4}$ - $1\frac{1}{4}$ in. long. *Peduncle* $1-1\frac{1}{2}$ in., erect, decurved, or slender. *Spathe* $\frac{3}{4}$ - $2\frac{1}{4}$ in., striate, base rounded. *Spadix* $1-2\frac{1}{4}$ in.

C. *Petiole* very short, base semi-amplexicaul (sheath 0).

16. **P. Thomsonianus**, *Schott Aroid.* i. 24, t. 51; *Prodr.* 571; leaves 4-6 by $1\frac{1}{4}$ -2 in. elliptic or oblong-lanceolate caudate-acuminate, base cuneate, peduncles lateral and terminal, spathe small oblong-lanceolate, spadix subsessile cylindric dense-fld.

THE CARNATIC; *G. Thomson*.

Branches as thick as a duck's quill. *Leaves* thinly coriaceous, rather unequal-sided, drying yellowish; petiole $\frac{1}{2}$ - $\frac{3}{4}$ in. *Peduncle* 1 in., decurved. *Spathe* $\frac{1}{2}$ in. *Spadix* $\frac{3}{4}$ -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. BIFABIUS, *Wall. Cat.* 4445, from Singapore, young leaves only.

P. OBLIQUUS, *Wall. Cat.* 4446; from Tavoy, *Gomez*.

32. ACORUS, *Linn.*

Aromatic marsh herbs, rootstock creeping. *Leaves* distichous, ensiform, base equitant, nerves parallel. *Peduncle* leaf-like. *Spathe* the ensiform continuation of the peduncle. *Spadix* sessile, cylindric, dense-fld., flowering upwards. *Sepals* 6, orbicular, concave, tips incurved. *Stamens* 6, filaments linear flat; anther reniform, cells confluent above, slits extrorse. *Ovary* conical, 2-3-celled; stigma minute; ovules many, pendulous from the top of each cell, orthotropous. *Berries* few-seeded. *Seeds* oblong, micropyle often fimbriate, albumen fleshy, embryo axile.—Species 2 north temp. regions.

1. **A. Calamus**, *Linn. Sp. Pl.* 324; leaves 3-6 ft. midrib stout. *Roxb. Fl. Ind.* ii. 169; *Don Prodr.* 21; *Wall. Cat.* 196; *Grah. Cat. Bomb. Pl.* 230; *Dalz. & Gibs. Bomb. Fl. Suppl.* 96; *Thw. Enum.* 337; *Griff. Notul.* iii. 157; *Ic. Pl. Asiat.* t. 162. *Engler Arac.* 217. *A. Griffithii* and *nilaghiensis*, *Schott in Estr. Bot. Zeitschr.* (1858), 357, and (1859), 101; *Prodr.* 580, and 579. *A. Belangeri*, *Schott in Ann. Mus. Lugd. Bat.* i. 284. *A. Casia*, *Bertol. Pl. Nuov. Asiat.* ii. (1865), 8.—*Rheede Hort. Mal.* xi. t. 48.

Throughout INDIA and CEYLON, in marshes, wild or cult., ascending the Himalaya to 6000 ft. in Sikkim. DISTRIB. north, temp. and warm regions.

Rootstock very aromatic. *Leaves* 3-6 ft. by $\frac{3}{4}$ -1 $\frac{1}{2}$ in., margins waved. *Peduncle* $\frac{1}{2}$ - $\frac{3}{4}$ in. broad. *Spathe* 6-30 in. long. *Spadix* 2-4 in. $\frac{1}{4}$ - $\frac{1}{2}$ in. diam., slightly curved. *Sepals* about equalling the ovary.—Sweet Flag.

2. **A. gramineus**, Soland. in Ait. Hort. Kew, i. 474; midrib 0. Schott Prodr. 580; Engler Arac. ii. 218. A Calamus, Benth. Fl. Hongk. 345. A. terrestris, Spreng. Syst. ii. 118; Schott l. c. 579. A. Tatarinovii, Schott in Estr. Bot. Zeitschr. (1859) 101. A. Calamus var. terrestris, Engler l. c. 217.

SIKKIM HIMALAYA, alt. 6000 ft. J.D.H. KHASIA HILLS, alt. 4-5000 ft., Griffith, &c.—DISTRIB. China, Japan.

Much more variable in size than A. Calamus, from 6 in. to 3 ft., with a shorter spathe and more slender spadix.

ORDER CLXVII. LEMNACEÆ.

Minute or small annual floating green scale-like plants, rootless or with capillary roots, propagated by budding or by hibernating bulbils, rarely by seed. *Flowers* 1-3, naked, or in a spathe; perianth 0. *Stamens* 1-2, anthers 1- or 2-celled. *Ovary* 1-celled; style short; stigma truncate, or funnel-shaped; ovules 1-7. *Utricle* bottle-shaped. *Seeds* 1- or more, testa coriaceous; albumen 0, or fleshy; embryo axile, cylindric.—Genera 2, or according to various authors 3 or 4. Species about 20, in all countries.

1. LEMNA, Linn.

Fronds with one or more roots, bearing the flowers in marginal clefts. *Filaments* slender; anthers 2-celled. *Ovules* 1-7.—Species 17, natives of all countries.

L. obcordata, Ham. in Wall. Cat. 5201, is a species of *Riccia*.

1. **L. minor**, Linn. Sp. Pl. 976; root solitary, frond symmetrical obovoid or oblong nearly flat on both surfaces, ovule solitary. Kunth Enum. iii. 4. Reichb. Ic. Fl. Germ. vii. t. 14. Hegelm. Lemnæ, 141, t. 9, 10; Boiss. Fl. Orient. v. 29; Kurz in Journ. Linn. Soc. ix. 266.

Throughout INDIA? WESTERN TIBET, to 9500 ft., Thomson.—DISTRIB. Cosmopolitan.

Frond $\frac{1}{4}$ - $\frac{1}{2}$ in. long; young sessile on the old, but soon detached, green above, epidermal cells with flexuous walls. *Root-sheath* not appendaged, cap obtuse. *Spathe* 2-lipped. *Stamens* 2 (each a male fl.). *Style* long. *Seed* horizontal, hemianatropal, albuminous.—Kurz (Journ. Linn. Soc. xi. 266) thinks that *L. minor* does not occur in India proper. If this be so, *L. paucicostata* has been mistaken for it, a point I must leave it for local botanists to clear up. Hegelmaier gives the Caucasus and W. Tibet as the only Asiatic habitats.

2. **L. paucicostata**, Hegelm. Lemnæ, 139, t. 8; root solitary, frond asymmetrical obovate or obovate-oblong nearly flat on both surfaces, ovule solitary. Boiss. Fl. Orient. v. 30. L. minor, Griff. Notul. iii. 216; Hegelm. in Seem. Journ. Bot. (1865), 112; Thw. Enum. 331.

In various parts of INDIA and CEYLON; ascending the Khasia Hills to 6000 ft.—DISTRIB. Cosmopolitan tropical.

Distinguished from *L. minor* by the asymmetric fronds, appendaged root-sheath, acute root-cap, and erect orthotropous seed.

3. **L. gibba**, Linn. Sp. Pl. 970; root solitary, frond orbicular or



obovoid tumid beneath, ovules 2-7. *Reichb. Ic. Fl. Germ.* vii. t. 14; *Boiss. Fl. Orient.* v. 30; *Hegelm. Lemnæ*, 145, t. 11-13. *Telmatophace gibba*, *Schleid. in Linnæa*, xiii. 391; *Kunth Enum.* iii. 6; *Kurz in Journ. Linn. Soc.* ix. 266.—*Lemna*, *Griff. Notul.* iii. 221 (2nd species), *Ic. Pl. Asiat.* t. 263.

Still waters throughout INDIA, ascending to 7000 ft. in the Himalaya.—DISTRIB. Cosmopolitan.

Frond $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., opaque, young sessile, cells beneath very large, epidermis with flexuous walls. *Root-sheath* elongate, cylindric, root-cap acute. *Stamens* 2. *Utricle* circumciss. *Seeds* erect, anatropous, albumen scanty or 0.

4. ***L. trisulca***, *Linn. Sp. Pl.* 970; root solitary, frond oblanceolate tip serrate young hastate persistent, ovule solitary. *Kunth Enum.* iii. 5; *Reichb. Ic. Fl. Germ.* vii. t. 15; *Hegelm. Lemnæ*, 134, t. 5, 6; *Boiss. Fl. Orient.* vi. 29; *Dalz. & Gibs. Bomb. Fl.* 281. *L. cruciata*, *Roxb. Fl. Ind.* iii. 566.—*Lemna*, *Griff. Notul.* 218; *Ic. Plant. Asiat.* t. 262.

PANJAB, *Stewart*. BENGAL, The CONCAN, MUNNEPORE, and BURMA.—DISTRIB. Temp. and trop. regions.

Fronds $\frac{1}{2}$ – $\frac{3}{4}$ in. long, young on one or both sides placed cross-wise to the old; epidermis 0. *Root-cap* acute. *Style* very short. *Seed* hemianatropous, horizontal; testa rough, grooved.

5. ***L. polyrrhiza***, *Linn. Sp. Pl.* 970; roots many, frond herbaceous broadly obovate or orbicular flat or nearly so 7-nerved, ovules 1-2 erect. *Reichb. Ic. Fl. Germ.* vii. t. 15; *Thw. Enum.* 331; *Kurz in Journ. Linn. Soc.* ix. 267. *L. orbiculata*, *Roxb. Fl. Ind.* iii. 565. *L. major*, *Griff. Notul.* iii. 216; *Ic. Plant. Asiat.* t. 264 (*anal.*). *Spirodela polyrrhiza*, *Schleid. in Linnæa*, xiii. 392; *Kunth. Enum.* iii. 7; *Hegelm. Lemnæ*, 151, t. 13-15; *Boiss. Fl. Orient.* v. 30.

Common throughout INDIA and CEYLON.—DISTRIB. Temp. and trop. regions.

Fronds $\frac{1}{2}$ – $\frac{3}{4}$ in. diam., dark green above, usually purplish beneath; epidermal cells with flexuous walls. *Spathe* 2-lipped. *Stamens* 2. *Ovules* 1-2, semianatropous.—*Kurz* describes a var. *concolor* with much larger fronds, green on both surfaces, as occurring under trees in Bengal.

6. ***L. oligorrhiza***, *Kurz in Journ. Linn. Soc.* ix. 267, t. 5; roots few, fronds membranous ovate or oblong 3-5-nerved. *Benth. Fl. Austral.* vii. 163. *Spirodela oligorrhiza*, *Hegelm. Lemnæ*, 147, t. 16. *S. melanorrhiza* and *pleiorrhiza*, *F. Muell. ex Kurz in Seem. Journ. Bot.* (1867) 115.

BENGAL, *Kurz*, and elsewhere in India.—DISTRIB. Trop. Asia, Australia, Polynesia.

Fronds $\frac{1}{2}$ – $\frac{3}{4}$ in. long by half as broad, thin, shining, collected in circinate groups, purple beneath. *Roots* 2-5, very long. *Flowers* as in *L. minor*.—*Kurz*, from whom the above characters are taken, says that he at first took it for an extreme form of *L. polyrrhiza*, in company of which he always found it in Bengal; but on discovering the flowers he considered it distinct. It has the general form and size of *L. minor*.

2. **WOLFFIA**, *Horkel*.

Fronds like grains of sand, rootless, proliferous, bearing the flowers on the upper surface. *Spathe* 0. *Anthers* sessile, 1-celled. *Style* short, stigma depressed; ovule 1, erect.

1. ***W. arrhiza***, *Wimm. Fl. Schles.* 140; fronds subglobose. *W. Michelii*, *Schleid. Beitrag. Bot.* 233. *W. Delilii*, *Kurz in Journ. Linn. Soc.*

ix. 265 (*not of Schleid.*). *Lemna arrhiza*, *Linn. Mant.* 294. *L. globosa*, *Roxb. Fl. Ind.* iii. 565; *Grah. Cat. Bomb. Pl.* 252; *Dalz. & Gibs. Bomb. Fl.* 281. *Grantia globosa*, *Griff. Notul.* iii. 229; *Ic. Pl. Asiat.* t. 267, f. 2. *Bruniera vivipara*, *Franchet in Billot.* 1864, 25.

Common, probably throughout INDIA and CEYLON.—DISTRIB. Cosmopolitan.

Of this *Kurz* distinguishes two Indian varieties, a larger, *Delili* (*Grantia globosa*, *Griff.*), and a smaller with more cylindric fronds, the *Lemna globosa*, *Roxb.*

2. ***W. microscopica***, *Kurz in Journ. Linn. Soc.* ix. 265; frond flat above, conical beneath and tapering into a root? *Hegelm. Lemnæ*, 127. *Grantia microscopica*, *Griff. Notul.* iii. 226; *Ic. Plant. Asiat.* t. 266-268.

BENGAL, *Griffith.*

Known only through Griffith's description and drawings.

ORDER CLXVIII. TRIURIDÆ.

Slender, leafless, coloured annuals. *Stem* subsimple, filiform, with a few distant scales. *Flowers* unisexual, small, in terminal corymbs or racemes; pedicels decurved, bracteate. *Perianth* inferior, 6-8-partite or -lobed; lobes ovate-lanceolate or subulate, valvate in bud. **MALE FL.** *Stamens* 2-6, hypogynous or perigynous, anthers free or immersed in a thick disk, cells 2, confluent, slits extrorse; pistillodes 3, subulate, or 0. **FEM. FL.** *Staminodes* 0 or few. *Carpels* many, sessile on a receptacle, 1-celled; style terminal lateral or basal, persistent; stigma acute, clavate, or penicillate. *Ovules* solitary, erect, anatropous. *Achenes* in a globose head, obovoid, coriaceous or fleshy, nucleus hard, embryo not seen.—Genera 2, tropical America and Asiatic.

SCIAPHILA, *Blume.*

Perianth 3-8-partite or -lobed. *Anthers* sessile at the base of the perianth. *Style* ventral or basilar.—Species about 14, Asiatic and American.

1. ***S. erubescens***, *Miers in Proc. Linn. Soc.* ii. (1850) 74; in *Trans. Linn. Soc.* xxi. 48; raceme many-fl., perianth segments 6 broadly lanceolate naked style, clavate penicillate hardly longer than the ovary. *Thw. Enum.* 294; *Benth. in Hook. Journ. Bot.* vii. (1855) 10. *Aphyllia erubescens*, *Champ. in Calcutt. Journ. Nat. Hist.* vii. 468.

CEYLON; in shady woods at Galle, *Champion*; Colombo, *Ferguson*.

Stem 3-4 in. *Flowers* $\frac{1}{2}$ in. diam., hyaline, pale purplish, speckled with red streaks; pedicels $\frac{1}{2}$ in.

2. ***S. secundiflora***, *Thw. ex Benth. in Hook. Journ. Bot.* vii. (1855) 10; *Enum.* 294; raceme second, few-fl., perianth segments 6 subulate acuminate naked, style clavate penicillate hardly longer than the ovary.

CEYLON; forests near Sittawake, *Thwaites*.

Stem 6-14 in., purplish; bracts broad, acute. *Flowers* monœcious, pedicel $\frac{1}{10}$ - $\frac{1}{2}$ in.; perianth about $\frac{1}{2}$ in. diam. *Anthers* sessile, transversely oblong, white.

3. ***S. janthina***, *Thw. Enum.* 294; flowers long-pedicelled, perianth segments 8 lanceolate, stamens 4, style subbasilar filiform much longer than the ovary. *Hyalisma janthina*, *Champ. in Calc. Journ. Nat. Hist.* vii. (1847) 466; *Miers. in Trans. Linn. Soc.* xxi. 49.

TRAVANCORE; Tinnevely, *Beddome*. CEYLON; in damp forests, *Champion*.

Stem 4-8 in.; bracts about $\frac{1}{2}$ in. *Flowers* alternate, opposite and whorled, mono- or diœcious, pedicel $\frac{1}{4}$ -1 in.; male $\frac{1}{8}$ 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 pistillodes, style ventral filiform much longer than the ovary.

KHASIA HILLS, alt. 4000 ft., J. D. H. & T. T.

Plant red-purple. *Stem* 3-6 in., filiform or capillary, flexuous, simple or branched, naked or with a few scales, fem. much the stoutest. *Flowers* diœcious, racemose, male $\frac{1}{16}$ in. diam., fem twice as large and longer pedicelled; bracts of male minute, of fem. $\frac{1}{8}$ in., subulate; perianth papillose. *Anthers* very large, globosely 4-lobed, white, dehiscence transverse; pistillodes erect, subulate, purple. *Carpels* many, papillose. *Achenes* reniformly obovoid, pericarp cellular, purple. *Seed* conform to the pericarp; testa chartaceous, yellow-brown, transversely strongly reticulate; nucleus oblong, cellular, homogeneous, white.—Described from drawings I made in the Khasia.

ORDER CLXIX. ALISMACEÆ.

Marsh or water plants of various habit. *Leaves* radical, entire. *Flowers* regular, uni- or bisexual. *Perianth segments* 6, 2-seriate, outer (sepals) herbaceous, inner petaloid rarely 0. *Stamens* 6 or more, hypogynous or perigynous; anthers erect, basifixed, 2-celled, slits lateral or dorsal. *Carpels* 3-6 or more, 1-celled, sessile or stipitate on a flat or raised receptacle; style short, long (or 0), subterminal or ventral, stigma simple; ovules 1 or more, insertion various. *Fruit* of small achenes or follicles. *Seeds* small, exalbuminous; embryo straight or conduplicate.—Genera 12, species about 60, cosmopolitan.

Tribe I. ALISMACEÆ. *Fruit* of 3 or more achenes.

Flowers bisexual. Stamens 6-9. Receptacle flat	1. ALISMA.
Flowers polygamous. Stamens 6. Receptacle flat	2. LIMNOPHYTON.
Flowers unisexual. Stamens many. Receptacle globose or oblong	3. SAGITTARIA.
Flowers monœcious. Stamens 3	4. WISNERIA.

Tribe II. BUTOMEÆ. *Fruit* of follicles.

Petals marcescent. Embryo straight	5. BUTOMUS.
Petals deciduous. Embryo hippocrepic	6. BUTOMOPSIS.

1. ALISMA, Linn.

Scapigerous herbs. *Leaves* lanceolate, cordate, or sagittate. *Flowers* bisexual in umbelled or 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.

1. **A. Plantago**, Linn.; leaves linear ovate-lanceolate or subcordate 5-7-nerved, fruiting sepals spreading, achenes membranous compressed, style slender deciduous. *Kunth Enum.* iii. 148; *Reichb. Ic. Fl. Germ.* vii. t. 57; *Micheli in DC. Monog. Phan.* iii. 32; *Boiss. Fl. Orient.* v. 9; *Wall. Cat.* 4998. ♀ *A. intermedium*, Griff. ex Voigt *Hort. Suburb. Calcutt.* 680.

Marshes, &c. of the LOWER HIMALAYA, alt. 1-7000 ft., from Kashmir to Munne-
pore and Burma.—DISTRIB. N. and S. temp. regions.

Rootstock fleshy, swollen. *Leaves* 6-8 in., erect or spreading. *Scape* 1-4 ft. *Flowers* in panicle whorls, $\frac{1}{2}$ in. diam.; petals pink or rose with a yellow claw. *Achenes* 20-30, in a single whorl; style ventral.—A small state found in Kashmir, alt. 7000 ft., by Clarke, resembles *A. ranunculoides*, but the carpels are in one whorl, though irregularly disposed.

2. *A. reniforme*, *Don Prodr.* 22; leaves orbicular-cordate or reni-
form 13-17-nerved, fruiting sepals persistent, achenes 5-8 turgid, endocarp
thick hard, style slender persistent. *Wight Ic.* t. 322; *Kunth Enum.* iii.
151; *Benth. Fl. Austral.* 186. *A. calophyllum*, *Wall. Cat.* 4997. *A.*
parnassifolium, β majus, *Micheli in DC. Monog. Phan.* iii. 36.

Marshes, &c., throughout the plains and low country of India, ascending the
hills to 5000 ft. (not in Ceylon).—DISTRIB. Australia.

Leaves coriaceous, $1\frac{1}{2}$ -4 in. (up to 7 in. broad), often broader than long, tip
rounded or emarginate, nervules very fine and close. *Scape* 1-3 ft. *Flowers* white,
 $\frac{1}{2}$ in. diam., in very large whorled panicles; branches and pedicels long; sepals as
long as the petals, at first erect in fruit, at length reflexed. *Achenes* not whorled,
obovoid, dorsally ribbed, ribs smooth; style subterminal.—United by Micheli with
the European *A. parnassifolium*, but differing much in the coriaceous very broad large
leaves and in geographical distribution.

3. *A. oligococcum*, *F. Muell. Fragm. Phyt. Austral.* i. 23; leaves
membranous broadly ovate-cordate with acute lobes and a narrow sinus
punctate 11-17-nerved, bracts very large lanceolate, fruiting sepals re-
flexed, achenes 2-6 whorled turgid dorsally keeled tubercled, endo-
carp thick hard, style very short terminal deciduous. *Benth. Fl. Austral.*
vii. 185; *Micheli, in DC. Monog. Phan.* iii. 37. *A. glandulosum*, *Thw.*
Enum. 332. *A. apetalum*, *Ham. in Wall. Cat.* 4996.

Marshes, &c., in the plains of the PANJAB and BENGAL, but not common. CEYLON,
Thwaites.—DISTRIB. Africa trop., Australia.

Leaves 3-6 in. long by 2-3 in. broad, nervules distant. *Panicle* 6-9 in. long
and broad; bracts herbaceous, lower 1-3 in. long, lanceolate. *Flowers* of *L.*
Plantago.

2. LIMNOPHYTON, *Miquel*.

An erect succulent marsh plant, with the characters of *Alisma*, except
that the flowers are polygamous.

L. obtusifolium, *Miq. Fl. Ind. Bat.* iii. 242; *Micheli, in A. DC.*
Monogr. Phan. iii. 39. *Alisma sagittifolium*, *Willd. Sp. Pl.* ii. 277;
Kunth. Enum. iii. 151. *A. Kotschii*, *Hochst. in Flora*, 1843, 499. *A.*
obtusifolium, *Thw. Enum.* 332. *Sagittaria obtusifolia*, *Linn.*; *Kunth.*
Enum. iii. 158; *Roeb. Fl. Ind.* iii. 646; *Dalz. & Gibs. Bomb. Fl.* 249;
Wall. Cat. 4992. *Dipseudochorion sagittifolium*, *Buchen. in Flora*, 1865,
241.—*Rheede Hort. Mal.* xi. t. 45.

The DECCAN; from the Concan southwards, in tanks, &c. CEYLON, *Thwaites*.—
DISTRIB. Trop. Africa, Madagascar.

Usually very robust, but sometimes dwarf. *Leaves* 6-12 by 4-8 in., reniformly
sagittate or triangular, with long tapering spreading lobes, many-nerved; petiole
2-3 ft. *Scape* 2-4 ft., stout, angled. *Flowers* many, $\frac{1}{2}$ - $\frac{1}{2}$ in. diam., white, upper
mostly male. *Sepals* reflexed after flowering. *Petals* obovate. *Stamens* 6, fila-
ments of the male enlarged at the base. *Achenes* numerous, turbinate, turgid, epicarp
fleshy; style ventral, stigma capitate.

3. **SAGITTARIA**, Linn.

Erect stemless, usually perennial water plants. *Leaves* long-petioled, elliptic cordate or sagittate. *Flowers* in paniced or spicate whorls, unisexual or polygamous. *Sepals* 3, herbaceous. *Petals* 3, membranous, deciduous. *Stamens* 6 or more; filaments filiform, compressed. *Carpels* very many, crowded on a large globose or oblong receptacle, laterally flattened; style ventral or apical, stigma papillose; ovules solitary, basilar. *Fruit* a globose or oblong head of flattened crested or winged achenes. *Seeds* erect, testa thin; embryo hippocrepic.—Species about 15, temperate and tropical.

1. **S. sagittifolia**, Linn.; leaves hastate or sagittate, achenes flat dorsally winged. *Kunth Enum.* iii. 156; *Roxb. Fl. Ind.* iii. 645; *Wall. Cat.* 4991; *Reichb. Fl. Germ.* vii. t. 53; *Boiss. Fl. Orient.* v. 11; *Micheli in A.DC. Monogr. Phan.* iii. 66. *S. hermaphrodita*, Ham. in *Wall. Cat.* l. c. *S. hastata*, Don *Prodr.* 22. *S. Doniana*, Sweet, *Hort. Brit.* 1826.

In tanks, &c., throughout the plains of INDIA from the Panjab to Bengal and Munnipore.—DISTRIB. Europe, N. Asia, N. America.

Leaves obtuse or acute, 2–8 in. long, very rarely elliptic or lanceolate, lobes more or less diverging; petiole 8–18 in., trigonous. *Scape* 6–18 in., with 3–5 whorls of 3–5 flowers each $\frac{1}{2}$ in. diam.; lower whorls fem., upper male, with longer pedicels; bracts short, obtuse. *Flowers* $\frac{3}{4}$ in. diam.; petals white, claw often purple. *Achenes* obliquely obovate, apiculate, wings broad entire or subcrenate.

2. **S. guayanensis**, Humb. Bonpl. & Kunth, *Nov. Gen. & Sp.* i. 250; leaves floating broadly ovate deeply cordate obtuse, achenes flat surrounded by a broad toothed wing. *Kunth Enum.* iii. 161. *S. cordifolia*, *Roxb. Fl. Ind.* iii. 647; *Kunth l. c.* *S. Lappula*, Don. *Prodr.* 22. *S. parviflora*, *Wall. Cat.* (ex *Micheli*). *Alisma*? *Hamiltonianum* and *cristatum*, *Wall. Cat.* 4993, 4994, 4995. *A. stellatum* and *pubescens*, Ham. ex *Wall. Cat.* 4993, 4995. *Lophiocarpus guayanensis*, *Micheli in A.DC. Monogr. Phan.* iii. 62.

In tanks and marshes, throughout the plains of INDIA, to BURMA and the MALAY PENINSULA, but not very common; (not in Ceylon).—DISTRIB. Malay Islands, China, trop. Australia.

Petioles, scape, and pedicels often more or less hairy. *Leaves* 1–2 in., membranous, lobes broad acute or obtuse, sinus broad or narrow; nerves radiating, obscure; petiole long or short. *Scape* 6–18 in., stout. *Flowers* $\frac{3}{4}$ in. diam., white, in few approximate irregular whorls; pedicels short, very stout; flowers of the lower whorls usually ternate, bisexual, 9–12-androus, of the upper more numerous, male, 6–10-androus. *Petals* obovate, erose. *Anthers* cordate at the base. *Achenes* very many.

4. **WISNERIA**, Micheli.

Scapigerous marsh or water herbs. *Leaves* long-petioled, filiform lanceolate or oblanceolate. *Flowers* minute, monœcious, in remote involucre whorls on a very slender rachis; involucre campanulate, truncate, membranous. *Sepals* 3, equal or one larger, persistent. *Petals* 2–4, equalling or smaller than the sepals. MALE FL. *Stamens* 3. *Pistillodes* subulate. FEM. FL. *Staminodes* setaceous. *Carpels* 3–6, erect, ovoid; receptacle small tumid; style 0, or terminal, short, stigma minute; ovule solitary, basilar. *Achenes* and seed subglobose or compressed; embryo conduplicate, hippocrepic.—Species 3, Trop. Asia, Africa, and Madagascar.

W. triandra, *Micheli in A.DC. Monog. Phan.* iii. 82; sepals and petals 3 each, achenes subglobose, stigma sessile. *Sagittaria triandra*, *Dalz. in Hook. Journ. Bot.* ii. (1850), 144; *Dalz. & Gibs. Bomb. Fl.* 249.

The CONCAN; in water holes, Malwan, *Stocks*.

Leaves with the petiole 9–16 in., narrowly linear-spathulate obtuse, $\frac{1}{4}$ – $\frac{1}{2}$ in. broad, midrib stout penni-nervuled, lateral nerves slender submarginal. *Scape* shorter than the petiole. *Flowers* ternate, very shortly pedicelled, white; sepals linear-oblong; petals much larger, obovate. *Filaments* short, anthers didymous. *Achenes* few, subglobose or obovoid, smooth.

5. **BUTOMUS**, *Linn.*

A glabrous erect water plant, with a stout creeping rootstock. *Leaves* erect, linear, elongate, triquetrous, blade 0. *Scape* erect, terete. *Flowers* bisexual, in simple bracteate umbels, pink. *Sepals* and *petals* both coloured and persistent, coriaceous, erect. *Stamens* 9, hypogynous, filaments elongate-subulate; anthers linear, didymous after dehiscence. *Carpels* 6, whorled on a flat receptacle, connate below; stigma ventral elongate furrowed; ovules many, scattered, parietal, ascending. *Fruit* of 6 coriaceous beaked many-seeded follicles. *Seeds* linear-oblong, furrowed; embryo straight.

B. umbellatus, *Linn.*; *Kunth Enum.* iii. 164; *Reichb. Ic. Fl. Germ.* vii. t. 58; *Boiss. Fl. Orient.* v. 12; *Wall. Cat.* 7244.

The PANJAB and KASHMIR; in marshes, &c., alt. 1–5000 ft.—DISTRIB. Europe; N. Asia.

Leaves 3–4 ft. by $\frac{1}{2}$ in. broad, acuminate, base sheathing. *Umbel* many-fl., bracts 3; pedicels 2–4 in. *Flowers* 1 in. diam.

6. **BUTOMOPSIS**, *Kunth.*

An annual marsh herb with milky juice. *Leaves* elliptic, acute. *Flowers* in solitary or superposed bracteate whorls; perianth as in *Butomus*, but petals larger than the sepals, membranous, fugacious, white. *Stamen* 8–12; anthers oblong. *Follicles*, 6–7, erect; membranous. *Seeds* very many, minute, smooth.

B. lanceolata, *Kunth Enum.* iii. 165; *Dalz. & Gibs. Bomb. Fl.* 249; *Benth. Fl. Austral.* vii. 187; *Micheli in A.DC. Monog. Phan.* iii. 87. *B. P. latifolia*, *Kunth l.c.* *Butomus lanceolatus*, *Roxb. Fl. Ind.* ii. 315; *Wall. Cat.* 4999. *B. latifolius*, *Don Prodr.* 22. *B. Dobia*, *Ham. in Wall. l.c.* *Tæganocharis cordofana*, *Hochst. in Flora* (1841), 369.

PLAINS OF INDIA, from Rohilkund to Assam and the Deccan.—DISTRIB. tropics of the old world.

Very variable in stature and stoutness. *Leaves* 2–3 in., broad or narrow, 3–7-nerved, acute obtuse or apiculate. *Scape* as long as the leaves, stout or slender. *Umbels* 3–20-fl.; bracts few, short, scarious; pedicels 2–3 in., erect. *Flowers* $\frac{3}{4}$ –1 in. diam.; sepals ovate or orbicular; petals longer, obovate. *Stamens* 8–10, filaments rather slender, anthers oblong. *Follicles* 6–7, tapering into short beaks, membranous, connate below.

ORDER CLXX. **NAIADACEÆ.**

Aquatic or marsh herbs of various habit. *Rootstock* usually creeping. *Stems* usually elongate (short or 0 in *Triglochin*) branched. *Leaves* erect,



or submerged or floating, base sheathing; stipules 0 or within the sheath. *Flowers* inconspicuous, usually green, 1-2-sexual. *Perianth* 0, or tubular, or of 3-4 inferior valvate segments. *Stamens* hypogynous; anthers 1-2-celled. *Ovary* of 1-4 1-ovuled carpels, style long or short, stigma various; ovule erect or pendulous. *Fruit* of 1-seeded utricle achenes or drupelets. *Seed* exalbuminous; embryo straight or curved, radicular end very large.—Temperate and tropical; genera 16, sp. about 120.

* Stigmas discoid or decurrent on the ovary.

† *Perianth* of sepals or scales. *Flowers* bisexual.

Marsh herbs. Sepals 6, herbaceous green	1. TRIGLOCHIN.
Aquatics. Sepals 1-3, white, membranous	2. APONOGETON.
Aquatics. Sepals 4, herbaceous, green	3. POTAMOGETON.

†† *Perianth* 0. *Flowers* uni- or bi-sexual.

Aquatics. Stamen 2. Carpels stipitate	4. RUPPIA.
Aquatics. Stamen 1. Carpels sessile	5. ZANNICHELLIA.

** Stigmas subulate or capillary. *Flowers* unisexual.

Fresh or brackish aquatics. <i>Perianth</i> hyaline	6. NAIAS.
Marine. <i>Perianth</i> 0	7. CYMODOCEA.

1. TRIGLOCHIN, Linn.

Scapigerous marsh herbs. *Leaves* rush-like, flat or terete. *Flowers* small, bisexual, spicate or racemose, 2-bracteate. *Perianth-segments* 3 or 6, herbaceous, concave, deciduous. *Stamens* 6, inserted on the base of the segments; anthers didymous, slits extrorse. *Carpels* 6, 1-celled, 1-ovuled, 3 alternate often imperfect; styles short, often connate, stigmas penicillate; ovules basilar, erect, anatropous. *Fruit* of 3 or 6 free or connate achenes or follicles with recurved tips. *Seed* erect; embryo straight.—Genus cosmopolitan; species about 12.

1. **T. palustre**, Linn. *Sp. Pl.* 338; leaves $\frac{1}{2}$ -terete throughout, fruit clavate, carpels 3 slender attached to the axis by a point. *Kunth Enum.* iii. 143; *Reichb. Ic. Fl. Germ.* vii. t. 51; *Boiss. Fl. Orient.* v. 13.—*Trigloch*in, *Griff. Notul.* iii. 204; *Ic. Pl. Asiat.* t. 271.

TEMPERATE and ALPINE HIMALAYA, and WESTERN TIBET, alt. 8-15,000 ft.—DISTRIB. N. temp. regions and S. America.

Stem 6-24 in., tuberous and stoloniferous. *Leaves* 2-12 in., flaccid. *Scape* slender; raceme elongating after flowering, pedicels short. *Perianth* green, margins purplish. *Anthers* purple. *Fruit* $\frac{1}{4}$ in. long, appressed to the rachis; carpels dorsally terete.

2. **T. maritimum**, Linn. *Sp. Pl.* 339; leaves slightly flattened at the tip, fruit oblong of 6 separable carpels. *Kunth Enum.* iii. 145; *Reichb. Ic. Fl. Germ.* vii. t. 52; *Boiss. Fl. Orient.* v. 13.

TEMPERATE and ALPINE HIMALAYA, and WESTERN TIBET, from 12,000-16,000 ft.—DISTRIB. N. temp. regions.

Larger, stouter, and more tuberous at the base than *T. palustre*. *Scape* stout, curved; raceme longer, but not elongating so much in fruit; flowers larger; fruit $\frac{1}{2}$ in., not appressed to the scape, carpels grooved on the back.

2. **APONOGETON**, *Thunb.*

Submerged scapigerous plants; rootstocks tuberous. *Leaves* floating or erect, oblong. *Scape* long, bearing a single or twin sessile spikes of often unilateral or distichous bisexual flowers; the very young spikes enclosed in a conical deciduous sheath. *Perianth* 0, or of 1-3 equal or unequal white segments. *Stamens* 6 or more, filaments subulate, unequal, persistent; anthers didymous. *Carpels* 3-6, 2- or more-ovuled; style short, stigma discoid or decurrent persistent; ovules basilar, anatropous. *Fruit* of 3 or more coriaceous follicles. *Seeds* erect; embryo straight.—Species about 20, Asiatic, African and Australian.

1. **A. monostachyon**, *Linn. f. Suppl.* 214; leaves floating oblong 3-5-nerved opaque, cross nervules distinct, spike solitary, sepals 2 shorter than the 3 smooth 4-8-seeded follicles. *Roxb. Cor. Pl.* i. 58, t. 81; *Fl. Ind.* ii. 210; *Thw. Enum.* 333; *Dalz. & Gibs. Bomb. Fl.* 248; *Griff. Notul.* iii. 203; *Wall. Cat.* 5167, A, B, C, E.; *Andr. Bot. Rep.* vi. t. 406. *A. monostachys*, *Edgew. in Hook. Lond. Journ. Bot.* iii. (1844), 405, t. 17. *A. lucens*, *Herb. Madr. A. flavidum*, *Herb. Ham.* *Spathium monostachyum*, *Edgew. in Calc. Journ. Nat. Hist.* iii. (1843), 533, t. 16. *Potamogeton indicus*, *Roth ex Roem. & Sch. Syst.* iii. 576. *Saururus natans*, *Linn. Mant.* 227.—*Rheede Hort. Mal.* ii. t. 15.

Tanks, &c., throughout INDIA and CEYLON.—DISTRIB. Trop. Asia and Australia.

Leaves 3-6 in., acute or obtuse, herbaceous, base cuneate rounded or cordate. *Spike* 1-6 in., lax or dense-fl. *Sepals* obovate to lanceolate. *Stamens* 6. *Seeds* oblong.—Submerged leaves membranous transparent and with distinct cross-nervules as in *A. crispum*.

2. **A. crispum**, *Thunb. Nov. Gen.* i. 73; leaves submerged from linear-oblong to lanceolate 3-7-nerved membranous translucent cross-nervules distinct, spike solitary, sepals much longer than the 3-4 smooth 1-2-seeded follicles. *Thw. Enum.* 333. *A. undulatum*, *Roxb. Fl. Ind.* ii. 211; *Wall. Cat.* 5167, D. 5168; 5175, F.; *Aitchis. Cat. Panjab Pl.* 145. *Ouvirandra undulata*, *Edgew. in Hook. Lond. Journ. Bot.* iii. (1844), 405, t. 18. *Spathium undulatum*, *Edgew. in Calc. Journ. Nat. Hist.* iii. (1843), 533, t. 15.—*Limogeton*, *Edgew. ex Griff. Notul.* iii. 203.

Tanks throughout INDIA and CEYLON.—DISTRIB. Australia.

Leaves 1-3 ft., flat or undulate; base acute rounded or cordate. *Sepals* very variable in size, if two species be not confounded under this name. *Roxburgh* describes them "as in *monostachyon*," but in some specimens they are fully $\frac{1}{2}$ in. long.

3. **A. echinatum**, *Roxb. Fl. Ind.* ii. 210; leaves floating linear-oblong 3-5-nerved opaque cross-nervules obsolete, spike solitary, sepals shorter than the 3 echinate 2-seeded follicles.

Tanks in BENGAL, *Roxburgh*.

I have seen but one specimen of what I take to be this plant, in *Herb. Wight*, named *A. dispernum*. *Wight* says it quite resembles *A. monostachyon*, except in the follicles, which are larger, 2-seeded, more narrowed into a nearly straight beak, and they are dorsally irregularly ridged. *Roxburgh* describes *echinatum* as about 6-seeded; but he figures on the plate of *A. monostachyon*, apart from the enlarged 6-seeded follicles of that plant, 3 others carpels which are strongly echinate and 2-seeded, and to which he doubtless alludes under his description of the former,

saying, "There is a var. if not a distinct species with hedgehog 2-seeded capsules, but in all other respects the same."—It follows that he, by inadvertence, describes the follicles of *A. echinatum* as 6-seeded.

4. **A. microphyllum**, *Roxb. Fl. Ind.* ii. 211; leaves very small oblong long-petioled sides incurved, spike solitary, sepals much larger than the 3 smooth 1-2-seeded follicles, seeds globose. *Spathium microphyllum*, *Voigt Hort. Suburb. Calcutt.* 694.

BHOTAN MTS.; in damp places, *Roxburgh*.

I have seen no specimens, and *Roxburgh's* description differs much from a drawing in his collection. The latter represents a plant seven inches high, with a smooth naked tuber, four leaves with sheathing petioles $1\frac{1}{2}$ in. long, blade $\frac{1}{2}$ by $\frac{1}{4}$ in. concave recurved, apparently oblong acute, and quite opaque; spike $1\frac{1}{2}$ in., clothed with spreading white sepals $\frac{1}{2}$ 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 $\frac{1}{8}$ broad, and the spike as everywhere covered with beautiful blue flowers. The globose seeds are remarkable.

3. **POTAMOGETON**, *Linn.*

Submerged water-plants with creeping rootstock. *Leaves* submerged or floating, opposite or alternate, entire or toothed; stipules intrafoliaceous. *Flowers* small, spicate on a scape rising from a membranous spathe, ebracteate. *Perianth-segments* 4, concave, green, valvate. *Anthers* 4, sessile on the segments, didymous, slits extrorse. *Carpels* 4, sessile, 1-celled, 1-ovuled; stigma subsessile or decurrent, persistent; ovule inserted in the inner angle of the cell, campylotropous. *Drupelets* small, coriaceous or spongy. *Seed* subreniform; embryo macropodal.—Species about 50, cosmopolitan.

In determining the Indian species of *Potamogeton* I have had the invaluable aid of Mr. Arthur Bennett, F.L.S., whose knowledge of the genus is as full as it is accurate.

* *Upper or all the leaves floating.*

1. **P. indicus**, *Roxb. Fl. Ind.* i. 452; upper leaves floating oblong elliptic or elliptic-lanceolate coriaceous, lower submerged longer narrower membranous, stipules $1-1\frac{1}{2}$ in. free, spike dense-fld., drupelets small smooth. *Kunth Enum.* iii. 139; *Don Prodr.* 21; *Wall. Cat.* 5175 excl. F.; *Grah. Cat. Bomb. Pl.* 200; *Dalz. & Gibs. Bomb. Fl.* 248. *P. Roxburghianus*, *Schult. f. Mant.* iii. 367. *P. natans*, *Thw. Enum.* 333.

Throughout the plains of INDIA, ascending the Himalaya to 9000 ft. in Sikkim. *BUUMA*, *Collett.* *CEYLON*, *Thwaites.*—DISTRIB. Malay and Sandwich Islds.

Stem terete. *Floating leaves* $3-4\frac{1}{2}$ by $1-2\frac{1}{2}$ in., alternate or uppermost opposite, base acute or rounded, opaque; stipules as long as the petioles or shorter. *Peduncle* stout or slender.—Differs from *P. natans* especially in the shorter stipules and smaller drupelets.

2. **P. natans**, *Linn. Sp. Pl.* 126; upper leaves floating oblong elliptic or elliptic-lanceolate biplicate at the insertion of the petiole, submerged few or 0, stipules 4-5 in. free spikes dense-fld., peduncle stout, drupelets dorsally keeled shortly beaked. *Kunth Enum.* iii. 127. *Reichb. Ic. Fl. Germ.* vii. t. 50; *Boiss. Fl. Orient.* v. 15; *Aitch. Cat. Panjab Pl.* 145. *P. rufescens*, *Aitch. l. c.* 145.

The PANJAB, Thomson. KASHMIR, alt. 5000 ft., Jacquemont, &c.—DISTRIB. widely diffused especially in temp. climates.

Stem terete. Leaves 2-6 in.; submerged (if present) sessile, long, narrow, and without a limb. Peduncle stout. Drupelets $\frac{1}{2}$ in. long.

3. **P. oblongus**, Viv. *Fl. Ital.* 2, t. 13; floating leaves long-petioled elliptic or lanceolate thinly coriaceous, submerged narrowly lanceolate, stipules $1\frac{1}{2}$ in., peduncle and dense-fld. spike very slender, drupelets minute shortly beaked not keeled. *Engl. Bot.* t. 2849. *P. polygonifolius*, Pourr. in *Mem. Acad. Toul.* iii. (1788), 325; *Hook. f. Students' Brit. Fl. Ed.* 3, 431. *P. digynus* and *P. elegans*, Wall. *Cat.* 5177, 5178.

NEPAL, Wallich. KHASIA HILLS, alt. 4-5000 ft. J.D.H. & T.T. SINGAPORE ? Wallich.—DISTRIB. Temp. and trop. regions of the old world.

The more membranous leaves, shorter stipules, very slender peduncle and spike, smaller flowers and minute drupelets not $\frac{1}{10}$ in. long, distinguish this from *P. satans*.

4. **P. javanicus**, Hassk. in *Verh. Natuurk. Ver. Ned. Ind.* i. (1856), 26; floating leaves small ovate-oblong or elliptic acute at both ends 5-7-nerved longer than their petiole, submerged linear acuminate, stipules $\frac{1}{2}$ -1 in., peduncle slender, spike lax fld., drupelets $\frac{1}{2}$ -orbicular beaked, ribs often toothed or tubercled, beak hooked, *Miq. Fl. Ind. Bat.* iii. 750. *P. tenuicaulis*, F. Muell. *Fragm.* i. 90, 244; *Benth. Fl. Austral.* vii. 171. *P. parvifolius*, Buchen. in *Brem. Abhandl.* vii. (1880), 32. *P. heterophyllus*, Ham. in Wall. *Cat.* 5181. *P. hybridus*, Mich. ? *Herb. Ind. Or. Hf. & T.*

Plains of INDIA; ascending the Himalaya to 7000 ft., in the N. West, and 9000 ft. in Sikkim. KHASIA HILLS, alt. 6000 ft.—DISTRIB. Trop. Asia, Africa and Australia.

Stem very slender. Leaves $\frac{1}{2}$ -1 $\frac{1}{2}$ in.; blade twice as long as the petiole or longer. Spike $\frac{1}{2}$ - $\frac{3}{4}$ in.; flowers very small, in interrupted whorls; peduncle as long or longer. Sepals orbicular-obovate. Drupelets $\frac{1}{12}$ in., turgid, beak stout.

** Leaves all submerged, ovate oblong or broadly linear, translucent.

5. **P. perfoliatus**, Linn. *Sp. Pl.* 126; stem stout, leaves amplexicaul ovate-cordate entire 5-9-nerved, peduncle short stout, drupelets hardly keeled shortly beaked. *Kunth Enum.* iii. 133; *Reichb. Ic. Fl. Germ.* vii. t. 29; *Boiss. Fl. Orient.* v. 17; *Dalz. & Gibs. Bomb. Fl.* 248.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4-8000 ft. WESTERN TIBET, alt. 8-14,000 ft.—DISTRIB. N. temp. regions, Australia.

Stem terete, dichotomous. Leaves 1-4 in., margins scaberrulous, upper opposite; stipules small, caducous. Peduncle stout, not thickened upwards. Spike dense-fld. Sepals long-clawed. Drupelets $\frac{1}{10}$ in., compressed, beak straight.

6. **P. crispus**, Linn. *Sp. Pl.* 126; stem slender, leaves semiamplexicaul linear or linear-oblong crisped serrulate 3-nerved, peduncle curved tapering upwards, spike few-fld., drupelets obliquely ovoid long-beaked. *Kunth Enum.* iii. 133; *Reichb. Ic. Fl. Germ.* vii. t. 29, 30; *Boiss. Fl. Orient.* v. 17. *P. tuberosus*, Roxb. *Fl. Ind.* i. 472; Wall. *Cat.* 5174; *Grah. Cat. Bomb. Fl.* 200; *Dalz. & Gibs. Bomb. Fl.* 248. *P. crenulatus*, Don *Prodr.* 22.

PLAINS OF INDIA AND TEMPERATE HIMALAYA; from Kashmir to Bhotan, alt. 4-6000 ft. MUNIPORE, Watt.—DISTRIB. N. and S. temp. and sub trop. 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-fl.; flowers very small. *Drupelets* $\frac{1}{2}$ in., obliquely ovoid, compressed, ribs entire or toothed.

7. **P. lucens**, Linn. *Sp. Pl.* 126; stem stout, leaves large subsessile oblong-lanceolate cuspidate undulate serrulate many-nerved, peduncle stout thickened upwards, spike stout, drupelets small turgid shortly beaked. *Kunth Enum.* iii. 132; *Reichb. Ic. Fl. Germ.* vii. t. 36, 37, 40; *Boiss. Fl. Orient.* v. 16.

KASHMIR, alt. 5-6000 ft., Jacquemont, &c. KUMAON, alt. 6400 ft., Strachey & Winterbottom.—DISTRIB. N. temp. regions, Australia.

Stem branched. *Leaves* 4-10 in., very variable, upper opposite sometimes floating; stipules large, long, 2-winged or -keeled. *Drupelets* $\frac{1}{10}$ in., convex on both faces, obtusely beaked.

8. **P. mucronatus**, Presl *Epimel.* 245; leaves all submerged longer than their petioles, elliptic- or oblong-lanceolate acute or cuspidate membranous many-nerved base acute or obtuse, stipules much longer than the petiole lanceolate connate, peduncle very long, spike of interrupted groups or whorls of flowers. *P. malaianus*, Miq. *Ill. Fl. Archip. Ind.* 46. *P. lucens*, Ham. in Wall. Cat. 5176.

BENGAL; at Dinagepore and Kulna and Karnata, Hamilton.—DISTRIB. Borneo Philipp. Islds.

Leaves 3-5 by $\frac{1}{2}$ - $\frac{3}{4}$ in., 5-9 or more-nerved, blade twice or thrice as long as the petiole; stipules 1-1 $\frac{1}{2}$ in. *Spike* 1 $\frac{1}{2}$ -2 in.; flowers laxly crowded or whorled. *Sepals* suborbicular, very shortly clawed. *Fruit* $\frac{1}{2}$ -orbicular, shortly beaked.—Has a good deal the aspect of *P. lucens*, to which Hamilton referred it. The specimens are very poor, and insufficient for a satisfactory diagnosis.

*** *Leaves* all submerged, very narrowly linear or filiform.

9. **P. pectinatus**, Linn. *Sp. Pl.* 127; leaves filiform acute opaque 1-3-nerved, margins slightly thickened, stipules adnate to the leaf-sheath, drupelets large turgid smooth hardly beaked. *Kunth Enum.* iii. 137; *Reichb. Ic. Fl. Germ.* vii. t. 19; *Boiss. Fl. Orient.* v. 18; *Aitch. Cat. Panjat Pl.* 145. *P. marinus*?, Ham. in Wall. Cat. 5179 A, B in part. *Ruppia* subsessilis, Thw. *Enum.* 333, in part.

Plains of INDIA, the HIMALAYA, and WESTERN and EASTERN TIBET, alt. 12-17,000 ft. CEYLON, Thwaites.—DISTRIB. most regions.

Stem filiform, densely distichously branched. *Leaves* 3-8 by $\frac{1}{10}$ - $\frac{1}{8}$ in., lower sometimes 5-nerved. *Peduncle* not thickened upwards; flowers interruptedly whorled. *Drupelets* $\frac{1}{8}$ in., dimidiate-obovoid.

10. **P. pusillus**, Linn. *Sp. Pl.* 127; leaves narrowly linear or filiform acute usually 3-nerved membranous, stipules small free, peduncle long filiform, flowers few minute clustered, drupelets turgid stoutly beaked obtusely keeled. *Kunth Enum.* iii. 136; *Reichb. Ic. Fl. Germ.* vii. t. 22; *Boiss. Fl. Orient.* v. 18; Wall. Cat. 5180.

KASHMIR, alt. 5000 ft., Thomson.—DISTRIB. N. and S. temp. regions.

Stem filiform, densely distichously branched. *Leaves* $\frac{1}{2}$ -3 in., rarely acuminate, rarely 5-7-nerved. *Spike* 6-10-fl. *Drupelets* obliquely ovoid.

Subsp. *flabellatus*, Hook. f., Students' Brit. Fl. 436; leaves $\frac{1}{12}$ in. broad 3-5-nerved. *P. flabellatus*, Bab. in Proc. Linn. Soc. Ser. ii. (1853), nom.; in *Phytologist*, iv. 1158. *P. marinus*? Ham. in Wall. Cat. 5179 B, in part.—Upper Bengal; Patna, Wallich. The Panjab, Thomson.—DISTRIB. Britain.

4. **RUPPIA**, Linn.

Submerged slender branched brackish-water plants. *Leaves* elongate, filiform, sheaths stipuliform. *Flowers* minute, bisexual, 2-6 together within the leaf-sheath on a short peduncle which usually elongates greatly after flowering, and is then straight or spirally twisted. *Perianth* 0. *Anthers* 2, sessile, opposite, 2-celled. *Carpels* 4, 1-ovuled, at length (in fruit) long-stipitate, stigma sessile; ovule pendulous. *Achenes* ovoid, obtuse or beaked. *Seed* uncinate, embryo macropodal.—Species temperate and subtropical.

R. rostellata, Koch in Reichb. *Ic. Crit.* ii. 66, fig. 306; *Ic. Fl. Germ.* vii. t. 25; peduncle straight after flowering, achenes obliquely ovoid acutely beaked. Boiss. *Fl. Orient.* v. 20. *R. maritima*, Griff. *Notul.* iii. 196; *Ic. Pl. Asiat.* t. 257-259.

THROUGHOUT INDIA and in CEYLON, in brackish water.—DISTRIB. Europe temp. and trop. Asia.

Stem 2 ft. and upwards. *Leaves* 1-3 in. *Fruiting peduncle* 1-6 in. *Achenes* $\frac{1}{2}$ 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. PEDICELLATA*; male peduncle short, achenes 2-4 subsessile, back crenate or tubercled, style as long as the body of the achene or longer, anthers 2-celled. Aschers. *Fl. Brandenb.* 668; Boiss. *Fl. Orient.* v. 15; Micheli, *Nov. Gen.* t. 34, f. 2. *Z. pedunculata*, Reichb. *Fl. Germ.* vii. t. 16; *Ic. Crit.* viii. t. 760. *Z. gibberosa*, Reichb. *l. l. c. c. t.* 16 and t. 759. *Ic. Fl. Germ.* vii. t. 21, 22. *Z. pedicellata*, Ham. in Wall. *Cat.* 5185; Griff. *Notul.* iii. 190; *Ic. Pl. Asiat.* t. 255, 256.

Salt marshes and lagoons throughout INDIA, ascends to 15,000 ft. in W. Tibet.—DISTRIB. (of *Z. palustris*), all regions but ? Australia.

I find the following forms amongst the Indian specimens: *a*, from Western Tibet; flowers sessile or very shortly peduncled, achenes stipitate, dorsally crenate, style shorter than the achene; *b*, from the Panjab and Behar; flowers sessile, achenes stipitate smooth or tubercled dorsally or ventrally or both, style very long; *c*, from Western Tibet, alt. 12-13,000 ft.; flowers sessile, achenes sessile very slender; *d*, from the Panjab; flowers subsessile, style as long as the achenes; *e*, from the Panjab and Behar; flowers peduncled, achenes small as long as their stalks, style shorter than the achene.

6. **NAIAS**, Linn.

Submerged plants; stem branched, filiform, smooth or muricate. *Leaves* opposite alternate or whorled, linear, entire or toothed. *Flowers* minute, axillary, monœcious or diœcious. MALE FL. *Perianth* an outer tubular or inflated entire or 4-fid tube and a hyaline inner. *Stamen* 1, adnate

to the inner perianth, apiculate or cuspidate, 1-4-celled. *Fem. perianth* 0, or hyaline and adherent to the carpel. *Carpel* 1, sessile, 1-ovuled; stigmas 2-4, slender; ovule basilar, erect, anatropous. *Achene* oblong. *Seed* erect, testa very thin; embryo straight.—Species about 10, temperate and tropical.

The Indian species of this genus require a very close examination, which I regret to say I have not materials in flower and fruit sufficient to enable me to undertake.

1. **N. major**, *All. Fl. Pedem.* ii. 221; stem terete toothed, leaves linear almost pinnatifidly toothed, teeth triangular, base hardly dilated, flowers solitary, anther 4-celled. *Kunth Enum.* iii. 112; *Nees Gen. Fl. Germ.* iii. t. x.; in *Linnaea*, ix. t. 7, and x. t. 1; *Boiss. Fl. Orient.* v. 27. *N. fucoides*, *Griff. Notul.* iii. 184; *Ic. Pl. Asiat.* t. 251, f. 1. *N. muricata*, *Del. Fl. Egypt.* 281. *N. spinosa*, *Ham. in Wall. Cat.* 5182.

Throughout India, in fresh and brackish water, ascending to 8000 ft. in Western Tibet. CEYLON.—DISTRIB. Europe, Asia, Africa.

Stem terete, branched. *Leaves* $\frac{1}{2}$ –1 $\frac{1}{2}$ in., teeth 4–8 on each side, dorsally spinous; sheath with rounded entire sides. *Flowers* dioecious; invol. of male oblong, 2-3-toothed. *Carpel* oblong, stigmas 2-3, filiform. *Achene* $\frac{1}{2}$ – $\frac{3}{4}$ in.

2. **N. graminea**, *Del. Fl. Egypt.* 282, t. 50, f. 3; leaves narrowly linear or subulate acuminate flaccid acutely many-toothed, basal auricles erect lanceolate toothed on both margins, flowers fascicled monœcious, anthers 4-celled. *Kunth Enum.* iii. 115; *Boiss. Fl. Orient.* v. 28; *A. Braun in Seem. Journ. Bot.* ii. (1864) 278, f. 5. *N. seminuda*, *Griff. Notul.* iii. 184; *Ic. Pl. Asiat.* t. 251, f. 2, and t. 253, 254. *N. semistipula*, *Balb. Fl. Ticin.* t. 15. *Caulinia alzanensis*, *Pollin. Fl. Veron.* iii. 49. *Fluvialis indica*, *Pers. ex Wall. Cat.* 5183 B.

Throughout INDIA in still fresh water, and CEYLON.—DISTRIB. the Old World generally.

Stem 1-2 ft. *Leaves* $\frac{2}{3}$ –1 in., usually whorled, broader, more transparent and more acutely toothed than is *N. minor*.

3. **N. minor**, *All. Fl. Pedem.* ii. 221; leaves very narrowly linear remotely toothed basal auricles rounded or truncate toothed rarely acute and entire, flowers fascicled monœcious, anther 1-celled. *Kunth Enum.* iii. 113; *Nees Gen. Fl. Germ.* iii. t. x.; *Boiss. Fl. Orient.* v. 28. *N. dichotoma*, *Roxb. Fl. Ind.* iii. 749. *N. ternata*, *Roxb. ex Griff. Notul.* iii. 183; *Griff. Ic. Pl. Asiat.* t. 252. *N. indica*, *Cham. in Linnaea*, iv. 501. *Caulinia indica*, and *fragilis*, *Willd. in Mem. Acad. Berl.* (1798) 89. *C. indica*, *Wall. Cat.* 5183, *in part.*

Throughout INDIA and CEYLON, in still sweet water.—DISTRIB. Old World generally.

Stem very slender, much branched. *Leaves* spreading, or the upper recurved, $\frac{1}{2}$ in. or less, hardly $\frac{1}{2}$ in. broad, green or brown when dry.—There may be two or more species in India under the above name. The other plant under Wallich's 5183 is a *Chara*.

4. **N. falciculata**, *A. Braun in Seem. Journ. Bot.* ii. (1864) 278, f. 4; stem rigid, leaves as in *N. minor*, but auricles falcately incurved entire or the inner margin entire the outer toothed.

MADRAS; at Tuticoreen, *Wight*.—DISTRIB. Philippine Islands.

I greatly doubt this being distinct from *N. minor*, amongst numerous specimens of which I find some with basal auricles very like those figured by Braun as *falciculata*.

INDETERMINABLE SPECIES.

N. TENUIS, A. Br. (not *Z. tenuis*, Reut. Cat. Jard. Gener., 1854) is a plant from Behar alluded to by Magnus in his "Beitrag. Gatt. Naias," Vorwort, p. vii., and refers probably to a form of *N. minor* as above diagnosed.

N. HETEROMORPHA, Griff. ex Voigt Hort. Suburb. Calcutt. 694. A Serampore specimen so named in Herb. Kew, by Griffith, has a very long laxly leafy stem, the long toothed leaves have no auricles, or most minute toothed ones. It is not in flower or fruit.

N. RIGIDA, Griff. Notul. iii. 181. I cannot identify any Indian species with this. It is a native of Serampore, described as blackish green when dry with fleshy rigid leaves. Some specimens included under *N. minor* answer to the colour.

7. *CYMODOCEA*, Kœnig.

Submerged marine plants; rootstock rigid, jointed, creeping. Leaves oblong or linear; sheaths stipular. Flowers axillary, uni- or bi-sexual, in membranous sheaths. Perianth 0. MALE FL. Anthers 2, elongate, connate, stipitate, slits extrorse; pollen confervoid. FL. FEM. Carpels 2, subsessile, ovoid, compressed, 1-ovuled; style short, stigmas subulate recurved; ovule pendulous, orthotropous. Fruit of 2 ovoid coriaceous or woody and externally succulent carpels. Seed pendulous; testa thick; embryo inflexed.—Species 4 or 5, Indian and Pacific Oceans.

As this sheet was passing through the press, I received from Dr. Trimen a list of the Ceylon Halophytes known to him, and in which I find *Cymodocea serrulata* (true) and *C. australis*. And amongst the *Hydrocharideæ*, there are to be added at p. 663 of vol. v., *Halophila Beccarii*, Asch., and *Thalassia Hemprichii*, Asch.

1. *C. ciliata*, Ehrenb. ex Aschers. in Sitzb. Ges. Naturf. Fr. Berl. (1867) 3; in *Linnæa* xxxv. 162; leaves 3-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in. linear falcate, tip rounded ciliate-serrulate. Boiss. Fl. Orient. v. 23; Benth. Fl. Austral. vii. 178; Aschers. in Sitzb. Bot. Ver. Brandb. (1882) 28. *Thalassia ciliata*, Kön. Ann. Bot. ii. 97; Kunth Enum. iii. 120. *Posidonia serrulata*, Thw. Enum. 333. *Zostera ciliata*, Forsk. Fl. Ægypt. Arab. 157.

ANDAMAN ISLANDS, Prain. CEYLON, Gardner, Harvey.—DISTR. of the genus. Stem or rhizome 3-12 in., woody, branched, covered with annular scars. Fl. and frt. unknown.

2. *C. serrulata*, Aschers. & Magn. in Sitzb. Ges. Naturf. Fr. Berl. (1867) 3; leaves 4-6 by $\frac{1}{2}$ - $\frac{1}{4}$ in. linear nearly straight, tip entire or denticulate. *Posidonia serrulata*, Spreng. Syst. i. 181.

CEYLON, Thwaites (C.P. 3056).—DISTRIB. of the genus.

I have seen no Ceylon flowering or fruiting specimens.

3. *C. isostifolia*, Aschers. l.c.; in *Linnæa*, l.c. 163; and in Nuov. Giorn. Bot. ii. 182; stem short, leaves terete fleshy grooved tip 3-toothed. Boiss. Fl. Orient. v. 22; Benth. Fl. Austral. vii. 178. *C. æquorea*, Kunth Enum. iii. 118 (excl. Syn.); Thw. Enum. 333.

SOUTH CARNATIC; at Tuticoreen, Wight. CEYLON, Harvey, Glenie.—DISTRIB. Indian Ocean.

Leaves 3-5 by $\frac{1}{2}$ - $\frac{1}{10}$ in., glaucous. Flowers in dichotomous cymes.

4. *C. australis*, Trim. Cat. Ceylon Pl. 99; leaves 5-7 by $\frac{1}{2}$ - $\frac{1}{4}$ in., linear nearly straight tip rounded or truncate and 3-toothed. *Halodule australis*, Miq. Fl. Ind. Bat. iii. 227. *Diplanthera tridentata*, Steinh. in Ann. Sc. Nat. Ser. ii. ix. 98. *Zostera uninervis*, Forsk. Fl. Ægypt. Arab. cxx. and 157.



Cymodocea.]

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. isatifolia*, as provisional only.

ORDER CLXXI. **ERIOCAULEÆ.**

Marsh or aquatic scapigerous herbs. *Leaves* narrow. *Flowers* very minute, in involucrate heads, bracteate, unisexual, usually monœcious; perianth inferior. **MALE FL.** *Sepals* of 2-3 free or connate scales. *Petals* 2-3, equal or unequal, often very obscure, inserted on the top of a clavate elongate stipes. *Stamens* 6 or fewer, some often reduced to filaments, 3 opposite to or adnate to the petals; anthers dorsified. *Pistillode* minute or 0. **FEM. FL.**; *sepals* 2-3, caducons. *Petals* 3 (rarely 2 or 0) persistent, spatulate or oblanceolate, usually ciliate or villous, and with a black gland on the disk. *Ovary* 3, rarely 2-celled; style short, persistent, stigmas 2-3 slender, with sometimes interposed lobes or appendages; ovules solitary in the cells, pendulous, orthotropous. *Capsule* deeply 3-lobed, membranous; lobes globose, loculicidal. *Seeds* pendulous, testa coriaceous, striolate and often papillose; embryo outside the floury albumen.—Genera 6, species 6-700 chiefly tropical.

The Indian species all belong to the genus *Eriocaulon*, in which the anthers are didymous and 2-celled, the stigmas without appendages, and the inner involucre bracts are not radiating. They are most difficult of classification, presenting no good sectional characters, that of flowers trimerous or dimerous being quite deceptive. The leaves vary greatly in length, breadth and nervation; as do the scapes in length. The sheath of the scape is usually membranous at the tip, but sometimes green, which latter is, I think, a good character. The outer invol. bracts may be erect spreading or deflexed, in the latter case they are usually hidden under the flowers, but they are sometimes though hidden spreading. The male fl. are invariably pedicelled; the fem. usually so, and this appears to afford a pretty good character; as is that of the fem. petals and ovary being raised on a stipes above the sepals, or not. The 3 male sepals may be, in the same head, connate in a funnel-shaped sheath split on one side, or 2, or all free. The male petals are often obsolete, and the filaments very variable in number and length in the same head. The fem. sepals are normally 3, and are very caducous, but the anticonous 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 hairiness, 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 striolations. The hairs of the head are of two kinds, white opaque stout obtuse bristles, and capillary transparent jointed ones; they are sometimes intermixed, and it is often difficult to say to which category the hairs should be referred.

In the following epitome of the Indian *Eriocaulons* (with which I am far from being satisfied) I have been obliged to propose a good many new species. Some of them may be described Malayan ones, of which I have seen no specimens, and the descriptions of which are too imperfect for their identification. I have minutely examined most of the old world species accessible to me, but find very few conspecific with the Indian.

ERIOCAULON, Linn.

A. Aquatics. *Stems* elongate, branched, submerged, densely leafy, upper branches floating. *Leaves* capillary. *Heads* very small. *Invol. bracts* very small, oblong or cuneate, glabrous. (See also *E. Dalzellii* at end of genus.)

1. ***E. setaceum***, *Linn. Sp. Pl.* 87; receptacle conical villous, fl. bracts cymbiform acute coriaceous glabrous black, seeds dark brown. *Kunth Enum.* iii. 550. *Steud. Syn. Pl. Cyp.* ii. 270; *Thw. Enum.* 341. *E. intermedium*, *Körn. in Linnæa*, xxvii. 601.—*Rheede Hort. Mal.* xii. t. 63.

MALABAR; at Quilon, *Wight*. CEYLON; *Walker*, &c.

Stem 2–3 ft., stout or slender, flexuous. *Leaves* $1\frac{1}{2}$ –2 in., flexuous, 1-nerved. *Peduncles* very many, slender, $1\frac{1}{2}$ –3 in.; sheath $\frac{3}{4}$ –1 in., tip membranous. *Heads* $\frac{1}{2}$ in. diam. *Male petals* obscure; stamens 6; fem. sepals cymbiform, glabrous or nearly so; petals narrow, ciliate, with or without a gland. *Seeds* oblong, quite smooth.

2. ***E. capillus-naiadis***, *Hook. f.*; receptacle conical or convex villous, fl. bracts whitish membranous outer glabrous inner with long white dorsal hairs, seeds dark olive-green or black. *E. setaceum*, *Wall. Cat. n.* 6077; *Mart. in Wall. Pl. As. Rar.* iii. 29; *Körn. in Linnæa*, xxvii. (excl. syn. *Linn.*).

BENGAL; Serampore, *Griffith*, Vicrampore, *Clarke*. KHASIA HILLS; at Nonkreem, *J. D. H. & T. T. BURMA*; Tavoy and Pegu, *Wallich*, &c. The CONCAN, *Stocks*.—DISTRIB. Cochin China.

Closely resembles *E. setaceum* in habit, foliage, &c. In the Burmese and Khasian specimens the fem. petals are ciliate with long hairs, in the Concan and Cochin-Chinese they are nearly glabrous.

3. ***E. bifistulosum***, *Van Heurck. Obs. Bot.* 105; receptacle conical glabrous, fl. bracts dark all with short dorsal bristles, seeds chesnut brown. *E. setaceum*, *Benth. Fl. Austral.* vii. 191.

KHASIA HILLS, at Myrung, alt. 5000 ft. *Griffith*.—DISTRIB. W. Africa, Australia.

This is closely allied to *E. capillus-naiadis* and *setaceum*, differing from both in the glabrous receptacle, and from the former in the very short hairs of the fl. bracts which are more mucronate and less membranous; the seeds too are much smaller. The fem. petals are narrow, glabrous, with minute apical glands, as in the Concan specimens of *E. capillus-naiadis*.

B. Terrestrial or marsh plants; stem rarely elongate.

* Petals of male fl. 3, one much the largest and protruded beyond the floral bracts, rarely subequal and all protruded. *Invol. bracts* globose in all; floral bearded.

† Heads more than $\frac{1}{2}$ in. diam. Receptacle villous.

4. ***E. robustum***, *Steud. Syn. Pl. Cyp.* 271; subcaulescent, scape subsolitary very stout, invol. bracts ovate-oblong or lanceolate acuminate pale shining, sepals and petals villously bearded, fem. fl. subsessile. *Körn. in Linnæa*, xxvii. 674. *S. bracteosum*, *Steud. l. c.* 272.

NILGHIRI HILLS; alt. 6000 ft., *Wight*, &c.

Rootstock often as thick as the thumb. *Leaves* 1–9 by $\frac{1}{4}$ – $\frac{3}{4}$ 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* $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; invol. bracts many-seriate, scarious; receptacle convex, villous; fl. bracts narrowly lanceolate, acuminate. *Flowers* 3-merous; sepals of both sexes 3, concave villous; stamens 6; fem. fl. with the ovary and petals stipitate above the sepals, stipes villous.—Much the stoutest Indian species.

5. ***E. caulescens***, *Hook. f. & Thoms. Herb. Ind. Or.*; caulescent, scape subsolitary from the stem or its branches, invol. bracts oblong outer

Eriocaulon.]

CLXXI. ERIOCAULLÆ. (J. D. Hooker.)

obtuse inner acute black shining, fem. fl. subsessile, sepals and petals villously bearded. *E. atratum*, β major, *Thw. Enum.* 341.

CEYLON; *Wight*; *G. Thomson*; central province, alt. 5-7000 ft., *Thwaites* (No. 131).

Stem simple, in young plants 3-4 in. long and as thick as the thumb, often copiously branched in old; branches 6-10 in. long, leafy throughout. *Leaves* 2-6 by $\frac{1}{2}$ - $\frac{3}{4}$ in., narrowed from the base to the obtuse tip, rigid, quite opaque; nerves very many, close, obscure. *Scape* stout or slender. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in.; invol. bracts sub 3-seriate, scarious; receptacle flat, villous; fl. bracts oblanceolate, acute, dark, shortly bearded; 2 sepals of fem. fl. concave, the 3rd flat; petals very unequal, glands large; ovary with petals stipitate, stipes villous.—The only Indian much-branched species.

†† Heads $\frac{1}{2}$ in. diam. or less.

§ *Receptacle villous.*

6. *E. subcaulescens*, *Hook. f.*; stem short stout densely leafy, leaves linear acute concave thick opaque, scapes 2-3, bracts all yellowish, involucre broadly obovate scarious, floral cuneately oblanceolate acute bearded, fem. fl. sessile, petals oblanceolate villous, ovary with petals sessile.

CEYLON; Newera Ellia, *Gardner*, *Thwaites* (C.P. 61 and 789 in *Herb. Kew*).

Stem 3-4 in., as thick as the little finger. *Leaves* very many, 2-3 by $\frac{1}{2}$ - $\frac{3}{4}$ in., erect, very many-nerved, quite smooth on both surfaces; sheath slightly woolly at the base. *Scape* 12 in., slender. *Head* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., depressed spherical, pale; male and fem. sepals 2 concave, 1 flat, all bearded; fem. petals oblanceolate villous; ovary villous at the base. *Seed* sub-globose, smooth.—Closely resembles a Bornean species from Kina Balu, in which the male petals are shorter.

7. *E. longicuspis*, *Hook. f.*; stem short stout, leaves short linear-subulate acuminate flat thick opaque, scapes tall very slender, invol. bracts very small cuneately obovate scarious blackish, floral cuneate tip black rounded toothed and with a long black cusp, fem. fl. pedicelled, petals oblanceolate ciliate with the ovary long-stipitate. *E. cristatum*, var. *Thw. Enum.* 341.

CEYLON, *Thwaites* (C.P. 1002 in *Herb. Kew*; 789 in *Thw. Enum.*).

Rootstock as thick as a swan's quill. *Leaves* 2-2 $\frac{1}{2}$ 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 pedicels; sepals 3, free, tips bearded; stamens 6; fem. petals very unequal, longer than the sepals, glands large.—I have seen only one specimen of this well-marked species.

8. *E. polycephalum*, *Hook. f.*; rootstock very stout, leaves elongate narrowly sword-shaped acuminate flat thin, scapes very many tall slender, invol. bracts very small cuneately obovate scarious blackish shining, floral oblanceolate long-cuspidate black softly bearded, fem. fl. shortly pedicelled, sepals and petals softly hairy, ovary subsessile.

CENTRAL INDIA; near Pachmarchi, *Duthie*.

Rootstock as thick as the middle finger. *Leaves* many, 2-8 by $\frac{1}{2}$ - $\frac{3}{4}$ in., lower recurved, very many-nerved, narrowed to the acuminate tip, rather glossy. *Scapes* 30 or more, 8-20 in. *Heads* $\frac{1}{2}$ - $\frac{3}{4}$ in., globose, ash-colored, hairs flexuous; receptacle convex, shortly villous; tips and cusps of bracts black; male sepals 3, free; stamens 6; fem. sepals long, narrow; petals narrowly oblanceolate, ciliate with long soft hairs.—A very handsome species, closely allied to *E. longicuspis*, but very much larger with many scapes.



9. ***E. odoratum***, Dalz. in Hook. *Kew Journ.* iii. (1851), 280; leaves short subulate recurved 7-nerved, scapes many filiform, heads snow white, invol. bracts short obovate-oblong obtuse scarious dark, floral cuneately obovate bearded, fem. fl. pedicelled, sepals narrow subequal oblanceolate, petals oblanceolate villously ciliate, ovary with petals very shortly stipitate. Dalz. & Gibs. *Bomb. Fl.* 280; Kærn. in *Linnæa*, xxvii. 683.

The CONCAN; prov. Malwan, in stagnant water, Dalzell.

Leaves 1 in., $\frac{1}{8}$ in. broad at base, narrowed thence to the finely acuminate tip, translucent. Scapes 6–10 in., deeply grooved; tip of sheath membranous. Heads $\frac{1}{8}$ – $\frac{1}{4}$ 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***, Kærn. in *Linnæa*, xxvii. 610; leaves very slender linear obtuse opaque; scape long solitary, invol. bracts cuneately obovate black shining inner acute, floral black shortly bearded outer orbicular-obovate very shortly cuspidate inner narrow cuneate acute, fem. fl. sessile, petals oblanceolate villous.

CEYLON; Gardner (n. 972).

Densely tufted. Leaves 4–6 in., erect or spreading from an erect base, $\frac{1}{16}$ – $\frac{1}{12}$ in. broad, sheaths woolly at the base, nerves very many, close. Scapes 1 ft. and under. Heads $\frac{1}{2}$ in. diam., hemispheric; invol. bracts convex, rigid, incurved; inner floral black above the middle; recept. hemispheric, densely villous; male fl. pedicelled, stamens 6; fem. subsessile; 2 sepals of fem. concave, narrow flat; ovary sessile, base hairy.—I am rather doubtful of this being Kærnicke's *E. atratum*, which he describes from a specimen in the Berlin Herb. as being stouter than *E. cristatum*, and broader leaved. It is most like the Khasian *cristatum* of the Ceylon species.

§§ Receptacle glabrous or nearly so (or villous in *E. cristatum*, var.).

11. ***E. cristatum***, Mart. in Wall. *Pl. As. Rar.* iii. 28; Cat. 6070; densely tufted, leaves erect 3–6 in. narrowly linear flat tip obtuse rigid opaque many-nerved striate, scapes 1 or more rigid about twice as long as the leaves, heads snow-white, invol. bracts cuneately obovate edged with black, floral dark broadly obcuneate acute very shortly bearded, fem. fl. shortly pedicelled, petals narrowly oblanceolate villously ciliate, ovary sessile. Kærn. in *Linnæa*, xxvii. 609.

KHASIA HILLS; alt. 4–5000 ft., common.

Leaves $\frac{1}{2}$ – $\frac{1}{10}$ in. broad, narrowed to the obtuse tip; sheaths short, not woolly at the base. Scapes rigid, deeply grooved. Heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam., black and white; invol. bracts coriaceous; floral rather rigid; receptacle flat or convex, quite glabrous, or very sparsely hairy. Seeds oblong with papillose ridges.—The *E. cristatum* of Benth. Fl. Hongk. differs in the equal or subequal male petals.

Var. MACKII; leaves broader, receptacle densely villous.—Assam (probably Khasia) Mrs. Mack.—Perhaps a different species.

12. ***E. melaleucum***, Mart. in Wall. *Pl. As. Rar.* iii. 28; Cat. 6080; leaves 1–2 in. subulate acuminate 3–7-nerved opaque, scapes subsolitary, invol. bracts membranous black, outer obovate-oblong obtuse, acute, floral acuminate black thickly bearded, fem. fl. subsessile, petals linear villously ciliate tipped with short white bristles, glands 0, ovary with petals subsessile. Kunth *Enum.* iii. 568; Kærn. in *Linnæa*, xxvii. 164. *E. leucomelas*, Steud. *Nom. Ed.* 2, i. 585; *Syn. Pl. Cyp.* 272; *E. quinquantulare*, Herb. Heyne.

NILGHIRI HILLS, Heyne, Schmidt. ARRAKAN, King.

Leaves translucent, recurved, more opaque in Schmidt's specimen; sheath glabrous at base. Scape strongly grooved. Head $\frac{1}{2}$ in. diam. black and white;

invol. bracts at length reflexed shining; receptacle subglobose; male sepals 3 free or 2 connate, odd petal shortly protruded; fem. sepals narrow, as long as the petals, 2 free concave 3rd flat; ovary and petals very shortly stipitate.—Very near *E. atratum* in which the recept. is villous, and the odd petal of male fl. not protruded. The specimens are few and poor, except King's. Kœrnicke describes the recept. as villous, but it is decidedly glabrous in Wallich's specimen.

13. *E. 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 obovate obtuse very shortly bearded, fem. fl. sessile, petals oblanceolate obtuse villously ciliate.

KHASIA HILLS; Myrung, alt. 5000 ft. Griffith (Kew Dist. 5578, 5580); Jaintea, alt. 4000 ft., Clarke.

Leaves flaccid, 5-7-nerved; sheath not woolly at the base. Sheath of scape not lacerate at the mouth. Heads $\frac{3}{8}$ - $\frac{1}{2}$ in. diam., white and black; invol. bracts 3-4-seriate, at length lacerate, not shining; receptacle globose; sepals of male 3, free; truncate tips bearded; odd petal shortly exserted; fem. sepals 2 concave 3rd flat; ovary very shortly stipitate.—Perhaps a form of *E. miserum*, but the large leaf-sheaths are very different, and the receptacle is globose.

14. *E. miserum*, Kern. 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. Rar. iii. 28; and Cat. 6070 (in part).

SILHET; Bruce (Herb. Wall.); KHASIA HILLS, in river sand, alt. 2500 ft., Clarke.

Rootstocks matted, 1-2 in. long, slender clothed with capillary roots. Leaves few, 1-2 in., much shorter, or 0 in Clarke's specimens. Scapes 12-18 in. flexuous, not deeply grooved, tips of sheaths membranous. Head $\frac{3}{8}$ - $\frac{1}{2}$ in. diam., grey-white; fl. bracts concealed by the male petals; invol. bracts 2-3-seriate; receptacle slender, columnar; male sepals bearded, petals subequal or one longest; fem. sepals 2 oblong cymbiform 3rd flat, all bearded; ovary with petals sessile or very shortly stipitate.—Wallich's specimens are young and imperfect.

15. *E. Collettii*, Hook. f.; leaves short broadly subulate acuminate recurved many-nerved, scapes tall slender, heads globose snow-white, invol. bracts very small linear-oblong obtuse membranous pale, floral oblanceolate acute, petals of male fl. subequal, fem. fl. sessile, sepals much shorter than the petals which are villous and with the ovary shortly stipitate.

UPPER BURMA; Shan Hills, alt 4000 ft., Collett.

Leaves $1\frac{1}{2}$ by $\frac{1}{4}$ in., narrowed from the base to the tip, opaque, striate. Scapes several, 6-grooved; sheaths rather short. Heads $\frac{1}{4}$ - $\frac{1}{2}$ 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*, Kern. 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.

INDIA; Huegel. N. CANARA, Tinai Ghat, alt. 2000 ft., in streams and pools, Talbot.

Stem very short. *Leaves* 6–15 by $\frac{1}{3}$ – $\frac{1}{2}$ in., exactly linear, opaque, 7–11-nerved, nerves very slender. *Scape* shorter or longer than the leaves; sheath 2–2½ in., tip obtuse membranous. *Heads* $\frac{1}{2}$ in. diam., black and white, rather few-fl.; receptacle convex, glabrous; invol. bracts green, much shorter than the floral; male sepals densely bearded, petals villous, one much largest; stamens 6; fem. sepals short oblong concave, tips truncate bearded; petals subequal, glands large. *Seeds* very minute, subglobose, pale yellowish, shining.—Male petals and stamens sometimes sessile between the sepals, the conical stipes being very short or 0.

** Petals of male fl. subequal, or one rather larger, often very obscure, none produced beyond the floral bracts.

† Involucral bracts woolly or hairy (sometimes glabrous in *E. Brownianum*). Receptacle villous in all.

17. **E. Wightianum**, Mart. in Wall. Pl. As. Rar. iii. 28; Cat. 6067; tall, stout, leaves broadly linear or ensiform, tips obtuse, heads globose snow-white, invol. bracts pale cuneiform reflexed tips truncate or rounded, floral oblanceolate acuminate strongly cuspidate villous, male petals small subequal, fem. fl. sessile, sepals narrow concave, bearded, petals obovate or oblanceolate villous with very long hairs, ovary sessile. Kunth Enum. iii. 563; Steud. Syn. Pl. Cyp. 271; Kœrn. in Linnæa, xxvii. 658 (excl. syn.) E. sexangulare, Herb. Heyne.

TENASSERIM, Wallich, &c. PEGU, Kurz. The CONCAN, Stocks, &c. CEYLON, ascending to 7000 ft. (C.P. 378, 3382).

Rootstock often as thick as the thumb. *Leaves* 4–10 by $\frac{1}{4}$ in. (and scapes), glabrous or sparsely hairy, many-nerved. *Scapes* many, stout, ribbed and deeply grooved; sheaths with long free green tips. *Heads* $\frac{1}{2}$ in. diam., subsquarrose from the prominent tips of the fl. bracts; invol. bracts coriaceous at the base; receptacle convex villous; flowers pedicelled; male petals minute in the Tenasserim specimens, small subequal in the Concan; stamens 6. *Seeds* globosely oblong, dark red-brown, papillose.—Fem. fl. sometimes 4-merous.

18. **E. Brownianum**, Mart. in Wall. Pl. As. Rar. iii. 25, t. 248; Cat. 6066; tall, slender, leaves narrowly linear or ensiform acuminate glabrous or hairy, scapes solitary very tall, heads $\frac{1}{2}$ in. diam. globose or hemispheric snow-white, invol. bracts obovate-oblong or cuneiform rigid spreading at length reflexed, outer floral cuneiform inner spatulate obtuse, male petals small, fem. fl. pedicelled, petals narrow villous with very long straight hairs, ovary subsessile. Kunth Enum. iii. 562; Steud. Syn. Pl. Cyp. 271; Kœrn. in Linnæa, xxvii. 663. E. nilagirense, Steud. l.c.; Kœrn. l.c. 661.

KHASIA HILLS, alt. 4–6000 ft., common. MUNNIPORE, Watt. NILGHIRI HILLS, Wight, Gardner. CEYLON, Gardner, ascending to 7000 ft., Thwaites (C.P. 377, 1001).

Rootstock stout. *Leaves* 6–18 by $\frac{1}{3}$ – $\frac{1}{2}$ in., many-nerved, and scapes glabrous pubescent or copiously hairy. *Scape* 1–2 ft., ribbed and deeply grooved; sheath very long, tip acuminate green. *Heads* sometimes depressed and concave beneath, the stiff pale or dark invol. bracts $\frac{1}{4}$ – $\frac{1}{2}$ in. long, equalling the flowers; receptacle flat or convex; male sepals free or connate, tips bearded, petals subequal; fem. sepals cymbiform, dorsally hirsute, acute or cuspidate. *Seeds* oblong or subglobose, papillose and striate.—The hairs of the fem. petals are much longest in the Khasian plant.

19. **E. sericans**, *Mart. in Wall. Pl. As. Rar.* iii. 29; *Cat.* 6079; leaves short subulate, scapes 1-2 slender, heads $\frac{1}{4}$ in. diam. globose snow-white, invol. bracts oblong pale yellow scarious not reflexed tips rounded, floral cuneate-obovate acute pubescent tips of outer glabrous, male sepals small orbicular, fem. fl. pedicelled, sepals narrow concave, petals oblan-ceolate ciliate, ovary with petals very shortly stipitate or sessile. *Kunth Enum.* iii. 568; *Steud. Syn. Pl. Cyp.* 272. *E. gracile*, *Mart. l.c.*; *Wall. Cat.* 6079; *Kunth l.c.* 558. *E. infirmum*, *Steud. l.c.* 270.

BURMA; at Prome and Tavoy, *Wallich*.

Rootstock small. *Leaves* $\frac{1}{2}$ -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* globosely oblong, papillose.—I have no doubt as to the specific identity of *sericans* with *gracile*; *Körnike* unites the former with *Wightianum*, it is certainly very close, but the heads are much smaller; the male petals larger and fem. broader. The ovary with petals is sessile in *gracile* very shortly stipitate in *sericans*. The specimens are very few.

20. **E. lanceolatum**, *Miq. in Pl. Metz exsicc.* n. 131; leaves narrowly oblong-lanceolate many-nerved translucent, scapes many slender, sheath inflated above tip green, heads globose $\frac{1}{4}$ in. diam. snow-white, invol. bracts small pale quadrate or obovate scarious not reflexed, male petals obscure, fem. fl. sessile, sepals 2 deeply cymbiform 3rd flat all bearded, petals very unequal oblanceolate ciliate, ovary with petals sessile. *Steud. Syn. Pl. Cyp.* 271; *Körn. in Linnæa*, xxvii. 656.

THE CONCAN and CANARA, *Metz, Stocks*.

Rootstock small. *Leaves* 1-2 $\frac{1}{2}$ by $\frac{1}{4}$ - $\frac{1}{2}$ in., acute or acuminate, flaccid, hardly sheathing. *Scapes* 4-6 in., not deeply grooved; sheath very slender below, inflated above the middle, tip acuminate. *Heads* very like those of *E. sericans*, as are the bracts and seeds.—One of the fem. sepals is sometimes winged at the back.

†† Involucral and floral bracts both glabrous or nearly so.

§ Receptacle glabrous or sparsely hairy.

21. **E. Sieboldianum**, *Sieb. & Zucc. ex Steud. Syn. Pl. Cyp.* 272; leaves short subulate or setaceous, scapes very many, heads small globose or ovoid, bracts all scarious, invol. oblong obtuse gradually passing into the oblong-lanceolate subacute shining floral, fem. fl. long-pedicelled, sepals 1-2 slender or 0, petals 0, ovary long-stipitate. *E. sexangulare*, *Mart. in Wall. Pl. As. Rar.* iii. 28. *E. hexangulare*, *Kunth Enum.* iii. 551; *Thw. Enum.* 341; *Steud. l.c.*; *Körn. in Linnæa*, xxvii. 613; *Dalz. & Gibs. Bomb. Fl.* 279; *Wall. Cat.* 6073. *E. setaceum*, *Herb. Heyne*. *E. nitidum* and *tenuë*, *Herb. Ham.*

THROUGHOUT INDIA; from Kashmir to Assam and Burma, and southward to CEYLON (C.P. 795).—DISTRIB. China, Japan, Mt. Philipp.

Annual. *Leaves* 2-4 in., 3-5-nerved, rarely $\frac{1}{10}$ in. broad, opaque or translucent. *Scapes* slender; sheath short. *Heads* $\frac{1}{2}$ 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 Linnæus is *E. Wallichianum* of Martius. In Herb. Linn. *E. sexangulare* bears its right name; where there is also a specimen of *E. Sieboldianum*, from Kœnig, unnamed.

22. *E. Duthiei*, Hook. f.; leaves very short broadly subulate, scapes many very slender, heads $\frac{1}{4}$ in. diam. broadly ovate or hemispheric, invol. bracts spreading oblong obtuse scarious shining passing into the dark linear-oblong or oblanceolate acuminate glabrous glistening floral, fem. fl. shortly pedicelled, sepals 2 very narrow, petals 3 filiform.

CENTRAL PROVINCES; Bhimkund, in the Khandma district, Duthie.

Leaves $\frac{1}{4}$ – $\frac{3}{8}$ in., many-nerved. Scapes 2–5 in.; sheath short. Heads nearly black, glistening; fl. bracts strongly incurved, sometimes obscurely pubescent towards the tips; receptacle very tall and slender, quite glabrous; flowers shortly pedicelled; male sepals 2, narrow, subacute, glabrous; petals very obscure; stamens 6; ovary with the petals stipitate. Seeds broadly oblong, quite smooth, yellow.

23. *E. alpestre*, Hook. f. & Thoms. *Herb. Ind. Or.*; leaves broadly or narrowly subulate, scapes very many short stout, heads broadly obconic few-fl., invol. bracts suberect as long as the flowers cuneiform coriaceous, floral obovate-oblong, fem. fl. sessile, sepals oblong cymbiform obtuse glabrous, petals 3 subequal obovate coriaceous glabrous glands apical. *E. kiusianum*, Maxim. in *Herb. Hort. Petrop.*

SIKKIM HIMALAYA, alt. 8–12,000 ft., and KHASIA HILLS, alt. 5–6000 ft., J. D. H., Clarke.—DISTRIB. W: China, Japan.

Leaves very many, 1–5 by $\frac{1}{4}$ – $\frac{1}{2}$ 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 $\frac{1}{4}$ 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.

24. *E. truncatum*, Ham. ex Mart. in Wall. *Pl. As. Rar.* iii. 29; Wall. *Cat.* 6076; leaves 1–2 in. subulate, scapes many stout, heads $\frac{1}{4}$ – $\frac{1}{2}$ in. diam. hemispheric, invol. bracts cuneate spreading shining, floral scarious obovoid tip concave truncately rounded glabrous, fem. fl. pedicelled, sepals 2 narrow, petals 3 filiform or very narrowly oblanceolate ciliate, ovary with petals stipitate. Kunth *Enum.* iii. 555; Steud. *Syn. Pl. Cyp.* ii. 270; Kœrn. in *Linnæa*, xxvii. 631; Thw. *Enum.* 341 (excl. syn.). *E. cinereum*, Ham. *Leucocephala spathacea*, Roxb. *Fl. Ind.* iii. 613.

ASSAM, BENGAL, BURMA, and southward to MALACCA and CEYLON (C.P. 793). —DISTRIB. Malay and Philippine Islands, China.

Leaves $\frac{1}{2}$ 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 Kwala Pehang, Ridley.—Possibly a different species.

§§ *Receptacle more or less villous.*



Р р 2

Densely tufted. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., compressed, opaque, 3–5-nerved, base dilated and sparsely woolly within. *Scapes* $1\frac{1}{2}$ – $2\frac{1}{2}$ in., capillary, flexuous; sheath short. *Heads* $\frac{1}{10}$ in. diam., shining; invol. bracts much longer than the floral, which are glabrous or sparsely hairy; receptacle small, columnar, sparsely villous; male calyx infundibular, split on one side, tips bearded; petals minute; stamens 3–4; fem. sepals 2, with rarely a filiform 3rd, falcately incurved with recurved tips, glabrous, keel or wing spinulose. *Seeds* oblong.—Resembles *E. achiton*, but invol. bracts very different.

††† Involucral bracts glabrous, floral bearded villous or pubescent.

§ *Receptacle glabrous or sparsely hairy.*

29. ***E. sexangulare***, Linn. *Sp. Pl.* 87; tall, stout, leaves long, scapes many tall, heads conoid or hemispheric hard hoary base truncate, invol. bracts coriaceous subquadrate or orbicular, floral persistent densely imbricate spathulate cuspidate rigid, fem. fl. sessile, petals short filiform with a terminal pencil of hairs, ovary with petals subsessile. *E. Wallichianum*, Mart. in Wall. *Pl. As. Rar.* iii. 26, t. 249; *Cat.* 6068; *Kunth Enum.* iii. 564; *Nees in Nov. Act. Nat. Cur.* xix., *Suppl.* i. 449; *Steud. Syn. Cyp.* 271; *Kern. in Linnæa*, xxvii. 687; *Thw. Enum.* 341; *Dalz. & Gibs. Bomb. Fl.* 280; *Trimen in Journ. Linn. Soc.* xxiv. 136. *E. quidrangulare*, Lour. *Fl. Cochinch.* 77.

TENASSERIM, southward to MALACCA; and the DECCAN PENINSULA, from CANARA southwards. CEYLON, *Macrae*, &c. (C.P. 220).—DISTRIB. Tropical Asia, Madagascar.

Rootstock as thick as the little finger or less. *Leaves* 4–12 in., $\frac{1}{4}$ – $\frac{3}{4}$ in. broad at the base, flat, narrowed up to the acuminate or subacute tip, many-nerved, opaque, striate, drying brown. *Scapes* up to 18 in., stiff; tips of sheaths acuminate, not membranous. *Heads* $\frac{1}{2}$ 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 incurved acute dorsally crenately winged or not, 3rd linear, narrow. *Seeds* subglobose or oblong, the ridges papillose.—In some Concan specimens from Dalzell the leaves are $\frac{1}{8}$ – $\frac{1}{4}$ in. broad, linear, flaccid, quite translucent, and the heads very small. The Australian *E. australe*, Br., hardly differs.

VAR. *longifolium*; more slender, leaves often longer, fem. fl. dimerous, petals sparsely hairy from the middle upwards. *E. longifolium*, *Nees in Herb. Willd. ex Kunth l.c.* 567; *Steud. l.c.*; *Kern. l.c.* 690. *E. sexangulare*, *Willd. Herb.*—Tenasserim, Malacca, the Andaman Islands, and Ceylon.

30. ***E. Dalzellii***, Kern. in *Linnæa*, xxvii. 605; rhizome elongate, leaves very slender finely acuminate, scapes many, heads hemispheric white villous, invol. bracts scarious obovate- or cuneate-oblong, floral hyaline oblanceolate subacute, fem. fl. pedicelled, sepals 2 linear slender, petals 3 narrowly oblanceolate ciliate with flexuous hairs, ovary with petals stipitate. *E. rivulare*, Dalz. in *Hook. Kew Journ.* iii. (1851) 280; *Dalz. & Gibs. Bomb. Fl.* 280.

SOUTH CONCAN; in the Malwan Province, in streams, *Dalzell*.

Rootstock elongate, prostrate, densely clothed with tortuous capillary rootlets. *Leaves* in a terminal tuft, 4–10 by $\frac{1}{16}$ – $\frac{1}{10}$ in., flexuous, flattened, opaque, 7-nerved. *Scapes* 7–18 in., 10-grooved. *Heads* $\frac{1}{4}$ in. diam., base truncate or intruded; invol. bracts short, yellowish; receptacle hemispheric or columnar, sparsely hairy; fl. bracts incurved, hairs caducous; male sepals free or connate, tips villous, petals small elliptic subequal; stamens 6. *Seeds* globose, smooth, shining.—Some flowerless very

long leaved specimens have a leafy stem 2-3 in. long, as in Sect. A, but much stouter. *E. fluviatile*, Trim. (see end of genus) is probably allied.

31. ***E. cuspidatum***, Dalz. in *Hook. Kew Journ.* iii. (1851) 281; leaves short linear-ensiform flaccid 7-9-nerved translucent, margins thickened, tip rounded and cuspidate, scapes several very long, heads globose or hemispheric white villous, invol. bracts cuneiform or rounded, scarious, floral membranous cuneate-obovate, fem. fl. sessile, sepals 3, 2 deeply cymbiform dorsally tubercled, ovary with petals sessile. *Dalz. & Gibs. Bomb. Fl.* 280.

The SOUTHERN CONCAN; between Vingorla and Malwan, *Dalzell*.

Leaves 1-4 by $\frac{1}{2}$ - $\frac{1}{4}$ in., erect and recurved. *Scapes* few or many, 6-10 in., soft, shining, obscurely furrowed; sheath much longer than the leaves, tips membranous. *Heads* $\frac{1}{2}$ - $\frac{1}{4}$ in. diam., base intruded; invol. bracts yellow, passing into the hyaline floral; receptacle convex, quite naked; male sepals 2, narrow, free; petals small, subequal, fimbriate; stamens 6; fem. sepals coriaceous; petals 3, very narrow, fimbriately villous towards the tip. *Seeds* oblong, quite smooth.

32. ***E. nepalense***, *Prescott ex Bong. in Act. Acad. Petrop. Ser. vi. i.* 610; leaves broadly subulate or ligulate many-nerved, scapes many slender, heads globose grey, invol. bracts cuneate-obovate scarious at length recurved, floral linear oblong dark obtuse or apiculate, fem. fl. shortly pedicelled, sepals cymbiform, petals very narrowly oblanceolate ciliate with the ovary stipitate. *Kunth Enum. iii.* 554; *Steud. Syn. Pl. Cyp.* 270. *E. viride*, *Kærn. in Linnæa*, xxvi. 637. *E. quinquangulare*, *Wall. Cat.* 6072 E.

TEMPERATE HIMALAYA; from Garwhal, alt. 5-6000 ft., to Sikkim, alt. 4-5000 ft. The KHASIA HILLS, alt. 4-6000 ft.

Rootstock small. *Leaves* 2-3 by $\frac{1}{2}$ - $\frac{1}{4}$ in., usually subulate and narrowed from the base to the acute tip, but often broader flaccid linear and obtuse or rounded at the tip, opaque or translucent, many-nerved. *Scapes* 4-9 in., soft; sheaths with membranous tips. *Head* $\frac{1}{2}$ in. diam.; receptacle convex or columnar, quite glabrous; floral bracts finely hairy; male sepals 3; petals minute; stamens 6; sepals very concave, tips ciliate. *Seeds* oblong, ribs papillose.—Very similar to *E. luzulæfolium* but the invol. bracts of the fully formed head are recurved, the receptacle is glabrous. The ligulate leaved specimens look different.

33. ***E. gregatum***, *Kærn. in Linnæa*, xxvii. 606; dwarf, tufted, leaves very slender flat acute flexuous opaque, scapes subsolitary, heads very small hemispheric or globose white or hoary, invol. bracts spreading or erect cuneiform black, floral oblanceolate obtuse and subacute dark, male petals small subequal, fem. fl. sessile, sepals 2 dorsally bearded narrowly cymbiform 3rd flat, tips villous with stout hairs, petals spatulately oblanceolate densely villous, ovary with petals sessile.

KHASIA HILLS; alt. 5-6000 ft., on rocks in streams, *Griffith, &c.*

Roots of capillary fibres. *Leaves* 1-1 $\frac{1}{2}$ by $\frac{1}{8}$ in. *Scapes* slender, often flexuous, deeply 4- or 5-grooved; sheaths with membranous tips. *Heads* $\frac{1}{2}$ in. diam., white above the black involucre; receptacle columnar, glabrous; male sepals 3, free or connate; petals minute, obovate, subequal, villous; stamens 2-6; fem. petals with large black glands. *Seeds* broadly oblong, yellow.—Allied to *E. mitophyllum* and *miserum*, but the male petals are small and equal.

34. ***E. Pumilio***, *Hook. f.*; leaves very short subulate acuminate, scape few short slender, sheath pale green not striate subinflated tip rounded, head $\frac{1}{10}$ in. diam. few-fld. hairy, invol. bracts 3-4 erect obovate

or cuneately oblong tips rounded, floral cuneately oblanceolate subacute, fem. fl. sessile, sepals 2 oblong concave tips ciliate flat, petals oblanceolate ciliate, ovary with petals sessile.

WESTERN HIMALAYA; Kumaon, 3-4000 ft. and Garwhal, alt. 8-9000 ft., *Duthie*.

Leaves $\frac{1}{2}$ - $\frac{3}{4}$ 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. achiton*, but the receptacle is quite glabrous.

§§ *Receptacle villous.*

35. *E. luzulaefolium*, *Mart. in Wall. Pl. As. Rar.* iii. 28; *Cat.* 6071; leaves short broadly subulate many-nerved, scapes many flexuous, head small hemispheric pubescent base truncate and intruded, invol. bracts spreading or erect (never reflexed) outer broadly cuneiform shining, floral cuneately oblanceolate obtuse, fem. fl. pedicelled, sepals slender concave tipped with bristles, petals 3 linear-lanceolate ciliate, ovary with petals stipitate. *Kunth Enum.* iii. 553; *Schnizl. Icon.* t. 46, f. 2, 5; *Steud. Syn. Pl. Cyp.* 270; *Koern. in Linnæa* xxvii. 636.

Throughout INDIA; from Bengal to Burma and the Concan, ascending the Khasia Hills to 6000 ft., common. CEYLON, *Gardner*.

Rootstock elongate and as stout as a swan's quill, or slender, densely fibrous. *Leaves* 1-3 by $\frac{1}{10}$ - $\frac{1}{8}$ 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.—Difficult to distinguish at sight from *E. trilobum* and *quingangulare*.

36. *E. quingangulare*, *Linn. Sp. Pl.* 87; leaves linear ensiform or subulate acute or acuminate, scapes many, heads globose grey or snow-white, invol. bracts very short scarious linear-oblong to broadly cuneate at length reflexed under the head, floral oblanceolate or spathulate hyaline acuminate or finely cuspidate, male petals minute, fem. fl. pedicelled, sepals slender, petals narrowly oblanceolate sparsely ciliate, ovary with petals stipitate or substipitate. *Mart. in Wall. Pl. As. Rar.* iii. 28; *Cat.* 6072; *Kunth Enum.* iii. 556; *Steud. Syn. Pl. Cyp.* 270, *Dalz. & Gibs. Bomb. Fl.* 280; *Thw. Enum.* 341. (excl. var.); *Koern. in Linnæa*, xxvii. 646. *E. argenteum*, *Mart. l.c.* *E. Martianum*, *Wall. Cat.* 7279 (proliferous state). *E. argyræum*, *Steud. l.c.* 271. *E. erythropodum*, *Miq. in Hohen. Herb. Canara*, n. 131. *Sphærochloa quadrangularis*, *Beauv. ex Desv. in Ann. Sc. Nat. Sc.* xiii. 47. *Leucocephala graminifolia*, *Roxb. Fl. Ind.* iii. 612.

Throughout INDIA; from the Upper Gangetic plain to BURMA, and southward to CEYLON (C.P. 792).

Leaves 1-4 by $\frac{1}{4}$ - $\frac{1}{2}$ 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., 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 *luzulaefolium* and

trilobum. It is said to be Australian, but I have seen no specimen from that country.

37. *E. trilobum*, *Ham. in Wall. Cat. n. 6072 D*; leaves broadly subulate or ensiform acute or acuminate many-nerved, scapes many, heads globose dark grey base intruded, invol. bracts small linear-oblong reflexed, floral spatulately oblanceolate obtuse or subacute, male petals minute, fem. fl. subsessile, sepals 3 dark cymbiformly oblanceolate, petals narrowly oblanceolate sparingly ciliate, ovary with petals sessile or subsessile. *E. quinquelobum*, *Wall. Cat. l.c.*; *Körn. in Linnæa*, xxvii. 645. *E. subulatum*, *Bojer ex Körn. l.c.* *E. Sollyanum*, *Royle Ill. 409, t. 97, f. 1.*

Throughout INDIA; from Kumaon, ascending to 4000 ft., to Bengal, the Concan and Malabar.

Habit of *E. quinquangulare*, from which it is often difficult to distinguish forms, but the heads are usually smaller, much darker in colour, the 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 length recurved, floral cuneately obovate acute dorsally tomentose, male sepals 3 glabrous, petals obscure, fem. fl. sessile, sepals 3 oblong, 2 concave obovate ciliate, ovary with petals sessile.

TENASSERIM, *Helfer (Kew Dist. 5584).*

Leaves 3-4 by $\frac{1}{4}$ - $\frac{1}{2}$ in., translucent. Scapes 4-9 in., flexuous, young glabrous or hairy below; sheath acuminate. Heads $\frac{1}{2}$ 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; stamens 4-6; fem. petals remarkably broad, unequal. Ovary sessile. Seeds minute, dark red-brown, strongly striate and papillose.

39. *E. Walkeri*, *Hook. f.*; densely tufted, leaves narrowly subulate or linear few-nerved tips obtuse, heads globose snow-white, invol. bracts shorter spreading outer quadrate or cuneiform inner oblong, floral oblanceolate acute or mucronate, fl. fem. sessile, sepals narrowly oblong obtuse, petals oblanceolate villously ciliate with very long jointed spreading hairs, and tipped with short stout obtuse white ones, ovary with petals sessile. *E. quinquangulare*, var. *argenteum*, *Thw. Enum. 341.*

CEYLON; at Caltura, *Macrae*; in paddy fields, *Thwaites (C.P. 3562).*

Leaves 1-2 by $\frac{1}{10}$ - $\frac{1}{6}$ in., glistening, opaque. Scapes 6-8 in., very slender. Heads $\frac{1}{2}$ - $\frac{1}{3}$ 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; chalaza very large.—A very distinct species, well characterized by the copious very long slender white hairs of the fem. petals, which appear to envelop the flower.

40. *E. Thwaitesii*, *Körn. in Linnæa*, xxvii. (1854), 627; leaves linear subulate or ensiform acuminate many-nerved, scapes many twice as long, head hemispheric dark sparsely mealy, involucre as broad as the heads,



bracts spreading and incurved obovate-oblong shining, floral oblanceolate acute tips hoary, male sepals glabrous, fem. fl. pedicelled, sepals cymbiform, petals short filiform penicillate above the middle with long spreading hairs, ovary with petals sessile.

NILGHIRI HILLS; *Schmidt*. CEYLON, *Walker*, *Thwaites* (C.P. 790, in part).

Leaves 1-2½ by ¼-½ 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 scarious; male sepals 3 (2 connate) glabrous or nearly so, petals very small, stamens 6; fem. sepals nearly glabrous, dorsally rounded or subcarinate. *Seeds* oblong with papillose striæ.—Well marked by the slender fem. petals, much like those of *E. sewangulare*. The Nilghiri specimens are much smaller and narrower leaved than the Cingalese.

41. *E. collinum*, *Hook. f.*; leaves short narrowly linear or subulate, scapes many, heads globose dark grey, invol. bracts small, outer very short cuneate-obovate, floral oblanceolate or spatulate acute acuminate or cuspidate dorsally hoary or the outer glabrous, male petals 3 small one often largest and exerted beyond the sepals but not beyond the bracts, fem. fl. pedicelled, sepals 2 cymbiform 3rd flat, petals narrowly oblanceolate ciliate, ovary and petals sessile or shortly stipitate. *E. luzulæfolium*, *Thw. Enum.* 341.

NILGHIRI HILLS, *Foulkes*, *Schmidt*, *Gardner*; Conoor, 7000 ft., *Clarke*. CEYLON; Newera Elia, *Gardner*, &c., alt. 4000 ft. (C.P. 796, 1000).

Densely tufted. *Leaves* 1-2½ by ¼-½ in., obtuse, compressed, 1-9-nerved, opaque or translucent. *Scapes* 1½-12 in., rigid, flexuous; sheath stout, equalling or shorter than the leaves, tip obtuse membranous. *Heads* ¼ in. diam.; invol. bracts scarious, at length reflexed; receptacle hemispheric or columnar, densely villous; sepals of male and fem. dark.—The well developed male petals distinguish this species from the others of this section except *E. Walkeri*, in which they are subequal.—In Wight's Herbarium there are specimens (without habitat) of this or a closely allied plant, smaller in size, in which the male petals are equal.

42. *E. achiton*, *Körn. in Linnæa*, xxvii. (1854), 630; small, leaves subulate, scapes twice as long, heads very small hemispheric few-fl., invol. bracts erect cuneiform pale, tip truncate or rounded, floral obovate-spatulate 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* ¼-½ in. diam.; invol. bracts few, coriaceous, shining; floral incurved, nearly glabrous; receptacle hemispheric, villous; flowers shortly pedicelled; male sepals 2, narrow; petals minute or obsolete; stamens few; fem. sepals filiform linear or dilated and concave towards the hairy tips, petals in the most developed heads 3, narrowly oblanceolate, ciliate. *Seeds* oblong, transversely striolate, red-brown.—Very near the *E. nigricans*, Br. of Australia.

43. *E. xeranthemum*, *Mart. in Wall. Pl. As. Rar.* iii. 29; *Wall. Cat.* 6084; dwarf, leaves subulate acuminate, scapes twice as long stout, heads broadly obconic, invol. bracts erect, outer much longer than the floral lanceolate acuminate, floral obovate-oblong or oblanceolate tips hirsute, fem. fl. subsessile, sepals 2 narrow tips ciliate, petals 3 narrowly oblanceolate ciliate, ovary with petals shortly stipitate. *Kunth Enum.* iii. 555. *Steud. Syn. Pl. Cyp.* 270; *Körn. in Linnæa*, xxvii. 624. *E. pygmæum*, *Dalz. in Hook. Kew Journ.* iii. (1851), *Dalz. & Gibs. Bomb. Fl.* 280. *E. xeranthemoides*, *Heurck & Muell. Arg. Obs. Bot.* 103.



NEPAL, Wallich. BENGAL, SILHET, the KHASIA HILLS, and TENASSERIM, Griffith, &c. The CONCAN, Stocks. CHOTA NAGPORE, Clarke.—DISTRIB. trop. Afr.

Tufted, annual. Leaves $\frac{1}{4}$ – $1\frac{1}{2}$ in., many-nerved, often recurved. Scapes striate, hardly grooved; sheath tumid, tips membranous. Heads $\frac{1}{2}$ – $\frac{3}{4}$ in. diam.; invol. bracts scarious, stellately spreading, pale, shining, often lacerate; receptacle convex, villous; flowers subsessile; male sepals 3, free (or 2 connate); petals minute or obsolete; fem. sepals rarely 3, the third capillary. Seeds much narrower than in most other species, linear-oblong, papillose all over, pale yellow.

IM PERFECTLY 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 $\frac{1}{4}$ in., solid, compressed, channelled, flaccid; sheath dilated, cottony within. Scape rather shorter than the leaves; sheath not dilated, tip acute. Head $\frac{1}{2}$ in. diam. (receptacle?).—Descr. from Trimen. The only specimen seen by me is in a very young state, with the flowers not available for analysis. Compare *E. Dalzellii*.

E. CEYLANICUM, Kærn. in Linnæa, xxvii. 667; a foot high, stem very short, leaves 2– $3\frac{1}{2}$ in. tufted linear suddenly mucronate, scapes solitary 1 in., heads rather large cylindric-globose woolly white 4 in. long, invol. bracts obovate at length hidden under the head, floral cuneate-obovate submembranous pale, receptacle hairy, male sepals obtuse membranous, 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 perianths obtuse. Ceylon, Herb. Berlin.—Evidently near *E. atratum*, but leaves mucronate.

E. EURYPELON, Kærn. l. c. 685; 2–3 in. high, leaves 3 in. tufted broadly linear narrowed upwards tip obtuse membranous, scapes crowded 4-winged $1\frac{1}{2}$ –3 in., heads subglobose $1\frac{3}{4}$ – $2\frac{1}{4}$ in. broad powdery pubescent and nigro-niveous, invol. bracts rigid powdery-pubescent olive-black much shorter than the heads, floral rhombic-cuneate olive-black rigid closely imbricate hiding the fl., receptacle hairy.—Ind. Or.

E. HETEROLEPIS, Steud. Syn. Pl. Cyp. 271; Kærn. l. c. 572; tufted, stem very short, leaves lanceolate from a broad base subobtuse, hardly 1 in. long.—Bombay, Roux.

E. MINIMUM, Lam. Encycl. iii. 275; Kunth Enum. iii.; Steud. Syn. Pl. Cyp. 268; A. Rich. Tent. Fl. Abyss. ii. 347?; Kærn. l. c. 635.—Ind. Or., Sonnerat. (Herb. Lamarek). Male sepals 2, free, linear-oblong.—Perhaps a form of *E. truncatum*, fid Kærn. more probably *E. Sieboldianum*.

E. NEESIANUM, Kærn. 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, Kærn.

ORDER CLXXII. CYPERACEÆ. By C. B. Clarke, F.R.S.

Grass- or rush-like herbs. Stems solid. Leaves 3-ranked, rarely 0; sheaths closed. Flowers 1–2-sexual, small or minute, solitary in the axils of the scales (glumes) of the spikes or spikelets that are solitary or variously disposed on the stem. Perianth 0, or of hypogynous bristles or scales. Stamens 1–3, rarely more; anthers linear, basifixed on the flattened fila-

ments. *Ovary* (in *Caricæ* enclosed in a utricle) 1-celled; style short or slender, 2-3-cleft, branches slender stigmatic; ovule 1, basal, erect, anatropous. *Fruit* a compressed or 3-gonous nut. *Seed* erect, free; embryo minute, inside the usually floury albumen.—Genera 60; species 3000, universally distributed.

The above Ordinal character applies especially to the Indian *Cyperaceæ*, and takes no account of exceptions to it, which occur in extra-Indian species.

I am indebted to Mr. C. B. Clarke, F.R.S., for the following account of the Indian *Cyperaceæ*. It will be observed that in it the citations of authors and of Floras have been almost restricted to those in which the species and their synonyms have been first indicated or described, and to the standard works of Kunth, Boeckeler and Steudel (and of Boott in the genus *Carex*), to a good figure when acceptable, and to the various Indian Floras, monographs, &c. The vast literature of the order, so many species of which are scattered over large areas of the globe and are hence described in many extra Indian works, renders this course unavoidable in the case of a "Flora" which, like that of British India, must have circumscribed limits. I have myself supplied the following clavis.—J. D. H.

A. CYPERÆ. *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. EUCYPERÆ. *Fl. glumes* usually many, distichously arranged. *Hypogynous bristles* 0.

* *Style* 2-fid. (in *Juncellus* very rarely 3-fid.).

Rhachilla of spikelet deciduous	1. KYLLINGA.
Rhachilla of spikelet persistent. Nut laterally compressed	2. PYCREUS.
Rhachilla of spikelet persistent. Nut dorsally compressed	3. JUNCCELLUS.

** *Style* 3-fid.

Rhachilla of spikelet persistent	4. CYPERUS.
Rhachilla of spikelet deciduous	5. MARISCUS.
Spikelet much flattened. Nut narrow, otherwise as <i>Mariscus</i>	6. COURTOISIA.

Tribe II. SCIRPÆ. *Fl. glumes* usually many, spirally arranged. *Hypogynous bristles* often present.

* *Style-base* constricted or articulate above the nut. Leaves all near the base of the stem. Inflorescence umbelled.

Hypogynous bristles nearly always present. Leaves 0	7. ELEOCHARIS.
Hypogynous bristles 0. <i>Style-base</i> persistent, or if deciduous not leaving a tumour on the nut	8. FIMBRISTYLIS.
Hypogynous bristles 0. <i>Style-base</i> 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 <i>F. Wallichii</i> , &c.	12. FUIBENA.
Hypogynous scales 2, hyaline, elliptic, enclosing the nut	13. LIPOCARPHA.

Tribe III. RYNCHOSPOREÆ. *Fl. glumes* 1 or 2, with several lower empty glumes and several upper empty or male glumes which are thinner and not keeled. *Hypogynous bristles* filiform, linear, or 0.

* *Style* 2-fid.



Style-base thickened not passing gradually into the nut . . . 14. RYNCHOSPOREA.

*** *Style 3-fid.*

- Lowest fertile gl. somewhat distant from the one above it. . . 15. SCHÆNUS.
Spikelets paniced, 1-7-fid., lowest fl. alone perfect . . . 16. CLADIUM.
Spikelets 3-4-fid., uppermost fl. alone perfect . . . 17. MICROSCHÆNUS.
Spikelets 1-2-fid., uppermost fl. alone perfect; hypog. scales
long . . . 18. LEPIDOSPERMA.
Spikelets 1-2-fid., as in 18, hypog. scales 0 . . . 19. GAHNIA.

Anomalous genus.

- Spikelets sessile in dense digitate cylindric spikes; glumes 4,
3 empty, uppermost with a perfect flower . . . 20. REMIREA.

B. *HYPOLYTREÆ*. *Spikelets* with one terminal fem. flower, two basal opposite male glumes, and 0-9 intercalated monandrous or empty spirally arranged glumes.

- Spikes corymbose; style 2-fid . . . 21. HYPOLYTNUM.
Spikes corymbose; style 3-fid . . . 22. THORACOSTACHYUM.
Spikes congested; style 3-fid . . . 23. MAPANIA.
Spikes in an oblong panicle . . . 24. SCIEPODEON.
Spikes in a unilateral dense spiciform panicle . . . 25. LEPIRONIA.

C. *SCLERIÆ*. *Spikelets* 1-sexual or with one basal fem. flower and one or more male or empty glumes. *Nut* stipitate, osseous. *Hypogynous scales* or bristles 0. . . 26. SCLERIA.

D. *CARICEÆ*. *Spikelets* uni- or bisexual, monœcious or dioecious. *Nuts* enclosed in an entire or 2-fid sac (utricle).

- Utricle split down one side . . . 27. KOBRESIA.
Utricle entire or 2-fid at the tip only . . . 28. CAREX.

1. **KYLLINGA**, Rottb.

Stem erect, simple, leafy below only, terminated by 1-3 sessile capitate spikes. *Spikes* ovoid or cylindric, dense, with numerous small compressed spikelets. *Glumes* 4-5, distichous, rhacheola disarticulating above the two lowest which are empty; gl. iii. bisexual; gl. iv. male or empty, rarely fertile; gl. v. rudimentary or 0 (rarely additional upper glumes occur). *Stamens* 1-3, anterior; anthers linear-oblong, mucous or nearly so. *Nut* compressed laterally; style linear, base continuous with nut; branches 2, linear.—Sp. 33; all hot and temp. regions except Europe.

* *Nut-bearing glume not winged in the upper half of its keel.*

1. **K. triceps**, Rottb. *Descr. et Ic.* 14, t. 4, fig. 6 (excl. cit. *Rheede*); nearly glabrous, rhizome very short, stem thickened at base, spikes 3-1 (rarely 4-5) subcylindric whiteish, nut ultimately yellow-brown. *Roeb. Fl. Ind.* 1. 181; *Nees in Wight Contrib.* 91; *Thw. Enum.* 345; *Boeck. in Linnæa*, xxxv. 418 (excl. var. β). *K. monocephala*, *Nees in Wight Contrib.* 91 (not of Rottb.). *K. brevifolia*? *Hb. Heyne*.—*Kyllingia*, *Wall. Cat.* 3443. *I. Lipocarpa*, *Wall. Cat.* 3445, partly.

From N.W. INDIA and SIND to BENGAL, BURMA, and CEYLON.—DISTRIB. Africa, China, Austral.

Stems 2-12 in., base tumid. *Leaves* as long (or half as long) as the stem, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad. *Head* $\frac{1}{2}$ - $\frac{3}{4}$ in. in diam.; bracts 3-4, up to 2-3 in. *Spikelets* $\frac{1}{12}$ - $\frac{1}{10}$ in.



Fertile glume ovate, keel smooth green subexcurrent, sides 3-4-striate, straw-colrd. *Stamens* usually 2. *Nut* $\frac{2}{3}$ 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 sub-cylindric straw-colrd., nut yellow-brown ultimately black. *Boeck. in Linnæa*, xxxv. 415.—*Kyllingia*, *Wall. Cat.* 3442, partly, 3443 D, partly.

Scattered widely in INDIA, not plentiful anywhere. TROPICAL HIMALAYA, from Kumaon to Sikkim. *PARASNATH*, *T. Anderson*. CHITTAGONG, *H. f. & T. Th. NILGHERRIES*, *King*. SINGAPORE, *Hullatt*.—DISTRIB. Afric., Austral.

Stems 4-12 in. *Leaves* $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, usually much shorter than stem. *Head* often of 3 spikes, median cylindric $\frac{2}{3}$ in. long, lateral much shorter, subovoid; bracts 3-4, up to 2-3 in. *Spikelets* $\frac{1}{10}$ - $\frac{1}{2}$ in. long. *Fertile glume* ovate, keel green scarcely excurrent, sides not glandular-papillose. *Nut* $\frac{2}{3}$ length of glume, ellipsoid, obtuse.

3. ***K. melanosperma***, *Nees in Wight Contrib.* 91; glabrous, rhizome thick very short, stem elongate, leaves short, head solitary ovoid, nut ultimately black. *Thw. Enum.* 345; *Boeck. in Linnæa*, xxxv. 419. *K. brevifolia*, *Nees l. c.* 91 (partly, not of *Rottb.*). *K. fuscescens*, *Boeck. l. c.* 421, partly. *K. vaginata* (and var. major), *Zoll. Verz. Ind. Archip.* ii. 63; *Miq. Fl. Ind. Bat.* iii. 290.—*Kyllingia*, sp. *Wall. Cat.* 3440.

NILGHERRIES, *Leschenault*, &c. CEYLON, *Thwaites*, &c. SINGAPORE, *Kurz*.—DISTRIB. Java, S. Africa, Madagasc.

Rhizome about 1 in. *Stems* 20 in., sharply triquetrous at top. *Leaves* often 4 by $\frac{1}{2}$ in., always much shorter than stem. *Spike* $\frac{2}{3}$ by $\frac{1}{4}$ in., thicker than in *K. cylindrica*; bracts up to 2-4 in., leaf-like. *Spikelets* $\frac{1}{2}$ in. long, usually with 1 rarely 2 nuts. *Fl. glume* ovate, acute, keel green scarcely scabrous, sides 3-4-striate fuscous. *Stamens* often 3. *Nut* $\frac{2}{3}$ length of glume, oblong-obovoid.

4. ***K. brevifolia***, *Rottb. Descr. et Ic.* 13, t. 4, fig. 3; glabrous, rhizome creeping elongate, leaves long or short, spikes 3-1 ovoid, fl. glume submucronate eglandular, keel upwards not winged, nut ultimately yellow-brown. *Nees in Wight Contrib.* 91 (partly); *Thw. Enum.* 345; *Boeck. in Linnæa*, xxxv. 424. *K. intermedia*, *Br. Prodr.* 219. *K. cruciata*, *Nees in Linnæa*, ix. 286. *K. monocephala*, *Thunb. Fl. Japon.* 35; *Miq. in Ann Mus. Lugd. Bat.* ii. 142 (not of *Rottb.*). *K. sororia*, *Kunth Enum.* ii. 131; *Miq. Fl. Ind. Bat.* iii. 293 (partly). *K. gracilis*, *Kunth l. c.* 134; *Miq. l. c.* 292. *K. fuscata*, *Miq. l. c.* 294. *K. aurata*, γ *Hohenackeri*, *Boeck. l. c.* 423. *K. triceps*, *Thunb. Fl. Japon.* 35 (not of *Rottb.*). *Schœnus coloratus*, *Linn. Sp. Pl. ed. 2*, 64, and herb. propr.—*Kyllingia*, *Wall. Cat.* 3443, partly.

Throughout INDIA; from the Panjab to Assam, CEYLON, and MALACCA.—DISTRIB. All warm regions except the Mediterranean.

Rhizome 4-12 in. *Stems* 4-24 in. (or sometimes $\frac{1}{2}$ -2 in. curved). *Leaves* $\frac{1}{10}$ - $\frac{1}{2}$ in. broad, longer than the stems or very much shorter. *Head* $\frac{1}{2}$ - $\frac{3}{4}$ in. diam., green or brownish; spikes often 1; if 3, median ovoid, scarcely cylindric; bracts 3-4, up to 4 in. *Spikelets* $\frac{1}{2}$ - $\frac{1}{2}$ 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* $\frac{2}{3}$ or $\frac{1}{2}$ the length of glume, ellipsoid, obtuse; style as long as half the nut.

** *Nut-bearing glume winged in upper half of keel.*

5. ***K. monocephala***, *Rottb. Descr. et Ic.* 13, t. 4, fig. 4; nearly glabrous, rhizome creeping elongate, spikes 1-3 ovoid, fl. glume submucronate

upper half of keel with a lunate crested glandular wing, nut yellow-brown. *Roxb. Fl. Ind.* i. 180; *Nees in Wight Contrib.* 91 (partly); *Miq. Fl. Ind. Bat.* iii. 291; *Thw. Enum.* 345; *Boeck. in Linnæa*, xxxv. 427. *K. triceps*, *Linn. f. Suppl.* 104 (partly, not of *Rottb.*). *K. sororia*, *Miq. Fl. Ind. Bat.* iii. 293 (partly, not of *Kunth*). *K. gracilis*, *Zoll. Verz. Ind. Archip.* ii. 63 (not of *Kunth*). *K. mindorensis*, *Steud. Syn. Pl. Cyp.* 67. *Scirpus Cephalotes*, *Jacq. Hort. Vind. t.* 97.—*Kyllingia*, *Wall. Cat.* 3443 A, F (partly), H (partly).

Throughout INDIA, common; from Kumaon to Assam, CEYLON and SINGAPORE.—DISTRIB. Hot and warm temp. regions of the Old World except the Mediterranean.

Closely resembles *K. brevifolia* except in the crest (usually straw-colrd. with scattered red circular resinous glands) on the upper part of keel of nut-bearing glume.

6. **K. squamulata**, *Vahl Enum.* ii. 381; nearly glabrous, roots fibrous, spikes 1-3 ovoid, fl. glume scarcely acute its keel winged by a broad hyaline incise-toothed crest, nut brown. *Boeck. in Linnæa*, xxxv. 431. *K. Metzii*, *Steud. Syn. Pl. Cyp.* 70. *K. monocephala*, *Strachey Herb. Kumaon*, 74 (not of *Rottb.*).

Western India; KASHMIR, *Thomson. GURWHAL*, up to 5500 ft., *Duthie. MT. ABOO, King. CANARA, Metz.*—DISTRIB. Trop. Africa.

Stems tufted (annual), 2-12 in. Leaves often longer than stem, $\frac{1}{2}$ in. broad. Head $\frac{1}{2}$ in. in diam., green or brown. Spikelets $\frac{1}{2}$ in. long, maturing 1 nut only.

2. PYCREUS, Beauv.

Characters of 4 *Cyperus* but nut compressed laterally, and style branches 2.—Species 50, all warm and temp. regions.

* Outer superficial cells of nut (at least on its shoulders) longitudinally oblong or elliptic; nut often appearing transversely lineolate or imperfectly zonate (by reason of the narrow ends of the cells running into an undulating line).

1. **P. flavescens**, *Nees in Linnæa*, ix. 283; annual, slender, umbel simple or reduced to 1 head, bracts spreading, spikelets linear $\frac{1}{10}$ in. wide yellow or pale, nut obovoid compressed shining black hardly half as long as the glume. *Cyperus flavescens*, *Linn. Sp. Pl.* 68 (not of *Linn. Herb.*); *Kunth Enum.* ii. 5; *Reichb. Ic. Fl. Germ.* viii. 31, t. 278, figs. 662-664; *Boeck. in Linnæa*, xxxv. 438, and in *Journ. Linn. Soc.* xviii. 104; *Clarke, l. c.* xxi. 36; *Boiss. Fl. Orient.* v. 364 (excl. *Cabul sp.*).

PUNJAB; Kurrum Valley, *Aitchison*, n. 964.—DISTRIB. N. temp. regions.

Stems 1-12 in. Leaves often $\frac{2}{3}$ length of stem, $\frac{1}{10}$ in. wide, grass-like. Spikelets clustered or very shortly spicate, spreading in fruit. Nut obtuse, with transverse white lines; black cells of surface longitudinally oblong.

2. **P. stramineus**, *C. B. Clarke*; umbels reduced to 1 compound head of 5-12 straw-colrd. spikelets, bracts and spikelets (even in fruit) suberect (otherwise nearly as *P. flavescens*). *Cyperus stramineus*, *Nees in Wight Contrib.* 74; *Kunth Enum.* ii. 9; *Clarke in Journ. Linn. Soc.* xxi. 39. *C. capillaris*, *Hochst. ms.*; *Steud. Syn. Pl. Cyp.* 4 (not of *Koenig.*). *C. coromandelinus*, *Boeck. in Linnæa*, xxxv. 480 (not of *Spreng.*). *C. filiformis*, *Heyne*; *Wall. Cat.* 3320 (partly).

Throughout INDIA, except the drier country, frequent, alt. 0-3000 ft.; from KHASIA, H. f. & T. T., to CEYLON and TAVOY.

Roots aromatic (J. D. Hooker). Spikelets 15-40-flid., or often long, even up to 70-flid.

3. **P. latespicatus**, C. B. Clarke; middle-sized, umbel simple or reduced to 1 head, spikelets spicate $\frac{1}{2}$ in. wide straw-colrd. more or less chestnut-red marked, nut obovoid compressed black hardly as long as $\frac{1}{2}$ glume. *Cyperus latespicatus*, Boeck. in *Flora*, xlii. 433 bis, and in *Linnæa*, xxxv. 467; Clarke in *Journ. Linn. Soc.* xxi. 40. *C. diaphanus*, Schrad. ex Roem. & Sch. Syst. ii., Mant. 477; Kunth Enum. ii. 9; Boeck. in *Linnæa*, xxxv. [1867-8] 437; Clarke, l. c. 80. *C. intermedius*, var. *indica*, Boeck. l. c. 451 (not of Steud.). *C. pseudo-bromoides*, Boeck. l. c. 464 (the Nepal plant). *C. angulatus*, Strachey Cat. Pl. Kumaon, 74; Duthie in E. T. Atkinson Gaz. x. [1876] 620 (not of Nees). *C. aphyllus*, Boeck. l. c. 450. *C. pauper*, C. B. Clarke, l. c. 41 (the Himal. plant not of Hochst.).—*Cyperaceæ*, Griff. Itin. Notes, 32, n. 506.

From KUMAON to KHASIA, alt. 3-6000 ft. BENGAL, CHOTA NAGPORE, and MALABAR.

Usually annual. Stems 4-16 in., occasionally 0. Leaves usually $\frac{1}{2}$ length of stem, $\frac{1}{2}$ in. wide, sometimes 0. Spikelets stouter than in *P. flavescens*, 20-60-flid. Nut with longitudinally oblong cells.—Strachey's plants are depauperated, filiform, bearing only 1 or 2 spikelets, and were formerly referred by me to *P. pauper*, an Abyssinian sp.

** Outer cells of the surface of nut all subquadrate hexagonal, none oblong.

† Stem decumbent at base, often clothed $\frac{1}{2}$ its length by leaf-sheaths.

4. **P. sanguinolentus**, Nees in *Linnæa*, ix. 283; middle-sized (or depauperate and filiform), umbel simple or contracted into 1 head, spikelets linear or oblong generally red-marked, glumes loosely imbricate, nut obovoid biconvex almost turgid. *Cyperus sanguinolentus*, Vahl Enum. ii. 351; Nees in Wight Contrib. 75; Thw. Enum. 342; Aitch. Cat. Punjab. Pl. 156. *C. Bragrostis*, Vahl l. c. 322? (exclud. syn. Retz.); Kunth Enum. ii. 7; Moritz. Verz. Zoll. Pfl. 96; Strachey Cat. Pl. Kumaon, 74; Boeck. in *Linnæa*, xxxv. 443; Clarke in *Journ. Linn. Soc.* xxi. 57, and xxv. 80. *C. cruentus*, Roxb. Fl. Ind. i. 196 (not of Rottb.). *C. pumilus*, Rottb. Desc. et Ic. 29, t. 9, fig. 4 (not of Linn.). *C. atratus*, Steud. in Zoll. Verz. Ind. Archip. ii. 62, and Pl. Cyp. 12; Mig. Fl. Ind. Bat. iii. 259; Boeck. l. c. 446. *C. concolor*, Steud. Pl. Cyp. 6. *C. Rehmanni*, Boiss. Fl. Orient. v. 364. *C. grossarius*, Heyne ms. *C. jemicinus*, Heyne ms. (not of Rottb.).—*Cyperus*, Wall. Cat. 3318 (mainly), 3335.

Throughout INDIA, ascending to 10,800 ft.; from KASHMIR to ASSAM, CEYLON, and SINGAPORE.—DISTRIB. Warm parts of the Old World.

Glabrous. Rhizome creeping, 4-10 in., or often flowering the first year. Stem 4-20 in. Leaves as long as stem or much shorter, $\frac{1}{10}$ in. wide. Spikelets shortly spicate or clustered, $\frac{1}{2}$ -1 by $\frac{1}{2}$ in., 6-24-flid. Glumes boat-shaped, ovate, obtuse, 3 green nerves on back, sides usually red- or chestnut-marked. Nut hardly $\frac{1}{2}$ length of glume, ashy-brown.—Belongs to a very small group of closely-allied species, which alone of all the *Cyperæ* have nodes (and sheaths and leaves) far above base of stem; usually a prominent character in *P. sanguinolentus*, but frequently absent. Sikkim

specimens from 10,000 ft., are 4-6 in. high with stem (and leaves) capillary, bearing 1 or 2 spikelets only, and may be a new species.

†† *Small or medium-sized, roots fibrous, leaves close to base of stem.*

5. **P. nitens**, *Nees in Linnæa*, ix. 283, and in *Nov. Act. Acad. Nat. Cur.* xix., *Suppl.* i. 43; small or scarcely middle-sized, umbel simple or reduced to 1 head, spikelets small clustered or shortly spicate linear or linear-oblong straw-colrd. or dusky, glumes minutely mucronate or nearly muticous, nut small obovoid. *Cyperus pumilus*, *Linn. Sp. Pl.* 69; *Gaertn. Fruct.* i. 9, t. 2, fig. 2; *Kunth Enum.* ii. 4 (in small part); *Roxb. Fl. Ind.* i. 196 (excl. syn. *Rottb.*); *Strachey Cat. Pl. Kumaon*, 74; *Clarke in Journ. Linn. Soc.* xxi. 43 (not of *Rottb.* or *Nees*). *C. nitens*, *Vahl Enum.* ii. 331; *Kunth Enum.* ii. 3; *Boeck. in Linnæa*, xxxv. 483 (not of *Retz.*). *C. membranaceus*, *Vahl. l. c.* 330; *Kunth l. c.* 3. *C. punctatus*, *Roxb. Fl. Ind.* i. 193 (excl. cit. *Pluk.*). *C. pulvinatus*, *Nees & Meyen in Wight Contrib.* 74; *Thw. Enum.* 342. *C. obstinatus*, *Steud. Syn. Pl. Cyp.* 10; *C. tortuosus*, *Herb. Roxb.*; *Wall. Cat.* 3339.—*Cyperus*, *Wall. Cat.* 3312 (mainly).

Throughout INDIA, alt. 0-6000 ft., frequent; from the PUNJAB to ASSAM, CEYLON, and SINGAPORE.—DISTRIB. Warm regions of the Old World.

Annual. *Stems* tufted, 1-12 in. *Leaves* often as long as stem, $\frac{1}{10}$ in. wide, weak. *Umbel* rays 1-6 in. up to 2-4 in. long, usually shorter. *Spikelets* 5-30 in a spike, $\frac{1}{2}$ - $\frac{3}{4}$ by $\frac{1}{12}$ in., 8-44-fld.; rhachilla slender, persistent. *Glumes* boat-shaped, 3-5-nerved, back green, sides pale nerveless, keel (in the Indian form) nearly always excurrent recurved. *Stamen* in the Indian plant usually 1 (in large examples sometimes 2). *Nut* compressed, brown, nut $\frac{1}{2}$ as long as the glume.

6. **P. pumilus**, *Nees in Linnæa*, ix. 283; annual, umbel simple, spikelets spicate oblong 6-10-fld. much compressed, glumes on back 3-nerved green, sides 2-3-nerved pale, keel excurrent recurved, nut broad ellipsoid flattened. *Cyperus hyalinus*, *Vahl Enum.* ii. 329; *Kunth Enum.* ii. 3; *Miq. Fl. Ind. Bat.* iii. 254; *Boeck. in Linnæa*, xxxv. 482; *Clarke in Journ. Linn. Soc.* xxi. p. 46; *Ridley in Forbes East. Archip.* 520. *C. pumilus*, *Nees in Wight Contrib.* 74 (excl. all syn.); *Kunth l. c.* 4 (in great part, not of *Linn.*) *C. strictus*, *Wight ms.* (not of *Roxb.*); *Wall. Cat.* 3336, *C* partly.

MADRAS; in rice-fields, *Wight, Leith.*—DISTRIB. Timor.

Stems 2-8 in. *Leaves* as long as stem, $\frac{1}{8}$ in. wide, weak. *Umbel* rays 3-7, up to 2 in. long. *Spikelets* 4-12 in a spikelet, not clustered, $\frac{1}{2}$ by $\frac{1}{8}$ in. *Glumes* almost glistening on their pale or yellowish nerved sides. *Nut* obtuse, ashy-black, more than $\frac{1}{2}$ length of glume.

7. **P. capillaris**, *Nees in Linnæa*, ix. 283 and in *Mart. Fl. Bras.* ii. pars. 1, 9; umbel apparently simple or condensed into 1 head, (see var. γ) spikelets clustered linear many-fld. much compressed straw-colrd., brown or black, nut small ellipsoid compressed apiculate chestnut-black. *Cyperus globosus*, *All. Fl. Pedem. Auctuar.* 49; *Reichb. Ic. Pl. Crit.* iii. 26, t. 229, and *Ic. Fl. Germ.* viii. 32, t. 279, fig. 665; *Boeck. in Linnæa*, xxxv. 458; *Clarke in Journ. Linn. Soc.* xx. 279 and xxi. 47. *C. flavidus*, *Decne. in Nouv. Ann. Mus.* iii. 359 (not of *Retz.* or *Roxb.*). *C. capillaris*, *Koenig. ms.*; *Roxb. Fl. Ind.* i. 194; *Nees in Wight Contrib.* 76; *Dalz. & Gibs. Bomb. Fl.* 283. *C. Lamarckianus*, *Schultes in Roem. & Sch. Syst.* ii. *Mant.* 108; *Kunth Enum.* ii. 9. *C. vulgaris*, *Sieber ms.*; *Kunth l. c.* 4. *C. mucronatus*, *Moritz Verz. Zoll. Pfl.* 95 (not of *Rottb.*). *C. flavus*.

cens, *Thw. Enum.* 342; *Aitch. Cat. Pl. Punjab* 155. *C. polystachyus*, *Strachey Cat. Pl. Kumaon*, 74; *Duthie in E. T. Atkinson Gaz.* x. 620.—*Cyperus*, *Wall. Cat.* 3318.

N. INDIA; alt. 0-6000 feet, from KASHMIR to CHOTA NAGPORE and ASSAM.—*DISTRIB.* Temp. and trop. old world.

Glabrous. *Stems* tufted, 4-24 in. *Leaves* 4-12 by $\frac{1}{2}$ in., weak. *Umbel* rays up to 2½ in., usually very short; bracts 4-8 in. *Spikes* subglobose. *Spikelets* 5-50, $\frac{3}{4}$ by $\frac{1}{10}$ in., 40-fld. *Glumes* ovate, obtuse. *Stamens* 2; anthers small, muticous. *Nut* $\frac{1}{2}$ length of glume.—The Himal. plant is identical with the European; its spikelets are rather broad, ferruginous-green, and the glumes are (in fruit) rather loose, thin. In the Khasia Hills the glumes are often browner, chestnut, or very black, rigid, tightly imbricated.

Var. *β. nilagiricus*, C. B. Clarke in *Journ. Linn. Soc.* xxi. 49; spikelets narrower more rigid, glumes (even in fruit) rigidly imbricated not inflated straw-colrd. or brown or (more often) chestnut or black. *Cyperus nilagiricus*, *Hochst. ms.*; *Steud. Syn. Cyp.* 2; *Boeck. in Linnæa*, xxxv. 457. *C. atro-ferrugineus*, *Steud. l.c.* 2. *C. Junghuhnii*, *Miq. Fl. Ind. Bat.* iii. 260. *C. ater*, *Dalz. & Gibs. Bomb. Fl.* 283 (not of Vahl.). *C. lucidus* and *lividus*, *Heyne ms.* *C. Eragrostis*, *Kottler, ms.* *C. semiteres*, *Heyne ms.*, *Wall. Cat.* 3310.—The Deccan Peninsula and Ceylon.—*DISTRIB.* Afric., S.E. Asia, Austral.—This var. is founded on the narrower spikelets; colour is accidental.

Var. *γ stricta*, C. B. Clarke, l.c.; spikelets narrower straw-colour or yellow less compressed frequently short 6-12-fld. sometimes curved or twisted, glumes closely packed but loosely imbricated. *Cyperus strictus*, *Lam. Ill.* i. 146; *Roxb. Fl. Ind.* i. 200; *Kunth Enum.* ii. 12; *Miq. Fl. Ind. Bat.* iii. 258. *C. tortuosus*, *Kænic ms.*; *Roxb. l.c.* 197; *Nees in Wight Contrib.* 75; *Kunth l.c.* 16. *C. divaricatus*, *Herb. Ham*; *Wall. Cat.* 3312 (partly).—N. India, from the Punjab to Assam, Chittagong and Chota Nagpore.—*DISTRIB.* Asia, Afric.

8. **P. polystachyus**, *Beauv. Fl. Owar.* II. 48, t. 86, fig. 2; umbel apparently simple or contracted into 1 head, spikelets clustered even in fruit suberect (see var. *β*) linear many-fld. dusky straw-colour often red-marked, nut oblong nearly symmetric truncate. *Cyperus polystachyus*, *Br. Prod.* 214; *Roxb. Fl. Ind.* i. 193; *Nees in Wight Contrib.* 75; *Kunth Enum.* ii. 13; *Dalz. & Gibs. Bomb. Fl.* 281; *Thw. Enum.* 342; *Boeck. in Linnæa*, xxxv. 477; *Boiss. Fl. Orient.* v. 365; *C. B. Clarke in Journ. Linn. Soc.* xx. 280 and xxi. 51. *C. odoratus*, *Linn. Sp. Pl. col.* i. 46. *C. teretifructus*, *Steud. in Zoll. Verz. Ind. Archip.* ii. 62 and *Syn. Cyp.* 3. *C. strigosus*, *Wight ms.* *C. corymbosus*, *Roxb. ms.* (not of Rottb.). *C. filiformis*, *Herb. Heyne*, *Wall. Cat.* 3320 A. (partly). *C. bicarinatus*, *Herb. Heyne*, *Wall. Cat.* 3333.—*Cyperus*, *Wall. Cat.* 3340.

Near the coast of INDIA from SIND to SINGAPORE; common. *SILHET*, *Hook. f. & T. T.*—*DISTRIB.* all warm especially maritime regions.

Glabrous. *Stems* 12-30 in., sometimes 0. *Leaves* overtopping stem or much shorter, $\frac{1}{2}$ in. broad, weak. *Umbel* rays 1-7, up to 0-2 in.; spikes compound of 10-50 spikelets; bracts 3-6, spreading, up to 4-16 in. spikelets $\frac{3}{4}$ by $\frac{1}{12}$ in., 20-50-fld. *Glumes* boat-shaped, ovate, muticous, papery, not rigid. *Stamens* 2 (usually); anthers small, oblong. *Nut* compressed, biconvex, black, $\frac{1}{2}$ length of glume.

Var. *β. laxiflorus*, *Benth. Fl. Austral.* vii. 261; spikes more open, spikelets in fruit rectangularly spreading subsolitary, often more tinged with yellow red or brown. *Cyperus paniculatus*, *Rottb. Descr. et Ic.* 40. *C. plenus*, *Heyne ms.*; *Kunth Enum.* ii. 12. *C. geminatus*, *Heyne ms.* *C. Hookerianus*, *Arnott ms.* (not of *Thwaites*).

THE DECCAN, and MALAY Peninsulas, and CEYLON, frequent.—*DISTRIB.* all hot regions.

9. **P. ferrugineus**, C. B. Clarke; spikelets rather broader redder, glumes more distant (otherwise as *P. polystachyus*, Var. β). *Cyperus ferrugineus*, Poir. in *Lam. Encyc.* vii. 261; *Kunth Enum.* ii. 11; *Baker Fl. Maurit.* 408. *C. polystachyus*, Vars. *ferruginea* and *macrostachya*, Boeck. in *Linnæa*, xxxv. 479, Vars. *ferruginea*, *micans* and *filicina*, C. B. Clarke in *Journ. Linn. Soc.* xxi. 54, 55. *C. strictus*, Rottler ms. Heyne ms. (not of Roxb.)—Wall. Cat. 3331.

The DECCAN PENINSULA; Rottler, G. Thomson. CHITTAGONG; J. D. H.—DISTRIB. Afric. Americ.

10. **P. sulcinus**, C. B. Clarke; as *P. polystachyus*, var. β , but spikelets longer, glumes more remote, nut unsymmetric its faces much compressed usually concave. *Cyperus sulcinus*, C. B. Clarke in *Journ. Linn. Soc.* xxi. 56 and xxv. 80.

BENGAL; up to 5000 feet, alt. frequent. ANAMALLAY MTS.; *Beddome*. PEGU; *Kurz*. TENASSERIM; *Helper* (*Kew Distrib.* n. 6209, 4).—DISTRIB. Afr. trop. Malaya.

Slender. Spikelets up to 40–50-flid. Narrow edge of nut much flattened against the rhacheola.

†† Robust, spikelets larger, yellow brown or red, leaves close to base of stem.

11. **P. angulatus**, Nees in *Linnæa*, ix. 283; robust, umbel simple, spikelets yellow or brown-yellow (see also var. β) spicate, nut small obovoid $\frac{1}{4}$ – $\frac{1}{2}$ length of glume. *Cyperus unioides*, Br. *Prod.* 216; C. B. Clarke in *Journ. Linn. Soc.* xxi. 60. *C. bromoides*, Willd. ms.; *Link Jahrb.* iii. 85; *Kunth Enum.* ii. 8; *Boeck. in Linnæa*, xxxv. 463. *C. angulatus*, Nees in *Wight Contrib.* 73; *Boeck. l.c.* 465.—*Cyperus*, Wall. Cat. n. 3324.

NEPAL; Wallich. DINAJPORE; C. B. Clarke. KHASIA; alt. 3–5000 feet, *Hf. & T. T.*, &c. NILGHIRI HILLS; *Wight*. AVA; Wallich.—DISTRIB. tropics.

Glabrous. Rhizome long, $\frac{1}{2}$ in. in diam., or often 0. Roots fibrous. Stem $1\frac{1}{2}$ –3 ft. Leaves often $\frac{2}{3}$ length of stem, $\frac{1}{2}$ in. broad. Umbel rays 3–8, up to 2–4 in. long (in depauperated a single few-spikeleted head); bracts 4–5, up to 8–12 in., leaf-like. Spikes of 3–20 spikelets, sometimes slightly compound; bracteoles inconspicuous. Spikelets $\frac{2}{3}$ by $\frac{1}{2}$ in., 22-flid. Glumes $\frac{1}{2}$ in., ovate, triangular-acute, loosely imbricate in fruit, 1–3-nerved, back green, sides shining yellow brown, margin crisped. Stamens 3; anthers oblong-linear. Nut compressed, black; style small, branches linear shortly exsert.

Var. β *Wightii*; umbel contracted into a subcompound head, spikelets larger shining chestnut-brown.

Deccan Peninsula; *Wight*.—A remarkable plant, only once collected. The spikelets are, in size and colour, unlike any Indian or other example of *P. angulatus*, while they most closely resemble *P. macranthus*, a Cape plant; but the nuts have the surface-cells subquadrate, while in *P. macranthus* these are longitudinally oblong.

12. **P. puncticulatus**, Nees in *Linnæa*, ix. 283; umbel compound or simple, spikelets red spicate, nut broad-ellipsoid truncate $\frac{1}{2}$ length of glume. *P. Baccha*, Nees in *Linnæa*, ix. 283. *Cyperus puncticulatus*, *Vahl Enum.* ii. 348; *Kunth Enum.* ii. 15; *Dalz. & Gibs. Bomb. Fl.* 283; *Thw. Enum.* 342; *Boeck. in Linnæa*, xxxv. 472 (*excl. syn. Roxb.*); C. B. Clarke in *Journ. Linn. Soc.* xxi. 68. *C. Baccha*, *Kunth l.c.* 115. *C. inundatus*, Nees in *Wight Contrib.* 76 (not of Roxb.). *C. procerus*, Roxb.



Fl. Ind. i. 203, chiefly. *C. flavidus*, *Herb. Heyne*; *Wall. Cat.* 3336, A. *C. tetegum*, *Herb. Wight*; *Wall. Cat.* 3355, B.

THE DECCAN PENINSULA; *Rottler, Wight, &c.* CEYLON; *Thwaites*.—DISTRIB. China.

Glabrous, annual. *Stem* erect at base, subsolitary, 1-2 ft. *Leaves* often as long as stem, $\frac{1}{4}$ in. broad. *Spikelets* $\frac{3}{4}$ by $\frac{1}{4}$ in., 7-80-fl., sides very parallel.

Var. β . *quinquagintiflorus*, C. B. Clarke, l.c. 69; spikelets elongate up to 50-fl., anthers apiculate. *Cyperus macrostachyus*, *Vahl Enum.* ii. 349 (as to plant of *Rottler*, not of *Lam. or Poir.*). *C. longus*, *Herb. Heyne*; *Wall. Cat.* 3336 B.—*Madras, Heyne*.

13. ***P. albomarginatus***, *Nees in Mart. Fl. Bras.* ii. part 1, 9; umbel simple or compound, spikelets long yellow or ruddy brown, glumes obtuse white-edged in fruit spreading not imbricate, nut obovoid greatly compressed nearly as long as glume. *Cyperus Hochstetteri*, *Nees ms.*; *Krauss in Flora*, xxviii. 755 (in note); *Boeck in Linnæa*, xxxv. 471; *C. B. Clarke in Journ. Linn. Soc.* xxi. 69. *C. flavicomus*, *Torrey Bot. Mexic. Bound.* 226; *Benth. Fl. Austral.* vii. 261 (excl. syn., not of *Michx.*).

CONCAN and MALABAR; *G. Thomson, &c.* RANGOON; *R. Scott, Kurz.*—DISTRIB. Tropics.

Glabrous, annual. *Stem* erect at base, subsolitary, 1-3 ft. *Leaves* often $\frac{3}{4}$ length of stem, $\frac{1}{2}$ in. broad. *Umbel* rays sometimes 11, up to 7 in. long, sometimes 2-3, only 1 in. long. *Spikelets* often large, 1 by $\frac{1}{2}$ in.

INDETERMINABLE SPECIES.

C. KAMPHÆVENERI, *Boeck. Cyp. Novæ*, i. (1888), 5; rhizome tuberous, style but little exerted shortly 2-fl.—NICOBAR ISLDS.; *Kamphævener*.

3. JUNCCELLUS.

Stem erect, simple, leafy only near base. *Inflorescence* umbellate or capitate. *Spikelets* linear or oblong, compressed; rhacheola persistent. *Glumes* distichous, deciduous, concave, muticous, 2 lowest empty, 4- ∞ -succeeding bisexual, uppermost 1-3 sterile or empty. *Stamens* 3-2, anterior; anthers oblong-linear. *Nut* plano-convex, broad plane face flat against rhacheola; style-base continuous with nut, not tumid; branches 2, linear.—Species 12, in all warm climates.

This genus is *Cyperus* Sect. *Juncellus* of Kunth, and differs from *Cyperus* by having a 2-fl style, and more or less compressed, not equilaterally trigonous nut. Several of the species have been considered by Boeckeler and others as forms with 2-branched styles of corresponding species of *Cyperus*.

* *Inflorescence umbelled.*

1. ***J. serotinus***, C. B. Clarke; stoloniferous, stout, stem at top triquetrous thick, leaves and bracts long, umbel compound, spikelets linear in dense spikes, glumes broad-ovate obtuse 7-9-nerved, nut longer than $\frac{1}{2}$ the glume. *Cyperus serotinus*, *Rotth. Descr. et Ic.* 31; *Kunth Enum.* ii. 19; *Boeck. in Linnæa*, xxxv. 492. *C. Monti*, *Linn. f. Suppl.* 102; *Host. Gram. Austr.* iv. 38, t. 67; *Reichb. Ic. Fl. Germ.* viii. 32, t. 279, fig. 666; *C. B. Clarke in Journ. Linn. Soc.* xxi. 72, t. 3, fig. 29; *Boiss. Fl. Orient.* v. 366. *C. japonicus*, *Miq. in Ann. Mus. Lugd. Bat.* ii. 140. *C. punctulatus*, *Atch. in Journ. Linn. Soc.* xix. 189 (not of *Vahl*).—*Monti, Bonon. Prodr.* 12, t. 1, fig. 2.



KASHMIR; alt. 1000 ft., Jacquemont, &c. PUNJAB; alt. 1000 ft., Thomson, &c.—DISTRIB. from Spain to Japan.

Glabrous, except sometimes rhachis of spikes. Stems solitary, 1-3 ft. Leaves often as long as stem, $\frac{1}{4}$ – $\frac{1}{2}$ in. broad. Bracts 3-5, up to 8-18 in. leaf-like. Umbel rays 3-6, up to 2-6 in. long, very unequal, rather stout; umbellules shortly corymbose or capitate; bracteoles short. Spikes of 5-40 spikelets. Spikelets $\frac{1}{4}$ – $\frac{1}{2}$ by $\frac{1}{10}$ – $\frac{1}{8}$ in., 12-30-fld. (or shorter 6-8-fld.), turgid; rhacheola robust, tetragonous, excavated, scarcely winged. Glumes approximate; margins narrowly scarious, in dried ripe examples incurved crisped. Stamens 3; anthers scarcely apiculate. Style short; branches about as long as nut. Nut obovoid, obtuse, smooth, dark-brown.—Much confused in herbaria with *Cyperus pilosus*, Vahl, which it generally resembles and has further the rhachis of the spikes minutely hairy, a rare character in *Cyperus*.

2. **J. stylosus**, C. B. Clarke; stem at top trigonous slender, leaves and bracts rather short, glumes not striate towards their margins, style-branches very long, nut (not quite ripe) small; otherwise as *J. serotinus*. *Cyperus* Monti, var. β ? *stylosa*, C. B. Clarke in Journ. Linn. Soc. xxi. 73.

KHASIA HILLS; Griffith.

Leaves not half length of stem. Bracts scarcely overtopping inflorescence. Rhachis of spikes glabrous. Glumes chestnut-red, with very narrow white margins, inflated as in *J. serotinus*. Spikelets comose from the persistent long dark-red styles. Nuts perhaps all imperfect.

3. **J. inundatus**, C. B. Clarke; stout, stem at top triquetrous thick, leaves and bracts long, umbel compound, spikelets in loose spikes, glumes obtuse 5-7-nerved, nut longer than $\frac{1}{2}$ the glume. *Cyperus inundatus*, Roxb. Fl. Ind. i. 201; Wall. Cat. 3342 A, B; C. B. Clarke in Journ. Linn. Soc. xxi. 31, 73 (not of Br. or Nees). *C. diluvialis*, Schultes in Roem. & Sch. Syst. ii. Mant. 124. *C. puncticulatus*, Steud. Syn. Cyp. 10 (partly, not of Vahl).—*Cyperus*, Wall. Cat. 3355, C. 3359, F.

BENGAL; in swamps, from Sylhet to the sea, frequent.—DISTRIB. China.

Rhachis of spike glabrous, 1-2 in., spikelets often $\frac{1}{4}$ – $\frac{1}{2}$ in. apart. Differs little from *J. serotinus*, but by the open spikes. In herbaria it is more frequently mixed either with *Cyperus procerus* or *Pycnus puncticulatus*.

4. **J. alopecuroides**, C. B. Clarke; large, leaves and bracts long, umbel large compound, spikes cylindric very dense, spikelets linear-oblong bearing 8-30 nuts, glumes concave dirty straw-colour, rhachilla rather stout subquadrangular not winged, nut small $\frac{1}{2}$ length of glume. *Cyperus alopecuroides*, Rottb. Descr. et Ic. (1773), 38, t. 8, fig. 2; Nees in Wight Contrib. 76; Kunth Enum. ii. 19; Thw. Enum. 342; Dalz. & Gibs. Bomb. Fl. 282; Miq. Fl. Ind. Bat. iii. 261; Boeck. in Linnæa, xxxvi. 322 (excl. var. a); Boiss. Fl. Orient. v. 367; C. B. Clarke in Journ. Linn. Soc. xxi. 30, 74, t. 2, fig. 13; King in T. E. Atkins. Gaz. x. (1876), 320. *C. compositus*, Br. Prodr. 217. *C. semidives*, Steud. Syn. Cyp. 36. *C. speciosus*, congestus, alopecuroides, Herb. Heyne; Wall. Cat. 3344, B, C.

Throughout India, from PESHAWUR, Griffith (Kew Distrib. 6150) to SILHET, Hook. f. & T. T., and CEYLON, Thwaites.—DISTRIB. Afric. and Austral. trop.

A large glabrous annual, 2-3 ft. Leaves often as long as stem, $\frac{1}{4}$ – $\frac{1}{2}$ 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 $\frac{1}{2}$ by $\frac{1}{2}$ in. Spikelets $\frac{1}{2}$ in., lanceolate, compressed. Glumes muticous or mucronulate. Stamens 3; anthers lanceolate, compressed. Nuts plano-convex, finally ashy-black (many imperfect pale); style muticous. Nuts plano-convex, finally ashy-black (many imperfect pale); style as long as nut, branches longer, shortly exsert.—United by Boeckeler with

Cyperus exaltatus, Retz; but separated by the very crowded spikes and 2-fid style.

** *Stem with one head of spikelets.*

5. ***J. pygmæus***, C. B. Clarke; annual, leaves and bracts long green flaccid, spikelets innumerable in a compound head linear often curved or twisted, nut plano-convex $\frac{3}{4}$ length of glume. *Cyperus pygmæus*, *Rotb. Descr. et Ic.* 20, t. 14, figs. 4, 5; *Nees in Wight Contrib.* 72; *Kunth Enum.* ii. 18; *Miq. Fl. Ind. Bat.* iii. 261; *Boiss. Fl. Orient.* v. 368 (excl. syn. *Roxb.*); *Boeck. in Linnæa*, xxxv. 493 (excl. var. β); C. B. Clarke in *Journ. Linn. Soc.* xx. 282 and xxi. 28–30, 81, t. 2, figs. 10, 10a; *King in E. T. Atkinson Gaz.* x. (1876), 320. *C. squarrosus*, *Roxb. Fl. Ind.* i. 190. *C. monocephalus*, *Roxb. mss.* (not *Fl. Ind.*). *Dichostylis pygmæa*, *Nees in Linnæa*, ix. 289. *Pycurus diffusus* and *pygmæus*, *Nees in Linnæa*, ix. 283.—*Isolepis?* *Wall. Cat.* 3495.

From KASHMIR to BURMA and Ceylon. All warm regions (excl. Europe).

Glabrous. *Stems* coespitose (often very many), 1–10 in. *Bracts* 3–6 in., spreading. *Head* $\frac{1}{4}$ – $\frac{3}{4}$ in. in diam. *Spikelets* often 100, $\frac{1}{4}$ in., 8–24-fld., greenish-white, finally pale brown. *Glumes* close-packed, boat-shaped. *Stamens* 2–1; anthers small, linear-oblong, mucous. *Nut* ellipsoid, brown, top pyramidal; style shorter than nut; branches shortly exsert.—Much confused (by Boeckeler finally united) with *Scirpus Michelianus*, *Linn.*; so that the synonymy cannot be completely extricated. In the young state it is difficult to distinguish the two apart; but when the spikelets of *J. pygmæus* are ripe, and the glumes (except a few of the top infertile) have fallen away, the scars on the rhacheola (and therefore the glumes and nuts) are seen to be exactly distichous; whilst the rhacheola of ripe *S. Michelianus*, shows the scars arranged spirally from the base of the spikelet. *Rheede's Hort.* Mal. xii. t. 54, on which alone several specific names are grounded, is usually referred here, but it is as likely to be *Fimbristylis argentea*, *Vahl*.

6. ***J. lævigatus***, C. B. Clarke; rhizome creeping, leaves short or long, lower bract as though continuing stem, head lateral, spikelets 1–30 linear 16–40-fld. somewhat turgid, glumes close-packed obtuse, nut $\frac{1}{2}$ – $\frac{3}{4}$ length of glume. *Cyperus lævigatus*, *Linn. Mant.* 179; *Rotb. Descr. et Ic.* 19, t. 16, fig. 1; *Miq. Fl. Ind. Bat.* iii. 260; *Boeck. in Linnæa*, xxxv. 486; *Boiss. Fl. Orient.* v. 366; C. B. Clarke in *Journ. Linn. Soc.* xx. 282 and xxi. 77; t. 3, figs. 20, 21 and t. 4, fig. 33; *Aitch. in Trans. Linn. Soc. ser.* 2; *Bot.* iii. 121. *C. mucronatus*, *Rotb. l. c.* 19, t. 8, fig. 4; *Roxb. Fl. Ind.* i. 185; *Nees in Wight Contrib.* 72; *Kunth Enum.* ii. 17; *Reichb. Ic. Fl. Germ.* viii. 31, t. 278, fig. 661. *C. lateralis*, *Forsk. Fl. Æg. Arab.* 13; *Roxb. l. c.* 186; *Nees in Wight Contrib.* 73 (not *Linn. f.*). *C. Roxburghianus*, *Presl. in Oken Isis*, xxi. 271. *C. pleuranthus*, *Nees l. c.* 73. *C. acuminatus*, *Roxb. ms.* *C. mucronatus* and *C. niveus*, *Herb. Heyne*; *Wall. Cat.* 3311. *Pycurus lævigatus*, *Nees in Linnæa*, x. 130. *P. mucronatus* and *lateralis*, *Nees l. c.* x. 283.

Throughout WESTERN INDIA from the Punjab, *Aitchison*, and Bundelkund, *Duthie*, to SOUTH MADRAS, *Wight*.—DISTRIB. most warm climates.

Glabrous. *Rhizome* usually woody, $\frac{1}{2}$ 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, $\frac{1}{2}$ in. broad, usually short, occasionally obsolete (i.e. sheaths terminated by a lanceolate process not tinged with chestnut or chestnut-red; rhacheola stout, tetragonous, hardly winged. *Glumes* concave, ovate, 7–11-nerved. *Stamens* 3; anthers yellow with a small