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FLORA

OF

BOMBAY.

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THE

FLORA OF THE PRESIDENCY OF BOMBAY.

BY

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FORMERLY PRINCIPAL OF THE COLLEGE OF SCIENCE AT POONA AND DIRECTOR OF THE BOTANICAL SURVEY OF WESTERN INDIA.

VOL. III

POLYGONACEÆ TO GRAMINEÆ.

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PREFACE TO REPRINTED EDITION.

When the Botanical Survey of India was reorganised in 1954 the Government of India decided on the advice of the eminent Botanists of the country that the important 'Floras' of the country which had gone out of print should be reprinted in order to provide immediate facilities of work on Systematic Botany of Phanerogams by students and Botanists of the country. The reprints are now being issued accordingly.

One particular point needs a special mention here. The Government of India, while recognising fully the need for bringing the 'Floras' of the country upto date after a thorough revision, cannot overlook the fact that such work is possible only on an extensive and thorough exploration of both regions already explored and those hitherto unexplored and a proper rating of the information thus obtained with the materials in the already published 'Floras'. For this reason alone, there is ample justification for a reprint of the old 'Floras'; the present effort is therefore the starting point in the greater project of the review of the 'Floras' of our country. It is hoped that these publications would thus meet the long-felt requirement of the Botanists of the country.

Owing to the necessity to conform to certain printing stipulations and using the same size of paper for all the reprinted 'Floras', the paginations in the reprinted volumes differ from the original. But the index, which is correspondingly corrected, would, it is hoped, enable reference without inconvenience. Some of the printing mistakes in the original flora have been corrected in this publication. It was also found that some of the vernacular names as well as names of genera and species had not been included in the indices of the original edition. These have been added in the present edition.

The original work was published in two unequal volumes each with separate indices. In the present reprint they are being published in three more or less equal volumes, volumes I and II with separate indices and volume III with a consolidated general index at the end, for convenience in handling.

J. C. SEN GUPTA,
Chief Botanist,
Botanical Survey of India.

Calcutta, 1958.

FLORA OF BOMBAY

ORDER CIV. **POLYGONACEÆ.**

Herbs, rarely shrubs, very rarely trees. Leaves alternate (rarely opposite), entire or serrulate ; stipules (ocreæ) scarious or membranous, usually sheathing the stem. Flowers usually small, hermaphrodite (rarely polygamous), regular solitary or in small bracteate clusters in spike-like inflorescence ; pedicels usually articulate. Perianth simple, inferior ; lobes or segments 3—6, free or connate, persistent, imbricate in bud. Stamens 5—8 (rarely more or fewer), opposite the perianth-segments ; filaments filiform, free or connate below in a ring ; anthers 2-celled, usually versatile. Disk annular, glandular or 0. Ovary superior, sessile, free, 1-celled, 2—4-gonous ; ovule solitary, orthotropous, sessile or at the end of a distinct funicle ; styles 3 or 2 (rarely 4), often short, free or somewhat connate ; stigmas capitate, peltate or fimbriate. Fruit a small hard, usually 3 (rarely 4)-gonous or biconvex nut enclosed in the perianth. Seed erect ; testa membranous ; albumen copious, floury, sometimes ruminate ; embryo lateral, straight, curved or sometimes peripheric ; radicle superior.—DISTRIB. Genera 30 ; species about 600, chiefly in temperate regions.

Perianth 3—5-cleft; stigmas capitellate.	
Shrubs.	
Stamens 12—18; styles 4	1. CALLIGONUM.
Stamens 8; styles 3	2. PTEROPYRUM.
Herbs (except *Polygonum chinense* which is an under-shrub); stamens 8 or fewer	3. POLYGONUM.
Perianth 6-cleft, the 3 inner segments much enlarged in fruit; stigmas fimbriate	4. RUMEX.

1. **CALLIGONUM,** Linn.

Rigid, much-branched shrubs. Leaves alternate, narrowly linear or subulate, sometimes very small or almost obsolete ; stipules short, membranous. Flowers hermaphrodite, solitary or few, loosely clustered, ocreate ; pedicels short ; bracteoles 0. Perianth 5-partite ; segments flat. Stamens 12—18. Ovary 4-gonous, the angles variously crested, winged, echinate or setose. Seed oblong, terete or 4-gonous ; testa thin ; embryo central, straight ; cotyledons narrow. —DISTRIB. Species 26, in dry or sandy regions of N. Africa, Western or Central Asia.

1. **Calligonum polygonoides,** *Linn. Sp. Pl.* (1753) p. 530. An almost leafless shrub ; branches terete, pale, glabrous, the internodes 1—1½ in. long ; flowering branchlets slender ; stipules short,

membranous, cup-shaped, obliquely truncate and produced upwards at one side. Flowers pinkish, fascicled in the axils of the ocreæ; pedicels $\frac{1}{16}$—$\frac{1}{10}$ in. long. Perianth about $\frac{1}{8}$ in. long, divided about $\frac{2}{3}$ the way down; segments obovate, cuneate. Ovary tuberculate; styles 4, slightly connate at the base; stigmas capitate. Nucleus of the fruit $\frac{1}{4}$—$\frac{1}{3}$ in. long, oblong, densely clothed with numerous branched reddish-brown bristles dilated at the base. Fl. B. I. v. 5, p. 22; Talb. Trees, Bomb. ed. 2, p. 276; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365; Watt, Dict. Econ. Prod. v. 2, p. 27.—Flowers: Apr.—May.

In the Bombay Presidency confined to Sind. SIND: *Stocks!*, *Woodrow*; Boogta hills, *Vicary!*—DISTRIB. India (Panjáb, Rajputana); Persia, Armenia, Syria.

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

Rigid shrubs with twiggy branches. Leaves small, alternate or fascicled, linear or spathulate; stipules very short or obsolete. Flowers small, hermaphrodite, ocreate; pedicels filiform; bracteoles 0. Perianth 5-partite; segments subequal. Stamens 8; filaments filiform, attached to a pilose ring; anthers oblong. Ovary 3-gonous, acuminate; styles 3; stigmas capitate. Nut broadly 3-winged, beaked. Seed beaked, base broad; embryo eccentric, slightly curved; cotyledons oblong, much shorter than the radicle.—DISTRIB. Western Asia; species 5 or 6.

1. **Pteropyrum Oliverii,** *Jaub. & Spach, Illustr. Pl. Orient.* v. 2 (1844) p. 9, t. 108. A much-branched glabrous shrub; branches twiggy with white bark. Leaves $\frac{1}{4}$—$\frac{5}{8}$ by $\frac{1}{10}$—$\frac{1}{8}$ in., spathulate-oblong, entire, fascicled, nerveless, the young ones often with revolute margins; petioles short, filiform; stipules thinly membranous, appressed to the branch, truncate, produced at one or both sides into a triangular appendage. Flowers in many-flowered fascicles; pedicels filiform, articulated below the middle. Perianth pink-colored; segments connate at the base into a short tube, the inner segments the largest, obovate-oblong. Stamens 8, of which the 5 shorter are alternate with the perianth-segments, the other 3 opposite the larger inner segments; filaments inserted on a hairy ring; anthers oblong, versatile. Fruit 3-winged, but appearing to be 6-winged owing to the twist received at the neck by which the upper halves of the wings become alternate with the lower. Fl. B. I. v. 5, p. 23; Wight, Icon. t. 1809; Talb. Trees, Bomb. ed. 2, p. 276; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365. *Atraphaxis sp.*, Aitch. Pb. & Sind Pl. p. 125. *Gibsonia conferta*, Stocks, MS.—Flowers: Oct.

SIND: *Vicary!*, *Stocks!*; Laki, *Woodrow.*—DISTRIB. Persia, Afghanistan.

3. **POLYGONUM,** Linn.

Herbs (rarely shrubs), usually erect. Leaves alternate; stipules membranous, connate into a tubular ocrea. Flowers hermaphrodite, small or minute, axillary or terminal, the clusters sessile or in spici-

form capitate or panicled racemes; pedicels short, usually jointed under the perianth; bracts and bracteoles membranous, ocreate. Perianth green or colored, 4—5 (rarely 3)-cleft. Stamens 5—8 (rarely 1—4), perigynous; filaments filiform, often dilated at the base, or alternate with the lobes of an annular or glandular disk; anthers 2-celled, the cells distinct, joined by a small connective. Ovary compressed or 3-gonous; ovule solitary, usually stipitate; styles 2 or 3, free or slightly connate below; stigma capitate. Fruit a compressed or 3-gonous nutlet with obtuse or acute angles, covered or nearly covered by the persistent perianth; pericarp usually hard, shining or dull. Seed albuminous; embryo lateral or eccentric; radicle long; cotyledons usually small.—DISTRIB. Throughout the world; species about 150.

Inflorescence axillary; flowers solitary or in small clusters.
- An erect branched undershrub ..... 1. *P. salicornioides.*
- A diffusely-branched prostrate herb ..... 2. *P. plebejum.*

Inflorescence terminal, racemose, spicate or capitate.
- Inflorescence of sessile or pedicellate flowers in branched spikes or spike-like racemes.
  - Racemes stout, compact; bracts closely imbricate.
    - Nutlets orbicular or biconvex.
      - Stipules and bracts eciliate; whole plant glabrous ..... 3. *P. glabrum.*
      - Stipules and bracts ciliate; peduncles strigosely hairy.
        - Stipules with a spreading or recurved scabrid limb ..... 4. *P. limbatum.*
        - Stipules without a limb ..... 5. *P. tomentosum.*
    - Nutlets distinctly trigonous ..... 6. *P. serrulatum.*
  - Racemes slender, lax; bracts more or less interrupted.
    - Perianth and whole plant glandular..... 7. *P. Hydropiper* var. *glandulosissima.*
    - Perianth eglandular ..... 8. *P. mite.*
- Inflorescence compressed, capitate.
  - Every or almost every head in the axil of an involucral leaf ..... 9. *P. alatum.*
  - Heads not in the axils of involucral leaves.
    - A climbing unarmed undershrub; leaves broadly ovate ..... 10. *P. chinense* var. *ovalifolia.*
    - Erect herbs, more or less armed with minute prickled.
      - Angles of stem prickly; leaves ¼—½ in. broad; bracts glabrous ..... 11. *P. pedunculare* var. *angustissima.*
      - Angles of stem almost without prickles; leaves ¾—1 in. broad; bracts subciliate. 12. *P. pedunculare* var. *nilagirica.*

1. **Polygonum salicornioides,** *Jaub & Spach, Illustr. Pl. Orient.* v. 2 (1844—46) p. 33, t. 123. A low erect branched undershrub; stem and branches pale, terete, striate, minutely scabrid along the ridges between the striæ. Leaves sessile, very deciduous, small, the lower ovate or oblong-lanceolate, becoming gradually smaller and subulate upwards, the uppermost minute; stipules membranous, produced into 2 triangular acute lobes. Fruit arising from

the upper axils, shortly pedicellate, solitary or 2—3, erect in flowering; pedicels thick, articulated below the perianth. Perianth rosy, 5-partite, the 2 outer segments concave, slightly keeled on the back, shorter and slightly narrower than the inner, the 3 inner segments flat. Stamens 8; anthers minute. Fruit not seen. Fl. B. I. v. 5, p. 26; Meissn. in DC. Prodr. v. 14, p. 90.

SIND: *Vicary*!

There is but one sheet in Herb. Kew. ticketed as above. The specimens on it are very imperfect.—DISTRIB. Persia.

2. **Polygonum plebejum,** *R. Br. Prodr.* (1810) p. 420. A diffusely-branched, prostrate herb, often with a woody rootstock; branches terete, striate. Leaves $\frac{1}{6}$—$\frac{3}{8}$ in. long, oblong, or linear, or obovate, sessile or shortly petiolate; stipules hyaline, short, lacerate to the middle, fimbriate. Flowers pink, axillary, solitary or 2—3 together; pedicels short or 0. Perianth $\frac{1}{10}$ in. long or less, divided nearly to the base; segments broad or narrow or the 2 outer (or all?) acute. Nuts 3-gonous, smooth, shining, $\frac{1}{12}$—$\frac{1}{10}$ in. long. Fl. B. I. v. 5, p. 27; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365; Prain, Beng. Pl. p. 884.—Flowers: Dec.—Mar.

A polymorphous plant of which there are several forms, many of which seem to be the result of soil and climate. Sir J. D. Hooker (Fl. B. I. l. c.) gives 11 forms or varieties, though he says that there is not one of these that does not seem to pass insensibly into 2 or more others. The shape of the sepals, which is relied on to furnish distinguishing characters for some of the varieties, is, Sir J. D. Hooker (*l. c.*) remarks, "so variable in age in other species that much importance must not be attached to it." A wet season or moist locality has a tendency to produce luxuriant plants with long internodes and large leaves, while a dry season or locality has the opposite tendency. The only apparent way of settling the question as to how far soil and climate affect the growth of the plant, would be to grow the plant under varying conditions. An experiment of this kind might be undertaken by one of the Botanic Gardens in

Of the varieties given by Sir J. D. Hooker in the 'Flora of B. India,' the following are those most commonly met with in the Bombay Presidency:—

VAR. 1. *P. plebejum proper,* Hook. f. Fl. B. I. v. 5, p. 28. Leaves $\frac{1}{6}$—$\frac{1}{3}$ in. long; flowers usually hidden among the stipules; sepals all obtuse, short and broad. Prain, Beng. Pl. p. 884.

Siddapur (N. Kanara), *Talbot,* 1080, ex *Gage,* Census Indian Polygonums.

VAR. 2. *effusa,* Hook, f. Fl. B. I. v. 5, p. 28. Leaves narrowly linear; flowers all or mostly pedicellate; sepals all obtuse, short and broad. A weed of wet places. Prain, Beng. Pl. p. 884. *Polygonum effusum,* Meissn. in DC. Prodr. v. 14, p. 93.

SIND: *Dalzell*!, *Stocks,* 30!; Karachi, *Cooke*!, *Kanitkar*!; Hyderabad, *Cooke*!

VAR. 3. *sindica,* Hook. f. Fl. B. I. v. 5, p. 29. Branches pale red-brown; leaves $\frac{1}{10}$—$\frac{1}{8}$ in. long, elliptic-oblong; flowers very minute, sunk among the stipules; sepals narrow, obtuse.

SIND : *Stocks* !
There is but 1 sheet in Herb. Kew. marked as above.

VAR. 4. *indica,* Hook. f. Fl. B. I. v. 5, p. 28. Branches uniformly spreading all round the crown ; leaves ¼—⅜ in. long, linear or obovate-oblong, flat, often apiculate ; sepals broad, the 2 outer acute. Watt, Dict. Econ. Prod. v. 6, part 1, p. 319. *Polygonum indicum,* Heyne, in Roth, Nov. Pl. Sp. p. 208 ; Wight, Icon. t. 1808. *P. elegans,* Dalz. & Gibs. p. 214 (*not* of Roxb.).

The commonest form. KONKAN : *Law* ! DECCAN : Mahableshwar, *Cooke* ! ; Karli, *Cooke* ! S. M. COUNTRY : Belgaum, *Ritchie,* 1311 ! ; Badami, *Cooke* !, *Woodrow* !, *Bhiva* ! KANARA : N. Kanara, *Talbot,* 57, ex *Gage,* Census Indian Polygonums.

VAR. 5. *brevifolia,* Hook. f. Fl. B. I. v. 5, p. 28. Leaves small, ⅛—¼ in. or less, obovate, acute or apiculate ; internodes very short, concealed by the leaves and stipules, which latter show as a white villous, band on the underside of the branchlets ; 2 outer sepals acute. Prain, Beng. Pl. p. 884.

KONKAN : *Stocks* !, *Dalzell* ! ; Atgaon, Thana districts, *Kanitkar* ! DECCAN : Poona, *Kanitkar* ! SIND : *Dalzell* !

VAR. 6. *Griffithii,* Hook. f. Fl. B. I. v. 5, p. 29. Branches excessively numerous from the root, very slender, quite naked below ; leaves orbicular, 1/10—⅛ in. in diam., apiculate, with a distinct median ridge ; stipules very crinite and woolly-looking ; flowers minute, hidden among the stipules ; sepals rounded, the 2 outer apiculate.

KONKAN : *Stocks* ! ex *Gage,* Census of Indian Polygonums.
Sir J. D. Hooker considers this a probable form of *brevifolia,* with the bases of the branches buried in the soil, and hence leafless and very slender.

VAR. 7. *polyneura,* Hook. f. Fl. B. I. v. 5, p. 29. Leaves ⅛ in. long, linear-oblong, acute ; stipules many-nerved ; flowers 1—2 in the axils, shortly pedicellate ; nut polished, smooth.

KANARA : Sirsi (N. Kanara), *Talbot,* 389, ex *Gage,* Census of Indian Polygonums.

VAR. 8. *micranthema,* Hook. f. Fl. B. I. v. 5, p. 29. Small ; branches very slender ; leaves ¼—⅓ in. long, linear or linear-oblong, obtuse ; flowers pedicellate, very minute ; sepals narrow, nutlets very small, 1/10—1/20 in. long. Prain, Beng. Pl. p. 884. *Polygonum micranthemum,* Franchett, MSS. Considered by Sir J. D. Hooker to be only a small state of *P. plebejum.*

SIND : Karachi district, *Ryan,* ex *Gage,* Census of Indian Polygonums.

3. **Polygonum glabrum,** *Willd. Sp. Pl.* v. 2 (1799) p. 447. Stems 2—5 ft., stout, simple or slightly branched, procumbent and usually reddish below, then erect, the young stems usually green, polished, with a dark reddish-brown ring at each node. Leaves 3—9 by ⅝—1¼ in., lanceolate, finely acuminate, glabrous, closely gland-dotted, tapering at the base ; lateral nerves numerous, close, slender ; petioles ⅛—½ in. long, those of the young leaves usually red ; stipules ⅞—1¼ in. long, those on the old stems torn and ragged, when young completely and closely sheathing the stem, conspicuously veined, the mouth truncate not ciliate. Flowers pink, in paniculate slender racemes ; peduncles usually glabrous ;

pedicels short; bracts ⅛ in. long, ovate, obtuse, with membranous not ciliate margins, few-flowered. Perianth ⅛—¼ in. long; segments oblong, obtuse. Stamens 6—8 (often 7). Styles 2, connate at the base, the free portions $\frac{1}{16}$ in. long, filiform. Nutlets ⅛ in. in diam., broadly ovoid or suborbicular, compressed, biconvex, black, shining. Fl. B. I. v. 5, p. 34; Grah. Cat. p. 172; Dalz. & Gibs. p. 214; Icon. t. 1799; Trim. Fl. Ceyl. v. 3, p. 412; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365; Prain, Beng. Pl. p. 884; Watt, Dict. Econ. Prod. v. 6, part 1, p. 318.—Flowers: Oct.—Mar. VERN. *Sheral.*

Dalzell without locality in Herb. Kew.! KONKAN: *Law!*; margins of tanks, *Graham*; Pen, *Kanitkar!* DECCAN: Vale of the Yenna at Mahableshwar, *Graham*; Mahableshwar near the lake, *Cooke!*, *H. M. Birdwood*; Poona, *Cooke!* KANARA: Vincholi on the Kála naddi, *Talbot*, 941, ex *Gage*, Census of Indian Polygonums. SIND: *Stocks!*, *Dalzell*, 1202, ex *Gage*, Census of Indian Polygonums.—DISTRIB. Throughout India; Ceylon, Australasia, China, Africa, America.

4. **Polygonum limbatum,** *Meissn. in DC. Prodr.* v. 14 (1856) p. 123. Stem stout, erect, simple, pubescent or glabrous. Leaves 4—8 by 1—1½ in., lanceolate, acuminate, scaberulous on both surfaces, base tapering; petioles short; stipules cylindric, strigose, the mouth truncate with a herbaceous spreading or recurved scabrid ciliate limb. Flowers in short erect paniculate racemes; peduncles strigose; pedicels short. Inflorescence and nuts as in *P. tomentosum*, from which it differs in the leaves, which are minutely scabrid, and in the stipules, which have a herbaceous scabrid limb. Fl. B. I. v. 5, p. 30; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365; Prain, Beng. Pl. p. 884.

Rare. KONKAN: *Law!*, *Stocks* ex *Gage*, Census Indian Polygonums.
There is but 1 sheet in Herb. Kew. ticketed "Konkan, Law." I have seen no others.—DISTRIB. India (Bengal, Upper Gangetic plain, Garwhal); Egypt, Tropical Africa.

5. **Polygonum tomentosum,** *Willd. Sp. Pl.* v. 2 (1799) p. 447. Stems one or more from a prostrate annual stock, 2—4 ft. long, often as thick as the finger, pubescent or glabrous. Leaves 4—8 by 1—1½ in., lanceolate, finely acuminate, silky-pubescent on both sides, rarely glabrate, base tapering; petioles ¼—⅜ in. long; stipules ½—1 in. long, membranous, hairy, the mouth truncate, erect, ciliate rigid bristles ¼ in. long. Flowers white, in paniculate spike-racemes 1½—3 in. long; peduncles strigosely hairy; pedicels ⅛ in. long; bracts ⅛ in. long, nearly as broad as long, 6—8-flowered, orbicular, hispid, ciliate with long bristles; bracteoles small, lanceolate, membranous. Perianth ⅛—⅓ in. long, divided about ⅔ the way down; segments 5, ovate-oblong, obtuse. Stamens 7—8. Styles 2, recurved. Nuts ⅛ in. in diam., orbicular, compressed, with rounded margins and convex faces. Fl. B. I. v. 5, p. 30; Trim. Fl. Ceyl. v. 3, p. 411; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365; Prain, Beng. Pl. p. 884.—Flowers: Nov.—May.

KANARA: Halyál, *Ritchie*, 1143!; Yellur, *Ritchie*, 1143!; Sirsi Road, *Raoji!*; Birchi, *Talbot*, 2051, ex *Gage*, Census of Indian Polygonums; Kumpta, *Woodrow!*—DISTRIB. India (Bengal, Assam, Cachar, W. Peninsula); Ceylon, Java, Philippines, Tropical and S. Africa.

6. **Polygonum serrulatum,** *Lagasca, Gen. & Sp. Pl.* (1816) p. 14. Stems 2—4 ft. high, slender, glabrous, often reddish. Leaves subsessile, drying green, 3—5 by $\frac{3}{8}$—$\frac{5}{8}$ in., linear, acute, glabrous or sometimes with a few scattered hairs on the upper side and the midrib, the margins usually ciliate with short hairs which are closely appressed to the edge, base slightly tapering, rounded; stipules reaching $1\frac{1}{2}$ in. long, strigose, the mouth truncate and ciliate with long stiff bristles which are nearly as long as the tube. Flowers in paniculate slender erect racemes $\frac{3}{4}$—2 in. long; peduncles glabrous; pedicels short; bracts membranous, glabrous, strongly (sometimes squarrosely) ciliate with long hairs, the margins somewhat rose-colored. Perianth white, $\frac{1}{10}$ in. long, eglandular; segments ovate. Stamens 5—8. Styles 3, connate at the base, the free portion filiform. Nutlets $\frac{1}{12}$ in. long, trigonous, smooth, and polished. Fl. B. I. v. 5, p. 38; Trim. Fl. Ceyl. v. 3, p. 413; Prain, Beng. Pl. p. 885. *Polygonum rivulare,* Grah. Cat. p. 172 (doubtfully of Kœn.); Dalz. & Gibs. p. 214. *P. barbatum,* Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365 (*not* of Linn.).—Flowers: Mar. VERN. *Dákta Sheral.*

Distinguished from *P. barbatum,* Linn., by the bristles of the stipules which are shorter, those of *P. barbatum* being longer than the tube, by the leaves which dry green, those of *P. barbatum* drying brown, and by the shape of the base of the leaves, which are acute in *P. barbatum,* usually rounded in *P. serrulatum.*

DECCAN: Mahableshwar, *Cooke!, H. M. Birdwood.* S. M. COUNTRY: Adur (Dharwar Collectorate), *Woodrow!* KANARA: *Talbot,* 3140, ex *Gage,* Census Ind. Polyg.—DISTRIB. India (Upper Gangetic plain, N. W. Himalaya, Assam, Birma, W. Peninsula); Ceylon, Malay Peninsula, China.

7. **Polygonum Hydropiper,** *Linn.* VAR. **glandulosissima,** *Gage, in Census Ind. Polyg. in Rec. Bot. Survey of India,* v. 2 (1903) p. 401. A glabrous annual 12—18 in. high, covered everywhere with minute glands; stem erect or ascending, branched. Leaves subsessile or shortly petiolate, lanceolate or oblong-lanceolate, rarely more than 3 in. long, variable in width; stipules glabrous, not ciliate. Flowers in filiform interrupted decurved racemes; bracts glabrous, glandular. Perianth pink, very glandular. Nutlets trigonous, opaque, granulate.

S. M. COUNTRY: near Hubli (Dharwar district), from Poona College of Science ex *Gage,* l.c. KANARA: N. Kanara, *Talbot,* 2682, ex *Gage* l. c.

I have not seen the specimens referred to which were sent from the College of Science at Poona, of which I was for many years Principal.

8. **Polygonum mite,** *Schrank, Fl. Baier.* v. 1 (1789) p. 668. A slender annual reaching 2 ft. high; stems reddish, grooved, glabrous. Leaves subsessile, 1—3 by $\frac{1}{4}$—$\frac{1}{2}$ in., linear-oblong or linear-lanceolate, acute, glabrous or with a few hairs on the nerves, the margins very minutely ciliolate; stipules $\frac{1}{2}$—$\frac{5}{8}$ in. long, the tube clothed with closely appressed hairs sunk in the tissue, ciliate with stiff hairs which are shorter than the tube. Racemes $\frac{3}{4}$—1 in. long; peduncles long, glabrous; bracts $\frac{1}{10}$ by $\frac{1}{12}$ in., eglandular, glabrous, ciliate. Perianth $\frac{1}{10}$ in. long, eglandular; segments ovate-oblong,

obtuse, pink. Nutlets ovoid, compressed, biconvex, shining, black, $\frac{1}{12}$ by $\frac{1}{16}$ in.

DECCAN: Mahableshwar, near the lake above the Chinamen's gardens, *Cooke*!

Probably introduced among imported seeds. Seeds and plants from Europe have been constantly distributed to the cultivators below the lake at Mahableshwar.—DISTRIB. India (Bengal, N. W. Himalaya); West Asia, Europe.

9. **Polygonum alatum,** *Buch.-Ham. in Don, Prodr. Fl. Nep.* (1825) p. 72. Annual; stems numerous, 1—2 ft. long, usually prostrate with many ascending branches, glabrous, grooved, rooting at the lower nodes. Leaves $\frac{3}{4}$—$1\frac{1}{2}$ by $\frac{1}{2}$—1 in., deltoid-ovate, acute or subobtuse, entire, minutely punctate, base subtruncate or subcordate, shortly cuneate; petioles $\frac{1}{4}$—$\frac{3}{8}$ in. long, winged, amplexicaul at the base; stipules membranous, obliquely truncate, acute, not ciliate but with a tuft of hairs at the base. Flowers in pedunculate heads with an involucral leaf at the base of each; peduncles glandular-hairy at the apex below the head; bracts $\frac{1}{8}$—$\frac{1}{6}$ in. long, ovate-oblong, membranous, not ciliate. Perianth $\frac{1}{8}$ in. long, 4-fid; lobes about $\frac{1}{20}$ in. long. Stamens 6—8, included. Nutlets $\frac{1}{12}$ in. long and nearly as broad, broadly ovoid, compressed, biconvex, minutely pitted in regular series, black. Fl. B. I. v. 5, p. 41; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365; Prain, Beng. Pl. p. 885; Watt, Dict. Econ. Prod. v. 6, part 1, p. 317. *Polygonum panctatum,* Buch.-Ham. in Don. Prodr. Fl. Nep. (1825) p. 72; Trim. Fl. Ceyl. v. 3, p. 413. *P. nepalense,* Meissn. Monog. (1826) p. 84; Wight, Icon. t. 1804.—Flowers: Aug.—Nov.

This is the var. *nepalensis* of Hook. f. Fl. B. I. v. 5, p. 42, which Captain Gage (Census Ind. Polyg. p. 405) says he cannot recognize from the specimens in the Calcutta Herbarium as distinct from *P. alatum proper.* The plant ought perhaps to have been called *Polygonum punctatum,* Buch.-Ham., as the specific name *punctatum* is really prior to that of *alatum,* though both occur on the same page of Don's Prodr. Fl. Nep. Otto Kuntze has adopted the specific name *punctatum* as also Trimen in his Fl. Ceyl. l. c.

DECCAN: Mahableshwar, abundant, *Cooke*!, *H. M. Birdwood.*—DISTRIB. Throughout India; Ceylon, Afghanistan, Africa, China.

10. **Polygonum chinense,** *Linn. Sp. Pl.* (1753) p. 363. VAR. **ovalifolia,** *Meissn. in Wall. Pl. As. Rar.* v. 3 (1832) p. 60. A large rambling undershrub, semi-scandent over bushes by its long divaricate branches; stems cylindric, glabrous, striate, the older ones dark-brown, the younger red. Leaves $1\frac{1}{2}$—4 by $\frac{3}{4}$—$2\frac{1}{2}$ in., elliptic or ovate, shortly acuminate, glabrous above, paler and with short stiff hairs on the nerves beneath, the margins entire or crenulate, often red, base usually truncate and sometimes very shortly cuneate (rarely acute, rounded or subcordate); petioles $\frac{1}{4}$—$\frac{1}{2}$ in. long, enlarged and auricled at the base, glandular-hairy; stipules very long, reaching sometimes $1\frac{3}{4}$ in., membranous, very obliquely truncate, lanceolate, acute, often much split and torn in age. Flowers sessile, in cymosely paniculate heads, white, slightly fragrant; peduncles glandular-hairy; bracts ovate, acute, sometimes glandular near the base. Perianth $\frac{1}{4}$ in. long, divided about $\frac{1}{2}$-way down; lobes 5, ovate-oblong, subobtuse. Ovary 3-gonous; styles 3, connate at the

base, divaricate. Nutlets $\frac{1}{6}$—$\frac{1}{5}$ by $\frac{1}{8}$ in., trigonous, black. Fl. B. I. v. 5, p. 45. *Polygonum chinense*, Grah. Cat. p. 172 ; Dalz. & Gibs. p. 214 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366.—Flowers : Nov.—Apr. VERN. *Nárali* ; *Paral*.

Dalzell without locality in Herb. Kew.! DECCAN : hills about Pár, *Graham* ; Mahableshwar, common, *Graham*, *Cooke*!, *H. M. Birdwood* ; Panchgani, *Bhiva*! S. M. COUNTRY : Rámghát, *Ritchie*, 655!—DISTRIB. India (W. Peninsula, N. W. & Himalaya, Nepal, Assam, Birma) ; Malay Peninsula.

11. **Polygonum pedunculare,** *Wall Cat.* (1828) 1718. VAR. **angustissima,** *Hook. f. Fl. B. I.* v. 5 (1886) p. 48. A slender erect annual ; stems grooved, sparsely armed with minute recurved prickles on the angles, otherwise smooth. Leaves 2½—4 by ¼—½ in., linear-lanceolate, acute, glabrous, with slightly ciliolate or scabrid margins, base acute ; petioles ⅛—½ in. long ; stipules ¾ in. long, membranous, tubular, obliquely truncate, the mouth lanceolate. Flowers in short oblong cymosely paniculate heads ; peduncles slender, glandular-hairy ; bracts ovate, acuminate, membranous, glabrous. Perianth $\frac{1}{10}$—⅛ in. long, pink or white, divided about ½-way down ; lobes elliptic-oblong, obtuse. Stamens 5 with 5 intermediate scales. Ovary compressed ; styles 2, connate below. Nutlets orbicular, compressed, $\frac{1}{12}$ in. long and as broad as long, biconvex. Wight, Icon. t. 1802, A ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366.—Flowers : Oct.—Dec.

KONKAN : near Ratnagiri, *Woodrow*! DECCAN : Mahableshwar, *Cooke*!, *Woodrow*! S. M. COUNTRY : near Belgaum, *Ritchie*, 1144! KANARA : Jagalbet watercourse on the Kála naddi, *Ritchie*, 1144!—DISTRIB. India (Bengal, W. Peninsula).

VAR. *nilagirica*, Hook. f. Fl. B. I. v. 5 (1886) p. 48. Stems glabrous, almost without prickles except a few below the stipules. Leaves 3—4¾ by ¾—1 in., oblong-lanceolate, acute, tapering at the base ; petioles ¼—⅜ in. long, often with minute prickles which sometimes extend along the midrib beneath. Bracts lanceolate, subciliate. *Polygonum nilagiricum* (sp.), C. B. Clarke, MSS. in Herb. Kew.

KANARA : Supa (N. Kanara), *Talbot*, 1383, ex Gage, Census Ind. Polyg.—DISTRIB. India (W. Peninsula).

4. **RUMEX,** Linn.

Perennial or annual herbs (rarely shrubs). Leaves mostly radical or cauline, alternate ; stipules hyaline, ocreate, often disappearing in age. Flowers hermaphrodite or monœcious, in axillary clusters or in whorls, arranged in simple or panicled racemes ; pedicels jointed ; bracts ocreate ; bracteoles 0. Perianth-segments 6 (rarely 4), the inner accrescent, entire or toothed ; the midrib or disk often enlarged or tuberculate. Stamens 6 ; filaments short ; anthers oblong. Ovary 3-gonous ; ovule solitary ; styles 3 ; stigmas fimbriate. Fruit a small nut enclosed in the usually enlarged inner perianth-segments, the angles acute. Seed erect ; embryo lateral, nearly straight ; cotyledons linear or oblong.—DISTRIB. All temperate and some tropical countries ; species about 140.

1. **Rumex dentatus,** *Linn. Mantiss.* 2 (1771) p. 226. An erect annual 1—2 ft. high ; stems usually red, grooved, glabrous. Leaves 3—4 by 1—1½ in., oblong, obtuse, glabrous, the petioles of the radical leaves reaching 2½ in. long, base rounded or cordate. Flowers pedicellate, in distinct whorls which are leafy or not. Perianth ⅛—⅓ in. long ; inner segments broadly ovate, much enlarged in fruit, reticulately veined, with an ovoid-oblong smooth tubercle at back and irregularly toothed or pectinate margins, the teeth numerous, straight, not hooked. Nut $\frac{1}{16}$ by $\frac{1}{16}$ in., acutely trigonous (almost winged). Fl. B. I. v. 5, p. 59 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366 ; Prain, Beng. Pl. p. 888.—Flowers : Sept.—Nov.

KONKAN : *Stocks.* S. M. COUNTRY : South of Belgaum, *Ritchie,* 1142 ! SIND : *Stocks* !—DISTRIB. India (Bengal, Assam, W. Peninsula).

Rumex vesicarius, Linn. Sp. Pl. (1753) p. 336. Annual, erect, glabrous, 6—12 in. high, branched from the root. Leaves 1—3 in. long, elliptic, ovate, or oblong, 3—5-nerved, base cuneate, cordate or hastate. Flowers monœcious ; inner perianth-segments membranous and reticulate in fruit, orbicular. Fl. B. I. v. 5, p. 61 ; Grah. Cat. p. 172 ; Duthie, Field & Garden Crops, part 3, p. 45 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366 ; Prain, Beng. Pl. p. 888 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 592.—VERN. *Chuka.*

Cultivated as a vegetable and for its medicinal properties, known sometimes as the *Bladder Dock.* It is said to be indigenous in the Western Panjáb. The leaves, seeds, and roots are employed in native medicine.

The following plants not belonging to any of the foregoing genera are sometimes grown :—

Fagopyrum esculentum, Mœnch. Method. (1794) p. 290. An glabrous annual with broadly ovate, cordate, acuminate leaves and pink or white flowers in axillary and terminal cymes. Nut trigonous with acute angles, light-brown, polished. *The Buckwheat,* occasionally grown in fields in the Deccan and Gujarat. Fl. B. I. v. 5, p. 55 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366 ; Watt, Dict. Econ. Prod. v. 3, p. 310.—Flowers : Jan. VERN. *Kuthu.*

The grain is eaten by Brahmins on fast days.

Antigonon leptopus, Hook & Arn. Bot. Beech. Voy. (1841) p. 308, t. 69. A large climber, a native of S. America, with cordate or deltoid leaves with stem-clasping petioles, and large panicles of showy pink flowers.

The plant is of easy culture and is largely grown in gardens. Woodr. Gard. in Ind. ed. 5, p. 430 ; Prain, Beng. Pl. p. 889.—Flowers : Aug.—Nov.

Muehlenbeckia platyclados, Meissn. in Bot. Zeit. v. 23 (1865) p. 313. A curious glabrous shrubby erect plant, a native of the Solomon Islands east of New Guinea, is occasionally grown in gardens. It has smooth flattened finely striate leaf-like branches and small flowers in lateral fascicles. *Coccoloba platyclada,* F. Muell. in Bot. Mag. v. 19 (1863) t. 5382.

ORDER CV. **PODOSTEMONACEÆ.**

Aquatic herbs usually annual, submerged and closely attached to rocks, flowering when exposed by the fall of the water-level. Primary axis various, early giving rise to a thallus. Leaves more or less distichous, simple, usually sheathing. Flowers hermaphrodite, small, regular and 3-merous with perianth ; or zygomorphic and 2-merous without perianth, hypogynous. Perianth when present 3-lobed ; lobes imbricate, marcescent. Aclamydeous flowers included before opening in a closed spathe which opens irregularly at the tip or by a slit on the upper side. Stamens hypogynous ; in regular flowers 3, alternate with the perianth-segments ; in zygomorphic flowers usually 2, monadelphous on the lower side of the flower, the common stalk usually much exceeding the partial filaments ; staminodes in zygomatic flowers usually 2 ; anthers introrse, 2-celled. Ovary superior, 2—3-celled, with thick placenta and delicate septa ; ovules numerous, anatropous ; stigmas 2—3. Capsule usually pedicellate, ribbed or smooth, septifragal. Seeds numerous, minute ; testa mucilaginous ; albumen 0 ; embryo straight.—DISTRIB. Genera about 20 ; species about 120, chiefly tropical.

Flowers regular; perianth-segments 3; stamens 3; ovary 3-celled	1. LAWIA.
Flowers zygomorphic; perianth 0; stamens 1—3; ovary 2-celled.	
Spathe erect, splitting irregularly at the tip	2. GRIFFITHELLA.
Spathe more or less prostrate, splitting along the upper side	3. HYDROBRYUM.

An Order but little investigated till recently. Its members are, some of them, very abundant in the Ghát streams in the Western Peninsula of India, but, owing to their fragile nature, dried herbarium specimens are rarely of much value. Mr. Willis, the Director of the Royal Botanic Gardens at Peradeniya, Ceylon, has spent much time and labor in the study of the Indian and Ceylon species, the result of which he has published in the Annals of the Royal Gardens at Peradeniya. Mr. Willis has had the opportunity of studying these plants in a living condition, which, as he has explained in his memoir, is the only satisfactory way of arriving at any useful result. I have followed Mr. Willis entirely as regards the Bombay species, but I have little doubt that more species than those I have dealt with are to be found in the streams of the Deccan and Konkan hills, and the ravines at Mahableshwar immediately after the rains would be a likely hunting-ground for future Indian botanists.

1. **LAWIA,** Griff.

Herbs growing on smooth rocks in rapids and waterfalls. Thallus closely attached to the rock, frondose, branched, rootless.

Leaves usually in rosettes on the upper surface of the thallus, very numerous, simple, entire, usually acute, green or red with whitish median line, easily detached and broken. Flowers numerous at the apices of the lobes of the thallus (rarely on the upper surface), solitary, on pedicels emerging from terminal axial leafy *cupules*. Perianth 3-fid, regular, imbricate, membranous, brownish, marcescent. Stamens 3, hypogynous, alternating with the perianth-segments ; anthers 2-celled, opening longitudinally. Ovary superior, ellipsoid obtuse, more or less 3-angled, 3-celled ; ovules numerous, anatropous, with a thick axile placenta ; septa very thin ; stigmas 3. Capsule more or less enclosed in the persistent perianth, ellipsoid or obovoid, 9-ribbed, 3-celled, septifragal ; valves 3, equal, opposite the perianth-segments, incurved after dehiscence. Seeds numerous, minute ; outer layer of testa sticky when wetted ; cotyledons crumpled.—DISTRIB. Species 1, S. India and Ceylon.

It is scarcely necessary to make any apology for restoring the original name of this genus, which was so named in honour of Mr. Law of the Bombay Civil Service, whose labors in the cause of botanical science are well known. The name *Lawia* was given to the genus by Tulasne from Griffith's manuscript and first published by him in 1849 (Ann. Sc. Nat sér. 3, v. 11, p. 112). In his Monogr. Podost. (1852) p. 189, as the generic name *Lawia* had been already given to a Rubiaceous genus by Wight in 1847, Tulasne substituted the name *Terniola* for *Lawia*. Wight's *Lawia* has been since reduced to *Adenosachme*, so that there can be no reason why the original name should not be restored. Warming, Trimen, Willis, &c. have adopted it.

1. **Lawia zeylanica,** *Tulasne, in Ann. Sc. Nat.* sér. 3, v. 11 (1849) p. 112 ; Trim. Fl. Ceyl. v. 3, p. 416 ; Willis, Rev. Podost, Ind. & Ceyl. in Ann. Roy. Gard. Peradeniya, p. 213. *Lawia pulchella,* Tul. l. c. p. 113. *L. longipes,* Tul. l. c. p. 113. *Tulasnea* all species *ramosissima* excepted, Wight, Icon. tt. 1919, 1920. *Dalzellia* all species *ramosissima* excepted, Wight, Icon. v. 5, part 2, p. 35. *Terniola zeylanica,* Tul. Monogr. Podost. (1852) p. 190, t. 13, fig. 3 ; Hook. f. Fl. B. I. v. 5, p. 62. *T. pulchella,* Tul. Monogr. Podost. p. 192 ; Dalz. & Gibs. p. 245 ; Fl. B. I. v. 5, p. 62 ; Woodr. Journ. Bomb. Nat. v. 12 (1899) p. 366. *T. Lawii,* Dalz. & Gibs. Fl. (1861) p. 245 ; Wedd. in DC. Prodr. v. 17 (1873) p. 47 ; Fl. B. I. v. 5, p. 63 ; Woodr. l. c. *T. longipes,* Tul. Monogr. Podost. p. 193, t. 13, fig. 2 ; Dalz. & Gibs. l. c. ; Fl. B. I. v. 5, p. 63 ; Woodr. l. c. *T. pedunculosa,* Dalz. & Gibs. l. c. ; Wedd. l. c. ; Fl. B. I. l. c. ; Woodr. l. c. *T. foliosa,* Dalz. & Gibs. l. c. ; Wedd. l. c. ; Fl. B. I. l. c. ; Woodr. l. c.

VAR. 1. *malabarica,* Willis, l. c. p. 215. Thallus frondiform, 6 in. or more in diam., with frequent branching and ribbon-like or flabelliform lobes, thick and hard. Leaves $\frac{1}{8}$—$\frac{1}{3}$ in. long or more, linear. Flowers numerous, closely crowded along the edges of the thallus emerging from short cupules ; fruiting pedicels variable, averaging about $\frac{1}{4}$ in. long. Fruit obovoid or ellipsoid, $\frac{1}{12}$—$\frac{1}{12}$ in. long with thin ribs and marked depressions between the carpels. Seeds yellowish-brown.

KANARA : on the Kála naddi.

VAR. 2. *konkanica*, Willis, l. c. p. 216. Thallus 6—10 in. in diam. with flabelliform lobes and crowded growing points. Leaves $\frac{1}{4}$—$\frac{2}{3}$ in. long. Cupules short or long, often leafy when young. Flowers often nodding in bud. Fruiting pedicels very variable, usually $\frac{1}{3}$ in. long or longer. Fruit $\frac{1}{16}$—$\frac{1}{10}$ in. long, obovoid, light-brown.

KONKAN: *Dalzell*!; streams in the Island of Salsette, *Law*! DECCAN: Igatpuri on the Thal Ghát (G. I. P. R.), *Willis*; Kasara on the Thal Ghát, *Willis*; Khandala, *Willis*, *Woodrow* ex *Willis*; Sákarpathár hill near Lanoli, *Woodrow* ex *Willis*; Khadshi river near Borkas, west of Poona, *Bhide* ex *Willis*; Warra Ghát between Wai and Wathár Railway-station, *Raoji*!—DISTRIB. India (W. Peninsula).

2. GRIFFITHELLA, Warming.

Thallus algiform, very polymorphous, $\frac{1}{12}$—$\frac{4}{5}$ in. in diam. Leaves distichous. Flowers naked, zygomorphic, emerging from an erect or ascending, tubular or funnel-shaped spathe which is irregularly ruptured at the tip. Stamens 2, monadelphous; staminodes 2. Ovary very oblique; stigmas 2, simple, subulate or more or less toothed or lobed, with small papillæ. Capsule quite smooth, nearly spherical, unequally lobed, splitting obliquely into a larger persistent and smaller deciduous lobe.—DISTRIB. India (W. Peninsula); species 1.

1. **Griffithella Hookeriana**, *Warming, Fam. Podost.* Afhandl. 6 (1901) p. 13. A minute moss-like plant 1—1½ in. high. Thallus most variable in ultimate form, sometimes cup-like or rotate, stalked, or completely attached, or creeping, ribbon-like. Leaves reaching $\frac{1}{3}$ in. long. Floral buds usually closely crowded; bracts usually 4—6, more or less cucullate. Spathe tubular or funnel-shaped, splitting into 2—many teeth at the tip. Stamens equalling or exceeding the ovary and stigmas. Stigmas subulate, cuneate, and then more or less toothed or fimbriate, the upper one then often divided into 2 to the base. Fruiting pedicels $\frac{1}{8}$—$\frac{3}{4}$ in. long. Capsules smooth, globose, variable in size. Willis, Podost. in Ann. Roy. Gard. Perad. p. 233. *Mniopsis Hookeriana*, Tul in Ann. Sc. Nat. sér. 3, v. 11 (1849) p. 105; Wight, Icon. t. 1918, fig. 4; Dalz. & Gibs. p. 245. *Podostemon Hookerianus*, Wedd. in DC. Prodr. v. 17 (1873) p. 74; Hook. f. Fl. B. I. v. 5, p. 65; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366.—Flowers: Oct.—Dec. VERN. *Karuk-phul*.

KONKAN: *Law*!; common in running streams, flowering as soon as its head is above water, *Dalzell & Gibson*; Atgaon (Tanna districts) on the Khadshi river, *Bhide* ex *Willis*. DECCAN: Máwal (Poona districts), *Woodrow*. KANARA: Kála naddi (N. Kanara), *Talbot*, 1129!, *Ritchie*!—DISTRIB. India (W. Peninsula).

3. HYDROBRYUM, Endl.

Thallus closely attached to rock by hairs at all points, crustaceous or ribbon-like, exogenously lobed or branched; secondary shoots usually prostrate when floriferous, 1-flowered, with small scaly bracts. Leaves simple, subulate. Flowers zygomorphic, pedicellate or sessile,

emerging from a more or less prostrate, boat-shaped spathe which splits along the upper side. Stamens 2 or 1, equalling or exceeding the ovary and stamens. Ovary subglobose, 2-celled ; stigmas 2, rather large, subulate, lobed or dentate, sometimes obcuneate, entire or lacerate. Fruit small, stalked or sessile, smooth or 8—12-ribbed. Seeds numerous.—DISTRIB. India and Ceylon ; species 5.

1. **Hydrobryum lichenoides,** *Kurz, in Journ. As. Soc. Beng.* v. 42, part 2 (1873) p. 103. Thallus ribbon-like, regularly branched. Stamens 2 (rarely 1), long or short. Stigmas ovate to subulate or obcuneate, usually toothed. Fruit 8-ribbed, unequally lobed. Willis, Podost. in Ann. Roy. Gard. Peradeniya, p. 242. *Podostemon acuminatus,* Wedd. in DC. Prodr. v. 17 (1873) p. 75 ; Hook. f. Fl. B. I. v. 5, p. 66.

VAR. 1. *khandalensis,* Willis, Podost. in Ann. Roy. Bot. Gard. Peradeniya, v. 1 (1901—1902) p. 245. Pedicels $\frac{1}{12}$—$\frac{1}{8}$ in. long ; capsules $\frac{1}{28}$—$\frac{1}{12}$ in. long, the ribs confluent below the apex. Stamens as long as the ovary and stigmas.

DECCAN : Khandala, common, *Willis.*

VAR. 2. *bhorensis,* Willis, l. c. Pedicels $\frac{1}{8}$—$\frac{1}{5}$ in. long ; capsules $\frac{1}{28}$—$\frac{1}{10}$ in. long, the ribs confluent below the apex, shallow ; buds more or less erect ; stamens as long as the ovary and stigmas.

DECCAN : on the Bhore Ghât near Khandala, *Willis.*

ORDER CVI. ARISTOLOCHIACEÆ.

Herbs or shrubs often climbing, usually more or less fœtid. Leaves alternate, entire or lobed ; stipules 0. Flowers hermaphrodite, often large, usually lurid, terminal, axillary or lateral, solitary, racemose or cymose, bracteate or not. Perianth simple, more or less adnate below to the ovary, regular or irregular, 3-lobed or tubular ; lobes valvate. Stamens 6 or more, adnate in 1 or 2 series to the top of the ovary or round the style ; anthers erect with parallel cells, dehiscing dorsally. Ovary 4—6-celled ; placentas ...al, free or meeting in the axis ; ovules numerous, anatropous ; ... columnar ; stigma lobed. Fruit capsular or baccate. Seeds ...merous ; albumen copious, fleshy ; embryo minute.—DISTRIB. ...enera 5 ; species about 200, chiefly tropical.

Shrubs; perianth campanulate, equaly 3-lobed; capsule septicidally 4-valved	1. BRAGANTIA.
Perennial herbs; perianth tubular, irregular, 2-lipped; capsule septicidally 6-valved	2. ARISTOLOCHIA.

1. BRAGANTIA, Lour.

Shrubs or undershrubs. Leaves petiolate, 3—5-nerved ; veins closely reticulate beneath ; stipules 0. Flowers in axillary cymes, bracteate. Perianth shortly campanulate, equally 3-lobed, deciduous, valvate. Stamens 6—12 (usually 9 and connate in threes opposite the perianth-segments). Ovary inferior, 4-celled ; ovules numerous,

2-seriate ; style short ; stigmas 3 or more, linear. Capsule elongate, 4-gonous, septicidally 4-valved, the valves separating from a placentiferous column. Seeds 3-gonous, rugose or deeply pitted, often coated with the remains of the placenta ; albumen fleshy, copious ; embryo minute.—DISTRIB. Species 4 or 5, Indian and Malayan.

1. **Bragantia Wallichii,** *R. Br. in Wall Cat.* (1828) 7415. An erect slender shrub, 6—10 ft. high, the young parts finely pubescent ; bark smooth, yellowish. Leaves distichous, 5—9 by 1½—2 in., oblong-lanceolate, acutely acuminate, entire, glabrous above, stellately pubescent and paler beneath, strongly 3-nerved from the base, with reticulate venation between the nerves, base subacute ; petioles ⅛ in. long, stout. Flowers in axillary irregular few-flowered cymes ; bracts small, linear, acute, pubescent ; pedicels rather long, densely pubescent. Perianth 3-partite ; segments broadly ovate or suborbicular, ½ in. long, pubescent, concave. Capsules 3—4 in. long, straight, obtuse, 4-gonous. Seeds acute at both ends, 3-gonous, 1/10 in. long, deeply pitted. Fl. B. I. v. 5, p. 73 ; Grah. Cat. p. 250 ; Dalz. & Gibs. p. 225 ; Trim. Fl. Ceyl. v. 3, p. 421 ; Talb. Trees, Bomb. ed. 2, p. 277 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366 ; Watt, Dict. Econ. Prod. v. 1, p. 519.—Flowers : Nov. VERN. *Chakráni* ; *Mirsagni.*

KONKAN : S. Konkan, rare, *Nimmo & Graham, Dalzell & Gibson*; Wari jungles, *Dalzell* ! KANARA : common, *Dalzell & Gibson*; Nilkund Ghát, *Woodrow*; common in the evergreen forests near the Gairsoppa Falls, *Talbot.* —DISTRIB. India (W. Peninsula) ; Ceylon.

EXCLUDED SPECIES.

BRAGANTIA DALZELLII, Hook. f. Fl. B. I. v. 5 (1886) p. 73. A fine species with leaves 12 by 3 in., torulose capsules 5—8 in. long, and 3-gonous rugose and deeply pitted seeds ½ in. long. There is 1 sheet in Herb. Kew. containing leaves and capsules but no flowers. Dalzell has given no habitat on this single specimen which is from his herbarium, so that it is impossible to say whether the plant is or is not a Bombay one. The plant has not apparently been found by any other Bombay collector. Neither Talbot nor Woodrow has seen it.

2. ARISTOLOCHIA, Linn.

Shrubs or perennial herbs, prostrate or twinning. Leaves alternate, entire or lobed, often with a stipule-like leaf of an undeveloped bud in the axil. Perianth colored ; tube inflated below, then contracted, hairy within ; limb oblique, usually 2-lipped. Stamens 6 (rarely 5 or more than 6), adnate 1-seriately above the ovary, the filaments or connectives not distinguishable from the style ; anthers adnate to the column ; dehiscence extrorse. Ovary inferior, more or less perfectly 6-celled (rarely 5- or 4-celled); placentas parietal or intruded or conniving and connate in the axis ; ovules many, 2-seriate ; style or column short, thick, divided above into 3 or 6 (rarely more) obtuse or linear short lobes. Capsule

lantern-like, septicidally 6 (rarely 5)-valved or splitting through the placentas. Seeds usually many, horizontal, often covered by the remains of the placenta ; albumen fleshy ; embryo minute.—DISTRIB. Species about 180, chiefly tropical.

Stems prostrate; leaves glaucous beneath; flowers solitary; bracts large, orbicular	1. *A. bracteata.*
Stems twining; leaves green beneath; flowers in racemes; bracts small, ovate or oblong.	
Leaves reaching 4 in. long, rounded, cuneate or subcordate at base; petioles $\frac{1}{8}$—$\frac{1}{4}$ in. long; racemes few-flowered	2. *A. indica.*
Leaves reaching 8 in. long, deeply cordate at base; petioles 1—2 in. long, twining; racemes many-flowered	3. *A. Tagala.*

1. **Aristolochia bracteata,** *Retz. Obs. Bot.* fasc. 5 (1789) p. 29. A slender perennial ; stems 12—18 in. long, weak, prostrate, branched, striate, glabrous. Leaves $1\frac{1}{2}$—3 in. long and as broad as long, reniform or broadly ovate, usually obtuse, cordate at base with a wide shallow sinus, glaucous beneath, finely reticulately veined, glabrous ; petioles $\frac{1}{2}$—$1\frac{1}{4}$ in. long. Flowers solitary ; pedicels with a large sessile orbicular or subreniform bract at the base. Perianth 1—$1\frac{3}{4}$ in. long, base subglobose, tube cylindric with a trumpet-shaped mouth, lip linear, dark-purple, with revolute margins, finely reticulately veined, as long as the tube. Capsules $\frac{1}{2}$—$\frac{3}{4}$ in. long, oblong-ellipsoid, 12-ribbed, glabrous. Seeds $\frac{1}{4}$ in. long, deltoid with a slightly cordate base. Fl. B. I. v. 5, p. 75 ; Grah. Cat. p. 178 ; Dalz. & Gibs. p. 224 ; Trim. Fl. Ceyl. v. 3, p. 422 ; Talb. Trees, Bomb. ed. 2, p. 278 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366 ; Prain, Beng. Pl. p. 890 ; Watt, Dict. Econ. Prod. v. 1, p. 314.—Flowers : Aug.—Nov. VERN. *Kidámár* ; *Gandháti.*

Abundant in the black soil of the Deccan and Gujarat, *Dalzell & Gibson.* KONKAN : *Law* ! DECCAN : *Graham* ; East Deccan, *Woodrow* ! S. M. COUNTRY : Badami, *Cooke* ! SIND : Hala range, *Vicary* ! ; Jemadar ka Landa near Karachi, *Stocks* !—DISTRIB. India (Bengal, W. Peninsula) ; Ceylon, Arabia, Tropical Africa.

Every part of the plant is nauseously bitter. It is much used by Hindu ians on account of its purgative and anthelmintic properties and the of the plant is squeezed into wounds to kill worms. Hence its native me *Kidámár.* See Watt, Dict. Econ. Prod. l. c.

2. **Aristolochia indica,** *Linn. Sp. Pl.* (1753) p. 960. Shrubby, twining ; stems long, slender, woody at the base, grooved, glabrous. Leaves variable ; in the broad form 4—5 by 3 in. ; in the narrow form $1\frac{1}{2}$—4 by $\frac{1}{2}$—1 in., from linear-oblong to obovate-oblong or subpanduriform, usually obtusely acuminate, glabrous, entire with somewhat undulate margins, base cuneate, rounded, subtruncate or subcordate. Flowers in few-flowered axillary racemes ; bracts small, ovate, acuminate, opposite the pedicels ; pedicels long, thickened above. Perianth greenish-white, reaching $1\frac{3}{4}$ in. long, with globose inflated base, then bent at a right angle and suddenly narrowed into a cylindric tube with oblique trumpet-shaped mouth gradually passing into a long narrow, linear-oblong, obtuse brownish lip. Anthers 6. Style 6-lobed. Capsules $1\frac{1}{2}$—2 in. long, oblong or globose-oblong,

opening from below upwards, 6-valved, the pedicels splitting into 6 filaments. Seeds deltoid-ovate, acute, flat, winged. Fl. B. I. v. 5, p. 75 ; Grah. Cat. p. 178 ; Dalz. & Gibs. p. 224 ; Trim. Fl. Ceyl. v. 3, p. 423 ; Talb. Trees, Bomb. ed. 2, p. 277 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366 ; Prain, Beng. Pl. p. 890 ; Watt, Dict. Econ. Prod. v. 1, p. 315.—Flowers: Nov. VERN. *Sapsund ; Sampsun.*

KONKAN : Cross Island (Bombay Harbour), *Graham.* S. M. COUNTRY : *Belgaum, Ritchie,* 1077 ! ; Badami, *Cooke* !—DISTRIB. India (Bengal, Nipal, W. Peninsula) ; Ceylon.

3. **Aristolochia Tagala,** *Cham. in Linnæa,* v. 7 (1832) p. 207. An extensively climbing shrub ; stems grooved, stout, glabrous. Leaves 4—8½ in. long, the upper leaves 2—3 in., the lower 3—5 in. broad, ovate or ovate-oblong (the upper often subsagittately lanceolate), acute or acuminate, base cordate usually with a deep and narrow sinus, glabrous, reticulately veined ; petioles twining, 1—2 in. long. Flowers numerous, in lax puberulous racemes, most of the flowers abortive, usually only 1 fertile ; bracts small. Perianth 2—2½ in. long, base globose, greenish-yellow ; tube curved, mouth oblique ; lip linear, straight, obtuse, villous, as long as the tube. Capsules 1—1½ in. long, globose-pyriform or oblong-ellipsoid, transversely rugulose, glabrous, the pedicels usually splitting into 6 filaments in fruit. Seeds ¼—⅜ in. long and as broad as long, broadly ovate-deltoid with a deep membranous wing, flattened, usually tuberculate on one face. Prain, Beng. Pl. p. 890. *Aristolochia Roxburghiana,* Klotzsch, in Monatsb. Berl. Akad. (1859) p. 696 ; Hook. f. Fl. B. I. v. 5, p. 75 ; Talb. Trees, Bomb. ed. 2, p. 277. *A. acuminata,* Roxb. Fl. Ind. v. 3 (1832) p. 489 (*not* of Lam.) ; Wight, Icon. t. 771 ; Grah. Cat. p. 178 ; Dalz. & Gibs. p. 224.

Rare. *Dalzell* without locality in Herb. Kew. ! KONKAN : S. Konkan, *Nimmo* ex *Graham;* banks of Chapora River at Maniri in the Wari Country, *Dalzell & Gibson.* DECCAN : Párghát leading to Mahableshwar, *Dalzell & Gibson.*—DISTRIB. (India, Bengal, Assam, Silhet, Birma, W. Peninsula); Ceylon, Java, Borneo.

Several species are grown as ornamental plants in gardens, of which the most common are the following :—

Aristolochia brasiliensis, Mart. & Zucc. Nov. Gen. & Sp. v. 1 (1824) p. 77. A native of Brazil with curious flowers, the upper lip of which with its inflated tube resembles the head and beak of a bird. *A. ornithocephala,* Hook. Bot. Mag. t. 4120 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366 & Gard. in Ind. ed. 5, p. 432. —VERN. *Popat-vel.*

Aristolochia fimbriata, Cham. in Linnæa, v. 7 (1832) p. 210, t. 6. A very pretty plant from Buenos Ayres, bearing in June solitary axillary greenish-white flowers of curious form, the tube being much swollen, the expanded part on the inside dark-brown netted with bright yellow and surrounded by black-tipped yellow hairs pointing inwards in bud. The flowers measure 2 in. in length

by 1 in. in width at the broadest part. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366 & Gard. in Ind. ed. 5, p. 432.A.

Aristolochia elegans, Masters, in Gard. Chron. v. 24 (1885) p. 301. A small free-flowering species, a native of Brazil, with ovate cordate leaves. The flowers have a slightly dilated tube which is suddenly bent upwards, the upper part dilated into a cordate cup-shaped limb of a rich purple color ornamented with creamy-white markings and having a golden-yellow eye surrounded by rich velvety purple. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366 & Gard. in Ind. ed. 5, p. 431.

ORDER CVII. **PIPERACEÆ.**

Herbs or shrubs often with swollen nodes, usually aromatic. Leaves alternate, opposite or whorled, often gland-dotted ; stipules 0 or 2, connate, or adnate to the petiole. Flowers minute, hermaphrodite or unisexual, in axillary or terminal catkin-like spikes subtended by a peltate bract. Perianth 0. Stamens 2—6 (rarely 7—8), hypogynous ; anthers often jointed on the filaments, the cells sometimes confluent ; dehiscence longitudinal. Ovary of 3—4 carpels with many ovules ; less commonly ovary 1-celled with 1 ovule ; ovules orthotropous ; stigmas distinct on the free carpels or ovary-lobes or terminal on the undivided ovary, occasionally solitary, sessile, terminal, simple or penicillate. Fruit small, indehiscent in the 1-celled species or of cocci or follicles in the many-carpelled species. Seeds globose, ovoid or oblong ; testa thin ; albumen copious, floury ; embryo enclosed in an amniotic cavity at the end of the albumen remote from the hilum ; cotyledons minute or obsolete ; radicle superior.—DISTRIB. Genera 8 ; species enumerated exceeding 1000, chiefly tropical American.

Anther-cells distinct; fruit tolerably large; stigmas 3—5, confluent	1. PIPER.
Anther-cells confluent; fruit minute; stigmas usually penicillate	2. PEPEROMIA.

1. **PIPER,** Linn.

Shrubs (rarely herbs), erect or scandent, often glandular and aromatic ; branches with swollen nodes. Leaves entire, often unequal-sided ; stipules various. Flowers diœcious (very rarely hermaphrodite), minute, spicate, each in the axil of a bract with or without 2 lateral bracteoles ; bracts peltate or cupular and adnate to the rhachis, sometimes decurrent, with or without raised margins ; bracteoles when present forming low ridges on each side of the flower or connate in a semilunar form. Perianth 0. Stamens 2—4 (rarely more) ; filaments short ; anthers 2-celled, the cells distinct. Ovary 1-celled ; ovule solitary, erect ; style short, conic, beaked or 0 ; stigmas 2—5. Fruit a small ovoid or globose 1-seeded berry. Seeds usually globose ; testa thin ; albumen floury within, with hardened periphery.—DISTRIB. Tropical and subtropical ; species perhaps 300.

Shrubby, climbing; flowers in simple spikes, usually dicœcious.
Glabrous shrubs.
Leaves usually acute at the base; fruit yellow. 1. *P. trichostachyon.*
Leaves usually rounded at the base; fruit red. 2. *P. nigrum.*
Grey-hirsute; leaves subcordate at base..... 3. *P. Hookeri.*
Herbaceous, erect; flowers in subumbellate spikes, hermaphrodite ..... 4. *P. subpeltatum.*

1. **Piper trichostachyon,** *Cass. DC. in DC. Prodr.* v. 16, part 1 (1869) p. 242. A stout woody climber. Leaves 3—5½ by 1—2 in., elliptic-lanceolate, acutely acuminate, dark green and shining above, paler beneath, glabrous, the margins slightly revolute, base usually acute, nearly equal-sided, 3-nerved, with 2 subopposite nerves a little higher up; petioles ¼—⅝ in. long, glabrous. Flowers in lax more or less interrupted pubescent spikes 3—4 in. long; bracts of male flowers waxy-white, globose, sessile, furnished within with long hairs between which the stamens appear like 2 eyes. Fruit globose, ⅛ in. in diam., yellow. Fl. B. I. v. 5, p. 80; Talb. Trees, Bomb. ed. 2, p. 278; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366. *Muldera trichostachya,* Miq. in Hook. Lond. Journ. Bot. v. 5 (1846) p. 556; Wight, Icon. t. 1944.

Stocks without locality in Herb. Kew.! KONKAN: *Law*!; Matheran, *Cooke*! DECCAN: Khandala, *Dalzell*!, *Woodrow.* KANARA: evergreen forests, *Talbot.*—Flowers: Oct.-Apr.—DISTRIB. India (W. Peninsula).

2. **Piper nigrum,** *Linn. Sp. Pl.* (1753) p. 28. A stout glabrous climber; stems terete, sparingly rooting, much thickened at the nodes. Leaves coriaceous, 4—7 by 2—5 in., broadly ovate, acuminate, glabrous, 5—9-nerved, the supra-basal nerves usually alternate, base usually rounded, more or less oblique; petioles ½—1 in. long. Flowers in slightly interrupted glabrous spikes of variable length (2—6 in.), dicœcious or sometimes polygamous; bracts of the female spikes more or less adnate to the rhachis, forming a short hemispheric cup beneath the ovary; bracteoles forming a semilunar ridge above the ovary. Stamens 2. Stigmas 2—4. Fruit globose, ¼ in. in diam. or less, at first yellow, afterwards becoming red when fully ripe. Fl. B. I. v. 5, p. 90; Grah. Cat. p. 198; Dalz. & Gibs. Suppl. p. 84; Trim. Fl. Ceyl. v. 3, p. 427; Talb. Trees, Bombay. ed. 2, p. 279; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366 & Gard. in Ind. ed. 5, p. 448; Prain, Beng. Pl. p. 893; Watt, Dict. Econ. Prod. v. 6, part 1, p. 260. *Piper trioicum,* Roxb. Fl. Ind. v. 1, p. 151; Wight, Icon. t. 1935; Grah. Cat. p. 199.—Flowers: Nov.—Jan. VERN. *Kála-miri; Mirvel.*

Doubtfully indigenous, but found abundantly in some of the N. Kanara forests probably as an escape. It is cultivated in the Konkan and Kanara, and the fruit furnishes the *black* and, when divested of its skin, the *white pepper* of commerce. See Watt, Dict. Econ. Prod. l. c.—DISTRIB. Cultivated in India, Ceylon, and the tropics generally.

3. **Piper Hookeri,** *Miq. in Hook. Lond. Journ. Bot.* v. 4 (1845) p. 437. A climbing shrub; branches stout, subterete; branchlets hairy. Leaves equal-sided, 2—4 by 1½—2 in., brown when dry, ovate or oblong-lanceolate, obtusely acuminate, thinly

coriaceous, glabrous above, hairy beneath, 5—7-nerved from a subcordate equal or less commonly oblique base, or with 2 of the nerves slightly supra-basal and opposite ; petioles ¼—¾ in. long, hairy or tomentose. Flowers in slender spikes, the male spikes 3—6 in. long ; bracts of male flowers orbicular, sometimes adnate below and shortly decurrent. Stamens 2. Stigmas 3—4, grey-tomentose, reflexed. Fruit globose. Fl. B. I. v. 5, p. 88 ; Dalz. & Gibs p. 315 (by error 115) ; Talb. Trees, Bombay. ed. 2, p. 278 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366.—Flowers : Apr.—Sept.

KONKAN : Matheran, *Cooke* ! DECCAN : Mahableshwar, *Cooke* !, *Dalzell & Gibson, Law* ! ; on the Ghâts from Bombay southwards to Kanara, *Talbot*.—DISTRIB. India (W. Peninsula).

4. **Piper subpeltatum,** *Willd. Sp. Pl.* v. 1 (1797) p. 166. A large perennial erect herb 3—5 ft. high ; stem thick, jointed, warted, but glabrous, branched. Leaves very large, 8—12 in. in diam., orbicular, shortly acuminate, entire or nearly so, glabrous except on the nerves beneath, closely gland-dotted, base deeply cordate with a narrow sinus, palmately nerved ; petioles 4—8 in. long, striate, amplexicaul at the base. Flowers hermaphrodite, minute, very numerous and closely packed ; spikes subumbellate, 3—7 together, 3—5 in. long, very shortly pedicellate ; bracts small, stalked, succulent, with a thickened triangular glabrous tip. Stamens 2. Stigmas 3. Fruit minute, trigonous, obovoid, truncate, brown. Fl. B. I. v. 5, p. 95 ; Trim. Fl. Ceyl. v. 3, p. 429 ; Talb. Trees, Bomb. ed. 2, p. 279. *Pothomorphe subpeltata,* Miq. Syst. Pip. p. 213 ; Wight, Icon. t. 1925.—Flowers : Oct.—Jan.

Rare. KANARA : in open situations in some evergreen forests of N. Kanara, *Talbot*.—DISTRIB. India (W. Peninsula) ; Ceylon, Penang, Malay Islands, Tropical Africa, Madagascar.

Piper Betle, Linn. Sp. Pl. (1753) p. 28. A perennial dioecious climber probably a native of Java, widely cultivated for its leaf throughout the Presidency, supplying the well-known *Pán* or *betel*- which is chewed almost universally by the natives. The plants (*Vines*) are supported in the betle-gardens on quick-growing trees or shrubs, such as Erythrina indica (*Pángara*) and Sesbania ægyptiaca (*Shewri*). A very full description of the mode of cultivation &c. will be found in Watt's Dict. Econ. Prod. v. 6, part 1, pp. 247—256. Fl. B. I. v. 5, p. 85 ; Grah. Cat. p. 198 ; Dalz. & Gibs. Suppl. p. 84 ; Trim. Fl. Ceyl. v. 3, p. 425 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366 & Gard. in Ind. ed. 5, p. 445 ; Talb. Trees, Bomb. ed. 2, p. 279 ; Prain, Beng. Pl. p. 892 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 247. *Chavica Betle,* Miq. Syst. Pip. p. 28 ; Wight, Icon. t. 1926.—VERN. *Nágvel.*

Piper longum, Linn. Sp. Pl. (1753) p. 29. *The Long Pepper,* a native of the hotter parts of India but not indigenous in the Bombay Presidency, though occasionally cultivated. Stems prostrate or ascending (not climbing). Leaves cordate, glabrous, the lower with

long petioles, the upper sessile and stem-clasping. Fruit small, about $\frac{1}{10}$ in. in diam., blackish-green, sunk in the fleshy spike which is about 1 in. long. Fl. B. I. v. 5, p. 83 ; Grah. Cat. p. 199 ; Dalz. & Gibs. Suppl. p. 84 ; Trim. Fl. Ceyl. v. 3, p. 424 ; Talb. Trees, Bomb. ed. 2, p. 279 ; Woodr. in Journ. Bomb. Nat v. 12 (1899) p. 366 ; Prain, Beng. Pl. p. 892 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 258.—Flowers : Oct.—Nov. VERN. *Pipli.*

The dried unripe fruit and the root are much employed in native medicine and no doubt possess valuable medicinal properties. See Watt, Dict. Econ. Prod. l. c.

2. **PEPEROMIA,** Ruiz & Pav.

Annual or perennial usually succulent herbs. Leaves opposite or whorled (less commonly alternate), entire, pellucido-punctate ; stipules 0. Flowers minute, hermaphrodite, sessile or sunk in the rhachis, often whorled, erect, in terminal or leaf-opposed (rarely axillary), solitary or fascicled spikes ; bracts sessile, sometimes peltately attached. Perianth 0. Stamens 2 ; filaments very short ; anther-cells confluent. Ovary 1-celled, obtuse, acute or beaked ; ovule solitary, erect ; stigma lateral or terminal, usually penicillate. Fruit a minute indehiscent almost dry berry or nutlet, pericarp thin. Seed minute ; testa membranous ; albumen floury.—DISTRIB. Species about 400, chiefly tropical and American.

1. **Peperomia Wightiana,** *Miq. in Hook. Lond. Journ. Bot.* v. 5 (1846) p. 548. A small succulent herb 3—8 in. high ; stems procumbent or ascending, rooting, slender, glabrous or nearly so. Leaves subfleshy, $\frac{1}{2}$—$1\frac{1}{4}$ by $\frac{3}{8}$—1 in., alternate or opposite, the upper sometimes ternately whorled, elliptic or obovate, sometimes suborbicular, obtuse, gland-dotted, the margins more or less ciliolate near the tip, base acute or rounded ; nerves 3 from the base, somewhat obscure ; petioles $\frac{1}{4}$—$\frac{1}{2}$ in. long, slender. Flowers laxly arranged in slender pedunculate erect spikes 1—$\frac{3}{4}$ in. long, much exceeding the leaves ; spikes 1—3 together, usually terminal. Fruit minute, globose, slightly rough. Fl. B. I. v. 5, p. 98 ; Trim. Fl. Ceyl. v. 3, p. 431 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366. *Peperomia portulacoides,* Dalz. & Gibs. Bo. Fl. p. 225 (*not* of Miq.) ; Woodr. in Journ. Bomb. Nat. l. c.—Flowers : July—Oct.

Stocks without locality in Herb. Kew.! KONKAN : on trees, *Dalzell*! DECCAN : Koina Valley below Mahableshwar, *Cooke*! KANARA : *Law*!—DISTRIB. India (W. Peninsula) ; Ceylon.

Peperomia pellucida, H. B. & K. Nov. Gen. & Sp. v. 1 (1815) p. 64. A succulent slender much-branched annual herb with weak procumbent glabrous stems 8—20 in. long, broadly ovate acute cordate thinly membranous 5—7-nerved opposite leaves, and very slender terminal and leaf-opposed spikes, a native of S. America, now quite naturalized in the Island of Bombay, where it is abundant, especially near Sewri.

The plant has also been naturalized in Calcutta and elsewhere in India. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 366 ; Prain, Beng. Pl. p. 894.

ORDER CVIII. **MYRISTICACEÆ.**

Evergreen trees often stellately tomentose. Leaves alternate, entire, often pellucido-punctate ; stipules 0. Flowers small, dicœcious, regular, fasciculate, umbellate or paniculate ; bracteoles persistent or caducous. Perianth simple, inferior, coriaceous, deciduous ; lobes usually 3, sometimes 2 or 4, connate below, valvate in bud. MALE FLOWERS : Stamens monadelphous, 3—18 (less often 30—45) ; anthers usually sessile, ovate or linear, 2-celled, adnate dorsally to a central vertical cylindric or angled sessile or stalked column, free from each other or connate, less often attached by their bases, without or with short filaments, to the edge of a peltate stipitate disk ; dehiscence always extrorse ; rudimentary pistil 0. FEMALE FLOWERS : Staminodes 0 or very rare. Ovary free, sessile at the base of the perianth, 1-celled ; ovule solitary, basal, erect, anatropous ; stigma usually sessile (rarely with a short style), capitate, discoid or lobed. Fruit more or less fleshy or thickly coriaceous, often splitting into 2 (rarely 4) valves. Seed erect, enclosed in a fleshy or membranous entire lobed or laciniate, usually highly colored, often aromatic aril ; testa usually thick ; albumen copious, hard, ruminate ; embryo small, basal ; cotyledons divaricate, flat or crumpled ; radicle short, inferior.—DISTRIB. Tropical East Asia, Malaya, America, Africa, Australia ; genus 1 ; species about 80.

1. **MYRISTICA,** Linn.

Character of the Order.

Male flowers in cymes or umbels; perianth 3-toothed with a bracteole at the base; staminal-column elongate; anthers connate to the column and to each other; aril laciniate.
- Male flowers in lax branched cymes at least twice as long as the petioles; fruit elongate-oblong, 2—2½ by 1—1½ in. ..... 1. *M. malabarica.*
- Male flowers in condensed many-flowered umbels or cymes, shorter or scarcely longer than the petioles; fruit subglobular or ovoid.
  - Leaves 6—10 in. long; fruit subglobular, 2½ in. in diam. ..... 2. *M. Beddomei.*
  - Leaves 12—24 in. long; fruit ovoid, 3—4 in. long 3. *M. magnifica.*

Male flowers in very shortly pedunculate axillary 3—6-flowered umbels; perianth deeply cleft; pedicels with a bracteole about the middle; staminal column peltate, subconcave; anthers attached by short filaments to its edge, radiating from the edge of the flattened column and dehiscing downwards; aril entire; fruit shortly pointed, 1—1½ in. long..... 4. *M. attenuata.*

1. **Myristica malabarica,** *Lamk. in Mém. Acad. Sc. Par.* (1788) p. 162. A moderate-sized tree, all parts but the inflorescence

glabrous ; bark smooth with small lenticular spots, the inner bark with much red juice (*Talbot*); young branches very thin, pale. Leaves thinly coriaceous, 4—6 by 1¼—2¼ in., oblong or elliptic-lanceolate, subacute, shining above, dull beneath, base acute ; main nerves 8—14 pairs, slender, not very prominent ; petioles ⅜—½ in. long. MALE FLOWERS in slender open 2—3-chotomous axillary or lateral subumbellate cymes 1—2 in. long ; buds ⅛ in. long, ovoid-globose ; peduncles long, slender ; pedicels ¼—½ in. long, slender, puberulous ; bracteole small, suborbicular, closely appressed to the base of the flower at one side. Perianth minutely scurfy-puberulous outside, glabrous inside ; teeth short, triangular. Staminal-column stalk, apiculate ; stalk about ¼ the height of the column, tomentose ; anthers 10—14, linear. FEMALE FLOWERS more globose and larger than the males, in few-flowered axillary umbels scarcely longer than the petioles. Perianth-teeth ovate. Bracteole forming a narrow imperfect cup round the base of the perianth. Ovary sessile, ovoid-globose, pointed, densely rufous-tomentose ; stigma large, sessile, 2-lobed. Fruit elongate, oblong, pointed, densely rufous-tomentose, 2—2½ by 1—1¼ in. Seed oblong, obtuse, slightly flattened on one side ; testa shining ; aril yellow, irregularly lobed and laciniate, extending to the apex of the seed. Fl. B. I. v. 5, p. 103 ; Dalz. & Gibs. p. 4 ; Bedd. Flor. Sylvat. t. 269 ; King, in Ann. Roy. Bot. Gard. Calc. v. 3, part 3, p. 288, t. 109 ; Talb. Trees, Bomb. ed. 2, p. 280 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367 ; Watt. Dict. Econ. Prod. v. 5, p. 314. *Myristica tomentosa*, Grah. Cat. p. 175 (*not* of Hook. f. & Thoms.).—Flowers : Nov.—Mar. VERN. *Rán-jáyphal* ; *Káyphal*.

KONKAN : evergreen forests of the Konkan Ghâts, *Talbot;* Malwán, *Gibson*! KANARA : common in the forests of the Kumpta táluka, *Talbot*; Chandavar (N. Kanara), *Woodrow*!—DISTRIB. India (W. Peninsula in wet forests at the base of hills).

Both the yellowish Mace and the Nutmegs are exported from N. Kanara to Bombay, and the former is said to be exported thence to the Continent (chiefly to Germany) as an adulterant for true Mace. See Watt, Dict. Econ. Prod. l. c.

2. **Myristica Beddomei,** *King, in Ann. Roy. Bot. Gard. Cal.* v. 3, part 3 (1891) p. 291, t. 118. A tall evergreen tree, glabrous except the underside of the leaves and the inflorescence ; bark smooth. Leaves coriaceous, 6—10 by 2½—3½ in., oblong or elliptic-lanceolate, acute, shining above, dull and glaucous beneath, base rounded or suddenly cuneate ; main nerves 13—17 pairs ; petioles ⅝—1¼ in. long. MALE FLOWERS in pedunculate woody 8—20-flowered axillary cymes ; peduncles short, stout ; bracteole suborbicular, tomentose, oblique, embracing a large part of the perianth on one side ; pedicels 1/10 in. long or 0. Perianth ⅛ in. long, ovoid, rufous-pubescent outside, glabrous inside ; teeth 3, broadly triangular, about 1/16 in. long. Staminal-column shorter than the perianth, cylindric, bluntly apiculate, stalked ; anthers 9 or 10, linear. FEMALE FLOWERS sessile, in axillary few-flowered cymes. Perianth globular-urceolate, expanded below the 3 spreading ovate teeth, pubescent outside. Ovary sessile, globose, narrowed to the apex, appressedly pubescent ;

stigma sessile, large, slightly oblique, subglobose. Fruit 2½ in. in diam., solitary or in pairs, subglobose, apiculate, grooved on one side along the suture; pericarp minutely rufous-pubescent, thick, succulent; pedicels ½ in. long, very stout. Seed globose, smooth; aril red, fleshy, extending to the apex. *Myristica laurifolia*, Bedd. Flor. Sylvat. t. 267; Hook. f. Fl. B. I. v. 5, p. 103; Talb. Trees, Bomb. ed. 2, p. 280; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367, all in part (*not* of Hook. f. & Thoms.).—Flowers: Dec.—Feb. VERN. *Jáyphal*; *Jajikai*.

KONKAN: Ghâts, *Talbot*. KANARA: common in the evergreen forests of the Southern Ghâts of N. Kanara, *Talbot*; Chandavar (N. Kanara), *Woodrow*!; Katgal (Karwar districts), *Kanitkar*!—DISTRIB. India (W. Peninsula), apparently endemic.

I have followed Sir George King (*l. c.*) in separating this from *M. laurifolia*, Hook. f. & Thoms., which name is restricted to the Ceylon plant.

3. **Myristica magnifica,** *Bedd. Flor. Sylvat.* (1872) t. 268. A tree 90—100 ft. high; bark smooth; trunk when young furnished with large aërial roots, which start from the trunk 10 or 20 ft. from the ground and are about ½ in. thick at the ends, afterwards developing into buttresses. Leaves coriaceous, 12—24 by 3½—8 in., elliptic-lanceolate, acute or acuminate, glabrous and shining above, silvery beneath, base rounded; main nerves 20—26 pairs, prominent on the lower side, impressed above, curving upwards and looping within the margin; petioles 1 in. long, stout, channelled. MALE FLOWERS in dense 8—15-flowered clusters from very short woody axillary tubercles; buds ovoid, their bases on one side embraced by a semiorbicular sericeous bracteole; pedicels $\frac{1}{10}$ in. long or 0. Perianth ⅛ in. long, ovoid-globose, silky-tomentose outside, glabrous inside; teeth 3 or 4, sharp. Staminal-column much shorter than the perianth, with a short hairy stalk, ovoid-cylindric, bluntly apiculate; anthers about 15, narrow, slightly unequal in length. FEMALE FLOWERS unknown. Fruit 3—4 by 2 in., solitary or in pairs, axillary, pedicellate, rufous-puberulous, ovoid; pedicels very stout, ½—⅝ in. long; pericarp thick, fleshy. Seed 2 by 1 in., subcylindric or ellipsoid, striate; aril narrowly laciniate from near the base, its laciniments much conduplicate at the apex. Fl. B. I. v. 5, p. 104; King, in Ann. Roy. Bot. Gard. Calc. v. 3, part 3 (1891) p. 291, t. 119; Talb. Trees, Bomb. ed. 2, p. 280.

Rare. KANARA: near Malamáni on the Gairsoppa Ghât in evergreen forests, *Talbot*.—DISTRIB. India (W. Peninsula).

4. **Myristica attenuata,** *Wall. Cat.* (1828) 6791. A tall evergreen tree; youngest branches and inflorescence covered with golden or tawny furfuraceous deciduous tomentum, ultimately glabrous and striate, slender; bark scaly, coming off in patches exposing a brown surface beneath, the inner bark with much red juice. Leaves thinly coriaceous, 5—9 by 1⅝—2⅞ in., elliptic-oblong or elliptic-lanceolate, acute or acuminate, glabrous and shining above, pale and glaucous beneath, base rounded or shortly cuneate; main nerves 12—20 pairs, prominent beneath; petioles ⅜—½ in. long. MALE FLOWERS obovate-globose, ⅛ in. in diam., in 3—6-flowered shortly pedunculate axillary

umbels ; pedicels ¼—⅜ in. long with a bracteole above the middle. Perianth deeply divided ; segments 3, fleshy, concave, densely rufous-woolly outside, glabrous inside. Staminal-disk stalked, subconcave, glabrous ; anthers about 13, ovate, dehiscing downwards ; filaments short. FEMALE FLOWERS in umbels like the males but fewer-flowered, subsessile or sessile. Perianth cylindric or narrowly ovoid, slightly gibbous at the base, 3-toothed ; otherwise as in the male. Ovary sessile, ovoid, densely tomentose ; style short, fleshy, glabrous, expanding above into a 2-lobed fleshy stigma, the lobes somewhat corrugated externally. Fruit 1—1½ in. long, ellipsoid or subovoid, abruptly and shortly pointed, densely clothed with rusty furfuraceous tomentum, but ultimately subglabrous. Seed narrowly ovoid ; aril thin, uniform, completely covering the seed. Fl. B. I. v. 5, p. 110 ; Dalz. & Gibs. p. 4 ; Bedd. For. Man. in Flor. Sylvat. p. clxxvi ; King, in Ann. Roy. Bot. Gard. Calc. v. 3, part 3 (1891) p. 316, t. 152 ; Talb. Trees, Bomb. ed. 2, p. 281 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367. *Myristica corticosa,* Bedd. Flor. Sylvat. t. 271 (*not* of Lour. nor of Hook. & Thoms.). *M. amygdalina,* Grah. Cat. p. 175 (*not* of Wall.).—Flowers : Oct.—Feb. VERN. *Rukt-mara.*

KONKAN : *Law* ! ; Ghâts, *Dalzell* ! ; evergreen forests, *Talbot* ; Wari jungles, *Dalzell* ! DECCAN : deep ravines at Khandala, *Graham.* KANARA : evergreen forests, common, *Talbot* ; Divimana Ghât (N. Kanara), *Woodrow* !—DISTRIB. India (W. Peninsula), apparently endemic.

ORDER CIX. LAURACEÆ.

Erect aromatic trees or shrubs usually evergreen [very rarely (*Cassytha*) leafless parasitic climbers]. Leaves alternate (rarely opposite or deciduous), gland-dotted ; stipules 0. Flowers regular, small, hermaphrodite (rarely 1-sexual), in axillary cymes, clusters, racemes or panicles ; bracts deciduous, often involucrate, sometimes 0. Perianth usually inferior ; tube short, sometimes enlarging in fruit ; lobes of limb usually 6 (rarely 4), 2-seriate, the lobes of each series imbricate (rarely subvalvate), all similar, small, herbaceous or petaloid and equal ; or the outer rarely smaller very rarely longer than the inner, occasionally one or more lobes abortive or one or more additional lobes present. Stamens usually a multiple of the perianth-lobes in 2—4 series on the tube ; filaments flattened, the inner or some or all the filaments often 2-glandular at the base ; anthers erect, 2- or 4-celled, the cells dehiscing by upcurved at length deciduous valvular lids. Ovary sessile at the base of the perianth-tube, 1-celled ; ovule solitary, anatropous, pendulous from the apex of the cell. Fruit a dry or fleshy berry, naked or rarely enclosed in or adnate to the perianth-tube ; the stalk often thickened. Seed pendulous ; testa membranous ; albumen 0 ; cotyledons planoconvex, fleshy ; radicle minute, superior.—DISTRIB. Genera 34 ; species 800—900, chiefly in the warmer regions of America, Asia, Australia, and the Pacific Islands.

Trees or shrubs.
- Anther-cells of third row (if present) extrorse; flowers hermaphrodite (rarely polygamous).
  - Anthers 2-celled.
    - Perianth-tube persistent, enclosing the fruit..... 1. CRYPTOCARYA.
    - Perianth quite deciduous ..... 2. BEILSCHMIEDIA.
  - Anthers 4-celled.
    - Perianth in fruit with persistent tube and usually deciduous segments ..... 3. CINNAMOMUM.
    - Perianth in fruit with persistent reflexed segments ..... 4. MACHILUS.
    - Perianth wholly deciduous ..... 5. ALSEODAPHNE.
- Anther-cells of all rows introrse, 4-celled; flowers dicœcious.
  - Flowers clustered in densely imbricating (not whorled) bracts ..... 6. ACTINODAPHNE.
  - Flowers umbellate, the heads supported by 4—6 whorled bracts ..... 7. LITSEA.

Parasitic leafless twining herbs ..... 8. CASSYTHA.

1. CRYPTOCARYA, R. Br.

Evergreen trees or shrubs. Leaves usually alternate, 3-nerved from the base or penninerved. Flowers small, hermaphrodite, in axillary and subterminal panicles. Perianth-tube turbinate or ovoid, ultimately narrowed at the top ; lobes of limb 6, subequal. Stamens 9 perfect, those of the 2 outer series with eglandular filaments and introrse 2-celled anthers, those of the third series with 2-glandular filaments and extrorse 2-celled anthers, those of the fourth series replaced by stipitate staminodes. Ovary sessile at the base of the perianth, enclosed in the tube ; style shortly exserted ; stigma obtuse or discoid. Fruit wholly enclosed in the perianth-tube and sometimes adnate to it ; tube accrescent, hardened or somewhat fleshy, smooth or ribbed, the mouth occluded ; limb deciduous or more or less persistent ; pericarp membranous or hard. Seed with a membranous testa often scarcely separable from the pericarp.—DISTRIB. Species 40, tropical and subtropical.

1. **Cryptocarya Wightiana,** *Thw. Enum.* (1861) p. 254. A large tree ; young parts rusty-pubescent ; bark thin, with large corky lenticels. Leaves coriaceous, 4—10 by 1¾—4 in., elliptic-oblong, shortly acuminate, glabrous above, whitish beneath, base subacute or rounded ; main nerves 7—10 pairs, prominent and more or less pubescent beneath, arcuate, with reticulate venation between ; petioles ½—¾ in. long. Flowers yellowish, numerous, in spreading axillary pubescent panicles usually shorter than the leaves ; pedicels short. Perianth of male flowers ⅛ in. long, pubescent outside, divided about ½-way down ; segments oblong, obtuse. Fruit ½ in. in diam. or ½ by ⅜ in., subglobose or oblong-ellipsoid, glabrous, purple-black.

The fruit of the specimens from Matheran is oblong-ellipsoid, that of specimens from Travancore and Ceylon seems to be more globose. Fl. B. I. v. 5, p. 120 ; Bedd. Flor. Sylvat. t. 299 ; Trim. Fl. Ceyl. v. 3, p. 439 ; Talb. Trees, Bomb. ed. 2, p. 282 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367 ; Watt, Dict. Econ. Prod. v. 2, p. 624. *Cryptocarya floribunda,* Wight, Icon.

t. 1829 (*not* of Nees) ; Dalz. & Gibs. p. 222.—Flowers: Dec.—Apr. VERN. *Gulmur.*

KONKAN: Matheran, *Cooke*!, *Woodrow*, *H. M. Birdwood.* KANARA: *Stocks*!; Yellapur Ghâts, *Talbot*, 2879!; Nilkund Ghât, *Talbot*, 2872!—DISTRIB. India (W. Peninsula); Ceylon.

EXCLUDED SPECIES.

CRYPTOCARYA STOCKSII, Meissn. in DC. Prodr. v. 15, part 1, p. 71. A large tree; branches and panicles rusty-tomentose. Leaves 2½—4 in. long, rigidly coriaceous, oblong, obtuse or rounded at the tip, glabrous above, glaucous beneath; nerves 6—7 pairs, stout, pubescent or glabrous. Panicles shorter than the leaves, dense-flowered. Fruit ovoid, ¼ in. long.

There is one sheet from Dalzell's and one from Stocks's Herbarium in Herb. Kew. Neither of these has reliable localities assigned to the plant. Talbot says (Trees, Bomb. ed. 2, p. 282) that he has not seen the tree in any of the N. Kanara forests. The specimens in Herb. Kew. may be from S. Kanara and therefore outside the Bombay area. Woodrow does not include it in his list.

BEILSCHMIEDIA,

Evergreen trees or shrubs. Leaves alternate or opposite. Flowers small, hermaphrodite, fasciculate or paniculate. Perianth-tube short ; lobes of limb subequal. Stamens 9 perfect, those of the 2 outer series with eglandular filaments and introrse 2-celled anthers ; those of the third series with 2-glandular filaments and extrorse 2-celled anthers ; those of the fourth series replaced by ovoid or cordate staminodes. Ovary sessile, free from the perianth, narrowed into the style ; stigma obtuse. Fruit an oblong, ovoid or globose berry ; pedicels not or slightly thickened ; perianth quite deciduous. Seed with membranous testa.—DISTRIB. Species about 20, all tropical.

1. **Beilschmiedia fagifolia,** VAR. **Dalzellii,** *Meissn. in DC. Prodr.* v. 15, part 1 (1864) p. 64. A large tree ; bark grey, scaly. Leaves coriaceous, 3½—5 by 1½—2 in., elliptic-lanceolate, acute, glabrous, smooth and shining above, closely reticulately veined beneath, base tapering ; main nerves about 10 pairs, slender ; petioles ⅜—⅝ in. long. Flowers in short axillary panicles ; pedicels thickened in fruit. Perianth ⅛—¼ in. long ; segments ¼ in. long or rather more, oblong, rounded at the tip, pubescent on both sides, gland-dotted. Ovary ovoid, pubescent, tapering into the style. Fruit 1½—1½ in. long, ovoid. Fl. B. I. v. 5, p. 122. *Beilschmiedia fagifolia,* Bedd. Flor. Sylvat. t. 263 ; Talb. Trees, Bomb. ed. 2, p. 282 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367. *B. Roxburghiana,* Dalz. & Gibs. p. 222 (*not* of Nees).

This plant and *B. fagifolia* proper might be placed as varieties under *B. Roxburghiana,* Nees.

Dalzell without locality in Herb. Kew.! KONKAN: *Law*!; Matheran, *Cooke*!, *Woodrow.* S. M. COUNTRY: Párva Ghát, *Ritchie,* 696! KANARA: *Stocks*!; evergreen forests of N. Kanara Ghâts, *Talbot*; Sonda, *Talbot,* 3658!; Ainshi Ghât, common, *Talbot*; Waguli, *Ritchie,* 1323!—DISTRIB. India (W. Peninsula).

3. CINNAMOMUM, Bl.

Evergreen trees or shrubs. Leaves opposite or alternate, usually 3-nerved. Flowers small, hermaphrodite or by abortion polygamous, in axillary and subterminal panicles, the females usually largest and sometimes with fewer parts. Perianth-tube short ; lobes of limb subequal. Stamens 9 perfect, or by abortion, fewer, those of the 2 outer rows with eglandular filaments and introrse 4-celled anthers, those of the third row with glandular filaments, the glands subsessile or stipitate, and extrorse 4 (rarely 2)-celled anthers, those of the fourth row replaced by shortly stipitate cordate or sagittate staminodes. Ovary sessile, free from the perianth, narrowed into the style ; stigma discoid or obscurely 3-lobed. Fruit a berry, resting on the spreading more or less enlarged perianth, the segments of which are wholly or partly deciduous, less often persistent. Seed with thin testa.—DISTRIB. Tropical and Subtropical Eastern Asia, Australia and the Pacific Islands ; species perhaps 130.

Fruiting perianth ¼ in. in diam.; fruit ½—⅝ in. long. 1. *C. zeylanicum.*
Fruiting perianth ⅜ in. in diam.; fruit 1 in. long..... 2. *C. macrocarpum.*

1. **Cinnamomum zeylanicum,** *Blume, Bijdr.* (1825) p. 568. A moderate-sized evergreen tree ; bark rather thick, smooth, pale ; twigs often compressed ; young parts glabrous except the buds which are finely silky. Leaves opposite or subopposite (rarely alternate), hard and coriaceous, 3—8 by 1½—3 in., ovate or ovate-lanceolate, subacute or shortly acuminate, glabrous and shining above, slightly paler beneath, base acute or rounded ; main nerves 3—5 from the base or nearly so, strong, with fine reticulate venation between ; petioles ½—1 in. long, flattened above. Flowers numerous, in silky-pubescent lax panicles usually longer that the leaves ; peduncles long, often clustered, glabrous or pubescent ; pedicels long. Perianth ⅛—¼ in. long ; tube $\frac{1}{10}$ in. long ; segments pubescent on both sides, oblong or somewhat obovate, usually obtuse. Fruit ½—⅝ in. long, oblong or ovoid-oblong, minutely apiculate, dry or slightly fleshy, dark purple, surrounded by the enlarged campanulate perianth which is ⅓ in. in diam. Fl. B. I. v. 5, p. 131 ; Wight, Icon. tt. 123, 134 ; Bedd. For. Man. in Flor. Sylvat. p. clxxxiv ; Thw. Fl. Ceyl. v. 3, p. 440 ; Talb. Trees, Bomb. ed. 2, p. 283 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367 ; Prain, Beng. Pl. p. 898 ; Watt, Dict. Econ. Prod. v. 2, p. 324. *Cinnamomum zeylanicum* var. *Wightii,* Bedd. Flor. Sylvat. t. 262. *C. aromaticum,* Grah. Cat. p. 173 ; Dalz. & Gibs. Suppl. p. 74. *C. iners,* Grah. Cat. p. 173.—Flowers : Nov.—Mar. VERN. *Dálchini.*

Dalzell without locality in Herb. Kew.! KONKAN : Goa territory, *Cooke* !; Amboli Ghát, *Kanitkar*! DECCAN : ravines about Khandala, not common, *Graham.* KANARA : *Stocks* !; common in all evergreen forests of N. Kanara, very abundant in the Kumpta and Siddapur tálukas, *Talbot*; Kála naddi, *Ritchie,* 967!; Supa, *Talbot,* 45!—DISTRIB. India (Birma, W. Peninsula); Ceylon; cultivated in the Malay Islands and elsewhere in the tropics.

The bark which furnishes the Cinnamon of commerce is largely exported from Kanara. The tree is cultivated in Ceylon.

2. **Cinnamomum macrocarpum,** *Hook. f. Fl. B. I.* v. 5 (1886) p. 133. A moderate-sized evergreen tree ; branches slender. Leaves

4½—7 by 1⅝—2½ in., thinly coriaceous, elliptic-lanceolate or oblong-lanceolate, 3—5-nerved, the lateral nerves sometimes starting ⅜ in. above the base; petioles ½—1 in. long. Flowers in panicles shorter than the leaves. Fruiting perianth apparently fleshy, broadly infundibuliform, ⅜ in. in diam., shortly 6-toothed. Fruit 1 by ¾ in., globosely oblong. Talb. Trees, Bomb. ed. 2, p. 283; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367, *Cinnamomum iners*, Wight, Icon. t. 130.

KANARA: evergreen forests of N. Kanara, *Talbot;* Supa (N. Kanara), *Woodrow.*—DISTRIB. India (W. Peninsula).

Talbot (Trees, Bomb. l. c.) is doubtful as to whether this should not be considered a variety of *C. zeylanicum* with large fruit. The difference in the perianth would however seem to be a constant character, but the material in Herb. Kew. is very meagre.

4. **MACHILUS,** Nees.

Evergreen trees. Leaves alternate, clustered near the ends of the branches, penninerved. Flowers small, hermaphrodite, in axillary panicles. Perianth-tube short or obsolete; segments 6, subequal, persistent, reflexed in fruit. Stamens 9 perfect, those of the 2 outer rows with eglandular filaments and introrse 4-celled anthers, those of the third row with filaments which have 2 stipitate glands at the base and extrorse 4-celled anthers, those of the fourth row replaced by stipitate cordate staminodes. Ovary sessile, narrowed into the style; stigma discoid. Fruit a globose or ovoid berry, seated on the persistent perianth. Seed with thin testa.—DISTRIB. Species 15—20, Asiatic.

1. **Machilus macrantha,** *Nees, in Wall. Pl. As. Rar.* v. 2 (1831) p. 70. A large tree; young parts glabrous. Leaves coriaceous, 3½—7 by 1⅛—2½ in.; variable in shape, from oblong and rounded at both ends to elliptic-lanceolate and acute at both ends, glabrous, shining above, glaucous beneath, finely reticulately veined; main nerves 8—12 pairs, not conspicuous; petioles ¾—1¼ in. long. Flowers yellow, numerous, in panicles near the ends of the branches, often several panicles together 6—8 in. long, stout, puberulous. Perianth ¼ in. long, silky-pubescent inside and outside; tube very short; segments oblong or linear-oblong, subacute. Filaments hairy. Fruit ½—¾ in. in diam., smooth, dark-green dotted with white, ultimately becoming black. Fl. B. I. v. 5, p. 140; Dalz. & Gibs. p. 221; Wight, Icon. t. 1824; Bedd. Flor. Sylvat. t. 264; Trim. Fl. Ceyl. v. 3, p. 443; Talb. Trees, Bomb. ed. 2, p. 283; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367. *Machilus glaucescens*, Wight, Icon. t. 1825 (excl. syn.); Dalz. & Gibs. p. 221. —Flowers: Dec.—Mar. VERN. *Gulum.*

Dalzell without locality in Herb. Kew.! KONKAN: *Law!*; moist forests, *Talbot;* Wari jungles, *Stocks!*; Matheran, *Cooke!*, *H. M. Birdwood.* S. M. COUNTRY: Castlerock, *Kanitkar!*; Párva Ghát, plentiful, *Dalzell & Gibson.* KANARA: *Stocks!*; throughout the Ghâts of N. Kanara in moist forests, *Talbot.* —DISTRIB. India (W. Peninsula); Ceylon.

It is not improbable that there are 2 distinct species here as given by Wight. The berry of *M. glaucescens*, Wight, is said to be of the size of a

gooseberry, that of *M. macrantha*, Nees, of the size of a large currant. The existing Herbarium material is insufficient to decide the question.

5. ALSEODAPHNE, Nees.

Evergreen trees. Leaves alternate, usually crowded towards the ends of the branchlets, often obovate, penninerved. Flowers hermaphrodite, in axillary and subterminal lax panicles. Perianth deeply divided; segments 6, subequal or the 3 outer smaller, deciduous. Stamens 9 perfect, those of the 2 outer rows with eglandular filaments and introrse 4-celled anthers, those of the third row with 2-glandular filaments and extrorse 4-celled anthers, those of the fourth row replaced by small sagittate staminodes. Fruit ellipsoid, seated on the truncate clavate end of the thick fleshy peduncle without any supporting perianth.—DISTRIB. Species about 15, tropical Asiatic.

1. **Alseodaphne semicarpifolia,** *Nees, in Wall. Pl. As. Rar.* v. 2 (1831) p. 72. A moderate-sized or sometimes a large much-branched tree; bark dark-colored, smooth. Leaves coriaceous, crowded towards the ends of the branchlets, appearing whorled from crowding, 3—6 by 1¾—3½ in., elliptic-oblong or obovate, rounded at the apex, glabrous, very finely reticulately veined, usually glaucous beneath, base tapering; main nerves 6—8 pairs; petioles ⅜—¾ in. long. Flowers yellowish-green, in subumbellate cymes at the tips of the branches of large lax axillary and subterminal panicles; peduncles usually longer than the leaves, the lower portion naked; pedicels rather long. Perianth ⅛—⅙ in. long; segments elliptic-oblong, obtuse, subequal or the outer rather smaller. Fruit ½—¾ in. long, ellipsoid, blunt, smooth. Fl. B. I. v. 5, p. 144; Dalz. & Gibs. p. 222; Wight, Icon. tt. 1826, 1827; Bedd. Flor. Sylvat. t. 297; Trim. Fl. Ceyl. v. 3, p. 444; Talb. Trees, Bomb. ed. 2, p. 284; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367.—Flowers: July—Dec. VERN. *Phudgus.*

Dalzell without locality in Herb. Kew.! KONKAN: Matheran, *H. M. Birdwood.* KANARA: *Law!*; Yacombi (N. Kanara), *Woodrow!*; evergreen forests on the N. Kanara Ghâts from the coast inland, *Talbot.*—DISTRIB. India Peninsula); Ceylon.

VAR. 1. *rufa,* Hook. f. Fl. B. I. v. 5, p. 144. The red color on the leaves of the solitary specimen in Herb. Kew. appears to have been caused by laterite dust adhering to them, a case of common occurrence on the laterite-topped hills of the Western Ghâts.

VAR. 2. *angustifolia,* Nees, in DC. Prodr. v. 15, part 1, p. 27. Leaves 3—5 by 1—1½ in., oblong-lanceolate, obtuse or subacute, glaucous beneath.

Dalzell without locality in Herb. Kew.! KANARA: *Stocks!*; near Yellapur, common, *Talbot.* Abundant in Ceylon, where (*fide* Trimen) it is one of the best timber-trees in the forests of that island.

6. ACTINODAPHNE, Nees.

Evergreen shrubs or trees. Leaves almost whorled, penninerved or 3-nerved. Flowers small, dicœcious, in axillary or lateral dense

sessile or pedunculate fascicles or umbels ; bracts imbricating, caducous (not whorled). Perianth-tube short ; segments 6, subequal. MALE FLOWERS : Stamens 9 perfect (rarely only 6), those of the 2 outer rows with eglandular filaments, the third row sometimes obsolete, if present with 2-glandular filaments ; anthers of all three rows introrse, 4-celled. Ovary reduced and empty or obsolete. FEMALE FLOWERS : Staminodes 9. Ovary free ; style longish ; stigma dilated. Fruit a berry resting on the enlarged hardened flat spreading or concave perianth-tube. Seed with thin testa.—DISTRIB. Species 50, Eastern Asia and Malaya.

1. **Actinodaphne Hookeri,** *Meissn. in DC. Prodr.* v. 15, part 1 (1864) p. 218 (exclud. var. *longifolia*). A medium-sized tree. Leaves coriaceous, in 2 whorls of 3 each, 4—7 by 1¾—2½ in., penninerved, elliptic-lanceolate, finely acuminate, the mature leaves glabrous above and usually clothed with thin tomentum beneath, the young leaves densely silky with long tawny hairs, base usually acute ; main nerves 6—10 pairs ; petioles ½—1 in. long, silky-pubescent. Flowers dioecious, yellowish, from the naked branches, the males in clusters of about 8, the females umbellate or subracemose on very short stout peduncles ; pedicels clothed with tawny hairs, those of the female flowers longer than the male. Perianth densely clothed with tawny hairs ; segments elliptic or ovate. Stamens 9 in the male flowers, reduced in the female to strap-shaped antherless staminodes, of the same number as the male stamens or less ; filaments thickly covered with whitish hairs, the interior row of 3 with 2 somewhat reniform glands at the base of each filament, the glands in the male flowers slightly stalked, those of the female sessile. Style rather thick ; stigma large, mushroom-shaped, oblique. Berry ⅓—½ in. long, ellipsoid, red when ripe, seated on the cup-shaped enlarged perianth-tube. Fl. B. I. v. 5, p. 149 ; Talb. Trees, Bomb. ed. 2, p. 284 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367 ; Watt, Dict. Econ. Prod. v. 1, p. 104. *Actinodaphne lanceolata,* Dalz. & Gibs. p. 312. *A. angustifolia,* Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 31 ; Wight, Icon. t. 1841. *Tetranthera lanceæfolia,* Grah. Cat. p. 174 (*not* of Roxb.).—Flowers : Nov. VERN. *Pisa.*

Dalzell without locality in Herb. Kew.! KONKAN : *Law*!; Matheran, *Otto Kuntze*!, *Cooke*! DECCAN : Mahableshwar, very common, *Cooke*!, *H. M. Birdwood, Dalzell & Gibson, Woodrow.* KANARA : *Stocks*!; evergreen forests of N. Kanara, *Talbot.*—DISTRIB. India (W. Peninsula).

7. LITSEA, Lamk.

Evergreen (rarely deciduous) trees or shrubs. Leaves alternate (rarely opposite or subopposite), penninerved (rarely 3-nerved from the base) ; buds naked or scaly. Flowers small, dioecious, usually umbellate ; umbels 4—6 (rarely more)-flowered, sessile or shortly pedunculate, axillary or in the scars of fallen leaves ; bracts involucrate, 4—6 (rarely more) to an involucre, concave, coriaceous or membranous. Perianth-tube ovoid, campanulate, or very short ; lobes of limb 6 or 4 (rarely fewer or more), equal or unequal or in a few wanting. MALE FLOWERS : Stamens 9 or 12 in 3-merous, 6 in

2-merous flowers (sometimes by abortion fewer than 6 and in a few more than 12) ; filaments of the first and second rows usually eglandular, those of the third and fourth (if present) 2-glandular ; anthers all introrse, 4-celled. Ovary minute, empty or obsolete (very rarely perfect). FEMALE FLOWERS: Staminodes 9 or 12, or in 2-merous flowers 6 (rarely more than 12). Ovary enclosed in the perianth-tube or free ; style short or long ; stigma usually irregularly lobed. Fruit a drupe or berry resting on the unchanged perianth or partly clasped at the base by the often much enlarged discoid or cupular perianth-tube. Seed with thin testa.—DISTRIB. Tropical and Eastern Asia, Australasia, the Pacific Islands, rare in Africa and America ; species 140.

Leaves persistent, penninerved.
Perianth-segments incomplete or wanting; tube hardly enlarged in fruit; stamens numerous, often 20.
Leaves thick, finely tomentose beneath; umbels solitary, many-flowered ..... 1. *L. tomentosa.*
Leaves thin, glabrous beneath or nearly so; umbels corymbose or racemose, few-flowered..... 2. *L. chinensis.*
Perianth-segments 6; tube enlarged, cup-shaped in fruit; stamens about 12.
Leaves glaucous beneath; filaments glabrous..... 3. *L. Stocksii.*
Leaves rusty-tomentose beneath; filaments hairy. 4. *L. Wightiana.*
Leaves 3-nerved; perianth-segments usually 4, deciduous ..... 5. *L. zeylanica.*

1. **Litsea tomentosa,** *Heyne, in Wall. Cat.* (1828) 2550. A moderate-sized tree, densely and softly tomentose except the upper side of the leaves ; bark thin, smooth. Leaves coriaceous, crowded towards the ends of the branches, 4—9 by 2—3¼ in., elliptic-lanceolate or obovate, shortly acuminate, glabrous above, finely tomentose and yellowish-white beneath, base acute ; main nerves 10—15 pairs, prominent beneath ; petioles ¼—½ in. long. Flowers pale-yellow, in solitary pedunculate many-flowered umbellate heads, globose before expansion ; peduncles reaching ½ in. long, hairy, drooping ; pedicels ¼ in. long, hairy ; bracts 4, broadly ovate or suborbicular, concave, tomentose. Perianth-tube very short, hairy outside ; segments vary- from 0—6 (commonly 0). Stamens 18—20 ; filaments long, slender, densely villous, the glands with long stalks. Staminodes of the female long, strap-shaped, numerous. Fruit ⅜—½ in. in diam., globose, black when ripe. Fl. B. I. v. 5, p. 157 ; Trim. Fl. Ceyl. v. 3, p. 449 ; Talb. Trees, Bomb. ed. 2, p. 285 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367. *Tetranthera apetala,* Grah. Cat. p. 174 (*not* of Roxb.) ; Dalz. & Gibs. p. 222. *Tetranthera tomentosa,* Roxb. ex Wall. Cat. (*l. c.*) ; Wight, Icon. t. 1834.—Flowers : Nov.—Dec. VERN. *Chikna.*

Dalzell without locality in Herb. Kew.! KONKAN : *Law!*; Vingorla, *Dalzell & Gibson*; evergreen forests, *Talbot;* Parel Hill, Bombay, *Graham.* DECCAN : Rotunda Ghát, Mahableshwar, *Cooke!, H. M. Birdwood.* S. M. COUNTRY : Castlerock, *Cooke!, Bhiva!, Woodrow.* KANARA : *Stocks!*; in evergreen forests, *Talbot*—DISTRIB. India (W. Peninsula); Ceylon.

2. **Litsea chinensis,** *Lam. Encyc. Méthod.* v. 3 (1789) p. 574. A small or moderate-sized evergreen, very variable tree ; inner bark viscid ; branchlets, inflorescence and underside of leaves more or less

pubescent. Leaves 5—8½ by 2¾—3½ in., thinly coriaceous, ovate or elliptic-lanceolate, usually obtuse, glabrous above, pale beneath, base acute; main nerves 8—12 pairs with finely reticulate venation between; petioles ½—1 in. long. Flowers white or yellowish, globose, ¼ in. in diam. before expansion, in axillary stalked corymbose or racemose few-flowered umbels. Perianth-tube long, silky; segments usually 0. Stamens reaching 20 or more in number; filaments clothed with long soft hairs, the glands with long stalks. Fruit globose, ½ in. in diam., purple when ripe. Lamarck's name has long priority over Persoon's. Trim. Fl. Ceyl. v. 3, p. 449. *Litsæa sebifera*, Pers. Syn. v. 2 (1807) p. 4; Hook. f. Fl. B. I. v. 5, p. 157; Talb. Trees, Bomb. ed. 2, p. 284; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367; Prain, Beng. Pl. p. 902; Watt, Dict. Econ. Prod. v. 5, p. 83. *Tetranthera apetala*, Roxb. Cor. Pl. v. 2, p. 25, t. 147.—Flowers: Mar.—July. VERN. *Maidlakdi*.

S. M. COUNTRY: Belgaum, *Ritchie*, 1317! KANARA: *Ritchie*, 1320!, *Stocks*!; Southern Ghâts of the Kumpta and Siddapur tálukas, *Talbot*; Yellapur, *Talbot*!; Yacombi, *Woodrow*.—DISTRIB. Throughout the hotter parts of India; Ceylon, Malay Islands, Australia.

The wood is excellent, durable, and not attacked by insects; the oil from the berries is used in rheumatism and the mucilaginous bark is largely used in native medicine. See Watt, Dict. Econ. Prod. l. c.

3. **Litsea Stocksii**, *Hook. f. Fl. B. I.* v. 5 (1886) p. 176. A small tree. Leaves coriaceous, alternate or subopposite, 4—8 by 2—3 in., elliptic-oblong, obtuse or subacute, glabrous above, glaucous beneath, with slightly revolute margins, penninerved, base acute; main nerves 8—12 pairs, strong, the midrib and nerves glabrous with a slightly yellowish tinge when fresh; petioles ¼—½ in. long, stout, glabrous. Heads of flowers in racemes axillary and from the old scars, the heads consisting of 4—8 flowers (very often 7, six round a central one); peduncles and pedicels pubescent, the latter increasing in fruit; bracts 4—6, concave, pubescent. Perianth hairy, 6- or occasionally in the female 7—8-divided. Stamens 12; filaments glabrous; glands stipitate. Style sublobate. Fruit ½ in. long, ellipsoid, when young green speckled with white, when ripe dark-purple, supported on the cup-shaped perianth-tube. Talb. Trees, Bomb. ed. 2, p. 285; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367.—Flowers: Sept.—Oct. *Tetranthera lanceæfolia*, Grah. Cat. p. 174, cited in Fl. B. I. l. c. as a synonym for this, is most certainly *Actinodaphne Hookeri* with red (not purple) fruit and which is "next to the *Jambool* the commonest tree at Mahableshwar."

KONKAN: *Law*! DECCAN: Mahableshwar, not common, *Cooke*!, *Gibson*!, *H. M. Birdwood*, *Woodrow*. KANARA: *Stocks*!; Chandwar, *Ritchie*, 1316!; common on the Ghâts from Ainshi southwards, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

4. **Litsea Wightiana**, *Benth. & Hook. f. Gen. Pl.* v. 3 (1880) p. 162. A large tree; branchlets, petioles, underside of leaves, and inflorescence clothed with dense rust-colored tomentum. Leaves very variable in size and breadth, coriaceous, alternate, penninerved, 3—7 by 1½—2¾ in., elliptic or elliptic-lanceolate, obtuse, acute or acuminate, glabrous and light-green above, usually brownish or purplish

beneath, base acute ; main nerves 8—15 pairs, impressed above, prominent beneath ; petioles ⅛—⅜ in. long, stout. Flowers in suberect or spreading racemes 1—4 in. long ; rhachis stout ; pedicels ¼—⅓ in. long, stout ; bracts 4, coriaceous. Perianth-tube turbinate, silky-tomentose ; segments silky-tomentose. Stamens 12 ; filaments hairy. Stigma discoid. Fruit ⅜ in. long, ellipsoid, the base enclosed in the cup-shaped more or less lobed perianth. Fl. B. I. v. 5, p. 177 ; Talb. Trees, Bomb. ed. 2, p. 285 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367. *Cyclicodaphne Wightiana,* Nees, in Wall. Pl. As. Rar. v. 2, p. 68 & v. 3, p. 31 ; Dalz. & Gibs. p. 222 ; Wight, Icon. t. 1833. *Tetranthera Wightiana,* Wall. Cat. 2557 ; Bedd. Flor. Sylvat. t. 293.—Flowers : Aug.—Nov.

DECCAN : Mahableshwar, below Bombay Point, *Symonds* ex *H. M. Birdwood.* KANARA : Southern Ghâts of N. Kanara in evergreen forests, common in the forests near the Falls of Gairsoppa, *Talbot.*—DISTRIB. India (W. Peninsula), apparently endemic.

5. **Litsea zeylanica,** *Nees, Cinnamom. Disput.* (1823) p. 58. A small or moderate-sized tree ; bark thin, smooth, grey ; branchlets slender. Leaves numerous, crowded towards the ends of the branches, 2½—6 by 1¼—2¼ in., elliptic-lanceolate, thinly coriaceous, obtusely or acutely acuminate, finely reticulately veined and more or less glaucous beneath, 3-nerved from a little above the acute base ; petioles ½—1 in. long. Flowers in small, sessile, clustered, 4—5-flowered umbels ; bracts silky. Perianth hairy ; tube rather long ; segments 4, acute, deciduous. Fruit either oblong-ellipsoid apiculate, ½ in. long, or globose not apiculate, ⅓ in. in diam., dark-purple when ripe (*Trimen*), seated on the disciform perianth-tube. Fl. B. I. v. 5, p. 178 ; Dalz. & Gibs. p. 223 ; Wight, Icon. tt. 132 and 1844 ; Bedd. Flor. Sylvat. t. 294 ; Trim. Fl. Ceyl. v. 3, p. 454 ; Talb. Trees, Bomb. ed. 2, p. 286 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367 ; Prain, Beng. Pl. p. 902 ; Watt, Dict. Econ. Prod. v. 5, p. 85.—Flowers : Oct.—Jan. VERN. *Kánvel* ; *Chirchira.*

Dalzell without locality in Herb. Kew.! KONKAN : moist forests, *Talbot.* DECCAN : Mahableshwar, *Cooke* !, *Woodrow, H. M. Birdwood.* S. M. COUNTRY : [illegible]va Ghât, *Dalzell & Gibson.* KANARA : *Stocks* ! ; in moist forests, common, *Talbot.*—DISTRIB. India (Bhotan and the Khasia Mountains, Silhet, Chittagong, W. Peninsula) ; Ceylon, Sumatra, Java.

8. CASSYTHA, Linn.

Filiform twining parasites adhering to their host by suckers. Leaves consisting of minute scales or 0. Flowers small, hermaphrodite, sometimes dimorphic, spicate, capitate or racemose ; bracteoles 3. Perianth-tube short and globose, or (often in the same species) as long as the limb and turbinate ; segments 6, the 3 outer smaller. Perfect stamens 9 or 6 ; filaments of first row eglandular with introrse 2-celled anthers, those of the second row similar or sometimes reduced to staminodes, those of the third row with 2-glandular filaments and extrorse anthers, those of the fourth row replaced by sessile or stipitate staminodes. Ovary globose, free in flower, closely covered by the enlarged perianth in fruit ; stigma subsessile, small

or capitate. Fruit a small drupe enclosed in the succulent perianth-tube and crowned by the perianth-limb. Seed with thin testa ; cotyledons ultimately confluent.—DISTRIB. Species 15, of which 1 is widely spread through the Tropics, 1 or 2 S. African, 1 from Borneo, and the rest Australian.

1. **Cassytha filiformis,** *Linn. Sp. Pl.* (1753) p. 35. A parasitic herbaceous leafless plant ; stems very long, cord-like, twined and matted together, branched, glabrous or pubescent, dark green. Flowers small, sessile, in lax lateral divaricate spikes ½—2 in. long ; bracteoles small, rounded, ciliate. Perianth twice as long as the bracteoles ; tube short ; segments 6 in 2 rows, the 3 outer segments short, rounded, ciliate, the inner oblong, acute, concave, valvate. Fruit about ¼ in. in diam., white, globose, smooth, enclosed in the fleshy perianth-tube and crowned with the erect perianth-segments. Fl. B. I. v. 5, p. 188 ; Grah. Cat. p. 175 ; Dalz. & Gibs. p. 223 ; Wight, Icon. t. 1847 ; Trim. Fl. Ceyl. v. 3, p. 455 ; Talb. Trees, Bomb. ed. 2, p. 286 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367 ; Prain, Beng. Pl. p. 904 ; Watt, Dict. Econ. Prod. v. 2, p. 226.—Flowers : Sept. VERN. *Amarvel.*

Throughout the Presidency often growing on *Ipomœa biloba* near the sea-coast, *Talbot.* KONKAN : common in hedges, *Graham, Dalzell & Gibson*; Shrivardhan, *Kanitkar*!—DISTRIB. Throughout India near the coast; Ceylon, Arabia, Mascarene Islands, Tropical East Asia and Islands, Australia, Polynesia, Tropical Africa, and America.

ORDER CX. THYMELEÆCEÆ.

Shrubs or small trees with tough fibrous bark. Leaves alternate or opposite, simple, quite entire. Flowers usually hermaphrodite, in axillary or terminal heads, umbels, clusters, or racemes. Perianth regular, tubular or campanulate, often corolline, frequently with a ring of scales or hairs at the mouth ; lobes 4—5, imbricate in bud. Stamens as many or twice as many as the perianth-lobes (rarely half as many), adnate to the perianth-tube, those opposite the lobes usually attached above the alternate ones ; filaments short, rarely as long as the anthers ; anthers erect, 2-celled, the cells parallel, dehiscing longitudinally. Disk annular, cupular, scaly or obsolete. Ovary superior, 1 (rarely 2)-celled ; ovule 1 in each cell, anatropous, pendulous from near the apex of the cell ; style short or long, terminal or eccentric ; stigma capitate. Fruit a small berry, drupe, or nut (rarely capsular). Seed solitary or 1 in each cell, pendulous or lateral ; albumen fleshy, copious or 0 ; cotyledons fleshy, usually thick ; radicle short, superior.—DISTRIB. Genera nearly 40, in Africa, Australia, Asia, Mediterranean region, America ; species about 360.

1. LASIOSIPHON, Fresen.

Shrubs. Leaves opposite or scattered. Flowers hermaphrodite, in dense sessile or pedunculate heads ; bracts broad. Perianth often silky-pubescent ; tube cylindric, circumscissile above the ovary ;

lobes 5, spreading, with 5 small scales alternating with them. Stamens 10, attached to the throat below the scales in 2 rows, the upper or all shortly exserted; filaments very short; anthers oblong or linear. Disk 0 or shortly annulate. Ovary superior, 1-celled; ovule solitary, pendulous; style long, filiform; stigma capitate. Fruit small, dry, included in the perianth-tube; pericarp membranous. Seed with a crustaceous testa.—DISTRIB. Tropical and S. Africa, Madagascar, Tropical Asia; species about 25.

1. **Lasiosiphon eriocephalus,** *Decaisne, in Jacq. Voy. Bot.* (1844) p. 148. A much-branched shrub, sometimes a small tree, with mottled bark. Leaves subsessile, 2—3 by ¾—1 in., oblong-lanceolate, acute, apiculate, glaucous and glabrous above, glabrous or silky beneath, base acute; petioles very short. Flowers yellow, nearly sessile, in erect dense terminal heads 1—1½ in. in diam., surrounded at the base by an involucre of large-imbricate elliptic-oblong, acute, silky-villous deciduous bracts. Perianth densely silky-villous; tube ⅜ in. long; lobes ⅛—½ in. long, oblong, obtuse, flat, with a linear usually 2-fid scale at each division. Anthers almost sessile. Fruit ⅜—½ in. long, ellipsoid-oblong, pointed, enclosed in the perianth. Fl. B. I. v. 5, p. 197; Bedd. For. Man. in Flor. Sylvat. p. clxxix & Anal. Gen. t. 25, fig. 2; Trim. Fl. Ceyl. v. 3, p. 459; Talb. Trees, Bomb. ed. 2, p. 286; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 367; Watt, Dict. Econ. Prod. v. 4, p. 589. *Lasiosiphon speciosus,* Decne. l. c. p. 147, t. 150; Dalz. & Gibs. p. 221. *Gnidia eriocephala,* Meissn. in Regensb. Denkschr. v. 3 (1841) p. 292; Grah. Cat. p. 176; Wight, Icon. t. 1859.—Flowers: Dec.—May. VERN. *Rametha.*

Dalzell without locality in Herb. Kew.! KONKAN: *Law!, Talbot*; Matheran, *Cooke!, H. M. Birdwood.* DECCAN: Khandala, *Dalzell & Gibson*; Karli, *Dalzell & Gibson*; Mahableshwar, common, *Cooke!, H. M. Birdwood.* S. M. COUNTRY: Belgaum hills, *Ritchie,* 657! KANARA: common on the Supa Ghâts of N. Kanara, *Talbot.*—DISTRIB. India (W. Peninsula); Ceylon.

The bark is used by the hill-tribes for tying up bundles, and has been recommended for use as a paper-making material. It is a powerful vesicant and frequently employed to poison fish in the small hill-streams. See Watt, Dict. Econ. Prod. l. c.

ORDER CXI. ELÆAGNACEÆ.

Trees or shrubs with copious silvery or brown scales. Leaves alternate or opposite, quite entire; stipules 0. Flowers small, regular, hermaphrodite or dioecious, axillary (rarely from the leafless nodes), fasciculate, spicate or racemose; bracts small, deciduous. Perianth in the hermaphrodite or female flowers tubular, constricted above the ovary, persistent below, deciduous above; limb 2—4-lobed (rarely truncate). Stamens in hermaphrodite flowers adnate to the throat of the perianth, in male flowers adnate to the base of the perianth, 4 alternate with, or 8 both opposite to and alternate with the perianth-lobes; filaments free, usually short; anthers oblong, 2-celled, the cells parallel, contiguous, dehiscing longitudinally; staminodes in female flowers 0. Ovary free, 1-celled; ovule solitary, erect, basal, anatropous; style terminal, linear or dilated above, oblique; stigma

lateral. Fruit a nut closely covered by the thickened berry-like perianth-base; pericarp membranous. Seed erect; testa hard; albumen scanty or 0; cotyledons thick, fleshy; radicle inferior, very short.—DISTRIB. North temperate and tropical regions; genera 3; species 16.

1. ELÆAGNUS, Linn.

Trees or shrubs often silvery with a scaly or stellate tomentum. Flowers hermaphrodite, axillary, shortly petiolate, solitary or 2—3-nate, or sometimes fasciculate on short leafless or leafy branchlets; bracts 0. Perianth with oblong or globose persistent base narrowed above the ovary, then campanulate or infundibuliform, valvately 4-fid at the apex, deciduous, usually with a prominent ring above the constriction within. Stamens 4, on the mouth of the perianth; filaments short. Ovary 1-celled; style linear, included, slightly dilated above; stigma lateral. Fruit enclosed in the persistent accrescent berried or rarely dry perianth-base; pericarp thinly membranous. Seed with hard shining testa; albumen 0 or very scanty.—DISTRIB. S. Europe, Temperate and Tropical Asia, Australia, N. America; species about 12.

1. **Elæagnus latifolia,** *Linn. Sp. Pl.* (1753) p. 121. A large, much-branched, usually scandent shrub, often running over high trees; trunk sometimes 4 in. or more in diam.; young shoots scurfy with rust-colored shining scales; stems and branches more or less spinous; bark smooth with corky excrescences. Leaves numerous, variable, thin or coriaceous, 1½—4 by ⅞—2 in., from broadly elliptic to elliptic-lanceolate, obtuse, acute or acuminate, the upper surface pale-green clothed with small whitish scurfy scales, the lower surface glistening silvery-white, margins more or less revolute, base acute or rounded; petioles ¼—⅜ in. long, scaly. Flowers usually many in a cluster, straw-colored; pedicels clothed with silvery scales. Perianth ⅛ in. long, covered with silvery scales; lobes ovate, acute, ⅛ in. long, spreading. Style hairy. Fruit nearly 1 in. long, ellipsoid, with 8 strong blunt ribs, crowned by the top of the perianth, pinkish, with small whitish scabrous spots; mesocarp succulent, edible; putamen white, clothed inside with white wool. Seed ¾ in. long. Fl. B. I. v. 5, p. 202; Wight, Icon. t. 1856; Bedd. For. Man. in Flor. Sylvat. p. clxxx; Trim. Fl. Ceyl. v. 3, p. 461; Talb. Trees, Bomb. ed. 2, p. 287; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368; Prain, Beng. Pl. p. 908; Watt, Dict. Econ. Prod. v. 3, p. 205. *Elæagnus Kologa,* Schlecht. in DC. Prodr. v. 14, p. 611; Dalz. & Gibs. p. 224. *E. conferta,* Roxb. Fl. Ind. v. 1, p. 440; Grah. Cat. p. 178.—Flowers: Nov.—Jan. VERN. *A'mbgul.*

Dalzell without locality in Herb. Kew.! KONKAN: *Law*!; all along the Ghâts, *Graham*; Matheran, *Cooke*!, *H. M. Birdwood.* DECCAN: Mahableshwar, *Graham, Cooke*!, *H. M. Birdwood, Woodrow*; Khandala, *Graham.* S. M. COUNTRY: Párva Ghât, *Ritchie,* 1330! KANARA: throughout N. Kanara, usually in or near evergreen forests, *Talbot.*—DISTRIB. Widely distributed throughout the hilly parts of India; Ceylon; Malay Islands, China.

The fruit is edible and sold in the bazaars on the hills. It has a subacid flavor somewhat resembling that of a red currant.

ORDER CXII. LORANTHACEÆ.

Evergreen shrubs usually parasitic on the branches of trees; stems much-branched, often jointed. Leaves usually opposite, coriaceous, entire, sometimes absent; stipules 0. Flowers hermaphrodite or 1-sexual, racemose, spicate, capitate or fasciculate; bracts usually scale-like; bracteoles usually 2. Perianth simple or double; sepals or simple perianth when sepaloid adnate to the ovary; limb annular or cupular, entire or shortly toothed; petals or simple perianth-segments when petaloid 3—8 (rarely 2), valvate, free or more or less connate in a tube or in a sheath split on the upper side. Stamens as many as and opposite to the corolla-lobes, usually adnate to them; filaments filiform; anthers usually 2-celled. Ovary inferior, at first apparently solid, at length 1-celled; ovule solitary, erect, adnate throughout to the walls of the ovary; style short or long; stigma simple. Fruit a 1-seeded berry or drupe. Seed adnate throughout to the pericarp; albumen fleshy or 0; embryo straight; radicle superior. —DISTRIB. Chiefly tropical; genera 13; species about 500.

Flowers hermaphrodite	1. LORANTHUS.
Flowers 1-sexual	2. VISCUM.

The Order is usually placed under *Monochlamydeæ*, though some botanists include it among the *Corollifloræ*. The albumen of the seed is remarkable, being frequently toothed at the apex. In the plates to the paper on the Development of the Ovula of *Loranthus* and *Viscum*, read by Mr. W. Griffith before the Linnean Society on June 21st, 1836 [published in Transactions, v. 18 (1841) p. 71], several figures are given which exhibit this curious character. Mr. Talbot has examined specimens of the fresh fruit of many of the Bombay *Loranthi*, and has described their albumen in his list of Trees, Shrubs, and Woody Climbers, ed. 2 (1902). I have quoted Mr. Talbot's descriptions *in extenso*.

1. LORANTHUS, Linn.

Branched shrubs, parasitic on the branches of trees. Leaves opposite (rarely alternate), entire, usually thick and fleshy or coriaceous. Flowers hermaphrodite, usually colored, spicate, racemose or cymose, axillary or on old nodes (rarely terminal); bracts concave or oblique, cupular; bracteoles 2, free or connate with the bract

Perianth double. Calyx-tube adnate to the ovary; limb short, truncate or 4—6-toothed, or obsolete. Petals 4—6, valvate, free or more or less connate in a tube with spreading tips, often split down one side. Stamens 4—6, adnate to the petals; filaments filiform or thickened; anthers ovate-oblong or linear, adnate or versatile, the cells parallel. Disk 0. Ovary inferior, 1-celled; ovule solitary; style columnar, filiform (rarely twisted); stigma entire, terminal, obtuse or capitate. Fruit a berry or drupe, globose, ovoid or oblong. Seed adnate to the pericarp; testa 0; albumen copious, fleshy or 0; embryo usually fleshy.—DISTRIB. Mostly tropical; species about 350.

Flowers without a pair of bracteoles within the bract. Bract solitary, not forming an involucre nor cup. Corolla 4-cleft. Flowers in glabrous spikes; anthers oblong, continuous with the filaments, distinctly 2-celled; berry ovoid. Flowers ½—¾ in. long	1. *L. Wallichianus*.

Flowers ½—¾ in. long	2. *L. obtusatus.*
Flowers in axillary clusters or racemose, mealy-tomentose; calyx scarcely any, truncate; anthers narrow, indistinct; fruit pyriform.	
Flowers pedicellate in subracemose fascicles, 1 in. long	3. *L. Scurrula.*
Flowers subsessile, 1—3 together, ⅛ in. long.	4. *L. Stocksii.*
Corolla 5-cleft.	
Flowers villous or pubescent; fruit ovoid; calyx slightly toothed	5. *L. gibbosus.*
Flowers glabrous.	
Corolla-lobes longer than the tube, spirally coiled	6. *L. elasticus.*
Corolla-lobes shorter than the tube, not spirally coiled.	
Leaves less than 2 in. long, cuneate at base; flowers in axillary fascicles	7. *L. cuneatus.*
Leaves more than 2 in. long, rounded at base; flowers in unilateral racemes	8. *L. longiflorus.*
Bracts connate, forming a small cup below the ovary; young branches 3-gonous	9. *L. trigonus.*
Bracts forming a large campanulate toothed involucre	10. *L. lageniferus.*
Flowers with a pair of bracteoles within the bract.	
Corolla less than 1 in. long, cleft to below the middle, straight	11. *L. capitellatus.*
Corolla 1 in. and more long, cleft ¼ the way down, slightly curved	12. *L. loniceroides.*

1. **Loranthus Wallichianus,** *Schultes f. Syst. Veg.* v. 7 (1829) p. 100. Branches terete ; bark pale. Leaves opposite and alternate, 2½—4 by 1½—2¼ in., coriaceous, elliptic, obtuse, penninerved, glabrous, base acute ; petioles ⅛—⅜ in. long. Flowers in axillary fasciculate slender glabrous racemes 1—3 in. long ; pedicels 1/10—⅛ in. long ; bract represented by a lateral spoon-shaped ciliate expansion of the pedicel. Flower (including calyx and corolla) ⅛—¼ in. long. Calyx globose, about 1/20 in. long ; limb annular, almost obsolete. Corolla red ; tube somewhat angular ; limb 4-fid, the lobes ovate, acute. Fruit ¼ in. long, ovoid, rugose. Fl. B. I. v. 5, p. 204 ; Dalz. & Gibs. p. 109 ; Wight, Icon. t. 143 ; Talb. Trees, Bomb. ed. 2, p. 289 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368.—Flowers : Apr.—July.

KONKAN : *Law* ! S. M. COUNTRY : Párva Ghát, *Dalzell & Gibson* ; Belgaum, *Ritchie,* 1074 ! KANARA : Karwar, *Woodrow* ; parasitic on *Memecylon edule* and other trees, common in the forests near Karwar, *Talbot.*—DISTRIB. India (W. Peninsula), apparently endemic.

2. **Loranthus obtusatus,** *Wall. Cat.* (1828) 526. Branches stout, lenticellate ; bark pale. Leaves subopposite, coriaceous, 2½—4½ by 1½—3 in., broadly ovate or elliptic, obtuse, entire, waved, glabrous, shining, the midrib in young leaves usually red ; petioles ½ in. long. Flowers (including calyx and corolla) ½—¾ in. long, in axillary many-flowered racemes which are solitary or 2—3 together and shorter than the leaves ; pedicels ⅛—⅛ in. long, slender, red ; bract oblique, ovate, concave, 1/16 in. long. Calyx ⅛ in. long, somewhat tubercular outside ; tube subcylindric, slightly constricted at the mouth ; limb very short but distinct. Corolla red outside, dark-purple inside ; tube with 4 prominent angles, readily splitting along

the angles ; limb 4-cleft, one of the divisions deeper than the others, the lobes obovate-oblong, rounded at the apex, thick and fleshy. Stamens 4 ; anthers black ; pollen whitish. Style 4-sided ; stigma large, capitate. Berry ⅛ in. long, ovoid, truncate at the apex, somewhat tuberculate. Fl. B. I. v. 5, p. 205 ; Grah. Cat. p. 86 ; Dalz. & Gibs. p. 109 ; Talb. Trees, Bomb. ed. 2, p. 289 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368.—Flowers: Feb.—May.

KONKAN : Ghâts, *Talbot*. DECCAN : Mahableshwar, *Cooke* !, *Woodrow* ! ; Rotunda Ghât, Mahableshwar, *Graham*. KANARA : N. Kanara Ghâts on Xylia dolabriformis, Myristica attenuata, and other trees, *Talbot* ; Supa Ghâts in deciduous forests, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

3. **Loranthus Scurrula,** *Linn. Sp. Pl.* ed. 2 (1762) p. 472. Much-branched ; branches terete, copiously lenticellate ; young parts rusty-tomentose. Leaves opposite, coriaceous, 1½—3 by 1—2 in., broadly elliptic, obtuse, glabrous or nearly so above, more or less rusty-tomentose beneath, penninerved, base rounded or subacute, sometimes subcordate ; petioles ¼—½ in. long. Flowers (including calyx and corolla) variable in length, ½—1 in. long, in shortly pedunculate rusty- or grey-tomentose, axillary short subracemose fascicles (often 2 or more from an axil) ; buds terete, clavate at tip ; pedicels usually short, slender ; bract ⅒ in. long, ovate, concave, oblique, tomentose, subciliate. Calyx somewhat wedge-shaped, grey- or rusty-tomentose, ⅒—⅛ in. long ; limb truncate, entire, very short. Corolla slender, usually curved, terete, greenish-yellow, tomentose ; lobes 4, narrowly elliptic, acute. Filaments long, flattened, purple ; anthers ⅛ in. long, narrowly linear. Stigma capitate, fusiform. Berry ¼—⅜ in. long, pyriform, tomentose. Albumen pink, obtusely quadrangular at the radicle-end, the other end terminating in a hard elongated point, surrounded with a green sticky layer ; embryo green, fusiform ; radicle not distinguishable from the tigellus (*Talbot*). Fl. B. I. v. 5, p. 208 ; Trim. Fl. Ceyl. v. 3, p. 465 ; Talb. Trees, Bomb. ed. 2, p. 289 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368 ; Prain, Beng. Pl. p. 910. *Loranthus buddleoides,* Desrouss. in Lamk. Encycl. Méthod. v. 3 (1789) p. 600 ; Grah. Cat. p. 86 ; Dalz. & Gibs. p. 110.—Flowers: Oct.—Feb.

KONKAN : *Law* !, *Stocks* ! ; Savantvadi, *Kanitkar* ! DECCAN : Warra below ...bleshwar, *Cooke* ! ; Panchgani, *Woodrow* ! ; Nasik, *Bhiva* ! S. M. COUNTRY : ...um, *Ritchie*, 337 ! ; Ramghât, *Gibson* ! KANARA : common in Kanara, ...n growing on Leea sambucina, Dillenia pentagyna, and Pterocarpus ...arsupium, *Talbot* ; Nilkund Ghât, *Talbot*, 260 !—DISTRIB. Common throughout India ; Ceylon.

4. **Loranthus Stocksii,** *Hook. f. Fl. B. I.* v. 5 (1886) p. 213. Stems and branches terete, more or less lenticellate. Leaves sessile or nearly so, opposite, ¾—2 by ½—1½ in., elliptic-oblong, obtuse, clothed when young with buff mealy tomentum, base rounded or subcordate ; nerves few, obscure. Flowers axillary, solitary or 2—3 together, in rusty-tomentose fascicles which are sessile or on very short peduncles ; bracts ¼ in. long, oblong, obtuse, tomentose or pubescent with orange-red hairs. Calyx ⅛ in. long, subglobose, densely pubescent with short orange-red hairs ; limb not produced above the ovary, densely pubescent at the top. Corolla reaching ⅝ in.

long, rusty-tomentose, split on one side ; tube cylindric, slightly curved ; lobes 4, spathulate-oblong, subobtuse, thick, concave, $\frac{1}{8}$—$\frac{1}{3}$ in. long. Anthers $\frac{1}{16}$ in. long, narrowly linear. Style 4-sided, exserted ; stigma capitate. Fruit $\frac{1}{2}$ in. long, pyriform, tomentose. Talb. Trees, Bomb. ed. 2, p. 290 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368.—Flowers : Nov.

Rare. KONKAN : *Stocks* ! ; Savantvadi jungles, *Kanitkar* ! ; Mazgaon Hill near Savantvadi, *Kanitkar* !—DISTRIB. India (W. Peninsula), apparently endemic.

5. **Loranthus gibbosus,** *Talbot, Trees, Bomb.* ed. 2 (1902) p. 289. A large shrub with scaly tomentose long pendent branches. Leaves alternate, 1—2½ by ½—1¾ in., ovate or obovate, obtuse, grey- or rusty-tomentose beneath, glabrescent above ; nerves 4—5 pairs ; petioles $\frac{1}{8}$ in. long, stout. Flowers in axillary 1—5-flowered fascicles ; bract tomentose. Calyx-teeth very short. Corolla $\frac{3}{4}$ in. long, curved, inflated and gibbous near the base ; tube split on one side ; lobes 5, reflexed, oblong ; pedicels $\frac{1}{10}$ in. long. Fruit pink, ovoid, $\frac{1}{3}$ in. long. Albumen green, with the teeth connate into a conical point, but marked with white lines and slightly swollen round the radicle, presenting the appearance of a grape-seed ; embryo with a globose or ovoid smooth radicle, dark-green in color (*Talbot*). *Loranthus tomentosus,* Talb. Trees, Bomb. ed. 1 (1894) p. 171 (*not* of Heyne) ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368.—Flowers : Oct.—Feb. VERN. *Dade.*

KONKAN and N. KANARA Ghâts growing on Phyllanthus emblica and more rarely on Mussænda frondosa, *Talbot.* KANARA : near Gairsoppa Falls, growing on Phyllanthus emblica, *Woodrow.*—DISTRIB. India (W. Peninsula).

The description is that of Mr. Talbot. I have seen no specimens of the plant, which is near *L. tomentosa,* Heyne, a Nilghiri and Ceylon plant.

6. **Loranthus elasticus,** *Desrouss. in Lamk. Encyc. Méthod.* v. 3 (1789) p. 599. Much-branched, glabrous ; branches dichotomous, pendulous, terete, swollen at the joints, the young ones green. Leaves opposite, sessile or nearly so, very thickly coriaceous, 1½—4 by ¾—1¾ in., ovate, elliptic, suborbicular or oblong-lanceolate, obtuse, dark-green and smooth above, glaucous beneath, base usually acute, the very young leaves often red ; nerves 3—5, obscure. Flowers sessile, fascicled at the nodes ; bracts red, broadly ovate, about $\frac{1}{20}$ in. long. Calyx red, $\frac{1}{8}$ in. long ; tube globose ; limb cylindric, entire, about $\frac{1}{20}$ in. long. Corolla 1 in. long, the lower part in bud obtusely 5-angled, the upper part cylindric ; tube split, greenish-white with bright green veins ; lobes 5, spirally coiled, narrowly linear, longer than the tube. Stamens 5 ; filaments red ; anthers $\frac{1}{8}$ in. long, narrow. Style very long, red ; stigma fusiform. Berry subglobose or ovoid, sessile, pink, ½ in. long ; albumen white, 5-toothed at the apex ; embryo club-shaped, the radicle-end covered with minute knobs (*Talbot*). Fl. B. I. v. 5, p. 216 ; Grah. Cat. p. 86 ; Dalz. & Gibs. p. 109 ; Wight, Icon. t. 343 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368.—Flowers : Oct.—Dec.

Dalzell without locality in Herb. Kew. ! KONKAN : *Graham, Talbot* ; Vingorla, *Ritchie,* 338 !, *Dalzell & Gibson* ; Banda road, *Kanitkar* ! DECCAN : Mahableshwar, *Cooke* ! KANARA : very common on mango-trees in N. Kanara,

Talbot; Kála naddi, *Ritchie*, 338!—DISTRIB. India (W. Peninsula), apparently endemic.

7. **Loranthus cuneatus,** *Heyne, in Roth, Nov. Pl. Sp.* (1821) p. 193. Branches long, slender, numerous; bark grey, lenticellate. Leaves subfleshy, alternate (sometimes in fascicles of 2 or 3), 1—1½ by ⅜—⅞ in., obovate, entire, rounded at the apex, glabrous, base cuneate, decurrent into a short petiole; midnerve branching before it reaches the apex of the leaf. Flowers 2—5, in axillary sessile or pedunculate fascicles; pedicels short, slender; bract ⅛ in. long, ovate, subacute, concave, oblique. Calyx ⅛—¼ in. long, more or less tomentose; tube subcylindric; limb with 5 triangular somewhat irregular lobes about $\frac{1}{20}$ in. long. Corolla reaching about 1¼ in. long, greenish-yellow outside, orange inside; tube straight or slightly curved, 5-ribbed, split down the back, slightly gibbously inflated above the middle; limb with 5 linear-lanceolate spreading or recurved lobes nearly ¼ in. long. Stamens 5, exserted beyond the corolla-tube; filaments dark-red, swollen at their insertion on the corolla; anthers very narrow. Style exceeding the stamens, green; stigma red. Berry red, ¼—⅜ in. long, obconic, truncate, crowned by the calyx-teeth. Albumen green, teeth at top minute, pointed; embryo club-shaped, furrowed; radicle thick, rounded (*Talbot*). Fl. B. I. v. 5, p. 214; Dalz. & Gibs. p. 110; Trim. Fl. Ceyl. v. 3, p. 466; Talb. Trees, Bomb. ed. 2, p. 290; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368.—Flowers: Apr.—May.

KONKAN: *Law*!, *Dalzell*!; Matheran, *Cooke*! DECCAN: Mahableshwar, very common on the Corkscrew or Rotunda Ghát (the old road to Bombay), *Cooke*! S. M. COUNTRY: Párva Ghát, *Dalzell & Gibson*; Belgaum Hills, *Ritchie*, 1084! KANARA: common near Yellapur on Terminalia paniculata, *Talbot*, 261!; also on Odina Wodier and Vitex altissima, *Talbot*.—DISTRIB. India (W. Peninsula); Ceylon.

8. **Loranthus longiflorus,** *Desrouss. in Lam. Encyc. Méthod.* v. 3 (1789) p. 598. A large bushy usually glabrous branch-parasite; bark grey, smooth; young parts glabrous or nearly so. Leaves thick, coriaceous, usually opposite, 3—7 by ¾—4 in., very variable in shape and venation, ovate, elliptic, or linear-oblong, obtuse; midrib ···inent, usually red, the secondary nerves obscure; petioles ⅛—½ ···ng, stout. Flowers in short spreading stout axillary unilateral ···emes often 2 from an axil; pedicels short; bract $\frac{1}{16}$ in. long, broadly ovate, subacute, concave. Calyx ⅛ in. long, more or less hoary-tomentose; tube cylindric; limb cupular, truncate, or shortly 5-toothed. Corolla 1—2 in. long, split at the back; tube curved, slightly widened upwards, scarlet or orange or less commonly pink or white; lobes 5, linear, ⅜ in. long, reflexed, green or yellowish. Anthers linear, equal in length to the free portion of the filament. Style slender, quadrangular; stigma rather small, subglobose. Berry ⅓—½ in. long, ovoid-oblong, pink, smooth, crowned by the cup-shaped calyx. Albumen white, copious, with 5 linear teeth at the top surrounding the green embryo which resembles a small nail ¼ in. long with a flattened head (the radicle) (*Talbot*). Fl. B. I. v. 5, p. 214; Grah. Cat. p. 86; Dalz. & Gibs. p. 110; Wight, Icon. t. 302; Trim. Fl. Ceyl. v. 3, p. 468; Talb. Trees, Bomb. ed. 2,

p. 290 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368 ; Prain, Beng. Pl. p. 910 ; Watt, Dict. Econ. Prod. v. 5, p. 92.—Flowers: Feb.—Mar. VERN. *Bándgul* ; *Betungli.*

KONKAN : *Law* !, *Stocks* ! ; the commonest species in the Konkan, *Dalzell & Gibson* ; common on mango-trees in Bombay and throughout the Konkan, *Graham.* DECCAN : *Woodrow* ; Poona, *Cooke* ! GUJARAT : *Dalzell & Gibson.* KANARA : parasitic on many kinds of trees in N. Kanara, *Talbot.*—DISTRIB. More or less throughout India ; Ceylon.

This should strictly be called *L. falcata,* Linn. f. Suppl. (1781), p. 211, a name which is prior to *longiflorus.*

VAR. 1. *amplexifolia,* Thwaites, Enum. (1859) p. 134. Leaves large, sessile, 4—8 in. long, broadly elliptic-oblong or suborbicular, almost amplexicaul, base cordate ; veins often purple beneath (*Trimen*). Inflorescence often terminal. Fl. B. I. v. 5, p. 215 ; Trim. Fl. Ceyl. v. 3, p. 468 ; Watt, Dict. Econ. Prod. l. c. *Loranthus amplexifolia* (sp.), DC. Prodr. v. 4 (1830) p. 305 ; Grah. Cat. p. 86.—Flowers : Sept.—Oct.

DECCAN : Khandala, *Graham.* S. M. COUNTRY : Rámghát, *Ritchie,* 995 ! KANARA : N. Kanara, often on Flacourtia montana, *Talbot.*

VAR. 2. *pubescens,* Hook. f. Fl. B. I. v. 5, p. 215. Leaves oblong or elliptic-oblong. Corolla in bud, peduncles, pedicels, and calyx minutely pubescent. Watt, Dict. Econ. Prod. l. c.

KONKAN : *Law* !, *Dalzell* ! S. M. COUNTRY : Belgaum, on Flacourtia, Chloroxylon, and Garcinia trees, *Ritchie,* 1083 !

VAR. 3. *falcata,* Kurz, For. Fl. v. 2 (1877) p. 321. Leaves narrowly linear, often falcate, 4—6 by ¼—½ in. Flowers ¾—1 in. long. Fl. B. I. v. 5, p. 215 ; Watt, Dict. Econ. Prod. l. c. *Loranthus falcatus,* Linn. f. Suppl. p. 211.

DECCAN : near Poona, *Cooke* ! KANARA : N. Kanara on Careya arborea, *Talbot.*

VAR. 4. *coccinea,* Talbot, Trees, Bomb. ed. 1 (1894) p. 172. Branches stout, lenticellate. Leaves broadly ovate, shortly petiolate. Calyx very rugose outside ; limb often 5-notched. Corolla-tube 2¼ in. long, bright scarlet ; lobes short, light-scarlet or greenish. Filaments scarlet. Fruit ovoid, crowned by the calyx-limb, hard, rugose. The teeth of the albumen are longer and more slender than in *L. longiflorus* proper ; embryo white, slender, gradually thickened at the radicle end which is apiculate (*Talbot*).—Flowers : Jan.—Feb.

A stout parasite growing frequently on *Terminalia bellerica* in N. Kanara. The description is taken from that of Mr. Talbot (Trees, Bomb. ed. 2, p. 290). I have not seen any specimens of the variety.

9. **Loranthus trigonus,** *Wight & Arn. Prodr.* (1834) p. 386. A robust glabrous tree-parasite ; branchlets often acutely 3-angled. Leaves thickly coriaceous, opposite or whorled in threes, 3—6 by 1¾—3¾ in., broadly elliptic, obtuse, glabrous, base rounded or acute ; petioles ½—¾ in. long, stout. Flowers in short axillary or lateral racemes or cymes 1—1½ in. long ; bract small, forming a shallow oblique cup ; pedicels ⅒ in. long. Calyx ⅒—⅛ in. long ; limb cupular, truncate. Corolla ¾ in. long ; tube dilated below the middle, straight ; lobes 5, linear, ¼—⅓ in. long. Berry ellipsoid, ⅜ in. long,

crowned by the cup-shaped calyx-limb. Embryo with a light-green warted superior radicle and covered by the white 4—5-toothed albumen ; cotyledons conferruminate (*Talbot*). Fl. B. I. v. 5, p. 219 ; Talb. Trees, Bomb. ed. 2, p. 291 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368.—Flowers : Nov.—Feb.

KONKAN : on the Ghâts of the South Konkan, *Talbot* ; Banda, *Woodrow*. S. M. COUNTRY : Belgaum, highest point of N. E. hills, *Ritchie*, 335 ! KANARA : Kumbarvada, *Talbot*, 1209 ! common on the Supa and Siddapur Ghâts growing on Eugenia jambolana, Ficus glomerata, Dalbergia latifolia, Zizyphus xylopyra, and Ficus mysorensis, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

10. **Loranthus lageniferus,** *Wight, Icon.* (1840) t. 306. Branches stout, terete, pale, with large lenticels. Leaves thinly coriaceous, opposite or alternate, 1¾—5 by 1½—4 in., elliptic or suborbicular, obtuse, glabrous, base rounded or subcordate ; petioles ⅛—¼ in. long. Flowers in fascicles on the naked branches ; peduncles ⅛—¼ in. long, each surmounted by a campanulate 5-lobed reddish involucre ¾—1¼ in. long, containing about 5 sessile or subsessile flowers ; lobes of the involucre short, unequal, deltoid-ovate. Calyx ⅛ in. long, more or less tomentose ; limb short with triangular lobes. Corolla 1¼—1¾ in. long, green or green and red, straight, slightly dilated above the middle ; limb with an annular enlargement outside just above the base of the lobes ; lobes ⅛ in. long, linear-oblong, narrow, subacute, concave. Filaments as long as the anthers ; anthers linear-oblong, ⅛ in. long. Stigma capitate, somewhat pear-shaped, pink. Fruit not seen. Differs from all the other Bombay species of *Loranthus* by its campanulate involucre. Fl. B. I. v. 5, p. 218 ; Grah. Cat. p. 86 ; Dalz. & Gibs. p. 110 ; Talb. Trees, Bomb. ed. 2, p. 291 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368.—Flowers : Apr.—June. VERN. *Bándguli*.

KONKAN : *Law* !, Matheran, *Cooke* ! ; Bassein Hills (Thana district) on Holarrhena antidysenterica, *Ryan* ! DECCAN : Lanoli, *Kanitkar* !, *Woodrow*. S. M. COUNTRY : Castlerock, *Woodrow*. KANARA : deciduous forests of N. Kanara near Dandeli, growing on Adina cordifolia, *Talbot*.—DISTRIB. India Peninsula), apparently endemic.

11. **Loranthus capitellatus,** *Wight & Arn. Prodr.* (1834) p. 382. Branches light-colored, the young branches oval in cross section. Leaves generally opposite, subcoriaceous, 2½—4 by 1—1⅝ in., elliptic-lanceolate, acuminate, glabrous, shining, base acute, decurrent into a short petiole which is sharply keeled at the back. Flowers 3—4 together, sessile or nearly so on very short peduncles in the opposite leaf-axils ; bract ⅛ in. long, broadly ovate or suborbicular, apiculate, glabrous ; bracteoles 2, similar to the bract. Calyx ⅛ in. long ; limb cylindric, nearly truncate. Corolla usually straight, reaching ⅞ in. long, divided to rather below the middle into 6 equal linear or linear-spathulate lobes tipped with purple ; tube slightly dilated below the lobes. In bud the lower half of the corolla is white, half the remainder green, and the top of the bud purple ; after expansion the green portion becomes red. Stamens 6 ; anthers multi-locellate. Style slightly exceeding the stamens ; stigma subglobose. Berry ellipsoid, ⅜ in. long, capped with the cylindric calyx-limb which gives

the fruit a bottle-shaped appearance, black, shining. Fl. B. I. v. 5, p. 221 ; Dalz. & Gibs. p. 109 ; Wight, Icon. t. 304 ; Trim. Fl. Ceyl. v. 3, p. 470 ; Talb. Trees, Bomb. ed. 2, p. 291 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368. *Loranthus loniceroides,* Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368 (*not* of Linn.). *L. ampullaceus,* Wall. Cat. 506, B (*not* of Roxb.) ; Grah. Cat. p. 86.—Flowers : Feb.—May.

Dalzell without locality in Herb. Kew.! KONKAN : *Stocks* ! ; Matheran, *Cooke.* DECCAN : Mahableshwar, common, *Cooke* ! S. M. COUNTRY : Belgaum, *Ritchie,* 336 ! ; Chorla Ghât on Lasiosiphon eriocephalus, *Dalzell & Gibson.* KANARA : Supa Ghâts of N. Kanara growing on Artocarpus integrifolia, *Talbot* ; Mandele (N. Kanara). *Ritchie,* 1770 !—DISTRIB. India (W. Peninsula) ; Ceylon.

It is this species, and not *Loranthus loniceroides,* Linn., which is common at Mahableshwar and Matheran.

12. **Loranthus loniceroides,** *Linn. Sp. Pl.* ed. 2 (1762) p. 473. Bushy, much-branched, glabrous ; stems stout, thickened at the nodes ; bark brownish-grey, smooth. Leaves thinly coriaceous, opposite, 2—5 by 1½—2 in., ovate-oblong or oblong-lanceolate, acuminate, shining, base rounded and then suddenly narrowed ; petioles ¼—⅓ in. long. Flowers few, in short axillary spikes ; peduncles about as long as the petioles, stout, in opposite leaf-axils ; bract ⅛ in. long, broadly ovate, acute ; bracteoles suborbicular, ⅛—⅙ in. long. Calyx ¼—⅓ in. long ; limb cylindric, truncate or very nearly so. Corolla 1—2 in. long, divided ⅓ the way down into 5—6 linear-oblong recurved lobes which are green tipped with dark pink (*Trimen*) ; tube pink, narrowly infundibuliform, slightly curved. Stamens 6 ; anthers slender, multi-locellate. Stigma subglobose. Berry green, ellipsoid, ½ in. long, surmounted by the cylindric calx-limb. Albumen green, firm, grooved and striped longitudinally with 4—5 more or less distinct grey or reddish lines, the teeth cohering in a flattened tip ; embryo with 2 separate cotyledons jointed to the radicle which has a swollen and flattened end (*Talbot*). Fl. B. I. v. 5, p. 221 ; Grah. Cat. p. 86 ; Dalz. & Gibs. p. 110 ; Trim. Fl. Ceyl. v. 3, p. 469 ; Talbot, Trees, Bomb. ed. 2, p. 291.

I have seen no specimens of *L. loniceroides* from the Bombay Presidency. There are none from Bombay in Herb. Kew., the specimens labelled as such by *Law, Ritchie,* and *Dalzell* having proved to be *L. capitellatus,* Wight & Arn.

EXCLUDED SPECIES.

LORANTHUS PULVERULENTUS, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. v. 2 (1824) p. 221 ; Fl. B. I. v. 5, p. 211 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368. The single specimen from Stocks in the Kew Herbarium has been transferred to *L. Scurrula,* Linn. Neither Talbot nor Woodrow has found the plant.

LORANTHUS INVOLUCRATUS, Roxb. Fl. Ind. v. 1 (1832) p. 552. This has been included in Dalzell's 'Bombay Flora' (p. 109) on the authority of Dr. Gibson as occurring at Bhimasankur, but it has not been found by any other collectors and it seems not improbable that Gibson may have mistaken *L. lageniferus* for it. The plant does not apparently occur in the W. Peninsula. Dalzell does not seem to have seen it, as his description in the 'Bombay Flora' is taken from Roxburgh (*l. c.*).

2. VISCUM, Linn.

Shrubs semiparasitic on trees. Leaves opposite, flat, and thick, or reduced to small scales or teeth. Flowers unisexual, fasciculate (rarely solitary), in the axils or on nodes (rarely terminal); bracts usually small; bracteoles 2, free or connate (rarely obsolete). Perianth-lobes in male flowers short and solid, in female flowers adnate to the ovary; limb 3—4-lobed, the lobes usually deciduous. Stamens 3—4; anthers broad, sessile, adnate to the perianth-lobes, dehiscing introrsely by numerous pores, the cells confluent. Ovary in female flowers inferior, 1-celled; ovate solitary; stigma sessile or subsessile, large, pulvinate. Fruit a succulent berry with soft viscid mesocarp. Seed adnate to the pericarp; albumen copious, fleshy; embryo terete, enclosed in the albumen, solitary, or sometimes 2 embryos in each seed.—DISTRIB. Temperate and tropical; species about 30.

Branches leafy (sometimes leafless in *Viscum capitellatum*).	
Leaves exceeding 1 in. long.	
Leaves obliquely ovate or falcate, acute	1. *V. monoicum.*
Leaves equally elliptic or elliptic-lanceolate, obtuse.	2. *V. orientale.*
Leaves less than 1 in. long, obovate-spathulate or suborbicular, sometimes 0	3. *V. capitellatum.*
Branches leafless.	
Young branches 4-angled, not swollen nor contracted at the nodes	4. *V. angulatum.*
Stems and branches flattened, contracted at the nodes.	5. *V. articulatum.*

1. **Viscum monoicum,** *Roxb. Fl. Ind.* v. 3 (1832) p. 763. A large shrub; branches terete, slender, slightly thickened at the nodes. Leaves scarcely coriaceous, 1½—5 by ⅓—1¾ in., obliquely ovate or lanceolate, often falcately curved, acute, base tapering into a short often obscure petiole; basal nerves 3—5, prominent. Flowers monœcious, 3—12 together, in axillary sessile or shortly pedunculate fascicles; bracts truncate, apiculate. Corolla-segments 3 or 4, triangular-oblong. Berry oblong, narrowed at both ends, ¼—⅓ in. long. B. I. v. 5, p. 224; Griff. Icon. Pl. As. t. 631; Trim. Fl. Ceyl. 3, p. 471; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368; Prain, Beng. Pl. p. 912; Watt, Dict. Econ. Prod. v. 6, part 4, p. 246.—Flowers: Sept.

Rare. S. M. COUNTRY: Londa, *Woodrow*.—DISTRIB. India (Oude, Sikkim, Khasia Hills, W. Peninsula); Ceylon.

2. **Viscum orientale,** *Willd. Sp. Pl.* v. 4 (1805) p. 737. Stems much-branched; branches terete or angular and grooved, sometimes whorled, thickened at the nodes; twigs slender, glabrous. Leaves numerous, 1¼—2 by ½—1 in., elliptic or elliptic-lanceolate, obtuse, glabrous, base tapering into a short often obscure petiole; basal nerves 3—5. Flowers in axillary sessile or shortly pedunculate clusters of 3—5, monœcious. Calyx-limb quite absent. Corolla-lobes 3 or 4, triangular, acute, deciduous. Berry ovoid or subglobose, ¼ in. long. Albumen green, biconvex, firm; embryo minute, comma-shaped; radicle green, slightly thickened at the top. Fl. B. I. v. 5, p. 224; Blume, Fl. Jav. Loranth. tt. 24, 25; Trim. Ceyl. v. 3, p. 471;

Talb. Trees, Bomb. ed. 2, p. 292 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368 ; Prain, Beng. Pl. p. 912 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 247.—Flowers : Sept.—Jan.

N. Kanara and Konkan Ghâts. KANARA : Nilkund Ghât, *Woodrow* ; Nilkund Ghât (N. Kanara) in evergreen forests growing on Terminalia paniculata and also on Loranthus loniceroides, *Talbot*.—DISTRIB. India (Bengal, Behar, Chittagong, Birma, W. Peninsula) ; Ceylon, Malay Islands, China, New Guinea, Australia.

3. **Viscum capitellatum,** *Sm. in Rees, Cyclop.* v. 37 (1819) n. 18. A dwarf shrub forming tufts 6—12 in. in diam. ; branches stout, terete or angular ; branchlets numerous, opposite, short, horizontal. Leaves few (sometimes not developed), ¼—1 in. long and often as broad as long, very fleshy, sessile, obovate-spathulate or suborbicular, concave above, sometimes 2-lobed at the apex, base cuneate, obscurely 3-nerved. Flowers very small, sessile, in threes or pairs, terminating short stout divaricate compressed opposite or whorled peduncles. Calyx-limb a fleshy ring. Corolla-lobes 3, triangular, subacute, fleshy, deciduous. Berry about ¼ in. long, ovoid-oblong, slightly rough with small prominences, pale-greenish or nearly white. Albumen green, fleshy, covered with an outer sticky layer ; embryo minute with a globose radicle-end (*Talbot*). Fl. B. I. v. 5, p. 225 ; Trim. Fl. Ceyl. v. 3, p. 471 ; Talb. Trees, Bomb. ed. 2, p. 292 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368.—Flowers : Sept.—Dec.

KANARA : Yellapur, *Woodrow* ; Sindole (N. Kanara), *Ritchie*, 1769! ; on the N. Kanara Ghâts, often parasitic on other Loranthaceæ, also on Terminalia paniculata, *Talbot*.—DISTRIB. India (W. Peninsula) ; Ceylon.

4. **Viscum angulatum,** *Heyne, ex DC. Prodr.* v. 4 (1830) p. 283. Leafless ; main stem terete or nearly so ; young branches numerous, 4-angled, jointed, the nodes not swollen nor contracted. Flowers minute, sessile, solitary or whorled at the nodes. Perianth-lobes deciduous. Berry globose. Fl. B. I. v. 5, p. 225 ; Dalz. & Gibs. p. 110 ; Talb. Trees, Bomb. ed. 2, p. 292 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368. *Viscum ramosissimum,* Wight, Icon. t. 1017 (*not* of Wall.) ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368.—Flowers apparently during most of the year. VERN. *Jalundar.*

KONKAN : Amboli Ghât, *Cooke*! DECCAN : Mahableshwar, *Cooke*! *Woodrow, H. M. Birdwood.* S. M. COUNTRY : Chorla Ghât, growing on Linociera intermedia, *Dalzell & Gibson.* KANARA : common on the Ghâts on many different kinds of trees, *Talbot*.—DISTRIB. India (W. Peninsula) ; Java, Australia.

5. **Viscum articulatum,** *Burm. Fl. Ind.* (1768) p. 311. A leafless pendulous much dichotomously branched shrub ; branches jointed, the internodes 1—2 by $\frac{1}{10}$—$\frac{1}{3}$ in., linear, flattened, slightly narrowed at each end, readily disarticulating, pale-green (turning yellowish-brown when dry and then longitudinally furrowed). Flowers minute, 3—4-merous, very shortly pedicellate, 1—6 together in fascicles at the nodes, each with a large cup-shaped bract at the base. Perianth-lobes small, triangular, deciduous. Berry ⅛ in. in diam., globose, smooth, greenish-yellow. Fl. B. I. v. 5, p. 226 ; Trim. Fl. Ceyl. v. 3, p. 472 ; Talb. Trees, Bomb. ed. 2, p. 293 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368 ; Prain, Beng. Pl. p. 912 ; Watt, Dict.

Econ. Prod. v. 6, part 4, p. 246. *Viscum attenuatum,* DC. Prod. v. 4, p. 284 ; Grah. Cat. p. 85.—Flowers : June—Aug.

KONKAN : *Law* !, *Graham.* DECCAN : Lanoli, *Woodrow, Kanitkar* ! S. M. COUNTRY on *Diospyros Melanoxylon* in the Dharwar district, *Talbot.*—DISTRIB. India (Himalaya, Assam, Khasia Hills, Birma, Central Provinces, W. Peninsula) ; Ceylon, Malay Peninsula and Archipelago, Java, Australia.

VAR. *dichotoma,* Kurz, For. Fl. v. 2 (1877) p. 325. Much stouter ; internodes thicker and broader, often ½ in. broad. Fl. B. I. v. 5, p. 226. *Viscum dichotomum* (sp.), Don, Prodr. Fl. Nep. p. 142.

KANARA : Ushele (N. Kanara), *Ritchie,* 333 !

EXCLUDED SPECIES.

VISCUM RAMOSISSIMUM, Wall. Cat. (1828) 6876. Stems numerous, very much branched, elongate, pendulous, very slender, terete or nearly so, striate. Leaves usually absent (on one only of the 2 sheets in Herb. Kew. there is a single spathulate sessile leaf 1 by ¼ in.). Flowers subsessile, 1—3 at the nodes, very small, with 3—5 imbricate bracts at the base. Berry subglobose, ⅛—⅓ in. in diam., apiculate, smooth, pale-green.

I cannot find any specimens of this plant from the Bombay Presidency, most of those purporting to be *V. ramosissimum* being *V. angulatum,* Heyne. It is rare in Ceylon (*Trimen*), Talbot gives the Bababuden hills (which are outside our area) as a habitat, while Wight & Arnott (Prodr. p. 380) give no habitat. There are in all but 2 sheets in Herb. Kew., one from Ceylon and the other without any locality assigned to the plant thereon. Fl. B. I. v. 5, p. 225; Trim. Fl. Ceyl. v. 3, p. 472; Talb. Trees, Bomb. ed. 2, p. 292.

ORDER CXIII. SANTALACEÆ.

Trees, shrubs, or herbs often semiparasitic on roots. Leaves alternate or opposite, entire, sometimes scale-like or 0 ; nerves inconspicuous ; stipules 0. Flowers hermaphrodite or 1-sexual, regular, usually small, in simple or compound cymes ; bracts usually small, sometimes leafy ; bracteoles 2, free or connate, subopposite, some- 1 or both obsolete. Perianth superior or inferior, simple, green olored ; limb 3—8-toothed, -lobed or -partite ; lobes often with a tuft of hairs behind the anthers. Stamens as many as and opposite to the perianth-lobes, attached above (rarely on) the perianth-base ; filaments filiform or wide ; anthers 2-celled, dehiscence longitudinal, introrse or lateral. Disk epigynous or perigynous. Ovary 1-celled, inferior ; ovules 2—3, adnate to or pendulous from a central column ; style usually short ; stigma entire or 3—6-lobed. Fruit a nut or drupe. Seed globose or ovoid, smooth, rugose or sulcate ; testa thin or obsolete ; albumen copious, fleshy ; embryo small, terete ; radicle superior. —DISTRIB. Temperate and tropical regions ; genera 28 ; species 220.

Trees or shrubs not spinous; anther-cells distinct, parallel.	
Leaves opposite; stamens with interposed processes; a small tree; flowers 2-sexual	1. SANTALUM.
Leaves alternate; stamens without interposed processes; a shrub; flowers polygamous	2. OSYRIS.
Aspinous tree; anther-cells divergent or confluent; leaves alternate; filaments 2-fid	3. SCLEROPYRUM.

1. SANTALUM, Linn.

Trees or shrubs. Leaves glabrous, subcoriaceous, opposite (rarely alternate). Flowers hermaphrodite, axillary or in terminal 3-chotomous paniculate cymes ; bracts minute. Perianth-tube campanulate or ovoid, adnate to the base of the ovary ; limb 4 (rarely 5)-lobed, the lobes valvate and with a tuft of hairs on the face. Stamens 4 or 5, adnate to the base of the perianth-lobes ; filaments slender, short ; anthers ovate, the cells distinct, parallel. Disk of fleshy spathulate scales, projecting between the stamens. Ovary at first free, ultimately ½-inferior ; ovules 2—3, inserted below the summit of a long acuminate free central column ; style elongate ; stigma 2—3-lobed. Fruit a subglobose drupe, annulate on the top by the deciduous perianth ; endocarp rugose. Seed subglobose ; albumen copious ; embryo linear, terete, straight or nearly so, in the centre of the albumen ; radicle exceeding the cotyledons.—DISTRIB. India, Malaya, Australia, and Pacific Islands ; species about 8.

1. **Santalum album,** *Linn. Sp. Pl.* (1753) p. 349. A small evergreen glabrous tree with slender drooping branches ; the sap-wood white and odorless, the heart-wood yellowish-brown, strongly scented. Leaves 1½—2½ by ⅝—1¼ in., elliptic-lanceolate, subacute, glabrous, entire, thin, base acute ; petioles ⅜—½ in. long, slender. Flowers brownish-purple, inodorous, in terminal and axillary paniculate cymes shorter than the leaves. Perianth campanulate ; limb of 4 valvate triangular segments. Stamens 4, exserted, alternating with 4 rounded obtuse scales. Drupe globose, ½ in. in diam., purple-black ; endocarp hard, ribbed. Fl. B. I. v. 5, p. 231 ; Grah. Cat. p. 177 ; Dalz. & Gibs. p. 224 ; Bedd. Flor. Sylvat. t. 256 ; Talb. Trees, Bomb. ed. 2, p. 293 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368 ; Prain, Beng. Pl. p. 914 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 461.—Flowers : Mar.—Aug. VERN. *Chandan.*

Indigenous throughout the dry districts of the Presidency from Nasik southwards, frequently planted in gardens as far north as Gujarat. KONKAN : *Stocks* !, *Dalzell* ! ; in gardens about Bombay, *Graham.* DECCAN : S.W. of Poona, *Dalzell & Gibson* ; Dongergaon near Ahmednagar, *Cooke* ! S. M. COUNTRY : *Dalzell & Gibson.* KANARA : dry deciduous forests of N. Kanara, *Talbot.*—DISTRIB. India (W. Peninsula), cultivated elsewhere.

The *White Sandalwood Tree.* A valuable essential oil is obtained by distillation from the wood and the roots, which latter yield the largest quantity. The wood is the *Sandalwood* of commerce used for carving, for burning in Parsi temples, and for the cremation of wealthy Hindus. See Watt, Dict. Econ. Prod. l. c.

2. OSYRIS, Linn.

Glabrous shrubs ; young branches angular. Leaves alternate, entire ; stipules 0. Flowers small, axillary, polygamous (male and 2-sexual), the male flowers in clusters, the bisexual often solitary. Perianth-tube solid in the male flowers, in the 2-sexual flowers adnate to the ovary ; lobes 3—4, triangular, valvate, with a tuft of hairs on the face. Stamens 3 or 4, inserted at the base of the perianth-lobes ; anther-cells distinct. Disk angular. Ovary inferior, sunk in the perianth-tube ; ovules 2—4, pendulous from a short stout central

placenta ; style short ; stigma 3—4-lobed. Fruit a globose or ovoid drupe. Seed globose, solitary ; embryo in the centre of copious fleshy albumen.—DISTRIB. S. Europe, Africa, India ; species 5 or 6.

1. **Osyris arborea,** *Wall. Cat.* (1828) 4035. A large much-branched glabrous shrub ; young branches sharply triangular. Leaves subsessile, coriaceous, numerous, glaucous, 1—1½ by ½—1 in., elliptic-oblong, or oblong-lanceolate, or obovate-oblong, mucronate, base cuneate. Flowers minute, axillary, yellowish-green, the male flowers in long-pedunculate shortly pedicellate 5-10-flowered umbels, the peduncles of the 2-sexual flowers carrying 1—3 flowers and elongating in fruit. Perianth-limb 3-lobed ; lobes triangular. Stamens opposite the perianth-lobes. Disk fleshy, 3-lobed, the lobes alternating with the stamens. Stigma 3-lobed. Drupe yellow, ¼—⅓ in. in diam., subglobose. Fl. B. I. v. 5, p. 232 ; Trim. Fl. Ceyl. v. 3, p. 474 ; Talb. Trees, Bomb. ed. 2, p. 294 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368 ; Watt, Dict. Econ. Prod. v. 5, p. 655. *Osyris Wightiana,* Wall. Cat. 4036 ; Grah. Cat. p. 177 ; Dalz. & Gibs. p. 223 ; Wight, Icon, t. 1853.—Flowers : Jan.—May. VERN. *Lotal* ; *Popli.*

On the Ghâts above 2,000 ft., *Dalzell* ! DECCAN : hills (widely), *Woodrow* ; Khandala, *Graham, Cooke* ! ; Mahableshwar, *Graham,* (abundant along the blue valley road) *Cooke* ! S. M. COUNTRY : dry forests of Belgaum districts, *Talbot* ; Belgaum, *Ritchie,* 659 ! KANARA : moist forests of N. Kanara from the sea-coast inland, *Talbot.*—DISTRIB. India (subtropical Himalaya, Birma, Central Provinces, W. Peninsula) ; Ceylon.

An infusion of the leaves has powerful emetic properties. The leaves have however been used as a substitute for tea in Kumaon, the first infusion, which is nauseating, having been rejected. See Watt, Dict. Econ. Prod. l. c.

IMPERFECTLY KNOWN SPECIES.

OSYRIS DIVARICATA, Pilger, in Bull. Herb. Boiss. ser. 2 (1906) p. 104. A shrub ; branches divaricate ; branchlets terete, glabrous, with thick transversely fissured bark. Leaves ¼—½ by ⅛—¼ in., elliptic or obovate-elliptic, apiculate or subobtuse, somewhat thick, puberulous on both sides, the nerves inconspicuous except the midnerve. Male flowers 3-merous, in small axillary fascicled cymes much shorter than the leaves ; peduncles slender, ⅛—¼ in. ; bracts very caducous, lanceolate, very short, falling before the expansion of the flower. Sepals broadly ovate, 1/16 in. broad, somewhat obtuse. Stamens about ½ as long as the sepals ; filaments with a tuft of hairs at the base. Rudimentary ovary 0. Female flowers and fruit unknown.

The above description is that of Pilger from a single specimen in Herb. Boiss. collected by Stocks on the Hala range. There is one imperfect specimen in Herb. Kew, collected by Stocks (no. 811) marked Kusbab ? Pass. Of this specimen Sir J. D. Hooker (Fl. B. I. v. 5, p. 232) remarks under *Osyris arborea* : "The Sindh ? plant (no doubt from Beluchistan) collected by Stocks appears to be a very different species" (from *Osyris arborea*).

Until the existence of the plant on the Sind portion of the Hala range can be definitely proved, it cannot be included in the Flora of Bombay.

3. SCLEROPYRUM, Arn.

Trees often spiny. Leaves alternate, coriaceous. Flowers in short catkin-like spikes at the leafless nodes, polygamous. Perianth-tube of male flowers solid, of female flowers adnate to the ovary ;

lobes 5, valvate or subimbricate. Stamens 5, inserted at the base of the lobes, short; anthers dehiscing transversely. Disk annular. Ovary inferior; ovules 3, pendulous from the top of a central column; style short; stigma large, peltate. Drupe pyriform, pedicellate. Seed subglobose; embryo terete.—DISTRIB. India and Ceylon; species 2.

1. **Scleropyrum Wallichianum,** *Arn. in Mag. Zool. & Bot.* v. 2 (1838) p. 550. A small tree armed with sharp conical woody often fascicled spines; bark smooth, greyish-white. Leaves coriaceous, red when young, 3—6 by 1¼—2½ in., ovate, elliptic or oblong, obtuse or subacute, glabrous, penninerved, base subacute; main nerves 3—5 pairs; petioles ⅛ in. long, stout. Flowers polygamous, yellowish-red. MALE FLOWERS in catkin-like spikes, axillary or above the scars of fallen leaves; bracts filiform, deciduous. Perianth-tube solid; segments 5, slightly imbricate in bud, with tufts of hairs behind the stamens. Stamens 5, inserted at the base of the perianth-lobes; filaments 2-fid; anthers 10. FEMALE FLOWERS in compact cylindric racemes. Perianth-tube adnate to the ovary. Stigma large, peltate. Drupe brown, pyriform, stalked, 1¼—2 in. long, crowned by the persistent perianth-segments, smooth. Fl. B. I. v. 5, p. 234; Wight, Icon. t. 241; Trim. Fl. Ceyl. v. 3, p. 475; Talb. Trees, Bomb. ed. 2, p. 294. *Pyrularia Wallichiana*, A. DC. in DC. Prodr. v. 14, p. 629; Bedd. Flor. Sylvat. t. 304.—Flowers: Dec.—Mar.

KONKAN: *Dalzell!*; Konkan Ghâts, *Talbot*. KANARA: evergreen forests near Yellapur; common near the Nilkund and Dodmune Ghâts, *Talbot*.—DISTRIB. India (W. Peninsula); Ceylon.

ORDER CXIV. **BALANOPHORACEÆ.**

Fleshy leafless often scaly herbs parasitic on roots. Flowers monœcious or dioecious, small or minute, crowded in spadix-like pedunculate heads or cones; peduncles very stout, simple, annual or arising from an amorphous tuberous, or a branching annual or perennial rootstock. MALE FLOWERS: Perianth 0 or of 3—8 valvate lobes. Stamens in the achlamydeous flowers 1—2; in the flowers with a perianth as many as its lobes and opposite to them, or more; filaments 0 or fleshy, free or connate in a column or tube; anthers free or connate, 2—many-celled, opening by pores or valves or bursting irregularly. FEMALE FLOWERS: Perianth 0 or confluent with the ovary; limb 0 or minutely toothed. Ovary 1—3-celled; ovule solitary in each cell, usually pendulous. Fruit minute, 1-seeded. Seed usually adherent to the pericarp; albumen densely granular and oily (rarely floury); embryo minute.—DISTRIB. Genera 14; species about 40, tropical or subtropical.

1. **BALANOPHORA,** Forst.

Glabrous fleshy herbs with a tuberous rootstock, warted with lenticels abounding in a waxy secretion. Peduncles bursting through the root-stock, which forms an irregularly toothed or lobed ring or short sheath at its base. Flowers minute, intermixed with clavate

cellular bodies, monœcious or dicecious. MALE FLOWERS: Perianth of 2—6 valvate lobes. Stamens 2—∞; filaments 0 or connate in a solid column. FEMALE FLOWERS: Perianth 0. Ovary ellipsoid, compressed, 1-celled, narrowed into the style; ovule solitary, pendulous; style long, slender; stigma terminal. Seed globose; albumen oily; embryo subglobose, consisting of 2—3 cells only.—DISTRIB. Eastern Asia, Australia, Polynesia; species about 12.

1. **Balanophora indica,** *Wall. Cat.* (1828) 7247. Rhizome tuberous with rounded lobes or branches, finely warted all over with large scattered stellate pustules, pale brown. Flowering stems numerous, crowded, male and female from the same rhizome, 3—6 in. long, the male rather the longer, closely covered with large ovate-oblong obtuse imbricate glabrous yellow or orange scales. MALE FLOWERS crowded in ovoid-oblong heads 2—2½ in. long, dull-red, drying dark-brown; pedicels rather stout, at first erect, then drooping; bracts much shorter than the pedicels, truncate. Perianth white; segments 4 or 5, linear, subacute, reflexed, ⅛ in. long. FEMALE FLOWERS in nearly globose velvety heads 1¼ in. in diam., purplish, drying dark-brown, densely covered with the minute flowers and with small clavate bodies. Perianth 0. Ovary stalked, hyaline; style long. Fl. B. I. v. 5, p. 237; Weddell, in. Ann. Sc. Nat. sér. 3, v. 14 (1850) t. 9; Hook. f. in Trans. Linn. Soc. v. 22 (1859) p. 46; Mrs. Hart, in Journ. Bomb. Nat. Hist. Soc. v. 1 (1886) p. 75; Trim. Fl. Ceyl. v. 3, p. 476; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368.—Flowers: Oct.—Nov.

DECCAN: Mahableshwar, *Mrs. W. E. Hart,* fairly plentiful in the wood above the Dhobi's waterfall in November, *H. M. Birdwood*; Khandala, on roots of Carissa Carandas, *Woodrow.* S. M. COUNTRY: Chorla Ghát, *Dalzell*! —DISTRIB. India (W. Peninsula); Ceylon.

ORDER CXV. EUPHORBIACEÆ.

Trees, shrubs, or herbs often with milky juice. Leaves alternate or opposite, rarely divided or compound; stipules usually small, caducous or persistent, rarely connate in a bud-protecting sheath; glands sometimes at the apex of the petiole or at the base of the leaf-blade. Flowers usually small or minute, always 1-sexual; inflorescence various, usually compound, sometimes (*Euphorbia*) of single naked 1-staminate florets in a perianth-like involucre surrounding a solitary pistil, more commonly the main inflorescence centripetal, axillary or racemose, the subdivisions cymose, sometimes wholly cymose in terminal dichotomous panicles, or reduced to simple clusters or solitary florets. Perianth often small, sometimes obsolete, often dissimilar in the two sexes, usually simple, calycine with valvate or imbricate segments, sometimes calycine and 2-seriate imbricate, with segments all similar or occasionally dissimilar, rarely double, the inner then of 4—5 small scale-like, or very rarely conspicuous petals. MALE FLOWERS: Torus sometimes forming an intra-staminal disk or with disk-glands or -lobes alternate with the stamens of the outer

series. Stamens various, sometimes solitary or fewer than, sometimes as many as the sepals or petals, sometimes indefinite (rarely very numerous) ; filaments free or connate ; anthers 2-celled, often didymous with longitudinal, transverse or porous dehiscence. Rudimentary ovary present or 0. FEMALE FLOWERS : Sepals usually larger and less connate than in the male. Petals sometimes smaller and less often present than in the male. Disk hypogynous or of discrete glands or 0. Ovary superior, sessile or stipitate, usually of 3 (rarely more or 2) carpels more or less united ; ovules 1—2 in each carpel, pendulous from the inner angle of the cell, the funicle often thickened ; styles as many as the carpels, free or united or entire or divided ; stigmatic surface usually on the inner face of the styles or style-arms. Fruit usually a capsule of three 2-valved 1—2-seeded cocci separating from a persistent axis, or a drupe with 1—3 cells or of one or more combined nuts. Seeds laterally attached at or above the middle of the cells, with or without an aril or caruncle at the hilum ; albumen fleshy ; embryo straight, enclosed in the albumen ; cotyledons flat, leafy, and radicle superior ; rarely albumen 0 and cotyledons fleshy.—DISTRIB. Chiefly tropical, rare in cold countries ; genera 200 ; species about 3000.

Flowers aggregate-monœcious in heads resembling single flowers consisting of a calyx-like involucre enclosing several flowers without perianths, viz. many males, each consisting of a solitary pedicellate stamen, surrounding a single central female consisting of a single 3-carpellary pistil ..... 1. EUPHORBIA.

Flowers dicœcious or separate-monœcious; inflorescence mostly axillary or lateral; perianth of sepals always present, sometimes also petals.

Stamens of the outer or only series opposite the sepals, or, if stamens all in centre of flower, the cells of the 2-many-carpelled ovary each 2-ovulate; petals when present minute; sepals 1—2-seriate; inflorescence lateral or axillary.

Leaves 3-foliolate ..... 2. BISCHOFIA.

Leaves simple, entire (sometimes serrulate in *Cyclostemon*).

Males in axillary fascicles or solitary, axillary.

Corolla of 5 (rarely 6) scale-like petals.

Calyx lobes or segments 5; valvate.

Ovary 2-celled; fruit a drupe..... 3. BRIDELIA.

Ovary 3-celled; fruit a capsule..... 4. CLEISTANTHUS.

Calyx of 5—6 imbricate sepals.

Disk of males broad, entire or 5-lobed; large shrubs or small trees..... 5. ACTEPHILA.

Disk of males of distinct glands; herbs or undershrubs ..... 6. ANDRACHNE.

Corolla absent in both sexes; sepals imbricate.

Styles confluent in a long or short column or cone; disk 0 in either sex; anthers 3—8 adnate to a central column..... 7. GLOCHIDION.

Styles separate or if partly connate the style-arms and stigma free.

Styles or style-arms slender.

Pistillode in males large; disk present in both sexes; stamens 3—5; filaments free; dicœcious shrubs... 8. FLUGGEA.

Pistillode absent in males.
Disk 0 in either sex.
Stamens 3; filaments united in a column.
Anthers sessile on the angles of a 3-gonous column; small monœcious shrubs or undershrubs..... 9. SAUROPUS.
Anthers adnate to whole length of column; monœcious shrub or small trees. 10. BREYNIA.
Disk present in the female and often in male flowers; filaments free or united ..... 11. PHYLLANTHUS.
Styles much dilated; fruit an indehiscent drupe.
Stamens 2—4 central; drupe 1-seeded. 12. PUTRANJIVA.
Stamens 4—∞ round an orbicular disk.
Ovary usually 1-celled; dicœcious trees or shrubs ..... 13. HEMICYCLIA.
Ovary 2—4-celled; dicœcious trees ..... 14. CYCLOSTEMON.
Males in axillary spikes racemes or panicles; stamens free round a rudimentary pistillode; fruit indehiscent; trees or shrubs usually dicœcious.
Seeds without an aril.
Ovary 1-celled; flowers of both sexes in slender racemes or spikes; stamens 2—5 ..... 15. ANTIDESMA.
Ovary 2-celled; males in catkin-like spikes; females clustered; stamens 1—5 ..... 16. APOROSA.
Seeds with an aril; ovary 2—3-celled; flowers in racemes; stamens 4—8..... 17. BACCAUREA.
Stamens of the outer or only series alternate with the sepals, or, if stamens all in the centre of flower, the cells of the 2—3 (rarely 4)-carpellate ovary each 1—ovulate; petals if present often exceeding the sepals; inflorescence axillary or terminal.
Petals present at least in the male flowers.
Inflorescence terminal.
Flowers in androgynous 2—3-chotomous cymes; leaves usually digitately lobed; stamens erect ..... 18. JATROPHA.
Flowers in androgynous spikes or racemes; leaves not digitately lobed; stamens inflexed in bud with anthers reversed ..... 19. CROTON.
Male sepals imbricate in bud (open in 22, *Dimorphocalyx*).
Male petals united; females with petals; fruit a drupe; a stellately tomentose tree ..... 20. GIVOTIA.
Male petals free.
Sepals of female flowers accrescent in fruit.
Females without petals; male petals shorter than the calyx... 21. BLACHIA.
Females with petals; male petals longer than the calyx..... 22. DIMORPHOCALYX.

Male sepals valvate in bud.
Petals present in both sexes; glabrous shrubs ..... 23. AGROSTISTACHYS.
Petals of female narrow or 0; hispid or stellately tomentose herbs ..... 24. CHROZOPHORA.
Petals 0 in either sex.
Male sepals 4—6, imbricate, free..... 25. BALIOSPERMUM.
Male calyx closed in bud, usually membranous, splitting valvately into 3—5 concave sepals, the sepals of female sometimes imbricate.
Styles distinct, usually long, entire, 2-fid, multifid or papillosely fimbriate; fruit capsular (rarely drupaceous).
Filaments free.
Anthers 2-celled, the cells united by their bases only.
Styles short, undivided ..... 26. CLAOXYLON.
Styles very long, fimbricate or lacerate ..... 27. ACALYPHA.
Anther-cells oblong or globose, laterally attached by a narrow or broad connective.
Stamens 4; styles plumose..... 28. ADENOCHLÆNA.
Stamens many; anther-cells 2.
Leaves opposite; flowers rather large, dicœcious; anther-cells oblong ..... 29. TREWIA.
Leaves alternate or opposite; flowers minute, monœcious or dicœcious; anther-cells globose. 30. MALLOTUS.
Stamens many or few; anthers 3—4-locellate, the cells globose.
Styles very long with 2—3-filiform arms ..... 31. CLEIDION.
Styles entire ..... 32. MACARANGA.
Filaments connate in bundles or branched; disk 0; fruit capsular; flowers dicœcious, the males and females in axillary or infra-axillary spikes ..... 33. HOMONOIA.
Styles connate; twining herbs with alternate leaves; flowers in axillary racemes; male calyx 3—5-partite; stamens 1—3; fruit capsular ..... 34. TRAGIA.
Calyx of male open in bud; leaves alternate; styles entire, free or connate at the base.
Trees or shrubs; stamens 3; filaments free.
Calyx 2—3-lobed; fruit fleshy or pulpy. 35. SAPIUM.
Calyx deeply 5-partite; fruit crustaceous. 36. EXCŒCARIA.
Herbs; stamens 2—4; filaments connate at the base; fruit crustaceous. 37. SEBASTIANIA.

1. **EUPHORBIA,** Linn.

Herbs, shrubs, or small trees of various habit, with milky juice; stems slender and leafy or thick and fleshy and sometimes leafless or nearly so. Leaves opposite or less commonly alternate. Flowers monœcious, combined in an inflorescence of many male florets surrounding a solitary female, arranged in a common 4—5-lobed perianth-like involucre with thick glands at the mouth, each gland often bearing a petaloid spreading white or colored limb. MALE

FLOWERS a stalked stamen without floral envelope. FEMALE FLOWERS: Ovary 3-celled on an ultimately exserted stalk in the centre of the involucre; ovule solitary in each cell; styles 3, free or connate. Fruit a capsule of three 2-valved cocci, separating elastically from a persistent axis and dehiscing ventrally or both ventrally and dorsally. Seeds albuminous; cotyledons broad, flat. The flower-heads in the genus have all the appearance of a single 2-sexual flower, especially when the involucre bears petal-like appendages.—DISTRIB. Species about 600, in all climates but the very cold.

Stems not developed above ground; leaves all radical. 1. *E. acaulis.*
Stems well developed above ground; leaves not all radical.
Perennial shrubs or small trees; stems and branches thick, fleshy; glands of involucre without a petaloid limb.
Styles 2-fid, leaves few, small, less than 1 in. long, very deciduous ..... 2. *E. antiquorum.*
Styles undivided; leaves many, large, exceeding 4 in. long.
Branches angular, with stipular thorns arising from thick subconfluent tubercles arranged in more or less regular rows..... 3. *E. ligularia.*
Branches cylindric, with stipular thorns arising from low distant spirally arranged tubercles ..... 4. *E. neriifolia.*
Annual herbs with slender erect ascending or prostrate stems and branches; glands of involucre with or without a petaloid limb.
Leaves exstipulate, alternate below and opposite above, or all alternate except the uppermost floral leaves; glands of involucre 2-horned without a petaloid limb.
Leaves less than 2 in. long..... 5. *E. dracunculoides.*
Leaves more than 2 in. long..... 6. *E. Rothiana.*
Leaves all opposite, stipulate, or, if stipules absent, the leaf-attachments connected by a transverse interpetiolar line; glands of involucre not horned, usually with a membranous petaloid limb.
Gland of the involucre with a conspicuous petaloid limb.
Floral leaves distichously imbricating, secund, concealing the involucres.
Leaves exceeding 1 in. long; capsules glabrous.
Seeds tuberculate ..... 7. *E. pycnostegia.*
Seeds smooth ..... 8. *E. zornioides.*
Leaves less than 1 in. long; capsules hairy ..... 9. *E. elegans.*
Floral leaves not distichously imbricating.
Cocci winged ..... 10. *E. notoptera.*
Cocci not winged.
Two upper limbs of involucre-glands much larger than the two lower ones ..... 11. *E. rosea.*
Limbs of involucre-glands subequal.
Involucres in villous heads; a decumbent villous herb ..... 12. *E. coccinea.*

Involucres in many-flowered cymes.
A dwarf glabrous shrub of the sea-shore; leaves entire; capsules glabrous ..... 13. *E. Atoto.*
Herb 6—18 in. high; leaves serrulate; capsules hairy ..... 14. *E. hypericifolia* var. *parviflora.*

Involucres solitary, axillary.
Erect glabrous herb; leaves obovate or elliptic-oblong, not imbricating ..... 15. *E. erythroclada.*
Decumbent herb; leaves linear-oblong, secund, subimbricate. 16. *E. linearifolia.*

Limb of involucre-gland inconspicuous or 0.
Erect or ascending herb 6—20 in. high, hispid with crisped hairs; leaves ½—1½ in. long ..... 17. *E. pilulifera.*
Prostrate herbs; leaves small, less than ½ in. long.
Stems hispidly hairy; capsules pubescent or hirsute.
Leaves crenulate; capsules pubescent; seeds furrowed ..... 18. *E. thymifolia.*
Leaves entire; capsules hirsute; seeds pitted ..... 19. *E. granulata.*
Stems glabrous; capsules glabrous.
Leaves nearly as broad as long; seeds smooth ..... 20. *E. microphylla.*
Leaves much longer than broad; seeds obscurely transversely rugose ..... 21. *E. Clarkeana.*

1. **Euphorbia acaulis,** *Roxb. Hort. Beng.* (1814) p. 36. Stem reduced to a stout cylindric underground rootstock 6—18 in. long by 1—2½ in. in diam., with only the scarred tip of the buried stem showing above ground. Leaves all radical, 6—12 by 1½—2½ in., subsessile, fleshy, nerveless, obovate or oblanceolate, obtuse or subacute, cuneate at the base, with curled margins, often spotted with red, glabrous. Cymes on long peduncles from the crown of the rootstock, appearing after the leaves have fallen, 3—many-flowered, dichotomous, of variable length ; bracts at the forks ovate-lanceolate, scarious. Involucres about ¼ in. in diam., greenish. Capsules ⅓ in. in diam. ; pedicels ½ in. long or less ; cocci compressed ; styles combined to the middle. Seeds broadly ovoid, subacute, smooth (*Hooker*).

The specific name *acaulis* given to the plant by Roxburgh is 11 years prior to the name *fusiformis,* Buch.-Ham. Grah. Cat. p. 179 ; Dalz. & Gibs. p. 226. *Euphorbia fusiformis,* Buch.-Ham. ex Don, Fl. Nep. (1825) p. 62 ; Hook. f. Fl. B. I. v. 5, p. 257 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 921.—Flowers : Apr.—May.

KONKAN : *Dalzell* ! ; Konkan hills, *Graham* ; Savantvadi, *Dalzell & Gibson.* DECCAN : Poona hills, *Woodrow* ; Mahableshwar, *Graham, Dalzell & Gibson, H. M. Birdwood.*—DISTRIB. India (Tropical Himalaya, Bengal, W. Peninsula).

2. **Euphorbia antiquorum,** *Linn. Sp. Pl.* (1753) p. 450. A large shrub or small tree 15—30 ft. high ; trunk stout, sometimes nearly 1 ft. in diam., cylindric or fluted ; bark thick, rough, brown ;

branches numerous, curving upwards, stout, fleshy, green, jointed, with 3—5 wide thick sinuate wings narrowed at either end in each joint and coarsely repand-crenate. Leaves small, ¼—½ in. long, subsessile, obovate-oblong, rounded or subtruncate, cuneate, fleshy, glabrous, soon deciduous, which gives the plant a leafless appearance ; stipular spines short, sharp, divaricate, persistent. Involucres 3-nate, forming small pedunculate cymes, the central flower sessile, female, the 2 lateral on long stout pedicels ; bracteoles numerous, laciniate ; glands 5, large, broader than long. Stamens numerous. Capsules nearly ½ in. in diam. ; cocci compressed, glabrous ; styles 2-fid. Fl. B. I. v. 5, p. 255 ; Grah. Cat. p. 179 ; Dalz. & Gibs. p. 226 ; Wight, Icon. t. 897 ; Bedd. For. Man. in Flor. Sylvat. p. ccxvi & Anal. Gen. t. 22, fig. 4 ; Trim. Fl. Ceyl. v. 4, p. 4 ; Talb. Trees, Bomb. ed. 2, p. 297 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 921 ; Watt, Dict. Econ. Prod. v. 3, p. 294.—Flowers in the rainy season.

Not common. DECCAN : Bijapur districts, *Talbot*. S. M. COUNTRY : Belgaum districts, *Talbot*.—DISTRIB. Throughout the hotter parts of India and Ceylon.

3. **Euphorbia ligularia,** *Roxb. Hort. Beng.* (1814) p. 36. An erect fleshy glabrous shrub or small tree seldom reaching 20 ft. high ; branches scattered, ascending, the young ones 5-sided, angled, with short stipular sharp thorns arising from thick tubercles arranged in 5 irregular rows. Leaves 6—12 by 2—3 in., alternate, near the tops of the branches, obovate-oblong or subspathulately obovate, acute, deciduous, base narowed into a very short petiole ; stipular thorns solitary or in pairs, ⅓—½ in. long. Involucres yellowish, hemispheric, in small stout dichotomous shortly pedunculate cymes, the lateral ones of the cymes with short thick pedicels, the central sessile and usually male ; lobes large, erect, roundish, fimbriate ; glands transversely oblong ; bracts numerous, fimbriate. Styles connate high up, undivided ; stigmas capitate. Capsules deeply 3-lobed, about ½ in. broad ; cocci compressed, glabrous. Roxb. Fl. Ind. v. 2 (1832) 5 ; Buch.-Ham. in Trans. Linn. Soc. v. 14 (1825) p. 285 (exclud. syn.). *Euphorbia neriifolia,* Dalz. & Gibs. Bo. Fl. (1861) p. 226 (*not* of Linn.) ; Hook. f. Fl. B. I. v. 5, p. 255 ; Talb. Trees, Bomb. ed. 2, p. 297 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 922 ; Watt, Dict. Econ. Prod. v. 3, p. 297. *Ligularia lactea,* Rumph. Herb. Amboin. v. 4 (1750) p. 91, t. 40 ; Grah. Cat. p. 179 and p. 251.—Flowers : Feb.—Mar., the new leaves appearing after the flowers. VERN. *Thor* ; *Sij.*

Throughout the Presidency; often planted as a fence.—DISTRIB. India (W. Peninsula) ; cultivated elsewhere and in Ceylon ; Beluchistan, Malay Islands.

Some confusion exists regarding this plant. There are two distinct plants, *Euphorbia neriifolia,* Linn., with *round stems* (*E. Nivula,* Bach.-Ham.), and *E. ligularia,* Roxb., with *angular stems.* Linnæus (Hort. Cliff. [1737] p. 196, n. 3) calls the stem of *E. neriifolia* (thus named in Sp. Pl. [1753] p. 451) "teretiusculus quinquefariam tuberculis prominulis angulatus." Roxburgh (Icones Roxburghianæ in Herb. Kew.) figures the stem of *E. neriifolia* in t. 1065 and t. 1971, contrasting it with the stem of *E. ligularia* in t. 1972. Rumphius (Herb. Amboin. v. 4 [1750] p. 91, t. 40) has, under the name *Ligularia lactea,* a drawing of the entire plant clearly showing its peculiar character. Roxburgh

(Fl. Ind. l. c.) cautions botanists against the error of assuming the identity of *E. neriifolia*, Linn., with *E. ligularia*, Roxb., and moreover states that he has had both plants growing for 14 years in the botanic garden at Calcutta. *E. Nivulia*, Buch.-Ham., is clearly *E. neriifolia*, Linn., with round stems. There is an excellent drawing of this plant, under Hamilton's name, in Herb. Kew., presented by Mr. Duthie, which exactly agrees with Roxburgh's drawing of *E. neriifolia*.

4. **Euphorbia neriifolia,** *Linn. Sp. Pl.* (1753) p. 451. A large glabrous fleshy erect shrub or small tree reaching 20 ft. or more high ; branches round, somewhat verticillate, with pairs of sharp stipular spines arising from low conical truncate distant spirally arranged tubercles. Leaves towards the ends of the branches, fleshy, alternate, 4—8 by 1¼—2½ in., obovate or obovate-oblong, rounded at the apex, smooth, glabrous, tapering towards the base, sessile or nearly so, deciduous ; midrib conspicuous beneath, the other nerves obscure. Involucres hemispheric, 3-nate, forming small shortly pedunculate solitary or twin cymes from above the leaf-scars on the tubercles, the central flower of each cyme male, sessile, appearing first, the 2 lateral flowers 2-sexual, pedicellate ; lobes of involucres large, erect, fimbriate ; glands transversely oblong ; bracteoles numerous, fimbriate. Stamens 40 in 5 bundles (*Dalzell & Gibson*). Capsules ¼ in. broad ; styles connate to the middle, undivided. Seeds smooth. *Euphorbia Nivulia,* Buch.-Ham. in Trans. Linn. Soc. v. 14 (1825) p. 286 ; Wight, Icon. t. 1862 ; Dalz. & Gibs. p. 225 ; Hook. f. Fl. B. I. v. 5, p. 255 ; Bedd. For. Man. in Flor. Sylvat. p. ccxvi ; Talb. Trees, Bomb. ed. 2, p. 297 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 922 ; Watt, Dict. Econ. Prod. v. 3, p. 298.—Flowers : March. VERN. *Nurang.*

GUJARAT : common, *Dalzell & Gibson*; dry rocky hills, *Talbot*. SIND : common, *Dalzell & Gibson, Talbot*.—DISTRIB. India (N.W. Himalaya, Pegu, Birma, W. Peninsula), often planted for hedges.

5. **Euphorbia dracunculoides,** *Lamk. Encyc. Méthod.* v. 2 (1786) p. 428. An annual dichotomously much-branched herb 1—1½ ft. high ; stems many from the root, erect, leafy. Leaves of the stem sessile, 1¼—2¾ by ⅛—¼ in., linear or linear-lanceolate, subacute, base acute (rarely rounded) ; floral leaves broader at the base and shorter. Involucres broadly campanulate, subsessile, solitary, $\frac{1}{10}$ in. across at the mouth, glabrous outside, pubescent inside ; lobes short, ovate, ciliolate ; glands semilunate, horned ; filaments pubescent. Capsules ⅛—$\frac{1}{6}$ in. in diam. ; styles $\frac{1}{25}$ in. long, free to the base, shortly 2-fid at the apex. Seeds ⅛ in. long, ellipsoid, rounded at the base, grooved down one side, with an arillode at the oblique depressed apex ; testa whitish, leprous, rugose or tuberculate. Fl. B. I. v. 5, p. 262 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 922 ; Watt, Dict. Econ. Prod. v. 3, p. 295.—Flowers : Aug.

DECCAN : Sholapur, *Woodrow* ! ; Máwal táluka (Poona districts), *Kanitkar* ! S. M. COUNTRY : Badami, *Cooke* ! SIND : *Bhola Puran* !—DISTRIB. Throughout India in the plains and low hills ; Arabia, Tropical Africa.

6. **Euphorbia Rothiana,** *Spreng. Syst.* v. 3 (1826) p. 796. Annual or perennial, erect, glaucous, 1—2 ft. high, abounding with

milky juice ; stem glabrous, cylindric, often tinged with red, densely leafy ; branches slender, some whorled round the stem from the upper leaf-axils, others in a whorled umbellate crown from the top of the stem, all again dichotomously branched. Leaves of the stem alternate, sessile, 2½—4 by ¼—⅝ in., linear-oblong, lanceolate, acute, mucronulate, entire, glabrous, base tapering ; leaves beneath the whorled crown of branches 4, sessile, radiating, broader than the stem-leaves ; floral leaves (bracts) beneath the dichotomous forks, opposite, broadly ovate or orbicular, acute, mucronate, rounded at the base. Involucres solitary, axillary in the upper axils, and terminal, $\frac{1}{10}$ in. in diam. at the mouth, campanulate, glabrous ; pedicels short ; lobes short, subquadrate, ciliate ; gland semilunate, horned, reaching ⅛ in. long, including the 2 decurved acute horns. Capsules nearly ¼ in. in diam., glabrous ; styles $\frac{1}{10}$ in. long, free almost to the base, 2-fid at the apex. Seeds ⅛—⅙ in. long, oblong, semicylindric, rounded at the base, grooved down one side, with a fleshy rugulose arillode at the oblique depressed apex, bluish-grey when ripe, smooth. Fl. B. I. v. 5, p. 263 ; Dalz. & Gibs. p. 226 ; Wight, Icon. t. 1864 ; Trim. Fl. Ceyl. v. 4, p. 8 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369. *Euphorbia glauca,* Roxb. Fl. Ind. v. 4 (1832) p. 473. *E. segetalis,* Grah. Cat. p. 179 (*not* of Willd.).—Flowers : Sept.—Nov. VERN. *Dudhi.*

KONKAN : *Stocks* !, *Law* ! ; Dasgaon, *Dalzell & Gibson.* DECCAN : Mahableshwar, common, *Cooke* !, *H. M. Birdwood* ; near Satara, *Kanitkar* ! ; Ambadkhind near Bhor, *Kanitkar* ! S. M. COUNTRY : Belgaum, *Ritchie,* 1251 !—DISTRIB. India (hills of Central India, W. Peninsula) ; Ceylon.

7. **Euphorbia pycnostegia,** *Boiss. Cent. Euphorb.* (1860) p. 9. Annual, slender, erect, glabrous, dichotomously branched, 1—2 ft. high ; stems often tinged with purple, terete, smooth, with swollen rather distant nodes. Leaves of the stem thin, 1—1½ by ½—⅝ in., opposite, sessile, oblong, obtuse or subacute, glabrous or nearly so, entire or finely serrulate ; floral leaves reaching ⅝ in. long, distichously imbricating, broadly ovate-cordate or suborbicular, often tinged with purple, reticulately veined, entire or serrulate, obtuse, n shortly apiculate ; stipules minute, fimbriate. Involucres alked, ¼ in. or more long (including the stalk), turbinate, glabrous outside, hairy inside ; lobes fimbriate ; gland transversely oblong ; limb white, obliquely obovate or suborbicular, rounded at the apex. Capsules glabrous ; cocci obtusely keeled ; styles short, divaricate, each deeply 2-lobed. Seeds $\frac{1}{12}$ in. long, oblong, obtusely 4-angled, tuberculate. Fl. B. I. v. 5, p. 246 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369.

KONKAN : *Stocks* !, *Law* ! ; Salsette, *Law* ! DECCAN : Bhore, *Kanitkar* ! ; Khandala, *Cooke* ! ; Mahableshwar, *H. M. Birdwood.*—DISTRIB. India (W. Peninsula).

8. **Euphorbia zornioides,** *Boiss. in DC. Prodr.* v. 15, part 2 (1862) p. 19. Glabrous ; stem erect, 1—2 ft. high, alternately and dichotomously much-branched, sometimes reaching ⅛ in. in diam., and woody at the base ; stem and branches dark reddish-brown, smooth, polished, terete, with long internodes. Leaves very shortly

petiolate, ¾—1¾ by ¼—⅜ in., linear-oblong, obtuse, apiculate, finely serrulate, oblique, unequal-sided and subcordate at the base ; stipules triangular, fimbriate ; floral leaves finely reticulately veined, ⅛—⅜ in. long, becoming smaller upwards, oblique at the base, serrulate, the upper distichously imbricating, often with pink margins, very shortly petiolate. Involucres subsolitary, glabrous outside, ¼ in. long (including a stalk ⅛ in. long) ; lobes fimbriate ; gland transversely oblong, about 1/20 in. long ; limb of gland white or rosy, the lobes 1/30 by 1/16 in., broadly obovate, subtruncate at the apex. Capsules subglobose ; cocci obtusely angled, glabrous ; styles short, each 2-lobed. Seeds 1/16—1/12 in. long, 4-angled, bluntly pointed, smooth, not rugose nor tuberculate nor grooved. Fl. B. I. v. 5, p. 246 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 922.

KONKAN : *Stocks* !, *Law* ! DECCAN : Máwal (Poona districts), *Woodrow* ; one mile south of Karkala Station (G. I. P. R.), *Kanitkar* !—DISTRIB. India (W. Peninsula).

9. **Euphorbia elegans,** *Spreng. Syst.* v. 3 (1826) p. 794. Stem 1—2 ft., dichotomously branched ; branches numerous, slender, clothed with long close or scattered weak soft hairs. Leaves opposite, distant, subsessile, ¼—¾ by ¼—½ in., broadly elliptic-oblong, obtuse, serrulate ; floral leaves subsessile, reaching ⅝ by ½ in., broadly elliptic or obovate, obtuse, softly hairy inside, much imbricating, forming short spikes at the ends of the branches. Involucres hairy outside and inside, ¼ in. long (including stalk), turbinate ; limb of gland ⅛ in. and more long, the lobes not oblique, rosy, obovate-cuneate, sinuate at the apex. Capsules hairy outside ; cocci subglobose ; styles long, 2-fid. Seeds 1/16—1/12 in. long, 4-angled, bluntly pointed, transversely parallel-grooved, glabrous. Fl. B. I. v. 5, p. 246 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369. *Euphorbia strobilifera,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 229 ; Dalz. & Gibs. p. 226. *E. rupestris,* Law, ex Grah. Cat. Pl. Bomb. p. 251 (*not* of Friwald. nor C. A. Mey.).—Flowers : Aug.—Sept.

KONKAN : on rocks in the Wari country, *Dalzell & Gibson.* DECCAN : Alimati Railway Station (Bijapur districts), *Kanitkar* ! S. M. COUNTRY : Badami, *Cooke* !—DISTRIB. India (W. Peninsula).

10. **Euphorbia notoptera,** *Boiss. in DC. Prodr.* v. 15, part 2 (1862) p. 26. An erect or ascending glabrous herb 1—2 ft. high ; stems dichotomously branched, terete, with long internodes. Leaves in distant opposite pairs, ¾—1½ by ⅛—½ in., shortly petiolate, often deflexed, linear-oblong, obtuse, very shortly mucronulate, remotely serrulate and with subrevolute margins, glabrous, base subcordate with very unequal lobes ; nerves obscure ; stipules very short and broad. Involucres solitary or 2—3 together, terminal, ⅛ in. long (including the stalk), campanulate, with pectinate lobes, supported at the base by linear acute floral leaves ⅜—½ in. long ; gland transversely oblong ; limb of gland with lobes 1/12 in. long by 1/10—⅛ in. broad, rounded or subtruncate at the apex, white. Capsules depressed-globose, rough, 1/10 in. in diam. ; cocci with 2 distant narrow wings. Seeds 1/12 in. long, 4-angled, bluntly pointed, tuberculately rugulose.

The winged cocci distinguish this from all other species. Fl. B. I. v. 5, p. 247 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369.—Flowers : Oct.—Dec.

In cultivated fields, Dalzell without locality in Herb. Kew. KONKAN : *Stocks* !, *Law* !, *Hooker* ! ; Vingorla, *Kanitkar* !, *Woodrow*. KANARA : *Law* ! ; near Kumpta, *Talbot*, 134 !—DISTRIB. India (W. Peninsula).

11. **Euphorbia rosea,** *Retz. Obs. Bot.* fasc. 4 (1786) p. 26. A perennial glabrous or sparsely hairy herb with a long woody taproot ; stems numerous, 4—8 in. long, brittle, prostrate, spreading, slender, flexuous, glabrous. Leaves numerous, opposite, $\frac{1}{4}$—$\frac{5}{8}$ by $\frac{1}{8}$—$\frac{1}{4}$ in., coriaceous, obliquely obovate or linear-spathulate, rounded at the apex, crenulate, serrulate or dentate, base rounded, very unequal-sided ; petioles short ; stipules interpetiolar, triangular. Involucres solitary or few, in small leafy axillary and terminal nearly sessile cymes $\frac{1}{8}$ in. long to the extremity of largest limb, subcampanulate ; stalk $\frac{1}{20}$ in. long ; lobes triangular, ciliate ; gland small, about $\frac{1}{30}$ in. long, transversely oblong ; limbs of the glands rosy, very conspicuous, those of the 2 upper glands long, $\frac{1}{8}$ by $\frac{1}{16}$ in., obliquely oblong, crenulate at the apex, those of the 2 lower glands much smaller, $\frac{1}{30}$ in. long, oblong or suborbicular, crenulate at the tip. Capsules $\frac{1}{12}$ in. long, glabrous ; styles $\frac{1}{16}$ in. long, connate about $\frac{1}{2}$-way up from the base, then divaricate and shortly 2-fid at the apex ; cocci slightly rough, bluntly keeled. Seeds $\frac{1}{16}$ in. long, transversely rugose. Fl. B. I. v. 5, p. 251 ; Trim. Fl. Ceyl. v. 4, p. 6 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369.—Flowers : Aug.

S. M. COUNTRY : Badami, *Cooke* !, *Bhiva* !, *Woodrow* !—DISTRIB. India (W. Peninsula) ; Ceylon, Afghanistan.

12. **Euphorbia coccinea,** *Roth, Nov. Pl. Sp.* (1821) p. 228. Whole plant villous with white hairs ; root woody ; stems filiform, purple, angularly flexous, brittle, 4—8 in. long, decumbent or prostrate, softly hispid with long weak hairs. Leaves subsessile, in scattered opposite pairs $\frac{1}{8}$—$\frac{3}{8}$ by $\frac{1}{10}$—$\frac{1}{4}$ in., rather coriaceous, entire, [illegible]ly elliptic or obovate-oblong, obtuse, oblique, hairy or glabrate [illegible]e, densely white-pilose beneath, base broadly auricled on one [illegible]e ; stipules linear-lanceolate, villous. Involucres in the axils of crowded small orbicular terminal leaves, campanulate, subsessile, $\frac{1}{10}$ in. long, forming small villous heads of 2—4 flowers (rarely reduced to a single flower) ; the tube hairy ; the lobes lanceolate, ciliate ; limb of gland $\frac{1}{20}$ by $\frac{1}{12}$ in., rosy, broadly obovate, denticulate at the apex, glabrous. Capsules $\frac{1}{10}$ in. long, white-woolly, truncate at the base ; cocci compressed, keeled ; styles slender, $\frac{1}{30}$ in. long, 2-fid. Fl. B. I. v. 5, p. 248 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369.—Flowers : July—Dec.

Rare. KONKAN : *Law* !, *Stocks* ! DECCAN : Diksal near Railway Station, *Woodrow* ; Rajwade, *Woodrow*.—DISTRIB. India (W. Peninsula).

13. **Euphorbia Atoto,** *Forst. Prodr.* (1786) n. 207. A dwarf glabrous shrub with a long stout root ; stem stout, much-branched, swollen at the nodes, erect or decumbent. Leaves opposite,

subsessile, ¾—1 by ⅜—½ in., elliptic or elliptic-oblong, obtuse, entire, base rounded, slightly unequal-sided; stipules small, fimbriate. Involucres axillary or in small leafy terminal cymes, pedicellate, turbinate, glabrous; lobes triangular; limb of glands small. Capsules glabrous; styles short, 2-fid. Seeds smooth. Fl. B. I. v. 5, p. 248; Trim. Fl. Ceyl. v. 4, p. 6; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369.

Doubtfully indigenous in the Bombay Presidency. Woodrow in his list (*l. c.*) gives the habitat of the plant as N. Kanara, but his specimens were obtained from Kandapur, which is in S. Kanara and outside the Presidency limits.—DISTRIB. S. India; Ceylon, Malay Archipelago, China, Australia.

14. **Euphorbia hypericifolia,** *Linn. Sp. Pl.* (1753) p. 454. VAR. **parviflora,** *Hook. f. Fl. B. I.* v. 5 (1887) p. 250. Annual, 6—18 in. high, erect or spreading, glabrous or sparsely pubescent. Leaves opposite, ½—1 by ¼—½ in., elliptic-oblong, obtuse, serrulate, base rounded, usually unequal-sided; nerves prominent beneath, slender; stipules minute, fimbriate, soon falling. Involucres in axillary and terminal usually pedunculate and many-flowered cymes, minute, turbinate, glabrous, with many subulate bracts at the base of the pedicel; lobes lanceolate, ciliate; limb of gland usually white, orbicular, rounded at the apex. Capsules subglobose, hairy; styles short, 2-fid. Seeds 1/10 in. long, smooth. Trim. Fl. Ceyl. v. 4, p. 7; Prain, Beng. Pl. p. 923; Watt, Dict. Econ. Prod. v. 3, p. 296. *Euphorbia hypericifolia,* Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369. *E. parviflora* (sp.), Linn. Syst. ed. 10 (1759) p. 1047; Grah. Cat. p. 179; Dalz. & Gibs. p. 227.—Flowers: Aug.—Nov.

KONKAN: *Stocks*!, *Law*! DECCAN: Bowdhán near Poona, *Cooke*!; banks of the Mula River near Poona, *Kanitkar*!; Purandhar, *Dr. Barnes*! GUJARAT: Surat, *Kanitkar*!; Godra, *Cooke*! SIND: Karachi, *Cooke*!—DISTRIB. Common throughout the hotter parts of India; Ceylon, Tropics generally except Australia and the Pacific Islands.

15. **Euphorbia erythroclada,** *Boiss. in DC. Prodr.* v. 15, part 2 (1862) p. 25. An erect glabrous herb 1—2 ft. high, alternately and dichotomously branched; stem and branches terete, polished, reddish-brown, with long internodes. Leaves membranous, ½—⅞ by ¼—⅓ in., in distant opposite pairs, obliquely oblong or obovate or elliptic-oblong, very obtuse, serrulate, base very unequal, rounded; petioles very short; stipules scarcely discernible. Involucres solitary, axillary, turbinate, red; lobes very short, triangular, ciliate; glands transversely ovate with a narrow rosy limb. Capsules depressed, ⅛ in. in diam.; cocci acutely keeled. Seeds 4-angled with 2—3 obsolete transverse ridges. Fl. B. I. v. 5, p. 247.

I have only seen the 2 imperfect sheets of this plant in Herb. Kew. identified and mentioned by Sir J. D. Hooker (Fl. B. I. l. c.). There is absolutely no evidence as to the locality whence these specimens were procured, the "Hab. Malabar, Konkan, &c." being merely on the printed label of Herb. Hook. f. & Thomson.

16. **Euphorbia linearifolia,** *Roth, Nov. Pl. Sp.* (1821) p. 224. Glabrous; stems many from a stout root, decumbent, about 1 ft. long, dark-purple, swollen at the nodes. Leaves ⅜—¾ by 1/10—⅛ in., opposite, secund, subimbricate, thickly coriaceous, linear-oblong, apiculate, pale beneath (the lowest leaves shorter, ovate-oblong), base

unequal-sided, rounded. Involucres solitary in the uppermost axils, $\frac{1}{8}$ in. long ; pedicel $\frac{1}{16}$ in. long ; limb of gland $\frac{1}{10}$ in. long, obovate, cuneate, rounded and crenulate at the apex, white. Styles nearly $\frac{1}{10}$ in. long. Capsules not seen. Fl. B. I. v. 5, p. 249 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369.

KANARA : Diggi (N. Kanara), Talbot, 1649!

The plant is but little known. There is but one specimen in Herb. Kew. marked as above.

17. **Euphorbia pilulifera,** *Linn. Sp. Pl.* (1753) p. 454. Annual, 6—20 in. high, erect or ascending, hispid with long often yellowish crisped hairs ; stems usually terete ; branches often 4-angled. Leaves opposite, $\frac{1}{2}$—$1\frac{1}{2}$ by $\frac{1}{4}$—$\frac{5}{8}$ in., obliquely oblong-lanceolate or obovate-lanceolate, acute or subacute, serrulate or dentate, dark green above, pale beneath, base usually unequal-sided, acute or rounded ; main nerves few, distinct ; petioles distinct, $\frac{1}{16}$—$\frac{1}{8}$ in. long ; stipules pectinate, soon falling. Involucres numerous, less than $\frac{1}{20}$ in. long, on a stalk of about the same length, crowded in small axillary shortly pedunculate globose cymes ; gland minute, globose, either without a limb or with a very small orbicular white entire one. Capsules $\frac{1}{20}$ in. in diam., appressedly hairy. Seeds $\frac{1}{30}$ in. long, ovoid-trigonous, slightly transversely rugose, light reddish-brown. Fl. B. I. v. 5, p. 250 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 923 ; Watt, Dict. Econ. Prod. v. 3, p. 298. *Euphorbia hirta,* Linn. Sp. Pl. (1753) p. 454 ; Grah. Cat. p. 179 ; Dalz. & Gibs. p. 227 ; Trim. Fl. Ceyl. v. 4, p. 7.—Flowers more or less throughout the year.

The specific name *hirta* occurs on the same page (Linn. Sp. Pl. p. 454) as the name *pilulifera,* to which it is really prior, as it precedes the latter on the page.

Common everywhere throughout the Presidency.—DISTRIB. Throughout the hotter parts of India, Ceylon, and most tropical and subtropical countries.

18. **Euphorbia thymifolia,** *Linn. Sp. Pl.* (1753) p. 454. A small annual herb, more or less hispidly pubescent ; stems prostrate, divaricately branched, slender, cylindric, more or less hairy. Leaves opposite, very small, numerous, $\frac{1}{8}$—$\frac{1}{4}$ by $\frac{1}{10}$—$\frac{1}{6}$ in., obliquely oblong or elliptic-oblong, rounded at the apex, crenulate, glabrous above, glaucous and usually slightly pubescent beneath, base rounded, very unequal-sided ; petioles very short ; stipules fimbriate. Involucres axillary, solitary or 2—3 in an axil, campanulate, $\frac{1}{30}$ in. long ; stalk very short ; gland minute or 0 ; limb 0. Capsules $\frac{1}{16}$ in. long, obtusely keeled, pubescent ; styles short, 2-fid. Seeds $\frac{1}{20}$ in. long, quadrangular, bluntly pointed, with 5 or 6 transverse furrows. Fl. B. I. v. 5, p. 252 ; Dalz. & Gibs. p. 227 ; Trim. Fl. Ceyl. v. 4, p. 8 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 923 ; Watt, Dict. Econ. Prod. v. 3, p. 300. *Euphorbia prostrata,* Grah. Cat. p. 179 (*not* of Ait.).—Flowers : more or less throughout the year. VERN. *Dhákti-dudhi* ; *Lahán-nayati.*

DECCAN : widely, *Woodrow* ; Poona, *Woodrow* ! SIND : *Cooke* ! ; Karachi, *Bhola Puran* !—DISTRIB. Throughout India in the plains and lower hills ; Ceylon and all hot countries except Australia.

19. **Euphorbia granulata,** *Forsk. Fl. Ægypt.-Arab.* (1775) p. 94. A small hispidly-villous plant with a perennial root ; stems many from the root, prostrate, hispid, leafy, 3—6 in. long, very brittle. Leaves opposite, coriaceous, $\frac{1}{10}$—$\frac{1}{8}$ by $\frac{1}{20}$—$\frac{1}{8}$ in., obliquely oblong or obovate-oblong, rounded or retuse at the tip, quite entire, villous on both surfaces, base narrow or rounded or subcordate ; petioles short ; stipules minute, ciliolate. Involucres minute, axillary and on short leafy branchlets, subsessile, turbinate, $\frac{1}{20}$ in. long ; gland usually without a limb. Capsules $\frac{1}{15}$ in. in diam. ; cocci hirsute, rounded at the back, not keeled ; styles very short, 2-fid. Seeds quadrangular, bluntly pointed, $\frac{1}{20}$ in. long, faintly pitted ; testa very mucous when wetted. Fl. B. I. v. 5, p. 252 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 923 ; Watt, Dict. Econ. Prod. v. 3, p. 295.

SIND : Karachi to Magar Pir, *Wykcham-Perry* ! There is but one very dilapidated specimen in Herb. Kew. from Sind.—DISTRIB. India (Panjab, Malwa, Chota Nagpur, W. Peninsula) ; Afghanistan, Arabia, Egypt, Canary Isles.

20. **Euphorbia microphylla,** *Heyne, in Roth, Nov. Pl. Sp.* (1821) p. 229. A nearly glabrous annual ; stems numerous, spreading from the root, 4—10 in. long, whitish, slender, leafy, glabrous, brittle, dichotomously branched. Leaves opposite, $\frac{1}{8}$—$\frac{1}{4}$ in. long, often nearly as broad as long, coriaceous, obliquely oblong, rounded-oblong, or subquadrate, rounded, subtruncate or retuse at the apex, usually entire, often with pink margins ; stipules 2-partite or laciniately toothed. Involucres numerous, subsolitary, axillary, $\frac{1}{12}$ in. long, broadly campanulate, glabrous ; stalk $\frac{1}{10}$—$\frac{1}{20}$ in. long ; lobes triangular, apiculate ; gland very shortly stipitate with a small limb. Capsules $\frac{1}{16}$ in. in diam., glabrous, keeled ; styles short, deeply 2-fid. Seeds scarcely $\frac{1}{20}$ in. long, obtusely quadrangular, very bluntly pointed, yellowish-brown, smooth, mucous when wetted. Fl. B. I. v. 5, p. 252 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 923 ; Watt, Dict. Econ. Prod. v. 3, p. 296. *Euphorbia uniflora,* Dalz. & Gibs. p. 227 (*not* of Roxb.).

KONKAN : *Law* ! ; *Stocks* ! ; Dasgaon, *Dalzell & Gibson.*—DISTRIB. India (Bengal, Behar, Tirhut, W. Peninsula) ; Java.

21. **Euphorbia Clarkeana,** *Hook. f. Fl. B. I.* v. 5 (1887) p. 253. Glabrous ; stems filiform, 3—8 in. long, numerous, prostrate and spreading (rarely suberect), leafy from an annual root, glabrous or nearly so. Leaves coriaceous, distichously spreading, $\frac{1}{8}$—$\frac{3}{8}$ by $\frac{1}{20}$—$\frac{1}{8}$ in., often crowded towards the ends of short branches, obliquely linear-oblong, entire or toothed at the rounded tip, glabrous, base very unequal-sided, almost auricled at one side ; petioles very short ; stipules rather large, setaceous from a broad toothed base. Involucres axillary, solitary, $\frac{1}{10}$ in. long, campanulate, glabrous ; lobes lanceolate, toothed, longer than the gland ; gland minute without a limb. Capsules glabrous, $\frac{1}{16}$ in. in diam. ; cocci keeled. Seeds $\frac{1}{20}$ in. long, acutely 4-angled, shortly bluntly pointed, obscurely transversely

rugose, pale-brown, mucous when wetted. Woodr. in Journ. Bomb. *Nat. v. 12 (1899) p. 369.*

SIND : *Stocks* !—DISTRIB. India (Panjáb, W. Peninsula).

Euphorbia pulcherrima, Willd. ex Klotzsch, in Otto & Dietr. Allg. Gartenz. v. 2 (1834) p. 27. An unarmed shrub, a native of America, with slender woody branches naked below. Upper floral leaves opposite, brightly colored, crimson or occasionally yellowish-white. Much grown in gardens as an ornamental plant on account of its showy floral leaves. Fl. B. I. v. 5, p. 239 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 & Gard. in Ind. ed. 5, p. 433 ; Prain, Beng. Pl. p. 922 ; Watt, Dict. Econ. Prod. v. 3, p. 299. *Poinsettia pulcherrima,* R. Grah. in Edinb. N. Phil. Journ. v. 20 (Jan. 1836) p. 412 ; Dalz. & Gibs. Suppl. p. 76.—Flowers in the cold season.

Euphorbia Tirucalli, Linn. Sp. Pl. (1753) p. 452. The common smooth *Milk-bush,* a native of Africa. Grows to the height of 20 ft. with spreading cylindric rush-like smooth green almost leafless branches. Used as a hedge plant and, though unarmed, makes a good fence, as cattle avoid it owing to its acrid milky juice. The older stems are often used for rafters, as the wood is strong and not liable to the attacks of insects. The wood is also used for making toys. Fl. B. I. v. 5, p. 254 ; Grah. Cat. p. 179 ; Dalz. & Gibs. Suppl. p. 76 ; Talb. Trees, Bomb. ed. 2, p. 297 ; Prain, Beng. Pl. p. 922 ; Watt, Dict. Econ. Prod. v. 3, p. 301.—Flowers : Aug.—Sept. VERN. *Sher.*

Euphorbia splendens, Boj. ex Hook. in Bot. Mag. (1929) t. 2902. A shrub, a native of Madagascar, with a much-branched stem and numerous long straight sharp thorns, alternate spathulate mucronate leaves, and scarlet showy flowers in dichotomous cymes. Dalz. & Gibs. Suppl. p. 76 ; Woodr. Gard. in Ind. ed. 5, p. 433.—Flowers : Jan.—Mar.

Euphorbia heterophylla, Linn. Sp. Pl. (1753) p. 453. An annual hairy herb, a native of N. America, in gardens and as an escape. Leaves of stem all alternate. Floral leaves opposite, green towards the apex, scarlet, crimson or rose-colored towards the base. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 922.—Flowers : Sept.—Mar.

Euphorbia geniculata, Orteg. Nov. Pl. Hort. Matrit. Dec. (1797) p. 18. An annual herb, a native of Tropical America, occasionally occurring as a weed in gardens. Leaves alternate in the lower, opposite in the upper part. Floral leaves narrower, green towards the apex, pale near the base. Fl. B. I. v. 5, p. 239 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 922.—Flowers : Oct.—Mar.

2. **BISCHOFIA,** Blume.

A large tree. Leaves alternate, 3-foliolate ; leaflets often crenate, Flowers minute, dicœcious, in axillary or lateral paniculate racemes,

the males scattered or clustered, with short pedicels, the females with longer pedicels. MALE FLOWERS: Sepals 5, concave, obtuse, imbricate, concealing the anthers. Petals 0. Disk 0. Stamens 5; filaments short; anthers large, the cells parallel. Pistillode short, broad. FEMALE FLOWERS: Sepals 5, ovate. Staminodes small or obsolete. Ovary exserted, 3—4-celled; ovules 2 in each cell; styles long, linear, stout, entire, stigmatic throughout on the inner face. Fruit a globose fleshy berry with 3—4 cells lined with a parchment-like 2-valved endocarp. Seeds turgidly oblong; testa crustaceous; albumen fleshy; cotyledons broad, flat; radicle straight, elongate.—DISTRIB. India (Sub-Himalayan forests and outer hills, Chota Nagpur, Assam, Burma, Chittagong, W. Peninsula); Malaya and Pacific Islands; species 1.

1. **Bischofia javanica,** *Blume, Bijdr.* (1826) p. 1168. A large deciduous tree with a tall erect cylindric trunk often of great girth; bark dark-colored; branches spreading, forming a large shady head. Leaves 3-foliolate, alternate; common petiole 3—6 in. long; leaflets 3—6 by 1½—3 in., elliptic, acuminate, crenate, glabrous; main nerves 6—8 pairs, slender; petiolules of lateral leaflets ⅜—⅝ in., those of the terminal leaflets reaching 1½ in. long. Flowers green, in axillary and lateral pedunculate paniculate racemes. MALE FLOWERS: Pedicels very short, slender. Sepals 5, obovate, concave, $\frac{1}{20}$ in. long. Stamens 5; filaments short; anthers globular. Pistillode short, broad. FEMALE FLOWERS: Pedicels longer than in the male, stout, elongating in fruit. Sepals ovate, subobtuse, $\frac{1}{10}$ in. long, not persistent in fruit. Styles nearly ⅛ in. long, linear. Fruit globose, fleshy, ¼—⅓ in. in diam., on long thickened pedicels, reddish-brown, 3—4-celled. Seeds 3 or 4, smooth, shining, brown, ⅛ in. long. Fl. B. I. v. 5, p. 345; Bedd. Flor. Sylvat. t. 259; Talb. Trees, Bomb. ed. 2, p. 306; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370; Prain, Beng. Pl. p. 926; Watt, Dict. Econ. Prod. v. 1, p. 454. *Bischofia trifoliata,* Hook. Icon. Pl. t. 844. *Stylodiscus trifoliatus,* Benn. Pl. Jav. Rar. p. 133, t. 29; Dalz. & Gibs. p. 235.—Flowers: Mar.—Apr. VERN. *Bok.*

KONKAN: *Stocks*!, *Law*! S. M. COUNTRY: Chorla Ghát, plentiful, *Dalzell & Gibson.* KANARA: evergreen forests of N. Kanara, common on the Ghâts, *Talbot*; Ambgaon, *Ritchie,* 1341!—DISTRIB. of the genus.

The tree furnishes a very beautiful wood which does not warp and deserves attention (*Brandis*).

3. **BRIDELIA,** Willd.

Shrubs or trees. Leaves alternate, usually quite entire, sometimes with strong nerves and prominent cross veins. Flowers monœcious or dicecious, small or minute, in axillary or spicate clusters, sessile or shortly pedicellate; bracts small, scale-like. MALE FLOWERS numerous. Perianth double. Calyx-segments 5, valvate. Petals 5, short, scale-like, stalked or spathulate. Disk broad, pulvinate or adnate to the calyx-tube. Stamens 5; filaments connate below in a column, which bears a terminal pistillode, free and spreading above; anther-cells 2, parallel. FEMALE FLOWERS few or solitary.

Calyx-segments usually narrower than in the male. Disk double, the inner forming a membranous central truncate cone often enclosing the young ovary. Ovary 2 (rarely 3)-celled, glabrous ; ovules 2 in each cell ; styles free or shortly united below, forked or subentire. Fruit a small drupe with 1—2 usually single-seeded cocci or pyrenes. Seed with usually fleshy, sometimes membranous albumen ; cotyledons thin or fleshy.—DISTRIB. Species about 30, Tropical African, Asiatic, and Australian.

Flowers dicœcious.
A tree; main nerves of leaves 15—25 pairs, straight; calyx glabrous ..... 1. *B. retusa.*
Flowers moncœcious.
A large climbing shrub; main nerves of leaves 6—12 pairs, slightly arching; calyx hairy; drupe oblong; style-arms long, slender ..... 2. *B. stipularis.*
A straggling shrub; main nerves of leaves 5—9 pairs, straight, branched; calyx glabrous; drupe globose; style-arms short, thick ..... 3. *B. Hamiltoniana.*

1. **Bridelia retusa,** *Spreng. Syst. Veg.* v. 3 (1826) p. 48. A small or moderate-sized deciduous tree, spinous when young ; bark grey. Leaves numerous, 3—6 by 1½—2½ in., rigidly coriaceous, elliptic-oblong, obtuse, subacute or rounded at the apex, with entire or slightly crenulate margins, bright green and glabrous above (turning pinkish-brown before falling), glaucous and usually finely tomentose beneath, base usually rounded (rarely cordate) ; main nerves prominent, straight, 15—25 pairs with finely reticulate venation between ; petioles ¼—½ in. long ; stipules ovate-lanceolate, usually oblique at the base, deciduous. Flowers dicœcious, greenish-yellow, sessile or shortly pedicellate, crowded in dense axillary clusters or on long axillary or terminal, sometimes paniculate spikes often exceeding the leaves. Calyx greenish, tinged with red, ⅛ in. in diam., glabrous ; segments fleshy, triangular-ovate, acute, spreading. Petals greenish-white, those of the male flowers obovate, pectinate, those of the female flowers subspathulate. Disk of male flowers thick and pulpy, of the female flowers truncate, enclosing the ovary. [illegible] short. Drupe fleshy, seated on the persistent slightly enlarged [illegible]x, ⅓ in. in diam., purple-black, edible. Fl. B. I. v. 5, p. 268 ; [illegible]edd. Flor. Sylvat. t. 260 ; Trim. Fl. Ceyl. v. 4, p. 10 ; Talb. Trees, Bomb. ed. 2, p. 298 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 927 ; Watt, Dict. Econ. Prod. v. 1, p. 536. *Briedelia spinosa,* Willd. Sp. Pl. v. 4 (1805) p. 979 ; Grah. Cat. p. 184. *B. montana,* Grah. Cat. p. 184 (*not* of Willd.) ; Dalz. & Gibs. p. 233.—Flowers : May—Oct. VERN. *Asána* ; *Kutgi.*

The earliest name of this plant under *Bridelia* is *B. spinosa,* Willd.

Tolerably common on the Konkan hills. KONKAN : *Law* !, *Stocks* !, *Lambert* ! ; Elephanta, *Graham* ; Matheran, *Cooke* ! DECCAN : Khandala, *Cooke* ! ; Mahableshwar, *Cooke* !—DISTRIB. Throughout India ; Ceylon.

2. **Bridelia stipularis,** *Blume, Bijdr.* (1825) p. 597. A large climbing shrub, sometimes with aerial roots (*Talbot*) ; bark dark-grey ; stems 2—8 in. in diam. ; branches sometimes with long deflexed

spines ; young branches long, slender, usually fulvous-tomentose. Leaves 1—4 by ½—2 in., subcoriaceous, elliptic-oblong or obovate, obtuse or subacute, often with shallowly crenate margins, glabrous above, pale and pubescent beneath ; main nerves 6—12 pairs, slightly arching, the transverse veins at right angles, parallel ; petioles ⅛—⅜ in. long. Flowers monœcious, greenish-yellow, in small dense axillary clusters or long spikes, often subtended by stipular hairy obliquely lanceolate acute bracts ⅛ in. long. Calyx ⅛ in. long, hairy outside ; segments triangular-ovate, acute, connate at the base. Petals $\frac{1}{16}$ in. long, broadly obovate or suborbicular, shortly cuneate at base, crenulate at apex. Staminal column ⅛ in. long to top of anthers. Styles with long slender arms. Drupe ⅜ in. long or more, ellipsoid-oblong, seated on the slightly enlarged calyx, black and juicy when ripe. Fl. B. I. v. 5, p. 270 ; Bedd. For. Man. in Flor. Sylvat. p. cci ; Talb. Trees, Bomb. ed. 2, p. 298 ; Prain, Beng. Pl. p. 927 ; Watt, Dict. Econ. Prod. v. 3, p. 536. *Briedelia scandens,* Willd. Sp. Pl. (1805) p. 979 ; Grah. Cat. p. 184 ; Dalz. & Gibs. p. 233 ; Trim. Fl. Ceyl. v. 4, p. 11. *B. montana,* Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 (*not* of Willd.). *Clutia stipularis,* Linn. Mantiss. p. 127. —Flowers : Oct.—Dec. VERN. *Patharpoda.*

The earliest name of this plant under *Bridelia* is *B. scandens,* Willd.

KONKAN : hilly parts, *Dalzell & Gibson* ; hills about Nagotna, *Graham* ; Ambeghát, *Woodrow.* DECCAN : hills about Pár, *Graham.* S. M. COUNTRY : Dharwar, *Cooke* ! ; Belgaum, *Cooke.* KANARA : banks of the Gatpraba River, *Law* ex *Graham.*—DISTRIB. Throughout India ; Ceylon, Malay Islands, Philippines, Tropical Africa.

3. **Bridelia Hamiltoniana,** *Wall. Cat.* (1828) 7882. A straggling nearly glabrous shrub. Leaves 1½—3½ by ¾—1¾ in., elongate-elliptic or obovate-elliptic or rhomboid, obtuse, entire or slightly crenulate, glabrous, base cuneately narrowed into the petiole ; main nerves 5—9 pairs, nearly straight, branched, with reticulate venation between ; petioles ⅛—¼ in. long ; stipules lanceolate-subulate, $\frac{1}{12}$—⅛ in. long. Flowers in minute axillary and spicate sessile clusters. Calyx ⅛ in. long, glabrous ; segments triangular-ovate, acute, connate at the base. Petals of male flowers orbicular-rhomboid, those of female flowers $\frac{1}{16}$—$\frac{1}{12}$ in. long, ovate, acute. Styles 2, distinct, $\frac{1}{25}$ in. long, shortly and bluntly 2-fid. Drupe globose, ¼ in. in diam., seated on the unaltered calyx, black. Fl. B. I. v. 5, p. 271 ; Bedd. For. Man. in Flor. Sylvat. p. ccii ; Talb. Trees, Bomb. ed. 2, p. 298 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369.—Flowers : Aug.—Nov.

Prain (Beng. Pl. p. 927) unites this with *B. montana,* Willd., but the difference between that species and the specimens of *B. Hamiltoniana* from W. India is so marked that I doubt if he could have had any Bombay specimens to examine.

KONKAN : *Law* !, *Lambert* !, *Dalzell* !, *Stocks* ! ; Shrivardhan (Colaba district), *Woodrow* ! ; Matheran, *Cooke* !, *Woodrow.* GUJARAT : *Kanitkar* !—DISTRIB. India (Behar, W. Peninsula).

4. CLEISTANTHUS, Hook. f.

Trees or shrubs. Leaves alternate, bifarious, entire. Flowers monœcious, small or minute, in axillary clusters or spikes, all sessile or the females shortly pedicellate. MALE FLOWERS: Calyx-segments 5, valvate. Petals 5, short, scale-like, stalked or spathulate. Disk broad, entire or sinuate. Stamens 5; filaments connate below in a central column, bearing a pyramidal or 3-lobed pistillode, free and spreading above; anther-cells parallel. FEMALE FLOWERS: Calyx less deeply lobed than in the male, cupular under the ovary. Disk double, the inner conic or turbinate, more or less enclosing the young ovary. Ovary 3 (rarely 4) celled, usually clothed with long hairs; ovules 2 in each cell; styles 3, free, 2-fid. Fruit a sessile or stipitate subglobose or depressed capsule with three 2-valved cocci. Seeds without an aril or arillode; albumen copious or scanty; cotyledons thin or fleshy, often folded.—DISTRIB. Tropical India, Malaya, Africa; species about 30.

1. **Cleistanthus malabaricus,** *Muell. Arg. in DC. Prodr.* v. 15, part 2 (1866) p. 508. A large shrub or small tree; young branches densely rufous-villous. Leaves 2½—6 by ⅞—1¾ in., oblanceolate, acuminate, glabrous or slightly hairy above, glaucous and thinly hairy beneath, narrowed into a short rufous-villous petiole less than ⅛ in. long; main nerves 6—10 pairs, arched; stipules ⅛—¼ in. long, linear-lanceolate. Flowers few, in axillary clusters. Calyx of female flowers ⅛—¼ in. long, glabrous; segments lanceolate, acute, connate at the base. Petals of female flowers ⅒ in. long, obovate, clowed. Capsules more than ¼ in. long, sparsely fulvous-hairy, 3 (sometimes 4)-celled (*Talbot*), deeply 3-lobed at the top and sides, subglobose. Seeds rugose, 3-angled. Fl. B. I. v. 5, p. 276; Bedd. For. Man. in Flor. Sylvat. p. cciii; Talb. Trees, Bomb. ed. 2, p. 299; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369; Watt, Dict. Econ. Prod. v. 2, p. 369.—Flowers: Nov.—Jan.

Dalzell without locality in Herb. Kew.! KONKAN: *Stocks*!, *Law*! KANARA: in the evergreen forests of N. Kanara, usually near streams and rivers, ; Falls of Gairsoppa, common near the river-bank above the great fall, *ol*!—DISTRIB. India (W. Peninsula).

5. ACTEPHILA, Blume.

Trees or shrubs. Leaves alternate, usually large, entire; stipules deciduous. Flowers monœcious or casually dicœcious, in axillary clusters; males numerous, shortly pedicellate; females solitary or few with long pedicels. MALE FLOWERS: Perianth usually double. Sepals 5—6, subequal or the inner larger, imbricate. Petals 5—6, small, scale-like or 0. Disk broad, entire or 5-lobed. Stamens 3—6, inserted on the disk; filaments free or nearly so; anther-cells parallel. Pistillode 3-cleft. FEMALE FLOWERS: Perianth as in the male. Ovary 3-celled, sessile on the 5-lobed disk; ovules 2 in each cell: styles short, free or connate, entire or 2-fid. Fruit a hard loculicidal capsule of three 2-valved cocci. Seed usually solitary in each coccus, large, 3-gonous, without aril or arillode; testa thin, brittle; albumen

scanty or 0 ; cotyledons fleshy, plicate or corrugate.—DISTRIB. India, Malaya, Australia ; species about 10.

1. **Actephila excelsa,** *Muell. Arg. in Linnæa,* v. 32 (1863) p. 78. A shrub or small tree ; bark greyish-brown, lenticellate ; young parts glabrous or nearly so. Leaves 3—7 by 1½—3 in., coriaceous, elliptic, obovate or oblanceolate, subacute or acuminate, glabrous, base acute ; main nerves 8—12 pairs, arched, slender ; petioles ⅓—¾ in. long ; stipules small, acuminate from a broad base, deciduous. Flowers usually monœcious, the males and females usually in the same cluster, the male flowers on short pedicels, the females on pedicels ¾—1½ in. long. Calyx-segments broadly ovate, obtuse. Petals obovate, cuneate, sometimes incised or 2-fid. Ovary globose, 3-lobed ; styles 3, bifid, divaricate. Capsules ¾—1¼ in. in diam., depressed-globose, 3-lobed, glabrous, minutely wrinkled when dry, seated on the persistent calyx. Seeds ½ in. long, obtusely trigonous, dorsally rounded, brown. Fl. B. I. v. 5, p. 282 ; Bedd. For. Man. in Flor. Sylvat. p. clxxxix & Anal. Gen. t. 23, fig. 3 ; Talb. Trees, Bomb. ed. 2, p. 299 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369 ; Prain, Beng. Pl. p. 929. *Actephila neilgherrensis,* Wight, Icon. (1852) t. 1910 ; Trim. Fl. Ceyl. v. 4, p. 14. *Anomospermum excelsum,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 228 & Bomb. Flor. p. 233.—Flowers : Aug.—Sept.

The earliest name of the plant under the genus *Actephila* is *A. neilgherrensis,* Wight.

KONKAN : *Stocks* !, *Dalzell* ! ; Sayhadri hills, *Dalzell* ! ; Phonda Ghát, *Dalzell.* S. M. COUNTRY : Castlerock, *Woodrow.*—DISTRIB. India (Assam, Birma, Chittagong, Cachar, Andamans, W. Peninsula) ; Ceylon, Java.

6. ANDRACHNE, Linn.

Herbs, undershrubs, or slender shrubs. Leaves alternate, petiolate, membranous, usually small, entire. Flowers small, monœcious, pedicellate ; male flowers clustered in the axils ; females solitary. MALE FLOWERS : Perianth usually double. Calyx 5—6-lobed or -partite. Petals 5—6, small or 0. Glands of the disk as many or twice as many as the petals. Stamens 5—6, alternate with the petals ; anthers erect, the cells parallel. Pistillode small. FEMALE FLOWERS : Calyx-segments usually larger than in the male. Petals minute or 0. Ovary 3-celled ; ovules 2 in each cell ; styles short, 2-fid or 2-partite. Capsule of three 2-valved cocci. Seeds curved, rugose, estrophiolate ; albumen fleshy ; embryo curved ; cotyledons broad, flat.—DISTRIB. Species about 10, variously dispersed.

1. **Andrachne aspera,** *Spreng. Syst. Veg.* v. 3 (1826) p. 884. A small somewhat glaucous undershrub ; stems numerous from a thick woody root, prostrate or ascending, very slender, 4—12 in. long, clothed with short glandular hairs. Leaves orbicular or more commonly reniform, usually broader than long, ¼—½ by ⅜—⅝ in., gradually smaller upwards, obtuse, shortly glandular-hairy, base cordate ; petioles of the lower leaves ¼ in. long or more, filiform,

those of the upper leaves very short ; stipules minute, lanceolate, hairy. Calyx 5-partite, hairy ; sepals $\frac{1}{10}$ in. long, lanceolate, obtuse, ciliate. Petals when present shorter than the calyx. Glands of the disk fleshy, those of the male flowers peltate, incised, those of the female obovate, truncate. Capsules $\frac{1}{8}$ in. in diam., globose, hairy, on filiform pedicels reaching $\frac{1}{8}$ in. long ; styles three, 2-partite to the base, $\frac{1}{30}$ in. long. Seeds 3-gonous, nearly white, reaching $\frac{1}{10}$ in. long, curved, rounded on the back, rugose. Fl. B. I. v. 5, p. 284 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369.—Flowers : Aug.

SIND : *Stocks* ; hills at the Hub near Karachi, *Bhola Puran* ! ; Laki, *Woodrow* !—DISTRIB. Persia, Arabia, Tropical Africa.

7. GLOCHIDION, Forst.

Evergreen trees or shrubs. Leaves alternate, bifarious, shortly petiolate, entire. Flowers small, monœcious or diœcious, in axillary clusters. Perianth simple. Petals 0. Disk 0. MALE FLOWERS : Sepals 6 (rarely 5), spreading, in 2 series, imbricate. Stamens connate in an ellipsoid or oblong sessile column ; anthers 3—8 (sometimes more), the cells linear, dehiscing extrorsely ; connectives produced as free points or connate in an umbonate head. Pistillode 0 or rarely minute and hidden between the anthers. FEMALE FLOWERS : Calyx usually of 6 short imbricate sepals or shortly tubular and unequally toothed or cleft. Ovary 3—15 celled ; ovules 2 in each cell ; styles connate in a globose, columnar conic or subclavate column, lobed or toothed at the tip. Fruit a capsule of 3 or more 2-valved cocci, often with twice as many lobes as cells, globose or orbicular and depressed, or intruded at the base and apex, crowned by the often enlarged style ; cocci coriaceous or crustaceous, the epicarp separable or not. Seeds hemispheric or laterally compressed ; testa crustaceous with often a succulent coat ; albumen copious, fleshy ; cotyledons flat.—DISTRIB. Species about 120, chiefly tropical Asiatic.

Anthers 4 or more; sepals of female flowers 5—6, distinct or connate at the base only.	
Flowers in axillary fascicles; capsules pubescent or hoary.	
Branchlets, leaves beneath, and flowers glabrous; capsules $\frac{3}{4}$ in. in diam., hoary.....	1. *G. lanceolarium.*
Branchlets, leaves beneath, and flowers pubescent; capsules $\frac{1}{4}$—$\frac{1}{3}$ in. in diam., pubescent...	2. *G. tomentosum.*
Flowers in umbellate clusters, on short usually supra-axillary peduncles; capsules glabrous.....	3. *G. zeylanicum* var. *nitidum.*
Anthers 3; sepals 5—6, distinct or connate at the base only.	
Female flowers pedicellate; branchlets pubescent.....	4. *G. velutinum.*
Female flowers sessile or nearly so; branchlets glabrous.	
Stipules subulate; style pubescent; capsules reaching $\frac{1}{2}$ in. in diam.	5. *G. malabaricum.*
Stipules triangular; style glabrous; capsules $\frac{1}{5}$—$\frac{1}{3}$ in. in diam.	6. *G. ellipticum.*
Anthers 3; calyx irregularly 4—6-toothed or -lobed.	
Calyx glabrous; capsules $\frac{3}{8}$ in. in diam., 6—8-lobed...	7. *G. Hohenackeri.*
Calyx pubescent, capsules $\frac{1}{4}$ in. in diam., irregularly and slightly 3-lobed	8. *G. Johnstonei.*

1. **Glochidion lanceolarium,** *Voigt, Hort. Suburb. Calc.* (1845) p. 153. A middle-sized evergreen tree ; branchlets angular, glabrous. Leaves coriaceous, 3—6 by 1½—2½ in., elliptic-oblong or elliptic-lanceolate, acuminate, shining, glabrous, base acute ; nerves 6—10 pairs, slender ; petioles ¼—½ in. long ; stipules triangular, acuminate. Flowers in axillary fascicle. MALE FLOWERS numerous, glabrous. Pedicels ½—¾ in. long, filiform. Sepals ⅛ in. long, linear-oblong. Anthers 4—6 ; connectives acute, ¼ the length of the anther. FEMALE FLOWERS few, sessile, mostly in the upper axils, a few mixed with the males. Sepals glabrous, unequal, rigidly coriaceous, cuspidate. Ovary hairy, usually 6 (sometimes 7—8)-celled, narrowed gradually into the conic-cylindric style, which is glabrous near the 6-toothed apex. Capsules orbicular, depressed, usually 6-celled and 12-lobed, ¾ in. in diam., hoary. Fl. B. I. v. 5, p. 308 ; Prain, Beng. Pl. p. 930 ; Watt, Dict. Econ. Prod. v. 3, p. 506.

The occurrence of this tree in the Bombay Presidency seems very doubtful. The tree called *G. lanceolarium* by Dalzell is *G. Hohenackeri*, Bedd. Talbot (Trees, Bomb. ed. 2, p. 301) says that *G. lanceolarium* is common on the Konkan and N. Kanara Ghâts, but I think it will be found that the *Bhoma* which occurs there is *G. Hohenackeri*, Bedd., which differs from *G. lanceolarium* in the number of anthers, the size of the capsules, and the glabrous ovary. See remarks under *G. Hohenackeri*, No. 7.

2. **Glochidion tomentosum,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 38. A shrub or small tree ; branchlets, leaves beneath, and flowers finely pubescent. Leaves 2—6 by 1—2½ in., elliptic-oblong or ovate-oblong, acute or acuminate, base usually rounded ; main nerves 6—8 pairs ; petioles ⅛—¼ in. long ; stipules lanceolate, acute, hairy. Flowers pedicellate, in axillary fascicles, the males few. MALE FLOWERS : Pedicels ⅜ in. long. Sepals 6, fleshy, ⅛ in. long, the 3 outer hairy outside, ciliolate, broadly rotund-ovate, twice as broad as the 3 inner, which are oblong or obovate-oblong, rounded at the apex, glabrous on the back. Staminal-column 1/12 in. high ; anthers 5—7 ; connectives about 1/50 in. long, acute. FEMALE FLOWERS : Pedicels ⅛ in. long. Sepals 4—6, about ⅛ in. long ; when 6 the 3 outer ovate, subacute, hairy outside and ciliate, thick and fleshy, 1/12 in. broad, the three inner about half as broad as the outer, oblong, often apiculate ; when sepals are 4 one of them only like the inner of the 6. Ovary spherical, sulcate, 5-celled ; style stout, conical, 4—5-cleft at the tip. Capsules ¼—⅓ in. in diam., depressed-globose, obscurely 10—12-lobed, pubescent. Fl. B. I. v. 5, p. 309 ; Bedd. For. Man. in Flor. Sylvat. p. cxcii ; Talb. Trees, Bomb. ed. 2, p. 302 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370.—Flowers : Dec.—Feb.

KONKAN : *Stocks* !, *Law* ! KANARA : *Dalzell* ; Yellapur, *Talbot*, 481 ! ; Falls of Gairsoppa, *Talbot*, 2645 !—DISTRIB. India (W. Peninsula).

3. **Glochidion zeylanicum,** *A. Juss. Tent. Euphorb.* (1824) p. 107. VAR. **nitidum,** *Hook. f. Fl. B. I.* v. 5 (1887) p. 311. A small nearly glabrous tree ; stem 1 ft. in diam. ; bark thin, grey, corky. Leaves 3½—7 by 1½—2½ in., oblong, obtuse or bluntly acuminate, glabrous, bright apple-green and shining above, paler beneath, base unequal-sided, usually rounded ; main-nerves 8—10 pairs ; petioles

⅛—¼ in. long, stout ; stipules triangular, acute, ⅛ in. long. Flowers shortly pedicellate, the male and female together in umbellate clusters on very short usually supra-axillary peduncles, the female flowers the more numerous. Sepals 5—6 in both sexes, broadly ovate-oblong, rounded at the apex, 1/10—⅛ in. long, fleshy, glabrous, similar in both sexes. Staminal-column 1/20 in. high ; anthers 5—7. Ovary 4—7-celled ; styles connate into a short cone, 6—8-toothed at the apex. Capsules ⅜—⅝ in. in diam., subglobose, pedicellate, obscurely lobed, glabrous. *Glochidion zeylanicum,* Talb. Trees, Bomb. ed. 2, p. 302 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370. *G. nitidum* Dalz. & Gibs. Bo. Fl. (1861) p. 235 ; Bedd. For. Man. in Flor. Sylvat. p. cxcii.—Flowers : Oct.—June.

KONKAN : near water in the S. Konkan, *Dalzell & Gibson*; Vingorla, *Dalzell* ! KANARA : N. Kanara Ghâts along streams and watercourses, both in evergreen and deciduous forests, *Talbot*; Yellapur and Jagalbet, *Woodrow*.—DISTRIB. India (W. Peninsula).

4. **Glochidion velutinum,** *Wight, Icon.* v. 5, part 2 (1852) p. 29, t. 1907—2. A small tree 26—30 ft. high ; young branches, under surface of the leaves, petioles, and inflorescence clothed with short velvety pubescence. Leaves thinly coriaceous, 2—4½ by 1⅛—2¼ in., elliptic-oblong or elliptic-lanceolate, acute, obtuse or shortly acuminate, base usually acute ; main nerves 6—8 pairs, conspicuous ; petioles ⅛ in. long ; stipules triangular, cuspidate. Flowers in axillary clusters, the males and females together. MALE FLOWERS : Pedicels often ¼ in. long, slender, pubescent. Sepals ⅛ in. long, ovate, subacute, keeled and pubescent on the back. Staminal-column 1/16 in. high ; anthers 3, connate in the lower half ; connectives acute, 1/10 in. long. FEMALE FLOWERS : Pedicels 0—⅛ in. long, pubescent. Ovary and style pubescent ; style enlarged at the truncate 4—7-toothed tip, longer than the ovary. Capsules ½ in. in diam., orbicular, depressed, 4—7-celled and 4—7-lobed, sessile or pedicellate, often leaving the bright red seeds on the tree. Fl. B. I. v. 5, p. 322 ; Bedd. For. Man. in Flor. Sylvat. p. cxcv ; Talb. Trees, Bomb. ed. 2, p. 303 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Prain, Beng. Pl. p. 930 ; , Dict. Econ. Prod. v. 3, p. 506.—Flowers : Dec.—Mar.

Dalzell without locality in Herb. Kew. KONKAN : *Law* ! ; Ghâts, *Stocks* ! M. COUNTRY : Londa, *Woodrow*. KANARA : *Ritchie*, 139 ! ; Jagalbet, *Talbot*, 21 !—DISTRIB. India (hot valleys of the Himalaya, Birma, Khasia Hills, W. Peninsula).

5. **Glochidion malabaricum,** *Bedd. For. Man. in Flor. Sylvat.* (1872) p. cxciv. A small tree ; branchlets glabrous. Leaves 3—5 by 1¼—2 in., elliptic-oblong or elliptic-lanceolate, acuminate, glabrous, base usually subacute ; main nerves 6—8 pairs, arching ; petioles ⅛—⅙ in. long ; stipules lanceolate-subulate. Flowers axillary, in dense clusters. MALE FLOWERS : Pedicels reaching ½ in. long, filiform. Calyx divided almost to the base ; sepals 6, fleshy, ⅛ by 1/20 in., oblanceolate-oblong. Staminal-column 1/16 in. high ; anthers free ; connectives about 1/10 in. long, triangular, acute. FEMALE FLOWERS sessile (rarely pedicellate), in dense clusters from which the males arise. Sepals 1/10 by 1/20 in. long, linear-oblong, obtuse. Ovary pubescent, shorter than the style ; style exserted, pubescent, cylindric or

conic, 4—7-toothed at the apex. Capsules reaching ½ in. in diam., orbicular, depressed, 3—5-lobed, pubescent, shortly pedicellate. Fl. B. I. v. 5, p. 319 ; Talb. Trees, Bomb. ed. 2, p. 303 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370.

KONKAN : *Stocks* !, *Law* !, *Talbot*. KANARA : *Law* ! ; N. Kanara Ghâts, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

6. **Glochidion ellipticum,** *Wight, Icon.* v. 5, part 2 (1852) p. 29, t. 1906. A shrub or small tree ; branchlets slender, angled, glabrous. Leaves 3—4¼ by 1—1½ in., elliptic-lanceolate, acuminate, glabrous, base acute, often unequal-sided ; main nerves 6—8 pairs, slender ; petioles ⅛ in. long ; stipules triangular-hastate. Flowers in axillary clusters, males and females together. MALE FLOWERS : Pedicels ¼—⅜ in. long, slender, glabrous or pubescent. Sepals 6, ovate, obtuse, $\frac{1}{16}$—$\frac{1}{12}$ in. long, glabrous. Staminal-column $\frac{1}{20}$ in. high ; anthers 3, free ; connectives $\frac{1}{80}$ in. long, acute. FEMALE FLOWERS : Pedicels 0 or very short. Sepals $\frac{1}{16}$ by $\frac{1}{16}$ in., linear-oblong, obtuse or subacute, pubescent. Style conical, $\frac{1}{30}$—$\frac{1}{20}$ in. long, glabrous or nearly so, 6-toothed at the apex. Capsules ⅕—⅓ in. in diam., depressed-globose, 4-lobed, pubescent. Fl. B. I. v. 5, p. 321 ; Talb. Trees, Bomb. ed. 2, p. 303 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370.—Flowers : Dec.—Feb.

In the Flora of B. I. l. c. the capsules are said to be ½ in. in diam., which seems an error. In an excellent fruiting specimen from Ainshi, N. Kanara (*Talbot,* 1856 !), the capsules are less than ¼ in. in diam., and the male pedicels are pubescent, while Wight's figure shows small capsules, and Talbot (Trees, Bomb. l. c.) calls them *very small*.

KANARA : Ainshi Ghât of N. Kanara, *Talbot,* 1856 !, *Woodrow*.—DISTRIB. India (W. Peninsula), apparently endemic.

7. **Glochidion Hohenackeri,** *Bedd. For. Man. in Flor. Sylvat.* (1873) p. cxciii. A middle-sized tree quite glabrous. Leaves 2½—6 by 1—1¾ in., elliptic-lanceolate, acutely or obtusely acuminate, base usually acute ; main nerves 6—10 pairs, slender ; petioles ¼—⅛ in. long ; stipules ⅛—$\frac{1}{16}$ in. long, obliquely triangular, acute. MALE FLOWERS greenish-yellow, on capillary pedicels reaching ½ in. long. Calyx partite nearly to the base ; sepals ⅛ by $\frac{1}{16}$ in., oblanceolate-oblong, rounded at the apex, fleshy. Anthers 3, about $\frac{1}{12}$ in. long, including the produced pointed connective, which is about $\frac{1}{80}$ in. long. FEMALE FLOWERS few, sessile, in small clusters usually of a deeper yellow than the male. Calyx glabrous, $\frac{1}{16}$ in. long, cup-shaped, with 4—6 irregular short lobes or teeth. Ovary glabrous ; style subglobose, 3—4-notched at the apex, broader than the ovary. Capsules ⅜ in. in diam., nearly sessile, turnip-shaped, 6—8-lobed, much depressed in the centre, crowned by the subglobose style in the sunk top. Seeds red, 2 in each cell, ⅛ in. long, rounded on the back, quite smooth. Fl. B. I. v. 5, p. 314 ; Talb. Trees, Bomb. ed. 2, p. 302 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370. *Glochidion lanceolarium,* Dalz. in Dalz. & Gibs. Bo. Fl. (1861) p. 235 (*not* of Voigt) ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370. *G. Ralphii,* Hook.

f. Fl. B. I. v. 5 (1887) p. 314 ; Talb. Trees, Bomb. ed. 2, p. 302. *Briedelia sinica*, Grah. Cat. p. 184.—Flowers : Dec.—Apr. VERN. *Bhoma*.

Dalzell without locality in Herb. Kew. KONKAN : *Gibson* !, *Stocks* !, *Law* ! ; Ambeghát, *Kanitkar* ! ; Matheran, *Cooke* ! DECCAN : Phonda Ghát, *Ritchie*, 1337 ! ; Mahableshwar, *Cooke* ! ; Khandala, *Graham*, *Cooke* ! KANARA : *Law* !, *Talbot*.—DISTRIB. India (W. Peninsula).

Note.—There is no doubt that this is the tree described by Dalzell as *G. lanceolarium*. Dalzell calls the capsules "*small*," a description which would not apply to the capsules of *G. lanccolarium*. *Glochidion Hahenackeri* is the tree which is so abundant on the Western Ghâts and which may be found at Mahableshwar, Matheran, and Khandala. It has been collected by Stocks, Law, Gibson, Ritchie, and Dalzell. Specimens collected by all these botanists may be found in the Kew Herbarium, whereas, with the exception of a single specimen of doubtful habitat from Herb. Lambert, not a single specimen of *G. lanccolarium*, Voigt, has been sent to Kew by Bombay botanists.

8. **Glochidion Johnstonei,** *Hook. f. Fl. B. I.* v. 5 (1887) p. 314. A small tree 30—40 ft. high ; trunk reaching 1½ ft. in diam. ; bark dark-colored, rough, fissured ; branchlets terete, tomentose. Leaves 3½—4½ by 1½—1¾ in., oblong or elliptic-oblong, obtuse or obtusely acuminate, glabrous above, more or less pubescent on the nerves beneath, base subequal, obtuse or subacute ; main nerves 6—8 pairs, slender, with reticulate venation between ; petioles $\frac{1}{10}$—⅛ in. long ; stipules lanceolate, pubescent, deciduous. Flowers in axillary clusters, the males on pubescent filiform pedicels reaching nearly ¼ in. long, the females sessile. MALE FLOWERS : Sepals 5 or 6, subequal, ⅛—⅙ in. long, linear-oblong or obovate-oblong, obtuse or subacute, sparsely hairy outside, fleshy. Staminal-column $\frac{1}{16}$ in. high ; anthers 3, the produced connectives about $\frac{1}{8}\frac{1}{0}$ in. long, acute. FEMALE FLOWERS sessile. Calyx $\frac{1}{16}$ in. long, hairy outside, turbinate, irregularly 4—6-lobed or -toothed. Style subglobose, obscurely lobed. Capsules ¼ in. across, depressed-globose, usually irregularly and slightly 3-lobed, the lobes again faintly emarginate, pubescent, crowned with 3 rounded pubescent style-tips. Talb. Trees, Bomb. ed. 2, p. 302.—Flowers : Feb.

KONKAN : *Stocks* !, *Law* ! KANARA : Arbail Ghât, *Talbot* ; Supa Ghâts near Anmode, *Talbot*, 1804 !—DISTRIB. India (W. Peninsula), apparently endemic.

8. **FLUGGEA,** Willd.

Shrubs unarmed or spiny. Leaves small, alternate, distichous, entire. Flowers dicœcious, minute, pedicellate, axillary, the males numerous, clustered, the females few in lax fascicles. Perianth simple. MALE FLOWERS : Sepals 5, almost petaloid, imbricate. Petals 0. Disk of 5, 4 or 3 glands, alternate with the stamens. Stamens 5 (rarely 4 or 3) ; filaments free ; anthers erect, the cells parallel, dehiscing longitudinally. Pistillode 2—3-fid. FEMALE FLOWERS : Sepals as in the male. Petals 0. Disk flat, annular, toothed. Ovary 1—3-celled ; ovules 2 in each cell ; styles free, recurved, usually 2-fid. Fruit globose, coriaceous or with a fleshy epicarp, bursting irregularly or into distinct 2-valved cocci. Seeds 3-quetrous with convex backs and

acute faces ; testa crustaceous ; albumen scanty ; embryo curved ; cotyledons broad, flat. DISTRIB. Tropics of the Old World ; species about 6.

Unarmed; leaves 1—3 in. long ..... 1. *F. microcarpa.*
Spinous; leaves rarely exceeding 1 in. long ..... 2. *F. Leucopyrus.*

1. **Fluggea microcarpa,** *Blume, Bijdr.* (1825) p. 580. A large unarmed glabrous shrub ; bark grey, with small lenticular specks ; branchlets angular. Leaves variable, thin, 1—3 by $\frac{5}{8}$—$1\frac{3}{4}$ in., elliptic or obovate, rounded, obtuse (rarely subacute), glabrous, somewhat glaucous and reticulately veined beneath, base usually acute ; main nerves 5—7 pairs, very slender ; petioles $\frac{1}{8}$—$\frac{1}{4}$ in. long. Flowers in axillary clusters from a crowd of minute bracts, the males very numerous, the females usually 1—5 (rarely several). MALE FLOWERS : Pedicels filiform, sometimes reaching $\frac{3}{8}$ in. long. Sepals $\frac{1}{16}$ by $\frac{1}{30}$ in., obovate-oblong, obtuse, concave. Stamens 3—5 ; filaments slender, free, sometimes $\frac{1}{12}$ in. or more long, with alternate glands at the base. Pistillode large, 3-fid. FEMALE FLOWERS : Pedicels rarely reaching $\frac{1}{4}$ in. long. Sepals as in the male. Ovary glabrous, ovoid or subglobose ; styles 3, about $\frac{1}{20}$ in. long, deeply divided into 2 linear acute segments. Fruit globose, of 2 kinds, one $\frac{1}{8}$—$\frac{1}{6}$ in. in diam., with a dry pericarp, the other $\frac{1}{3}$ in. in diam., white with a fleshy pericarp which is edible. Seeds rounded on the back with acute faces, very minutely punctulate. Fl. B. I. v. 5, p. 328 ; Talb. Trees, Bomb. ed. 2, p. 304 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Prain, Beng. Pl. p. 931. *Fluggea Leucopyrus,* Dalz. & Gibs. p. 236 (*not* of Willd.). *Phyllanthus retusus,* Roxb. Fl. Ind. v. 3, p. 657 ; Grah. Cat. p. 180. *Chorisandra pinnata,* Wight, Icon. t. 1994. *Securinega obovata,* Muell. Arg. in DC. Prodr. v. 15, part 2, p. 449 ; Bedd. For. Man. in Flor. Sylvat. p. cxcvii.—Flowers : May—June. VERN. *Pándharphalli.*

Throughout the Presidency widely spread in deciduous forests. SIND : *Stocks* !—DISTRIB. Throughout India ; China, Malay Islands, Australia, Tropical Africa.

2. **Fluggea Leucopyrus,** *Willd. Sp. Pl.* v. 4 (1805) p. 757. A large rigid bush with somewhat straggling branches ; branchlets angular, slender, leafy, usually ending in sharp spines. Leaves $\frac{5}{8}$—1 by $\frac{1}{2}$—$\frac{5}{8}$ in. (rarely reaching $1\frac{1}{2}$ by 1 in.), obovate, or obcordate, or rotundate, glaucous and reticulately veined beneath. Flowers as in *Fluggea microcarpa.* Fruit globose, about $\frac{1}{4}$ in. in diam., smooth, quite white when ripe, 3-celled ; styles 3, bifid. Fl. B. I. v. 5, p. 328 ; Wight, Icon. t. 1875 ; Trim. Fl. Ceyl. v. 4, p. 33 ; Talb. Trees, Bomb. ed. 2, p. 305 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370. *Fluggea virosa,* Dalz. & Gibs. Bo. Fl. (1861) p. 236. *Securinega Leucopyrus,* Muell. Arg. in DC. Prodr. v. 15, part 2, p. 451 ; Bedd. For. Man. in Flor. Sylvat. p. cxcvii.—Flowers : May. VERN. *Pándharphalli.*

Throughout the Presidency and Sind, usually in open situations, *Talbot.* KONKAN : Malabar and Worli Hills (Bombay), *Dalzell & Gibson.* DECCAN : Parvati Hill near Poona, *Kanitkar* ! ; near Wadi Station, *Bhiva* ! ; Purandhar, *Bhiva* !—DISTRIB. India (Punjáb, Birma, W. Peninsula), Ceylon.

9. SAUROPUS, Blume.

Small shrubs or undershrubs. Leaves alternate, distichous, membranous, quite entire ; stipules minute. Flowers pedicellate, monœcious, minute, axillary, clustered or solitary. Perianth simple. MALE FLOWERS : Sepals connate in a disk-like urceolate or turbinate 6-lobed or 6-cleft calyx ; mouth small with superficial thickenings that meet round the stamens. Petals 0. Disk 0. Stamens 3 ; filaments connate in a short truncate 3-gonous column ; anthers sessile on the angles of the column, the cells linear or subglobose, dehiscing extrorsely. Pistillode 0. FEMALE FLOWERS : Sepals connate in a 6-cleft accrescent calyx. Petals 0. Disk 0. Ovary ovoid or globose, 3-celled, rounded or concave at the apex ; ovules 2 in each cell ; styles 3, very short, spreading, 2-fid or 2-partite. Fruit globose or depressed, fleshy or coriaceous, 6-valved or rupturing irregularly, containing 6 indehiscent 3-gonous crustaceous or bony cocci. Seeds with fleshy albumen ; embryo straight or nearly so ; cotyledons flat, broad.—DISTRIB. India and Malaya ; species about 20.

1. **Sauropus quadrangularis,** *Muell. Arg. in Linnæa,* v. 32 (1863) p. 73. A low slender branched shrub 1—1½ ft. high ; young shoots angular. Leaves ½—⅞ by ⅓—½ in., thin, elliptic-oblong or obovate, apiculate, base obtuse or acute ; main nerves 4—5 pairs ; petioles $\frac{1}{20}$ in. long ; stipules minute, lanceolate-subulate. MALE FLOWERS : Pedicels filiform, reaching ¼ in. long. Calyx 6-lobed, divided about ½-way down ; lobes about $\frac{1}{20}$ in. long, triangular, acute ; basal appendages vaulting over the small staminal column. FEMALE FLOWERS solitary from the upper axils. Pedicels short. Calyx divided almost to the base ; sepals $\frac{1}{6}$ by $\frac{1}{5}$ in., obovate, rounded at the apex, veined. Fruit ⅓ in. in diam., depressed-globose ; cocci $\frac{1}{6}$ in. long, rounded on the back, with acute faces, 3-gonous, smooth, pale. Fl. B. I. v. 5, p. 335 ; Talb. Trees, Bomb. ed. 2, p. 304 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Prain, Beng. Pl. p. 932. *Phyllanthus rhamnoides,* Roxb. Fl. Ind. v. 3 (1832) p. 663 (*not* of Willd.). *Ceratogynum rhamnoides,* Wight, Icon. t. 1900 (figure bad) ; *A.* & Gibs. p. 234.—Flowers : June—Aug. VERN. *Chikli.*

A rather rare plant. KONKAN : Vingorla, *Dalzell & Gibson.* KANARA : *Law* ! ; Arbail Ghât, *Talbot.*—DISTRIB. India (Behar, Chota Nagpur, W. Peninsula, Birma).

10. BREYNIA, Forst.

Shrubs or small trees. Leaves small, alternate, petiolate, entire, often distichous. Flowers monœcious, axillary, minute. Perianth simple. Pedicels distinct, solitary or the males fascicled, the fascicle rarely replaced by a short raceme. MALE FLOWERS : Calyx turbinate or hemispheric with a truncate limb, the margin often thickened and lobulate opposite the minute inflexed and rounded lobes. Petals 0. Disk 0. Stamens 3 ; filaments connate in a column ; anthers slender, adnate to the whole length of the column, the cells linear, parallel, distinct. Pistillode 0. FEMALE FLOWERS : Calyx coriaceous, turbinate, campanulate or rotate ; limb broadly and shortly 6-lobed, often

much accrescent and disciform in fruit. Petals 0. Disk O. Staminodes 0. Ovary 3-celled, fleshy above, globose or truncate or depressed at the apex ; ovules 2 in each cell ; styles 3, sessile or connate in a short column, each 2-fid or 2-lobed ; or stigmas 3, simple, minute, immersed in a cavity at the top of the ovary. Fruit globose or depressed, more or less succulent, indehiscent, or with a 6-valved pericarp enclosing 3—6 imperforate indehiscent cocci. Seeds with membranous testa ; albumen fleshy ; cotyledons broad ; radicle long. —DISTRIB. Tropical Asia, Africa, and Pacific Islands ; species about 12.

Calyx greatly enlarged in fruit ..... 1. *B. patens.*
Calyx not or scarcely enlarged in fruit ..... 2. *B. rhamnoides.*

1. **Breynia patens,** *Rolfe, in Journ. Bot.* N. S. v. 11 (1882) p. 359. A shrub or small tree with spreading branches ; bark smooth, grey ; branchlets slender, angular, glabrous. Leaves numerous, distichous, ½—1⅛ by ⅓—⅝ in., membranous, broadly elliptic, obtuse, glabrous, glaucous beneath ; main nerves 3—5 pairs ; petioles 1/16 in. long ; stipules 1/16 in. long, subulate from a triangular base, persistent. Flowers appearing with the young leaves, axillary on filiform pedicels, the males in the lower, the females in the upper axils. MALE FLOWERS pale yellow, in fascicles of 1—3. Calyx turbinate or campanulate, 1/16—⅛ in. long, truncate or crenate at the mouth. Anthers adnate throughout their entire length to the acute staminal-column which is produced beyond them. FEMALE FLOWERS greenish. Pedicels shorter than in the male. Calyx deeply divided into 6 rounded apiculate segments. Ovary truncate ; styles 3, stout, 2-fid. Fruit depressed-globose, ½—⅔ in. in diam., faintly 3-lobed, orange-red, fleshy but dehiscent, seated on the greatly enlarged colored calyx. Seeds 3-quetrous with an orange-yellow aril ; testa perforate at the hilum. Fl. B. I. v. 5, p. 329 ; Trim. Fl. Ceyl. v. 4, p. 33 ; Talb. Trees, Bomb. ed. 2, p. 303 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Prain, Beng. Pl. p. 933. *Melanthesa obliqua,* Wight, Icon. t. 1898. *M. turbinata,* Wight, Icon. v. 5, part 2, p. 26, t. 1897 (by error in Tab. *truncata*) ; Dalz. & Gibs. p. 234. *Melanthesopsis patens,* Muell. Arg. in DC. Prodr. v. 15, part 2 (1866) p. 437 ; Bedd. in For. Man. in Flor. Sylvat. p. cxcvi. *Phyllanthus turbinatus,* Kœn. ex Roxb. Hort. Beng. (1814) p. 104 ; Grah. Cat. p. 180.—Flowers : Apr.—June. VERN. *Kangli.*

KONKAN : *Law!, Talbot*; Malabar and Worli Hills (Bombay), *Graham*; Salsette, *Graham.* DECCAN : Khandala, *Woodrow*; Lanoli, *Kanitkar*! KANARA : *Talbot*; Yellapur, *Woodrow*!—DISTRIB. India (Tropical Himalaya, Assam, Chittagong, Birma, W. Peninsula) ; Ceylon.

2. **Breynia rhamnoides,** *Muell. Arg. in DC. Prodr.* v. 15, part 2 (1866) p. 440. A large glabrous shrub with many horizontal branches ; bark yellowish ; branchlets angular, glabrous. Leaves numerous, thin, distichous, spreading, ⅝—1½ by ⅜—1 in., elliptic, obtuse or subacute, pale beneath, base subacute or rounded ; petioles 1/16 in. long ; stipules 1/16 in. long, subulate from a triangular base, persistent. Flowers minute, the males usually in small fascicles, the females mostly solitary ; pedicels filiform, variable in length. MALE FLOWERS :

Calyx turbinate or subcampanulate ; mouth entire or obscurely lobed. Staminal-column truncate at the apex, produced beyond the adnate anthers. FEMALE FLOWERS : Calyx cup-shaped, 6-lobed ; lobes acute. Ovary exserted, oblong, truncate ; styles very short. Fruit globose, scarcely reaching ¼ in. in diam., smooth, succulent, dull-red. Seeds ⅛ in. long without an aril ; testa imperforate except at the very base. Fl. B. I. v. 5, p. 330 ; Bedd. For. Man. in Flor. Sylvat. p. cxcvi & Anal. Gen. t. 24, fig. 2 (by error in Tab. *Melanthesopsis patens*) ; Trim. Fl. Ceyl. v. 4, p. 34 ; Talb. Trees, Bomb. ed. 2, p. 303 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Prain, Beng. Pl. p. 933 ; Watt, Dict. Econ. Prod. v. 1, p. 534. *Phyllanthus Vitis-Idæa*, Roxb. Fl. Ind. v. 3, p. 665 ; Grah. Cat. p. 180. *Melanthesa rhamnoides*, Blume, Bijdr. (1825) p. 591 ; Wight, Icon. t. 1898.—Flowers : Apr.—June.

KONKAN : *Talbot*. KANARA : *Talbot* ; Devimana, *Woodrow* !—Throughout Tropical India ; Ceylon, China, Malay Islands, Philippines.

11. PHYLLANTHUS, Linn.

Herbs, shrubs, or trees. Leaves bifarious or distichous, alternate, entire, the branchlets with their leaves often resembling pinnate leaves ; stipules usually narrow or 0. Flowers small, monœcious (dicœcious in *P. indicus*), axillary or on old nodes ; males usually many, fascicled, subsessile or pedicellate, rarely few or solitary ; females in the same or distinct axils with longer pedicels, solitary of few. Perianth simple. MALE FLOWERS : Sepals 4—6, free or very shortly connate, imbricate and more or less 2-seriate. Disk glandular (rarely 0). Stamens 3 (rarely 4 or 5), in the centre of the flower ; filaments free or connate ; anthers 2-celled, oblong or didymous (rarely reniform), the cells parallel or diverging ; dehiscence extrorse, vertical or transverse. Pistillode 0. FEMALE FLOWERS : Sepals as in the male. Petals 0. Ovary usually 3-celled ; ovules 2 in each cell ; styles free or connate, usually 2-fid, with slender arms (rarely dilated). Fruit of 3 crustaceous or coriaceous (rarely bony) 2-valved cocci with ithout a separable coriaceous (rarely fleshy) epicarp, sometimes -celled berry or a drupe with a 3—4-celled bony endocarp. Seeds 3-gonous ; testa crustaceous ; hilum without a strophiole ; albumen fleshy ; cotyledons flat or flexuous.—DISTRIB. Species about 400, in all warm countries.

Sepals 5—6 in both sexes; stamens 5 or 3; styles 3; flowers monœcious.
- Stamens 5 in 2 series, the 3 inner filaments connate ..... 1. *P. reticulatus.*
- Stamens 3; filaments united in a long or short column, rarely free and recurved.
  - Anthers erect; slits vertical; connective usually produced.
    - Fruit large, fleshy, with 3 bony 2-valved cocci; disk absent in male flowers; styles united below, twice 2-fid; a tree 2. *P. Emblica.*
    - Fruit a capsule of 3 crustaceous 2-valved cocci; disk present in male and female flowers; styles once 2-fid, free.
      - A shrub; stipules minute, setaceous 3. *P. Lawii.*

Herbs; stipules peltate.
Leaves scattered, cuneate-obovate; capsules smooth ..... 4. *P. maderaspatensis.*
Leaves close-set, distichously imbricating, oblong or linear-oblong; capsules echinate ..... 5. *P. Urinaria.*
Anthers didymous or reniform, the cells subglobose; slits very short, so that when the cells are confluent the dehiscence seems transverse; fruit a capsule; styles once 2-fid, free or connate.
Stipules peltate ..... 6. *P. simplex.*
Stipules simple, not peltate.
Glabrous annuals.
Styles minute, 2-lobed; disk-glands of males minute; seeds with regular parallel ribs ..... 7. *P. Niruri.*
Styles reflexed with recurved arms; disk-glands of males stellately lobed; seeds with irregular ribs... 8. *P. debilis.*
Branches and leaves hispidly hairy.... 9. *P. scabrifolius.*
Sepals 4 in both sexes; stamens 4; styles 3; flowers diœcious; a tree ..... 10. *P. indicus.*

1. **Phyllanthus reticulatus,** *Poir. Encyc. Méthod.* v. 5 (1804) p. 298. A large glabrous or pubescent straggling or climbing shrub (in the forests along the Indus in Sind climbing over the largest trees [*Brandis*]); branches smooth or lenticellate. Leaves ½—1¼ by ⅓—¾ in., variable, oblong or elliptic, sometimes almost rotundate, obtuse or acute, thin, glabrous or nearly so, pale beneath, base rounded, acute or subcordate; main nerves few, slender; petioles 1/16—⅛ in. long, slender, stipules 1/16 in. long, ovate, acute, sometimes bristle-pointed. Flowers axillary, the males in fascicles of 2—6, the females solitary; pedicels 1/16—¼ in. long, slender. Calyx glabrous, reaching 1/10 in. long; segments oblong, very obtuse, alternating with the glands of the disk. MALE FLOWERS: Stamens 5, the 3 inner connate into a column, the 2 outer free, shorter. FEMALE FLOWERS: Ovary 5—10-celled; ovules 2 in each cell, superposed; styles 3, minute, 2-lobed. Fruit a purple fleshy berry ⅛ in. in diam., globose, smooth and shining. Seeds 8—16 (usually 10), irregularly 3-genous, finely granulate. Fl. B. I. v. 5, p. 288; Trim. Fl. Ceyl. v. 4, p. 19; Talb. Trees, Bomb. ed. 2, p. 300; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369; Prain, Beng. Pl. p. 934; Watt, Dict. Econ. Prod. v. 6, part 1, p. 223. *Phyllanthus multiflorus,* Willd. Sp. Pl. v. 4 (1805) p. 581; Grah. Cat. p. 180. *Anisonema multiflora,* Wight, Icon. t. 1899; Dalz. & Gibs. p. 234.—Flowers throughout the year. VERN. *Pávan*; *Datvan.*

Throughout the Presidency, often in hedges. KONKAN: *Law*!, *Stocks*!, *Graham.* S. M. COUNTRY: Dharwar, *Cooke*! KANARA: Karwar, *Talbot,* 12! GUJARAT: Dakor, *Kanitkar*!—DISTRIB. Throughout Tropical India; Ceylon, Tropical Africa, China, Malay Islands.

2. **Phyllanthus Emblica,** *Linn. Sp. Pl.* (1753) p. 982. A deciduous small or middle-sized tree with crooked trunk and spreading branches; bark greenish-grey, peeling off in conchoidal flakes; branchlets glabrous or finely pubescent, 4—8 in. long, often deciduous. Leaves subsessile, ⅜—½ by 1/10—⅛ in., closely set along the

branchlets, distichous, light-green, glabrous, narrowly linear, obtuse, imbricate when young having the appearance of pinnate leaves; stipules ovate, finely acute. Flowers greenish-yellow, in axillary fascicles on the leaf-bearing branchlets, often on the naked portion below the leaves, with fimbriate bracts at the base. MALE FLOWERS numerous, on short slender pedicels. Sepals 6, oblong, obtuse, $\frac{1}{20}$ in. long. Disk 0. Anthers 3 on a short central column. FEMALE FLOWERS few, subsessile. Sepals as in the male. Disk a lacerate cup. Ovary 3-celled; styles connate at the base, irregularly twice 2-fid with acute lobes. Fruit $\frac{1}{2}$—$\frac{5}{8}$ in. in diam., fleshy, globose, with 6 obscure vertical furrows, pale yellow, of three 2-seeded crustaceous cocci. Seeds 6, 3-gonous. Fl. B. I. v. 5, p. 289; Grah. Cat. p. 180; Bedd. Flor. Sylvat. t. 258; Trim. Fl. Ceyl. v. 4, p. 19; Talb. Trees, Bomb. ed. 2, p. 300; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370; Prain, Beng. Pl. p. 934; Watt, Dict. Econ. Prod. v. 6, part 1, p. 217. *Emblica officinalis*, Gærtn. Fruct. v. 2 (1791) p. 122, t. 108; Wight, Icon. t. 1896; Dalz. & Gibs. p. 235.—FLOWERS: Mar.—May. VERN. *Avlá; Amlá; Nelli.*

Throughout the Presidency in deciduous forests, often planted. KONKAN: *Dalzell & Gibson*; Matheran, *Cooke*!; Western Ghâts, *Woodrow*. DECCAN: *Graham, Dalzell & Gibson*.—DISTRIB. Throughout tropical India, wild or planted; Ceylon, China, Malay Islands.

The fruit known as the *Emblic Myrobalan* is used as a medicine, and for dyeing and tanning. It is also made into a sweetmeat with sugar, and sometimes used as a pickle. The wood is valuable for various purposes. See Watt, Dict. Econ. Prod. l. c.

3. **Phyllanthus Lawii,** *Grah. Cat. Pl. Bomb.* (1839) p. 181. A glabrous shrub usually growing along river-banks; branches grooved. Leaves $\frac{1}{8}$—$\frac{1}{5}$ by $\frac{1}{12}$—$\frac{1}{10}$ in., distichous, overlapping, linear-oblong, rounded at the apex, often apiculate, base rounded or subcordate; nerves obscure; petioles scarcely $\frac{1}{50}$ in. long; stipules $\frac{1}{20}$ in. long, lanceolate-subulate. Flowers axillary, the males solitary or few together, the female solitary. Sepals of male and female flowers 6, linear-oblong, obtuse, those of the female flowers $\frac{1}{10}$ in. long. Stamens 3, the filaments united in a short column; anthers erect with ical slits. Styles 3, distinct, $\frac{1}{20}$ in. long, shortly and bluntly id, the short lobes usually recurved. Capsules $\frac{1}{8}$ in. in diam., on a pedicel about $\frac{1}{50}$ in. long, globose, slightly depressed, glabrous. Seeds $\frac{1}{10}$ in. long, 3-gonous, rounded on the back, glabrous. Fl. B. I. v. 5, p. 290; Talb. Trees, Bomb. ed. 2, p. 300; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370; Prain, Beng. Pl. p. 934. *Phyllanthus polyphyllus*, Dalz. & Gibs. p. 234 (*not* of Willd.).—Flowers: Sept.—Oct.

Often forming dense thickets along the banks of rivers towards the Ghâts. KONKAN: *Stocks*!, *Law*!, *Dalzell*!, *Lambert*! S. M. COUNTRY: Nalatwar near Kaladghi, *Graham*; Castlerock, *Cooke*! KANARA: banks of the Gatpraba River, *Graham*; common along the Kála naddi, forming dense thickets like tamarisk near the water's edge, *Talbot*.—DISTRIB. India (Behar, Central Provinces, W. Peninsula).

4. **Phyllanthus maderaspatensis,** *Linn. Sp. Pl.* (1753) p. 982. Annual but sometimes woody at the base, very variable in habit; stems glabrous, 1—3 ft. long, erect, ascending or decumbent. Leaves

scattered, variable, ¼—1¼ by ⅛—⅝ in., glabrous, obovate-cuneate, rounded, truncate or somewhat obcordate at the apex, mucronate, much tapering into a very short petiole, glaucous and with a few lateral nerves conspicuous beneath ; stipules peltate, lanceolate, very acute. Flowers axillary, the male flowers minute in small clusters, subsessile, the female larger, solitary, shortly pedicellate. Sepals 6, obovate, obtuse, green with white margins. Stamens 3 ; filaments connate. Styles 3, distinct, very small, 2-lobed. Capsules ⅛ in. in diam., depressed-globose, glabrous, 3-lobed. Seeds 1/16 in. long, 3-gonous, rounded on the back, muriculate in fine lines (beautifully marked like basket-work, *Dalzell & Gibson*), brown. Fl. B. I. v. 5, p. 292 ; Grah. Cat. p. 180 ; Dalz. & Gibs. p. 233 ; **Wight, Icon. t.** 1895, fig. 3 ; Trim. Fl. Ceyl. v. 4, p. 20 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Prain, Beng. Pl. p. 934 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 221.—Flowers : July—Aug. VERN. *Kanocha.*

Dalzell without locality in Herb. Kew. ! *Stocks* without locality in Herb. Kew. ! DECCAN : *Cooke* ! S. M. COUNTRY : Badami, *Woodrow*.—DISTRIB. India (drier parts) ; Ceylon, Tropical Africa, Arabia, Java, China, Australia.

5. **Phyllanthus Urinaria,** *Linn. Sp. Pl.* (1753) p. 982. Annual, 1—2 ft. high, glabrous or nearly so. Stems erect, slightly branched ; leaf-bearing branchlets short, flattened or slightly winged. Leaves closely placed, distichously imbricate, sessile or nearly so, ¼—½ by 1/10—¼ in., oblong or linear-oblong, rounded and apiculate at the apex, pale beneath, glabrous, base rounded, usually oblique ; stipules peltate, very acute, from a broad base. Flowers minute, axillary, subsessile, solitary, yellowish. Sepals 1/10—1/5 in. long, oblong, rounded, not enlarged in fruit. Capsules ⅛ in. in diam., globose, scarcely lobed, echinate. Seeds 1/16 in. long, 3-gonous, rounded on the back, transversely furrowed. Fl. B. I. v. 5, p. 293 ; Grah. Cat. p. 180 ; Trim. Fl. Ceyl. v. 4, p. 21 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Prain, Beng. Pl. p. 934 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 224. *Phyllanthus leprocarpus,* Wight, Icon. t. 1895, fig. 4.—Flowers : Aug.

KONKAN : Kalyan, *Bhiva* ! ; Matheran, *Bhiva* !, *Woodrow* ; Bombay, *Graham*. DECCAN : Khandala, *Woodrow*.—DISTRIB. Throughout India ; Ceylon, Tropics generally.

6. **Phyllanthus simplex,** *Retz. Obs. Bot.* fasc. 5 (1789) p. 29. A glabrous perennial herb or an undershrub, usually with a long taproot ; branches compressed. Leaves distichous, numerous, ½—¾ by ⅛—¼ in., subsessile, closely placed and often overlapping, linear-oblong, obtuse, apiculate ; stipules peltate, sagittate, brown, scarious. Flowers usually solitary, on slender axillary pedicels, the female larger than the male. Sepals about 1/10 in. long, oblong, obtuse, those of the female flowers slightly enlarged in fruit. Stamens 3, distinct ; anthers didymous, the slits very short, so that when the cells are confluent the dehiscence seems transverse. Styles short, 2-fid. Capsules 1/10 in. in diam., globose, slightly 3-lobed, crustaceous, usually slightly rough with minute prominences but not echinate. Seeds 1/20—1/16 in. long, 3-gonous, rounded on the back, covered with minute

tubercles in irregular lines, very dark brown. Fl. B. I. v. 5, p. 295 ; Dalz. & Gibs. p. 234 ; Trim. Fl. Ceyl. v. 4, p. 22 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Prain, Beng. Pl. p. 935 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 223.—Flowers : Aug.—Nov.

KONKAN : Worli (Bombay), *Stocks* ! ; Kalyan, *Bhiva* ! S. M. COUNTRY : Badami, *Cooke* ! ; Dharwar, *Woodrow*.—DISTRIB. Throughout India ; Ceylon, Malay Islands, China, Pacific Islands.

7. **Phyllanthus Niruri,** *Linn. Sp. Pl.* (1753) p. 981. Annual herb 1—2 ft. high, quite glabrous ; stem often branched at the base, angular ; leaf-bearing branchlets slender, spreading. Leaves numerous, subsessile, distichous, often imbricating, ¼—½ by ⅛—¼ in., elliptic-oblong, obtuse (rarely subacute), glaucous beneath, base rounded ; petioles very short ; stipules lanceolate-subulate, very acute. Flowers yellowish, very numerous, axillary, the males 1—3, the females solitary. Sepals of male flowers $\frac{1}{10}$ in. long, rounded, those of the female $\frac{1}{20}$ in. long, oblong, subacute, with white margins, not enlarged in fruit. Stamens 3 ; anthers sessile on a short column. Styles minute, free, 2-lobed. Disk of male of minute glands ; of female annular, lobed. Capsules $\frac{1}{10}$ in. in diam., depressed-globose, smooth, scarcely lobed. Seeds $\frac{1}{16}$ in. long, 3-gonous, rounded and with longitudinal regular parallel ribs on the back. Fl. B. I. v. 5, p. 298 ; Grah. Cat. p. 180 ; Dalz. & Gibs. p. 234 ; Wight, Icon. t. 1894 ; Trim. Fl. Ceyl. v. 4, p. 23 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Prain, Beng. Pl. p. 935 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 222.—Flowers : July—Aug. VERN. *Bhuiávali.*

A common weed in gardens and cultivated land, *Graham, Dalzell.* KONKAN : *Stocks* !, *Law* ! ; Worli (Bombay), *Stocks* ! DECCAN : *Woodrow* ; Poona, *Cooke* !—DISTRIB. Throughout India ; Ceylon, Tropics generally except Australia. The plant is much employed in native medicine.

8. **Phyllanthus debilis,** *Herb. Ham. ex Wall. Cat.* (1828) sub n. 7892. A glabrous annual 1—3 ft. high ; stem terete, naked below, branched above. Leaves ¼—¾ by ⅛—⅜ in., thinly membranous, elliptic or obovate, obtuse or acute, glaucous beneath, base usually acute ; lateral nerves obscure ; petioles $\frac{1}{20}$—$\frac{1}{12}$ in. long ; stipules lanceolate-subulate, scarious. Flowers axillary, on short pedicels, the pedicels of the females longer than those of the males. Sepals of female flowers $\frac{1}{16}$—$\frac{1}{12}$ in. long, with broad thin scarious margins, obovate-oblong, enlarged in fruit ; sepals of the male much smaller. Disk-glands of male flowers stellately lobed. Filaments short, free. Styles $\frac{1}{80}$ in. long, free, 2-fid, the arms recurved. Capsules $\frac{1}{10}$ in. in diam., depressed-globose. Seeds $\frac{1}{20}$—$\frac{1}{16}$ in. long, 3-gonous, rounded and irregularly ribbed on the back. Fl. B. I. v. 5, p. 299 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Prain, Beng. Pl. p. 935.

SIND : *Bhola Puran* !, *Woodrow*.—DISTRIB. India (N. W. Provinces, Sikkim, Behar, Assam, W. Peninsula) ; Tropical Africa.

9. **Phyllanthus scabrifolius,** *Hook. f. Fl. B. I.* v. 5 (1887) p. 299. An annual leafy herb 6—10 in. high ; stem erect, branched from the base and upwards ; branches angular, clothed with short stiff white hairs on the angles. Leaves ⅜—½ by ¼ in., subsessile,

broadly elliptic or obovate, rounded at the apex, pale when dry, scaberulous beneath and with undulate margins; main nerves 4—5 pairs, distinct on both surfaces; petioles minute; stipules lanceolate-subulate, membranous. Flowers very shortly pedicellate. Sepals oblong or obovate-oblong, with white scarious margins, those of the female flowers $\frac{1}{10}$ in. long, of the males shorter. Filaments short, united to the middle, the apex recurved; anther-cells at length confluent. Styles 3, distinct, $\frac{1}{30}$ in. long, 2-fid, the lobes recurved. Disk of male of rounded glands, of the female a low crenate cup. Capsules $\frac{1}{8}$ in. in diam., depressed-globose, smooth or slightly granulate. Seeds $\frac{1}{20}$ in. long, broad, 3-gonous, rounded, and with 7—9 parallel ribs on the back and concentric ribs on the faces. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370.

KONKAN: *Stocks*! DECCAN: Dongergaon near Ahmednagar, *Woodrow*. There is but one sheet in Herb. Kew. marked Konkan, *Stocks*. Woodrow, however, reports the plant from Ahmednagar in the Deccan.—DISTRIB. India (W. Peninsula), apparently endemic.

10. **Phyllanthus indicus,** *Muell. Arg. in Linnæa,* v. 32 (1863) p. 52. A much-branched deciduous glabrous tree 30—40 ft. high; bark white, scaly, smooth, exfoliating in plates. Leaves membranous, 2½—6 by 1½—3 in., distichous, elliptic or elliptic-lanceolate, obtuse, acute or acuminate, often apiculate, glabrous, glaucous beneath, base acute; main nerves 6—10 pairs; petioles ¼ in. long; stipules lanceolate, deciduous. Flowers dicœcious, pedicellate, pale-green, the males in fascicles in the axils and on the branches on capillary pedicels ⅛—¼ in. long, the females larger, in umbellate clusters on stout pedicels ½—1 in. long. Sepals 4 (rarely 5), oblong, obtuse, the 2 outer larger. MALE FLOWERS: Stamens 4; filaments free; anthers oblong, adnate, extrorse, dehiscing longitudinally. Disk annular, fleshy, large. Rudimentary ovary 0. FEMALE FLOWERS: Stamens 0. Disk small, narrow. Ovary 3-celled; ovules 2 in each cell; styles very short, deeply 2-fid, the lobes recurved. Capsules ⅜ in. in diam., globose, usually reticulately rugose; cocci 2-valved, 2-seeded. Seeds irregularly 3-gonous, blue, surrounded by an aril. Fl. B. I. v. 5, p. 305; Bedd. For. Man. in Flor. Sylvat. p. cxci; Trim. Fl. Ceyl. v. 4, p. 27; Talb. Trees, Bomb. ed. 2, p. 300; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370; Watt, Dict. Econ. Prod. v. 6, part 1, p. 221. *Prosorus indica,* Dalz. in Kew Journ. Bot. v. 4 (1852) p. 346; Dalz. & Gibs. p. 236.—Flowers: Apr.—May. VERN. *Pánnána.*

KONKAN: *Dalzell*!, *Law*! S. M. COUNTRY: Párva Ghát, *Ritchie,* 1343! KANARA: *Law*!; N. Kanara Ghâts in deciduous and evergreen forests, *Talbot*; Puttagudda near Yellapur, *Talbot,* 1173!—DISTRIB. India (W. Peninsula); Ceylon.

Phyllanthus distichus, Muell. Arg. in DC. Prodr. v. 15, part 2 (1866) p. 413. A glabrous robust deciduous tree, a native of the Malay Islands and Madagascar, with pinnately distichous obliquely ovate acute leaves 2—3 in. long, small reddish flowers densely clustered, and a globose fleshy acid ribbed fruit of the size of a large

gooseberry, is sometimes grown in gardens. Fl. B. I. v. 5, p. 304 ; Talb. Trees, Bomb. ed. 2, p. 300 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Prain, Beng. Pl. p. 935 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 217. *Cicca disticha,* Linn. Mant. p. 124 ; Grah. Cat. p. 180 ; Dalz. & Gibs. Suppl. p. 78. The fruit is known as the *Country Gooseberry,* and is used in tarts and for pickles.—VERN. *Harpharori.*

DOUBTFUL SPECIES.

PHYLLANTHUS RHEEDEI, Wight, Icon. v. 5 (1852) part 2, p. 25, t. 1895, fig. 1. This plant is given by Woodrow in his list as occurring in Sind. I have seen no specimens from that Province, and it scarcely seems likely that it should occur there. The specimens in the Kew Herbarium are from the Nilghiri Mountains, alt. 6000 ft., and from the montane zone in Ceylon, alt. 4—7000 ft. Fl. B. I. v. 5, p. 293; Trim. Fl. Ceyl. v. 4, p. 21; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370.—DISTRIB. India (Nilghiri Hills); Ceylon.

12. **PUTRANJIVA,** Wall.

Trees. Leaves alternate, evergreen, entire or serrulate, penni-nerved and reticulately veined. Flowers monœcious or diœcious, axillary, pedicellate, the males clustered, the females subsolitary. Perianth simple. MALE FLOWERS : Calyx 3—6-lobed ; lobes imbricate. Petals 0. Disk 0. Stamens 2—4 in the centre of the flower ; filaments free or more or less connate ; anthers erect, the cells parallel. Pistillode 0. FEMALE FLOWERS : Calyx as in the male. Petals 0. Disk 0. Ovary ovoid, 2—3-celled ; ovules 2 in each cell ; styles short, spreading, dilated, with broad fleshy arms. Fruit an ovoid or globose drupe ; endocarp hard, 1-celled. Seed solitary, ovoid : testa crustaceous ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. Species 2, Indian.

1. **Putranjiva Roxburghii,** *Wall. Tent. Fl. Nep.* (1826) p. 61. Evergreen tree 30—40 ft. high with pendent branches, nearly glabrous except the young shoots ; bark corky, pale. Leaves coriaceous, dark-green, shining, 2½—4 by ⅝—1½ in., elliptic-oblong, acute, obtuse or shortly acuminate, distantly serrulate ; main nerves numerous, slender, with reticulate venation between ; petioles ¼ in. long ; stipules small, triangular, acute, soon falling. Flowers diœcious. MALE FLOWERS very shortly pedicellate, crowded in rounded axillary clusters on the main or on short axillary branches. Sepals $\frac{1}{10}$ in. long, oblong, obtuse, ciliolate. Filaments $\frac{1}{16}$—$\frac{1}{12}$ in. long, more or less connate at the base ; anthers globose, $\frac{1}{16}$—$\frac{1}{12}$ in. in diam. FEMALE FLOWERS 1—3 in an axil ; pedicels ⅛—½ in. long. Sepals broadly elliptic, obtuse, concave, ciliolate, $\frac{1}{10}$ in. long. Ovary finely silky, 3-celled ; styles 3, recurved, dilated into broad fleshy crescent-shaped stigmas. Drupe ½—¾ in. long, ellipsoid, rounded or pointed at the apex, narrowed at the base, white-tomentose, with pedicels ½—1 in. long ; stone pointed, rugose, very hard. Fl. B. I. v. 5, p. 336 ; Dalz. & Gibs. p. 236 ; Wight, Icon. t. 1876 ; Bedd. Flor. Sylvat. t. 275 ; Trim. Fl. Ceyl. v. 4, p. 35 ; Talb. Trees, Bomb. ed. 2,

p. 305 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Prain, Beng. Pl. p. 936 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 372.—Flowers : Mar.—May. VERN. *Putranjiva.*

KONKAN : *Talbot* ; Kanheri and Alibág jungles, *Dalzell & Gibson.* DECCAN : Poona, *Woodrow* (planted) ; Khandala, *Dalzell & Gibson.* S. M. COUNTRY : Belgaum, *Dalzell & Gibson.* KANARA : evergreen forests of N. Kanara, nowhere common, *Talbot* ; Bunwasi, *Talbot* !—DISTRIB. Throughout Tropical India wild and cultivated ; Ceylon.

The stones of the fruit are made into necklaces and put round the necks of children to preserve them from evil ; hence the name, which means *the life of the child.* The wood is used for turning. See Watt, Dict. Econ. Prod. l. c.

13. **HEMICYCLIA,** Wight & Arn.

Trees or shrubs. Leaves evergreen, alternate, petiolate, quite entire, usually very unequal-sided at the base. Flowers small, pedicellate, diœcious, apetalous. MALE FLOWERS : Sepals 4—5, imbricate, the inner usually larger and subpetaloid. Stamens 4—23, inserted round an orbicular disk ; filaments free ; anthers erect, the cells parallel. Pistillode 0. FEMALE FLOWERS : Calyx as in the male. Disk flat, annular. Ovary obliquely ovoid, 1 (rarely 2)-celled ; ovules 2 in each cell ; stigma 1 (rarely 2), sessile or on a short style, broadly reniform or semiorbicular, flat or recurved, entire or emarginate. Fruit drupaceous, globose or ovoid, indehiscent ; endocarp hard. Seed usually solitary, oblong, grooved on one face, arillate ; albumen fleshy ; embryo straight ; cotyledons broad, flat.—DISTRIB. India, Malay Archipelago, Australia ; species 9.

Fruit globose, small, ¼—½ in. in diam.	1. *H. sepiaria.*
Fruit obovoid, ¾ in. long	2. *H. venusta.*

1. **Hemicyclia sepiaria,** *Wight & Arn. in Edinb. New Phil. Journ.* v. 14 (1833) p. 297. A rigid much-branched shrub 6—9 ft. high ; young shoots puberulous. Leaves very coriaceous, 1½—3½ by ¾—1¾ in., elliptic or elliptic-oblong, obtuse or retuse, glabrous, shining above, base rounded or cordate. Flowers pubescent or villous, pedicellate. Sepals 4. MALE FLOWERS : Pedicels ⅛—¼ in. long, pubescent. Sepals ⅒ in. long and as broad as long, ovate-oblong or suborbicular, concave, rounded at the apex, ciliolate. Stamens 8—10 on a cupular disk ; filaments ⅕ in. long, slender ; anthers oblong, ⅕ in. long. FEMALE FLOWERS : Pedicels shorter than in the male, sometimes almost 0. Calyx as in the male. Ovary somewhat truncate at the apex, 1—2-celled ; style 0 or almost 0 ; stigma orbicular or semicircular with slightly crenulate margins, like a small mushroom or half a mushroom on the top of the ovary. Fruit globose, ¼—½ in. in diam., edible, crimson when ripe, 1-seeded ; endocarp bony. Fl. B. I. v. 5, p. 337 ; Dalz. & Gibs. p. 229 ; Wight, Icon. t. 1872 ; Bedd. For. Man in Flor. Sylvat. p. cxcviii ; Trim. Fl. Ceyl. v. 4, p. 36 ; Talb. Trees, Bomb. ed. 2, p. 306 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370 ; Watt, Dict. Econ. Prod. v. 4, p. 218.

KANARA : *Talbot, Woodrow.*—DISTRIB. India (W. Peninsula) ; Ceylon.

2. **Hemicyclia venusta,** *Thwaites, in Kew Journ. Bot.* v. 7 (1855) p. 272. A middle-sized evergreen tree with smooth bark ;

branchlets slender, drooping, glabrous or nearly so. Leaves thickly coriaceous, 2¾—5½ by 1—2 in., elliptic or oblong, obtuse or acuminate, glabrous, reticulately veined, base usually acute, sometimes unequal-sided ; petioles ⅛—¼ in. long. Flowers axillary, the males in fascicles, the females usually solitary. MALE FLOWERS : Pedicels ¼ in. long. Sepals 4, broadly ovate, obtuse, ⅛ by ⅛ in., pubescent outside. Stamens 5—8, surrounding a fleshy crenulate disk ; filaments $\frac{1}{16}$ in. long ; anthers $\frac{1}{16}$ in. long, oblong. FEMALE FLOWERS : Pedicels ¼ in. long. Sepals as in the male. Ovary seated on a fleshy nearly flat disk ; style 0 ; stigma $\frac{1}{10}$ in. in diam., orbicular, sessile like a mushroom on the ovary. Fruit ¾ by ½ in., obovoid, sometimes gibbous. Fl. B. I. v. 5, p. 339 ; Dalz. & Gibs. p. 229 ; Bedd. For. Man. in Flor. Sylvat. p. cxcviii ; Talb. Trees, Bomb. ed. 2, p. 306. *Astylis venusta,* Wight, Icon. v. 6 (1853) p. 13, t. 1992.—Flowers : Nov.

Western India, *Gibson* ! ; *Dalzell* without locality in Herb. Kew. ! KONKAN : *Stocks* !, *Law* ! S. M. COUNTRY : hills in the Dharwar zilla, *Dalzell & Gibson.* KANARA : Southern Ghâts of N. Kanara in evergreen forests, *Talbot.*—DISTRIB. India (W. Peninsula).

14. CYCLOSTEMON, Blume.

Trees. Leaves coriaceous, alternate, entire or crenulate, base often unequal-sided. Flowers dioecious, axillary, clustered. Perianth simple. MALE FLOWERS : Sepals 4—6, broad, imbricate. Buds globose. Petals 0. Disk globose or depressed. Stamens many or few, inserted round the disk ; filaments short, free ; anthers erect, the cells parallel. Pistillode 0 or minute. FEMALE FLOWERS : Sepals as in the male. Petals 0. Disk annular or 0. Ovary 2—4-celled ; ovules 2 in each cell ; style elongate or 0 ; stigmas dilated, fleshy, or connate into a peltate disk. Fruit subglobose or ovoid, indehiscent. Seed solitary in each cell ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. Tropical India, Malaya, Africa ; species about 18.

1. **Cyclostemon confertiflorus,** *Hook. f. Fl. B. I.* v. 5 (1887) 341. A large tree ; bark grey, smooth. Leaves coriaceous, 4—8 by 1½—3 in., oblong or elliptic-oblong, obtusely acuminate, glabrous, with undulate margins, base usually acute, often unequal-sided ; main nerves 5—8 pairs, slender, with reticulate venation between ; petioles ¼—⅓ in. long, stout. MALE FLOWERS in clusters in the axils or on the old wood. Pedicels 0—⅓ in. long. Sepals 5, orbicular, ⅛—⅓ in. in diam., coriaceous, glabrous, veined, concave. Disk funnel-shaped, glabrous, radiately ribbed inside and with a membranous lobed border. Stamens about 20, outside the disk ; filaments reaching ⅛ in. long, stout ; anthers $\frac{1}{10}$ in. long, oblong. FEMALE FLOWERS : Calyx, ovary, and style not seen, the specimens in Herb. Kew. being males. Fruit according to *Talbot* (Trees, Bomb. ed. 2, p. 306) yellow, smooth, size of a small orange, flattened, 2-seeded. Seeds plano-convex, ¾ in. long, rough. Talb. Trees, Bomb. ed. 2, p. 306 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370.—Flowers : Dec. VERN. *Augai-mara.*

Rare. KANARA : evergreen forests at Katgal, *Talbot,* 277 !—DISTRIB. India (N. Kanara).

15. ANTIDESMA, Linn.

Trees or shrubs. Leaves alternate, entire; stipules narrow. Flowers dicœcious, small or minute, in slender axillary or terminal simple or branched spikes or racemes. Perianth simple. MALE FLOWERS: Calyx 3—5 (rarely 6—8)-lobed or -partite. Petals 0. Disk entire or lobed. Stamens 2—5 (rarely more), inserted (often irregularly), on or around the disk; filaments inflexed in bud; anthers lunate or didymous, the cells globose, approximate or distant; connective thickened. Pistillode minute, clavate or globose (rarely 2—fid), glabrous or hairy, sometimes obsolete. FEMALE FLOWERS: Calyx as in the male. Disk usually annular or pulvinate. Ovary 1-celled; ovules 2, pendulous; stigmas 2—4, usually short, 2-fid or 2-partite. Fruit a small drupe, more or less compressed, crowned by the sublateral or terminal stigmas. Seed small; albumen fleshy; cotyledons broad, flat.—DISTRIB. Tropical Asia, Africa, Australia, Polynesia; species 60—70.

Leaves very obtuse; ovary pubescent or tomentose; calyx 5—7-partite; stamens 4—7	1. *A. Ghæsembilla.*
Leaves acute or acuminate; ovary glabrous; calyx cupular, 4-lobed.	
Male flowers sessile; stamens 3	2. *A. Bunius.*
Male flowers pedicellate.	
Stamens 2	3. *A. diandrum.*
Stamens 3—4	4. *A. Menasu.*

1. **Antidesma Ghæsembilla,** *Gærtn. Fruct.* v. 1 (1788) p. 189, t. 39. A small deciduous tree; bark grey; branchlets pubescent or fulvous-tomentose. Leaves 2—4 by 1¼—2½ in., broadly elliptic or orbicular-oblong, rounded at the apex, sometimes emarginate, glabrous or nearly so above, pubescent or tomentose beneath, base rounded; main nerves 5—7 pairs; petioles ¼—½ in. long, pubescent; stipules ⅛ in. long, lanceolate, acute. Flowers sessile, in slender paniculate spikes. MALE FLOWERS: Calyx 5—7-partite, densely fulvous-hairy, 1/10 in. across when spread out flat. Stamens 4—7; filaments 1/10 in. long; anthers some-what horseshoe-shaped. Disk 5-partite, pubescent. FEMALE FLOWERS: Calyx as in the male. Ovary densely pubescent; stigmas minute, recurved. Fruit subglobose when fresh, ½ in. in diam., reddish-purple, edible. Fl. B. I. v. 5, p. 357; Bedd. For. Man. in Flor. Sylvat. p. cc; Trim. Fl. Ceyl. v. 4, p. 43; Talb. Trees, Bomb. ed. 2, p. 308; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371; Prain, Beng. Pl. p. 938; Watt, Dict. Econ. Prod. v. 1, p. 270. *Antidesma paniculata,* Roxb. Fl. Ind. v. 3 (1832) p. 770; Wight, Icon. t. 820; Grah. Cat. p. 186; Dalz. & Gibs. p. 237. *A. pubescens,* Roxb. Cor. Pl. v. 2 (1798) p. 35, t. 167; Grah. Cat. p. 186; Dalz. & Gibs. p. 237.—Flowers: May—July. VERN. *Jondhra.*

KONKAN: *Law!*; S. Konkan, *Graham*; hills near Vingorla, *Dalzell & Gibson.* S. M. COUNTRY: Londa, *Woodrow.* KANARA: *Woodrow!*; forests of N. Kanara, *Talbot!*—DISTRIB. India (Oudh forests, Assam, Bengal, W. Peninsula); Ceylon, Malay Islands, China.

2. **Antidesma Bunius,** *Spreng. Syst. Veg.* v. 1 (1825) p. 826. A small evergreen tree; bark greyish-brown; young shoots hairy.

Leaves variable, 3—7 by 1¼—2½ in., elongate-elliptic or elliptic-lanceolate or oblanceolate, acuminate, glabrous and shining above, base tapering ; main nerves 10—12 pairs, arching ; petioles ⅛ in. long or less, stout ; stipules lanceolate-subulate, hairy, quickly falling. Flowers reddish, numerous, in pubescent spikes, the spikes of the female simple, of the male often compound. MALE FLOWERS sessile. Calyx cupular, shortly 4-lobed. Disk lobed, glabrous. Stamens 3, exserted. Pistillode short, truncate. FEMALE FLOWERS on short pedicels ⅛—¼ in. long. Calyx shortly tubular, truncate. Disk cupular. Ovary glabrous ; stigmas 3, large, short, dilated, spreading. Fruit ⅓ in. in diam., globose-ovoid, stalked, smooth, red, turning black. Fl. B. I. v. 5, p. 358 ; Wight, Icon. t. 819 ; Bedd. For. Man. in Flor. Sylvat. p. cc, t. 24, fig. 3 ; Trim. Fl. Ceyl. v. 4, p. 43 ; Talb. Trees, Bomb. ed. 2, p. 308 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 ; Prain, Beng. Pl. p. 938 ; Watt, Dict. Econ. Prod. v. 1, p. 269. *Antidesma Alexiteria*, Grah. Cat. p. 186 (*not* of Linn.). —Flowers : May—June. VERN. *A'mati.*

KONKAN : *Talbot.* DECCAN : Khandala Ghát, rare, *Graham, Talbot.* KANARA : N. Kanara in moist forests, *Talbot.*—DISTRIB. India (Nipal, Assam, Birma, Chota Nagpur, W. Peninsula) ; Ceylon, China.

3. **Antidesma diandrum,** *Roth, Nov. Pl. Sp.* (1821) p. 369. A large shrub or small tree, the young parts usually glabrous. Leaves thin, 2—5 by 1—2 in., lanceolate, or elliptic-lanceolate, or obovate, acute or acuminate, glabrous above, glabrous or slightly pubescent beneath, base acute ; petioles ⅛ in. long ; stipules ¼ in. long, linear, acute. Flowers in long slender glabrous or pubescent racemes, both sexes pedicellate ; bracts beneath the pedicels ovate, $\frac{1}{25}$ in. long. MALE FLOWERS : Pedicels $\frac{1}{20}$ in. long. Calyx cup-shaped, $\frac{1}{20}$ in long, with 4 short obtuse lobes. Stamens usually 2 ; filaments $\frac{1}{16}$ in. long, at the base of a glabrous disk. FEMALE FLOWERS : Pedicels stouter than in the male. Calyx $\frac{1}{16}$ in. long ; lobes rather deeper than in the [illegible] Ovary glabrous ; styles 2, short, terminal, one of them usually [illegible] Fruit ⅛ in. in diam., purplish-red, edible. Fl. B. I. v. 5, 361 ; Dalz. & Gibs. p. 237 ; Bedd. For. Man. in Flor. Sylvat. [illegible]. cci ; Trim. Fl. Ceyl. v. 4, p. 44 ; Talb. Trees, Bomb. ed. 2, p. 308 ; Prain, Beng. Pl. p. 938 ; Watt, Dict. Econ. Prod. v. 1, p. 270. *Antidesma lanceolarium,* Wall. Cat. 7284 ; Wight, Icon. t. 766.—Flowers : May—July.

KONKAN : *Law* ! ; Vingorla, *Dalzell & Gibson.* KANARA : N. Kanara in moist forests from the coast inland, *Talbot* ; Yellapur, *Talbot* !—DISTRIB. India (Subhimalayan tract, Behar, Chota Nagpur, Central Provinces, Bengal, Birma, W. Peninsula) ; Ceylon.

The fruit is eaten, as also the leaves, which have an acid taste like sorrel. The wood is pinkish-grey, hard and close-grained (*Talbot*).

4. **Antidesma Menasu,** *Miq. ex Tul. in Ann. Sc. Nat.* sér. 3, v. 15 (1851) p. 215. A small or middle-sized tree ; branchlets, stipules, petioles, and inflorescence velvety. Leaves 3½—7 by 1¼—2½ in. (sometimes 10 in. long, *Talbot*), elliptic-oblong, acuminate (the acumen often very long), glabrous and shining on both sides ; main nerves 6—10 pairs, arched ; petioles ⅛—¼ in. long ; stipules ⅛—¼ in. long, linear, acute. Flowers in axillary and terminal, solitary or

paniculate racemes, the male and female flowers with short stout pedicels ; bracts $\frac{1}{12}$ in. long, setaceous. MALE FLOWERS : Calyx cup-shaped, $\frac{1}{16}$ in. long, 4-lobed from above the middle, the lobes rounded. Stamens 3—4, inserted between the lobes of the glabrous disk ; filaments $\frac{1}{16}$ in. long. Pistillode columnar, glabrous. FEMALE FLOWERS : Calyx $\frac{1}{16}$ in. long, cup-shaped, 4-lobed from about the middle, the lobes acute. Ovary glabrous ; stigmas 3—5. Fruit $\frac{1}{6}$—$\frac{1}{4}$ in. long, ovoid, acute. Fl. B. I. v. 5, p. 364 ; Talb. Trees, Bomb. ed. 2, p. 308 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 ; Watt, Dict. Econ. Prod. v. 1, p. 270. *Antidesma lanceolatum*, Dalz. & Gibs. p. 237 (*not* of Tul.).—Flowers : Feb.—May.

Evergreen forests of the Konkan and N. Kanara, also along nálas in deciduous moist forests, *Talbot*. *Dalzell* without locality in Herb. Kew.! *Lambert* without locality in Herb. Kew.! KONKAN : *Law*!—DISTRIB. India (W. Peninsula).

VAR. *lincarifolia*, Hook. f. Fl. B. I. v. 5 (1887) p. 364. Leaves 3—5 by $\frac{1}{2}$—$1\frac{1}{2}$ in., linear-oblong, shining on both sides.

Dalzell without locality in Herb. Kew.! KANARA : common in the Siddapur taluka of N. Kanara, *Talbot* ; Ainshi (N. Kanara), *Woodrow*.

16. **APOROSA**, Blume.

Trees. Leaves coriaceous, alternate, entire (rarely sinuate-toothed). Flowers minute, diœcious (rarely monœcious), the males most minute, in axillary catkin-like spikes, the females sessile or shortly pedicellate, in short bracteate spikes ; the bracts concave and imbricating. MALE FLOWERS : Sepals 3—6 (usually 4), membranous, imbricate. Petals 0. Disk 0. Stamens 2—5 in the centre of the flower ; filaments free, capillary ; anthers didymous. Pistillode minute or 0. FEMALE FLOWERS : Sepals as in the male but larger. Petals 0. Disk 0. Ovary 2 (rarely 3)-celled ; ovules 2 in each cell ; stigmas small, plumose, simple or 2—4-cleft, spreading and recurved (rarely elongate and 2-partite). Fruit an ellipsoid ovoid or globose capsule, opening irregularly or partially, 2—4-valved from the base upwards ; epicarp thin or thick and spongy or fleshy ; endocarp thin, often separable ; cells glabrous or hairy within, especially on the septum. Seeds oblong or suborbicular, usually plano-convex ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. Species 30—40, tropical Asiatic and Malayan.

1. **Aporosa Lindleyana**, *Baillon, Etud. Gen. Euphorb.* (1858) p. 645. A small or middle-sized tree ; bark thin, smooth. Leaves thinly coriaceous, $3\frac{1}{2}$—$6\frac{1}{2}$ by $1\frac{3}{8}$—$2\frac{1}{4}$ in., elliptic-oblong, acuminate, glabrous, base acute or rounded ; main nerves 8—10 pairs, slender ; petioles $\frac{1}{8}$—$\frac{1}{2}$ in. long ; stipules lanceolate, acute, soon falling. MALE FLOWERS sessile ; spikes 1—$1\frac{1}{2}$ in. long, dense. Sepals usually 4, ovate-oblong, obtuse, $\frac{1}{20}$ in. long, ciliate. Stamens 2—3 ; filaments $\frac{1}{16}$ in. long ; anthers subglobose. FEMALE FLOWERS in very short, hairy, often clustered racemes ; pedicels short. Sepals ovate, subacute, $\frac{1}{16}$ in. long. Ovary flask-shaped, shortly pedicellate, hairy ; style short, with 3 large laciniate curved stigmas $\frac{1}{20}$ in. long. Fruit

⅜ in. or slightly more in diam., quite globose, pointed with the style. Seeds plano-convex, broadly ovate, subacute, ¼ in. long and as broad as long. Fl. B. I. v. 5, p. 349 ; Bedd. Flor. Sylvat. t. 286 ; Trim. Fl. Ceyl. v. 4, p. 40 ; Talb. Trees, Bomb. ed. 2, p. 307 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 370. *Scepa Lindleyana,* Wight, Icon. v. 2, part 1, p. 5, t. 361 ; Dalz. & Gibs. p. 236.—Flowers : Dec.—Feb. VERN. *Sali.*

Common in the evergreen forests of the Konkan and N. Kanara, *Talbot.* KANARA : common, *Ritchie,* 1364 ! ; Supa on the Kála naddi, *Ritchie,* 1364 ! ; Arbail Ghát (N. Kanara), *Woodrow.*—DISTRIB. India (W. Peninsula) ; Ceylon.

17. **BACCAUREA,** Lour.

Evergreen trees. Leaves alternate, entire (rarely crenate-serrate), penninerved. Flowers diœcious (rarely monœcious), in simple or panicled spikes or racemes. Perianth simple, the male flowers usually very small. MALE FLOWERS : Sepals 4—5, usually unequal, imbricate. Petals 0. Disk 0 or obscure and glandular. Stamens 4—8 ; filaments short, free ; anthers small, didymous. Pistillode pubescent, orbicular, sessile or stipitate, rarely an irregular cleft column. FEMALE FLOWERS : Sepals 4—6, linear or oblong, much larger than in the male. Petals 0. Disk 0. Ovary ovoid or globose, 2—5-celled ; ovules 2 in each cell ; stigmas 2—5, small, sessile, free or connate into a short style, each 2-lobed or 2-cleft, the arms wide or narrow, papillose, rarely united into one peltate stigma. Fruit a tardily dehiscent ovoid globose obovoid or fusiform 2—4-celled capsule ; pericarp thick or thin, coriaceous, crustaceous or woody. Seeds broad, usually dorsally compressed or flattened, covered by a thick fleshy aril ; albumen fleshy or hard ; cotyledons broad, flat.—DISTRIB. Species about 30, mostly Indo-Malayan, a few in Tropical Africa and Polynesia.

1. **Baccaurea courtallensis,** *Muell. Arg. in DC. Prodr.* v. 15, part 2 (1866) p. 459. A large or middle-sized tree ; young parts minutely pubescent. Leaves 3—8 by 1¼—3 in., elliptic, shortly acuminate, glabrous, base usually acute ; petioles ¾—1½ in. long ; stipules ovate, deciduous. MALE FLOWERS very small, reddish, in puberulous racemose panicles 7—10 in. long, generally much crowded on the trunk ; pedicels scarcely $\frac{1}{20}$ in. long, crowded in little clusters of 3—7 together with or without a short peduncle, and with an ovate concave bract at the base. Sepals 4—6, scarcely $\frac{1}{12}$ in. long. Stamens 5—10. Pistillode discoid, entire or 2—5-lobed. FEMALE FLOWERS about twice as large as the male, in simple puberulous racemes 8—12 in. long ; pedicels $\frac{1}{12}$—⅛ in. long, irregularly arranged along the rhachis, and with a minute bract at the base of each. Sepals usually 5 (less commonly 6, 7 or 8), mostly unequal, ⅛—⅙ in. long, ovate, acute. Ovary ovoid, truncate, hairy, 3-celled ; stigma sessile, 3-lobed. Fruit subglobose, 1 in. or more in diam., rough, with 3 prominent ridges running from the apex to the base, bright crimson when ripe, hanging in great profusion from the trunk, which appears as a crimson mass (*Beddome*). Seeds enclosed in a succulent edible aril. Fl. B. I.

v. 5, p. 367 ; Talb. Trees, Bomb. ed. 2, p. 309. *Baccaurea sapida*, Bedd. Fl. Sylvat. t. 280 (*not* of Muell. Arg.). *Pierardia macrostachya*, Wight, Icon. tt. 1912 & 1913.

This has been included on the authority of Talbot (Trees, Bomb. ed. 2, p. 309), who gives it as occurring at Sungsal (N. Kanara). There is but one very imperfect specimen in Herb. Kew. from the Anamali Hills, though Beddome says that it is abundant in moist forests of the Western Ghâts from Kanara to Travancore.—DISTRIB. India (W. Peninsula).

18. JATROPHA, Linn.

Herbs, shrubs, or trees, often glandular or prickly. Leaves alternate, often digitately lobed ; stipules often ciliate. Flowers monœcious, in terminal cymes, the central flowers in the cyme or its forks usually female. Perianth usually double. MALE FLOWERS : Calyx 5-lobed or -partite, the segments often colored, imbricate. Petals 5, free or connate. Disk entire or of 5 glands. Stamens numerous ; filaments of all or of the interior only connate below ; anthers erect, ovate or oblong, the cells parallel, contiguous. Pistillode 0. FEMALE FLOWERS : Calyx as in the male. Petals sometimes absent. Ovary 2—4-celled ; ovules solitary in each cell ; styles connate below, 2-fid above, the lobes entire or again 2-lobed. Fruit a capsule of 2—4 cocci ; cocci 2-valved ; endocarp crustaceous or hard. Seeds ovoid or oblong ; testa crustaceous ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. Species about 70, chiefly American.

A small tree reaching 8 ft. high; margins of leaves with gland-tipped hairs ..... 1. *J. glandulifera.*
A shrub 1—1½ ft. high, margins of leaves without gland-tipped hairs ..... 2. *J. nana.*

1. **Jatropha glandulifera,** *Roxb. Fl. Ind.* v. 3 (1832) p. 688. A small evergreen tree containing much clear pale-yellow juice ; trunk short, stout, dichotomously branched. Leaves 2½—5 in. long, and as broad as long, palmately 3—5-lobed below the middle, the posterior lobes the smaller ; lobes obovate or elliptic, shortly and acutely acuminate, glabrous, the margins serrate, each serrature ending in a gland-tipped bristle, base cordate with a broad but shallow sinus ; main nerves numerous, slender ; petioles 2—5 in. long, without glandular hairs ; stipules very long, divided into many filiform segments, each with a glandular head. Flowers monœcious, greenish-yellow, in glandular corymbose cymes ; bracts long, lanceolate, acute, with gland-tipped hairs on the margins. MALE FLOWERS : Calyx ⅛ in. long, divided almost to the base ; segments ovate, obtuse. Stamens 8, all united into a column in the lower half, free above. Disk of 5 glands at the base of the staminal-column. Corolla ¼ in. long, 5-lobed ; lobes ⅛—⅓ in. long, oblong-obovate, rounded, veined. FEMALE FLOWERS : Calyx divided to the base or nearly so ; segments 5, ovate, acute. Capsules reaching ½ in. long, ellipsoid-oblong, smooth, 3-lobed. Seeds ellipsoid-oblong, ⅓ in. long, smooth and shining, black. Roxburgh (*l. c.*), in a footnote, cautions botanists against assuming, after a cursory examination, that the petals of the corolla are free. They separate very easily, but close examination

shows them to be connate at the base, as Roxburgh has described them. Fl. B. I. v. 5, p. 382 ; Dalz. & Gibs. p. 229 ; Trim. Fl. Ceyl. v. p. 45 ; Talb. Trees, Bomb. ed. 2, p. 309 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 ; Watt, Dict. Econ. Prod. v. 4, p. 548. *Jatropha glauca,* Vahl, Symb. v. 1 (1790) p. 78 ; Grah. Cat. p. 183.—Flowers : Aug.—Nov. VERN. *Underbibi* ; *Jangli-erand.*

DECCAN : Pandarpur (near Sholapur), abundant, *Graham, Dalzell & Gibson, Talbot, Woodrow* ! ; Kaladgi, *Law* !—DISTRIB. India (apparently limited to the 2 localities mentioned) ; Ceylon (abundant in some places near the sea-coast), Tropical Africa.

It is very doubtful if this plant is indigenous in the Bombay Presidency. The only places apparently in which it is to be found are Pandarpur and Kaladgi in the Deccan. There is a legend concerning the first springing up of the plant at Pandarpur. Pandarpur is the scene of an annual fair which is attended by thousands of native devotees, and it is quite intelligible that a few seeds might have been accidentally imported by some of them. Roxburgh (Fl. Ind. l. c.) states that he has been unable to find how the plant originally reached the Botanic Garden at Calcutta. Trimen (Fl. Ceyl. v. 4, p. 46) is of opinion that the plant is an introduction in Ceylon, where it is abundant in a few places near the coast.

2. **Jatropha nana,** *Dalz. in Dalz. & Gibs. Bo. Fl.* (1861) p. 229. A glabrous undershrub 1—1½ ft. high ; root woody, as thick as the finger ; stem round, smooth, not much branched ; branches erect. Leaves large for the size of the plant, 3—5 in. long and about as broad as long, broadly ovate, entire or 3-lobed from above the middle, the lobes with entire naked margins, ovate, obtuse or subacute, the middle lobe the largest, base cuneate, with three strong nerves from the base ; petioles variable in length, ⅛—1 in. long ; stipules not seen. Flowers pedicellate in few-flowered terminal paniculate cymes ; bracts lanceolate, acute, the margins not glandular. MALE FLOWERS : Calyx ⅛ in. long, glabrous, divided about ½ way down ; lobes ovate, subobtuse. Stamens 8, all united in the lower half ; disk of minute glands. Corolla ¼ in. long, glabrous outside ; segments almost or wholly free to the base, obovate, cuneate, densely glandular-hairy at the base inside. FEMALE FLOWERS : Calyx ⅛—⅙ in. long, divided almost to the base, glabrous ; segments lanceolate, subacute. Corolla nearly ⅜ in. long ; petals free, obovate-oblong, glabrous outside, glandular-hairy at the base inside. Ovary glabrous, obovoid, seated on a somewhat saucer-shaped glandular disk. Style ⅛ in. long, divided into 3 branches from about the middle, each of the branches again divided at the apex into 2 somewhat triangular lobes about 1/20 in. long. Capsules ⅜ in. long, obovoid-oblong, flattened at the top, slightly 6-lobed. Fl. B. I. v. 5, p. 382 ; Talb. Trees, Bomb. ed. 2, p. 309 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 ; Watt, Dict. Econ. Prod. v. 4, p. 549.—Flowers : May—July.

DECCAN : hills near Poona, *Dalzell* !, *Cooke* !, *Woodrow* ! ; Bowdhan 8 miles west of Poona, *Kanitkar* ! ; Chattarsinghi Hill near Poona, *Cooke* !—DISTRIB. Apparently endemic in the Deccan.

Jatropha gossypifolia, Linn. Sp. Pl. (1753) p. 1006. A shrub, a native of Brazil, cultivated in gardens and found as an escape. Leaves palmately 3—5-lobed, at first brown, afterwards becoming green ;

petioles long, clothed with numerous fascicled and branched gland-tipped bristles. Corolla red. This is often mistaken for *J. glandulifera*, which it much resembles. Fl. B. I. v. 5, p. 383 ; Dalz. & Gibs. Suppl. p. 78 ; Talb. Trees, Bomb. ed. 2, p. 310 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 & Gard. in Ind. ed. 5, p. 442 ; Prain, Beng. Pl. p. 941.

Jatropha multifida, Linn. Sp. Pl. (1753) p. 1006. A glabrous shrub, a native of America, cultivated everywhere in gardens, and known as the *Coral Plant*. It has orbicular leaves 3—9 in. in diam., palmately cut into many narrow entire or subdivided segments. Peduncles and flowers scarlet. Fl. B. I. v. 5, p. 383 ; Grah. Cat. p. 183 ; Talb. Trees, Bomb. ed. 2, p. 309 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 & Gard. in Ind. ed. 5, p. 442 ; Prain, Beng. Pl. p. 941.

Jatropha podagrica, Hook. Bot. Mag. (1848) t. 4376. A small shrub with a curious gouty stem, large peltate leaves and small bright red flowers, a native of New Grenada, often grown in conservatories, but thriving well on a bank of rich soil fully exposed to the sun and regularly watered. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 & Gard. in Ind. ed. 5, p. 442.

Jatropha Curcas, Linn. Sp. Pl. (1753) p. 1006. A soft-wooded shrub or small tree, a native of Tropical America, commonly grown as a fence near villages. The cut branches sprout readily and grow rapidly, which accounts for its being used for this purpose, as it really makes anything but a good fence. The leaves are angular or 3—5-lobed, 4—6 in. long, and the flowers are yellowish-green. Stamens 10, the 5 inner connate into a central column. The seed is known as the *Physic-nut* and is a violent purgative. Fl. B. I. v. 5, p. 383 ; Grah. Cat. p. 183 ; Dalz. & Gibs. Suppl. p. 77 ; Talb. Trees, Bomb. ed. 2, p. 309 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 & Gard. in Ind. ed. 5, p. 442 ; Prain, Beng. Pl. p. 941 ; Watt, Dict. Econ. Prod. v. 4, p. 545.—VERN. *Mogali-eranda*.

The seeds are used by the poorer classes as a purgative and yield an illuminating oil. The Chinese are said to form a varnish by boiling the oil with oxide of iron.—The juice from the stems is very elastic, like caoutchouc, and native boys blow bubbles with it from the end of a straw. When dried it forms a brittle substance like shellac, which may perhaps be utilized. See Watt, Dict. Econ. Prod. l. c.

Jatropha hastata, Jacq. Enum. Pl. Carib. (1760) p. 32. A pretty shrub with panduriform leaves and crimson flowers in terminal corymbose cymes, a native of Cuba.

Jatropha pandurœfolia, Andr. Bot. Rep. t. 267 ; Woodr. Gard. in Ind. ed. 5, p. 442.

19. **CROTON**, Linn.

Trees or shrubs (rarely herbs). Leaves usually alternate, usually 2-glandular at the base. Flowers monœcious (in the Indian species),

solitary or clustered on the rhachis of a terminal raceme ; bracts small. MALE FLOWERS : Calyx 5 (rarely 4—6)-partite ; segments imbricate or subvalvate. Petals 5 (rarely 4—6), never exceeding but sometimes shorter than the calyx. Disk of 4—6 glands opposite the sepals. Stamens many, inserted on a hairy receptacle ; filaments free, inflexed in bud, at length straight ; anthers adnate, with parallel cells. Pistillode 0. FEMALE FLOWERS : Sepals usually more ovate than in the male, rarely accrescent in fruit. Petals smaller than the sepals or obsolete. Disk annular, or of 4—6 glands opposite the sepals. Ovary 3 (rarely 2—4)-celled ; ovule solitary in each cell ; style usually long and slender, 2—4-cleft. Capsule subequally 6-valved, or of 3 separating 2-valved cocci. Seeds smooth ; caruncle small ; testa crustaceous ; albumen copious ; cotyledons broad.—DISTRIB. All hot countries ; number of species uncertain, 500 described.

Fruit with scales as well as stellate hairs ; leaves silvery beneath with white scales	1. *C. reticulatus.*
Fruit with orbicular small scales, but without stellate hairs ; leaves glabrous when mature	2. *C. oblongifolius.*
Fruit with stellate hairs, but without scales ; leaves with a few scattered stellate hairs, but without scales.	3. *C. Gibsonianus.*

1. **Croton reticulatus,** *Heyne, in Wall. Cat.* (1828) 7724 B. A shrub or small tree ; branchlets, petioles, and rhachis covered with ferruginous easily detachable scales. Leaves 2½—6 by 1—2 in., elliptic-lanceolate, acute or acuminate, entire, glabrous above, clothed beneath with silvery scales, base acute or rounded, furnished with a pair of stipitate glands ; petioles ¼—1¼ in. long ; stipules subulate. Flowers pedicellate, clothed with silvery scales, in terminal racemes shorter than the leaves, the females few at the base of the raceme. MALE FLOWERS : Buds globose. Pedicels $\frac{1}{16}$—$\frac{1}{6}$ in. long, slender. Sepals $\frac{1}{10}$ in. long, ovate-oblong, obtuse, ciliolate. Petals slightly shorter than the sepals, obovate, obtuse. Stamens 14—20, inserted on a hairy receptacle. FEMALE FLOWERS : Pedicels stout, $\frac{1}{10}$ in. long. Calyx $\frac{1}{6}$—¼ in. long ; sepals oblong-lanceolate, much enlarged in fruit. Ovary with reddish-brown scales and stellate hairs. Style about ¼ in. long, 3-branched shortly above the base, each branch again 2-branched and again divided into 2 long linear lobes at the apex. Capsules ovoid-oblong, under ½ in. long, slightly 3-lobed, apiculate, with reddish-brown stellate hairs mixed with scales. Seeds purplish-brown mottled with white. Fl. B. I. v. 5, p. 386 ; Bedd. Icon. Pl. Ind. Or. t. 233 ; Trim. Fl. Ceyl. v. 4, p. 47 ; Talb. Trees, Bomb. ed. 2, p. 311 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 ; Watt, Dict. Econ. Prod. v. 2, p. 617. *Croton hypoleucos,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 123 ; Dalz. & Gibs. p. 231.—Flowers : Oct.—Jan. VERN. *Pándri.*

KONKAN : hills, rather rare, *Dalzell* ! ; Matheran, *Cooke* !, *Macnaghten* ! ; Ambeghât, *Woodrow* ! DECCAN : Phonda Ghât, *Ritchie,* 1348 ! S. M. COUNTRY : Parle (Belgaum districts), *Talbot.*—DISTRIB. India (W. Peninsula) ; Ceylon.

2. **Croton oblongifolius,** *Roxb. Fl. Ind.* v. 3 (1832) p. 685. A middle-sized tree ; young shoots, branchlets, inflorescence, calyx, and ovary clothed with minute orbicular silvery scales. Leaves 5—10 by

2½—4½ in., crowded towards the ends of the branchlets, oblong-lanceolate, subacute, glabrous when fully grown, more or less crenate or serrate, penninerved, base usually acute with no apparent glands above the petioles ; main nerves numerous, slender ; petioles ¾—1½ in. long. Flowers pale yellowish-green, solitary or fascicled in the axils of minute bracts on long erect often fascicled racemes, the males in the upper part of the raceme, the females in the lower part. MALE FLOWERS : Pedicels variable in length, reaching ⅛ in. long, slender. Calyx more than ¼ in. across when flattened out, divided about ¾ the way down ; segments more than 1/10 in. long, ovate, obtuse. Petals ⅛ in. long, elliptic-lanceolate, obtuse, woolly. Stamens 12, inflexed in bud ; filaments ⅛ in. long, the lower half hairy. FEMALE FLOWERS : Pedicels short, stout. Sepals more acute than in the male with densely ciliate margins. Petals 1/12 in. long, obovate, with densely woolly margins. Styles 3, nearly ⅛ in. long, each again subdivided into 2 long slender curled branches ⅛ in. long. Capsules less than ½ in. in diam., subglobose, a little depressed, slightly 3-lobed, clothed with small orbicular scales. Seeds ⅛ by ¼ in., ellipsoid, rounded and quite smooth on the back. Fl. B. I. v. 5, p. 386 ; Dalz. & Gibs. p. 231 ; Bedd. For. Man. in Flor. Sylvat. p. cciv ; Trim. Fl. Ceyl. v. 4, p. 47 ; Talb. Trees, Bomb. ed. 2, p. 311 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 ; Prain, Beng. Pl. p. 943 ; Watt, Dict. Econ. Prod. v. 2, p. 616.

Rare. KONKAN : *Stocks* ! ; Fort of Banda, *Dalzell & Gibson*.—DISTRIB. India (Silhet, Bengal, Chota Nagpur, Central Provinces, Birma, W. Peninsula) ; Ceylon.

3. **Croton Gibsonianus,** *Nimmo, in Grah. Cat. Pl. Bomb.* (1839) p. 251. A tall nearly glabrous shrub. Leaves 3—7 by 1½—2½ in., elliptic-oblong, acuminate, minutely serrate, glabrous or with a few stellate hairs, base rounded, usually with 2 stipitate glands ; main nerves 6—8 pairs, slender, with reticulate venation between ; petioles ½—1 in. long, often with a few stellate hairs at the apex and at the base. Flowers in long slender racemes 5—10 in. long, the males often fascicled, the females usually solitary and near the base of the raceme ; bracteoles minute, linear. MALE FLOWERS : Pedicels ¼—⅓ in. long, filiform. Calyx ⅛ in. long, divided nearly to the base ; segments ovate, acute, membranous. Petals 1/10 in. long, oblong, ciliate. Stamens 10, on a hairy receptacle. Disk of 5 large glands. FEMALE FLOWERS : Pedicels ⅛ in. long, stout, stellately hairy. Calyx stellately hairy, especially at the base ; sepals ⅛ by 1/12 in., ovate, acute. Petals 0. Disk saucer-shaped. Ovary globose, densely stellately hairy ; styles 3, reaching ¼ in. long, each subdivided almost to the base into 2 linear branches. Capsules globose, ½ in. in diam., 3-lobed, stellately hairy. Seeds ⅛ by ⅛ in., broadly ellipsoid, smooth, shining, brown, mottled. Fl. B. I. v. 5, p. 392 ; Dalz. & Gibs. p. 232 ; Talb. Trees, Bomb. ed. 2, p. 311 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371.—Flowers : Nov.

KONKAN : *Gibson* ! DECCAN : near Nasik, *Dalzell & Gibson* ; Harishchandragad, *Graham*. KANARA : *Law* ! ; near Gairsoppa Falls, *Woodrow, Talbot*, 288 ! ; moist forests on the Ghâts to the south, *Talbot*.—DISTRIB. India (W. Peninsula).

Croton Tiglium, Linn. Sp. Pl. (1753) p. 1004. A small evergreen tree grown for the oil produced from its seeds and becoming naturalized in the S. Konkan. Young shoots sparsely stellately hairy. Leaves 2—4 in. long, thinly membranous, glabrous, ovate, acuminate, serrate, 3—5-nerved. Stamens 15—20. Capsules ¾—1 in. long, white, turbinately ovoid, obtusely trigonous. Fl. B. I. v. 5, p. 393 ; Grah. Cat. p. 182 ; Talbot, Trees, Bomb. ed. 2, p. 311 ; Prain, Beng. Pl. p. 943 ; Watt, Dict. Econ. Prod. v. 2, p. 617.

The seeds yield a yellowish oil which is used as a drastic purgative and as a rubefacient. The plant was at one time grown at Hewra near Poona, and the capsules sent to the Medical Stores at Bombay, where the oil was expressed. The supply is now imported from China *via* Singapore. See Watt, Dict. Econ. Prod. l. c.

Excluded Species.

CROTON AROMATICUS, Linn. Sp. Pl. (1753) p. 1005. A slightly aromatic shrub or small tree; bark smooth, pale-grey; young parts rough with harsh stellate hairs. Leaves 2½—4 by 1¼—3 in., ovate, acute, irregularly and shallowly crenate-serrate, slightly rough with a few stellate hairs above, much more so, especially on the nerves, beneath, base 3—5 nerved, rounded or cordate, usually with 2 (rarely 4) stalked peltate circular glands; petioles ½—1¼ in. long, rough. Flowers numerous, pedicellate, in terminal racemes 4—6 in. long, the males in the upper half of the raceme; bracts small, lanceolate, acute. Male flowers: Sepals acute, ⅛ in. long, stellately hairy. Petals as long as the sepals, bordered with white hair. Stamens 20—30, on a densely white-woolly receptacle. Female flowers remote, on stout pedicels. Ovary stellately hispid; style-branches 3, each again subdivided. Fruit less than ½ in. in diam., subglobose, 3-lobed, rough with short stellate hairs. Fl. B. I. v. 5, p. 388; Wight, Icon. t. 1915; Trim. Fl. Ceyl. v. 4, p. 47; Talb. Trees, Bomb. ed 2, p. 311; Woodr. in Journ. Bomb. Nat. v. 12 (1899), p. 371; Watt, Dict. Econ. Prod. v. 2, p. 615.

I cannot find any evidence in favour of the plant being indigenous in the Bombay Presidency. There is one sheet in Herb. Kew. marked *Herb. Stocks*, but, as no habitat is given, the specimen might have been collected anywhere. Talbot (Trees, Bomb. ed. 2, p. 311) gives the Bababudin Hills above 4000 ft. (which are outside our area) as the habitat of the plant, and Woodrow in his list gives no habitat at all. The specimens in Herb. Kew. are from the Nilghiris, Kurg and Travancore, and the plant seems to be tolerably common in Ceylon.

CROTON LAWIANUS, Nimmo, in Grah. Cat. Pl. Bomb. (1839) p. 251. A small tree; branches slender, terete, smooth. Leaves coriaceous, 3—5 in. long, broadly ovate, caudate-acuminate, entire, strongly 3-nerved, the young leaves finely softly stellately hairy. Flowers in short slender racemes; bracts 0. Male flowers 3—5; pedicels capillary. Sepals ovate, obtuse, gland-dotted, sparsely stellately hairy. Petals larger, oblong, fimbriate. Stamens about 20. Disk of 5 large glands. Female flowers few. Pedicels stout, erect. Sepals large, oblong, glabrous, much enlarged and foliaceous in fruit. Ovary oblong, glabrous, 3-lobed; styles 3, united below, very stout, recurved, 2-lobed, the lobes 2-fid. Capsules ⅝ in. in diam., shorter than the enlarged leafy green sepals, thickly crustaceous, rugose, glabrous. Seeds ⅓—½ in. long, oblong, striately mottled brown and white. Fl. B. I. v. 5, p. 394; Dalz. & Gibs. p. 232; Talb. Trees, Bomb. ed. 2, p. 311.

Dr. Gibson states that this tree has been found at Bhimasankar, a high hill of the Western Ghâts, but no other collectors have found it, and, as Mr. Talbot remarks (Trees, Bomb. ed. 2, p. 312), it may perhaps be found in the southern parts of N. Kanara, but has not as yet been seen in the Bombay Presidency. The Bababudin Hills given as a habitat in the 'Flora of British India' are outside our area.

CROTON RHEEDEI, Grah. Cat. (1839) p. 182, described as an erect suffruticose plant 2 or 3 feet high with flowers in terminal spikes appearing in April, found on the Thal Ghât and in Salsette, cannot be identified. Fl. B. I. v. 5, p. 395.

CROTON GIBSONI, Grah. Cat. (1839) p. 182, described as an erect suffruticose species with petiolate cordate serrate leaves, much resembling the last species and found in the northern parts of the Deccan, cannot be identified. Fl. B. I. v. 5, p. 395.

CROTON RAMIFLORUS, Grah. Cat. (1839) p. 182, described as a small tree with alternate petiolate ovate-oblong leaves somewhat glaucous beneath, small white flowers growing from the naked branches, and fruit the size of a large pea half hidden in the calyx which grows into 5 scarious wings in shaded ravines at Khandala, but not common, flowering in October, cannot be identified. It is not improbable that it may be *Dimorphocalyx*. Fl. B. I. v. 5, p. 395.

20. **GIVOTIA**, Griff.

A small stellately tomentose tree. Leaves alternate, rounded and cordate, sinuate-toothed, 5—9-nerved at the base. Flowers in axillary and subterminal racemose or paniculate cymes, dicœcious. Disk entire or lobed. MALE FLOWERS: Sepals 5, broad, unequal, imbricate. Petals 5, longer, cohering in a subglobose 5-lobed corolla. Disk of orbicular glands. Stamens 13—25, crowded on a woolly receptacle; filaments connate below, erect; anthers ovate, dorsifixed, the cells parallel. Pistillode 0. FEMALE FLOWERS: Perianth of the male. Disk cupular. Ovary 2—3-celled; ovule solitary in each cell; styles short, spreading, 2-fid. Drupe subglobose; putamen crustaceous, 1-celled, 1-seeded. Seed globose or ellipsoid; testa bony; albumen fleshy; cotyledons broad, flat.—DISTRIB. Western Peninsula of India, Ceylon; species 1.

1. **Givotia rottleriformis,** *Griff. in Calc. Journ. Nat. Hist.* v. 4 (1844) p. 388. A soft-wooded middle-sized tree with stout branches; branchlets, petioles, underside of leaves, and sepals densely clothed with white stellate tomentum. Leaves 5—10 in. long and nearly as broad as long, broadly ovate or rotundate, cordate with a deep sinus, coarsely and irregularly dentate or incised, palmately nerved, acute, coriaceous, hoary becoming glabrous above, densely clothed beneath with white woolly stellate tomentum; nerves 5—7, basal, with several pairs above them; petioles stout, woolly-tomentose, 4—6 in. long, often with 1 or 2 glands. Flowers dicœcious, in axillary paniculate dense or lax-flowered cymes 4—8 in. long near the ends of the branches; pedicels jointed; bracts narrow, linear. Sepals 5, stellately hairy outside. Petals 5, longer than the sepals, more or less cohering. MALE FLOWERS: Disk of 5 orbicular glands. Stamens 13—25; filaments connate below, erect, hairy at the base, on a woolly receptacle. Sepals $\frac{1}{6}$ in. long. Corolla $\frac{1}{4}$ in. long, campanulate with rounded lobes. FEMALE FLOWERS: Disk cup-shaped. Ovary stellately hairy, 2—3-celled. Drupe $\frac{3}{4}$—1 in. in diam., subglobose. Fl. B. I. v. 5, p. 395; Dalz. & Gibs. p. 228; Wight, Icon. t. 1889; Bedd. Flor. Sylvat. t. 285; Trim. Fl. Ceyl. v. 4, p. 50; Talb. Trees, Bomb. ed. 2, p. 312; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371; Watt, Dict. Econ. Prod. v. 3, p. 503.—Flowers: July—Sept. VERN. *Polki-*

DECCAN : Kartriz Ghât near Poona, *Bhiva l*, *Woodrow*. S. M. COUNTRY : Dharwar, *Talbot*; Belgaum districts, *Talbot*. KANARA : Diggi, *Woodrow*.—DISTRIB. India (W. Peninsula) ; Ceylon.

The wood, which is light, white, and even-grained, is employed in the manufacture of toys, imitation fruits and other fancy articles; the surface takes paint readily. The seeds yield an oil which is used as a lubricant for fine machinery.

21. **BLACHIA,** Baill.

Glabrous shrubs or small trees. Leaves alternate or the upper subopposite, shortly petiolate, entire, penninerved. Flowers monœcious or subdiœcious, the males terminal, subumbellate or racemose on filiform pedicels, the females solitary or fascicled on stout pedicels thickened above. MALE FLOWERS : Sepals 4—5, concave, membranous, imbricate. Petals small, rounded, hyaline. Disk-glands scale-like, alternating with the petals. Stamens 10—30, on a convex receptacle ; filaments free ; anther-cells on the margin of the connective, the tips at length confluent. Pistillode 0. FEMALE FLOWERS : Sepals lanceolate or oblong, accrescent or sometimes caducous. Petals 0. Disk obscure or annular. Ovary 3—4-celled ; ovule 1 in each cell ; styles distinct, filiform, 2-partite. Capsule of three 2-valved cocci. Seeds oblong, estrophiolate ; testa crustaceous, shining ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. Western Peninsula of India, Ceylon, 1 species in China ; species 5 or 6.

1. **Blachia denudata,** *Benth. in Journ. Linn. Soc.* v. 17 (1880) p. 226. A large shrub or small tree reaching 30 ft. high and 3 in. in diam. ; bark smooth. Leaves very variable, 2½—6 by 1—2½ in., oblong-lanceolate or ovate, obtuse, acute or acuminate, entire, glabrous, penninerved, base usually acute ; main nerves 6—8 pairs, slender ; petioles ¼—½ in. long. Flowers in terminal racemes, the males at the top, the females few at the base of the raceme. MALE FLOWERS : Pedicels ⅛ in. long, filiform. Sepals usually 4, membranous, suborbicular, concave, imbricate, ⅛ in. in diam. Petals much smaller than the sepals, hyaline, $\frac{1}{30}$—$\frac{1}{20}$ in. long, broadly obovate. Glands of the disk scale-like, as long as the petals, oblong, slightly 3-lobed. Stamens 10—30 ; filaments $\frac{1}{16}$—$\frac{1}{20}$ in. long, flattened ; anthers somewhat horseshoe-shaped, the cells on the margin of the connective. FEMALE FLOWERS : Pedicels stout, thickened upwards. Sepals ovate-lanceolate, acute, very deciduous. Petals 0. Styles 3, deeply 2-fid. Capsules ellipsoid or subglobose, ⅓—½ in. long, glabrous, deeply 3-lobed, of three 2-valved cocci. Seeds reaching ⅜ by ¼ in., ellipsoid, smooth and shining, brown mottled with white. Fl. B. I. v. 5, p. 403 ; Talb. Trees, Bomb. ed. 2, p. 312 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371. *Blachia umbellata,* Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 (*not* of Baill.). *Croton umbellatum,* Dalz. & Gibs. Bo. Fl. (1861) p. 231 (exclud. syn.).

Dalzell & Stocks, without locality in Herb. Kew.! KONKAN : Goa jungles, *Dalzell*! S. M. COUNTRY : Chorla Ghât, *Dalzell & Gibson.* KANARA : evergreen forests near the Gairsoppa Falls, *Talbot,* 283! ; N. Kanara, *Talbot,* 284! ; Karwar, *Woodrow.*—DISTRIB. India (W. Peninsula).

22. DIMORPHOCALYX, Thwaites.

Glabrous trees. Leaves alternate, petiolate, quite entire, coriaceous, penninerved, stipulate. Flowers dicœcious (rarely monœcious), the males solitary or in clusters on the old wood, the females solitary or 2—3 together, terminal or leaf-opposed. MALE FLOWERS: Calyx cup-shaped, normally 5-toothed or -lobed, open in bud. Petals normally 5, erect, imbricate, longer than the calyx. Disk-glands alternate with the petals. Stamens 10—20 in two rows, often with an odd stamen at top; filaments connate in a column; anthers dorsifixed or innate, the cells adnate to a thick connective, parallel or divergent. Pistillode 0. FEMALE FLOWERS: Calyx divided almost to the base; sepals 5, oblong or oblong-lanceolate, obtuse, imbricate, enlarging greatly in fruit. Petals 5. Disk annular. Ovary 3-celled; ovule 1 in each cell; styles 3, connate at the base, 2-fid. Capsule of three 2-valved crustaceous cocci surrounded at the base by the persistent calyx, capped with the styles. Seed ovoid; testa crustaceous; albumen fleshy; cotyledons broad, flat.—DISTRIB. Species 3 or 4, South Indian and Malayan.

1. **Dimorphocalyx Lawianus,** *Hook. f. Fl. B. I.* v. 5 (1887) p. 404. A small or middle-sized tree. Leaves 3—7 by 1½—3 in., elliptic-lanceolate, obtuse or obtusely acuminate (rarely subacute), glabrous, reticulately veined, dark-green above, paler beneath, base usually acute; petioles ¼—½ in. long; stipules small, triangular. Flowers dicœcious (rarely monœcious), the males usually solitary on the old wood, shortly pedicellate, the females solitary or 2—3 together on long pedicels, with usually a small bract on the pedicel. MALE FLOWERS: Calyx ⅛ in. long, open in bud, with 5 (rarely 4) shallow distant rounded lobes about $\frac{1}{16}$ in. long. Petals 5 (rarely 4), ⅜ by ⅛ in., oblong, obtuse. Staminal-column ⅜ in. high, on a hairy receptacle; stamens 10—14 (*Beddome*), often 11 in 2 rows of 5 each and a terminal one, the filaments of the outer row connate at the base, the free portion about $\frac{1}{16}$ in. long, those of the second series connate into a column, the free portion very short scarcely $\frac{1}{16}$ in. long, the uppermost solitary stamen with a filament $\frac{1}{16}$ in. long. FEMALE FLOWERS: Calyx divided almost to the base; sepals in fruit reaching ⅞ by ½ in. or more, variable in size and shape, often unequal, oblong or oblong-lanceolate, obtuse, parallel-nerved and reticulately veined. Disk annular, hairy. Ovary ovoid, densely hairy; styles ⅓ in. long, connate at the very base, each deeply divided into 2 branches, the branches again 2-fid at the apex. Capsules ½ in. in diam., globose, hairy, 3-lobed. Seeds ⅜ by ¼ in., ellipsoid, yellowish mottled with brown. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371; Talb. Trees, Bomb. ed. 2, p. 313. ? *Croton ramiflorum*, Grah. Cat. p. 182. *Trigonostemon Lawianus*, Muell. Arg. in Linnæa, v. 34 (1865) p. 212; Bedd. Flor. Sylvat. t. 273 (exclud. syn.).—Flowers Mar.—Oct.

Dalzell without locality in Herb. Kew. KONKAN: *Law!*; Matheran, *Cooke!*, *H. M. Birdwood.* DECCAN: Khandala, *Woodrow!* KANARA: Southern Ghâts between Nilkund and Gairsoppa, *Talbot.*—DISTRIB. India (W. Peninsula).

This plant seems to be scarcely distinct from *Dimorphocalyx glabellus*, Thwaites, from which it differs chiefly in the greater size of its parts. I have

JAI-HIND COACHING CLASSES.
406, 4th Floor, Auto Commerce House,

examined several (5 or 6) male flowers and have not found 15 stamens in any of them, 11 in 2 rows of 5 each, with an odd one at top, being the usual complement. The sepals are very variable in size and shape and are not always unequal.

Trimen (Fl. Ceyl. l. c.) alludes to the variableness of *C. glabellus* and states that the difference in appearance between the male and female plants has sometimes led to their being collected as separate species.

23. AGROSTISTACHYS, Dalzell.

Glabrous shrubs or small trees. Leaves alternate, coriaceous, usually very long, petiolate or subsessile, entire, serrate or sinuate, penninerved. Flowers dicœcious, in axillary or supra-axillary bracteate racemes or spikes, the males solitary or in small clusters within each bract, the female solitary. MALE FLOWERS: Calyx globose, splitting into 2—5 valvate lobes. Petals 5—8, shorter than the calyx. Disk-glands large, alternating with the petals. Stamens 8—13 on a convex receptacle; filaments nearly free; anthers versatile, the cells pendulous from the thickened connective. Pistillode 0 or 2—3-fid. FEMALE FLOWERS: Sepals 2—4. Petals usually 5, longer than the sepals, caducous. Ovary 3-celled; ovule 1 in each cell; styles short, thick, spreading, entire or 2-fid. Capsule of three 2-valved cocci. Seeds globose; testa crustaceous, shining; albumen fleshy; cotyledons broad, flat.—DISTRIB. Tropical India and Africa; species 8.

Leaves petiolate, serrate; male flowers solitary in the axils of the bracts; ovary glabrous	1. *A. indica.*
Leaves subsessile; male flowers many in the axils of the bracts; ovary pubescent	2. *A. longifolia.*

1. **Agrostistachys indica,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 41. A shrub 5—6 ft. high (*Dalzell*), reaching 15 ft. high (according to *Beddome*). Leaves numerous, thick, 5—11 by 1½—3½ in., elliptic-oblong or oblong-lanceolate, acute, coarsely and sharply serrate with incurved spinulose teeth, glabrous, base acute, running down into the petiole; main nerves 10—20 pairs, prominent, with reticulate venation between; petioles ½—1½ in. long. MALE FLOWERS minute, solitary in the axils of small imbricating, broadly ovate finely ciliate bracts arranged to form little grass-like spikelets, in axillary or supra-axillary clusters. Sepals membranous, ovate. Petals 5—8, rounded or subquadrate, white. Disk-glands very large. Stamens 8—13. FEMALE FLOWERS solitary, pedicellate, the pedicels with 3—5 scale-like bracts at the base. Ovary glabrous. Capsules ½ in. in diam., 3-lobed, glabrous, red. Seeds globose, pale brown. Fl. B. I. v. 5, p. 406; Dalz. & Gibs. p. 232; Bedd. For. Man. in Flor. Sylvat. p. ccv & Icon. Pl. Ind. Or. t. 241; Trim. Fl. Ceyl. v. 4, p. 55; Talb. Trees, Bomb. ed. 2, p. 313; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371.—Flowers: Feb.

Dalzell without locality in Herb. Kew. Western Peninsula on the Ghâts, from the Konkan southwards, *Talbot*. KONKAN: Talkat Ghât, *Dalzell & Gibson*; Sahyadri Mountains, *Dalzell*. S. M. COUNTRY: Belgaum districts, *Talbot*. KANARA: N. Kanara, in evergreen forests on the banks of streams, *Talbot*.—DISTRIB. India (W. Peninsula); Ceylon.

2. **Agrostistachys longifolia,** *Benth. ex Hook. f. Fl. B. I.* v. 5 (1887) p. 407. A large shrub or small tree ; branches stout, marked with the scars of petioles and stipules ; young parts glabrous, very resinous. Leaves numerous, crowded at the ends of the branches, 6—20 by 1½—3 in., oblanceolate, nearly sessile, very shortly acuminate, quite entire, glabrous, stiff and leathery ; main nerves 10—18 pairs, prominent beneath ; stipules short, broad, acute, caducous. Flowers in lax spiciform racemes much shorter than the leaves, the males in clusters in the axils of single ovate bracts, the females fewer, solitary, distant along the rhachis, with longer often jointed pedicels. MALE FLOWERS : Calyx about ⅛ in. long, membranous, glabrous. Sepals 2 or 3, entire. Petals 5, small. Disk-glands large. Stamens about 10. Pistillode 2—3-cleft. FEMALE FLOWERS : Sepals 5, ovate, acute. Disk large, lobed. Ovary pubescent. Capsules ⅜ in. in diam., 3-lobed ; cocci globose, smooth, crustaceous. Seeds ⅕—¼ in. in diam., globose, smooth, brown. Trim. Fl. Ceyl. v. 4, p. 56 ; Talb. Trees, Bomb. ed. 2, p. 313 ; Woodr. in Journ. Bomb. Nat v. 12 (1899) p. 371. *Sarcoclinium longifolium,* Wight, Icon. v. 5 (1852) part 2, p. 24, tt. 1887—8 ; Bedd. For. Man. in Flor. Sylvat. p. ccv & Anal. Gen. t. 23, fig. 1.—Flowers : July—Oct.

KANARA : N. Kanara, *Woodrow* ; evergreen forests on the Supa Ghâts along streams, *Talbot.*—DISTRIB. India (W. Peninsula) ; Ceylon.

24. CHROZOPHORA, Neck.

Diffuse densely hispid or stellately tomentose herbs. Leaves alternate, sinuate-toothed or lobed, wavy or plicate, 2-glandular at the base. Flowers monœcious, in axillary bracteate racemes, the males crowded in the upper part of the raceme, the females solitary, pedicellate, in the lower part. MALE FLOWERS : Calyx globose or ovoid, splitting into 5 valvate segments. Petals 5, short. Disk obscure. Stamens 5—15 ; filaments connate below in a column in 1—3 series ; anthers oblong, the cells parallel, contiguous. Pistillode 0. FEMALE FLOWERS : Sepals 5, narrow. Petals 5, very narrow, sometimes setaceous or obsolete. Disk of 5 short broad glands alternating with the petals. Ovary 3-celled ; ovule solitary in each cell ; styles erect or spreading, 2-fid. Capsule of 3 hispid, tomentose or lepidote, 2-valved, almost fleshy cocci. Seeds estrophiolate ; testa shining ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. Species 4—6, Mediterranean, Asiatic, and African.

Ovary and capsule with stellate tomentum and silvery scales.
- A prostrate herb; stamens 15 in 2 whorls..... 1. *C. tinctoria.*
- Shrubby erect; stamens 5 ..... 2. *C. obliqua.*

Ovary and capsule with stellate tomentum but without silvery scales.
- An erect stellately hairy herb; lower part of stem usually without branches; leaves pale, reaching 4 in. long; sepals of female flowers triangular... 3. *C. plicata.*
- A prostrate stellately woolly herb, diffusely branched from the root; leaves dark-brown, less than 1½ in. in diam.; sepals of female flowers linear..... 4. *C. prostrata.*

1. **Chrozophora tinctoria,** *A. Juss. Tent. Euphorb.* (1824) p. 28, t. 7, fig. 25. An annual prostrate herb, the whole plant densely clothed with stellate tomentum ; stems about 1 ft. long, branched, not stout. Leaves thick, softly stellately tomentose on both surfaces, 1¼—2¾ by 1¼—2½ in., from ovate and sinuate-toothed or entire to rounded and obtusely lobed ; petioles ½—2½ in. long. Flowers in short racemes lengthening in fruit, the males numerous, crowded and sessile at the top of the raceme, the females pedicellate in the lower part, solitary ; bracts narrowly linear, 1/16—1/12 in. long, hairy. MALE FLOWERS : Calyx ⅛—⅓ in. long, densely stellately tomentose. Petals 5, thin, membranous, elliptic-lanceolate, 1/10 in. long. Stamens about 15 in 2 whorls. FEMALE FLOWERS : Pedicels often elongating in fruit. Calyx divided almost to the base, densely stellately tomentose ; sepals 5, triangular, acute, 1/10 in. long by 1/30 in. wide at the base. Petals like the sepals but narrower and shorter, densely stellately tomentose. Ovary stellately tomentose and clothed with silvery scales ; styles 3, each deeply 2-fid, usually spreading. Capsules ¼—⅜ in. in diam., clothed with stellate tomentum and silvery scales. Seeds ⅛ in. long, shining with a silvery sheen, slightly tuberculate. Fl. B. I. v. 5, p. 408 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 ; Watt, Dict. Econ. Prod. v. 2, p. 621.—Flowers : Nov. VERN. *Okharáda.*

DECCAN : *Stocks* ! GUJARAT : widely, *Woodrow.* SIND : *Dalzell* !—DISTRIB. India (Panjáb) ; Afghanistan and eastwards to the Mediterranean region.

The plant is cultivated in the south of France for the dye it yields. See Watt, Dict. Econ. Prod. l. c.

2. **Chrozophora obliqua,** *A. Juss. Tent. Euphorb.* (1824) p. 28. Shrubby, erect or suberect, much-branched, thickly stellately tomentose. Leaves 1—2 by ½—¾ in., ovate or ovate-lanceolate, sinuate-toothed, sub-obtuse, clothed on both sides with stellate tomentum, base rounded or cuneate, usually 2-glandular ; main nerves few, prominent beneath ; petioles ¼—1 in. long ; stipules linear, soon falling. Flowers in axillary bracteate racemes, the males in the upper part sessile, the females in the lower part pedicellate ; bracts linear, hairy, in. long. MALE FLOWERS : Calyx ⅛—¼ in. long, densely stellately mentose. Petals thin, membranous, 1/10 in. long. Stamens 5. FEMALE FLOWERS : Sepals 1/10 in. long by 1/30 in. wide at the base, triangular, very acute, stellately tomentose. Petals as the sepals but much narrower and shorter, stellately tomentose. Ovary clothed with stellate tomentum and silvery scales ; styles 3, erect, 1/10 in. long, 2-fid to about ½ way down, stellately tomentose outside. Capsules ¼ in. in diam., clothed with stellate tomentum and silvery scales. Seeds roughly tuberculate. Fl. B. I. v. 5, p. 409 ; Boiss. Fl. Orient. v. 4, p. 1141 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371. *Croton oblongifolium,* Delile, Fl. Egypt. p. 139, t. 51, fig. 1.

SIND : *Stocks* !

There is but 1 imperfect sheet in Herb. Kew. from the Bombay Presidency marked as above, while there is only one other sheet from India in Herb. Kew., which is from Ferozepur in the Panjáb.—DISTRIB. Arabia, N. Africa.

3. **Chrozophora plicata,** *A. Juss. Tent. Euphorb.* (1824) p. 28. Annual erect hoary herb reaching 2 ft. high with a long straight

slender tap-root ; stem usually naked in the lower part, slightly branched above, stellately hairy. Leaves thick, pale, variable in shape and size, 2—4 by 1½—4 in., ovate to orbicular, sometimes obscurely 3-lobed, wrinkled, clothed on both sides with long stellate hairs, base truncate, cordate or cuneate ; petioles 1—2 in. long. Flowers in pedunculate densely stellately hairy racemes ; bracts linear, ⅛—¼ in. long, stellately hairy. MALE FLOWERS : Calyx ⅛ in. long. Petals $\frac{1}{10}$ in. long, very thin, ovate-lanceolate. Stamens 15 in 2 whorls. FEMALE FLOWERS : Sepals $\frac{1}{12}$ by $\frac{1}{20}$ in., triangular, acute, hairy. Petals as the sepals but shorter and narrower, hairy. Styles $\frac{1}{10}$ in. long, slightly connate at the very base, 2-fid to rather less than ½ way down. Capsules ⅓ in. in diam., densely stellately hairy without silvery scales. Fl. B. I. v. 5, p. 409 ; Dalz. & Gibs. p. 232 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 ; Prain, Beng. Pl. p. 944 ; Watt, Dict. Econ. Prod. v. 2, p. 620. *Croton plicatum*, Vahl, Symb. Bot. v. 1 (1790) p. 78 ; Grah. Cat. p. 182.—Flowers : Apr. VERN. *Suryavarti.*

DECCAN : in rice-fields after the rains, *Graham, Dalzell & Gibson*; Poona, *Cooke* !, *Woodrow* ! S. M. COUNTRY : Dharwar, *Cooke* ! GUJARAT; *Dalzell & Gibson*; Ankleshvar, *Kanitkar* ! ; Baroda, *Woodrow*.—DISTRIB. Throughout India in the drier parts; westward to Spain and N. Africa.

A dye similar to that obtained from *C. tinctoria* may be obtained from this plant; the ashes of the root are given to children in coughs and the seeds are used as a purgative. See Watt, Dict. Econ. Prod. l. c.

4. **Chrozophora prostrata,** *Dalzell, in Dalz. & Gibs. Bo. Fl.* (1861) p. 233. A procumbent humifuse stellately woolly herb ; branches numerous, spreading from the root, woolly-tomentose. Leaves ½—1¼ in. in diam., broadly ovate or orbicular, dark-colored, deeply bullate, finely pubescent and with some stellate hairs above, densely stellately woolly beneath, base cordate or truncate. Flowers in short few-flowered axillary racemes ; bracts linear, ⅛—¼ in. long. MALE FLOWERS : Calyx ⅛ in. long. Petals elliptic-lanceolate, rather more than $\frac{1}{10}$ in. long. Stamens 15 in 2 whorls. FEMALE FLOWERS : Sepals $\frac{1}{10}$ by $\frac{1}{20}$ in., linear, acute. Petals linear, as the sepals but smaller and narrower. Styles $\frac{1}{10}$ in. long, slightly connate at the base, 2-fid to more than ½ way down. Capsules ¼ in. in diam., stellately woolly without silvery scales. Fl. B. I. v. 5, p. 410.

DECCAN : in dried up water-holes common, *Dalzell & Gibson;* Alandi near Poona, *Cooke* ! ; Nasik, *Kanitkar* ! ; Poona, banks of the Mula River, *Cooke* !, *Kanitkar* ! ; Malegaon, *Bhiva* ! S. M. COUNTRY : *Ritchie,* 1345 ! SIND : *Stocks* ! —DISTRIB. Throughout India ; N. Africa.

I think there are sufficient grounds for maintaining this as a separate species. It seems to be tolerably common in Egypt, where it has been collected by Schweinfurth (Nos. 137, 837, and 898 in Herb. Kew.), who considers it to be a species distinct from *C. plicata,* which also occurs in Egypt. The fact that this prostrate plant, as pointed out by Sir George Watt (Dict. Econ. Prod. v. 2, p. 621), does not furnish a dye, while the erect plant *C. plicata* does, goes far to show that they are different species.

25. **BALIOSPERMUM,** Blume.

Erect shrubs. Leaves alternate, sinuate-toothed or lobed, penni-nerved or 3—5-nerved from the base, 2-glandular at the base. Flowers

small, monœcious or dicœcious, paniculate or racemose. MALE FLOWERS globose; sepals 4—5, membranous, orbicular, concave, imbricate. Petals 0. Disk of 4—6 glands. Stamens 10—30; filaments slender, free; anthers terminal, the cells adnate throughout to the broad connective, dehiscing at first introrsely, the slits ultimately lateral. Pistillode 0. FEMALE FLOWERS: Sepals 5—6, lanceolate, entire or toothed, sometimes accrescent in fruit. Petals 0. Disk entire. Ovary 3-celled; ovule solitary in each cell; styles rather long, 2-fid or 2-partite; stigmas smooth (not fimbriate). Capsule of three 2-valved crustaceous cocci. Seeds ovoid; testa crustaceous; albumen fleshy; cotyledons broad, flat.—DISTRIB. India and Malaya; species 6.

1. **Baliospermum axillare,** *Blume, Bijdr.* (1825) p. 604. A leafy stout usually monœcious undershrub 3—6 ft. high with herbaceous branches from the root, glabrous except the young shoots and sometimes the leaves beneath. Leaves sinuate-toothed, the upper small, lanceolate, penninerved, the lower large, reaching 6—12 in. long and often as broad, ovate, often palmately 3—5-lobed, base rounded or cuneate, 2-glandular; petioles 2—6 in. long; stipules of 2 glands. Flowers in numerous axillary racemes or contracted panicles, all male or with a few females below. MALE FLOWERS: Calyx globose, $\frac{1}{10}$ in. long, 4—5-partite, glabrous or slightly pubescent; segments suborbicular, concave, imbricate, membranous, finely mottled. Disk of 6 glands. Stamens about 20. FEMALE FLOWERS: Sepals ovate-lanceolate, pubescent, not accrescent in fruit. Disk $\frac{1}{10}$ in. in diam., thin, entire. Ovary hairy; styles about $\frac{1}{16}$ in. long, thick, 2-partite, dull-red, the stigmatic surface smooth, not fimbriate. Capsules $\frac{1}{3}$—$\frac{1}{2}$ in. long, obovoid, usually hairy, of three 2-valved crustaceous cocci. Seeds $\frac{1}{3}$ by $\frac{1}{4}$ in., ellipsoid, quite smooth, mottled. Fl. B. I. v. 5, p. 461; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372; Prain, Beng. Pl. p. 946. *Baliospermum polyandrum,* Wight, Icon. t. 1885; Dalz. & Gibs. p. 232. *B. montanum,* Muell. Arg. in DC. Prodr. v. 15, part 2, 1125; Watt, Dict. Econ. Prod. v. 1, p. 364.—Flowers: Dec.

VERN. *Dánti*; *Jamálgota.*

KONKAN: *Stocks*!, *Woodrow*!, *Dalzell*!, *Lambert*; Uran (Bombay harbour), *Stocks*!; Ratnagiri, *Stocks*!; Caranja Hills, *Dalzell & Gibson.*—DISTRIB. India (Behar, N. Bengal, Chota Nagpur, Assam, Birma, W. Peninsula); Malaya.

The seeds are used as a drastic purgative, one seed being the dose for an adult. The root is considered cathartic and is much employed in Hindu medicine. See Watt, Dict. Econ. Prod. l. c.

26. CLAOXYLON, A. Juss.

Evergreen trees or shrubs (rarely annual herbs). Leaves alternate, usually long-petiolate, oblong, entire or sinuate-toothed, usually penninerved. Flowers usually dicœcious (in the single Bombay species monœcious), small, in axillary or lateral spikes or racemes. MALE FLOWERS: Calyx subglobose, of 3—4 valvate segments. Petals 0. Disk 0. Stamens numerous (rarely few), inserted on or around a central receptacle, often intermixed with glands or long linear ciliate

scales ; filaments free ; anthers erect, the cells connate at the base only but not confluent, free above and erect, dehiscing extrorsely. Pistillode 0. FEMALE FLOWERS : Calyx as in the male. Petals 0. Disk 0 or of 3 petal-like hypogynous scales alternate with the carpels. Ovary 3-celled ; ovule solitary in each cell ; styles short (rarely long), entire, fringed, spreading. Capsule of three 2-valved cocci, or indehiscent and coriaceous. Seeds subglobose, with or without an aril ; testa crustaceous ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. Tropics of the Old World ; species about 40.

1. **Claoxylon Mercurialis,** *Thwaites Enum.* (1861) p. 271. Annual, erect, 8—24 in. high, glabrous or nearly so. Leaves numerous, spreading, 1—2 by ½—1 in., ovate-lanceolate, subacute, crenate-serrate, thin, glabrous, base rounded or acute ; nerves 4—5 pairs, slender ; petioles ⅓—¾ in. long, very slender. Flowers few, distant, in very slender racemes usually longer than the leaves, the female flowers usually solitary with several males. MALE FLOWERS : Sepals 3, broadly ovate, $\frac{1}{10}$ in. long. Stamens variable, usually 5—10. FEMALE FLOWERS : Sepals 3, broadly ovate, acute, $\frac{1}{16}$ in. long in fruit. Ovary pubescent ; styles $\frac{1}{10}$ in. long, fringed, spreading. Capsules ⅛ in. in diam., of 3 subglobose almost distinct hairy cocci. Seeds globose, pale-brown, deeply foveolate. Fl. B. I. v. 5, p. 412 ; Trim. Fl. Ceyl. v. 4, p. 63 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372 ; Prain, Beng. Pl. p. 947. *Tragia Mercurialis,* Linn. Sp. Pl. (1753) p. 980 ; Grah. Cat. p. 186. *Micrococca Mercurialis,* Benth. in Hook. Niger Flora (1849) p. 503. *Microstachys Mercurialis,* Dalz. & Gibs. Bo. Fl. p. 227.—Flowers : July.

KANARA : *Law* ! ; Karwar, a common weed, *Talbot* ! GUJARAT : Porbander, *Woodrow.*—DISTRIB. India (Behar, Birma, W. Peninsula) ; Ceylon, Arabia, Tropical Africa.

A weed usually in cultivated ground.

27. **ACALYPHA,** Linn.

Herbs shrubs or trees. Leaves alternate, toothed or crenate (rarely entire), penninerved or 3—5-nerved. Flowers usually monœcious, minute, in axillary or terminal racemes, or the females 1—2 in a pedunculate solitary bract, or casually dioecious ; males very minute, ebracteate ; females often at the base of large accrescent leafy bracts, low on the male spike or in separate spikes. Perianth simple. MALE FLOWERS : Sepals 4, valvate. Petals 0. Disk 0. Stamens usually 8, sometimes many on a convex receptacle ; filaments short, free ; anther-cells distinct, divaricate, often at length twisted or flexuous. Pistillode 0. FEMALE FLOWERS : Sepals 3—4, minute, imbricate. Petals 0. Disk 0. Ovary 3-celled ; ovule solitary in each cell ; styles filiform, often very long and laciniate or fimbriate. Capsules of 3 minute 2-valved crustaceous cocci. Seeds subglobose ; testa crustaceous ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. Species 220, tropical and subtropical.

Female bracts solitary, very large, 2-flowered, entire. 1. *A. Dalzellii.*

Female spikes with several toothed or fimbriate bracts.
Bracts concealing the capsules.
Bracts shortly dentate, truncate ..... 2. *A. indica.*
Bracts 3-lobed ..... 3. *A. brachystachya.*
Bracts fimbriate ..... 4. *A. ciliata.*
Bracts not concealing the capsules.
Bracts glabrous, bordered with gland-tipped hairs; capsules glabrous or nearly so ..... 5. *A. malabarica.*
Bracts hairy, not bordered with gland-tipped hairs; capsules hispid with bulbous-based hairs... 6. *A. lanceolata.*

1. **Acalypha Dalzellii,** *Hook. f. Fl. B. I.* v. 5 (1887) p. 414. Shrubby, glabrous, much branched; branches terete; bark brown. Leaves eglandular, membranous, 1¾—2¾ by ⅞—1⅜ in., ovate-lanceolate, subobtuse, obscurely crenate, glabrous, 3—5-nerved, base cuneate; petioles ¾—1¼ in. long, very slender. MALE FLOWERS not seen. FEMALE FLOWERS in pairs in the axil of a solitary reniform quite entire bract ¼—½ in. in diam., on a long filiform peduncle reaching 1 in. long. Sepals lanceolate, ciliate. Ovary glabrous, 3—4-celled; styles pectinately laciniate. Fruit not seen.

Dalzell without locality in Herb. Kew.!

A very remarkable species of which there is but 1 specimen in Herb. Kew. from Dalzell's Bombay Herbarium, the flowers on which are all female. No locality has been assigned to the plant and the only reason for assuming it to be a native of Bombay is that the sheet came from Dalzell's *Bombay* Herbarium.

2. **Acalypha indica,** *Linn. Sp. Pl.* (1753) p. 1003. Annual erect herb 1—2½ ft. high; branches numerous, long, ascending, angular, finely pubescent. Leaves 1—3 by ¾—1¾ in., ovate or rhomboid-ovate, acute or subobtuse, crenate-serrate, glabrous, thin, base cuneate, somewhat 3-nerved; petioles usually longer than the blade, slender; stipules minute. Flowers in numerous lax erect, elongate axillary spikes, the males minute, clustered near the summit of the spike, the females scattered, 3—5 surrounded by a shortly pedunculate large leafy truncate dentate cuneiform many-nerved bract ¼—⅓ in. in diam. Ovary hispid. Capsules small, hispid, quite concealed by the bract, often only 1-seeded. Seeds ovoid, smooth, pale-brown, 1/20 in. long. Fl. B. I. v. 5, p. 416; Grah. Cat. p. 186; Dalz. & Gibs. p. 228; Wight, Icon. t. 877; Trim. Fl. Ceyl. v. 4, p. 58; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372; Prain, Beng. Pl. p. 947; Watt, Dict. Econ. Prod. v. 1, p. 62.—Flowers: June—Sept. VERN. *Kupi*; *Khokali.*

DECCAN: *Woodrow*; Poona districts, *Cooke*!; Dongergaon near Ahmednagar, *Cooke*! S. M. COUNTRY: Dharwar, *Woodrow*!—DISTRIB. Throughout India; Ceylon, Tropical Africa, Philippines.

The roots, leaves, and tender shoots are used in Hindu medicine. See Watt, Dict. Econ. Prod. l. c.

Nimmo (*fide* Graham) says that cats are as much affected by the roots of this plant as they are by those of Valerian.

3. **Acalypha brachystachya,** *Hornem. Hort. Hafn.* (1815) p. 909. Herbaceous, annual, 6—12 in. high, flaccid, glabrous or nearly so. Leaves thinly membranous, 1—3 by ⅝—1¾ in., ovate, acute or acuminate, crenate-serrate, with a few scattered hairs on both surfaces, base

usually cordate, obscurely 7-nerved ; petioles ¾—2 in. long, very slender. Flowers in short axillary androgynous spikes about ½ in. long, the male flowers few in minute clusters at the top of the spike, the females crowded in 2—3-flowered bracts at its base ; bracts of the female flowers green, very large, cut into 3 linear spreading entire 1-nerved obtuse lobes. Ovary hispid ; styles pectinately laciniate, $\frac{1}{12}$ in. long. Capsules hispid, quite concealed by the large bracts. Seeds ovoid, $\frac{1}{16}$ in. long, reddish-brown, smooth or nearly so. Fl. B. I. v. 5, p. 416 ; Muell. Arg. in DC. Prodr. v. 15, part 2, p. 870 ; Trim. Fl. Ceyl. v. 4, p. 59 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372 ; Watt, Dict. Econ. Prod. v. 1, p. 61.—Flowers : Aug.

Rare in the Bombay Presidency. The only specimens I have seen from that Presidency were collected at Panchgani (4000 ft.) in the Deccan.—DISTRIB. India (temperate Himalaya, W. Peninsula) ; Ceylon, Java, Tropical Africa.

4. **Acalypha ciliata,** *Forsk. Fl. Ægypt.-Arab.* (1775) p. 162. Herbaceous, stout, 1—2½ ft. high ; stems erect, not much branched, striate, the older glabrous, the younger pubescent. Leaves 1¾—3 by 1—1½ in., ovate, often caudate-acuminate, thin, finely serrate, hairy on the veins beneath, base usually rounded, 5-nerved ; petioles usually exceeding the leaf-blade, spreading, slender. Flowers in axillary androgynous spikes ½—¾ in. long, the males few, sessile, very minute, at the top of the spike, the females several, crowded at its base ; bracts of female flowers large (like the calyx of a Labiate, *Hooker*), 1—2-flowered, pale green, exceeding the capsules, with many nerves ending in long subulate hispid teeth. Capsules concealed by the bracts, quite glabrous, nearly white, twisted after dehiscence. Seeds globosely ovoid, $\frac{1}{16}$ in. long, smooth. Fl. B. I. v. 5, p. 417 ; Dalz. & Gibs. p. 228 ; Trim. Fl. Ceyl. v. 4, p. 59 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372 ; Prain, Beng. Pl. p. 947 ; Watt, Dict. Econ. Prod. v. 1, p. 62.—Flowers : Sept.

KONKAN : *Stocks* !, *Law* ! DECCAN : Junnar (Poona districts), *Kanitkar* !, *Woodrow*. KANARA : *Law* ! ; Halyal (N. Kanara), *Woodrow*.—DISTRIB. India (Central Bengal, W. Peninsula) ; Ceylon, Arabia, Tropical Africa.

5. **Acalypha malabarica,** *Muell. Arg. in Linnæa*, v. 34 (1865) p. 42. A stout leafy somewhat flaccid branched annual 6—12 in. high ; stem pubescent. Leaves rather rigid, 1—1½ by ½—¾ in., elliptic or elliptic-lanceolate, subacute, subserrate, base usually acute, 5-nerved ; petioles shorter or longer than the leaf-blade, slender. Flowers in axillary androgynous spikes ½ in. long, the males few, terminal, minute, the females numerous ; bracts of females about ⅛ in. in diam. when spread out, nearly as long as the capsules, alternate, 2—5-flowered, glabrous, about 12-toothed, bordered with slender gland-tipped hairs. Capsules nearly glabrous. Seeds globosely ovoid, smooth, pale-brown. Fl. B. I. v. 5, p. 416.—Flowers : Aug.

KONKAN : *Stocks* !, *Law* ! DECCAN : Poona, *Cooke* ! KANARA : *Law* !, *Stocks* ! GUJARAT : Surat, *Cooke* !—DISTRIB. India (W. Peninsula).

6. **Acalypha lanceolata,** *Willd. Sp. Pl.* v. 4 (1805) p. 524. Annual, 6—18 in. high, much branched from the base ; branches clothed with long weak hairs. Leaves ½—1½ by ¼—¾ in., ovate-

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lanceolate, subacute, serrate, slightly hairy especially on the nerves, base acute or rounded, 3—5-nerved ; petioles ½—1 in. long, slender, hairy. Flowers in short sessile axillary spikes, the male flowers in a minute head concealed by the uppermost bracts or produced into a small spike ; bracts of female 1-flowered, ⅛ in. across when spread out flat, with several deep acute teeth, hairy, not concealing the capsules. Ovary hispid ; styles $\frac{1}{30}$ in. long, laciniate. Capsules longer than the bracts, hispid with hairs from glandular bases. Seeds ovoid, acute, $\frac{1}{16}$ in. long, smooth, pale yellowish-brown. Trim. Fl. Ceyl. v. 4, p. 59. *Acalypha fallax,* Muell. Arg. in Linnæa, v. 34 (1865) p. 43 ; Trim. Syst. Cat. p. 82 ; Hook. f. Fl. B. I. v. 5, p. 416 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372. *A. hispida,* Thw. Enum. p. 271 (*not* of Burm.). *A. Wightiana,* Muell. Arg. in Linnæa, v. 34 (1865) p. 43.—Flowers : Aug.

Rare in the Bombay Presidency. S. M. COUNTRY : Karlimatti, *Cooke* ! ; Badami, *Woodrow* !—DISTRIB. India (W. Peninsula, Birma) ; Ceylon, Sumatra, Java.

Acalypha Wilkesiana, Muell. Arg. in DC. Prodr. v. 15, part 2, p. 817. A shrub 6—10 ft. high, a native of the Fiji Islands, often grown in gardens for the sake of its highly ornamental leaves. Leaves large, reaching 8 in. long, ovate, acuminate, coarsely serrate, naturally bronze-colored, but under cultivation assuming a great variety of tints, pink yellow and brown, when the plant is very ornamental. There is a fine figure of the leaves in Seem. Fl. Vit. (1865) t. 58. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372 & Gard. in Ind. ed. 5, p. 434.

Numerous varieties of this plant are in cultivation, a common one being the variety *marginata* with large olive-brown leaves margined with rosy carmine.

Acalypha hispida, Burm. Fl. Ind. (1768) p. 303, t. 61, fig. 1 (*not* of Willd. nor Blume). A shrub, a native of New Guinea, sometimes grown in gardens. It has broadly ovate serrate cordate leaves and a very long pendulous female raceme 12—18 in. long, like a cat's tail, scarlet. Fl. B. I. v. 5, p. 417 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372. *Caturus spiciflorus,* Willd. Sp. Pl. v. 4 (1805) p. 714 ; Roxb. Fl. Ind. v. 3, p. 760.

28. **ADENOCHLÆNA,** Baill.

Trees or shrubs, glabrous or stellately tomentose. Leaves alternate, entire. Flowers monœcious, in terminal or axillary spiciform racemes, the males numerous, clustered, the females few at the base of the spikes. Disk 0. MALE FLOWERS globose in bud. Sepals 4—6, valvate. Stamens 4—6 exserted ; filaments free, round a columnar pistillode ; anthers dorsifixed, versatile, the cells parallel, adnate to the thick connective. FEMALE FLOWERS : Sepals 5—8, narrow, unequal. Ovary 3-celled ; ovule 1 in each cell ; styles long, connate below, spreading and 2-fid above, with recurved plumose multifid

arms. Capsule of three 2-valved cocci. Seeds estrophiolate, subglobose ; testa crustaceous ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. India and Malaya ; species 4 or 5.

1. **Adenochlœna indica,** *Bedd. Flor. Sylvat.* v. 2 (1872) t. 261 *in adnot.* A shrub or moderate-sized tree ; young parts puberulous ; bark white, smooth. Leaves subcoriaceous, 3—7 by 1½—3½ in., elliptic, entire, more or less bluntly pointed, often mucronate, glabrous or nearly so, base shortly rounded or very narrowly cordate (rarely subacute) ; main nerves 6—8 pairs, prominent beneath, with reticulate venation between ; petioles ¼—4 in. long, somewhat thickened at the top ; stipules lanceolate. Flowers in lateral and terminal interrupted scurfily puberulous spikes 2—6 in. long, the males numerous, the females very few at the base of the spike ; bracts minute. MALE FLOWERS : Buds globose $\frac{1}{10}$ in. in diam. Stamens 4—5, exserted. FEMALE FLOWERS : Sepals lanceolate, unequal, tomentose. Ovary tomentose ; styles 3, united into a stout column at the base, free and spreading above, each divided into 2 arms which are again 2-fid, papillose. Capsules scabrous, ¾ in. in diam. Fl. B. I. v. 5, p. 418 ; Talb. Trees, Bomb. ed. 2, p. 314 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372. *Cephalocroton indicum,* Bedd. Flor. Sylvat. (1872) t. 261. *Symphyllia mallotiformis,* Muell. Arg. in Linnæa, v. 34 (1865) p. 156 & in DC. Prodr. v. 15, part 2, p. 764.—Flowers : Oct.—Dec.

Rare in the Bombay Presidency. KANARA : N. Kanara near the falls of Gairsoppa, *Talbot,* 276!—DISTRIB. India (W. Peninsula, but not on the Nilghiris), apparently endemic.

29. **TREWIA,** Linn.

Soft-wooded trees. Leaves opposite, broadly ovate or orbicular, entire ; base cordate, 3—5-nerved. Flowers diœcious, rather large, developed before the leaves, the males in lax lateral bracteate racemes one to each bract, the females long-pedunculate, solitary or racemose. Perianth simple. Petals 0. Disk 0. MALE FLOWERS : Calyx globose, splitting into 3—4 broad concave often reflexed segments. Stamens numerous, on a convex receptacle ; filaments free ; anthers dorsifixed, oblong, the cells parallel, contiguous. Pistillode 0. FEMALE FLOWERS : Sepals 3—5, broad, imbricate, caducous. Ovary 2—4-celled ; ovule solitary in each cell ; styles connate below, long, terete, entire, papillose throughout. Fruit 2—4-celled, indehiscent or dehiscing loculicidally ; pericarp more or less fleshy ; endocarp crustaceous. Seeds rounded on the back with flat or angular faces, smooth ; testa hard ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. India ; Ceylon ; species 2.

Female flowers solitary or 2—3 together; fruit globose, 1—1½ in. in diam., woody, indehiscent ..... 1. *T. nudiflora.*
Female flowers numerous, in short racemes; fruit ovoid, ⅜ in. long; pericarp thin, loculicidal ..... 2. *T. polycarpa.*

1. **Trewia nudiflora,** *Linn. Sp. Pl.* (1753) p. 1193 (*Trevia*). A large deciduous tree ; bark smooth, grey ; wood white, soft ; young shoots and sometimes leaves beneath and inflorescence clothed with cottony wool, at other times nearly glabrous. Leaves opposite, 3—7

by 2—5½ in., ovate, entire, acuminate, glabrous and bright green above, base cordate, 3—5-nerved ; petioles 1—3 in. long ; stipules minute, acute, soon falling. Flowers dicœcious, the males in racemes 3—8 in. long, the females on long peduncles. MALE FLOWERS : Flowers ⅛—½ in. in diam. Sepals valvate, concave ; pedicels slender, short, horizontal. Stamens numerous. FEMALE FLOWERS solitary or 2—3 together ; peduncles reaching 4 in. long. Sepals 3—5, broad, imbricate, caducous. Ovary woolly ; styles ½—¾ in. long, yellow. Fruit almost woody, globose, 1—1½ in. in diam., tomentose when young. Seeds rounded on the back, slightly angular on the face, smooth and polished, dark-brown. Fl. B. I. v. 5, p. 423 ; Grah. Cat. p. 185 ; Dalz. & Gibs. p. 231 ; Wight, Icon. t. 1870 (male flowers only) ; Bedd. Flor. Sylvat. t. 281 (male flowers only) ; Trim. Fl. Ceyl. v. 4, p. 61 ; Talb. Trees, Bomb. ed. 2, p. 314 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372 ; Prain, Beng. Pl. p. 948 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 76.—Flowers : Dec.—Mar. VERN. *Petári.*

KONKAN : in moist forests, often along the banks of rivers and streams, *Talbot*; Wari Country *Dalzell*! ; Banda in the Wari Country, *Woodrow*.—DISTRIB. Throughout the hotter parts of India; Ceylon, Malacca, Sumatra, Java.

2. **Trewia polycarpa,** *Benth. in Gen. Pl.* v. 3 (1880) p. 318. A tree. Leaves subopposite 6—8 in. long and often as broad as long, broadly ovate, acuminate, glabrous or nearly so, reticulately veined, base cordate, 5-nerved ; petioles 1½—3 in. long. Female racemes lateral, many-flowered, 2—3 in. long ; pedicels short, stout. Ovary 2-celled ; styles long, papillose all over. Fruit ⅜ in. long, globosely ovoid, densely tomentose ; pericarp crustaceous, loculicidal. Seeds ⅓ by ⅛ in., rounded at both ends and on the back with a nearly flat face, smooth. Male flowers not seen ; the specimens in Herb. Kew. are all female. Fl. B. I. v. 5, p. 424 ; Talb. Trees, Bomb. ed. 2, p. 315 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372. *Trewia nudiflora,* Wight, Icon. t. 1871 (the female flowers only) ; Bedd. Flor. Sylvat. t. 281 (the female flowers only).

KONKAN : *Stocks*!, *Law*!, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

30. **MALLOTUS,** Lour.

Trees or shrubs. Leaves opposite or alternate, entire, toothed or 3-lobed, penninerved or 3—7-nerved, sometimes peltate often gland-dotted beneath and sometimes with glandular areas at the base above. Flowers dicœcious or monœcious, small or minute, in axillary or terminal simple or branched spikes or racemes, the males fascicled, the females solitary in the bracts. Perianth simple. MALE FLOWERS : Calyx globose or ovoid, 3—5-partite ; lobes valvate. Petals 0. Disk 0. Stamens numerous, crowded on a flat or convex receptacle ; filaments free ; anthers small, dorsifixed, the cells globose or shortly oblong, parallel, adnate to the wide connective, often discrete. Pistillode 0 or minute. FEMALE FLOWERS : Calyx spathaceous or valvately 3—6-lobed or partite. Petals 0. Disk 0 or small. Ovary 2—4-celled ; ovule

1 in each cell ; styles free or connate below, spreading or recurved above, entire, plumose or papillose. Fruit a capsule of 2—3 (rarely 4) 2-valved tuberculate, echinate paleaceous or smooth cocci. Seeds ovoid, oblong or globose ; testa crustaceous ; albumen fleshy ; cotyledons broad flat.—DISTRIB. Tropics of the Old World ; species about 70.

Trees; leaves mostly alternate.
Capsules 3—4-coccous, clothed with long soft villous spines ..... 1. *M. albus.*
Capsules 3-coccous, covered with a red resinous powder ..... 2. *M. philippinensis.*
Erect shrubs; leaves opposite.
Capsules 3-coccous, echinate with short stout conical spines ..... .3 *M. stenanthus.*
Capsules 3—4-coccous, densely clothed with long slender villous filaments often ⅛ in. long..... 4. *M. Lawii.*
A straggling or climbing shrub; leaves alternate; capsules 2-coccous, stellately fulvous-tomentose..... 5. *M. repandus.*

1. **Mallotus albus,** *Muell. Arg. in Linnæa,* v. 34 (1865) p. 188. A moderate-sized tree, sometimes reaching 50 ft. high ; branchlets, petioles, underside of leaves and inflorescence densely clothed with grey or tawny stellate tomentum. Leaves 4—8 in. long and often as broad as long, very variable, mostly alternate, broadly ovate or orbicular or triangular-ovate, acuminate, entire or with shallow lobes, dark-green above, white-tomentose beneath, base narrowly peltate, rounded, truncate or shallowly cordate, 2-glandular, usually 5-nerved ; 3—8 in. long. Flowers diœcious, in axillary and terminal panicles, the males in distant clusters, the females shortly pedicellate, crowded. MALE FLOWERS : Buds globose, ⅛ in. in diam. Sepals usually 4, elliptic-lanceolate, acute, ⅛ in. long, scurfily tomentose. Stamens very numerous ; filaments slender ; anther-cells parallel. FEMALE FLOWERS : Calyx hemispheric, ⅛ in. long, 4—5-lobed, the sepals rather thicker than in the male. Ovary densely clothed with stellate hairs ; styles papillose, almost plumose. Capsules loculicidally 4-valved, ½ in. in diam., globose, echinate with soft woolly spines, white-tomentose. Seeds ⅛ by ⅛ in., rounded on the back, angular on the face, nearly black. Fl. B. I. v. 5, p. 429 ; Trim. Fl. Ceyl. v. 4, p. 65 ; Talb. Trees, Bomb. ed. 2, p. 315 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372 ; Prain, Beng. Pl. p. 949 ; Watt, Dict. Econ. Prod. v. 5, p. 114. *Rottlera peltata,* Wight, Icon. v. 5 (1852) p. 21, t. 1873 (by error *fultata*). *R. mappoides,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 122 ; Dalz. & Gibs. p. 230.—Flowers : Sept.—Dec. This is the VAR. *occidentalis* of Hook. f. Fl. B. I. v. 5, p. 429.

KONKAN : moist forests, *Talbot.* S. M. COUNTRY : Párva Ghát, *Stocks* !, Castlerock, *Kanitkar* !, *Woodrow* ; Daski, 3 miles from Castlerock, *Bhiva* ! KANARA : moist forests, *Talbot;* Gatpraba River, *Dalzell* !, near Yellapur, *Talbot,* 42 ! ; Talaveri, *Stocks* !—DISTRIB. India (W. Peninsula) ; Ceylon.

2. **Mallotus philippinensis,** *Muell. Arg. in Linnæa,* v. 34 (1865) p. 196. A small much-branched tree ; branchlets, young leaves, and inflorescence tawny- or rusty-pubescent. Leaves alternate, variable,

3—6 by 1¼—3 in., ovate or ovate-lanceolate, acuminate, entire or slightly toothed, glabrous above, pubescent and with numerous orbicular red glands beneath, reticulately veined, base rounded or acute, strongly 3-nerved at the base and with 4—7 pairs of nerves above the basal ones ; petioles 1—2 in. long, cylindric, fulvous-pubescent, with 2 small sessile glands one on each side of the summit. Flowers dioecious, small ; the males clustered, sessile or very shortly pedicellate, in erect terminal spikes which are usually several together and often longer than the leaves ; the females sessile or nearly so, in short spikes. MALE FLOWERS : Sepals 4 (rarely 5), ⅛ in. long, lanceolate, acute. Stamens numerous. Bracts $\frac{1}{16}$ in. long, broadly ovate, acute. Buds globosely ovoid. FEMALE FLOWERS : Calyx divided nearly to the base ; sepals 3 or 4, thicker than in the male, ovate-lanceolate. Ovary with red glands, 3-celled ; styles 3, simple papillose. Capsules ⅓—½ in. in diam., 3-lobed, loculicidally 3-valved, covered with a bright-red powder consisting of minute stellate hairs and fine grains of a red resinous substance soluble in alcohol and ether. Seeds ⅛ in. in diam., subglobose, black. Fl. B. I. v. 5, p. 442 ; Bedd. Flor. Sylvat. t. 289 ; Trim. Fl. Ceyl. v. 4, p. 68 ; Talb. Trees, Bomb. ed. 2, p. 316 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372 ; Prain, Beng. Pl. p. 949 ; Watt, Dict. Econ. Prod. v. 5, p. 114. *Rottlera tinctoria,* Roxb. Cor. Pl. v. 2 (1798) p. 36, t. 167 ; Grah. Cat. p. 184 ; Dalz. & Gibs. p. 230.—Flowers : Nov.—Jan. VERN. *Shendri ; Kamala ; Ruhin ; Kapilo.*

KONKAN : N. & S. Konkan, *Law* ! ; hills throughout the Konkans, *Graham* ; Konkan jungles, *Dalzell & Gibson* ; Campoli, *Bhiva* ! ; Ambeghât, *Cooke* ! DECCAN : Mahableshwar, *Cooke* !, *Graham* ; Nasik, *Bhiva* ! GUJARAT : Balsar, *Kanitkar* ! SIND : *Stocks* !—DISTRIB. Throughout Tropical India ; Ceylon, Malay Islands, Australia, China.

The red powder which covers the seeds furnishes a valuable dye which is employed in dyeing silk a bright flame-colour. The powder is also used in medicine and is considered to be efficacious in the expulsion of Tænia or Tape-worm. (See Watt, Dict. Econ. Prod. l. c.).

3. **Mallotus stenanthus,** *Muell. Arg. in Linnæa,* v. 34 (1865) 191. A nearly glabrous shrub with yellow resinous glands on the young branchlets, inflorescence, and the underside of the leaves ; branches red-brown ; branchlets compressed. Leaves opposite, 3—6 by 1—1¾ in., lanceolate, obtusely acuminate, entire or sinuate-toothed, glabrous, shining, dotted on the underside with numerous yellow resinous glands, penninerved, base narrowly rounded ; nerves 5—7 pairs, prominent beneath, and reticulate venation between ; petioles ¼—⅜ in. long. Flowers in slender axillary and terminal racemes ½—2 in. long. MALE FLOWERS sessile or shortly pedicellate ; buds ovoid. Calyx divided to the base. Sepals usually 4, lanceolate, $\frac{1}{16}$ in. long, clothed with yellow resinous glands. Bracts ovate, acute. Stamens about 20 ; filaments stout, $\frac{1}{16}$—$\frac{1}{12}$ in. long. FEMALE FLOWERS sessile or nearly so ; buds oblong. Capsules ⅛ in. in diam., tridymous, clothed with yellow resinous glands, echinate with short stout sparsely scattered conical spines. Seeds globose, smooth, ⅛—⅕ in. in diam. There is a great dearth of female flowers in Herb. Kew. Fl. B. I. v. 5, p. 437 ; Bedd. For. Man. in Flor. Sylvat. p. ccix ;

Talb. Trees, Bomb. ed. 2, p. 316 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372.—Flowers : Sept.—Nov.

Dalzell without locality in Herb. Kew! KONKAN : *Stocks*!, *Law*! KANARA : Talaveri, *Ritchie*, 1256! ; Yellapur, *Talbot*, 1039!—DISTRIB. India (W. Peninsula), apparently endemic.

4. **Mallotus Lawii,** *Muell. Arg. in Linnæa,* v. 34 (1865) p. 192. A small shrub ; branchlets, petioles, and inflorescence pubescent. Leaves 4—8 by 1½—2¾ in., opposite, penninerved, elliptic-lanceolate, or oblong-lanceolate, or sometimes oblanceolate, obtuse, acuminate, repand-dentate, glabrous or nearly so, clothed beneath with minute yellow resinous glands, base usually acute ; nerves 5—8 pairs with reticulate venation between ; petioles ⅛—⅜ in. long. Flowers in slender racemes shorter than the leaves. MALE FLOWERS numerous, in rather distant fascicles along the rhachis, sessile or shortly pedicellate ; buds globose, shortly pointed. Sepals 3—4, broadly ovate, acute, villous, ⅛—⅙ in. long. Stamens very numerous, 50 or more ; filaments short. FEMALE FLOWERS : Racemes few-flowered ; flowers pedicellate, 1 to each bract ; bracts ovate, acute, 1/12 in. long. Calyx spathaceous, ¼ in. long, splitting into about 6 lanceolate unequal villous segments. Styles shortly connate at the base, divided above into spreading plumose lobes. Capsules ⅜ in. in diam., 3—4-coccous, densely clothed with long slender villous filaments which are sometimes ⅛ in. long. Seeds subglobose, smooth, polished. Fl. B. I. v. 5, p. 438 ; Bedd. For. Man. in Flor. Sylvat. p. ccix ; Talb. Trees, Bomb. ed. 2, p. 316 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372. *Mallotus aureo-punctatus,* Muell. Arg. in DC. Prodr. v. 15 (1864) p. 973 ; Bedd. For. Man. in Flor. Sylvat. p. ccix. *Rottlera aureo-punctata,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 122 ; Dalz. & Gibs. p. 230.—Flowers : Oct.—Jan.

KONKAN : *Stocks*!, *Law*! ; Matheran, *Cooke*!, *Woodrow*!, *H. M. Birdwood* ; Miradonger near Pen, *Dalzell*! ; evergreen forests, *Talbot*. DECCAN : Khandala, *Woodrow*! S. M. COUNTRY : Londa, *Woodrow*! KANARA : N. Kanara, *Woodrow* ; evergreen forests near the Devimana and Nilkund Ghâts, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

5. **Mallotus repandus,** *Muell. Arg. in Linnæa,* v. 34 (1865) p. 197. A large straggling or climbing dioecious shrub ; stem fluted, white, scaly, rough at the base, covered sparingly with large spines 1—3 in. long, single or 3—4 from a tubercle (*Talbot*) ; branchlets, petioles, underside of the leaves, and inflorescence with tawny stellate tomentum. Leaves alternate, 2—3½ by 1½—3 in., broadly deltoid-ovate or rhomboid-ovate, acuminate, entire or sinuate-toothed, with pale scattered glands beneath, base truncate or cuneate, 3-nerved ; petioles 1—1½ in. long. MALE FLOWERS pedicellate, in paniculate racemes 4—6 in. long ; bracts 1/10 in. long, linear-lanceolate, hairy ; buds globosely ovoid, fulvous-pubescent. Calyx divided to the base ; sepals 5, ovate, acute, deflexed, ⅛—⅕ in. long. Stamens numerous, 50—60 ; filaments 1/10 in. long, filiform ; anther-cells of the inner stamens often quite separate, attached at different levels of the connective. FEMALE FLOWERS with rather long pedicels, in simple or branched racemes ; bracts as in the male. Calyx not divided quite

to the base ; tube short, globose, about $\frac{1}{30}$ in. long ; segments 4, linear-lanceolate, $\frac{1}{8}$ in. long. Styles 2, plumose, spreading, very shortly connate below. Capsules didymous, stellately fulvous-tomentose, $\frac{1}{2}$ in. across. Seeds globose, $\frac{1}{8}$—$\frac{1}{6}$ in. in diam., black. Fl. B. I. v. 5, p. 442 ; Bedd. For. Man. in Flor. Sylvat. p. ccx ; Trim. Fl. Ceyl. v. 4, p. 67 ; Talb. Trees, Bomb. ed. 2, p. 316 ; Prain, Beng. Pl. p. 949. *Rottlera dicocca,* Roxb. Fl. Ind. v. 3, p. 829 ; Dalz. & Gibs. p. 230.—Flowers : Sept.—Oct.

KONKAN : S. Konkan, common, *Dalzell & Gibson, Talbot.* KANARA : *Law* !, *Stocks* ! ; evergreen forests near Yellapur, *Talbot.*—DISTRIB. India (Bengal, Birma, Assam, W. Peninsula) ; Ceylon, China, Malaya, New Caledonia.

31. **CLEIDION,** Blume.

Glabrous trees. Leaves alternate, usually sinuate-toothed, penni-nerved. Flowers small, monœcious or diœcious ; males in long axillary racemes ; females 1—2 on a long axillary peduncle. Perianth simple. MALE FLOWERS : Calyx globose, splitting into 3—4 valvate segments. Petals 0. Stamens numerous, in a globose mass on a convex or conical receptacle ; filaments free ; anthers dorsifixed and 4-celled or 2-celled, the cells transversely didymous on a broad connective. Pistillode 0. FEMALE FLOWERS : Sepals 3—5, imbricate. Petals 0. Ovary 2—3-celled ; ovule 1 in each cell ; styles 2—3-fid, connate below, the arms long, filiform. Capsule of 1—3 two-valved cocci. Seeds subglobose ; testa coriaceous ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. Species about 13, tropical.

1. **Cleidion javanicum,** *Blume, Bijdr.* (1825) p. 613. A glabrous evergreen middle-sized tree ; bark grey, rough with a powdery surface of small raised corky cells (*Talbot*). Leaves alternate, coriaceous, 3—6 by 1¼—2 in., elliptic-lanceolate, acuminate, serrate or subentire, glabrous, dark-green above, paler beneath, base acute ; main nerves 5—7 pairs, conspicuous beneath ; petioles 1—3 in. long, thickened at the top. MALE FLOWERS in long axillary racemes. Calyx globose, splitting into 3—4 valvate reflexed segments $\frac{1}{8}$ in. long, thin, lanceolate, glabrous. Stamens many, on a conical receptacle ; anthers 4-celled. FEMALE FLOWERS solitary on a long axillary peduncle 2—4 in. long. Sepals 3—5, short, thick, ovate. Styles 2, very long, each again divided into 2 spreading filiform arms. Capsules large, nearly 1 in. across, smooth, tipped with the persistent styles, 2-lobed, the lobes nearly globose, each splitting into 2 valves. Seeds $\frac{5}{8}$ in. in diam., globular, grey mottled with brown. Fl. B. I. v. 5, p. 444 ; Bedd. Flor. Sylvat. t. 272 ; Trim. Fl. Ceyl. v. 4, p. 69 ; Talb. Trees, Bomb. ed. 2, p. 316 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372 ; Prain, Beng. Pl. p. 950 ; Watt, Dict. Econ. Prod. v. 2, p. 368. *Rottlera uranda,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 229 ; Dalz. & Gibs. p. 230.—Flowers : Oct.—Dec.

Dalzell without locality in Herb. Kew. ! KONKAN : *Law* ! DECCAN : Phonda Ghát, *Stocks* !, *Dalzell & Gibson.* KANARA : Yacombi (N. Kanara), *Kanitkar* !, *Woodrow* ; Ainshi Ghát forests, *Talbot, Woodrow.*—DISTRIB. India (Assam, Chittagong, Birma, W. Peninsula) ; Ceylon, Java.

32. MACARANGA, Thouars.

Trees or shrubs. Leaves alternate, often large and peltate, entire or lobed, more or less glandular beneath, 3-many-nerved at the base. Flowers usually dicœcious, in axillary racemes or panicles; males many, clustered; females one or few to each bract; bracts often large, entire or toothed. Perianth simple. MALE FLOWERS minute. Calyx globose or obovoid; sepals 3—5, valvate. Petals 0. Disk 0. Stamens central, 1—3, oftener 20—30; filaments short, free; anthers terminal, short, 2-celled and 4-valved, or 3-celled and 3-valved. Pistillode 0. FEMALE FLOWERS: Calyx 2—4-lobed. Petals 0. Disk 0. Ovary 2—6 (rarely by abortion 1)-celled; ovule 1 in each cell; styles entire, short or long. Fruit a small capsule of 1—5 naked or echinate 2-valved cocci, often glandular or with a waxy coat. Seeds globose; testa crustaceous or bony; albumen fleshy; cotyledons broad, flat.—DISTRIB. Tropics of the Old World; species about 80.

1. **Macaranga tomentosa,** *Wight, Icon.* v. 5, part 2 (1852) p. 23 & in v. 6, t. 1949, fig. 1. A small or middle-sized tree; bark dark-grey; branchlets stout; young shoots tomentose. Leaves 5—8 by 3¼—5½ in., ovate or deltoid-ovate, or orbicular, cuspidate, broadly peltate, entire or minutely toothed, glabrous or nearly so above, more or less pubescent and closely gland-dotted beneath, base rounded; basal nerves numerous and with 6—8 pairs of strong nerves above the basal ones, with reticulate venation between; petioles 3—6 in. long; stipules ovate, acuminate, reflexed, caducous. MALE FLOWERS minute, $\frac{1}{16}$ in. in diam., numerous, in interrupted dense sessile heads, enveloped in bracts and bracteoles, arranged in numerous much-branched axillary rusty-tomentose panicles shorter or longer than the leaves; bracts broader than long, toothed, veined; bracteoles concave. Sepals 3, minute, obovate, cuneate. Stamens 2—3. FEMALE FLOWERS: Panicles simpler than in the male, the branches racemose with larger bracts. Calyx-limb obsolete. Ovary densely glandular, 1-celled; stigma sessile, often embracing one side of the ovary, thickly papillose. Capsules ¼—⅓ in. in diam., globose, hairy and glandular. Seed globose; testa brown, crustaceous, rough. Bedd. Flor. Sylvat. t. 287; Trim. Fl. Ceyl. v. 4, p. 70. *Macaranga Roxburghii*, Wight, Icon. v. 5, part 2 (1852) p. 23 & in v. 6, t. 1949, fig. 4; Dalz. & Gibs. p. 228; Hook. f. Fl. B. I. v. 5, p. 448; Talb. Trees, Bomb. ed. 2, p. 317; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372; Watt, Dict. Econ. Prod. v. 5, p. 103. *M. peltata,* Muell. Arg. in DC. Prodr. v. 15 (1865) p. 1010; Bedd. For. Man. in Flor. Sylvat. p. cexi; Prain, Beng. Pl. p. 951. *Osyris peltata,* Roxb. Fl. Ind. v. 3 (1832) p. 755; Grah. Cat. p. 177.—Flowers: Jan.—Mar. VERN. *Chánda; Chandáda.*

KONKAN: *Dalzell & Gibson*; moist forests, *Talbot*; Matheran, *Cooke*!, *H. M. Birdwood*, *Woodrow*! DECCAN: Khandala, *Graham*, *Cooke*!; Párghát, *Graham*; Thal Ghát, *Graham*.—DISTRIB. India (hills of Orissa and the Circars, W. Peninsula); Ceylon.

Excluded Species.

MACARANGA INDICA, Wight, Icon. v. 5, part 2 (1852) p. 23, t. 1883 & t. 1949, fig. 2. A large tree; branchlets very robust, glaucous; young shoots tawny-tomentose. Leaves 5—10 in. in diam., orbicular-ovate, acuminate, broadly peltate; petioles longer than the leaves. MALE FLOWERS in narrow fulvous-pubescent panicles; bracts minute, with a large glandular appendage. Sepals 2—3. Stamens 3—10. FEMALE FLOWERS: Panicles hairy. Sepals usually 4. Ovary 1—2-celled. Capsules small, $\frac{1}{8}$ in. in diam. Fl. B. I. v. 5, p. 446; Trim. Fl. Ceyl. v. 4, p. 70; Talb. Trees, Bomb. ed. 2, p. 317.

This is given in the 'Flora of British India' as occurring on the Western Ghâts, but it has not been found in the Bombay Presidency though occurring on the Nilghiris and other hills in the southern portion of the Peninsula. Talbot (*l. c.*) says that it does not to his knowledge occur in N. Kanara.

33. **HOMONOIA**, Lour.

Rigid shrubs. Leaves alternate, narrow and subentire, or short and toothed, glandular-lepidote. Flowers usually dicœcious, in many or few-flowered axillary spikes or from the old wood. Perianth simple. MALE FLOWERS: Calyx globose, splitting into 3 valvate segments. Petals 0. Disk 0. Stamens many, in a dense globose cluster of repeatedly branching filaments; anthers with subglobose cells, sessile on the filament-branches, divaricate, the connective obscure. Pistillode 0. FEMALE FLOWERS: Sepals 5—8, narrow, imbricate, unequal. Petals 0. Disk 0. Ovary 3-celled; ovule 1 in each cell; styles entire or slightly connate at the base, spreading. Capsule small, of three smooth 2-valved cocci. Seeds rounded on the back, slightly angular on the inner face; testa crustaceous, hard, with a thin fleshy coat; albumen fleshy; cotyledons broad, flat.—DISTRIB. Species 3 or 4 Indian and Malayan.

Leaves linear-oblong; spikes long, slender..... 1. *H. riparia.*
Leaves obovate; spikes short, stout..... 2. *H. retusa.*

1. **Homonoia riparia,** *Lour. Fl. Cochinch.* (1790) p. 637. A rigid evergreen willow-like shrub; branchlets, young leaves and inflorescence pubescent. Leaves numerous, erect, all closely set, 3—6 by $\frac{3}{8}$—$\frac{3}{4}$ in., linear-oblong or linear-lanceolate, acute, apiculate, entire or more or less toothed, glabrous above, clothed beneath with scattered and numerous minute orbicular scales, base acute or rounded; main nerves numerous, 10—30 pairs with reticulate venation between; petioles $\frac{1}{8}$—$\frac{3}{8}$ in. long; stipules $\frac{1}{8}$ in. long, linear-lanceolate, acute. Flowers dicœcious, sessile, in axillary bracteate spikes 2—5 in. long; rhachis pubescent; bracts ovate, acuminate, pubescent, $\frac{1}{12}$ in. long. MALE FLOWERS: Sepals 3, broadly elliptic, acute, concave, veined, glabrous, $\frac{1}{8}$ in. long. Stamens very numerous, in globose heads; anthers red. FEMALE FLOWERS: Sepals usually 5, narrowly ovate, acuminate, $\frac{1}{10}$ in. long. Ovary pubescent; styles 3, shortly connate at the base, nearly $\frac{1}{4}$ in. long, papillose. Capsules globose, $\frac{1}{8}$ in. in diam., tomentose. Seeds $\frac{1}{16}$ in. long, rounded on the back, slightly angular on the inner face, smooth, yellowish-brown. Fl. B. I. v. 5, p. 455; Bedd. For. Man. in Flor. Sylvat. p. ccxii; Trim. Fl. Ceyl. v. 4, p. 72; Talb. Trees, Bomb. ed. 2, p. 318; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372; Prain, Beng. Pl. p. 951;

Watt, Dict. Econ. Prod. v. 4, p. 263. *Adelia neriifolia*, Roth, Nov. Pl. Sp. p. 375 ; Grah. Cat. p. 185 ; Dalz. & Gibs. p. 231 ; Wight, Icon. t. 1868.—Flowers : Jan.—Apr. VERN. *Serni.*

KONKAN : in river beds, *Law* !, *Talbot;* Ambeghát, *Woodrow.* DECCAN : Koina river, *Cooke* ! ; beds of streams in the ravines of Mahableshwar, *Cooke* ! S. M. COUNTRY : Rámghát, *Ritchie,* 679 ! KANARA : *Talbot* ; Karwar, *Woodrow* ; Kála naddi, *Ritchie,* 679 !—DISTRIB. India (Assam, N. Bengal, Birma, Central Provinces, W. Peninsula) ; Ceylon, Cochinchina, Java.

2. **Homonoia retusa,** *Muell. Arg. in Linnæa*, v. 34 (1865) p. 200. A small rigid glabrous shrub 2—4 ft. high ; branches stout, woody. Leaves 1—2 by ½—¾ in., sessile or nearly so, rigidly coriaceous, obovate or cuneate-obovate, or oblanceolate, toothed towards the top, glabrous above, sparsely glandular beneath ; nerves 6—10 pairs. Flowers sessile in short stout spikes ¼—1 in. long ; rhachis glabrous ; bracts ovate, acute, pubescent, $\frac{1}{16}$—$\frac{1}{12}$ in. long. MALE FLOWERS : Sepals 3, broadly elliptic, concave, glabrous, often apiculate, ⅛ in. long. FEMALE FLOWERS : Sepals narrow, ovate-lanceolate, acute, $\frac{1}{16}$ in. long, pubescent. Styles $\frac{1}{16}$ in. long, plumose. Capsules ⅛ in. in diam., globose, hoary. Seeds $\frac{1}{16}$ in. long, rounded on the back, slightly angular on the inner face, yellow. Fl. B. I. v. 5, p. 456 ; Bedd. For. Man. in Flor. Sylvat. p. ccxii ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372. *Adelia retusa*, Grah. Cat. Pl. Bo. (1839) p. 185 ; Dalz. & Gibs. p. 231.—Flowers : Apr. VERN. *Machim.*

Dalzell without locality in Herb. Kew ! KONKAN : *Stocks* !, *Lambert* ! DECCAN : in river-beds, *Woodrow* ; Mula River, Kirkee, *Cooke* !, *Kanitkar* ! KANARA : *Law* ; Supa (N. Kanara), *Talbot* !—DISTRIB. India (W. Peninsula), apparently endemic.

34. TRAGIA.

Perennial, usually twining or climbing herbs, hispid with stinging hairs. Leaves alternate, simple or palmately 3-lobed, serrate, 3—5-nerved at the base. Flowers monœcious, in terminal and leaf-opposed androgynous racemes, the males uppermost in the raceme the females below, few. Perianth simple. MALE FLOWERS : Calyx globose or obovoid, valvately 3—5-partite. Petals 0. Disk 0 or obscure. Stamens 1—3 (rarely many) ; filaments free or connate ; anthers ovate or oblong, the cells contiguous, parallel. Pistillode minute, 3-fid or 0. FEMALE FLOWERS : Sepals 6, imbricate, entire or pinnatifid, often enlarged hardened and stellately spreading in fruit. Petals 0. Disk 0. Ovary 3-celled ; ovule 1 in each cell ; styles united in a column at the base, free, spreading and entire above. Fruit a capsule of three 2-valved cocci ; endocarp crustaceous. Seeds globose ; testa crustaceous ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. Species about 50, chiefly tropical.

A twining herb; leaves simple; styles circinately revolute ..... 1. *T. involucrata.*
An erect or sometimes climbing herb; leaves palmately 3-partite; styles slightly spreading, not revolute..... 2. *T. cannabina.*

1. **Tragia involucrata,** *Linn. Sp. Pl.* (1753) p. 980. A perennial more or less hispid herb, with scattered stinging hairs ; stems

elongate, slender, twining. Leaves 1—4 by ¾—2 in., variable, oblong-lanceolate to broadly ovate, acuminate, serrate, hairy, base rounded or cordate ; petioles ⅛—⅝ in. long ; stipules ¼ in. long, ovate, acute, somewhat auricled at the base. Flowers shortly pedicellate, in terminal axillary and leaf-opposed usually hairy racemes 1—2 in. long, the males in the upper part, yellowish, the females few (rarely many) in the lower part of the raceme ; bracts 1/16 in. long, lanceolate, acute. MALE FLOWERS : Sepals 3, broadly elliptic or orbicular, concave, 1/16 in. long, glabrous. Stamens 3. Pistillode small, 3-fid. FEMALE FLOWERS : Sepals 6, ovate, pinnatifid, very hispid, ⅛ in. long, much elongating and becoming rigid in fruit. Ovary 3-lobed, hispid ; styles 3, circinately revolute, united below in a stout cylindric column often as long as the branches. Capsules ⅓ in. in diam., 3-lobed, white, more or less hispid. Seeds globose, smooth. Fl. B. I. v. 5, p. 465 ; Grah. Cat. p. 186 ; Dalz. & Gibs. p. 228 ; Trim. Fl. Ceyl. v. 4, p. 61 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372 ; Prain, Beng. Pl. p. 952 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 71.—Flowers : Nov.—Dec. VERN. *Kolti* ; *Khájakolti*.

Throughout the Presidency in the hills. KONKAN : Matheran, *Cooke* !, *H. M. Birdwood*. DECCAN : Panchgani, *Macnaghten* ! ; Mahableshwar, *Cooke* ! ; Khandala, *Nene* ! S. M. COUNTRY : Castlerock, *Cooke* !—DISTRIB. Throughout India ; Ceylon, China.

2. **Tragia cannabina,** *Linn. f. Suppl.* (1781), p. 415. Shrubby erect or climbing amongst bushes, not twining, 4—5 feet high, more or less hispid and with stinging hairs ; stems stout, terete, woody. Leaves palmately 3-partite, reaching 3½ in. long ; lobes toothed or pinnatifid, the middle lobe much longer than the lateral ones. Racemes as in the last species ; bracts 1/16—⅛ in. long, lanceolate, acute. MALE FLOWERS as in the last species. FEMALE FLOWERS : Calyx as in the last species. Styles 3, slightly spreading, but not revolute as in *T. involucrata*. Capsules ⅜ in. across, 3-lobed, hirsute ; lobes globose. Seeds globose, smooth, ⅛ in. in diam. Dalz. & Gibs. p. 228 ; Juss. Tent. Euphorb. t. 15, 49 B. *Tragia involucrata*, var. *cannabina*, Muell. Arg. in DC. Prodr. v. 15, part 2, p. 944 ; Hook. f. Fl. B. I. v. 5, p. 465.—Flowers : May—June.

The styles are well shown in Jussieu's figure *l. c.*

KONKAN : *Stocks* ! *Lambert* ! DECCAN : Dhairi near Kadakvasla (Poona districts), *Kanitkar* !, Khandesh, *Woodrow* !, Poona districts, *Cooke* ! ; Junnar (Poona districts) *Kanitkar* ! GUJARAT : in hedges, *Dalzell & Gibson*.—DISTRIB. India (Gangetic Plain, W. Peninsula) ; Ceylon.

I think that the habit, the shape of the leaves and the non-revolute styles constitute sufficient points of difference to justify the restoration of this plant to the rank of a species.

35. **SAPIUM,** P. Br.

Trees and shrubs. Leaves alternate, entire, serrate or toothed, penninerved ; petiole often 2-glandular at the apex. Flowers monœcious, in terminal simple or branched spikes or racemes, the males above, several in each bract, the females in the lower part of the spikes or in separate spikes, solitary in the bracts. MALE FLOWERS : Calyx membranous, shortly 2—3-lobed or toothed, or splitting to the

base into 2—3 valvate segments. Petals 0. Disk 0. Stamens 2 or 3; filaments free; anther-cells ovoid, distinct, contiguous, parallel. Pistillode 0. FEMALE FLOWERS: Calyx 3-fid or 3-partite. Petals 0. Disk 0. Ovary 2—3-celled; ovule 1 in each cell; styles free or connate at the base, spreading and recurved, entire. Fruit a crustaceous capsule, fleshy or pulpy, rarely woody, ultimately loculicidally 3-valved. Seeds globose, or ovoid, estrophiolate, usually long-persistent on the columella; testa crustaceous; albumen fleshy; cotyledons broad, flat.—DISTRIB. Species 25, all tropical.

1. **Sapium insigne,** *Trim. Syst. Cat. Ceyl. Pl.* (1885) p. 83. A middle-sized glabrous deciduous tree, with a thick milky poisonous juice, thick branches and bright green foliage. Leaves crowded towards the ends of the branches, 5—10 by 2—3¼ in., elliptic-lanceolate or oblong-lanceolate, acuminate, crenate-serrate, often with a few glands on the margin, glabrous, base acute, sometimes unequal-sided; main nerves 10—16 pairs, slender; petioles 1—1¾ in. long, with 2 conspicuous glands at the apex. Flowers appearing when the tree is bare of leaves, monœcious, in unisexual robust spikes 3—8 in. long, the males sessile, the females sessile or very shortly pedicellate, the female spikes much thickened in fruit. MALE FLOWERS in round clusters ¼—⅜ in. in diam., the central flower opening first. Sepals 2, orbicular, concave, 1/16 in. in diam. Stamens 2; filaments very short. FEMALE FLOWERS: Sepals ovate, acuminate, 1/16 in. long. Ovary ovoid, glabrous; styles 3, short, spreading, shortly connate at the base. Capsules ⅜ in. in diam., 2—3-celled, globosely ovoid, fleshy at first (purple, *Graham*), dry and irregularly dehiscent when ripe, packed closely together along the rhachis. Seeds ¼ in. long and broad, ovoid, somewhat compressed, smooth, pale. Fl. B. I. v. 5, p. 471; Trim. Fl. Ceyl. v. 4, p. 76; Talb. Trees, Bomb. ed. 2, p. 319; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 373; Prain, Beng. Pl. p. 954; Watt, Dict. Econ. Prod. v. 6, part 2, p. 471. *Sapium baccatum,* Grah. Cat. p. 181 (*not* of Roxb.). *Falconeria malabarica,* Wight, Icon. t. 1866. *Excœcaria insignis,* Muell. Arg. in DC. Prodr. v. 15 (1866) p. 1212; Bedd. For. Man. in Flor. Sylvat. (1873) p. ccxiv & Anal. Gen. t. 22. fig. 5 (bis).—Flowers: Dec.—Feb. VERN. *Ura; Dudla.*

Common near the coast of the Konkan and N. Kanara on dry rocky soil, usually on laterite, also in moist forests near the Ghâts, *Talbot.* Sparingly on the hills from Nasik to Vingorla, *Dalzell & Gibson.* KONKAN: Ratnagiri, *Dalzell!* DECCAN: Lanoli, *Woodrow*; Khandala, *Wight!*; Phonda Ghât, *Ritchie* 1334!—DISTRIB. India (Sub-himalayas, Assam, Chittagong, W. Peninsula); Ceylon.

Sapium sebiferum, Roxb. Fl. Ind. v. 3 (1832) p. 693. A small glabrous tree a native of China, known as the *Chinese Tallow Tree,* occasionally cultivated in gardens. Leaves rhomboid, entire, on long slender petioles. Flowers in terminal spiciform racemes. Ovary glabrous; styles 3, long, spreading, recurved. Capsule coriaceous, subglobose, shortly pointed. Seeds enclosed in a thick layer of a white fatty substance (*vegetable tallow*) attached to a central column

which splits into 3 slender divisions. Fl. B. I. v. 5, p. 470 ; Grah. Cat. p. 181 ; Dalz. & Gibs. Suppl. p. 77 ; Trim. Fl. Ceyl. v. 4, p. 76 ; Talb. Trees, Bomb. ed. 2, p. 319 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 373 ; Prain, Beng. Pl. p. 954 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 472.—Flowers : June. VERN. *Pipalyank.*

Sapium indicum, Willd. Sp. Pl. v. 4 (1805) p. 572. An evergreen glabrous tree 20—25 feet high, occasionally planted but not indigenous in the Bombay Presidency. Leaves elliptic-lanceolate, serrate, 3—5 in. long. Racemes spiciform, solitary ; male flowers clustered, subsessile : female flowers larger, pedicellate. Fruit 1 in. in diam., glabrous, woody when ripe. Fl. B. I. v. 5, p. 471 ; Grah. Cat. p. 181 ; Wight, Icon. t. 1950 ; Talb. Trees, Bomb. ed. 2, p. 319 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 373 ; Prain, Beng. Pl. p. 954 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 471.

Graham (*l. c.*) states on the authority of Nimmo that this tree is to be found in various parts of the S. Konkan. It has not been found wild by any other collectors, and Talbot (*l. c.*) is of opinion that the tree is not found in the Bombay Presidency.

36. EXCŒCARIA, Linn.

Glabrous trees or shrubs with acrid milky juice. Leaves alternate or opposite, entire or subserrate. Flowers dicœcious or monœcious, in lateral axillary or terminal 1-sexual or androgynous racemes or spikes ; males 1—3 in each bract, 2-bracteolate ; females at the base of the raceme or in separate racemes ; rhachis with large glands beneath or at the side of the bracts. Perianth simple. MALE FLOWERS : Sepals 3, small, subequal. Petals 0. Disk 0. Stamens 3 ; filaments free ; anthers didymous, the cells globose, distinct, contiguous, parallel. Pistillode 0. FEMALE FLOWERS : Calyx 3-fid or 3-partite. Petals 0. Disk 0. Ovary 3-celled ; ovule 1 in each cell ; styles stout, shortly connate below, spreading and recurved above, entire. Fruit a 3-coccous capsule, the cocci separating from the columella with elastically-twisted valves. Seeds subglobose or 3-gonous, estrophiolate ; testa crustaceous ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. Tropical Asia, Africa and Australia ; species about 30.

Leaves alternate, elliptic ..... 1. *E. Agallocha.*
Leaves opposite, linear-oblong ..... 2. *E. robusta.*

1. **Excœcaria Agallocha,** *Linn. Syst. Nat.* ed. 10 (1759) p. 1288. A small poisonous evergreen tree with white highly acrid juice. Leaves alternate, thickly coriaceous, 2—4 by 1¼—2 in., elliptic, acuminate, entire or shallowly sinuate-crenate, base acute ; petioles ½—1½ in. long. Flowers minute, fragrant, yellowish-green ; bracts rounded, fleshy. MALE FLOWERS sessile, in numerous catkin-like spikes 1—2 in. long ; bracts with 1 flower and several minute bracteoles. Sepals minute, unequal, subserrulate. Stamens long, exserted. FEMALE FLOWERS pedicellate. Racemes few, ½—1 in. long, the upper flowers usually imperfect. Sepals broadly ovate, acute, subserrulate. Styles free nearly to the base. Capsules very variable in size, ¼—1 in. in diam. Seeds subglobose, smooth. Fl. B. I. v. 5, p. 472 ;

Grah. Cat. p. 185 ; Dalz. & Gibs. p. 227 ; Bedd. For. Man. in Flor. Sylvat. p. ccxv ; Wight, Icon. t. 1865 B ; Hook. Comp. Bot. Mag. v. 2 (1836) p. 306, t. 30 ; Trim. Fl. Ceyl. v. 4, p. 77 ; Talb. Trees, Bomb. ed. 2, p. 320 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 373 ; Prain, Beng. Pl. p. 955 ; Watt, Dict. Econ. Prod. v. 3, p. 306. *Excœcaria Camettia,* Willd. Sp. Pl. v. 4, p. 864 ; Grah. Cat. p. 185.—Flowers : July—Aug. VERN. *Geva* ; *Surund* ; *Phungali.*

In tidal marshes along the coasts of the Presidency. KONKAN : *Stocks* ! KANARA : Kumpta, *Woodrow* !.—DISTRIB. India (Sundribans, Birma, W. Peninsula) ; Ceylon, Indian Archipelago, N. Australia, New Caledonia.

The tree is sometimes called *The Blinding Tree.* The juice is extremely acrid, producing blisters on the skin. It hardens into a kind of a black caoutchouc.

2. **Excœcaria robusta,** *Hook. f. Fl. B. I.* v. 5 (1888) p. 474. A shrub ; branches stout, as thick as a goose-quill. Leaves opposite, coriaceous, 5—8 by 1½—2½ in., linear-oblong, acuminate, entire or sinuate-subserrate, base acute ; main nerves 15—20 pairs, spreading, slender ; petioles ½—⅔ in. long, stout, eglandular. Flowers in axillary 1-sexual robust spikes. MALE FLOWERS : Spikes solitary, 4—5 in. long ; rhachis very stout ; bracts small, broad, fleshy ; bracteoles large, embracing the unexpanded flower. Sepals 3, membranous, with a broad cordate base, unequal, orbicular, irregularly toothed, the point of insertion small. FEMALE FLOWERS not seen. Fruit immature ⅜ in. in diam., on a very short axillary raceme, 3-lobed, truncate at top ; pedicels short, stout ; style short, persistent. Talb. Trees, Bomb. ed. 2, p. 320 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 373.

The occurrence of this shrub in the Bombay Presidency is doubtful. There is but one sheet from the Presidency in Herb. Kew. ticketed "*Konkan Stocks,*" but the handwriting on the ticket is not that of Stocks. No other collectors seem to have found the plant in Bombay. There are 3 other sheets in Herb. Kew. from Kurg. None of the specimens have female flowers.

Excœcaria bicolor, Hassk. Retzia (1855) p. 158. A handsome shrub 4—5 ft. high, with ovate-lanceolate opposite leaves olive-green above, crimson beneath, bearing minute flowers in the cold season, is often cultivated as an ornamental shrub in gardens. Woodr. Gard. in Ind. ed. 5, p. 444.

37. **SEBASTIANA,** Spreng.

Shrubs rarely herbs. Leaves alternate, penninerved. Flowers monœcious, in terminal, axillary, and lateral slender racemes ; males minute, 1—3 in each bract ; females solitary or at the base of the raceme. MALE FLOWERS : Calyx minute, membranous, unequally 5-lobed or 5-partite. Petals 0. Disk 0. Stamens 2—4 ; filaments short, free or nearly so ; anther-cells contiguous but distinct, parallel. Pistillode 0. FEMALE FLOWERS : Calyx 3-lobed or 3-partite. Petals 0. Disk 0. Ovary exserted, 3-celled ; ovule 1 in each cell ; styles free or connate at the base, entire, revolute or spreading. Capsule globose,

of 3 cocci separating from a columella ; endocarp crustaceous. Seeds oblong or subglobose, strophiolate ; testa smooth ; albumen fleshy ; cotyledons broad, flat.—DISTRIB. Species 40, almost all American.

1. **Sebastiana Chamælea,** *Muell. Arg. in DC. Prodr.* v. 15, part 2 (1866) p. 1175. An annular glabrous herb 1—2 ft. high ; stems numerous from a long thin tap-root, ascending, slender, grooved, ribbed or terete. Leaves ¾—3 by ⅛—½ in., linear or narrowly oblong-elliptic, obtuse, finely serrulate, base tapering ; midnerve strong, prominent beneath ; petioles 1/12—⅛ in. long ; stipules ovate, acute, ciliate. Flowers yellowish. MALE FLOWERS in axillary or leaf-opposed slender short spikes ; bracts very small, acute, with a large often stipitate gland on each side, 1—2-flowered. Calyx minute, membranous, not covering the stamens in bud ; lobes 5, ovate, acute, ciliate. Stamens usually 3 ; filaments distinct. FEMALE FLOWERS usually solitary at the base of the male, or lateral on the branches without any males. Sepals 3, larger than in the male, obovate, acute, lacerate and ciliate, 2-glandular within. Ovary much exserted ; styles 3, small, undivided. Capsules ¼—⅓ in. long, crustaceous, subglobosely oblong, 3-coccous, the cocci with 2 rows of spinules on the back of each, separating from a persistent columella, glabrous except for the spinules. Seeds ⅛ in. long, ellipsoid-oblong, rounded at both ends, yellow. Fl. B. I. v. 5, p. 475 ; Trim. Fl. Ceylon, v. 4, p. 78 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 373 ; Prain, Beng. Pl. p. 955. *Microstachys Chamælea,* A. Juss. Tent. Euphorb. p. 49 ; Dalz. & Gibs. p. 228. *Tragia Chamælea,* Linn. Sp. Pl. (1753) p. 981 ; Grah. Cat. p. 186.—Flowers : Sept.—Dec. VERN. *Bhui-crandi.*

KONKAN : *Stocks* !, *Dalzell* ! ; Bombay, *Dr. Crespigny* ! ; Vingorla, *Dalzell & Gibson, Woodrow* ; Ratnagiri, *Woodrow, Kanitkar* ! ; Marmagão, *Cooke* !—DISTRIB. India (Behar, Chota Nagpur, Birma, W. Peninsula) ; Ceylon, China, Malay Islands, Tropical Australia and Africa.

The following plants not belonging to any of the foregoing genera are more or less commonly grown throughout the Presidency :—

Pedilanthus tithymaloides, Poit. in Ann. Mus. Par. v. 19 (1812) p. 390, t. 19. A succulent shrub about 3 ft. high a native of S. America, with fleshy leaves and a scarlet slipper-shaped involucre, commonly used for borders of walks in gardens. Fl. B. I. v. 5, p. 239 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 368, & Gard. in Ind. ed. 5, p. 444 ; Prain, Beng. Pl. p. 925. *Euphorbia tithymaloides,* Linn. Sp. Pl. (1753) p. 453 ; Dalz. & Gibs. Suppl. p. 76.—Flowers : Jan. VERN. *Vilayti-sher.*

Synadenium Grantii, Hook. f. Bot. Mag. (1867) t. 5633. An erect bush 6—10 ft. high with a stout terete green stem and few thick erect branches. Leaves scattered, 3—4 in. long, obovate-spathulate. Involucre ¼ in. in diam., consisting of an annular tomentose red-purple cushion, on the inner margin of which are 5 broadly oblong pubescent toothed erect scales. A native of Tropical Africa,

sometimes grown in gardens. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 369.—Flowers: Nov.—Feb.

Aleurites moluccana, Willd. Sp. Pl. v. 4 (1805) p. 590. A handsome evergeen tree 40—60 ft. high, a native of the Pacific Islands. Leaves polymorphous, crowded at the ends of the branches. Flowers white, with short pedicels. Fruit 2—2½ in. in diam., subglobose, fleshy, smooth, olive-colored, containing 1 or 2 hard albuminous oily seeds with a furrowed testa. The seeds are eaten and contain a large quantity of oil which is used in cookery and for burning as well as in medicine. The tree is known as the *Bengal Walnut* or *Candle-nut Tree*. It grows well about Belgaum. Fl. B. I. v. 5, p. 384 ; Bedd. Flor. Sylvat. t. 276 ; Talb. Trees, Bomb. ed. 2, p. 310 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371 ; Prain, Beng. Pl. p. 942 ; Watt, Dict. Econ. Prod. v. 1, p. 163. *Aleurites triloba*, Forst. Charact. Gen. (1776) p. 112 ; Grah. Cat. p. 181 ; Dalz. & Gibs. Suppl. p. 76. *Jatropha moluccana*, Linn. Sp. Pl. (1753) p. 1006.—Flowers: Apr.—May. VERN. *Akrot*.

Codiæum variegatum, Blume, Bijdr. (1825) p. 606. An evergreen shrub with alternate leaves often waved and infinitely variable in size, form, and coloring, a native of the Molucca Islands. The varieties of this plant, which is the *Croton* of Anglo-Indians, are numerous. Somewhat less than 20 years ago a perfect rage for its cultivation prevailed in the Bombay Presidency and it was grown everywhere in gardens. Woodrow (Gard. in Ind. ed. 5, pp. 435—442) enumerates more than 30 varieties. Fl. B. I. v. 5, p. 399 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 371, & Gard. in Ind. ed. 5, p. 435 ; Prain, Beng. Pl. p. 944. *Codiæum pictum*, Hook. f. Bot. Mag. t. 3051. *Croton variegatum*, Linn. Sp. Pl. ed. 3 (1764) p. 1424 ; Grah. Cat. p. 182 ; Dalz. & Gibs. Suppl. p. 77.

Manihot utilissima, Pohl, Pl. Bras. Icon. (1827) v. 1, p. 32, t. 24. A tall herbaceous plant with a tuberous root and palmate leaves, a native of S. America, yielding *Cassava* and *Tapioca*, has been occasionally cultivated in gardens. Graham (Cat. p. 183) says that it was introduced by the Portuguese at Goa, but is grown in Bombay gardens simply as an ornamental plant and not used economically. Fl. B. I. v. 5, p. 239 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372 ; Prain, Beng. Pl. p. 940 ; Watt, Dict. Econ. Prod. v. 5, p. 157. *Jatropha manihot*, Linn. Sp. Pl. (1753) p. 1007 ; Grah. Cat. p. 183 ; Dalz. & Gibs. Suppl. p. 77.

Hippomane mancinella, Linn. Sp. Pl. (1753) p. 1191. A middle-sized tree 40—50 ft. high, with virulent poisonous juice. Leaves ovate or elliptic, serrulate or crenate, shining, with a single gland on the upper side at the junction with the petiole. Fruit a roundish, fleshy, yellowish-green drupe. The tree, which is a highly poisonous one, is a native of Tropical S. America and has been grown in the Victoria gardens, Bombay. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 373. —Flowers: May.

Ricinus communis, Linn. Sp. Pl. (1753) p. 1007. The well-known *Castor-oil Plant* cultivated throughout India and naturalized near

habitations, but, probably, a native of Africa. Two varieties are commonly grown, the larger with green, the smaller with red stem and flowers. The bright-colored leaved varieties are very effective in gardens. The oil is largely used for burning and when cold-drawn furnishes the medicinal castor oil. Very full particulars as to mode of cultivation of the plant and extraction and uses of the oil will be found in Watt's Dictionary of Economic Products. Fl. B. I. v. 5, p. 457 ; Grah. Cat. p. 183 ; Dalz. & Gibs. Suppl. p. 78 ; Trim. Fl. Ceyl. v. 4, p. 72 ; Talb. Trees, Bomb. ed. 2, p. 318 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 372, & Gard. in Ind. ed. 5, p. 435 ; Prain, Beng. Pl. p. 952 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 506. —VERN. *Erand.*

Hura crepitans, Linn. Sp. Pl. (1753) p. 1008. A branching shady tree known as the *Sand-box Tree,* a native of Tropical America, with glossy leaves and reddish inconspicuous flowers, has been planted at Poona and Khandala. The curious round hard-shelled fruit is about the size of an orange and when ripe often bursts with great force and with a noise like the report of a pistol. The plant abounds in a poisonous milky juice which is said to cause blindness if applied to the eyes. Dalz. & Gibs. Suppl. p. 76 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 373.

ORDER CXVI. **URTICACEÆ.**

Herbs, shrubs, or trees. Leaves usually alternate, often oblique ; stipules various. Flowers cymose or clustered, usually minute, monœcious or dioecious, 1-sexual, hermaphrodite, or rarely polygamous, often crowded on the surface of a fleshy flat concave or globose receptacle, sometimes hollow and closed (*Ficus*) ; bracts usually small or 0, sometimes 2—4 or more, involucrate ; bracteoles usually small or 0, sometimes conspicuous. Perianth simple, calycine, regular or irregular, equally or unequally toothed, lobed or partite ; segments imbricate or valvate. Disk hypogynous, obscure or 0. Stamens as many as and opposite to the perianth-lobes, sometimes aduate to their base (rarely fewer or more) ; filaments free or rarely connate at the base ; anthers 2-celled. Pistillode in male flowers small or 0. Ovary superior, 1-celled ; ovule solitary ; style often excentric, simple or 2-fid with stigmatic arms, or stigma sessile, plumose or penicillate. Fruit simple, indehiscent, a drupe or samara, or of free achenes, or compound in a confluent mass of perianths and pericarps. Seed erect, lateral or pendulous ; testa membranous ; albumen copious, scanty or 0 ; embryo straight or curved.—DISTRIB. Throughout both hemispheres ; genera 109 ; species 1500.

Plants with watery juice.
- Anthers in bud erect; style 2-fid; ovule pendulous.
  - Fruit dry, winged, leaves deciduous ..... 1. HOLOPTELEA.
  - Fruit a drupe; leaves persistent.
    - Stipules free.
      - Male sepals imbricate; cotyledons broad... 2. CELTIS.
      - Male sepals induplicate-valvate; cotyledons narrow ..... 3. TREMA.

Stipules connate, sheathing the bud ..... 4. GIRONNIERA.
Anthers in bud reversed; stamens inflexed; style undivided or 0; ovule erect, orthotropous.
Leaves and stems with stinging hairs.
Ovary oblique; an annual herb..... 5. FLEURYA.
Ovary straight; a perennial herb..... 6. GIRARDINIA.
Leaves and stems without stinging hairs.
Female perianth 3—5-partite or obsolete.
Leaves opposite ..... 7. LECANTHUS.
Leaves alternate ..... 8. PLATOSTEMA.
Female perianth tubular, shortly toothed or subentire, enclosing the achenes.
Flowers not involucrate.
Fruiting perianth dry, membranous; stigma filiform.
Shrubs; stigma persistent ..... 9. BŒHMERIA.
Herbs (rarely suffruticose); stigma jointed, deciduous ..... 10. POUZOLZIA.
Fruiting perianth fleshy; stigma penicillate ..... 11. DEBREGEASIA.
Flowers involucrate.
Female perianth tubular, 4-fid; stamens 3—4; stigma penicillate.... 12. PARIETARIA.
Female perianth 0; stamen 1; stigma filiform ..... 13. FORSKOHLEA.
Plants with milky juice.
Anthers in bud reversed; stamens inflexed; ovule pendulous, anatropous; shrubs or trees.
Male flowers subcapitate; female perianths not confluent; style 2-fid ..... 14. STREBLUS.
Male flowers in globose heads; female perianths confluent; style undivided, elongate ..... 15. PLECOSPERMUM.
Anthers in bud erect; trees or shrubs.
Flowers on the inner wall of a closed receptacle.. 16. FICUS.
Flowers all exposed.
Male flowers on a disciform receptacle; females solitary, without perianth; stamens 3—8 ..... 17. ANTIARIS.
Flowers in naked or lanceolate heads; female perianth tubular; stamen 1 ..... 18. ARTOCARPUS.

1. **HOLOPTELEA,** Planch.

Deciduous trees. Leaves alternate, distichous, penninerved, entire; stipules lateral, scarious. Flowers polygamous or hermaphrodite, the males without a rudimentary ovary, in fascicles at scars of previous year's shoots which are scaly but leafless. Perianth simple, calycine, 4—8-partite; lobes imbricate, often unequal. Stamens 4—8 (usually 7 or 8); filaments erect, ultimately exserted; anthers hairy. Ovary stipitate, compressed; ovule solitary, pendulous; style short, 2-fid, the arms stigmatic within throughout their whole length. Fruit dry, indehiscent, samaroid and flat, the nucleus expanded as an obliquely ovate reticulate wing. Seed flat; albumen 0; cotyledons longitudinally complicate; radicle small, superior.—DISTRIB. Throughout the greater part of India except in the higher hills; Ceylon, Cochinchina.

1. **Holoptelea integrifolia,** *Planch. in Ann. Sc. Nat.* sér. 3, v. 10 (1848) p. 266. A large spreading glabrous deciduous tree 50—60

ft. high ; bark grey, pustular. Leaves 3—5 by 1¼—2½ in., elliptic, acuminate, glabrous, entire (those of the seedlings and shoots often serrate), base rounded or cordate ; main nerves 5—7 pairs ; petioles ¼—½ in. long. Flowers usually male and hermaphrodite mixed, in short racemes or fascicles at the scars of fallen leaves. Sepals often 4, pubescent, 1/16—1/10 in. long. Stamens 4—8 (often 6 or 7) ; filaments glabrous ; anthers pubescent. Ovary compressed, pubescent, 1-celled, stalked, the stalk lengthening as the seed ripens ; styles 1/10—⅛ in. long, stigmatose on the inside throughout their whole length. Samara nearly orbicular, 1 in. in diam., with reticulately veined wings. Fl. B. I. v. 5, p. 481 ; Dalz. & Gibs. p. 238 ; Wight, Icon. t. 1968 ; Trim. Fl. Ceyl. v. 4, p. 80 ; Talb. Trees, Bomb. ed. 2, p. 321 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Prain, Beng. Pl. p. 958 ; Watt, Dict. Econ. Prod. v. 4, p. 261. *Ulmus integrifolia*, Roxb. Cor. Pl. v. 1 (1795) p. 56, t. 78, & in Willd. Sp. Pl. v. 1 (1797) p. 1326 ; Grah. Cat. p. 188 ; Bedd. Flor. Sylvat. t. 310.—Flowers : Feb.—Mar. VERN. *Vávli.*

Throughout the Presidency in deciduous forests, *Talbot*. KONKAN : *Dalzell* ! ; Nagotna, common, *Graham* ; Bombay, *Law* ! DECCAN : Poona, *Cooke* !, *Woodrow* ! ; Khandala, *Graham*. S. M. COUNTRY : *Graham* ; Belgaum, *Ritchie*, 1002 !—DISTRIB. India (Subhimalayas, Ajmere, Bandelkand, Behar, Birma, W. Peninsula) ; Ceylon, Cochinchina.

2. **CELTIS,** Linn.

Trees or shrubs, evergreen or deciduous. Leaves alternate, ovate, entire or serrate, bifarious, base 3-nerved ; stipules lateral, free. Flowers small, polygamous, solitary or cymose, the males and androgynous cymes usually at the base of the shoots, the females in the upper axils. Perianth simple. Sepals 4 or 5, imbricate. Petals 0. Stamens 4 or 5, short, erect in bud, inserted round a woolly torus. Ovary sessile ; ovule pendulous ; style-arms simple or lobed. Fruit a small ovoid or globose drupe ; endocarp hard, smooth or rugose. Seed with membranous testa ; albumen scanty or 0 ; embryo curved ; cotyledons broad, inflexed, flat or replicate, surrounding the upcurved radicle.—DISTRIB. Species about 60, temperate and tropical, especially in the N. hemisphere.

Leaves unequal-sided at the base; sepals not ciliate..... 1. *C. cinnamomea.*
Leaves equal-sided at the base; sepals ciliate..... 2. *C. Wightii.*

1. **Celtis cinnamomea,** *Lindl. in Wall. Cat.* (1828) 3696. A tree 30—40 ft. high ; branchlets tomentose. Leaves when young membranous, when adult chartaceous, 2¼—4 by 1—1⅞ in., obliquely ovate, long-acuminate, entire, crenate or serrate, glabrous, dark-green, 3-nerved to below the tip, reticulately veined, base acute or rounded ; petioles ⅜ in. long ; stipules ½ in. long, lanceolate-subulate, caducous. Flowers in paniculate cymes, the flowers of the upper panicles often all fertile, the lower panicles with the upper flowers fertile, the lower male ; pedicels filiform, of variable lengths. Sepals 4—5 (usually 5), 1/10 in. long, elliptic-oblong, obtuse, finely mottled, entire. Stamens 4—5 (commonly 4), surrounding a woolly disk. Ovary seated on a woolly disk, sessile, ovoid ; styles ½ in. long, spreading,

curled, villous. Drupe pisiform, narrowed to the obtusely beaked tip. Fl. B. I. v. 5, p. 482 ; Kurz, For. Fl. v. 2, p. 472 ; Trim. Fl. Ceyl. v. 4, p. 81 ; Prain, Beng. Pl. p. 959 ; Watt, Dict. Econ. Prod. v. 2, p. 243. *Celtis dysodoxylon*, Thw. Enum. p. 267 ; Bedd. For. Man. in Flor. Sylvat. p. ccxix. *C. Roxburghii*, Dalz. & Gibs. Bo. Fl. p. 237 (*not* of Planch.). *Celtis tetrandra*, Talb. Trees, Bomb. ed. 2, p. 322 (*not* of Roxb.).—Flowers : Feb.—Apr. VERN. *Brumaj.*

KONKAN : *Law* ! ; S. Konkan, *Ritchie*, 692 ! DECCAN : Khandala, *Cooke* !, *Bhiva* ! KANARA : on the Kâla naddi, *Ritchie*, 692 !—DISTRIB. India (Sikkim Himalaya, Assam, Chittagong, Birma, Behar, N. Bengal, W. Peninsula) ; Ceylon, Malay Islands.

From the description given of the inflorescence, it seems clear that the plant described by Dalzell & Gibson (Bo. Fl. l. c.) under the name *Celtis Roxburghii* was this plant and not *Celtis tetrandra*, Roxb. As far as I know, *Celtis tetrandra*, Roxb., does not occur in the Bombay Presidency. Talbot gives it in his list (p. 322), but as he very kindly sent me from India the specimens he had so named, I have been enabled to diagnose them as unmistakably *Celtis cinnomomea.*

2. **Celtis Wightii,** *Planch. in Ann. Sc. Nat.* sér. 3, v. 10 (1848) p. 307. A middle-sized tree 30—40 ft. high ; young shoots puberulous ; young foliage pink. Leaves rigidly coriaceous, 3—6 by 1¾—2½ in., ovate or elliptic-oblong, acuminate, entire or sparsely crenate-serrate, conspicuously 3-nerved almost to the tip, reticulately veined with transverse veins, base equal-sided, rounded or acute ; petioles ¼—⅜ in. long ; stipules somewhat peltate, caducous. Flowers yellow, in axillary short puberulous cymes, the male and fertile together, the former below the latter. Sepals acuminate, ciliate. Stamens 5. Drupes shortly pedicellate, ovoid, ¼—½ in. long, scarlet, the tip obtuse or 2-cuspidate. Fl. B. I. v. 5, p. 483 ; Wight, Icon. t. 1969 ; Bedd. For. Man. in Flor. Sylvat. p. ccxviii ; Trim. Fl. Ceyl. v. 4, p. 81 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Watt, Dict. Econ. Prod. v. 2, p. 244. *Bosea trinervia,* Roxb. Fl. Ind. v. 2, p. 87.

Rare in the Bombay Presidency. DECCAN : Khandala, *Woodrow* !, *Bhiva* ! —DISTRIB. India (W. Peninsula, Andaman Islands) ; Ceylon, Malay Islands, Australia.

3. **TREMA,** Lour.

Shrubs or trees. Leaves alternate, serrate, 3—7-nerved at the base ; stipules lateral, caducous. Flowers monœcious, subdiœcious, or polygamous, in small axillary cymes. Perianth simple. MALE FLOWERS : Sepals 4—5, induplicate-valvate or subimbricate. Petals 0. Stamens 4—5, erect in bud. Pistillode small or 0. FEMALE FLOWERS : Sepals as in the male when stamens are present, flat and subimbricate if stamens 0. Petals 0. Ovary sessile ; ovule pendulous ; style central with 2 linear arms. Fruit a small straight ovoid or subglobose drupe usually tipped by the style ; endocarp hard. Seed small ; testa membranous ; albumen fleshy ; cotyledons narrow ; radicle ascending.—DISTRIB. Species about 20, tropical and subtropical.

1. **Trema orientalis,** *Blume, Mus. Bot.* v. 2 (1856) p. 62. A fast-growing short-lived tree 25—30 ft. high with straight spreading

branches ; branchlets pubescent. Leaves 2¾—5 by 1¼—1¾ in., obliquely ovate, acuminate, crenate-serrulate, chartaceous, somewhat rough above, clothed beneath with soft often white pubescent, base unequal-sided, rounded or subcordate ; lateral basal nerves reaching to half the length of the leaf ; petioles ¼—⅜ in. long. Flowers in axillary pubescent cymes longer than the petiole, the male cymes rather more compact than the female and usually on different trees. MALE FLOWERS : Sepals 1/16 in. long, elliptic-lanceolate. Stamens 5. Pistillode small. FEMALE FLOWERS : Sepals 1/16 in. long, elliptic, ciliolate. Ovary sessile ; style-arms 1/16 in. long, villous, slightly incurved. Drupe ⅛ in. in diam., black when ripe. Fl. B. I. v. 5, p. 484 ; Trim. Fl. Ceyl. v. 4, p. 82 ; Talb. Trees, Bomb. ed. 2, p. 322 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Prain, Beng. Pl. p. 959 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 75. *Sponia Wightii,* Planch. in Ann. Sc. Nat. sér. 3, v. 10 (1848) p. 322 ; Wight, Icon. t. 1971 ; Dalz. & Gibs. p. 238 ; Bedd. Flor. Sylvat. t. 311. *Celtis orientalis,* Linn. Sp. Pl. (1753) p. 1044 ; Grah. Cat. p. 189.—Flowers more or less throughout the year. VERN. *Gol.*

KONKAN : *Law* !, *Lambert* !, *Dalzell* !, *Talbot* ! ; Kanheri forests, *Graham* ; Salsette, *Graham* ; Matheran, *Cooke* !, *H. M. Birdwood.* DECCAN : Khandala, *Woodrow* ! ; Lanoli, *Cooke* ! S. M. COUNTRY : Rámghát, *Ritchie,* 935 ! KANARA : in moist forests common, *Talbot.*—DISTRIB. More or less throughout India ; Ceylon, Malay Islands.

The tree is known as the *Nettle* or *Charcoal-Tree.* It is employed for making charcoal for the manufacture of gunpowder.

4. GIRONNIERA, Gaud.

Unarmed evergreen trees or shrubs. Leaves alternate, penni-nerved ; stipules sheathing the buds, caducous. Flowers dioecious, in axillary cymes or the females solitary. MALE FLOWERS minute, globose. Sepals 5, broad, obtuse, imbricate. Stamens 5 ; filaments erect in bud. Pistillode woolly. FEMALE FLOWERS : Sepals narrower than in the male, acute. Ovary sessile ; ovule pendulous ; style ntral with 2 spreading filiform arms. Drupe ovoid or subglobose ; ndocarp hard. Albumen copious, scanty or 0. Embryo contorted.—DISTRIB. Species 8 or 10, South Indian, Malayan, and Chinese.

1. **Gironniera reticulata,** *Thw. Enum.* (1861) p. 268. A very large tree with buttresses at the base ; bark grey, smooth ; young parts glabrous or sparsely appressedly hairy. Leaves 3—5 by 1½—2¼ in., ovate to ovate-oblong, acuminate or caudate, glabrous, smooth, shining, base rounded or acute ; main nerves 8—12 pairs, conspicuous beneath with reticulate venation between ; petioles ¼—½ in. long ; stipules connate, lanceolate, hairy, caducous. Flowers axillary, the males in short paniculately branched cymes, the females solitary. MALE FLOWERS : Perianth-segments 5, rounded, obtuse. Stamens 5. Pistillode a small tuft of hairs. FEMALE FLOWERS : Sepals narrower than in the male, acute. Ovary glabrous. Drupe ovoid, hardly compressed, stoutly beaked, glabrous, ⅝—¾ in. long (including the beak). Fl. B. I. v. 5, p. 486 ; Bedd. Flor. Sylvat. t. 313, fig. 1 ; Trim. Fl.

Ceyl. v. 4, p. 83 ; Talb. Trees, Bomb. ed. 2, p. 323 ; Watt, Dict. Econ. Prod. v. 3, p. 502.—Flowers : Nov.—Jan.

KANARA : Sirsi and Siddapur subdivisions of N. Kanara, *Talbot*; Sonda (N. Kanara), *Talbot*, 3646!—DISTRIB. India (Sikkim Himalaya, Assam, Birma, Pegu, W. Peninsula) ; Ceylon, Java.

5. FLEURYA, Gaud.

Annual herbs with stinging hairs. Leaves alternate, toothed, 3-nerved ; stipules connate in opposite pairs or 0. Flowers monœcious in the only Bombay species, clustered, the clusters cymose in solitary axillary spikes or racemes, 1-sexual or androgynous. MALE FLOWERS : Sepals 4—5, ovate-lanceolate, subvalvate or imbricate. Petals 0. Stamens 4 or 5, inflexed in bud. Pistillode globose or clavate. FEMALE FLOWERS : Sepals 4, free, imbricate or connate in a cup-shaped calyx, with the upper hooded and the anterior minute or obsolete. Ovary oblique ; ovule solitary, erect ; style obliquely ovoid or linear, at length hooked, sometimes with 2 basal arms. Fruit an oblique compressed membranous exserted achene. Seed with very scanty albumen ; cotyledons broad.—DISTRIB. Tropical and S. African ; species 8.

1. **Fleurya interrupta,** *Gaud. in Freyc. Voy. Bot.* (1826) p. 497. Stems 2—4 ft. high, erect, flexuous, branched, furrowed, the whole plant more or less sparsely clothed with scattered stinging hairs. Leaves 1—6 by ½—4 in., broadly ovate, acuminate, coarsely crenate-serrate, with a few scattered stinging hairs, base truncate, cordate or shortly cuneate ; petioles as long as or longer than the leaf-blade, very slender ; stipules long, 2-fid to about the middle, the segments linear-subulate, ciliolate. Flowers greenish, on solitary interrupted axillary racemes of variable length (2—10 in.), arranged in distant paniculate cymes along the rhachis. MALE FLOWERS few, soon fading. Perianth $\frac{1}{20}$ in. long ; sepals concave. Stamens 4. FEMALE FLOWERS : Perianth $\frac{1}{16}$ in. long, cup-shaped, 4-toothed, on a decurved pedicel. Achenes $\frac{1}{16}$ in. long and nearly as broad as long, much compressed, with 3 keels round the margin and with a subcordate or truncate base ; style subulate, curved towards the base of the achene. Fl. B. I. v. 5, p. 548 ; Dalz. & Gibs. p. 238 ; Wight, Icon. t. 1975 ; Trim. Fl. Ceyl. v. 4, p. 104 ; Weddell, Monog. (1856) p. 115, A, fig. 9 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516 ; Prain, Beng. Pl. p. 961. *Urtica interrupta,* Linn. Sp. Pl. (1753) p. 985 ; Grah. Cat. p. 187.—Flowers : Aug.

KONKAN : *Law*!, *Stocks*! ; Parel (Bombay), *Ranade*!, *Woodrow*! ; Matheran, *H. M. Birdwood.* S. M. COUNTRY : Londa, *Cooke*! ; Belgaum, *Ritchie*, 1365! KANARA : *Law*!—DISTRIB. India (Behar, C. Bengal, Khasia Hills, W. Peninsula) ; Ceylon, Malay and Pacific Islands, China, Abyssinia.

6. GIRARDINIA, Gaud.

Herbs or undershrubs with stout stinging hairs. Leaves alternate, 3-nerved, entire or lobed, serrate ; stipules connate, foliaceous. Flowers monœcious (in the Bombay species), in simple or panicled

cymes or heads armed with stinging hairs. Perianth simple. MALE FLOWERS: Sepals 4—5, valvate. Petals 0. Stamens 4—5, inflexed in bud; filaments free. Pistillode globose or cup-shaped. FEMALE FLOWERS: Perianth tubular, ventricose, 2—3-toothed, at length split on one side, spathaceous. Ovary straight; ovule solitary, erect; stigma subulate, papillose. Fruit a broad compressed achene with thickish pericarp; albumen scanty or 0; cotyledons broad.—DISTRIB. Tropical Asia and Africa; species 7.

1. **Girardinia zeylanica,** *Decaisne, in Jacq. Voy.* (1844) p. 152. A tall robust, perennial-rooted herb, 4—6 ft. high, closely armed with slender stinging hairs; stem and branches furrowed. Leaves 4—10 in. long and often as broad, the upper variously lobed and more or less deeply cut though never to the base, more or less pubescent, coarsely serrate, the serratures triangular, sometimes ½ in. deep, base cordate or truncate; petioles 3—7 in. long, armed with stinging hairs; stipules ½—⅝ by ⅓ in., ovate, cordate, shortly acuminate, 2-fid. Flowers in pedunculate racemose cymes, the males in the lower, the females in the upper axils. MALE FLOWERS: Sepals $\frac{1}{16}$ in. long, elliptic, obtuse. Pistillode subglobose, slightly hollowed at the apex. FEMALE FLOWERS: Perianth $\frac{1}{10}$ in. long, 3-lobed at first to less than ½ way down, afterwards splitting on one side; lobes triangular, acute, hairy. Fruiting cymes short, stout, 1—2 in. long by 1—1½ in. broad, densely clothed with slender stinging hairs; peduncles rather shorter than the cyme. Achenes ⅛ in. long and nearly as broad as long, obliquely ovate, much compressed. Weddell, Monog. Urtic. p. 166; Prain, Beng. Pl. p. 961. *Girardinia heterophylla,* Dalz. & Gibs. p. 238 (*not* of Decaisne); Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516. *G. heterophylla* var. *zeylanica,* Hook. f. Fl. B. I. v. 5, p. 551; Watt, Dict. Econ. Prod. v. 3, p. 501. *Urtica zeylanica,* Burm. Thes. Zeyl. p. 231. *Urtica heterophylla,* Roxb. Fl. Ind. v. 3 (1832) p. 586 (*not* of Vahl); Wight, Icon. t. 687; Grah. Cat. p. 187.—Flowers: Oct. VERN. *Motha Khájoti.*

KONKAN: *Stocks!*; W. Ghâts, *Woodrow.* DECCAN: Mahableshwar, *Cooke!*, *J. M. Birdwood, Woodrow.*—DISTRIB. India (Chota Nagpur, W. Peninsula); Ceylon.

The plant furnishes a very strong fibre, but owing to its stinging properties the extraction is difficult.

7. LECANTHUS, Wedd.

Succulent herbs; stems ascending, decumbent and often rooting at the base. Leaves opposite in unequal pairs, ovate, serrate, 3-nerved from the oblique base; stipules scarious. Flowers monœcious or diœcious, crowded on solitary, axillary, pedunculate, bracteate, saucer-like, fleshy receptacles. MALE FLOWERS: Sepals 4—5, subequal. Stamens 4—5; filaments inflexed in bud. FEMALE FLOWERS: Sepals 3 or 4, minute, nearly equal or very unequal. Ovary straight; ovule erect; stigma sessile, penicillate. Achene ovoid, compressed; albumen fleshy; cotyledons ovate.—DISTRIB. India, Ceylon, China, Java, Africa; species 2.

A low weak herb rarely reaching 6 in. high; female perianth of 3 very unequal segments ..... 1. *L. Wightii.*
More robust, reaching 24 in. high; female perianth of 4 subequal segments ..... 2. *L. Wallichii.*

1. **Lecanthus Wightii,** *Wedd. in Ann. Sc. Nat.* sér. 4, v. 1 (1854) p. 187. A low weak herb ; stem sometimes scarcely 1 in., rarely exceeding 4—6 in. high. Leaves opposite, ½—1½ by ¼—1 in., the upper the largest, ovate, acute, sharply serrate, sparingly hairy above, glabrous beneath, 3-nerved from an oblique acute base ; petioles ⅛—¼ in. long, very slender. Flowers on fleshy receptacles ¼—⅓ in. in diam., supported on stalks rarely more than 1 in. long. Perianth of female flowers 3-partite, the segments very unequal, one larger hooded at the tip, the other 2 flat. Achenes narrowly oblong, longer than the perianth, red. Wedd. Monog. Urtic. (1856) p. 280, t. 9, fig. C ; C. H. Wright, in Journ. Linn. Soc. v. 26 (1899) p. 480 ; Collett, Flor. Simlen. (1902) p. 465 ; Hook. f. Fl. B. I. v. 5, p. 559 *ex parte ;* Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516. *Elatostema ovata,* Wight, Icon. t. 1985 ? *Procris obtusa,* Royle, Illustr. t. 83, fig. 3.—Flowers : Sept.—Oct.

Dalzell without locality in Herb. Kew.! KONKAN : matheran, *Woodrow, H. M. Birdwood.* S. M. COUNTRY : Belgaum, *Ritchie,* 1372!—DISTRIB. Throughout India, ascending to 10,000 feet; Africa, China.

2. **Lecanthus Wallichii,** *Wedd. in Ann. Sc. Nat.* sér. 4, v. 1 (1854) p. 187. Stems 12—24 in. high, robust. Leaves 2—4½ by 1—2 in., ovate-lanceolate, acute or acuminate, serrate, sparsely hairy above, glabrous beneath, base acute ; petioles ¼—1½ in. long. Receptacles ½—1½ in. in diam., on stalks varying from 2—12 in. long. Perianth of female flowers 4-partite ; segments subequal, hooded at tip. Staminodes 4, opposite to and ½ as long as the perianth segments, linear, flat, incurved at the apex. Achenes $\frac{1}{12}$ in. long, ovoid, shorter than the perianth, muriculate, purple-brown. C. H. Wright, in Journ. Linn. Soc. v. 26 (1899) p. 480 ; Collett, Flor. Simlen. (1902) p. 465. *Lecanthus Wightii,* Hook. f. Fl. B. I. v. 5, p. 559 *ex parte ;* Trim. Fl. Ceyl. v. 4, p. 108. *Elatostema oppositifolium,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 179 ; Dalz. & Gibs. p. 239. *Procris peduncularis,* Wall. Cat. 4634 ; Royle, Illustr. t. 83, fig. 2.—Flowers : Oct.

Dalzell without locality in Herb. Kew.! KONKAN : *Stocks*!, *Law*! DECCAN : Khandala, *Cooke*!—DISTRIB. Throughout India, ascending to 10,000 feet; Ceylon, China.

8. ELATOSTEMA, Forst.

Herbs or undershrubs. Leaves alternate or sometimes with a minute leaf subopposed to the normal leaf, distichous, sessile or subsessile, usually very oblique and inequilateral, 3-nerved from the base or shortly above it ; stipules lateral or intrapetiolar. Flowers very minute, monœcious or diœcious, crowded on sessile or pedunculate 1-sexual usually involucrate receptacles ; bracts of the involucre rounded, oblong or ovate, the outer at times with a dorsal spur or horn, bases nearly free or more or less confluent in a fleshy circular or lobed disk, the tips projecting from its margin, rarely the

margin entire ; bracteoles densely crowded, those of the male heads usually oblong, of the female heads spathulate ; florets often in clusters in the heads, each cluster surrounded by a partial bract and the head then lobulate. MALE FLOWERS : Sepals 4—5, of which 2 or more are usually tuberculate or spurred on the back. Stamens 4—5, inflexed in bud. Pistillode minute. FEMALE FLOWERS : Sepals 3—5, very minute, much shorter than the ovary, persistent. Staminodes minute or 0. Ovary straight ; ovule erect ; stigma penicillate. Fruit a minute ellipsoid or fusiform usually ribbed achene, subtended by the very minute perianth. Seed usually exalbuminous ; testa membranous ; cotyledons ovate or semi-cylindric.—DISTRIB. Tropics of the Old World except Australia ; species about 50.

A herb or undershrub, 3—4 ft. high..... 1. *E. lineolatum.*
A small herb, 4—8 in. high..... 2. *E. cuneatum.*

1. **Elatostema lineolatum,** *Wight, Icon.* v. 6 (1853) p. 11, t. 1984. Herbaceous or suffruticose, 3—4 ft. high, pubescent or tomentose. Leaves 2—5½ by ¾—1¾ in., very variable, subsessile or shortly petiolate, oblong or oblong-lanceolate or cuneately obovate or linear-oblong, often obliquely falcate, acuminate or caudate, entire or coarsely crenate, toothed or serrate above the middle, base acute or cuneate ; lateral nerves few ; cystoliths crowded and conspicuous ; stipules linear-lanceolate. Flowers dioœcious ; receptacle of both sexes sessile, capitate. MALE FLOWERS pisiform ; bracts rounded, pubescent ; bracteoles oblong with pubescent costa and tips. Sepals rounded, obtuse, pubescent. FEMALE FLOWERS smaller than the male ; bracteoles spathulate, ciliate. Sepals minute, denticulate. Achenes ellipsoid, acute.

This is the var. *major* of Thwaites (Enum. p. 260). I cannot find any good characters to separate VAR. *integrifolia,* Hook. f. (Fl. B. I. v. 5, p. 565), from this. Fl. B. I. v. 5, p. 565 ; Weddell, Monog. Urtic. p. 312 ; Trim. Fl. Ceyl. v. 4, p. 110 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516.

KONKAN : *Stocks* !, *Law* ! S. M. COUNTRY : Castlerock, *Bhiva* ! KANARA : *Stocks* !, *Law* ! ; Kála naddi, *Ritchie,* 1371 ! ; Honavar, *Dalzell* !—DISTRIB. India (Tropical Himalaya, W. Peninsula) ; Ceylon.

2. **Elatostema cuneatum,** *Wight, Icon.* v. 6 (1853) p. 35, t. 2091, fig. 3. An annual herb, more or less pubescent, 4—8 in. high ; stem simple or scarcely branched, often rooting near the base. Leaves (the uppermost) ¾—1½ by ⅜—⅝ in., subsessile, falcately cuneate or hatchet-shaped, coarsely crenate above the middle, tip rounded or subacute, sometimes with a minute opposite leaflet at the base, the upper surface with numerous cystoliths ; stipules ovate ; lower leaves on the stem few, very small, sometimes nearly entire. FEMALE FLOWERS : Heads sessile, solitary, at each node, ⅛—¼ in. in diam. ; bracts of the involucre pubescent ; bracteoles oblong-spathulate, shortly ciliate. Perianth-segments of female 3, very short. Achenes $\frac{1}{10}$ in. long, ellipsoid, ribbed, yellow. MALE FLOWERS not seen. Fl. B. I. v. 5, p. 568 ; Dalz. & Gibs. p. 239 ; Wedd. Monog. Urtic. p. 330 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516.—Flowers : Sept.—Oct.

KONKAN : W. Ghâts, *Woodrow*; on old walls Mahim woods, Bombay, *Dalzell & Gibson*; Bombay, *Dalzell*!; walls at Thana, *Gibson*! S. M. COUNTRY : Belgaum, *Dalzell & Gibson*.—DISTRIB. India (Sikkim Himalaya, W. Peninsula).

9. BŒHMERIA, Jacq.

Shrubs or small trees. Leaves alternate or opposite, toothed, 3-nerved at the base ; stipules usually free, deciduous. Flowers monœcious or dioecious, both sexes in axillary spicate racemose or paniculate clusters ; bracts small, scarious. MALE FLOWERS : Perianth 3—5-lobed or -partite, valvate. Stamens 3—5, inflexed in bud. Pistillode clavate or globose. FEMALE FLOWERS : Perianth tubular, 2—4-toothed, sometimes angled or winged or ventricose in fruit. Ovary included ; ovule erect ; stigma filiform, persistent. Fruit a crustaceous achene, at first closely covered by the perianth, ultimately free. Seed with a thinly membranous testa ; albumen copious or scanty ; cotyledons ovate.—DISTRIB. Chiefly tropical ; species about 45.

Flower-clusters axillary; leaves all alternate	1. *B. malabarica.*
Flower-clusters in simple or paniculate spikes; leaves mostly opposite	2. *B. scabrella.*

1. **Bœhmeria malabarica,** *Wedd. Monog. Urtic.* (1856) p. 355. An erect shrub or small tree ; bark thin, greyish-brown ; stems and branches terete, pubescent. Leaves membranous, alternate, subequal or alternately large and small, the larger 4—8 by 1¾—3½ in., elliptic-lanceolate, acuminate or caudate, crenulate or serrulate from above the rounded subacute or sometimes cordate base, glabrous and sometimes rugose above, pubescent beneath, strongly 3-nerved from the base with 2—4 lateral pairs of nerves above, reticulately veined between the nerves ; petioles ¾—3 in. long ; stipules small, deciduous. Flowers monœcious, minute, greenish-white, in small axillary sessile clusters ⅛—¼ in. in diam., the males and females in different axils. MALE FLOWERS : Perianth 4-partite, pubescent. Stamens 4. Pistillode small, subglobose. FEMALE FLOWERS : Perianth tubular, 4-toothed, pubescent. Achenes minute, ovoid, closely invested by the perianth. Fl. B. I. v. 5, p. 575 ; Trim. Fl. Ceyl. v. 4, p. 113 ; Talb. Trees, Bomb. ed. 2, p. 334 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516 ; Prain, Beng. Pl. p. 964 ; Watt, Dict. Econ. Prod. v. 1, p. 467. *Bœhmeria travancorica*, Bedd. For. Man. in Flor. Sylvat. p. ccxxv, & Anal. Gen. t. 27, fig. 2 (by error *B. ramiflora*).—Flowers : Nov.—Feb.

KONKAN : *Stocks*!, *Law*!, *Talbot*. KANARA : Karwar, *Woodrow* ; N. Kanara, in evergreen forests, common on the Siddapur Ghât, *Talbot* ; Nilkund Ghât, *Talbot*, 1629!—DISTRIB. India (Sikkim Himalaya, Khasia Mountains, Chittagong, W. Peninsula) ; Ceylon, Java.

The plant yields a very strong fibre.

2. **Bœhmeria scabrella,** *Gaud. in Freyc. Voy.* (1826) p. 500. A shrub with soft glabrous or strigose more or less grooved branches. Leaves usually opposite, 3½—7 by 1½—4 in., broadly ovate, acuminate or caudate, sharply serrate with triangular serratures, nearly glabrous or pubescent, wrinkled on both surfaces, base rounded or cordate ;

main nerves 3 from the base, each penninervuled ; petioles ¾—4 in. long ; stipules lanceolate, acute. Flowers in small pisiform clusters on slender (usually simple) erect spikes 4—8 in. long. MALE FLOWERS : Sepals 4, ovate, acuminate. FEMALE FLOWERS : Perianth 1/20 in. long, somewhat flask-shaped, shortly contracted round the base of the style into a very small unequally 4-toothed mouth. Style 1/16 in. long, filiform, pubescent, sometimes curled, persistent. Achenes 1/25 in. long, shining, compressed, closely invested by the gibbous turgid pubescent perianth. C. B. Clarke, in Journ. Linn. Soc. v. 15, p. 124 ; Prain, Beng. Pl. p. 964. *Bœhmeria platyphylla,* Talb. Trees, Bomb. ed. 2, p. 334 (*not* of Don) ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516. *B. platyphylla* var. *scabrella,* Wedd. Monog. Urtic. (1856) p. 365 ; Hook. f. Fl. B. I. v. 5, p. 578 ; Watt, Dict. Econ. Prod. v. 1, p. 484. *Splitgerbera scabrella,* Dalz. & Gibs. Bo. Fl. (1861) p. 239. *Urtica scabrella,* Roxb. Fl. Ind. v. 3 (1832) p. 581 ; Wight, Icon. t. 691.—Flowers : Apr.—Oct.

The late Mr. C. B. Clarke (Journ. Linn. Soc. l. c.) was of opinion that both *B. scabrella,* Gaud., and *B. rotundifolia,* Don, were quite distinct species from *B. platyphylla,* Don, and that no intermediate forms existed in India, Prain (*l. c.*) is of the same opinion as regards *B. scabrella.* I cannot find that *B. rotundifolia* occurs in the Bombay Presidency. I have not seen any specimens from there ; there are none in Herb. Kew.

KONKAN : hilly jungles, *Dalzell & Gibson;* Mira Hills, near Pen, *Dalzell & Gibson*; common in moist forests near the sea-coast, *Talbot;* Pen, *Woodrow;* Goa jungles, *Woodrow.* DECCAN : Koina Valley below Mahableshwar, *Cooke* ! KANARA : N. Kanara near the sea-coast, *Talbot.*—DISTRIB. More or less throughout India ; Ceylon.

Bœhmeria nivea, Gaud. in Freyc. Voy. (1826) p. 499. The *Rhea Plant,* grown for its fibre chiefly in Bengal and Assam, has been occasionally grown in gardens in the Bombay Presidency. It is a native of the Malay Islands, China and Japan. Jackson, Index Kewen. v. 1, p. 317 ; Hook. & Arn. in Bot. Beech. Voy. (1841) p. 214 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516 ; Prain, Beng. Pl. p. 964 ; Watt, Dict. Econ. Prod. v. 1, p. 468.

A full description of the methods of *Rhea* cultivation and the mode of extraction of the fibre may be found in Watt's Dict. Econ. Prod. l. c.

10. **POUZOLZIA,** Gaud.

Herbs or undershrubs. Leaves alternate or the lower (rarely all) opposite, usually entire, 3-nerved at the base, smaller upwards, the uppermost often reduced to bracts ; stipules free, often persistent. Flowers minute, usually monœcious, in 1-sexual or androgynous clusters sessile in the axils of leaves or bracts, the individual florets pedicellate ; bracteoles small. MALE FLOWERS : Perianth 4—5-partite or -lobed (rarely 3-partite) ; lobes valvate with concave or abruptly inflexed tips and transversely plicate backs. Stamens 4 or 5 (rarely 3). Pistillode clavate or oblong. FEMALE FLOWERS : Perianth tubular,

often beaked ; mouth contracted, 2—4-toothed. Ovary included ; ovule erect ; stigma filiform, jointed to the top of the ovary, soon deciduous. Fruit a small achene with brittle shining pericarp, enclosed in but usually free from the marcescent perianth. Seed with membranous testa ; albumen very scanty or 0 ; cotyledons ovate.—DISTRIB. Chiefly tropical Asiatic ; enumerated species about 50, but reducible to a smaller number.

Lobes of the male perianth convex or gibbous on the back	1. *P. indica.*
Lobes of the male perianth abruptly inflexed above the middle, transversely folded at the flexure, hence the buds truncate.	
Stem terminating in a bracteate spike; stamens 5...	2. *P. pentandra.*
Stem not running out into a bracteate spike; flowers axillary; stamens 3—5.	
Stamens 5	3. *P. Bennettiana.*
Stamens 3—4	4. *P. integrifolia.*

1. **Pouzolzia indica,** *Gaud. in Freyc. Voy.* (1826) p. 503. A perennial-rooted herb very variable in size and habit, glabrous, hoary, pubescent or hirsute ; stem erect or prostrate, 6—20 in. long, stout or slender. Leaves opposite or alternate, ¾—1½ by ⅜—⅝ in., ovate or ovate-lanceolate, obtuse, acute or acuminate, quite entire, hairy, base acute or rounded ; nerves 1 pair above the 3 basal ones, sparingly branched ; petioles ⅛—¾ in. long ; stipules ovate, acuminate, ciliate. Flowers in small axillary androgynous clusters, strigose with simple or hooked hairs. MALE FLOWERS : Sepals 4, dorsally rounded, acute. Stamens 4. Pistillode small, clavate. FEMALE FLOWERS : Perianth tubular, persistent, ribbed, 2-fid at the apex, closely investing the achene. Achenes 1/20 in. long, broadly ovoid, acute, smooth and shining, white with a dark-colored tip. Fl. B. I. v. 5, p. 581 ; Dalz. & Gibs. p. 240 ; Wight, Icon. t. 1980, fig. 1 & t. 2100, fig. 40 ; Wedd. Monog. Urtic. p. 398 ; Trim. Fl. Ceyl. v. 4, p. 115 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516 ; Prain, Beng. Pl. p. 965. *Pouzolzia procumbens,* Wight, Icon. t. 2099, n. 35. *Parietaria indica,* Linn. Mant. p. 128 ; Grah. Cat. p. 187.—Flowers : Sept.

Common in gardens as a weed, *Dalzell & Gibson.* DECCAN : near Dapuri (Poona districts), *Graham;* Khandala, *Bhiva* ! ; hills near Junnar, *Woodrow.* S. M. COUNTRY : Rámghát, *Ritchie,* 1370 !—DISTRIB. Throughout India ; Ceylon, Malay Islands, China.

2. **Pouzolzia pentandra,** *Benn. Pl. Jav. Rar.* (1838) p. 64, t. 14. A tall erect glabrous perennial-rooted herb 2—3 ft. high ; stem terete below, usually angular above, diffusely branched. Leaves sessile or shortly petiolate, submembranous, the lower opposite, oblong-lanceolate, acute or acuminate, strongly 3-nerved, ciliolate ; the upper floral leaves much smaller, sometimes only ¼ in. long, mostly alternate, linear-oblong, ovate, often cordate, acuminate or cuspidate, exceeding the flower-clusters. Flowers clustered in the floral leaves (bracts) of an erect or nodding terminal spike reaching 18 in. long. MALE FLOWERS pedicellate, truncate in bud, with a concave top, ciliate. Perianth usually 5-partite. Stamens 5. FEMALE FLOWERS : Perianth in fruit with 2 or 3 broad lateral membranous wings, forming an almost orbicular fruit 2-lobed at the base and the apex. Fl.

B. I. v. 5, p. 583 ; Dalz. & Gibs. p. 240 ; Wight, Icon. t. 2096, n. 20 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516 ; Prain, Beng. Pl. p. 965 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 334.—Flowers : Sept.—Nov.

KONKAN : Island of Karanja, *Dalzell & Gibson.* DECCAN : Kolhapur, *Cooke* ! S. M. COUNTRY : Belgaum, *Ritchie,* 638 ! ; Cheeta Hill near Belgaum, *Ritchie,* 1369 ! KANARA : *Law* ! ; Kála naddi near Supa, *Ritchie,* 1368 !—DISTRIB. India (Tropical Himalaya, Assam, Khasia Mountains, Bengal, W. Peninsula) ; Afghanistan, Java.

VAR. 1. *Stocksii,* Hook. f. Fl. B. I. v. 5, p. 583. Straggling, ramous, seeking support and then ascending (*Wight*) ; stem and branches glabrous. Leaves glabrous or nearly so, except the hispid margins ; lower floral leaves larger. *Pouzolzia Stocksii* (sp.), Wight, Icon. v. 6, p. 41, n. 18 ; Dalz. & Gibs. p. 240.

KONKAN : *Stocks* ! DECCAN : Kheir, *Stocks* ! KANARA : *Dalzell* ! ; near Supa in watercourses, *Ritchie,* $1\frac{3}{4}$! !

VAR. 2. *integrifolia,* Hook. f. Fl. B. I. v. 5, p. 583. A large-leaved flaccid form. Leaves opposite, 2—$2\frac{1}{2}$ in. long, sessile, with cordate base, oblong-lanceolate, acute, soft, not ciliate ; floral leaves $\frac{1}{2}$ in. long, ovate-lanceolate, acuminate, with cordate base.

KONKAN : *Dalzell* !, *Law* ! DECCAN : 23 miles W. of Kolhapur, *Woodrow.* KANARA : *Law* !, *Stocks* !

VAR. 3. *ramosissima,* Wedd. in DC. Prodr. v. 16, part 1, p. 235. Stems much-branched. Leaves hispid on the margins, sessile, cordate, acuminate. Perianth in fruit usually 3-winged, the middle wing often thicker than the others. Fl. B. I. v. 5, p. 583. *Pouzolzia ramosissima* (sp.), Wight, Icon t. 2095, fig. 17, and *P. Dalzellii,* t. 2096, fig. 21.

KONKAN.

3. **Pouzolzia Bennettiana,** *Wight, Icon.* v. 6 (1853) p. 10 and p. 40, t. 1978. Suffruticose ; stem erect, suberect or prostrate, sparingly branched, 2—3 ft. high, glabrous or pubescent. Leaves 3—5 by $1\frac{1}{4}$—$1\frac{3}{4}$ in., opposite or alternately whorled, sessile or very shortly petiolate, not passing into bracts, elliptic-lanceolate, acuminate or caudate, quite entire, more or less pubescent on both surfaces, base rounded or subcordate, somewhat oblique, 3-nerved, the 2 lateral nerves running to the tips of the leaves ; stipules persistent. Flowers in dense axillary cymose clusters. MALE FLOWERS : Sepals with a transverse dorsal ridge at the flexure, acuminate. Stamens 5. FEMALE FLOWERS : Fruiting perianth ribbed or with 2—4 membranous, reticulately veined wings. Fl. B. I. v. 5, p. 585 ; Trim. Fl. Ceyl. v. 4, p. 117 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516. —Flowers : Oct.

DECCAN : Panchgani Ghât, *Cooke* ! S. M. COUNTRY : Badami, *Woodrow.*—DISTRIB. India (W. Peninsula) ; Ceylon.

4. **Pouzolzia integrifolia,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 134. Suffruticose, 3—4 ft. high, glabrous or nearly so ; stem compressed, grooved. Leaves opposite and alternately whorled, sessile, 2—$3\frac{1}{2}$ by $\frac{3}{8}$—1 in., triangular-lanceolate, the margins rough with short stout hairs, the upper and lower surfaces more or less pubescent,

base broad, truncate, cordate or rounded, subamplexicaul, 3—5-nerved. Flowers in dense axillary clusters, the males numerous, the females few. MALE FLOWERS: Sepals ciliate at the flexure. Stamens 3—4. FEMALE FLOWERS: Fruiting perianth ribbed or sometimes 2—3-winged. Achene ovoid acute, brown, shining. Fl. B. I. v. 5, p. 587; Dalz. & Gibs. p. 240.—Flowers: Oct.

KONKAN: *Law*!, *Stocks*!, *Dalzell*! S. M. COUNTRY: Belgaum, *Ritchie*!—DISTRIB. India (W. Peninsula) apparently endemic.

11. **DEBREGEASIA,** Gaud.

Shrubs or trees. Leaves alternate, petiolate, serrate-crenate, 3-nerved; stipules connate, intrapetiolar, 2-fid. Flowers monœcious or diœcious, in dense globose paniculate or spicate sessile clusters; bracts of male clusters scarious. MALE FLOWERS: Perianth usually 4 (rarely 3 or 5) -partite; lobes valvate. Stamens usually 4 (rarely 3 or 5), inflexed in bud. Pistillode glabrous or woolly at the base. FEMALE FLOWERS: Perianth ovoid or obovoid, succulent in fruit, the mouth contracted and minutely toothed. Ovary straight, included; ovule erect; stigma sessile, penicillate. Fruit an achene, at first adnate to the fleshy perianth. Seed with membranous testa; albumen copious or scanty; cotyledons short, broad.—DISTRIB. Tropical Asia and Africa; species 5.

1. **Debregeasia velutina,** *Gaud. in Bot. Voy. Bonite* (1844—6) t. 90. A tall shrub or small tree, erect, branched, the branches rough with warty excrescences and the scars of fallen leaves. Leaves 2—7 by ¾—2 in., lanceolate or oblong-lanceolate, finely acuminate, serrulate, rough and wrinkled above, prominently reticulately veined, white- or ashy-tomentose and softer beneath, base usually rounded; main nerves 3 from the base and 2—3 pairs from the midrib above; petioles ½—1¼ in. long, hairy; stipules chaffy, ¼—⅜ in. long, 2-fid at the apex. Flowers in compact heads arranged in lateral dichotomous cymes; peduncles and pedicels hairy. MALE FLOWERS: Sepals 4. Stamens 4. FEMALE FLOWERS: Perianth tubular, with a small 4-toothed mouth. Stigma sessile, penicillate. Fruit ⅛ in. in diam., consisting of an aggregation of more or less obovoid perianths and their contained achenes, yellow when ripe, somewhat resembling a small raspberry, edible. Fl. B. I. v. 5, p. 590; Wedd. Monog. Urtic. p. 460, t. 15 A, figs. 1—9; Trim. Fl. Ceyl. v. 4, p. 119; Talb. Trees, Bomb. ed. 2, p. 334; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516; Watt, Dict. Econ. Prod. v. 3, p. 54. *Conocephalus niveus,* Wight, Icon. t. 1959; Dalz. & Gibs. p. 239. *Morocarpus longifolius,* Blume, Mus. Bot. Lugd. Bat. v. 2, p. 156; Bedd. For. Man. in Flor. Sylvat. p. ccxxvi, and Anal. Gen. t. 26, fig. 5. *Bœhmeria ramiflora,* Grah. Cat. p. 187 (*not* of Jacq.).—Flowers: Nov.—Jan. VERN. *Kápsi.*

KONKAN: *Stocks*!, *Talbot*; Ambeghát, *Woodrow*; Konkan and Ghát jungles, *Dalzell & Gibson.* DECCAN: Phonda Ghát, *Ritchie,* 1383!; Mahableshwar, *Law*!, *Cooke*! KANARA: *Law*!, *Talbot.*—DISTRIB. India (outer Himalaya, Assam, Khasia Hills, Birma, W. Peninsula); Ceylon, Java.

12. **PARIETARIA,** Tournef.

Herbs rarely undershrubs. Leaves alternate, entire, 3-nerved ; stipules 0. Flowers polygamous, in cymose clusters, the bracts at the base more or less connate into an involucre. MALE FLOWERS : Sepals 3—4, valvate. Stamens 3—4, inflexed in bud. Pistillode glabrous. FEMALE FLOWERS : Perianth tubular, 4-fid. Ovary straight ; ovule erect ; stigma penicillate. Achene enclosed in the persistent perianth, crustaceous ; testa membranous ; albumen copious ; cotyledons oblong.—DISTRIB. Temperate and tropical regions ; species about 8.

1. **Parietaria debilis,** *Forst. f. Prodr.* (1786) p. 73. A diffuse flaccid pubescent herb ; stems numerous, 6—18 in. long, very slender, straggling, often matted. Leaves alternate, entire, thin, very variable in shape and size, ½—1½ by ⅜—1 in., broadly ovate or suborbicular, obtuse, base rounded or cuneate ; petioles filiform, reaching sometimes 1½ in. long. Flowers minute, polygamous, in axillary 3—7-flowered cymes, male and bisexual flowers few, female flowers numerous ; bracts linear, acute, shortly united at the base. MALE FLOWERS : Perianth 4-partite. Stamens 4. FEMALE FLOWERS : Perianth tubular, 4-lobed, enclosing the ovary ; lobes acute. Stigma a sessile tuft of hairs. Achene ovoid, enclosed in the persistent perianth. Fl. B. I. v. 5, p. 593 ; Wedd. Monog. Urtic. p. 514, t. 17, figs. 21, 22, 23, 24, 25 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516.

Dalzell without locality in Herb. Kew. DECCAN : Junnar Hill (Poona districts), *Kanitkar*! KANARA : *Thomson*! ; Karwar, *Talbot,* 42!—DISTRIB. India (Temperate Himalaya from the Panjáb to Sikkim ; W. Peninsula) ; Afghanistan, China, and many temperate and tropical regions, extending to Australia and Chili.

13. **FORSKOHLEA,** Linn.

Herbs sometimes woody at the base. Leaves alternate, toothed, 3-nerved, often hoary beneath ; stipules lateral, free. Flowers monœcious, aggregated in a tubular or campanulate 3—6-partite androgynous involucre which is densely woolly within, the male flowers numerous on the periphery of the involucre, the female flowers 1—5 in its centre. MALE FLOWERS : Perianth clavate in bud, in flower irregularly split, 3-lobed or 3-toothed, 1 lobe inflexed. Stamen 1. Pistillode 0. FEMALE FLOWERS : Perianth 0. Ovary straight ; ovule erect ; stigma filiform, hispid, persistent. Achenes enclosed in the involucre, enveloped in wool, ovate, compressed ; testa membranous ; albumen scanty or 0 ; cotyledons broad.—DISTRIB. India, Arabia, Africa, Spain ; species 5.

1. **Forskohlea tenacissima,** *Linn. Mant.* (1767) p. 72. Suffruticose ; stem 6—24 in. long. Leaves ½—1¾ by ⅜—1½ in., variable in shape and size, rhombic, elliptic, orbicular or obovate, obtuse, toothed or serrate, softly hairy with hooked hairs above, white-woolly beneath, base cuneate ; petioles ¼—1¼ in. long ; stipules ovate, acute, scarious, ciliate. Flowers monœcious, in axillary androgynous

membranous involucres, the males at the margin, the females 1—4 in the centre of the involucre ; bracts usually 5, foliaceous, lanceolate, hispid above, silky below, reaching nearly ½ in. long. MALE FLOWERS : Perianth unequally 3-lobed. Stamen 1. FEMALE FLOWERS : Perianth 0. Achenes $\frac{1}{16}$—$\frac{1}{8}$ in. long, ovoid, compressed, tapering into the filiform style. Fl. B. I. v. 5, p. 593 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517.—Flowers : Feb.

Dalzell without locality in Herb. Kew.! SIND : *Stocks*!; Hala range, *Vicary*!; Shahadpur, *Woodrow*!.—DISTRIB. India (Western Panjáb) ; Afghanistan, Egypt, Arabia.

14. **STREBLUS,** Lour.

Unarmed shrubs or trees with milky juice. Leaves alternate, penninerved, scabrous ; stipules small, lanceolate. Flowers axillary, usually dicœcious, the males in pedunculate heads or spikes ; female flowers pedicellate, bracteate, solitary or 2—4 together. MALE FLOWERS : Sepals 4, imbricate. Stamens 4, inflexed in bud. Pistillode dilated at the top. FEMALE FLOWERS : Sepals 4, imbricate, embracing the ovary. Ovary straight, retuse ; ovule pendulous ; style central with very long arms. Fruit membranous, straight, subglobose, laxly covered by the persistent perianth. Seed globose, testa membranous ; albumen 0 ; embryo globose ; one cotyledon very large, embracing the smaller and the ascending radicle.—DISTRIB. Species 2, Indian and Malayan.

1. **Streblus asper,** *Lour. Fl. Cochinch.* v. 2 (1790) p. 615. A small rigid gnarled tree with smooth grey bark and numerous interwoven pubescent branchlets. Leaves 1—3½ by ⅝—1¼ in., elliptic or rhomboid, or obovate, acute or acuminate, the margins more or less irregularly toothed in the upper half, roughly scaberulous on both surfaces but especially beneath ; main nerves 4—6 pairs ; petioles $\frac{1}{16}$—⅛ in. long ; stipules obliquely lanceolate. Flowers dicœcious, the males in shortly pedunculate globose heads, the females solitary on axillary usually fascicled pedicels ½ in. long. MALE FLOWERS : Perianth campanulate ; sepals 4, pubescent outside. Stamens 4. FEMALE FLOWERS : Pedicels slender, thickened upwards. Sepals 4. Ovary straight ; style terminal, 2-branched, the arms very long and slender. Fruit pisiform, laxly clothed by the enlarged persistent perianth, yellow, edible. Fl. B. I. v. 5, p. 489 ; Bedd. For. Man. in Flor. Sylvat. p. ccxxi, & Anal. Gen. t. 26, fig. 1 ; Talb. Trees, Bomb. ed. 2, p. 323 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Prain, Beng. Pl. p. 969 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 373. *Epicarpurus orientalis,* Blume, Bijdr. (1825) p. 488 ; Dalz. & Gibs. p. 240 ; Wight, Icon. t. 1961.—Flowers : Jan.—Mar. VERN. *Kharoti.*

Stocks without locality in Herb. Kew.! DECCAN : Nasik, *Bhiva*! S. M. COUNTRY : Dharwar, *Woodrow* ; Belgaum, *Ritchie,* 1374! KANARA : evergreen forests, *Talbot.* GUJARAT : *Woodrow* ; Godra, *Cooke*! ; Balsar, *Bhiva*!—DISTRIB. Drier parts of India ; Ceylon, Malay Islands, Cochinchina, China, Siam.

The rough leaves of the tree are used as sandpaper to polish wood and ivory; the milky juice is used in native medicine and acts as a rennet, rapidly coagulating milk.

15. **PLECOSPERMUM,** Trécul.

Glabrous trees or shrubs. Leaves alternate, quite entire, penni-nerved. Flowers diœcious, in axillary solitary or 2—3-nate pedunculate heads. MALE FLOWERS bracteate. Perianth-lobes 4, concave, imbricate. Stamens 4, inflexed in bud. Pistillode minute, hairy. FEMALE FLOWERS: Perianths fleshy, 4-toothed, connate into a fleshy head. Ovary straight, included; ovule pendulous; style filiform, undivided. Fruit an irregularly-shaped fleshy anthocarp, enclosing a few immersed coriaceous achenes which are adnate to the perianths; albumen 0; embryo subglobose; one cotyledon very large, fleshy, embracing the smaller one; radicle upcurved.—DISTRIB. Species 3, of which 1 is African, the other 2 Indian.

1. **Plecospermum spinosum,** *Trécul, in Ann. Sc. Nat.* sér. 3, v. 8 (1847) p. 124. A large thorny shrub or small tree; branchlets drooping, minutely pubescent; spines stout, axillary, straight. Leaves 2—3 by 1—1½ in., obovate or elliptic, obtuse or acute, glabrous, base narrowed into the petiole; nerves 4—6 pairs, slender; petioles ⅛—⅝ in. long. Flowers diœcious, in axillary solitary or fascicled heads. MALE FLOWERS: Heads ¼ in. in diam.; peduncles ¼ in. long, often fascicled; flowers distinct, minute, subsessile, pubescent; bracteoles minute. Sepals 4, obtuse or notched, pubescent. Stamens 4, long-exserted. FEMALE FLOWERS: Heads larger than in the male; flowers connate in the heads. Perianth 4-toothed. Fruit pubescent, lobed, ½ in. in diam. Fl. B. I. v. 5, p. 491; Bedd. For. Man. in Flor. Sylvat. p. ccxx, & Anal. Gen. t. 26, fig. 2; Wight, Icon. t. 1963; Trim. Fl. Ceyl. v. 4, p. 103; Talb. Trees, Bomb. ed. 2, p. 323; Watt, Dict. Econ. Prod. v. 6, part 1, p. 290.—Flowers: Apr.—June.

S. M. COUNTRY: Dharwar district, common in hedges, *Talbot.* KANARA: Bunwasi, Sirsi subdivision of N. Kanara, *Talbot.*—DISTRIB. India (Subhimalayan tract from the Panjáb eastwards, W. Peninsula); Ceylon.

16. **FICUS,** Linn.

Trees or shrubs sometimes scandent or epiphytic (at least primarily); juice milky. Leaves alternate (rarely opposite), entire, lobed, serrate or toothed; stipules clothing the bud, caducous. Flowers minute, 1-sexual, monœcious (very rarely diœcious) on the inner walls of a fleshy receptacle the mouth of which is closed by imbricate bracts; florets often mixed with bracteoles, of four forms, male, female, gall, and (rarely) neuter; receptacles usually androgynous, the males nearest the mouth; males, females, and galls may occur in the same receptacle, or males and galls may be in one set, females and neuters in another, or males and galls in one set, females only in another. MALE FLOWERS: Perianth 2—6-fid or -partite. Stamens 1 or 2 (rarely 3—6), erect in bud. NEUTER FLOWERS: Perianth as in the male. FEMALE FLOWERS: Perianth as

in the male or imperfect or obsolete. Ovary straight or oblique; ovule pendulous; style excentric; stigma entire or 2-armed, acute or obtuse. GALL FLOWERS: Perianth as in the female. Ovary containing the pupa of a hymenopterous insect; style short, often dilated upwards. Fruit an enlarged hollow cup-shaped closed receptacle, the inner wall studded with crustaceous or fleshy achenes. Seed pendulous; testa membranous; albumen scanty; embryo curved; cotyledons equal or unequal; radicle ascending.—DISTRIB. Species about 600, mostly tropical.

The Indian Figs have been so minutely described by Sir George King in the Annals of the Royal Botanic Gardens Calcutta [vols. i. and ii. (1888)] that nothing practically has been left for anyone coming after him to do. I have simply adopted, with very slight alteration, Sir George King's descriptions, which are wonderfully clear and accurate.

Pseudo-hermaphrodite; male flowers with 1 stamen and a rudimentary pistil in the same receptacle with the gall flowers; female flowers in a separate receptacle (*Palæomorphe*) ..... 1. *F. gibbosa.*

Unisexual or asexual; male flowers without any rudimentary pistil; male, gall, and female flowers in the same receptacle; stamen 1 (sometimes 2 stamens in *F. callosa*) (*Urostigma*).

Leaves coriaceous or subcoriaceous; petioles short or moderately long, stout, never jointed to the blade.

Receptacles sessile, with 3 basal bracts.

Leaves more or less tomentose.

Leaves obtuse; receptacles puberulous, globose, red, ¾ in. in diam. ..... 2. *F. bengalensis.*

Leaves reaching 8 in. long, shortly acuminate; receptacles oblong or obovate, nearly glabrous when ripe, 1 in. long ..... 3. *F. mysorensis.*

Leaves reaching 5 in. long, bluntly apiculate; receptacles pisiform, less than ½ in. in diam., grey-tomentose ..... 4. *F. tomentosa.*

Leaves glabrous.

Receptacles yellow or reddish, ⅓ in. in diam.; basal bracts blunt; petioles ¼—½ in. long... 5. *F. retusa.*

Receptacles greenish-yellow, dotted, ¼ in. in diam.; basal bracts acute; petioles ¾—1 in. long ..... 6. *F. Talboti.*

Receptacles in pairs on distinct slender peduncles ½—¾ in. long, without basal bracts, but with 3 small bracts low down on the peduncle..... 7. *F. nervosa.*

Leaves subcoriaceous or membranous on long slender petioles which are sometimes jointed to the blade.

Apices of leaves more or less caudate-acuminate.

Bases of leaves slightly narrowed to the petiole, 5-nerved; apical tail ½ as long as the main part of the blade; receptacles not depressed at the apex ..... 8. *F. Rumphii.*

Bases of leaves not narrowed to the petiole, rounded or truncate, 5—7-nerved; apical tail ½ as long as the main part of the blade; receptacles depressed at the apex ..... 9. *F. religiosa.*

Bases of leaves cordate; apex shortly caudate-acuminate ..... 10. *F. Arnottiana.*

Apices of leaves not caudate-acuminate.

Receptacles sessile, in groups of about 4 from tubercles (shortened branches) ..... 11. *F. Tsjakela.*

Receptacles sessile, in pairs, axillary; stamen 1.
Primary nerves of leaves indistinct; male perianth of 3 sepals ..... 12. *F. Tsiela.*
Primary nerves of leaves distinct; male perianth of 4 or 5 sepals ..... 13. *F. infectoria.*

Receptacles on a peduncle ¾ in. long; stamens sometimes 2 ..... 14. *F. callosa.*

Unisexual; male and gall flowers in one set of receptacles; fertile female flowers in another (in *F. glomerata* all three kinds of flowers in the same receptacle).
Male flowers with 1 stamen.
Receptacles axillary, solitary; basal bracts minute or 0; small trees, shrubs, or climbers with alternate leaves.
A creeping shrub; bracts minute, basal or high up on the peduncle ..... 15. *F. heterophylla.*
An erect shrub; basal bracts 0 ..... 16. *F. asperrima.*
Receptacles in some individuals all axillary, in others all on branches from the stem near the root, in others occupying both situations; basal bracts 3; erect or spreading shrubs or trees usually with opposite leaves, all parts hispid-pubescent ..... 17. *F. hispida.*
Male flowers with 2 stamens.
Receptacles pedunculate, all in fascicles from the stem or branches; basal bracts 3 (*Neomorphe*); a tree with alternate leaves ..... 18. *F. glomerata.*

1. **Ficus gibbosa,** *Blume, Bijdr.* (1825) p. 466. VAR. **parasitica,** *King, Sp. Fic.* (1888) p. 6, t. 2 b, fig. B. A small or sometimes a large tree often epiphytic or climbing, enclosing the trunks of trees in a network of branches or creeping along old walls and on the sides of wells. Leaves 3—6 in. long, thinly coriaceous, more or less rhomboid or subrhomboid, minutely hispid above, scabrid and minutely hispid beneath, obtuse, acute or acuminate, base acute, often unequal-sided; main nerves 3—7 pairs, prominent beneath, pale and shining; petioles ⅛—½ in. long; stipules ⅛—½ in. long, ovate-lanceolate, slightly curved. Receptacles pedunculate, solitary or in pairs or fascicled, axillary and from below the leaves, depressed-globose or globose-pyriform, mammillate, with rather a prominent umbilicus, minutely verrucose, subscabrid, without basal bracts, yellow when ripe, ⅛—⅓ in. across; peduncles ⅛—½ in. long, bracteate at the base. MALE FLOWERS: Only near the mouth of the receptacles containing gall flowers. Sepals 4—6, linear, fleshy, hairy. Stamen 1; filament short, united by its base to an abortive (insect-attacked) pistil. GALL FLOWERS: Perianth as in the male. Ovary globose, smooth; style short, lateral. FERTILE FLOWERS in separate receptacles. Sepals 4, slightly hairy. Style elongate, lateral. Achenes slightly papillose, obliquely ovoid. Fl. B. I. v. 5, p. 497; Prain, Beng. Pl. p. 972; Watt, Dict. Econ. Prod. v. 3, p. 351. *Ficus gibbosa,* Talb. Trees, Bomb. ed. 2, p. 326; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515. *F. parasitica* (sp.) Kœn. ex Willd. in Mém. Acad. Berol. 1798 (1801) p. 102; Bedd. For. Man. in Flor. Sylvat. p. ccxxiv. *F. Ampelos,* Kœn. in Roxb. Hort. Beng. (1814) p. 103 (*not* of Burm.); Wight, Icon. t. 652. *Urostigma Ampelos,*

Dalz. & Gibs. Bo. Fl. (1861) p. 315. *Urostigma volubile,* Dalz. & Gibs. Bo. Fl. (1861) p. 242.—Fruit ripe Apr.—May. VERN. *Dátir.*

Throughout the Presidency, tolerably common.—DISTRIB. India (Behar, Central India, W. Peninsula).

The leaves are used to polish ivory, and the root-bark is employed in native medicine. See Watt, Dict. Econ. Prod. l. c.

2. **Ficus bengalensis,** *Linn. Hort. Cliff.* (1737) p. 471, no. 4, & *Sp. Pl.* (1753) p. 1059. A very large tree reaching 100 ft. high, sending down many aërial roots from the branches and thus extending the growth of the tree indefinitely ; young parts softly pubescent. Leaves coriaceous, 4—8 by 2—5 in., ovate or orbicular-ovate to elliptic, obtuse, entire, glabrescent above, glabrous or minutely pubescent beneath, base rounded or subcordate, 3—7-nerved with about 5—7 pairs of lateral nerves above the basal ones and distinct reticulate venation between ; peduncles ½—2 in. long, stout ; stipules ¾—1 in. long, coriaceous. Receptacles about ¾ in. in diam., sessile in pairs, axillary, globose, puberulous, red when ripe, with 3 broad rounded nearly glabrous coriaceous basal bracts. MALE FLOWERS rather numerous near the mouth of the receptacles. Sepals 4, lanceolate. Stamen 1. GALL FLOWERS : Perianth as in the male. Style short. FERTILE FLOWERS : Perianth shorter than in the male. Style elongate. Fl. B. I. v. 5, p. 499 ; J. Commel. Hort. Med. Amstel. Rar. Pl. Hist. v. 1 (1697) p. 119, t. 62 ; Bedd. For. Man. in Flor. Sylvat. p. ccxxii ; King, Sp. Fic. p. 18, t. 13 & t. 81, fig. C ; Trim. Fl. Ceyl. v. 4, p. 86 ; Talb. Trees, Bomb. ed. 2, p. 326 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Prain, Beng. Pl. p. 973 ; Watt, Dict. Econ. Prod. v. 3, p. 343. *Ficus indica,* Linn. Amœn. Acad. ed. 3, v. 1, (1787) p. 27 ; Grah. Cat. p. 189. *Urostigma bengalense,* Gasp. Nov. Gen. Fic. p. 7 ; Wight, Icon. t. 1989 ; Dalz. & Gibs. p. 240.—Fruit ripe Apr.—June. VERN. *Wad.*

The tree, known to Anglo-Indians as the *Banyan-tree,* is widely planted, often near temples and shrines. It is an object of veneration among Hindus. From its property of extending indefinitely by means of its aërial roots many of the trees attain a large size. A celebrated tree known as the *Kabir Bar* grows on an island in the Narbada river opposite the village of Sukiltirat about 12 miles above Broach, and a very large tree may be found near Jaoli, a village in the Sattara Collectorate. The measurements of this latter tree taken in 1882 by Mr. (now Sir William) Lee Warner are given by Sir G. King (*l. c.*) and are as follows :—Circumference of head 1587 ft.; length from North to South 595 ft., and from East to West 442 ft. The plant is not found wild in the Bombay Presidency. Sir G. King states that it is "really wild only in the Sub-himalayan forests and on the lower slopes of the hill-ranges in Southern India."

3. **Ficus mysorensis,** *Heyne,* in *Roth. Nov. Pl. Sp.* (1821) p. 390. A tree with a shady head, often leafless when in ripe fruit (*Talbot*) ; aërial roots few, embracing the stem ; young branches with grey or rufous flocculent tomentum, afterwards glabrous ; stem usually short ; bark thick, grey, rough. Leaves coriaceous, 3½—8 by 2½—5 in., ovate or elliptic, shortly and abruptly acuminate, entire, glabrous and minutely dotted above, at first flocculent-tomentose, afterwards nearly glabrous beneath ; base rounded or cordate, 3—5-nerved, with 10—13 pairs of lateral nerves above the basal ones ; petioles stout, ¾—1¾ in. long ; stipules ¼—½ in. long, broadly

triangular, flocculent-tomentose. Receptacles sessile in pairs, axillary, oblong to subobovate, truncate or slightly depressed at the apex, flocculent-tomentose when young, nearly glabrous, 1 in. long, orange-red when ripe, with 3 broadly triangular blunt spreading basal bracts. MALE FLOWERS near the apex of the receptacle, rather numerous, pedicellate. Stamen 1 ; anther-cells sub-globular. Sepals 4. GALL FLOWERS broad, smooth. Style short, subterminal. FERTILE FLOWERS : Sepals 4. Style elongate, lateral. Achenes ovoid. Fl. B. I. v. 5, p. 500 ; Bedd. For. Man. in Flor. Sylvat. p. ccxxiii ; Trim. Fl. Ceyl. v. 4, p. 86 ; King, Sp. Fic. p. 19, t. 14 & t. 81, fig. D ; Talb. Trees, Bomb. ed. 2, p. 327 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Watt, Dict. Econ. Prod. v. 3, p. 356.—Fruit ripe Apr.—May. VERN. *Burali-Wad.*

KONKAN : along the Ghâts, *Talbot.* DECCAN : Lanoli, *Woodrow* ! S. M. COUNTRY : Dharwar, *Woodrow* ; Belgaum, *Ritchie,* 693 !—DISTRIB. India (Sikkim, Khasia Mountains, Birma, W. Peninsula) ; Ceylon.

VAR. *pubescens,* King, Sp. Fic. p. 20. Leaves smaller with fewer lateral nerves and often with repand margins ; tomentum denser, larger, more copious and of a deep rusty-red colour especially on the young parts. Fl. B. I. v. 5, p. 500. *Ficus pubescens* (sp.), Roth, Nov. Pl. Sp. (1821) p. 387. *Urostigma dasycarpum,* Miq. in Hook. Lond. Journ. Bot. v. 6 (1847) p. 574 ; Dalz. & Gibs. p. 242.

Dalzell without locality in Herb. Kew: ! KONKAN : *Dalzell & Gibson, Law* ! KANARA : *Law* !

4. **Ficus tomentosa,** *Roxb. Hort. Beng.* (1814) p. 103. A large shady tree with thin aërial roots from the branches ; young parts clothed with rusty-grey tomentum ; bark white, scaly. Leaves crowded towards the ends of the branches, coriaceous, 2—5 by 1—3 in., ovate-elliptic or obovate-elliptic, bluntly apiculate, entire, glabrous or nearly so and dotted above, softly and densely rusty-grey tomentose beneath, base rounded or cordate, 3—7-nerved, with about 5 pairs of lateral nerves above the basal ones ; petioles ¾—1 in. long ; stipules ⅓—½ in. long, densely woolly on the back. Receptacles sessile in pairs, axillary, pisiform, grey-tomentose, ¼—⅝ in. in diam. ; apical scales small, glabrous ; basal bracts 3, large, spreading, pubescent, sometimes 3-fid when young. MALE FLOWERS few, near the mouth of the receptacle. Sepals 4, lanceolate. Stamen 1. GALL FLOWERS : Sepals 4, shorter than the ovary. Ovary smooth ; style short. FERTILE FLOWERS : Sepals 4, shorter than the ovary. Style elongate. Achenes tuberculate. Fl. B. I. v. 5, p. 501 ; Wight, Icon. t. 647 ; Bedd. For. Man. in Flor. Sylvat. p. ccxxiii ; King, Sp. Fic. p. 22, t. 18 & t. 81, fig. G ; Trim. Fl. Ceyl. v. 4, p. 87 ; Talb. Trees, Bomb. ed. 2, p. 327 ; Prain, Beng. Pl. p. 973.—Fruit ripe Mar.—Apr. VERN. *Kallu-goli.*

KONKAN : near the coast, *Talbot.* S. M. COUNTRY : on sandstone rocks near Badami, *Talbot.* KANARA : Yellapur, *Talbot,* 509 ! ; Karwar, *Talbot* ! ; Kâla naddi, *Ritchie,* 1378 !—DISTRIB. India (Gangetic plain, Behar, Central India) ; Ceylon.

5. **Ficus retusa,** *Linn. Mantiss.* (1767) p. 129. A moderate-sized shady tree, all parts glabrous ; aërial roots usually few, sometimes

absent (*Talbot*). Leaves coriaceous, 2—4 in. long and nearly as broad, elliptic, ovate or obovate, rounded or shortly and bluntly acuminate at the apex, polished and shining, base narrowed into the petiole, 3-nerved, with 5—6 pairs of main lateral nerves above the basal ones, not more prominent than the secondary nerves, reticulately veined between ; petioles ¼—½ in. long ; stipules lanceolate, ⅖ in. long. Receptacles small, about ⅓ in. in diam., sessile in pairs, axillary or from the scars of fallen leaves, depressed-globose, smooth, yellow or reddish when ripe ; basal bracts 3, broadly ovate, blunt, spreading, persistent. MALE FLOWERS numerous, scattered, sessile or shortly pedicellate. Sepals 3, subspathulate. Stamen 1 ; filament as long as the cordate apiculate anther. GALL FLOWERS sessile or pedicellate. Sepals 3, oblong or broadly spathulate. Style short. FERTILE FLOWERS usually sessile. Sepals 3, much shorter than in the gall flowers. Style short ; stigma cylindric or clavate. Achenes ovoid or obovoid. Fl. B. I. v. 5, p. 511 ; Bedd. For. Man. in Flor. Sylvat. p. ccxxiii ; King, Sp. Fic. p. 50, t. 61 & t. 84, fig. P ; Trim. Fl. Ceyl. v. 4, p. 89 ; Talb. Trees, Bomb. ed. 2, p. 328 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Watt, Dict. Econ. Prod. v. 3, p. 360. *Ficus Benjamina*, Willd. Sp. Pl. v. 4, p. 1143 (*not* of Linn.) ; Roxb. Fl. Ind. v. 3, p. 550 ; Grah. Cat. p. 191. *Urostigma nitidum*, Miq. in Hook. Lond. Journ. Bot. v. 6 (1847) p. 582 ; Dalz. & Gibs. p. 242. *Urostigma retusum*, Gasp. Nov. Gen. Fic. (1844) p. 7 ; Dalz. & Gibs. p. 241—VERN. *Nándruk*.

Throughout the Bombay Presidency, often planted as a roadside tree, a purpose for which it is well adapted owing to the dense shade it affords.

6. **Ficus Talboti,** *G. King, Sp. Fic. in Ann. Roy. Bot. Gard. Calc.* v. 1 (1888) p. 51, t. 63 & t. 84, fig. Q. A large tree, all plants glabrous ; milky juice abundant, that of the young branches yellowish (*Talbot*) ; bark grey, smooth. Leaves thinly coriaceous, 3½—4 in. long, ovate or elliptic, shortly caudate-acuminate, entire, smooth and shining, base narrowed, 3—5-nerved ; main lateral nerves 6—9 pairs above the basal ones, rather promient on both surfaces ; petioles ¾—1 in. long ; stipules ovate, ¼ in. long. Receptacles sessile in pairs, axillary, obovoid, rather depressed at the apex, smooth, about ¼ in. across, when ripe greenish-yellow, dotted (*Talbot*), basal bracts 3, ovate, acute. MALE FLOWERS few, only near the mouth of the receptacle, sessile. Sepals 3, broadly ovate. Stamen 1 ; filament short. GALL FLOWERS sessile or pedicellate. Sepals 3, lanceolate. Ovary ovoid, narrowed at each end ; style terminal. FERTILE FLOWERS : Perianth as in the gall flowers. Style short, lateral. Achenes ovoid or obovoid, minutely tuberculate. Fl. B. I. v. 5, p. 512 ; Talb. Trees, Bomb. ed. 2, p. 328 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515.—Fruit ripe Dec.—Jan.

S. M. COUNTRY : evergreen forests of Belgaum, *Talbot*. KANARA : Southern Ghâts of N. Kanara, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

7. **Ficus nervosa,** *Heyne, in Roth, Nov. Pl. Sp.* (1821) p. 388. A very large tree without aërial roots (*Talbot*) ; milky juice pearly white (*Talbot*) ; trunk cylindric ; bark smooth, dark-colored ; young

parts minutely appressedly pubescent. Leaves thinly coriaceous, 3½—8 by 1½—3 in., elliptic, oblong-lanceolate to obovate-elliptic or oblanceolate, abruptly and narrowly acuminate, the acumen ½—1 in. long, with entire slightly undulate and revolute margins, shining on both surfaces, the lower minutely tuberculate, base narrowed (rarely rounded), subequilateral, 3—5-nerved, lateral main nerves 7—10 pairs, nearly at right angles to the midrib, prominent beneath ; petioles ½—¾ in. long ; stipules lanceolate or ovate-lanceolate, membranous, puberulous, about ½ in. long. Receptacles pedunculate in pairs, axillary, slightly verrucose when young, when ripe yellow, depressed-globose, ¼—¾ in. in diam., puberulous ; peduncles ½—⅝ in. long, slender, pubescent ; bracts at base of receptacle 0, at base of peduncle 3, small, ovate-rotund, pubescent. MALE FLOWERS few, only near the mouth of the receptacle. Sepals 2, unequal, spathulate. Stamen 1 ; anther single, attached by a filament as long as itself to one of the sepals. GALL FLOWERS sessile or pedicellate. Sepals 3, elongate, acuminate. Ovary ovoid, smooth ; style short. FERTILE FLOWERS usually sessile. Sepals 3, lanceolate. Achenes ovoid, acuminate. Style twice as long as the achene ; stigma clavate. Fl. B. I. v. 5, p. 512 ; Bedd. For. Man. in Flor. Sylvat. p. ccxxiii ; King, Sp. Fic. p. 53, t. 65 ; Trim. Fl. Ceyl. v. 4, p. 89 ; Talb. Trees, Bomb. ed. 2, p. 328 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Prain, Beng. Pl. p. 974—Fruit ripe Feb.

KONKAN : *Stocks* !, *Law* ! DECCAN : Lanoli, *Woodrow*. KANARA : evergreen forests of N. Kanara from Supa southwards, *Talbot* ; Kadgal (N. Kanara), *Talbot*, 245 !—DISTRIB. India (Sikkim and Bhutan Himalaya, Khasia, Assam, Birma, W. Peninsula) ; Ceylon, Malayan Peninsula and Archipelago, China.

The figure 660 in Wight's 'Icones' has been incorrectly cited by Sir G. King (*l. c.*) and in the 'Flora of British India' as *Ficus nervosa*. The figure in the 'Icones' is that of *Ficus angustifolia*, Roxb. (non *F. glaberrima*, Blume). Wight's figure agrees with Roxburgh's unpublished drawing.

In the 'Flora of British India' (*l. c.*) a curious mistake occurs which has been perpetuated in Trimen's 'Flora of Ceylon' (*l. c.*). The leaves are said to be ½—1 in. long. Sir G. King (*l. c.*) describes the *acumen* of the leaves as ½—1 in. long, and this measurement has been apparently taken for the *blade* in the publications named.

8. **Ficus Rumphii,** *Blume, Bijdr.* (1825) p. 437. A moderate-sized deciduous tree at first usually epiphytic, all parts glabrous. Leaves subcoriaceous, 3—6 by 2—3¾ in., broadly ovate, with an acumen ⅓—⅛ as long as the blade, and entire subundulate margins, glabrous, shining, base broad, truncate, slightly narrowed towards the petiole (rarely subcordate), 5-nerved ; lateral main nerves 3—6 pairs, rather irregular, prominent only in the young leaves which are red just after unfolding, the venation between the nerves finely reticulate ; petioles 2½—3½ in. long ; stipules ovate-lanceolate, ½—1 in. long. Receptacles sessile, in pairs, axillary or from old scars, globular, not depressed at the apex, smooth, ½ in. in diam. when ripe, when young whitish with dark spots, when ripe nearly black ; basal bracts 3, rotund, small. MALE FLOWERS few, only near the mouth of the receptacle. Sepals 3, spathulate. Stamen 1 ; anther single on a filament as long as itself. GALL and FERTILE FLOWERS : Sepals 3, lanceolate ; gall ovary smooth, usually obovoid. Achenes

minutely tuberculate, mucilaginous. Style in both elongate ; stigma clavate. Fl. B. I. v. 5, p. 512 ; King, Sp. Fic. p. 54, t. 67 B & t. 84, fig. T ; Talb. Trees, Bomb. ed. 2, p. 328 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Prain, Beng. Pl. p. 974 ; Watt, Dict. Econ. Prod. v. 3, p. 361. *Ficus cordifolia,* Roxb. Fl. Ind. v. 3 (1832) p. 548 (*not* of Blume) ; Wight, Icon. t. 640. *Urostigma cordifolium,* Miq. in Hook. Lond. Journ. Bot. v. 6 (1847) p. 564.—Fruit ripe May—June. VERN. *Pair ; Ashta.*

KONKAN : Western Ghâts, *Woodrow, Dalzell & Gibson.* DECCAN : Khandala, pretty common, *Graham*; Mahableshwar, *Cooke!, H. M. Birdwood.*—DISTRIB. India (Panjáb, N. India, Assam, Birma, Central India, W. Peninsula); Malayan Peninsula and Archipelago.

9. **Ficus religiosa,** *Linn. Sp. Pl.* (1753) p. 1059. A large glabrous usually epiphytic tree. Leaves coriaceous, 4—7 by 3—4 in., ovate-rotund, narrowed upwards and the apex produced into a linear-lanceolate tail about ½ as long as the main portion of the blade (⅓ as long as the whole blade), entire, base broad, rounded, truncate, sometimes in young leaves cordate, 5—7-nerved ; lateral main nerves about 8 pairs with finely reticulate venation between ; petioles 3—4 in. long, slender ; stipules minute, ovate, acute. Receptacles in pairs, axillary, sessile, smooth, depressed-globose, ½ in. in diam. ; dark-purple when ripe ; basal bracts broad, spreading. MALE FLOWERS few, only near the mouth of some receptacles (absent in others), sessile. Sepals 3, broadly ovate. Stamen 1 ; anther single, ovate-rotund ; filament short. GALL and FERTILE FLOWERS sessile or pedicellate, the gall flowers much more numerous than the fertile females, many of them without perianth. Sepals 5, lanceolate. Style short, lateral ; stigma rounded. Fl. B. I. v. 5, p. 513 ; Bedd. Flor. Sylvat. t. 314 ; Grah. Cat. p. 190 ; King, Sp. Fic. p. 55, t. 67 A & t. 84, fig. U ; Talb. Trees, Bomb. ed. 2, p. 328 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Prain, Beng. Pl. p. 974 ; Watt, Dict. Econ. Prod. v. 3, p. 357. *Urostigma religiosum,* Gasp. Ricer. Caprif. (1845) p. 82, t. 7, figs. 1—5 ; Wight, Icon. t. 1967 ; Dalz. & Gibs. p. 241.—Fruit ripe May—July. VERN. *Pipal.*

Universally planted but not wild in the Bombay Presidency. According to Sir George King it is truly wild in the Subhimalayan forests, in Bengal, and in Central India. The tree is held in great veneration by the Hindus. It is extremely destructive to neglected buildings; when once rooted in the joints of the masonry it rapidly disrupts them.

10. **Ficus Arnottiana,** *Miq. Ann. Mus. Lugd. Bat.* v. 3 (1867) p. 287. A glabrous tree or shrub. Leaves subcoriaceous, 3—8 by 2—6 in., broadly ovate, narrowed upwards to the shortly caudate-acuminate apex, with entire margins, base usually cordate, never narrowed to the petiole, 7-nerved ; lateral main nerves 5—7 pairs, with minute lucid reticulation between ; petioles 2—6 in. long ; stipules ovate-lanceolate, ½—1 in. long, caducous, reddish-brown when dried. Receptacles mostly from the axils of fallen leaves, in pairs or clusters from tubercles, sessile or shortly pedunculate, depressed-globose, smooth, ½—⅝ in. in diam., purple with greenish dots when ripe ; basal bracts 3, brown, membranous ; peduncles when present $\frac{1}{10}$—¼ in. long. MALE FLOWERS few, near the mouth of the

receptacles, sessile. Sepals 3, loose, inflated, broadly acuminate, larger than the small subsessile solitary anther. GALL and FERTILE FLOWERS undistinguishable except by the contents of the ovary, sessile or pedicellate, the perianth gamophyllous, lax, toothed at the apex, completely investing the ovary. Style elongate ; stigma flat. Fl. B. I. v. 5, p. 513 ; King, Sp. Fic. p. 56, t. 68 & t. 84, fig. V ; Trim. Fl. Ceyl. v. 4, p. 90 ; Talb. Trees, Bomb. ed. 2, p. 329 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Prain, Beng. Pl. p. 974. *Urostigma cordifolium,* Dalz. & Gibs. p. 242 (*not* of Miq.). *Ficus cordifolia,* Grah. Cat. p. 192 (*not* of Roxb.).—Fruit ripe Feb.—Apr. VERN. *Pair.*

KONKAN : on rocks near the coast, *Talbot;* W. Ghâts, *Woodrow, Dalzell & Gibson;* Matheran, *Cooke* ! ; Khandala, *Graham.* KANARA : on rocks on the coast and also in moist forests, *Talbot;* Kumpta, near the Yena rocks, *Talbot.* —DISTRIB. India in rocky places (Rajputana, Central Provinces, Behar, W. Peninsula) ; Ceylon.

11. **Ficus Tsjakela,** *Burm. Fl. Ind.* (1768) p. 227. A large glabrous tree without aërial roots, leafless for a time during the dry season ; bark rough, dark-colored. Leaves very glossy above, coriaceous, 3—7½ by 1½—3 in., ovate-oblong, shortly and abruptly acuminate, with entire slightly undulate margins, base broad, rounded or subtruncate, 3—5-nerved ; lateral main nerves 7—10 pairs, slightly prominent on both surfaces ; petioles 1—2¼ in. long, slender ; stipules small, ovate-lanceolate, ½ in. long ; leaf-scales of the young branches large, linear-lanceolate, flaccid, caducous, 3—5 in. long. Receptacles in clusters of 2—6, on very short crowded tubercles (abortive branchlets), in the axils of the leaves or more frequently in the axils of the scars of fallen leaves, sessile (rarely very shortly pedunculate), depressed-globose, ⅓ in. in diam., whitish-yellow, dotted when ripe ; basal bracts 3, broad, deeply 2-fid. MALE FLOWERS few, near the mouth of the receptacle, sessile. Sepals 3, ovate, shorter than the single stamen. Filaments as long as or longer than the ovate anther. GALL and FERTILE FLOWERS alike except as regards the contents of the ovary. Sepals 3—4. Fertile achenes obovate. Style elongate ; stigma cylindric. Fl. B. I. v. 5, p. 514 ; King, Sp. Fic. p. 57, t. 70 & t. 84, fig. X ; Trim. Fl. Ceyl. v. 4, p. 91 ; Talb. Trees, Bomb. ed. 2, p. 329 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515. *Ficus infectoria,* Willd. Sp. Pl. v. 4 (1805) p. 1137 (*not* of Roxb.). *Ficus venosa,* Ait. Hort. Kew. ed. 1, v. 3 (1789) p. 451 (*not* of Willd.).—Fruit ripe Mar.—May. VERN. *Kel.*

Stocks without locality in Herb. Kew. KANARA : abundant in the forests of Yellapur and generally on the Ghâts of N. Kanara, *Talbot;* Sirsi, *Woodrow.*—DISTRIB. India (W. Peninsula) ; Ceylon.

12. **Ficus Tsiela,** *Roxb. Fl. Ind.* v. 3 (1832) p. 549. A large spreading tree without aërial roots, all parts glabrous. Leaves thinly coriaceous, 3—6 by 1½—3½ in., broadly ovate or elliptic-lanceolate, acute or obtusely cuspidate, with entire margins, base narrowed or rounded, 3-nerved ; main lateral nerves (indistinct till the leaf is dry) about 8—10 pairs with reticulate venation between ; petioles 1½—2 in. long ; stipules ½—1 in. long, ovate, acuminate. Receptacles crowded towards the ends of the branches, axillary or from

leaf-scars, sessile, globose, about ½ in. in diam., smooth and purple when ripe ; basal bracts 3, minute, broadly ovate, scarious. MALE FLOWERS sessile. Sepals 3, ovate, acuminate, longer than the single stamen ; anther broadly ovate ; filament thick, clavate, larger than the anther. GALL and FERTILE FLOWERS : Sepals 3, ovate. Achenes ovoid-reniform, the fertile broader than the gall ones. Style in both long ; stigma very long, cylindric. Fl. B. I. v. 5, p. 515 ; Grah. Cat. p. 191 ; King, Sp. Fic. p. 59, tt. 73, 74 & t. 84, fig. Z, 2 ; Trim. Fl. Ceyl. v. 4, p. 92 ; Talb. Trees, Bomb. ed. 2, p. 329 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Watt, Dict. Econ. Prod. v. 3, p. 362. *Ficus Tsiala,* Wight, Icon. t. 668 ; Bedd. Flor. Sylvat. t. 314. *Urostigma pseudo-Tjiela,* Miq. in Hook. Lond. Journ. Bot. v. 6 (1847) p. 566 ; Dalz. & Gibs. p. 241.—Fruit ripe Apr.—Oct. VER. *Pipri.*

Stocks without locality in Herb. Kew.! Western Peninsula from the Konkan southwards. Widely planted as a roadside or avenue tree, for which it is well adapted.—DISTRIB. India (Central Provinces, W. Peninsula); Ceylon.

13. **Ficus infectoria,** *Roxb. Fl. Ind.* v. 3 (1832) p. 551 (*exclud. Syn. Rheede*) (*not* of Willd.). A large spreading deciduous fast-growing tree, all parts glabrous ; bark grey, smooth, scaly. Leaves membranous, 3½—5 by 2—2½ in., ovate or ovate-oblong, shortly and rather abruptly acuminate, with entire, subundulate margins ; base usually rounded, slightly cordate, or sometimes narrowed or acute, 3-nerved ; lateral main nerves 5—7, not very prominent ; petioles 1½—2¼ in. long, sometimes indistinctly joined with the blade ; stipules about ½ in. long, broadly ovate, acute, pubescent. Receptacles axillary, in pairs, sessile, globose, ¼ in. diam., whitish, flushed with red and dotted when ripe ; basal bracts 3, ovate-rotund, minute. MALE FLOWERS few, sessile near the mouth of the receptacles. Stamen 1 ; anther broadly ovate ; filament short. Sepals 4 or 5. GALL and FERTILE FLOWERS : Perianth as in the male. Style of fertile female flowers long, of the gall flowers short ; stigma elongate. Fl. B. I. v. 5, p. 515 ; Grah. Cat. p. 191 ; Bedd. For. Man. in Flor. Sylvat. p. ccxxii (*exlud. syn.*) ; Wight, Icon. t. 665 ; King, Sp. Fic. p. 60, t. 75 & t. 84, fig. Y, 2 ; Trim. Fl. Ceyl. v. 4, p. 92 ; Talb. Trees, Bomb. ed. 2, p. 329 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Prain, Beng. Pl. p. 975 ; Watt, Dict. Econ. Prod. v. 3, p. 355. *Ficus lacor,* Buch.-Ham. in Linn. Trans. v. 15 (1827) p. 150. *Urostigma infectorium,* Miq. Fl. Ind. Bat. v. 1, part 2 (1859) p. 339 ; Dalz. & Gibs. p. 241.—VERN. *Bassári ; Pipli.*

KONKAN : *Law!, Stocks!, Dalzell & Gibson.* KANARA : *Talbot.* Often planted along roadsides in the Presidency, but not very common in a wild state.—DISTRIB. India(plains and lower hills, Bengal, Assam, Birma, E. and W. Peninsulas) ; Ceylon, Malaya.

The oldest name for this plant is *Ficus lacor,* Buch.-Ham. (1825), for although Roxburgh has published *Ficus infectoria* as a species in Hort. Beng. (1814) p. 66, he has there founded the species on Rheede, Hort. Mal. v. 3, p. 64, which is *Ficus Tsjakela.*

VAR. 1. *Lambertiana,* King, Sp. Fic. p. 63, t. 76. Leaves more coriaceous, the base broad, rounded, emarginate or subcordate

(rarely narrowed); receptacles $\frac{1}{3}$—$\frac{2}{3}$ in. in diam. on pubescent peduncles $\frac{1}{3}$—$\frac{1}{2}$ in. long. Fl. B. I. v. 5, p. 516; Prain, Beng. Pl. p. 975. *Ficus Lambertiana* (Sp.), Miq. Ann. Mus. v. 3, p. 286. *Urostigma Lambertianum,* Miq. in. Hook. Lond. Journ. Bot. v. 6 (1847) p. 565; Dalz. & Gibs. p. 241.

KONKAN: *Law*!, *Stocks*!, *Lambert.* KANARA: *Talbot;* on the Kála naddi near Jagalbet, *Ritchie,* 685!

VAR. 2. *Wightiana,* King, Sp. Fic. p. 63, t. 77. Leaves smaller than in the type (often only $2\frac{1}{2}$ in. long), narrowed at the base. Receptacles large for the size of the leaves, on glabrous or pubescent peduncles about $\frac{1}{2}$ in. long. Fl. B. I. v. 5, p. 516. *Ficus Wightiana* (sp.), Wall. Cat. 4540; Bedd. For. Man. in Flor. Sylvat. p. ccxxii.

KANARA: southern parts of N. Kanara, *Talbot.*

14. **Ficus callosa,** *Willd. in Mém. Acad. Berl.* (1798) p. 102. A large evergreen tree 40—60 ft. high, with pearly-white juice and without aërial roots; branchlets hoary, warted. Leaves 4—9 by 2—$5\frac{1}{2}$ in. (in barren shoots often 12 in. long or more), of a rigid hard coriaceous texture, elliptic, obtuse, or with a short blunt acumen, with entire slightly recurved margins, smooth and shining above, beneath pale, pubescent when young, scaberulous but glabrous when old, strongly reticulate, base broad, rounded or sometimes slightly narrowed to the petiole, 3—5-nerved; lateral main nerves 5—12 pairs, thin, but prominent below, as are the reticulations; petioles $1\frac{1}{4}$—2 in. long; stipules ovate-lanceolate, nearly $\frac{1}{2}$ in. long, pubescent. Receptacles pedunculate, solitary, axillary, subglobose, when ripe yellow and 1—$1\frac{1}{4}$ in. in diam., slightly depressed at top and contracted at the base into a short stalk, at the junction of which with the peduncle are 3 broadly ovate pubescent bracts; peduncle $\frac{3}{4}$ in. long, pubescent or scabrid; flowers intermixed with numerous ovate-lanceolate bracteoles which rise from the interior of the receptacle along with them. MALE FLOWERS rather numerous, scattered, pedicellate. Sepals 3, spathulate. Stamens 1 or 2; filaments short, slender; anthers small, ovate. GALL and FERTILE FLOWERS similar. Perianth deeply 3—4-cleft; segments broadly lanceolate. Style elongate; stigma deeply 2-fid. Ripe achenes obovoid. Fl. B. I. v. 5, p. 516; King, Sp. Fic. p. 64, t. 85 & t. 84, fig. V, 2; Trim. Fl. Ceyl. v. 4, p. 93; Talb. Trees, Bomb. ed. 2, p. 330; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515.—Fruit ripe June—July.

KANARA: N. Kanara, *Talbot,* 414!, *Woodrow*; Usheli (N. Kanara), *Ritchie*! —DISTRIB. India (Birma, Andamans, W. Peninsula); Ceylon, Java.

15. **Ficus heterophylla,** *Linn. f. Suppl.* (1781) p. 442. A shrub, sometimes creeping along the ground or over rocks; branchlets shortly pubescent. Leaves polymorphous, petiolate, membranous, ovate or orbicular-ovate to lanceolate, more or less acuminate, entire or 3—many-lobed, both surfaces scabrous, the margins irregularly and coarsely toothed or repand-dentate, base rounded or cordate, 3—5-nerved; lateral main nerves 4—8 pairs, arched, or in much-lobed leaves palmate; petioles $\frac{1}{2}$—$2\frac{1}{2}$ in. long; stipules 2 to each leaf, $\frac{1}{3}$—$\frac{1}{2}$ in. long, ovate, scarious. Receptacles pedunculate, solitary,

axillary, spherical or pyriform, more or less hispid scabrid or warted when young, when ripe nearly smooth, dark-orange, always with a more or less prominent mammillate umbilicus which is imperfectly closed by bracts ; peduncles ½—1 in. long ; bracts basal or high up on the peduncle, minute, triangular, glabrous. Perianth of all flowers 3—4-cleft. MALE FLOWERS : Stamen 1. GALL FLOWERS : Ovary ovoid, smooth ; style short, lateral. FERTILE FLOWERS : Perianth hyaline, viscid, tuberculate. Achenes subglobose. Style long, lateral ; stigma cylindric. Fl. B. I. v. 5, p. 518 ; Grah. Cat. p. 191 ; Dalz. & Gibs. p. 243 ; Wight, Icon. t. 659 ; King, Sp. Fic. p. 75, t. 94 ; Trim. Fl. Ceyl. v. 4, p. 93 ; Talb. Trees, Bomb. ed. 2, p. 330 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Prain, Beng. Pl. p. 975 ; Watt, Dict. Econ. Prod. v. 3, p. 353. *Ficus acutiloba,* Miq. in Hook. Lond. Journ. Bot. v. 7 (1848) p. 227 ; Dalz. & Gibs. p. 243.—Fruit ripe May—June.

Throughout the Presidency along the banks of streams and rivers. KONKAN : *Stocks* !, *Law* ! ; Malabar Hill (Bombay), *Graham, Dalzell.* DECCAN : Poona, *Woodrow.* S. M. COUNTRY : Belgaum, *Ritchie,* 1377 ! KANARA : N. Kanara, *Talbot.*—DISTRIB. India (throughout the hotter parts, usually near water) ; Ceylon, Malay Islands.

16. **Ficus asperrima,** *Roxb. Fl. Ind.* v. 3 (1832) p. 554. A shrub or small tree without aërial roots ; young parts scabrous ; bark white, smooth. Leaves crowded about the extremities of the branchlets, 1½—5 by ⅝—2¾ in., alternate, petiolate, oblong-lanceolate to ovate or obovate or elliptic, entire (very rarely irregularly 3-lobed)*, blunt or acuminate, serrate, toothed or crenate in the upper part, scabrid and hispid on both surfaces, base usually rounded, 3-nerved ; lateral main nerves 3—5 pairs, very prominent and hispid on the lower surface as are the reticulations ; petioles ⅜—1¼ in. long ; stipules minute. Receptacles solitary, pedunculate, globose, ½—⅞ in. in diam., slightly depressed at the apex, when ripe yellow or purple with yellowish dots, scabrous-hispid, with rather a prominent umbilicus ; basal bracts 0 ; peduncles ⅛—¼ in. long. MALE FLOWERS numerous in the upper part of the receptacles. Sepals 4—5, linear-lanceolate, scabrid. Stamen 1. GALL FLOWERS : Sepals as in the male. Ovary ovoid-lanceolate ; style thick, terminal ; stigma dilated. FERTILE FLOWERS : Sepals 6—7, linear-lanceolate, smooth. Achenes elongate, obovoid, minutely tuberculate. Style lateral, filiform ; stigma obovoid. Fl. B. I. v. 5, p. 522 ; Grah. Cat. p. 191 ; Dalz. & Gibs. p. 243 ; Wight, Icon. t. 633 ; Bedd. For. Man. in Flor. Sylvat. p. ccxxiv ; King, Sp. Fic. p. 80, t. 100 ; Trim. Fl. Ceyl. v. 4, p. 94 ; Talb. Trees, Bomb. ed. 2, p. 330 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Watt, Dict. Econ. Prod. v. 3, p. 343.—Fruit ripe Mar.—Apr. VERN. *Karvat.*

KONKAN : *Stocks* !, *Law* !, *Graham, Talbot* ; Bombay, common, *Dalzell & Gibson* ; Marmagão, *Cooke* ! DECCAN : Fitzgerald Ghát below Mahableshwar, *Cooke* ! S. M. COUNTRY, Rámghát, *Ritchie,* 691 ! KANARA : moist forests of

* I have collected at Marmagão a specimen (no doubt a sport) with irregularly 3-lobed leaves.

N. Kanara, common, *Talbot*.—DISTRIB. India (Central India, W. Peninsula); Ceylon.

The leaves are used as sandpaper to polish wood and ivory.

17. **Ficus hispida,** *Linn. f. Suppl.* (1781) p. 442. A shrub or small tree, all parts more or less hispid-pubescent. Leaves usually opposite, petiolate, membranous, 4—12 by 2—6 in., ovate, oblong, or subobovate, apiculate or shortly and abruptly acuminate, toothed or entire, the lower surface hispid-pubescent, the upper hispid-scabrid, base rounded, subcordate or subcuneate, 3—5-nerved; lateral main nerves 3—5 pairs with fine reticulations between; petioles ½—1½ in. long (in young shoots 3—3½ in. long), densely hispid; stipules 2 to each leaf, ovate-lanceolate, pubescent outside, about ½ in. long. Receptacles ½—1 in. across, turbinate, obovoid or subpyriform, yellowish when ripe, slightly umbonate, hispid and sometimes with bracts scattered along the sides, on peduncles ⅛—⅜ in. long in pairs from the axils of the leaves, or in fascicles from shortened tuberculate branches from the old wood, or in pairs or fascicles on elongate stipular bracteate sometimes leafy branches issuing from the larger branches and stem and often reaching to or even penetrating the soil (*F. dæmonum,* Kœn.); basal bracts 3. MALE FLOWERS rather numerous, near the apex of the receptacle containing the galls. Sepals 3, concave, hyaline. Stamen 1; anther broad; filament short. GALL FLOWERS pedicellate. Perianth 0. Ovary smooth, globose; style short, subterminal; stigma dilated. FERTILE FLOWERS: Perianth 0 (Beddome says it is thin and transparent and easily overlooked). Achenes ovoid; style lateral; stigma cylindric, tubular. Fl. B. I. v. 5, p. 522; Bedd. For. Man. in Flor. Sylvat. p. ccxxiv; King, Sp. Fic. p. 116, tt. 154 & 155; Trim. Fl. Ceyl. v. 4, p. 94; Talb. Trees, Bomb. ed. 2, p. 330; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515; Prain, Beng. Pl. p. 976; Watt, Dict. Econ. Prod. v. 3, p. 354. *Ficus oppositifolia,* Willd. Sp. Pl. v. 4 (1805) p. 1151; Wight, Icon. t. 638; Grah. Cat. p. 191. *Covellia oppositifolia,* Gasp. Ricer. Caprif. (1845) p. 85; Dalz. & Gibs. p. 243. *Covellia dæmonum,* Miq. in Hook. Lond. Journ. Bot. v. 7 (1848) p. 462; Dalz. & Gibs. p. 244. *Ficus dæmonum,* Kœn. in Vahl, Enum. Pl. v. 2 (1806) p. 198; Roxb. Fl. Ind. v. 3 (1832) p. 562 (*dæmona*); Grah. Cat. p. 192; Wight, Icon. t. 641.—Fruit ripe Apr.—July. VERN. *Kála-umbar*; *Bokeda.*

KONKAN: *Stocks*!, *Woodrow*; Bombay, *Graham.* DECCAN: Khandala, *Graham.* S. M. COUNTRY: Rámghát, *Ritchie,* 687!; Belgaum, *Ritchie,* 1379! KANARA: banks of rivers and moist situations in N. Kanara, common in the moist forests near Karwar and along the coast, *Talbot*.—DISTRIB. More or less throughout India; Ceylon.

18. **Ficus glomerata,** *Roxb. Cor. Pl.* v. 2 (1798) p. 13, t. 123. An evergreen tree 50—60 ft. high; young shoots glabrous, pubescent or scaberulous. Leaves 3—6 by 1¼—2½ in., ovate-oblong or elliptic-lanceolate, tapering to a bluntish point at the apex, with entire margins, glabrous on both surfaces when mature, base acute or rounded, 3-nerved; lateral main nerves 4—6 pairs; petioles ½—1½ in. long, glabrous; stipules ¾ in. long, ovate-lanceolate, scarious, pubescent. Receptacles shortly pedunculate, on short leafless warted

branches often only a few inches long which issue from the stem and larger branches, much contracted at the base when young, subglobose, pyriform or subturbinate, 1¼ in. across, smooth or pubescent, red when ripe, with depressed umbilicus (edible but usually full of worms) ; basal bracts 3, ovate-triangular ; male, female, and gall flowers together in one receptacle, the male flowers forming a zone near the mouth, the fertile female flowers forming a layer near the walls of the receptacle, and the gall flowers a more internal layer. MALE FLOWERS sessile. Sepals 3—4, membranous, inflated, enveloping the 2 elongate ovate anthers ; filaments connate. GALL FLOWERS pedicellate. Perianth gamophyllous, irregularly toothed, covering only the base of the rough ovoid ovary. Style lateral, elongate ; stigma clavate. FERTILE FLOWERS subsessile. Perianth gamophyllous, with 4 or 5 long lanceolate teeth enveloping the small minutely tuberculate achene. Style subterminal ; stigma clavate. Fl. B. I. v. 5, p. 535 ; Grah. Cat. p. 190 ; Wight, Icon. t. 667 ; Bedd. For. Man. in Flor. Sylvat. p. ccxxiv ; King, Sp. Fic. p. 173, t. 218 A ; Trim. Fl. Ceyl. v. 4, p. 96 ; Talb. Trees, Bomb. ed. 2, p. 331 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516 ; Prain, Beng. Pl. p. 978 ; Watt, Dict. Econ. Prod. v. 3, p. 351. *Covellia glomerata,* Miq. in Hook. Lond. Journ. Bot. v. 7 (1848) p. 465 ; Dalz. & Gibs. p. 243.—Fruit ripe at different times of the year. VERN. *Umbar.*

Common throughout the Presidency near village, along roadsides and near streams and rivers.—DISTRIB. Throughout India ; Ceylon.

Ficus scandens, Roxb. Hort. Beng. (1814) p. 65. A large rooting climber, a native of the Subhimalayas, Behar, Khasia Hills, and Birma, occasionally cultivated in gardens. Fl. B. I. v. 5, p. 526 ; King, Sp. Fic. p. 129, t. 162 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Prain, Beng. Pl. p. 977.

Ficus elastica, Roxb. Hort. Beng. (1814) p. 65. A large glabrous usually epiphytic tree, with aërial roots and large coriaceous, shining, closely parallel-nerved leaves 5—10 in. long, with pink stipules reaching sometimes 6 in. long. The receptacles are enclosed while young by hooded involucres which fall off, leaving a saucer-shaped basal cup under the receptacle. The *Indian Caoutchouc Tree,* a native of the outer Himalaya, Assam, Khasia Hills, Birma, and the Malayan Archipelago, sometimes grown as an ornamental tree in gardens in Bombay and Poona. Fl. B. I. v. 5, p. 508 ; Grah. Cat. p. 190 ; Dalz. & Gibs. Suppl. p. 79 ; King, Sp. Fic. p. 45, t. 54 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515, & Gard. in Ind. ed. 5, p. 454 ; Watt, Dict. Econ. Prod. v. 3, p. 350.

Ficus carica, Linn. Sp. Pl. (1753) p. 1059. A middle-sized deciduous tree said to be indigenous in Syria and Palestine, with cordate 3—5-nerved dentate and more or less deeply lobed leaves 4—8 in. long, grown for its edible fruit. It is not very extensively grown in the Bombay Presidency, the area under its cultivation being about 300 acres, most of which are in the Poona Collectorate. It is

grown in N.W. India, largely cultivated in Afghanistan and Beluchistan as well as in S. Europe. Grah. Cat. p. 191 ; Dalz. & Gibs. Suppl. p. 80 ; Brandis, For. Fl. p. 418 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515, & Gard. in Ind. ed. 5, p. 451 ; Watt, Dict. Econ. Prod. v. 3, p. 347. *The Fig.*—VERN. *Anjir.*

EXCLUDED SPECIES OF *Ficus*.

FICUS BENJAMINA, Linn. Mantiss. (1767) p. 129; Fl. B. I. v. 5, p. 508; King, Sp. Fic. p. 43, t. 52 & t. 83, fig. H; Watt, Dict. Econ. Prod. v. 3, p. 346. *Urostigma Benjamineum*, Miq. in Hook. Lond. Journ. Bot. v. 6 (1847) p. 583; Dalz. & Gibs. p. 242. ? *Ficus striata*, Roth, Nov. Pl. Sp. (1821) p. 387.

The only apparent authority for the existence of this tree in the Bombay Presidency is the statement in Dalzell & Gibson's 'Bombay Flora' (*l. c.*) that Roth's specimens of *Ficus striata*, which Sir G. King considers doubtfully synonymous with *F. Benjamina*, were received from the S. Maratha Country, but I can find no evidence that this was so. Sir George King has never seen a wild specimen from W. India, nor has the tree been found wild in the Bombay Presidency either by Talbot or Woodrow.

17. **ANTIARIS,** Leschen.

Evergreen trees. Leaves alternate, bifarious, penninerved, entire or serrate ; stipules small, connate, caducous. Flowers monœcious, the males crowded on the surface of an axillary pedunculate receptacle surrounded by confluent imbricating bracts, the females minute, solitary, in a pyriform involucre of many confluent bracts. MALE FLOWERS : Sepals 3—4, narrowly spathulate, imbricate. Stamens 3—8. Pistillode 0. FEMALE FLOWERS : Perianth 0. Ovary adnate to the involucre ; ovule pendulous ; style-arms 2, subulate, recurved. Fruit fleshy ; pericarp confluent with the receptacle. Seed exalbuminous ; testa hard ; embryo subglobose ; cotyledons equal, fleshy ; radicle small, superior.—DISTRIB. Species 5 or 6, Indian, Malayan, and Australian.

1 **Antiaris toxicaria,** *Leschen. in Ann. Mus. Par.* v. 16 (1810) p. 478. A very tall tree reaching 250 ft. in height ; trunk often buttressed ; bark dark-grey, pustular. Leaves 3—6 by 1¼—2½ in., elliptic-oblong, acuminate, often mucronate, glabrous, entire or serrulate, polished and shining above, base usually rounded but sometimes subcordate or truncate ; main nerves 8—10 pairs with reticulate venation between, the midrib velvety ; petioles ¼ in. long, stout, velvety. Flowers monœcious, the male receptacles 3—4 together, orbicular, tomentose, ½ in. in diam., peduncles velvety ; the females solitary, enclosed in a pear-shaped axillary subsessile velvety involucre of numerous confluent bracts. MALE FLOWERS : Sepals 3—4, spathulate, imbricate. Stamens 3—8 ; filaments erect. FEMALE FLOWERS : Perianth 0. Ovary adnate to the involucre. Fruit red, velvety, ⅜ by ½ in. ; pyriform or subglobose, 1-seeded, on a stalk ⅜ in. long. Fl. B. I. v. 5, p. 537 ; Trim. Fl. Ceyl. v. 4, p 97 ; Talb. Trees, Bomb. ed. 2, p. 332 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516 ; Watt, Dict. Econ. Prod. v. 1, p. 266. *Antiaris*

innoxia, Blume, Rumphia, v. 1 (1835) p. 172, t. 54 ; Bedd. Flor. Sylvat. t. 307. *A. saccidora*, Dalz. in Kew Journ. Bot. v. 3 (1851) p. 232 ; Dalz. & Gibs. p. 244. *Lepurandra saccidora*, Nimmo, in Grah. Cat. p. 193.—Flowers : Sept.—Oct. VERN. *Karwat* ; *Jasund.* Known also as *The Upas Tree* and the *Travancore Sacking Tree.*

KONKAN : on the hills, *Dalzell & Gibson* : evergreen forests, *Talbot* ; Wari country, *Dalzell & Gibson.* DECCAN : Khandala, *Graham, Dalzell & Gibson.* KANARA : in evergreen forests, common at Yellapur, *Talbot*—DISTRIB. India (Birma, Pegu, Tenasserim, W. Peninsula) ; Ceylon, Malay Peninsula and Archipelago.

The tough inner bark readily separates from the wood and is formed into sacks by the hill tribes. The trunk or branch is cut to the required length and then soaked in water and beaten till the fibre separates from the wood. The fibre is then turned inside out and a slice of wood cut off to form the bottom of the sack. I have seen a coat and a pair of trousers made of the fibre, but as a curiosity, not for wear.

18. **ARTOCARPUS,** Forst.

Evergreen trees with milky juice. Leaves alternate, coriaceous, often very large, entire, lobed or pinnatifid, penninerved. Flowers monœcious, densely crowded on globose or oblong 1-sexual solitary usually axillary receptacles, often mixed with scales which are often thickened or peltate at the apex. MALE FLOWERS : Perianth 2—4-lobed or -partite ; lobes obtuse, valvate or slightly imbricate. Stamen 1, erect. Pistillode 0. FEMALE FLOWERS : Perianths tubular, confluent below with the receptacle ; mouth minute. Ovary straight ; ovule pendulous ; style central or lateral ; stigma entire (rarely 2—3-fid). Fruit a much enlarged fleshy oblong cylindric or subglobose entire or lobed receptacle, clothed with the greatly accrescent fleshy perianths and carpels (*anthocarps*) which have hardened spinescent or truncate or pyramidal or flat apices. Seed pendulous ; testa membranous ; albumen 0 ; embryo straight or incurved ; cotyledons fleshy, equal or unequal ; radicle short, superior.—DISTRIB. Tropical Asia, Malaya, China, Pacific Islands ; species about 40.

Fruit spinous (the tips of the anthocarps ending in a sharp spine) ..... 1. *A. hirsuta.*
Fruit smooth (tips of the anthocarps truncate and flat) ... 2. *A. Lakoocha.*

1. **Artocarpus hirsuta,** *Lam. Encycl. Méthod.* v. 3 (1789) p. 210. A large evergreen tree attaining 200 ft. in height (*Brandis*) ; young shoots, petioles, peduncles, stipules, midribs, and main nerves appressedly hispid with long tawny hairs. Leaves 6—9 by 4—6 in., broadly ovate or elliptic (rarely obovate), subacute, coriaceous, entire, smooth, and when adult glabrous except on the midrib and nerves beneath, slightly narrowed to the base ; main nerves about 10 pairs, prominent beneath ; petioles stout, ½—⅞ in. long ; stipules nearly 1 in. long, lanceolate. Flowers on axillary pedunculate receptacles ; the male receptacles narrowly cylindric, at first erect or ascending, afterwards pendulous, 4—6 in. long and about ¼ in. in diam. ; the female receptacles erect, 4½ by 3½ in. MALE FLOWERS : Sepals 2, united below. Stamen 1 ; anther exserted, ovate. Receptacle-scales

(bracteoles) chaffy, not peltate. FEMALE FLOWERS: Perianth tubular, confluent below with the receptacle. Fruit size of a lemon, echinate, the spines (free apices of anthocarps) about ¼ in. long, cylindric, straight, hispid, perforate at the apex for the filiform style, edible. Seeds ½—¾ in. long, ovoid. Fl. B. I. v. 5, p. 541; Grah. Cat. p. 193; Dalz. & Gibs. p. 244; Bedd. Flor. Sylvat. t. 308; King, in Ann. Roy. Bot. Gard. Calc. v. 2 (1889) p. 9, t. 5; Talb. Trees, Bomb. ed. 2, p. 332; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516; Watt, Dict. Econ. Prod. v. 1, p. 329.—Flowers: Jan.—Feb.

KONKAN: *Law*!, *Talbot*. DECCAN: Bhor country, *Dalzell & Gibson*; Sangli, *Dalzell*! KANARA: evergreen forests of N. Kanara, *Talbot*; Divimana (N. Kanara), *Woodrow*.—DISTRIB. India (W. Peninsula).

2. **Artocarpus Lakoocha,** *Roxb. Fl. Ind.* v. 3 (1832) p. 524. A large deciduous tree reaching 50—60 ft. in height with a spreading head; bark rough, grey; young shoots thin, densely clothed with a soft grey, tawny or rusty tomentum. Leaves coriaceous, 4—12 by 2—6 in., oblong, elliptic or subovate, entire (the young ones sometimes serrate), obtuse, cuspidate, glabrous and shining above, softly pubescent beneath, base broad or narrow, truncate or rounded; main nerves 6—12 pairs with reticulate venation between; petioles ½—1 in. long, lanceolate, tawny-pubescent. Flowers in axillary globose shortly pedunculate heads; bracteoles peltate. MALE FLOWERS: Sepals 2—3, triangular, truncate, puberulous. Stamen 1; filament broad below, tapering upwards; anther exserted, short, broad, 2-celled. FEMALE FLOWERS: Anthocarps completely united. Fruit 2—3 in. in diam., lobulate, smooth, velvety, yellow, edible. Seeds oblong, few, broad, about ½ in. across. Fl. B. I. v. 5, p. 543; Grah. Cat. p. 193; Dalz. & Gibs. p. 244; Bedd. For. Man. in Flor. Sylvat. p. ccxix; King, in Ann. Roy. Bot. Gard. Calc. v. 2 (1889) p. 14; Talb. Trees, Bomb. ed. 2, p. 332; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516; Prain, Beng. Pl. p. 971; Watt, Dict. Econ. Prod. v. 1, p. 333.—Flowers: Mar.—Apr. VERN. *Otamb; Lowi.*

KONKAN: *Law*!, *Stocks*!, *Talbot*; Salsette and N. Konkan, *Graham*. S. M. COUNTRY: Dharwar, *Woodrow*. KANARA: evergreen forests of N. Kanara, common in the forests of Yellapur, *Talbot*; Yacombi, *Woodrow*!, *Cooke*!; west of Supa, *Ritchie*, 1381!—DISTRIB. India (Subhimalayan tract and outer hills, Khasia, Birma, W. Peninsula); Ceylon, Malay Peninsula.

Artocarpus integrifolia, Linn. f. Suppl. (1781) p. 412. A large evergreen tree, glabrous except the youngest shoots. Leaves 4—8 in. long, elliptic or obovate, acuminate, entire, or those of the young plants sometimes lobed dark-green and shining above, rather rough beneath, base narrowed; main nerves 7—8 pairs; petioles ½—1 in. long; stipules large, glabrous, soon caducous. Fruit 12—30 by 6—12 in., hanging on short stalks from the trunk and larger branches; anthocarps pyramidal. Seeds oblong or reniform, oily, of the size of a nutmeg. Fl. B. I. v. 5, p. 541; Grah. Cat. p. 192; Dalz. & Gibs. p. 244; Bedd. For. Man. in Flor. Sylvat. p. ccxix; Talb. Trees, Bomb. ed. 2, p. 331; Woodr. in Journ. Bomb. Nat. v. 12

(1899) p. 516 ; Prain, Beng. Pl. p. 971 ; Watt, Dict. Econ. Prod. v. 1, p. 330.—Flowers : Nov.—Jan. VERN. *Phannas.*

The well-known *Jack-fruit Tree,* widely cultivated, said by Beddome and Gamble to be indigenous in some of the forests of the Western Ghâts. In the Bombay Presidency it is, so far as I know, found only in the neighbourhood of villages or near the sites of deserted villages. The yellow pulp of the large fruit is much eaten, as are the seeds which are cooked. The wood was formerly used extensively in the manufacture of furniture; it is bright yellow when freshly cut, but darkens by age, becoming like mahogany.

Artocarpus incisa, Linn. f. Suppl. (1781) p. 411. A middle-sized tree with leaves 1—2 feet long, more or less deeply pinnatifidly cut in the upper part, and a muricated fruit of the size of a small pummalo. Fl. B. I. v. 5, p. 539 ; Grah. Cat. p. 192 ; Dalz. & Gibs. Suppl. p. 79 (by error *A. indica*) ; Talb. Trees, Bomb. ed. 2, p. 331 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516, & Gard. in Ind. ed. 5, p. 456 ; Bot. Mag. t. 2869—2871.

The *Bread-fruit Tree,* a native of the Pacific Islands. The equable humid climate of Bombay seems to suit it, and plants have been grown at the Victoria Gardens and at Parel, Girgaum, and Colaba. It does not thrive if planted at any distance from the sea.

The following plants not belonging to any of the foregoing genera are variously grown or found as weeds in the Presidency :—

Morus alba, Linn. Sp. Pl. (1753) p. 986. A deciduous monœcious tree 30—40 ft. high, cultivated in gardens. Its native country is not known with certainty. The tree is known as *The White Mulberry,* though the color of the fruit varies from white to purple. It is cultivated for its fruit and for its leaves, which latter are used to feed silkworms. Fl. B. I. v. 5, p. 492 ; Grah. Cat. p. 194 ; Dalz. & Gibs. Suppl. p. 80 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Watt, Dict. Econ. Prod. v. 5, p. 279.—VERN. *Tut.*

Morus indica, Linn. Sp. Pl. (1753) p. 986. A deciduous shrub or small tree wild in the Subhimalayan tract, the outer hills of the Panjáb, and the valley of Sikkim, cultivated largely in Bengal and Birma and sparingly in the W. Peninsula for its leaves, which are used to feed silkworms. Much money was spent by the Bombay Government in an attempt to introduce the cultivation of this plant into the Deccan, which after 12 years' trial resulted in failure and was abandoned in 1846 (Dalzell & Gibson, Suppl. p. 80). The shrub is common about villages in N. Kanara (*Talbot*). Fl. B. I. v. 5, p. 492 ; Grah. Cat. p. 194 ; Dalz. & Gibs. Suppl. p. 80 ; Talb. Trees, Bomb. ed. 2, p. 324 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Prain, Beng. Pl. p. 967 ; Watt, Dict. Econ. Prod. v. 5, p. 281.—Flowers : Feb.—June.

Morus lævigata, Wall. Cat. 4649. A middle-sized deciduous tree, a native of the tropical and subtropical Himalayas, with ovate shortly acuminate often cordate leaves and long cylindric yellowish-white sweet but insipid fruit, cultivated in gardens at Dharwar (fide *Talbot*). Fl. B. I. v. 5, p. 492 ; Talb. Trees, Bomb. ed. 2, p. 324 ;

Prain, Beng. Pl. p. 968 ; Watt, Dict. Econ. Prod. v. 5, p. 284.—Flowers : Nov.—Feb.

Pilea microphylla, Liebm. in Vidensk. Selsk. Skr. ser. 5, v. 2 (1851) p. 296. A small usually creeping herb a native of S. America, rapidly becoming naturalized in India, known as *The Gunpowder Plant,* owing to the cloud of pollen discharged from the anthers when the plant is shaken, occurs as a weed in Bombay and Poona. Prain, Beng. Pl. p. 962. *Pilea muscosa,* Lindl. Coll. Bot. (1821) t. 4 ; Fl. B. I. v. 5, p. 551 ; Trim. Fl. Ceyl. v. 4, p. 108 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516. *Parietaria microphylla,* Linn. Syst. ed. 10 (1759) p. 1308.—Flowers : Oct.

Cannabis sativa, Linn. Sp. Pl. (1753) p. 1027. A tall erect annual herb, wild in Central Asia, cultivated in many parts of the Presidency for the intoxicating drugs known as *Gánja, Charas,* and *Bhâng* which are obtained from it. The cultivation in India for the fibre the plant produces does not seem to have been attended with satisfactory results. A very full description may be found in Watt's Dict. Econ. Prod. v. 2, pp. 103—126. Fl. B. I. v. 5, p. 487 ; Grah. Cat. p. 187 ; Dalz. & Gibs. Suppl. p. 79 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 515 ; Watt, Dict. Econ. Prod. v. 2, p. 103. *Cannabis indica,* Lamk. Encyc. Méthod. v. 1 (1783) p. 695.

Conocephalus suaveolens, Blume, Bijdr. (1825) p. 484. A scandent dicœcious shrub common in the forests of Chittagong, Silhet, and Eastern Bengal, with alternate elliptic-oblong entire smooth leaves 4—8 by 3—6 in., and corymbose axillary heads of very fragrant flowers, is grown in gardens. Fl. B. I. v. 5, p. 545 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516 ; Prain, Beng. Pl. p. 969. *Urtica naucliflora,* Roxb. Fl. Ind. v. 3 (1832) p. 592.

Pellionia Daveauana, N. E. Brown, in Gard. Chron. (1880) part 2, p. 262. A creeping succulent herb, a native of Cochinchina, suitable for a suspended basket or rock-work. Its leaves are very ornamental, ½—2¼ in. long, roundish-elliptic or elliptic-oblong, either entirely of a dark bronzy olive-green slightly tinted with violet, or marked with a broad central irregular band of bright green. Woodr. Gard. in Ind. ed. 5, p. 455.

Pellionia pulchra, N. E. Brown, in Gard. Chron. (1882) part 2, p. 712. A creeping succulent herb with leaves which are blackish along the midrib and veins, the interspaces being green, affording a pretty variegation. Suitable for hanging baskets and rock-work. Woodr. Gard. in Ind. ed. 5, p. 456.

Laportea Schomburghii, versicolor, Bull. Cat. (1875) p. 7. A handsome ornamental-leaved plant, a native of the South Sea Islands, introduced into London in 1875. Leaves deep green, irregularly mottled with greyish-green, and variegated with patches of creamy white ; petioles fleshy, red-purple, which color is continued along the midrib and nerves. Nicholson, Dict. Gard. v. 2, p. 235 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516.

EXCLUDED SPECIES.

LAPORTEA CRENULATA, Gaud. in Freyc. Voy. Bot. p. 498. A large evergreen shrub 8—10 ft. high with highly irritant stinging hairs and ovate or elliptic entire or crenulate leaves, known as the *Fever-* or *Devil-nettle*. A sting from the hairs is very painful, the effects lasting for several days.

There is one sheet in Herb. Kew. marked "*Konkan Herb. Stocks*," not, however, in Stocks's handwriting. It is not an uncommon experience to find it assumed that anything collected by Stocks to which no locality has been assigned was collected in the Konkan. In the present case there is not a shadow of evidence to show that the plant was collected in that division of the Presidency. Talbot says (Trees, Bomb. ed. 2, p. 333) : "Does not seem to have been met with in the Presidency by any other collector since Stocks's time." It is quite inconceivable that a plant possessing such formidable stinging properties (for a full description of which a reference may be made to Beddome's *Flora Sylvatica*, t. 306) should have escaped notice if it existed in the Presidency. Fl. B. I. v. 5, p. 550; Brandis, For. Fl. p. 404; Bedd. Flor. Sylvat. t. 306; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 516; Watt, Dict. Econ. Prod. v. 4, p. 587.

VILLEBRUNEA INTEGRIFOLIA, Gaud. Voy. Bonite (1844—46) t. 91. A small evergreen tree with elliptic-oblong membranous leaves 6—14 in. long, drying brown, and globose flower-clusters in small dichotomously branched hispid cymes from the branchlets below the leaves. Fl. B. I. v. 5, p. 589; Talb. Trees, Bomb. ed. 2, p. 334; Prain, Beng. Pl. p. 966; Watt, Dict. Econ. Prod. v. 6, part 4, p. 238.

There are 2 sheets in Herb. Kew. marked "*Herb. Stocks Konkan*," but not in Stocks's handwriting. This seems to be a case similar to that of *Laportea crenulata*, in which a plant collected by Stocks, without an authentic locality-label on it, was assumed to have been collected in the Konkan. No other collectors have found the plant there, and Talbot, who has an intimate acquaintance with the plants of the South Konkan and North Kanara, remarks (*l. c.*) : "This species has not been met with in the Bombay Presidency as far as I know."

CONOCEPHALUS CONCOLOR, Dalz. in Dalz. & Gibs. Bo. Fl. (1861) p. 239. Shrubby. Leaves very large, 1 ft. long, irregularly scattered, 3-nerved, perfectly smooth, oblong-ovate, acute, green on both sides. Female flower axillary. DECCAN : Phonda Ghat, *Dalzell & Gibson*. The above is Dalzell's description of the plant, which has not as yet been found by any other collector, and there are no specimens anywhere so far as I know. Fl. B. I. v. 5, p. 546; Talb. Trees, Bomb. ed. 2, p. 333.

ORDER *CXVII. CASUARINACEÆ.*

An Order with only one genus (*Casuarina*), of which one species (*Casuarina equisetifolia*, Forst. Char. Gen. [1776] p. 104, t. 52) is extensively planted but is not indigenous in the Bombay Presidency. It is a tall evergreen leafless very ornamental dioecious tree, with cylindric or angled deciduous branchlets. There are large plantations in N. Kanara near the sea-coast, and, from the readiness with which it accommodates itself to coast-sands, the tree is useful in the reclamation of land from the sea (*Gamble*). The reddish-brown wood, known as the *Beef-wood* of Australia, is very heavy and hard and almost unworkable by Indian carpenters owing to its hardness. It is chiefly used for fuel. The wind, when blowing through a plantation of *Casuarinas*, sounds like the waves of the sea. Fl. B. I. v. 5, p. 598 ; Dalz. & Gibs. Suppl. p. 82 ; Bedd. For. Man. in Flor. Sylvat. p. ccxxvi ; Trim. Fl. Ceyl. v. 4, p. 120 ;

Talb. Trees, Bomb. ed. 2, p. 335 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517 ; Prain, Beng. Pl. p. 985 ; Watt, Dict. Econ. Prod. v. 2, p. 230. *Casuarina muricata,* Roxb. Fl. Ind. v. 3, p. 519 ; Grah. Cat. p. 196 ; Dalz. & Gibs. Suppl. p. 82.—DISTRIB. India (east side of the Bay of Bengal from Chittagong southwards, elsewhere planted) ; Malay Archipelago, Australia.

ORDER CXVIII. SALICACEÆ.

Deciduous fast-growing trees or shrubs. Leaves alternate, petiolate ; stipules free. Flowers dicœcious (rarely monœcious), in catkins which are similar in both sexes, each bract bearing 1 flower in its axil ; bracteoles 0. Perianth 0. Disk of one or more scales or glands, or cup-shaped. MALE FLOWERS : Stamens 2 or more ; filaments free or connate ; anthers ovate-oblong, dehiscing longitudinally. Rudimentary ovary in normal flowers 0. FEMALE FLOWERS : Ovary sessile or stalked, 1-celled ; ovules few or many, on 2—4 sub-basal or parietal placentas, erect, anatropous ; style short or 0 ; stigmas short, notched or lobed. Fruit an ovoid or lanceolate 2—4-valved capsule. Seeds few or many ; funicle with a pencil of long silky deciduous hairs ; albumen 0 ; cotyledons plano-convex ; radicle short, inferior.—DISTRIB. Genera 2 ; species about 180, chiefly in N. temperate regions.

Petioles short; disk of 1 or 2 separate glands; stamens 2—12; ovules few on each placenta	1. SALIX.
Petioles long; disk flat or cup-shaped; stamens 4—30; ovules numerous on each placenta	2. POPULUS.

1. SALIX, Linn.

Trees or shrubs. Leaves lanceolate, ovate or elliptic, entire or serrulate ; petioles short, as a rule less than ¼ the length of the leaf-blade ; stipules various. Flowers small, dicœcious (rarely monœcious ; sometimes androgynous in *S. ichnostachya*), in usually dense catkins ; bracts small, entire. Perianth 0. Disk of 2 scales (anterior and posterior) or of one posterior scale, fleshy or glandular. MALE FLOWERS : Stamens 2—12 (in many species 2) ; filaments long, filiform, usually free ; anthers usually small. FEMALE FLOWERS : Ovary sessile or stalked ; placentas 2 ; ovules 2-seriate on each placenta, usually 4—8 ; style usually short with 2 short retuse or 2-fid arms. Fruit a 2-valved capsule, the valves generally rolled back. Seeds with a penicillate funicle ; albumen 0 ; cotyledons plano-convex ; radicle inferior.—DISTRIB. Species about 160, almost all in the Northern Hemisphere.

Capsules glabrous, pedicellate	1. *S. tetrasperma.*
Capsules densely woolly, sessile or nearly so	2. *S. ichnostachya.*

1. Salix tetrasperma, *Roxb. Cor. Pl.* v. 1 (1795) p. 66, t. 97. A much-branched tree 20—40 ft. high ; bark rough with deep vertical furrows ; young shoots silky, becoming glabrous. Leaves 2—5 by ⅜—1½ in., lanceolate, acute or acuminate, usually serrulate,

sometimes obscurely so, green and glabrous above, white and more or less silky beneath when very young ; petioles $\frac{3}{8}$—$\frac{5}{8}$ in. long ; stipules subulate, deciduous. Flowers appearing after the leaves ; catkins hairy, 2—5 in. long ; peduncles silky-villous, leafy at the base. MALE FLOWERS sweet-scented, sessile ; bracts ovate, concave, subacute, silky-villous, veined. Disk of 2 yellow glands. Stamens 5—10 ; filaments free, of various lengths, the longest about twice as long as the bract ; anthers yellow. FEMALE FLOWERS pedicellate ; bracts smaller than those of the male, oblong or obovate-oblong, hairy. Disk small, ½-annular, yellow, clasping the pedicel at the side opposite the bract. Ovary fusiform, glabrous ; ovules 4—6 (usually 4) ; stigma sessile, 2-branched, each branch 2-lobed. Capsule glabrous, $\frac{1}{8}$—$\frac{1}{6}$ in. long on a long slender stalk. Seeds 4—6. Fl. B. I. v. 5, p. 626 ; Grah. Cat. p. 195 ; Dalz. & Gibs. p. 220 ; Wight, Icon. t. 1954 ; Bedd. Flor. Sylvat. t. 302 ; Talb. Trees, Bomb. ed. 2, p. 336 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517 ; Prain, Beng. Pl. p. 989 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 391.—Flowers : Oct. VERN. *Walunj.*

DECCAN : Poona, *Woodrow*; Mahableshwar, *Cooke!*, *H. M. Birdwood*, vale of the Yena (Mahableshwar) and other moist places, *Graham.* S. M. COUNTRY : in various places, *Law* ex *Graham*; Belgaum, *Ritchie*, 159!; planted along roadsides about Belgaum, chiefly male trees, *Talbot.*—DISTRIB. India (on river-banks and in moist places); China, Malay Peninsula and Archipelago.

2. **Salix ichnostachya,** *Lindl. in Wall. Cat.* (1828) n. 3702. A moderate-sized tree. Leaves 3—6 by $\frac{7}{8}$—2 in., lanceolate or elliptic-lanceolate, acute or acuminate, subcoriaceous, smooth and shining above, glaucous beneath, penninerved, base usually acute ; main nerves numerous, slender ; petioles ½—1¼ in. long. Catkins softly woolly, often androgynous (the males and females mixed in the same catkin). MALE FLOWERS : Bracts ⅛ in. long, ovate-oblong, obtuse, concave, densely woolly. Stamens 6—8. FEMALE FLOWERS : Bracts much smaller than in the male, $\frac{1}{16}$—$\frac{1}{12}$ in. long, suborbicular, concave, densely woolly. Ovary sessile or nearly so ; stigma sessile, short, 2-fid. Capsules sessile or nearly so, globosely ovoid, densely woolly. Fl. B. I. v. 5, p. 628 ; Wight, Icon. t. 1953 ; Talb. Trees, Bomb. ed. 2, p. 336.—Flowers : Oct.

In the specimens from Wight's Herbarium in Herb. Kew. many of the catkins are androgynous.

KONKAN and N. KANARA : along river-banks, *Talbot.*—DISTRIB. India (W. Peninsula).

Salix babylonica, Linn. Sp. Pl. (1753) p. 1017. A tree attaining 50 ft. high with drooping branches. Leaves 3—6 by ½ in., narrowly lanceolate. Flowers appearing with the leaves ; catkins very slender, the male catkins ½—1 in. long, the female 1 in. long. Capsules glabrous, sessile. The *Weeping Willow*, well known in England, occasionally grown as an ornamental tree.—Graham says that there was a plant in Parel Garden, Bombay, reared from a cutting of the tree which grew over the tomb of Napoleon at St. Helena.

Fl. B. I. v. 5, p. 629 ; Grah. Cat. p. 195 ; Dalz. & Gibs. Suppl. p. 81 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 388.

2. **POPULUS,** Linn.

Trees with scaly often resinous buds. Leaves alternate, usually broad, 3—5-nerved from the base, penninerved above, entire, toothed or lobed (in the only Bombay species very heteromorphous) ; stipules narrow, membranous, fugacious. Flowers often pedicellate in both sexes, dicœcious, in usually lax catkins ; bracts of catkins caducous, crenate or lobed. Disk fleshy or membranous, cup-shaped, often oblique, entire, toothed or irregularly lobed. MALE FLOWERS : Stamens 4—30 ; filaments filiform, free ; anthers usually large. FEMALE FLOWERS : Ovary sessile within the disk ; placentas 2—3 (rarely 4) ; ovules many on each placenta. Capsule 2—4-valved. Seeds very small with a long and dense coma.—DISTRIB. Species 18, chiefly in N. temperate regions.

1. **Populus euphratica,** *Oliv. Voy. Atlas,* v. 3, p. 449, tt. 45, 46. A middle-sized usually gregarious tree 40—50 ft. high ; buds slightly pubescent, not viscid. Leaves most variable in shape, those of seedlings, young trees, and young shoots linear or oblong, entire and shortly petiolate, 3—6 in. long, those of older trees usually broadly ovate, rhomboid or orbicular, 2—3 in. long and often as broad or broader than long, dentate or more or less cut or lobed, with a rounded cordate or cuneate 3—5-nerved base, the narrower leaves sometimes entire. Flowers pedicellate in both sexes ; catkins glabrous. MALE FLOWERS on long slender pedicels reaching $\frac{1}{8}$ in. long. Disk membranous, suborbicular, with 6—8 (usually 8) irregular acute teeth. Stamens 8—12 ; filaments filiform ; anthers oblong, quadrangular, longer than the filaments. FEMALE FLOWERS : Disk membranous, caducous, tubular, with 8—12 linear segments. Stigmas 2—3, more or less irregularly crescent-shaped, narrowed into a short style. Capsules $\frac{1}{4}$—$\frac{1}{2}$ in. long, ovoid-lanceolate, turgid, 2—3- (commonly 3-) valved ; pedicels shorter than the capsules. Seeds narrowly ellipsoid, acute at both ends, $\frac{1}{12}$ in. long, enveloped in a mass of silky hairs. Fl. B. I. v. 5, p. 638 ; Talb. Trees, Bomb. ed. 2, p. 336 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 326.—Flowers : Feb., nearly leafless in January. VERN. *Bán.*

In the Bombay Presidency confined to Sind. SIND : *Ritchie,* 690!, *Stocks,* 424!, *Dalzell*!, *Woodrow.*—DISTRIB. India (Panjáb) ; W. Thibet, Beluchistan, Afghanistan, westwards to Syria and Egypt.

The wood is largely used for fuel in Sind.

ORDER CXIX. **CERATOPHYLLACEÆ.**

Submerged slender fragile branched herbs. Leaves whorled, dichotomously cleft into filiform minutely toothed lobes ; stipules 0. Flowers minute, monœcious, axillary, sessile. MALE FLOWERS solitary. Perianth (or involucre) of 6—12 narrow subvalvate 2-fid

segments. Stamens 20—30; filaments very short; anthers erect, extrorse, dehiscing longitudinally; connective truncate or 2-toothed at the apex. FEMALE FLOWERS: Perianth of the male. Ovary sessile, ovoid, 1-celled; ovule solitary, pendulous, orthotropous; style subulate, stigmatic on one side. Fruit a small coriaceous ovoid or ellipsoid somewhat compressed nutlet, terminating in a long subulate style with a spur projecting from the base on either side. Seed pendulous; testa membranous; albumen 0; embryo straight; cotyledons thick; radicle short, inferior; plumule many-leaved.—DISTRIB. Genus 1; species 1, very variable, in all temperate and tropical countries.

1. CERATOPHYLLUM, Linn.

Characters of the Order.

1. **Ceratophyllum demersum,** *Linn. Sp. Pl.* (1753) p. 992. Whole plant 8—36 in. long, forming a much-branched tangle of slender branches and leaves which collapse in a tassel when taken out of the water. Leaves about 1 in. long; segments spreading in water, variable in thickness and amount of toothing. MALE FLOWERS solitary, in separate axils from the female but on the same plant. Perianth (or involucre) of 6—12 narrow 2-fid segments. Stamens 10—30, sessile; anthers large, white (*Clarke*). FEMALE FLOWERS: Perianth (or involucre) as in the male, often with an entire acute (not 2-fid) apex. Ovary sessile, 1-celled; style subulate. Fruit very variable. Fl. B. I. v. 5, p. 639; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517; Engler, in Engl. & Prantl, Pflanzenf. v. 3, part 2, p. 11, fig. 12; Prain, Beng. Pl. p. 990. *Ceratophyllum verticillatum,* Roxb. Hort. Beng. (1814) p. 68, & Fl. Ind. v. 3 (1832) p. 624; Trim. Fl. Ceyl. v. 4, p. 120.

Sir Joseph Hooker (Fl. B. I. l. c.) considers the Indian species of Chamisso and Wallich to be referable to this, but at the same time is of opinion that an examination of living specimens is necessary for verification. Wight and Arnott (Prodr. pp. 309 & 310) give 3 Indian species figured in Wight's 'Icones,' but suggest that these might perhaps be regarded as forms of *C. verticillatum,* Roxb., which Sir J. Hooker makes synonymous with *C. demersum.* The following are the 3 species given by Wight and Arnott:—

C. tuberculatum, Cham. in Linnæa, v. 4 (1829) p. 504, t. 5, fig. 6 *d.* Fruit ellipsoid, slightly compressed, wingless; spines at first slender and weak, afterwards strong; sides of the fruit convex, finely tuberculate. Wight & Arn. Prod. p. 309; Wight, Icon. t. 1948, fig. 3.

C. muricatum, Cham. in Linnæa, v. 4 (1829) p. 504, t. 5, fig. 6 *c.* Fruit ellipsoid, slightly compressed, winged; spines slender, weak; wing narrow, regularly many-toothed; sides of the fruit convex, more or less muricated, particularly towards the apex. Wight & Arn. Prodr. p. 309; Wight, Icon. t. 1948, figs. 1, 2. *C. platyacanthum,* Cham. l. c. fig. 6 *a*; Engl. in Engl. & Prantl, Pflanzenf. v. 3, part 2, p. 12.

C. missionis, Wall. Cat. (1828) n. 7007. Fruit ellipsoid, slightly compressed, winged; spines elongate, the lateral ones flattened; the wing broader downwards and decurrent along the base of the spines, with a few irregular teeth; sides of the fruit convex, finely tuberculate. Wight & Arn. Prodr. p. 310; Wight, Icon. t. 1948, fig. 4.

ORDER CXX. GNETACEÆ.

Trees or shrubs ; branches jointed at the nodes. Leaves opposite, large and green or minute and scale-like ; stipules 0. Flowers 1-sexual, monœcious or dicœcious, in axillary or terminal spikes or cones. MALE FLOWERS : Perianth valvately 2-lobed or spathaceous. Stamens connate in a column of united filaments ; anthers 2—8, globose, 1—3-celled, sessile or subsessile on the column. FEMALE FLOWERS : A naked erect ovule with 2—3 coats, of which one is produced into a styliform tube with a discoid mouth. Seed dry or drupe-like ; albumen copious or scanty ; embryo straight ; cotyledons appressed ; radicle long, superior.—DISTRIB. Genera 3 ; species about 40, in temperate and tropical regions.

Shrubs leafless or nearly so	1. EPHEDRA.
Trees or shrubs with large green leaves	2. GNETUM.

1. EPHEDRA, Linn.

Erect or subscandent rigid shrubs ; branches opposite or whorled, terete, striate, with membranous sheaths at the nodes, which often bear narrow leafy blades. Flowers unisexual, usually dicœcious. MALE FLOWERS in short bracteate spikelets which are whorled or in pairs. Perianth of 2 opposite compressed membranous sepals. Anthers 2—8, on a central column, 2-celled, opening by a short slit at the apex. FEMALE FLOWERS usually in pairs, sometimes 3 or solitary, each flower consisting of 1 ovule with a single integument prolonged into a styliform tube (*tubillus*) and enclosed in a bag (? perianth), each female inflorescence supported by several pairs of decussate bracts. Fruit (in the Indian species) fleshy, consisting of several succulent bracts enclosing 1 or 2 seeds.—DISTRIB. Dry regions of Europe, N. Africa, Asia, and America ; species 31.

1. **Ephedra foliata,** *Boiss. Fl. Orient.* v. 5 (1881) p. 716. A dicœcious or monœcious climbing shrub reaching 15 ft. long or more (rarely prostrate or hanging from walls) ; branches often fascicled, slender ; bark green or glaucescent, smooth, striate ; buds terminal, minute, shortly ovate or more or less elongate. Leaves 2, 3, or 4, shortly connate at the base, 1—1⅛ in. long by $\frac{1}{12}$ in. broad, linear-setaceous. MALE FLOWERS : Spikelets ovate, obtuse, tetragonal, in pairs, or 3 together, or solitary, of various lengths, often with a peduncle 1—1½ in. long ; flowers 6—24 ; bracts rotund, obtuse, connate for ⅓—½ their length, $\frac{1}{16}$—$\frac{1}{12}$ in. long and as broad as long. Perianth obovate, exceeding the bracts. Staminal-column equalling the perianth or shortly exserted. FEMALE FLOWERS : Floral galbuli in depauperate usually nodding cymes, ovate, on long peduncles or in short fascicles, with 3 pairs of bracts. Flowers usually in pairs, equalling the bracts. Integument at first oblong, obtusely trigonous ; tubillus exserted, straight, short. Fruit globose, ¼ in. in diam., semitransparent, red or milky-white, showing 2 dark-colored seeds. Stapf, Die Art. der Gatt. Ephed. (1889) p. 49. *Ephedra peduncularis,* Boiss. Fl. Orient. v. 5 (1881) p. 717 ; Hook. f. Fl. B. I. v. 5, p. 641 ;

Talb. Trees, Bomb. ed. 2, p. 337; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517; Watt, Dict. Econ. Prod. v. 3, p. 251. *E. Alte*, Brandis, For. Flor. p. 501, t. 69 (*not* of C. A. Meyer).—Flowers: Mar.—Apr.

In the Bombay Presidency confined to Sind. SIND: *Woodrow*, *Stocks*, 449!; hills at the Hub near Karachi, *Bhola Puran*!; near Schwan, *Dalzell*, 7! —DISTRIB. India (Panjáb, Rajputana); Afghanistan to Syria.

2. GNETUM, Linn.

Evergreen climbing shrubs or erect trees; branches jointed. Leaves opposite, entire, penninerved. Flowers monœcious or diœcious, whorled, in the axils of the cupular bracts of axillary or terminal solitary or paniculate spikes, often surrounded by jointed hairs. MALE FLOWERS: Perianth narrowly clavate, entire or valvately 2-fid. Stamens adnate to the base of the perianth; filaments connate in a column, exserted from the mouth of the perianth; anter-cells 2, distinct, sessile on the top of the column, opening by terminal slits. FEMALE FLOWERS (some imperfect): Ovule ovoid or globose, the inner integument produced into a slender exserted tube with often a toothed or fimbriate mouth. Seed drupe-like.—DISTRIB. Tropical Asia, Africa, America, Pacific Islands; species about 15.

1. **Gnetum scandens,** *Roxb. Hort. Beng.* (1814) p. 66. A lofty diœcious climber with dichotomous branches; bark thick, scaly; young shoots jointed and swollen at the insertion of the leaves. Leaves opposite, 4½—6 by 2—3 in., ovate-oblong or elliptic, obtusely acuminate, smooth and polished, base obtuse or very shortly cuneate; main nerves 6—8 pairs, slender, with lax reticulate venation between; petioles ¼—½ in. long. Flowers in stiff paniculate spikes (generally one or two opposite pairs of cylindric spikes and a terminal one); bracts of the male flowers closely imbricate, those of the female interrupted. Fruiting spikes 3—10 in. long. Stigma 3-fid. Fruit somewhat olive-shaped, drupaceous, 1—1½ in. long, of a reddish-orange color when ripe, obtuse at the apex, narrowed at the base into a short stout stalk, the pulp intermixed with many tender spicules. Fl. B. I. v. 5, p. 642; Grah. Cat. p. 188; Dalz. & Gibs. p. 246; Talb. Trees, Bomb. ed. 2, p. 337; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517; Prain, Beng. Pl. p. 991; Watt, Dict. Econ. Prod. v. 3, p. 518.—Flowers: Dec.—Mar. VERN. *Kombal*; *Umbli.*

KONKAN: *Law*!, *Dalzell*!; dense jungles below the Ghâts, *Dalzell*! DECCAN: ravines at Par, below Mahableshwar, *Graham*; Lanoli, *Graham*, *Woodrow*; Phonda Ghât, *Ritchie*, 954! S. M. COUNTRY: Castlerock, *Kanitkar*! KANARA: common in the moist forests of N. Kanara, abundant in the evergreen forests of the Supa Ghât, *Talbot*.—DISTRIB. India (Sikkim, Assam, Khasia Hills, Chittagong, Birma, Andamans, W. Peninsula); Malay Peninsula and Archipelago, China.

ORDER *CXXI. CONIFERÆ.*

There are no plants of the Order indigenous to the Bombay Presidency. The following are the principal species grown in gardens:—

Cupressus glauca, Lam. Encyc. Méthod. v. 2 (1786) p. 243. A tree of very upright habit, with numerous short branches covering the stem, extensively grown as an ornamental tree, but does not succeed below the Ghâts and above only when the soil is rich and deep (*Dalzell & Gibson*). It is known as the *Goa Cypress* or *Cedar of Goa.* Fl. B. I. v. 5, p. 645 ; Grah. Cat. p. 196 ; Dalz. & Gibs. Suppl. p. 83 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517, & Gard. in Ind. ed. 5, p. 459 ; Watt, Dict. Econ. Prod. v. 2, p. 646.

Cupressus sempervirens, Linn. Sp. Pl. (1753) p. 1002. A tall tree, attaining 100 ft. high and 9 ft. in girth of trunk, a native of Europe. Foliage dark green. Leaves ovate-oblong, convex, with a gland on each side. Fl. B. I. v. 5, p. 645 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517, & Gard. in Ind. ed. 5, p. 459 ; Watt, Dict. Econ. Prod. v. 2, p. 646.

Cupressus torulosa, D. Don, Prodr. Fl. Nep. (1825) p. 55. A tall tree, a native of the W. Himalaya, attaining 150 ft. high, with a girth of trunk of 17 ft. Leaves $\frac{1}{20}$ in. long, triangular-ovate obtuse, with an oblong gland on either side of the midrib. Fl. B. I. v. 5, p. 645 ; Dalz. & Gibs. Suppl. p. 83 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517 ; Watt, Dict. Econ. Prod. v. 2, p. 646.

Cupressus funebris, Endl. Syn. Conif. (1847) p. 58. A handsome tree, a native of China, attaining 60 ft., with dark green foliage, wide-spreading branches and pendulous distichous branchlets. Fl. B. I. v. 5, p. 646 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517, & Gard. in Ind. ed. 5, p. 459 ; Watt, Dict. Econ. Prod. v. 2, p. 645.

Juniperus communis, Linn. Sp. Pl. (1753) p. 1040. *The Common Juniper,* occurring in India in the Western Himalaya and distributed to temperate and subarctic regions in Europe, Asia, N. Africa, and N. America, is sometimes grown in gardens. Fl. B. I. v. 5, p. 646 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517, & Gard. in Ind. ed. 5, p. 459 ; Watt, Dict. Econ. Prod. v. 4, p. 552.

Juniperus chinensis, Linn. Mantiss. 1 (1767) p. 127. A dwarf conical bluish-green shrub of slow growth. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517, & Gard in Ind. ed. 5, p. 459.

Araucaria excelsa, R. Br. in Ait. Hort. Kew. ed. 2, v. 5 (1813) p. 412. *The Norfolk Island Pine,* a native of Norfolk Island, a very handsome species with graceful feathery branches. Woodr. Gard. in Ind. ed. 5, p. 458.

Araucaria Cookii, R. Br. ex D. Don, in Trans. Linn. Soc. v. 18 (1841) p. 164. A native of New Caledonia, resembling the last, but of more irregular outline. Woodr. Gard. in Ind. ed. 5, p. 458.

Araucaria Cunninghamii, Sweet, Hort. Brit. ed. 2 (1830) p. 475. A large tree of rapid growth with whorls of branches often 4 feet apart, a native of Queensland. Woodr. Gard. in Ind. ed. 5, p. 458 ; Watt, Dict. Econ. Prod. v. 1, p. 289.

Araucaria Bidwilli, Hook. Lond. Journ. Bot. v. 2 (1843) p. 503, tt. 18, 19. A native of Australia, with triangular leaves about 1 in. in length. A delicate species in the plains of India, but thrives well in a conservatory covered with coir matting. Woodr. Gard. in Ind. ed. 5, p. 458.

ORDER *CXXII. CYCADACEÆ.*

There are no plants of the Order indigenous to the Bombay Presidency. The two following species are commonly grown in gardens for ornamental purposes:—

Cycas Rumphii, Miq. in Bull. Sc. Phys. Nat. Néerl. (1839) p. 45. A palm-like evergreen tree with leaves 5—8 ft. in length, abundant in the Malabar and Cochin forests. Fl. B. I. v. 5, p. 657; Prain, Beng. Pl. p. 993; Watt, Dict. Econ. Prod. v. 2, p. 675. *Cycas circinalis,* Roxb. Fl. Ind. v. 3, p. 744 (*not* of Linn.); Dalz. & Gibs. Suppl. p. 83; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517, & Gard. in Ind. ed. 5, p. 461; Watt, Dict. Econ. Prod. v. 2, p. 675.

Cycas revoluta, Thunb. Fl. Jap. (1784) p. 229. A more dwarf species than the former with smaller leaves, a native of Japan. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517, & Gard. in Ind. ed. 5, p. 461; Prain, Beng. Pl. p. 993; Watt, Dict. Econ. Prod. v. 2, p. 675.

ORDER CXXIII. **HYDROCHARITACEÆ*.**

Aquatic usually submerged herbs. Leaves undivided. Flowers regular, monœcious or diœcious (rarely 2-sexual), enclosed in an entire or 2-leaved spathe; females solitary; perianth superior. Sepals 3, green or petaloid. Petals membranous or 0. MALE FLOWERS: Stamens 3—12 in 1—4 series; anthers 2-celled. FEMALE FLOWERS: Ovary inferior, 1-celled; placentas 3—6, parietal or intruded, sometimes almost meeting at the axis; ovules numerous on each placenta, anatropous or orthotropous; styles or style-arms 3—12. Fruit globose or ovoid, dry or pulpy (rarely dehiscent). Seeds few or many; albumen 0; embryo smooth or lineate.—DISTRIB. Warm regions of the world; genera 14; species about 40.

Stems branching, leafy; leaves small; spathes small, sessile.
- Leaves whorled; styles undivided; ovules anatropous ..... 1. HYDRILLA.
- Leaves scattered; styles notched; ovules orthotropous ..... 2. LAGAROSIPHON.

Stems 0, or with stolons only, or a creeping root-stock.
- Leaves all long and narrow, sessile; male scapes many-flowered.
  - Perianth single ..... 3. VALLISNERIA.
  - Perianth double ..... 4. BLYXA.
- Leaves mostly or all petiolate; flowers solitary ..... 5. OTTELIA.

1. **HYDRILLA,** Rich.

A submerged leafy fresh-water herb. Leaves short, 3—4-nately whorled or the lower opposite. Flowers minute, diœcious, the males shortly pedicellate, solitary in a subglobose muricate spathe, the

* From ὕδωρ water, and χάρις grace. The genitive of χάρις is χάριτος; hence the Order should be written *Hydrocharitaceæ* not *Hydrocharidaceæ.*

females sessile, 1—2 in a tubular 2-toothed spathe. MALE FLOWERS: Sepals 3, ovate or obovate, green. Petals 3, oblong or cuneiform. Stamens 3; anthers large, reniform, opening elastically. Pistillode minute. FEMALE FLOWERS: Sepals 3, linear, green. Petals 3, narrow. Ovary produced beyond the spathe into a filiform beak, 1-celled; ovules anatropous; styles 2—3, linear, undivided; stigmas fimbriate. Fruit subulate, smooth or muricate. Seeds 2—3, oblong, minute; testa produced at both ends.—DISTRIB. Central Europe, Mauritius, Madagascar, Tropical Asia and Australia; species 1.

1. **Hydrilla verticillata,** *Presl, Bot. Bemerk.* (1844) p. 112. Fresh-water plants forming large masses; stem slender, 1 ft. and more long, with fibrous roots, much branched, flaccid, with long or short internodes, often rooting from the nodes; branches with a short sheathing leaf at the base. Leaves ¼—⅜ by $\frac{1}{12}$—⅛ in., sessile, 4—8 in a whorl (the lowest often opposite), linear or linear-oblong, apiculate, entire or serrulate; midrib strong. Flowers ⅛—¼ in. long; perianth-segments very variable. Fruit smooth or muricate. The little membranous spathe of the male flowers ultimately splits and liberates the flower, which rises to the top of the water, where it floats, expands, and scatters its pollen. Fl. B. I. v. 5, p. 659; Dalz. & Gibs. p. 277; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517; Prain, Beng. Pl. p. 995; Watt, Dict. Econ. Prod. v. 4, p. 310. *Hydrilla ovalifolia,* Rich. in Mém. Inst. Fr. v. 12, part 2 (1811) p. 76, t. 2; Trim. Fl. Ceyl. v. 4, p. 123. *Serpicula verticillata,* Linn. f. Suppl. (1781) p. 416; Roxb. Cor. Pl. v. 2 (1798) p. 33, t. 164; Fl. Ind. v. 3, p. 578. —Flowers: Dec.

Common in tanks throughout the Presidency. KONKAN: Uran (Bombay Harbour), *Stocks*! DECCAN: Tanks near Poona, *Cooke*!, *Woodrow*; Bijapur, *Cooke*! SIND: Manchar Lake, *Stocks*, 1197!—DISTRIB. Of the genus.

2. LAGAROSIPHON, Harv.

Submerged fresh-water herbs. Leaves scattered, fasciculate or subverticillate, serrulate, the lower sometimes opposite. Flowers dioecious; the males minute, many, in an ovoid 2-fid axillary sessile spathe, the females solitary, sessile in a narrow oblong spathe. Sepals 3, petaloid. Petals rather shorter than or as long as the sepals. MALE FLOWERS: Stamens 2 or 3; filaments short; anthers ovate; staminodes often 2—3. Pistillode 0. FEMALE FLOWERS: Staminodes 0. Ovary oblong, produced into a filiform beak; ovules many, orthotropous; styles 3, stout, notched. Fruit ovoid, oblong or linear; pericarp membranous. Seeds numerous; testa with a mucous coat.—DISTRIB. India, Africa, Madagascar; species 9 or 10.

1. **Lagarosiphon Roxburghii,** *Benth. in Gen. Pl.* v. 3, part 2 (1883) p. 452. Stem 2—3 ft. long, filiform; roots fibrous; upper branches floating. Leaves 3—4 by ¼ in., alternate and opposite, sessile, oblong-lanceolate, acute, minutely serrulate. MALE FLOWERS: Spathe ovoid, at length 2-valved, enclosing many minute, shortly pedicellate flowers. Sepals roadly oblong, pink. Petals as long as the sepals or nearly so, white. Stamens 2; anthers dehiscing transversely.

FEMALE FLOWERS: Spathe ½ in. long, tubular, 2-fid. Ovary lanceolate, produced into a filiform flexuous beak 2—3 in. long. Fl. B. I. v. 5, p. 659; Trim. Fl. Ceyl. v. 4, p. 124; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517; Prain, Beng. Pl. p. 995. *Nechamandra Roxburghii*, Planch. in Ann. Sc. Nat. sér. 3, v. 11 (1849) p. 78 (*exclud. syn.* Roxb. Cor. Pl.); Dalz. & Gibs. p. 277. *Valisneria alternifolia*, Roxb. Hort. Beng. (1814) p. 71; Fl. Ind. v. 3, p. 750; Wight, in Hook. Bot. Misc. v. 2, p. 344, Suppl. t. 11; Grah. Cat. p. 199.—Flowers: Aug.—Feb.

Tolerably common in tanks throughout the Presidency.—DISTRIB. Throughout India; Ceylon, Tropical Asia.

3. **VALLISNERIA**, Linn.

A submerged tufted stemless stoloniferous herb. Leaves very long, linear. Flowers dicœcious, the males many, minute, in an ovoid 3-lobed, shortly pedunculate spathe, the females solitary in a tubular 3-toothed spathe terminal on a very long filiform spiral scape. Sepals 3. Petals 0. MALE FLOWERS: Stamens 1—3; filaments rather thick; anthers didymous. Pistillode 0. FEMALE FLOWERS: Staminodes 3, each 2-fid. Ovary narrow, not produced upwards; ovules numerous; stigmas 3, broad, notched. Fruit linear, included in the spathe. Seeds numerous, oblong; testa membranous.—DISTRIB. Species about 4, in the warmer regions of both hemispheres.

1. **Vallisneria spiralis**, *Linn. Sp. Pl.* (1753) p. 1015. Leaves radical, narrow, linear, varying in length with the depth of the water, reaching sometimes 15 by ½ in., green, translucent, entire or the tips serrulate. MALE FLOWERS numerous, minute. Spathe shortly pedunculate, ¼ in. long, breaking off at the base when the flowers emerge and float on the surface of the water. Pedicels long, slender. Stamens 1—3. FEMALE FLOWERS solitary. Spathe 3-toothed, carried to the surface of the water in flower by the uncoiling of the long filiform spiral scape, which, after fertilization, again coils close and brings the ovary down to ripen under water. Fruit linear, included in the spathe, many-seeded. Fl. B. I. v. 5, p. 660; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517; Prain, Beng. Pl. p. 996; Watt, Dict. Econ. Prod. v. 6, part 4, p. 220. *Vallisneria spiraloides*, Roxb. Hort. Beng. (1814) p. 71; Grah. Cat. p. 200.—Flowers: Apr.—May. VERN. *Saivala*.

More or less abundant throughout the Presidency. KONKAN: *Law*! DECCAN: Poona, *Woodrow*; Kirkee, in the Mula River, *J. G. Woodrow*! SIND: *Stocks*!, *Ritchie*, 695!— DISTRIB. Throughout India; westward to Spain and in warm regions of the Old and New Worlds.

4. **BLYXA**, Noronha.

Annual submerged tufted scapigerous herbs. Leaves linear, acute, entire or minutely serrulate. Flowers hermaphrodite or dicœcious; scapes long or short; males pedicellate, several in a tubular 3-toothed spathe; hermaphrodite or female flowers solitary sessile, within a tubular 2-toothed spathe. Sepals 3, linear. Petals 3, linear,

longer than the sepals. MALE FLOWERS: Stamens normally 3-seriate, 1 or more often reduced to staminodes; anthers narrow, erect. Pistillodes 3, slender. FEMALE FLOWERS: Staminodes 0 or minute. Ovary linear, 1-celled, beaked; placentas parietal; ovules many; style very short; stigmas 3, filiform. Fruit linear, included in the ribbed narrow ventricose spathe; pericarp membranous. Seeds numerous, oblong, smooth or tuberculate, often tailed.—DISTRIB. Tropical Asia, Australia, Sumatra; species 7 or 8.

Flowers dicœcious; seeds with short tails.	
Leaves broad at the base, 8—24 in. long, narrowed upwards to the acuminate tip; seeds $\frac{1}{24}$ in. long, tuberculate	1. *B. Roxburghii.*
Leaves narrowed from below the middle to the base, 4—6 in. long; seeds $\frac{1}{8}$ in. long, strongly echinate	2. *B. Talboti.*
Flowers hermaphrodite; seeds with long filiform tails	3. *B. echinosperma.*

1. **Blyxa Roxburghii,** *Rich. in Mém. Inst. Fr.* (1811) p. 77, t. 5. Leaves 8—24 by $\frac{1}{4}$—$\frac{1}{2}$ in., radical, linear, broad at the base, finely acuminate at the apex. Flowers dicœcious, white. MALE FLOWERS: Scape straight, as long as or rather longer than the leaves. Stamens 8; filaments of unequal lengths, shorter than the petals. FEMALE FLOWERS: Scape shorter and thicker than in the male. Fruit 2—4 by $\frac{1}{8}$ in. Seeds small, $\frac{1}{24}$ in. long, distinctly tuberculate, shortly tailed. Fl. B. I. v. 5, p. 660; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517; Prain, Beng. Pl. p. 996. *Vallisneria octandra,* Roxb. Cor. Pl. v. 2 (1798) p. 34, t. 165; Grah. Cat. p. 199.—Flowers: Feb.

In still water throughout the Presidency, tolerably common.—DISTRIB. Tropical Asia and Australia.

2. **Blyxa Talboti,** *Hook. f. Fl. B. I.* v. 5 (1888) p. 661. Leaves 4—6 by $\frac{1}{8}$—$\frac{3}{8}$ in., linear-lanceolate, serrulate. Flowers 1-sexual. Capsules 1—2 by $\frac{1}{8}$ in. Seeds very strongly echinate with a short tail at each end. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517.—Flowers: Aug.

There is but one sheet in Herb. Kew., the specimens on which are female plants only. I have not seen any male flowers.

KANARA: Karwar, *Talbot,* 287!

3. **Blyxa echinosperma,** *Hook. f. Fl. B. I.* v. 5 (1888) p. 661. An annual almost stemless herb growing in shallow and deep water. Leaves variable in length, 6 in. to 4 ft. long by $\frac{1}{8}$—$\frac{1}{2}$ in. broad, narrowly linear, with entire or (under the lens) minutely denticulate margins. Flowers hermaphrodite, 1 in each spathe. Scapes filiform, elongate, 1—3 ft. long or more, depending on the depth of water. Sepals 3, narrowly linear, obtuse, greenish. Petals white, often spirally twisted at the tip. Stamens 3. Stigmas 3. Capsules 2—3 by $\frac{1}{8}$ in., terete. Seeds spinescent, sometimes $\frac{1}{2}$ in. long (including the tails), with a long filiform tail at each end. At the time of flowering the deep-water plants become detached from the bottom and float on the surface (*Talbot*). Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 517; Prain, Beng. Pl. p. 996. *Hydrotrophus echinospermus,* C. B. Clarke, in Journ. Linn. Soc. v. 14 (1875) p. 8, t. 1.—Flowers: July—Oct.

Stocks without locality in Herb. Kew.! DECCAN: Mahableshwar, *Cooke*!, *Woodrow*. S. M. COUNTRY: Belgaum, *Ritchie*, 1392! KANARA: Yellapur, common in tanks, *Talbot*, 287!—DISTRIB. India (Bengal, W. Peninsula).

5. OTTELIA, Pers.

Submerged or partially floating fresh-water herbs; root fibrous. Leaves radical, crowded, of 2 forms, the submerged narrow, shortly petiolate, the floating ovate-lanceolate, oblong or cordate with long petioles. Flowers solitary, hermaphrodite, sessile within a tubular long-pedunculate spathe. Sepals 3, linear or oblong. Petals 3, longer than the sepals, obovate or orbicular, with fleshy basal appendages. Stamens 6—15, in 2—5 series; anthers erect. Ovary oblong, beaked, almost 6-celled; ovules many; placentas diffuse; styles 6, linear, 2-fid. Fruit oblong, enclosed in the spathe, 3—6-winged. Seeds many, oblong; testa pulpy.—DISTRIB. Species 6 or 7, tropical and subtropical.

1. **Ottelia alismoides,** *Pers. Syn. Pl.* v. 1 (1805) p. 400. A succulent flaccid herb; roots fibrous. Leaves usually submerged, very variable, 2—6 by 1—3 in. (when orbicular reaching 7 in. in diam.), oblong or orbicular, cordate, membranous, undulate, 7—11-nerved; petioles 3-gonous, their length depending on the depth of the water. Flowers solitary. Spathe 1—1½ in. long, 5—6-winged; peduncles varying in length with the depth of water; wings of spathe undulate, unequal; mouth 5—6-toothed. Sepals small, oblong, green. Petals nearly orbicular, 1 in. broad, white with a yellow base, reticulately veined. Ovary narrowly oblong; placentas 6—12. Fruit 1—1½ in. long, ellipsoid, crowned by the withered perianth. Fl. B. I. v. 5, p. 662; Trim. Fl. Ceyl. v. 4, p. 125; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518; Prain, Beng. Pl. p. 997. *Ottelia indica,* Planch. MS. ex Dalz. & Gibs. Bo. Fl. (1861) p. 278. *Damasonium indicum,* Willd. Sp. Pl. v. 2 (1799) p. 276; Grah. Cat. p. 200; Bot. Mag. t. 1201.—Flowers: Dec.—Apr.

Common in tanks, *Dalzell & Gibson.* KONKAN: *Stocks*; Bombay, *Nimmo* ex *Graham.* DECCAN: Poona, *Woodrow*; Bijapur, *Cooke*!; Kolhapur, *Cooke*! GUJARAT: Bulsar, *Dr. Lush* ex *Graham.*—DISTRIB. Throughout India; Ceylon, Tropical Asia, Australia.

ORDER CXXIV. BURMANNIACEÆ.

Erect herbs, annual or with a perennial rootstock, simple or sparingly branched. Leaves chiefly radical or reduced to scales or 0. Flowers hermaphrodite, regular, solitary, terminal, or unilaterally spicate or racemose on a forked rhachis with a bract opposite each. Perianth superior, corolline, persistent, 6-lobed or 6-cleft (rarely 3-lobed); lobes valvate. Stamens 3 or 6, included, adnate to the perianth-tube or throat; filaments very short or 0; anthers 2-celled, dehiscing transversely or longitudinally. Ovary inferior, 3-celled with axial placentas, or 1-celled with 3 parietal placentas; ovules many, minute. Fruit a loculicidal capsule, or opening vertically. Seeds many, minute, reticulate; albumen 0; embryo homogeneous.—

DISTRIB. Throughout warm regions in both hemispheres ; genera 10 ; species 54.

1. BURMANNIA, Linn.

Annual herbs ; stems simple or divided. Leaves ensiform, acuminate, radical, sometimes reduced to scales or 0. Flowers solitary or few. Perianth-segments 2-seriate, connate in a winged or angled tube ; segments of outer series 3, of inner also 3, smaller, sometimes obsolete. Stamens 3, sessile or subsessile ; anther-cells short, separated by a broad connective, dorsally crested, dehiscing transversely. Ovary 3-celled ; style short ; stigma 3-lobed. Fruit a capsule more or less 3-winged, opening loculicidally between the wings, or sometimes rupturing transversely. Seeds minute, oblong or subglobose.—DISTRIB. Tropics of both hemispheres ; species about 20.

1. **Burmannia cælestis,** *Don, Prodr. Fl. Nep.* (1825) p. 44. VAR. **pusilla,** *Trim. Fl. Ceyl.* v. 4 (1898) p. 131. Stem 3—6 in. (rarely reaching 7 in.) high, very slender. Leaves very few, scale-like, sessile along the stem, $\frac{1}{10}$—$\frac{1}{8}$ in. long, lanceolate-subulate. Flowers $\frac{1}{4}$—$\frac{1}{2}$ in. long, obcordate or orbicular in outline, blue or purple, solitary or 2—3 together (often 3 when the central flower is sessile, the others stalked). Calyx-tube winged, the wings rounded, truncate or retuse at the top. Petals minute.—Flowers : Sept.—Oct.

This is the common form. I have never seen a specimen of *B. cælestis proper* from the Bombay Presidency. *Burmannia pusilla* (sp.), Thw. Enum. p. 325 ; Hook. f. Fl. B. I. v. 5, p. 665 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518. *B. triflora,* Roxb. Fl. Ind. v. 2 (1832) p. 117 in part ; Dalz. & Gibs. p. 271. *B. disticha,* Grah. Cat. p. 223 (*not* of Linn.). *Gonyanthes pusilla,* Miers, in Trans. Linn. Soc. v. 18 (1841) p. 537, t. 38, fig. 3.

KONKAN : hot springs near Mahar, *Dalzell & Gibson* ; Matheran, *Cooke* !, *H. M. Birdwood.* DECCAN : Mahableshwar, *Cooke* !, *Woodrow* ! S. M. COUNTRY : Castlerock, *Talbot,* 2588 !

ORDER CXXV. ORCHIDACEÆ.

Herbs (rarely shrubby), usually either (1) terrestrial often tuberous-rooted with annual herbaceous leafy or leafless simple stems and with solitary or spicate or racemose flowers, or (2) epiphytes with perennial stems or branches usually leafy, variously thickened and often forming a pseudobulb, flowering from the top, sides, or base of the pseudobulb ; bracts usually present. Flowers hermaphrodite, irregular, often showy. Perianth superior, of 6 free or variously connate segments, 2-seriate ; 3 outer segments (*sepals*) more or less similar, the 2 lateral sometimes connate in a short or long sac or spur-like base (*mentum*) ; 3 inner segments dissimilar, the 2 lateral alike and often resembling the sepals, the remaining petal (*lip*) usually very differently shaped. Stamens and style united in a column opposite the lip ; anther usually 1 (sometimes 2) on the front, top, or back of the column and free or adnate to it, 2-celled or, by subdivision, 4-celled ; top of the column sometimes

produced towards the lip into a beak (*rostellum*) ; pollen-grains usually coherent in each cell into 1, 2, or 4 pairs of oblong or globose or pyriform waxy or powdery masses (*pollinia*), which are free or adnate by pairs or fours immediately or by a stalk (*caudicle*) to a gland. Ovary inferior, 1-celled, usually linear or twisted ; ovules many, minute ; stigma one or two viscid spots on the top or concave face of the column, opposite the lip and below the anther. Fruit a capsule, usually opening by 3 or 6 longitudinal fissures (rarely fleshy and subindehiscent). Seeds very many, minute, with a lax hyaline testa enclosing a homogeneous nucleus.—DISTRIB. Genera 340 ; species about 5000, temperate and tropical (rarely arctic).

Pollinia waxy.
Pollinia free or those of each cell held together at the base by a viscid appendage, not attached by their bases or by a caudicle to the rostellum.
Pollinia 4.
Leaves equitant ..... 1. OBERONIA.
Leaves not equitant.
Terrestrial or epiphytic herbs; leaves membranous, usually sessile; inflorescence terminal; flowers rather small, in racemes or spikes; column prolonged below into a foot.
Lip with basal auricles; column very short with broad arms; terrestrial herbs ..... 2. MICROSTYLIS.
Lip without basal auricles; column long with callosities or wings or both; rostellum sometimes double; terrestrial or epiphytic herbs ..... 3. LIPARIS.
Epiphytic herbs; leaves chartaceous or coriaceous; column more or less prolonged below into a foot.
Stems solitary or cæspitose or composed of discrete pseudobulbs basally attached on a short or long rhizome.
Flowers from the stems or pseudobulbs, terminal or axillary, solitary or on short few-flowered peduncles or in few- or many-flowered racemes, usually large and showy; stems cæspitose with more than 2 leaves, rarely a creeping rhizome with distant pseudobulbs and binary or solitary apical leaves; pollinia all subequal, always free; lip rarely mobile ..... 4. DENDROBIUM.
Flowers from lateral scapes rising from the base of the pseudobulbs or from the rhizome between them, solitary or in heads, umbels, or racemes; leaves solitary and coriaceous, or binary and chartaceous, usually from the apices of pseudobulbs on a generally prolonged rhizome (occasionally the rhizome and less often the pseudobulbs inconspicuous or absent); pollinia free or occasionally attached by their bases to a small ball of translucent tissue, the inner pair always smaller than the outer.
Lateral sepals greatly exceeding the dorsal; flowers umbellate ..... 5. CIRRHOPETALUM.

Lateral sepals not greatly exceeding the dorsal.
Lateral sepals alongside or under the lip; flowers racemose or spicate; pollinia free ..... 6. BULBOPHYLLUM.
Lateral sepals spreading; scape 1-flowered; pollinia subcoherent in pairs in each cell ..... 7. TRIAS.
Stems jointed, composed of elongated pseudobulbs strung on a woody core; leaves solitary or binary, chartaceous; flowers in racemes; column footless ..... 8. PHOLIDOTA.
Tufted stemless herbs; leaves radical; pseudobulbs 0; flowers in panicles; column footless..... 9. JOSEPHIA.

Pollinia 8.
Epiphytic pseudobulbous herbs, usually small; inflorescence lateral or terminal, racemose or capitate; flowers with a mentum; column prolonged below into a foot; lip incumbent on the foot of the column; pollinia subequal, all cohering or cohering by fours to a common membrane.
Sepals connivent at the base, all or the lateral only connate; pseudobulbs small, discoid, reticulate ..... 10. PORPAX.
Sepals and petals free; pseudobulbs not discoid ..... 11. ERIA.
Epiphytic or terrestrial herbs; stems slender or equally thickened along their whole length; leaves distichous, lanceolate, glaucous; lip adnate to the base of the footless column, shortly spurred; side lobes involving the column; midlobe fringed; pollinia attached by fours to a granular membrane ..... 12. THUNIA.

Pollinia 2 or 4, attached singly or in pairs or fours by one or rarely two caudicles to a viscid gland derived from the stigma.
Pollinia 2.
Stem pseudobulbous or tuberous ot the base.
Terrestrial herbs; flowers in pedunculate racemes; leaves plicate.
Lip distinctly 3-lobed, saccate or spurred at the base; inflorescence strict..... 13. EULOPHIA.
Lip obscurely 3-lobed, wide-ventricose, but not spurred at the base; inflorescence at first decurved ..... 14. GEODORUM.
Epiphytic herbs with long linear sheating leaves on usually a large fleshy pseudobulb; lobes of the lip embracing the unwinged column..... 15. CYMBIDIUM.
Stem not pseudobulbous nor tuberous at the base.
Column prolonged into a foot.
Spur erect or parallel to the blade of the lip, pointing forwards; lip adnate to the produced foot of the column; side lobes of lip erect; foot of column long ..... 16. SARCOCHILUS.
Spur saccate, laterally compressed; side lobes of lip 0; foot of column small ..... 17. RHYNCHOSTYLIS.
Spur conical, usually more or less elongated, erect or curved under the midlobe of the lip; foot of column large ..... 18. ÆRIDES.

Column not prolonged into a foot.
Lip not spurred nor saccate.
Leaves terete; flowers in short spikes; caudicle of pollinia broad ..... 19. LUISIA.
Leaves lorate; flowers in racemes with very long simple or branched peduncles; caudicle of pollinia long, narrow ..... 20. COTTONIA.
Lip spurred or saccate.
Side lobes of lip large; flowers large ..... 21. VANDA.
Side lobes of lip small or 0.
Spurs 2, collateral ..... 22. DIPLOCENTRUM.
Spur or sac single.
Spur not septate within; flowers corymbose, fleshy, rigid, not flexible ..... 23. ACAMPE.
Spur septate within; flowers in extra-axillary racemes or panicles, flexible ... 24. SARCANTHUS.
Pollinia powdery or lamellate, never waxy.
Anther terminal; pollinia 2 or 4, cohering by their sides, without either gland or caudicle; leaf solitary, appearing after the flowers; small terrestrial erect green herbs ..... 25. POGONIA.
Anther posticous, vertical, but inverted; pollinia 2, or 4 in 2 pairs, attached occasionally directly but usually by one or two caudicles to a single gland.
Stigma single, anticous; pollinia 4, short, clavate, inserted without a caudicle on a small elongate gland; lip neither clawed nor spurred ..... 26. SPIRANTHES.
Stigmas 2, lateral, distant; pollinia 2, bipartite; lip clawed beyond the spur or sac; leaves membranous.
Sepals free ..... 27. ZEUXINE.
Sepals connate to the middle into a tube ..... 28. CHEIROSTYLIS.
Anther-cells sessile on the column, remote or contiguous, always discrete; pollinia 2, sometimes 2-partite, adnate with or without caudicles to separate glands; leaves membranous; terrestrial herbs.
Sepals subequal and more or less connivent; petals equal to or shorter than the sepals ..... 29. PERISTYLUS.
Sepals unequal, the lateral ones more or less spreading.
Stigmas sessile or subsessile, confluent or more or less distinct ..... 30. PLATANTHERA.
Stigmas more or less distinctly stalked, very rarely confluent ..... 31. HABENARIA.

1. **OBERONIA,** Lindl.

Epiphytic herbs with usually very short often tufted stems. Leaves coriaceous or fleshy, usually ensiform, always distichous and equitant. Flowers minute, numerous, in dense subcylindric spikes or racemes, expanding centrifugally. Sepals ovate or oblong, subequal. Petals as wide as or narrower than the sepals. Lip larger than the sepals, sessile, more or less concave, usually lobed and often erose. Column very short, stout. Anther terminal or incumbent; pollinia 4, cohering in pairs, waxy.—DISTRIB. Species about 60, Tropical Asiatic, Australian, and Pacific.

Petals broad, ovate or obovate.
Petals ovate; lateral lobes of lip small; midlobe 2-fid with a broad sinus; flowers greenish-yellow ... 1. *O. Falconeri.*

Petals obovate; lateral lobes of lip large, orbicular; midlobe 2-fid with a narrow sinus; flowers brick-red ..... 2. *O. recurva.*
Petals linear ..... 3. *O. Brunoniana.*

1. **Oberonia Falconeri,** *Hook. f. Icon. Pl.* (1888) t. 1780. Leaves coriaceous, broadly ensiform, acute, subfalcate, 1—2 by ¼—½ in., the lower becoming gradually smaller. Scape terete, shorter than the leaves, robust ; bracts numerous, ovate-lanceolate or oblong, serrulate, slightly shorter than the flowers. Flowers about $\frac{1}{20}$ in. across, greenish-yellow, numerous, shortly pedicellate, in a dense raceme 3—5 in. long ; rhachis stout. Sepals broadly ovate. Petals ovate, obtuse. Lip linear-oblong ; side lobes small, rounded or tooth-like ; midlobe 2-fid at the apex, the lobules narrow, parallel or incurved, subacute, with a subtruncate broad sinus. Capsules shortly pedicellate, deeply ribbed, ⅛—¼ in. long. Fl. B. I. v. 5, p. 678 , Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518 ; Prain, Beng. Pl. p. 1003 ; Gammie, in Journ. Bomb. Nat. v. 16, part 4 (1905) p. 564. *Oberonia iridifolia,* Wall. Cat. 1948 (1 and 3) in part (*not* of Lindl.).—Flowers : Sept.—Oct.

KONKAN : *Law* !, *Woodrow* ! ; Kalyan, *Millard* ex *Gammie.*—DISTRIB. India (Nepal, Behar, Chota Nagpur, Dehra Dun, W. Peninsula).

2. **Oberonia recurva,** *Lindl. in Bot. Reg.* (1839) *Misc.* No. 8. A small plant 2—3½ in. high to top of inflorescence. Leaves 1—1¾ in. long, thin, pale green, oblong-lanceolate, acuminate, nearly straight. Scape short, terete ; bracts lanceolate, shorter than the flowers, entire or subcrenulate. Flowers $\frac{1}{30}$ in. across, hyaline, sparsely gland-dotted, pale brick-red, pedicellate, in slender dense-flowered racemes 1½—2½ in. long. Sepals broadly triangular-ovate, obtuse. Petals obovate-oblong, obtuse, irregularly toothed. Lip usually longer than the sepals, the margins crenate or erose ; side lobes large, orbicular ; midlobe obcordate, 2-lobulate, with usually a narrow sinus. Capsules ⅛ in. long, ovoid or subobovoid, with elongate pedicels as long as the capsules. Fl. B. I. v. 5, p. 680 ; Dalz. & Gibs. p. 260 ; Trim. Fl. Ceyl. v. 4, p. 137 ; Hook. f. Icon. Pl. (1888) t. 1784 A ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518 ; Gammie, in Journ. Bomb. Nat. v. 16, part 4 (1905) p. 564. *Oberonia setifera,* Lindl. Fol. Orchid. [*Oberonia*] (1859) p. 3.—Flowers : Feb.—Apr.

Throughout the Ghâts and Konkan, *Gammie.* KONKAN : *Law* !, *Dalzell* ! DECCAN : Mahableshwar, *Cooke* !, *Woodrow*, *H. M. Birdwood* ; Khandala, *Law*, 39 !—DISTRIB. India (W. Peninsula).

3. **Oberonia Brunoniana,** *Wight, Icon.* v. 5 (1852) p. 3, t. 1622. A large and handsome species. Leaves elongate, 6—14 by ¾—1¼ in., linear-oblong, succulent, nearly as long as the inflorescence. Scapes 2—8 in. long, flattened, adnate to the upper leaf, 2-edged ; adnate leaf 1—4 in. long, usually falcate at the apex, variable in position ; bracts lanceolate, denticulate, acute. Flowers ⅛ in. across, sessile, in dense stiff erect spikes 4—6 in. long, like a rat's tail (*Hooker*). Sepals ovate, subobtuse, reflexed, slightly longer than the petals, brown. Petals linear, subacute, quite entire, pale yellow. Lip

brown, cordate at the base, with a concave disk, entire, constricted below the apex which is 2-lobed, sometimes with a small tooth between the lobes. Capsules ⅛—¼ in. long, sessile or nearly so. Fl. B. I. v. 5, p. 681. This may possibly be the plant which Dalzell & Gibson (Bo. Fl. p. 260) term *O. Lindleyana.*

KONKAN: *Dalzell!* KANARA: Kála naddi, *Ritchie,* 1405!—DISTRIB. India (W. Peninsula), apparently endemic.

EXCLUDED SPECIES.

OBERONIA PLATYCAULON, Wight, Icon. v. 5 (1852) p. 3, t. 1623. Leaves 6—10 by ½—¾ in., narrowly ensiform, straight, subacute. Scape very broad, flat, adnate to a leaf to the top and almost as broad as the leaf; bracts ovate, sheathing the sessile ovary, erose, obtuse. Flowers whitish or pale yellow, about ⅛ in. across, in spikes 3—5 in. long with a stout rhachis. Petals narrow, linear, slightly shorter than the sepals. Lips broader than long; side lobes broad, rounded; midlobe 3-toothed, the central tooth the smallest. Capsules sessile or nearly so.

This plant does not appear to have been found in the Bombay Presidency. It seems to belong to the Pulney Hills. Graham does not mention the plant (nor in fact the genus) in his Catalogue, nor do Dalzell & Gibson include it in their 'Flora of Bombay.' Woodrow does not cite it, and Gammie says in his "Orchids of the Bombay Presidency" (Journ. Bomb. Nat. v. 16, p. 564) that he does not know the plant. There are in all 2 sheets in Herb. Kew., one from the Pulney Hills from Wight's Herbarium and one other (also from Wight's Herbarium) without flowers, on which is a ticket apparently written by Wight—"19. *Parasite, rare. I do not know what it is*"; and at the bottom of the sheet in pencil are the words "*Bombay Graham.*" Thus the only evidence as to the occurrence of the plant in Bombay depends on a pencilled note which does not state that the plant was collected in Bombay, but merely sent from there by Graham.

2. MICROSTYLIS, Nutt.

Terrestrial (rarely epiphytic) herbs, pseudobulbous or not. Leaves one or more, membranous, plicate, continuous with their sheaths. Flowers small, resupinate in terminal racemes. Sepals spreading or recurved, subequal. Petals as long as the sepals but narrower. Lip adnate to the base of the column, usually flat, the basal lobes large, sagittate, and produced upwards; or cup-shaped with small lobes or without basal lobes, the apex emarginate, 2—3-lobed, erose or entire. Column usually very short with 2 spreading arms; anther subterminal, 2-celled; pollinia 4, ovoid or obovoid, waxy.—DISTRIB. Species about 70, chiefly in Tropical Asia and America.

1. **Microstylis versicolor,** *Lindl. Gen. & Sp. Orchid.* (1830) p. 21 (*not* of Wight). Stem 3—6 in. high, slender or robust, stoloniferous, bearing numerous acute sheaths, base swollen or not. Leaves usually drying yellowish-brown, thinly membranous, petiolate, 2½—7 by 1¼—3 in., broadly ovate or elliptic, acute or acuminate, plaited, silvery or purplish beneath, 5—7-nerved, decurrent into a sheathing petiole ½—3 in. long, base usually unequal-sided. Scape with raceme 6—12 in. long; bracts lanceolate, deflexed, about as

long as the flowers. Flowers fragrant, $\frac{1}{8}$—$\frac{1}{6}$ in. broad, green, yellow, or purple, in slender racemes. Sepals broadly ovate, obtuse, concave, 1-nerved, the dorsal longest and narrowest. Petals narrowly linear, subobtuse. Lip broader than long, rounded, reniform or fan-shaped, pectinate. Column somewhat constricted in the middle, truncate; arms short or 0. Fruit $\frac{3}{8}$ in. long, clavate-oblong, erect, shortly pedicellate. Jackson, Index Kewen. v. 3 (1895) p. 234. *Microstylis Rheedei,* Wight, Icon. v. 3 (1843—45) part 2, p. 9, t. 902. Hook. f. Fl. B. I. v. 5, p. 690; Dalz. & Gibs. p. 260 (*exclud. syn.*); Hook. f. Icon. Pl. t. 1832; Trim. Fl. Ceyl. v. 4, p. 141; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518; Prain, Beng. Pl. p. 1004; Gammie, in Journ. Bomb. Nat. v. 16, part 4 (1905) p. 565. *Malaxis Rheedei,* Heyne, ex Wall. Cat. (1828) sub n. 1939; Grah. Cat. p. 202.—Flowers: June—Aug.

Lindley's specific name *versicolor* is more than 13 years prior to Wight's name *Rheedei.*

Common on the Ghâts. KONKAN: *Law*!, *Stocks*! DECCAN: Khandala, *Cooke*!; Mahableshwar, *Cooke*!, *Woodrow*, *H. M. Birdwood*; Koina Valley below Mahableshwar, common, *Cooke*! KANARA: *Law*!—DISTRIB. India (Chota Nagpur, W. Peninsula); Ceylon.

3. **LIPARIS,** Rich.

Terrestrial or epiphytic herbs (terrestrial in the Bombay species), pseudobulbous or not. Leaves 1 or more, membranous or coriaceous, continuous with the sheath, or thickened and jointed at the base. Flowers small, in terminal racemes, resupinate or not. Sepals spreading or recurved, the margins usually revolute. Petals as long as the sepals, but much narrower. Lip adnate to the base of the column, usually broad, flat or deflexed from the middle, sometimes concave, often with calli near the base. Column elongate, often arched, usually winged near the apex and tumid or dilated and compressed at the base; anther terminal; pollinia 4.—DISTRIB. Species about 120, in temperate and tropical regions, most numerous in India.

1. **Liparis nervosa,** *Lindl. Gen. & Sp. Orchid.* (1830) p. 26. Terrestrial, 6—15 in. high. Pseudobulbs often present, ovoid. Stem 2—5 in. long, slightly bulbous at the base, bearing several sheaths. Leaves 2 or 3, alternate, sessile, sheathing, $2\frac{1}{2}$—5 by $\frac{3}{4}$—$1\frac{3}{4}$, elliptic-lanceolate, acute, narrowed into the amplexicaul sheath, plicate; main nerves 5, with numerous slender parallel veins between. Scape angular, together with the raceme 4—8 in. long; bracts $\frac{1}{8}$—$\frac{1}{4}$ in. long, lanceolate, acute, spreading (not deflexed), shorter than the twisted ovary. Flowers green, tinged with pink or yellow, in erect rigid racemes; rhachis angular, striate. Sepals 5-nerved; dorsal sepal $\frac{1}{4}$ by $\frac{1}{16}$ in., linear-lanceolate, obtusely pointed, with revolute margins; lateral sepals $\frac{1}{8}$ by $\frac{1}{8}$ in., falcate-oblong, recurved. Petals $\frac{1}{4}$ by $\frac{1}{20}$ in., linear, obtuse, with revolute margins, reflexed. Lip $\frac{1}{8}$ in. long and as broad as long, cuneately obovate or subquadrate, often recurved from the middle, tip truncate or slightly obcordate with a

minute apiculus, and with 2 calli at the base. Column incurved above the middle, with 2 small rounded wings. Fruit ½—¾ in. long, clavate, very shortly pedicellate. Trim. Fl. Ceyl. v. 4, p. 145 ; Index Kewen. Suppl. 2 (1905) p. 106. *Liparis paradoxa,* Reichb. f. in Walp. Ann. v. 6 (1861) p. 218 ; Hook. f. Fl. B. I. v. 5, p. 697 ; King, in Ann. Roy. Bot. Gard. Calc. v. 8, p. 27, t. 34 ; Prain, Beng. Pl. p. 1005 ; ? Gammie, in Journ. Bomb. Nat. v. 16, part 4 (1905) p. 565. *Liparis odorata,* Lindl. Gen. & Sp. Orchid. (1830) p. 26. *Malaxis nervosa,* Sw. in Vet. Akad. Nya Handl. Stockh. v. 21 (1800) p. 235. *Malaxis odorata,* Willd. Sp. Pl. v. 4 (1805) p. 91 ; Grah. Cat. p. 202.—Flowers : July—Sept.

Rare. KONKAN : *Stocks* !, *Law* ! KANARA : *Law* ! Gammie [Journ. Bomb. Nat. v. 16, part 4 (1905) p. 565] describes a plant very close to this which was collected by Mr. Spooner on the Belgaum and N. Kanara Ghâts, but the lateral sepals of that plant are described as being similar to the dorsal, which is not the case in the specimens of *L. nervosa* in Herb. kew. collected by *Stocks* and *Law*.

VAR. *Dalzellii*. More robust, with stems ⅜ in. in diam., leaves 4—6 by 2½—2¾ in., and much larger flowers. *Liparis Dalzellii* (sp.), Hook. f. Fl. B. I. v. 5 (1890) p. 698 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518 ; Gammie, in Journ. Bomb. Nat. v. 16, part 4 (1905) p. 565.

There is but 1 specimen in Herb. Kew. from the South Konkan supplied by Dalzell, and no one seems to have seen another. Woodrow merely cites the 'Flora of British India,' and Gammie says he does not know the plant. Except its size, I can find no difference between the variety and the typical plant, and I conclude that the variety is merely an accidental luxuriant specimen grown under some peculiar conditions.

4. **DENDROBIUM,** Swartz.

Epiphytic herbs ; pseudobulbs short and fleshy or elongated and stem-like, usually tufted. Leaves sessile, never plicate, bases sheathing. Flowers solitary or in fascicles or racemes, often large and showy. Sepals subequal, the latter obliquely adnate to the foot of the column and forming with it a sac or mentum (*spur*). Petals usually like the sepals. Lip sessile or clawed at the base, adnate to and incumbent on the foot of the column ; side lobes embracing the column or spreading or 0 ; terminal lobe broad or narrow, flat, convex, concave or saccate, its disk sometimes lamellate. Column short, its foot long or short with usually a nectar-secreting depression or cavity at its extremity, the apex angled or 2-toothed ; anther 2-celled ; pollinia 4, equal in length, sometimes in free pairs but usually all slightly coherent, the 4 never all quite free, ovoid or oblong, slightly compressed, waxy.—DISTRIB. Species about 300, Tropical Asiatic, Australasian, and Polynesian.

Stems branched, the branches formed by chains of uninodal sessile or stipitate pseudobulbs. Leaf solitary, terminal, coriaceous, flat, persistent. Flowers 1—3 from the base of the leaf, medium-sized, white or pale, lasting only one day; mentum (*spur*) short; the edge of the lip plicate ..... 1. *D. Macræi.*

Pseudobulbs short, tufted, with 2 or 3 leaves; or stems elongate and leafy. Leaves narrow, membranous, deciduous or persistent. Flowers in slender terminal or lateral racemes, small or medium-sized; mentum rather long, conical incurved, or short and obtuse; lip often with a flat keel on the disk that terminates in a truncate crenate callus on the midlobe.

- Stems simple or nearly so, often a small pseudobulb.
  - Small plants with crowded ovoid pseudobulbs; flowers small, in racemes from the top of the pseudobulb; petals not broader than the dorsal sepal.
    - Sepals and petals white; lip pink with dark-red veins ..... 2. *D. microbolbon.*
    - Sepals and petals white; lip yellow-green ..... 3. *D. Mabelæ.*
  - Larger plants; stems tufted, 10—18 in. long; flowers in terminal and lateral racemes; petals broader than the dorsal sepals.
    - Lateral sepals oblong; midlobe of lip subquadrate; flowers cream-colored ... 4. *D. chlorops.*
    - Lateral sepals lanceolate, falcate; midlobe of lip ovate, acute; flowers white, often with a tinge of pink ..... 5. *D. barbatulum.*
- Stems long, copiously branched; flowers small ... 6. *D. herbaceum.*

Stems elongate, stout or slender, cylindric, clavate or nodose. Leaves membranous or coriaceous, persistent or deciduous. Flowers usually large, in lateral pairs or fascicles or racemes (very rarely solitary), variously colored, white, yellow, or purple.

- Mentum (*spur*) half as long as the dorsal sepal; lip longer than broad ..... 7. *D. macrostachyum.*
- Mentum less than half as long as the dorsal sepal; lip as broad as long ..... 8. *D. crepidatum.*

1. **Dendrobium Macræi,** *Lindl. Gen. & Sp. Orchid.* (1830) p. 75. Rhizome creeping, annulate, giving off pendulous smooth polished stems 2—3 ft. long, bearing at irregular intervals narrowly fusiform somewhat compressed shining pseudobulbs 2—2½ in. long; internodes long, terete. Leaf terminal from the top of the pseudobulb, solitary, 4—8 by ¾—1 in., linear-oblong, obtuse, with numerous parallel slender veins. Flowers remaining open for a few hours only, 1—3 from near the base of a leaf, ¾—1 in. across, white, the lip and mentum yellow [in the Sikkim specimen figured in the Annals of the Royal Botanic Garden, Calcutta (*l. c.*), the side lobes of the lip are shown pale-pink speckled with red, the middle greenish-yellow]; bracts beneath the flower small, ovate, acute, sheathing. Sepals oblong-lanceolate, subacute, spreading. Mentum (*spur*) short, broad, conical. Petals narrower than the sepals, linear-oblong, obtuse. Lip oblong-obovate in general outline, decurved about the middle, concave; side lobes oblong, obtuse, the disk between them with 2 fleshy crests; midlobe contracted and coarsely erose-crisped at its base, the terminal part expanded and the edges much plicate. Column short with a short foot; pollinia narrowly oblong. Fl. B. I. v. 5, p. 714; Dalz. & Gibs. p. 260; Trim. Fl. Ceyl. v. 4, p. 150;

King, in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 61, t. 86 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518 ; Gammie, in Journ. Bomb. Nat. v. 16, part 4 (1905) p. 566. *Dendrobium nodosum,* Dalz. in Kew Journ. Bot. v. 4 (1852) p. 292.—Flowers : June—Aug. VERN. *Joivansi.*

DECCAN : Mahableshwar, *Cooke* ! ; Koina Valley below Mahableshwar, where it forms large masses on the branches of trees, *Cooke* !, *H. M. Birdwood.* S. M. COUNTRY : Rámghát, on Jambul trees, *Dalzell & Gibson.* KANARA : Sampkhand (N. Kanara), *Woodrow.*—DISTRIB. India (Sikkim, Khasia Hills, Birma, W. Peninsula) ; Ceylon, Java.

2. **Dendrobium microbolbon,** *A. Rich. in Ann. Sc. Nat.* sér. 2, v. 15 (1841) p. 19, t. 8. A small epiphyte. Pseudobulbs small, ½—¾ in. long, ovoid, crowded, covered with a network of fibres formed by decaying membranous sheaths. Leaves usually 2 from the top of the pseudobulb, very soon falling, rather thick, 2—3 by ¼—⅜ in., oblong-lanceolate, acute. Flowers 4—10, in racemes 1—3 in. long (including the scape) ; bracts ⅒—⅛ in. long, lanceolate ; pedicels and ovary together ¼ in. long in flower, slender. Sepals white ; lateral sepals ⅕ in. long by ⅒ in. broad below the middle from where it is decurrent into the mentum, falcately tapering to a subacute point ; dorsal sepal ¼ by ⅛ in., lanceolate, obtuse, veined. Mentum (*spur*) stout, ⅛ in. long, slightly curved. Petals white, ¼ by ⅒ in., oblanceolate, obtuse. Lip pink with darker veins, ¼ in. long and as broad as long, suborbicular in outline, 3-lobed ; side lobes small, subacute ; midlobe about ⅛ in. long, truncate or slightly emarginate, crenulate, the disk with a pair of fleshy keels each terminating in front in a short triangular point. Capsules large for the size of the plant, ¼ in. long, broadly ellipsoid, smooth (not ribbed), on a slender pedicel ⅓ in. long. Fl. B. I. v. 5, p. 716 ; Dalz. & Gibs. p. 261 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518 ; Gammie, in Journ. Bomb. Nat. v. 16, part 4 (1905) p. 567. *Dendrobium humile,* Wight, Icon. v. 5, part 1 (1852) p. 5, t. 1643. *D. crispum,* Dalz. in Kew Journ. Bot. v. 4 (1852) p. 111.—Flowers : Dec.—Mar.

KONKAN : *Stocks* !, *Dalzell* ! ; throughout the Ghâts and Konkan, *Gammie.* DECCAN : Mahableshwar, *Cooke* !, *Fairbank* ex *H. M. Birdwood* ; Lanoli, *Woodrow.*—DISTRIB. India (W. Peninsula).

3. **Dendrobium Mabelæ,** *Gammie, in Journ. Bomb. Nat.* v. 16, part 4 (1905) p. 567. Pseudobulbs small, tufted, 2-jointed, ovoid, ¼ in. long, or as much as 4-jointed and 1½ in. long, clothed with a network of fibres. Leaves 2, linear-oblong, reaching 3 in. long, moderately firm. Flowers 3—4 or more, in racemes which are longer than the leaves and arising between them ; peduncle slender, bracteate at the base and towards the middle ; pedicels including the ovary ¼ in. long. Sepals white ; lateral sepals ¼ in. long from a broad base, subfalcate, acute ; dorsal sepal rather more than ¼ in. long by ⅒ in. broad, oblong-lanceolate. Petals white, as long as the dorsal sepal, linear-spathulate. Lip yellowish-green with faint rose-colored blotches and streaks (*Gammie*), hinged on the extremity of the foot of the column, suborbicular in outline, ⅛ in. long ; side lobes shallow, obtuse ; midlobe suborbicular, ⅒ in. in diam., fringed with thick white hairs ; disk with a channelled ridge which is free and 2-lobed

at the end and extending as far as the lateral lobes.—Flowers: Oct.—Dec.

S. M. COUNTRY: Belgaum Ghâts, *Gammie*; Castlerock, *Bhiva!*; Londa, *Bhiva!*—DISTRIB. India (W. Peninsula).

4. **Dendrobium chlorops,** *Lindl. in Bot. Reg.* (1844) *Misc.* p. 44. Stems tufted, 12—18 in. long, usually slender. Leaves on first year's shoots 2—4 by ¼—½ in., lanceolate, acute, the second year's shoots leafless and flower-bearing. Flowers ⅝ in. in diam., with a primrose-like scent when first expanded, in lateral and terminal racemes 3—6 in. long; pedicels and ovary together reaching ½ in. long in flower, slender; bracts below the pedicels ⅛ in. long, ovate-lanceolate, acute. Sepals cream-colored; lateral sepals ⅓ in. long by ⅛ in. broad at the base, oblong-lanceolate, subacute; dorsal sepal ⅓ in. long, less than ⅛ in. broad, oblanceolate, obtuse. Mentum (*spur*) conical, ⅛ in. long. Petals ⅜ by ⅛ in., cream-colored, obovate. Lip flat, rather more than ⅜ in. long; side lobes small, rounded, greenish; midlobe large, subquadrate, cream-colored; disk pubescent with a channelled ridge. Column greenish; anther white (*Veitch*). Fruit not seen. Fl. B. I. v. 5, p. 719; Dalz. & Gibs. p. 261; Veitch, Man. Orchid. Pl. part 3 (1888) p. 27; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518; Gammie, in Journ. Bomb. Nat. v. 16, part 4 (1905) p. 568. *Dendrobium barbatulum,* Wight, Icon. t. 910 (*not* of Lindl.). *Cymbidium ovatum,* Willd. Sp. Pl. v. 4 (1805) p. 101; Grah. Cat. p. 203.—Flowers in the cold season.

Throughout the Ghâts and Konkan towards the south, *Gammie*. KONKAN: *Stocks!*, *Law!*; Konkan Ghâts, *Woodrow*. DECCAN: Mahableshwar, *Cooke!*, *H. M. Birdwood*; Phonda Ghât, *Ritchie*, 1410!—DISTRIB. India (W. Peninsula), apparently endemic.

5. **Dendrobium barbatulum,** *Lindl. in Wall. Cat.* (1828) 2013. Stems 10—15 in. long, swollen at the base, tapering towards the apex. Leaves 3—4 by ½ in., lanceolate, acute, deciduous. Flowers white, often suffused with pink, glistening when fresh, in lateral and terminal racemes 3—6 in. long (including the peduncle); pedicels together with the ovary in flower ½ in. long; bracts 1/10—⅛ in. long, lanceolate, scarious. Lateral sepals ¾ by ⅛ in., lanceolate, acute, slightly falcate; dorsal sepal ¾ by ⅛ in., linear-lanceolate, acute. Mentum (*spur*) conical, acute, ⅛ in. long. Petals ⅞ by ⅛ in., broadly lanceolate, acute. Lip ⅝ in. long, 3-lobed; side lobes ⅛ in. long, obtuse; midlobe ⅝ by ⅜ in., rhomboid-obovate, apiculate, entire, bearded at the base with yellow hairs. Fruit 1¼ in. long. Fl. B. I. v. 5, p. 719; Dalz. & Gibs. p. 261; Veitch, Man. Orchid. Pl. part 3 (1888) p. 21; Bot. Mag. t. 5918; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 31.—Flowers: Apr.—May. VERN. *Jadhia-lasan.*

KONKAN: *Stocks!*, *Law!*, *Graham*; Matheran, *Woodrow*, *H. M. Birdwood.* DECCAN: Mahableshwar, common, *Cooke!*—DISTRIB. India (W. Peninsula).

6. **Dendrobium herbaceum,** *Lindl. in Bot. Reg.* (1840) *Misc.* p. 69. A large pendulous epiphyte with much-branched stems 2—3 ft. long; lower part of stem naked and as well as the branches

smooth, polished and shining, brown or yellow ; branchlets leafy. Leaves 2—4½ by ¼—⅜ in., linear-lanceolate, acute or subobtuse, caducous. Flowers yellow ; racemes terminal, few-flowered, rarely reaching 1 in. long ; peduncle ¼—⅓ in. long ; pedicels together with the ovary ¼—½ in. long, filiform ; bracts 1/12—⅛ in. long, lanceolate, scarious. Lateral sepals ¼ in. long by 1/10 in. broad at the base, oblong-lanceolate, subacute, slightly falcate ; dorsal sepal ¼ by 1/12 in., oblong-lanceolate. Mentum (*spur*) minute, rounded. Petals ⅛ by 1/16 in., linear, obtuse. Lip ⅛ by 1/12 in., oblong, slightly constricted about 1/10 in. from the apex ; side lobes very narrow or obsolete ; midlobe ovate, subacute, entire. Fruit ¾ in. long, ellipsoid, tapering at the base into a stalk ½ in. long, with 3 broad flat ribs and 3 narrow ones. Fl. B. I. v. 5, p. 719 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518 ; Prain, Beng. Pl. p. 1006 ; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 32. *Dendrobium ramosissimum*, Wight, Icon. v. 5, part 1 (1852) p. 6, t. 1648 ; Dalz. & Gibs. p. 261.—Flowers : Nov.

KONKAN : *Gibson* !, *Dalzell* !, *Stocks* ! DECCAN : Mahableshwar, *Woodrow* ; Koina Valley below Mahableshwar, abundant, *Cooke* !, *H. M. Birdwood* ; Wada below Mahableshwar, *Cooke* !—DISTRIB. India (Bengal, W. Peninsula).

7. **Dendrobium macrostachyum,** *Lindl. Gen. & Sp. Orchid.* (1830) p. 78. Stems many, pendulous, crowded, slender, terete, the leaf-bearing stems 8—20 in. long, the flowering stems longer, sometimes reaching 4 ft. long (*Trimen*). Leaves sessile, sheathing at the base, 2—3½ by ½—⅞ in., oblong-lanceolate, acute, membranous, the sheaths appressed to the stem. Flowers 2—4 from the leafless stems of the previous year's growth, fragrant, very pale green or yellow, often tinged with pink ; peduncle short ; pedicels with the ovary reaching 1 in. long, slender, often curved ; bracts small, ovate, acute, scarious. Lateral sepals ½—⅝ by ⅛—⅙ in., oblong-lanceolate, acute ; dorsal sepal similar. Mentum (*spur*) ¼—⅓ in. long, funnel-shaped, obtuse. Petals ½—⅝ by 1/10—⅛ in., linear-lanceolate, acute. Lip ⅝—¾ in. long and less than ½ in. broad, with a long claw, ovate-oblong, finely pubescent, crenulate on the margin ; side lobes small, rounded, often obscure ; midlobe quadrately ovate, obtuse, yellow at the tip ; disk veined with purple. Fruit 1—1¼ in. long, narrowly fusiform, tapering into the stalk. Fl. B. I. v. 5, p. 735 ; Wight, Icon. t. 1647 ; Trim. Fl. Ceyl. v. 4, p. 152 ; Prain, Beng. Pl. p. 1007 ; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 32.—Flowers : May.

KONKAN : S. Konkan, *Dalzell*, 45 ! DECCAN : Koina Valley below Mahableshwar, *Cooke* ! S. M. Country : Belgaum Ghâts, *Gammie*. KANARA : *Woodrow* !, *Gammie*.—DISTRIB. India (Chota Nagpur, W. Peninsula) ; Ceylon.

8. **Dendrobium crepidatum,** *Lindl. & Paxt. Fl. Gard.* v. 1 (1850) p. 63, fig. 45. Stems tufted, almost as thick as the little finger, fleshy, loosely sheathed, 12—18 in. long, jointed at intervals of about 1 in., the internodes marked with longitudinal white lines on a sea-green ground. Leaves 2—5 by ½—⅝ in., linear-lanceolate, acute, falling at the end of the first season. Flowers in fascicles of two or three produced from every joint except the lowermost,

of wax-like texture, white tinted with lilac except the disk which is yellow ; pedicel together with the ovary reaching 1½ in. long in flower, pale purple ; bracts minute, ovate, acute. Lateral sepals ½ by ⅓ in., oblong-elliptic, rounded at the apex ; dorsal sepal similar. Mentum (*spur*) ⅛ in. long, obtuse. Petals ½ by ⅓ in., elliptic, rounded at the apex. Lip ½ in. long and as broad as long, with a yellow disk and white tip, slightly retuse at the apex and with a short claw, plaited at each side at the base forming a slipper-like cavity. Fruit clavate, 1½—2 in. long. Fl. B. I. v. 5, p. 740 ; Bot. Mag. t. 4993 & t. 5011 ; Veitch, Man. Orchid. Pl. part 3 (1888) p. 33 ; Prain, Beng. Pl. p. 1007 ; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 33. *Dendrobium Lawanum,* Lindl. in Journ. Linn. Soc. v. 3 (1859) p. 10 ; Dalz. & Gibs. p. 260. *Dendrochilum roseum,* Dalz. in Kew Journ. Bot. v. 4 (1852) p. 291.—Flowers : Mar.—Apr.

KONKAN : *Law* !, *Dalzell* !, *Stocks* ! ; near Vingorla, *Dalzell,* 33 ! DECCAN : Mahableshwar Hills, *Cooke* ! S. M. COUNTRY : Belgaum Ghâts, *Gammie.* KANARA : *Gammie.*—DISTRIB. India (Chota Nagpur, Assam, Khasia Mountains, W. Peninsula).

The following plants of the genus are sometimes grown in the Bombay Presidency :—

Dendrobium formosum, Roxb. in Wall. Cat. (1828) 1998. A native of the tropical Himalayas, Assam, the Khasia Hills, and Birma. Stems 12—18 in. long, cylindric, nearly as thick as the little finger. Leaves ovate-oblong, 5 in. long, amplexicaul, unequally 2-lobed at the apex. Flowers white, with an orange blotch on the lip, 3—4 in. in diam. Lip broadly obovate, entire. Fl. B. I. v. 5, p. 721 ; Veitch, Man. Orchid. Pl. part 3 (1888) p. 44 ; Bot. Reg. (1838) Misc. p. 49 ; Prain, Beng. Pl. p. 1006 ; Woodr. Gard. in Ind. ed. 5, p. 474.

Dendrobium albo-sanguineum, Lindl. & Paxt. Fl. Gard. v. 2 (1852) p. 93. A native of Birma. Stems subcylindric, 6—12 in. high and about ½ in. thick. Leaves linear-lanceolate, reaching 6 in. long. Flowers nearly 3 in. in diam., pale buff with maroon-purple blotches at the base of the lip. Lip with a broad claw and broadly obovate blade. Fl. B. I. v. 5, p. 722 ; Bot. Mag. t. 5130 ; Veitch, Man. Orchid. Pl. part 3 (1888) p. 16 ; Woodr. Gard. in Ind. ed. 5, p. 473.

Dendrobium cretaceum, Lindl. in Bot. Reg. (1847) t. 62. A native of Assam and the Khasia Hills. Stems stoutish, 9—12 in. long, curved. Leaves 2—3 in. long, oblong-lanceolate, deciduous. Flowers 1½ in. in diam., cream-white. Lip elliptic-oblong, fimbriate-dentate ; disk yellowish, streaked with crimson. Fl. B. I. v. 5, p. 736 ; Bot. Mag. t. 4686 ; Veitch, Man. Orchid. Pl. part 3 (1888) p. 33 ; Woodr. Gard. in Ind. ed. 5, p. 474.

Dendrobium heterocarpum, Wall. in Lindl. Gen. & Sp. Orchid. (1830) p. 78. A native of Nepal, Assam, Birma, Ceylon, Java, and the Philippines. Stems erect, stoutish, 9—18 in. high, yellow. Leaves 4—5 in. long, oblong-lanceolate, acute, deciduous. Flowers with a primrose fragrance, 2—2½ in. across. Sepals and petals

cream-colored. Lip buff-yellow streaked with reddish-purple ; disk velvety. Fl. B. I. v. 5, p. 737 ; Trim. Fl. Ceyl. v. 4, p. 154. *Dendrobium aureum,* Lindl. Gen. & Sp. Orchid. (1830) p. 77 ; Bot. Reg. (1839) t. 20 ; Veitch, Man. Orchid. Pl. part 3 (1888) p. 19 ; Woodr. Gard. in Ind. ed. 5, p. 473.

Dendrobium Pierardi, Roxb. Hort. Beng. (1814) p. 63. A native of Sikkim and Bengal, where it is common in the Sundribans. Stems slender, pendulous, 2—3 ft. long. Leaves ovate-lanceolate, the lowermost 4—5 in. long, gradually smaller upwards, deciduous. Flowers 1—2 in. across, usually in pairs. Sepals and petals pale rosy-mauve. Lip broadly deltoid, primrose-yellow, streaked with purple at the base. Fl. B. I. v. 5, p. 738 ; Bot. Mag. t. 2584 ; Veitch, Man. Orchid. Pl. part 3 (1888) p. 69 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518, & Gard. in Ind. ed. 5, p. 475 ; Prain, Beng. Pl. p. 1007. *Cymbidium aphyllum,* Sw. in Nov. Act. Soc. Sc. Upsal. v. 6 (1799) p. 73 ; Grah. Cat. p. 203.

Dendrobium nobile, Lindl. Gen. & Sp. Orchid. (1830) p. 79. A native of the Eastern Himalayas, the Khasia Mountains, and China. Stems tufted, 12—20 in. or more long. Leaves 3—4 in. long, ovate-lanceolate, obliquely emarginate. Flowers 2½—3 in. across, variable in color, odorous. Several varieties of this plant have been described. Fl. B. I. v. 5, p. 740 ; Bot. Reg. (1844) Misc. p. 48 ; Veitch, Man. Orchid. Pl. part 3 (1888) p. 63 ; Woodr. Gard. in Ind. ed. 5, p. 474.

Dendrobium Parishii, Reichb. f. in Bot. Zeit. (1863) p. 237. A native of Upper Birma and Tenasserim. Stems thick, 1 ft. or more long. Leaves 3—5 in. long, oblong-lanceolate, deciduous. Flowers usually rose-purple, 1½—2 in. in diam. Lip with 2 maroon blotches. Fl. B. I. v. 5, p. 740 ; Bot. Mag. t. 5488 ; Veitch, Man. Orchid. Pl. part 3 (1888) p. 68 ; Woodr. Gard. in Ind. ed. 5, p. 475.

Dendrobium aqueum, Lindl. in Bot. Reg. (1843) t. 54. A native of the Nilghiris. Stems 12—20 in. long, decumbent, stoutish, yellowish-green when young. Leaves 3—5 in. long, ovate-oblong, acute. Flowers solitary or in pairs, cream-white except a yellowish disk on the lip. Lip subrhomboid, obscurely 3-lobed. Fl. B. I. v. 5, p. 739 ; Bot. Mag. t. 4640. *Dendrobium album,* Wight, Icon. t. 1645 ; Veitch, Man. Orchid. Pl. part 3 (1888) p. 18 ; Woodr. Gard. in Ind. ed. 5, p. 473.

Dendrobium Dalhousieanum, Wall. MSS. in Paxt. Mag. v. 11 (1844) p. 145. A native of Sikkim, Assam, and Birma. Stems 3—4 ft. long, spotted with purple when young. Leaves 4—6 in. long, ovate-lanceolate, deciduous. Flowers 4—5 in. across, pale-yellow, veined and tinted with rose. Lip elliptic, concave, obscurely 3-lobed, with a large maroon-purple blotch on each side near the base. Fl. B. I. v. 5, p. 743 ; Veitch, Man. Orchid. Pl. part 3 (1888) p. 35 ; Woodr. Gard. in Ind. ed. 5, p. 474.

Dendrobium aggregatum, Roxb. Fl. Ind. v. 3 (1832) p. 477. A native of Assam, Birma, and China. Pseudobulbs clustered, reaching 2 in. long, 1-leaved. Flowers 1½ in. in diam., primrose-yellow when first expanded, changing in age to orange-yellow with a deeper color

on the lip. Lip transversely oblong, with a short claw and pubescent disk. Fl. B. I. v. 5, p. 749 ; Bot. Mag. t. 3643 ; Veitch, Man. Orchid. Pl. part 3 (1888) p. 15 ; Woodr. Gard. in Ind. ed. 5, p. 472.

Dendrobium Farmeri, Paxt. Mag. v. 15 (1849) p. 241. A native of the tropical Eastern Himalayas, Assam, and Birma. Stems 10—18 in. long, clavate, 4-angled. Leaves 2—4, near the summit of the stems, 6 in. long, elliptic-oblong, persistent. Flowers 2 in. across, pale straw-yellow tinted with rose. Lip suborbicular ; disk deep yellow. Fl. B. I. v. 5, p. 750 ; Bot. Mag. t. 4659 ; Veitch, Man. Orchid. Pl. part 3 (1888) p. 41 ; Woodr. Gard. in Ind. ed. 5, p. 474.

5. **CIRRHOPETALUM,** Lindl.

Epiphytic herbs with usually a creeping rhizome but sometimes tufted. Pseudobulbs 1 (rarely 2) -leaved. Leaves when solitary usually coriaceous and persistent, when geminate usually membranous and deciduous. Flowers in whorled umbels (in the Bombay species) on scapes rising from the base of a pseudobulb. Lateral sepals usually much elongated and acuminate, oblique, often connate by their inner edges, their bases adnate to the sides of the column or its foot ; dorsal sepals short, concave, rarely half as long as the lateral, usually much shorter. Petals shorter than the dorsal sepal. Lip small, tumid, usually entire, always shorter than the dorsal sepal, jointed to the end of the foot of the column and more or less mobile. Column short with 2 (rarely 4) tooth-like appendages at the apex, the foot more or less produced. Anther 2-celled ; pollinia 4, waxy, cohering in one mass and sometimes attached by their lower ends to a mass of viscid tissue, the 2 inner usually small and lamelliform.—DISTRIB. Species about 50, chiefly Indian and Malayan.

1. **Cirrhopetalum fimbriatum,** *Lindl. in Bot. Reg.* (1839) *Misc.* p. 72. Pseudobulbs clustered, ovoid, irregularly angular, smooth and polished, yellow and leafless when flowering, reaching 1 in. long. Leaves (from a specimen grown at Kew) 3—4 by ½—⅝ in., oblong-lanceolate, acute. Scape from below the pseudobulbs, 4—8 in. long, slender, smooth, terete, with 2 or 3 lanceolate acute bract-like scales ; flowers in umbels, nearly sessile, numerous ; bracts ⅛ in. long, lanceolate, acutely acuminate. Sepals green ; lateral sepals 1—1¼ in. long, linear, acute, flat, cohering by their inner edges to near the tip, 5-nerved ; dorsal sepal reaching ¼ in. long, ovate, suddenly tapering at the apex into a long subulate tail, 3-nerved. Petals ⅛ in. long, ovate, caudate, fringed with purple cilia, 1-nerved. Lip reddish-brown, fleshy, somewhat tongue-shaped, ⅛ in. long. Column with 2 subulate horizontal horns. Fl. B. I. v. 5, p. 774 ; Dalz. & Gibs. p. 261 ; Bot. Mag. t. 4391 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518 ; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 34. *Cirrhopetalum Wallichii,* Grah. Cat. p. 205 (*not* of Lindl.).—Flowers : Apr.—May.

KONKAN : *Stocks* !, *Law* !, *Gammie.* DECCAN : Párghát below Mahableshwar, *Law* !, *Graham*; Rotunda Ghát, Mahableshwar, *Graham*; Koina Valley below Mahableshwar, *Cooke* !, *Woodrow*; Mahableshwar, *H. M. Birdwood.* S. M. COUNTRY : Párva Ghát, *Dalzell & Gibson.* KANARA : *Law* !, *Gammie*;

Supa Ghâts of N. Kanara, *Talbot*, 651 This orchid is known to Anglo-Indians as the *Umbrella Orchis*.—DISTRIB. India (W. Peninsula), apparently endemic.

6. BULBOPHYLLUM, Thouars.

Epiphytic herbs. Pseudobulbs from a creeping rhizome (rarely 0), 1 (rarely 2) -leaved. Flowers on scapes from the rhizome usually close to the pseudobulbs, racemose, spicate, capitate, umbellate or solitary. Sepals subequal or the lateral rather longer than the dorsal and free or connate under the lip. Petals usually smaller than the dorsal sepal. Lip articulate with the foot of the column, mobile, small, usually much recurved. Column very short, often 2-aristate at the apex. Anther 2-celled ; pollinia 4, free, the 2 inner smaller (rarely obsolete).—DISTRIB. Species nearly 300, chiefly Asiatic, a few African, American, and Australian.

1. **Bulbophyllum neilgherrense,** *Wight, Icon.* v. 5, part 1 (1852) p. 6, t. 1650. Rhizome creeping. Pseudobulbs ovoid, 1½—2 in. long, irregularly angled. Leaf 1 from the top of the pseudobulb, 3½—5½ by 1—1½ in., oblong, obtuse, often slightly emarginate, tapering at the base, strongly many-nerved. Scape stout, from the base of the pseudobulb, sheathed at the base, jointed and with bract-like sheaths at the joints. Flowers in many-flowered racemes reaching with the scape sometimes 7 in. long ; bracts ¼ in. long, lanceolate, acute ; pedicel with ovary about as long as the bract when in flower. Sepals dull brownish-yellow, suffused with red at their bases ; lateral sepals ⅜ in. long, ovate-lanceolate, acute, oblique ; dorsal sepal ¼ by ⅛ in., broadly ovate, acute. Petals smaller than the dorsal sepal, ovate, acuminate, pale yellow. Lip 3-lobed, recurved ; side lobes small, purple, entire or toothed ; midlobe tongue-shaped, obtuse, brownish-yellow. Column with lanceolate spurs. Fl. B. I. v. 5, p. 761 ; Bot. Mag. t. 5050 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518 ; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 33.—Flowers : Dec.

Not very common. S. M. COUNTRY : Belgaum Ghâts, *Gammie*. KANARA : N. Kanara Ghâts, *Gammie* ; Sampkhand, *Woodrow*.—DISTRIB. India (W. Peninsula).

7. TRIAS, Lindl.

Small epiphytic pseudobulbous herbs. Leaves solitary on the pseudobulbs, coriaceous. Flowers solitary on lateral scapes. Sepals subequal, spreading, 7-nerved ; lateral adnate to the foot of the column. Petals small, oblong or linear. Lip small, coriaceous or fleshy, jointed to the foot of the column, inflexed, incumbent, mobile. Column short, broad, the tip winged or toothed or angled. Anther erect, caducous, 2-celled, produced into a long horn ; pollinia 4, waxy, subcoherent in pairs in each cell.—DISTRIB. Species 3 or 4, all Indian.

1. **Trias Stocksii,** *Hook. f. Fl. B. I.* v. 5 (1890) p. 781. A small epiphyte. Rhizome creeping. Pseudobulbs globosely ovoid, ⅜—¾ in. in diam. Leaves ¾—1¼ by ⅜—½ in., elliptic-oblong, usually

acute, sometimes apiculate, tapering at the base. Scape ½ in. long. Flowers large for the size of the plant, ½—⅝ in. in diam. Lateral sepals ¼ by ⅛ in., oblong, obtuse ; dorsal sepal ⅛ by ⅛ in., oblong, obtuse. Petals small, linear-lanceolate, acute, erect. Lip oblong, smooth, the shoulders convex, the tip rounded. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518 ; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 34.

Rare. KONKAN : *Law* ! KANARA : *Stocks*, 69 !—DISTRIB. India (W. Peninsula).

8. PHOLIDOTA, Lindl.

Epiphytic herbs with jointed often branching stems, with internodes like pseudobulbs, or with tufted pseudobulbs. Leaves usually in pairs (solitary in *P. imbricata*, the only Bombay species), membranous, many-nerved. Flowers small, subglobose, expanding from above downwards, in racemes which are terminal or from the base of a pseudobulb, usually drooping and distichous ; peduncles ebracteate ; floral bracts large and persistent. Sepals concave. Petals narrower than the sepals. Lip more or less cymbiform and saccate, usually without side lobes. Column short, the apex shortly hooded or winged ; anther more or less globose ; pollinia 4, waxy, subglobose or clavate, cohering by pairs to one or two membranes.—DISTRIB. India, Ceylon, China, Malay Peninsula, Australia ; species about 20.

1. **Pholidota imbricata,** *Lindl. in Hook. Fl. Exot.* (1825) t. 138. A pendent epiphyte ; pseudobulbs cæspitose, cylindric, thickened at the base, 2—3 in. long and ½—¾ in. thick at the middle, or shorter and more ovoid, furrowed, more or less enveloped in large fibrous sheaths. Leaf solitary, 6—12 by 1¼—2¼ in., elliptic-lanceolate or oblanceolate, acute, strongly 3—5-nerved, tapering at the base into a stout petiole 1½ in. long. Flowers in dense many-flowered drooping racemes 6—9 in. long, rising from the top of the pseudobulb, distichous, ¼ in. long, white with a pinkish or yellowish tinge (*Trimen*) ; peduncles slender, naked, as long as or longer than the raceme ; floral bracts large, longer than the slender stalked ovary, persistent, pale brown, convolute, ⅓ in. broad, subrotund, minutely apiculate, many-nerved, the edges irregularly folded. Sepals ¼ in. long ; lateral sepals connate at the base, cymbiform with a winged keel ; dorsal sepal orbicular, 3-nerved. Petals linear-oblong, subacute. Lip 3-lobed, saccate between the side lobes ; side lobes large, broad, rounded ; midlobe divided at the apex into 2 small oblong lobules separated by a broad sinus. Column broad and winged in its upper half ; pollinia clavate, attached by pairs to two small membranes. Capsules ¾ in. long, ellipsoid, strongly ribbed, the fruiting rhachis thickened. Fl. B. I. v. 5, p. 845 ; Dalz. & Gibs. p. 262 ; Wight, Icon. t. 907 ; Lindl. Bot. Reg. tt. 1213, 1777 ; Trim. Fl. Ceyl. v. 4, p. 162 ; King & Pantl. Ann. Roy. Bot. Gard. Calc. v. 8, p. 144, t. 201 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518 ; Prain, Beng. Pl. p. 1012.—Flowers : July.

KONKAN : *Stocks* !, *Law* ! ; S. Konkan, *Dalzell*, 51 ! ; near Vingorla rare, *Dalzell & Gibson*. KANARA : N. Kanara, *Woodrow*.—DISTRIB. India (Sikkim, Kumaon, Bhutan, Assam, Chittagong, Birma, Andaman Islands, W. Peninsula) ; Ceylon, Malay Peninsula, China, Philippines.

9. **JOSEPHIA,** Wight.

Epiphytic almost stemless tufted herbs ; root-fibres very stout. Leaves radical, petiolate, coriaceous, elliptic or oblong. Flowers small, pedicellate, in slender secundly branched panicles terminal or subterminal on the branches ; bracts persistent, small. Sepals connivent, subequal, oblong, obtuse, concave, with a subsaccate base. Petals as long as the sepals, oblong, obtuse. Lip adnate to the base of the column, erect, fleshy, concave ; side lobes short, rounded, incurved ; midlobe small, rounded ; disk with a broad callus uniting the side lobes. Column erect, nearly as long as the sepals, broad above, footless. Anther acuminate, 2-celled ; pollinia 4, oblong, parallel, subcaudate, attached by a viscus to a broad gland.—DISTRIB. East Indies ; species 2.

Wight says on the authority of Jerdon, who had the plants in cultivation for 3 years, that the flowers in the genus are annually renewed on the old scapes.

1. **Josephia lanceolata,** *Wight, Icon.* v. 5, part 1 (1852) p. 19, t. 1742 (leaves only ; for flowers see t. 1743). Leaves including petioles 3—5½ by ½—1 in., oblong or oblong-lanceolate or oblanceolate, obtuse or subacute, apiculate, very coriaceous, dull green, strongly nerved, contracted at the base into a channelled petiole ½—2 in. long. Inflorescence very like that of a *Statice ;* scapes exceeding the leaves, sometimes reaching 12 in. long ; flowers white, tinged with purple ; bracts small, ovate, acute, persistent ; pedicel with the ovary short. Sepals ⅛—⅒ in. long, obtuse, 3-nerved. Petals linear-oblong, obtuse, 1-nerved. Lip fleshy ; side lobes small, rounded ; midlobe subquadrate, rounded, somewhat saccate between the side lobes. Column purple. Fl. B. I. v. 5, p. 823 ; Trim. Fl. Ceyl. v. 4, p. 182 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518.

KANARA : *Stocks*, 50 !, *Law* !

Wight's draftsman has transposed the figures of the inflorescence in the 'Icones,' giving the inflorescence of *Josephia lanceolata* to *Josephia latifolia*.

10. **PORPAX,** Lindl.

Small epiphytes with much depressed subdiscoid pseudobulbs clothed with reticulate sheaths. Leaves 2, membranous, caducous. Flowers 1—3, subsessile on the top of the pseudobulbs. Sepals connivent at the base, often all connate into a tube or the lateral only connate ; lateral pair oblique at the base and adnate to the long-produced foot of the column. Petals small, free, usually shorter than the sepals. Lip sessile on the foot of the column and incumbent. Column short, wingless, its foot very long. Pollinia normally 8, pyriform or obovoid, attached by fours to a very short granular membrane.—DISTRIB. Species 6, all East Indian.

This genus, founded by Lindley in 1845 (Bot. Reg. Misc. p. 62), has been included under *Eria* by Bentham & Hooker f. [Gen. Pl. v. 3 (1883) p. 509], but has been again separated by King & Pantling [Orchids of the Sikkim Himalaya in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 113].

Flowers dark purple, campanulate; leaves oblong; sepals connate almost throughout their entire length into a tube ..... 1. *P. reticulata.*

Flowers yellow, 2-lipped; leaves suborbicular; lateral sepals connate at the base; dorsal sepal free or nearly so ..... 2. *P. Lichenora.*

1. **Porpax reticulata,** *Lindl. in Bot. Reg.* v. 31 (1845) *Misc.* p. 62. Pseudobulbs button-like, $\frac{3}{4}$ in. in diam., covered with lace-like sheaths. Leaves less than 1 in. long, broadly oblong. Flowers solitary, reaching $\frac{1}{2}$ in. or more long, purple-brown, rising from between the leaves with sheaths and an orbicular bract at the base. Sepals all connate in a subcampanulate 3-lobed tube, strongly nerved on the inside; lobes broadly ovate, acute. Petals included in a sepaline tube, $\frac{1}{3}$ by $\frac{1}{16}$—$\frac{1}{10}$ in., spathulate, strongly 5-nerved. Mentum (*spur*) obscure. Lip $\frac{1}{8}$ in. long, panduriform, crenulate, shortly clawed, furnished at the base with an erect subulate tooth-like process. Pollinia 8, pyriform. Fruit not seen. *Eria reticulata,* Benth. in Gen. Pl. v. 3 (1883) p. 509; Hook. f. Fl. B. I. v. 5, p. 786; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 35. *Aggeianthus marchantioides,* Wight, Icon. v. 5, part 1 (1852) p. 18, t. 1737.—Flowers: June—July.

Throughout the Western Ghâts, but not easy to discover as the pseudobulbs are small and resemble the bark on which they rest. KANARA: Chandwâr, *Ritchie,* 1415!

2. **Porpax Lichenora,** *T. Cooke.* Pseudobulbs depressed, disk-like, $\frac{1}{2}$—$\frac{3}{4}$ in. in diam., crowded, covered with a fibrous network. Leaves 2 on each pseudobulb, $\frac{1}{2}$—$1\frac{1}{4}$ in. long, broadly ovate or orbicular, ciliate, brownish beautifully tessellated with green (*Gammie*). Flowers $\frac{1}{3}$ in. long, yellowish, 2-lipped; pedicels very short with a broad ciliate bract and many subsimilar sheaths. Lateral sepals connate, pubescent, concave; dorsal sepal orbicular-ovate, 5-nerved (? free or connate with the lateral ones). Mentum (*spur*) small, rounded. Petals linear-spathulate, much shorter than the sepals. Lip very small, shortly clawed, ovate-cordate, with toothed sides and an acute tip. *Eria Lichenora,* Lindl. in Journ. Linn. Soc. v. 3 (1858) p. 46; Hook. f. Fl. B. I. v. 5, p. 787; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 35. *Lichenora Jerdoniana,* Wight, Icon. v. 5, part 1 (1852) p. 18, t. 1738 (figure not good).—Flowers: July.

KONKAN: *Stocks!, Law!* S. M. COUNTRY: Belgaum Ghâts, *Spooner* ex *Gammie.* KANARA: *Spooner* ex *Gammie*; Sampkhand, *Woodrow.*—DISTRIB. India (W. Peninsula).

The plant requires the examination of *fresh* specimens. There is but one sheet in Herb. Kew., the specimens on which are imperfect. Wight says in his description (Icon. *l. c.*) that the sepals are adherent at the base, but this is not shown in his drawing, which is not good, his material, as he has explained, having been limited.

11. **ERIA,** Lindl.

Epiphytic usually pseudobulbous herbs; pseudobulbs often elongate and stem-like. Flowers never large, rarely showy, often pubescent or tomentose, in racemes, spikes, or heads on 1—2-flowered peduncles. Sepals free, adnate to the elongate foot of the column and forming with it a short or long and spur-like or saccate mentum. Petals like the sepals. Lip sessile on the foot of the column and incumbent. Column short and straight or long and little curved. Anther imperfectly 4- or 8-celled; pollinia waxy, pyriform or broadly obovoid, attached in fours by their bases to a granular membrane or occasionally all attached to a single viscus.—DISTRIB. Tropical Asia; species more than 100.

Flowers solitary on slender scapes	1. *E. reticosa.*
Flowers in racemes.	
Small plants less than 4 in. high; leaves less than 3 in. long; sepals and petals greenish-yellow.	
Margins of sepals entire; lip ovate-lanceolate	2. *E. Dalzellii.*
Margins of sepals ciliate with minute gland-tipped hairs; lip pandurate	3. *E. microchilos.*
Plant exceeding 4 in. high; leaves 4—8 in. long; sepals and petals white	4. *E. mysorensis.*

1. **Eria reticosa,** *Wight, Icon.* v. 5 (1852) p. 4, t. 1637. Cæspitose, stemless; pseudobulbs ½—¾ in. in diam., enclosed in a net-like sac, depressed-globose. Leaves 2, oblong-lanceolate or elliptic-lanceolate, acute, 1—3 by ⅜—⅞ in. Flowers solitary, large for the size of the plant, on slender scapes 1—1¾ in. long; bract below the flower large, ⅓ in. long and nearly as broad, ovate, acute, cordate, strongly nerved. Sepals pure white; lateral sepals reaching ⅞ in. long by ⅜ in. broad at the base, falcate, acute, 7-nerved; dorsal sepal nearly 1 in. long by ¼ in. broad, oblong-lanceolate, acute, 5-nerved. Mentum short, broad, sac-like. Petals white, as long as the lateral sepals, ¼ in. broad, oblong-lanceolate, acute, 5-nerved. Lip ¾ in. long, 3-lobed; side lobes long, narrow, rounded, white edged with a purple line (*Ritchie*); midlobe ¼—⅜ in. long, ovate, acute, yellow at base and white towards the tip (*Gammie*), the margins subcrenulate; disk with 2 crested ridges. Column very short, yellow. Capsules ½ in. long, obovoid, conspicuously and deeply ribbed. Fl. B. I. v. 5, p. 787; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 36. *Eria braccata,* Dalz. & Gibs. Bo. Fl. p. 262 (*not* of Lindl.). *Eria uniflora,* Dalz. in Kew Journ. Bot. v. 4 (1852) p. 111.—Flowers: July.

KONKAN: *Stocks*!, *Law*!, *Dalzell*!, *Woodrow*; Western Ghâts, *Gammie.* DECCAN: Mahableshwar, *Dalzell*!, *H. M. Birdwood*; Lanoli, very common, *Gammie.* S. M. COUNTRY: Rámghât, *Ritchie,* 707!—DISTRIB. India (W. Peninsula).

2. **Eria Dalzellii,** *Lindl. in Journ. Linn. Soc.* v. 3 (1858) p. 47. A small plant 1½—3 in. high (rarely more). Pseudobulbs flattened, ovoid, reaching ½ in. in diam., reticulated; principal venation pinnate (*Gammie*). Leaves usually 2, oblanceolate-oblong, obtuse. Flowers in racemes from between the leaves, secund, green with a yellow tinge; pedicels short; bract below the flower ⅛ in. long, lanceolate

with a long acumen. Sepals lanceolate, acute, often recurved towards the apex ; lateral sepals $\frac{1}{3}$ in. long ; dorsal sepal $\frac{1}{4}$ in. long. Mentum (*spur*) broad, short, blunt, sac-like. Petals as long as the lateral sepals, lanceolate, acute. Lip $\frac{1}{10}$ by $\frac{1}{15}$ in., rather thick, ovate-lanceolate, with 2 distinct callosities at the base ; side lobes narrow, rounded, $\frac{1}{2}$ *the length of the lip ; midlobe* $\frac{1}{20}$ *in. long,* linear, acute, with a crenulate margin. Column nearly white (*Gammie*). Anther imperfectly 8-celled ; pollinia 8, pyriform. Fl. B. I. v. 5, p. 789 ; Dalz. & Gibs. p. 262 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518 ; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 36. *Dendrobium filiforme,* Wight, Icon. v. 5, part 1 (1852) p. 5, t. 1642.—Flowers : July.

KONKAN : *Stocks* !, *Law* !, *Dalzell* !, *Gammie* ; S. Konkan and Ghâts, *Dalzell & Gibson.*—DISTRIB. India (W. Peninsula).

There is a marked difference between the lip of this orchid and the lip of *Eria microchilos,* Lindl., which it otherwise much resembles. The points of difference between the two plants have been clearly pointed out by Gammie (Journ. Bomb. Nat. *l. c.*). I have examined Lindley's own specimens in his Herbarium.

3. **Eria microchilos,** *Lindl. in Journ. Linn. Soc.* v. 3 (1858) p. 47. Pseudobulbs flattened, irregularly shaped, $\frac{1}{2}$ in. in diam., reticulated ; principal venation flabellate (*Gammie*). Leaves 2—4, oblong-lanceolate, obtuse, reaching 2 in. long. Flowers secund, in racemes rising from the base of the leaves ; bracts $\frac{1}{10}$ in. long, ovate-lanceolate, acute. Sepals minutely ciliate with gland-tipped hairs ; lateral sepals $\frac{1}{8}$ in. long, broadly lanceolate, acute ; dorsal sepal $\frac{1}{6}$ in. long, linear-lanceolate. Mentum (*spur*) $\frac{1}{12}$ in. long, curved forward. Petals $\frac{1}{6}$ by $\frac{1}{20}$ in., more or less ciliate with minute gland-tipped hairs. Lip $\frac{1}{10}$—$\frac{1}{8}$ in. long, thin, pandurate ; side lobes small, rounded ; midlobe broadly ovate, rounded and with subcrenulate margins ; disk with almost obsolete ridges which coalesce in a single line towards the apex. Column green (*Gammie*) ; pollinia 8, pyriform, unequal. Dalz. & Gibs. p. 262 ; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 36. *Eria Dalzellii* var. *fimbriata,* Hook. f. Fl. B. I. v. 5, 789. *Dendrobium microchilos,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 345.—Flowers : July—Aug.

KONKAN : *Stocks* !, *Law* !, *Dalzell* !, *Gammie* ; Wari country on mango-trees, *Dalzell & Gibson.* DECCAN : Mahableshwar, common, *Cooke* !—DISTRIB. India (W. Peninsula).

The difference between the lip of this orchid and that of *Eria Dalzellii* is sufficient to justify its restoration to the rank of a species which is given to it by Lindley.

4. **Eria mysorensis,** *Lindl. in Journ. Linn. Soc.* v. 3 (1858) p. 54. Pseudobulbs ovoid, 2—3 in. long. Leaves 4—5, membranous, 4—8 by $\frac{3}{4}$—$1\frac{1}{4}$ in., elliptic-lanceolate or oblong-lanceolate, acute, strongly and closely parallel-nerved. Flowers 6—12, in glabrous curved racemes which are shorter than the leaves, usually 2 racemes on each pseudobulb ; pedicels $\frac{1}{4}$—$\frac{1}{2}$ in. long, filiform ; bracts $\frac{1}{2}$—$\frac{5}{8}$ in. long, ovate-lanceolate, acute, glabrous, reflexed. Sepals white, strongly nerved ; lateral sepals $\frac{1}{2}$ in. long by $\frac{1}{8}$ in. broad at the base, falcate, acute ; dorsal sepal $\frac{1}{2}$ by $\frac{1}{10}$ in., linear-lanceolate, acute. Mentum (*spur*) very small, obtuse, sac-like. Petals white, rather

shorter than the dorsal sepal, $\frac{1}{16}$ in. broad, lanceolate, acute, strongly 3-nerved. Lip $\frac{1}{3}$ by $\frac{1}{16}$ in., oblong or subpandurate, with a short claw, subcordate at the base; side lobes narrow, rounded, purple (*Gammie*); midlobe about $\frac{1}{8}$ in. long, yellow (*Gammie*), apiculate, the side nerves usually forming arched thickened ridges. Fl. B. I. v. 5, p. 793; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518; Gammie, in Journ. Bomb. Nat. v. 17, part 1 (1906) p. 37.—Flowers: July.

KONKAN: *Stocks*!; Western Ghâts, *Gammie*. DECCAN: Koina Valley below Mahableshwar, *Cooke*!, *Woodrow*, *H. M. Birdwood*; Mahableshwar, *Gammie*. S. M. COUNTRY: Dharwar, *Law*!—DISTRIB. India (W. Peninsula).

12. **THUNIA,** Reichb.

Terrestrial or epiphytic herbs; stems slender or equally thickened along their entire length, elongate, leafy, with numerous foliaceous sheaths below. Leaves distichous, lanceolate, glaucous. Flowers in terminal drooping racemes; bracts large, scarious. Sepals erecto-patent, subequal, lanceolate, acute. Petals like the sepals. Lip adnate to the base of the footless column, shortly spurred; side lobes short, involving the column; midlobe fringed. Anther narrow, pendulous, incompletely 4-celled; pollinia 8, waxy, attached in fours to a granular membrane; rostellum 3-lobed.—DISTRIB. Species 5 or 6, East Indian.

1. **Thunia venosa,** *Rolfe, in Orchid. Rev.* v. 13 (1905) p. 206. Epiphytic. Flowers in terminal congested racemes. There is one specimen of this orchid from the Bombay Presidency in Herb. Kew. collected by Dalzell in 1869 on the east side of Matheran Hill and which Dalzell described as a new *Dendrobium*. I subjoin Dalzell's description *literatim* from his manuscript in Herb. Kew.:—

"Stem 1—1½ ft. high. Leaves sheathing, alternate, bifarious, their sheaths entire, 1 in. long; leaves gradually larger upwards, 3—7 in. long. Flowers terminal, 3—4, each subtended by a pale green foliaceous persistent bract nearly 2 inches in length. Sepals and petals alike, pure white, linear-lanceolate, acute, erect in flowering and spreading like a fan, all on one side and furthest from the axis, the lip being inner and opposed. Labellum ½ in., shorter than the sepals and petals, somewhat trumpet-shaped, the lower parts of the margin meeting. Throat of the labellum with 5 parallel rugged ridges; edges of labellum lacerato-fimbriate, the inside painted throughout with veins of a carmine colour. Spur half the length of the ovary, decidedly short, cylindrical. Column rather long, expanded upwards into wings, semicucullate above, white, shaped like the hood of a cobra. Lip not articulated with the spur, which merely forms the tubular base of the labellum. Flowers in the rainy season (August). Very unlike *Dendrobium chlorops* and *D. barbatulum* in habit, as the leaves and flowers of this plant appear together, but in the cold and hot seasons it is scarcely distinguishable from them except by the somewhat larger fruit. Appears to come nearest in habit and appearance to *D. formosum*, Roxb., figured in Wall. Pl. As. Rar. t. 39. This is by far the handsomest orchid in the Bombay

Presidency." *Phajus albus,* Bot. Reg. (1838) t. 33 (*not* of Lindl.); Bot. Mag. t. 3991; Grah. Cat. p. 205; Hook. f. Fl. B. I. v. 5, p. 818 in part; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 518.—Flowers: July—Aug.

Rare. KONKAN: Matheran Hill eastern side, *Dalzell*! DECCAN: on trees at Khandala, *Graham*; Mahableshwar, *Fairbank* ex *H. M. Birdwood*; Lanoli, *Woodrow.*

King and Pantling (Ann. Roy. Bot. Gard. Calc. v. 8, p. 111) mention, as occurring in Sikkim, a small and epiphytal form of *Phajus albus* with a shorter congested raceme and not ascending beyond 3000 ft., which would seem to be this.—DISTRIB. India (Kumaon, Sikkim, Assam, Khasia, Mussoorie, Birma, W. Peninsula).

13. EULOPHIA, R. Br.

Terrestrial glabrous herbs with fleshy tubers or rhizomes (rarely pseudobulbous). Leaves appearing with or after the flowers, long, narrow, usually plicate. Flowers racemose, rarely paniculate, on a tall erect sheathed usually lateral scape. Sepals free, spreading, subequal. Petals subsimilar. Lip adnate to the base of the column or to its foot, base saccate or with a short spur; side lobes erect and embracing the column (rarely 0); midlobe spreading or recurved; disk usually ridged or crested. Column with or without a foot, its apex entire and often oblique, the margins sometimes winged or lobed; anther terminal, sometimes with 2 apical processes, 2-celled; pollinia 2, globose, attached by a caudicle to the flat gland of the rostellum.—DISTRIB. Tropical, numerous in Africa; species about 50.

Column not produced into a foot.	
Lip longer than broad; side lobes of lip short or 0; disk of lip with many fringed nerves.	
Sepals ½ in. long; side lobes of lip 0	1. *E. ochreata.*
Sepals ⅛—1¼ in. long; side lobes of lip ⅛ in. long	2. *E. herbacea.*
Lip broader than long; disk of lip with 3 crested nerves	3. *E. pratensis.*
Column produced into a foot	4. *E. nuda.*

1. **Eulophia ochreata,** *Lindl. in Journ. Linn. Soc.* v. 3 (1858) p. 24. Roots tuberous, hypogeal. Leaves 3—5, elliptic-lanceolate, acuminate, 4—12 by 1½—2½ in., many-nerved, sessile. Flowers membranous in all their parts, in dense many-flowered cylindric racemes 4—6 in. long; scape 8—12 in. long, stout below, furnished with broad loose ochreate sheaths; bracts beneath the flowers ⅓—½ in. long, conspicuous, narrow, linear-lanceolate, acute; pedicels with ovary ½ in. long. Sepals ½ in. long, linear-lanceolate, acute, strongly nerved. Petals ⅜ in. long, broadly elliptic, acute, strongly nerved. Spur a small hemispheric sac. Lip ⅜ in. long, broadly ovate, obtuse; side lobes 0; nerves all fringed. Fl. B. I. v. 6, p. 2; Dalz. & Gibs. p. 265.

KONKAN: *Stocks*!, *Law*!, *Dalzell & Gibson.* S. M. COUNTRY: Dharwar, *Law*! KANARA: *Law*!—DISTRIB. India (W. Peninsula), apparently endemic.

2. **Eulophia herbacea,** *Lindl. Gen. & Sp. Orchid.* (1833) p. 182. Stem 4—6 in. long, sheathed. Leaves 6—12 in. long, varying in breadth from 1—3½ in., linear-lanceolate or elliptic lanceolate, many-nerved.

Flowers large, in rather lax racemes; scape stout, 2—3 ft. high, with large acuminate sheaths; bracts beneath the pedicels reaching 1¾ in. long, linear-lanceolate, acuminate; pedicels with ovary ¾—1 in. long. Sepals green, ⅞—1½ by ⅛ in., linear-lanceolate. Mentum (*spur*) ⅛ in. long, slender, terete, obtuse. Petals white, ½—⅝ by ¼—⅜ in., oblong-elliptic, obtuse or subacute, with numerous strong branched purple nerves. Lip ¾ in. long; side lobes ⅛ in. long, rounded; midlobe ⅜—½ in. long, oblong or obovate-oblong, obtuse, apiculate, white, with many fringed yellow nerves. Column ¼ in. high, not produced into a foot. Capsules 1½—1¾ in. long, ellipsoid, faintly ribbed. Fl. B. I. v. 6, p. 2; Dalz. & Gibs. p. 265; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519; Watt, Dict. Econ. Prod. v. 3, p. 291. *Eulophia bicolor*, Lindl. in Journ. Linn. Soc. v. 3 (1858) p. 24 (*not* of Dalzell). *Eulophia carinata*, Grah. Cat. p. 202 (*not* of Lindl.).— Flowers: July.

KONKAN: *Stocks*!, *Law*!, *Dalzell*!, *Dalzell & Gibson*. KANARA: *Law*! GUJARAT: Panch Mahals near Dohad, *Raoji*!; Khodva, *Raoji*!—DISTRIB. India (W. Himalaya, W. Peninsula).

3. **Eulophia pratensis**, *Lindl. in Journ. Linn. Soc.* v. 3 (1858) p. 25. Leaves appearing after the flowers; hence Lindley and Dalzell describe the plant as leafless. Leaves petiolate, reaching 12 in. long, in breadth varying from ½—1½ in., oblong-lanceolate, acute, strongly nerved, tapering at the base into a long sheathing petiole. Flowers yellow, in lax racemes; scape 1—3 ft. long, with appressed acute sheaths; bracts beneath the pedicels ⅜—½ in. long, ovate-lanceolate, acuminate, membranous; pedicels with ovary ⅓—⅝ in. long. Sepals elliptic-oblong, obtuse, subfleshy, 5-nerved; lateral sepals ½ by ¼ in.; dorsal sepal slightly longer and slightly narrower than the lateral ones. Mentum (*spur*) ⅛ in. long, conical from a broad base, subacute. Petals shorter and broader than the dorsal sepal, elliptic-oblong, obtuse. Lip 7/16 in. long, ⅝ in. broad across the side lobes when spread out; side lobes large, ⅛ in. long, oblong, rounded; midlobe ⅛ in. long, broadly ovate or suborbicular, obtuse; disk with 3 crested nerves. Capsules 1¼ in. long, ellipsoid, turgid. Fl. B. I. v. 6, p. 4; Dalz. & Gibs. p. 264; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519. *Eulophia ramentacea*, Wight, Icon. v. 5, part 1 (1852) p. 8, t. 1666 (*not* of Lindl.). *E. virens*, Grah. Cat. p. 202 (*not* of Brown).—Flowers: Nov.—Feb. VERN. *Satavari*.

DECCAN: *Stocks*, 22!; pasture-lands, *Dalzell & Gibson*; Páshan 6 miles west of Poona, *Tukaram*!; Poona, *Woodrow*, 965!; Panchgani, *A. St. J. Cooke*! S. M. COUNTRY: Belgaum, *Ritchie*, 1421!—DISTRIB. India (W. Peninsula), apparently endemic.

4. **Eulophia nuda**, *Lindl. in Wall. Cat.* (1828) 7371. Root tuberous, like a small potato, spherical, smooth. Leaves from the sides of the tuber (forming by their sheaths a short pseudo-stem), 10—14 in. long, variable in breadth, elliptic-lanceolate, acute, plicate, narrowed into the long tubular sheath. Flowers 9—20, in lax racemes from the base of the pseudo-stem; scape 1½—2 ft. long, erect, stiff, with a few wide sheaths at the base and some scattered upwards; bracts beneath the flowers ¼—⅝ in. long, lanceolate, acute;

pedicels with ovary ¾—1¼ in. long. Sepals greenish-purple, linear-oblong, acute, 7-nerved; lateral sepals ⅞ by ⅛ in., inserted on the spur of the lip, slightly falcate; dorsal sepal ⅞ by ⅛ in. Mentum (*spur*) very short, conical, obtuse, purplish-green. Petals white, ⅝ by ⅛ in., oblong, obtuse, many-nerved. Lip ⅞ in. long by ⅝ in. broad across the side lobes, white or yellow flushed with pink or purple; side lobes short, rounded; midlobe ½ in. long, obovate oblong, obtuse, crimped; disk with about 9 strong nerves. Column short with a long foot. Capsules 1½ in. long, fusiform, conspicuously ribbed; pedicels of capsules very short. Fl. B. I. v. 6, p. 5; King & Pantl. in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 180, t. 243; Trim. Fl. Ceyl. v. 4, p. 177; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519; Prain, Beng. Pl. p. 1016. *Eulophia bicolor*, Dalz. in Kew Journ. Bot. v. 3 (1851) p. 343; Dalz. & Gibs. p. 264. *Cyrtoptera fusca*, Wight, Icon. v. 5, part 1 (1852) p. 11, t. 1690.—Flowers: June. VERN. *Ambarkand.*

KONKAN: *Stocks*!, *Dalzell*! S. M. COUNTRY: Rámghát, *Ritchie*, 708!; Londa, *Woodrow*. KANARA: Kála naddi, *Ritchie*, 708!—DISTRIB. India (Chota Nagpur, Assam, Birma, Pegu, Tenasserim, W. Peninsula); Ceylon.

14. **GEODORUM**, Jackson.

Terrestrial herbs with underground subglobose rhizomes. Leaves elliptic, plicate, their sheaths forming a pseudo-stem. Flowers rather crowded, in corymbose racemes decurved at first; bracts narrow, membranous; scape from the base of the pseudo-stem. Sepals equal, oblong, subacute, erect. Petals as long as the sepals but broader and blunt. Lip sessile on the base of the column; side lobes 0; apical lobe broad, rounded, 2-fid or emarginate; disk with a forked basal callus. Column less than half the length of the lip; anther broad, 2-celled; pollinia 2, broadly ovoid, attached by a tapering slender caudicle to a small orbicular gland.—DISTRIB. Species 9 or 10, Indian, Malayan, and Australian.

1. **Geodorum dilatatum**, *R. Br. in Ait. Hort. Kew.* ed. 2, v. 5 (1813) p. 207. Tubers globular, apiculate, 1¼ in. in diam. Pseudo-stem 3—6 in. long. Leaves 6—20 by 1½—4 in., elliptic, acute, tapering at the base to a long sheath. Flowers pale purple or rose-colored, in racemes which are short, corymbose, and drooping when in flower, but lengthening and erect in fruit; bract ½ in. long, linear-lanceolate, acute; pedicels with ovary shorter than the bracts. Sepals ⅜ by ⅛ in., oblong, acute. Petals ⅜ by ⅓ in., oblong, obtuse. Lip pale purple with darker markings, ⅜ by ⅓ in., ventricose at the base, subpandurate, without side lobes; the apical lobe broad, rounded, 2-fid or emarginate; disk with a channelled ridge ending in raised yellow calli. Pollinia 2, with elongate pits on their posterior surface. Fl. B. I. v. 6, p. 17; Dalz. & Gibs. p. 266; Prain, Beng. Pl. p. 1017. *Geodorum purpureum*, Hook. f. Fl. B. I. v. 6 (1890) p. 16 in part; Dalz. & Gibs. p. 266; King & Pantling, in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 181, t. 245; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519. *Limodorum recurvum*, Roxb. Cor. Pl. v. 1 (1795)

t. 39, & Fl. Ind. v. 3 (1832) p. 469. *Malaxis cernua*, Willd. Sp. Pl. v. 4 (1805) p. 93 ; Grah. Cat. p. 203. *Bela-pola*, Rheede, Hort. Mal. v. 11, p. 69, t. 35.—Flowers : June—July.

KONKAN : *Stocks* !, *Law* !, *Dalzell* ! ; S. Konkan, *Graham* ; Ghâts in S. Konkan, *Stocks*, 421 ; Wari country, *Dalzell & Gibson*. KANARA : Kâla naddi, *Ritchie*, 1420 !—DISTRIB. India (Sikkim, Nepal, Assam, Bengal, Andaman Islands, W. Peninsula) ; Ceylon.

I have followed Colonel Prain (Beng. Pl. p. 1017) in calling this *G. dilatatum*, Br. (*Limodorum recurvum*, Roxb.). The description given by Brown in Ait. Hort. Kew. of *G. purpureum* (*Limodorum nutans*, Roxb.), derived probably from Roxburgh's description and figure (Cor. Pl. v. 1, t. 40), does not suit. The acute lip shown in Roxburgh's figure, which is otherwise an excellent one, does not agree with the lip of this plant, nor in fact with that of any species of *Geodorum*. In his 'Flora Indica,' v. 3 (1832) p. 469, Roxburgh again describes the lip of *Limodorum nutans* as acute, and cites Rheede (Hort. Mal. v. 11, t. 35), who however in his figure of *Bela-pola* shows the lip as subpandurate, obtuse, and 2-fid at the apex. The lip as figured by Rheede corresponds exactly with the lip of *G. dilatatum*. Dalzell & Gibson (Bomb. Fl. *l. c.*) follow Roxburgh, which shows that Dalzell cannot himself have examined the plant, as his own specimens have the obtuse lip characteristic of the genus. The length of the raceme, as being greater or less than the leaves, is not a character of much importance, for the racemes keep on lengthening after flowering, as pointed out by King & Pantling (*l. c.*). After spending much time over drawings and descriptions, I have come to the conclusion indicated by Sir J. Hooker (Trimen's Fl. Ceyl. v. 4, p. 179) that *G. dilatatum* and *G. purpureum* are both forms of one species, and as Brown's description of *G. dilatatum* fits the plant better than his description of *G. purpureum*, the former name has been adopted.

15. **CYMBIDIUM,** Swartz.

Epiphytes with a short stout pseudo-stem (rarely terrestrial or with an elongated leafy stem). Leaves coriaceous, very long and narrow (rarely elliptic). Flowers in many- or few-flowered erect or drooping racemes from the side of the pseudo-stem ; peduncle with numerous sheaths ; floral bracts various. Sepals and petals subequal, free, erect or spreading. Lip adnate to the base of the column and embracing it more or less by its convolute side lobes ; midlobe decurved, often with undulate edges ; disk usually with 2 ridges. Column long, without a foot ; anther 1-celled or imperfectly 2-celled ; pollinia 2, ovoid, pyriform, cuneiform or globular, more or less partite, sessile on a small or large often strap-shaped gland.—DISTRIB. Tropical or subtropical, on mountains in Asia with a few from Africa and Australia ; species about 60.

1. **Cymbidium aloifolium,** *Swartz, in Nov. Act. Upsal.* v. 6 (1799) p. 73. Pseudo-stem short. Leaves 12—18 by ¾—1⅛ in., linear-oblong, curved, obtuse, fleshy, slightly and obliquely notched at the apex, somewhat sheathing and slightly expanded at the base. Flowers yellowish-red, in many-flowered drooping racemes 9—15 in. long ; bracts ⅛—⅙ in. long, ovate, acute ; pedicels with ovary ¼—¾ in. long. Sepals subequal, oblanceolate-oblong, obtuse ; the lateral pair somewhat falcate. Petals as long as the sepals, oblanceolate-ovate, obtuse. Lip purplish, as long as the sepals, oblong, 3-lobed, its upper surface with 2 lamellæ broken and disconnected in the middle ; side lobes long, narrow, blunt, entire, their apices pointing forward ;

midlobe ovate-oblong, much decurved. Column slightly thickened at the apex ; anther papillose, subquadrate, the gland of the pollinia small. Capsules 2—2½ in. long, elliptic, ribbed. Fl. B. I. v. 6, p. 10 (*in part*) ; Lindl. Gen. & Sp. Orchid. (1833) p. 165 ; Grah. Cat. p. 203 ; Dalz. & Gibs. p. 266 ; Roxb. Fl. Ind. v. 3 (1832) p. 458 ; Wight, Icon. tt. 1687—88 ; King & Pantl. in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 189, t. 252. *Cymbidium bicolor*, Hook. f. Fl. B. I. v. 6, p. 11 (*not* of Lindl.) ; Trim. Fl. Ceyl. v. 4, p. 179 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519.—Flowers: Apr.—May.

KONKAN : *Stocks* !, *Law* ! ; S. Konkan, *Dalzell*, 46 ! ; Ghâts and hilly parts of the Konkan, *Graham* ; Alibag, *Dalzell & Gibson* ; Salsette, *Dalzell & Gibson*. KANARA : Sirsi (N. Kanara), *Woodrow* ; Chandwâr, *Ritchie*, 1419 ! ; Kâla naddi, *Ritchie*, 1418 !—DISTRIB. India (Bengal, Assam, Andaman Islands, W. Peninsula) ; Ceylon, Perak.

Cymbidium eburneum, Lindl. in Bot. Reg. (1847) t. 67. An epiphyte, a native of Nepal, Sikkim, and the Khasia Mountains, sometimes grown in conservatories. It has large linear-lanceolate leaves 12—24 by ⅔—¾ in., large flowers with ivory-white sepals, the petals and lip stained with pale yellow. Fl. B. I. v. 6, p. 11 ; Woodr. Gard. in Ind. ed. 5, p. 472.

16. SARCOCHILUS, Br.

Epiphytic herbs ; stem very short or 0 ; pseudobulbs 0. Leaves oblong, coriaceous, usually flat. Flowers small, in erect or pendulous racemes. Sepals subequal, spreading ; lateral sepals more or less adnate to the foot of the column. Petals like the sepals. Lip often almost shoe-shaped, adnate to the produced foot of the column, usually spurred ; side lobes erect, subpetaloid or tooth-like ; midlobe fleshy, various ; spur erect or parallel to the blade of the lip. Column short, produced into a more or less elongated foot ; rostellum short ; pollinia 2 entire or sulcate ; caudicle linear ; gland large.—DISTRIB. East Indies, Malay Archipelago, South Sea Islands and Australia ; species about 30.

A difficult genus which requires revision. Ridley [Journ. Linn. Soc. v. 32 (1896) p. 348] proposes to limit it to species with a long foot to the column, a porrect spur and a small often fleshy epichile, whereas King and Pantling [Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 206] characterize the genus as spurless. Pfitzer [Engl. & Prantl, Pflanzenf. v. 2, part 6 (1889) p. 218] makes the lip spurred or almost shoe-shaped and includes Dalzell's *Micropera* in the genus.

Leaves less than 3 in. long; racemes shorter than the leaves ..... 1. *S. viridiflorus*.
Leaves 4—7 in. long; racemes much longer than the leaves ..... 2. *S. maculatus*.

Mr. Rolfe of the Kew Herbarium, whose knowledge of orchids is both varied and extensive, is of opinion that the two species named in the key above should be placed under *Sarcochilus* and not under *Saccolabium*.

1. **Sarcochilus viridiflorus,** *T. Cooke* (*not* of Hook. f. in Fl. B. I. v. 6, p. 38). A small plant 3—4 in. high, stemless ; roots long. Leaves 1½—2½ by ¼—½ in., flat, linear-oblong, 2-lobed at the apex. Flowers in few-flowered racemes scarcely reaching 1 in. long ; bracts $\frac{1}{10}$ in. long, broadly ovate, obtuse. Sepals greenish-white ; lateral sepals ¼ by $\frac{1}{10}$ in., obovate, obtuse, veined ; dorsal sepal very slightly longer than the lateral ones, spathulate, rounded at the apex. Petals as long as the sepals, ⅛ in. broad, obovate, obtuse, greenish-white. Lip rather more than ¼ in. long ; side lobes erect, broadly triangular, rounded at the apex ; midlobe ⅛—⅓ in. long by ¼ in. broad, membranous, usually 3-lobed, the central lobe triangular, acute, the lateral lobes obtuse ; spur ⅛ in. long, conical, obtuse, pointing forward, parallel to the blade of the lip. *Saccolabium viridiflorum,* Lindl. in Journ. Linn. Soc. v. 3 (1858) p. 36 ; Hook. f. Fl. B. I. v. 6, p. 63. *Micropera viridiflora,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 282.

KONKAN : *Law* !, *Dalzell,* 26 ! DECCAN : Mahableshwar, *Cooke* ! ; Koina Valley below Mahableshwar, *Cooke* ! KANARA : Usheli, *Ritchie,* 1426 ! ; Chandwâr, *Ritchie,* 1426 !—DISTRIB. India (W. Peninsula).

The specific name *viridiflora* was inaugurated by Dalzell in 1851, and is therefore prior to the same specific name given by Thwaites [Enum. (1864) p. 430] to *Ærides viridiflorum,* from which Sir Joseph Hooker (Fl. B. I. v. 6, p. 38) has derived the specific name of *Sarcochilus viridiflorus.* A new specific name must therefore be found for that plant.

2. **Sarcochilus maculatus,** *Benth. in Benth. & Hook. f. Gen. Pl.* v. 3 (1883) p. 575. Almost stemless. Leaves 4—7 by 1¼—1¾ in., linear-oblong, narrowed towards the base, obliquely emarginate at the apex. Flowers in erect elongate simple racemes much longer than the leaves, many-flowered from the base ; pedicels very short ; bracts $\frac{1}{10}$ in. long, ovate, acute. Sepals yellow with a purple spot in the centre (*Dalzell*) ; lateral sepals ¼ by ⅛ in., obovate ; dorsal sepal very slightly longer than the lateral ones, obovate. Petals yellow with a purple spot in the centre (*Dalzell*), as long as the dorsal sepal, ⅛ in. wide. Lip painted with white and rose-color (*Dalzell*) ; side lobes $\frac{1}{10}$ in. long, erect, acute from a triangular base ; midlobe ⅛ by ⅛ in., resembling (as described by Dalzell) a shoe with the front leather turned backward and like a side-saddle, with membranous margins, 3-lobed at the apex, the central lobe rounded ; spur short, obtuse, continuous with the foot of the column, pointing forwards, hairy within. Capsules 1¼ in. long, nearly sessile, ellipsoid, 6-ribbed. *Saccolabium maculatum,* Hook. f. Fl. B. I. v. 6 (1890) p. 64 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519. *Micropera maculata,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 282 ; Lindl. in Journ. Linn. Soc. v. 3 (1858) p. 38 ; Dalz. & Gibs. p. 263.—Flowers : May.

KONKAN : Western Ghâts, *Dalzell* ! DECCAN : Phonda Ghât, *Ritchie,* 1427 ! KANARA : 6 miles west of Divimana, *Woodrow.*—DISTRIB. India (W. Peninsula).

17. RHYNCHOSTYLIS, Blume.

Epiphytic herbs without pseudobulbs ; stem elongate, stout, leafy. Leaves very coriaceous, linear-oblong, truncately or bluntly 2-lobed

at the apex. Flowers in long pendulous many-flowered cylindric racemes, showy. Sepals spreading, broad, obtuse. Petals narrower than the sepals. Lip adnate to the short foot of the column, the hypochile forming a deep wide pubescent sac without side lobes, the epichile obovate, acute, concave, with erect margins. Column short, stout, dilated at the base, and with a very short foot ; stigma small ; anther terminal, rounded ; pollinia 2, elliptic, attached by a slender long caudicle to a small oblong gland.—DISTRIB. Species 2 or 3, Indian and Malayan.

1. **Rhynchostylis retusa,** *Blume, Bijdr.* (1825) p. 286, t. 49. Stems 3—8 in. long, as thick as the middle finger, clothed with the sheaths of decayed leaves, emitting many stout branching roots 6—10 in. long and as thick as a swan's quill ; internodes short. Leaves 6—18 by ½—1½ in., loriform, spreading and recurved, denticulate-truncate, obliquely præmorse or bluntly unequally 2-lobed at the apex, one lobe truncate, the other rounded. Flowers handsome, in dense cylindric racemes which are longer than the leaves, pale pink dotted with deeper colored spots, the lip deeper pink ; peduncles short, with a few small scattered sheaths ; bracts $\frac{1}{10}$—$\frac{1}{8}$ in. long, ovate, acute, persistent ; pedicels with ovary ¼—½ in. long. Sepals veined ; lateral sepals ⅓ by ¼ in., somewhat obliquely obovate-orbicular ; dorsal sepal ⅓ by ⅛ in., obovate, rounded at the apex. Petals as long as the sepals, ⅛ in. wide, elliptic-oblong, subobtuse. Lip dark pink, clawed, with a saccate flattened spur (*hypochile*) ¼ in. deep, the portion in front of the spur (*epichile*) ⅓ in. long, the basal part of which is oblong or cuneate-oblong, $\frac{1}{10}$ in. wide, the apical part widening into a broad rounded retuse midlobe ¼ in. wide. Capsules clavate, 1—1½ in. long, acutely 3-angled and 6-ribbed, on a short stout pedicel. Fl. B. I. v. 6, p. 32 ; King & Pantling, in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 213, t. 284 ; Trim. Fl. Ceyl. v. 4, p. 187 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519 ; Prain, Beng. Pl. p. 1020. *Saccolabium guttatum,* Lindl. in Wall. Cat. (1828) 7308 ; Dalz. & Gibs. p. 263 ; Wight, Icon. tt. 1745—46 ; Bot. Mag. t. 4108. *Ærides retusum,* Sw. in Schrad. Journ. v. 2 (1799) p. 233 ; Grah. Cat. p. 204.—Flowers : May.

KONKAN : *Stocks* !, *Law* !, *Dalzell* !, *Woodrow* ; Salsette, *Dalzell & Gibson.* KANARA : Kâla naddi, *Ritchie* !—DISTRIB. India (Sikkim ; base of Himalaya, Gharwal to Bhotan, Assam, Khasia Hills, Birma, W. Peninsula) ; Ceylon, Malayan Archipelago.

18. ÆRIDES, Lour.

Epiphytic herbs with leafly stems ; pseudobulbs 0. Leaves coriaceous, linear or terete. Flowers usually numerous and showy, in dense or lax, decurved racemes, sometimes solitary ; floral bracts minute. Sepals broad, spreading ; lateral sepals adnate to the base or foot of the column. Petals like the sepals. Lip adnate to the column, spurred ; side lobes large, or small or 0 ; midlobe longer than the side lobes or smaller and incurved between them. Column short with a short or long foot ; anther 2-celled, with or without a

beak ; pollinia 2, globose, sulcate ; caudicle long or short ; gland various.—DISTRIB. Species about 50, Eastern Asiatic.

Lip horizontal or inflexed.
- Flowers almost inodorous; lateral sepals $\frac{3}{8}$ in. long, obovate; petals rose-colored, speckled with dots of a deeper color; midlobe of lip quadrate-oblong ..... 1. *Æ. maculosum.*
- Flowers sweetly fragrant; lateral sepals $\frac{1}{4}$ in. long, obliquely oblong; petals pinkish-white, not speckled; midlobe of lip ovate ..... 2. *Æ. crispum.*

Lip deflexed; lateral sepals $\frac{1}{4}$ in. long, elliptic or suborbicular ..... 3. *Æ. radicosum.*

1. **Ærides maculosum,** *Lindl. in Bot. Reg.* (1845) t. 58. Stems 1—3 in. long, stout, with many sheaths and numerous long tough roots as thick as a goose-quill, which are dry and shrivelled in the hot and cold seasons, thickening and becoming succulent during the rainy season. Leaves 6—9 by $\frac{5}{8}$—$\frac{7}{8}$ in., linear-oblong, channelled, unequally 2-lobed at the apex. Flowers almost inodorous, in racemes 4—10 in. long, which are usually paniculately branched ; peduncles green, $1\frac{1}{2}$—3 in. long, with a few appressed acute sheaths ; pedicels with ovary $\frac{1}{2}$—$\frac{5}{8}$ in. long, rose-colored ; bracts minute, ovate, acute. Sepals pale rose-colored ; lateral sepals $\frac{3}{8}$ in. long or a little longer, nearly as broad as long, obovate, sometimes slightly apiculate, somewhat gibbous, nerved ; dorsal sepal as long as the lateral, rather narrower, obovate. Petals as long as the sepals, $\frac{1}{8}$ in. broad, oblong, obtuse, slightly gibbous, rose-colored, speckled with minute dots of a deeper color. Lip exceeding $\frac{1}{2}$ in. long and nearly $\frac{1}{2}$ in. broad ; side lobes rounded, crenulate ; midlobe $\frac{1}{4}$ in. long and as broad as long, quadrate-oblong, rounded and retuse at the apex, of a dark rose-color in the centre, shaded off towards the slightly crisped margins ; spur rather large, incurved like a hook. Capsules $\frac{3}{4}$—1 in. long, ellipsoid or obovoid, with 3 deep acute ribs. Fl. B. I. v. 6, p. 45 ; Dalz. & Gibs. p. 266 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519 ; Prain, Beng. Pl. p. 1020. *Saccolabium speciosum,* Wight, Icon. v. 5, part 1 (1852) p. 9, tt. 1674—75.—Flowers : May.

KONKAN : *Stocks* !, *Law* !, *Dalzell,* 75 ! DECCAN : Mahableshwar, *Cooke* !, *Woodrow* ; Panchgani, *Cooke* ! S. M. COUNTRY : Belgaum, west face of Cheeta Hill, *Ritchie,* 713 !—DISTRIB. India (Chota Nagpur (rare), W. Peninsula).

2. **Ærides crispum,** *Lindl. in Wall. Cat.* (1828) 7319. Stem 4—10 in. long, very stout, clothed with sheaths of decayed leaves ; roots long and slender, clasping the tree closely, dry and shrivelled in the dry, thickening and becoming succulent during the rainy season. Leaves 4—8 by $1\frac{1}{4}$—$1\frac{3}{4}$ in., oblong or lorate, thickly coriaceous, unequally 2-lobed at the apex, channelled, smooth, curved. Flowers sweetly fragrant, in long often paniculately branched racemes 5—12 in. long ; peduncles green, 4—8 in. long, with a few acute appressed sheaths ; pedicels with ovary $\frac{1}{2}$—$\frac{3}{4}$ in. long, pale pink ; bracts small, ovate, acute. Sepals pinkish-white ; lateral sepals $\frac{5}{8}$ by $\frac{1}{2}$ in., obliquely oblong, roundish, acute at the apex ; dorsal sepal $\frac{1}{2}$ by $\frac{5}{8}$ in., obovate, obtuse, often slightly apiculate. Petals $\frac{1}{2}$ by $\frac{5}{8}$ in., broadly obovate, pinkish-white, shaded with darker pink. Lip 1 in. long, geniculately inflexed at the claw ; side lobes small,

oblique, straight on the lower, elliptic on the upper margin, marked with pink lines; midlobe exceeding ½ in. long, ovate, subobtuse, somewhat 3-lobed, with reflexed and crenulate margins, darker in color than the lateral lobes, with 2 fleshy calli at the base which close the mouth of the spur; spur short, incurved, its apex often concealed beneath the reflexed edges of the lower lip. Column with a purple ring over each of the 2 pollinia. Capsules 1—1½ in. long, pyriform, deeply ribbed. Fl. B. I. v. 6, p. 45; Dalz. & Gibs. p. 265; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519. *Ærides Lindleyana*, Wight, Icon. v. 5 (1852) p. 9, t. 1677; Dalz. & Gibs. p. 265.—Flowers: Apr.—May.

KONKAN: near Vingorla, *Dalzell & Gibson*; Wari country, *Dalzell & Gibson*. DECCAN: Mahableshwar, very common, *Cooke* !, *Woodrow*, *H. M. Birdwood*. KANARA: Usheli, *Ritchie*, 713!—DISTRIB. India (W. Peninsula).

3. **Ærides radicosum,** *A. Rich. in Ann. Sc. Nat.* sér. 2, v. 15 (1841) p. 65, t. 1, fig. C. Stem 1½—4 in. long, as thick as the thumb, covered with sheaths of decayed leaves. Leaves coriaceous, 4—10 by ¾—1 in., linear-oblong, unequally 2-lobed at the apex, often mottled with purple. Flowers deep rose-colored, in stout racemes or panicles rarely exceeding the leaves; peduncles 2—3 in. long, stout; bracts $\frac{1}{10}$ in. long, ovate, acute; pedicels with ovary ¼—⅓ in. long. Sepals 5-nerved; lateral sepals ¼ in. long and as broad as long, broadly elliptic or suborbicular; dorsal sepal ⅓ by ⅛ in., elliptic, obtuse. Petals as long as and slightly narrower than the lateral sepals, broadly elliptic, obtuse, 5-nerved. Lip deflexed, longer than the sepals; side lobes minute; midlobe ovate; disk with 2 large basal calli; spur cylindric, obtuse, incurved. Anther beaked; caudicle of the pollinia short, subtriangular; gland large. Fl. B. I. v. 6, p. 46; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519. *Saccolabium Wightianum*, Lindl. in Wall. Cat. 7303 in part (*not* of Dalzell & Gibson); Wight, Icon. t. 917. *Saccolabium rubrum*, Wight, Icon. v. 5, part 1 (1852) p. 9, t. 1673 (*not* of Lindl.); Dalz. & Gibs. p. 264.—Flowers: May.

KONKAN: Salsette, *Dalzell & Gibson*. DECCAN: Mahableshwar, *Woodrow*. KANARA: near Konapa on the Kála naddi, *Ritchie*, 715!—DISTRIB. India (W. Peninsula).

Woodrow in his list of Bombay plants notes this as occurring at Mahableshwar.—I have never met with it there nor does Mr. H. M. Birdwood mention it in his list of Mahableshwar and Matheran plants.

EXCLUDED SPECIES.

ÆRIDES ODORATUM, Lour. Fl. Cochinch. (1790) p. 525. Stem very stout. Leaves flat, keeled, oblong, blunt and obtusely 2-lobed at the apex, 6—12 by 1—1½ in. Flowers fragrant, white with pink spots, in supra-axillary deflexed many-flowered racemes as long as or longer than the leaves; peduncles short with short distant sheaths; bracts broad, sheathing, blunt. Sepals unequal, spreading; lateral sepals larger than the dorsal, blunt; dorsal sepal elliptic, obtuse. Lip adnate to the short foot of the column; side lobes shallow, truncate, erose; midlobe linear, entire or erose, lying between the edges of the side lobes; spur large, infundibuliform, curved forwards. Anther triangular, depressed, beaked; pollinia globose; caudicle linear; gland quadrate.

In Sir J. Hooker's 'Flora of British India,' v. 6, p. 47, the word *Concan* is a misprint for *Circars*, which is the locality given by Heyne in Herb. Rottl. There are no specimens from the Konkan in Herb. Kew. Woodrow in his list of Bombay plants [Journ. Bomb. Nat. v. 12 (1899) p. 519] gives the Konkan as habitat, but has evidently done so on the authority of the 'Flora of British India.' King & Pantling, in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 212, t. 282, give the following distribution of the plant, viz.: Sikkim, westwards to Nepal, Khasia Hills, Silhet, Chittagong, Birma, Cochinchina, China, and Java.

19. LUISIA, Gaud.

Epiphytic herbs with rigid, terete, usually erect sheathed stems woody below. Leaves terete, fleshy, distant, spreading. Flowers usually small, of a dull color, in short extra-axillary spikes; rhachis stout; floral bracts short, scarious, persistent. Sepals subequal or the depressed dorsal smaller. Petals equal to the sepals or much longer, spreading. Lip sessile on the base of the column, divided into 2 parts, the hypochile (basal part of lip) concave or flat, the epichile (apical part of lip) decurved, broad and ridged, entire or crenate, undulate, more or less blunt. Column stout, much shorter than the lip; stigma usually large; anther broad, 2-celled; pollinia 2, ovoid or subglobose, attached by a broad caudicle to a subquadrate or elongate gland. Capsule narrow, ridged, suberect.—DISTRIB. Species about 15, mostly tropical Asiatic, a few Australian.

Petals as long as the lateral sepals; epichile rhomboid-ovate with entire apex ..... 1. *L. teretifolia.*
Petals much longer than the lateral sepals; epichile 2-lobed at the apex ..... 2. *L. tenuifolia.*

1. **Luisia teretifolia,** *Gaud. Bot. Freyc. Voy.* (1826) p. 427, t. 37. Stem 6—12 in. long, about as thick as a swan's quill, sometimes branching and with stout vermiform roots; internodes ½—¾ in. long. Leaves terete, spreading, 3—7 by $\frac{1}{16}$—⅛ in., green spotted with purple, the tip rounded. Flowers in short 2—3-flowered spikes reaching with the peduncle 1—2 in. long. Sepals greenish-yellow; lateral sepals ⅓ by $\frac{1}{10}$ in., oblong, subacute, with a winged keel at the back; dorsal sepal linear-oblong, $\frac{1}{16}$ in. broad. Petals yellow, as long as the sepals, linear-oblong, obtuse. Lip ¼ in. long; hypochile green spotted with purple, quadrate, subsaccate; epichile dark purple, broadly cordate, rhomboid-ovate, obtuse, obscurely 3-lobed, deflexed, fleshy. Column stout, $\frac{1}{10}$ in. long; anther depressed; pollinia 2, attached by a stout caudicle to a broadly oblong gland. Capsules ¾—1⅜ in. long. Fl. B. I. v. 6, p. 22; King & Pantling, in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 202, t. 271; Trim. Fl. Ceyl. v. 4, p. 190; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519; Prain, Beng. Pl. p. 1018. *Cymbidium triste,* Roxb. Hort. Beng. (1814) p. 63; Bot. Mag. t. 3648; Wight, Icon. t. 911 (text only). *C. tenuifolium,* Wight, Icon. t. 1689 (excluding text).—Flowers: May—June.

KONKAN: W. Ghâts, *Woodrow.* KANARA: Usheli, *Ritchie,* 1417!—DISTRIB. India (Sikkim, Khasia Hills, Bengal, Pegu, Andamans, W. Peninsula); Ceylon.

2. **Luisia tenuifolia,** *Blume, Rumph.* v. 4 (1848) p. 50. Stem 12 in. or more long, slender. Leaves 4—7 in. long, very variable in

thickness, sometimes very slender, green, spreading, straight or flexuous; tip rounded. Flowers few, in short spikes ½ in. long together with peduncle. Sepals yellowish with a purple tinge; lateral sepals ⅜ by ⅛ in., ovate, subacute, concave; dorsal sepal oblong, obtuse. Petals ⅝ by 1/12 in., linear, obtuse, of the same color as the sepals. Lip exceeding ½ in. long, narrowly pandurate, convex, base broad, 2-auricled, tip with 2 divergent lobules, dark purple with a white patch on either side, the terminal lobes pale purple (*Trimen*); disk with 3 large calli. Fl. B. I. v. 6, p. 24; Dalz. & Gibs. p. 266; Wight, Icon. t. 911 (excluding text); Trim. Fl. Ceyl. v. 4, p. 191; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519. *Cymbidium tenuifolium*, Lindl. Gen. & Sp. Orchid. (1833) p. 167 (exclud. syn.); Grah. Cat. p. 203.—Flowers: Aug.

KONKAN: *Stocks*!, *Law*!, *Dalzell*, 41! & 49! S. KONKAN, *Nimmo* ex *Graham*. KANARA: Bomenhali (N. Kanara), *Woodrow*.—DISTRIB. India (W. Peninsula); Ceylon.

20. **COTTONIA**, Wight.

Epiphytic; stem stout, elongate, terete, leafy, emitting stout vermiform roots. Leaves long, narrow, coriaceous; internodes short. Flowers in short racemes; peduncles very long, slender, simple or paniculately branched; bracts small. Sepals subequal, spreading. Petals rather narrower than the sepals, spreading or reflexed. Lip sessile, not jointed at the base of the column, flat, much longer than the sepals, subpandurate, 2-auricled at the base, with interposed calli; side lobes indistinct; midlobe rounded, retuse, with villous margin. Column short, without a foot; anthers depressed, hemispheric, 2-celled; pollinia 2, pyriform, 2-cleft, or 4, the 2 smaller incumbent on the larger; caudicle long, narrow; gland small.—DISTRIB. India and Ceylon; species 1.

1. **Cottonia macrostachys**, *Wight, Icon.* v. 5, part 1 (1852) p. 21, t. 1755. Stem 4—8 in. long, nearly as thick as the little finger, clothed with short appressed sheaths. Leaves 5—8 by ½—⅝ in., lorate, spreading, straight or recurved, abruptly ending in 2 lobes, one longer and more rounded than the other with a broad acute sinus between them, keeled beneath, dull green, sometimes obscurely mottled. Flowers somewhat resembling a humble-bee, in short few-flowered racemes; peduncles 12—30 in. long, erect, green, often mottled with red, simple or branched, the branches forming terminal racemes; bracts minute, ovate, persistent; pedicels with ovary ½—¾ in. long; flower-buds subglobose. Sepals greenish-yellow veined with red; lateral sepals ⅜ by ⅛ in., ovate-oblong, subobtuse; dorsal sepal ⅜ by ⅛ in., obovate-oblong. Petals greenish-yellow veined with red, ⅛ by ⅛ in., oblanceolate, obtuse. Lip nearly ½ in. long by ⅛ in. broad, 2-auricled at the base, subpandurate, purple with yellow villous border; side lobes obscure; midlobe rounded, retuse. Capsules 1½—2¼ in. long, narrowly fusiform, acutely angled. Fl. B. I. v. 6, p. 26; Dalz. & Gibs. p. 263; Bot. Mag. t. 7099; Trim. Fl. Ceyl. v. 4, p. 203; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519.—Flowers: Apr.—May.

KONKAN: *Stocks*!, *Law*!, *Woodrow*, 7!; South Konkan, *Dalzell*, 4! KANARA: N. Kanara, *Woodrow*; Supa, *Ritchie*, 1424!—DISTRIB. India (W. Peninsula); Ceylon.

21. VANDA, R. Br.

Epiphytic herbs; stems leafy. Leaves thickly coriaceous or fleshy, flat and keeled, or terete. Flowers large and often showy, axillary, in simple lax or dense racemes, or sometimes solitary; floral bracts much shorter than the ovary. Sepals spreading or connivent, narrowed at the base. Petals like the sepals. Lip large, usually saccate or spurred at the base; side lobes large or small (rarely obsolete), adnate to the short foot of the column or to the sides of the sac or spur; midlobe fleshy, various; disk usually ridged or lamellate, sometimes carunculate. Column short, stout, with or without a short foot; anther 2-celled; rostellum small; pollinia 2, didymous, globose, ovoid or obovoid; caudicle short and broad or long and geniculate; gland usually large.—DISTRIB. Tropical Asia and Australia; species about 20.

Stem 4—6 in. long; flowers less than 1 in. across, yellow except the blue fleshy ridges on the lip; capsule 1—1½ in. long ..... 1. *V. parviflora.*

Stem 12—24 in. long; flowers 1½—2 in. across; sepals and petals greenish with brown nerves; midlobe of lip violet; capsule 3 in. long ..... 2. *V. Roxburghii.*

1. **Vanda parviflora,** *Lindl. in Bot. Reg.* v. 30 (1844) *Misc.* p. 45. Stem stout, 3—6 in. long, leafy, clothed with the remains of sheaths of fallen leaves, emitting large vermiform roots. Leaves 3—8 by ⅜—½ in., linear-oblong, conduplicate, keeled, unequally and obtusely 2-lobed at the apex. Flowers in few-flowered racemes from below the leaves and about as long as them; rhachis of raceme stout; bracts $\frac{1}{12}$ in. long, ovate, acute; peduncles about as long as the racemes; pedicels with ovary ⅝—¾ in. long. Sepals yellow; lateral sepals ⅓ by ⅙ in., broadly obovate or suborbicular; dorsal sepal slightly longer than the lateral, ⅛ in. broad, obovate-oblong. Petals yellow, ⅓ by $\frac{1}{10}$ in., spathulate-oblong. Lip ⅓ in. long, adnate to the foot of the column, spurred; spur narrowly infundibuliform, curved at the tip; side lobes erect, oblong, rounded, rising from the mouth of the spur; midlobe fleshy, subquadrately obovoid, decurved, the tip dilated, crenulate, truncate or retuse; disk whitish, with 2 broad fleshy lilac-colored ridges. Column short with a short foot; anther depressed; pollinia subglobose; caudicle broad, short. Capsules 1—1½ in. long, clavate or fusiform, with winged ridges. Fl. B. I. v. 6, p. 50; Wight, Icon. t. 1669; Trim. Fl. Ceyl. v. 4, p. 192; King & Pantling, in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 215, t. 286; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519; Prain, Beng. Pl. p. 1021. *Ærides Wightianum,* Lindl. in Wall. Cat. 7320; Wight, Icon. v. 5, part 1 (1852) p. 8; Dalz. & Gibs. p. 265. ? *Vanda spathulata,* Grah. Cat. p. 204 (*not* of Spreng.).—Flowers: May.

KONKAN: *Stocks*!, *Law*!, *Gibson*!, *Woodrow*; S. Konkan, *Dalzell & Gibson.* DECCAN: Máwal, *Woodrow*; hills round Mahableshwar, *Cooke*! S. M. COUNTRY: Belgaum and Kolhapur Road, *Ritchie*; 1433!—DISTRIB. India (Sikkim, Kumaon, Nepal, Assam, Birma, W. Peninsula); Ceylon.

2. **Vanda Roxburghii,** *R. Br. in Bot. Reg.* v. 6 (1820) t. 506. Stem 1—2 ft. long, stout, scandent by the stout, simple or branching roots. Leaves thickly coriaceous, 6—8 by ½—¾ in., recurved, complicate, obtusely keeled, præmorse, with usually 2 unequal rounded lobes and an acute interposed one. Flowers in 6—10-flowered racemes reaching with the peduncle 6—10 in. long; bracts scarious, ⅛ in. long, ovate, acute; pedicels with ovary 1½—2 in. long. Sepals yellow, tessellated with brown lines and with white margins; lateral sepals 1 by ⅝ in., obovate with subcuneate bases and with more or less waved margins; dorsal sepal as long as the lateral, ½ in. broad, obovate-oblong. Petals yellow with brown lines and white margins, shorter than the sepals, ½ in. wide. Lip ⅝ in. long, bluish dotted with purple; side lobes rising from the mouth of the spur ¼ in. long, ovate, acute, erect; midlobe 7/16 in. long, pandurate, the lower part broadly elliptic, the apical portion quadrate, dilated at the fleshy 2-lobed tip; disk tumid, with fleshy ridges; spur straight, conical, obtuse, ¼ in. long. Column very short; pollinia ellipsoid or subglobose; caudicle short, broad; gland large. Capsules 3—3½ in. long, narrowly clavate-oblong with acute ribs and a short pedicel. Fl. B. I. v. 6, p. 52; Grah. Cat. p. 204; Wight, Icon. t. 916; Trim. Fl. Ceyl. v. 4, p. 192; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519; Prain, Beng. Pl. p. 1021.—Flowers: July.

KONKAN: *Woodrow*, 1! GUJARAT: Chikli on the Atavesi River, *Gibson*! KANARA: Kála naddi, *Ritchie*, 1425!—DISTRIB. India (Bengal, Behar, W. Peninsula); Ceylon.

22. DIPLOCENTRUM, Lindl.

Epiphytic herbs; stems short, leafy; pseudobulbs 0. Leaves distichous, narrow, fleshy, subterete or complicate. Flowers small, in long subspiciform racemes; peduncles lateral, sometimes branched. Sepals subequal or the lateral larger. Petals like the dorsal sepal. Lip sessile, jointed on the base of the column, spreading, entire, shortly 2-spurred; disk fleshy. Column very short, 2-auricled, truncate; anther 2-celled; pollinia 2, ovoid, sulcate or 2-partite, attached by a broad caudicle to a broad gland.—DISTRIB. Species 2 or 3, Indian.

1. **Diplocentrum congestum,** *Wight, Icon.* v. 5 (1852) part 1, p. 10, t. 1682. Stem short. Leaves 3—3½ by ⅜—⅝ in., linear-oblong, recurved, unequally and obtusely 2-lobed at the apex. Flowers numerous, in pendulous sometimes sparingly branched racemes 3—6 in. long; bracts spreading, triangular-ovate, 1/20—⅛ in. long; pedicels ⅛ in. long. Sepals dull brownish-green, ⅛—⅙ in. long; lateral sepals reflexed. Petals colored as the sepals, 1/10—⅛ in. long, elliptic-oblong, obtuse. Lip about ⅛ in. long, rose-colored, reflexed and truncate at the apex, rather broader and obtusely keeled at the base; spurs 2, saccate-oblong, 1/16 in. long, slightly divergent. Capsules less than ½ in. long, oblong, shortly pedicellate. Fl. B. I. v. 6, p. 78; Rolfe, in Hook. Icon. Pl. v. 27 (1901) t. 2687.—Flowers: June—Sept.

Rare. KANARA: Sirsi-Kumpta road (N. Kanara), *Woodrow*!—DISTRIB. India (W. Peninsula).

23. **ACAMPE,** Lindl.

Epiphytic herbs ; stem usually very long and stout. Leaves thickly coriaceous, keeled, distichous, oblique at the apex. Flowers corymbose, in large spreading panicles, fleshy, brittle, yellow, spotted ; peduncles short, rigid, lateral ; bracts broad, short, persistent. Sepals fleshy, brittle, flat ; lateral sepals adnate to the usually small spur of the lip ; dorsal sepal often slightly larger than the lateral ones. Petals like the sepals, straight. Lip fleshy, bent upwards, saccate or spurred, adnate to the footless column, often tuberculate and pubescent within the sac. Column short, thick, without a foot ; anthers ovate, 2-celled ; pollinia 2, waxy, globose ; caudicle slender, linear, longer than the pollinia ; gland small, subrotund.—DISTRIB. Tropical Asia ; species 8 or 9.

The genus was founded by Lindley in 1853 [Fol. Orchid. (*Acampe*)]. The 'Flora of British India' places it as a section (*Acampe*) under *Saccolabium*, but the genus seems sufficiently well defined to have independent rank accorded to it. Ridley remarks [Journ. Linn. Soc. v. 32 (1896) p. 346] that there seems no good reason why the genus should be merged in *Saccolabium*. Pfitzer [Engl. & Prantl, Pflanzenf. v. 2, part 6 (1889) p. 213] keeps the genus distinct and Mr. Rolfe of the Kew Herbarium is also in favor of so maintaining it.

1. **Acampe Wightiana,** *Lindl. Fol. Orchid.* (1853) p. 2 (*Acampe*). Stem 12—18 in. long, as thick as the little finger, clothed with sheaths of fallen leaves ; internodes short ; roots long, very stout. Leaves 4—8 by ⅝—1¼ in., ligulate, thickly coriaceous, flat, irregularly 2-lobed at the apex, the lobes rounded, usually with an acute sinus. Flowers corymbose, in supra-axillary panicles 1½—2½ in. long including the peduncle ; peduncle about as long as the panicle, stout, with many cupular sheaths ; bracts short, broadly ovate, persistent ; pedicels with ovary ⅛—¼ in. long. Sepals yellow, barred with red ; lateral sepals ⅜ by ⅕ in., elliptic-oblong, obtuse ; dorsal sepal as long and as broad as the lateral ones, obovate-oblong, obtuse. Petals yellow, barred with red, ⅛ by $\frac{1}{10}$ in., obovate, obtuse. Lip less than ⅛ in. long, white, with a few transverse red stripes ; side lobes small, rounded ; midlobe ⅛ in. long, ovate, obtuse, fleshy ; spur a short rounded sac. Pollinia 2, large, globose ; caudicle short ; gland small. Capsules 1½—3 in. long, sessile or nearly so, clavate, or oblong, or fusiform, with many ribs. *Acampe excavata,* Lindl. Fol. Orchid. (1853) p. 3 (*Acampe*). *Saccolabium Wightianum,* Hook. f. Fl. B. I. v. 6 (1890) p. 62 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519 ; Trim. Fl. Ceyl. v. 4, p. 199. *Saccolabium præmorsum,* Hook. f. Fl. B. I. v. 6 (1890) p. 52 ; Prain, Beng. Pl. p. 1022. *S. papillosum,* Dalz. & Gibs. Bo. Fl. (1861) p. 264 (*not* of Lindl.). *Ærides præmorsum,* Grah. Cat. p. 204 (*not* of Willd.). *Vanda Wightiana,* Lindl. ex Wight, Icon. v. 5, part 1 (1852) p. 9, t. 1670.—Flowers : May.

KONKAN : *Graham, Stocks* !, *Law* !, *Woodrow,* 5 ! ; Indapur (S. Konkan), *Graham.* S. M. COUNTRY : Belgaum, *Ritchie,* 716 !—DISTRIB. India (Bengal, W. Peninsula) ; Ceylon.

I cannot separate *Acampe excavata,* Lindl., from this. The material in Herb. Kew. is scanty and an examination of fresh specimens much to be desired.

24. SARCANTHUS, Lindl.

Epiphytic herbs ; stems usually elongate ; pseudobulbs 0. Leaves fleshy, terete or flat. Flowers small, in extra-axillary racemes or panicles ; bracts small. Sepals subequal, all spreading or reflexed, or the dorsal concave or connivent over the column. Petals rather smaller than the sepals, spreading. Lip adnate to the base of the column or to its foot ; base with an infundibuliform spur sometimes dilated at the apex, divided by a longitudinal septum reaching from the base to about half-way up or higher, but not reaching the mouth, with a callus both on the upper and lower walls ; side lobes small, more or less triangular and acute ; midlobe small, triangular or hastate. Column short, stout, often with a foot as long as or longer than itself ; anther depressed ; pollinia 2, bifid.—DISTRIB. Eastern Tropical Asia ; species about 35.

1. **Sarcanthus peduncularis,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 343. Stem 10—12 in. long, about as thick as a duck's quill, pendulous, leafy. Leaves coriaceous, 4—6 by $\frac{1}{4}$ in., linear, obtusely acuminate, narrowed at the base, straight or falcately recurved, the sheaths ribbed. Flowers deflexed, in racemes which are shorter than the leaves ; bracts minute, ovate, acute, persistent ; pedicel with ovary $\frac{1}{12}$ in. long. Sepals yellow with red margins ; lateral sepals $\frac{1}{8}$ by $\frac{1}{10}$ in., elliptic obtuse ; dorsal sepal slightly longer and slightly narrower than the lateral ones, spathulate-oblong. Petals $\frac{1}{8}$ by $\frac{1}{12}$ in., spathulate, colored like the sepals. Lip white or yellowish, with violet side lobes, $\frac{1}{8}$ in. long ; side lobes triangular, acute, small ; midlobe incurved, acute ; spur $\frac{1}{10}$—$\frac{1}{8}$ in. long, subcylindric or conical, septate almost to the mouth. Column short ; anther with a long subulate beak ; pollinia 2-partite ; caudicle slender ; gland small. Capsules $\frac{2}{3}$—$\frac{3}{4}$ in. long, fusiform or oblong, sessile or nearly so. Fl. B. I. v. 6, p. 67 ; Dalz. & Gibs. p. 264 ; Trim. Fl. Ceyl. v. 4, p. 200. *Sarcanthus pauciflorus,* Wight, Icon. v. 5 (1852) part 1, p. 20, t. 1747 (*bad*).—Flowers : July—Aug.

KONKAN : *Stocks,* 35 !, *Law* ! ; near the village of Virdi in Wari country, *Dalzell* ! KANARA : Kála naddi, *Ritchie,* 1430 !—DISTRIB. India (W. Peninsula) ; Ceylon.

25. POGONIA, Juss.

Terrestrial, tuberous-rooted, 1-leaved herbs ; tuber giving off below the surface of the ground 2 or 3 stolons, each producing at its tip a tuber smaller than that of the parent. Leaf broadly cordate or orbicular, strongly plicate, from the same tuber as the flowers, but usually subsequent to the appearance of the flowering scape, occasionally contemporaneous with the flowers. Flowers solitary, or few, or several, racemose, often pendulous on scapes arising from the tuber. Sepals subequal, narrow, connivent or spreading. Petals like the sepals. Lip adnate to the base of the column, sometimes slightly saccate at the base, rather narrow, the lower portion convolute round the column ; side lobes small or 0 ; midlobe flat, ovate or orbicular, entire or fimbriate. Column elongate, clavate upwards ; stigma

anticous, oblong or orbicular ; anther more or less incumbent, substipitate ; pollinia 2 or 4, elongate, powdery, often coherent, without caudicle or gland.—DISTRIB. Species about 60, Asiatic, American, and African.

Scapes 1—3-flowered; bracts $\frac{1}{10}$ in. long; lip without side lobes	1. *P. plicata.*
Scapes many-flowered; bracts $\frac{1}{4}$ in. long; lip with obtuse side lobes	2. *P. carinata.*

1. **Pogonia plicata,** *Lindl. Gen. & Sp. Orchid.* (1840) p. 415. Tuber globose, $\frac{1}{2}$ in. in diam. or less. Leaf dark green mottled with purplish-brown, lying flat on the ground and appearing after the flowers have withered, 2—4 in. long and nearly as broad as long, broadly ovate or suborbicular, obtuse, acute or shortly acuminate, many-nerved from a cordate base ; petioles $\frac{3}{4}$—$2\frac{1}{2}$ in. long. Scape 3—6 in. long with 2 or 3 tubular sheaths with subacute dilated apices. Flowers 2 or 3 ; floral bract $\frac{1}{10}$ in. long, ovate, acute. Sepals $\frac{3}{8}$ by $\frac{1}{16}$ in., linear-lanceolate, acuminate, yellowish-green. Petals like the sepals and similarly colored. Lip lilac with a green spot at the base and a yellow line along the thickened part of the midrib, less than $\frac{1}{3}$ in. long, convolute and embracing the column, entire except the minutely emarginate apex, the midrib thickened and callus-like for more than half its length, the base slightly saccate. Column narrowed in the lower half, the upper portion clavate ; pollinia 4, narrowly oblong. Fl. B. I. v. 6, p. 119 ; King & Pantling, in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 268, t. 358 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519 ; Prain, Beng. Pl. p. 1025. ? *Pogonia flabelliformis,* Dalz. & Gibs. Bo. Fl. (1861) p. 270 (*not* of Lindl.).—Flowers : June.

KONKAN : *Stocks* !, *Law* ! DECCAN : Lanoli, *Woodrow* ! ; Khandala, *Cooke* ! —DISTRIB. India (Bengal, W. Peninsula).

2. **Pogonia carinata,** *Lindl. Gen. & Sp. Orchid.* (1840) p. 414. Leaf $1\frac{1}{2}$—$2\frac{1}{2}$ in. in diam., orbicular, cuspidate, 7—9-nerved, glabrous, base broadly cordate, the central part cuneate ; petioles 1—3 in. long. Flowers numerous, in racemes measuring with the stems 6—12 in. long ; bracts linear, acute, $\frac{1}{2}$ in. long. Sepals pale-green, $\frac{7}{8}$ in. long, oblong-lanceolate, acuminate, nerved. Petals like the sepals in form and color. Lip with purple veins and spots on a pale greenish-yellow ground, $\frac{3}{4}$ in. long, not saccate at the base, 3-lobed about the middle ; side lobes $\frac{1}{10}$ in. long, rounded ; midlobe $\frac{1}{3}$ in. long, ovate-oblong, subobtuse, crenulate. Fl. B. I. v. 6, p. 121 ; Dalz. & Gibs. p. 270 ; Prain, Beng. Pl. p. 1026. *Pogonia flabelliformis,* Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519. *Epipactis carinata,* Roxb. Fl. Ind. v. 3 (1832) p. 454 ; Grah. Cat. p. 205.—Flowers : May—June.

KONKAN : *Stocks* !, *Law* ! DECCAN : Lanoli, *Woodrow*. S. M. COUNTRY : near Dharwar, *Law* ex *Stocks*, 68 ! KANARA : *Law* !—DISTRIB. India (Bengal, W. Peninsula).

26. SPIRANTHES, Rich.

Terrestrial leafy herbs with tuberous or fibrous roots. Leaves linear (in the Indian species). Flowers small, secund, on a twisted

erect spike. Sepals subequal, free or sometimes cohering with the petals to form an erect hood ; lateral pair gibbous at the base. Petals like the dorsal sepal. Lip erect, entire or 3-lobed, the base concave but neither saccate nor spurred ; disk bearing lamellæ or calli. Column short, terete ; stigma single, broad, anticous ; rostellum erect, obtuse, or elongate and 2-fid ; anther erect, 2-celled ; pollinia 4, united in pairs, sessile on a small gland.—DISTRIB. Species about 80, temperate and tropical.

1. **Spiranthes australis,** *Lindl. in Bot. Reg.* v. 10 (1824) sub t. 823. Whole plant 6—18 in. high ; stem stout or slender ; roots consisting of elongate fleshy white cylindric or almost tuberous fibres. Leaves 4—5, alternate, usually clustered near the base of the stem, 1½—5 by ¼ in., linear or linear-lanceolate, acute or acuminate, sometimes oblanceolate, shortly sheathing. Stem with a few distant acute sheaths (reduced leaves). Flowers numerous, in spikes 3—6 in. long on a glandular-pubescent spirally twisted rhachis ; bracts ovate, acute or acuminate, exceeding the sessile ovary. Sepals ⅛ by $\frac{1}{16}$ in., subequal, ovate-oblong, acute, with broad bases. Petals slightly shorter than the sepals, $\frac{1}{25}$ in. broad, linear, obtuse, more or less connate with the dorsal sepal into a hood. Lip $\frac{1}{10}$—⅛ in. long, 3-lobed, dilated at base and apex, the base subsaccate, 2-glandular, the apex subquadrate, truncate, retuse, crenulate. Pollinia cohering, clavate. Capsules ¼ in. long, fusiform, ribbed. Fl. B. I. v. 6, p. 102 ; Dalz. & Gibs. p. 270 ; Wight, Icon. t. 1724 (*middle and right-hand figs.*) ; King & Pantling, in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 278, t. 369 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519 ; Prain, Beng. Pl. p. 1028.

Rare in the Bombay Presidency. KONKAN : *Stocks* ! S. M. COUNTRY : Chorla Ghát, *Dalzell & Gibson.* KANARA : *Dalzell,* 40 !—DISTRIB. Throughout the mountainous parts of India at suitable elevations ; Ceylon, Afghanistan, Northern Asia, China, Java, Australia, New Zealand.

27. ZEUXINE, Lindl.

Terrestrial herbs ; stems decumbent at the base, succulent, glabrous. Leaves membranous, sometimes withering at flowering time. Flowers small, in racemes or spikes. Sepals usually subequal ; lateral pair free ; dorsal sepal concave and forming a hood with the petals. Petals like the dorsal sepal. Lip adnate to the base of the column, cymbiform or saccate, the apical lobe shortly clawed or sessile, divided into 2 oblong subquadrate more or less truncate divergent lobules, or entire, or with narrow decurved lobules ; sac at the base with calli or laminæ inside. Column very short, its anterior face with lamellar or conical processes ; stigmas 2, lateral, distant ; anther membranous, sometimes ridged, its cells contiguous ; pollinia pyriform, attached by an oblong gland to the erect rostellum.—DISTRIB. Species about 20, Tropical Asiatic and African.

Leaves linear, sessile ; lip not longer than the sepals ; pollinia sessile on an oblong gland	1. *Z. sulcata.*
Leaves ovate, petiolate ; lip twice as long as the sepals ; pollinia adnate for two-thirds of their length to the linear appendage of the gland	2. *Z. longilabris.*

1. **Zeuxine sulcata,** *Lindl. Gen. & Sp. Orchid.* (1840) p. 485. Whole plant 2—10 in. high ; stem passing into the peduncle, leafy, glabrous. Leaves 1—2 by $\frac{1}{8}$—$\frac{1}{4}$ in., linear, acuminate, clasping, sessile on the hyaline truncate sheaths, gradually passing into linear bracts upwards. Flowers in densely-flowered racemes $\frac{1}{2}$—2 in. long ; bracts $\frac{1}{8}$ in. long, much exceeding the ovary, ovate, caudate-acuminate, erect, membranous ; pedicels very short. Sepals unequal, greenish-white ; lateral pair $\frac{1}{8}$ by $\frac{1}{16}$ in., smaller than the dorsal, obliquely ovate-oblong, subobtuse ; dorsal sepal $\frac{1}{8}$ by $\frac{1}{10}$ in., concave, ovate, obtuse. Petals greenish-white, slightly shorter than the dorsal sepal, $\frac{1}{16}$ in. broad, falcately oblong, obtuse, united with the dorsal sepal to form a hood over the column. Lip $\frac{1}{8}$ in. long, hammer-headed, yellow, with a small cymbiform sac at the base ; apical lobe $\frac{1}{20}$ by $\frac{1}{12}$ in., subquadrate, entire or emarginate at the apex. Column very short, with 2 wings at its apex covering the anther ; arms of rostellum short, stout, parallel ; anther depressed, very shortly beaked, covered by the wings of the column ; pollinia clavate, sessile on an oblong gland. Fl. B. I. v. 6, p. 106 ; King & Pantling, in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 286, t. 381 ; Trim. Fl. Ceyl. v. 4, p. 215 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519 ; Prain, Beng. Pl. p. 1029 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 355. *Zeuxine bracteata,* Wight, Icon. v. 5, part 1 (1852) p. 16, t. 1724 (*bis*). *Z. brevifolia,* Wight, Icon. l. c. t. 1725. *Z robusta,* Wight, Icon. l. c. t. 1726.—Flowers : Jan.

KONKAN : *Stocks* !, *Law* ! DECCAN : hills in the Deccan, *Cooke* !, *Woodrow* ! S. M. COUNTRY : Dharwar, *Law* ! KANARA : *Law* ! SIND : *Stocks*, 411 !—DISTRIB. Throughout India ; Ceylon, China, Japan, Java, Afghanistan, Philippines.

2. **Zeuxine longilabris,** *Benth. in Benth. & Hook. f. Gen. Pl.* v. 3 (1883) p. 600. Whole plant about 6—10 in. high, slender, ascending from a creeping and rooting base, about as thick as a crow's quill. Leaves few, rather distant, 1—$1\frac{3}{4}$ by $\frac{1}{3}$—$\frac{1}{2}$ in., shortly petiolate, ovate or ovate-oblong, acute, 7-nerved, glabrous, base rounded ; sheaths short, hyaline, inflated. Flowers in lax few-flowered spikes ; scape including the spike 4—10 in. long, very slender, pubescent, with 2 or 3 distant lanceolate sheaths ; rhachis of spike glandular-pubescent, 2—3 in. long ; bracts about as long as the pubescent ovary, narrowly lanceolate. Sepals $\frac{1}{4}$ in. long, greenish, oblong, obtuse, pubescent. Petals white, twice as long as the sepals. Lip with a claw which is saccate at the base, gradually dilated into the deeply 2-lobed obovate-cuneate midlobe, the cuneate lobes or wings of which are separated by a narrow acute sinus and are crenulate or coarsely toothed on the outer margin ; sac with 2 spurs in the cavity. Anther with a long beak ; pollinia pyriform, adnate for two-thirds of their length to the linear appendage of the small gland. Fl. B. I. v. 6, p. 107 ; Trim. Fl. Ceyl. v. 4, p. 216 ; Prain, Beng. Pl. p. 1029. *Monochilus longilabre,* Lindl. Gen. & Sp. Orchid. (1840) p. 487 ; Dalz. & Gibs. p. 271. *M. affine,* Wight, Icon. v. 5, part 1 (1852) p. 16, t. 1728.

Rare in the Bombay Presidency. KONKAN : *Law* !, *Stocks* !—DISTRIB. India (Bengal, Assam, W. Peninsula) ; Ceylon.

28. **CHEIROSTYLIS,** Blume.

Terrestrial herbs ; stems decumbent and succulent at the base. Leaves membranous. Flowers few, racemose. Sepals united in their lower half into a ventricose tube. Petals shorter than the sepals. Lip saccate or cymbiform at the base, the sac with enclosed calli or setæ, the anterior lobe shortly clawed, 2-lobed or fimbriate. Column short with 2 long fleshy appendages in front ; rostellum 2-cleft ; stigmas 2, lateral ; anther erect, its cells short ; pollinia 2, bipartite ; caudicle short ; gland oblong.—DISTRIB. Species about 12, chiefly Indian and Malayan.

1. **Cheirostylis flabellata,** *Wight, Icon.* v. 5, part 1 (1852) p. 16. Whole plant 4—8 in. high. Leaves thin, ½—¾ by ⅜—½ in., ovate, acute, 3-nerved and reticulately veined, glabrous, base rounded or subcordate ; sheaths hyaline, truncate, inflated ; petioles ⅛—⅜ in. long. Flowers few, white, in short racemes which rarely reach 1 in. long ; scapes 6—7 in. long, slender ; sheaths few, loose, acuminate ; bracts ⅛—⅛ in. long, ovate, acuminate. Sepals ¼ in. long, united half-way up into a ventricose tube, the lobes ovate-oblong. Petals linear-oblong, falcate, obtuse, the tips exserted. Lip ¼ in. long, with a short saccate claw and a broad spreading suborbicular 2-lobed limb, the lobes sub-5-fid ; sac cymbiform, with 2 enclosed calli. Column short ; appendages and rostellar arms long, subspathulate ; anther with a dilated membranous tip ; pollinia 2, pyriform, subsessile on the elongate gland. Fl. B. I. v. 6, p. 105 ; Dalz. & Gibs. p. 271 ; Trim. Fl. Ceyl. v. 4, p. 211 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519. *Monochilus flabellatum,* Wight, Icon. t. 1727.—Flowers : Mar.

S. M. COUNTRY : Chorla Ghât, *Dalzell & Gibson.* KANARA : Kumpta-Sirsi road, *Woodrow.*—DISTRIB. India (Bhotan Himalaya, Tenasserim, W. Peninsula) ; Ceylon.

29. **PERISTYLUS,** Blume.

Terrestrial herbs. Sepals and petals free, subequal, connivent or subconnivent. Lip continuous with the column, free or slightly adnate to it, produced at the base into a short (sometimes very short) spur, erect or somewhat spreading, entire or 3-lobed. Column short, footless ; clinandrium erect, short. Anther-cells parallel ; apex inferior, short and adnate to the base of the column ; pollinia granular with short caudicles and exserted naked glands ; staminodes lateral, auriculate. Stigma sessile. Rostellum subulate or tooth-like, situated between the anther-cells. Capsule ellipsoid or oblong.—DISTRIB. Throughout the N. temperate regions and in the tropics of Asia and Africa, chiefly in the mountains ; species 40 or 50.

Spur as long as or longer than the sepals, subclavate ... 1. *P. Stocksii.*
Spur shorter than the sepals, globose or ellipsoid.
  Stem leafy, the leaves scattered or subimbricate ..... 2. *P. spiralis.*
  Leaves clustered about the middle of the stem.
    Lip shorter than the sepals; petals white ..... 3. *P. plantagineus.*

Lip as long as the sepals; petals yellow or yellowish-green.
Lateral sepals mucronate at the back below the apex; spikes dense, 4—12 in. long ..... 4. *P. goodyeroides.* var. *affinis.*
Lateral sepals not mucronate at the back below the apex; spikes lax, 2—3 in. long ..... 5. *P. Lawii.*

1. **Peristylus Stocksii,** *Kraenzlin, Orchid. Gen. et Sp.* v. 1 (1898) p. 513. Whole plant 6—18 in. high; stem slender, with numerous sheaths in the lower part. Leaves more or less clustered towards the middle of the stem, variable, 3—4 by ½—1½ in., obovate or elliptic, or lanceolate, obtuse, acute or acuminate, usually petiolate. Flowers yellowish, in twisted spikes 3—6 in. long; peduncles with a few scales between the leaves and the spike; bracts ⅛—⅝ in. long, ovate, acuminate, the lower bracts longer than the upper, sometimes shorter than the curved ovary. Sepals 1-nerved; lateral sepals ⅛ by 1/20 in. long, oblong, obtuse; dorsal sepal ⅛ by 1/12 in., elliptic-oblong, obtuse. Petals ⅛ in. long, obliquely ovate, obtuse, subfleshy. Lip ⅛ in. long, 3-lobed at the apex, the lobes shorter than the sepals; claw broad, concave; lateral lobes a little shorter and narrower than the midlobe, slightly incurved; midlobe 1/16—1/12 by 1/30 in., oblong, obtuse; spur ⅛—⅓ in. long, inflated downwards, shorter than the ovary. Pollinia clavate. Stigmatic lobes clavate. Rostellum reduced to a triangular tooth. *Habenaria Stocksii,* Hook. f. Fl. B. I. v. 6 (1890) p. 158; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520.—Flowers: July—Aug.

KONKAN: *Dalzell!, Law!*; Dronaghiri, *Stocks!*; Neral below Matheran, *Bhiva!* S. M. COUNTRY: Rámghát, *Ritchie,* 1398!—DISTRIB. India (W. Peninsula).

2. **Peristylus spiralis,** *A. Rich. in Ann. Sc. Nat.* sér. 2, v. 15, p. 69, t. 2, B. Whole plant 6—18 in. high; stem leafy, often flexuous; tubers small, oblong, pyriform or globose. Leaves 1—2½ by ¼—⅜ in., linear-lanceolate, obtuse, acute or acuminate, coriaceous, 5—7-nerved, sheathing at the base, the upper passing into numerous lanceolate sheaths. Flowers greenish-white, secund, in spirally twisted lax-flowered slender spikes 2—10 in. long; bracts ¼—⅜ in. long, lanceolate, finely acuminate, equalling or the lower exceeding the ovary. Lateral sepals ⅛ by 1/30 in., linear, obtuse, falcate; dorsal sepal ⅛ by 1/20 in., linear-oblong, obtuse, concave. Petals ⅛ by 1/16 in., ovate-oblong or linear-oblong, obtuse. Lip variable, fleshy, ⅛ in. long, rather longer than broad, with a short broad concave claw, 3-lobed nearly to the middle; side lobes usually slightly longer and much narrower than the midlobe, linear, acute, more or less spreading; midlobe 1/16 by 1/10 in., linear, obtuse; spur a small globose sac 1/20 in. in diam. Anthers minute, the cells parallel; tubes 0; pollinia pyriform; caudicle short; glands oblong. Stigmatic processes short, clavate. Rostellum 3-fid. Wight, Icon. t. 1696; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1898) p. 510. *Habenaria torta,* Hook. f. Fl. B. I. v. 6 (1890) p. 159; Trim. Fl. Ceyl. v. 4, p. 234; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520.

KONKAN: *Law!, Stocks,* 67!; Western Ghâts southwards, *Woodrow.*—DISTRIB. India (W. Peninsula); Ceylon.

3. **Peristylus plantagineus,** *Lindl. Gen. & Sp. Orchid.* (1835) p. 300. Whole plant 12—20 in. high; stem robust, leafy chiefly about the middle, closely embraced by many long narrowly lanceolate sheaths above the leaves, and with loose sheaths below them; tubers large, cylindric-oblong. Leaves few, 4—8 by 1¾—2½ in., oblong-lanceolate, or elliptic-lanceolate, acuminate, strongly nerved beneath, closely sheathing at the base. Flowers in dense spikes 4—8 in. long; bracts reaching ⅜ in. long, erect, narrowly lanceolate, acuminate. Sepals greenish; lateral sepals ⅜ by 1/12 in., elliptic-oblong, obtuse; dorsal sepal ⅜ by 1/10 in., oblong, obtuse. Petals white, very broad, obliquely orbicular, sub-cartilaginous, the tips recurved; nerves branching. Lip white, shorter than the sepals, broadly obovate, entire or shortly 3-lobed; lobes obtuse, contracted beyond the very short broad concave base; spur small, scrotiform. Anther-cells parallel; tubes short, recurved; pollinia clavate; caudicles short; glands small. Stigmatic processes short, stout. Rostellum short, acute. Wight, Icon. t. 921; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1898) p. 516. *Peristylus elatus,* Dalz. & Gibs. in Kew Journ. Bot. v. 3 (1851) p. 344; Dalz. & Gibs. p. 270. *Habenaria Wightii,* Trimen, Cat. Ceyl. Pl. (1885) p. 91; Hook. f. Fl. B. I. v. 6 (1890) p. 162; Trim. Fl. Ceyl. v. 4, p. 232; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520.—Flowers: July.

KONKAN: *Nimmo*!; Malwán, *Dalzell.* S. M. COUNTRY: Rámghát, *Ritchie,* 1396! KANARA: *Law*!—DISTRIB. India (W. Peninsula); Ceylon.

4. **Peristylus goodyeroides,** *Lindl.* VAR. *β,* **affinis,** *Lindl. Gen. & Sp. Orchid.* (1835) p. 300. Stem 1—2 ft. high, stout. Leaves close together about the middle of the stem, 6—10 by 2—2½ in., elliptic-lanceolate, acute, contracted at the base, scarcely petiolate. Flowers yellowish-green, in dense spikes 4—12 in. long; bracts ½—¾ in. long, lanceolate, membranous, finely acuminate, the lower longer than, the upper equalling the sessile ovary. Lateral sepals ⅓ by 1/12 in., oblong, obtuse, mucronate at the back below the apex; dorsal sepal ⅓ by 1/10 in., elliptic-oblong, obtuse, not mucronate. Petals ⅓ by ⅛ in., obliquely obovate, strongly nerved. Lip ⅓ by ⅛ in., without a claw, usually 3-fid, the lobes very variable; spur subglobose, 1/12 in. long. Anther small; tubes very short; pollinia clavate. Rostellum erect, toothed. *Peristylus goodyeroides,* Dalz. & Gibs. p. 270. *Habenaria goodyeroides,* Grah. Cat. Bo. Pl. (1839) p. 201 (*not* of Don); Hook. f. Fl. B. I. v. 6, p. 161; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520. *H. goodyeroides* var. *affinis,* King & Pantling, in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 327, t. 430 *bis. H. affinis,* Don, Prodr. Fl. Nep. (1825) p. 25 (*not* of Wight).—Flowers: Aug.

KONKAN: *Nimmo*!, *Dalzell*!; S. Konkan, *Dalzell & Gibson.*—DISTRIB. India (Nepal, Khasia Hills, Naga Hills, Sikkim, W. Peninsula).

5. **Peristylus Lawii,** *Wight, Icon.* v. 5, part 1 (1852) p. 12, t. 1695. Stem 6—12 in. high with loose sheaths below the leaves. Leaves 3—5 from about the middle of the stem, membranous, not reduced to bract-like leaves above, 2½—4 by ¾—1½ in., oblong-lanceolate, acute, sheathing at the base. Flowers small, yellow, in

narrow strict slender lax spikes 2—3 in. long ; bracts $\frac{3}{8}$ in. long or more, exceeding the ovary, lanceolate, acuminate. Sepals 1-nerved ; lateral sepals $\frac{1}{8}$ by $\frac{1}{16}$ in., oblong, obtuse ; dorsal sepal $\frac{1}{8}$ by $\frac{1}{16}$ in., oblong, obtuse, concave. Petals $\frac{1}{8}$ by $\frac{1}{16}$ in., oblong, obtuse. Lip $\frac{1}{8}$ by $\frac{1}{10}$ in. with a concave claw, shortly 3-lobed at the apex ; lobes $\frac{1}{30}$ in. long, subequal, obtuse, the 2 lateral lobes rounded on the outer edge, slightly curved, the midlobe straight ; spur short, scrotiform, $\frac{1}{20}$ in. long. Anther-tubes 0 ; pollinia clavate ; caudicle 0 ; glands small. Stigmatic processes very short, clavate. Rostellum short, triangular, acute. Dalz. & Gibs. p. 270 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1898) p. 510. *Habenaria Lawii*, Hook. f. Fl. B. I. v. 6 (1890) p. 162 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; Prain, Beng. Pl. p. 1032.—Flowers : Aug.

KONKAN : *Dalzell* !, *Law* ! ; Neral below Matheran, *Bhiva* ! S. M. COUNTRY : Belgaum, *Law* ! ; near Dharwar, *Law* ex *Stocks*, 73 !—DISTRIB. India (Bengal, Behar, W. Peninsula).

30. **PLATANTHERA,** Rich.

Terrestrial herbs. Tubers ovoid-globose, rarely lobed. Flowers small or large, in lax or dense spikes or racemes ; bracts mostly narrow. Sepals unequal, free ; lateral more or less spreading or reflexed. Petals simple, usually narrower than the dorsal sepal and appressed to it forming a hood. Lip continuous with the column, sometimes shortly adnate to it, produced at the base into a short or elongate spur, entire or 3-lobed ; side lobes sometimes fimbriate or pectinate. Column short, footless ; clinandrium erect, short, or scarcely as long as the anther. Anther-cells parallel or divergent ; apex inferior, short and adnate to the side lobes of the rostellum ; pollinia granular, with short caudicles and exserted naked glands ; staminodes lateral, small, rounded or auriculate. Stigmas sessile or subsessile, more or less confluent, often pulvinate. Rostellum 3-lobed ; middle lobe subulate or tooth-like, situated between the anther-cells ; side lobes short. Capsule ellipsoid or oblong.—DISTRIB. Throughout the N. temperate regions and in the tropics of Asia and Africa, chiefly in the mountains ; species 60 or 70.

I have followed Kraenzlin in rehabilitating this genus, a course which has been followed in Dyer's recently published 'Flora of Tropical Africa.' It is distinguished from *Habenaria* by the short, more or less confluent stigmas.

1. **Platanthera Susannæ,** *Lindl. Gen. & Sp. Orchid.* (1835) p. 295. A tall stout herb 2—4 ft. high ; stem leafy up to the inflorescence. Leaves 2—6 by 1—2 in., ovate-oblong or oblong-lanceolate, imbricating, acute or acuminate, the upper sheathing, becoming smaller and passing into large leafy bracts above. Flowers white, fragrant, very shortly pedicellate, in 3—6-flowered racemes ; bracts leafy, 2½—3 in. long. Lateral sepals 1½ by $\frac{3}{4}$ in., obliquely subquadrately oblong, ascending ; dorsal sepal 1¼ in. long and as broad as long, broadly rhomboid, spreading. Petals 1¼ by $\frac{1}{8}$ in., linear, acute. Lip 1½ in. long ; side lobes 1½ in. long, truncate, the outer margins pectinate in the middle ; midlobe 1¼ by ¼ in., linear or dilated downwards ; spur 4 in. long, more than twice as long as the

ovary. Anther very broad and large ; pollinia linear, about as long as their caudicle. Capsules together with pedicels 2 in. long, ellipsoid, beaked ; pedicels stout, ¼ in. long. Dalz. & Gibs. p. 269 ; Wight, Icon. t. 920 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1898) p. 601. *Habenaria Susannæ*, R. Br. Prodr. (1810) p. 312 ; Hook. f. Fl. B. I. v. 6 (1890) p. 137 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519 ; Prain, Beng. Pl. p. 1030. *H. gigantea*, Don, Prodr. Fl. Nep. (1825) p. 24 ; Grah. Cat. p. 201.—Flowers : Sept. VERN. *Wagchora.*

KONKAN : Matheran, *Cooke* !, *H. M. Birdwood.* DECCAN : Khandala, *Stocks*, 71, *Cooke* !, *Graham*, *Woodrow* ; Mahableshwar, *Cooke* ! S. M. COUNTRY : Belgaum, *Ritchie*, 1395 !—DISTRIB. India (Khasia, Naga and Manipur Hills, Birma, Hills of the Western Peninsula) ; China, Malay Islands.

31. **HABENARIA,** Willd.

Terrestrial usually leafy herbs with undivided or lobed tubers. Leaves flat with sheathing bases. Flowers spicate or racemose, usually green or yellow, or the sepals green and the petals white ; bracts mostly narrow. Sepals unequal ; lateral sepals more or less spreading or reflexed. Petals simple or 2-lobed or 2-partite (very rarely 3-partite), the segments usually filiform, equal or unequal. Lip continuous with the column, often shortly adnate to it, produced at the base into a short or elongated spur ; limb spreading or pendulous, narrow or broad, undivided, or 3-lobed, or 3-partite. Column continuous with the ovary, not reclinate, short, footless ; anther-cells parallel or diverging, forming with the side arms of the rostellum channels or tubes for the caudicles of the pollinia ; pollinia granular, with short elongate caudicles and an exserted naked gland ; stigma 2-lobed or extended into 2 short or elongate often clavate papillose processes ; rostellum 3-lobed, the midlobe narrowly triangular, hidden between the anther-cells. Capsule ellipsoid or oblong, sometimes beaked.—DISTRIB. Species about 400, widely diffused through tropical and subtropical regions.

Petals 2-partite ; lip 3-lobed or 3-partite.
- Sepals with filiform tips ..... 1. *H. stenopetala.*
- Sepals acute but not filiform at the tips.
  - Lower segment of petals shorter than the upper ; pedicels very short or 0 ; stem leafy upwards ..... 2. *H. digitata.*
  - Lower segment of petals longer than the upper ; pedicels long ; stem with leaves at the base only.
    - Leaves more than one, linear, oblong or lanceolate, narrowed and sheathing at the base ; upper segment of petals longer than broad ... 3. *H. rariflora.*
    - Leaf solitary, subrotund ; upper segment of petals as broad as long ..... 4. *H. grandiflora.*

Petals entire.
- Side lobes of lip petaloid, broader than the midlobe.
  - Lip deeply 3-lobed or 3-partite, not or hardly longer than the lateral sepals.
    - Side lobes of lip small, rounded ..... 5. *H. platyphylla.*
    - Side lobes of lip large, obliquely truncate and denticulate at the apex ..... 6. *H. suaveolens.*

Lip deeply 3-lobed or 3-partite, much longer than the lateral sepals.
Lobes of lip with long filiform tails ..... 7. *H. crinifera.*
Lobes of lip not tailed.
Spur reaching 4 in. long; lateral sepals ½ in. long ..... 8. *H. longecalcarata.*
Spur 1½ in. long; lateral sepals ½ in. long ... 9. *H. plantaginea.*
Side lobes of lip not broader than the midlobe.
Tubes of the anther-cells long; lateral sepals very gibbous with many arched nerves; stem leafy upwards ..... 10. *H. commelinifolia.*
Tubes of the anther-cells short.
Stem leafy upwards.
Bracts large, cucullate; flowers secund.
Leaves 1½ in. long; spur subacute; flowers greenish-yellow ..... 11. *H. Heyneana.*
Leaves 2 in. long; spur subobtuse; flowers white ..... 12. *H. subpubens.*
Leaves 3—6, clustered towards the middle or at the base of the stem.
Bracts as long as or longer than the ovary; lateral segments of lip narrower than the central linear segment.
Spur not longer than the ovary; lateral segments of lip slender but not filiform, scarcely or not longer than the midlobe.
Spur slender, incurved; leaves green throughout, placed near the middle of the stem ..... 13. *H. affinis.*
Spur stout, clavate; leaves with narrow yellowish margins, placed near the base of the stem ..... 14. *H. marginata.*
Bracts much shorter than the ovary; spur slightly exceeding the ovary, thickened below; leaves green throughout, placed near the base of the stem ..... 15. *H. viridiflora* var. *Dalzellii.*
Leaves 2 (rarely 3), radical or opposite on the stem, broadly ovate or suborbicular, cordate at the base.
Plant 8—18 in. high; bracts ½—¾ in. long; lateral lobes of lip shorter than the midlobe ..... 16. *H. crassifolia.*
Plant 4—10 in. high; bracts ¼ in. long; lateral lobes of lip longer than the midlobe ..... 17. *H. diphylla.*

1. **Habenaria stenopetala,** *Lindl. Gen. & Sp. Orchid.* (1835) p. 319 (*not* p. 324). Stem 1—2 ft. high, stout, the lower portion clothed with closely appressed sheaths. Leaves in the middle part of the stem, 3—8 by 1—2 in., membranous, oblong-lanceolate or ovate-lanceolate, acute, the margins undulate, base narrowed or broad, amplexicaul or sheathing, the upper part of the stem between the leaves and the raceme with lanceolate acuminate bract-like leaves much smaller than those of the middle stem. Flowers arranged in many-flowered racemes 3—6 in. long, variable in size, the sepals and petals greenish, the lip brown; floral bracts lanceolate, acuminate, about as long as the slender stalked ovary. Sepals subequal; lateral

sepals $\frac{3}{8}$—$\frac{1}{2}$ *in. long, reaching* $\frac{1}{6}$ *in. broad,* oblong-lanceolate, somewhat oblique, strongly 3-nerved, and with a long filiform apical tail; dorsal sepal similar. Petals shorter than the sepals, 2-partite, the segments linear, acute, usually unequal. Lip 3-partite, the segments variable, the lateral segments sometimes as long as the middle one but usually shorter than it; spur as long as or longer than the ovary, 2-ridged, slender, turned upwards. Column stout; anther-cells rather distant, parallel, narrow, erect, their tubes long; pollinia oblong; caudicles slender, twice as long as the pollinia; glands minute. Staminodes ovate, rugulose, situated externally to the anther-cell and stigma on each side. Stigmas 2, oblong, with slightly divergent blunt apices, situated below the anthers and at the margins of the mouth of the spur. Capsules linear-oblong, $\frac{1}{2}$—$\frac{3}{4}$ in. long. Fl. B. I. v. 6, p. 134; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 358; King & Pantling, in Ann. Roy. Bot. Gard. Calc. v. 8 (1898) p. 308, t. 404; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519; Prain, Beng. Pl. p. 1030. ? *Habenaria modesta,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 262; Dalz. & Gibs. p. 267.

Rare. KONKAN: *Dalzell*!, *Law*!, *Stocks*, 64! S. M. COUNTRY: Párva Ghát, *Dalzell*, 15!—DISTRIB. India (Upper Assam, Bengal, W. Peninsula).

2. **Habenaria digitata,** *Lindl. Gen. & Sp. Orchid.* (1835) p. 307. Stem 1—2 ft. high, leafy, the lower part with closely appressed sheaths. Leaves variable, 2—4½ by $\frac{3}{4}$—1¼ in., ovate-oblong, acute or acuminate, sheathing at the base. Flowers greenish-white, in cylindric, many-flowered, rather lax racemes; bracts large, lanceolate, acute, often foliaceous; pedicels very short. Sepals greenish-white; lateral sepals ½ by ¼ in., ovate, acute, subfalcate, spreading; dorsal sepal ½ by ⅓ in., broadly elliptic or suborbicular, obtuse, 3-nerved. Petals 2-partite; upper segment ½ by $\frac{1}{10}$ in., subfalcate, acute, 3-nerved; lower segment shorter, narrowly linear, acute, the segments separated by a rather wide sinus. Lip 3-partite, the segments linear, the lateral usually shorter than the middle one, which is about ½ in. long; spur reaching ¾ in. long, equalling the ovary or nearly so, subclavate at the tip, with an erect ligule at the mouth. Stigmatic processes clavate-oblong, appressed to the lip. Anther-cells parallel, the tubes upcurved; rostellum shorter than the anther, obtusely triangular. Fl. B. I. v. 6, p. 134; Dalz. & Gibs. p. 267; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 270; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519; Prain, Beng. Pl. p. 1030. *Habenaria Gibsoni,* Hook. f. Fl. B. I. v. 6 (1890) p. 135; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519. *H. trinervia,* Wight, Icon. v. 5, part 1 (1852) p. 12, t. 1701.—Flowers: July.

KONKAN: *Stocks*!, *Law*!; Island of Karanja, *Dalzell & Gibson.* DECCAN: Lanoli, *Woodrow*; Khandala, *Cooke*!, *Bhiva*!, *Woodrow*; Purandhar, *Dr. Barnes*! KANARA: *Law*!—DISTRIB. India (Kashmir, Assam, Silhet, Bengal, Tenasserim, W. Peninsula).

VAR. *foliosa,* Hook. f. Fl. B. I. v. 6 (1890) p. 135. A smaller plant 6—12 in. high, all its parts smaller. Leaves 2 by 1 in. Racemes dense-flowered. Lateral sepals $\frac{5}{16}$ by ⅛ in.; dorsal sepal ¼ by ⅛ in. Upper segment of petals ⅓ by $\frac{1}{20}$ in. Lip ⅜ in. long; spur ⅝ in. long.

Habenaria foliosa (sp.), A. Rich. in Ann. Sc. Nat. sér. 2, v. 15 (1841) p. 71 ; Dalz. & Gibs. p. 267 ; Wight, Icon. t. 1700 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 273. *H. laciniata,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 261.—Flowers : July.

Rare in the Bombay Presidency. I have only seen 1 specimen collected on the hills about Kadakvasla near Poona ; there are no specimens in Herb. Kew. Dalzell & Gibson mention the occurrence of the plant in Salsette, but there are no specimens in Dalzell's herbarium. I have followed Sir J. Hooker in making the plant a variety of *H. digitata,* from which it differs chiefly in the size of all its parts. Kraenzlin (*l. c.*) restores it to specific rank. In his clavis (p. 261) Kraenzlin gives as a distinguishing character the lengths of the petal-segments, which in the key he declares to be equal. In his description, however (p. 273), he describes the lower segments as shorter than the upper, which is correct.

3. **Habenaria rariflora,** *A. Rich. in Ann. Sc. Nat.* sér. 2, v. 15 (1841) p. 70, t. 2, D. Whole plant 2—10 in. high. Leaves radical or subradical, variable, 2½—4 by ⅜—1 in., linear-oblong or lanceolate, acute, sometimes complicate. Flowers white, 1—3 in short racemes ; bracts ovate, acuminate, ⅝—1 in. long ; pedicels erect, about as long as the ovary and together with it reaching sometimes 2 in. long. Sepals 5-nerved ; lateral sepals rather more than ⅜ in. long by ⅛ in. broad, ovate-oblong, acute, subfalcate ; dorsal sepal ⅜ by ¼ in., broadly ovate, subacute. Petals 2-partite ; upper segments ⅛ by ⅛ in., ovate, acuminate, oblique, 3—4-nerved ; lower segments longer than the upper, linear, acute. Lip ½ in. long, 3-partite ; lateral segments filiform, longer than the broader linear obtuse middle one ; spur longer than the ovary, often exceeding 2 in. in length, upcurved. Anther large, apiculate, the cells parallel, the tubes short, upcurved ; glands of pollinia orbicular ; rostellum erect, slender. Stigmatic processes clavate. Fl. B. I. v. 6, p. 136 ; Dalz. & Gibs. p. 268 ; Wight, Icon. t. 924 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 271 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519. *Habenaria uniflora,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 344.—Flowers : July—Aug.

KONKAN : *Stocks* !, *Law* !, *Dalzell* ! DECCAN : Panchgani, *Cooke* ! ; Karkala (near Poona), *Woodrow* ; Purandhar, *Dr. Barnes* !, *Woodrow*.—DISTRIB. India (W. Peninsula).

4. **Habenaria grandiflora,** *Lindl. in Wall. Cat.* (1828) 7032. Whole plant 3—8 in. high. Leaf radical, solitary, 1—2 in. long and as broad or nearly as broad as long, broadly ovate or suborbicular, often acute or apiculate at the apex, base cordate ; petiole 0. Flowers white, in 1—4-flowered lax racemes ; scape with one or two sheaths, together with the raceme 3—8 in. high ; bracts ½ in. or more long, ovate, acuminate ; pedicels about as long as the ovary, both together 1—2 in. long. Lateral sepals ⅜ by ⅛ in., obliquely ovate, acute, 7-nerved ; dorsal sepal ⅛ by ⅛ in., ovate, cucullate, obtuse, apiculate. Petals 2-partite ; upper segment very broad, ¼ by ¼ in., obliquely ovate or suborbicular ; lower segment ⅜ in. long, filiform. Lip ½ in. long, 3-partite, the segments subequal ; lateral segments filiform ; middle segment ⅛ in. broad, linear-lanceolate, acute ; spur ¾ in. long, curved, longer than the ovary, clavate at the tip. Anther 3-cuspidate, the cells parallel, the tubes rather short, broad, spreading ;

gland of pollinia large, orbicular. Stigmatic processes large, clavate. Rostellum elongate, erect. Fl. B. I. v. 6, p. 136 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 337 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 519. *Habenaria rotundifolia*, Lindl. Gen. & Sp. Orchid. (1835) p. 306 ; Dalz. & Gibs. p. 267.—Flowers : July.

KONKAN : *Stocks* !, *Law* ! DECCAN : Máwal (Poona districts), *Stocks* ! ; Shivapur, *Cooke* ! ; Mahableshwar, *Cooke* !, *Stocks* !, *H. M. Birdwood* ; Sinhagad (near Poona), *Woodrow* ; Purandhar, *Woodrow*. S. M. COUNTRY : Belgaum, *Stocks* ! —DISTRIB. India (W. Peninsula).

The tubers furnish the *Salep misri* of Indian bazaars.

5. **Habenaria platyphylla,** *Spreng. Syst. Veg.* v. 3 (1826) p. 690. Whole plant 6—18 in. high. Leaves 3—6, lying flat on the ground, fleshy, 2—4 in. long and as broad or nearly as broad as long, sessile, orbicular or elliptic. Flowers white, fragrant, in dense-flowered short spikes ; scape together with spike 6—18 in. long, the scape with numerous erect lanceolate-subulate sheaths up to the spike ; bracts lanceolate, acute, shorter than the long-beaked ovary. Lateral sepals $\frac{3}{8}$ by $\frac{1}{4}$ in., obliquely ovate, obtuse ; dorsal sepal rather more than $\frac{1}{4}$ in. long by $\frac{1}{8}$ in. wide, broadly elliptic, obtuse. Petals $\frac{1}{8}$ by $\frac{1}{16}$ in., linear, subacute. Ovary 1 in. long with a slender beak as long as the body. Lip nearly $\frac{1}{3}$ in. long, veined ; side lobes $\frac{1}{10}$ by $\frac{1}{10}$ in., rounded ; midlobe $\frac{1}{8}$ in. long, triangular, acute ; spur $1\frac{1}{3}$—$1\frac{1}{2}$ in. long, clavate at the apex, the mouth funnel-shaped, with a short tooth. Anther-cells divergent ; tubes long ; glands of the pollinia small. Stigmatic processes subglobose. Rostellum short, triangular. Fl. B. I. v. 6, p. 140 ; Grah. Cat. p. 201 ; Wight, Icon. t. 1709 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 411 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520.—Flowers : Aug.—Sept.

KONKAN : *Dalzell* !, *Stocks* !, *Law* ! S. M. COUNTRY : Belgaum, *Ritchie*, 76 ! ; Dharwar, *Woodrow*.—DISTRIB. India (W. Peninsula).

6. **Habenaria suaveolens,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) 263. Whole plant 8—12 in. high ; stem short, clothed at the base below the leaves with a few old sheaths. Leaves 3—5, arising about 1 in. or so above the ground, 3—6 by $\frac{1}{4}$—$\frac{5}{8}$ in., linear-oblong or linear-lanceolate, acute or acuminate. Flowers fragrant, in few-flowered secund lax racemes ; bracts $\frac{1}{2}$—$\frac{3}{4}$ in. long, ovate-lanceolate, finely acuminate, exceeding the very shortly pedicellate ovary ; peduncles with raceme 4—10 in. long. Lateral sepals $\frac{1}{3}$ by $\frac{1}{8}$ in., triangular-oblong, acute, subfalcate ; dorsal sepal $\frac{1}{8}$ by $\frac{1}{8}$ in., ovate, acute. Lip $\frac{3}{8}$ in. long ; side lobes $\frac{1}{8}$ in. broad, obliquely truncate and denticulate at the apex ; midlobe a little longer than the side lobes, $\frac{1}{10}$ in. broad, linear-spathulate, acute ; spur $\frac{3}{8}$ in. long, about equalling the ovary, subclavate at the apex. Anther-tubes 0 ; pollinia clavate, as long as their stout caudicles ; glands large, orbicular. Stigmatic processes very short. Fl. B. I. v. 6, p. 140 ; Dalz. & Gibs. p. 268 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 416 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520.

KONKAN : *Dalzell* ! ; between Vingorla and Malwán, rare, *Dalzell & Gibson, Woodrow*.—DISTRIB. India (W. Peninsula).

7. **Habenaria crinifera,** *Lindl. Gen. & Sp. Orchid.* (1835) p. 323. Whole plant 3—18 in. high ; stem short, leafy near the base. Leaves 2—6 by $\frac{3}{8}$—$1\frac{1}{2}$ in., oblong-lanceolate, acuminate, spreading, broadly sheathing below. Flowers in short racemes 2—3 in. long ; peduncles 2—15 in. long, with large distant lanceolate-subulate sheaths ; bracts reaching $\frac{1}{2}$ in. long, ovate-lanceolate, acuminate ; ovary beaked, together with beak and pedicel reaching 1 in. long. Sepals greenish ; lateral sepals $\frac{1}{3}$ by $\frac{1}{6}$ in., obliquely ovate, subacute ; dorsal sepal $\frac{1}{4}$ in. long and nearly as broad as long, orbicular-ovate, acute. Petals white, erect, linear, acute. Lip white, 3 times as long as the sepals, with a long claw, 3-lobed ; side lobes cuneiform, the outer margin toothed and with a slender tail as long as itself produced from the inner margin ; midlobe clawed, cleft into 2 lanceolate long-tailed segments as long as the side lobes ; spur $1\frac{1}{4}$—$1\frac{1}{2}$ in. long, slender, incurved, the mouth with a strong ligule. Anther-tubes long, straight ; caudicles of pollinia winged ; glands very small. Stigmatic processes clavate, adnate to the mouth of the spur. Rostellum very short, obtuse. Capsules 1—$1\frac{1}{2}$ in. long, fusiform, with a slender beak. Fl. B. I. v. 6, p. 142 ; Dalz. & Gibs. p. 269 ; Wight, Icon. t. 926 ; Trim. Fl. Ceyl. v. 4, p. 229 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 424. *Habenaria schizochilus,* Grah. Cat. Bo. Pl. (1839) p. 252.

Not common. KONKAN : Vingorla, *Dalzell & Gibson, Woodrow.* S. M. COUNTRY : Rámghát, *Law* ex *Graham, Dalzell* ex *Stocks,* 5!—DISTRIB. India (W. Peninsula).

8. **Habenaria longecalcarata,** *A. Rich. in Ann. Sc. Nat.* sér. 2, v. 15 (1841) p. 71, t. 3, B. Whole plant 12—20 in. high or even more ; stem short, leafy near the base. Leaves 3—5, oblong or oblong-lanceolate, variable in size, $1\frac{3}{4}$—4 by $\frac{3}{4}$—$1\frac{1}{4}$ in. Flowers white, jasmine-scented, few (1—4), in short lax racemes ; bracts 1 in. long, convolute round the pedicels, acute ; pedicels in fruit reaching $1\frac{1}{2}$ in. long. Lateral sepals $\frac{1}{2}$ by $\frac{1}{4}$ in., obliquely ovate, subacute ; dorsal sepal $\frac{7}{16}$ by $\frac{1}{4}$ in., elliptic, obtuse. Petals exceeding $\frac{3}{8}$ in. long, oblong, subfalcate, subobtuse. Lip $\frac{3}{4}$ in. long or longer, with a claw $\frac{1}{3}$ by $\frac{1}{8}$ in., 3-lobed beyond the claw ; side lobes $\frac{5}{8}$ in. long by $\frac{1}{10}$ in. broad at the base, linear, becoming broader outwards, obliquely cut to a fine point at the apex and toothed on the outside ; midlobe $\frac{3}{8}$ by $\frac{1}{10}$ in., linear, acute ; spur often reaching 4 in. long, thickened from below the middle towards the tip. Anther-tubes long, slender ; pollinia narrowly pyriform, shorter than the caudicles, which are narrowly winged on one side. Stigmatic processes thick, surrounding the mouth of the spur. Rostellum obscure. Fl. B. I. v. 6, p. 141 ; Dalz. & Gibs. p. 268 ; Wight, Icon. t. 925 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 418 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520. *Habenaria longicorniculata,* Grah. Cat. Bo. Pl. (1839) p. 202.—Flowers : Sept.—Oct.

KONKAN : *Nimmo* ex *Graham, Jacquemont,* 598!; common on the Ghâts, *Stocks,* 22! DECCAN : *Woodrow*; Purandhar, *Kanitkar*!; Bhor Ghâts, *Cooke*!; Khandala, *Cooke*!, *Woodrow, Graham.* S. M. COUNTRY : near Belgaum, abundant, *Dalzell & Gibson.*—DISTRIB. India (W. Peninsula).

9. **Habenaria plantaginea,** *Lindl. Gen. & Sp. Orchid.* (1835) p. 323. A slender herb 8—12 in. high ; tubers oblong. Leaves radical, 3—6 by ¾—1½ in., elliptic or elliptic-oblong, acute, spreading, membranous, narrowed at the base into a short sheath. Flowers pure white, subsecund, in lax spikes 3—5 in. long ; scapes 5—6 in. long, with many distant open lanceolate acuminate sheaths ½—1 in. long ; bracts ⅜—½ in. long, ovate-lanceolate, finely acuminate, much shorter than the beaked ovary. Sepals strongly 3-nerved ; lateral sepals ⅛ by $\frac{1}{10}$ in., falcately oblong, subacute ; dorsal sepal ⅛ by ⅛ in., ovate-oblong. Petals ⅛ by $\frac{1}{20}$ in., linear-lanceolate, acute. Lip $\frac{7}{16}$ in. long by about ⅜ in. broad, flabelliform from a narrow claw, many-nerved, 3-lobed, puberulous ; lateral lobes half-ovate, ¼ by ⅛ in., subacute ; midlobe nearly but not quite as long and only half as broad as the lateral, linear, acute ; spur 1¼ in. long, equal to or longer than the ovary, pendulous. Anther-tubes short, upcurved ; pollinia pyriform, as long as their broad caudicles, which are inserted upon an (at first apparently simple) entire lanceolate concave gland, which afterwards divides longitudinally, each pollinia carrying away one half. Stigmatic processes large, clavate. Rostellum triangular, broad. Capsule ⅜ in. long, turgidly fusiform, curved, with a short slender beak. Fl. B. I. v. 6, p. 141 ; Wight, Icon. t. 1710 ; Trim. Fl. Ceyl. v. 4, p. 229 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 413 ; Prain, Beng. Pl. p. 1030.—Flowers : Mar.—Apr.

KONKAN : *Dalzell* ! ; Matheran, *H. M. Birdwood.* DECCAN : Ambenala Ghát near Lanoli, *Kanitkar* !—DISTRIB. India (Subtropical Himalaya, Behar, Central India, W. Peninsula) ; Ceylon.

10. **Habenaria commelinifolia,** *Wall. ex Lindl. Gen. & Sp. Orchid.* (1835) p. 325. Stem 2—3 ft. high, with sheaths at the base, leafy upwards, the leaves becoming gradually smaller, passing into lanceolate caudate-acuminate bract-like sheaths below the spike ; tubers ellipsoid. Leaves 3—6 by ¾—1¼ in., oblong or oblong-lanceolate, flat, sheathing at the base. Flowers sessile, white, inodorous, in spikes 4—8 in. long ; bracts 1 in. long, lanceolate, produced to a fine acicular point, exceeding the body of the ovary without the beak. Lateral sepals nearly ½ in. long, very gibbous, hatchet-shaped, beaked, with many arched nerves ; dorsal sepal ⅜ in. long, orbicular, shortly beaked, hooded. Petals ⅓ by ⅛ in., obliquely ovate-oblong, obtuse. Lip linear for about ⅛ in. from the base, $\frac{1}{10}$ in. broad, then divided into 3 segments, of which the lateral are filiform and exceed 1 in. long, the middle segment ⅝ by $\frac{1}{10}$ in., linear, shorter than the lateral ; spur 1½—2½ in. long, incurved, green, with a funnel-shaped mouth. Anther-tubes long, straight, erect. Stigmatic processes large, clavate, incurved. Rostellum short, triangular. Capsules sessile, fusiform, 1½ in. long including the curved beak which is twice as long as the body of the capsule. Fl. B. I. v. 6, p. 143 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 322 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; Prain, Beng. Pl. p. 1031. *Orchis commelinifolia,* Roxb. Fl. Ind. v. 3 (1832) p. 451 ; Grah. Cat. p. 201. —Flowers : Sept.

KONKAN : *Stocks* !, *Law* !, *Dalzell* ! ; S. Konkan in pasture-lands, *Graham*. DECCAN : Khandala, *Woodrow*.—DISTRIB. India (Tropical W. Himalaya, Bengal, Birma, W. Peninsula).

11. **Habenaria Heyneana,** *Lindl. Gen. & Sp. Orchid.* (1835) p. 320. Whole plant scarcely reaching 10 in. high ; stem stout, leafy. Leaves turning black in drying, subimbricate, 1—1½ by ¼—⅝ in., sheathing, ovate, acute, erect or recurved, soon reduced upwards to smaller bract-like leaves. Flowers greenish-yellow, few, secund, in terminal spikes ; bracts imbricating, the lower reaching 1 in., the upper ¾ in. long, ovate, finely acuminate, cucullate, exceeding the flowers. Lateral sepals ¼ by $\frac{1}{10}$ in., obliquely ovate, straight on the upper, rounded on the lower edge, obtuse or subacute ; dorsal sepal ⅛ by ⅛ in., ovate, subobtuse. Petals ⅛ by $\frac{1}{20}$ in., linear, acute, falcate. Lip thick, ¼ in. long, 3-lobed at the apex, with a basal claw $\frac{1}{16}$ by $\frac{1}{16}$ in. ; side lobes $\frac{1}{16}$ by $\frac{1}{30}$, linear, subacute ; midlobe oblong, rounded at the apex, ⅛ by $\frac{1}{12}$ in. ; spur ⅜ in. long, subclavate at the tip, shorter than the sessile not beaked ovary. Anther-tubes 0 ; caudicles of pollinia very short, stout ; gland large, orbicular. Stigmatic processes large, spreading, clavate. Rostellum short, triangular, acute. Fl. B. I. v. 6, p. 148 ; Dalz. & Gibs. p. 268 ; Wight, Icon. t. 923 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 375 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520.—Flowers : Aug.—Sept.

KONKAN : *Law* !, *Dalzell* ! ; S. Konkan, *Dalzell* ex *Stocks*, 78 ! ; Southern Ghâts, *Stocks*, 12 ! ; Wari country, *Dalzell & Gibson*. DECCAN : *Stocks*, 60 ! ; Lanoli, *Woodrow*. KANARA : Sirsi, *Dalzell* !—DISTRIB. India (W. Peninsula).

12. **Habenaria subpubens,** *A. rich. in Ann. Sc. Nat.* sér. 2, v. 15 (1841) p. 75, t. 4, C. Whole plant 6—12 in. high ; stem slender, leafy. Leaves 2 by ⅜ in., smaller upwards and passing into bracts, sheathing at the base, linear-lanceolate, acute, apiculate. Flowers white, secund, pedicellate, in slender racemes 1½—4 in. long ; bracts ½—⅝ in. long, ovate-lanceolate, acute, apiculate, cucullate ; pedicels with ovary ⅝ in. long. Lateral sepals ¼ by $\frac{1}{12}$ in., oblong, acute ; dorsal sepal ¼ by ⅛ in., ovate, obtuse. Petals ¼ by $\frac{1}{16}$ in., falcate. Lip ¼ in. long with a claw $\frac{1}{16}$ by $\frac{1}{16}$ in., 3-lobed beyond the claw ; side lobes linear, subfalcate, $\frac{1}{25}$ in. broad, rather shorter than the midlobe ; midlobe $\frac{1}{12}$ in. broad, fleshy, elliptic, subobtuse ; spur ⅜ in. long, linear, subobtuse. Anther apiculate. Stigmatic processes adnate to the claw. Fl. B. I. v. 6, p. 148 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 361 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520. *Habenaria candida,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 262 ; Dalz. & Gibs. p. 267. Scarcely distinct from *H. Heyneana.*

KONKAN : *Dalzell* ! ; S. Konkan, *Dalzell & Gibson*. DECCAN : Karli near Khandala, *Jacquemont*, 619 ! S. M. COUNTRY : Dharwar, *Law* ex *Stocks*, 79 !—DISTRIB. India (W. Peninsula).

13. **Habenaria affinis,** *Wight, Icon.* v. 5, part 1 (1852) p. 13, t. 1707 (*not* of Don). Stem stout, 1—2 ft. high, with several sheaths at the base. Leaves 3—6, clustered near the middle of the stem, 4—6 by 1—2 in., elliptic-lanceolate, acuminate, sheathing at the base.

Flowers in long cylindric racemes 6 in. or more long ; peduncle of raceme bearing several lanceolate finely acuminate sheaths above the leaves ; bracts ½ in. long, ovate-lanceolate, caudate-acuminate, longer than the curved, very shortly pedicellate, shortly beaked ovary. Lateral sepals ⅕ by $\frac{1}{12}$ in., oblong-lanceolate, acute ; dorsal sepal ⅛ by $\frac{1}{10}$ in., ovate, acute. Petals ⅕ in. long, similar to the lateral sepals. Lip with a claw $\frac{1}{16}$ in. long and broad, 3-lobed beyond the claw ; side lobes ⅓ in. long by $\frac{1}{30}$ in. broad at base, tapering to a fine point ; midlobe nearly ¼ in. long by $\frac{1}{16}$ in. wide, linear, subacute ; spur ⅓ in. long, slender, much curved, acute. Anther-tubes shortly upcurved. Stigmatic processes large, clavate. Fl. B. I. v. 6, p. 149 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 324 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; Prain, Beng. Pl. p. 1031.

DECCAN : Purandhar, *Woodrow*. S. M. COUNTRY, Belgaum, *Ritchie*, 17!—DISTRIB. India (Bengal, Central India, W. Peninsula).

14. **Habenaria marginata,** *Coleb. in Hook. Exot. Fl.* (1825) t. 136. Whole plant 4—10 in. high. Leaves few (often 3), subradical, sessile, 2—4 by ½—1 in., oblong, obtuse, with yellow or white margins, reduced upwards to lanceolate finely acuminate sheaths ½—1 in. long. Flowers yellow, sessile, numerous, in cylindric spikes 1½—3 in. long ; bracts ½—¾ in. long, ovate-lanceolate, finely acuminate, about equalling the sessile ovary. Sepals 5-nerved ; lateral sepals rather less than ⅓ in. long and $\frac{1}{10}$ in. broad, obliquely oblong, acute ; dorsal sepal ¼ by ⅛ in., broadly ovate, acute, cucullate. Petals ⅕ in. long, oblong-lanceolate, acute, falcate from a broad base, closely appressed to the dorsal sepal. Lip nearly ½ in. long, with a claw $\frac{1}{20}$ in. long and broad, 3-lobed beyond the claw ; side lobes acute, 1-nerved ; midlobe rather more than ¼ in. long, and $\frac{1}{12}$ in. broad, lanceolate, subobtuse, 3-nerved ; spur nearly ½ in. long, stout, curved, clavate at the tip. Anther-tubes short, spreading, funnel-shaped. Stigmatic processes elongate, adnate to the lip. Rostellum triangular, acute. Capsules ½ in. long, fusiform, turgid, curved, obscurely beaked. Fl. B. I. v. 6, p. 150 ; Grah. Cat. p. 201 ; Dalz. & Gibs. p. 268 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 360 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; Prain, Beng. Pl. p. 1031.—Flowers : Aug.

KONKAN : *Law*!, *Dalzell*! ; S. Konkan, *Nimmo* ex *Graham*, *Stocks*, 6! ; Karanja, *Dalzell & Gibson* ; Uran (island in Bombay Harbour), *Dalzell*! DECCAN : Junnar near Poona, *Dalzell & Gibson*, *Stocks*, 59! ; Purandhar, *Woodrow*.—DISTRIB. India (W. Himalaya, Behar, Bengal, Birma, W. Peninsula).

VAR. *flavescens*. A more slender plant ; flowers fewer ; ovary more distinctly beaked. *Habenaria flavescens* (sp.), Hook. f. Fl. B. I. v. 6 (1890) p. 150.

KONKAN ; *Law*!

There is but 1 sheet in Herb. Kew., the specimens on which seem to have been drawn up by growing in the shade. I can discover no characters which would entitle the plant to the rank of a species. Indeed Sir J. Hooker (*l. c.*) was of opinion that it was probably a form of *H. marginata*.

15. **Habenaria viridiflora,** *R. Br.* VAR. **Dalzellii.** *Hook. f. Fl. B. I.* v. 6 (1890) p. 150. Whole plant 4—14 in. high ; stem below

the leaves very short. Leaves 3—5, arising near the base of the stem, 1—3 by $\frac{1}{16}$—$\frac{3}{16}$ in., linear, acute or acuminate, often apiculate. Flowers yellow, in many-flowered rather lax racemes 1½—3 in. long, on long very slender wiry peduncles clothed with many ovate-lanceolate, finely acuminate sheaths; bracts $\frac{1}{8}$—$\frac{1}{4}$ in. long, shorter than the shortly pedicellate ovaries (which with the pedicels reach ½ in. long), ovate-lanceolate, finely acuminate. Lateral sepals $\frac{1}{8}$ by $\frac{1}{12}$ in., obliquely ovate, subobtuse, strongly nerved; dorsal sepal $\frac{1}{16}$ by $\frac{1}{16}$ in., ovate, subacute. Petals $\frac{1}{8}$ by $\frac{1}{12}$ in., obliquely ovate, subobtuse. Lip ¼ in. long, 3-partite almost to the base; side lobes $\frac{1}{8}$ by $\frac{1}{32}$ in., linear, acuminate, recurved; midlobe shorter than the side lobes, $\frac{1}{32}$ in. broad, linear, subacute; spur $\frac{5}{8}$ in. long, slightly thickened towards the acute tip, incurved, exceeding the ovary. Anther-tubes short, upcurved; pollinia pyriform; caudicles short. Stigmatic processes long, clavate. Rostellum short, broad. Capsules together with pedicel exceeding ½ in. long, fusiform, hardly beaked. *Habenaria viridiflora*, Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 (*not* of Br.). *Cœloglossum luteum*, Dalz. in Kew Journ. Bot. v. 2 (1850) p. 263; Dalz. & Gibs. p. 269.—Flowers: Aug.

It is the above variety and not the type which seems to occur in the Bombay Presidency; at least this is the plant which is represented from that Presidency in Herb. Kew., and I have seen no others. It is apparently a rare plant.

Dalzell without locality in Herb. Kew.! KONKAN: *Stocks*, 36!; Málwan, *Dalzell & Gibson*.—DISTRIB. India (W. Peninsula).

16. **Habenaria crassifolia,** *A. Rich. in Ann. Sc. Nat.* sér. 2, v. 15 (1841) p. 72, t. 3, C. Whole plant 8—18 in. high. Leaves 2 or 3, radical, fleshy, variable in size and shape, 1—4½ by 1—2½ in., broadly ovate, acute, or suborbicular, or sometimes subreniform and broader than long, base cordate. Flowers white, in elongated many-flowered racemes 3—6 in. long; scape with many finely acuminate sheaths; bracts ½—¾ in. long, ovate-lanceolate, caudate-acuminate; pedicels together with beaked ovary reaching nearly ¾ in. long. Sepals rather less than ¼ in. long by ⅛ in. broad; lateral sepals oblong, obtuse, with 3 strong nerves and usually weaker ones; dorsal sepal elliptic, obtuse, with 3 very strong nerves. Petals ⅛ by $\frac{1}{10}$ in., ovate, acute, with a strong midrib and 2 small weak lateral nerves. Lip ⅛ in. long, 3-lobed; lobes linear-lanceolate, subacute, $\frac{1}{10}$ in. broad, the lateral lobes usually slightly shorter than the midlobe; spur ⅜ in. long, green. Anther-tubes short, spreading. Stigmatic processes short. Rostellum small, erect. Fl. B. I. v. 6, p. 151; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520; Kraenzlin, Orchid. Gen. & Sp. v. 1 (1897) p. 344. *Platanthera brachyphylla*, Lindl. Gen. & Sp. Orchid. (1835) p. 293; Wight, Icon. t. 1694; Dalz. & Gibs. p. 269.—Flowers: Sept.

KONKAN: *Stocks*!, *Law*! DECCAN: Junnar Hill near Poona, *Stocks*, 77!; Mahableshwar, *Cooke*!, *Woodrow*, *H. M. Birdwood*; Purandhar, *Woodrow*.—DISTRIB. India (W. Peninsula).

17. **Habenaria diphylla,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 262. Whole plant 4—10 in. high. Leaves 2, radical, pressing

close on the ground, one of the pair usually smaller than the other, subfleshy, 1—2 in. in diam., orbicular with a short acumen, base cordate. Flowers greenish-white, in many-flowered racemes ; scape with many ovate-lanceolate acuminate sheaths ; bracts ¼ in. long, ovate, acuminate, shorter than the ovary ; pedicels together with ovary ⅓—½ in. long. Lateral sepals $\frac{5}{16}$ by ⅛ in., ovate, acute, 3-nerved ; dorsal sepal ¼ by ⅛ in., broadly ovate, subacute, cucullate, somewhat obscurely nerved. Petals as long as the lateral sepals, $\frac{1}{16}$ in. broad, linear, acute, subfalcate. Lip longer than the sepals, 3-partite ; segments filiform, the lateral longer than the middle one ; spur ½ in. long, inflated, acute. Anther-tubes very short. Stigmatic processes elongate, clavate, adnate to the mouth of the spur. Rostellum obscure. Fl. B. I. v. 6, p. 151 ; Dalz. & Gibs. p. 268 ; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 346 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; Prain, Beng. Pl. p. 1031. *Habenaria Jerdoniana,* Wight, Icon. v. 5, part 1 (1852) p. 14, t. 1715. *Liparis diphyllos,* Nimmo, in Grah. Cat. (1839) p. 252.

KONKAN : *Stocks* !, *Dalzell* ! ; S. Konkan, *Nimmo, Dalzell & Gibson.* KANARA : *Law* !—DISTRIB. India (W. Himálaya, Dacca (*C. B. Clarke*), W. Peninsula).

IMPERFECTLY KNOWN SPECIES.

HABENARIA CARANJENSIS, Dalz. in Kew Journ. Bot v. 2 (1850) p. 262; Dalz. & Gibs. Bo. Fl. p. 267. Lower leaves somewhat rounded, upper oblong-lanceolate, 3-nerved; bracts acuminate, shorter than the ovary; upper sepal rounded; petals half-ovate, obtuse; lip tripartite; middle division oblong, rather obtuse; lateral ones shorter, cuneate, truncate; spur clavate, shorter than the ovary; flowers small, yellow.

The above is the description given by Dalzell in the 'Bombay Flora' of Dalzell and Gibson. There are no specimens in Herb. Kew. and the plant does not appear to have been collected by any other botanist than Dalzell. Fl. B. I. v. 6, p. 166; Kraenzlin, Orchid. Gen. et Sp. v. 1 (1897) p. 365.

ORDER CXXVI. **SCITAMINEÆ.**

Herbs often large, frequently with a pseudo-stem of convolute leaf-sheaths (rarely with a woody caudex). Leaves radical or cauline, usually membranous ; sheaths generally large, clasping the stem ; lamina with a strong central nerve and pinnate close secondary nerves ; petioles short or 0. Flowers hermaphrodite, rarely 1-sexual (*Musa*), irregular, solitary or spicate ; bracts membranous or herbaceous ; bracteoles membranous or 0. Perianth 2-seriate, superior ; outer segments 3, calycine (rarely petaloid), free and imbricate, or connate in an entire, toothed or spathaceous tube ; inner segments petaloid, connate in a long or short corolla-tube free or adnate to the petaloid staminodes ; limb 3-partite, the segments free or connate. Stamens only 1 perfect, the rest replaced by petaloid staminodes, or 5 perfect with a sixth imperfect or obsolete ; anthers linear, 2-celled (rarely of one cell on the margin of a petaloid connective). Ovary 3 (rarely 1 or 2) -celled, inferior ; ovules many

(rarely few), anatropous, axile (rarely parietal); style usually slender, with 2 short stylodes, crowning the ovary; stigma usually entire or subentire. Fruit a loculicidally 3-valved capsule, or indehiscent and membranous or fleshy, usually crowned by the remains of the perianth. Seeds often arillate; albumen floury; embryo small.—DISTRIB. Genera about 50; species very many, throughout the warmer regions of both hemispheres.

Stamen only 1 perfect, the others reduced to staminodes or wanting.
- Anther 2-celled; calyx tubular or spathaceous; style slender, embraced below the stigma by the anther.
  - Ovary 1-celled; placentas 3, parietal; corolla-tube long; flowers yellow ..... 1. GLOBBA.
  - Ovary 3-celled; placentas axile.
    - Lateral staminodes broad.
      - Connective not spurred at the base; corolla-tube long, slender.
        - Filament short; connective broad, crested; stigma turbinate ..... 2. KÆMPFERIA.
        - Filament long, complicate; connective broad, not crested; stigma turbinate ..... 3. HITCHENIA.
        - Filament long, narrow; connective very narrow, not crested; stigma subglobose ..... 4. HEDYCHIUM.
      - Connective spurred at the base; corolla-tube funnel-shaped ..... 5. CURCUMA.
    - Lateral staminodes small or 0 (rarely narrow and adnate to the lip); corolla-tube cylindric.
      - Flowers in dense cone-like spikes.
        - Anther-cells divaricate, on a short arcuate filament, with or without a petaloid crest ..... 6. AMOMUM.
        - Anther-cells contiguous, parallel.
          - Filament short; connective produced into a narrow appendage as long as the anther; stigma small, subglobose; spikes usually produced direct from the rootstock ..... 7. ZINGIBER.
          - Filament forming with the produced connective an oblong petaloid process with the contiguous linear anther-cells placed in its middle; stigma with a semilunar pit ciliate round the margin; spikes usually at the top of leafy stems, rarely produced direct from the rootstock. 8. COSTUS.
      - Flowers in racemes or panicles at the top of leafy stems; filament long; anther-cells divergent at the apex; stigma subglobose ..... 9. ALPINIA.
- Anther 1-celled, laterally adnate to a petaloid filament; calyx of free sepals ..... 10. PHRYNIUM.

Stamens 5 perfect, the sixth imperfect or absent; stigma more or less distinctly 6-lobed ..... 11. MUSA.

1. **GLOBBA,** Linn.

Herbs with creeping rhizomes and erect stems. Leaves oblong or oblong-lanceolate. Flowers in terminal panicles or spikes ; bracts usually deciduous ; buds often replaced by bulbils. Calyx funnel-shaped, 3-lobed. Petals 3, connate in a corolla with a tube longer than the calyx ; corolla-lobes ovate, subequal. Stamen 1 perfect ; filament long, incurved, with 2 dorsal appendages ; anther oblong, the connective simple, winged, or spurred, produced beyond the cells ; lateral staminodes petaloid, contiguous to the corolla-segments. Lip deflexed. Ovary 1-celled ; ovules many, on 3 parietal placentas ; style filiform, lying in a groove of the filament ; stigma turbinate. Fruit a globose capsule, tardily dehiscent.—DISTRIB. East India, Malaya, China, Philippines, New Guinea ; species 60 or 70.

1. **Globba bulbifera,** *Roxb. in As. Res.* v. 11 (1810) p. 358. Stems 8—24 in. high, slender, erect or drooping, crowded on a tufted root-stock ; root of fleshy fibres. Leaves 3—7 by 1—1¾ in., few, elliptic-lanceolate or oblong-lanceolate, distichous, shortly petiolate, green above, paler and more or less puberulous beneath ; midrib stout ; sheath long, ciliate ; ligule very short, ciliate. Flowers in lax spikes or racemes 2—3½ in. long, fragrant, sessile or very shortly pedicellate, the lower replaced by yellow ovoid bulbils ⅛—¼ in. long ; bracts loose, elliptic-oblong, obtuse or subacute, the lower sometimes more than 1 in. long, becoming smaller upwards. Calyx ⅛—¼ in. long, funnel-shaped, 3-toothed. Corolla yellow ; tube very slender, nearly ½ in. long ; segments subequal, oblong, shorter than the tube. Lip deeply 2-fid, narrow, deflexed. Filament long, slender, incurved ; anther-cells narrow, winged on both sides, the wings spreading, deeply 2-fid. Fruit ¼ in. long, oblong, terete, smooth. Fl. B. I. v. 6, p. 206 ; Trim. Fl. Ceyl. v. 4, p. 240 ; Prain, Beng. Pl. p. 1037 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 154. *Globba marantina,* Wall. Cat. 6532 (*not* of Linn.) ; Grah. Cat. p. 211 ; Dalz. & Gibs. p. 272 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520. *G. marantinoides,* Wight, Icon. v. 6 (1853) p. 15 (by error in t. 2001 *G. marantina*).—Flowers : Aug.

KONKAN : *Stocks* !, *Law* ! ; Wari country on Wag Donger, *Dalzell* ! S. M. COUNTRY : Párva Ghát, *Ritchie,* 1440 ! KANARA : Yellapur, *Woodrow.*—DISTRIB. India (E. Himalaya, Bengal, W. Peninsula) ; Ceylon, Malay Islands, Timor.

IMPERFECTLY KNOWN SPECIES.

GLOBBA CANARENSIS, Baker, in Hook. f. Fl. B. I. v. 6 (1890) p. 206. Leaves small, thin, caudate; panicle few-flowered, lax, most of the flowers replaced by long narrow acuminate bulbils; calyx green, narrowly funnel-shaped, ⅛ in. long; corolla-tube more than twice as long as the calyx; corolla-segments oblong, ⅛ in. long; anthers not seen.

KANARA : *Law* !

GLOBBA PLATYSTACHYA, Baker, l. c. Leaves large and thin; panicle short, lax, and very broad, the lower branches 2—4 in. long, ending in a bulbil and bearing numerous close flowers shortly pedicellate towards the end, each subtended by a small persistent ovate acutely-keeled bract; calyx green,

broadly funnel-shaped, $\frac{1}{12}$ in. long; corolla-tube 3 times the length of the calyx; corolla-segments oblong, yellow, $\frac{1}{8}$—$\frac{1}{6}$ in. long; anthers not seen.

KONKAN: *Law!*

The descriptions of these two species are taken from the original descriptions in the 'Flora of British India,' given by Mr. Baker. No fresh material has been sent to Kew, so that no further advance has been made there in the knowledge of the plants.

2. **KÆMPFERIA,** Linn. Gen. Pl. (1737) p. 331.

Herbs with short stems or stemless; rootstock often tuberous. Leaves few. Flowers spicate, on radical scapes or at the apex of the leafy stem. Calyx short, cylindric, splitting spathaceously. Petals 3, connate in a corolla with a long slender tube; corolla-lobes equal, usually spreading. Stamen 1 perfect; filament short, arcuate; anther 2-celled, the cells discrete, on a wide connective which is produced above into a petaloid crest, not spurred below; lateral staminodes broad, petaloid. Lip broad, usually 2-fid. Ovary 3-celled; ovules many on 3 axile placentas; style long, filiform; stigma turbinate. Fruit an oblong capsule with thin pericarp. Seeds subglobose, with a small lacerate aril.—DISTRIB. Species about 50, Indian and Malayan.

Stemless; spikes central, radical; anther-crest 2-lobed or 2-fid.	
Leaves rotund-ovate, spreading flat upon the ground; petioles short; lip deeply 2-fid	1. *K. Galanga.*
Leaves narrowed at the base, erect; petioles long; lip entire	2. *K. pandurata.*
Leafy stem produced; spikes terminal; anther-crest entire, ciliate	3. *K. scaposa.*

1. **Kæmpferia Galanga,** *Linn. Sp. Pl.* (1753) p. 2. Rootstock tuberous, aromatic; root-fibres fleshy, cylindric, not aromatic. Leaves 2, spreading horizontally, lying flat on the surface of the ground, $2\frac{1}{2}$—5 by $1\frac{3}{4}$—$3\frac{1}{2}$ in., rotund-ovate, deltoid-acuminate, thin, deep green, 10—12-ribbed, the margins not thickened nor colored; petioles short, channelled. Flowers 6—12 from the centre of the plant between the leaves, fugacious, fragrant, opening successively; bracts lanceolate, green, short. Calyx as long as the outer bracts. Corolla-tube 1 in. long; lobes lanceolate, pure white, a little shorter than the tube. Lateral staminodes $\frac{3}{8}$—$\frac{3}{4}$ in. long, cuneate-obovate, white. Lip rather more than 1 in. long and nearly 1 in. broad, deeply 2-lobed, the lobes with a lilac spot at the base. Connective produced into a quadrate 2-lobed appendage. Fl. B. I. v. 6, p. 219; Grah. Cat. p. 208; Wight, Icon. t. 899; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520; Prain, Beng. Pl. p. 1038; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 77 (*Kæmpfera*); Watt, Dict. Econ. Prod. v. 4, p. 561.—Flowers: June—July. VERN. *Chanda-mula.*

KONKAN: S. Konkan, *Nimmo* ex *Graham.* DECCAN: Máwal, *Woodrow.*—DISTRIB. More or less throughout India, often cultivated in gardens; Malay Islands.

The tubers, according to Roxburgh, are employed in perfumery, and they are used in Hindu medicine. The true *Galanga* root of the drug-shops is not

however furnished by this plant, but by *Alpinia officinarum*, and a less valuable product by *Alpinia Galanga*. See Watt, Dict. Econ. Prod. l. c.

2. **Kæmpferia pandurata,** *Roxb. in Asiat. Res.* v. 11 (1810) p. 328, t. 2. Stemless ; rootstock horizontal, bright yellow within, with many nodose branches and thick succulent vermiform root-fibres. Leaves few (usually 3 or 4), 9—15 by 1¾—4 in., distichous, erect, elliptic-oblong, acute or shortly acuminate, decurrent into a long deeply channelled petiole which reaches 6 in. long, glabrous and green on both surfaces ; midrib stout ; ligule short, acute, membranous. Flowers in terminal spikes, subsessile among the leaves ; bracts about 2 in. long, linear-lanceolate. Calyx-tube about 1 in. long, cylindric, narrow, hyaline, 2-fid. Corolla-tube reaching 2 in. long or more, white or pale pink, very slender, cylindric, erect or curved at the top ; segments pink, ¾ in. long, oblong, acute, spreading. Staminodes 3, oblong or lanceolate, spreading, the 2 lateral ½ in. long, equal. Lip ¾ in. broad, elliptic-panduriform, undulate, white tinged with red. Anther erect, recurved ; connective produced into a quadrate short 2-fid appendage. Fl. B. I. v. 6, p. 220 ; Grah. Cat. p. 208 ; Dalz. & Gibs. Suppl. p. 87 ; Bot. Reg. t. 173 ; Trim. Fl. Ceyl. v. 4, p. 243 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 89 (*Kæmpfera*).

KONKAN : *Nimmo* ex *Graham*. GUJARAT : *Nimmo* ex *Graham*.

Graham [Cat. Pl. Bo. (1839) p. 208] notes this as occurring in the Konkans and Gujarat on the authority of Nimmo. It has not, however, been found in either locality by recent collectors, while Dalzell & Gibson (Bo. Fl. Suppl. p. 87) say that they have not been able to trace the plant in the S. Konkan and deny that it is indigenous in the Bombay Presidency. I have seen no specimens from thence. Trimen [Fl. Ceyl. (*l. c.*)] says that it is nowhere wild in Ceylon.—DISTRIB. Birma, Malaya, Andamans, Ceylon, Java.

3. **Kæmpferia scaposa,** *Benth. in Benth. & Hook. Gen. Pl.* v. 3 (1883) p. 642. Leaf-bearing axis of the flowering plant elongate ; root-stock tuberous, oblique ; root-fibres long, slender. Leaves numerous, 8—12 by 2—3 in., oblong-lanceolate, long-acuminate, glabrous, green above, paler beneath, narrowed into a deeply channelled petiole as long as the blade. Flowers in terminal dense spikes 3—9 in. long, on usually naked peduncles reaching 18 in. long ; bracts the lower remote, the upper dense, 1—2½ in. long, lanceolate, acute, green, persistent, each including a pair of flowers. Calyx tubular, loosely sheathing the corolla-tube, 1—1¼ in. long, 3-toothed, the teeth subequal. Corolla-tube reaching 3½ in. long ; lobes lanceolate, ¾ in. long, the posticous cucullate and mucronate. Lateral staminodes oblong, acute, white. Lip broad, 2-fid, more than 1 in. long. Filament short, $\frac{1}{12}$ in. long and as broad ; connective produced above the anther into a subtrapezoidal ciliate appendage. Stigma turbinate, tuberculate on the back. Capsules obovoid, red, subtomentose, ½ in. long. Seeds dark brown with a white lacerate aril. Fl. B. I. v. 6, p. 224 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 72. *Hedychium scaposum*, Nimmo, ex Grah. Cat. Pl. Bo. (1839) p. 205 ; Dalz. & Gibs. p. 273. *Monolophus scaposus*, Dalz. in Kew

Journ. Bot. v. 2 (1850) p. 143; Wight, Icon. t. 2030.—Flowers: July—Nov. VERN. *Chohola; Sunha.*

KONKAN: *Stocks!*, *Law!*, *Dalzell!*; Malwán, *Dalzell!*; banks of rivulets in the S. Konkan, *Dalzell & Gibson.* DECCAN: *Stocks!*, *Woodrow!*; Lanoli, *Woodrow, Graham, King!*; Karli, *Graham, Jacquemont,* 639! KANARA: *Law!* DISTRIB. India (W. Peninsula).

Kæmpferia rotunda, Linn. Sp. Pl. (1753) p. 3. A stemless plant with a tuberous rootstock and many thick succulent root-fibres bearing oblong tubers. Leaves few, erect, 12 by 3—4 in., oblong, acuminate, mottled green above and pale red-purple beneath. Flowers sweetly fragrant, of various shades of purple and white, appearing in April before the leaves. Cultivated but not indigenous in the Bombay Presidency. Fl. B. I. v. 6, p. 222; Grah. Cat. p. 208; Dalz. & Gibs. Suppl. p. 86; Wight, Icon. t. 2029; Trim. Fl. Ceyl. v. 4, p. 244; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 87; Prain, Beng. Pl. p. 1038; Watt, Dict. Econ. Prod. v. 4, p. 561.—Flowers: Apr. VERN. *Bhui-champa.*

3. HITCHENIA, Wall.

Annual herbs; rhizome with tuberiferous fibres. Leaves petiolate or sessile, oblong-lanceolate or elliptic. Flowers in terminal spikes; bracts subcoriaceous, all fertile or the upper sterile, forming a coma. Calyx tubular, membranous, 3-toothed. Corolla-tube elongate, slender, slightly enlarged above; lobes 3, subequal, oblong or ovate. Lateral staminodes petaloid, free from the filiform filament. Lip scarcely longer than the corolla-lobes, orbicular or cunneate, 2-lobed. Anther-cells marginal on the broad connective, not crested; filament as long as the lip, narrow, complicate. Ovary 3-celled; ovules many, superposed; style filiform; stigma exserted beyond the anther-cells, turbinate. Capsule oblong, 3-gonous, coriaceous, crowned by the calyx, variously rupturing or sub-3-valved. Seeds shining, usually arillate.—DISTRIB. Species 3, Indian.

1. **Hitchenia caulina,** *Baker, in Hook. f. Fl. B. I.* v. 6 (1890) p. 224. Rhizome with many ellipsoid tubers hanging to the fibres, the tubers white inside; stem leafy, 3—4 ft. high. Leaves 12—20 by 3—6 in., oblong-lanceolate, acuminate, narrowed at the base, waved, strongly nerved, with sheathing petioles. Flowers yellow or white, in terminal spikes 5—9 in. long and reaching 2½ in. in diam.; bracts 1—1¼ in. long, green or greenish-white, sometimes tinged with red, obovate-cuneate, those of the coma white or occasionally pink, all united together by their backs and edges. Calyx thinly membranous, tubular, 3-fid. Corolla-tube 1½ in. long, slender; lobes thinly membranous, one larger than the other two, the large one ovate-oblong, shortly acuminate, the 2 smaller linear-oblong. Lateral staminodes petaloid, ½ in. long. Lip ½ in. in diam., 2-fid, with a yellow band at the division. Anther-cells oblong, spurred at the base. Ovary

3-celled ; style hidden between the cells of the anther ; stigma 2-lipped, funnel-shaped, ciliate at the top, projecting beyond the anther. Seeds ovoid, with a lacerate aril. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 97. *Curcuma caulina,* Grah. Cat. Pl. Bo. (1839) p. 210 ; Dalz. & Gibs. p. 275 ; Watt, Dict. Econ. Prod. v. 2, p. 658.—Flowers : Aug.—Oct. VERN. *Chávar.*

DECCAN : Mahableshwar, abundant, *Graham, Dalzell & Gibson, Cooke*!, *Woodrow*!, *H. M. Birdwood*; Khandala, *Cooke*! ; Panchgani, *Woodrow.*— DISTRIB. India (W. Peninsula).

Known to Anglo-Indians at Mahableshwar as the *Arrowroot Plant.* Arrow-root was at one time extracted from the tubers by the Chinese gardeners on the hill. See Watt, Dict. Econ. Prod. l. c.

4. **HEDYCHIUM,** Koenig.

Herbs with perennial tuberous rootstocks ; root-fibres hardly thickened ; stem elongate, leafy. Leaves distichous, oblong or lanceolate. Flowers usually in terminal spikes ; bracts oblong, sub-coriaceous, 1- or more-flowered. Calyx tubular, 3-toothed. Corolla-tube long, slender ; lobes equal, linear, spreading. Perfect stamen 1 ; lateral staminodes linear or cuneate-oblong. Lip large, 2-fid. Ovary 3-celled ; ovules many, superposed on axile placentas ; style long, filiform ; stigma subglobose. Fruit a globose 3-valved capsule. Seeds many, small, with a lacerate aril.—DISTRIB. Species 38, chiefly Indian and Malayan.

1. **Hedychium coronarium,** *Koenig, in Retz. Obs. Bot.* fasc. 3 (1783) p. 73. Stem 3—5 ft. high, erect ; rootstock stout, horizontal, ½—2 in. in diam., fleshy, jointed. Leaves sessile, 9—14 by 1¼—2¼ in., lanceolate, finely acuminate, glabrous above, glabrous or sparsely pubescent beneath and on the midrib, base narrowed ; sheath smooth ; ligule ¾—1¼ in. long, membranous. Flowers fragrant, pure white, in dense oblong spikes 4—8 in. long ; bracts closely imbricate, 3—4-flowered, the outer 1½—2 by 1 in., at first green, becoming brown by age, ovate, obtuse ; bracteoles 3, membranous. Calyx 1—1½ in. long, cylindric, green, shorter than the bracts. Corolla-tube 3 in. long ; segments linear, half as long as the tube, reflexed. Lateral staminodes 1½—2 by ½ in., oblong-lanceolate, subobtuse, white. Lip 1½—2 in. broad, suddenly contracted into a short claw, entire or 2-fid ; lobes short, rounded. Stamen 1¾ in. long ; anther about ½ in. long. Capsules oblong, glabrous, the valves orange-yellow inside. Seeds many, with a crimson aril. Fl. B. I. v. 6, p. 225 ; Grah. Cat. p. 205 ; Dalz. & Gibs. Suppl. p. 86 ; Wight, Icon. t. 2010 ; Bot. Mag. t. 708 ; Trim. Fl. Ceyl. v. 4, 245 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 44 ; Prain, Beng. Pl. p. 1039.—Flowers : Aug.—Sept. VERN. *Sontaka.*

KONKAN : *Law*! DECCAN : Lanoli, *Woodrow;* Mahableshwar, *H. M. Birdwood.* KANARA : Kála naddi near Supa, *Ritchie,* 1435!—DISTRIB. Throughout India; Ceylon, Malay Islands.

5. CURCUMA, Linn.

Stemless herbs with tuberous rootstocks bearing sessile and long-stipitate tubers. Leaves usually oblong, often very large. Flowers in dense compound spikes, vernal or æstival, and preceding, or autumnal and contemporaneous with the leaves, crowned by a coma of enlarged colored bracts ; lower bracts ovate, membranous, enclosing several bracteolate fugacious flowers which open in succession. Calyx short, cylindric, minutely toothed. Corolla-tube funnel-shaped ; corolla-lobes usually ovate or oblong, the upper longer and somewhat concave. Stamen 1 perfect ; filament short ; anthers not crested, with contiguous cells spurred at the base ; lateral staminodes oblong, petaloid, connate with the filament. Lip orbicular, with a deflexed tip. Ovary 3-celled ; ovules numerous on axile placentas ; style filiform ; stigma 2-lipped, the lips ciliate. Fruit a tardily dehiscent globose membranous 3-valved capsule. Seeds ovoid or oblong, usually arillate.—DISTRIB. Species about 40, chiefly in S.E. Asia.

Flowering spike vernal or æstival, lateral, apart from and usually appearing before the leafy spike.
- Leaves 6—10 in. long; rootstock small, emitting fleshy fibres terminating in small tubers white inside; corolla-lobes pink ..... 1. *C. neilgherrensis.*
- Leaves 15—24 in. long; rootstock large, of palmately branched sessile tubers yellow inside; corolla-lobes pink ..... 2. *C. aromatica.*

Flowering spike autumnal, rising in the centre of a previously formed tuft of leaves.
- Rootstock small, bearing tubers at the ends of the fibres (no sessile tubers); tubers white inside.
  - Flowers yellow ..... 3. *C. pseudomontana.*
  - Flowers purple ..... 4. *C. decipiens.*
- Rootstock large; tubers sessile, pale yellow inside. 5. *C. Amada.*

1. **Curcuma neilgherrensis,** *Wight, Icon.* v. 6 (1853) p. 16, t. 2006. Whole plant with the leaves rarely reaching 16 in. high, sometimes not more than 3 in. or even less before the leaves appear ; rootstock small, white inside ; root-fibres numerous, slender. Leaves 6—10 by 1½—2½ in., shortly petiolate, lanceolate or oblong-lanceolate, acuminate, glabrous, narrowed at the base. Flowers bright yellow, in dense vernal spikes of variable length depending on the size of the plant (in well-grown specimens reaching 4 in. long by 2 in. in diam.) ; peduncles of variable length with sheaths at the base ; flowering bracts 1—1½ in. long, oblong-lanceolate, acute, pale yellowish-green, the bracts of the coma dense, pink. Calyx ⅓ in. long, 3-toothed, split down one side. Corolla-tube ⅝ in. long ; lobes oblong. Lip broadly ovate or suborbicular, more highly colored than the lobes, obtuse, 2-fid at the apex. Capsules glabrous, globose, ½ in. in diam. Fl. B. I. v. 6, p. 210 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 109. *Curcuma angustifolia,* Dalz. & Gibs. Bo. Fl. (1861) p. 274 (*not* of Roxb.).

KONKAN : *Stocks* !, *Law* ! DECCAN : Sinhagad near Poona, *Woodrow.* S. M. COUNTRY : Dharwar, *Law* ! KANARA : *Law* !—DISTRIB. India (W. Peninsula).

2. **Curcuma aromatica,** *Salisb. Parad. Lond.* t. 96 (1805). Rootstock large, of palmately branched, sessile annulate biennial tubers yellow and aromatic inside. Leaves 15—24 by 4—8 in., oblong-elliptic or oblong-lanceolate, caudate-acuminate, green, often variegated above, pubescent beneath, base deltoid ; petioles as long as or longer than the blade. Flowering stem appearing with or before the leafing stem, as thick as the forefinger, sheathed. Flowers fragrant, shorter than the bracts, in spikes 6—12 in. long ; flowering bracts 1½—2 in. long, ovate, recurved, cymbiform, rounded at the tip, pale green, connate below forming pouches for the flowers ; bracts of the coma 2—3 in. long, more or less tinged with red or pink. Calyx ⅓ in. long, irregularly 3-lobed. Corolla-tube 1 in. long, the upper half funnel-shaped ; lobes pale rose-colored, the lateral lobes oblong, the dorsal longer, ovate, concave, arching over the anthers. Lip yellow, obovate, deflexed, subentire or obscurely 3-lobed. Lateral staminodes oblong, obtuse, as long as the corolla-lobes. Fl. B. I. v. 6, p. 210 ; Wight, Icon. t. 2005 ; Rosc. Monandr. Pl. (1828) t. 103 ; Trim. Fl. Ceyl. v. 4, p. 241 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 111 ; Prain, Beng. Pl. p. 1041 ; Watt, Dict. Econ. Prod. v. 2, p. 655. *Curcuma zedoaria,* Roxb. As. Res. v. 11 (1810) p. 333 (*not* of Rosc.) ; Grah. Cat. p. 209 ; Dalz. & Gibs. p. 274 ; Bot. Mag. t. 1546.—Flowers: May. VERN. *Rán-haldi ; Amba-halad.*

KONKAN : *Dalzell & Gibson;* moist shady places in the Konkan, *Graham;* Kanheri forests, *Graham;* Parel Hill (Bombay), *Graham.*—DISTRIB. India (Bengal, W. Peninsula); sometimes cultivated and known as *Yellow Zedoary.* The tubers are used medicinally. See Watt, Dic. Econ. Prod. l. c.

3. **Curcuma pseudomontana,** *Grah. Cat. Pl. Bomb.* (1839) p. 210. Rootstock small, bearing small almond-like or subglobose tubers at the ends of the fibres (but no sessile tubers) ; tubers pure white inside, edible. Leaves uniformly green, reaching 2 ft. or more long (including the petiole), 4—6 in. broad, lanceolate-oblong, acuminate, tapering to the base ; petioles 8—15 in. long. Flowers appearing with the leaves, bright yellow, 2 or 3 in each bract, in autumnal central narrowly oblong spikes 2—5 by 1—1¾ in. ; peduncles 3—4 in. long, embraced by leaf-sheaths ; flowering bracts 1¼—1¾ by ⅝—⅞ in., obovate-lanceolate, green with an acute pink tip ; bracts of coma oblong-lanceolate, the lowest with purple edges only, the upper more or less uniformly mauve-purple. Dalz. & Gibs. p. 275 ; Lisboa, in Journ. Bomb. Nat. v. 2 (1887) p. 144 ; Watt, Dict. Econ. Prod. v. 2, p. 669. *Curcuma Ranadei,* Prain, in Journ. Bomb. Nat. v. 11 (1898) p. 463 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 440. *C. montana,* Baker, in Hook. f. Fl. B. I. v. 6, p. 214 *in part* (*not* of Rosc.) ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520.—Flowers: Sept. VERN. *Sindarbar ; Shindalvan.*

KONKAN : *Stocks* !, *Law* !, *Dalzell & Gibson*; Salsette, *Graham.*

Baker in Hook. f. Fl. B. I. l. c. has reduced this to *C. montana,* Roxb., but the tubers in Roxburgh's plant are sessile and yellow inside, while Graham, though admitting that his plant is closely allied to *C. montana,* describes its tubers as *hanging from the fibres of the rootstock and perfectly white inside.*

There are unfortunately no rhizomes to any of the specimens in Herb. Kew. which have been named *C. montana* or *C. pseudomontana*, and an examination of fresh specimens by botanists on the spot is very desirable. Graham makes a mistake in his description in stating that the leaves are 19 inches wide, an error which Dalzell and Gibson reproduce, reducing the width however to 18 inches.

The description given by Graham, though rather indefinite as to size and shape of tubers, seems to fit the plant described as *C. Ranadei* by Colonel Prain (Journ. Bomb. Nat. l. c.). Thus, the lower bracts of the coma are, in the case of *C. Ranadei*, described by Colonel Prain as having purple edges, while the bracts of *C. pseudomontana* are said by Graham to have their edges dark brown or reddish. Again, the upper bracts of the coma of *C. Ranadei* are described as more or less uniformly mauve-purple, those of *C. pseudomontana* as dark rose-colored. The flowers in both are bright yellow, the inflorescence being central. The fact that *C. Ranadei* was grown in a pot in Calcutta from a tuber accidentally sent from Bombay together with rhizomes of *Kæmpferia scaposa*, under climatic conditions differing greatly from those of the natural home of the plant in the Konkan hills, might account for minor differences.—DISTRIB. India (W. Peninsula), apparently endemic.

The tubers are boiled and eaten in times of scarcity according to Graham.

4. **Curcuma decipiens,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 144. Rootstock bearing numerous almond-like tubers white inside at the ends of the fibres, but with no sessile tubers. Leaves 6—8 by 3—5 in., broadly elliptic, shortly deltoid-acuminate, membranous, green, usually glabrous, base rounded or subcordate ; petioles as long as the leaf. Flowers twin, purple, in æstival spikes 2½—5 by 1—1¾ in., those which first emerge from the soil lateral, the later spikes central ; peduncles 2½—3 in. long ; flowering bracts 1 in. long, ovate, obtuse, saccate, purple ; bracts of the coma numerous, oblong, purple. Calyx nearly ½ in. long, obtusely toothed, puberulous below the teeth and near the base. Corolla purple ; tube twice as long as the calyx ; lobes oblong-lanceolate. Lip obovate, 2-fid, with crisped margins. Fl. B. I. v. 6, p. 215 ; Dalz. & Gibs. p. 274 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 105.—Flowers : June—Sept.

KONKAN : *Law* !, *Stocks* !, *Dalzell* ! ; Malwán, *Dalzell* ! ; Uran (island in Bombay Harbour), *Dalzell* !—DISTRIB. India (W. Peninsula), apparently endemic

5. **Curcuma Amada,** *Roxb. in Asiat. Res.* v. 11 (1810) p. 341. Rootstock large ; sessile tubers thick, cylindric or ellipsoid, pale yellow inside. Leaves long-petiolate, in tufts, the blade 12—18 by 3—5 in., oblong-lanceolate, acute or acuminate, narrowed to the base, glabrous and green on both sides ; petioles as long as the leaf-blade (12—18 in.). Flowers in autumnal spikes 3—6 by 1½—2 in., in the centre of the tuft of leaves ; peduncle 6 in. long or more ; flowering bracts 1 in. long, greenish-white ; bracts of the coma longer and narrower, tinged with pink or red. Calyx nearly ½ in. long, obtusely 3-toothed. Corolla white or very pale yellow ; tube about 1 in. long ; lobes oblong, acute. Lip semi-elliptic, yellow, 3-lobed, the middle lobe emarginate. Fl. B. I. v. 6, p. 213 ; Grah. Cat. p. 209 ; Dalz. & Gibs. p. 275 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 108 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520 ; Prain, Beng. Pl. p. 1041 ; Watt, Dict. Econ. Prod. v. 2, p. 652.—Flowers : Sept.

KONKANS *and* GUJARAT, *Nimmo* ex *Graham.* I have seen no specimens from the Bombay Presidency; there are none in Herb. Kew. Woodrow in his list merely quotes Nimmo.—DISTRIB. India (Bengal, W. Peninsula); Malay Peninsula and Archipelago.

The plant is often cultivated and known as the *Mango-Ginger;* the tubers when fresh have somewhat the odor of a green Mango, hence the name. They are employed in native medicine as carminative and stomachic. See Watt, Dict. Econ. Prod. l. c.

Curcuma zedoaria, Rosc. Monandr. Pl. (1828) t. 109. Rootstock of palmately-branched sessile cylindric oblong annulate tubers, pale yellow inside, with a camphoraceous odor and bitterish spicy taste, also bearing long fleshy fibres that terminate in smaller oblong less fragrant tubers. Leaves 4—6 with long petioles, 1—2 ft. long, oblong-lanceolate, finely acuminate, glabrous on both surfaces, clouded with purple down the middle. Flowering stem 8—10 in. long, appearing before the leaves, stout, clothed with obtuse sheaths. Flowers yellow in spikes 3—5 by 2—3 in.; flowering bracts 1½ in. long, ovate, recurved, cymbiform, green tinged with red; bracts of the coma reaching 2 in. long, crimson or purple. Calyx ⅓ in. long, obtusely 3-toothed. Corolla-tube twice as long as the calyx, funnel-shaped; lateral lobes oblong, the dorsal lobe larger, vaulted, arching over the anther. Lip ½ in. broad, suborbicular, deflexed, obscurely 3-lobed, deep yellow. Capsule ovoid, 3-gonous, thin, smooth, bursting irregularly. Seeds ellipsoid with a white lacerate aril. Fl. B. I. v. 6, p. 210; Trim. Fl. Ceyl. v. 4, p. 241; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 110; Prain, Beng. Pl. p. 1041; Watt, Dict. Econ. Prod. v. 2, p. 669. *Curcuma Zerumbet,* Roxb. in Asiat. Res. v. 11 (1810) p. 333; Grah. Cat. p. 209.—VERN. *Kachora.*

Not wild in the Bombay Presidency; cultivated more or less throughout India; said to be wild in the Eastern Himalaya and in Chittagong.

The tubers are employed in native medicine as a stomachic and also as an application to bruises and sprains. Powered and dried they used to form one of the constituents of the red powder used by the Hindus at the Holi festival. See Watt, Dict. Econ. Prod. l. c.

Curcuma longa, Linn. Sp. Pl. (1753) p. 2. A tall herb; rootstock large, ovoid, with sessile cylindric tubers orange inside. Leaves very large, in tufts, reaching 4 ft. or more long (including a petiole about as long as the blade), oblong-lanceolate, tapering to the base. Flowers in autumnal spikes 4—6 by 2 in.; peduncles 6 in. long or more, hidden by the sheathing petiole; flowering bracts pale green; bracts of the coma tinged with pink. The plant is cultivated all over India for the *turmeric* obtained from its rhizomes, but is doubtfully wild anywhere in India, though Mr. Clarke considers it to be wild in Behar, and Prain says it may perhaps be indigenous in Chota Nagpur. Watt (Dict. Econ. Prod. v. 2, p. 660) suggests that it may have been introduced from China or Cochinchina. It is largely cultivated in the Bombay Presidency in places where the soil is good and the water-supply abundant. Fl. B. I. v. 6, p. 214; Grah. Cat. p. 209; Dalz. & Gibs. p. 87; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 520;

K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 108 ; Prain, Beng. Pl. p. 1041 ; Watt, Dict. Econ. Prod. v. 2, p. 659.—VERN. *Haldi*.

6. AMOMUM, Linn.

Herbs with elongate leafy stems and perennial extensive rootstocks. Leaves usually oblong-lanceolate. Flowers in dense spikes direct from the rootstock ; bracts imbricate. Calyx cylindric, 3-toothed. Corolla-tube cylindric ; lobes 3, oblong or linear-oblong, the upper often broader and more convex. Stamen 1 perfect ; filament short, arcuate ; anther 2-celled, the cells divaricate, sometimes hairy, often with a petaloid crest ; lateral staminodes minute or obsolete. Lip broad or ligulate. Ovary 3-celled ; ovules many, superposed ; placentas axile ; style filiform ; stigma small, subglobose, or larger and dorsally gibbous. Fruit indehiscent or bursting irregularly, sometimes beaked or winged or echinate. Seeds globose or truncate.—DISTRIB. India, Malayan Archipelago, New Guinea, Australia, Philippine Islands, China, Japan ; species about 87.

1. **Amomum microstephanum,** *Baker, in Hook. f. Fl. B. I.* v. 6 (1892) p. 239. A perennial herb reaching 4 ft. or more in height ; stems leafy. Leaves large, 20—24 by 2½—4 in., linear-lanceolate, acuminate, glabrous above, silky-pubescent beneath, base tapering ; petioles 3—7 in. long. Flowers white, in globose shortly pedunculate spikes 2 in. in diam. ; exterior bracts few, oblong, glabrous, 1—1⅝ in. long, the inner bracts membranous. Calyx ¾—⅞ in. long, tubular, membranous, 3-toothed, split down one side. Corolla-tube shorter than the calyx ; lobes linear-oblong, half as long as the tube. Lip 1¼ in. long, obovate. Anther glabrous, ½ in. long ; crest small, orbicular. Capsules 9-ribbed, echinate. K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 257.

Rare. KONKAN : *Stocks* ! ; near Chandavár (planted), *Ritchie* !—DISTRIB. India (W. Peninsula).

7. ZINGIBER, Adans.

Herbs with elongated leafy stems and horizontal tuberous rootstocks. Leaves oblong-lanceolate. Flowers in spikes usually radical, less commonly terminal, very rarely lateral on the leafy stems ; peduncle short or long ; bracts persistent, usually 1-flowered. Calyx cylindric, shortly 3-lobed. Corolla 3-lobed, with a cylindric tube ; lobes lanceolate, the upper concave. Stamen 1 perfect ; filament short ; anther 2-celled, the cells contiguous, with a narrow crest as long as themselves ; lateral staminodes 0, or adnate to the obovate-cuneate lip. Ovary 3-celled ; ovules many, superposed ; placentas axile ; style filiform ; stigma small, subglobose. Fruit an oblong capsule, tardily dehiscent. Seeds large, globose, arillate.—DISTRIB. Species 55, East Indies, Malaya, and New Guinea ; 1 species widely cultivated throughout the Tropics.

Spikes produced direct from the rootstock very short and dense; peduncles very short or 0.
- Leaves pubescent beneath; lip yellow ..... 1. *Z. Nimmonii.*
- Leaves glabrous beneath; midlobe of lip variegated pink and white; the side lobes red and yellow ..... 2. *Z. cernuum.*

Spikes terminating elongate peduncles beset with sheathing scarious bracts.
- Leaves glabrous beneath; bracts green ..... 3. *Z. Zerumbet.*
- Leaves pubescent beneath; bracts reddish.
  - Lip yellowish-white, marked with purple lines; side lobes of lip small; capsule ellipsoid, 1 in. long ..... 4. *Z. macrostachyum.*
  - Lip yellow-white, not marked with purple lines; side lobes of lip large; capsule subglobose, ⅔ inch long ..... 5. *Z. Cassumar.*

1. **Zingiber Nimmonii,** (by error *Nimmoi,* corrected in Dalz. & Gibs. Bo. Fl. p. 273), *Dalz. in Kew Journ. Bot.* v. 4 (1852) p. 341. Stem leafy, 4—5 ft. high, as thick as the middle finger, reddish-green, glabrous. Leaves 6—12 by 2—3 in., nearly sessile, oblong-lanceolate, acuminate, green and glabrous above, pubescent beneath, base acute; petioles scarcely ⅛ in. long, with long sheaths and a short truncate ligule about ⅒ in. long. Flowers in shortly pedunculate ovate or subglobose spikes scarcely rising above the ground; bracts linear-oblong or lanceolate, acute, glabrous, green streaked with red, the inner 2-fid. Corolla-tube as long as the bracts; lobes reddish-yellow. Lip 3-lobed, yellow; midlobe rotund-ovate or subobovate, scarcely emarginate; side lobes small, rounded. Capsules ellipsoid, the size of a pigeon's egg. Fl. B. I. v. 6, p. 244; Dalz. & Gibs. p. 273; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 184. *Alpinia Nimmonii,* Grah. Cat. Pl. Bo. (1839) p. 206.—Flowers: July.

KONKAN: *Stocks!, Law!*; N. & S. Konkan, *Dalzell & Gibson*; Sahyadri range, *Dalzell!* DECCAN: Lanoli Grove, abundant, *Graham*; Khandala, *Graham.* CANARA: *Law!*—DISTRIB. India (W. Peninsula).

2. **Zingiber cernuum,** *Dalz. in Kew Journ. Bot.* v. 4 (1852) p. 342. Stem bright green, somewhat curved, glabrous. Leaves narrowly elliptic, acuminate, glabrous on both sides. Spikes ovate, obtuse, very shortly pedunculate, scarcely appearing above the ground; bracts ovate or oblong, somewhat obtuse, greenish-yellow, glabrous, the inner shortly 3-fid. Corolla buff-colored. Lip 3-lobed; midlobe ovate, deeply 2-fid, variegated with white and red; side lobes variegated with red and yellow. Fruit yellowish-white, smooth. Seeds (unripe) red, striated; aril membranous. Fl. B. I. v. 6, p. 245; Dalz. & Gibs. p. 273; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 182.—Flowers: July.

S. M. COUNTRY: Rámghát, *Dalzell.*

The description above is that of Dalzell. I have seen no specimens; there are none in Herb. Kew.

The plant unfortunately flowers in July, at which time the whole of the hill-sides are streaming with water, rendering plant-collecting a task of no ordinary difficulty. It is hoped that local botanists will endeavour to procure

specimens, describe them when fresh, and send some to the Kew Herbarium.—DISTRIB. India (W. Peninsula).

3. **Zingiber Zerumbet,** *Roscoe, ex Smith, Exot. Bot.* v. 2 (1805) p. 105, t. 112. Rootstock large, not much branched, hard, biennial, yellow inside, with a strong aromatic ginger-like taste, but with some bitterness ; root-fibres vermiform ; leafing stem 3—5 ft. high, about ½ in. in diam., cylindric, glabrous, annual. Leaves 8—12 by 2—3 in., sessile, oblong-lanceolate or oblanceolate, acuminate, glabrous, base narrowed ; ligule ½—¾ in. long, truncate, membranous. Flowering stem 12—18 in. long, stout, usually flexuous, clothed with long appressed obtuse sheaths. Flowers pale sulphur-yellow, in conico-oblong or ovoid obtuse spikes 3—4 by 2 in. ; bracts 1—1½ in. long, closely imbricate, ovate-oblong or obovate, with rounded apex and pale membranous margins, bright green at first but becoming red in fruit. Calyx-tube 1 in. long, appressed to the corolla-tube, 3-toothed, glabrous. Corolla-tube 1¼ in. long ; lobes ovate-lanceolate, acuminate, the lateral smaller, adnate to the base of the lip. Lip shorter than the corolla-lobes and of a darker yellow, 3-fid ; lobes obtuse, the midlobe the longest. Anther glabrous. Style glabrous ; stigma minute, funnel-shaped with ciliate mouth. Capsules ellipsoid, 1 in. long. Seeds ⅛ in. long, oblong, black. Fl. B. I. v. 6, p. 247 ; Grah. Cat. p. 207 ; Dalz. & Gibs. p. 272 ; Wight, Icon. t. 2003 ; Bot. Mag. t. 2000 ; Trim. Fl. Ceyl. v. 4, p. 259 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 172 ; Prain, Beng. Pl. p. 1044 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 366.—Flowers : July.

KONKAN : *Nimmo* ex *Graham* ; common about old wells in the S. Konkan, *Dalzell & Gibson* ; sometimes cultivated.—DISTRIB. Throughout India ; Ceylon, Malay Peninsula ; widely cultivated in the Tropics of the Old World.

4. **Zingiber macrostachyum,** *Dalz. in Kew Journ. Bot.* v. 4 (1852) p. 342. Leafing stem reaching 20 in. high, red, pubescent. Leaves sessile, 5—12 by 1—2 in., lanceolate, acuminate, dark green and glabrous above, paler and pubescent beneath ; sheaths ribbed, puberulous near the top ; ligule ⅛ in. long, 2-lobed, the lobes rounded, pubescent. Flowers in long cylindric spikes 6—12 in. long ; peduncle about as long as the spike, with large oblong bract-like scarious sheaths ; bracts obovate, acute, reddish, reaching 1¼ in. long. Corolla white or greenish-white ; tube as long as the bracts ; lobes lanceolate, nearly 1 in. long. Lip obovate, 3-lobed ; midlobe rounded, emarginate, pale yellow marked with diverging purple lines ; lateral lobes small, obtuse. Capsules obovoid, pubescent, red, of the size of a sparrow's egg. Seeds dark purple with a large white aril. Fl. B. I. v. 6, p. 247 ; Dalz. & Gibs. p. 273 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 179. *Alpinia Neesana,* Grah. Cat. Pl. Bo. (1839) p. 207.—Flowers : July. VERN. *Nisam.*

KONKAN : Wargaon, *Graham.* DECCAN : Mahableshwar, *H. M. Birdwood* ; Khandala, *Graham* ; Lanoli on the borders of the grove, *Graham.* S. M. COUNTRY : Rámghát, *Dalzell.* KANARA : Kála naddi, *Ritchie,* 719!—DISTRIB. India (W. Peninsula), apparently endemic.

5. **Zingiber Cassumar,** *Roxb. in Asiat. Res.* v. 11 (1810) p. 347, t. 5. Rootstock perennial, yellow inside, with an aromatic, warm, somewhat camphoraceous taste, without bitterness. Leafing stem 4—6 ft. high. Leaves subsessile, 9—14 by ¾—1½ in., oblong-lanceolate, acute, glabrous above, pubescent beneath, base slightly rounded ; sheaths pubescent. Flowers in dense fusiform or oblong-ellipsoid spikes 3½—6 by 1½—2 in. ; peduncles 4—10 in. long, with numerous oblong sheaths ; bracts 1—1½ in. long and nearly as broad as long, broadly ovate, subacute, bright-red or greenish-red, or green, pubescent and with narrow membranous margins. Calyx ¾ in. long, membranous, truncate, glabrous, split half-way down. Corolla-tube 1 in. long, slender, glabrous ; lobes lanceolate, the lateral 1 by ¼ in., the dorsal 1¼ by ⅜ in., concave. Lip suborbicular, deeply 2-lobed, nearly 1 in. in diam., yellow (not spotted), with crisped margins. Stamen yellowish-white, shorter than the lip, the appendix of the connective long, flexuous. Style glabrous ; stigma obconic, ciliate. Capsules subglobose, ⅔ in. long, membranous. Seeds many, very small, purple. Fl. B. I. v. 6, p. 248 ; Grah. Cat. p. 207 ; Dalz. & Gibs. p. 272 ; Trim. Fl. Ceyl. v. 4, p. 258 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 179 ; Prain, Beng. Pl. p. 1044 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 357.—Flowers : July—Aug. VERN. *Malbárihalad.*

KONKAN : *Stocks* ! ; W. Ghâts, *Woodrow.* S. M. COUNTRY : Londa, *Woodrow.* KANARA : *Law* !—DISTRIB. Throughout India ; Ceylon, Malay Peninsula ; widely cultivated in Tropical Asia.

Zingiber officinale, Roscoe, in Trans. Linn. Soc. v. 8 (1807) p. 348. A herb with slender leafy stems 3—4 ft. high, which furnishes the *Ginger* of commerce, not apparently known in the wild state, but doubtless a native of Tropical Asia. It is cultivated largely throughout the tropics. It rarely flowers and still more rarely produces seed (*Roxburgh*). It is extensively grown in the Deccan and Gujarat.—VERN. *Ale, Adrak* (the fresh root) ; *Sunt* (the dried root). Fl. B. I. v. 6, p. 246 ; Grah. Cat. p. 207 ; Dalz. & Gibs. Suppl. p. 87 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 170 ; Prain, Beng. Pl. p. 1044 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 358.

8. COSTUS, Linn.

Herbs with long leafy stems ; rootstock tuberous, horizontal. Leaves oblong, with broad sheaths. Flowers in dense globose or ovoid usually terminal heads. Calyx short, funnel-shaped ; teeth 3, ovate. Corolla-tube short ; corolla-lobes large, oblong, subequal. Stamen 1 perfect ; filament forming with the connective an oblong petaloid process with the contiguous linear anther-cells situated in its middle ; lateral staminodes minute or obsolete. Lip large, obovate, with incurved margins. Ovary 3-celled ; ovules many, superposed ; placentas axile ; style filiform ; stigma with a semi-linear marginally

ciliate foveola. Fruit a globose or ovoid capsule tardily opening on one side between the ribs. Seeds obovoid or subglobose ; aril short. —DISTRIB. Species nearly 100, in the tropics of both hemispheres.

1. **Costus speciosus,** *Smith, in Trans. Linn. Soc.* v. 1 (1791) p. 249. An erect plant 4—9 ft. high ; rootstock tuberous, insipid ; stem subwoody at the base. Leaves 6—12 by 2½—3 in., subsessile, spirally arranged, oblong or oblanceolate-oblong, acute or acuminate, often cuspidate, glabrous above, silky-pubescent beneath, base rounded ; sheaths coriaceous ; ligule 0. Flowers white, numerous, in very dense spikes 2—5 by 1½—3 in. ; bracts ¾—1¼ in. long, ovate, acuminate, often pungently mucronate, bright-red ; bracteole solitary below the calyx, ⅝ in. long. Calyx 1¼ in. long ; lobes ¼ in. long, deltoid-ovate, cuspidate. Corolla-tube as long as the calyx ; lobes ovate-oblong, apiculate, the lateral lobes 1⅜ by ½ in., the dorsal 1⅝ by ¾ in. Lip suborbicular, white with a yellow centre, 2 in. and more in diam., concave, plicate, crisped, the margins sometimes meeting in the middle ; disk pubescent and with a tuft of hairs at its base. Stamen 1½—1¾ in. long, with a tuft of hairs at the base of the filament ; connective petaloid, ½ in. broad, pubescent, produced into a glabrous appendage as long as the linear anther-cells. Style 1½ in. long, slender ; stigma with a semilunar ciliate mouth. Capsules globosely 3-gonous, ¾ in. in diam., red. Seeds black, with a white aril. Fl. B. I. v. 6, p. 249 ; Grah. Cat. p. 208 ; Dalz. & Gibs. p. 274 ; Trim. Fl. Ceyl. v. 4, p. 246 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 398 ; Prain, Beng. Pl. p. 1045 ; Watt, Dict. Econ. Prod. v. 2, p. 579.—Flowers : Aug.—Oct. VERN. *Kosht.*

KONKAN : W. Ghâts, *Woodrow, Ritchie,* 14381 ; Kanheri forests, *Graham* ; Salsette, *Graham.* DECCAN : Khandala, *Graham, Cooke* ! S. M. COUNTRY : Castlerock, *Woodrow.*—DISTRIB. More or less throughout India ; Ceylon, Malay Islands.

9. **ALPINIA,** Linn.

Herbs with elongate leafy stems and horizontal rootstocks. Leaves oblong or lanceolate. Flowers in terminal racemes or panicles ; bracteoles large, sometimes enveloping the buds. Calyx loosely tubular, 3-toothed. Corolla-tube cylindric, rarely longer than the calyx ; corolla-lobes oblong or linear-oblong, the upper usually broader and more convex than the lateral. Stamen 1 perfect ; filament flattened ; anther-cells diverging at the top, occasionally with an orbicular crest ; lateral staminodes minute or obsolete. Lip spreading, often orbicular, with incurved margins, sometimes with 2 subulate processes at the base of the claw. Ovary 3-celled ; ovules few or many on each placenta ; style filiform ; stigma subglobose. Fruit globose, dry or fleshy, usually indehiscent. Seeds globose or angled.—DISTRIB. India, Malaya, Philippines, New Guinea, Pacific Islands, China, Japan ; species about 150.

Lip broadly elliptic, white striated with red; fruit orange-red ..... 1. *A. Galanga.*
Lip obovate-cuneate, emarginate, pink; fruit black..... 2. *A. Allhugas.*

1. **Alpinia Galanga,** *Swartz, Obs. Bot.* (1791) p. 8. Rootstock perennial, tuberous, slightly aromatic. Leaves 9—18 by 1½—4½ *in.*, oblong-lanceolate, acute, glabrous, green above, paler beneath, with slightly callous white margins ; sheaths long, glabrous ; ligule reaching ⅜ in. long, but usually shorter, rounded. Flowers greenish-white, in dense-flowered panicles 6—12 in. long ; branches short ; rhachis pubescent ; pedicels ⅛—⅓ in. long ; bracts ⅜ in. long, ovate-lanceolate. Calyx ⅜ in. long, tubular, irregularly 3-toothed. Corolla 1¼ in. long ; tube ½ in. long ; lobes oblong, obtuse, subequal, ¼ in. broad. Lip ⅝ in. long ; claw green, ¼ by $\frac{1}{10}$ in. ; blade white striated with red, rather more than ½ in. long, broadly elliptic, shortly 2-lobed at the apex, with a pair of subulate glands at the base of the claw. Stamen ¾ in. long. Fruit the size of a small cherry, orange-red. Fl. B. I. v. 6, p. 253 ; Grah. Cat. p. 206 ; Dalz. & Gibs. p. 274 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 316 ; Prain, Beng. Pl. p. 1046 ; Watt, Dict. Econ. Prod. v. 1, p. 192.—Flowers : May. VERN. *Kulinján.*

KONKAN : *Stocks* !, *Law* ! ; S. Konkan, *Nimmo* ex *Graham, Dalzell* ! ; Wari country, truly wild on Wág-donger, *Dalzell & Gibson.* KANARA : N. Kanara, *Talbot,* 2552 !—DISTRIB. Throughout India, often cultivated ; Ceylon, Malay Islands.

2. **Alpinia Allhugas,** *Roscoe, in Trans. Linn. Soc.* v. 8 (1807) p. 346. A stout perennial herb 3—6 ft. high ; root tuberous, aromatic. Leaves 8—18 by 1¾—4 in., sessile or nearly so, linear-oblong or oblong-lanceolate, acuminate, cuspidate, glabrous, base acute ; sheaths long, glabrous, striate, compressed ; ligule nearly ¼ in. long, obtuse, glabrous. Flowers inodorous, pink, in erect, decompound, lax- or dense-flowered panicles 6—12 in. long, the branches short, ascending, with large narrowly linear deciduous floral leaves sometimes reaching 9 in. long, at the lower forks ; rhachis pubescent or tomentose ; pedicels short ; bracts small, ovate, cupular. Calyx subcampanulate, ⅜—½ in. long, pubescent, the mouth oblique, obtusely 2—3-toothed. Corolla-tube about as long as the calyx ; lobes longer than the tube, linear-oblong, cymbiform, dorsally pubescent, shortly spurred below the hooded tip. Lip rather more than 1 in. long (including the slender claw), pink, obovate-cuneate or suborbicular, 2-fid, the margins waved and erose ; claw as long as the limb, with 2 linear-subulate glands $\frac{1}{10}$ in. long at the base. Stamen arcuate, shorter than the lip ; connective not or obscurely crested. Style glabrous ; stigma small. Fruit black, thin, globose, ⅜ in. in diam., irregularly rupturing. Seeds many, small, black, angular. Fl. B. I. v. 6, p. 253 ; Grah. Cat. p. 206 ; Dalz. & Gibs. p. 273 ; Trim. Fl. Ceyl. v. 4, p. 247 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 344 ; Prain, Beng. Pl. p. 1046 ; Watt, Dict. Econ. Prod. v. 1, p. 192.—VERN. *Taraka.*

KONKAN : S. Konkan, *Nimmo* ex *Graham.*

Alpinia nutans, Roscoe, in Smith, Exot. Bot. v. 2 (1805) p. 93, t. 106, & in Trans. Linn. Soc. v. 8 (1807) p. 346. A very handsome plant grown commonly in gardens, a native of the Eastern Himalaya, Birma, Malay Islands and Peninsula ; stem reaching 8—10 ft. high. Leaves 12—24 by 3—6 in., oblong-lanceolate. Flowers in panicles 6—12 in. long, with a very hairy rhachis ; bracts large, concave, ivory-white with pink tips. Corolla white with a tinge of pink, the lip beautifully variegated with red and yellow. Fl. B. I. v. 6, p. 256 ; Grah. Cat. p. 206 ; Dalz. & Gibs. Suppl. p. 85 ; Roxb. in Asiat. Res. v. 11 (1810) p. 354 ; Fl. Ind. v. 1, p. 65 ; Watt, Dict. Econ. Prod. v. 1, p. 195. *Globba nutans,* Linn. Mantiss. 2 (1771) p. 170. *Zerumbet speciosum,* Wendl. Sert. Hann. v. 1, fasc. 4 (1798) t. 19. *Alpinia speciosa,* K. Schum. in Engl. Bot. Jahrb. v. 27 (1900) p. 284.—VERN. *Puna-champa ; Nág-damani.*

DOUBTFULLY INDIGENOUS SPECIES.

ALPINIA CALCARATA, Roscoe, in Trans. Linn. Soc. v. 8 (1807) p. 347. Rootstock perennial, not tuberous. Leafing stem slender, 2—4 ft. high. Leaves 6—12 by 1—2 in., lanceolate, acuminate, green and glossy. Flowers numerous, large, in dense panicles 3—4 in. long; rhachis pubescent; bracts small, ovate. Calyx-tube funnel-shaped, ½—⅔ in. long. Corolla-segments ½ in. long. Lip 1—1½ in. long, ovate-oblong, sessile, yellow, streaked with purple veins, emarginate. Ovary densely pubescent; ovules many in each cell. Capsules globose, red. Fl. B. I. v. 6, p. 254; Wight, Icon. t. 2028 (by error in Tab. *A. nutans*); Grah. Cat. p. 206; Dalz. & Gibs. p. 274; Trim. Fl. Ceyl. v. 4, p. 249; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 338; Watt, Dict. Econ. Prod. v. 1, p. 192.

The plant is a native of China and the S. Malay Peninsula and is also given for Ceylon and the S. Konkan in Hook. f. Fl. B. I. l. c. Trimen (*l. c.*) says he has not seen the plant in Ceylon otherwise than in gardens, while the only authority for its presence in the S. Konkan is Nimmo ex Graham (Cat. Pl. Bo. l. c.). Dalzell & Gibson have not found the plant wild, neither have any other Bombay botanists. I think therefore that its existence as a wild plant in the Konkan is very problematical.

10. **PHRYNIUM,** Willd.

Herbs usually with creeping rootstocks. Leaves large, oblong, radical ; petioles long, sheathing, simulating stems. Flowers in spikes produced from the side of the petiole or direct from the rootstock ; bracts 2—more-flowered. Sepals 3, narrow. Corolla-tube cylindric, shorter or scarcely longer than the calyx ; lobes linear-oblong, subequal, spreading. Staminal-tube longer than the corolla-tube ; segments unequal, petaloid, one bearing a single marginal anther-cell. Ovary 3-celled ; ovule usually solitary in each cell (rarely 2 of the cells empty) ; style adnate below to the staminal-tube, free and hooked above ; stigma capitate or funnel-shaped. Fruit subglobose, indehiscent or tardily rupturing. Seeds 1—3, erect ; aril short, fleshy ; embryo curved.—DISTRIB. Species about 20, in the Tropics of the Old World.

Leaves 6—10 by 2—3 in.; flowers white, in short radical spikes	1. *P. spicatum.*
Leaves 12—18 by 6—8 in.; flowers purplish, in capitate spikes sessile on the side of the petiole above the middle	2. *P. capitatum.*

1. **Phrynium spicatum,** *Roxb. Hort. Beng.* (1814) p. 1. Rootstock widely creeping, perennial, not tuberous. Leaves 2—4, oblong, 6—10 by 2—3 in., caudate-acuminate, base rounded ; petioles slender, much longer than the blade. Flowers white, in short spikes 1—1½ in. long ; bracts ¾ in. long, ovate, green. Sepals narrowly lanceolate, about ½ in. long. Corolla-tube ¾ in. long ; lobes oblong, obtuse, ¼ in. long. Larger staminodes spathulate, ⅓ in. long, the inner much smaller. Stamen with a rather large appendage. Fruit 3-seeded. Seeds ¼ in. long, 3-quetrous on the inner face, dull brown. Fl. B. I. v. 6, p. 259 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521. *Stachyphrynium spicatum,* K. Schum. in Engler, Pflanzenreich, v. 4, part 48 (1902) p. 46.

Rare. KONKAN : *Law* !—DISTRIB. Pegu.

2. **Phrynium capitatum,** *Willd. Sp. Pl.* v. 1 (1797) p. 17. Rootstock tuberous, with many fleshy root-fibres. Leaves 12—18 by 6—8 in., oblong or oblong-lanceolate, acuminate, smooth on both sides, base rounded or cuneate ; midrib slender ; veins many, arched ; petioles 2—3 ft. long, stout, terete ; sheaths long, green. Flowers purplish, in capitate spikes 1½—2 in. in diam., sessile on the side of the petiole above the middle ; outer bracts 2—3 at the base of the spike, large, rigid, with incurved scarious tips, breaking up into tufts of fibres ; inner bracts closely imbricate, oblong, acute, 2—4-flowered ; pedicels short. Sepals ⅜ in. long, linear, hairy. Corolla about 1 in. long ; tube slender, funnel-shaped above ; segments 3, purple, spathulate, recurved, the tips hairy. Staminal-column 5-lobed, the 2 outer lobes larger, one orbicular, concave ; filament adnate to the smaller segment ; anther small. Ovary hairy ; stigma funnel-shaped, hooked. Fruit size of a gooseberry, turbinate, 3-gonous, 3-valved. Seeds erect, subglobose ; testa spongy ; embryo curved. Fl. B. I. v. 6, p. 258 ; Grah. Cat. p. 212 ; Dalz. & Gibs. p. 271 ; Trim. Fl. Ceyl. v. 4, p. 263 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 48 (1902) p. 53 ; Prain, Beng. Pl. p. 1049.

KONKAN : in shady jungles, *Dalzell & Gibson.*—DISTRIB. India (Bengal, Chota Nagpur, Travancore, W. Peninsula) ; Ceylon, Malaya.

11. MUSA, Linn.

Tree-like herbs with thick stems composed of convolute leaf-sheaths. Leaves very large, oblong. Flowers in subterminal stout spikes, the lower female, the upper male ; bracts large, spathaceous, ovate or orbicular. Calyx tubular, spathaceous, slit down one side to the base, 3—5-lobed. Corolla a single convex membranous petal as long as the calyx and opposite its slit, embracing the base of the stamens and style. Stamens 5 perfect (6th rudimentary or 0) ; filaments erect, stout, filiform ; anthers linear, erect, 2-celled. Ovary 3-celled ; ovules many, superposed ; style filiform from a thickened

base ; stigma subglobose, 6-lobed. Fruit large, oblong or fusiform, obtusely 3—5-angled, fleshy, indehiscent. Seeds embedded in pulp, subglobose or angled by pressure ; in cultivated forms often obsolete. —DISTRIB. Species about 40, tropical.

Stoloniferous, 3—5 ft. high; root perennial; bracts few-flowered	1. *M. rosacea.*
Not stoloniferous, 10—12 ft. high, dying after flowering; bracts many-flowered	2. *M. superba.*

1. **Musa rosacea,** *Jacq. Hort. Schoenb.* v. 4 (1804) p. 22, t. 445. Stem slender, cylindric, 3—5 ft. high, 3—4 in. in diam. ; root perennial, stoloniferous. Leaves linear-oblong, firm in texture, petiolate. Flowers in drooping or erect spikes reaching 6 in. long ; bracts few-flowered, ovate, lilac or reddish, about 6 in. long, oblong. Calyx about 1 in. long, yellowish-white, 5-toothed. Petal as long as the calyx. Fruit linear-oblong, slightly incurved, obscurely 4—5-angled, of the size of a man's finger, firm, not edible. Seeds many, black, tuberculate. Fl. B. I. v. 6, p. 263 ; Bot. Reg. t. 706 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 45 (1900) p. 24. *Musa ornata,* Roxb. Hort. Beng. (1814) p. 19 ; Dalz. & Gibs. p. 272 ; Prain, Beng. Pl. p. 1050 ; Watt, Dict. Econ. Prod. v. 5, p. 290.

Grows in almost inaccessible places on the sides of precipitous crags in the Konkan hills.—DISTRIB. India (Eastern Himalaya, Chota Nagpur, Chittagong, W. Peninsula) ; Java.

2. **Musa superba,** *Roxb. Hort. Beng.* (1814) p. 19. Whole plant 10—12 ft. high ; trunk not stoloniferous, 7—8 ft. in circumference at the base, narrowed to 3 ft. below the leaves. Leaves 5—10 by 2—3 ft., oblong, narrowed to the base ; free petioles short. Flowers in 2 dense rows of 10—15 each, arranged in spikes which are at first globose, 1 ft. in diam., finally drooping and ⅓ the length of the trunk ; bracts orbicular, reaching 1 ft. long and broad, dull claret-brown. Calyx 1—1½ in. long ; lobes 3, linear, loosely cohering. Petal ½ in. long, pale, almost pellucid, the apex 3-lobed, the 2 side lobes rounded, the midlobe long, linear. Fruit oblong, subcoriaceous, 3 by 1½ in., nearly dry when ripe. Seeds numerous, subglobose, angled by pressure, ⅓—½ in. in diam., smooth, brown or black. Fl. B. I. v. 6, p. 261 ; Dalz. & Gibs. p. 272 ; Roxb. Cor. Pl. t. 223 ; Wight, Icon. tt. 2017—18 ; R. Graham, in Bot. Mag. tt. 3849—3850 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 45 (1900) p. 16 ; Watt, Dict. Econ. Prod. v. 5, p. 302. *Musa textilis,* J. Grah. Cat. Pl. Bo. (1839) p. 213 (*not* of Née).—VERN. *Chowáni.*

Widely spread throughout the Western Ghâts.

Musa textilis, Luis Née, in Ann. Ciénc. Nat. v. 4 (1801) p. 123. Stem cylindric, green, 20 ft. or more high, stoloniferous from the base. Leaves oblong, deltoid at the base, bright green above, rather glaucous beneath, smaller and firmer in texture than those of *Musa sapientum ;* petioles 1 ft. long. Spike drooping, shorter than the leaves ; male flowers deciduous ; bracts polished outside. Fruit green, 2—3 by 1 in.,

3-gonous, curved, with numerous seeds, not edible. Seeds turbinate, black, ⅛ in. in diam., angled by pressure. Fl. B. I. v. 6, p. 263; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521, & Gard. in Ind. ed. 5, p. 489; Watt, Dict. Econ. Prod. v. 5, p. 302; K. Schum. in Engler, Pflanzenreich, v. 4, part 45 (1900) p. 19. The plant is a native of the Philippines and furnishes the well-known *Manilla Hemp*. It has been introduced into India in several places, but has not proved a commercial success.

Musa coccinea, Andr. Bot. Rep. (1799) t. 47. Stem stoloniferous, slender, about 4 feet high, with oblong leaves 36 by 6 in. and spikes of flowers enclosed in bright scarlet bracts. A native of S. China and Cochinchina, grown in gardens as an ornamental plant. Woodr. Gard. in Ind. ed. 5, p. 488; K. Schum. in Engler, Pflanzenreich, v. 4, part 45 (1900) p. 23.

Musa sumatrana, Beccari, in Illustr. Hortic. v. 27 (1880) p. 37, t. 375. Whole plant 7—8 ft. high. Leaves with irregular blotches of claret-brown. A native of Sumatra, grown as an ornamental plant in conservatories. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521, & Gard. in Ind. ed. 5, p. 484; K. Schum. in Engler, Pflanzenreich, v. 4, part 45 (1900) p. 24.

Musa Ensete, J. F. Gmel. Syst. v. 2 (1791) p. 567. A very large species. Whole plant 30—40 ft. high; leaves oblong, acute, sometimes 20 by 3 ft. with a red midrib; bracts 9—12 in. long, dark claret-brown. A native of Abyssinia, the largest *Musa* known, grown as an ornamental plant in gardens. Its chief characteristic is the bright red of the massive midribs of the leaves. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521, & Gard. in Ind. ed. 5, p. 489; K. Schum. in Engler, Pflanzenreich, v. 4, part 45 (1900) p. 15.

Musa zebrina, Van Houtte, ex Planch. in Flor. des Serres, v. 10 (1854—55) p. 223. Whole plant 5—10 ft. high. Leaves oblong-lanceolate, green, striped with dark bands above, red beneath, a native of the Malay Peninsula, grown as an ornamental plant in gardens.

Baker (Fl. B. I. v. 6, p. 263) has made this a variety of *Musa sapientum,* to which Ridley objects and considers that it should more properly be made a variety of *M. malaccensis,* Ridley or of *M. sumatrana,* Beccari. *Musa sapientum* var. *zebrina,* Bak. in Hook. f. Fl. B. I. v. 6, p. 263; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521. *Maranta zebrina,* Grah. Cat. p. 212.

Musa chinensis, Sweet, Hort. Brit. ed. 2 (1830) p. 596. Whole plant 4—6 ft. high; leaves 6—8 in a dense rosette, spreading, oblong, 2—3 by 1 ft.; petioles short, stout, deeply channelled, with broad crisped green edges. Spike dense, 1—2 ft. long; bracts red-brown; male flowers persistent. Fruit 6-angled, 4—5 in. long, yellow, with a thick skin, of inferior flavor until dead ripe, when it is rich. *Musa Cavendishii,* Lambert, ex Paxt. Mag. Bot. v. 3 (1837) p. 51; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521, & Gard. in Ind. ed. 5, p. 486; K. Schum. in Engler, Pflanzenreich, v. 4, part 45 (1900) p. 17. A native of S. China, extensively cultivated in tropical and

subtropical countries and known as the *Chinese* or *Dwarf Banana*.—VERN. *Gugi*.

Musa paradisiaca, Linn. Sp. Pl. (1753) p. 1043. Stoloniferous; trunk cylindric, reaching 25 ft. or more, with a diameter of 6 in. Leaves oblong, green, reaching 8 ft. long and 2 ft. broad. Inflorescence pendulous, reaching 4 ft. long; male flowers and bracts subpersistent. Fruit cylindric, up to 12 in. long, generally yellowish or yellowish-green when ripe, the pulp scarcely sweet, rather firm, not fit to eat without cooking. Trim. Fl. Ceyl. v. 4, p. 265; K. Schum. in Engler, Pflanzenreich, v. 4, part 45 (1900) p. 19. *Musa paradisiaca* var. *normalis*, O. Kuntze, Revis. Gen. v. 2 (1891) p. 692. *Musa Cliffortiana*, Linn. Sp. Pl. (1753) p. 1043 in syn. *M. sapientum* var. *paradisiaca*, Baker, in Ann. Bot. v. 7 (1893) p. 213, & in Hook. f. Fl. B. I. v. 6, p. 262; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521; Prain, Beng. Pl. p. 1050; Watt, Dict. Econ. Prod. v. 5, p. 292.

The well-known *Plantain* or *Banana*, usually known by the former name in India, many varieties of which are cultivated for their fruit throughout the tropics. Its native country is uncertain, but it is probably of Asiatic origin. I have followed O. Kuntze and K. Schumann in making *M. paradisiaca*, Linn., the type and *M. sapientum*, Linn., the subspecies or variety. Mr. Baker (Ann. Bot. l. c.) has made *M. sapientum* the type and *M. paradisiaca* a subspecies, but he has done so apparently under the mistaken notion that the names of both plants occurred *for the first time* in Linnæus's Sp. Pl. ed. 2 (1763) p. 1477, where they appear together. As a matter of fact, however, *Musa paradisiaca* appears *for the first time* in Linnæus's first edition (1753) on page 1043, in which *M. sapientum* does not occur at all, while *Musa sapientum* appears *for the first time* in Linn. Syst. ed. 10 (1759) p. 1303, where *M. paradisiaca* occurs above it. As *M. paradisiaca* has 6 years' priority to *M. sapientum*, there can be no question that to make it a subspecies of the latter would, unless some very cogent reason could be assigned, be somewhat anomalous.

SUBSPECIES *sapientum*, K. Schum. in Engler, Pflanzenreich, v. 4, part 45 (1900) p. 20. Male flowers and bracts deciduous; fruit oblong, usually 3-gonous, yellow or reddish when ripe, the pulp sweet and edible without cooking. *Musa paradisiaca* var. *sapientum*, O. Kuntze, Revis. Gen. v. 2, p. 692. *M. sapientum* (sp.), Linn. Syst. ed. 10 (1759) p. 1303; Baker, in Hook. f. Fl. B. I. v. 6, p. 262; Grah. Cat. p. 212; Dalz. & Gibs. Suppl. p. 88; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521; Prain, Beng. Pl. p. 1050; Watt, Dict. Econ. Prod. v. 5, p. 290.—VERN. *Kela*.

VAR. *vittata*, Hook. in Bot. Mag. t. 5402. Leaves and long fruits striped with white; bracts bright red inside. Imported from the Island of St. Thomas (W. Africa) and grown as an ornamental plant in gardens. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521, & Gard. in Ind. ed. 5, p. 489; K. Schum. in Engler, Pflanzenreich, v. 4, part 45 (1900) p. 21.

Several forms or varieties of the subspecies (*M. sapientum*) are cultivated in W. India for their fruit. Of these the chief are the following, which, with the vernacular names by which they are

known, have been taken from Woodrow's Gard. in Ind. ed. 5, p. 486 :—

Raj-kel ; Rám-kela ; Lál-kela. Stem very strong, reddish, of medium height ; leaves with red midrib and edges ; fruit very large, subcylindric, red-skinned, of luscious flavor. Grown largely about Bassein, 30 miles N. of Bombay.

Son-kel (var. *Champa,* Hort.). Stem very tall, weak ; leaves thin, large ; fruit small, subcylindric, yellow, thin-skinned, of excellent flavor. Considered to be the best of the plantains grown in the Bombay Presidency.

Gossavi. Stem of medium height ; fruit of medium size, yellow, thin-skinned, of superior flavor.

Botatti. Stem tall, stout ; fruit 3-gonous, thick-skinned, yellow, of sweet flavor.

Lokandi. Stem 10 ft. high, reddish, stout ; leaves thick, large ; fruit long, subcylindric, yellow, with moderately thick skin, and of superior flavor.

The following plants not belonging to any of the foregoing genera are grown as useful or ornamental plants :—

Heliconia angustifolia, Hook. Bot. Mag. (1849) t. 4475. A native of Brazil, grown as an ornamental plant in gardens ; leaves with long petioles gracefully arching ; flowers white with greenish tips ; bracts scarlet, lanceolate, acuminate. K. Schum. in Engler, Pflanzenreich, v. 4, part 45 (1900) p. 39. *Heliconia bicolor,* Benth. in Maund, Bot. v. 3, t. 101 ; Woodr. Gard. in Ind. ed. 5, p. 490.

Heliconia metallica, Planch. & Linden, in Bot. Mag. (1862) t. 5315. A native of New Granada. Leaves elegantly drooping and recurved, broadly lanceolate, the underside, midrib, margins and curving veins of a dark bronzy red ; flowers scarlet. Woodr. Gard. in Ind. ed. 5, p. 490. *Heliconia vinosa,* Bull, Cat. (1871) p. 5.

Heliconia Bihai, Linn. Mantiss. v. 2, p. 211. A native of the West Indies, introduced by Nimmo in 1833. It reaches about 12 ft. high, with ovate-lanceolate leaves on long petioles and red or orange bracts enclosing the flowers. Woodr. Gard. in Ind. ed. 5, p. 490. *Heliconia buccinata,* Roxb. Hort. Beng. (1814) p. 19 ; Grah. Cat. p. 213 ; Dalz. & Gibs. Suppl. p. 89 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521.

Ravenala madagascarensis, Sonnerat, Voy. v. 3 (1782) Bk. 5, p. 244. A very elegant tree known as the *Traveller's Tree,* with plantain-like leaves on long petioles forming a fan-like head ; flowers white. A native of Madagascar, grown in gardens, but it does not thrive at any great distance from the coast. Fl. B. I. v. 6, p. 198 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 45 (1900) p. 29, fig. 6 ; Prain, Beng. Pl. p. 1050. *Urania speciosa,* Willd., Sp. Pl. v. 2 (1799) p. 7 ; Grah. Cat. p. 213 ; Dalz. & Gibs. Suppl. p. 89.

Canna indica, Linn., Sp. Pl. (1753) p. 1. Rootstock tuberous with many fibres ; stem 3—4 ft. high. Leaves 6—18 by 4—8 in., oblong- or elliptic-lanceolate, caudate-acuminate. Flowers rather distant, 2—2½ in. long, scarlet or yellow. Fruit erect, ½—1 in. long, subglobose or oblong, obscurely 3-lobed. Seeds the size of a pea, spherical ; testa crustaceous, black, shining. The seeds are commonly known as the *Indian Shot.* Flowers more or less throughout the year. In gardens in the Bombay Presidency very common, but not indigenous. Fl. B. I. v. 6, p. 260 ; Grah. Cat. p. 211 ; Dalz. & Gibs. Suppl. p. 88 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521 ; Prain, Beng. Pl. p. 1047 ; Watt, Dict. Econ. Prod. v. 2, p. 102.

Elettaria Cardamomum, Maton, in Trans. Linn. Soc. v. 10 (1811) p. 254. Rootstock woody or fleshy, branching ; stem 6—9 ft. high, clothed below with spongy sheaths. Leaves subsessile, 1—2 ft. by 3 in., oblong-lanceolate. Panicles several to one leafy stem, 1—2 ft. long ; bracts linear-oblong, persistent, 1½—2 in. long. Calyx ½ in. long. Lip of corolla white, streaked with violet. Capsules subglobose or oblong, about ½ in. long, marked with many fine vertical ribs. Fl. B. I. v. 6, p. 251 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521, & Gard. in Ind. ed. 5, p. 482 ; K. Schum. in Engler, Pflanzenreich, v. 4, part 46 (1904) p. 268 ; Watt, Dict. Econ. Prod. v. 3, p. 227. *Alpinia Cardamomum,* Roxb. in Asiat. Res. v. 11 (1810) p. 355 ; Grah. Cat. p. 206 ; Dalz. & Gibs. Suppl. p. 86.—Flowers : Jan. VERN. *Elchi ; Elachi.*

The Cardamom; cultivated in the hilly tracts of N. Kanara and in many parts of S. India. A very full description may be found in Watt's Dictionary, l. c.

ORDER CXXVII. **BROMELIACEÆ.**

Of this Order there exists but one representative in the Bombay Presidency, the *Pine Apple, Ananas sativus,* Schult., a native of Tropical America, often cultivated. *Ananas sativus,* Schult. f. Syst. v. 7 (1830) p. 1283 ; Watt, Dict. Econ. Prod. v. 1, p. 236. *Ananassa sativa,* Lindl. Bot. Reg. v. 13 (1827) sub. t. 1068 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521 ; Prain, Beng. Pl. p. 1052. *Bromelia Ananas,* Linn. Sp. Pl. (1753) p. 285 ; Grah. Cat. p. 222 ; Dalz. & Gibs. Suppl. p. 94 ; Bot. Mag. t. 1554.—Flowers : Jan.—Mar. VERN. *Ananas.*

ORDER CXXVIII. **HÆMODORACEÆ.**

Perennial herbs ; rootstock short, tuberous, with usually fascicled root-fibres. Leaves usually radical, often distichous, narrow, with equitant sheaths ; nerves parallel. Flowers hermaphrodite, regular or nearly so, in terminal spikes, racemes or panicles. Perianth corolline, 2-seriate ; lobes 6, imbricate or induplicato-valvate. Stamens 6, opposite or more or less adnate to the perianth-lobes, or fewer ; anthers erect or versatile, 2-celled, rarely opening by pores. Ovary

inferior or sub-inferior, perfectly or imperfectly 3-celled ; ovules 1 or more, attached to the inner angle of the cells ; style filiform (rarely short or obsolete) ; stigma simple or 3-notched. Fruit a superior or nearly superior loculicidal capsule, or an inferior indehiscent berry tipped by the perianth. Seeds various ; embryo small, partially enclosed in fleshy albumen.—DISTRIB. Genera 26 ; species about 120, in Australia, S. Africa, N. and S. America, Central and Eastern Asia.

1. OPHIOPOGON, Ker-Gawl.

Scapigerous herbs. Stems short from a short rootstock, or elongate and subscandent. Leaves linear or lanceolate, parallel-nerved. Flowers in racemes ; scape leafy or naked ; bracts scarious, usually many-flowered. Perianth superior ; segments spreading. Stamens 6, on the bases of the perianth-segments ; filaments short, erect ; anthers basi-fixed. Ovary inferior, 3-celled, the crown flat or depressed ; ovules 2 in each cell, collateral, erect, anatropous ; style columnar ; stigma 3-toothed. Fruit indehiscent. Seeds few ; testa fleshy or succulent.—DISTRIB. Species 8 or 10, East Asiatic.

1. **Ophiopogon intermedius,** *Don. Prodr. Fl. Nep.* (1825) p. 48. VAR. **pauciflora,** *Hook. f. Fl. B. I.* v. 6 (1892) p. 269. Rootstock short. Leaves 6—20 by $\frac{1}{8}$—$\frac{1}{3}$ in., linear, acute or acuminate, dark green above, paler beneath. Flowers white, rather distant, in lax racemes 1—2 in. long, on very long slender scapes 4—10 in. long ; bracts narrowly lanceolate, variable in length, sometimes as much as $\frac{1}{2}$ in. long ; pedicels $\frac{1}{10}$—$\frac{1}{6}$ in. long. Perianth campanulate, $\frac{1}{4}$ in. long ; segments $\frac{1}{6}$ by $\frac{1}{10}$ in., elliptic-oblong, obtuse. Anthers narrowly oblong. Seeds subglobose, $\frac{1}{3}$ in. in diam., crowded round and almost concealing the small withering pericarp ; testa soft, blue. *Ophiopogon intermedius,* Trim. Fl. Ceyl. v. 4, p. 267 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521. *O. indicus,* Wight, Icon. v. 6 (1853) p. 26, t. 2050.—Flowers : Sept.

Not common. *Dalzell* without locality in Herb. Kew. ! ; *Stocks* without locality in Herb. Kew. ! DECCAN : Mahableshwar, *Woodrow.*—DISTRIB. India (Khasia Hills, W. Peninsula) ; Ceylon.

Sansevieria zeylanica, Willd. Sp. Pl. v. 2 (1799) p. 159. Stem very short. Leaves about 8 or 9 in a tuft, 2½—3 ft. long by 1 in. broad towards the middle, suberect, rigid, pale green with transverse bands of dark green, $\frac{1}{4}$ in. thick, with a terete rigid spine-like tip 1—2 in. long. Flowers greenish-white tinged with violet, in fascicles of 3—6 on long racemes 1—2 ft. long.

The *Bow-string Hemp,* sometimes but not very commonly grown in gardens. It does not produce seed in the Bombay Presidency. The fibre is excellent and very strong, used for fishing-lines and bow-strings. Grah. Cat. p. 218 ; Dalz. & Gibs. Suppl. p. 91 ; Trim. Fl. Ceyl v. 4, p. 267 ; Roxb. Cor. Pl. v. 2, p. 43, t. 184 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 460. *Sansevieria Roxburghiana,* Schultz, f. Syst. v. 7 (1829)

p. 357 ; Hook. f. Fl. B. I. v. 6, p. 271 ; Bot. Mag. t. 7487 ; Prain, Beng. Pl. p. 1054.—Flowers: Jan. VERN. *Murba ; Murva ; Naghin.*

DISTRIB. India (usually cultivated; said to be indigenous on the Coromandel coast); Ceylon, Java, China, Africa.

Sansevieria cylindrica, Boj. Hort. Maurit. (1837) p. 349. The *terete-leaved Bow-string Hemp,* a native of Tropical Africa. Leaves terete, quite solid ; flowers cream-white tinged with pink, in fascicles along the rhachis of a long raceme. Occasionally cultivated in gardens. Hook. in Bot. Mag. t. 5093 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522 ; Prain, Beng. Pl. p. 1054.

EXCLUDED SPECIES.

PELIOSANTHES NEILGHERRENSIS, Wight, Icon. v. 6 (1853) p. 26, t. 2052. Leaves membranous, 3—8 in a tuft from the base of the plant, 4½—8 by ¾—1½ in., oblong-lanceolate, acuminate, base acute; nerves slender, 10—15, of which 5 are stronger than the others, the transverse nervules conspicuous; petioles 4—8 in. long, slender. Flowers dark purple, measuring ⅝ in. across when spread out, secund, in racemes 8—12 in. long (including the scape); bracts 1-flowered, ovate-lanceolate, acuminate, scarious, the tips inflexed, the lower bracts reaching ½ in., the upper 1/12—¼ in. long; pedicels ⅛—¼ in. long, articulated at the apex, cernuous. Perianth-segments 6, oblong, obtuse, about ⅛ in. long. Mouth of corona 6-toothed. Stigma 3-lobed. Seeds obturbinately ovoid, ¼—⅓ in. long. Fl. B. I. v. 6, p. 266; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 521; Baker, in Journ. Linn. Soc. v. 17 (1880) p. 503.

In the 'Flora of British India' Kanara is given as a habitat of this plant on Wight's reputed authority. Woodrow in his list of Bombay Plants copies the 'Flora of British India' and also gives Kanara, *Wight.* But Wight does not anywhere give Kanara as a habitat. In his 'Icones' (*l. c.*) he gives Sispara, and Steudel (Herb. No. 1306) also gives Sispara, which is on the Nilghiris at an elevation of about 6000 feet. There is absolutely no evidence of the existence of the plant in the Bombay Presidency.

ORDER CXXIX **AMARYLLIDACEÆ.**

Perennial herbs (rarely shrubs or undershrubs). Rootstock a bulb, tuber or corm, rarely an erect stock. Leaves radical. Scape naked (in the Indian genera). Flowers few, often umbellate ; bracts membranous or colored (rarely herbaceous), the outer under the umbel 1—3 (rarely many) -involucrate ; occasionally the inflorescence racemose or paniculate with scattered bracts. Perianth regular or irregular, 2-seriate, 6-lobed or-partite, sometimes with a corona at the mouth of the tube. Stamens 6, adnate to the bases of the perianth-segments, rarely epigynous ; filaments free or connate ; anthers erect or versatile. Ovary 3-celled, inferior ; ovules many, anatropous, 2-seriate on the inner angles of the cells ; style slender ; stigma simple or 3-cleft. Fruit inferior, usually a loculicidal capsule, rarely fleshy and bursting irregularly. Seeds few or many ; albumen fleshy, enclosing the small embryo.—DISTRIB. Genera 64 ; species about 650, in temperate and tropical regions.

Rootstock tuberous; leaves strongly nerved, flat or plicate; flowers spicate or racemose; perianth yellow, not showy.
- Fruit opening at the top as a circumscissile or 3-valved capsule; ovary not produced above the crown into a stipe supporting the perianth ..... 1. HYPOXIS.
- Fruit indehiscent; ovary often produced into a stipe between the crown and the base of the perianth-lobes ..... 2. CURCULIGO.

Rootstock a tunicated bulb; leaves not strongly nerved, flat, smooth; flowers at the apex of a scape, usually umbellate; perianth white or pink, not yellow, large and showy.
- Filaments attached to the perianth-lobes but not connate ..... 3. CRINUM.
- Filaments united towards their base by an intervening petaloid membrane ..... 4. PANCRATIUM.

1. **HYPOXIS,** Linn.

Herbs with a tuberous rootstock or a tunicate, membranous or fibrous corm. Leaves narrow, radical, strongly nerved. Flowers solitary, or racemose, or umbellate; bracts small, linear, or obsolete. Perianth rotate, 6-partite, persistent, sessile on the top of the inferior ovary. Stamens 6, adnate to the base of and shorter than the perianth-segments; filaments short; anthers erect, dorsifixed. Ovary inferior, 3-celled; ovules many, 2-seriate in each cell; style short, columnar; stigmas 3, erect, stout, distinct or connate. Fruit a globose or oblong capsule, opening by 3 valves or circumscissilely. Seeds globose; testa crustaceous, shining, beaked at the tip.—DISTRIB. Species about 50, widely diffused but rare in Asia; numerous in S. Africa.

1. **Hypoxis aurea,** *Lour. Fl. Cochinch.* (1790) p. 200. Dicœcious; rootstock subglobose, or elongate and erect, crowned with the fibrous remains of old leaves. Leaves 6—12, narrowly linear, 4—14 by $\frac{1}{10}$—$\frac{1}{8}$ in., subcoriaceous, acute, keeled. Scapes 1—4, filiform, 1—4 in. long, 1 (less commonly 2) -flowered, nearly glabrous or sparsely clothed with pale brown hairs; bracts setaceous. Ovary broadly clavate, $\frac{1}{8}$—$\frac{1}{4}$ in. long, clothed with golden-brown short shining hairs. Perianth-segments $\frac{1}{4}$—$\frac{1}{3}$ in. long, thinly hairy, elliptic-lanceolate, yellow, the outer green at the back. Anthers sagittate. Capsules with thin walls, oblong or clavate-oblong, $\frac{1}{4}$—$\frac{1}{2}$ in. long, ultimately 3-valved, crowned with the erect perianth-segments. Seeds black, finely tuberculate. Fl. B. I. v. 6, p. 277; Baker, in Journ. Linn. Soc. v. 17 (1880) p. 108; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522; Prain, Beng. Pl. p. 1058. *Curculigo graminifolia,* Nimmo, ex Grah. Cat. Pl. Bo. (1839) p. 215; Dalz. & Gibs. p. 276.—Flowers: July.

KONKAN: Shivnar Fort, *Dalzell & Gibson.* DECCAN: *Dalzell,* 10!; Khandala, *Graham, Dalzell & Gibson, Woodrow*; Purandhar, *Dr. Barnes*!; Mahableshwar, *H. M. Birdwood.* S. M. COUNTRY: Belgaum, *Ritchie,* 1443!, *Talbot,* 2276! KANARA: *Law*!—DISTRIB. Throughout India in hilly parts; Java, China, Japan, Philippines.

2. CURCULIGO, Gærtn.

Herbs with a tuberous rootstock or a tunicate corm. Leaves lanceolate and plicate, or linear and flat, often large. Flowers spicate, racemose or subcapitate, the lower flowers usually 2-sexual, the upper often male. Perianth 6-partite, separated from the ovary by a short or long solid stipe bearing the rotate limb. Stamens 6, adnate to the base of the perianth-lobes ; filaments short ; anthers linear, erect. Ovary inferior, 3-celled, with a short or long beak ; ovules 2 or more in each cell, with a distinct, often long funicle ; style short, columnar ; stigmas 3, oblong, erect, appressed. Fruit an indehiscent berry. Seeds subglobose ; testa crustaceous, black, often beaked.—DISTRIB. Species about 12, tropical.

1. **Curculigo orchioides,** *Gærtn. Fruct.* v. 1 (1788) p. 63, t. 13. Rootstock stout, short or elongate (sometimes 1 ft. long), with copious fleshy root-fibres. Leaves sessile or petiolate, 6—18 by ½—1 in., linear or linear-lanceolate, membranous, plicate, glabrous or sparsely softly hairy, the tips sometimes rooting and reaching the ground, base sheathing. Scape very short, clavate, flattened, with the pedicels, bracts, and ovary hidden among the leaf-sheaths. Flowers bright-yellow, distichous, the lowest in the raceme 2-sexual, the upper male ; bracts lanceolate, membranous. Perianth-segments ½—⅔ in. long, elliptic-oblong, acute, hairy on the back, the stipes (the long slender beak of the ovary) very slender, ½—1 in. long, which alone with the perianth appears above ground. Stamens small ; filaments very short ; anthers linear. Ovary lanceolate, the cells 6—8-ovulate ; stigma 3-cleft. Capsules ½ in. long, hypogæous, 1—4-seeded, with a slender beak ; septa spongy. Seeds oblong ; testa deeply grooved in wavy lines, black, shining. Fl. B. I. v. 6, p. 279 ; Grah. Cat. p. 215 ; Trim. Fl. Ceyl. v. 4, p. 269 ; Roxb. Cor. Pl. v. 1 (1795) p. 14, t. 13 ; Bot. Mag. t. 1076 ; Baker, in Journ. Linn. Soc. v. 17 (1880) p. 124 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522 ; Prain, Beng. Pl. p. 1059 ; Watt, Dict. Econ. Prod. v. 2, p. 650. *Curculigo malabarica,* Wight, Icon. v. 6 (1853) p. 22, t. 2043, fig. 1 ; Dalz. & Gibs. p. 276. *Curculigo brevifolia,* Dryand. in Ait. Hort. Kew. ed. 2, v. 2 (1811) p. 253 ; Wight, Icon. t. 2043, fig. 2 ; Grah. Cat. p. 215 ; Dalz. & Gibs. p. 276.

KONKAN : *Law* ! ; S. Konkan, *Nimmo* ex *Graham.* DECCAN : Mahableshwar, *Graham, Dalzell & Gibson, H. M. Birdwood.* KANARA : *Law* !—DISTRIB. India (Bengal, Assam, W. Peninsula) ; Java.

Curculigo recurvata, Dryand. in Ait. Hort. Kew. ed. 2, v. 2 (1811) p. 253. Leaves large, 2—3 ft. by 3—6 in., lanceolate, plicate ; petiole 1 ft. long ; flowers yellow, ¾ in. across, in heads 2—4 in. in diam. Occasionally grown in gardens, a native of the Tropical Himalaya, Bengal, Birma, Malay Islands, China, and Australia. Fl. B. I. v. 6, p. 278 ; Bot. Reg. t. 770 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522 ; Prain, Beng. Pl. p. 1059.

3. CRINUM, Linn.

Herbs with large tunicated bulbs, the bulbs often produced into a long or short neck. Leaves numerous, elongate, lorate or ensiform. Scape solid. Flowers large, umbellate ; bracts 2, spathe-like ; bracteoles linear. Perianth funnel- or salver-shaped ; tube long, straight or incurved ; lobes 6, linear-lanceolate or oblong, spreading or conniving. Stamens 6, on the throat of the perianth-tube ; filaments free, filiform ; anthers linear, dorsifixed. Ovary 3-celled ; ovules few or many in a cell ; style filiform ; stigma minute, subcapitate. Capsule irregularly subglobose, membranous or coriaceous, bursting irregularly. Seeds few, large, rounded ; testa thick ; albumen copious, fleshy.—DISTRIB. Tropical Asia, Africa, Australia, and America ; species about 75.

Perianth erect, salver-shaped; lobes stellately patent; stamens very long, spreading.
- Perianth-lobes linear.
  - Leaves 5—7 in. wide; umbels 15—20-flowered; perianth-tube 3—4 in. long ..... 1. *C. asiaticum.*
  - Leaves ⅔—1 in. wide; umbels 6—12-flowered; perianth-tube 2½—3 in. long ..... 2. *C. defixum.*
- Perianth-lobes lanceolate.
  - Leaves 1—2 in. wide; flowers subsessile; bracts 2—3 in. long ..... 3. *C. pratense.*
  - Leaves 3—4 in. wide; pedicels 1 in. long; bracts less than 2 in. long ..... 4. *C. Woodrowi.*

Perianth funnel-shaped; tube curved; lobes oblong or lanceolate; stamens very long, declinate; style longer than the filaments ..... 5. *C. latifolium.*

Perianth nodding, funnel-shaped; stamens very short; filaments ¼ in. long; style shorter than the filaments, included in the tube ..... 6. *C. brachynema.*

1. **Crinum asiaticum,** *Linn. Sp. Pl.* (1753) p. 292. Bulb 2—4 in. in diam., narrowed into a neck 6—12 in. long, which is clothed with old leaf-sheaths. Leaves 20—30, thin, 3—5 ft. by 5—7 in., linear-lanceolate, shortly acuminate, flat, narrow, with a sheathing base, bright-green with smooth margins. Scape 1½—3 ft., reaching 1 in. in diam. Flowers white, fragrant at night, 15—50 in an umbel ; bracts 3—4 in. long ; pedicels ¼—1 in. long. Perianth-tube greenish-white, 3—4 in. long, cylindric, slender ; lobes nearly as long as the tube, linear, recurved or revolute. Stamens reddish ; filaments slender, shorter than the lobes of the perianth ; anthers ½—¾ in. long. Fruit subglobose, 1—2 in. in diam., 1 (rarely 2) -seeded, beaked by the fleshy base of the perianth, dehiscing irregularly. Fl. B. I. v. 6, p. 280 ; Grah. Cat. p. 215 ; Dalz. & Gibs. p. 275 ; Baker, Handb. Amaryllid. (1888) p. 75 ; Bot. Mag. t. 1073 ; Trim. Fl. Ceyl. v. 4, p. 270 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522 ; Prain, Beng. Pl. p. 2, p. 1060. *Crinum asiaticum* var. *toxicaria,* Watt, Dict. Econ. Prod. v. 2, p. 589. *Crinum toxicarium,* Roxb. Fl. Ind. v. 2 (1832) p. 134 ; Wight, Icon. tt. 2021—2 ; Grah. Cat. p. 216.—VERN. *Nagdaun.*

Often cultivated in gardens, but rather doubtfully indigenous. KONKAN : N. & S. Konkan, *Graham, Dalzell & Gibson.*

2. **Crinum defixum,** *Ker-Gawl, in Journ. Sci. & Arts,* v. 3 (1817) p. 105. Bulb ovoid, 2—3 in. in diam., with a fusiform stoloniferous base ; neck 2—6 in. long, cylindric. Leaves 6—8 to a bulb, 2—3 ft. by ¾—1 in., linear, deeply channelled down the face, obtuse or acute, concave, thick, dark-green, with slightly rough margins. Scapes from the axils of the lowest leaves, 1½—2½ ft. long, erect, cylindric ; bracts 2, oblong-lanceolate, subacute, 1½—2 in. long ; bracteoles filiform. Flowers white, fragrant at night, in 6—12-flowered umbels ; pedicels very short. Perianth-tube 2½—3 in. long, slender, cylindric ; lobes nearly as long as the tube, narrowly linear. Filaments shorter than the lobes of the perianth, spreading, bright-red ; anthers ½ in. long. Style declinate ; stigma simple. Fruit subglobose, 1—1½ in. in diam., shortly pedicellate, beaked by the perianth-tube, 1-celled, 1- or more-seeded. Seeds rugose. Fl. B. I. v. 6, p. 281 ; Bot. Mag. t. 2208 ; Trim. Fl. Ceyl. v. 4, p. 271 ; Baker, Handb. Amaryllid. (1888) p. 76 ; Prain, Beng. Pl. p. 1060 ; Watt, Dict. Econ. Prod. v. 2, p. 590. *Crinum Roxburghii,* Dalz. & Gibs. Bo. Fl. (1861) p. 275. *C. ensifolium,* Roxb. Hort. Beng. (1814) p. 23 ; Fl. B. I. v. 6, p. 281 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522. *C. asiaticum,* Roxb. Fl. Ind. v. 2 (1832) p. 127 (*not* of Linn.).—Flowers : Aug.—Sept.

Ritchie, 1444, without locality in Herb. Kew.! KONKAN : N. & S. **Konkan,** *Law*! S. M. COUNTRY : Belgaum, *Ritchie,* 724! KANARA : Kála naddi, *Ritchie,* 724!

3. **Crinum pratense,** *Herbert, Amaryllid.* (1837) p. 256. Bulb ovoid, 4—5 in. in diam. ; neck 2—2½ in. long. Leaves 6—8 to a bulb, 1½—2 ft. by 1—2 in., narrowed towards the obtuse or subacute apex, linear, sub-erect, channelled down the face, the margins entire or ciliolate. Scape lateral, compressed, 12 in. or more long and about ½ in. in diam. Flowers fragrant, 6—12 in an umbel, subsessile ; bracts large, 2—3 in. long, ovate-deltoid, acute. Perianth-tube greenish, 3—4 in. long, at first curved ; lobes lanceolate, white, about as long as the tube, ½ in. broad. Filaments bright-red, rather shorter than the perianth-lobes. Ovules 3—4 in each cell. Fl. B. I. v. 6, p. 282 ; Baker, Handb. Amaryllid. (1888) p. 82 ; Prain, Beng. Pl. p. 1060 ; Watt, Dict. Econ. Prod. v. 2, p. 590. *Crinum longifolium,* Roxb. Hort. Beng. (1814) p. 23.

Dalzell without locality in Herb. Kew.! S. M. COUNTRY : Belgaum, on banks of nálas, *Ritchie,* 1445!—DISTRIB. Plains of India and Birma.

4. **Crinum Woodrowi,** *Baker, in Bot. Mag.* (1898) t. 7597. Bulb globose, 4 in. in diam., without any produced neck ; outer tunics brown, membranous. Leaves 1 ft. by 3—4 in., few, contemporary with the flowers, linear, obtuse, glabrous, bright-green, not ciliate on the margin. Scape arising from the bulb outside the tuft of leaves, stout, compressed, 1 ft. long. Umbels 6—7-flowered ; pedicels about 1 in. long ; bracts 1½—1¾ in. long, ovate, acute. Perianth-tube 3—3½ in. long, cylindric, greenish ; lobes white, as long as the tube, lanceolate, spreading equally. Filaments bright-red, shorter than the perianth-lobes ; anthers linear, ⅓ in. long, yellow.

Style overtopping the stamens. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522.—Flowers: May—June.

DECCAN: Mahableshwar, *Woodrow*.

The bulbs of this plant were sent to Kew by Mr. G. M. Woodrow, who obtained them from Mahableshwar, supposing them to be the bulbs of *Crinum brachynema*. The bulbs flowered at Kew and the plant proved to be a new species. The above description is that of Mr. Baker made from the Kew-grown specimens.

5. **Crinum latifolium,** *Linn. Sp. Pl.* (1753) p. 291. Bulb large, subglobose, 5—6 in. in diam.; neck short, stout. Leaves numerous, 2—3 ft. by 3—5 in., lorate, acuminate, bright-green, the margins slightly scabrous. Scape inserted on the neck of the bulb, about as long as the leaves, stout, tinged with purple. Flowers fragrant, white, streaked or tinged with purple down the middle, in 10—20-flowered umbels; pedicels very short; bracts 3—4 in. long, oblong-lanceolate. Perianth-tube 3—6 in. long, curved, cylindric; lobes 3—4 by 1 in., oblong-lanceolate, acute, much longer than the stamens. Stamens declinate, much shorter than the perianth-lobes; filaments 2½—3 in. long; anthers ½—¾ in. long, grey. Style longer than the stamens. Ovary with 5—6 superposed ovules in each cell. Fruit subglobose, 1½—2 in. in diam. Fl. B. I. v. 6, p. 283; Grah. Cat. p. 216; Wight, Icon. tt. 2019—20; Trim. Fl. Ceyl. v. 4, p. 271; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522; Prain, Beng. Pl. p. 1060; Baker, Handb. Amaryllid. (1888) p. 87. *Crinum zeylanicum,* Linn. Syst. ed. 12 (1767) p. 236; Watt, Dict. Econ. Prod. v. 2, p. 591. *C. ornatum,* Herbert, Amaryllid. (1837) p. 262; Bot. Mag. t. 1171. *C. ornatum* var. *latifolium* and *Herbertianum,* Herbert, Amaryllid. p. 263.—Flowers: May—June.

KONKAN: *Ritchie*!; N. & S. Konkan, rare, *Nimmo* ex *Graham*. DECCAN: Lanoli, *Woodrow*; Panchgani, *Woodrow*. KANARA: banks of the Kála naddi, *Ritchie*!—DISTRIB. Throughout India, Birma, and Ceylon, wild or cultivated.

VAR. *zeylanica,* Herbert, Amaryllid. (1837) p. 262. Bulb 6—8 in. in diam.; leaves fewer, narrower, 1½—2 in. wide, shorter, with smooth undulate margins; flowers pinkish; anthers brown. Prain, Beng. Pl. p. 1061. *C. zeylanicum* (sp.), Linn. Syst. ed. 12, v. 2 (1767) p. 236; Grah. Cat. p. 216.—Flowers: July.

Wild in both Konkans, *Graham*.

6. **Crinum brachynema,** *Herbert, in Bot. Reg.* (1842) *Misc.* p. 36. Bulb ovoid, 2½—3 in. in diam., without a distinct neck. Leaves not developed till after the flowers, 1½—2 ft. by 3—4 in., lorate, bright-green, moderately firm, with entire margins. Scape about 1 ft. high, subterete. Flowers pedicellate, 15—20 in an umbel, fragrant; bracts lanceolate, 1½—2 in. long, greenish. Perianth-tube not much curved, greenish, 1½—2 in. long; lobes 2 by ¾ in., pure white, oblanceolate, obtuse, cuspidate. Filaments ¼ in. long; anthers ¼—⅓ in. long, oblong, yellow. Style shorter than the filaments, included in the tube. Easily distinguished by the short stamens and style. Fl. B. I. v. 6, p. 284; Baker, Handb. Amaryllid. (1888) p. 88; Bot. Mag. t. 5937; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522.—Flowers: May.

Stocks without locality in Herb. Kew.! DECCAN: **Mahableshwar**, *Cooke!*, *Woodrow*, *Lady Reay*.

Very common in the open jungle on the Mahableshwar Hills, where the naked scapes appear in May as soon as the mists come on the hills before the rains. It is very abundant on the hills, and the bulbs with their flowers are hawked about for sale by the hill coolies. The plant has been grown at Kew from a bulb sent to England by Lady Reay (wife of a former Governor of Bombay) in December, 1888. It is worthy of a place in conservatories, and the supply of bulbs from Mahableshwar would be practically inexhaustible.

CRINUM AUGUSTUM, Dalz. & Gibs. Bo. Fl. (1861) p. 275. Bulb columnar, mostly above ground. Leaves lanceolate, channelled, linearly tapering, 3—5 ft. long and 3—4 in. broad; scapes lateral, from the axils of the outermost leaves and nearly as long; umbels composed of 30—40 pedicellate flowers, white or rosy, fragrant; tube of corolla 2½—5 in. long. On the banks of the Gatpraba and Malpurba rivers.

The above is Dalzell & Gibson's description, from which I fail to identify the plant. There are no specimens in Dalzell's Herbarium in Herb. Kew.

Crinum augustum, Roxb. Hort. Beng. p. 23, is a native of Mauritius and the Seychelles, and *C. canaliculatum*, which Dalzell & Gibson cite as a synonym, is *C. pedunculatum*, Br., a native of Eastern Australia.

4. PANCRATIUM, Linn.

Herbs with tunicate bulbs. Leaves linear or lanceolate, often bifarious. Flowers large, umbellate or solitary, sessile or pedicellate, within 1 or 2 membranous spathes; bracteoles few, linear, hyaline. Perianth funnel-shaped; tube usually long, widened at the mouth; lobes 6, narrow, suberect, subequal. Stamens 6, shorter than the perianth, adnate to its throat; filaments filiform, but connate below in a petaloid membranous cup, the edge of which between the free filaments may be toothed or lobed; anthers oblong or shortly linear, dorsifixed. Ovary 3-celled; ovules many, 2-seriate in each cell; style long, filiform; stigma small, capitate. Fruit a large subglobosely 3-angled loculicidally 3-valved capsule. Seeds many, angular; testa thick, lax, black.—DISTRIB. S. Europe, India, Africa; species about 12.

Bulb without a neck; perianth-tube 1½—2 in. long; staminal-cup small	1. *P. triflorum*.
Bulb with a long neck; perianth-tube 3—4 in. long; staminal-cup broad	2. *P. parvum*.

1. **Pancratium triflorum**, *Roxb. Fl. Ind.* v. 2 (1832) p. 126. Bulb globose, 1½—2 in. in diam.; neck 0. Leaves thin, contemporary with the flowers, lanceolate, 8—18 by ½—1 in., linear-lanceolate, acute. Scape slender, 6—9 in. long. Flowers fragrant, 3—8 in an umbel; spathe single, ovate, acute; pedicels very short. Perianth-tube 1½—2 in. long, the throat dilated to ½ in. in diam.; lobes linear, ¾—1 in. long. Staminal-cup ¼ in. long with bifid teeth between the short filaments; anthers ⅛ in. long. Style reaching to the top of the perianth-lobes. Fl. B. I. v. 6, p. 285; Baker, Handb. Amaryllid. p. 118; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522. *Pancratium malabathricum*, Herbert, Amaryllid. (1837) p. 202.—Flowers: May—June.

DECCAN: Mahableshwar, *Woodrow;* Poona, *Woodrow*; Shinvagad, *Symonds*!, *Woodrow*! S. M. COUNTRY: Belgaum, *Ritchie*, 1449!—DISTRIB. India (Bengal, W. Peninsula).

2. **Pancratium parvum,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 144. Bulb globose; neck long, cylindric. Leaves thin, contemporary with the flowers, 6—9 by ¼—¾ in., linear or linear-lanceolate, attenuated towards the base. Scape very slender, compressed, striate, 6—12 in. long. Flowers white, 2—4 in an umbel; pedicels ½—¾ in. long; spathe single, sometimes deeply bifid. Perianth-tube 3—5 in. long, dilated above; lobes 1 in. long, linear. Staminal-cup funnel-shaped, half as long as the perianth-lobes, 12-toothed; filaments hardly longer than the teeth of the cup, and much shorter than the linear anthers. Ovary many-ovulate; style overtopping the anthers. Capsules ovoid, 3-lobed. Seeds few. Fl. B. I. v. 6, p. 286; Dalz. & Gibs. p. 276; Baker, Handb. Amaryllid. p. 119; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522.—Flowers: June—July.

Stocks without locality in Herb. Kew.! KONKAN: *Kanitkar*!; Konkan hills, *Dalzell & Gibson*; Dronagiri Hill (Thana districts), *Dalzell*. DECCAN: Purandhar, *Woodrow*. S. M. COUNTRY: Belgaum Ghâts, *Ritchie*, 1450! KANARA: *Law*!—DISTRIB. India (W. Peninsula), apparently endemic.

The following plants not belonging to any of the above-named genera are grown as ornamental or useful plants:—

Polianthes tuberosa, Linn. Sp. Pl. (1753) p. 316. *The Tuberose,* much cultivated in gardens in the Presidency and more or less throughout India; a native of Mexico, growing 3—4 ft. high. Leaves radical or on the lower part of the stem. Flowers white, very fragrant, in long terminal simple racemes; perianth funnel-shaped. Grah. Cat. p. 217; Dalz. & Gibs. Suppl. p. 90; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524; Watt, Dict. Econ. Prod. v. 6, part 1, p. 312.—VERN. *Gulchabu.*

A number of important fibre-yielding plants belonging to the genera *Agave* and *Furcræa* have been introduced into India, some of which have become naturalized.

The following synopsis of the plants belonging to these genera which are cultivated or naturalized in the Bombay Presidency has been prepared from the paper entitled "Notes on *Agave* and *Furcræa* in India," by Drummond and Prain, of which the authors have been good enough to let me see a copy in advance. The following Key has been prepared for me by Mr. Drummond:—

Stamens in bud inflexed under the tips of the perianth-segments; after æstivation resilient and much longer than the perianth-segments	1. AGAVE.
Stamens about equalling the perianth-segments	2. FURCRÆA.

1. *AGAVE,* Linn.

SECT. I. **Euagave.** Inflorescence candelabriform.

Perianth-segments narrowed from about the middle to a ligulate tip	1. *A. sisalana.*
Perianth-segments not constricted towards the tip. Leaves in a close globose rosette	2. *A. Wightii.*

Leaves in a lax rosette or tufted.
Leaves narrow, linear-oblong..... 3. *A. Cantala.*
Leaves distinctly broader at or above the middle.
Neck of leaf sharply constricted..... 4. *A. americana.*
Neck of leaf hardly constricted ..... 5. *A. Vera-Cruz.*

1. *Agave sisalana,* Perrine, ex Engelmann, in Trans. Acad. Sc. St. Louis, v. 3 (1873) pp. 316—318 ; Drummond & Prain, in Agricultural Ledger, No. 7 (1906) p. 89. Native country unknown ; imported from Central America and the West Indies to India between 1885 and 1892, and grown on a small scale in the Bombay Presidency for its fibre. Mr. Woodrow endeavoured to raise a Company to grow the plant on a large scale in Bombay, but his efforts were unsuccessful. The species varies in India as regards the presence or absence of spines on the leaf-margins. *Agave rigida* var. *sisalana,* Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522.—Flowers : Jan.—Mar.

2. *Agave Wightii,* Drummond & Prain, in Agricultural Ledger, No. 7 (1906) p. 91. Believed to be a native of St. Vincent (W. Indies), widely naturalized and planted for hedges in S. India, where it was probably introduced in the 17th century by the Portuguese or Dutch. *Agave vivipara,* Wight, Icon. t. 2024 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522 (short-leaved form). *Agave Cantula,* Dalz. & Gibs. Bo. Fl. Suppl. p. 93 (*not* of Roxb.).—Flowers : Jan.—June. VERN. *Chota-Guial.*

KONKAN : Bombay, *Burkhill.* DECCAN : Sattara-road Station (S. M. Railway), *Burkhill.*

A variegated form named *A. Cookei* by Woodrow (Journ. Bomb. Nat. v. 12 (1899) p. 522) is very closely allied to *A. Wightii,* and has been treated as a variety of that plant, though probably a distinct species. Woodrow (*MS.*) describes it as having much white on the margins of the leaves, of slight growth, and very desirable as an ornamental plant in gardens.

3. *Agave Cantala,* Roxb. Hort. Beng. (1814) p. 25 ; Drummond & Prain, in Agricultural Ledger, No. 7 (1906) p. 87. Native country unknown ; naturalized in different parts of India, probably introduced from Central America *via* the Philippines in the 17th century. *Agave Cantula,* Roxb. Fl. Ind. v. 2 (1832) p. 167 ; Grah. Cat. p. 222 (*not* of Dalz. & Gibs.). *A. vivipara,* Dalz. & Gibs. Bo. Fl. (1861) Suppl. p. 93 (*not* of Wight) ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522.—Flowers : Jan.—June. VERN. *Guial.*

KONKAN : Bassein, Salsette, Coorla (near Bombay), *Burkhill.* DECCAN : Poona, Sattara, Kolhapur, *Burkhill.* S. M. COUNTRY : Belgaum, *Burkhill.*

4. *Agave americana,* Linn., var. *variegata,* Hook. in Bot. Mag. (1839) t. 3654. Native country unknown ; commonly grown as an ornamental plant in parks and large gardens ; nowhere naturalized in India. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522.—VERN. *Latia-Guial.*

5. *Agave Vera-Cruz,* Mill. Gard. Dict. ed. 8 (1768) n. 7 ; Drummond & Prain, in Agricultural Ledger, No. 7 (1906) p. 86. Native country unknown, but most probably Mexico ; commonly naturalized and planted as a hedge in S. India and parts of the Deccan ; used as a

hedge-plant along the S. Maratha Railway line. *Agave Cantula*, Prain, Beng. Pl. p. 1057 (*not* of Roxb.).

SECT. II. Littæa. Inflorescence spicate.

Species belonging to this section may be met with, but in India have been so far grown as ornamental plants exclusively.

2. *FURCRÆA*, Vent.

Only one *Furcræa* has shown any tendency to become naturalized in W. India, which has been usually identified with *Furcræa gigantea*, Vent., but its identity with that species has not as yet been satisfactorily determined by Drummond and Prain, for want of specimens of the inflorescence. It is known as *Mauritius Hemp* or (*fide* Woodrow) *Natal Hemp*. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522.

Planted along the Railway line in the Deccan, *Burkhill*.

ORDER CXXX. **TACCACEÆ.**

Perennial herbs ; rootstock tuberous or creeping. Leaves radical, large, undivided and costate, or pinnately lobed and reticulately veined ; petiole long. Flowers hermaphrodite, regular, densely umbellate on the top of a long naked scape ; outer bracts 2—6 (usually 4), leafy and broad, forming an involucre, sometimes colored ; inner bracts (bracteoles) under the pedicels many, long, filiform, pendent. Perianth usually lurid, superior, urceolate or subcampanulate, biseriately 6-lobed. Stamens 6, adnate to the perianth-tube or to the base of the perianth-lobes, included ; filaments very short, dilated or laterally appendaged at the base, cucullate above the anthers, with 2 ribs or horns on the inner face ; anthers 2-celled, sessile within the hood. Ovary inferior, 3-angular, 1-celled ; ovules many, on 3 parietal placentas, anatropous or almost amphitropous ; style short, included ; stigmas 3, often petaloid, broad, 2-fid, and inflexed like an umbrella over the style. Fruit globose, ovoid, turbinate or oblong, 3—6-ribbed, forming an indehiscent berry or rarely a 3-valved capsule. Seeds numerous, ovoid, compressed, longitudinally striate ; albumen hard ; embryo minute.—DISTRIB. Species about 10, tropical.

1. **TACCA**, Forst.

Characters of the Order ; fruit always indehiscent.

1. **Tacca pinnatifida**, *Forst. Char. Gen.* (1778) p. 70, t. 35. Rootstock globose, 6—10 in. in diam. ; rootlets superficial. Leaves 1—3 ft. in diam., circular in outline, 3-partite, the segments variously pinnatifid, margins undulate ; petioles 1—3 ft. long, terete, striate, hollow. Scape longer than the petiole, tapering upwards, terete, with pale and dark green stripes, 10—40-flowered. Flowers pedicellate,

drooping, about ⅜ in. across, green tinged with purple ; involucral bracts 6—12, oblong-lanceolate, acuminate, recurved, striped with purple ; bracteoles filiform, numerous, very much longer than the bracts. Perianth subglobose, greenish ; lobes margined with purple, connivent. Fruit of the size of a pigeon's egg, yellow, 6-ribbed. Seeds angular. Fl. B. I. v. 6, p. 287 ; Grah. Cat. p. 230 ; Dalz. & Gibs. p. 276 ; Trim. Fl. Ceyl. v. 4, p. 274 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 402.—Flowers : Sept. VERN. *Deva-kanda.*

Dalzell without locality in Herb. Kew. KONKAN : *Nimmo* ex *Graham*, common in the rains, *Dalzell & Gibson;* Worli and Parel Hills (Bombay), *Graham;* Kalyan, *Woodrow.*—DISTRIB. India (Bengal, Central India, W. Peninsula) ; Ceylon, Malaya, Pacific Islands, Australia.

Tacca lævis, Roxb., which is given in the 'Flora of B. India' as occurring in the S. Konkan, on the authority of Nimmo, ex Grah. Cat. p. 230, has not, in my opinion, any claim to be considered an indigenous plant. Dalzell does not mention it in his 'Bombay Flora,' which was written on Graham's Catalogue as a ground-work. Woodrow merely quotes Graham, and no Bombay botanists seem to have found the plant in that Presidency.

ORDER CXXXI. **DIOSCOREACEÆ.**

Large, usually climbing herbs with generally a thick fleshy tuberous underground rootstock (rarely a cluster of tuberous roots). Leaves alternate or opposite, simple or compound, costate and reticulate ; petioles often angular and twisted at the base. Flowers small, usually 1-sexual, spicate or racemose, dicœcious or monœcious in separate spikes, regular ; bracts small, often minute, sometimes obsolete ; male spikes or racemes simple or paniculate ; female simple, sometimes reduced to 1—2 flowers ; perianth superior, 6-lobed, in 2 series. MALE FLOWERS : Perianth campanulate or rotate, deeply 6-fid, or urceolate with narrow mouth and short spreading lobes. Stamens 6, adnate to the base of the perianth, all perfect or 3 reduced to staminodes, or only 3 and no staminodes ; filaments incurved or recurved ; anthers small, 2-celled, globose, oblong or didymous, or the cells discrete on branches of the filament. Pistillode various or 0. FEMALE FLOWERS : Perianth usually smaller than in the male, 6-fid or 6-partite, persistent. Staminodes 3 or 6 or 0. Ovary inferior, 3-quetrous, 3-celled ; ovules 2 in each cell, superposed, pendulous, anatropous or subamphitropous ; styles 3, very short ; stigmas entire or 2-fid, recurved. Fruit a berry or 3-valved capsule. Seeds flat or globose ; albumen fleshy, rather hard ; embryo minute, enclosed in the albumen.—DISTRIB. Genera 8 ; species about 160, tropical and subtropical.

1. **DIOSCOREA,** Linn.

Herbs with slender twining (rarely procumbent) stems. Leaves alternate or sometimes opposite, entire or lobed, or digitately 3—9-foliolate. Flowers 1-sexual, usually dicœcious. MALE FLOWERS :

Perianth campanulate, rotate, or urceolate ; lobes short, spreading. Stamens 6 perfect, or 3 alternating with 3 staminodes, or 3 without staminodes ; anthers small, the cells contiguous or discrete. Pistillode thick, fleshy or 0. FEMALE FLOWERS : Perianth-segments 6, free, small. Staminodes 6 or 3 or 0. Ovary inferior, 3-quetrous, 3-celled ; ovules 2 in each cell, superposed, laterally attached near the apex ; styles 3, short ; stigmas terminal, entire or 2-fid, reflexed above the style. Fruit a loculicidal capsule, laterally flattened, almost winged. Seeds compressed, often with a large membranous wing ; albumen compressed, fleshy or hard, 2-laminate ; embryo between the laminæ with a suborbicular cotyledon.—DISTRIB. Tropical and subtropical ; species 150.

Leaves 3—5-foliolate.
Stamens 6, all antheriferous; leaflets 3..... 1. *D. dæmona.*
Stamens 3 antheriferous, alternating with 3 staminodes; leaflets usually 5, sometimes 3, rarely 7..... 2. *D. pentaphylla.*
Leaves simple.
Capsules longer than broad; seeds winged at the base only; leaves opposite and alternate..... 3. *D. bulbifera.*
Capsules suborbicular, often broader than long; seeds winged all round; leaves usually opposite..... 4. *D. oppositifolia.*

1. **Dioscorea dæmona,** *Roxb. Fl. Ind.* v. 3 (1832) p. 805. Root tuberous, lobed, biennial ; stems twining, more or less prickly. Leaves 3-foliolate ; common petiole 4—8 in. long, usually prickly ; leaflets 4—8 by 2—5 in., all petiolulate, broadly cuneate-obovate, cuspidately caudate-acuminate, villous when young, glabrous in age, sometimes reticulately veined, base tapering, 3—5-nerved ; lateral leaflets very oblique ; petiolules $\frac{1}{8}$—$\frac{5}{8}$ in. long. MALE FLOWERS in dense cylindric pedunculate spikes $\frac{1}{4}$—$\frac{1}{3}$ in. long, arranged in clusters along the more or less prickly, pubescent or villous rhachis of a raceme 6—18 in. long ; peduncles of spikes $\frac{1}{20}$—$\frac{1}{4}$ in. long, pubescent ; bracts broadly ovate, deltoid at the apex, pubescent, shorter than the flowers. Perianth nearly $\frac{1}{8}$ in. across ; lobes broadly oblong or suborbicular, usually rounded, the 3 outer membranous, shorter than the inner, the 3 inner coriaceous or somewhat fleshy, with incurved tips, longer than the outer. Stamens 6, all antheriferous ; anthers subsessile. Pistillode very low, broad. FEMALE FLOWERS : Spikes solitary, distant. Capsules 2 by 1 in., quadrately oblong, truncately rounded at the ends, smooth and polished ; pedicels very short. Seeds $1\frac{1}{4}$ in. long (including the wing) ; wing $\frac{7}{8}$ by $\frac{1}{2}$ in., at the base of the seed, membranous, oblong, obtuse, broader than the flat oblique nucleus. Fl. B. I. v. 6, p. 289 ; Wight, Icon. t. 811 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522 ; Prain, Beng. Pl. p. 1064 ; Watt, Dict. Econ. Prod. v. 3, p. 129. *Helmia dæmona,* Kunth, Enum. v. 5 (1850) p. 439 ; Dalz. & Gibs. p. 247.—Flowers : Oct.

Not common in the Bombay Presidency. KONKAN : *Law* ! ; hills in the Konkan rare, *Dalzell & Gibson* ; Vingorla, *Dalzell & Gibson.* S. M. COUNTRY : Castlerock, *Woodrow.* KANARA : below the fall on the Kála naddi, *Ritchie,* 1448 !—DISTRIB. Throughout India ; Malaya, Tonkin.

2. **Dioscorea pentaphylla,** *Linn. Sp. Pl.* (1753) p. 1032. Root-tubers oblong, very long (5—6 ft. according to Thwaites) ; stem

slender, twining, glabrous, prickly towards the base, often bulbiferous in the leaf-axils. Leaves alternate, 3—5 (rarely 7) -foliolate, glabrous or sparsely pubescent beneath ; common petiole 1—2½ in. long ; leaflets variable in size and shape, 2—5 by 1—2 in., elliptic-lanceolate, ovate or obovate, acuminate, cuspidate or subcaudate, base usually acute ; lateral leaflets oblique at the base ; petiolules very short. MALE FLOWERS pale-greenish, fragrant, in very slender shortly pedunculate racemes 1—1½ in. long, which are solitary or in fascicles along the hairy branches of a panicle 6—12 in. long ; bracts $\frac{1}{10}$ in. long and as broad as long, membranous, often mottled with brown, broadly ovate or almost semicircular, with a long slender acumen, glabrous. Perianth nearly $\frac{1}{8}$ in. across when spread out ; segments often mottled with brown, ovate, subacute, sparsely pubescent, subequal ; pedicels very short. Stamens 3 perfect ; anthers subsessile ; staminodes 3, minute. Pistillode 3-lobed. FEMALE FLOWERS in axillary pendulous pubescent spikes 2—6 in. long. Capsules quadrately oblong, ¾—1 in. long, usually retuse at both ends, nearly glabrous or more or less pubescent, often apiculate. Seeds ½—¾ in. long (including the wing at the base) ; wing longer and broader than the oblique nucleus, thinly membranous. Fl. B. I. v. 6, p. 289 ; Grah. Cat. p. 218 ; Dalz. & Gibs. p. 247 ; Wight, Icon. t. 814 ; Trim. Fl. Ceyl. v. 4, p. 276 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522 ; Prain, Beng. Pl. p. 1065 ; Watt, Dict. Econ. Prod. v. 3, p. 132. *Dioscorea triphylla,* Linn. Sp. Pl. (1753) p. 1032 ; Grah. Cat. p. 218 ; Dalz. & Gibs. p. 247. *D. Jacquemontii,* Hook. f. Fl. B. I. v. 6 (1892) p. 290.—Flowers : Sept.—Oct. VERN. *Shendvel.*

KONKAN : *Dalzell & Gibson;* Konkan and Ghâts, *Graham.* DECCAN : Khandala, *Cooke* !; Sinhagad, *Woodrow*; Mahableshwar, *Cooke* !, *H. M. Birdwood;* between Poona and Karli, *Jacquemont* ! S. M. COUNTRY : Belgaum, *Ritchie,* 730 !—DISTRIB. Throughout India; Ceylon, Malay hills, Tropical Africa. The tubers of the wild plant are dug up and eaten throughout India. The fragrant male flowers are sold in the native bazaars and eaten as greens (*Dalzell & Gibson*).

I cannot separate *Dioscorea Jacquemontii,* Hook. f., from *D. pentaphylla,* which is itself a rather variable plant. I have found mottled bracts and mottled perianth-lobes, as well as flowers nearly ⅛ in. across when spread out, in many specimens of *D. pentaphylla* from several localities in the Presidency. The difference in the size of the flowers, varying perhaps $\frac{1}{16}$ in. or so, may, I think, depend not only on the age of the plant, but also (as is the case with the leaves) on the part of the plant from which they have been gathered. In Herb. Kew. I have found that a specimen collected by *Ritchie* in Belgaum (No. 730) has been named *D. Jacquemontii,* while a similar specimen, collected in the same locality and bearing the same number, has been consigned to the *pentaphylla* bundle.

3. **Dioscorea bulbifera,** *Linn. Sp. Pl.* (1753) p. 1033. Tubers large, globose or elongate ; stem terete, unarmed, glabrous, bulbiferous in the leaf-axils, the bulbils warted. Leaves opposite and alternate, variable in size, 3—14 in. long and broad, membranous, dark-green, broadly ovate, acuminate, cuspidate or caudate, base cordate with a broad, deep, or shallow sinus ; nerves 7—9 (rarely 11). MALE FLOWERS variable in size, green or purplish, in short slender (almost capillary) spikes 1—4 in. long, close together or scattered on the branches of crowded axillary slender pendulous glabrous spikes

or panicles reaching 12 in. long ; bracts ovate, acuminate. Perianth sessile by a broad base ; segments subvalvate, fleshy, the outer $\frac{1}{10}$ in. long, lanceolate, the inner smaller and narrower. Stamen 6 ; filaments short ; anthers minute, didymous ; pistillode 3-lobed. FEMALE FLOWERS sessile, $\frac{1}{8}$ in. long, in axillary solitary or fascicled pendulous spikes 4—10 in. long. Perianth as in the male. Staminodes 6. Bracts below the ovary minute, ovate, acuminate. Style short, conical ; stigmas 3, very short, recurved. Capsules $\frac{3}{8}$—1 in. by $\frac{1}{3}$—$\frac{1}{2}$ in., quadrately oblong, rather broader upwards, with a truncate or subcordate base. Seeds winged at the lower end only, the wing twice as long as the nucleus. Grah. Cat. p. 219 ; Trim. Fl. Ceyl. v. 4, p. 279 *in adnot.* ; Wight, Icon. t. 878 ; Watt, Dict. Econ. Prod. v. 3, p. 128. *Dioscorea bulbifera* var. *pulchella,* Prain, Beng. Pl. p. 1065. *D. pulchella* (sp.), Roxb. Fl. Ind. v. 3 (1832) p. 801. *Helmia bulbifera,* Kunth, Enum. v. 5 (1850) p. 435 ; Dalz. & Gibs. p. 247.—Flowers : Aug.—Oct. VERN. *Kadu-karanda.*

Stocks without locality in Herb. Kew.! KONKAN : *Graham, Dalzell & Gibson*; Dapoli, *Nairne.* S. M. COUNTRY : Belgaum, *Ritchie,* 728! ; Londa, *Cooke* !—DISTRIB. Throughout India ; Ceylon.

VAR. *sativa,* Prain, Beng. Pl. p. 1065. Stem with axillary bulbils, smooth, not warted. *Dioscorea sativa* (sp.), Hook. f. Fl. B. I. v. 6 (1892) p. 295 ; Grah. Cat. p. 218 ; Dalz. & Gibs. Suppl. p. 92 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523 ; Watt, Dict. Econ. Prod. v. 3, p. 133.—VERN. *Gorkan.*

Occasionally cultivated.

4. **Dioscorea oppositifolia,** *Linn. Sp. Pl.* (1753) p. 1033. A large climber ; rootstock short, with many long cylindric roots as thick as a swan's quill ; stem slender, unarmed ; branches terete, not bulbiferous, glabrous or pubescent. Leaves coriaceous, opposite or subopposite (rarely alternate), simple, 2—5 by 1—3 in., polymorphous, from lanceolate to elliptic-oblong, ovate or suborbicular, acuminate or rounded, with well-defined cartilaginous margins, usually glabrous, base rounded, with 3—5 strong nerves ; petioles $\frac{1}{4}$—$1\frac{1}{4}$ in. long. MALE FLOWERS in dense shortly pedunculate spikes $\frac{3}{8}$—$1\frac{1}{4}$ in. long which are fascicled in the leaf-axils or along a slender axillary rhachis 4—10 in. long ; bracts below the spikes $\frac{1}{8}$ in. long, lanceolate-subulate ; bracts below the flowers $\frac{1}{20}$ in. long, ovate, acuminate, membranous, mottled with brown. Perianth sessile with a broad base ; outer lobes $\frac{1}{12}$ by $\frac{1}{16}$ in., broadly ovate or suborbicular, concave, obtuse, mottled with brown ; inner lobes smaller, somewhat ovate, mottled with brown. Stamens 6, perfect ; anthers didymous ; pistillode obscure. FEMALE FLOWERS distant, in solitary or fasciculate axillary spikes 6—8 in. long ; bracts $\frac{1}{20}$ in. long, suborbicular, acuminate, and as well as the perianth-lobes mottled with brown. Capsules suborbicular or often broader than long, 1—$1\frac{1}{2}$ in. in diam., truncate, retuse or almost 2-lobed at the apex, coriaceous, glabrous, base cuneate. Seeds orbicular, $\frac{3}{4}$—1 in. in diam. with a large membranous wing all round the nucleus. Fl. B. I. v. 6, p. 292 ; Grah. Cat. p. 219 ; Dalz. & Gibs. p. 247 ; Wight, Icon. t. 813 ; Trim. Fl. Ceyl. v. 4, p. 276 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523 ;

Watt, Dict. Econ. Prod. v. 3, p. 132.—Flowers: Sept.—Oct. VERN. *Paspoli.*

Stocks without locality in Herb. Kew.! KONKAN: *Stocks*! DECCAN: near Poona, *Woodrow*, 364!; Bowdhan, 8 miles W. of Poona, *Kanitkar*!; Khandala, *Cooke*!; near Shivapur, *Kanitkar*! KANARA: *Stocks*!—DISTRIB. East and west coasts of S. India, Assam; Ceylon.

Dioscorea fasciculata, Roxb. Fl. Ind. v. 3 (1832) p. 801. Var. *spinosa,* Prain, Beng. Pl. p. 1065. Tubers few, unequal, mixed with many fibrous roots, of which the uppermost are spinous. Leaves pubescent, reniform or orbicular, cordate at the base, with sharp stipule-like spines. Capsules broader than long, broadly obcordate. *Dioscorea spinosa* (sp.), Roxb. ex Wall. Cat. (1828) 5103; Hook. f. in Fl. B. I. v. 6 (1892) p. 291; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 522. *D. aculeata,* Roxb. Fl. Ind. v. 3 (1832) p. 800; Grah. Cat. p. 218; Dalz. & Gibs. Suppl. p. 92; Watt, Dict. Econ. Prod. v. 3, p. 125.

Sparingly cultivated in gardens. The tubers are largely imported into Bombay and known as the *Goa Potato* (*Graham, Dalzell & Gibson*).

Dioscorea alata, Linn. Sp. Pl. (1753) p. 1033. Var. *globosa,* Prain, Beng. Pl. p. 1065. Quite glabrous; tubers roundish or oblong, white inside; stem acutely angled or winged. Leaves mostly opposite, 3—7 by 1½—5 in., broadly ovate, cuspidately acuminate, subhastately or deeply cordate and 7—9-nerved at the base; petioles 2—5 in. long. Capsules 1 by 1½ in., broader than long, of 2 semicircular flat lobes, retuse at the apex, cuneate at the base. Seeds with a wing all round. Cultivated commonly. *Dioscorea alata* (sp.), Grah. Cat. p. 218; Hook. f. Fl. B. I. v. 6, p. 296; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523 (all in part). *Dioscorea globosa* (sp.), Roxb. Fl. Ind. v. 3 (1832) p. 797; Dalz. & Gibs. Suppl. p. 92; Watt, Dict. Econ. Prod. v. 3, p. 131. Graham says that the plant is wild in the Konkan, but this is not the case. The plant has not apparently been found wild in India and is only known in cultivation. The tubers are much esteemed as a vegetable by Europeans and natives.—Flowers: Aug. VERN. *Goradu.*

EXCLUDED SPECIES.

DIOSCOREA GLABRA, Roxb. Fl. Ind. v. 3 (1832) p. 804. This species does not appear to occur in the Bombay Presidency, though the Konkan is assigned as its habitat in the 'Flora of British India.' There are no specimens from the Konkan in Herb. Kew. Woodrow in his list merely copies the Flora of B. I., but neither he nor any other botanist has discovered the plant in Bombay.

ORDER CXXXII. LILIACEÆ.

Herbs (very rarely shrubs or small trees) with fibrous roots, or a creeping rootstock, or a bulb or corn. Leaves various. Flowers usually hermaphrodite, axillary or terminal, solitary, or twin, or umbellate, spicate, racemose, paniculate, or fasciculate; bracts

usually small, scarious, sometimes, when the flowers are umbellate, spathe-like. Perianth herbaceous or petaloid, usually 6-merous in 2 series, imbricate (rarely valvate) in bud. Stamens 6 (rarely 3 or fewer), hypogynous or adnate to the perianth ; filaments free or connate ; anthers oblong or linear, often dorsifixed, usually dehiscing longitudinally. Ovary 3-celled ; ovules 2 or more from the inner angles of the cells, anatropous (rarely orthotropous) ; style usually simple, often long (rarely short or 0), or styles 3. Fruit a capsule or berry, usually 3 (rarely 1) -celled. Seeds 1 or more, globose or flattened ; albumen horny or fleshy ; embryo small, terete.—DISTRIB. Genera 187 ; species about 2500, in all climates and countries.

Shrubs with perennial stems above ground; fruit berry-like.
- Stems climbing or straggling; leaves replaced by linear or acicular cladodes ..... 1. ASPARAGUS.
- Stems leafy.
  - Leaves 3—5-nerved and reticulately veined, arranged at intervals along a usually climbing stem ..... 2. SMILAX.
  - Leaves closely and numerously parallel-nerved, generally clustered at the apex of a usually erect caudex ..... 3. DRACÆNA.

Herbs with annual stems or scapes rising usually from underground perennial rootstocks, corms, or bulbs, rarely (*Asphodelus*) the plant wholly annual.
- Underground perennial stems large in proportion to the roots.
  - Perennial stem a creeping rootstock; annual aerial stem erect, leafy; leaves broad; fruit a berry... 4. DISPORUM.
  - Perennial stem compact, not creeping; fruit a loculicidal capsule.
    - Aerial annual stem climbing, leafy; leaves broad, with tendril-like tips; perianth large, showy; rootstock tuber-like, irregular, naked 5. GLORIOSA.
    - Aerial annual stems or scapes erect; leaves narrow; rootstock a globose coated corm or bulb.
      - Perennial stem a solid corm covered with brown sheaths; annual stem leafy; flowers solitary or corymbose ..... 6. IPHIGENIA.
      - Perennial stem a tunicated bulb; annual scape simple, naked; leaves radical; flowers racemose.
        - Seeds subglobose; perianth 6-partite; segments stellate ..... 7. SCILLA.
        - Seeds flattened.
          - Perianth campanulate, 6-partite..... 8. URGINEA.
          - Perianth cylindric, 6-lobed; outer lobes recurved from the middle, the inner from the tips only..... 9. DIPCADI.
- Underground perennial stem small or (*Asphodelus* sometimes) none; root-fibres large, numerous, usually some or all fleshy or tuberous; leaves radical; capsule loculicidal.
  - Each cell of the ovary 2-ovulate; capsule 3-quetrous; leaves semiterete; plant often wholly annual ..... 10. ASPHODELUS.
  - Each cell of the ovary 4- or more-ovulate; capsule deeply 3-winged; leaves flat..... 11. CHLOROPHYTUM.

1. ASPARAGUS, Linn.

Undershrubs ; stems erect, straggling or climbing, terete, grooved or angled ; rootstock stout, creeping. Leaves minute, scale-like, bearing in their axils tufts of needle-like or flattened cladodes. Flowers hermaphrodite (in the Bombay species), small or minute, axillary, solitary, fasciculate or racemose, pendulous ; pedicels jointed ; bracts minute or obsolete. Perianth petaloid, 6-partite, campanulate or funnel-shaped. Stamens 6, adnate to the base of the perianth-segments ; filaments free ; anthers oblong. Ovary 3-celled ; ovules 2 or more in each cell ; style columnar ; stigmas 3, recurved. Fruit a globose pulpy berry. Seeds few or by abortion solitary, subglobose ; testa black, fragile ; embryo dorsal ; albumen hard.—DISTRIB. Europe and Temperate and Tropical Asia and Africa ; species about 100.

Flowers in axillary clusters, not racemose.	
An erect straggling undershrub; leaves with small spinous spurs $\frac{1}{10}$ in. long; cladodes mucronate, in clusters of 3—8, straight or falcate	1. *A. dumosus*
A subscandent undershrub; leaves with hard conical spinous spurs $\frac{1}{6}$—$\frac{1}{4}$ in. long; cladodes 3-gonous, acuminate, in clusters of 3—5	2. *A. Jacquemonti.*
Flowers racemose.	
Cladodes subulate or 3-quetrous.	
Cladodes short, less than $\frac{1}{2}$ in. long; bracts large	3. *A. lævissimus.*
Cladodes more than $\frac{1}{2}$ in. long, very slender; bracts small	4. *A. racemosus* var. *javanica.*
Cladodes flattened, linear, $\frac{1}{20}$—$\frac{1}{16}$ in. wide, usually falcate	5. *A. gonoclados.*

1. **Asparagus dumosus,** *Baker, in Journ. Linn. Soc.* v. 14 (1874) p. 608. A branched spreading diffuse undershrubs, 2 ft. high, the older branches woody, the younger flexuous ; branchlets pale, glabrous, conspicuously striate, the striæ often minutely scabrous. Leaves deltoid-ovate, cuspidate, with a spur about $\frac{1}{20}$ in. long at the base, standing out from the branch. Cladodes $\frac{1}{4}$—$\frac{1}{2}$ in. long, in clusters of 3—8, stout, linear, channelled, mucronate. Flowers axillary, 2—4-nate ; pedicels $\frac{1}{10}$ in. long, filiform. Perianth rather more than $\frac{1}{8}$ in. long, funnel-shaped ; segments oblanceolate. Stamens $\frac{1}{10}$ in. long ; anthers subglobose, $\frac{1}{30}$ in. in diam. Style $\frac{1}{20}$ in. long ; stigmas 3, spreading, about $\frac{1}{30}$ in. long. Berry $\frac{1}{8}$ in. in diam. Fl. B. I. v. 6, p. 315 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523.

SIND : *Stocks,* 441 ! ; *Dalzell,* 59 ! ; Jemadar ka Landa near Karachi, *Stocks,* 441 ! Apparently endemic in Sind.

2. **Asparagus Jacquemonti,** *Baker, in Journ. Linn. Soc.* v. 14 (1874) p. 615. A branched subscandent undershrub ; stems terete, quite smooth, with angular flexuous spreading or decurved branchlets. Leaves spurred at the base with hard spines $\frac{1}{6}$—$\frac{1}{4}$ in. long. Cladodes 3—5-nate, spreading, arcuate, 3-quetrous, $\frac{3}{8}$—$\frac{1}{2}$ in. long. Flowers axillary, solitary or in pairs, sometimes furnished with a short common peduncle ; pedicels $\frac{1}{8}$—$\frac{1}{6}$ in. long, filiform, jointed

above the middle. Perianth $\frac{1}{16}$—$\frac{1}{10}$ in. long; segments oblong obovate, obtuse, spreading. Anthers about $\frac{1}{60}$ in. in diam., globose Style short. Berry not seen. Fl. B. I. v. 6, p. 316; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523.

DECCAN: between Poona and Karli, *Jacquemont*, 526!

There is but 1 sheet in Herb. Kew. without fruit. The plant does not appear to have been found by any other collector, which, considering that the locality indicated by Jacquemont is on the Railway line, seems strange.—DISTRIB. India (W. Peninsula).

3. **Asparagus lævissimus,** *Steud. in Hohen. Pl. Nilg. Exsicc.* no. 1304. A subscandent undershrub; main stems terete, polished; branches conspicuously striate; branchlets ascending, angular. Leaves with stout conical deflexed rigid spinous spurs, $\frac{1}{3}$—$\frac{1}{2}$ in. long at the base. Cladodes 3—6-nate, spreading or ascending, 3-quetrous, $\frac{1}{2}$—$\frac{3}{8}$ by $\frac{1}{50}$ in. Flowers in dense racemes 1—2 in. long, solitary or twin; pedicels $\frac{1}{10}$—$\frac{1}{8}$ in. long, filiform, jointed at or below the middle; bracts below the pedicels $\frac{1}{10}$—$\frac{1}{8}$ in. long, ovate, acute, concave. Perianth-segments $\frac{1}{10}$—$\frac{1}{8}$ by $\frac{1}{30}$ in., linear-oblong, obtuse. Stamens as long as the perianth; anthers $\frac{1}{50}$ in. in diam., subglobose. Style very short and stout; stigmas 3, spreading. Berry $\frac{1}{4}$ in. in diam. Fl. B. I. v. 6, p. 317; Baker, in Journ. Linn. Soc. v. 14 (1874) p. 623; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523.

Rare. KONKAN: *Stocks*!, *Laws*!; Western Ghâts, *Woodrow*.—DISTRIB. India (W. Peninsula).

4. **Asparagus racemosus,** *Willd. Sp. Pl.* v. 2 (1799) p. 152. VAR. **javanica,** *Baker, in Journ. Linn. Soc.* v. 14 (1874) p. 624. An extensively scandent spinous much-branched undershrub; rootstock tuberous; branches angular. Leaves $\frac{1}{3}$—$\frac{1}{2}$ in. long, linear-subulate, with a stout conical spinous spur, straight or slightly curved, $\frac{1}{3}$—$\frac{1}{2}$ in. long, at the base. Cladodes very slender, $\frac{1}{2}$—1 in. long, spinous-pointed. Flowers white, fragrant, in simple (rarely branched) racemes 2—6 in. long; rhachis 3-quetrous, with several cladodes along it, increasing in number towards the apex, which is often crowned with a tuft of them; pedicels $\frac{1}{3}$—$\frac{1}{2}$ in. long, filiform, jointed above the middle, usually solitary, but sometimes 2-nate along the rhachis, with a small ovate acute bract $\frac{1}{16}$ in. long at the base. Perianth-segments $\frac{1}{10}$ by $\frac{1}{30}$ in., linear-oblong, obtuse. Anthers subglobose, $\frac{1}{60}$ in. in diam. Style very short; stigmas spreading. Berry globose, $\frac{1}{3}$ in. in diam., red when ripe. Fl. B. I. v. 6, p. 316; Wight, Icon. t. 2056; Baker, in Journ. Linn. Soc. v. 14 (1874) p. 623; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523; Prain, Beng. Pl. p. 1070; Watt, Dict. Econ. Prod. v. 1, p. 345. *Asparagus sarmentosus,* Grah. Cat. p. 221 (*not* of Linn.). *Asparagopsis javanica,* Kunth, Enum. (1850) v. 5, p. 100. *Asparagopsis sarmentosa,* Dalz. & Gibs. Bo. Fl. (1861) p. 246 (*not* of Kunth).—Flowers: June—Sept. VERN. *Satavari.*

Common on the Ghâts. KONKAN: *Law*!, *Stocks*!, *Graham*. DECCAN: *Graham;* common on Deccan hills, *Cooke*!, *Woodrow*!; Panchgani, *Cooke*!; Mahableshwar, *Cooke*!, *H. M. Birdwood*. S. M. COUNTRY: Castlerock, *Woodrow;* Badami, *Woodrow*! GUJARAT: *Dalzell & Gibson*. KANARA: Kála naddi, *Ritchie*, 737!—DISTRIB. India (W. Peninsula); Java.

The oblong fleshy tubers are often candied for the table.

5. **Asparagus gonoclados,** *Baker, in Journ. Linn. Soc.* v. 14 (1874) p. 627. A much-branched subscandent armed undershrub; main stems smooth, terete; branches firm, green, 3-quetrous. Leaves spurred at the base with hard spines ¼—½ in. long. Cladodes 2—6-nate, ¾—1 by 1/20—1/16 in., flat, usually falcate, ascending, firm, subcostate, narrowed to both ends, finely spinous-pointed. Flowers white, in racemes 1—3 in. long, sometimes fasciculate or obscurely paniculate; pedicels 1/20—1/12 in. long, jointed about the middle; bracts 1/16 in. long, ovate, boat-shaped. Perianth 1/16—1/12 in. long; segments spreading, the outer linear-oblong, the inner subspathulate. Anthers minute. Berry globose, ⅛ in. in diam., or didymous and twice as broad (*Trimen*). Fl. B. I. v. 6, p. 318; Trim. Fl. Ceyl. v. 4, p. 286; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523. —Flowers: Jan.

Rare. KONKAN: *Law!* KANARA: Siddapur (N. Kanara), *Woodrow.*—DISTRIB. India (W. Peninsula); Ceylon.

Asparagus officinalis, Linn. Sp. Pl. (1753) p. 313. *The Asparagus,* often cultivated in the gardens of Europeans in India, but requiring very careful treatment and high manuring to produce shoots of any size. As asparagus plantations in India do not last long, it is advisable to prepare a fresh one yearly.

2. SMILAX, Linn.

Climbing shrubs (rarely erect herbs). Leaves alternate (rarely opposite), persistent, 3—7-nerved, reticulately veined; petiole usually with 2 tendrils above its base. Flowers small, umbellate, diœcious. Perianth of 6 free, usually incurved or recurved, subequal segments. MALE FLOWERS: Stamens 6 or more, inserted at the base of the perianth; filaments erect, free, long or short; anthers oblong, 2-celled, didymous, with contiguous cells or with cells discrete by a forking of the connective. Pistillode 0. FEMALE FLOWERS: Staminodes 3 or 6, filiform. Ovary 3-celled, 3-gonous; ovules 1—2 in each cell, orthotropous, pendulous; style short or 0; stigmas 3, stout, recurved. Fruit a globose berry. Seeds solitary, or more often 2, hemispheric (rarely 3); albumen horny; embryo small.—DISTRIB. Species about 180, in temperate and tropical regions.

1. **Smilax macrophylla,** *Roxb. Hort. Beng.* (1814) p. 72. A large climber; stems smooth, striate, armed with a few small distant prickles or almost unarmed. Leaves alternate, 3—8 by 1½—4½ in. (much larger in some Kumaon and Rangoon specimens), broadly ovate, or suborbicular, acuminate or cuspidate, glabrous, polished and shining, base usually rounded; main nerves 5—7 (usually 5), with reticulate venation between; petioles ½—1 in. long, stout, narrowly sheathing below the middle; tendrils very long and slender. Flowers in pedunculate many-flowered umbels; peduncles ½—¾ in. long; bracts below the peduncles ovate, acute, 1/10—⅛ in. long; pedicels of both male and female flowers arising from an aggregation of numerous minute bracts. MALE FLOWERS: Pedicels ⅛ in. long.

Perianth ¼—⅓ *in. long; segments linear, obtuse, erect when young, afterwards reflexed, the 3 outer* ⅒ *in. broad, the 3 inner half as broad.* Stamens ¼ in. long. FEMALE FLOWERS: Perianth rather shorter than in the male, the segments reflexed, the 3 outer ovate-oblong, obtuse, 1/12 in. broad, the 3 inner half as broad; pedicels ¼—⅓ in. long, slightly elongating in fruit. Stigmas 3, recurved. Berry perfectly spherical, of the size of a large pea, smooth, remaining green for a long time, becoming ultimately red when ripe; fruiting pedicels ⅝—1 in. long. Fl. B. I. v. 6, p. 310; Grah. Cat. p. 219; Dalz. & Gibs. p. 246; DC. Monog. Phan. v. 1 (1878) p. 193; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523; Prain, Beng. Pl. p. 1071; Watt, Dict. Econ. Prod. v. 6, part 3, p. 255. *Smilax ovalifolia,* Roxb. Fl. Ind. v. 3 (1832) p. 794; Grah. Cat. p. 219; Dalz. & Gibs. p. 246.—Flowers: Aug. VERN. *Ghotvel.*

KONKAN: *Graham, Dalzell & Gibson.* DECCAN: Mahableshwar, common, *Cooke!, H. M. Birdwood, Woodrow.* S. M. COUNTRY: Chorla Ghát, *Dalzell & Gibson.*—DISTRIB. Throughout India.

3. **DRACÆNA,** Linn.

Shrubs (sometimes climbing) or small trees. Leaves alternate or crowded and subterminal, sessile or petiolate, many-nerved, costate or not. Flowers in terminal racemes, panicles, heads, or umbels; bracts small. Perianth corolline, tubular, campanulate or funnel-shaped, 6-cleft; lobes narrow. Stamens 6, adnate to the base of the perianth-tube; filaments filiform or flattened; anthers versatile. Ovary 3-celled; ovules in each cell solitary, erect; style filiform; stigma capitate. Fruit a globose, didymous or 3-lobed berry. Seeds globose or angled; testa thickened; albumen horny; embryo small. —DISTRIB. Warm regions of the Old World; species about 35.

1. **Dracæna terniflora,** *Roxb. Fl. Ind.* v. 2 (1832) p. 159. A slightly branched glabrous straggling shrub, the stems scarcely more than ¼ in. thick, sometimes rooting at the base. Leaves (including the petioles) 8—12 by 1¾—2½ in., somewhat crowded, elliptic-lanceolate, acute or acuminate, thinly coriaceous, narrowed into the petiole; petioles 1—3 in. long, with a widened subamplexicaul base. Flowers white, often 2—3 together on the rhachis of a usually simple raceme 4—8 in. long; pedicels ⅛ in. long, jointed in the middle; bracts scarious, ovate, acute. Perianth ¾—⅞ in. long, divided to about the middle; lobes linear, obtuse, 1/12 in. broad. Anthers ⅒ in. long. Style ⅝ in. long. Fruit a red globose berry nearly as large as a cherry, smooth, glossy, 1-seeded. Fl. B. I. v. 6, p. 328; Kurz, For. Fl. v. 2, p. 545 (by error *ternifolia*); Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523; Prain, Beng. Pl. p. 1072. *D. spicata,* Baker, in Journ. Linn. Soc. v. 14 (1874) p. 532. *D. terminalis,* Wight, Icon. v. 6 (1853) p. 26, t. 2054. *D. Heyneana,* Wall. Cat. (1828) 5151.—Flowers: Dec.

Ritchie without locality, 1461, in Herb. Kew.! KONKAN: Wari country, *Dalzell!* S. M. COUNTRY: Castlerock, *Cooke!* KANARA: Kumpta-Sirsi Road, *Woodrow!*—DISTRIB. More or less throughout India; Malay Peninsula.

Mr. Baker (Journ. Linn. Soc. l. c.) unites this with *D. spicata*, Roxb., under that specific name. Prain (Beng. Pl. p. 1072) gives characters by which the two species may be distinguished. *D. spicata* is a small tree with erect stems, broadly and shortly petiolate leaves, flowers in fascicles, and an orange-red berry, while *D. terniflora* is a straggling shrub with ascending weakly branched stems, narrowly and distinctly petiolate leaves, flowers 2—3-nate, and a cherry-red berry.

The following are often grown in gardens:—

Dracæna elliptica, Thunb. Diss. Bot. Dracæn. (1808) p. 6. An undershrub, a native of Silhet, the Khasia Hills, Birma, the Andamans, and Java, 2½ ft. high, with terete stems as thick as a goose-quill, leaves green, or blotched with white or black, or all purple, and with greenish-yellow flowers in pedicellate fascicles of threes. Fl. B. I. v. 6, p. 330; Woodr. Gard. in Ind. ed. 5, p. 506.

There is a pretty variety, *maculata* (Bot. Mag. t. 4787), with the leaves spotted or blotched with yellow.

Dracæna concinna, Kunth, Enum. v. 5 (1850) p. 8. A neat-growing species reaching 6 ft. high, with narrow green leaves with purplish-red margins, a native of Mauritius. Woodr. Gard. in Ind. ed. 5, p. 505.

Dracæna Goldieana, Bull, Cat. (1877) p. 9. A magnificent ornamental foliage plant of erect habit, a native of Tropical Africa. It bears white flowers in a dense globose sessile head 2 in. in diam., and ovate cordate acuminate leaves, marbled and irregularly banded with dark green and silvery grey in alternate straight or furcate bands. Woodr. Gard. in Ind. ed. 5, p. 507; Illust. Hortic. v. 25 (1878) p. 8, t. 300.

4. **DISPORUM**, Salisb.

Herbs with erect angular leafy stems arising from a creeping rootstock. Leaves sessile or subsessile, strongly nerved. Flowers in terminal or axillary few-flowered umbels; pedicels decurved. Perianth narrowly campanulate, deciduous; lobes 6, petaloid, subequal, free, erect or spreading at the tips, their bases saccate or spurred. Stamens 6, hypogynous; anthers dorsifixed, dehiscing extrorsely. Ovary 3-celled; ovules 2—6 in each cell; style long or short; stigmas 3, short. Fruit a fleshy pisiform black berry. Seeds few, subglobose; testa brown; albumen horny; embryo small.—DISTRIB. Species about 12, Asiatic and N. American.

1. **Disporum Leschenaultianum**, *D. Don, in Trans. Linn. Soc.* v. 18 (1839) p. 518. Stem 1—2 ft. high, acutely angular, simple below and clothed with broad sheathing scales, dichotomously branched above. Leaves 1—4 by 1—2 in., ovate-oblong, cuspidately acuminate, membranous, green on both sides, with 5—9 strong nerves and many slender intermediate ones, base rounded; petioles ⅛—¼ in. long. Flowers white, in axillary 3—5-flowered sessile umbels; pedicels ⅝—⅞ in. long. Perianth ¾—⅝ in. long; segments ⅛—¼ in. broad, oblong-lanceolate, subacute, obscurely ciliolate on the margins and with a subsaccate base. Filaments stout, about as

long as the anthers. Berry ¾ in. in diam., depressed-globose, dark-blue when ripe. Seeds globose. Fl. B. I. v. 6, p. 360 ; Wight, Icon. t. 2048 ; Baker, in Journ. Linn. Soc. v. 14 (1874) p. 590 ; Trim. Fl. Ceyl. v. 4, p. 289 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524. *Disporum mysorense*, Wight, Icon. v. 6 (1853) p. 25, t. 2049. *D. ceylanicum*, Wight, Icon. v. 6 (1853) p. 26, t. 2049.

Rare. KANARA : Santaveri (N. Kanara), *Talbot* ex *Woodrow*.—DISTRIB. India (W. Peninsula); Ceylon.

5. GLORIOSA, Linn.

Climbing herbs ; stems leafy, springing from a naked tuberous rootstock. Leaves alternate, opposite or 3-nately whorled, lanceolate, strongly nerved, with a long spiral tendril-like apex. Flowers large, showy, axillary, solitary ; pedicels reflexed at the tip. Perianth petaloid, persistent ; segments 6, subequal, spreading or reflexed, the margins often undulate. Stamens 6, hypogynous ; filaments filiform ; anthers linear, dorsifixed, versatile, dehiscing extrorsely. Ovary 3-celled ; ovules numerous in each cell ; style filiform, deflexed, with 3 subulate arms, stigmatose within. Fruit a large coriaceous septicidal capsule. Seeds subglobose ; testa spongy, wing-like ; embryo cylindric.—DISTRIB. Tropical Asia and Africa ; species 3 or 4.

1. **Gloriosa superba,** *Linn. Sp. Pl.* (1753) p. 305. A herbaceous tall glabrous branching climber ; rootstock of arched, solid, fleshy-white, cylindric tubers 6—12 by 1—1½ in., pointed at each end, bifurcately branched or **V**-shaped, producing a new joint at the end of each branch ; roots fibrous ; stems annual, 10—20 ft. long, given off from the angles of the young tubers, herbaceous. Leaves sessile or nearly so, 3—6 by ¾—1¾ in., scattered or opposite, or sometimes (from the suppression of the internodes) ternately whorled, ovate-lanceolate, acuminate, tip ending in a tendril-like spiral, base cordate ; nerves parallel. Flowers large, axillary, solitary, or subcorymbose towards the ends of the branches from the nearness of the leaves, remaining for about 7 days without withering ; pedicels 3—6 in. long, the tips deflexed. Perianth-segments reaching 2½ by ⅓—½ in., linear-lanceolate with crisply waved margins, greenish at first, then yellow, passing through orange and scarlet to crimson. Filaments 1½—1¾ in. long, spreading ; anthers nearly ½ in. long. Style reaching 2 in. long ; the arms about ¼ in. long. Capsules 1¾ by ¾ in., linear-oblong. The change of color which takes place during the time the flowers remain without drooping, has caused a discrepancy in descriptions by several authors, and new species have actually been founded in consequence of the variation. Fl. B. I. v. 6, p. 358 ; Grah. Cat. p. 221 : Wight, Icon. t. 2047 ; Trim. Fl. Ceyl. v. 4, p. 294 ; Baker, in Journ. Linn. Soc. v. 17 (1879) p. 457 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524 ; Prain, Beng. Pl. p. 1073 ; Watt, Dict. Econ. Prod. v. 3, p. 506. *Methonica superba,* Lam. Encyc. Méthod. v. 4 (1797) p. 133 ; Dalz. & Gibs. p. 250 (*Methonia*). —Flowers : July—Oct. VERN. *Bachnág ; Khadyánág.*

KONKAN : *Stocks* !, *Graham*; Vingorla, *Woodrow*; along the Railway line between Karjat and Kalyan abundant, *Cooke* ! GUJARAT : *Graham*.—DISTRIB. Throughout Tropical India; Ceylon, Tropical Africa, Malacca, Cochinchina.

6. IPHIGENIA, Kunth.

Herbs with small tunicate corms ; stems erect, slender, leafy. Leaves few, scattered, linear, the upper bract-like. Flowers small, erect, solitary or corymbose. Perianth petaloid, 6-partite, stellately spreading, deciduous ; segments equal, narrow, clawed. Stamens 6, hypogynous ; filaments short, flat ; anthers oblong, versatile, introrsely attached. Ovary 3-celled ; ovules numerous in each cell ; styles 3, shortly connate below, free above, linear, recurved, stigmatose within. Fruit a loculicidal capsule. Seeds subglobose ; testa thin, brown, appressed ; albumen fleshy ; embryo small.—DISTRIB. India, Africa, and Australia ; species 4.

Perianth purple; segments linear-subulate.....1. *I. indica.*
Perianth whitish; segments oblanceolate.....2. *I. pallida.*

1. **Iphigenia indica,** *A. Gray, in Kunth, Enum.* v. 4 (1843) p. 213. Corm subglobose, ½—⅝ in. in diam., narrowed into a short neck, tunicate with pale brown sheaths ; stem 3—10 in. high, rigid or flexuous. Leaves alternate, few, sessile, the lower 6—8 by ⅛—½ in., the upper gradually smaller, all narrowly linear or linear-lanceolate, acuminate, coriaceous, base sheathing ; nerves obscure. Flowers purple, few or many in a terminal erect raceme ; bracts linear or subulate, the lower leafy ; pedicels ½—1 in. long. Perianth-segments ⅜ in. long, narrow, linear-subulate, acute, clawed, spreading or reflexed when the flower is fully expanded. Stamens ⅛ in. long ; filaments flattened ; anthers 1/20 in. long, versatile. Ovary oblong, about as long as the stamens ; styles 3, united at the base, 1/16 in. long, recurved. Capsules oblong-ellipsoid or sub-obovoid, ⅜—⅝ in. long, 3-grooved, obtuse. Seeds 1/10 in. in diam., ellipsoid or subglobose, brown. Fl. B. I. v. 6, p. 357 ; Baker, in Journ. Linn. Soc. v. 17 (1879) p. 450 ; Trim. Fl. Ceyl. v. 4, p. 293 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524 ; Prain, Beng. Pl. p. 1074 ; Watt, Dict. Econ. Prod. v. 4, p. 476. *Anguillaria indica,* Br. Prodr. (1810) p. 273 ; Grah. Cat. p. 222.—Flowers : June—July. VERN. *Márkallai.*

KONKAN : *Stocks* !, *Law* !, *Nimmo* ex *Graham*. DECCAN : Poona, *Woodrow*; Khandala, *Graham*; Mahableshwar, *H. M. Birdwood*.—DISTRIB. Throughout India; Ceylon, Australia Philippines.

2. **Iphigenia pallida,** *Baker, in Journ. Linn. Soc.* v. 17 (1879) p. 451. Corm globose, ½ in. thick, tunicate with pale brown sheaths ; neck hypogæal ; stem above ground 3—4 in. high, flexuous. Leaves usually 4, linear, grass-like, 3—4 by ⅛—¼ in., the upper smaller. Flowers 1—4, white or tinged with purple, corymbose ; bracts linear, foliaceous ; pedicels ascending, ¼—1½ in. long. Perianth-segments ⅛—¼ by 1/10 in., oblanceolate, acute, many-nerved. Stamens 1/10—⅛ in. long ; filaments flattened ; anthers 1/20 in. long, versatile. Ovary obovoid ; styles 3, recurved, 1/16 in. long. Capsules ⅛ in. long, obovoid.

Fl. B. I. v. 6, p. 357; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524.

KONKAN: *Stocks*! DECCAN: Mahableshwar (ticket without authority in Herb. Kew.!). S. M. COUNTRY: Belgaum, *Ritchie*, 739!; Ghâts near Belgaum, *Stocks*!—DISTRIB. India (W. Peninsula), apparently endemic.

7. **SCILLA,** Linn.

Herbs with tunicate bulbs. Leaves radical, linear, lorate or oblong. Flowers in racemes, on a simple leafless scape; bracts small. Perianth petaloid, persistent, stellate or campanulate; segments 6, subequal, often recurved. Stamens 6, adnate at or near the base of the perianth-segments; filaments usually filiform; anthers ovate or oblong, dehiscing introrsely. Ovary 3-celled; ovules usually few in each cell (often 2); style filiform; stigma small, capitate. Fruit a globose 3-lobed loculicidal capsule, the cells 1—2-seeded. Seeds obovoid or subglobose; testa thin, black; embryo shorter than the firm albumen.—DISTRIB. Europe, Temperate Asia; species about 80.

1. **Scilla indica,** *Baker, in Saund. Refug. Bot.* v. 3 (1870) *App.* p. 12. Bulb ovoid or globose, 1—1½ in. in diam. Leaves appearing with the flowers, 3—6 by ½—1 in., variable, from oblong to lanceolate or oblanceolate, subacute, narrowed into a sheathing petiole, rather fleshy, waved, obtusely keeled, sometimes rooting at the tips, dull green above and often blotched with black, paler and glaucous beneath. Scape 2—5 in. long, rather stout. Flowers greenish-purple, in cylindric, many-flowered racemes 2—4 in. long; bracts minute, scarious; pedicels filiform, ¼—⅜ in. long. Perianth-segments ⅛—¼ by $\frac{1}{16}$—$\frac{1}{12}$ in., linear-oblong, obtuse. Filaments ⅛ in. long, purple; anthers $\frac{1}{16}$ in. long, ellipsoid. Style ⅛—⅛ in. long. Capsules ⅛ in. long and broad, membranous. Fl. B. I. v. 6, p. 348; Baker, in Journ. Linn. Soc. v. 13 (1872) p. 250; Trim. Fl. Ceyl. v. 4, p. 293; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524; Prain, Beng. Pl. p. 1074; Watt, Dict. Econ. Prod. v. 6, part 2, p. 489. *Scilla maculata,* Baker, in Journ. Linn. Soc. v. 13 (1872) p. 250. *Ledebouria maculata,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 143; Dalz. & Gibs. p. 251. *Ledebouria hyacinthina,* Roth, Nov. Pl. Sp. (1821) p. 195; Wight, Icon. t. 2040; Grah. Cat. p. 220; Dalz. & Gibs. p. 251; Bot. Mag. t. 3226.—Flowers: May—July.

Dalzell without locality in Herb. Kew.! KONKAN: *Stocks*! DECCAN: Mahableshwar, very common, appearing with the first fall of rain at the end of May or beginning of June, *Cooke*!, *H. M. Birdwood*; Alandi, *Woodrow*! S. M. COUNTRY: Belgaum, *Ritchie*, 733!; Castlerock, *Woodrow*.—DISTRIB. India (Behar, Central India, Chota Nagpur, W. Peninsula); Ceylon, Abyssinia.

8. **URGINEA,** Steinh.

Herbs with tunicate bulbs. Leaves radical, linear or lorate. Flowers racemose on a long leafless scape, often appearing before the leaves; pedicels short or long, articulate; bracts small. Perianth petaloid, campanulate; segments 6, subequal. Stamens 6, adnate at or near the base of the perianth-lobes, included; filaments filiform or thickened at the base; anthers oblong or linear, dehiscing

introrsely. Ovary 3-celled, often 3-gonous; ovules numerous in each cell; style tapering towards the base. Fruit an oblong, 3-quetrous, loculicidal capsule. Seeds usually many in each cell, compressed; testa black; embryo rather large; albumen fleshy.—DISTRIB. Species about 24, S. European, W. Asiatic, and African.

1. **Urginea indica,** *Kunth, Enum.* v. 4 (1843) p. 333. Bulb pale, 2—4 in. long, ovoid, thick. Leaves appearing after the flowers, 6—18 by ½—1 in., nearly flat, sub-bifarious, linear, acute. Scape erect, brittle, 12—18 in. long by ⅛—¼ in. diam. at the base. Flowers dingy brown (*Dalzell & Gibson*), very distant, in slender laxly flowered racemes 6—12 in. long; bracts minute, soon falling; pedicels 1—1½ in. long, slender, spreading or decurved. Perianth campanulate; segments ⅜ by ⅒—⅛ in., oblong-oblanceolate, obtuse, with 2 or 3 strong approximate nerves down the middle. Stamens rather more than ¼ in. long; filaments flattened; anthers ⅒ in. long. Style obconic. Capsules ellipsoid, tapering to both ends, ½—¾ in. long, the cells 6—9-seeded. Seeds elliptic, ¼ by ⅛ in., flattened, black. Fl. B. I. v. 6, p. 347; Dalz. & Gibs. p. 250; Baker, in Journ. Linn. Soc. v. 13 (1872) p. 222; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524; Prain, Beng. Pl. p. 1075; Watt, Dict. Econ. Prod. v. 6, part 4, p. 213. *Scilla indica,* Roxb. Fl. Ind. v. 2 (1832) p. 147; Grah. Cat. p. 220 (*not* of Baker).—VERN. *Jangli-piaz.*

KONKAN: *Stocks*!; common on the sandy shores of both Konkans, *Graham, Nairne, Dalzell*; Harni, on the coast below Bombay, *Dalzell & Gibson.*—DISTRIB. India (Western Himalaya, Behar, Chota Nagpur, Birma, W. Peninsula especially near the sea); Tropical Africa.

Used in medicine as a substitute for the true Squill.

9. DIPCADI, Medic.

Tuberous scapigerous herbs. Leaves usually narrowly linear. Flowers racemose, bracteate. Perianth tubular; tube cylindric; segments 6, erect, the outer recurved from about the middle, the inner at the tips only. Stamens 6, inserted in the throat of the perianth, included; filaments short or 0; anthers linear, versatile, dehiscing introrsely. Ovary stipitate or sessile, 3-celled; ovules many in each cell; style short, straight; stigma 3-lobed. Capsule membranous, subglobose or broadly obovate, deeply 3-sulcate, sessile or stalked, loculicidally 3-valved, few- or many-seeded. Seeds in each cell 6—20, compressed; testa black, membranous.—DISTRIB. Europe, W. Asia, Africa; species about 27.

Ovary stipitate.	
Flowers more than ¾ in. long, usually about 1½ in. long	1. *D. concanense.*
Flowers less than ¾ in. long.	
Pedicels not longer than the bracts	2. *D. montanum.*
Pedicels capillary, longer than the bracts	3. *D. minor.*
Ovary not stipitate	4. *D. erythræum.*

1. **Dipcadi concanense,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 143 (*Uropetalum*). Bulb tunicate, small, ½—¾ in. in diam. Leaves 3—4, subfleshy, 5—10 in. long, semiterete, linear-subulate, scarcely more than ⅟₁₂ in. thick. Scape terete, 6—12 in. long, smooth, naked,

Flowers white, in 2—6-flowered racemes 2—5 in. long ; bracts ⅛—⅙ in. long, triangular, acuminate, shorter than the pedicels ; pedicels ¼—½ in. long. Perianth 1½ in. long ; the 3 outer lobes rather less than ½ in. long by 1/10 in. wide, linear, obtuse, many-nerved ; the 3 inner lobes connate to about the middle, the free portion ⅛ in. wide, oblong-lanceolate, obtuse, with 5 close parallel nerves. Filaments flattened, ¼ in. long ; anthers ⅛—⅙ in. long. Ovary ⅓ in. long, obovoid, distinctly stalked ; style 1 in. long ; stigma 3-lobed, the lobes 1/20 in. long. Capsules broader than long, ⅜ by ½ in. Seeds ellipsoid, flattened, ¼ by ⅛ in., black. Fl. B. I. v. 6, p. 346 ; Baker, in Journ. Linn. Soc. v. 11 (1870) p. 399 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524. *Uropetalum concanense,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 143 ; Dalz. & Gibs. p. 250.

KONKAN : rocky places in Malwán, *Dalzell* !—DISTRIB. India (W. Peninsula), apparently endemic.

2. **Dipcadi montanum,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 142 (*Uropetalum*). Bulb tunicate, globose, 1 in. in diam. Leaves 5—11 by 1/16—⅛ in., narrowly linear, acute. Scape 8—12 in. high, subterete, smooth, naked. Flowers white, in ultimately lax 6—10-flowered racemes 3—4½ in. long ; bracts ⅜ in. long, lanceolate, finely acuminate ; pedicels ¼—⅜ in. long, filiform. Perianth a little more than ½ in. long ; the 3 outer lobes as long as the tube, elliptic-oblong, obtuse, ⅛ in. wide, with 5 close conspicuous parallel nerves in the middle and with an indurated apex. Stamens attached at the base of the perianth-lobes ; filaments 1/10 in. long, flattened ; anthers 1/12 in. long, versatile. Ovary ¼ in. long (including a stalk about 1/16 in. long), obovoid ; style rather less than ¼ in. long ; stigma 3-lobed, the lobes about 1/15 in. long. Capsules stalked, broader than long, reaching ⅜ by ½ in., 3—5-seeded. Seeds ⅛—1/10 in., ellipsoid, flat, dull black. Fl. B. I. v. 6, p. 346 ; Baker, in Journ. Linn. Soc. v. 11 (1870) p. 398 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524. *Uropetalum montanum,* Dalz. l. c. ; Dalz. & Gibs. p. 250.—Flowers : July—Aug.

DECCAN : Western Deccan, *Dalzell & Gibson*; Sahyadri range, lat. 19°, *Dalzell* ! ; Junnar near Poona, *Woodrow* ! S. M. COUNTRY : Belgaum, *Stocks* !, *Dalzell & Gibson, Ritchie,* 1454 !—DISTRIB. India (W. Peninsula).

Trimen (Fl. Ceyl. v. 4, p. 291) gives this for Ceylon, but the description renders the identification doubtful.

3. **Dipcadi minor,** *Hook. f. Fl. B. I.* v. 6 (1892) p. 346. Racemes 6—12-flowered ; bracts much shorter than the capillary pedicels. Perianth ⅛—½ in. long ; outer lobes as long as the tube.

There is but one sheet in Herb. Kew. containing a few scraps of the plant collected by Dalzell. The specimens have neither bulbs, leaves, nor fruit. Dalzell on the sheet gives "Hewra Plain" as its habitat. In the 'Flora of British India' (v. 6, p. 346) the localities "Malwán" and "Hewra Plain" have been transposed.

Malwán is given by Dalzell as the habitat of *D. concanense,* Hewra Plain as that of *D. minor.*

4. **Dipcadi erythræum,** *Webb & Berth. Hist. Nat. Canar.* v. 3 (1848) p. 341. Bulb. tunicate, ½—⅞ in. in diam. Leaves 6—8 by ⅛—⅓ in., narrowly linear. Scape 4—7 in. long. Flowers greenish,

in lax 6—12-flowered racemes 4—6 in. long ; bracts $\frac{3}{8}$—$\frac{7}{8}$ in. long, the lower the longest, ovate, finely acuminate ; pedicels $\frac{1}{8}$—$\frac{1}{3}$ in. long. Perianth campanulate, $\frac{5}{8}$ in. long ; outer lobes $\frac{3}{8}$ by $\frac{1}{8}$ in., elliptic-oblong, obtuse, with indurated tips, 7-nerved ; inner lobes similar, 5-nerved. Ovary sessile, $\frac{1}{4}$ in. long, elliptic-obovoid. Capsules $\frac{1}{2}$—$\frac{5}{8}$ in. long and as broad, slightly cuneate at the base, on a stout stalk $\frac{1}{8}$—$\frac{1}{4}$ in. long, transversely veined. Seeds $\frac{1}{4}$—$\frac{5}{16}$ in. in diam., orbicular, flat, black. *Dipcadi unicolor,* Baker, in Journ. Linn. Soc. v. 11 (1870) p. 397 ; Hook. f. Fl. B. I. v. 6, p. 346 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524.

SIND : Jemadar ka Landa near Karachi, *Stocks,* 634 ! ; lower hills of Sind, *Stocks* !, *Dalzell* !—DISTRIB. Arabia, Egypt.

10. **ASPHODELUS,** Linn.

Annual or perennial herbs ; root-fibres slender or fleshy. Leaves radical, linear, 3-quetrous, or terete and fistular. Flowers racemose, on a simple or branched leafless scape ; pedicels jointed, solitary in the axils of small scarious bracts. Perianth petaloid, marcescent ; segments 6, free or shortly connate below. Stamens 6, hypogynous, shorter than the perianth-segments ; filaments dilated at the base, enclosing the ovary ; anthers oblong or almost linear, versatile, the filament inserted in a pit at the back of the connective. Ovary 3-celled ; ovules 2 in each cell, collateral ; style filiform ; stigma somewhat 3-lobed. Fruit a globose loculicidal capsule with rugose partitions. Seeds usually solitary in each cell of the capsule ; testa black, usually rugose ; albumen cartilaginous ; embryo rather large.—DISTRIB. Species 6 or 7, S. Europe and eastward to India.

1. **Asphodelus tenuifolius,** *Cav. in Ann. Cienc. Nat.* v. 3 (1801) p. 46, t. 27, fig. 2. Annual. Leaves 6—12 by $\frac{1}{16}$—$\frac{1}{8}$ in., terete, fistulous, acute, sheathing at the base, finely puberulous. Scapes several from the root, smooth or puberulous, much branched in the upper part, 1—2 ft. high. Flowers white, distant, laxly racemose, solitary in each bract ; pedicels $\frac{1}{8}$—$\frac{1}{4}$ in. long, jointed below the middle ; bracts broadly ovate, cymbiform, acute, $\frac{1}{10}$ in. long, scarious, with a strong brownish keel. Perianth $\frac{1}{8}$—$\frac{1}{3}$ in. long ; segments oblong, obtuse, $\frac{1}{16}$ in. wide, with a strong conspicuous brownish costa. Stamens $\frac{1}{8}$ in. long ; filaments slightly fusiform towards the top ; anthers $\frac{1}{20}$ in. long. Style $\frac{1}{12}$ in. long ; stigma small, subcapitate, minutely 3-lobed. Capsules globose, $\frac{1}{8}$—$\frac{1}{3}$ in. in diam., erect, the valves deeply wrinkled. Seeds $\frac{1}{8}$ in. long, sharply 3-gonous, acute, black. Fl. B. I. v. 6, p. 332 ; Cav. Icon. t. 587, fig. 2 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523 ; Prain, Beng. Pl. p. 1076. *Asphodelus clavatus,* Roxb. Fl. Ind. v. 2 (1832) p. 148 ; Graham, Cat. p. 219. *A. fistulosus* var. *tenuifolius,* Baker, in Journ. Linn. Soc. v. 15 (1875) p. 272. *Asphodelus pauciflorus,* Wight, Icon. v. 6 (1853) p. 27 (*A. parviflorus* in Tab. 2062). *Asphodelus fistulosus,* Watt, Dict. Econ. Prod. v. 1, p. 346.—Flowers : Nov.—Feb.

DECCAN : Kirkee, *J. G. Woodrow* ! GUJARAT : *Woodrow* ; Ahmedabad, *Law* ex *Graham, Bhiva* !—DISTRIB. Throughout India in fields ; westward to the Canary Islands.

11. CHLOROPHYTUM, Ker.

Herbs with a short hard rootstock emitting many fascicled roots, often thick and fleshy and tuber-like. Leaves radical, clustered, often broad, rarely linear or lorate. Flowers laxly racemose on a simple or branching leafless scape; pedicels usually fascicled in the axils of small scarious, or large membranous bracts. Perianth petaloid, marcescent or persistent, rarely deciduous; segments free, rotate. Stamens 6, hypogynous, free or the 3 inner adnate to the perianth-segments, included; filaments filiform, often widened above the middle; anthers oblong or linear, dehiscing introrsely, the filament inserted in a small pit on the back of the connective. Ovary 3-quetrous, 3-celled; ovules 4 or more in each cell; style filiform; stigma small. Fruit a coriaceous truncate or emarginate, 3-winged, loculicidal capsule. Seeds broad, usually compressed; testa black; albumen rather hard; embryo often curved, rather large.—DISTRIB. Species about 40, tropical and subtropical.

Flowers in simple or shortly branched dense-flowered racemes.
  Leaves lanceolate or oblanceolate, petiolate.
    Scape 3—6 in. long, naked ..... 1. *C. breviscapum.*
    Scape 1—2 ft. long, bracteate ..... 2. *C. glaucum.*
  Leaves linear or lorate, not petiolate.
    Scape as long as the leaves; perianth-segments ⅛ by $\frac{1}{10}$ in., oblanceolate, 5-nerved ..... 3. *C. attenuatum.*
    Scape longer than the leaves; perianth-segments ½ by ⅛ in., oblong, 7-nerved ..... 4. *C. tuberosum.*
Flowers in simple or branched racemes, remotely scattered, solitary or in pairs.
  Leaves 1½—3½ in. broad; seeds orbicular ..... 5. *C. orchidastrum.*
  Leaves ⅛—½ in. broad; seeds angular ..... 6. *C. laxum.*

1. **Chlorophytum breviscapum,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 141. Root-fibres with oblong tubers pendulous from them. Leaves 6—9, membranous, 12—14 by ¾—1½ in., linear-oblong or oblong-lanceolate, acuminate, flat, with undulate margins, shining above, pale beneath, attenuated towards the base in a broad petiole. Scape 4—8 in. long (rarely branched), naked. Flowers white, in usually simple racemes 2—4 in. long; bracts membranous, ovate-lanceolate, with a long acumination, the lower bracts ½—¾, the upper ⅜ in. long; pedicels 2—4-nate, ¼—⅓ in. long, jointed near the top. Perianth rather more than ⅜ in. long; segments linear, acute, $\frac{1}{12}$ in. broad, 3-nerved. Stamens ⅓ in. long; anthers ⅛ in. long, linear-oblong. Style ⅛ in. long, slender; stigma minute. Capsules depressed-globose, emarginate, acutely 3-winged, ⅜ in. in diam., the cells 1—3-seeded. Seeds globose, compressed, ⅛ in. in diam., finely papillose, black. Fl. B. I. v. 6, p. 333; Dalz. & Gibs. p. 252; Baker, in Journ. Linn. Soc. v. 15 (1875) p. 323; Watt, Dict. Econ. Prod. v. 2, p. 269.—Flowers: July—Aug.

Stocks without locality in Herb. Kew.! KONKAN: Malwán, *Dalzell*! S. M. COUNTRY: Belgaum Ghâts, *Ritchie,* 1457!—DISTRIB. India (Sikkim Himalaya, W. Peninsula).

2. **Chlorophytum glaucum,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 142. Root-fibres cylindric. Leaves 6—8, membranous,

12—18 by 1—2 in., narrowly oblanceolate, acute, glabrous, glaucous, attenuated into a short broad petiole. Scape strict, erect, simple, 1—2 ft. long, clothed with many narrowly lanceolate sheaths. Flowers white, in simple dense racemes 6—12 by 1 in. ; bracts persistent, forming a terminal coma before flowering, lanceolate, acuminate, the lower ¾—1 in. long, the upper ½—⅓ in. long ; pedicels ascending, ¼—½ in. long, slender, jointed at or above the middle, the lower 2—3-nate. Perianth-segments less than ½ in. long by ⅛ in. broad, linear-lanceolate, subobtuse, 5-nerved. Stamens ⅓ in. long ; filaments minutely papillose ; anthers ⅛ in. long. Style ⅓ in. long ; stigma minute. Capsules globose, emarginate, acutely 3-winged, the cells 2—4-seeded. Seeds orbicular, ⅛ in. in diam., compressed, dull black, not papillose. Fl. B. I. v. 6, p. 334 ; Dalz. & Gibs. p. 252 ; Baker, in Journ. Linn. Soc. v. 15 (1875) p. 324 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523 ; Dalz. & Gibs. p. 252.

Stocks without locality in Herb. Kew.! KONKAN : *Law*! ; Sahyadri range, lat. 16°—18°, *Dalzell*! KANARA : *Law*!—DISTRIB. India (W. Peninsula), apparently endemic.

3. **Chlorophytum attenuatum,** *Baker, in Journ. Linn. Soc.* v. 15 (1875) p. 332. Roots fleshy (not or rarely tuberous). Leaves 6—9, membranous, 9—18 by ½—1 in., linear, acute, slightly narrowed at the base, with 15—20 distinct immersed veins. Scape glabrous, naked, erect, as long as the leaves. Flowers white, in simple (rarely forked) racemes 3—6 in. long, dense in the upper part ; bracts ovate-lanceolate, acuminate, the upper ⅛—¼, the lower ½—1 in. long ; pedicels erect, jointed about the middle, 2—3-nate, ⅛—⅜ in. long. Perianth-segments ⅓ by $\frac{1}{10}$ in., oblong-lanceolate or oblanceolate, obtuse, 5-nerved. Stamens ⅓ in. long ; filaments ⅛ in. long, longer than the anthers ; anthers narrowly linear. Style ¼ in. long. Capsules globose, acutely 3-winged, broadly obcordate, ⅓ in. in diam. ; cells 3—4-seeded. Fl. B. I. v. 6, p. 335 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523. *Phalangium attenuatum,* Wight, Icon. v. 6 (1853) p. 21, t. 2037.—Flowers : rainy season.

KONKAN : *Stocks*!, *Law*!—DISTRIB. India (W. Peninsula), apparently endemic.

4. **Chlorophytum tuberosum,** *Baker, in Journ. Linn. Soc.* v. 15 (1875) p. 332. Root-fibres cylindric, with ellipsoid tubers hanging from them. Leaves 6—12, membranous, sessile, 6—12 by ½—1 in., shorter than the scape, usually falcate, recurved, acuminate, the margins undulate. Scape terete, naked, 3—12 in. long. Flowers white, in simple or shortly branched racemes 2—4 in. long by 1—1½ in. wide when expanded ; bracts lanceolate, acuminate, the lower ½—¾ in. long ; pedicels ascending, ¼—½ in. long, jointed below the middle. Perianth-segments less than ½ in. long by ⅓ in. broad, oblong-lanceolate, subacute, 7—9-nerved. Stamens ⅓ in. long ; anthers ⅛—⅓ in. long, narrowly linear, ultimately twisted. Stigma minute. Capsules obovoid, ⅜ by ¼ in., shining, transversely veined, emarginate, the cells 4—6-seeded. Seeds irregularly orbicular, ⅛ in. in diam., black. Fl. B. I. v. 6, p. 334 ; Woodr. in

Journ. Bomb. Nat. v. 12 (1899) p. 523; Prain, Beng. Pl. p. 1077. *Chlorophytum anthericoideum*, Dalz. in Kew Journ. Bot. v. 2 (1850) p. 141; Dalz. & Gibs. p. 251. *Phalangium tuberosum*, Wight, Icon. v. 6 (1853) p. 21, t. 2036. *Anthericum tuberosum*, Roxb. Fl. Ind. v. 2 (1832) p. 149; Grah. Cat. p. 219.—Flowers: July. VERN. *Kuli.*

KONKAN: *Stocks!*, *Law!*, *Dalzell!* DECCAN: Poona, *Woodrow*, 101!, *Jacquemont*, 555!; Bowdhan near Poona, *Bhiva!*—DISTRIB. India (E. Himalaya, Behar, W. Bengal, Birma, W. Peninsula); Abyssinia.

5. **Chlorophytum orchidastrum,** *Lindl. in Bot. Reg.* (1824) t. 813. Whole plant 3 ft. high; root-fibres tuberous. Leaves 6—9, membranous, 12—24 by ½—3½ in., elliptic-lanceolate, acute, strongly nerved, glabrous and shining on both sides, narrowed at the base into a winged petiole 6—9 in. long. Scape 1 ft. long, thick, terete, naked. Flowers white, in very lax panicles 1—2 ft. long, the branches each with a large lanceolate acute bract reaching sometimes 1½ in. long, at the base; bracts of the inflorescence ¼—½ in. long, ovate-lanceolate; pedicels ascending, usually geminate, ¼—½ in. long, jointed about the middle. Perianth-segments ⅜ by ⅛ in., oblong-lanceolate, subacute, 5-nerved. Stamens ⅓ in. long; anthers ⅛ in. long. Style ¼ in. long. Capsules ¼ by ⅜ in., depressed-globose, deeply lobed at the apex, broader than long, transversely veined. Seed solitary, flattened, rather broader than long, orbicular or subreniform, minutely papillose, dull black. Fl. B. I. v. 6, p. 336; Baker, in Journ. Linn. Soc. v. 15 (1875) p. 325; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523. *Chlorophytum Nimmonii*, Dalz. in Kew Journ. Bot. v. 2 (1850) p. 142; Dalz. & Gibs. p. 252. *Phalangium oligospermum*, Wight, Icon. v. 6 (1853) p. 21, t. 2038. *Anthericum Nimmonii*, Grah. Cat. p. 220.—Flowers: July—Aug.

KONKAN: *Stocks!*, *Dalzell!* S. M. COUNTRY: Cheeta Hill, Belgaum, *Ritchie*, 1460!—DISTRIB. India (W. Peninsula); Tonkin, Tropical Africa.

6. **Chlorophytum laxum,** *R. Br. Prodr.* (1810) p. 277. A low plant rarely exceeding 1 ft. high; root-fibres usually with small oblong tubers hanging from them. Leaves 6—12, grass-like, 6—12 by ⅛—¼ (rarely ½) in., subdistichous, usually spreading and recurved, longer than the scape, narrowly linear, falcate, flat or folded, acute, glabrous, with numerous conspicuous nerves. Scape very slender, flexuous, 1—3 in. long, naked. Flowers few, greenish-white, very distant (sometimes 1 in. apart), in lax very slender simple or forked racemes 3—10 in. long, with scarious ovate-lanceolate acuminate bracts ⅛ in. long at the base of the branches when forked; bracts of the inflorescence the lower ¼, the upper ⅛ in. long, ovate, acuminate; pedicels jointed about the middle, short, becoming longer and drooping in fruit, the lower sometimes geminate. Perianth-segments ⅛—⅙ by $\frac{1}{16}$ in., oblong, obtuse, obscurely 3-nerved. Stamens alternately short and long, the longer $\frac{1}{12}$, the shorter $\frac{1}{16}$ in. long; anthers $\frac{1}{30}$ in. long, subglobose, green. Style $\frac{1}{25}$ in. long. Capsules ⅛ by ¼ in., broadly obcordate, 3-winged, the cells 1—4-seeded. Seeds ⅛ in. across, irregularly angled, black, minutely papillose. Fl. B. I. v. 6, p. 336; Trim. Fl. Ceyl. v. 4, p. 290; Woodr. in Journ.

Bomb. Nat. v. 12 (1899) p. 523. *Chlorophytum laxiflorum*, Baker, in Journ. Linn. Soc. v. 15 (1875) p. 328 (by error). *C. parviflorum*, Dalz. in Kew Journ. Bot. v. 2 (1850) p. 141 ; Dalz. & Gibs. p. 251.—Flowers : July.

Dalzell without locality in Herb. Kew.! KONKAN : *Dalzell*!, DECCAN : *Cooke*! S. M. COUNTRY : Kákti Hills, Belgaum, *Ritchie*, 1458! ; Dharwar, on stony ground, *Talbot*, 2498! KANARA : Tinai Ghát (N. Kanara), *Talbot*, 2553!—DISTRIB. India (W. Peninsula) ; Ceylon, China, Borneo, Tropical Africa and Australia.

A large number of non-indigenous plants belonging to the Order are grown in gardens, of which a few of the most common are the following :—

Aloe vera, Linn. Sp. Pl. (1753) p. 320. A native of the Mediterranean region. Leaves ensiform, dense, aggregate, 2—4 in. broad, narrowed from base to apex, pale green, with distant horny prickles on the margins. Scape 2—3 ft. long, simple or branched. Raceme dense, 6—12 in. long. Perianth yellow, cylindric, ¾—1 in. long. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523 ; Watt, Dict. Econ. Prod. v. 1, p. 186.—VERN. *Yellia*.

Aloe variegata, Linn. Sp. Pl. (1753) p. 321. A native of S. Africa. Leaves close, erecto-patent, 4—5 by 1 in., lanceolate, bright green spotted with grey and with whitish denticulate margins. Scape simple, tapering, 6—8 in. long. Raceme simple, 3—4 in. long. Perianth reddish, 1—1⅓ in. long. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523.—VERN. *Chota-Yellia*.

Agapanthus umbellatus, L'Hérit. Sert. Angl. (1788) p. 17. A native of S. Africa known as the *African Blue Lily*, introduced into Bombay by Nimmo. Leaves numerous, radical, linear, somewhat fleshy. Scapes tall, bearing many-flowered umbels of bright blue flowers. Perianth funnel-shaped. The plant grows well at Mahableshwar, but when brought to the plains, flowers freely for a time and then dies. Grah. Cat. p. 217 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523, & Gard. in Ind. ed. 5, p. 497.—Flowers : May.

Yucca gloriosa, Linn. Sp. Pl. (1753) p. 319. A native of the West Indies known as *Adam's Needle*, almost naturalized in Indian gardens. A magnificent aloe-like plant with lanceolate, sharp-pointed leaves and bearing during the rainy season a large panicle of creamy-white flowers as large as a hen's egg. Grah. Cat. p. 221 ; Dalz. & Gibs. Suppl. p. 93 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523, & Gard. in Ind. ed. 5, p. 502 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 321.—VERN. *Yacca*.

Yucca aloifolia, Linn. Sp. Pl. (1753) p. 319. A native of the West Indies to North Carolina. Tall, with a slender stem 10—15 ft. high. Leaves 50—100, rigid, ensiform, 1—1½ ft. by 1—1½ in., somewhat glaucous, with a pungent reddish-brown horn at the tip, the margins whitish, serrulate. Flowers in dense rhomboid panicles 1—2 ft. long, with ascending branches. Perianth white, 1½—2 in. long. Grah. Cat. p. 221 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523 ; Bot. Mag. t. 1700.

Cordyline terminalis, Kunth, Enum. v. 5 (1850) p. 25. A native of the South Sea Islands, largely cultivated in tropical countries. It is an erect glabrous shrub 8—10 ft. high, with distichous green or purplish, oblong-lanceolate acuminate leaves, narrowed at the base, 1—3 ft. by 2—5 in., and subsessile white flowers in branched panicles. Fl. B. I. v. 6, p. 331 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523, & Gard. in Ind. ed. 5, p. 516 ; Prain, Beng. Pl. p. 1072.

The so-called *Dracænas* of Indian gardens are mostly forms or varieties of this plant.

VAR. *ferrea*, Baker, in Journ. Linn. Soc. v. 14 (1874) p. 540. Leaves narrower, more oblanceolate, dull purple or variegated, 2—2½ in. broad ; flowers usually smaller, tinged with purple. *Dracæna ferrea* (sp.), Linn. Syst. ed. 12 (1767) p. 246 ; Bot. Mag. t. 2053 ; Grah. Cat. p. 221 ; Dalz. & Gibs. Suppl. p. 93. Common in gardens, introduced from China (*Graham*).

Allium ascalonicum, Linn. Amœn. Acad. v. 4 (1759) p. 454. Leaves fistular, basal only ; heads dense, with flowers only. *The Shallot*, cultivated. Fl. B. I. v. 6, p. 337 ; Grah. Cat. p. 220 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523 ; Prain, Beng. Pl. p. 1075 ; Watt, Dict. Econ. Prod. v. 1, p. 168.

Allium Cepa, Linn. Sp. Pl. (1753) p. 300. Leaves fistular, subdistichous ; heads dense, with flowers and bulbils. *The Onion*, much cultivated as a cold season crop throughout the Deccan and Gujarat. The Onions of Bombay are well known and celebrated throughout India. Fl. B. I. v. 6, p. 337 ; Grah. Cat. p. 220 ; Dalz. & Gibs. Suppl. p. 92 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523 ; Prain, Beng. Pl. p. 1075 ; Watt, Dict. Econ. Prod. v. 1, p. 169.—VERN. *Piáz*.

Allium ampeloprasum, Linn. Sp. Pl. (1753) p. 294. Leaves flat ; heads dense, bearing flowers only ; bulb long cylindric, simple. *The Leek*, cultivated. Fl. B. I. v. 6, p. 337 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523 ; Prain, Beng. Pl. p. 1075. *Allium Porrum*, Linn. Sp. Pl. (1753) p. 295 ; Roxb. Fl. Ind. v. 2 (1832) p. 141 ; Grah. Cat. p. 221 ; Dalz. & Gibs. Suppl. p. 92 ; Watt, Dict. Econ. Prod. v. 1, p. 171 (*Porum*).—VERN. *Khorát*.

Allium sativum, Linn. Sp. Pl. (1753) p. 296. Leaves flat ; heads lax, bearing both flowers and bulbils ; bulb short, compressed. *Garlic*, widely cultivated in irrigated lands of the Deccan and S. M. Country. Fl. B. I. v. 6, p. 337 ; Grah. Cat. p. 220 ; Dalz. & Gibs. Suppl. p. 92 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523 ; Prain, Beng. Pl. p. 1075 ; Watt, Dict. Econ. Prod. v. 1, p. 172.—VERN. *Lasan*.

Lilium neilgherrense, Wight, Icon. v. 6 (1853) p. 20, tt. 2031—32. A native of the Nilghiri and Pulney Hills, growing about 3 ft. high. Leaves lanceolate, shining, 5 by ¾ in., 3—5-nerved. Flowers white, tinged with green outside, trumpet-shaped, 8 in. or more long and 5 in. across at the mouth, fragrant. Fl. B. I. v. 6, p. 350 ; Woodr. Gard. in Ind. ed. 5, p. 501.

Lilium giganteum, Wall. Tent. Fl. Nep. (1826) p. 21, tt. 12, 13. A splendid species, a native of the Himalayas, with a tall stem reaching 10 ft. high. Lower leaves ovate, cordate, 1 ft. or more long and broad, with petioles 9—12 in. long. Racemes 1—2 ft. long; flowers 5—7 in. long and 4 in. across, fragrant, white, slightly tinged with green outside and with a purplish throat. Fl. B. I. v. 6, p. 349; Woodr. Gard. in Ind. ed. 5, p. 502; Watt, Dict. Econ. Prod. v. 4, p. 640.—Flowers: Aug.—Sept.

Dianella ensifolia, Redouté, Lil. v. 1 (1802) t. 1. Stem 3—6 ft. high, rigid. Lower leaves 1—2 ft. by ¾—1½ in., linear-lanceolate. Flowers inodorous, white, greenish or bluish, in panicles 1—2 ft. long. Perianth ¼—⅓ in. long. Berry dark purple or blue, ⅓ in. in diam. A native of the Tropical Himalaya, the Khasia Hills, Birma, and Ceylon, often grown in gardens. Fl. B. I. v. 6, p. 337; Dalz. & Gibs. Suppl. p. 93; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 523.

Order CXXXIII. **PONTEDERIACEÆ.**

Fresh-water and marsh herbs, erect or floating. Leafy stems 1-foliolate, springing from the buried rootstock or from the joints of the floating stem; basal leaf long-petiolate, blade floating or upraised. Flowers hermaphrodite, racemose or spicate, rarely fasciculate or paniculate at the ends of 1-leaved stems or branches; bract under inflorescence spathe-like; bracts under the flowers minute or obsolete. Perianth inferior, petaloid, marcescent, usually tubular; lobes 6, sub-2-seriate, similar or the 3 inner smaller. Stamens 6 or 3, unequally adnate to the perianth-tube or the base of the perianth-lobes, usually declinate, the upper shorter; filaments free; anthers oblong (rarely ovate), with 2 parallel distinct cells. Ovary superior, 3-celled with axile placentas, or 1-celled with parietal placentas, each placenta with many 2-seriate ovules (sometimes only one in each cell fertile), anatropous; style filiform or columnar; stigma terminal, entire or lobed. Fruit a dry, membranous, loculicidally 3-valved (rarely indehiscent) capsule. Seeds ovoid or ellipsoid, small; testa longitudinally ribbed; albumen floury or horny; embryo central, cylindric.—Distrib. Genera 5; species about 36.

1. **MONOCHORIA,** Presl.

Aquatic herbs; rootstock creeping, clothed with leaf-sheaths. Leaves radical and solitary at the top of the emerging stem or branches, ovate-cordate, sagittate or lanceolate; petioles of the radical leaves long, those of the cauline leaves shorter. Flowers in a raceme, sessile within the axil of the cauline leaves shorter. Flowers in a raceme, sessile within the axil of the cauline leaf and fasciculately long-pedicellate, or pedunculate and subspicately short-pedicellate. Perianth campanulate; tube 0; lobes 6, distinct, subequal. Stamens 6, adnate to the base of the perianth-lobes, or hypogynous, one usually largest with its filament toothed on one side;

anthers basifixed, dehiscing by a terminal ultimately elongate slit. Ovary 3-celled; ovules many in each cell; style filiform; stigma minutely 3-lobed. Fruit an oblong membranous loculicidal capsule. Seeds many, ovoid, obtuse, many-ribbed; embryo cylindric in the centre of floury albumen.—DISTRIB. Species about 6, in the tropics of the Old World.

Rootstock elongate, creeping; leaves hastate, sagittate, or cordate; flowers on long pedicels, subumbellate or racemose; inflorescence centrifugal ..... 1. *M. hastæfolia.*
Rootstock short, suberect; leaves ovate; flowers on short pedicels, subspicate; inflorescence centripetal. 2. *M. vaginalis.*

1. **Monochoria hastæfolia,** *Presl, Reliq. Hœnk.* v. 1 (1830) p. 128. Rootstock stout, creeping and rooting below, spongy, clothed with the remains of old sheaths. Leaves 4—8 by 2—6 in., sagittate, hastate, or cordate, obtuse, acute, or acuminate, smooth and glossy, many-nerved, the basal sinus more or less deep; petioles of the floral leaves tumid above and embracing spathe-like the short stout peduncle; petioles of the radical leaves 1½—2 ft. long with a broad sheathing base. Inflorescence centrifugal; flowers of a brilliant purplish-blue, crowded, racemose or subumbellate; pedicels variable in length, rarely reaching as much as 1 in. long. Perianth-segments ⅝ in. long, twisting corkscrew-fashion round the fruit when withering; large segments obovate, ¼ in. wide, the smaller segments oblong, ⅛ in. wide, all with 3 strong parallel nerves in the middle and finely veined at each side of the nerves, reticulately so towards the margin. Filament of the large anther ⅛ inch long with an acute horn 1/12 in. long at one side; anthers linear-oblong, the large anther blue, ⅛ in. long, the small anthers yellow, rather more than ⅛ in. long. Ovary ellipsoid or ovoid, ⅛ in. long; style ¼ in. long; stigma obscurely 3-lobed. Capsules ⅝ in. long, ellipsoid. Seeds ellipsoid, rounded at both ends, 1/50 in. long, pale, with many fine brown ribs. Fl. B. I. v. 6, p. 362; Trim. Fl. Ceyl. v. 4, p. 295; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524; Prain, Beng. Pl. p. 1079. *Monochoria hastata,* Solms-Laub. in DC. Monogr. Phan. v. 4 (1883) p. 523. *Pontederia hastata,* Linn. Sp. Pl. (1753) p. 288; Grah. Cat. p. 222; Dalz. & Gibs. p. 249; Roxb. Cor. Pl. v. 2, t. 111.—Flowers: Dec.

Margins of tanks and water-holes common, *Dalzell & Gibson.* Rice-fields and margins of tanks, *Graham.* DECCAN: Poona, *Cooke!*; Sholapur, *Woodrow.* —DISTRIB. Throughout India; Ceylon, Malay Islands, China.

2. **Monochoria vaginalis,** *Presl, Reliq. Hœnk.* v. 1 (1830) p. 128. Rootstock short, suberect, spongy. Leaves very variable, 2—4 by 1¼—2 in., from linear to ovate or ovate-cordate, usually acuminate; petioles of the lower leaves long, stout, terete, the peduncles emerging from the channelled sheaths of the uppermost leaves. Inflorescence centripetal; flowers blue, usually spotted with red; in subspicate racemes which are globose at first, the rhachis lengthening as the flowers expand, the terminal flower opening first; pedicels short, ⅛—¼ in. long. Perianth campanulate, 6-partite, the segments ⅜ in. long, nearly equal in length, 3 of them narrowly obovate, nearly ⅛ in. wide, broader than the other 3 which are

linear-oblong, $\frac{1}{16}$—$\frac{1}{12}$ in. wide. Filament of the large anther $\frac{1}{8}$ in. long, with an acute horn at one side, the filaments of the smaller anthers filiform, $\frac{1}{4}$ in. long ; anthers linear-oblong, the larger anther $\frac{1}{10}$ in. long, the smaller anthers $\frac{1}{16}$ in. long. Ovary $\frac{1}{10}$ in. long, ellipsoid, glandular ; style $\frac{1}{8}$ in. long ; stigma 3-lobed. Fruit ellipsoid, less than $\frac{1}{2}$ in. long, glandular outside. Seeds $\frac{1}{30}$ in. long, ellipsoid, rounded at each end, pale, with many brown ribs. Fl. B. I. v. 6, p. 363 ; Solms-Laub. in DC. Monog. Phan. v. 4 (1883) p. 524 ; Trim. Fl. Ceyl. v. 4, p. 295 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524 ; Prain, Beng. Pl. p. 1079. *Pontederia vaginalis*, Burm. Fl. Ind. (1768) p. 80 ; Roxb. Cor. Pl. v. 2, t. 110 ; Grah. Cat. p. 222 ; Dalz. & Gibs. p. 249.—Flowers : Dec.

Rice-fields and margins of tanks common, *Graham, Dalzell & Gibson. Stocks* without locality in Herb. Kew.! KONKAN : Vingorla, *Woodrow*!—DISTRIB. Throughout India; Ceylon, Singapore, Malay Islands, China, Japan, Tropical Africa.

ORDER CXXXIV. XYRIDACEÆ.

Erect, tufted, rush-like, scapigerous, glabrous herbs. Leaves radical, elongate, linear or subulate ; sheaths short. Scape stout or slender, as long as or shorter than the leaves, terete, angled or compressed, naked. Flowers hermaphrodite, sessile in the rigid, dark brown, imbricating bracts of a terminal globose or ovoid cone-like head or spike, opening one at a time ; bracts orbicular or obovate, coriaceous, convex, persistent. Perianth inferior, 2-seriate. Sepals (or bracteoles) 3, deciduous, membranous, the 2 lateral small (like bracteoles), narrowly boat-shaped, arched, keeled or winged, the dorsal sepal petaloid, broader, arching over the young flowers, sometimes absent. Petals 3, clawed, obovate or spathulate, colored. Stamens 3, perfect, shorter than the corolla-lobes and attached near their bases ; anthers sagittate, 2-celled, dorsi-fixed, dehiscing longitudinally ; staminodes 3, alternating with the corolla-lobes or 0. Ovary superior, 1-celled or imperfectly 3-celled ; placentas 3, basal and confluent or parietal ; ovules numerous, orthotropous ; style usually 3-fid, with long arms ; stigmas capitate or dilated. Fruit a loculicidally 3-valved capsule, or with the top circumscissile. Seeds minute, oblong, strongly ribbed ; embryo minute, in floury albumen.—DISTRIB. Genera 2, one (*Xyris*) found in all warm regions, the other American ; species about 50.

1. XYRIS, Linn.

Characters of the Order.

1. **Xyris indica,** *Linn. Sp. Pl.* (1753) p. 42. An erect annual 6—20 in. high. Leaves usually shorter than, but sometimes as long as the scape, $\frac{1}{8}$—$\frac{3}{8}$ in. broad, spongy, linear, narrowed to an obtuse or acute tip. Scape stout, deeply grooved and acutely angled. Flowers in ellipsoid spikes $\frac{1}{2}$—$\frac{3}{4}$ in. long ; bracts many, orbicular or cuneately obovate, usually broader than long, dark red-brown, shining,

very coriaceous, with scarious margins. Flowers bright yellow, ½ in. across. Lateral sepals narrowly boat-shaped, dorsally winged, the wing serrulate. Claw of petals as long as the sepals; limb obovate or suborbicular, erose, veined. Filaments short, broad; anthers oblong, $\frac{1}{30}$ in. long. Style, including the 3 arms, $\frac{1}{20}$ in. long, the arms about $\frac{1}{40}$ in. long; stigmas truncate. Capsules ovoid, ⅛ in. long. Seeds minute, ellipsoid, very strongly ribbed. Fl. B. I. v. 6, p. 364; Grah. Cat. p. 223; Dalz. & Gibs. p. 259; Trim. Fl. Ceyl. v. 4, p. 297; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524; Prain, Beng. Pl. p. 1080; Watt, Dict. Econ. Prod. v. 6, part 4, p. 321.—Flowers: Nov.—Jan. VERN. *Dadumari.*

KONKAN: *Stocks* !, *Dalzell* !, *Graham*; salt marshes in the S. Konkan, *Dalzell & Gibson.* S. M. COUNTRY: Londa, *Woodrow.*—DISTRIB. India (Bengal, Birma, Assam, W. Peninsula); Ceylon, Malay Islands.

The natives of Bengal esteem the plant as a certain cure for ringworm. See Watt, Dict. Econ. Prod. l. c.

ORDER CXXXV. **COMMELINACEÆ.**

Herbs prostrate or erect, rarely climbing, very rarely shrubby. Leaves costate, with sheathing bases; nerves parallel. Flowers more or less irregular, hermaphrodite or by abortion polygamous, often cymose; cymes scorpioid, straight or reduced to one flower, sometimes paniculate, often enclosed in spathe-like bracts; floral bracts usually small, opposite the pedicels or obsolete, sometimes herbaceous and dichotomously imbricate. Perianth inferior, 6-partite, 2-seriate; outer segments 3, herbaceous, often persistent; inner segments 3, petaloid, free or united into a tube below, spreading above, marcescent. Stamens 6, adnate to the base of the perianth-segments, all perfect or 2 or more reduced to staminodes; filaments often bearded with jointed hairs; anthers oblong or globose, often dissimilar. Ovary 3- or 2-celled, free; ovules solitary or few, on the inner angles of the cells, orthotropous. Fruit a loculicidal capsule or indehiscent, with a thin fragile or a succulent pericarp. Seeds angled; testa smooth or rugose; albumen floury; embryo minute, remote from the hilum.—DISTRIB. Genera 25; species about 300, tropical and subtropical.

Stamens 3 perfect, 1—3 staminodes.	
Cymes enclosed in spathaceous bracts	1. COMMELINA.
Cymes paniculate; bracts not spathaceous	2. ANEILEMA.
Stamens 6 perfect.	
Petals united below into a tube; cymes scorpioid.....	3. CYANOTIS.
Petals free; cymes secund, in thyrsoid panicles.....	4. FLOSCOPA.

1. **COMMELINA,** Linn.

Herbs usually slender and creeping below. Leaves with lax sheaths, petiolate or not. Flowers in usually 2-fid scorpioid cymes emerging singly from a terminal complicate, or funnel-shaped, or hooded spathe; flowers of the upper cyme-branch small, deciduous, of the lower fertile; fruiting pedicel and capsule retracted within the

spathe. Sepals 3, membranous, the 2 inner often connate below. Petals 3, longer than the sepals, two large, clawed, the third smaller, subsessile. Stamens 3 perfect, with 2—3 imperfect; anthers oblong, one usually longer than the others. Ovary 3 (rarely 2) -celled, 2 of the cells 1—2-ovulate, the third cell if present 1-ovulate or empty. Fruit a loculicidal capsule hidden in the spathe by the decurving of the pedicel after flowering, the posticous cell sometimes indehiscent or obsolete, or the 2 anticous cells empty, indehiscent, and connate as a ligulate body, from which the posticous cell falls away. Seeds ellipsoid or angled; testa reticulate, pitted or rugose.—DISTRIB. Species about 90, tropical and subtropical.

Ovary 3-celled, the 2 anticous cells 2-ovulate, the posticous 1-ovulate or obsolete.
- Capsule 3-celled, the 2 anticous cells loculicidally dehiscent, each usually 2-seeded, the posticous cell keeled, 1-seeded and deciduous, at length dehiscent; seeds free in the cells.
  - Spathes complicate, the margins free or connate at the very base only.
    - Spathes sessile; seeds transversely grooved. 1. *C. subulata.*
    - Spathes pedunculate.
      - Seeds reticulate, cylindric; spathes sometimes cordate at the base..... 2. *C. nudiflora.*
      - Seeds smooth, truncate at one end; spathes always rounded at the base.
        - Branches of cyme equal; seeds appendaged ..... 3. *C. salicifolia.*
        - Branches of cyme unequal; seeds not appendaged ..... 4. *C. Hasskarlii.*
  - Spathes turbinate; capsule always 5-seeded; seeds closely pitted ..... 5. *C. benghalensis.*
- Capsule 3-celled; anticous cells 0—2-seeded; posticous cell not keeled, 1-seeded, indehiscent, deciduous; seed free or adnate to the cell.
  - Stem erect; peduncle of spathe reaching 2 in. long; flowers yellow, drying blue..... 6. *C. hirsuta.*
  - Stems diffuse, rooting at the nodes; peduncle of spathe less than ½ in. long; flowers blue. 7. *C. Forskalæi.*
- Capsule 2-celled (rarely with a dorsal cell, which is empty or contains an imperfect seed); lateral cells 1—2-seeded.
  - Capsules constricted in the middle, bicuspidate; seeds not appendaged ..... 8. *C. clavata.*
  - Capsules not constricted in the middle, not bicuspidate; seeds appendaged at each end. 9. *C. attenuata.*

All the cells of the ovary 1-ovulate.
- Capsule 3-celled, subequally 3-valved; seeds free in the cells.
  - Spathe sessile or nearly so; capsule trigonous-obovoid ..... 10. *C. obliqua.*
  - Spathe pedunculate; capsules quadrate-oblong..... 11. *C. paleata.*
- Capsule 3-celled, 2-valved; seed adnate to the cell... 12. *C. albescens.*

1. **Commelina subulata,** *Roth, Nov. Pl. Sp.* (1821) p. 23. Nearly glabrous; root fibrous; stem erect, slender, 8—16 in. high, simple or branched. Leaves 1—3 by $\frac{1}{10}$—$\frac{1}{8}$ in., linear, glabrous or nearly so, the sheaths reaching ½ in. long, with glabrous or ciliate margins. Peduncles $\frac{1}{12}$ inch long, scattered, but often 2—3 together towards the apices of the branches. Spathes ¼—⅜ in. long, falcate,

acute, pubescent, green or striate with purple, base cordate. Flowers small, orange-purple, when dry violet (*C. B. Clarke*). Capsules small, 5 (rarely 3) -seeded, at first 2-, but afterwards, from the dorsal valve becoming 2-partite, 3-valved. Seeds black, puberulous, slightly compressed, deeply transversely grooved. Fl. B. I. v. 6, p. 369 ; Clarke, in DC. Monog. Phan. v. 3, p. 148 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524.

This has been included on the authority of Woodrow (Journ. Bomb. Nat. l c.), but, as he gives no locality, it would seem as if he had himself never found the plant.

There are in all only 3 sheets in Herb. Kew., one a wretched fragment from Wight's and the other two from Rottler's Herbarium. There is nothing to show that the plant is indigenous to Bombay. The habitat (Peninsular India) embraces a very wide area.—DISTRIB. Tropical Africa, Abyssinia.

2. **Commelina nudiflora,** *Linn. Sp. Pl.* (1753) p. 41. Diffuse, nearly glabrous ; root fibrous ; stems 2—3 ft. long and upwards, branching from the base ; branches prostrate or subscandent, often rooting at the rather distant nodes, the tips ascending. Leaves sessile, 1½—3 by ½—⅔ in., lanceolate or ovate-lanceolate, acute or acuminate, glabrous or puberulous, the sheaths sometimes exceeding ¾ in. long, loose, glabrous, usually with ciliate margins. Peduncles ½—⅝ in. long, spreading or erect. Spathes ¾—1¼ in. long, ovate or ovate-lanceolate, acute or acuminate, base rounded or cordate with rounded lobes, glabrous or pubescent. Cymes usually two, 1- to 3-flowered ; flowers ½—⅔ in. across, the two interior petals obovate with long claws, dark blue, the exterior subsessile, orbicular, of a paler blue or nearly white, sometimes subobsolete. Ovary 3-celled, of which two cells are 2-ovulate, the third 1-ovulate. Capsules ¼ in. long, broadly oblong, acuminate, coriaceous, 5-seeded. Seeds oblong-cylindric, tuberculate and reticulate, brown. Fl. B. I. v. 6, p. 369 ; Grah. Cat. p. 223 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 144 ; Trim. Fl. Ceyl. v. 4, p. 300 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524 ; Prain, Beng. Pl. p. 1081 ; Watt, Dict. Econ. Prod. v. 2, p. 516.—*Commelina communis,* Walter, Fl. Carol. (1788) p. 68 ; Dalz. & Gibs. p. 252.—Flowers : Dec. VERN. *Gandolgi.*

Common everywhere in the Konkan, Deccan, and S. M. Country.—DISTRIB. Throughout India; Ceylon, Singapore, and many tropical and subtropical countries.

3 **Commelina salicifolia,** *Roxb. Fl. Ind.* v. 1 (1832) p. 172. Stems slender, decumbent, sometimes rooting, glabrous, with long internodes. Leaves 3—6 by ⅛—½ in., linear-lanceolate, glabrous or nearly so ; sheaths ⅝—1 in. long, ciliolate. Spathes 1—2 in. long, ovate-lanceolate, axillary, acute or acuminate, glabrous, base rounded ; peduncles ½—1¼ in. long, slender. Flowers small, polygamous ; branches of the cyme equal, usually 1—2-flowered. Sepals free, ovate, obtuse, the 2 inner connate below, larger than the outer. Petals dark blue, the 2 larger ovate with undulate margins and long claws, the smaller one broadly ovate, entire, subsessile or with a very short claw. Stamens 3 fertile ; one anther large, lunate, the other two smaller, ellipsoid ; staminodes 3, clavate. Capsules ¼ in. long, quadrate, membranous. Seeds black, powdered with white, smooth, ovoid

or subglobose, ⅛ in. long, appendaged at one end with a whitish membranous appendage. Fl. B. I. v. 6, p. 370 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 157 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524 ; Prain, Beng. Pl. p. 1082 ; Watt, Dict. Econ. Prod. v. 2, p. 516.—Flowers : Oct.—Dec.

KONKAN : *Woodrow*. S. M. COUNTRY : Belgaum, *Ritchie*, 751 !—DISTRIB. India (Bengal, Assam, Birma, W. Peninsula) ; Java.

4. **Commelina Hasskarlii,** *Clarke, Comm. & Cyrt. Beng.* (1874) p. 13, t. 3. Stem much-branched, glabrous or pubescent, sometimes scaberulous. Leaves 1—3 by ½—⅝ in., narrowly lanceolate, subacute ; sheaths ½ in. long, with a broad base, ciliate. Spathes ½—1 in. long, axillary, scattered, ovate-lanceolate, cordate at the base with rounded lobes, glabrous, scabrid, or hispid ; peduncles ½—1 in. long. Flowers in pubescent cymes, the upper branch 2—4- the lower 1—2-flowered. Capsules ¼ in. long, quadrate, subtruncate, apiculate, membranous. Seeds ⅛—⅛ in. long, cylindric, truncate at one end, subacute or rounded at the other, without an appendage. Fl. B. I. v. 6, p. 370 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 157 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524 ; Prain, Beng. Pl. p. 1082.—Flowers : Aug.—Nov.

Not common. KONKAN : *Law* ! DECCAN : *Cooke* ! ; Poona, *Woodrow*.—DISTRIB. India (Upper Gangetic Plain, Bengal, Assam, Malwa, W. Peninsula).

5. **Commelina benghalensis,** *Linn. Sp. Pl.* (1753) p. 41. Stem 2—3 ft. long, slender, dichotomously branched from the base upwards ; branches diffuse, glabrous or pubescent, creeping and rooting below. Leaves 1—3 by ½—1½ in., ovate or oblong, obtuse, sessile or shortly petiolate, pubescent or villous on both surfaces, base unequal-sided, rounded, cuneate or cordate ; nerves 7—11 pairs ; sheaths short or long, pubescent or villous, the margins ciliate or sometimes bearded with rufous hairs. Spathes 1—3 together, funnel-shaped or turbinate, auricled on one side, pubescent or hirsute ; peduncles very short or 0. Upper branch of cyme 2—3-flowered ; the lower 1—2-flowered, not uncommonly depauperate or obsolete. Sepals small, oblong, pubescent. Petals blue ; larger petals orbicular or transversely oblong. Anthers oblong. Ovary 3-celled, 2 cells 2-ovulate, 1 cell 1-ovulate. Capsules ¼ in. long, pyriform, membranous, 5-seeded. Seeds oblong, closely pitted. Fl. B. I. v. 6, p. 370 ; Grah. Cat. p. 223 ; Dalz. & Gibs. p. 253 ; Wight, Icon. t. 2065 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 159 ; Trim. Fl. Ceyl. v. 4, p. 301 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524 ; Prain, Beng. Pl. p. 1082 ; Watt, Dict. Econ. Prod. v. 2, p. 515.—Flowers : Aug.—Dec.

KONKAN : Bombay, *Stocks* !, *Dalzell* ! DECCAN : *Cooke* ! ; Deccan hills, *Stocks* ! ; Poona, *Woodrow*. S. M. COUNTRY : Belgaum, *Ritchie*, 752 ! GUJARAT : Baroda, *Woodrow*.

From the lower nodes sometimes leafless underground branches proceed, bearing much depauperated scapes containing flowers white in color and smaller than the blue flowers produced in light. These flowers mature abnormal papery, 1—2-celled, 1—2-seeded capsules with abundance of usually abnormal unequal, large seeds, which ripen underground and are perfect, whereas perfect seeds are often wanting in the aërial flowers.—DISTRIB. Throughout India ; Ceylon, China, Tropical Asia and Africa.

6. **Commelina hirsuta,** *Clarke, in DC. Monog. Phan.* v. 3 (1881) p. 163 (*not* of Br.). A low usually hirsute herb ; stems erect, branched from the base, 6—12 in. long. Leaves 2—3½ by ¼—½ in., linear-lanceolate, obtuse, acute, or acuminate, more or less hirsute on both surfaces ; sheaths ½—⅝ in. long, villous, striate. Spathes ⅜—1¼ in. long, acuminate, hirsute or villous, ciliate, base cordate ; peduncles ¾—2 in. long, hirsute. Flowers yellow, drying deep blue (*C. B. Clarke*). Sepals small, ovate, obtuse, speckled with brown spots. Petals 3, the two larger orbicular with crenulate margins and a long claw, the smaller petal almost as large as the others, sessile. Stamens 3 fertile ; filaments long, slender, spirally twisted ; staminodes 2. Ovary hairy ; style long, filiform ; stigma simple. Capsules ⅛ in. long, with the lateral cells empty ; lateral valves linear ; dorsal ellipsoid, subrugose. Seed ellipsoid. Fl. B. I. v. 6, p. 371 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524. *Heterocarpus hirsutus,* Wight, Icon. v. 6 (1853) p. 29, t. 2067.—Flowers : Aug.—Oct.

Belgaum, *Ritchie,* 751 !

There is in Herb. Kew. but one specimen of the plant from the Bombay Presidency named by Mr. Clarke, and collected by Dr. Ritchie at Belgaum.—DISTRIB. India (W. Peninsula).

7. **Commelina Forskalæi,** *Vahl, Enum.* v. 2 (1806) p. 172. Stems long, branched, slender, diffuse, rooting at the nodes. Leaves 1—2 by ¼—½ in., glabrous or puberulous, narrowly oblong, obtuse or subacute, narrowed at the base, the margins usually undulate or crenulate ; sheaths ⅓—½ in. long, finely striate, pubescent, ciliate. Spathes ½ in. long and about ⅜ in. wide, broadly ovate, complicate or hooded, acute, sparsely hairy with long slender hairs, finely striate, base usually truncate or sometimes cuneate ; peduncles ¼—⅜ in. long. Upper cyme-branch 1—3-flowered. Petals blue, the 2 larger obovate, with a very long slender claw. Filaments very long, spirally coiled. Lateral cells of capsule either both empty or one or both containing an orange-brown seed ; dorsal cell of capsule ⅛ in. long, oblong, somewhat laterally compressed, rounded at both ends, slightly ribbed, containing 1 large seed which quite fills the cell. Seeds without appendages, orange-brown ; those of the lateral cells subglobose and irregularly angled when only one cell contains a seed, orbicular in outline, subdiscoid, compressed, when both cells are seed-bearing ; the seed of the dorsal capsule ⅛ in. long, oblong, rounded at both ends. Fl. B. I. v. 6, p. 371 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 168 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524.—Flowers : Nov.

DECCAN : Poona, *Cooke* !, *Woodrow* !, *Jacquemont,* 360 !—DISTRIB. India (W. Peninsula) ; Tropical Africa.

Leafless suckers bear capsules that ripen underground as in *C. benghalensis.*

8. **Commelina clavata,** *Clarke, Comm. & Cyrt. Beng.* (1874) p. 15, t. 5. Stem 1—3 ft. long, sparingly branched ; branches diffuse, as thick as a crow-quill, rooting at the nodes. Leaves 1½—3 by ¼—⅝ in., ovate or elliptic-lanceolate, or linear-lanceolate, acuminate, glabrous, puberulous or pubescent on one or both surfaces, narrowed at the base ; sheaths ½—1 in. long, narrowed into the blade, glabrous or

pubescent, ribbed, sometimes speckled with brown, usually hirsute at the mouth. Spathes ¾—1¼ in. long, ovate-lanceolate, acuminate, glabrous or pubescent, base rounded or cordate ; peduncles ¾—1¾ in. long. Sepals spotted with small brown linear spots. Capsules when perfect ⅛ by ⅛ in., quadrate-oblong, truncately rounded at the ends, the tip bicuspidate, slightly constricted in the middle, with 4 seeds ; sometimes the 2 upper ovules alone produce seed, and the capsule is then constricted at the base, as if stalked. Seeds 4 (the two lower sometimes wanting), ⅛ in. long, cylindric, truncate at one end, rounded at the other, reticulately pitted. Fl. B. I. v. 6, p. 371 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 171, t. 2, fig. 2 ; Trim. Fl. Ceyl. v. 4, p. 301 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524.

Rare. KONKAN : Matheran, *Woodrow*. S. M. COUNTRY : *Talbot* ! ; Badami, *Woodrow*.—DISTRIB. India (W. Peninsula) ; Ceylon, Java.

9. **Commelina attenuata,** *Koen. ex Vahl, Enum.* v. 2 (1806) p. 168. Stem 1—3 ft. long, slender, much-branched, glabrous or sparsely hairy. Leaves sessile, 1¼—3 by ⅛—½ in., linear or linear-lanceolate, acute or subobtuse ; sheaths about ¼—⅜ in. long, ciliate, often scarcely distinct from the leaf-blade. Spathes 1—1½ in. long, narrowly ovate-lanceolate, acute or caudate-acuminate, glabrous, base deeply sagittately cordate, with large auricles ; peduncles ⅜—1½ in. long, glabrous or pubescent. Flowers small, blue. Ovary 2-celled, the cells 2-ovulate. Capsules ¼ in. long, subquadrate-oblong, compressed, membranous, not constricted in the middle, 2-celled, the cells 1—2-seeded. Seeds when solitary large, ⅛ in. long ; testa ash-colored or straw-colored with a white appendage at either end ; when 2 seeds are superposed in a cell, the lower seed is much smaller. Fl. B. I. v. 6, p. 372 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 172 ; Trim. Fl. Ceyl. v. 4, p. 303 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524 ; Prain, Beng. Pl. p. 1082. *Commelina rajmahalensis*, Clarke, in Journ. Linn. Soc. v. 11 (1870) p. 444, & Comm. & Cyrt. Beng. (1874) p. 17, t. 7.

I have seen no Bombay specimens, the specimen from Badami cited by Woodrow in his list having proved to be *C. clavata*.

10. **Commelina obliqua,** *Buch.-Ham. in Don, Prodr. Fl. Nep.* (1825) p. 45 (*not* of Vahl). Stem 2—3 ft. high, stout, branched, glabrous. Leaves 4—7 by 1—2 in., sessile or petiolate, lanceolate or elliptic-lanceolate, acute or caudate-acuminate, membranous, glabrous, scabrous or villous ; sheaths reaching 1 in. long, the mouth bearded with long hairs. Spathes sessile or nearly so, ¾—1 in. long and as broad as long, solitary or crowded in terminal heads, acute turbinately funnel-shaped, glabrous or subscabrid, usually filled with a clear glutinous liquid. Flowers blue, about ⅜ in. across, in simple (not branched) racemes ; large petals clawed, orbicular. Ovary 3-celled, the cells 1-ovulate. Capsules ⅜ in. long, trigonous-obovoid, subequally 3-valved, 3-celled, 3-seeded. Seeds ¼ in. long, oblong or ellipsoid, smooth, puberulous, lead-colored. Fl. B. I. v. 6, p. 372 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 178 ; Trim. Fl. Ceyl. v. 4, p. 303 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524 ; Prain, Beng. Pl.

p. 1082 ; Watt, Dict. Econ. Prod. v. 2, p. 516. *Commelina polyspatha,* Wight, Icon. v. 6 (1853) p. 29, t. 2066.

KONKAN : *Stocks* !, *Law* ! ; Bassein, *Raoji* ! DECCAN : Purandhar, *Woodrow.* —DISTRIB. Throughout India; Ceylon, Malay Islands.

11. **Commelina paleata,** *Hassk. in Miq. Pl. Jungh.* (1851—55) p. 139. Stem stout, branched, glabrous. Leaves 2—6 by 1—1¾ in., elliptic or broadly lanceolate, acuminate, glabrous or nearly so, base usually cuneate ; sheaths ¾—1 in. long. Spathes ¾—1¼ in. long, shortly cucullate, ovate, acute or acuminate, with a broad rhomboid base, scabridly pubescent ; peduncles ⅜—⅝ in. long. Flowers blue ; lower cyme-branch 1—2-flowered, upper 4-flowered. Capsules ¼ in. long, quadrate-oblong, 3-celled, 3-valved. Seeds 3, subequal, ⅛ in. long, ellipsoid, rounded at both ends, dull black, nearly smooth, scarcely compressed. Fl. B. I. v. 6, p. 372 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 178 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524.

KONKAN : *Stocks* ! ; North and South Konkan, *Law* !—DISTRIB. India (W. Peninsula) ; Java.

12. **Commelina albescens,** *Hassk. in Schweinf. Beitr. Fl. Æthiop.* (1867) p. 210. Root-fibres thick ; stems thickened at the base, often 2 or more from the root, clothed below with many white membranous sheaths, glabrous. Leaves 2—3 by ¼—½ in., linear or linear-lanceolate, acute, glabrous, the margins often undulate. Spathes ½—¾ in. long and sometimes nearly as broad as long, 1—3 together, subsessile, glabrous or nearly so, finely striate, cucullate, falcately hooked at one end, auricled at the other. Flowers blue, the lower raceme obsolete, the upper 3—5- flowered. Capsules ⅛ in. long, 3-celled, 2-valved, the dorsal cell indehiscent, with muricate ribs. Seeds 1/10—⅛ in. long, rounded at the ends and on the back, somewhat angular on the inner face, dull black. Fl. B. I. v. 6, p. 373 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 184 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524.

In the Bombay Presidency confined to Sind. SIND : *Dalzell* !, *Stocks* !, *Cooke* !, *Woodrow.*—DISTRIB. Beluchistan, Arabia, Tropical Africa.

I have not found that the seeds are spotted with yellow as noted by Mr. Clarke, though I have examined a considerable number.

DOUBTFUL AND INDETERMINABLE SPECIES.

COMMELINA AVENÆFOLIA, Grah. Cat. Pl. Bo. (1839) p. 224. Leaves sprinkled with hairs; sheaths hairy; involucre truncate. In the dense part of the jungle at Khandala (Deccan), *Graham.*

There are no data for the determination of this plant, of which the description is very meagre.

2. ANEILEMA, R. Br.

Simple or branched erect or decumbent herbs ; roots usually fibrous (sometimes tuberous). Leaves usually alternate, sometimes all radical, occasionally clustered under the inflorescence, usually narrow and sessile (rarely broad and petiolate). Flowers in axillary and

terminal panicles, bracteate and bracteolate ; bracts not spathaceous. Sepals 3, membranous, free. Petals 3, obovate, equal. Stamens 2 or 3 with perfect anthers and 2—4 (rarely 0) reduced to staminodes with imperfect anthers ; filaments slender, bearded or not. Ovary sessile, 2—3-celled ; cells 1—many-ovulate ; style slender, naked or bearded ; stigma minute. Fruit a loculicidal capsule. Seeds 1 or more in each cell, with a thick hard rugose or pitted testa.—DISTRIB. Species about 60, tropical and subtropical, chiefly Asiatic.

Cells of the ovary 2 ∞-ovulate; seeds 1-seriate in each cell.	
Cells of the ovary 3-∞-ovulate; cells of the capsule 1—3- or more-seeded. (See also *A. nudiflorum.*)	
Flowers in panicles terminating an erect leafless scape with large sheathing bracts; leaves all radical	1. *A. scapiflorum.*
Flowers in panicles terminating leafy stems.	
Root of slender tubers; leaves reaching 12 in. long; filaments all bearded	2. *A. herbaceum.*
Root fibrous; leaves less than 3 in. long; filaments of fertile stamens bearded, of the sterile usually naked.	
A procumbent herb; stem less than 1 ft. long; filaments of sterile stamens sometimes bearded	3. *A. spiratum.*
An erect herb 1 ft. high; filaments of sterile stamens never bearded	4. *A. dimorphum.*
Flowers in axillary 1—3-flowered cymes.	
Flowers blue; filaments all naked	5. *A. pauciflorum.*
Flowers ochre-yellow; filaments all bearded	6. *A. versicolor.*
Cells of the ovary 2-ovulate; cells of the capsule 2-seeded (sometimes 3-seeded in *A. nudiflorum* var. *compressa*).	
Leaves 2—5 in. long; root fibrous	7. *A. nudiflorum.*
Leaves reaching 12 in. or more long; root tuberous or fibrous.	
Root tuberous; fertile stamens 2 with 3 staminodes and 1 rudimentary antherless stamen; filaments of the 3 staminodes naked	8. *A. sinicum.*
Root fibrous; fertile stamens 3; staminodes 3; rudimentary stamen 0; filaments of all equal and bearded	9. *A. giganteum.*
Cells of the ovary 4—20-ovulate; seeds 2-seriate in each cell.	
Flowers axillary, solitary or clustered; pedicels jointed in the middle; flowers yellow.	
Stem not exceeding 8 in. long; leaves less than 1 in. long; filaments naked	10. *A. ochraceum.*
Stem reaching 16 in. long; leaves exceeding 1 in. long; filaments bearded	11. *A. lanuginosum.*
Flowers in paniculate cymes, blue; leaves grass-like.	12. *A. paniculatum.*
Cells of the ovary 1-ovulate; cells of the capsule 1-seeded or empty	13. *A. vaginatum.*

1. **Aneilema scapiflorum,** *Wight, Icon.* v. 6 (1853) p. 30, t. 2073. A tufted herb ; root of elongate pisiform tubers. Leaves all radical, erect, 4—8 by ⅜—⅝ in., narrowly ensiform, finely acuminate, glabrous or nearly so, slightly narrowed at the base. Flowers in erect elongate panicles on terminal leafless scapes ; scape together with the panicle 8—18 in. long ; sheaths on the scape below the panicle ¾—2¼ in. long, embracing the scape, finely acuminate with an oblique mouth ; upper bracts amplexicaul, ovate, acuminate or

truncate, membranous, often spotted with small spots. Sepals ¼ in. long, elliptic-oblong, subacute, 3—5-nerved, purple-green. Petals blue, ⅜ in. long, obovate, reticulately veined. Stamens 3 perfect and 3 staminodes; filaments all bearded with blue hairs; anthers of fertile stamens blue, those of the staminodes yellow. Capsules ¼ in. long, obovoid. Seeds 5 or 6 in a cell, superposed, $\frac{1}{16}$ in. in diam., sharply 3-gonous. Fl. B. I. v. 6, p. 375; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 200; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524; Prain, Beng. Pl. p. 1083; Watt, Dict. Econ. Prod. v. 1, p. 252. *Aneilema tuberosum*, Buch.-Ham. in Wall. Cat. (1828) 5207; Dalz. & Gibs. p. 255.—Flowers: May—June.

Not common. S. M. COUNTRY: *Ritchie*, 748! KANARA: Kála naddi, *Ritchie*, 748!—DISTRIB. India (temperate and tropical Himalaya; Bhotan, Tirhut, W. Peninsula); Ceylon.

2. **Aneilema herbaceum,** *Wall. Cat.* (1828) 5223. Erect, robust, 3—4 ft. high, glabrous or nearly so; root of slender linear-oblong tubers; stem stout, round, smooth, leafy. Leaves sessile, the lower sometimes reaching 12 by 2 in., the cauline leaves 4—6 by 1¼—1½ in., all narrowly oblong or ensiform, acuminate, smooth with white undulate margins, base cuneate, rounded or cordate; sheaths entire. Flowers in stout glabrous dichotomously branched panicles, the branches distant and few-flowered; bracts small, soon falling. Sepals ¼ in. long, elliptic-oblong, concave, persistent on the fruit, marked with short brown lines, 3-nerved. Petals blue, obovate or suborbicular. Stamens 3 (sometimes only 2) perfect; staminodes 3 or 4; filaments of all bearded. Capsules ellipsoid or subglobose, ¼ in. in diam., with a bluish tinge, smooth, glistening, mucronate. Seeds 3—4 (rarely 5) in each cell, 1-seriate, $\frac{1}{10}$ in. in diam., 3-gonous, reticulate, glandular-puberulous. Clarke, in DC. Monog. Phan. v. 3 (1881) p. 204; Jackson, Index Kewen. v. 1, p. 130. *Aneilema lineolatum*, Kunth, Enum. v. 4 (1843) p. 69; Clarke, Comm. & Cyrt. Beng. p. 27, t. 15; Hook. f. Fl. B. I. v. 6 (1892) p. 376; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524; Prain, Beng. Pl. p. 1084. *A. elatum*, Kunth, Enum. v. 4 (1843) p. 70; Dalz. in Kew Journ. Bot. v. 3 (1851) p. 137; Dalz. & Gibs. p. 254. *A. latifolium*, Wight, Icon. v. 6 (1853) p. 30, t. 2072.—Flowers: Aug.—Sept.

KONKAN: *Stocks!*, *Law!*; dark woods of the S. Konkan, *Dalzell & Gibson*; Wari country, *Dalzell!* S. M. COUNTRY: Rámghát, *Ritchie*, 1459!—DISTRIB. India (Sikkim, Bhotan, Khasia Hills, Birma, W. Peninsula); Malay Islands.

3. **Aneilema spiratum,** *R. Br. Prodr.* (1810) p. 271 (*in adnot.*). A dwarf annual, branched from the base; root fibrous; branches 6—10 in. long (often less), decumbent and rooting below, leafy. Leaves sessile, the lower broadly linear-lanceolate, the upper oblong, cordate, all amplexicaul, glabrous, ½—1½ by ⅓—½ in., acute, canaliculate in the middle; sheaths very short. Flowers about ⅛ in. across, in dichotomously branched, few-flowered panicles; peduncles terminal and from the upper axils, solitary or twin; pedicels rather long, longer than the fruit, bifarious, distant; bracts minute, ovate, amplexicaul, persistent. Sepals spreading. Petals blue, broadly oblong, obtuse. Stamens 3 perfect, the anthers apiculate, blue, the

filaments bearded ; staminodes 3, shorter than the stamens, the filaments usually naked but occasionally bearded. Ovary 3-celled ; cells 3—many-ovulate. Capsules $\frac{1}{10}$—$\frac{1}{8}$ in. long, oblong, mucronate, smooth, shining, 3-gonous, the cells 3—7-seeded. Seeds 1-seriate, minute, angular or cubical, white or straw-colored. Fl. B. I. v. 6, p. 377 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 207 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525 ; Prain, Beng. Pl. p. 1084. *Aneilema canaliculatum,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 137 ; Dalz. & Gibs. p. 254. *A. nanum,* Kunth, Enum. v. 4 (1843) p. 65 ; Wight, Icon. t. 2077 right-hand figure.—Flowers : Oct.

KONKAN : *Dalzell* !, *Stocks* !, *Law* ! ; Ratnagiri, *Woodrow*. DECCAN : Mahableshwar, *Woodrow*. S. M. COUNTRY : Belgaum, *Ritchie* !—DISTRIB. Throughout India ; Ceylon, Malay Islands, China.

4. **Aneilema dimorphum,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 138. Whole plant glabrous (except the mouths of the sheaths), about 1 ft. high ; root fibrous ; stems many, branching from the root, the branches erect, terete, striate. Leaves 1—2½ by $\frac{1}{3}$—½ in., linear-oblong to ovate-lanceolate, obtuse or acute, flat, base rounded or cordate ; mouth of short sheath ciliate. Flowers ½ in. across, in panicles 1—1½ in. long, which are sparingly dichotomously branched, few-flowered ; bracts small, $\frac{1}{20}$—$\frac{1}{12}$ in. long, ovate or orbicular, obtuse, cucullate, persistent. Sepals ovate, obtuse, concave, reflexed. Petals blue, obovate, subacute. Stamens 3 fertile and 3 staminodes ; filaments of fertile stamens bearded, those of the staminodes naked. Ovary 3-celled ; cells 3—5-ovulate. Capsules $\frac{1}{8}$—¼ in. long, oblong, 3-gonous, shining. Seeds 3—5, uniseriate in each cell, $\frac{1}{12}$ in. in diam., subcubical, cupped at one end, brown-black, minutely striate. Fl. B. I. v. 6, p. 377 ; Dalz. & Gibs. p. 254 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 206 ; Trim. Fl. Ceyl. v. 4, p. 307 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 524. *Aneilema paniculatum,* Wight, Icon. v. 6 (1853) p. 31, t. 2075 (*not* of Wall.).

KONKAN : *Stocks* !, *Law* !, Malwán, *Dalzell* ! KANARA : *Law* !—DISTRIB. India (W. Peninsula) ; Ceylon.

5. **Aneilema pauciflorum,** *Wight, Icon.* v. 6 (1853) p. 31, t. 2077 (*not* of Dalzell). A small decumbent plant creeping and rooting at the nodes ; stem villous on one side. Leaves ½—1¼ by $\frac{3}{8}$—$\frac{5}{8}$ in., sessile, ovate, subacute, more or less hairy on both sides, base rounded or cordate ; sheaths with ciliate margins. Flowers blue (?) ; pedicels axillary, solitary, or the upper 1—3-nate, ¼—$\frac{3}{8}$ in. long. Sepals narrowly oblong, thickened at the tips. Petals obovate. Stamens 3 fertile and 3 sterile, the filaments of the latter only half as long as those of the former ; filaments of both stamens and staminodes naked. Capsules ¼ by $\frac{1}{10}$ in., oblong-fusiform, acute, somewhat 3-gonous, smooth, 3-celled. Seeds 4—6 in each cell, 1-seriate, superposed, cubical, nearly smooth, black. Fl. B. I. v. 6, p. 378 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 207 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525.

KONKAN : Matheran, *Woodrow*. DECCAN : Mahableshwar, *Woodrow*.—DISTRIB. India (W. Peninsula), apparently endemic.

There is but one sheet in Herb. Kew. (Wight's original example) from

near Coimbatore in the Madras Presidency. Woodrow gives the plant for Matheran and Mahableshwar.

6. **Aneilema versicolor,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 136. A small herb with weak suberect branches ; root fibrous ; stems 4—8 in. long, many from the root, deeply striate, glabrous or hispid. Leaves alternate, bifarious, 1—2 by $\frac{3}{8}$—$\frac{1}{2}$ in., flat, oblong-lanceolate, acuminate, smooth, stem-clasping, 5—7-nerved ; sheaths rather long, furrowed, more or less hispid. Flowers ochre-yellow, bluish when withering, rose-colored in bud (*Dalzell*) ; pedicels axillary, filiform, jointed about the middle, solitary or the upper 1—3-nate. Sepals oblong, obtuse, concave. Petals ochre-yellow. Stamens 3 fertile, spreading ; filaments subulate, bearded in the lower part. Staminodes 3, shorter than the fertile stamens ; filaments sparingly bearded. Capsules $\frac{1}{4}$ in. long, scarcely longer than the persistent sepals, linear, subtrigonous, pointed, erect ; cells 5—7-seeded. Seeds cubical, about $\frac{1}{16}$ in. long. Fl. B. I. v. 6, p. 378 ; Dalz. & Gibs. p. 253 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 208 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525.

KONKAN : Malwán, *Dalzell & Gibson.* DECCAN : Mahableshwar, *Cooke!* S. M. COUNTRY : *Ritchie,* 749!—DISTRIB. India (W. Peninsula).

7. **Aneilema nudiflorum,** *R. Br. Prodr.* (1810) p. 271 (*in adnot.*). Root fibrous ; stem subsimple or branched from the base ; branches 6—12 in. long, weak, procumbent, often rooting at the nodes. Leaves 2—5 by $\frac{1}{4}$—$\frac{1}{2}$ in., linear-oblong or lanceolate, acute or acuminate, flat, glabrous, hairy or sparingly villous, base rounded, cordate, or narrowed into the sheath ; sheaths hairy, the margins and mouth strongly ciliate. Flowers in terminal (rarely axillary) panicles ; branches of panicles long, scarred above ; flowers in subglobose or subcorymbose cymes at the ends of the branches ; pedicels $\frac{1}{8}$—$\frac{1}{6}$ in. long ; bracts $\frac{1}{6}$ in. long, cymbiform, caducous. Sepals $\frac{1}{8}$ by $\frac{1}{20}$ in. oblong, obtuse. Petals suborbicular, blue or purple. Stamens 2 perfect, 2—4 sterile ; filaments of the fertile only or of all bearded. Ovary 3-celled ; cells 2-ovulate ; style naked. Capsule $\frac{1}{8}$ in. long, 3-gonously subglobose, membranous, mucronate, smooth, 3-celled, with 2 seeds in each cell. Seeds $\frac{1}{16}$ in. long, truncate at one end, rounded at the other, angular on the inner, rounded on the outer face, tuberculate, dark brown. Fl. B. I. v. 6, p. 378 ; Dalz. & Gibs. p. 253 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 210 ; Trim. Fl. Ceyl. v. 4, p. 308 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525 ; Prain, Beng. Pl. p. 1084. *Commelina nudiflora,* Linn. Mantiss. p. 177 (*not* of Sp. Pl.) ; Grah. Cat. p. 223.—Flowers : Sept.

Throughout the Presidency tolerably common. GUJARAT : Domas near Surat, *Cooke!* ; Godra, *Cooke!, Woodrow.*—DISTRIB. Throughout India ; Ceylon, China, Malay Islands.

VAR. *compressa,* Clarke, in DC. Monog. Phan. v. 3 (1881) p. 211. Leaves shorter, more fleshy ; petals rose-colored ; ovary often with 3 ovules in each cell ; capsules often with 3 seeds in each cell. Fl. B. I. v. 6, p. 379. *Aneilema compressum* (sp.), Dalz. in Kew Journ. Bot. v. 3 (1851) p. 138 ; Dalz. & Gibs. p. 253.

KONKAN : Malwán, *Dalzell!*

8. **Aneilema sinicum,** *Lindl. Bot. Reg.* (1822) t. 659. Root of elongate tubers ; stems 1—2 ft. high, suberect, glabrous, with long internodes. Leaves 6—12 by ½—⅝ in., linear, acute, cauline and tufted at the base of the stem, glabrous or nearly so ; sheaths long, ciliate. Flowers in terminal lax panicles ; branches of the panicle closely scarred above ; bracts ⅜ in. long, ovate, acute, membranous, caducous ; pedicels 0—¼ in. long. Sepals ovate, acute, concave. Petals exceeding the sepals, obovate or suborbicular, blue. Stamens 2 fertile, twice as long as the staminodes, with bearded filaments ; 1 rudimentary stamen consisting of a bearded filament with an acute antherless apex and 3 sterile stamens, the filaments of which are naked. Ovary with 2 ovules in each cell. Capsules subglobose, ¼ in. in diam., 3-celled, each cell 1—2-seeded. Seeds 1/12 in. long, obscurely rugose. Fl. B. I. v. 6, p. 379 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 212 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525. *Aneilema secundum,* Wight, Icon v. 6 (1853) p. 31, t. 2075.

KONKAN : *Stocks* ! DECCAN : Mahableshwar, *Cooke* ! ; Wada, *Woodrow.*— DISTRIB. India (W. Peninsula) ; Africa, China, Malay Islands.

9. **Aneilema giganteum,** *R. Br. Prodr.* (1810) p. 271. Root fibrous, the fibres thick but scarcely tuberous ; stem 1—3½ ft. high, erect, glabrous or nearly so, with long internodes. Leaves : the lowest 10—18, the upper 2—5 in. long, ⅛—½ in. broad, linear, finely acuminate, flat, striate, narrowed into a short or long sheath. Flowers ½ in. across in terminal (rarely axillary) panicles ; primary branches 3—4, umbellate, each again branched, the ultimate branches deeply, closely (almost pectinately) scarred ; bracts at the axils of the branches of the panicle large, broadly ovate, cordate, acute ; bracteoles ⅛—¼ in. long, orbicular, concave, caducous ; pedicels ⅛—¼ in. long. Sepals ovate-oblong, acute, concave. Petals pale purplish-blue, obovate or suborbicular. Stamens 3 perfect and 3 sterile ; filaments of all equal and bearded. Ovary 3-celled ; cells 2-ovulate ; style naked. Capsules ⅜ in. long, oblong-ellipsoid, mucronate, the cells 2-seeded ; valves hard, polished. Seeds irregularly shaped, rough or echinulate, brown. Fl. B. I. v. 6, p. 379 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 212 ; Trim. Fl. Ceyl. v. 4, p. 308. *Aneilema ensifolium,* Wight, Icon. v. 6 (1853) p. 30, t. 2074.

KONKAN : *Stocks* !, *Law* ! DECCAN : Mahableshwar, *Cooke* !—DISTRIB. India (Assam, Khasia Hills, W. Peninsula) ; Ceylon, Malay Islands, China, Australia, Africa.

10. **Aneilema ochraceum,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 135. Stem 4—8 in. long, rooting at the lower nodes, erect, simple, round, smooth, leafy. Leaves sessile, ¾—1½ by ¼—½ in., flat, oblong or ovate-oblong, acute or subobtuse, glabrous or nearly so, base cordate, subamplexicaul. Pedicels fascicled, 2—7 from a leaf-axil, ¼—¾ in. long, slender, minutely hispid, articulate about the middle. Sepals elliptic, obtuse, glabrous. Petals ochre-yellow, when withering blue, obovate. Stamens 3 fertile and 3 sterile ; filaments of the fertile longer than those of the sterile ones, all naked. Capsules ⅛—⅙ in. long, broadly oblong, obtuse, mucronate. Seeds 7—8 in each cell in 2 rows, straw-colored, angular, rugose. Fl. B. I. v. 6, p. 380 ; Dalz.

& Gibs. p. 253; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 214, t. 4, fig. 3; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525. *Dichæspermum repens*, Wight, Icon. v. 6 (1853) p. 31, t. 2078, fig. 3 (*not* of Hassk.).

KONKAN: *Stocks!*, *Law!*, *Woodrow*; wet places in the S. Konkan, *Dalzell & Gibson*. KANARA: *Law!*, *Dalzell!*—DISTRIB. India (W. Peninsula).

11. **Aneilema lanuginosum,** *Wall. Cat.* (1828) 5221. Root of thickened fibres, almost tuberous; stem erect, pubescent, or villous, or nearly glabrous, 6—16 in. long, stout, branched. Leaves sessile, 1½—2½ by ¼—⅜ in., linear or linear-lanceolate with a broad base, finely acuminate, pubescent on both sides, conspicuously striate and with undulate margins. Flowers from the upper leaf-sheaths, 1—5 from each sheath; pedicels ¾—2 in. long, erect in fruit, jointed in the middle and there furnished with a minute ovate scarious bracteole. Sepals ¼ by ⅛ in., elliptic, obtuse, straw-colored. Petals ⅜ in. long, broadly obovate or suborbicular, salmon-colored, turning blue in drying (*Gamble*). Filaments densely bearded. Capsules nearly ⅛ in. long, oblong, trigonous, shining, long-cuspidate with the style. Seeds angular, smooth, sometimes slightly pitted. Fl. B. I. v. 6, p. 380; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 214; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525.—Flowers: Sept.—Oct.

KONKAN: *Stocks!*, *Law!* DECCAN: Mahableshwar, *Woodrow*. S. M. COUNTRY: Belgaum, *Ritchie*, 1474!—DISTRIB. India (W. Peninsula), apparently endemic.

12. **Aneilema paniculatum,** *Wall. Cat.* (1828) 5216. A small plant 2½—8 in. high; root fibrous; stem sheathed at the base with yellowish scarious sheaths. Leaves 2—4 by 1/20—1/10 in., linear, finely acuminate. Flowers in paniculate cymes; bracts ochreate, 1/20—1/16 in. long, cyathiform, truncate, with a tooth at the apex, persistent; pedicels ⅛—⅜ in. long, filiform, red (*Dalzell*). Sepals 1/10—⅛ by 1/16 in., elliptic, obtuse, glabrous. Petals ⅛—⅙ in. long, obovate, cuneate, veined, blue. Stamens 3 fertile and 3 sterile; filaments all connate at the very base, naked. Ovary ovoid; style 1/16 in. long. Capsules 1/10—⅛ in. long, ellipsoid or subglobose, smooth, shining. Seeds 6—8 in each cell, pale yellow, 2-seriate, irregularly angular, smooth. Fl. B. I. v. 6, p. 381; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 215; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525. *Aneilema semiteres*, Dalz. in Kew Journ. Bot. v. 3 (1851) p. 138; Dalz. & Gibs. p. 254. *Dichæspermum juncoides*, Wight, Icon. v. 6 (1853) p. 31, t. 2078. *Commelina Nimmoniana*, Grah. Cat. Pl. Bo. (1839) p. 224.—Flowers: Aug.

KONKAN: *Dalzell!*, *Law!*; Malabar Hill (Bombay), *Graham*; Narel below Matheran, *Kanitkar!* DECCAN: Mâwal near Poona, *Woodrow*; between Poona and Karli, *Jacquemont*, 561! KANARA: Karwar, *Woodrow*.—DISTRIB. India (W. Peninsula) in rocky places.

13. **Aneilema vaginatum,** *R. Br. Prod.* (1810) p. 271 (*in adnot.*). Root fibrous, the fibres stout, almost fleshy; stem 6—18 in. long, very slender, flaccid, rooting at the lower nodes; branches suberect, ending in filiform peduncles with distant flowering bracts. Leaves 3—8 by ¼—⅜ in., linear, acuminate, flat, glabrous or sparsely hairy;

sheaths short, open, ciliate. Flowers small, 1—3 together, fascicled in distant bracts, along the filiform very slender terminations of the branches ; bracts ⅛—½ in. long, narrowly oblong, obtuse, sheathing, strongly ribbed ; pedicels ½—¾ in. long, very slender, puberulous, usually twice-jointed. Sepals ⅛ in. long, ovate-oblong, obtuse, glabrous or pubescent. Petals orbicular, blue. Stamens 2 perfect, 3—4 sterile ; filaments of the perfect stamens bearded, those of the sterile ones usually naked, shorter than the fertile filaments. Ovary 2-celled ; cells 1-ovulate. Capsules ⅛ in. in diam., globose, cuspidate, shining, 3-celled ; cells 1-seeded or empty. Seeds 3-gonously conic, one end abruptly truncate, the other narrowed, obtuse, slightly rugose, black. Fl. B. I. v. 6, p. 381 ; Wight, Icon. t. 2076 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 216 ; Trim. Fl. Ceyl. v. 4, p. 309 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525 ; Prain, Beng. Pl. p. 1084. *Aneilema pauciflorum,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 136 ; Dalz. & Gibs. p. 253.—Flowers : Aug.

A very distinct species. The panicle is reduced to a long filiform rhachis with very distant bracteate clusters of flowers.

KONKAN : *Dalzell* !, *Stocks* !, *Law* ! ; Matheran, *Woodrow*. KANARA : *Law* ! —DISTRIB. Throughout tropical India in rice-fields and wet places; Ceylon, China.

EXCLUDED SPECIES.

ANEILEMA KOENIGII, Wall. Cat. (1828) 5214. This does not appear to be a Bombay plant. Woodrow includes it in his list of plants without locality. According to the 'Flora of British India' it occurs in S. India to the south of the Konkan and Kanara. I have seen no specimens from Bombay; there are none in Herb. Kew., and the plant does not seem to have been found by any Bombay botanists.

3. CYANOTIS, Don.

Herbs prostrate or creeping. Leaves small. Flowers in axillary and terminal scorpioid cymes, formed of large imbricate, 2-seriate, secund, foliaceous, falcate bracteoles, the petals and stamens alone exserted (rarely the corolla-tube also exserted) ; sometimes the flowers in exposed racemes or fascicled in the ochreate leaf-sheath. Sepals 3, subequal, free or connate below. Petals 3, subequal, often united into a tube below ; the limb orbicular. Stamens 6, all perfect, subequal, hypogynous or epipetalous ; filaments usually bearded, often inflated towards the apex ; anthers oblong. Ovary 3-celled ; ovules 2 in each cell, collateral, one erect, the other pendulous. Fruit a 3-celled loculicidal capsule. Seeds usually 2 in each cell, superposed, cubical or pyramidal, usually rugose.—DISTRIB. Species 35, in the warm regions of the Old World, Africa, India, Malaya, Ceylon, S. China, Tropical Australia.

Cymes enclosed in 2-seriate falcate imbricating bracteoles; valves of the capsule separating from a free central columnar 3-toothed axis ..... 1. *C. papilionacea.*

Capsule with no free central column after dehiscence.

Root of fusiform narrow tubers; a large coarse species ..... 2. *C. tuberosa.*

JAI-HIND COACHING CLASSES.
406, 4th Floor, Auto Commerce House,
Kennedy Bridge, BOMBAY-7.

Root fibrous.
A floccosely silky or cobwebby woolly herb; filaments bearded with hairs of 2 colors; leaves ¾—2 in. long; seeds oblong, faintly rugose..... 3. *C. fasciculata.*
Not floccosely silky nor cobwebby; filaments bearded with hairs of one color.
Leaves 1¼—2¼ in. long, ovate-oblong with rounded or cordate bases; seeds 3-gonous, striate, with 2 large pits on 2 of the faces. 4. *C. cristata.*
Leaves 6—18 in. long, narrowed from the base to the tip; seeds truncate at the base, slightly tapering upwards, with shortly conical apex ..... 5. *C. Wightii.*
Bracteoles small, not imbricating in 2 series.
Epiphytic viviparous herb; flowers in small umbels terminating short lateral peduncles from a long scape ..... 6. *C. vivipara.*
Terrestrial not viviparous herb; flowers axillary, enclosed in the sheaths of the leaves..... 7. *C. axillaris.*

1. **Cyanotis papilionacea,** *Schultes f. Syst.* v. 7 (1830) p. 1151. A hispid annual 4—8 in. high, sparingly branched from near the base, the branches decumbent, often rooting; stem red, terete, striate, patently pilose. Leaves sessile, linear-oblong or lanceolate, 1—2 by ¼—½ in., acute, acuminate, or obtuse and apiculate, more or less hairy above, patently hairy beneath, the upper leaves longer than the lower; sheaths very short. Peduncles slender, ½—2 in. long, patently hairy; bract ovate-lanceolate, falcately recurved, often longer than the spike; bracteoles ⅓ in. long, 2-seriate, ovate, falcate, acute, ciliate. Sepals lanceolate, acute, ciliate. Corolla-tube whitish, longer than the lobes; lobes bluish-purple, rounded. Stamens much exserted, twice as long as the corolla, equalling the style; anthers violet; filaments slightly thickened at the tip, bearded above with blue hairs. Ovary hairy; style naked. Capsules included, oblong, ¾ by ⅛ in., hairy towards the apex; valves separating from a free central columnar 3-toothed axis. Seeds smooth or pitted, 2 in each cell. Fl. B. I. v. 6, p. 384; Wight, Icon. t. 2089; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 246; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525. *Cyanotis hispida,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 139; Dalz. & Gibs. p. 255. *Tradescantia rupestris,* Law, in Grah. Cat. Pl. Bo. (1839) p. 223.—Flowers: Aug.—Sept.

KONKAN: *Dalzell!*, *Woodrow*; S. Konkan on rocks, *Dalzell & Gibson;* Malwán, *Dalzell!* KANARA: *Law!*—DISTRIB. India (W. Peninsula).

2. **Cyanotis tuberosa,** *Schultes f. Syst.* v. 7 (1830) p. 1153. Root of fusiform tubers; stem 6—36 in. long, swollen and very hirsute at the very base, suberect or prostrate and creeping below, densely villous or almost glabrous. Leaves sessile, the radical and lower cauline 6—10 by ⅓—1 in., often purple beneath, linear or ensiform, villous, the upper cauline leaves much shorter; sheaths of radical leaves 1 in. long, glabrous, those of the cauline leaves shortly silky. Cymes villous or densely hirsute, ½—1 in. long, usually pedunculate, in the axils of short ovate acute leaves (bracts) which are shorter than the cyme, strongly falcately decurved; bracteoles imbricate in 2 series, usually many, ⅓—⅔ in. long. Sepals ¼ by $\frac{1}{16}$

in., linear-lanceolate, acute, densely villous and ciliate. Corolla ⅓ in. long, bluish-purple; lobes $\frac{1}{10}$—$\frac{1}{8}$ in. long, ovate, subacute. Filaments spirally twisted, fusiform towards the tips, densely bearded above with blue hairs; anthers $\frac{1}{20}$ in. long, yellow. Style thickened at the tip, with a tuft of hairs near the apex. Capsules ⅛ by $\frac{1}{10}$ in., ellipsoid, the upper half hairy, the lower half glabrous. Seeds $\frac{1}{16}$ in. long and broad, truncate at the base, shortly conic at the apex, obscurely rugose, brown. Fl. B. I. v. 6, p. 386; Dalz. & Gibs. p. 256; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 249; Trim. Fl. Ceyl. v. 4, p. 312; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525; Watt, Dict. Econ. Prod. v. 2, p. 674. *Tradescantia tuberosa,* Roxb. Cor. Pl. v. 2 (1798) p. 5, t. 108; Grah. Cat. p. 223.—Flowers: Aug.—Sept.

KONKAN: *Stocks*!, *Law*!; N. & S. Konkan, *Law*! DECCAN: Purandhar, *Bhiva*! S. M. COUNTRY: Belgaum, *Stocks*! *Ritchie*, 1½²!; Dharwar, *Woodrow*; Badami, *Woodrow*. KANARA: *Law*!; Kála naddi, *Ritchie*, 743!—DISTRIB. India (W. Peninsula); Ceylon.

VAR. *ascendens,* C. B. Clarke, in DC. Monog. Phan. v. 3 (1881) p. 249. A smaller plant, more glabrous; branches ascending or procumbent, rooting and proliferous at the nodes; flowers blue. Fl. B. I. v. 6, p. 386; Prain, Beng. Fl. p. 1085. *Cyanotis ascendens* (sp.), Dalz. in Kew Journ. Bot. v. 4 (1852) p. 343; Dalz. & Gibs. p. 255. *C. sarmentosa,* Wight, Icon. v. 6 (1853) p. 33, t. 2087.

KONKAN: *Stocks*!, *Law*! DECCAN: hills near Chattersinghi (Poona districts), *Cooke*!; Bowdhan, near Poona, *Ranade*! S. M. COUNTRY: Belgaum, *Dalzell*!, *Stocks*!, *Ritchie*, 1466!; Badami, *Woodrow*.

3. **Cyanotis fasciculata,** *Schultes f. Syst.* v. 7 (1830) p. 1152. A small branched floccosely silky or cobwebby woolly herb; root annual, fibrous; branches 4—10 in. long, spreading, slightly rooting below, leafy. Leaves ¾—2 by ⅛—⅜ in., sessile, linear-lanceolate or narrowed from the base to the tip, acute or acuminate, straight or recurved, cobwebby on both sides (rarely glabrate). Cymes ¼—⅔ in. long, axillary and terminal; peduncles ½—1 in. long, 1 or more together; bracts lanceolate, ⅜—½ in. long, usually falcately recurved, acute, longer than (rarely shorter than or equalling) the cobwebby cyme; bracteoles ¼—⅓ in. long; lanceolate or ovate-lanceolate, falcate, acuminate. Sepals ⅛ by $\frac{1}{12}$ in., elliptic-lanceolate, acute, cobwebby. Corolla ¼ in. long, pink; lobes $\frac{1}{10}$—⅛ in. long, ovate, obtuse or subacute. Filaments filiform, spirally twisted, bearded with hairs of 2 colors, blue and white (*Dalzell*). Ovary with an erect tuft of hairs at the apex; style naked, fusiform at the tip. Capsules ⅛ by $\frac{1}{12}$ in., oblong, 3-gonous, pilose at the apex. Seeds oblong, faintly rugose. Fl. B. I. v. 6, p. 387; Dalz. & Gibs. p. 255; Wight, Icon. t. 2086; Trim. Fl. Ceyl. v. 4, p. 314; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525. *Cyanotis dichrotricha,* Stocks, in Wight, Icon. v. 6 (1853) p. 33, t. 2087.

In the 'Flora of British India,' p. 388, *Tradescantia rupestris* (Law, in Grah. Cat. p. 223) is given as a synonym for this plant, but it has also been given as a synonym for *C. papilionacea* in p. 385, which is the synonymy adopted by Dalzell (Bo. Fl. p. 255), and is, I think, correct.

KONKAN: *Stocks*!, *Law*! DECCAN: common, *Woodrow*; Poona districts, *Cooke*!; Panchgani, *Cooke*!, *Bhiva*!—DISTRIB. India (W. Peninsula); Ceylon.

VAR. *glabrescens*, C. B. Clarke, in DC. Monog. Phan. v. 3 (1881) p. 253. Leaves linear, glabrous, very minutely reticulate on both sides; bracts glabrous; bracteoles woolly. Fl. B. I. v. 6, p. 388.

DECCAN: Panchgani, *Cooke*! S. M. COUNTRY: Belgaum, *Ritchie*, 746!

4. **Cyanotis cristata,** *Schultes f. Syst.* v. 7 (1830) p. 1150. Root fibrous, the fibres very slender; stem branched from the base, the branches 6—18 in. long, slender, creeping and rooting below, then ascending, glabrous or with spreading hairs; internodes 1—3 in. long. Leaves 1½—2½ by ½—¾ in., sessile, spreading, ovate-oblong, obtuse or subacute, flat, glabrous or sparsely hairy, with villously ciliate margins, base rounded or cordate; sheaths short, hirsute. Flowers in scorpioidly recurved cymes ½—1 in. long, longer than the bracteoles; peduncles ½—4 in. long, sometimes almost 0; bracts like the leaves, ⅜—1½ in. long, ovate, cordate, acuminate, ciliate; bracteoles ½ by ⅛ in., few or many, 2-seriate, ovate, falcate, acute, glabrous, or ciliate with long hairs. Sepals lanceolate, acuminate. Corolla-tube not much exceeding the sepals; corolla-lobes ovate. Filaments fusiform below the tip, bearded above. Style naked. Capsules 1/10—⅛ in. long, oblong, 3-gonous, truncate, membranous, nearly glabrous. Seeds 1/20 in. long, 3-gonous, striate and with 2 large pits on two of the faces, black. Fl. B. I. v. 6, p. 385; Dalz. & Gibs. p. 256; Wight, Icon. t. 2082; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 247; Trim. Fl. Ceyl. v. 4, p. 311; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525; Prain, Beng. Pl. p. 1085. *Tradescantia cristata*, Jacq. Hort. Vind. v. 2 (1772) p. 64, t. 137; Grah. Cat. p. 223.—Flowers: Aug.—Oct.

A very common species during the rains. KONKAN: *Stocks*!; Parel (Bombay), *Woodrow*!; Bassein, *Raoji*! DECCAN: Mahableshwar, *Cooke*!, *Woodrow*!; Wassind, *Woodorw*. S. M. COUNTRY: Belgaum, *Ritchie*, 742!—DISTRIB. Throughout Tropical India; Ceylon, Malay Islands, Mauritius, Tropical Africa.

5. **Cyanotis Wightii,** *C. B. Clarke, in DC. Monog. Phan.* v. 3. (1881) p. 250. A tall plant, 2—3 ft. high; root fibrous, woody, not tuberous; stems many, elongate, branched, usually softly villous. Leaves 6—18 by ½—1½ in., narrowly lanceolate, more or less sparsely hairy, with villously ciliate margins, narrowed from the base to the tip; sheaths loose, ½—⅞ in. long, pilose. Cymes axillary and terminal, subcorymbose; peduncles variable in length, usually several together from a large linear-lanceolate, falcately-deflexed leaf; bracts below the cymes ovate-lanceolate, foliaceous, usually longer than the cyme but occasionally shorter; bracteoles falcately ovate, acuminate, ½—¾ in. long, ciliate. Sepals ¼ in. long, lanceolate, acute, hairy. Corolla blue; lobes shorter than the tube, ovate or suborbicular. Filaments bearded above. Ovary obovoid, hirsute at the top; style naked, thickened at the tip. Capsules ⅛ by 1/12 in., obovoid, obtuse, hirsute at the apex, splitting to the base. Seeds 1/16 in. long, truncate at the base, slightly tapering upwards with a shortly conical apex. Fl. B. I. v. 6, p. 386; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525. *Cyanotis longifolia*, Wight, Icon. v. 6 (1853) p. 33, t. 2084 (*not* of Benth.).—Flowers: Aug.—Sept.

DECCAN : Mahableshwar, *Cooke* !, *Woodrow*; Panchgani, *Woodrow*.—DISTRIB. India (W. Peninsula).

6. **Cyanotis vivipara,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 226. Epiphytic, stemless, subscapigerous, clothed with scattered rufous spreading hairs ; rootstock small, with tufts of pilose, radical, sessile, linear, acute leaves, 2—5 by ¼—⅜ in., clothed and ciliate with rufous hairs. Scapes many from the root, very slender (almost filiform), rooting below, viviparous at the apex, with several small oblong-lanceolate acute leaves ¼—½ in. long, from the axils of which short, slender, hairy peduncles issue, each bearing an umbel of 2—4 shortly pedicellate flowers, with 2 small oblong acute bracts beneath each umbel. Sepals ⅛ in. long, narrowly oblong, villous. Petals white, connate to the middle. Filaments not bearded (*Clarke*). Style naked. Capsules ⅛ by 1/20 in., oblong, obtuse, rufous-hairy, the valves much recurved after dehiscence. Seeds cylindric, smooth. Fl. B. I. v. 6, p. 388 ; Dalz. & Gibs. p. 255 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 244, t. 5, fig. 5 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525.—Flowers : Aug.—Sept.

KONKAN : *Woodrow*; N. & S. Konkan, *Law* ! ; Sahyadri Hills, *Dalzell* ! S. M. COUNTRY : Párva Ghát, *Dalzell* !—DISTRIB. India (W. Peninsula).

7. **Cyanotis axillaris,** *Schultes f. Syst.* v. 7 (1830) p. 1154. Root fibrous ; stem annual, 6—18 in. long, stout or slender, diffusely branched, leafy, glabrous ; branches suberect and creeping below, or prostrate, glabrous or sparsely hairy, often colored ; internodes 1—3 in. long. Leaves sessile, 2—6 by ⅛—⅓ in., narrowly linear or linear-lanceolate, acute or acuminate, flat, glabrous or more or less hairy ; sheaths ¼—⅜ in. long, inflated, ciliate. Flowers violet-blue, clustered in the inflated sheaths, the cymes reduced to axillary fascicles of flowers with the small linear or linear-lanceolate bracteoles almost concealed in the leaf-sheaths. Sepals ⅜ in. long, spathulate-lanceolate, acuminate, sparsely hairy. Corolla-tube ⅛ in. long ; corolla-lobes broadly ovate, subacute. Filaments fusiform below the tip, bearded. Style fusiform at the apex, naked. Capsules rather more than ¼ in. long, oblong-ellipsoid, beaked, shortly stipitate, quite glabrous except the beak. Seeds 1/10 in. long, oblong, compressed, truncate at the base, rounded at the apex with a very short conical tip, beautifully mottled, dark brown, shining. Fl. B. I. v. 6, p. 388 ; Dalz. & Gibs. p. 256 ; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 244 ; Trim. Fl. Ceyl. v. 4, p. 315 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525 ; Prain, Beng. Pl. p. 1085 ; Watt, Dict. Econ. Prod. v. 2, p. 674. *Tradescantia axillaris,* Linn. Mantiss. (1771) p. 321 ; Roxb. Cor. Pl. v. 2 (1798) p. 5, t. 107 ; Grah. Cat. p. 223.—Flowers : Aug.—Sept.

DECCAN : common in the W. Deccan, *Dalzell & Gibson;* Poona, *Cooke* !, *Woodrow*. S. M. COUNTRY : Karlimatti, *Woodrow* ! GUJARAT : Baroda, *Woodrow*.—DISTRIB. Throughout India; Ceylon, East Asia, Tropical Australia.

4. FLOSCOPA, Lour.

Erect or subscandent herbs. Leaves lanceolate. Flowers in terminal or axillary panicles of secund but not scorpioid cymes ; bracts

minute. Sepals 3, oblong, free. Petals 3, obovate, free. Stamens 6, all perfect, or 1 imperfect, hypogynous; filaments filiform, glabrous. Ovary 2-celled; ovules solitary in each cell. Fruit a compressed or didymous loculicidal 2-celled capsule. Seed solitary in each cell, hemispheric.—DISTRIB. Species about 11, tropical.

1. **Floscopa scandens,** *Lour. Fl. Cochinch.* (1790) p. 193. Root fibrous; stem rather slender, rooting below; internodes long; branches ascending, leafy above, glabrous or pubescent. Leaves 2—4 by ½—1 in., elliptic-lanceolate, acuminate, much narrowed at the base, subsessile or shortly petiolate, scaberulous above, glabrous or pubescent beneath; sheaths loose, short, glabrous or villous, the mouth fringed with long hairs. Flowers in terminal, sessile or shortly pedunculate villous or hirsute panicles, the flowers racemosely arranged along the long erect or ascending many-flowered branches of the panicle, pedicellate, small, subglobose, the lower flowers bracteate, the upper ebracteate; bracteoles minute. Sepals $\frac{1}{10}$—$\frac{1}{8}$ in. long, rotund-ellipsoid, concave, villous. Petals slightly longer than the sepals, broadly obovate, white, lilac or pink. Filaments longer than the petals, equal, purplish; anthers golden-yellow. Ovary glabrous. Capsules rather broader than long, $\frac{1}{10}$—$\frac{1}{8}$ in. in diam., suborbicular, abruptly subacute at both ends, shining. Seeds $\frac{1}{16}$ in. long, pale glaucous, dorsally transversely wrinkled. Fl. B. I. v. 6, p. 390; Clarke, in DC. Monog. Phan. v. 3 (1881) p. 265; Trim. Fl. Ceyl. v. 4, p. 316; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525; Prain, Beng. Pl. p. 1086. *Dithyrocarpus paniculatus,* Kunth, Enum. v. 4 (1843) p. 79; Dalz. & Gibs. p. 256. *Dithyrocarpus petiolatus, D. Rothii* and *D. undulatus,* Wight, Icon. v. 6 (1853) p. 32, tt. 2079, 2080.—Flowers: Oct.—Nov.

KONKAN: on the Ghâts, *Dalzell & Gibson.* S. M. COUNTRY: Londa, *Cooke*! Castlerock, *Woodrow.* KANARA: *Woodrow*; Jagalbet, *Ritchie,* 747!; Kâla naddi, *Ritchie,* 747!—DISTRIB. Throughout Tropical India in swampy places; Ceylon, East Asia, Tropical Australia.

The following plants of the Order are commonly grown in gardens:—

Rhoeo discolor, Hance, in Walp. Ann. v. 3 (1853) p. 659. Leaves large, upright, much imbricated, narrowly lanceolate, acute, sheathed at the base, green above and purple beneath. Flowers blue or purple, almost included within the bracts. A native of Central America. When grown in a rich soil and regularly watered it is a striking plant easily propagated by cuttings. Common in gardens and in pots about bungalows, usually known as Tradescantia. *Tradescantia discolor,* L'Hérit. Sert. Angl. (1788) p. 8, t. 12; Grah. Cat. p. 223; Dalz. & Gibs. Suppl. p. 94; Woodr. Gard. in Ind. ed. 5, p. 517.

Zebrina pendula, Schnizl. in Bot. Zeit. v. 7 (1849) p. 870. A decumbent herb of creeping habit. It has green leaves 1½ by ¾ in., striped (Zebra-like) with white above and purple beneath. It forms a good basket plant and is also useful for covering the earth in large pots or tubs, or as an edging. It is a native of Mexico, and is easily

propagated by cuttings. *Tradescantia zebrina*, Hort. ex Loud. Encyc. Pl. v. 2 (1855) Suppl. 2, p. 1340 ; Dalz. & Gibs. Suppl. p. 94 ; Woodr. Gard. in Ind. ed. 5, p. 517.

ORDER CXXXVI. **FLAGELLARIACEÆ.**

Shrubs with long, usually climbing leafy stems. Leaves many-nerved, usually long, with sheathing bases. Flowers small, regular, hermaphrodite or dicœcious, in terminal panicles ; bracts often lanceolate ; bracteoles minute or 0. Perianth inferior, persistent ; segments 6, free, small, imbricate, sub-2-seriate, dry or sub-petaloid. Stamens 6, hypogynous ; filaments free, filiform ; anthers ovate or oblong, basifixed, 2-celled. Ovary superior, 3-celled ; ovule solitary in each cell, anatropous, adnate to the axis ; style short with 3 stigmatic arms, or styles 3 distinct. Fruit a small berry or a drupe with 1—3 pyrenes. Seeds laterally attached ; testa membranous or thick ; albumen floury ; embryo lenticular.—DISTRIB. Genera 3 ; species 7—8, of the Old World and Pacific.

1. **FLAGELLARIA,** Linn.

A climbing shrub with long slender stems. Leaves many, lanceolate, with tendril-like tips ; nerves many, parallel. Flowers many, small, hermaphrodite, fascicled or spicate along the branches of a terminal panicle ; bracts small, scale-like. Perianth subpetaloid ; segments 6, ovate, obtuse. Stamens 6, hypogynous. Ovary 3-celled ; ovule solitary, affixed laterally ; style divided nearly to the base into 3 subentire or 2-partite stigmatic arms. Fruit a small globose or ovoid drupe, with a thin succulent exocarp and a bony 1—2-seeded endocarp. Seed globose or ovoid ; testa appressed, membranous.—DISTRIB. Species 1 Fijian and the following :—

1. **Flagellaria indica,** *Linn. Sp. Pl.* (1753) p. 333. A reed-like climber, quite glabrous, climbing over lofty trees by the leaf-tendrils ; stem nearly 1 in. thick towards the base, terete, smooth ; branches clothed with cylindric smooth, striate, closed, truncate sheaths ; branchlets as thick as a crow-quill. Leaves sessile, 6—10 in. long, variable in breadth, lanceolate from a rounded base, shortly narrowed into the sheath, drawn out at the apex into a slender spiral tendril, many-nerved ; sheaths cylindric, striate, 2-auricled at the apex. Flowers white, in shortly pedunculate irregularly laxly branched panicles 6—12 in. long. Outer perianth-segments $\frac{1}{10}$ in. long, broadly ovate or suborbicular, obtuse ; inner segments similar, more or less unequal. Anthers $\frac{1}{12}$ in. long, deeply 2-fid at the base. Ovary to top of stigma $\frac{1}{10}$ in. long ; style-arms about $\frac{1}{20}$ in. long. Drupe pisiform, red, smooth. Fl. B. I. v. 6, p. 391 ; Grah. Cat. p. 230 ; Dalz. & Gibs. p. 256 ; Trim. Fl. Ceyl. v. 4, p. 317 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525 ; Prain, Beng. Pl. p. 1087.

KONKAN : *Stocks* !; S. Konkan, *Dalzell*; among rocks near the sea, *Dalzell & Gibson.*—DISTRIB. Throughout India, chiefly near the coast; Ceylon, Tropical Asia and Africa.

ORDER CXXXVII. JUNCACEÆ.

Erect usually perennial herbs ; stems tufted or with a creeping root-stock. Leaves flat, terete, or reduced to sheaths. Flowers usually small, hermaphrodite, regular, in axillary or terminal cymes, green or whitish and membranous, or brown and coriaceous ; bracts small. Perianth inferior, persistent ; segments or lobes 6, more or less 2-seriate, free or connate below in a very short tube, persistent, imbricate. Stamens usually 6, adnate to the base of the perianth-lobes or hypogynous, occasionally the 3 of the inner series absent ; filaments filiform ; anthers basifixed. Ovary superior, 3-celled or 1-celled ; ovules 3 basilar in 1-celled ovaries, numerous on the inner angles of the cells in 3-celled ovaries, anatropous. Fruit a capsule 1—3-celled, loculicidally 3-valved. Seeds erect ; testa membranous, often produced at each end ; albumen dense ; embryo small, near the hilum.—DISTRIB. Genera 14 ; species about 200.

1. JUNCUS, Linn.

Perennial (rarely annual) glabrous herbs ; stems simple under the inflorescence. Leaves radical, or few near the base of the stem, linear, or terete, or reduced to sheaths. Flowers small, usually clustered in fascicles or 2-fid cymules, either sessile capitate, or unequally pedunculate paniculate, the whole inflorescence terminal or subterminal on the scape-like stems, with 1—3 leafy bracts. Perianth with 6 glume-like segments, free, lanceolate or oblong, often with scarious margins, the 3 outer keeled or with a thickened midrib. Stamens 6 (rarely 3), hypogynous or nearly so ; anthers oblong or linear, erect ; dehiscence longitudinal, introrse. Ovary 1-celled or imperfectly or perfectly 3-celled ; ovules many on each placenta ; style filiform ; stigmatic arms 3, filiform, often spirally twisted. Fruit a capsule, dehiscing by 3 valves with mesial placentas, or rarely by 3 valves leaving the placentas persistent or connate in a central column. Seeds small, ovoid ; testa striate, reticulate, or transversely lineate ; embryo small, near the base of the fleshy albumen.—DISTRIB. Species about 150, temperate and arctic, rarely tropical.

2—5 ft. high; leaves solid, few; seeds shortly tailed at each end; floral bracts ovate, mucronate, with membranous margins; anthers longer than the filaments.	1. *J. maritimus.*
2 ft. high; leaves with a central hollow; seeds not tailed; floral bracts hyaline, acuminate; anthers shorter than the filaments	2. *J. punctorius.*

1. **Juncus maritimus,** *Lamk. Encyc. Méthod.* v. 3 (1789) p. 264. Perennial, densely cæspitose ; stems 2—5 ft. high, erect, terete, striate ; pith solid ; basal sheaths short, narrow, obtuse, pungent, or produced into a solid terete pungent leaf. Flowers in decompound cymes 1—2 in. long, with erect branches ; floral bracts ovate, mucronate, the margins broadly membranous. Sepals $\frac{1}{8}$—$\frac{1}{6}$ in. long, pale-green, with membranous margins, lanceolate, acute. Petals slightly shorter, obtuse. Stamens 6 ; filaments dilated and connate at the base ; anthers linear, yellow, longer than the filaments. Capsules

longer than the sepals, ovoid or conic, 3-gonous, obtuse, mucronate, shining, 3-celled. Seeds oblong or obovoid, caudate at each end. Fl. B. I. v. 6, p. 393 ; Buchen. Monog. Junc. in Engl. Bot. Jahrb. v. 12 (1890) p. 256 ; Boiss. Fl. Orient. v. 5, p. 354 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525.—Flowers : Oct.

SIND : *Woodrow*; sandy shores of Sind, *Stocks, Dalzell,* 11—DISTRIB. Afghanistan and westward to the Atlantic, N. and S. America, Australia.

2. **Juncus punctorius,** *Linn. f. Suppl.* (1781) p. 208. Tall, stout, perennial, pale-green, 2 ft. high ; stems soft, often as thick as a goosequill, terete, smooth. Leaves as long as the stem and nearly as a stout, acuminate, irregularly septate, cylindric or compressed, multitubular with a central hollow. Flowers brownish-red in erect umbellately decompound cymes with divaricate branches ; bracts short, pungent, the floral hyaline, acuminate, shorter than the flowers. Sepals $\frac{1}{10}$—$\frac{1}{8}$ in. long, oblong-lanceolate, acute. Petals broader than the sepals, subacute. Stamens 6, shorter than the sepals ; filaments filiform, as long as or somewhat longer than the anthers ; anthers linear, yellow. Ovary 3-gonous, ovoid ; style cylindric, longer than the ovary. Capsules as long as the sepals, 3-gonous-ovoid, mucronate, 3-celled. Seeds ovoid, minute, scarcely $\frac{1}{30}$ in. long, costate and reticulate, pale brown, not tailed. Fl. B. I. v. 6, p. 395 ; Buchen. in Engl. Bot. Jahrb. v. 12 (1890) p. 277 ; Boiss. Fl. Orient. v. 5, p. 357 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525.—VERN. *Dher.*

SIND : *Stocks,* 1093!

There is but a single specimen from Sind in Herb. Kew. from Stocks and 1 from Beluchistan.—DISTRIB. Beluchistan; westward to Persia, Arabia, and N. & S. Africa.

ORDER CXXXVIII. PALMÆ.

Shrubs or trees, solitary or gregarious, naked or prickly ; stem erect, scandent or decumbent, rarely branched above. Leaves alternate, usually crowded at the apex of the stem, plicate in bud, pinnatisect or palmate, rarely entire or 2-pinnatisect ; petiole sheathing. Flowers small, hermaphrodite or 1-sexual, usually 3-bracteolate, in branched spikes or panicles, enclosed in one or more large sheathing spathes. Perianth inferior, 2-seriate ; segments in each series 3, usually all free, imbricate or valvate. Stamens usually 6, inserted in 2 series opposite the perianth-segments, sometimes 3 opposite the outer series of segments, occasionally many at the base of the perianth, usually included ; filaments free or connate, subulate or filiform (rarely flattened) ; anthers versatile, 2-celled ; dehiscence lateral or extrorse. Ovary 1—3-celled or of 3 one-celled carpels ; ovules in each carpel 1—2, anatropous, adnate to the wall, base, or top of the cell ; stigmas 3, usually sessile. Fruit a 1—3-celled drupe or hard berry, or of 1—3 carpels ; pericarp smooth or rough, or clothed with downward-imbricating shining scales. Seeds erect or laterally attached, rarely pendulous ; raphe usually branching all over the testa ; albumen horny or bony, uniform or ruminate ; embryo small, in a cavity

near the surface of the albumen.—DISTRIB. Genera about 130 ; species about 1100, chiefly tropical.

Leaves pinnate or pinnatisect.
- Fruit not clothed with scales; stem erect, unarmed; neither the leaf-rhachis nor the spadix nor the sheath produced as an armed flagellum.
  - Leaves simply pinnate; leaflets induplicate, without midrib; flowers dicœcious ..... 1. PHŒNIX.
  - Leaves simply pinnate, linear or lanceolate, with midrib and reduplicate sides, the terminal leaflets often confluent as a plaited limb.
    - Spadix androgynous, on the stem below the leaves; clusters of 3 flowers, 1 male between 2 females, all along the spike; stamens numerous ..... 2. PINANGA.
    - Spadix from the leaf-axils; leaflets præmorse, auricled; stamens ∞ ..... 3. ARENGA.
  - Leaves twice pinnatisect, the segments very obliquely dimidiate-flabelliform; spadix axillary, followed progressively downwards by alternate male and female spadices ..... 4. CARYOTA.
- Fruit clothed with reflexed, shining, closely appressed, imbricating scales; leaf-rhachis or spadix or sheath produced as an armed flagellum ..... 5. CALAMUS.

Leaves flabelliform, fan-like or orbicular.
- Spadix axillary, from among the leaves; flowers polygamous ..... 6. NANNORRHOPS.
- Spadix terminal; flowers hermaphrodite; monocarpic palms flowering once and then dying ..... 7. CORYPHA.

1. PHŒNIX, Linn.

Tall trees or low shrubs, the entire stem or the upper portion only closely covered by the more or less rhomboid bases of the petioles ; stems occasionally branched. Leaves pinnate ; leaflets entire, linear, folded longitudinally and attached obliquely with their folded bases to the woody common petiole, the lowest pinnæ often transformed into spines ; midrib 0, but a slender nerve on either side of the fold ; main nerves longitudinal, parallel ; common petiole semiterete or flat, often widening at the base into a sheath, which frequently expands into a mass of tough reticulate fibres. Flowers dicœcious, small, yellowish, coriaceous, on usually several branched axillary (interfoliar) erect or drooping spadices. Spathe basilar, complete, coriaceous. MALE FLOWERS : Sepals 3, connate in a cupular 3-toothed calyx. Petals 3, obliquely ovate, valvate. Stamens 6 ; filaments short, subulate ; anthers erect, dorsifixed. Pistillode minute or 0. FEMALE FLOWERS : Sepals 3, connate in a globose accrescent calyx. Petals 3, rounded, imbricate. Staminodes 6, free or connate in a 6-toothed cup. Carpels 3, free ; ovules erect ; stigmas sessile, hooked. Fruit oblong, terete, 1-seeded, with a terminal stigma, a fleshy pericarp and a membranous endocarp. Seed oblong, ventrally grooved ; albumen uniform or subruminate ; embryo dorsal or subbasilar.—DISTRIB. Asia and Africa ; species about 11.

Tall palms; stems from 15—50 ft. high.
Stem slender, 30—50 ft. high; leaves 7—12 ft. long; fruit orange-yellow ..... 1. *P. sylvestris.*
Stem very stout, 15—20 ft. high; leaves 3—5 ft. long; fruit brown ..... 2. *P. robusta.*
Low palms with very short stems, often stemless.
Stem very short or 0; fruiting peduncles short; bases of leaves thickened and decurrent on the common petiole ..... 3. *P. acaulis.*
Stem ½—10 ft. high; fruiting peduncles long; bases of leaves not thickened and not decurrent on the common petiole ..... 4. *P. humilis* var. *pedunculata.*

1. **Phœnix sylvestris,** *Roxb. Hort. Beng.* (1814) p. 73. A tall graceful palm when not cut for tapping, 30—50 ft. high, with a large thick hemispherical crown ; trunk clothed with the persistent bases of the petioles. Leaves greyish-green, 7—12 ft. long, quite glabrous, pinnate ; leaflets 6—18 by ¼—1 in., fasciculate, 2—4-farious, rigid ; petioles short, compressed only towards the apex, bearing at the base a few channelled triangular spines reaching 4 in. long. MALE FLOWERS white, scented. Spadix 2—3 ft. long, erect ; branches filiform ; peduncle much compressed. Spathes 12—16 in. long, scurfy, separating into 2 boat-shaped valves. Flowers ¼—⅓ in. long, numerous, angular, oblique. Calyx cup-shaped, with 3 short rounded teeth. Petals 3 or 4 times as long as the calyx, concave, warted on the outside. Filaments very short (scarcely any), free ; anthers linear, shorter than the petals. FEMALE FLOWERS : Spadix and spathe as in the male ; fruiting peduncles short, about 6 in. long. Flowers distant, roundish. Calyx cup-shaped, obsoletely 3-toothed. Petals 3, very broad, convolutely imbricate. Staminodes 3 or 4. Fruiting-spadix 3 ft. long, nodding, much compressed, of a golden orange color. Fruit 1—1¼ in. long, oblong-ellipsoid, orange-yellow, edible. Seeds ⅝ in. long, rounded at the ends, grooved on one face, pale brown. Fl. B. I. v. 6, p. 425 ; Grah. Cat. p. 224 ; Dalz. & Gibs. p. 278 ; Griff. Palm. Brit. E. Ind. (1850) p. 141, t. 228, A ; Talb. Trees, Bomb. ed. 2, p. 341 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525 ; Prain, Beng. Pl. p. 1096 ; Brandis, Ind. Trees (1906) p. 645 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 208.—Flowers: Jan.—Feb. VERN. *Shindi.*

Known as the *Wild Date-Palm* or the *Date-sugar Palm,* cultivated and often self-sown; tolerably common throughout India; common in moist ground throughout the dry districts of the Bombay Presidency, usually along banks and in the beds of streams and watercourses, certainly indigenous (*Talbot*).—DISTRIB. Throughout India, wild or more often cultivated.

The leaves are used for making mats, baskets, brooms, and fans. The petioles are beaten and the fibre twisted into ropes which are employed in drawing water from wells. The fruit is eaten by the poorer classes, but is not palatable. From the juice obtained by tapping the tree, a coarse sugar is manufactured by boiling. See Watt, Dict. Econ. Prod. l. c.

2. **Phœnix robusta,** *Hook. f. Fl. B. I.* v. 6 (1892) p. 427. Trunk 15—20 ft. high and about 15 in. in diam., clothed and appearing tessellated from the spirally arranged small leaf-sheaths. Leaves 3—5 ft. long, glabrous, shining, shorter, broader, thinner, and smoother than those of *Phœnix sylvestris ;* leaflets fascicled,

quadrifarious, strict, strongly conduplicate. Fruiting peduncle 2 ft. long. Spathe fringed with brown wool on the keel (*Brandis*). Ripe fruit brown (*Prain*).

The plant was collected by Sir J. Hooker on Parasnath in Behar and seems also to have been obtained by Woodrow on a hill near Bhorkas in the Poona districts. (Notes on a journey from Poona to Nagotna in Records Bot. Survey of India.) The great size of the trunks and their tessellated appearance, due to the comparatively small size of the old appressed leaf-sheaths, furnish good characters. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 526, and in Records Bot. Surv. Ind. v. 1, part 6 (1895) p. 94 ; Brandis, Ind. Trees (1906) p. 645. *Phœnix humilis robusta*, Becc. Males. v. 3 (1886—1890) p. 379.—Flowers : Feb. VERN. *Shelu.*

DECCAN : gregarious on the top of trap hills near Bhorkas (Poona districts), *Woodrow* ; Nandgaon (W. Ghâts), *Woodrow*.—DISTRIB. Behar (on Parasnath).

In the place near Bhorkas, where it is locally abundant, it is used largely for the manufacture of date-matting (*Woodrow*).

3. **Phœnix acaulis,** *Roxb. Hort. Beng.* (1814) p. 73 ; *Buch.-Ham. ex Roxb. Fl. Ind.* v. 3 (1832) p. 783*. A dwarf palm, often almost stemless ; stem bulbiform, 6—10 in. in diam., clothed with the sheaths and the bases of the petioles, the ends of which are often bristly with the protruding hard fibro-vascular bundles. Leaves 2—6 ft. long ; leaflets 10—20 by ⅓—⅔ in., stiff, fasciculate, the base thickened and decurrent ; petioles 1 ft. or more long, with spines 2—6 in. long. Spadix 6—10 in. long, compressed, rather longer than the spathe ; branches very stout, yellow. Spathes about 6 in. long with their bases rather below the surface of the ground. MALE FLOWERS ¼—⅓ in. long, alternate, solitary, pale-yellow. Stamens 6 ; filaments very short. Pistillode 0. FEMALE FLOWERS : Spadix and spathe as in the male. Calyx cup-shaped, truncate, with three obscure teeth on the margin. Petals 3, subrotund, thick and fleshy, concave, smooth. Fruiting peduncle short, usually concealed among the leaves. Fruit ½—⅔ in. long, oblong-ellipsoid, black when ripe, edible. Seed ¼—⅓ in. long, deeply grooved. Fl. B. I. v. 6, p. 426 ; Dalz. & Gibs. p. 278 ; Griff. Palm. Brit. E. Ind. (1850) p. 137 ; Talb. Trees, Bomb. ed. 2, p. 342 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525 ; Prain, Beng. Pl. p. 1096 ; Brandis, Ind. Trees (1906) p. 645 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 199.—Flowers : Dec.—Jan. VERN. *Shevra ; Shilind.*

The *Dwarf Date-Palm.* KANARA : Ghâts of the Sirsi taluka (N. Kanara), *Talbot.*—DISTRIB. Northern and Central India, Birma, W. Peninsula.

4. **Phœnix humilis,** *Royle, Illustr.* (1839) p. 394. VAR. **pedunculata,** *Becc. Males.* v. 3 (1886—1890) p. 379. Monœcious, soboliferous ; stem ½—10 ft. high, by 9 in. in diam., densely covered with the bases of the fallen petioles more or less spirally arranged ; root suckers developing when the primary stem has been burnt or injured.

* Roxburgh attributes this to himself in Hort. Beng. (1814), but to Buchanan in Flor. Ind. (1832).

Leaves 4—8 ft. long ; leaflets pliable, 10—20 by ⅓—½ in., fasciculate, more or less quadrifarious, the uppermost sometimes confluent, base not thickened and not decurrent into the common petiole ; petioles 1 in. broad at the base, with spines reaching 3 in. long. Spathe about 8 in. long, with fringed margin. Spadix scarcely exceeding the spathe. Calyx cup-shaped, 3-toothed. Fruiting spadix 3—4 ft. long, the compressed peduncle much elongate. Fruit ½ in. long, at first orange then black, edible. Fl. B. I. v. 6, p. 427 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 526 ; Talb. Trees, Bomb. ed. 2, p. 342 ; Brandis, Ind. Trees (1906) p. 645 (in part). *Phœnix pedunculata* (sp.), Griff. Palm. Brit. E. Ind. (1850) p. 139.—Flowers : Dec.—Feb. Doubtfully distinct from *P. acaulis*.

Common on the Ghâts of N. Kanara, *Talbot*.—DISTRIB. Hilly districts of India ; China, Cochinchina.

The leaflets are made into mats commonly used for covering bales of red pepper in the Dharwar district (*Talbot*).

Phœnix rupicola, T. Anders. in Journ. Linn. Soc. v 11 (1870) p. 13. A small graceful palm a native of Sikkim, occasionally grown in gardens. It develops a stem very slowly and when fully grown the trunk is 12—20 ft. high by 8—10 in. in diam. It has bright green leaves which are somewhat spirally twisted, leaflets 18 by ½—1 in., and an oblong shining yellow fruit ¾ in. long. Fl. B. I. v. 6, p. 425 ; Woodr. Gard. in Ind. ed. 5, p. 526 ; Brandis, Ind. Trees (1906) p. 646.

2. **PINANGA,** Blume.

Unarmed ; stem erect, annulate. Leaves pinnatisect, with the upper segments confluent. Flowers monœcious, androgynous, ternate, 1 female between 2 males, the clusters in 2 or 4 or 6 series on spadices from the stem below the leaves ; spathe solitary. MALE FLOWERS obliquely 3-quetrous. Sepals 3, acute, keeled, not imbricate. Petals 3, ovate or lanceolate, valvate. Stamens 6 or many ; anthers subsessile, basifixed, erect. FEMALE FLOWERS much smaller than the males, ovoid or globose. Sepals 3, orbicular, imbricate. Petals 3, orbicular, broadly imbricate. Ovary 1-celled ; ovule basilar, erect ; stigmas 3. Fruit ovoid or ellipsoid, with fibrous pericarp. Seed ovoid or ellipsoid ; albumen ruminate ; embryo basilar.—DISTRIB. Tropical Asia and Malaya ; species about 24.

1. **Pinanga Dicksonii,** *Blume, Rumphia,* v. 2 (1836) p. 77 *in Obs.* A very slender, smooth, green-stemmed palm ; trunk solitary, tall, 16—20 ft. high by 1—2 in. in diam., soboliferous. Leaves pinnate, forked, 4 ft. long ; leaflets numerous, sessile, elongate, 12—24 by ¾—1 in., broadly linear, præmorse, 5—7-nerved, the uppermost confluent. Spadix refracted ; branches 4—8, stout, densely clothed with imbricating flowers. Spathe simple, rigid, compressed. MALE FLOWERS : Sepals subulate. Petals rather longer than the sepals, ovate, cordate, valvate, tapering at the tips. Stamens numerous, 20—30 ; filaments very short ; pistillode 0. FEMALE FLOWERS : Sepals reniform. Petals similar. Fruit ½—¾ in. long by ⅓ in. in

diam., ellipsoid. Fl. B. I. v. 6, p. 409 ; Talbot, Trees, Bomb. ed. 2, p. 339 ; Brandis, Ind. Trees (1906) p. 647. *Areca Dicksonii*, Roxb. Fl. Ind. v. 3 (1832) p. 616 ; Griff. Palm. Brit. E. Ind. (1850) p. 153, t. 231.

KANARA : evergreen forests near the Gairsoppa and Nilkund Ghâts of N. Kanara, gregarious and locally abundant, *Talbot*.—DISTRIB. India (W. Peninsula).

3. **ARENGA,** Labill.

Tall stout palms, flowering first from an upper leaf-axil and successively from the lower ; upper portion of trunk densely clothed with the black fibrous remains of the leaf-sheaths. Leaves terminal, long, pinnatisect ; leaflets long, linear, usually præmorse, with a midrib and numerous longitudinal nerves and one or two auricles at the base. Spathes many, clothing the peduncle of the spadix. Spadix axillary, large, much-branched ; branches slender, pendulous ; peduncles short, decurved. Male and female flowers usually solitary and in separate spadices, rarely 3-nate, a female between two males. MALE FLOWERS symmetric. Sepals 3, orbicular, imbricate. Petals oblong, valvate. Stamens numerous ; filaments short ; anthers apiculate ; pistillode 0. FEMALE FLOWERS subglobose. Sepals cordate. Petals triangular, valvate. Staminodes many or 0. Ovary subglobose, 3-celled. Fruit obovoidly globose, 2—3-seeded ; stigmas terminal. Seeds compressed or plano-convex ; albumen uniform ; embryo dorsal.—DISTRIB. Tropical Asia and Australia ; species 10.

1. **Arenga Wightii,** *Griff. in Calc. Journ. Nat. Hist.* v. 5 (1845) p. 475. Monœcious, forming dense clumps by suckers. Trunk 3—10 ft. high, as thick as a man's thigh, soboliferous. Leaves 12—28 ft. long ; leaflets alternate, crowded, 3—3½ ft. long by 1½—2 in., linear-ensiform, pale beneath, the margins sparingly toothed from the middle, 2-auricled at the base, the lower auricle very large, 1½—2 in. long, obliquely over-lapping the petiole, the apex narrowed, unequally 2-lobed and jagged-toothed. Spadix decurved, pendulous ; peduncle about 2 ft. long, quite concealed by the sheathing imbricate lacerate spathes. MALE FLOWERS strongly scented. Branches of the spadix about 2 ft. long, subfastigiate, slender, with a scaly bract at the base of each ; flowers distant, rather large, in pairs ; buds acute. Sepals 3, orbicular, imbricate, with thick bases. Petals 3, oblong, very thick and coriaceous. FEMALE FLOWERS : Branches of the spadix attenuate towards the ends, where they bear rudimentary flowers. Sepals broadly cordate, small. Petals triangular, acute or cuspidate. Stigmas 3, short, recurved. Fruit spirally arranged and crowded on the lower halves of the branches of the spadix (the upper halves naked), about as large as a crab-apple, globosely turbinate, broader than long, much depressed at the apex, crowned with the remains of the stigmas. Seeds 3, convex on one face, unequally angular on the other, marked with branched veins converging at the apex of the seed, smooth, brown ; albumen uniform. Fl. B. I. v. 6, p. 422 ; Griff. Palm. Brit. E. Ind. (1850) p. 167, t. 235, E ; Talb. Trees, Bomb. ed. 2, p. 340 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899)

p. 525 ; Brandis, Ind. Trees (1906) p. 648.—Flowers: Nov.—Jan. VERN. *Dhudasal.*

KANARA : Ankola Ghâts of N. Kanara; common on the Mushki Ghât at about 1500 ft. elevation; very common on the Ghâts near the falls of Gairsoppa in evergreen forests; Divimana Ghât (N. Kanara), *Woodrow.*—DISTRIB. India (W. Peninsula).

Arenga saccharifera, Labill. in Mém. Inst. Par. v. 4 (1801) p. 209. A beautiful and magnificent palm with trunk 20—40 ft. high, and large dark-green shining leaves 20—25 ft. long, which take a graceful plume-like curve towards the summit. Fine specimens may be seen in Bombay, where it is grown as an ornamental tree. It is a native of Assam, Birma, and the Malay Peninsula. Fl. B. I. v. 6, p. 421 ; Griff. Palm. Brit. E. Ind. (1850) p. 164 ; Woodr. Gard. in Ind. ed. 5, p. 518 ; Brandis, Ind. Trees (1906) p. 648.

4. CARYOTA, Linn.

Tall unarmed palms with annulate, naked or sheathed trunks, soboliferous or not, flowering when full grown from the axils of the leaves, beginning at the upper and then successively downwards, after which the plant dies, usually a male and a female spadix alternately. Leaves terminal, usually forming an elongate coma, few, large, bipinnatisect or decompound ; leaflets (pinnules) very obliquely dimidiately flabelliform, or cuneiform, præmorse or rounded at the tip, their bases swollen at the point of attachment ; nerves and veins flabellate. Flowers monœcious, solitary and nude, or ternate with the central flower female, on the slender pendulous branches of axillary (*interfoliar*) much fastigiately branched spadices with short thick peduncles. Spathes 3—5, incomplete, tubular. MALE FLOWERS symmetric. Sepals 3, short, rounded, coriaceous, closely imbricate. Petals 3, larger than the sepals, linear-oblong or ovate-oblong, valvate. Stamens numerous ; filaments short ; anthers long ; pistillode 0. FEMALE FLOWERS subglobose, smaller than the male. Sepals 3, ovate or orbicular, concave, closely imbricate. Petals 3, rounded, valvate. Staminodes 3 or 6 or 0. Ovary obovoid, 3-gonous, 3-celled ; ovule in each fertile cell solitary ; stigma sessile, 3-lobed. Fruit glabrous, 1—2 (rarely 3) -seeded, crowned by the stigma ; sarcocarp full of rhaphides. Seed erect ; albumen ruminate ; embryo dorsal.—DISTRIB. Tropical Asia, Malaya and Australia ; species about 10.

1. **Caryota urens,** *Linn. Sp. Pl.* (1753) p. 1189. Trunk 40—60 ft. high by 1—1½ ft. in diam., cylindric, annulate, not or scarcely soboliferous, smooth, grey, shining, covered with long shallow cracks with corky edges. Leaves bipinnate, 18—20 by 10—15 ft. ; primary divisions 5—6 ft. long, arched and drooping ; leaflets 4—8 in. long, fasciculate or alternate, cuneiform, obliquely truncate, irregularly serrate-toothed on the truncate margin, the upper margin produced beyond the leaflets into a tail, flabellately veined, quite glabrous, bright green, shining, the margins at the base recurved ; petiole

very stout, about 3 in. thick at the base ; sheath smooth, with fibrous netted margins. Spadix 10—12 ft. long ; branches simple, forming a dense tassel drooping from the stout short peduncle, all reaching the same level. Spathes 1½ ft. long, closely embracing the peduncle of the spadix. MALE FLOWERS : Buds narrowly cylindric, ½ in. long. Sepals cordate, ciliate. Petals coriaceous, concave, reddish. Stamens about 40 ; filaments short, white ; anthers acuminate, as long as the petals. FEMALE FLOWERS : Sepals rather broader than in the male. Staminodes usually 3. Ovule solitary, erect. Fruit ⅔—¾ in. in diam., reddish ; pericarp acrid, stinging. Seeds 1 or 2. Fl. B. I. v. 6, p. 422 ; Grah. Cat. p. 226 ; Dalz. & Gibs. p. 278 ; Griff. Palm. Brit. E. Ind. (1850) p. 169 ; Trim. Fl. Ceyl. v. 4, p. 324 ; Talb. Trees, Bomb. ed. 2, p. 341 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525 ; Prain, Beng. Pl. p. 1093 ; Brandis, Ind. Trees (1906) p. 654 ; Watt, Dict. Econ. Prod. v. 2, p. 206.—Flowers during most of the year. VERN. *Bherli-mád.*

Very common in the evergreen forests of the Konkan and N. Kanara.—DISTRIB. Throughout the hotter parts of India; Ceylon, Tropical Asia, Malaya.

The leaves give the *Kittul* fibre, which is very strong and is made into ropes, brushes, baskets, and other articles; the fibre from the sheathing petioles is made into ropes and fishing-lines. The trees are tapped for *toddy*, which when boiled yields coarse sugar (*jaggery*). The pith furnishes a good palatable sago, while the outer part of the stem supplies a hard durable wood used for agricultural purposes and in general use for field-tools.

The tree is known as the *Hill-Palm* or *Sago-Palm;* sometimes called the *Fish-tail Palm.* See Watt, Dict. Econ. Prod. l. c.

5. **CALAMUS,** Linn.

Perennial, armed, usually scandent tufted palms. Leaves alternate, pinnatisect ; leaflets acuminate ; nerves parallel ; rhachis often produced as an armed flagellum ; sheath armed, produced into a ligule or ochrea with or without a lateral armed flagellum. Flowers small, polygamo-dioecious, in usually distichous often scorpioid spikelets, solitary or binate (a female, a male, or both) in the axils of the bracteoles of axillary usually much-elongate and much-branched spadices. Spathe tubular or open, persistent, sheathing the peduncle and branches of the spadix, and passing into bracts and bracteoles. MALE FLOWERS : Calyx cupular, 3-toothed. Petals 3, acute, coriaceous, valvate. Stamens 6 ; filaments short ; anthers dorsifixed. FEMALE FLOWERS slightly accrescent ; fruiting pedicelliform or explanate. Calyx tubular, 3-toothed. Corolla tubular below, 3-fid ; lobes valvate. Staminodes connate into a cup. Ovary incompletely 3-celled, clothed with retrorse scales ; ovules basilar, erect ; style short or long ; stigmas 3. Fruit globose or ellipsoid, beaked ; pericarp thin, clothed with appressed, deflexed, closely imbricate scales. Seed subglobose or oblong, smooth or pitted ; albumen uniform or ruminate ; embryo vertical or basal.—DISTRIB. India, Malay Archipelago, S. China, N. Australia ; a few in Tropical Africa ; species 160—170.

An extensive climber; stems slender ..... 1. *C. pseudotenuis.*
Stems stout, erect ..... 2. *C. Thwaitesii.*

1. **Calamus pseudotenuis,** *Becc. ex Hook. f. Fl. B. I.* v. 6 (1892) p. 445. Stem slender, extensively climbing ; sheaths set with many unequal, straight, flat, very sharp spines reaching sometimes 1 in. long. Leaves about 4 ft. long ; petioles 8 in. long, with a few solitary short spreading spines ; rhachis not produced into a flagellum, armed with slender flat spines, scurfy when young ; flagellum of sheath very long, slender, compressed below, thin, cylindric, and set with half rings of deflexed hooked spines ; leaflets 50 or more, nearly equidistant, 8—15 by ¾—1 in., linear-lanceolate, acuminate, thin, with setulose margins ; nerves 3—5. MALE FLOWERS : Spikes of the spadix long, slender, decurved. Flowers usually 2—3 together, $\frac{1}{10}$—$\frac{1}{8}$ in. long, subglobose. Calyx cupular, lobes acute. Petals sessile, short, polished. Filaments very short. FEMALE FLOWERS : Spadix very long, slender ; branches distant, armed with short deflexed spines. Spathes flattened, the lower elongate, tubular, 2-edged. Fruit ovoid, ⅓—½ in. in diam. ; beak stout, ¼ in. long, conical ; scales 9—12 in a vertical row, rounded, dull-yellow with brown scarious margins. Trim. Fl. Ceyl. v. 4, p. 330 ; Talb. Trees, Bomb. ed. 2, p. 345 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 526 ; Brandis, Ind. Trees (1906) p. 652.

KANARA : common on the Ghâts of N. Kanara, *Talbot.*—DISTRIB. India (W. Peninsula) ; Ceylon.

2. **Calamus Thwaitesii,** *Becc. ex Hook. f. Fl. B. I.* v. 6 (1892) p. 441. Stem stout, erect, 1½ in. in diam. ; leaf-sheaths with close, oblique, raised lines which are thickly set with flattened, stiff, sharp, shining, deflexed, ovate-lanceolate or ensiform spines, 1—2 in. long and with smaller narrower erect ones below each line of large ones. Leaves 4½ ft. long ; petioles 7—12 in. long, stout, channelled above, set with imperfect rings of flat spines ; rhachis not produced into a flagellum, with a raised ridge, set beneath with half rings of straight, slightly deflexed, dark brown spines ; leaflets many, 2—2½ ft. by 1½—2 in., equidistant or fasciculate, very acute, with ciliate and spinulose margins, 3-nerved beneath, with the midrib retrorsely spinulose. MALE FLOWERS ovoid, ⅛—¼ in. long. Spadix up to 20 ft. long, very slender, with very long flagella set with half whorls of short, deflexed, hooked spines. Calyx broadly 3-lobed ; lobes rounded. Petals ovate-oblong, sessile. Filaments very broad, narrowed at the top into a geniculate tip carrying the versatile anther. FEMALE FLOWERS ⅛ in. long. Spadix with stouter branches than the male. Perianth enlarged in fruit. Fruit seated on the sessile enlarged perianth, ¾—1 in. long including the beak, ellipsoid ; beak stout, conical, straight ; scales rather large, tumid, with a narrow dark-brown border, shallowly channelled in the centre, 5—6 superposed in each vertical row, dull orange-yellow ; albumen uniform. Trim. Fl. Ceyl. v. 4, p. 330 ; Talb. Trees, Pomb. ed. 2, p. 344 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 526 ; Brandis, Ind. Trees (1906) p. 652.—Flowers : Feb.—Mar. VERN. *Handibet.*

KANARA : common in the evergreen forests at the foot of the Nilkund Ghât of N. Kanara, *Talbot.*—DISTRIB. India (W. Peninsula) ; Ceylon.

Calamus Rotang, Linn. Sp. Pl. (1753) p. 325. Sometimes grown in gardens, abundant in the southern part of the Western Peninsula and in Ceylon, but not indigenous in the Bombay Presidency. When young it is a very graceful plant, with pinnate leaves 1—2 ft. long, and with black spines ½ in. long on the stem and leaf-sheaths, but when it attains a height of 5—6 feet and develops its whip-like flagella armed with numerous sharp recurved thorns it is generally considered time to cut it down. Fl. B. I. v. 6, p. 447 ; Trim. Fl. Ceyl. v. 4, p. 331 ; Woodr. Gard. in Ind. ed. 5, p. 520 ; Brandis, Ind. Trees (1906) p. 652.

6. **NANNORRHOPS,** 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 axillary (*intrafoliar*), much-branched ; spathes tubular, sheathing. Flowers polygamous. Calyx tubular, membranous, unequally 3-lobed. Corolla 3-partite ; segments valvate. Stamens in hermaphrodite flowers 6, in male flowers about 9. Ovary 3-gonous ; ovules basilar ; style short ; stigma 3-toothed. Drupe small, globose or oblong, 1-seeded. Seed free, erect, ventrally hollowed ; hilum small ; albumen uniform ; embryo dorsal or sub-basilar.—DISTRIB. India (Sind and the Panjáb) ; Afghanistan ; species 1.

1. **Nannorrhops Ritchieana,** *Griff. in Calc. Journ. Nat. Hist.* v. 5 (1845) p. 342 (under *Chamærops*). Gregarious, the leaves usually tufted from an underground much-branched rhizome 8—10 ft. long, as thick as a man's arm, at times from an erect branching stem reaching 20 ft. high. Leaves 2—3 ft. long and broad, cuneately flabellate, rigid, plicate, greyish-green, consisting of 8—15 linear rigid segments 12—15 in. long, with often interposed fibres, folded, 2-partite ; petioles unarmed, concave, with a mass of rust-colored wool at the base. Flowers polygamous, male and hermaphrodite. Spadix pyramidal ; branches ascending and recurved ; branchlets slender. Flowers in pairs in the axils of hyaline bracts, distinct or connate, and bicuspidate. Calyx thinly membranous, flat, 3-toothed. Petals connate at the base. Stamens 6 (sometimes 9 in the male flowers), in the male flowers inserted in the corolla-tube, in hermaphrodite flowers in its throat. Ovary 3-celled, narrowed into the short style. Fruit globose or ellipsoid, ½—¾ in. in diam. Fl. B. I. v. 6, p. 429 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 526 ; Brandis, Ind. Trees (1906) p. 655.—Flowers : Aug.—Nov.

In the Bombay Presidency confined to Sind. SIND : *Woodrow, Talbot, Brandis.*—DISTRIB. India (Panjáb) ; Afghanistan.

7. **CORYPHA,** Linn.

Tall, stout, unarmed palms, dying after once flowering and ripening their seed, at the age of between 20 and 40 years. Leaves very large, orbicular or lunate, flabellately multifid, the segments folded lengthwise ; petioles stout, concave, spinous at the edges. Flowers

small, hermaphrodite. Spadix large, terminal, erect, pyramidally paniculate. Spathes many, tubular. Calyx cupular, 3-fid. Petals 3, connate at the base, ovate, acute, imbricate or subvalvate. Stamens 6 ; filaments subulate ; anthers dorsifixed. Ovary 3-lobed, 3-celled ; ovules basilar, erect in each cell ; style short, subulate ; stigma minute. Fruit usually 1 globose drupe with 2 abortive carpels at the base. Seed erect, globose or oblong ; albumen uniform ; embryo spiral.—DISTRIB. Tropical Asia ; species 6.

1. **Corypha umbraculifera,** *Linn. Sp. Pl.* (1753) p. 1187. Trunk erect, straight, cylindric, 30—80 by 2—3 ft., annulate. Leaves 8—16 ft. in diam., plicate, cleft to about the middle into 80—100 linear-lanceolate acute or 2-fid lobes ; petioles 5—10 ft. long, very stout, the margins armed with short, compressed, dark-colored spines. Spadix pyramidal, 10—20 ft. long, decompound, shortly and stoutly pedunculate ; peduncles clothed with tubular spathes which are pierced by the primary branches ; branches of the spadix forming pendulous spikes. Calyx broadly 3-lobed. Petals oblong, about $\frac{1}{12}$ in. long. Ovary suddenly contracted into the style. Drupe shortly stipitate, globose, $1\frac{1}{2}$ in. in diam., with 2 small arrested carpels at its base. Seeds globose, very hard, smooth and polished. Fl. B. I. v. 6, p. 428 ; Grah. Cat. p. 224 ; Dalz. & Gibs. Suppl. p. 94 ; Griff. Palm. Brit. E. Ind. (1850) p. 116 ; Trim. Fl. Ceyl. v. 4, p. 328 ; Talb. Trees, Bomb. ed. 2, p. 343 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 526 ; Prain, Beng. Pl. p. 1090 ; Brandis, Ind. Trees (1906) p. 657 ; Watt, Dict. Econ. Prod. v. 2, p. 575.—VERN. *Táli.*

KONKAN : moist forests of the Kumpta and Honavar talukas of N. Kanara, covering extensive areas near the Gairsoppa and Yena rivers, also on the Yellapur Ghâts; sometimes planted in gardens near the coast, *Talbot.*—DISTRIB. India (Andamans, W. Peninsula); Ceylon; cultivated in Tropical India, Ceylon, and Birma.

The *Talipot Palm* of Ceylon or the *Fan-Palm* of S. India, one of the largest and most imposing of Eastern Palms. The young fruit pounded is used for stupefying fish (*Trimen*). The leaves form mats, fans, and umbrellas (of which latter there is a considerable trade from N. Kanara), and are used for writing on. A kind of bread is made from the pounded soft interior of the trunk. The seeds known as *Bajurbet* (*Talbot*) have the hardness of ivory and are used for making beads and buttons and imported into Europe for the latter purpose.

The following non-indigenous palms, not belonging to any of the foregoing genera, are grown as economic or ornamental plants in the Presidency :—

Areca Catechu, Linn. Sp. Pl. (1753) p. 1189. A graceful slender-stemmed palm ; trunk reaching nearly 100 ft. high, scarcely exceeding 1 ft. in diam., green in the upper part, annulate with raised rings which are not quite horizontal but alternately inclined to opposite sides. Leaves pinnate, 4—6 ft. long ; leaflets quite glabrous, 1—2 ft. long, with one or several midribs, the upper leaflets confluent. Spadix androgynous, from below the leaves, branched. Lowest spathe large, glabrous, pale straw-colored, parallel-veined. Stamens 6. Fruit $1\frac{1}{2}$—2

in. long, fleshy-fibrous, orange or scarlet, supported by the persistent perianth, the seeds in the upper part.

The *Supári* or *Betel-nut Palm,* the original country of which is uncertain (said to be Cochinchina), cultivated but never wild throughout the Presidency, very abundantly in the Sirsi and Siddapur talukas of N. Kanara. The wood is used for a variety of purposes ; the sheaths of the leaves are made into hats and also used for writing on. The principal product of the tree, however, is the hard seed, which is chewed by the natives with lime and the leaves of the *Piper Betel.* Fl. B. I. v. 6, p. 405 ; Grah. Cat. p. 225 ; Dalz. & Gibs. Suppl. p. 95 ; Trim. Fl. Ceyl. v. 4, p. 321 ; Talb. Trees, Bomb. ed. 2, p. 339 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525 ; Brandis, Ind. Trees (1906) p. 646 ; Watt, Dict. Econ. Prod. v. 1, p. 291.—VERN. *Supári.*

Actinorhytis calapparia, H. Wendl. & Drude, in Linnæa, v. 39 (1875) p. 184. A tall palm with slender smooth grey annulate trunk 60 ft. high by 1 ft. in diam., said to be indigenous in the islands of the Malay Archipelago, planted in the *Supári* (Areca) gardens of the Haiga Brahmins throughout N. Kanara, probably introduced at the same time and along with the *Supári.* Leaves pinnate, the blade 8 or 9 ft. long by 4½ ft. broad, lanceolate in outline ; leaflets 1¼—1½ in. broad, linear, acuminate, equally 2-partite. Fruit orange, pendulous, ovoid, of the size of a large egg. Talb. Trees, Bomb. ed. 2, p. 340 (*capparia*) ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525 (*capparia*). *Areca calapparia,* Blume, Rhumph. v. 2 (1836) t. 100. fig. 2. *Areca cocoides,* Griff. in Calc. Journ. Nat. Hist. v. 5 (1845) p. 454, & Palm. Brit. E. Ind. (1850) p. 150, t. 230, B.—Flowers : Nov.—Jan. VERN. *Rám-supári.*

Wallichia caryotoides, Roxb. Cor. Pl. v. 3 (1819) p. 91, t. 295. A stemless or short-stemmed palm with pinnatisect leaves, a native of Chittagong and Birma, sometimes grown in gardens. The leaves are 4 ft. long, in tufts from the rhizomes ; leaflets fasciculate on the lower part of the petiole, cuneate, lobed, the lobes large præmorse. Fl. B. I. v. 6, p. 419 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 525 ; Prain, Beng. Pl. p. 1094 ; Brandis, Ind. Trees (1906) p. 655.

Hyphæne thebaica, Mart. Hist. Nat. Palm. v. 3 (1836—1850) p. 225, tt. 131—133. The *Doum Palm* of Upper Egypt, from which it extends to the equator. Stem terete, 10—30 ft. high, dividing into 3 or 4 branches above the middle. Leaves fan-shaped. When seen from a distance against the sky the upper part looks like the letter W. The tree was, according to Graham, introduced into Bombay by Nimmo in 1828, and again by Maccullough in 1837. It is not very attractive as a garden plant, but there are several specimens in the public park at Baroda and at Poona, while there is a fine tree at Sewree in Bombay. The pulp of the fruit is edible. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 526, & Gard. in Ind. ed. 5, p. 524. *Hyphæne coriacea,* Grah. Cat. p. 224 (*not* of Gaertn.) ; Dalz. & Gibs. Suppl. p. 95.

Livistona chinensis, R. Br. Prodr. (1810) p. 268. A handsome palm, a native of China and Japan, with a stout obscurely annulate

trunk 20—30 ft. high, and large fan-shaped leaves with long pendulous bipartite divisions, on usually long petioles armed with short recurved spines and rising from a network of brown fibres. The length of the petioles depends on the position in which the plant is grown, being longer in slight shade than in the open. Flowers white, with an unpleasant odor (*Griffith*). Fruit-bearing spadix nodding, with subsecund branches. Fruit a dull-blue olive-like drupe. The palm is commonly grown in gardens and does well with ordinary border treatment if watered freely during dry weather. Fl. B. I. v. 6, p. 434 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 526, & Gard. in Ind. ed. 5, p. 525 ; Prain, Beng. Pl. p. 1091. *Livistona mauritiana,* Wall. in Voigt, Hort. Suburb. Calc. (1845) p. 641 (*nomen nudum*).

Oreodoxa regia, H. B. & K. Nov. Gen. & Sp. v. 1 (1815) p. 305. A fine palm with pinnate leaves 4—6 ft. long, leaflets 6—15 in. long and nearly 1 in. broad, a native of Cuba. The lowest pinna is often produced into a long pendulous whip 3—5 ft. in length which in medium-sized plants furnishes an easy means of identification. Fully developed avenues of this palm are among the chief ornaments of the Botanical Gardens at Culcutta and at Peradeniya (Ceylon), and good specimens may be seen in the Victoria Gardens, Bombay, and at Poona (Woodrow). Dalz. & Gibs. Suppl. p. 95 ; Woodr. Gard. in Ind. ed. 5, p. 525.

Washingtonia filifera, H. Wendl. in Bot. Zeit. v. 37 (1879) p. 68. A tree 20—40 ft. high, a native of California, with circular flabelliform leaves, the segments separated half-way down and the margins fringed with numerous white threads (hence the specific name). The petioles are armed with stout hooked marginal spines. The tree is of rapid growth and bears the full sun in the dry air of the Deccan, where it may be seen at Poona. Woodr. Gard. in Ind. ed. 5, p. 528.

Licuala peltata, Roxb. Fl. Ind. v. 2 (1832) p. 179. A dwarf palm introduced by Nimmo (*fide* Graham), a native of Chittagong, Birma, and the Andamans, with a trunk 6—12 ft. high, sometimes thicker in the upper portion owing to the persistent petiole-bases. Leaves nearly orbicular, 3—5 ft. in diam., peltate, horizontal, divided almost to the petiole into 16—20 cuneate segments, plaited and 6—10-toothed at the apex ; petiole about 6 ft. long, the sides armed with strong, sharp, smooth, recurved spines. Spadix erect, longer than the leaves, simply branched, densely covered with greenish-white flowers. Drupe ½ in. long, ellipsoid, red. Fl. B. I. v. 6, p. 430 ; Grah. Cat. p. 225 ; Woodr. Gard. in Ind. ed. 5, p. 524 ; Prain, Beng. Pl. p. 1091 ; Brandis, Ind. Trees (1906) p. 656 ; Watt, Dict. Econ. Prod. v. 4, p. 639.

Borassus flabellifer, Linn. Sp. Pl. (1753) p. 1187. *The Palmyra* or *Brab Tree,* a native of Tropical Africa, cultivated and sometimes self-sown. Trunk attains 100 ft. high and 2 ft. in diam. near the ground, with a dense mass of long rootlets, often swollen above the middle, when young covered with dry leaves or the bases of petioles, when old marked with the black narrow scars of the latter. Leaves 3—5 ft. in diam. ; segments 60—80, shining, folded along the midrib, linear-lanceolate ; petioles 2—4 ft. long, semiterete, the margins with

hard spinescent serratures. Flowers dicœcious. Spadix very large, simply branched, sheathed with numerous open spathes. MALE FLOWERS small ; spikes 1—3 at the ends of the branches, cylindric, densely clothed with imbricating bracts ; numerous minute secund spikelets concealed by the bracts so as to appear immersed in the spike, the flowers coming to the surface one by one as they successively open. Stamens 6 ; filaments connate with the corolla into a stalk. FEMALE FLOWERS larger, globose, 1 in. in diam. ; perianth fleshy, greatly accrescent. Sepals imbricate. Petals smaller, convolute. Staminodes 6—9. Ovary 3—4-celled. Fruit a large subglobose brown drupe 6 in. in diam. or more, with 1—3 obcordate fibrous pyrenes, enclosed by the enlarged perianth. Seeds oblong, 3-lobed at the top ; albumen uniform, hollow. Fl. B. I. v. 6, p. 482 ; Trim. Fl. Ceyl. v. 4, p. 336 ; Talb. Trees, Bomb. ed. 2, p. 343 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427 ; Prain, Beng. Pl. p. 1092 ; Brandis, Ind. Trees (1906) p. 657. *Borassus flabelliformis*, Murr. Syst. ed. 13 (1774) p. 827 ; Grah. Cat. p. 226 ; Dalz. & Gibs. p. 278 ; Watt, Dict. Econ. Prod. v. 1, p. 495.—Flowers : Mar.—Apr. VERN. *Tád ; Tádi ; Tár.*

Cultivated throughout India. Every part of the plant is utilized. A gum is obtained from it ; the wood is hard, heavy and durable, and used for water-pipes and channels and for posts, rafters, &c. ; the leaves are used for thatching, for mats and for writing on ; the cut flower-stalks yield sugar and when fermented a country liquor ; the fruit is roasted and eaten. See Watt, Dict. Econ. Prod. l. c.

Cocos nucifera, Linn. Sp. Pl. (1753) p. 1188. *The Cocoa-nut Tree*. An unarmed monœcious palm. Trunk 40—80 ft. high, annulate, thickened at the base, with a mass of rootlets. Leaves 6—15 ft. long ; leaflets equidistant, 2—3 ft. long, linear-lanceolate coriaceous ; petioles 3—5 ft. long, stout. Spadix 4—6 ft. long, stout, androgynous, at length drooping, simply panicled ; branches bearing scattered female flowers (often between 2 males) towards their bases and numerous males above. Lower spathes 2—3 ft. long, oblong, hard, splitting lengthwise. MALE FLOWERS unsymmetric. Sepals small, valvate. Petals ½ in. long, oblong, acute, valvate. Stamens 6 ; filaments subulate ; anthers linear erect. Pistillode minute or 0. FEMALE FLOWERS larger than the male, 1 in. long, ovoid, supported by broad bracteoles. Perianth accrescent. Sepals 1 in. in diam., round, concave, imbricate. Petals shorter than the sepals, convolute, with imbricate tips. Fruit 8—12 in. long, 3-gonously obovoid or subglobose, green or yellowish ; pericarp thick, fibrous ; endocarp bony, with 3 basal pores indicating the 3 cells of the ovary ; albumen lining the endocarp, the cavity large, filled with a sweet somewhat milky fluid known as *Cocoa-nut milk*. Fl. B. I. v. 6, p. 482 ; Grah. Cat. p. 225 ; Dalz. & Gibs. p. 279 ; Talb. Trees, Bomb. ed. 2, p. 342 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427 ; Prain, Beng. Pl. p. 1095 ; Watt, Dict. Econ. Prod. v. 2, p. 415.—Flowers : throughout the year. VERN. *Narel.*

Planted throughout the Presidency especially near the sea-coast, where it grows better than inland ; in fact it is rarely seen at any

distance from the coast in Bombay. Its native country is a matter of uncertainty ; it is said to be indigenous in Cocos Island and the North Andamans. The uses to which the Cocoa-nut palm is put are amazingly numerous. In Watt's 'Dictionary of Economic Products' a list is given of various articles prepared from the tree exhibited by Mr. Pereira, Head Assistant to the Medical Storekeeper, Bombay, at the Colonial and Indian Exhibition.

The articles exhibited numbered no less than 83. The fibrous pericarp yields coir which is used for ropes, mats, &c., and exported largely. The oil from the nuts is an important article of trade, used for burning, cooking, the manufacture of soap, &c. The sap is drawn regularly from the trees and allowed to ferment and used thus as a beverage or afterwards distilled to make *arrack*.

The ripe cocoa-nuts are largely exported as an article of food. For an exhaustive account of the cocoa-nut industry, see Watt, Dict. Econ. Prod. l. c.

Cocos plumosa, Hook. Bot. Mag. t. 5180. A very graceful palm, a native of Brazil, introduced recently into the Bombay Presidency and well worthy of a place in gardens.

The plant has a straight stem and very long pinnate leaves recurved at the end forming a graceful plume. Woodr. Gard. in Ind. ed. 5, p. 522.

Order CXXXIX. **PANDANACEÆ.**

Dicœcious trees or shrubs, sometimes scandent with aerial roots, the stem often forked and supported, as if standing on stilts, by numerous adventitions roots. Leaves coriaceous, narrow, acuminate, sessile, with a sheathing base, in tristichous spirals, the edges and midrib usually spinous, the spines on the margins erect, those on the midrib usually retrorse ; transverse nerves prominent. Spadix axillary or terminal, simple or branched, clothed with leafly spathes ; flowers small, crowded or catkin-like ; perianth 0 ; bracts and bracteoles 0. Male flowers : Stamens numerous ; filaments free or connate ; anthers erect, basifixed. Pistillode small or obsolete. Female flowers : Staminodes small or 0. Ovary 1-celled, free or connate with those of contiguous flowers in phalanges of 2 or more ; ovules solitary and suberect, or many and parietal ; stigmas subsessile, papillose. Fruit a syncarpium, consisting of numerous more or less obconic drupes, the apex of each drupe or carpel distinct, pyramidal, conical or convex, crowned by the hardened style or stigma. Seeds minute ; testa striate ; albumen abundant, hard and oily ; embryo minute.— Distrib. Tropical Asia, Africa, Australia, Polynesia, Malay Peninsula and Archipelago, New Zealand ; genera 2 ; species about 200.

1. **PANDANUS,** Linn. f.

Palm-like small trees or shrubs ; stems sometimes very short, erect, or procumbent and rooting. Leaves long, spirally arranged at the ends of the branches, sheathing at the base. Flowers dicœcious.

MALE FLOWERS: Spadix compound, with numerous yellow or white keeled spathes. Stamens numerous, single or united into bundles on the spadix; filaments short or long; anthers sessile, elongate, 2-celled. FEMALE FLOWERS: Spadix simple, protected by leafly spathes. Staminodes 0. Ovary of 1 or several 1-celled carpels, free or connate; ovule solitary in each cell, ascending from the base of a parietal placenta. Fruit an oblong syncarpium, usually solitary, of woody or fleshy thick-walled drupes, which are deciduous singly or in masses from a fleshy receptacle, the upper half of each carpel hollow or filled with a spongy pith-like tissue. Seeds large, strophiolate; albumen fleshy; embryo small; radicle inferior.—DISTRIB. Asia, Tropical Africa, Australia, and Polynesia; species about 150.

Carpels distinct; spathes of males not scented, yellow; style forked ..... 1. *P. furcatus.*
Carpels connate; spathes of males strongly scented, white; style not forked ..... 2. *P. tectorius.*

1. **Pandanus furcatus,** *Roxb. Hort. Beng.* (1814) p. 71. A small gregarious tree with trunk 10—30 ft. high, by 6 in. in diam. (in the Bombay Presidency only a spreading bush), branched, with aerial roots from the lower part of the trunk. Leaves dark green, 8—15 ft. long by 3—6 in. wide, with short stout sharp spines on the margins and midrib. MALE FLOWERS in compound cylindric spikes 4–6 in. long by ¾—1¼ in. broad, densely floriferous. Spathes golden yellow, inodorous, the lowest reaching 2½ ft. long by 4 in. wide, produced at the apex into a spinulose 3-quetrous acumen. Staminal-column ⅛ in. long with 3—5 stamens fascicled at the apex; filaments short; anthers ⅛ in. long, linear, mucronate. FEMALE FLOWERS: Syncarpium usually solitary, subtrigonous, orange-red when fully ripe, 6—9 in. long, variable in size; drupes obconic with a convex crown; styles deeply 2—3-forked, shining, spinulose. Fl. B. I. v. 6, p. 484; Dalz. & Gibs. p. 279; Talb. Trees, Bomb. ed. 2, p. 345; Warburg, in Engl. Pflanzenreich, v. 4, part 9 (1900) p. 75; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427; Prain, Beng. Pl. p. 1101; Brandis, Ind. Trees (1906) p. 659; Watt, Dict. Econ. Prod. v. 6, part 1, p. 4.—Flowers: cold and hot seasons.

S. M. COUNTRY: between Belgaum and Rámghát, *Dalzell & Gibson*; common in the Ghát forests of Belgaum, *Talbot.* KANARA: forming dense almost impenetrable thickets in marshy places near watercourses, *Talbot.*—DISTRIB. India (hills of Khasia and Manipur, Chittagong, Birma, W. Peninsula); Malay Peninsula and Archipelago.

2. **Pandanus tectorius,** *Soland. ex Parkinson, Journ. Voy. H.M.S. Endeavour,* p. 46 (1773). Shrubby, up to 20 ft. high, rarely erect; stem supported by aerial roots. Leaves glaucous-green, 3—5 ft. long, ensiform, caudate-acuminate, coriaceous, the marginal spines pointing forward, those on the midrib pointing forward or backward. MALE FLOWERS: Spadix with numerous subsessile cylindric spikes 2—4 by 1—1½ in., enclosed in long white fragrant caudate-acuminate spathes. Staminal-column ¼—½ in. long; anthers longer than the slender filaments, cuspidate, inserted along the whole length of the upper portion. FEMALE FLOWERS: Spadix solitary, 2 in. in diam. Carpels confluent in obpyramidal groups of 6—10 or fewer; stigmas

short, reniform, yellow. Fruit an oblong or globose syncarpium, 6—10 in. long and broad, yellow or red ; drupes numerous (50—60), each consisting of 5—12 carpels ; carpels 2—3 in. long, turbinate, angular, the crown smooth, convex, more or less depressed round the reniform stigmas. Warburg, in Engl. Pflanzenreich, v. 4, part 9 (1900) p. 46 ; Brandis, Ind. Trees (1906) p. 659. *Pandanus odoratissimus,* Linn. f. Suppl. (1781) p. 424 ; Grah. Cat. p. 227 ; Dalz. & Gibs. p. 279 ; Trim. Fl. Ceyl. v. 4, p. 339 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 5. *P. fascicularis,* Lam. Encyc. Méthod. v. 1 (1783) p. 372 ; Hook. f. Fl. B. I. v. 6, p. 485 ; Talb. Trees, Bomb. ed. 2, p. 345 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427.—Flowers : hot and rainy seasons. VERN. *Keura.*

KONKAN : in sandy places near the sea-coast, *Talbot.*—DISTRIB. Sea-coast of the Indian Peninsula on both sides, Sundribans, Birma, Andamans; often planted and known as the *Screw Pine.*

Pandanus Candelabrum, Beauv. Fl. Ow. v. 1 (1804) p. 37. VAR. *variegata,* Hort. ex Nicholson, Dict. Gard. v. 3, p. 16, fig. 17. A native of Java, often grown in gardens, where it is very ornamental if in an isolated position where its gracefully disposed leaves may be seen to advantage. The leaves are 3—6 ft. long by about 4 in. wide, gradually tapering to a fine point, armed with white spines on the margins which point forward, the spines on the back of the midrib pointing partly forward and partly backward. The ground-color of the leaves is bright green with bands of white extending from the base to the apex. It is a plant of great beauty, growing well in sandy soil if abundantly watered. *Pandanus javanicus* var. *variegata,* Hort. ex Nicholson, Dict. Gard. v. 3, p. 17 ; Woodr. Gard. in Ind. ed. 5, p. 529.

Pandanus labyrinthicus, Kurz, in Miq. Ann. Mus. Bot. Lugd. Bat. v. 2 (1866) p. 53. A shrub 10—20 ft. high, a native of Sumatra ; stem bearing a crown of leaves, branched, erecto-patent, sending out intricate aerial roots on every side. Leaves about 3 ft. long by 1½ in. wide, very acute, glaucescent beneath, spiny on the margins and the apex of the keel. Fruit scarlet when ripe, oblong-ellipsoid, reaching 4 in. long. Bot. Mag. t. 7063 ; Nicholson, Dict. Gard. Suppl. p. 580. *Pandanus ceramicus,* Woodr. Gard. in Ind. ed. 5, p. 530.

ORDER CXL. **TYPHACEÆ.**

Aquatic or palustrine perennial herbs. Leaves linear, erect or floating, sheathing below ; nerves parallel. Flowers small, monœcious or, by abortion, diœcious, small or minute, densely crowded in globose or cylindric 1-sexual bracteate spikes the upper flowers of which are males ; bracteoles 0. Perianth of membranous, green scales or slender hairs. MALE FLOWERS : Stamens 1—7 ; filaments free or connate ; anthers basifixed, erect, cuneate or linear-oblong, dehiscing longitudinally ; connective sometimes produced. Pistillode 0.

FEMALE FLOWERS: Ovary superior, 1—2-celled, the cells 1-ovulate; ovules pendulous from the top of the cell; styles free, short or long, persistent, laterally papillosely stigmatic. Fruit small, membranous or drupaceous. Seeds pendulous; albumen fleshy or floury; embryo axile, cylindric, the radical end thickened; plumule in a lateral slit.—DISTRIB. Genera 2; species about 15, cosmopolitan.

1. TYPHA, Linn.

Marsh herbs. Leaves erect, spongy. Flowers small, in very dense superposed cylindric spikes, often intermixed with hairs with dilated tips. Perianth of capillary hairs or in the male flowers obsolete. Stamens 1 or more; connective thickened at the tip. Ovary often reduced to a clavate-tipped hair, long-stalked, narrowed into a capillary style, with a clavate or filiform stigma. Fruit very minute; pericarp membranous, indehiscent or follicular. Seed with striate testa; albumen floury.—DISTRIB. Temperate and tropical regions; species about 10.

1. **Typha angustata,** *Bory & Chaub. Exp. Sci. Morée, Bot.* v. 1 (1832) p. 338. A robust plant; stem 5—10 ft. high. Leaves exceeding the flowering stem, ¾—1 in. broad, semicylindric above the sheath. Spikes cylindric, the male and female spikes often separated by a considerable interval, the female spikes pale brown, ½—⅞ in. in diam. Female flowers mixed with clavate-tipped pistillodes; bracteoles subspathulate, equalling the linear stigmas, both longer than the hairs. Pollen simple. According to Aitchison (Bot. Afghan Delim. Comm. in Trans. Linn. Soc. N.S. v. 3 [1887] p. 120) the species sometimes bears male and female flowers on different plants. Fl. B. I. v. 6, p. 489; Bory & Chaub. Nouv. Fl. Pélop. (1838) p. 4; Boiss. Fl. Orient. v. 5 (1881) p. 50; Aitch. in Trans. Linn. Soc. New Series, v. 3 (1887) p. 120; Graebner, in Engl. Pflanzenreich, v. 4, part 8 (1900) p. 14; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427; Prain, Beng. Pl. p. 1102. *Typha angustifolia,* Sibth. & Sm. Fl. Græc. Prodr. v. 2 (1813) p. 226 (*not* of Linn.); Roxb. Fl. Ind. v. 3 (1832) p. 567; Watt, Dict. Econ. Prod. v. 6, part 4, p. 207; *Typha elephantina,* Grah. Cat. p. 227 (*not* of Roxb.).—Flowers: Aug. VERN. *Pan-kanis; Pun; Jangli-bajri.*

DECCAN: *Gibson* ex *Graham*; Poona, *Cooke*!, *Woodrow*. SIND: *Stocks*, 542!—DISTRIB. More or less throughout India; N. Asia, N. Africa.

Mats, screens, &c. are made of the reed in Sind and a curious yellow caked substance called *Bur* is made of the flowers and is much eaten by all classes of natives in Sind (*Stocks*).

Typha elephantina, Roxb. Fl. Ind. v. 3 (1832) p. 566, does not appear to be indigenous in the Bombay Presidency. Woodrow (Journ. Bomb. Nat. v. 13[1901] p. 427) says that it is planted in Bombay, no doubt as an ornamental plant. The leaves are broad, trigonous above the sheath, and the pollen is 4-globate. Graebner, in Engl. Pflanzenreich, v. 4, part 8 (1900) p. 11.

ORDER CXLI. ARACEÆ.

Herbs usually glabrous (rarely armed), with watery, acrid, or milky juice, stemless or with a short stock or corm or tuber; or shrubs with sympodial branches, climbing by aerial roots. Leaves in shrubby species alternate, distichous or spiral; in herbaceous species few, clustered or solitary, radical sometimes appearing without or after the flowers; petiole with a sheathing base; blade entire or lobed or pinnate or perforate, often with cataphyllaries at the base of the leaf-sheaths. Flowers 1-sexual or hermaphrodite, sessile on a spadix which is more or less completely enclosed in a green or colored spathe; when 1-sexual, usually monœcious (rarely dicœcious) with males towards the apex and females at the base of the spadix, often with neuters between them and sometimes with neuters above the males. Perianth 0, or of a few scales (rarely cupular or urceolate). Stamens in hermaphrodite flowers 4—8, in male flowers 1 or more, distinct or confluent; anthers 2—4-celled, free or (in confluent stamens) connate by means of the thickened connective, the cells discrete or contiguous, free or buried in the connective and opening by a terminal pore (rarely by a longitudinal slit); pollen globose or ellipsoid, powdery or conglomerate. Ovary sessile, 1—3-celled; ovules in each cell 1 or more, basilar, apical, axile or parietal; style short or long; stigma discoid or lobed. Fruit of many small free or connate berries or drupes adnate to the spadix. Seeds in each drupe or berry 1 or few (rarely many), small or large, usually embedded in a mucilaginous pulp; albumen copious or 0; embryo axile or in exalbuminous genera thick, with the plumule in a lateral slit.—DISTRIB. Genera about 100; species about 1000, chiefly tropical.

Flowers 1-sexual, monœcious (often dicœcious in *Arisæma*).
- Water or marsh plants; spadix without a barren appendage.
  - Floating stemless herbs; leaves sessile in a rosette-like tuft ..... 1. PISTIA.
  - Submerged, aquatic or marsh herbs.
    - Ovaries in one whorl ..... 2. CRYPTOCORYNE.
    - Ovaries spirally arranged ..... 3. LAGENANDRA.
- Terrestrial tuberous herbs.
  - Spadix with a barren terminal appendage; ovules not parietal.
    - Male flowers stipitate; flowers often dicœcious ..... 4. ARISÆMA.
    - Male flowers sessile or nearly so; flowers always monœcious.
      - Flowers and leaves present together.
        - Ovules 1—2, basal ..... 5. TYPHONIUM.
        - Ovules many, basal and apical .... 6. THERIOPHONUM.
      - Flowers appearing before the leaves.
        - Ovules orthotropous; males and females remote; neuters present above the females ..... 7. SAUROMATUM.
        - Ovules anatropous; males and females contiguous; neuters 0 ... 8. AMORPHOPHALLUS.

Spadix without a barren appendage; ovules many, parietal.	
Female inflorescence adnate to base of spathe; stigma stellate	9. ARIOPSIS.
Spadix free from the spathe; stigma discoid	10. REMUSATIA.
Flowers hermaphrodite; stem scandent; spathe small.	11. POTHOS.

1. **PISTIA,** Linn.

A floating gregarious monœcious stoloniferous herb. Leaves sessile in a close spiral, obovate-cuneate, together forming a cup; veins parallel; stipulary sheaths small, membranous. Spathe small, shortly pedunculate, tubular below, open above; tube short; limb ovate, concave, spreading. Spadix adnate to the back of the tube of the spathe, free above. MALE INFLORESCENCE a whorl of a few sessile connate stamens below the apex of the spadix, with a whorl of minute neuters below it; anther-slits vertical. FEMALE INFLORESCENCE a solitary oblong 1-celled ovary, obliquely adnate to the spadix for nearly its whole length, the tip free, forming a conical style with a discoid stigma; ovules many, crowded on a parietal placenta, orthotropous. Fruit ovoid; pericarp thin, bursting irregularly. Seeds many, oblong or obovoid; testa ultimately rugose; albumen copious, floury; embryo minute, apical, cuneiform.—DISTRIB. Species 1, tropical.

1. **Pistia Stratiotes,** *Linn. Sp. Pl.* (1753) p. 963. A floating stemless stoloniferous herb with a peculiar muriatic odor; roots of tufted simple white fibres clothed with fibrillæ. Leaves 1½—4 in. long, variable in breadth, obovate-cuneate, rounded or retuse at the apex, densely and closely pubescent on both surfaces; nerves few or many, flabellately arranged, converging within the margin. Spathe about ½ in. long, obliquely campanulate, white, gibbous and closed below, contracted about the middle, dilated and nearly orbicular above.—DISTRIB. Throughout India and Ceylon and the tropics generally. Fl. B. I. v. 6, p. 497; Grah. Cat. p. 200; Dalz. & Gibs. p. 281; Roxb. Cor. Pl. v. 3 (1819) p. 64, t. 268; Trim. Fl. Ceyl. v. 4, p. 345; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427; Prain, Beng. Pl. p. 1105; Watt, Dict. Econ. Prod. v. 6, part 1, p. 275.—Flowers: July—Nov.

Common in tanks throughout the Presidency.—DISTRIB. of the genus.

2. **CRYPTOCORYNE,** Fisch.

Herbs usually marsh or aquatic; stem short or 0 or a creeping rootstock. Leaves narrow or broad. Spathe tubular with connate margins and a transverse septum within below. Spadix very slender, its tip adnate to the septum of the spathe. MALE INFLORESCENCE cylindric. Stamens 1—2, distinct; anthers short, sessile, truncate, cells 2 with conic perforate tips, pollen vermiform. FEMALE INFLORESCENCE a single whorl of connate 1-celled ovaries with a few neuters; ovules many, erect, orthotropous; styles short, recurved. Fruit a fleshy syncarpium, of connate, coriaceous, many-seeded carpels, the

valves stellately spreading. Seeds oblong ; testa rugose ; albumen copious ; embryo axile ; plumule sometimes germinating in the fruit. —DISTRIB. Species 26, tropical Asiatic.

Tube of spathe longer than the limb	1. *C. retrospiralis.*
Tube of spathe shorter than the limb.	
Limb of spathe transversely rugose or plicate within.	2. *C. spiralis.*
Limb of spathe smooth within	3. *C. cognata.*

1. **Cryptocoryne retrospiralis,** *Kunth, Enum.* v. 3 (1841) p. 12. An herb usually submerged ; root of fleshy fibres, stem 0. Leaves numerous, radical, 3—18 by ¼—¾ in., narrowly linear or linear-lanceolate, sessile or with a short stout petiole, acute or finely acuminate ; midrib slender. Spathe subsessile, nearly as long as the leaves, deep green streaked with purple ; tube narrow, longer than the limb, not or scarcely twisted ; limb glabrous, closely twisted. Ovaries 5—6 ; ovules 3 or more ; stigmas orbicular. Fl. B. I. v. 6, p. 493 ; Wight, Icon. t. 772 ; Engler, in DC. Monog. Phan. v. 2 (1879) p. 625 ; Engler, in Engl. & Prantl, Pflanzenf. v. 2, part 3 (1889) p. 152, fig. 99 A—C ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427 ; Prain, Beng. Pl. p. 1105. *Cryptocoryne Roxburghii,* Dalz. & Gibs. Bo. Fl. (1861) p. 259 (*not* of Schott).

KONKAN : Bombay, *Law* ! ; banks of the Pen River, *Law* ! ; beds of rivers in the Konkan, *Gibson* ! ; bed of the river near Mira, *Gibson,* 151 ! DECCAN : Poona on river banks, *Ranade* !, *Woodrow.*—DISTRIB. India (Bengal, Behar, Birma, W. Peninsula).

2. **Cryptocoryne spiralis,** *Fisch. in Linnæa,* v. 5 (1830) p. 428. A small grass-like herb growing on the margins of ditches and ponds, submerged during the rainy season only. Rootstock tuberous, soboliferous ; roots vermiform. Leaves 3—8 by ⅛—⅜ in., linear-lanceolate, acute or acuminate, narrowed from the middle to both ends ; nerves nearly parallel ; petiole short, stout. Spathe subsessile, 3—5 in. long ; tube very short, much shorter than the limb, linear-lanceolate, at first twisted, greenish outside, dark purple and transversely lamellate within. Ovaries 5—6 ; stigmas broadly elliptic. Fl. B. I. v. 6, p. 494 ; Wight, Icon. t. 773 ; Engler, in DC. Monog. Phan. v. 2 (1879) p. 628, and in Engl. & Prantl, Pflanzenf. v. 2, part 3 (1889) p. 152, fig. 99 D—G ; Trim. Fl. Ceyl. v. 4, p. 346 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427 ; Prain, Beng. Pl. p. 1105. *Arum spirale,* Retz. Obs. fasc. 1 (1779) p. 30 ; Bot. Mag. t. 2220 ; Grah. Cat. p. 228.

KONKAN : *Dalzell* !, *Stocks* !—DISTRIB. India (Bengal, W. Peninsula).

3. **Cryptocoryne cognata,** *Schott, in Bonplandia,* Jahrg. 5 (1857) p. 222. Root bulbous, with vermiform fibres. Leaf-blade 6—10 by ⅜—1½ in., oblong-lanceolate, narrowed and acute at both ends, the margins undulate ; midrib very broad ; petioles stout, shorter than or equalling the blade. Spathe reaching 7 in. long, shortly pedunculate ; limb much longer than the tube, narrowed into a long tail which (in the Kew specimens at least) is not twisted ; tube of spathe reaching 2 in. long. Male inflorescence separated from the female by an interspace of about 1¼ in. Fl. B. I. v. 6, p. 494 ; Engler, in DC. Monog.

Phan. v. 2 (1879) p. 629 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427.

There are but 2 sheets in Herb. Kew., the specimens on both of which are from the KONKAN, one collected by *Stocks*, the other by *Law*.—DISTRIB. India (W. Peninsula).

DOUBTFUL SPECIES.

CRYPTOCORYNE DALZELLII, Schott, in Bonplandia, Jahrg. 5 (1857) p. 221.

This singular plant, of which Dalzell says he can make nothing, is represented in Herb. Kew. by half a sheet of specimens, chiefly of fruit in various stages, and a drawing. Dalzell says in a note attached to the sheet : "The leaf is lanceolate, without petiole and apparently amplexicaul, the margin transparent and finally crenated; veins parallel; surface woolly as if covered densely with cobweb. No stamens; no ovarium; nothing but what is observed in the drawing. The perianth is fleshy and what appears as the pedicel is solid." The fruit is ovoid, about ½ by ⅓ in. on a solitary stalk. The seeds are 2-seriate, oblong, subtrigonous. The sheet is marked *"Bombay, Dalzell,"* without further information as to locality. Fl. B. I. v. 6, p. 495; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427.

EXCLUDED SPECIES.

CRYPTOCORYNE UNILOCULARIS, Kunth, Enum. v. 3 (1841) p. 13; Wight, Icon. t. 774; Jackson, Index Kewen. v. 2, p. 661. *Cryptocoryne Roxburghii*, Schott, Prodr. Syst. Aroid. (1860) p. 18; Dalz. & Gibs. p. 257; Engler, in DC. Monog. Phan. v. 2 (1879) p. 629. *Ambrosinia unilocularis*, Roxb. Fl. Ind. v. 3 (1832) p. 493.

I can find no evidence of the occurrence of this (a Coromandel plant) in the Bombay Presidency. Dalzell [Bo. Fl. (1861) p. 257] mentions the plant as *common*, but he has supplied no specimens of it, and I am of opinion that the plant he has described (*l. c.*) as *C. Roxburghii* is *C. retrospiralis*, Kunth, of which there are specimens at Kew from the Konkan and Deccan. There is not a single specimen in Herb. Kew. of Roxburgh's plant, nothing but a drawing, and I believe that no specimen is extant. The plant noticed in Woodrow's list from Poona proves to be *C. retrospiralis*.

3. LAGENANDRA, Dalz.

Aquatic herbs with the characters of *Cryptocoryne*, but with many ovaries in close cycles at the base of the spadix.—DISTRIB. Species 5, India and Ceylon.

1. **Lagenandra toxicaria,** *Dalz. in Kew Journ. Bot.* v. 4 (1852) p. 289. Rootstock reaching 2 in. thick, creeping, simple, coriaceous, annulate ; root-fibres vermiform. Leaves 6—15 by 2—5 in., elliptic-oblong, obtuse or acute, margins undulate, entire, base acute or rounded ; midrib very stout, with many slender veins diverging from it ; petiole as long as the blade, semicylindric, ½ in. in diam. ; stipular sheaths acuminate, 2-keeled. Peduncle shorter and more slender than the petiole, compressed. Spathe 3—9 in. long, tubular below ; the limb ¾—1½ in. broad, ovate-lanceolate, caudate-acuminate, slightly twisted ; tube much shorter than the long-tailed limb. Male inflorescence cylindric ; anthers crowded, yellow, the cells with

tubular tips. Female inflorescence of many ovaries, in many cycles, crowded in a globose head ; stigma sessile, pulvinate, 5-angled ; ovules 4—8 on a basal placenta. Syncarpium on a short decurved peduncle, globose, 1½—2 in. in diam. ; carpels about ⅓ in. long, partially dehiscent. Seeds ⅜ in. long, narrowly oblong, furrowed. Fl. B. I. v. 6, p. 495 ; Dalz. & Gibs. p. 257 ; Engler, in DC. Monog. Phan. v. 2, p. 621 ; Trim. Fl. Ceyl. v. 4, p. 349 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427.—Flowers : Feb.—Mar. VERN. *Vatsanáb.*

KONKAN : in marshes, *Dalzell.* S. M. COUNTRY : Belgaum, *Dalzell.* KANARA : Koessi (N. Kanara), *Talbot,* 1813!—DISTRIB. India (W. Peninsula) ; Ceylon.

4. **ARISÆMA,** Mart.

Tuberous monœcious or diœcious herbs. Leaves 1—3, often coming up with the flowers but sometimes after them, trisect or pedate or verticillately 5- or more-sect. Spathe deciduous ; tube convolute ; limb often acuminate or tailed, usually incurved. Spadix included or exserted, always with a barren appendage which is often long and filiform. MALE INFLORESCENCE of many usually stipitate connate stamens ; anthers 2—5, oblong or subglobose, the cells distinct or confluent, dehiscing by pores or vertical slits. FEMALE INFLORESCENCE : Flowers densely crowded ; ovary ovoid, oblong or subglobose, 1-celled ; ovules 2 or more, basal, orthotropous ; style short or 0. NEUTER FLOWERS 0 or few, subulate, above the males or the females or on the appendage. Fruit a 1- or few-seeded berry. Seeds ovoid or globose ; testa rather thick ; albumen copious ; embryo axile.—DISTRIB. Temperate and tropical Asia ; N. America ; species about 50.

Leaves pedatisect; appendage of spadix elongate, far-exserted	1. *A. tortuosum.*
Leaflets whorled.	
Leaflets sessile.	
Spathe 4—12 in. long with an obtusely acuminate tip; tube narrow, petiole 2 ft. long; peduncle short; appendage narrowly clavate	2. *A. Leschenaultii.*
Spathe 3—5 in. long with an acute (not caudate) tip; tube wide; petiole 1 ft. long; peduncle 1 ft. long; appendage tapering from the base to the tip	3. *A. Murrayi.*
Leaflets petiolate with thread-like tips which are 1—3 in. long; spathe 6 in. long with a caudate tip 3 in. long; petiole 10—14 in. long	4. *A. caudatum.*

1. **Arisæma tortuosum,** *Schott, in Schott & Endlich. Meletem.* (1832) p. 17. A tall plant reaching 3 ft. high ; tubers spheroidal, up to 4 in. in diam. Leaves 2—3, pedatipartite ; petioles 1—3 ft. long, the sheaths often mottled with purple ; leaflets sessile or petiolate, 4—8 in. long, of variable breadth, ovate-lanceolate or linear-lanceolate, subcaudately acuminate, distant or crowded or almost radiately arranged. Peduncle 2—4 ft. long. Spathe 4—6 in. long, green outside ; tube about as long as the limb, subcylindric, gaping, gradually dilating into the limb, pale purplish inside ; limb ovate or

ovate-oblong acuminate, broadly cymbiform, incurved. Spadix 1- or 2-sexual ; male flowers stalked ; appendage very long, much exserted, tapering, like a rat's tail, quite smooth, usually erect at first, then porrect, and again erect. Ovaries ovoid, attenuated into a short style. Berry 4—5-seeded. Fl. B. I. v. 6, p. 502 ; Engler, in DC. Monog. Phan. v. 2 (1879) p. 545 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427 ; Prain, Beng. Pl. p. 1106 ; Watt, Dict. Econ. Prod. v. 1, p. 312. *Arisæma curvatum,* Dalz. & Gibs. Bo. Fl. (1861) p. 258 (*not* of Kunth) ; Hook. in Bot. Mag. (1871) t. 5931.

KONKAN : *Stocks* ! ; Western Ghâts, *Woodrow.*—DISTRIB. India (Manipur, Sikkim-Himalaya, Bengal, W. Peninsula).

2. **Arisæma Leschenaultii,** *Blume, Rumphia,* v. 1 (1835) p. 93. Monœcious or diœcious ; tubers 2 in. in diam., globose ; roots from the upper side of the tuber. Leaf solitary ; petiole stout, 2 ft. long, usually mottled and banded with red and brown ; leaflets 5—11, whorled, 4—6 by 1½—2½ in., sessile, lanceolate, caudate-acuminate, dark green above, paler beneath, base tapering ; midrib stout. Peduncle short. Spathe 4—12 in. long, dark green, striped externally with purple ; tube as long as the limb, cylindric, narrow, ribbed, erect, gradually dilated into the limb ; limb slightly decurved, ovate-lanceolate, cymbiform, terminating in a straight obtusely acuminate tip of variable length. Spadix shorter than the spathe, about 3 in. long, gradually passing into a very narrowly clavate pale-green smooth appendage with a rounded, sometimes verruculose tip. Anthers 3—4-nate, sessile, with a few subulate neuters above them. Ovaries many, minute, densely crowded. Fl. B. I. v. 6, p. 504 ; Engler, in DC. Monog. Phan. v. 2 (1879) p. 552 ; Trim. Fl. Ceyl. v. 4, p. 352 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 427 ; Watt, Dict. Econ. Prod. v. 1, p. 311. *Arum erubescens,* Dalz. & Gibs. Bo. Fl. (1861) p. 258 (*not* of Schott).

KONKAN : Western Ghâts, *Woodrow.* S. M. COUNTRY : between Râmghât and Belgaum in the rains, *Dalzell & Gibson.*—DISTRIB. India (Nipal, Khasia Hills, W. Peninsula) ; Ceylon.

3. **Arisæma Murrayi,** *Hook. in Bot. Mag.* (1848) t. 4388. Tubers of the size of small potatoes with root-fibres from the upper side. Leaf solitary, coming up after the flowers, peltate, divided to the base into 5—10 ovate-lanceolate acuminate segments 3—6 by 1—2 in. ; petiole reaching 12 in. long. Peduncle 6—10 in. long, slender, reddish, round, smooth, coming up before the leaves. Spathe striate, 3—5 in. long, green at the base, forming a wide tube for more than ⅓ its length ; limb ovate, convex, acute, somewhat cucullate, pure white with a purple base. Spadix narrowed from the base upwards ; appendage curved, narrowed from the base to the tip, included or exserted. Male flowers scattered, with a few neuters above them. Ovaries numerous, crowded, bright red when ripe, variously compressed. Heads in fruit conical. Fl. B. I. v. 6, p. 507 ; Dalz. & Gibs. p. 258 ; Engler, in DC. Monog. Phan. v. 2 (1879) p. 552 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428 ; Watt, Dict. Econ. Prod. v. 1, p. 312. *Arum Murrayi,* Grah. Cat. Pl. Bo. (1839) p. 229.—Flowers : May—July. VERN. *Sápacha Kánda* (i.e. Snake root).

KONKAN : *Stocks* !; Matheran, *Cooke* ! DECCAN : Mahableshwar, *Cooke* !, *Graham*, *Dalzell & Gibson*; Sinhagad, *Woodrow*; Purandhar, Bhiva !; Khandala, Bhiva ! GUJARAT : Bansda Hill S.W. of Surat, *Law*.—DISTRIB. India (W. Peninsula).

Very common at Mahableshwar, where it is known to the residents as the *Cobra*- or *Snake*-Lily. It appears about the end of May or beginning of June all over the hill, its white flowers without leaves being conspicuous objects throughout the woods. It is equally common at Matheran.

4. **Arisæma caudatum,** *Engler, in DC. Monog. Phan.* v. 2 (1879) p. 559. Tuber depressed-globose. Leaf solitary ; petiole stout and as well as the peduncle barred and streaked ; leaflets 7, petiolulate, 5 by 2 in. (exclusive of the thread-like tips), cuneately elliptic, acuminate and with long capillary tips 1—3 in. long. Peduncle very short. Spathe 6 in. long (not including the 3 in. caudate tip) ; tube elongate, cylindric ; limb incurved, ovate-lanceolate, rather abruptly narrowed into a very long subulate tail ; margins below recurved. Spadix androgynous ; appendage included, shorter than the flowering portion, not thickened below, the tip rounded. Fl. B. I. v. 6, p. 503 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428.

KONKAN : *Stocks* (Icon. in Herb. Kew.) !

The description given above is that of Sir Joseph Hooker, made from a drawing by Stocks which is in Herb. Kew. There are no specimens of the plant in Herb. Kew. Engler (*l. c.*) says that he has seen one badly dried specimen.

5. TYPHONIUM, Schott.

Tuberous herbs. Leaves entire, or 3—5-lobed, or pedatisect. Flowers monœcious. Tube of spathe short, convolute, with a constricted mouth, persistent ; limb of spathe ovate-oblong, lanceolate, or linear, deciduous. Spadix usually exserted, with a long smooth barren appendage. Male and female inflorescences distant, with neuters above the females and sometimes also below the males. MALE INFLORESCENCE : Stamens 1—3 ; anthers subsessile, the cells contiguous, opening by pores or chinks ; pollen globose. FEMALE INFLORESCENCE : Ovary 1-celled ; placenta basal ; ovules 1—2, erect ; stigma sessile. Fruit of ovoid 1—2-seeded berries. Seeds globose ; albumen copious ; embryo axile.—DISTRIB. Tropics of the Old World ; species about 17.

Leaves bearing bulbs; neuters above the female inflorescence linear ..... 1. *T. bulbiferum.*
Leaves not bearing bulbs; neuters above the female inflorescence clavate or obovoid ..... 2. *T. cuspidatum.*

1. **Typhonium bulbiferum,** *Dalz. in Kew Journ. Bot.* v. 4 (1852) p. 113. A small plant 4—8 in. high ; tuber ⅛—½ in. in diam. Leaves triangular-hastate, sagittate or cordate, 2—4 in. long and often as broad across the lobes, the angles acute ; petiole 5—6 in. long, slender, usually with a pisiform tuber at the top. Peduncle 1—2½ in. long. Spathe slender, pale rose-colored. 3—5 in. long, convolute ; tube ⅜—½ in. long. Spadix as long as the spathe, slender, yellow ; appendage filiform. Neuters above the female inflorescence linear, erect, yellow. Anthers sessile, dehiscing by a terminal pore. Pollen rosy, hispid. Style 0. Fl. B. I. v. 6, p. 511 ; Dalz. & Gibs. p. 258 ;

Engler, in DC. Monog. Phan. v. 2 (1879) p. 611 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 208.

KONKAN : *Stocks* ! ; S. Konkan, *Dalzell, Woodrow.*—DISTRIB. India (W. Peninsula).

2. **Typhonium cuspidatum,** *Decaisne, in Nouv. Ann. Mus. Par.* v. 3 (1834) p. 367. Tuber ¾—1 in. in diam., subglobose. Leaves 2—4½ in. long, of variable width, hastately or cordately oblong or lanceolate, acuminate ; basal lobes short, subacute ; sinus narrow or open ; petiole 4—10 in. long. Peduncle slender, long or short. Spathe 4—7 in. long (including the tail), the lower portion lanceolate, produced into a slender tail which reaches as much as 5 in. long. Spadix shortly stipitate ; appendage produced into a long filiform tail and as long as or longer than the spathe. Male inflorescence ¼ in. long, cylindric ; female shortly cylindric. Neuters above the female inflorescence clavate or obovoid, purple-headed, those above the male subulate, white. Anthers minute, yellow. Ovary clavate, green. Fl. B. I. v. 6, p. 511 ; Engler, in DC. Monog. Phan. v. 2 (1879) p. 616 ; Trim. Fl. Ceyl. v. 4, p. 354 ; Prain, Beng. Pl. p. 1107. *Arum cuspidatum,* Blume, Cat. Hort. Buit. (1823) p. 101. *Arum flagelliforme,* Roxb. Hort. Beng. (1814) p. 65 ; Lodd. Bot. Cab. (1819) t. 396 ; Wight, Icon. t. 791.—Flowers : Aug.—Sept.

Rare. KONKAN : Parel near Bombay, *Ranade* !—DISTRIB. India (Bengal, Birma, W. Peninsula) ; Ceylon, Malay Peninsula and Islands.

6. THERIOPHONUM, Blume.

Tuberous monœcious herbs ; stem 0. Leaves few, petiolate, always undivided, cordate or sagittate, appearing simultaneously with the flowers. Tube of spathe short, convolute, constricted at the mouth, persistent ; limb deciduous. Spadix slender. Male and female inflorescences distant, the male with subulate neuters above and long narrow clavate ones immediately below it, the female of obconic ovaries at the base of the spadix, the interspace between the female inflorescence and lower neuters naked. Anthers sessile, globose. Ovary sessile, 1-celled ; stigmas pulvinate ; ovules many, some basilar and some pendulous from the apex of the cell, orthotropous. Berries ovoid or oblong.—DISTRIB. Species 5, all Indian.

1. **Theriophonum Dalzellii,** *Schott, Aroid.* (1853) p. 15. Tuber of the size of a walnut ; stem 0. Leaves appearing with the flowers, 4—8 in. long, of variable breadth, elliptic, oblong, or linear, acute or subobtuse, base rounded or hastate, or sagittate ; petiole 4—10 in. long. Peduncle stout, 3—6 in. long, from the sheathing base of the leaves, in fruit twisted and curved to the ground. Spathe 4—7 in. long, oblong-lanceolate ; tube green when young, soon fading to white ; limb flat, deep purple, rapidly fading. Appendage of spadix terete, elongate, purple at the base, greenish-yellow above. Anthers rosy-purple, opening by pores. Neuter flowers greenish-yellow. Ovary green ; ovules 4—6, of which 1—3 are pendulous from the top of the cell of the ovary, the remaining ones basal, erect. Fruit

angular, 4—5-seeded. Fl. B. I. v. 6, p. 513 ; Engler, in DC. Monog. Phan. v. 2 (1879) p. 608 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428. *Tapinocarpus indicus*, Dalz. in Kew Journ. Bot. v. 3 (1851) p. 346 ; Dalz. & Gibs. p. 258. *Tapinocarpus Dalzellii*, Schott, Gen. Aroid. (1858) t. 15.—Flowers : July—Aug.

KONKAN : *Stocks* !, *Dalzell* ! ; Vingorla, *Dalzell* ; moist grassy places in S. Konkan, *Dalzell & Gibson* ; Kalyan, *Woodrow* ! KANARA : Karwar, *Talbot*, 85 !—DISTRIB. India (W. Peninsula).

7. **SAUROMATUM,** Schott.

Tuberous herbs leafing after flowering. Leaf solitary, pedatipartite with a long petiole. Flowers monœcious. Spathe with a short peduncle ; tube cylindric, short, the margins connate below ; limb very long, narrow, open, reflexed. Spadix sessile, very long, with a slender barren appendage as long as the spathe. Male and female inflorescences short, widely distant, dense-flowered, with a few large clavate neuters close above the females. MALE INFLORESCENCE : Anthers large, sessile, subcompressed, 4-lobed ; cells contiguous, opposite, obovate-oblong, opening by terminal pores ; connective at length prominent. FEMALE INFLORESCENCE : Ovary oblong, 1-celled, rounded at the apex ; ovules 1—2, erect, basal ; style very short or 0. Fruit of obpyramidal 1-seeded substipitate berries. Seeds globose or somewhat convex, with an obconic strophiole ; albumen copious ; embryo axile.—DISTRIB. Tropical Asia and Africa ; species about 6.

1. **Sauromatum guttatum,** *Schott, in Schott & Endlich. Meletem.* (1832) p. 17. Tuber large. Leaf pedatisect, 6—12 in. broad ; segments 7—15, variable, 2—15 by 1—3 in., elliptic, acuminate, deep green ; midrib and veins impressed above, prominent beneath, the lower part of the midrib often spotted ; petiole stout, 12—18 in. long, green or spotted. Peduncle rather short, stout, green or spotted. Spathe 12—28 in. long ; tube ovoid or subglobose ; limb linear-lanceolate, thick, green or yellowish, usually with dark purple spots or blotches, the margins generally purple and waved. Spadix shorter than the spathe ; appendage 2—8 in. long, cylindric and obtuse, or narrowed from the base to a fine point, green or dark purple. MALE INFLORESCENCE ½ in. long, about 3 in. above the female. Anthers densely packed. FEMALE INFLORESCENCE ½ in. long. NEUTERS ½ in. long, spreading, close above the female. Fl. B. I. v. 6, p. 508 ; Engler, in DC. Monog. Phan. v. 2 (1879) p. 570 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428 ; Prain, Beng. Pl. p. 1109. *Sauromatum punctatum*, C. Koch, in Wochenschr. v. 1 (1858) p. 263 ; N. E. Brown, in Gard. Chron. (1880) part 2, p. 134. *Arum sessiliflorum*, Roxb. Fl. Ind. v. 3 (1832) p. 507 ; Wight, Icon. t. 800.—Flowers : April. VERN. *Nurki.*

KONKAN : *Stocks* ; Thana, *Law*, *Lisboa*. DECCAN : Máwal (Poona districts), *Woodrow* ; Lanoli, *Woodrow* !—DISTRIB. India (Panjáb, Upper Gangetic Plain, Himalaya from Nipal to Simla, W. Peninsula).

The leaf figured as the leaf of *Pythonium Wallichianum* in the 'Journal of the Bombay Natural History Society' [v. 7 (1893) p. 312, plate D] is that of this plant. The inflorescence figured on the same plate is that of *Amorphophallus commutatus*, Engler.

8. **AMORPHOPHALLUS,** Blume.

Tuberous herbs flowering before or together with the leaves. Leaf solitary, 3-partite ; segments pinnatisect. Flowers monœcious. Spathe with an open or convolute funnel-shaped or campanulate limb. Spadix exserted or included ; appendage large, short or long. Inflorescence cylindric, dense-flowered ; males and females contiguous ; neuters 0. MALE INFLORESCENCE : Stamens 2—4 ; anthers sessile, the cells oblong, opening by apical pores. FEMALE INFLORESCENCE : Ovaries globose, 1—4-celled ; ovules in each cell solitary, sub-basal, anatropous ; style short or long ; stigma entire or 2—4-lobed. Fruit of clustered subglobose or obovoid berries. Seeds large ; albumen 0 ; embryo macropodous.—DISTRIB. Tropics of the Old World ; species 30—40.

Leaves bulbiferous	1. *A. bulbifer.*
Leaves not bulbiferous.	
Spathe greenish-pink, 6—10 in. broad; appendage irregularly amorphous, dark-purple	2. *A. campanulatus.*
Spathe brownish-purple, 2—5 in. broad; appendage terete, smooth, cream-colored	3. *A. commutatus.*

1. **Amorphophallus bulbifer,** *Blume, Rumphia,* v. 1 (1835) p. 148. Tuber globose, 2—4 in. in diam. Leaf 12—18 in. in diam., ultimately bulbilliferous at the base, on the forks and on the nerves above ; petiole 3—4 ft. long, spotted ; leaflets 3—8 in. long, obovate or lanceolate, with purple edges. Peduncle 8—12 in. long, green and pink, streaked with green or black. Spathe 5—8 in. long, erect, pale-pink or yellowish shaded with pink, rose-pink inside. Spadix sessile ; appendage 3—4 in. long, conoid or oblong, rounded at the top, pale flesh-colored or white. MALE INFLORESCENCE reaching 1½ in. long. Anthers short. FEMALE INFLORESCENCE 1 in. long. Stigma 2-lobed. Fl. B. I. v. 6, p. 515 ; Engler, in DC. Monog. Phan. v. 2 (1879) p. 317 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428 ; Prain, Beng. Pl. p. 1109 ; Watt, Dict. Econ. Prod. v. 1, p. 225. *Arum bulbiferum,* Roxb. Hort. Beng. (1814) p. 65, Bot. Mag. t. 2072 & t. 2508 ; Grah. Cat. p. 229.—Flowers in April ; leaves appear in June and July.

KONKAN : S. Konkan, *Graham.* S. M. COUNTRY : Londa, *Woodrow.* This is included on the authority of *Graham,* who gives the S. Konkan as its habitat, and of *Woodrow,* who reports its occurrence at Londa near Dharwar in the S. M. Country. I have seen no specimens from the Bombay Presidency; there are none in Herb. Kew.—DISTRIB. India (Bengal, Sikkim, Khasia Hills, Birma, W. Peninsula).

2. **Amorphophallus campanulatus,** *Blume ex Decaisne, in Nouv. Ann. Mus. Par.* v. 3 (1834) p. 366. Tuber depressed-globose, 8—10 in. in diam., bulbiferous, dark brown. Leaves appearing long after the flowers, 1—3 ft. broad ; segments spreading, simple or forked ; petioles 2—3 ft. long, stout, warted, dark green, with paler blotches ; leaflets 2—5 in. long, of variable width, obovate or oblong, acute, strongly many-veined, with green edges. Peduncle short, stout, elongating in fruit ; sheaths linear-oblong. Spathe campanulate, pointed, 6—10 in. broad, strongly closely veined, with recurved undulate and crisped margins, greenish-pink externally with pale

ocellated blotches, base within purple. Spadix as long as the spathe; appendage varying in size up to 8 by 5 in., globose, conoid or amorphous, sinuately lobulate, dark red-purple, spongy within. MALE INFLORESCENCE subturbinate, about 3 in. long, 1—2 in. in diam. Anthers densely crowded, pale-yellow; pollen golden-yellow. FEMALE INFLORESCENCE 3 in. long or more, reaching 2½ in. in diam. Ovaries densely crowded, sessile, depressed-globose; style ½ in. long, stout, ascending, purple; stigma large, 2—3-lobed. Berries red, 2—3-seeded, obovoid. Fl. B. I. v. 6, p. 513; Dalz. & Gibs. p. 259; Engler, in DC. Monog. Phan. v. 2 (1879) p. 309; Trim. Fl. Ceyl. v. 4, p. 355; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Prain, Beng. Pl. p. 1109; Watt, Dict. Econ. Prod. v. 1, p. 225. *Arum campanulatum*, Roxb. Cor. Pl. v. 3 (1819) p. 68, t. 272; Grah. Cat. p. 228; Wight, Icon. t. 785.—VERN. *Suran.*

Cultivated in Bombay gardens for the large tuberous roots which are eaten; also to a considerable extent in the Deccan and Gujarat. Dalzell says that it grows wild on the banks of rivers in the Southern Konkan.—DISTRIB. Cultivated largely throughout the plains of India and Ceylon.

3. **Amorphophallus commutatus,** *Engler, in DC. Monog. Phan.* v. 2 (1879) p. 319. Annual; tuber oblate-spherical, 4 by 2 in., depressed above. Leaf solitary, appearing a month or more after the flowers, about 2 ft. in expansion, 3-sect*, each primary division 2-sect; petiole reaching 2 ft. long by ¾ in. in diam., tapering upwards, solid, rough and variously spotted. Leaflets: 1 terminal 4½ by 2 in., 2 decurrent on each side and 2 below the bifurcation, reducing in size downwards. Peduncle 1—3 ft. long by about ¾ in. in diam. at the base, tapering upwards, variously spotted with purple and white and rough with minute spinules; cataphylls 2 (sometimes 3), sheathing the base of the peduncle, pale rose-colored, acute, the longest about 4 in. long. Spathe thick, brownish-purple outside, pinkish-purple inside, 6—10 by 2—5 in., ovate-lanceolate, acute or acuminate, broadest at the middle, rough inside at the base, obtuse at the tip. Spadix sessile, columnar; appendage as long as or longer than the spathe, cream-colored, terete, smooth, not contracted above the inflorescence, the tip obtuse. MALE INFLORESCENCE 1—2 in. long. Anthers sessile, at first round, straw-colored, changing to brownish-purple and becoming enlarged and irregularly quadrate in outline. FEMALE INFLORESCENCE: Ovaries numerous, 1-celled; ovule solitary; stigma sessile, disciform, orange-red. Fl. B. I. v. 6, p. 515; Lisboa, in Journ. Bomb. Nat. v. 10 (1896) p. 527; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428. *Amorphophallus sylvaticus,* Dalz. & Gibs. Bo. Fl. (1861) p. 259 (*not* of Kunth). *Dracontium polyphyllum,* Grah. Cat. Pl. Bo. (1839) p. 229 (*not* of Denst.). *Pythonium Wallichianum,* Kirtikar, in Journ. Bomb. Nat. v. 7 (1893) p. 312 (*not* of Schott) the flower only.—Flowers: May—June. VERN. *Shevla.*

KONKAN: *Stocks, Graham*; S. Konkan, *Dalzell & Gibson*; Western Ghâts from Bombay to Kumpta, *Lisboa*; Marmagão, *Woodrow*!; Matheran, *Cooke*!, *Lisboa*; near Kalyan, *Woodrow*; Shevdi near Bombay, *Woodrow.*—DISTRIB. India (W. Peninsula).

* Woodrow has sent to Herb. Kew. an abnormal 5-sect leaf from a tuber planted in the College of Science Bot. Garden at Poona.

The appearance of the leaves so long after the flowers has rendered it difficult to obtain authentic specimens of the former until the plant was grown by Woodrow in the Botanical Garden of the College of Science at Poona and specimens sent to Kew. The late Dr. Lisboa has described the plant at great length from Woodrow's specimens in the 'Journal of the Bombay Natural History Society,' v. 10 (1896) p. 527.

The plant is very common at Matheran, where its flowers appear about the end of May. When the anthers are ripe, the odor of the plant is most offensive, resembling carrion, and visitors to the Hill often complain of *defective conservancy* at this time.

9. **ARIOPSIS,** Nimmo.

A small tuberous herb. Leaves entire, peltate. Spathe small, cymbiform, open, persistent ; tube 0. Spadix shorter than the spathe ; appendage 0. Male flowers cylindric ; female adnate to the base of the spathe. MALE INFLORESCENCE : Flowers imbedded in the tissue of the spadix. Anthers connate in groups of 3, each 2-celled, surrounding a pore into which they all open. FEMALE INFLORESCENCE : Ovaries few, oblong, 1-celled, secund ; ovules many, orthotropous, 2-seriate, on 4—6 parietal placentas ; stigma sessile, stellately 4—6-fid. Berries 3—6-angled, many-seeded. Seeds pendulous ; albumen copious ; embryo axile.—DISTRIB. Species 1, Indian.

1. **Ariopsis peltata,** *Nimmo, ex Grah. Cat. Pl. Bo.* (1839) p. 252. A small plant ; tubers small, green, clustered, with many slender root-fibres. Leaf solitary, 1—6 in. in diam., membranous, peltate, orbicular or shallowly cordate, tip rounded or acute, glaucous beneath ; petiole 3—8 in. long, slender. Peduncle 1½—4 in. long, very slender ; cataphylls 2 or 3, white spotted with purple, ½—¾ in. long. Spathe ½—⅞ by ⅜—½ in., incurved, apiculate, violet with a green dorsal ridge, paler within. Spadix shorter than the spathe, decurved ; appendage 0. Male flowers dark purple ; female flowers green. Stigma yellow. Fl. B. I. v. 6, p. 519 ; Dalz. & Gibs. p. 259 ; Engler, in DC. Monog. Phan. v. 2 (1879) p. 528 ; Bot. Mag. t. 4222 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428. *Ariopsis protanthera,* N. E. Brown, in Rep. Roy. Gard. Kew (1877) p. 51. *Remusatia vivipara,* Wight, Icon. t. 900 (*not* of Schott).—Flowers : June—Sept.

KONKAN : *Stocks* !, *Dalzell & Gibson* ; Neral below Matheran, *Woodrow*. —DISTRIB. India (W. subtropical Himalaya, Birma, W. Peninsula).

10. **REMUSATIA,** Schott.

Tuberous herbs, emitting long leafless bulbilliferous shoots from the crown of the tuber. Leaf solitary, entire, peltate, coming up after the flowers. Flowers monœcious. Spathe coriaceous, shortly stipitate ; tube convolute, constricted at the mouth, accrescent over the fruit ; limb broad or narrow, erect, or spreading and reflexed, deciduous. Spadix very short, sessile ; appendage 0. Male and female inflorescences distant, with interspersed neuters. MALE INFLORESCENCE forming a clavate mass of densely packed flat-topped anthers mixed with neuters, the individual stamens with a fleshy connective bearing 2—3 small immersed anther-cells opening by

terminal slits. FEMALE INFLORESCENCE short, cylindric. Ovaries closely packed, ovoid, 1-celled ; ovules many, on parietal placentas, orthotropous ; stigma sessile, discoid. Fruit of small clustered berries. Seeds small ; albumen copious ; embryo axile.—DISTRIB. Species 2, Indian.

1. **Remusatia vivipara,** *Schott, in Schott & Endlich. Meletem.* (1832) p. 18. Tubers 1—1½ in. in diam., clustered, depressed, rooting from the crown ; bulbilliferous shoots 6—12 in. long, as thick as a goose-quill, simple or shortly branched, ascending, flexuous, bearing at the nodes clusters of oblong, squarrosely scaly bulbils $\frac{1}{10}$—$\frac{1}{4}$ in. long. Leaves peltate, 5 by 3½ to 18 by 12 in., membranous, orbicular-ovate or -cordate, acute or acuminate, with strong main nerves and fine venation between them ; petiole 6—12 in. long, with a short sheath. Spathe 4—5 in. long, coriaceous ; tube 1—2 in. long, oblong, or ovoid, green ; limb 2—3 in. long, broadly orbicular-ovate or ovate-cordate, 2—3 in. broad, golden-yellow. Spadix 1—1½ in. long ; the male inflorescence ¼ in. long. The plant rarely flowers, but sends up long bulbilliferous shoots from the crown of the tuber. Fl. B. I. v. 6, p. 521 ; Dalz. & Gibs. p. 259 ; Engler, in DC. Monog. Phan. v. 2 (1879) p. 496 ; Trim. Fl. Ceyl. v. 4, p. 358 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428 ; Prain, Beng. Pl. p. 1113. *Arum viviparum,* Roxb. Fl. Ind. v. 3 (1832) p. 496 ; Grah. Cat. p. 228 ; Wight, Icon. t. 798.

KONKAN : both Konkans, *Nimmo* ex *Graham;* in the clefts of trees in Ghât jungles, *Dalzell & Gibson*; Neral below Matheran, *Bhiva*! DECCAN : Lanoli, *Woodrow*; Khandala, *Woodrow*; Koina Valley below Mahableshwar, *Cooke*!—DISTRIB. India (subtropical Himalaya, Khasia Hills, Chota Nagpur, W. Peninsula) ; Ceylon, Java.

11. POTHOS, Linn.

Evergreen branching shrubs, climbing by aerial roots. Leaves distichous, obliquely linear to ovate, the blade sometimes obsolete ; petiole winged or leaf-like, sheathing at the base. Flowers hermaphrodite, all fertile. Peduncles axillary or infra-axillary, leafy, or sheathed, or naked. Spathe small, ovate or concave, coriaceous, persistent. Spadix shorter than the spathe, stipitate. Perianth of 6 segments with hooded tips. Stamens 6 ; filaments short or long, linear or dilated ; anthers terminal, dehiscing by extrorse chinks. Ovary ovoid, oblong, or depressed, 3-celled ; ovule solitary in each cell, anatropous, adnate to the inner angle ; stigma small, sessile, hemispheric. Berries ellipsoid, often compressed ; testa thick ; albumen 0 ; embryo macropodal.—DISTRIB. Tropical Asia, Australia and the Pacific Islands, one species in Madagascar ; species about 50.

1. **Pothos scandens,** *Linn. Sp. Pl.* (1753) p. 968. A climbing plant clothing trees and walls like ivy ; stem as thick as the little finger, much branched, tough, terete, smooth, leafy ; internodes ½—1 in. long. Leaves very variable, 2—4 by ½—2 in., obovate, elliptic or lanceolate, acute, acuminate or apiculate, coriaceous, bright green, base cuneate or rounded ; petiole broadly winged, 1—3 by ¼—⅝ in., the base ½-amplexicaul. Peduncles ⅛—⅝ in. long, the base clothed

with ovate acute imbricating cataphylls about ½ in. long. Spathe ⅜—½ in. long, cymbiform, cuspidate, green. Spadix yellow, as long as the spathe, stipitate, globose, ovoid, or shortly oblong, the stipes as long as the inflorescence. Anthers terminal, minute, the cells divaricate. Ovary 3-celled, truncate ; stigma minute, lobulate. Berries ½—⅝ in. long, oblong, scarlet, few ripening. Fl. B. I. v. 6, p. 551 ; Grah. Cat. p. 229 ; Dalz. & Gibs. p. 257 ; Engler, in DC. Monog. Phan. v. 2 (1879) p. 84 ; Trim. Fl. Ceyl. v. 4, p. 364 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428 ; Prain, Beng. Pl. p. 1115.—Flowers : May—July.

KONKAN : *Stocks* ! ; in dense jungles, *Graham* ; Goa jungles, *Dr. Lush* ex *Graham* ; Ghát jungles, pretty common, *Dalzell & Gibson* ; ravines about Pár (below Mahableshwar), *Graham* ; Marmagão, *Bhiva* ! KANARA : Kadgal (N. Kanara), *Woodrow*.—DISTRIB. Throughout India ; Ceylon, Malay Islands, China.

Pothos aurea, Linden ex André, in Illustr. Hortic. v. 27 (1880) p. 69, t. 381. A showy plant. Leaves 15 by 10 in., ovate, cordate, acute, thick, fleshy, strikingly variegated, of a dark green, boldly and irregularly marked by bands or fantastic-shaped blotches of yellow varying in intensity from cream to orange. Introduced into England from the Salomon Isles in 1880. In the cemetery in Sewree, Bombay, which is close to the sea, very fine specimens may be seen (*Woodrow*). Woodr. Gard. in Ind. ed. 5, p. 545.

Pothos nitens, Bull, Cat. (1887) p. 11. A native of the Eastern Archipelago, grown in conservatories and gardens. Leaves ovate, acute, slightly and unequally cordate at the base, of a dark shining bronzy-purplish green. Woodr. Gard. in Ind. ed. 5, p. 545.

EXCLUDED SPECIES.

SYNANTHERIAS SYLVATICA, Schott, Gen. Aroid. (1858) t. 28. Tuber 1—2½ in. in diam., bulbilliferous. Leaves 1½—2½ ft. in diam. ; petiole 1—2 ft. long, pale green with darker streaks. Leaflets few, ovate-lanceolate or oblanceolate. Spathe 1—4 in. long, pale pink spotted with green, purple within towards the base. Appendage of spadix reaching 7 in. long, purple, smooth. Male and female inflorescences distant, with interposed neuters. Fl. B. I. v. 6, p. 518 ; Trim. Fl. Ceyl. v. 4, p. 357.

I cannot find any satisfactory evidence of the occurrence of this as a Bombay plant. Engler [DC. Monog. Phan. v. 2 (1879) p. 320] gives Bombay as its habitat from the specimens in the Herbarium of Hooker and Thomson, which were however obtained from the Nilghiri Hills and Kurg, localities quite outside the Bombay Presidency. There is in Herb. Kew. a solitary specimen which was presented to the Glasgow Botanic Garden by Mrs. Nimmo, but this is accompanied by no authentic note of locality and may have been collected anywhere. Woodrow gives Marmagão in his list, but the Marmagão plant is *Amorphophallus commutatus*, Engl., which, though quite distinct, has often been mistaken for this.

The plant occurs in S. India and is common in the drier parts of Ceylon.

The following non-indigenous plants not belonging to any of the foregoing genera are more or less cultivated :—

Colocasia Antiquorum, Schott, in Schott & Endlich. Meletem. (1832) p. 18. Rootstock tuberous. Leaves large, ovate, with a broad

triangular basal sinus. Spathe 8—18 in. long, caudate-acuminate, erect, pale yellow. Cultivated throughout the hotter parts of India and in all warm regions. All parts of the cultivated plants are eaten, but especially the starch from the tubers which attain 6 in. in diam. Fl. B. I. v. 6, p. 523 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428 ; Prain, Beng. Pl. p. 1112 ; Watt, Dict. Econ. Prod. v. 2, p. 509. *Arum Colocasia,* Linn. Sp. Pl. (1753) p. 965 ; Roxb. Fl. Ind. v. 3 (1832) p. 494 ; Grah. Cat. p. 228. *Caladium ovatum,* Grah. Cat. p. 229 (*not* of Vent.).—VERN. *Alu.*

Alocasia indica, Schott, in Oestr. Bot. Wochenbl. (1854) p. 410. A stout herb ; rootstock suberect, large, 3—8 ft. long, 3—8 in. thick with few soboli. Leaves large, ovate, deeply sagittately cordate ; lobes rounded, the sinus narrow. Spathe 8—12 in. long, pale yellowish-green. Fl. B. I. v. 6, p. 525 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428 ; Prain, Beng. Pl. p. 1111 ; Watt, Dict. Econ. Prod. v. 1, p. 178. *Arum indicum,* Roxb. Fl. Ind. v. 3 (1832) p. 498 ; Wight, Icon. t. 794.

Cultivated in native gardens. The stems and rootstocks are eaten. In Bengal they form an important article of food.

Alocasia macrorhiza, Schott, in Schott & Endlich. Meletem. (1832) p. 18. A very stout herb ; rootstock suberect, very large, 6—16 ft. long and as thick as a man's arm. Spathe 6—10 in. long, fragrant. A native of Tropical Asia, Australia, and the Pacific Islands. Occasionally grown in native gardens. Fl. B. I. v. 6, p. 526 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428 ; Prain, Beng. Pl. p. 1111. *Alocasia odora,* Watt, Dict. Econ. Prod. v. 1, p. 178.

Alocasia metallica, Hook. in Bot. Mag. (1860) t. 5190 (*not* of Schott). A slow-growing plant with leaves 12—18 in. long of a rich bronze color on the upper, purple on the lower side, a native of Borneo, often grown in conservatories ; a very ornamental plant.

Alocasia Lowii, Hook. in Bot. Mag. (1863) t. 5376. A very ornamental plant when well grown, a native of Borneo. Leaves 14—16 in. long, cordate-sagittate, olive-green, with thick white ribs, deep purple beneath. Woodr. Gard. in Ind. ed. 5, p. 532.

Caladium. The plants of this genus, which contains perhaps 10 true species all natives of South America, have been so hybridized chiefly from *Caladium bicolor,* Vent., that the florists' varieties have become very numerous. Bull of Chelsea in a list of Caladiums quoted by Woodrow (Gard. in Ind. ed. 5, p. 535) gives about 90 varieties of *Caladium,* several of which have been introduced into Indian gardens, where their ornamental leaves are striking objects between May and October.

Anthurium. Several varieties of this genus have been recently introduced into gardens and conservatories. Some of the hybrids are extremely handsome.

Acorus Calamus, Linn. Sp. Pl. (1753) p. 324. Rootstock as thick as the middle finger, creeping and branching, very aromatic. Leaves 3—6 ft. by ¾—1¼ in. Cultivated in native gardens and easily

established, though not indigenous. Throughout Asia, Europe and N. America ; known as the *Sweet Flag* in England ; formerly used to strew the floors of apartments. Fl. B. I. v. 6, p. 555 ; Grah. Cat. p. 230 ; Dalz. & Gibs. Suppl. p. 96 ; Trim. Fl. Ceyl. v. 4, p. 365 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428 ; Watt, Dict. Econ. Prod. v. 1, p. 99.—VERN. *Yekand.*

The root is used medicinally and to keep insects from clothes.

Rhaphidophora pertusa, Schott, in Bonplandia, Jahrg. 5 (1857) p. 45. A lofty epiphytic climber ; stem cylindric, reaching 1½ in. in diam., green, smooth, leafy. Leaves 8—18 by 6—10 in., broadly ovate, cuspidate, dark green, often with oblong holes at one side. Spathe shortly pedunculate, yellow. A native of S. India, Ceylon (rare), and the Malay Islands, grown in gardens. Fl. B. I. v. 6, p. 546 ; Trim. Fl. Ceyl. v. 4, p. 361 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428. *Scindapsus pertusus,* Schott, in Schott & Endlich. Meletem. (1832) p. 21 ; Wight, Icon. t. 781. *Pothos pertusa,* Roxb. Hort. Beng. (1814) p. 83 ; Grah. Cat. p. 230.

ORDER CXLII. **LEMNACEÆ.**

Small or minute gregarious aquatic herbs, scale-like or globular, without roots or with capillary ones, propagated by buds or bulbils, rarely by seed. Fronds smooth above, spongy below. Flowers monœcious, 1—3, naked or enclosed in a membranous spathe. Perianth 0. MALE FLOWERS : Stamens 1 or 2 ; anthers 1- or 2-celled, the cells superposed, dehiscing by transverse slits. FEMALE FLOWERS : Ovary sessile, 1-celled, narrowed into a funnel-shaped style ; ovules 1—7, basal, erect or horizontal ; stigma simple. Fruit a minute flask-shaped utricle indehiscent or opening circumscissilely. Seeds erect or horizontal, 1—7 ; testa coriaceous ; albumen fleshy or 0 ; embryo cylindric, axile.—DISTRIB. Species about 20, cosmopolitan.

Fronds flat, with 1 or more roots, bearing the flowers in marginal clefts ; anthers 2-celled ; filaments slender.	1. LEMNA.
Fronds minute, like grains of sand, rootless, proliferous, bearing the flowers on the upper surface ; anthers sessile, 1-celled	2. WOLFFIA.

1. **LEMNA,** Linn.

Small herbs ; fronds with one or more capillary roots rising from the side or the base. Flowers in marginal clefts of the frond, at first enclosed in a small spathe. MALE FLOWERS in pairs, one of each pair opening before the other. Stamen solitary ; filaments filiform or enlarged in the middle, recurved ; anthers 2-celled, globose, the cells dehiscing by transverse slits ; pollen muricate. FEMALE FLOWER : a solitary ovary close to the male ; ovules 1—7, anatropous, semianatropous, or orthotropous. Fruit a utricle, 1—7-seeded. Seeds erect or horizontal ; embryo conic or ovoid.—DISTRIB. Species 17, cosmopolitan.

Root solitary.
Fronds tailed, translucent, thin, the young hastate, set crosswise to the parent frond; seed horizontal... 1. *L. trisulca.*
Fronds not tailed, opaque, thick, the young fronds sessile; seed erect ..... 2. *L. gibba.*
Roots many ..... 3. *L. polyrhiza.*

1. **Lemna trisulca,** *Linn. Sp. Pl.* (1753) p. 970. Fronds submerged, ¼—¾ in. long (not including the tail, which often attains ½ in. long), translucent, thin, flat, elliptic-lanceolate or oblanceolate, crenate-serrate near the apex, the young fronds hastate, at length tailed and attenuated into a stalk by which they remain attached to the parent frond, each frond giving rise to a single root-fibre; root-cap acute. Ovule solitary. Seed semianatropous, horizontal; testa rough, grooved. The young fronds rise at right angles from one or both sides of the parent frond and remain connected with it crosswise. Fl. B. I. v. 6, p. 557; Dalz. & Gibs. p. 281; Engler, in Engl. & Prantl, Pflanzenf. v. 2, part 3, p. 160, fig. 104; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 17, t. 1394; Boiss. Fl. Orient. v. 5, p. 29; Prain, Beng. Pl. p. 1116; Watt, Dict Econ. Prod. v. 4, p. 620.

In ponds and tanks in the Konkan, not common.—DISTRIB. Temperate and tropical regions.

2. **Lemna gibba,** *Linn. Sp. Pl.* (1753) p. 970. Fronds floating, suborbicular or obovate, entire, not tailed, ⅛—½ in. in diam., opaque, thick, flat above, at length very convex beneath, the young fronds sessile, each giving rise to a single root-fibre, the under surface at length spongy and greatly swollen; root-sheath elongate, cylindric; root-cap acute. Stamens 2. Utricle opening circumscissilely. Seeds erect, anatropous; albumen scanty or 0. Fl. B. I. v. 6, p. 556; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Boiss. Fl. Orient. v. 5, p. 30; Watt, Dict. Econ. Prod. v. 4, p. 620; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 22, t. 1396.—Flowers: Sept.

DECCAN: Boshri near Poona, *Woodrow.*—DISTRIB. Cosmopolitan.

3. **Lemna polyrhiza,** *Linn. Sp. Pl.* (1753) p. 970. Fronds herbaceous, not tailed, floating, opaque, thick, flat above, slightly convex below, ¼—⅓ in. in diam., dark green above, usually purplish beneath, 7-veined; epidermal cells with sinuous walls; young fronds sessile, each frond giving rise to a tuft of root-fibres. Spathe 2-lipped. Stamens 2. Ovules 1—2, semianatropous. Fl. B. I. v. 6, p. 557; Trim. Fl. Ceyl. v. 4, p. 367; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428; Prain, Beng. Pl. p. 1117; Watt, Dict. Econ. Prod. v. 4, p. 620; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 23, t. 1397. *Spirodela polyrhiza,* Schleid. in Linnæa, v. 13 (1839) p. 392; Engler, in Engl. & Prantl, Pflanzenf. v. 2, part 3, p. 154, fig. 101 A.—Flowers: Sept.

DECCAN: Poona, *Woodrow.*—DISTRIB. Cosmopolitan.

2. WOLFFIA, Horkel.

Very minute herbs, flattish, globose or conically produced below, rootless. Flowers inserted in a groove on the upper surface of the plant. Spathe 0. MALE FLOWER solitary. Stamen solitary; filament

short or long ; anther globose, 1-celled ; pollen smooth. FEMALE FLOWER solitary, close to the male. Ovary globose or ovoid ; ovule solitary, orthotropous. Fruit a spherical utricle. Seed globose, erect ; testa thick ; albumen scanty.—DISTRIB. Europe, East Indies, Tropical Africa, Tropical and Temperate America ; species 12.

1. **Wolffia Michelii,** *Schleid. Beitr. Bot.* (1844) p. 233. A minute floating annual herb. Fronds opaque, ovate-oblong or subglobose, $\frac{1}{20}$ in. long or less, convex on both surfaces, not tailed, rootless ; young fronds solitary and sessile from the very base of the parent frond. Jackson, Index Kewen. v. 4 (1895) p. 1233. *Wolffia arrhiza,* Hork. ex Wim. Fl. Schles. ed. 3 (1857) p. 140 ; Hook. f. Fl. B. I. v. 6, p. 557 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 428 ; Prain, Beng. Pl. p. 1117. *Lemna globosa,* Roxb. Hort. Beng. (1814) p. 66 ; Grah. Cat. p. 252 ; Dalz. & Gibs. p. 281. *Lemna arrhiza,* Linn. Mantiss. 2 (1771) p. 294 ; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 24, t. 1398.

Tanks throughout the Presidency common, covering the water like a green scum.

ORDER CXLIII. ALISMACEÆ.

Aquatic or marsh herbs, usually erect, sometimes floating. Leaves radical or clustered at the nodes of floating stems, entire, petiolate, often pellucid-dotted or lineolate. Flowers pedicellate, regular, 1-sexual or hermaphrodite, in umbellate or paniculate whorls, usually white or pink ; bracts 3 or more, membranous ; bracteoles small. Perianth-segments 6 in 2 series, the 3 outer (*sepals*) herbaceous, the inner whorl petaloid, rarely obsolete. Stamens 6 or more (rarely 3), hypogynous or perigynous ; anthers erect, basifixed, 2-celled, dehiscing by lateral or dorsal longitudinal slits. Carpels 3—6 or more, 1-celled, sessile or stipitate on a flat or raised receptacle ; ovules 1 or more in each carpel ; placentas on the inner angle (rarely ovule solitary and basal) ; style long or short (rarely 0) subterminal or ventral ; stigma simple. Fruit of small achenes or follicles. Seeds small or minute ; albumen 0 ; embryo straight or conduplicate.—DISTRIB. Genera 12 ; species about 60, cosmopolitan.

Fruit indehiscent of 3 or more achenes.	
Flowers polygamous; stamens 6; receptacle flat	1. LIMNOPHYTON.
Flowers 1-sexual; stamens usually many (rarely as few as 6); receptacle globose or oblong	2. SAGITTARIA.
Flowers monœcious; stamens 3; receptacle small, tumid	3. WISNERIA.
Fruit dehiscent of 6—7 follicles; stamens 8—12; flowers hermaphrodite	4. BUTOMOPSIS.

1. LIMNOPHYTON, Miquel.

A scapigerous stemless palustrine perennial herb with milky juice. Leaves sagittate, erect. Flowers polygamous (male and hermaphrodite), white, in paniculate whorls. Scapes stout. Receptacle flat. Sepals 3, herbaceous, persistent. Petals 3, membranous, deciduous.

Stamens 6 in 2 series, largest in the male flowers ; filaments compressed. Carpels 15—20, obsolete in the male flowers ; ovule solitary, anatropous, basal ; stigma small on a ventral style. Fruit of several compressed or turgid hard achenes. Seeds erect, basal ; testa membranous ; embryo horseshoe-shaped.—DISTRIB. Asia and Tropical Africa ; species 1.

1. **Limnophyton obtusifolium,** *Miq. Fl. Ind. Bat.* v. 3 (1855) p. 243. Rootstock short, stout, with numerous long root-fibres. Leaves all radical, 6—12 by 4—8 in. (sometimes as broad as long), reniformly or deltoidly sagittate or triangular, acute or subobtuse, or with rounded tip ; basal lobes long, tapering to a fine point, spreading, as long as the rest of the blade, the sinus very broad, open ; primary nerves 6—8 pairs, radiating from the top of the petiole, with irregular reticulate venation between them ; petiole 1—3 ft. long, stout, striate, channelled above. Panicle with a stout angular scape 2—4 ft. long ; branches long, erecto-patent, the lower branches usually in 4 whorls ; bracts whorled, broadly ovate-lanceolate, acuminate, with many parallel nerves, the lower reaching 1 in. long. Flowers many, $\frac{1}{8}$—$\frac{1}{2}$ in. in diam., white, in whorls at the nodes of the branches of the panicle 4—15 in a whorl, the upper whorls mostly male, the lower hermaphrodite ; pedicels 1—3 in. long, those of the male flowers more slender than the female. Sepals 3, orbicular-ovate, concave, ribbed, green. Petals 3, broadly obovate, $\frac{1}{6}$ in. long and broad. Filaments 6, flattened, with dilated bases. Achenes in a globose head $\frac{1}{2}$—$\frac{3}{4}$ in. in diam., obovoid, turgid, wrinkled. Fl. B. I. v. 6, p. 560 ; Micheli, in DC. Monog. Phan. v. 3 (1881) p. 39 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Prain, Beng. Pl. p. 1119. *Sagittaria obtusifolia,* Linn. Sp. Pl. (1753) p. 993 ; Grah. Cat. p. 199 ; Dalz. & Gibs. p. 249.—Flowers : Feb. VERN. *Nalkut.*

KONKAN : *Stocks* ! ; tanks throughout the Konkans, *Graham.* KANARA : Halyal tank, *Ritchie,* 1390 ! GUJARAT : *Dalzell & Gibson* ; Ankleshwar near Broach, *Woodrow.*—DISTRIB. India (W. Peninsula) ; Ceylon, Tropical Africa, Madagascar.

2. SAGITTARIA, Linn.

Erect, stemless, usually perennial aquatic herbs. Leaves with long petioles, elliptic, cordate or sagittate. Flowers 1-sexual or polygamous, in paniculate or spicate whorls. Sepals 3, herbaceous, persistent. Petals 3, membranous, deciduous. Stamens in male flowers about 24 with only staminodes in the female flowers, or 6—10 in the male flowers with 9—12 in the hermaphrodite ; filaments filiform, compressed. Carpels very many, crowded on a large globose or oblong receptacle, flattened laterally. Ovary solitary, basal ; style ventral or apical ; stigma papillose. Fruit a globose or oblong head of flattened crested or winged achenes. Seed erect, basal ; testa thin ; embryo horseshoe-shaped.—DISTRIB. Species about 15, temperate and tropical.

1. **Sagittaria sagittifolia,** *Linn. Sp. Pl.* (1753) p. 993. Rhizome thick, tuberous, stoloniferous. Leaves radical, 2—8 in. long, very variable, the first leaves of the young plants very slender and very

acute, the next one or two simply cordate-oblong, the rest sagittate, acute, smooth, with more or less divergent basal lobes which are 2—3-nerved and narrower than the upper part of the blade, which latter is oblong or lanceolate, acute, 5-nerved, the nerves extending from the top of the petiole to the apex of the leaf ; petioles sometimes reaching nearly 2 ft. long, 3-gonous. Scape 6—18 in. long. Flowers ½—¾ in. in diam., white, often with a purple claw, in 3—5 whorls along the scape with 3—5 (usually 3) flowers in each whorl, the lower whorls female, the upper male, with longer pedicels (hermaphrodite flowers occur sometimes, but rarely) ; bracts narrowly ovate, membranous. Sepals ovate, acute, much smaller than the petals. Petals large, broadly obovate. Filaments in the male flowers very many, absent in the female flowers ; anthers sagittate. Achenes obliquely obovate, flattened, apiculate, winged, the wings broad, entire or subcrenate. Fl. B. I. v. 6, p. 561 ; Grah. Cat. p. 199 ; Buchenau, in Engl. & Prantl, Pflanzenf. v. 2, part 1, p. 231, fig. 176 ; Micheli, in DC. Monog. Phan. v. 3 (1881) p. 66 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Prain, Beng. Pl. p. 1120 ; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 68, t. 1436 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 383.—Flowers : Sept.

Rare in the Bombay Presidency. KONKAN : *Stocks* ! ; Malwán, *Woodrow*.—DISTRIB. Europe, Asia, N. America.

3. **WISNERIA,** Micheli.

Scapigerous marsh herbs. Leaves radical, long-petiolate, narrowly lanceolate. Flowers monœcious, in remote involucrate whorls on a slender rhachis ; involucre campanulate, truncate, membranous. Sepals 3, equal or one longer, persistent. Petals 2—4, equalling or smaller than the sepals. MALE FLOWERS : Stamens 3. Pistillodes subulate. FEMALE FLOWERS : Staminodes 3, setaceous. Carpels 3—6, erect, ovoid ; receptacle small, tumid ; ovule solitary, basal ; style 0 or terminal ; stigma minute. Achenes and seed subglobose or compressed ; testa thin ; embryo horseshoe-shaped.—DISTRIB. Asia, Africa, and Madagascar ; species 3.

1. **Wisneria triandra,** *Micheli, in DC. Monog. Phan.* v. 3 (1881) p. 82. A herb about 1 ft. high ; root fibrous. Leaves glabrous, long-petiolate, longer than the scape, reaching with the petiole 9—15 in. long, the blade less than ½ in. broad, narrowly linear-spathulate, obtusely keeled on the back ; midrib stout, penninerved, the lateral nerves slender, submarginal ; petioles terete, sheathing at the base, twice as long as the leaf-blade. Scape erect, simple, terete, 5—6 in. high, floriferous at the apex, obtusely 3-gonous. Whorls of flowers 6—8, of which the 1—2 lower consist of females, the upper of males. Flowers white, usually 3 in a whorl ; pedicels short, longer than the bracts ; bracts connate, sheathing, obtuse. Sepals 3, linear-oblong. Petals 3, shorter than the sepals. MALE FLOWERS : Stamens 3, opposite the sepals ; anthers didymous ; filaments short. FEMALE FLOWERS : Achenes few, subglobose or obovoid, smooth. Fl. B. I. v. 6, p. 562 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429.

Sagittaria triandra, Dalz. in Kew Journ. Bot. v. 2 (1850) p. 144 ; Dalz. & Gibs. p. 249.—Flowers : Aug.

KONKAN : Malwán, *Dalzell* !, *Woodrow*.—DISTRIB. India (W. Peninsula).

4. **BUTOMOPSIS,** Kunth.

An annual scapigerous marsh herb with milky juice. Leaves radical, elliptic, acute. Flowers hermaphrodite, umbellate on a scape ; whorls sometimes superposed, bracteate. Sepals 3, herbaceous, persistent. Petals 3, membranous, deciduous, white, larger than the sepals. Stamens 8—12 (usually 9), hypogynous ; 6 outer in pairs opposite the sepals, sometimes one of a pair obsolete ; 3 inner single, opposite the petals, sometimes one or more replaced by a pair ; filaments filiform ; anthers oblong. Carpels 6—9, whorled, on a flat receptacle, sessile, shortly connate below, 1-celled ; ovules many, small, on reticulate parietal placentas, ascending, anatropous ; style short. Fruit of 6—7 erect membranous follicles. Seeds numerous, minute, parietal, smooth ; embryo conduplicate, horseshoe-shaped.—DISTRIB. Asia, Africa, Tropical Australia ; species 2.

1. **Butomopsis lanceolata,** *Kunth, Enum.* v. 3 (1841) p. 165. Rhizome small, sending out leaves above, fibrous roots below. Leaves 2—6 by $\frac{5}{8}$—$2\frac{1}{4}$ in., elliptic-lanceolate, acute, membranous, quite entire, attenuated into the petiole ; main nerves 5—7 ; petioles dilated at the base, reaching 8 in. long. Scape usually longer than the leaves, stout, bearing an umbel of 3—20 flowers at its apex ; bracts below the umbel scarious, $\frac{1}{2}$—$\frac{5}{8}$ in. long, ovate, acute ; pedicels very variable in length, 1—6 in. long in the same umbel. Sepals 3, herbaceous, $\frac{1}{3}$ by $\frac{1}{4}$ in., elliptic, obtuse, reticulately veined, persistent. Petals white, fugacious. Follicles 6—7, reticulately veined, tapering into short beaks. Seeds very numerous, oblong, with rounded ends, about $\frac{1}{10}$ in. long, dark brown, shining. Fl. B. I. v. 6, p. 562 ; Dalz. & Gibs. p. 249 ; Micheli, in DC. Monog. v. 3 (1881) p. 87 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Prain, Beng. Pl. p. 1120. *Butomus lanceolatus*, Roxb. Hort. Beng. (1814) p. 89 ; Grah. Cat. p. 251.—Flowers : Nov.

Rare in the Bombay Presidency. GUJARAT : tank at Chikli near Surat, *Law* ex *Graham* ; Godra, *Woodrow*.—DISTRIB. Plains of India ; Tropics of the Old World, Australia.

ORDER CXLIV. **NAIADACEÆ.**

Aquatic or marsh herbs of various habit ; rootstock stout or slender, sometimes tuberous, often creeping or 0 ; stem floating or rooted in the ground. Leaves entire or serrate, submerged or floating, sheathing at the base, sometimes stipulate. Flowers 1- or 2-sexual, green, usually inconspicuous, in spikes, racemes, or terminal or axillary pedunculate spadices ; bracts small or 0. Perianth 0, or of 3—4 inferior valvate segments, or tubular and very delicate. Stamens 1—6, hypogynous, free in 2-sexual flowers, solitary or connate in

male flowers ; anthers 1—2-celled. Carpels 1—6 ; ovules 1 or more in each carpel, erect or pendulous ; style long or short ; stigma usually simple, sometimes stigmas 2—3 capillary. Fruit various. Seeds erect, pendulous, or laterally peltate ; testa coriaceous or somewhat fleshy ; albumen 0 ; embryo fleshy, straight.—DISTRIB. Genera 16 ; species about 150, temperate and tropical.

Flowers 2-sexual.
- Perianth of sepals present; carpels sessile.
  - Sepals 1—3, white, pink or pale blue, membranous; stamens 6 or more ..... 1. APONOGETON.
  - Sepals 4, green, herbaceous; anthers 4, sessile. 2. POTAMOGETON.
- Perianth wanting; carpels stipitate; anthers 2, sessile ..... 3. RUPPIA.

Flowers 1-sexual.
- Style long, slender; stigma oblique, peltate; achenes 2—9; male perianth wanting ..... 4. ZANNICHELLIA.
- Style wanting; stigmas 2—4, slender; achene solitary; male perianth double ..... 5. NAIAS.

1. APONOGETON, Linn. f.

Scapigerous fresh water herbs ; rootstock tuberous, crowned by numerous root-fibres. Leaves oblong, floating or submerged, membranous. Flowers 2-sexual, on long scapes bearing solitary or geminate, often unilateral spikes, which when young are enclosed in a conical quickly deciduous sheath. Perianth of 1—3 equal or unequal pink, white, or pale blue segments or obsolete. Stamens 6 or more ; filaments subulate, unequal, persistent ; anthers didymous. Carpels 3—6 ; ovules 2 or more in each carpel, basal, anatropous ; style short or 0 ; stigma discoid or decurrent, persistent. Seeds erect ; testa thick or thin ; albumen 0 ; embryo straight.—DISTRIB. Species 22, Asiatic, African, and Australian.

1. **Aponogeton monostachyon,** *Linn. f. Suppl.* (1781) p. 214. An aquatic herb ; rootstock $\frac{1}{3}$—$\frac{1}{2}$ in. in diam., stoloniferous, edible. Leaves floating, $2\frac{1}{2}$—8 by $\frac{3}{4}$—$1\frac{1}{2}$ in., oblong or linear-oblong, acute or obtuse, base cuneate, rounded, or cordate, 3—5-nerved and with numerous distinct cross nervules between them ; petioles varying with the depth of the water, often very long, subtrigonous. Scape varying with the depth of the water ; spike solitary, 1—6 in. long, dense- or lax-flowered ; flowers white, pink or pale blue. Sepals 2, obovate or suborbicular, $\frac{1}{10}$ in. long and broad. Stamens 6, as long as or longer than the perianth-segments ; anthers bluish-purple. Carpels 3. Follicles subglobose ; style subulate. Seeds 4—8, oblong ; testa lax, 6—8-ribbed, striate. Fl. B. I. v. 6, p. 564 ; Grah. Cat. p. 200 ; Dalz. & Gibs. p. 248 ; Trim. Fl. Ceyl. v. 4, p. 372 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Prain, Beng. Pl. p. 1122 ; Watt, Dict. Econ. Prod. v. 1, p. 277.—Flowers : July—Dec.

KONKAN : *Stocks* !, *Graham*; Salsette, *Graham*. S. M. COUNTRY : tanks in the Dharwar and Belgaum Collectorates, *Dalzell & Gibson*; Samasji (Dharwar districts), *Woodrow* ! GUJARAT : Godra, *Woodrow*.—DISTRIB. Throughout India; Ceylon, Tropical Asia, and Australia.

2. POTAMOGETON, Linn.

Aquatic submerged herbs with creeping rootstock. Leaves submerged or floating, opposite or alternate, entire or toothed ; stipules inter-foliaceous. Flowers minute, hermaphrodite, spicate on a short or long axillary or leaf-opposed peduncle arising from a sheath ; bracts 0. Perianth of 4 concave green valvate segments. Stamens 4 ; anthers sessile at the base of the segments of the perianth, didymous. Carpels 4, free, sessile, 1-celled and 1-ovulate ; ovule campylotropous, adnate to the inner angle of the carpel ; stigma subsessile or decurrent, persistent. Fruit of small coriaceous or spongy drupelets. Seed subreniform ; embryo macropodal.—DISTRIB. Species about 80, cosmopolitan.

Upper or all leaves floating	1. *P. indicus.*
Leaves all submerged.	
Leaves amplexicaul, ovate, cordate, entire, translucent, 5—9-nerved; stem stout; peduncle short; spike dense-flowered	2. *P. perfoliatus.*
Leaves semiamplexicaul, linear-oblong, crisped, serrulate, translucent, 3-nerved; stem slender; peduncle long; spike few-flowered	3. *P. crispus.*
Leaves filiform, opaque; stem filiform; flowers in distant whorls on the peduncle	4. *P. pectinatus.*

1. **Potamogeton indicus,** *Roxb. Fl. Ind.* v. 1 (1832) p. 452. Stem terete, branched, smooth, its length depending on the depth of the water. Leaves petiolate ; the upper floating, 2½—4 by 1—1½ in., alternate or uppermost opposite, oblong or elliptic-lanceolate, acute, obtuse or acuminate, thinly coriaceous, opaque, glossy, many-nerved, base acute or rounded, the petioles variable in length with stipules 1—1½ in. long, free ; the lower submerged leaves reaching 8 in. long, membranous, undulate, with petioles shorter than the blade. Peduncles axillary or leaf-opposed, 1—2 in. long, stout or slender, not thickened upwards. Spike 1½ in. long, dense-flowered, green. Sepals 4, clawed, $\frac{1}{10}$ in. long, including the claw which is nearly as long as the limb ; limb suborbicular, $\frac{1}{16}$—$\frac{1}{12}$ in. broad, concave. Drupelets $\frac{1}{8}$ in. long, obliquely truncate, shortly beaked. Fl. B. I. v. 6, p. 565 ; Grah. Cat. p. 200 ; Dalz. & Gibs. p. 248 ; Trim. Fl. Ceyl. v. 4, p. 373 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Prain, Beng. Pl. p. 1122.—Flowers : Dec.

Pretty common in tanks and ponds. DECCAN : water-holes of the high hill forts of the Western Deccan, *Dalzell & Gibson*; Poona, *Woodrow* !, *Cooke* !—DISTRIB. Throughout the plains of India; Ceylon, Malay and Sandwich Islands.

2. **Potamogeton perfoliatus,** *Linn. Sp. Pl.* (1753) p. 126. Stem stout, terete, slightly branched. Leaves 1—2½ by $\frac{5}{8}$—1 in., sessile, ovate-lanceolate, obtuse, membranous, translucent, amplexicaul, base cordate, 5—9-nerved ; stipules small, caducous. Peduncle stout, short, not thickened upwards. Spikes dense-flowered, ¼—$\frac{7}{8}$ in. long. Sepals with long claws, elliptic-obovate. Drupelets $\frac{1}{8}$ in. long, obliquely ovoid, hardly keeled, slightly compressed, with a short usually curved beak. Fl. B. I. v. 6, p. 566 ; Dalz. & Gibs. p. 248 ; Reichb. Icon. Fl. Germ. v. 7 (1845) p. 19, t. 29 ; Syme, Eng. Bot.

ed. 3, v. 9 (1869) p. 42, t. 1412 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429.—Flowers : Dec.—Feb.

DECCAN : in the stream round Dapuri garden near Poona, *Dalzell & Gibson*; Poona, *Cooke* !, *Woodrow* ! SIND : Jemadar ka Landa near Karachi, *Stocks*, 380 !—DISTRIB. India (W. Himalaya, W. Tibet, W. Peninsula); N. temperate regions, Australia.

3. **Potamogeton crispus,** *Linn. Sp. Pl.* (1753) p. 126. Stem branched, compressed. Leaves 1—3 by $\frac{1}{8}$—$\frac{3}{8}$ in., all submerged, semi-amplexicaul, linear or linear-oblong, obtuse, with crisped and finely serrulate margins, 3-nerved, translucent ; stipules small, caducous. Peduncle long, often curved, tapering upwards. Spike $\frac{1}{4}$—$\frac{1}{3}$ in. long, few-flowered ; flowers small. Sepals clawed, $\frac{1}{10}$ in. long icluding the claw ; limb suborbicular. Drupelets obliquely ovoid, $\frac{1}{8}$ in. long, terminated by a slightly recurved compressed beak. Fl. B. I. v. 6, p. 566 ; Dalz. & Gibs. p. 248 ; Reichb. Icon. Fl. Germ. v. 7 (1845) p. 18, tt. 29, 30 ; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 43, t. 1413 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Prain, Beng. Pl. p. 1123 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 331. *Potamogeton tuberosus,* Roxb. Hort. Beng. (1814) p. 12 ; Grah. Cat. p. 200.

KONKAN : tanks in the Konkans, *Dalzell & Gibson.* DECCAN : Poona, *Woodrow.*—DISTRIB. Plains of India and temperate Himalaya; North and South temperate and subtropical regions.

4. **Potamogeton pectinatus,** *Linn. Sp. Pl.* (1753) p. 127. Stem filiform, copiously distichously branched, forming with the leaves tassel-like masses when taken out of the water. Leaves all submerged, alternate, 1—6 by $\frac{1}{2}\frac{1}{5}$—$\frac{1}{10}$ in., narrowly linear or filiform, acute, opaque, 1—3-nerved or the lower sometimes 5-nerved ; stipules adnate to the leaf-sheaths, the tips free. Peduncle with the spike 2—3 in. long, filiform, usually longer than the leaves, not thickened upwards ; flowers few in few distant whorls, minute, green. Sepals suborbicular. Drupelets $\frac{1}{8}$—$\frac{1}{6}$ in. long, turgid, dimidiate-obovoid, slightly compressed, shortly beaked, rounded and obscurely 3-keeled on the back, with a very short straight beak. Fl. B. I. v. 6, p. 567 ; Dalz. & Gibs. p. 248 ; Trim. Fl. Ceyl. v. 4, p. 374 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Prain, Beng. Pl. p. 1123.—Flowers : Aug.

Dalzell without locality in Herb. Kew. ! DECCAN : Poona, *Woodrow.* GUJARAT : tank at Gogo (Kathiawad) plentiful, *Dalzell & Gibson.* SIND : Jemadar ka Landa, near Karachi, *Stocks,* 375 ! ; Manchar Lake, *Stocks* !—DISTRIB. Plains of India, the Himalayas, and Western and Eastern Tibet; Ceylon, most regions.

3. **RUPPIA,** Linn.

Submerged plants growing in brackish water ; rootstock creeping, much-branched ; stems slender, dichotomously branched. Leaves alternate or subopposite, filiform, formed of two parallel tubes ; sheath elongate, narrow. Flowers minute, hermaphrodite, 2—6 together within a leaf-sheath on an ultimately elongating straight or spirally coiled peduncle. Perianth 0. Stamens 2 ; anthers sessile, 2-celled. Carpels 4 ; ovule solitary in each carpel, pendulous ;

stigma peltate. Fruit of 4 stipitate ovoid obtuse or beaked achenes. Seed pendulous, uncinate ; embryo macropodal.—DISTRIB. Species 2 or 3, temperate and subtropical.

1. **Ruppia rostellata,** *Koch, ex Reichb. Icon. Pl. Crit.* v. 2 (1824) p. 66, t. 174, fig. 306. A submerged aquatic herb growing in brackish water, forming tangled masses of filiform leafy flaccid stems and branches ; stems 2 ft. long or more. Leaves filiform, 2—4 in. long, dull olive-green. Peduncles ½—1 in. long, not spirally coiled. Flowers minute, in pairs, enclosed in a leaf-sheath. Stipes of carpels rapidly lengthening after flowering up to 1 in. long, spreading and forming an umbellate head of achenes. Achenes $\frac{1}{12}$—$\frac{1}{10}$ in. long, beaked ; endocarp hard. Fl. B. I. v. 6, p. 568 ; Reichb. Icon. Fl. Germ. v. 7 (1845) p. 10, t. 17, fig. 25 ; Trim. Fl. Ceyl. v. 4, p. 374 ; Syme, Eng. Bot. ed. 3, v. 9 (1869) p. 59, t. 1428 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Prain, Beng. Pl. p. 1124. ? *Zostera marina,* Dalz. & Gibs. Bo. Fl. (1861) p. 277 (*not* of Linn.).

Stocks without locality in Herb. Kew.! KONKAN : Salt-works at Nathay, *Stocks*!; Mahim near Bombay, *Woodrow*.—DISTRIB. Throughout India in brackish water; Ceylon, Temperate Europe and Tropical Asia.

4. ZANNICHELLIA, Linn.

Aquatic submerged herbs growing in brackish or fresh water ; rootstock slender ; stem slender. Leaves linear, with stipular sheaths. Flowers minute, monœcious, both sexes in one membranous sheath. MALE FLOWERS : Perianth 0. Stamen solitary ; filament filiform ; anther linear, 2—3-celled. FEMALE FLOWERS : Perianth cupular, hyaline. Carpels 2—9, sessile ; ovule solitary in each carpel, pendulous, orthotropous ; style rather long, slender ; stigma oblique, peltate. Fruit of sessile or stipitate subreniformly incurved achenes usually 4 in number. Seed pendulous ; testa thin ; embryo subcylindric, with the cotyledonary end folded twice on itself.—DISTRIB. Species 4—5, but probably all forms of one species.

1. **Zannichellia palustris,** *Linn. Sp. Pl.* (1753) p. 969. SUB-SP. **pedicellata,** *Syme, Eng. Bot.* ed. 3, v. 9 (1869) p. 57, t. 1426. Stems very slender, filiform. Leaves 1—3 in. long, all submerged, alternate or opposite, narrowly linear or filiform. Flowers minute, subsessile, enclosed in the leaf-sheaths. Filament of the male flowers at first short, afterwards elongating. Peduncles in the Sind specimen (the only specimen from the Bombay Presidency that I have seen) reaching $\frac{1}{10}$ in. long. Achenes distinctly stipitate, about ⅛ in. long including the beak (which is about half as long as the body of the achene), subreniformly incurved, crested on the back. Fl. B. I. v. 6, p. 568 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Prain, Beng. Pl. p. 1124.

Rare. DECCAN : Poona, Mula River, *Woodrow*. SIND : *Dalzell*! Dalzell does not state whether his specimens grew in brackish or fresh water. His specimens merely bear the ticket "*Zannichellia* Scinde."—DISTRIB. Salt-marshes and less commonly in fresh water, throughout India ; most temperate and subtropical regions.

5. **NAIAS,** Linn.

Annual submerged herbs growing in fresh or brackish water ; stems rooting from the nodes, branched, filiform, smooth or muricate. Leaves sessile, opposite, alternate or whorled, narrowly linear, sinuate-dentate or serrulate. Flowers minute, axillary, 1-sexual, monœcious (rarely dioœcious). MALE FLOWERS : Perianth double, the outer tubular or inflated, entire or 4-fid, the inner hyaline. Stamen solitary, adnate to the inner perianth-tube ; anther apiculate or cuspidate, usually 4 (rarely 1)-celled. FEMALE FLOWERS : Perianth 0, or hyaline and adnate to the carpel. Carpel solitary, sessile, 1-ovulate ; ovule basal, erect, anatropous. Fruit an oblong achene. Seed erect ; testa very thin ; embryo straight.—DISTRIB. Throughout the world except in Arctic regions ; species 31.

1. **Naias minor,** *All. Fl. Pedem.* v. 2 (1785) p. 221. A small plant, growing in fresh water, 1¾—10 in. high ; stem slender, much dichotomously branched ; internodes short, smooth. Leaves ⅜—⅞ in. long, scarcely $\frac{1}{20}$ in. broad, narrowly linear, the upper recurved, with 6—12 spreading teeth on each margin ; sheaths truncate, rounded. Flowers fasciculate, monœcious, the male and female often found in successive leaf-axils. MALE FLOWERS about $\frac{1}{16}$ in. long. Anthers 1-celled. FEMALE FLOWERS about $\frac{1}{10}$ in. long. Style long ; stigmas 2, unequal. Achenes $\frac{1}{12}$—$\frac{1}{8}$ in. long. Seed narrowly ellipsoid, pitted. Fl. B. I. v. 6, p. 569 ; Trim. Fl. Ceyl. v. 4, p. 376 ; Rendle, in Trans. Linn. Soc. ser. 2, v. 5, p. 410 (1899), & in Engler, Pflanzenreich, v. 4, part 12 (1901) p. 14 and p. 2, fig. 1, D—F ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Prain, Beng. Pl. p. 1124. *Naias indica,* Cham. in Linnæa, v. 4 (1829) p. 501 ; Dalz. & Gibs. p. 277.

DECCAN : Poona, *Woodrow.*

This has been included on the authority of Woodrow, who gives Poona as the habitat of the plant. I have seen no specimens from Bombay; there are none in Herb. Kew.—DISTRIB. More or less throughout India in still fresh water; Ceylon, Old World generally.

ORDER CXLV. **ERIOCAULACEÆ.**

Annual or perennial scapigerous marsh (rarely aquatic) herbs. Leaves narrow, with sheathing bases ; veins parallel. Flowers 1-sexual, usually monœcious, minute, mostly white, densely aggregated in a solitary globose or hemispheric head at the apex of a peduncle with a tubular basal sheath ; heads androgynous (rarely 1-sexual), with an involucre of short 2—many-seriate imbricate scarious or chartaceous bracts, often radiating beyond the circumference of the flowering part of the head ; the florets often more or less hoary with short white hairs, and closely packed on a flat, convex, hemispheric, or conical receptacle, each floret solitary in the axil of a cuneiform bract which equals or exceeds its floret, and is usually dorsally hoary near the apex (rarely absent). Corolla usually separated from the calyx by a distinct stipes, sometimes rudimentary, especially in the male flowers (rarely absent). MALE FLOWERS : sepals usually 3, free

or connate, deciduous (rarely 2 or 0). Petals usually 3, connate in a stipitate funnel-shaped minutely 3-lobed corolla, one lobe sometimes longer than the others. Stamens 6 or fewer, inserted on the corolla; filaments short, often unequal; anthers didymous, 2-celled, usually black. Pistillode 0 or reduced to minute glands. FEMALE FLOWERS sessile or stipitate. Sepals 2—3 (rarely 1 or 0), unequal, usually concave, deciduous. Petals usually 3, unequal, broad or narrow, often ciliate or hairy, frequently with a dark glandular spot on the inner face. Ovary superior, sessile or stipitate, globose, 2—3-celled; ovary solitary in each cell, pendulous; style-branches 2—3, filiform. Fruit a small membranous 2—3-celled loculicidal capsule. Seeds minute, oblong, ellipsoid or globose, smooth, striate, or ribbed; albumen floury; embryo minute.—DISTRIB. Genera 9, according to Ruhland [Monog. Eriocaul. in Engler, Pflanzenreich, v. 4, part 30 (1903)]; species about 370, in the warmer regions of both hemispheres, most numerous in Tropical America, few in temperate regions.

1. ERIOCAULON, Linn.

Marsh or aquatic herbs; stem usually very short or 0, rarely elongate. Leaves linear, membranous, often fenestrate. Male and female flowers generally mixed in the same, rarely in separate heads. MALE FLOWERS: Sepals 2—3, free or often more or less united into a split spathe (rarely absent). Petals 2—3, at the apex of the tube, sometimes with a black gland on the inner face, sometimes rudimentary or absent. Stamens twice as many as the petals or by abortion fewer; anthers 2-celled, usually black. FEMALE FLOWERS: Sepals usually free, mostly unequal, concave, boat-shaped or flattened, often bearded on the apical part or ciliate. Petals 2—3, always free (rarely absent), often with a black gland on the inner face a little below the apex.—DISTRIB. Warmer parts of both hemispheres in marshy places, North Asia, China, Japan, N. America, Africa, Australia, one species in the British Isles, otherwise absent from Europe; species about 200.

Aquatics; stems elongate, floating, branched.
- Leaves capillary, 1-nerved ..... 1. *E. setaceum.*
- Leaves linear, 4—7-nerved ..... 2. *E. rivulare.*

Terrestrial or marsh plants; stems short or 0.
- Petals of male flowers 3, one much the largest and protruded beyond the floral bracts; involucral bracts orbicular; floral bracts bearded.
  - Receptacle villous; heads snowy-white; anthers black; plant with an odor of chamomile ..... 3. *E. odoratum.*
  - Receptacle glabrous or nearly so; heads white at apex, dark in lower half; anthers white; plant inodorous ..... 4. *E. breviscapum.*
- Petals of male flowers subequal or one rather larger, none produced beyond the floral bracts.
  - Involucral bracts woolly or hairy; receptacle villous.
    - Leaves linear, 3½—8 in. long; peduncles conspicuously 7-ribbed, usually twisted; petals of male flowers unequal ..... 5. *E. Wightianum.*

Leaves lanceolate, 1—2½ in. long; peduncles slightly 6-ribbed, scarcely twisted; petals of male flowers subequal ..... 6. *E. lanceolatum.*
Involucral and floral bracts both glabrous or nearly so.
Receptacle glabrous or nearly so; peduncles glabrous, 5-ribbed ..... 7. *E. Sieboldianum.*
Receptacle more or less villous.
Plant reaching 8 in. high; peduncles 4-ribbed, hairy ..... 8. *E. stellatulum.*
Plant 1—2½ in. high; peduncles obsoletely ribbed, glabrous ..... 9. *E. minutum.*
Involucral bracts alone glabrous; floral bracts bearded or pubescent.
Peduncles 3—10 in. high.
Receptacle sparsely hairy or glabrous.
Receptacle sparsely hairy; leaves 4 in. and more long; peduncles 5-ribbed; sepals 3 ..... 10. *E. sexangulare.*
Receptacle glabrous; leaves less than 4 in. long; peduncles 7-ribbed; sepals 2. 11. *E. cuspidatum.*
Receptacle villous.
Seeds closely transversely (microscopically) ridged.
Involucral bracts erect or spreading, never reflexed; heads pale grey, hemispheric, with truncate base; floral bracts subacute ..... 12. *E. luzulæfolium.*
Involucral bracts at first radiating beyond the head, at length reflexed; heads dark grey, subglobose; floral bracts subacute ..... 13. *E. trilobum.*
Seeds smooth, not transversely ridged; involucral bracts reflexed; heads pale grey or snowy white, globosely ovoid; floral bracts acuminate ..... 14. *E. quinquangulare.*
Peduncles less than 3 in. high; involucral bracts longer than the flowering part of the head, shining, pale yellow or nearly white ..... 15. *E. Xeranthemum.*

1. **Eriocaulon setaceum,** *Linn. Sp. Pl.* (1753) p. 87. A submerged aquatic; stem 1—3 ft. long, usually simple, stout or slender, densely clothed throughout its length with capillary flexuous glabrous, pellucid, 1-nerved leaves 1½—2 in. long; tips of stems floating. Peduncles numerous, umbellately fasciculate on the apex of the stem, 1½—4 in. high, slender, unequal, glabrous, 6-sulcate, more or less twisted; sheath ¾—1 in. long, obliquely split at the apex, membranous. Heads subglobose, ⅛—⅙ in. in diam., greenish-white, often quite white at the apex; involucral bracts $\frac{1}{16}$ in. long, broadly obovate or suborbicular, obtuse, concave; floral bracts obovate-cuneate, hairy on the back below the apex, membranous; receptacle villous. MALE FLOWERS: Sepals usually connate into spathe split open in front. Corolla-tube with 3 small subequal petals at its apex, hairy with white hairs. Stamens 6, the 3 opposite the petals a little larger than the others. FEMALE FLOWERS shortly stipitate. Sepals $\frac{1}{16}$—$\frac{1}{12}$ in. long, obovate-cymbiform, hairy on the back at the apex. Corolla shortly stipitate; petals 3, linear or linear-spathulate, narrow, ciliate with white hairs, usually with a black glandular spot on

the inner face below the apex. Ovary 3-lobed; style-branches 3, filiform. Seeds $\frac{1}{50}$ in. long, oblong, smooth, brown. Linn. Fl. Zeyl. (1747) p. 20, n. 50 (*Eriocaulon* without specific name); Rheede, Hort. Mal. v. 12, p. 129, t. 68; Kœrn. in Linæa, v. 27 (1856) p. 603; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 89. *Eriocaulon Capillus-naiadis*, Hook. f. Fl. B. I. v. 6 (1893) p. 572; Trim. Fl. Ceyl. v. 5, p. 2; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1126.—Flowers: Oct.—Dec.

KONKAN: *Stocks*!, *Dalzell*!, *Woodrow*.—DISTRIB. India (Bengal, Khasia Hills, Birma, W. Peninsula); Ceylon, Cochinchina.

I have followed Ruhland (*l. c.*) in making *E. Capillus-naiadis*, Hook. f., conspecific with *E. setaceum*, Linn. In the 'Flora of British India' (*l. c.*) *E. Capillus-naiadis*, Hook. f., is made conspecific with *E. setaceum* of Kœrnicke, which is certainly that of Linnæus. Ruhland restores *E. intermedium*, Kœrn., which is the *E. setaceum* of many authors, but not of Linnæus.

2. **Eriocaulon rivulare**, *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 280. Stem simple, elongate, submerged, densely leafy. Leaves linear, flat, all along the stem, somewhat crowded at its apex, 4—9 by $\frac{1}{12}$ in., attenuated into a subulate acumen, dilated at the base, fenestrately 4—7-nerved, opaque, rigid. Peduncles numerous, umbellately fasciculate on the top of the stem, 7—18 in. high, 8—10-sulcate, glabrous, twice as long as the leaves; sheaths tubular, 2—3 in. long, multi-striate, glabrous, shortly split at the apex. Heads globose, reaching $\frac{1}{4}$ in. in diam., snowy-white; involucral bracts $\frac{1}{10}$ in. long, broadly obovate-oblong, lacerate at the apex; floral bracts $\frac{1}{10}$—$\frac{1}{8}$ in. long, oblanceolate-oblong, subacute, hyaline, hairy on the back below the apex; receptacle columnar, hairy. MALE FLOWERS: Sepals 3, all free, $\frac{1}{16}$—$\frac{1}{12}$ in. long, or connate into a spathe split in front. Corolla-tube $\frac{1}{16}$ in. long; petals 3, spathulate, about $\frac{1}{20}$ in. long, subequal, with a black glandular spot, densely hairy. Stamens 6, those opposite the petals the longest; anthers white. FEMALE FLOWERS: Sepals 3, linear, acute, puberulous on the back. Petals 3, linear-spathulate, $\frac{1}{12}$—$\frac{1}{10}$ in. long, obtuse, white, with a black spot below the apex, hairy. Ovary 3-lobed; style-branches 3, filiform. Seeds globose, smooth. Dalz. & Gibs. p. 280; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 91. *Eriocaulon Dalzellii*, Kœrn. in Linnæa, v. 27 (1856) p. 605; Dalz. & Gibs. p. 316; Hook. f. Fl. B. I. v. 6, p. 580; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429.—Flowers: Oct.—Dec.

KONKAN: *Stocks*!; Malwán in streams, *Dalzell*!—DISTRIB. India (W. Peninsula).

The specific name *rivulare* originally given to the plant by Dalzell (1851) was changed into *Dalzellii* by Kœrnicke (*l. c.*) on account of the name *rivulare* having been preoccupied by Don (1849). But Don's plant is now *E. latifolium*, Smith (1809), so that Dalzell's name has been restored.

3. **Eriocaulon odoratum**, *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 280. Stemless or nearly so. Leaves 1—3 by $\frac{1}{12}$—$\frac{1}{8}$ in., linear-subulate, cæspitose, erect or recurved, fenestrately 6—9-nerved, glabrous, translucent. Peduncles few or many, unequal, 4—8 in. high, slender, glabrous, twisted, 5—6-ribbed; sheaths 1—2½ in. long, close, obliquely split. Heads subglobose, $\frac{1}{8}$—$\frac{1}{5}$ in. in diam.,

snowy-villous ; involucral bracts $\frac{1}{16}$ in. long, broadly obovate-cuneate, glabrous, at length lacerate at the apex ; floral bracts $\frac{1}{16}$ in. long, rhomboid-obovate, cuneate, acuminate, hairy on the upper part of the back with opaque white hairs ; receptacle pilose. MALE FLOWERS : Sepals 3, cuneate-oblong, narrow, subobtuse, free or often connate into a spathe split in front, white-hairy on the upper part of the back. Corolla-tube $\frac{1}{12}$ in. long ; petals very unequal, hairy, each with a black spot. Anthers black. FEMALE FLOWERS stipitate. Sepals 2, lanceolate, acute, boat-shaped, $\frac{1}{16}$ in. long, pilose. Petals 3, one larger than the other two, $\frac{1}{20}$—$\frac{1}{16}$ in. long, narrow, linear-spathulate, hairy with white opaque hairs and with a black spot on each. Style-branches 3, long, filiform. Fl. B. I. v. 6, p. 574 ; Dalz. & Gibs. p. 280 ; Kœrn. in Linnæa, v. 27 (1856) p. 683 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 110.—Flowers : Sept.

KONKAN : *Stocks* !, *Woodrow* ; Malwán in stagnant water, *Dalzell* ! KANARA : Kulgi (N. Kanara), *Talbot*, 1837 ! ; Karwar, *Talbot*, 2949 ! ; Supa on the Kála naddi, *Talbot*, 2948 !—DISTRIB. India (W. Peninsula).

The plant is described by Dalzell as smelling strongly of chamomile.

4. **Eriocaulon breviscapum,** *Kœrn. in Linnæa*, v. 27 (1856) p. 676. Plant 6—15 in. high, growing in still water ; root of numerous glabrous slender white fibres ; stem almost 0. Leaves cæspitose (? floating), 6—15 by $\frac{1}{8}$—$\frac{1}{3}$ in., linear, subobtuse, glabrous, flat, opaque, conspicuously 7—11-nerved. Peduncles shorter or longer than the leaves, solitary (? or few), 6—8 in. high, glabrous, erect, not or scarcely twisted ; sheaths 2—4 in. long, obliquely split. Heads globose or hemispheric, $\frac{1}{4}$—$\frac{3}{8}$ in. in diam., densely white-villous at the apex, the lower portion of the head dark brown ; involucral bracts $\frac{1}{12}$ in. long, broadly ovate or obovate, obtuse, glabrous, membranous ; floral bracts $\frac{1}{8}$ in. long, linear-oblong, acute, very hairy on the upper part with white hairs. MALE FLOWERS stipitate. Sepals 3, obovate-oblong, obtuse, $\frac{1}{12}$ in. long, slightly unequal, hairy at the top. Corolla-tube $\frac{1}{20}$ in. long ; petals slightly unequal, the longest $\frac{1}{16}$ in. long, very hairy, each with a black spot. Stamens 6, those opposite the petals the longest ; anthers white or pale yellow. FEMALE FLOWERS very shortly stipitate. Sepals 3, oblong, concave, truncate, $\frac{1}{12}$ in. long, pilose. Petals 3, narrowly linear-spathulate, slightly unequal, the longest $\frac{1}{16}$ in. long, all densely hairy with white hairs and with a black spot. Ovary 3-lobed, shortly stipitate ; style-branches 3, filiform. Seeds subglobose, pale yellow, shining. Fl. B. I. v. 6, p. 575 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 70.—Flowers : Dec.—Feb.

Rare. KANARA : Tinai Ghát (2000 ft.), *Talbot*, 1379 ! ; Anmod (N. Kanara), *Talbot*, 1609 !—DISTRIB. India (W. Peninsula).

There are only 2 sheets in Herb. Kew., both from N. Kanara.

5. **Eriocaulon Wightianum,** *Mart. in Wall. Pl. As. Rar.* v. 3 (1832) p. 28. Stem short or elongate, often as thick as the thumb. Leaves cæspitose, $3\frac{1}{2}$—8 by $\frac{1}{4}$—$\frac{5}{8}$ in., linear, obtuse or subobtuse, glabrous or nearly so, flat, many-nerved, scarcely fenestrate.

Peduncles strict, aggregated, 6—15 in. high, conspicuously about 7-ribbed, glabrous or sparsely hairy, usually twisted ; sheaths 2—4 in. long, obliquely and deeply split, sparsely hairy, ribbed. Heads ¼—½ in. in diam., globose, densely white-villous ; involucral bracts ⅛—⅛ in. long, cuneate-obovate, the outer obtuse, the inner subacute, hairy at the back in the upper part, ultimately reflexed ; floral bracts ⅛ in. long, rhomboid-cuneate or obovate-cuneate, acuminate, densely clothed with white hairs in the upper part ; receptacle pilose. MALE FLOWERS stipitate. Sepals 3, obovate-oblong, cuneate at the base, free or connate into a spathe, hyaline, the tips pubescent. Corolla-tube $\frac{1}{20}$ in. long ; petals all densely hairy at the apex and without a black spot, one slightly larger than the other 2, about $\frac{1}{10}$ in. long. Stamens 6 ; anthers black. FEMALE FLOWERS sessile or very shortly stipitate. Sepals 3, free, slightly unequal, linear-obovate, bearded towards the tip. Petals $\frac{1}{10}$ in. long, narrowly linear-spathulate, villous with long white hairs and with a minute black spot. Ovary sessile, 3-lobed ; style-branches 3, filiform. Seeds about $\frac{1}{50}$ in. long, ellipsoid, dark reddish-brown, smooth, minutely papillose. Fl. B. I. v. 6, p. 576 ; Wall. Cat. 6067 ; Kœrn. in Linnæa, v. 27 (1856) p. 658 ; Trim. Fl. Ceyl. v. 5, p. 8 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 420 ; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 75.—Flowers : Oct.—Nov.

Dalzell without locality in Herb. Kew. KONKAN : *Stocks* ! KANARA : Falls of Gairsoppa, *Talbot*, 771 !—DISTRIB. India (Birma, W. Peninsula) ; Ceylon.

6. **Eriocaulon lanceolatum,** *Miq. ex Steud. Syn. Pl. Cyp.* part 2 (1855) p. 271. Plant 4—8 in. high ; stem very short. Leaves cæspitose, erect, 1—2½ by ¼—½ in., oblong-lanceolate, subacute, glabrous, thinly membranous, translucent, many-nerved. Peduncles few, 3—8 in. high, slender, slightly 6-ribbed, scarcely twisted, glabrous ; sheaths lax, 1—2½ in. long, obliquely split, glabrous. Heads subglobose, white-villous ; involucral bracts $\frac{1}{16}$ in. long, broadly obovate or quadrate, obtuse, scarious, not reflexed, hairy on the back in the upper part, ciliate at the apex ; floral bracts cuneate-oblong, obtuse, hairy on the back ; receptacle villous. MALE FLOWERS : Sepals 3, boat-shaped, $\frac{1}{20}$—$\frac{1}{16}$ in. long. Corolla-tube $\frac{1}{50}$ in. long ; petals 3, minute, subequal, each with a black spot. Stamens 6 ; anthers black. FEMALE FLOWERS sessile. Sepals 3, of which 2 are deeply boat-shaped, $\frac{1}{10}$—⅛ in. long, the other flat, one of the sepals sometimes winged at the back. Petals 3, unequal, $\frac{1}{10}$ in. long, linear-lanceolate, acute, with a small spot, pubescent. Ovary deeply 3-lobed ; style-branches 3, slender. Seeds $\frac{1}{50}$ in. long, slightly ribbed, broadly oblong, reddish-brown. Fl. B. I. v. 6, p. 577 ; Kœrn. in Linnæa, v. 27 (1856) p. 656 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 78.—Flowers : Oct.—Nov.

Rare. KONKAN : *Stocks* ! KANARA : Supa, *Talbot*, 2947 !—DISTRIB. India (W. Peninsula).

7. **Eriocaulon Sieboldianum** (*Sieboldtianum*), *Sieb. & Zucc. ex Steud. Syn. Pl. Cyp.* part 2 (1855) p. 272. A low stemless tufted

annual scarcely reaching 6 in. high. Leaves 1—2½ by $\frac{1}{30}$—$\frac{1}{10}$ in., narrowly linear, subulate, glabrous, opaque or translucent, few-nerved. Peduncles numerous, aggregated, glabrous, 3—6 in. high, slender, 5-ribbed; sheaths ⅛—1 in. long, obliquely split, glabrous, shorter than the leaves. Heads small, ⅛—¼ in. in diam., whitish or purplish, globose or ovoid; involucral bracts $\frac{1}{10}$—⅛ in. long, the outer oblong, obtuse, the tip often lacerate, the inner narrower, all scarious, spreading or ascending, glabrous, pale; floral bracts $\frac{1}{10}$—⅛ in. long, linear-oblong or oblong-lanceolate, obtuse or subacute, closely imbricating, hyaline, glabrous, shining, often with a broad central purplish band; receptacle columnar, glabrous or nearly so. MALE FLOWERS stipitate. Sepals connate into a glabrous cucullate spathe, split in front, 3-toothed at the apex. Corolla-tube $\frac{1}{30}$ in. long; petals minute, narrow, subequal. Stamens 6; anthers rotund, white. FEMALE FLOWERS stipitate. Sepals usually 2, free, narrowly linear, acute, hyaline, glabrous, deciduous. Petals 0. Ovary stipitate, the stipes with a node at the position of the petals, 3-lobed; style-branches 3, filiform. Seeds about $\frac{1}{60}$ in. long, ellipsoid, smooth, reddish-brown, shining. Fl. B. I. v. 6, p. 577; Trim. Fl. Ceyl. v. 5, p. 10; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 111; Prain, Beng. Pl. p. 1126. *Eriocaulon sexangulare*, Mart. in Wall. Pl. As. Rar. v. 3 (1832) p. 28 (*not* of Linn.); Grah. Cat. p. 231; Dalz. & Gibs. p. 279; Kœrn. in Linnæa, v. 27 (1856) p. 613.—Flowers: Sept.

Rare. KONKAN: *Stocks*! KANARA: Karwar, *Talbot*, 1290!—DISTRIB. Throughout India; Ceylon, China, Japan.

8. **Eriocaulon stellatulum,** *Kœrn. in Linnæa*, v. 27 (1856) p. 620. Plant reaching 8 in. high; stem scarcely any. Leaves 1—3 by ¼—½ in., broadly linear, subacute, tapering from the base to the tip, many-nerved, flat, glabrous, membranous. Peduncles 2—8 in. high, slender, 4-sulcate, hairy with spreading hairs; sheaths 1—1½ in. long, obliquely split, with a long acuminate tip, glabrous or slightly hairy near the base. Heads ¼—⅓ in. in diam., globose, stellately echinulate from the long spreading bracts, glabrous, white; involucral bracts ⅛—⅓ in. long, ovate, acuminate, scarious, glabrous, at length reflexed; floral-bracts ⅛—⅓ in. long, narrowly lanceolate, hyaline, glabrous, stellately spreading, much exceeding the flowers; receptacle pilose. MALE FLOWERS scarcely stipitate. Sepals 2, free or connate, $\frac{1}{16}$—$\frac{1}{12}$ in. long, obliquely obovate, acute, glabrous, hyaline. Corolla-tube scarcely $\frac{1}{20}$ in. long; petals minute, subequal, with a dark spot. Stamens 6; anthers black. FEMALE FLOWERS sessile. Sepals 3, falcately ovate, $\frac{1}{10}$ in. long, with a long subulate ultimately recurved acumen, dorsally crenately winged, glabrous, white. Petals 3, linear-spathulate, $\frac{1}{20}$ in. long, obtuse, hairy, usually with a black spot. Ovary sessile, 3-lobed; style-branches 3, filiform. Seeds $\frac{1}{30}$ in. long, globosely ellipsoid, smooth, shining, chestnut-brown. Fl. B. I. v. 6, p. 579; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 97.—Flowers: Feb.

KONKAN: *Stocks*! KANARA: Darsinguda (3200 ft.), *Talbot*, 1598!—DISTRIB. India (W. Peninsula).

9. **Eriocaulon minutum,** *Hook. f. Fl. B. I.* v. 6 (1893) p. 579. A small densely tufted herb 1—2½ in. high. Leaves ½—¾ in. long, subulate or filiform, acute or obtuse, compressed, opaque, 3—5-nerved, base dilated and sparsely woolly within. Peduncles 1—2½ in. high, capillary, flexuous, numerous, aggregated, obsoletely ribbed, slender, glabrous, slightly twisted ; sheaths rather lax, ¼—⅜ in. long, obliquely split. Heads $\frac{1}{10}$ in. in diam., white, shining, glabrous ; involucral bracts $\frac{1}{10}$ in. long, erect, ovate-lanceolate, acuminate ; floral bracts shorter, oblanceolate, acute or cuspidate ; receptacle small, columnar, glabrous or sparsely villous. MALE FLOWERS : Sepals connate into a spathe split in front, irregularly 3-toothed, pale, glabrous. Petals minute, almost 0. Stamens 3—6 ; anthers black. FEMALE FLOWERS subsessile. Sepals 2, with rarely a filiform third one, boat-shaped, concave, falcately curved, acute, winged or keeled on the back, glabrous, the keel or wing spinulose. Petals 0. Ovary 2—3-lobed, subsessile ; style-branches 3, very short. Seeds oblong. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 111.

Rare. KONKAN : *Stocks* !—DISTRIB. India (W. Peninsula).

10. **Eriocaulon sexangulare,** *Linn. Sp. Pl.* (1753) p. 87. A tall stout herb ; stem as thick as the little finger or less, short (rarely elongate). Leaves erect, cæspitose, 4—12 in. long by ¼—¾ in. wide at the base, linear, narrowed from the base to the subacute or acuminate tip, thin, many-nerved, opaque, drying brown. Peduncles many, stiff, up to 18 in. high, 5-ribbed, more or less twisted ; sheaths 3—6 in. long, obliquely split, herbaceous, with a long green acumen. Heads ⅛—⅜ in. in diam., globose, hemispherical or cylindric-ovoid (sometimes viviparous), hard, hoary, with truncate base ; bracts imbricate, closely appressed, concealing the flowers, those of the involucre ⅛ in. long, subquadrate, orbicular or obovate, acute, glabrous, yellow, shining, the floral bracts ⅛ in. long, cuneate-obovate, with a sudden short triangular acumination ; receptacle globose, columnar or hemispheric, sparsely hairy. MALE FLOWERS quite flat. Sepals free or connate, $\frac{1}{12}$ in. long, boat-shaped, winged, glabrous. Corolla-tube $\frac{1}{20}$ in. long ; petals minute, triangular, ciliate, usually with a small black spot. Stamens 6 ; anthers black. FEMALE FLOWERS sessile. Sepals 3, free, 2 of which are large, boat-shaped, acute, $\frac{1}{10}$—⅛ in. long, dorsally broadly winged, the third small, linear, flat, all glabrous. Petals filiform, terminated by a pencil of long hairs. Ovary subsessile ; style-branches 3, filiform. Seeds subglobose, ribbed, the ridges papillose. Fl. B. I. v. 6, p. 580 ; Trim. Fl. Ceyl. v. 5, p. 5 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 110. *Eriocaulon Wallichianum,* Mart. in Wall. Pl. As. Rar. v. 3 (1832) p. 27, t. 249 ; Kœrn. in Linnæa, v. 27 (1856) p. 687 ; Dalz. & Gibs. p. 280.—Flowers : Sept.

KONKAN : *Stocks* !, *Dalzell* !, *Woodrow* ; W. Ghâts, *Woodrow.*—DISTRIB. India (W. Peninsula) ; Ceylon, Tropical Asia, Madagascar.

11. **Eriocaulon cuspidatum,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 281. Stemless. Leaves cæspitose, erect, 1—3½ by ⅛—¼ in.,

linear-oblong, rounded and cuspidate at the apex, glabrous, translucent, fenestrately 7—9-nerved. Peduncles 6—12 in. high, fasciculate, few or many, 7-sulcate; sheaths reaching sometimes 4 in. long, obliquely split, glabrous. Heads $\frac{1}{8}$—$\frac{1}{4}$ in. in diam., hemispheric or subglobose, white-puberulous; involucral bracts $\frac{1}{10}$ in. long, broadly obovate-cuneate, obtuse, concave, glabrous; floral bracts similar; receptacle glabrous. MALE FLOWERS: Sepals 2, free, $\frac{1}{10}$ in. long, obovate-lanceolate, acute, deeply concave, hyaline, slightly winged and puberulous on the back. Corolla-tube $\frac{1}{16}$ in. long; petals small, unequal, with a conspicuous black spot, hairy. Stamens 6; anthers black. FEMALE FLOWERS: Sepals 2, elliptic-lanceolate, acute, $\frac{1}{12}$—$\frac{1}{10}$ in. long with a pubescent rounded crest-like wing on the back. Petals 3, unequal, narrowly linear-lanceolate, fimbriately villous towards the tip and with a conspicuous black spot. Ovary 3-lobed; style-branches 3, filiform. Seeds oblong, quite smooth. Fl. B. I. v. 6, p. 581; Dalz. & Gibs. p. 280; Kœrn. in Linnæa, v. 27 (1856) p. 684; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 104; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429.—Flowers: Nov.

KONKAN: *Stocks*!, *Law*!, *Dalzell*!; between Vingorla and Malwán, *Dalzell*! KANARA: Siddapur in rice-fields, *Talbot*, 1083!—DISTRIB. India (W. Peninsula).

12. **Eriocaulon luzulæfolium,** *Mart. in Wall. Pl. As. Rar.* v. 3 (1832) p. 28. A herb 4—10 in. high; stems stout or slender, sometimes as thick as a swan's quill, with many fibrous glabrous whitish roots. Leaves cæspitose, 1—3 by $\frac{1}{16}$—$\frac{1}{8}$ in. in the middle, linear-lanceolate, narrowed from the base to the tip, subacute, glabrous, flat, opaque or translucent, fenestrately 10—12-nerved near the base. Peduncles 3—10 in. high, numerous, erect, glabrous, 5-sulcate, twisted; sheaths 1—2 in. long, obliquely split, at length lacerate at the mouth, glabrous, more or less striate. Heads $\frac{1}{8}$—$\frac{1}{5}$ in. in diam., hemispheric, hard, pale grey, pubescent, base truncate; involucral bracts about $\frac{1}{10}$ in. long, conspicuous, oblong-obovate, cuneate, obtuse, concave, subcoriaceous, glabrous, shining, never reflexed; floral bracts narrower, $\frac{1}{10}$ in. long, spathulate-oblong, subacute, shortly pubescent at the apex; receptacle conical or columnar, villous with long hairs. MALE FLOWERS stipitate. Sepals 3, oblong-obovate, concave, $\frac{1}{20}$—$\frac{1}{16}$ in. long, obtuse or subacute, ciliate at the tips, free or two connate. Corolla-tube about $\frac{1}{20}$ in. long; petals minute, equal, without a glandular spot. Stamens 6; anthers black. FEMALE FLOWERS shortly stipitate. Sepals 3, linear-oblong, falcate, concave, acute, dorsally tipped with bristly hairs. Petals 3, linear-lanceolate, $\frac{1}{12}$ in. long, ciliate, without a glandular spot. Ovary subsessile, 3-lobed; style-branches 3, filiform. Seeds ellipsoid, orange-yellow, faintly ribbed and very closely microscopically transversely ridged. Fl. B. I. v. 6, p. 582; Trim. Fl. Ceyl. v. 5, p. 7; Kœrn. in Linnæa, v. 27 (1856) p. 636; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429; Prain, Beng. Pl. p. 1126; Ruhl. in Engler, Pflanzenreich, v. 4, part 30, p. 88.

KONKAN: *Stocks*!—DISTRIB. Throughout India; Ceylon.

13. **Eriocaulon trilobum,** *Buch.-Ham. in Wall. Cat.* (1828) 6072, D. A stemless herb of rice-fields and wet places. Leaves erect, cæspitose, green, 1¾—4½ by $\frac{1}{10}$—¼ in., linear, narrowed towards an acute or subobtuse apex, glabrous, flat, fenestrately 9—11-nerved, not drying red. Peduncles numerous, 3—8 in. high, glabrous, 5—6-ribbed, twisted ; sheaths ¾—2 in. long, obliquely split, somewhat lax, striatulate. Heads ⅛—⅓ in. in diam., subglobose, dark grey ; involucral bracts ⅛ by $\frac{1}{20}$ in., linear-oblong, obtuse, glabrous, at first radiating beyond the head, afterwards reflexed, pale, shining ; floral bracts $\frac{1}{12}$ in. long, cuneate-obovate, obtuse or subacute, not acuminate, ciliate at the apex, concave ; receptacle villous. MALE FLOWERS shortly stipitate. Sepals 3, oblong, obtuse, $\frac{1}{16}$ in. long, connate into a spathe, glabrous. Corolla-tube $\frac{1}{32}$ in. long ; petals minute. Stamens 6 ; anthers black. FEMALE FLOWERS subsessile. Sepals 3, oblanceolate, boat-shaped, $\frac{1}{16}$ in. long, hairy on the back. Petals 3, free, narrowly spathulate, hairy above and with a black spot. Ovary subsessile, 3-lobed ; style-branches 3, filiform. Seeds about $\frac{1}{50}$ in. long, ellipsoid, microscopically closely transversely ridged, pale yellow. Fl. B. I. v. 6, p. 583 ; Kœrn. in Linnæa, v. 27 (1856) p. 645 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Prain, Beng. Pl. p. 1127 ; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 74. *Eriocaulon Sollyanum,* Royle, Illustr. (1839) p. 409, t. 97, fig. 1. Seems scarcely to differ from *E. infaustum,* N. E. Brown, in Dyer, Fl. Trop. Africa, v. 8 (1902) p. 253.

Dalzell without locality in Herb. Kew.! KONKAN : *Stocks!, Law!* SIND : *Stocks!*—DISTRIB. Throughout India.

14. **Eriocaulon quinquangulare,** *Linn. Sp. Pl.* (1753) p. 87. Stems very short. Leaves 1—4 by $\frac{1}{10}$—⅓ in., linear, attenuated towards the apex, acute or acuminate, glabrous, flat, membranous, fenestrately 5—11-nerved, opaque or subtranslucent, green above, often purplish beneath, frequently drying red. Peduncles many, 3—9 in. high, glabrous, 5-ribbed, scarcely twisted ; sheaths 1—2¼ in. long, obliquely split, glabrous, often purplish. Heads globosely ovoid, ⅛—¼ in. in diam., grey or snow-white ; involucral bracts $\frac{1}{12}$ in. long, linear-oblong or obovate-oblong, subcuneate at the base, very obtuse, scarious, glistening, at length reflexed and concealed under the head ; floral bracts $\frac{1}{10}$ in. long, sub-rhomboid or oblanceolate, acuminate, dorsally hairy, base cuneate ; receptacle globose or columnar, sparsely villous. MALE FLOWERS : Sepals 3, all or 2 only connate into a spathe, $\frac{1}{16}$ in. long, oblong-spathulate, obtuse, penicillate at the tips. Corolla-tube about $\frac{1}{20}$ in. long ; petals minute, pilose. Stamens 6 ; anthers black. FEMALE FLOWERS stipitate. Sepals 3, free, $\frac{1}{16}$ in. long, narrowly linear-spathulate, obtuse, pilose towards the apex, white. Petals 3, free, $\frac{1}{20}$ in. long, linear-spathulate, villous, usually with a black spot. Ovary stipitate or sub-sessile, 3-lobed ; style-branches 3, long, filiform. Seeds $\frac{1}{50}$ in. long, ellipsoid or subglobose, pale yellow, quite smooth. Fl. B. I. v. 6, p. 582 ; Grah. Cat. p. 230 ; Dalz. & Gibs. p. 280 ; Kœrn. in Linnæa, v. 27 (1856) p. 641 ; Trim. Fl. Ceyl. v. 5, p. 9 ; Ruhl. in Engler,

Pflanzenreich, v. 4, part 30 (1903) p. 85 ; Prain, Beng. Pl. p. 1127 ; Linn. Fl. Zeyl. (1747) n. 48 (*Eriocaulon* without specific name).

Stocks without locality in Herb. Kew.! KONKAN : Salsette, in rice-fields, frequent, *Jacquemont*, 742!—DISTRIB. Throughout India; Ceylon.

15. **Eriocaulon Xeranthemum,** *Mart. in Wall. Pl. As. Rar.* v. 3 (1832) p. 29. A small stemless plant 1—2½ in. high. Leaves cæspitose, ¾—1½ by $\frac{1}{16}$—⅛ in., linear-lanceolate, acute or acuminate, flat, glabrous, translucent, fenestrately 7—11-nerved, often recurved. Peduncles ½—2½ in. high, few or many, stout, striate, more or less twisted ; sheaths reaching 1 in. long, obliquely split, glabrous. Heads (including the involucral bracts) ⅛—⅓ in. long ; involucral bracts longer than the flowering part of the head, lanceolate, acuminate, glabrous, glistening, scarious, pale yellow or nearly white ; floral bracts $\frac{1}{10}$—⅓ in. long, oblong-obovate, obtuse, cuneate at the base, hairy at the apex. Receptacle glabrous or nearly so. MALE FLOWERS subsessile. Sepals $\frac{1}{20}$ in. long, obovate-cuneate, obtuse or truncate, hairy at the apex, free or all or 2 connate into a spathe split in front. Corolla-tube short ; petals minute, glabrous. Stamens 6 ; anthers yellow (*Dalzell*). FEMALE FLOWERS subsessile. Sepals 2 (rarely 3, the third capillary), $\frac{1}{20}$—$\frac{1}{16}$ in. long, unequal, lanceolate, narrower than the male sepals, hairy at the tip. Petals $\frac{1}{20}$ in. long, linear or oblanceolate, hairy at the tip and with a minute glandular spot which is yellow (*fide* Dalzell). Ovary sessile, 3-lobed ; style-branches 3, filiform. Seeds narrowly oblong, yellow, papillose. Fl. B. I. v. 6, p. 584 ; Kœrn. in Linnæa, v. 27 (1856) p. 624 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 429 ; Prain, Beng. Pl. p. 1127 ; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 96. *Eriocaulon pygmæum*, Dalz. in Kew Journ. Bot. v. 3 (1851) p. 281 ; Dalz. & Gibs. p. 280.

KONKAN : *Stocks*! ; near Malwán in marshy places, *Dalzell*. KANARA : Karwar, *Talbot*, 2945!—DISTRIB. Throughout India.

IMPERFECTLY KNOWN SPECIES.

ERIOCAULON BOMBAYANUM, Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 104. Stem very short. Leaves linear-lanceolate, acute, ½—¾ by $\frac{1}{12}$—$\frac{1}{10}$ in. Peduncles many, 3¼—4 in. high; sheaths as long as the leaves. Heads globose or globosely cylindric, densely snowy-puberulous; involucral bracts always conspicuous, lanceolate or oblong-obovate, acute, green, glabrous; floral bracts oblong-obovate, acute, ciliate, dark-colored. Flowers heteromerous. MALE FLOWERS : Sepals 2, connate into a spathe to the apex, ciliate, obtuse, olive-green. Petals 3, very small, glandular. Stamens 6; anthers black. FEMALE FLOWERS : Sepals 2, linear, winged or keeled, acute, concave, dark-colored, ciliate. Petals 3, linear-oblanceolate, with a glandular spot, ciliate, white. Ovary 3-lobed. The above is Ruhland's description.

KONKAN : Bombay, *Warburg*, 867, in Herb. Berol. ex Ruhland. I have seen no specimens; there are none in Herb. Kew.

ERIOCAULON RITCHIEANUM, Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 73. Stem very short. Leaves 1½—2½ by $\frac{1}{10}$ in., linear. Peduncle solitary, about 6½ in. high, scarcely twisted; sheaths lax, glabrous, 1½ in. long. Heads subglobose, white-villous at the top, ⅛—⅕ in. in diam.; involucral bracts obovate, obtuse, glabrous; floral bracts similar, acute, greyish-yellow puberulous on the back near the apex. MALE FLOWERS : Sepals connate into a spathe, very obtuse. Petals small, with a gland. Anthers white. FEMALE

FLOWERS: Sepals ovate, acute, free, lax, grey-green, puberulous on the back. Petals oblong-spathulate, white, subobtuse, with gland. Ovary 3-lobed. The above is Ruhland's description.

S. M. COUNTRY: Belgaum, *Ritchie*, 1248, in Herb. Boiss.-Barb. I have seen no specimens; there are none in Herb. Kew.

ERIOCAULON ROBUSTO-BROWNIANUM, Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 77. Stem very short. Leaves cæspitose, lanceolate, very obtuse, fenestrate at the base, glabrous, 8—10 in. long by 1 in. broad at the base. Peduncles numerous, twisted, subrobust, 12—16 in. high; sheaths rather loose, obliquely split, 3¼—4¼ in. long. Heads globose, snowy-white, puberulous, nearly ½ in. in diam.; involucral bracts broadly obovate, the exterior obtuse, the inner acute, pale straw-colored, puberulous at the back near the apex, then glabrous, at length concealed by the flowers; floral bracts obovate, acuminate, rather rigid, greyish-white, a little longer than the flowers. Flowers trimerous. MALE FLOWERS: Sepals spathaceo-connate, obtuse, ciliate, gland-bearing. Anthers black. FEMALE FLOWERS: Sepals obovate, acute, keeled, ciliate, grey, subequal. Petals narrowly oblong, gland-bearing, ciliate. The above is Ruhland's description.

KANARA: Dharwar and Bellary district (*Saw.* according to Ruhland, but probably a misprint for *Law*). I have seen no specimens; there are none in Herb. Kew.

ERIOCAULON ROUXIANUM, Steud. Syn. Pl. Cyp. part 2 (1855) p. 270. Stemless. Leaves 1—1½ in. long from a broad base, linear-lanceolate, subobtuse, 9—11-nerved, subpellucid, twice as long as the tumid sheaths, which are whitish, submembranous, entire or 2-fid at the apex. Heads ⅓ in. in diam., snowy-villous; involucral bracts longer than the heads, herbaceous, erect, linear-oblong, obtuse, entire; floral bracts ovate, subobtuse, ciliate at the apex. Kœrn. in Linnæa, v. 27 (1856) p. 626; Dalz. & Gibs. p. 316; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 116. Collected in Bombay by Polydore Roux (*fide* Steudel). Kœrnicke, who has not seen any specimens, considers the species somewhat doubtful and, as far as may be judged from the meagre description, to approach near to *E. Thwaitesii*, in identification which Ruhland considers doubtful.

Dalzell, who has collected and described many of the Bombay Eriocaulons, has seen neither this plant nor *E. heterolepis*. There are no specimens in Herb. Kew. Roux's specimens, collected in Bombay in 1832, are said to be in Delessert's Herbarium (Lasegue, in Deless. Mus. Bot. (1845) p. 156).

EXCLUDED SPECIES.

ERIOCAULON HETEROLEPIS, Steud. Syn. Pl. Cyp. part 2 (1855) p. 271. Stemless, tufted. Leaves lanceolate from a broad base, subobtuse. Involucral bracts 2-seriate, scarious, the exterior oblong-lanceolate, deciduous, the interior ovate, obtuse, much shorter than the head; floral bracts cuneate-ovate. Sepals linear, ciliate at the apex. Fl. B. I. v. 6, p. 585; Kœrn. in Linnæa, v. 27 (1856) p. 652; Dalz. & Gibs. p. 316; Ruhl. in Engler, Pflanzenreich, v. 4, part 30, p. 74.

Plant collected by Polydore Roux near Bombay (*fide* Steudel). The species depends altogether on the description by Steudel, who may or may not have had Roux's specimens. Kœrnicke states (*l. c.*) that he has seen no specimens of the plant and considers the species a very doubtful one which may have been described under another name, but, curiously enough, he has made a *variety* to this doubtful species in Miq. Ann. Mus. Lugd. Bat. v. 3 (1867) p. 239, which he names var. *nigricans*, a Java plant, which he fully describes. Ruhland (*l. c.*) copies Kœrnicke's description of the Java plant (var. *nigricans*), and assigns it to *E. heterolepis* as a typical description of that species.

ERIOCAULON EURYPEPLON, Kœrn. in Linnæa, v. 27 (1856) p. 685; Hook. f. Fl. B. I. v. 6, p. 585; Ruhl. in Engler, Pflanzenreich, v. 4, part 30 (1903) p. 104.

Kœrnicke gives "East Indies" as the habitat of the plant which is stated to have been collected by Huegel no. 1886 (Hb. Vindob. et Zuccarini), no precise locality having been mentioned. Ruhland (*l. c.*) gives East Indies, Malabar, Konkan, &c. as the habitat, and Stocks, Huegel, &c. as the collectors, but there is no mention of the whereabouts of the specimens said to have been collected by Stocks. None of these are to be found in Herb. Kew., and as Stocks almost invariably sent his collections to the Kew Herbarium, I think it probable that Ruhland has made a mistake in his citation. There is, as far as I know, no evidence of the existence of the species in the Bombay Presidency.

ORDER CXLVI. CYPERACEÆ.

Perennial (rarely annual) herbs with the habit of grasses ; roots fibrous ; stem terete or 3-angled, usually simple. Leaves grass-like, (rarely 0), 3-ranked, mostly crowded at the base of the stem (the upper fewer), with tubular sheaths which are more or less closed or the lower split to the base ; ligule 0 or a short prolongation of the mouth of the sheath opposite to the blade. Inflorescence of solitary, fasciculate, paniculate or spicate spikelets, composed of small distichously or spirally imbricate scales (glumes) ; flowers minute, 1—2-sexual, in the axils of the glumes. Perianth 0, or of 2 or more hypogynous bristles or scales (ovary enclosed in a utricle in *Carex*). Stamens 1—3 ; filaments flattened ; anthers basifixed, linear. Ovary 1-celled ; ovule solitary, basal, erect, anatropous ; style short or long ; stigmas 2—3. Fruit a compressed or trigonous nut. Seed erect, free ; embryo minute, within the base of the floury albumen.—DISTRIB. Genera about 65 ; species about 3000, universally distributed.

Nut not enclosed in a utricle.
- Flowers 2-sexual, solitary in the glumes of a simple spikelet.
  - Flowering glumes all distichous.
    - Fruit-bearing glumes not winged on the keel.
      - Spikelets many-flowered ..... 1. CYPERUS.
      - Spikelets 1—2-flowered..... 2. KYLLINGA.
    - Fruit-bearing glumes with winged keels..... 3. COURTOISIA.
  - Flowering glumes all spirally imbricate or the lower only distichous.
    - Spikelets many-flowered.
      - Hypogynous bristles or scales 0.
        - Style-base swollen, disarticulating from the nut ..... 4. FIMBRISTYLIS.
        - Style-base persistent, leaving a tumour on the nut ..... 5. STENOPHYLLUS.
      - Hypogynous bristles or scales present.
        - Nut with hypogynous bristles.
          - Style-base swollen ..... 6. ELEOCHARIS.
          - Style-base not swollen ..... 7. SCIRPUS.
        - Nut with hypogynous scales.
          - Hypogynous scales 6, divided to the base into linear segments; stigmas 3..... 8. ERIOPHORUM.
          - Hypogynous scales not divided into segments.
            - Hypogynous scales 6 or 3 or 0, petal-like; stigmas 3 ..... 9. FUIRENA.

Hypogynous scales 2, lateral, bracteole-like; stigmas 2 ..... 10. HYPOLYTRUM.
Spikelets few-flowered.
Stigmas 2 ..... 11. RHYNCHOSPORA.
Stigmas 3 ..... 12. REMIREA.
Flowers 1-sexual; nut stipitate, bony; scales or bristles 0 ..... 13. SCLERIA.
Nut enclosed in a bottle-shaped utricle with an entire or notched or shortly slit mouth..... 14. CAREX.

1. CYPERUS, Linn.

Perennial (rarely annual) glabrous herbs ; rhizome creeping, short or long or 0. Leaves mostly towards the base of the stem, occasionally reduced to sheaths. Spikelets in solitary globose or umbellate heads or spikes ; involucral bracts 1 or more, foliaceous ; bracteoles under the secondary divisions of the inflorescence ; rhachilla usually persistent, not or in a few species disarticulating towards the base, sometimes with membranous wings derived from the persistent glume-bases. Glumes distichous, the 2 lowest empty, these above 2-sexual, all nearly equal, deciduous from below upwards, the uppermost 1—3 sterile or empty ; hypogynous scales or bristles 0. Stamens 1—3 ; anthers linear or oblong. Ovary compressed ; style short or long or obsolete ; stigmas 2 or 3. Fruit trigonous, triquetrous, obovoid, or plano-convex.—DISTRIB. All warm and temperate regions ; species about 360.

I have followed Boeckeler in including under the genus *Cyperus* the genera *Pycreus*, *Juncellus*, and *Mariscus*, a course followed by Pax (Engl. & Prantl, Pflanzenf.). The late Dr. Trimen in his 'Flora of Ceylon' continued by Sir Joseph Hooker includes the first two genera in *Cyperus*, but retains *Mariscus* as a distinct genus. The generic distinction in that genus, however, viz. the disarticulation of the rhachilla of the spikelets above the 2 lowest glumes, cannot be applied in the field, but may be said to be limited to herbarium specimens. In a recently published pamphlet by Dr. N. L. Britton, Director-in-Chief of the New York Botanical Gardens, "The Sedges of Jamaica" [Bulletin of the Department of Agriculture of Jamaica, vol. 5, Supplement 1 (1907)], that botanist makes the following remarks on page 1 :— "I have accepted the generic limits outlined by Mr. Clarke with the exception of his treatment of *Cyperus* and its segregates, where I have accepted the view of previous authors in taking *Cyperus* in its broad sense rather than recognizing the genera *Pycreus*, *Mariscus*, and *Torulinium*, as I believe the characters depended on by Mr. Clarke for the maintenance of these genera are too vague for satisfactory use."

Stigmas 2.
Fruit a laterally compressed nut.
Superficial cells of the nut longitudinally oblong or elliptic. Nut often appearing zonate or muricate by reason of the thickened ends of the cells running into an undulating or broken horizontal line.
Spikelets lanceolate, 20—60-flowered; nut obovoid black ..... 1. *C. latespicatus.*
Spikelets linear-oblong with exactly parallel sides, 20-flowered; nut globosely ovoid, brown ..... 2. *C. malabaricus.*

Superficial cells of the nut nearly square. **Nut** often appearing regularly dotted by reason of the light reflected from the convex surface of each cell.
- **Stems** often clothed for ½—¾ of their length by leaf-sheaths, decumbent at the base; rhizome creeping, 4—10 in. long..... 3. *C. sanguinolentus.*

Stems enveloped in leaf-sheaths only a little way above the base, erect; roots fibrous.
- Annuals.
  - Stems tufted.
    - Spikelets 6—10-flowered; rhachilla winged; stamens 2—3 ..... 4. *C. hyalinus.*
    - Spikelets 20—50-flowered; rhachilla not winged.
      - Stamen 1; nut $\frac{1}{10}$ in. long..... 5. *C. pumilus.*
      - Stamens 2; nut $\frac{1}{20}$ in. long..... 6. *C. globosus.*
  - Stem robust, solitary or subsolitary.
    - Nut $\frac{1}{10}$ in. long, rounded at the apex; glumes with conspicuous white margins; bracts reaching 16 in. long; stamens usually 3..... 7. *C. albomarginatus.*
    - Nut $\frac{1}{16}$ in. long, obcordate at the apex; margins of glumes not conspicuously white; bracts reaching 9 or 10 in. long; stamens 3..... 8. *C. puncticulatus.*
- **Perennial; nut** $\frac{1}{20}$ in. long; stamens usually 2. 9. *C. odoratus.*

Fruit a dorsally compressed nut.
- **Spikelets** many, densely packed in a terminal head; stems reaching 10 in. long; bracts 1—6 in. long; a dwarf annual herb..... 10. *C. pygmæus.*
- Spikelets 1—30 in 1 apparently lateral head; stems reaching 2 ft. long; bracts 1—3 in. long. 11. *C. lævigatus.*
- **Spikes** umbellate; stems reaching 3 ft. long; bracts reaching 18 in. long; a stout perennial herb ..... 12. *C. alopecuroides.*

Stigmas 3; fruit a trigonous or triquetrous nut.
- Rhachilla of spikelets persistent.
  - Inflorescence usually umbellate, rarely capitate.
    - Spikelets digitate or clustered, not spicate or racemose.
      - Annuals (except *C. Haspan*).
        - Glumes mucronate.
          - Nut $\frac{1}{20}$ in. long.
            - Nut oblong, pale brown or yellow; style shorter than the nut; stamens 1—2; margins of glumes hyaline..... 13. *C. castaneus.*
            - Nut obovoid, dark-brown; style longer than the nut; stamens 3; margins of glumes hyaline ..... 14. *C. Tencriffæ.*
          - Nut $\frac{1}{30}$ in. long, obovoid, dark-brown; style shorter than the nut; stamens 1—2; margins of glumes hyaline..... 15. *C. uncinatus.*
        - Glumes not mucronate.
          - Nut white when ripe, $\frac{1}{30}$ in. long, globosely obovoid; stamen 1 (rarely 2); whole plant yellowish ..... 16. *C. flavidus.*
          - Nut brown.
            - Nut nearly as long as the obovate-oblong glume; stamen 1 (rarely 2) ... 17. *C. difformis.*
            - Nut ⅔ the length of the glume; glumes with crisped incurved tips; stamens 1—2 ..... 18. *C. pulcherrimus.*

Nut ⅓ the length of the glume; stamens 2—3; flowering in the first season but often biennial or perennial. 19. *C. Haspan.*

Perennials with a woody rootstock; stamens usually 3.

Inflorescence of 1 head (sometimes umbellate in *C. conglomeratus* and *C. Atkinsoni*).

Rhizome very short; rootlets wiry.

Stems slender, close-set, nodose at the base.

Stems closely 1-seriate; spikelets 3—12 in a lax head; stamens 3; glumes ⅛ in. long. 20. *C. niveus.*

Stems cæspitose with 1 dense head; stamen 1; glumes ½ in. long ... 21. *C. leucocephalus.*

Rhizome creeping; rootlets thick.

Rootlets not woolly.

Stem solitary, distant on a much-divided, elongate, creeping rhizome ..... 22. *C. arenarius.*

Stems cæspitose, on a short rhizome (inflorescence sometimes umbellate) ..... 23. *C. Atkinsoni.*

Rootlets woolly (inflorescence sometimes umbellate) ..... 24. *C. conglomeratus.*

Spikelets spicately, rarely subracemosely disposed; stamens usually 3.

Rhachilla of spikelets not or scarcely winged.

Annuals with tufted stems.

Stems 4—16 in. long; spikelets ½—1¼ in. long; nut about ½ as long as the glume. 25. *C. compressus.*

Stems 3—6 in. long; spikelets ¼—⅓ in. long; nut less than ½ the length of the glume ..... 26. *C. aristatus.*

Stems 14—20 in. long; nut nearly as long as the glume ..... 27. *C. Iria.*

Perennials with woody rhizome and often long stolons.

Spikelets compressed; rootstock with elongate stolons; bracts divaricate ... 28. *C. procerus.*

Spikelets spicate.

Leaves more than 1 ft. long.

Glumes remote; nut nearly as long as the glume ..... 29. *C. nutans.*

Glumes not remote; nut ½ as long as the glume; bracts never divaricate; no true stolons ..... 30. *C. eleusinoides.*

Leaves not more than 6 in. long..... 31. *C. malaccensis.*

Rhachilla of spikelets distinctly winged.

Leaves short, rarely ½ as long as the stem.

Glumes approximate; stolons long, stout.

Spikelets pale straw-colored; bracts very short, rarely half as long as the umbel-rays; stem not articulate when dry ..... 32. *C. tegetiformis.*

Spikelets rusty-brown; bracts more than half as long as the umbel-rays; stem more or less articulate when dry ..... 33. *C. corymbosus.*

Glumes remote, in fruit scarcely imbricating; stolons 0 ..... 34. *C. tegetum.*

Leaves long, more than half as long as the stem or longer.
Rhizome stoloniferous.
Leaves arising from the stem at some distance above the base and below its middle; stems 4—12 in. long ... 35. *C. bulbosus.*
Leaves radical.
Stolons 4—8 in. long, bearing hard black fragrant tubers; stems 4—30 in. long ... 36. *C. rotundus.*
Stolons not or rarely tuberiferous; stems 2—4 ft. long ... 37. *C. tuberosus.*
Rhizome not stoloniferous.
Spikelets much compressed, ascending; wings persistent ... 38. *C. exaltatus.*
Spikelets terete, spreading horizontally; wings deciduous ... 39. *C. digitatus.*
Rhachilla of spikelets disarticulating above the 2 lowest glumes.
Stems less than 1 ft. long; spikelets bearing 1 nut ... 40. *C. Clarkei.*
Stems much more than 1 ft. long.
Spikelets distant along the rhachis, bearing 1—2 nuts; margins of glumes not hyaline; nut oblong, not curved, $\frac{1}{6}$ in. long, pale-brown; style more than $\frac{1}{2}$ as long as the nut; rhizome not stoloniferous ... 41. *C. konkanensis.*
Spikelets closely packed along the rhachis.
Spikelets bearing 1 nut; margins of glumes hyaline; nut $\frac{1}{8}$ in. long, oblong, curved, pale-brown; style not $\frac{1}{4}$ the length of the nut; rhizome stoloniferous ... 42. *C. paniceus* var. [*Roxburghiana.*
Spikelets bearing 3—6 nuts; nut $\frac{1}{16}$ in. long, ellipsoid, not curved, black; margins of glumes hyaline; style more than $\frac{1}{2}$ as long as the nut; rhizome stoloniferous ... 43. *C. pennatus.*
Spikelets bearing 4—14 nuts; margins of glumes not hyaline; rhachilla with oblong persistent wings. 44. *C. dilutus.*

1. **Cyperus latespicatus,** *Boeck. in Flora,* v. 42, p. 433 (of no. 28, July 1859, not of no. 27). Usually annual ; rhizome not creeping ; stems 4—12 in. high, erect, slender, stiff, obscurely angled, striate. Leaves shorter than the stem, linear, rather rigid, very acute, $\frac{1}{16}$—$\frac{1}{8}$ in. broad. Umbel simple, sometimes reduced to one head ; bracts 3, unequal, the longest sometimes reaching 4 in. long, similar to the leaves. Spikelets straw-colored, shaded with chestnut-brown, oblong-lanceolate, compressed, $\frac{3}{8}$—$\frac{5}{8}$ in. long, 20—60-flowered. Glumes $\frac{1}{8}$ in. long, boat-shaped, when opened out broadly ovate, acute, $\frac{1}{10}$ in. broad, leaving a scar on the rhachilla after falling. Nuts obovoid, black $\frac{1}{20}$ in. long, very shortly apiculate, slightly compressed, microscopically longitudinally striatulate and irregularly subreticulate ; style $\frac{1}{30}$—$\frac{1}{20}$ in. long ; stigmas 2, filiform, longer than the style. Boeck. in Linnæa, v. 35 (1868) p. 467 ; Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 40. *Pycreus latespicatus,* C. B. Clarke, in Hook. f. Fl. B. I.

v. 6 (1893) p. 590 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430 ; Prain, Beng. Pl. p. 1136.—Flowers : Sept.

KONKAN : *Stocks* !, *Law* ! DECCAN : Máwal (Poona districts), *Woodrow* !—DISTRIB. More or less throughout India.

2. **Cyperus malabaricus,** *C. B. Clarke, in Journ. Linn. Soc.* v. 34 (1898) p. 12 (*Pycreus*). Root fibrous ; stems cæspitose, slender, 1 ft. high. Leaves about $\frac{2}{3}$ as long as the stem, $\frac{1}{12}$ in. broad, weak. Inflorescence about 1 in. long and broad, composed of 6—12 spikelets arranged upon 2—3 sessile branchlets ; involucral bracts 3, similar to the leaves, the longest reaching $3\frac{1}{2}$ in. long. Spikelets 20-flowered, distant, $\frac{1}{4}$—$\frac{3}{8}$ by $\frac{1}{8}$ in., linear-oblong, subacute, the sides exactly parallel. Glumes $\frac{1}{10}$ in. long, boat-shaped, dark brown with narrow white margins, when opened out broadly ovate, acute, and $\frac{1}{16}$ in. wide. Nut globosely ovoid, slightly compressed, very shortly apiculate, brown, microscopically longitudinally striatulate and faintly transversely ribbed ; style $\frac{1}{16}$ in. long ; stigmas 2, rather shorter than the style, filiform. *Pycreus malabaricus,* C. B. Clarke (*l.c.*), Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.

DECCAN : Lanoli, *Woodrow* ! ; Khandala, *Cooke* !, *Woodrow* !—DISTRIB. India (W. Peninsula), apparently endemic.

3. **Cyperus sanguinolentus,** *Vahl, Enum.* v. 2 (1806) p. 351. Rhizome creeping, as thick as a crow-quill, 4—10 in. long ; stems 4—20 in. long, stout, decumbent at the base, often clothed $\frac{1}{3}$ of their length with leaf-sheaths. Leaves few, many or 0, as long as the stem or shorter, $\frac{1}{10}$—$\frac{1}{6}$ in. broad, acuminate, 1-nerved ; midrib often red. Umbel small, simple ; bracts 3—5, up to 5 in. long, foliaceous. Spikelets 3—6 (sometimes contracted into a single head), $\frac{1}{4}$—$\frac{3}{5}$ by $\frac{1}{8}$ in., flat, linear or oblong, 6—24-flowered, reddish-brown. Glumes $\frac{1}{10}$ by $\frac{1}{10}$ in., boat-shaped, broadly ovate, obtuse, nearly as broad as long, greenish-yellow and with 3 green nerves at the back, the sides reddish-brown. Anthers linear, muticous. Nuts $\frac{1}{20}$ in. long, suborbicular, laterally compressed, shortly apiculate, biconvex, brown ; style $\frac{1}{20}$—$\frac{1}{16}$ in. long ; stigmas 2, capillary, about as long as the style. Nees, in Wight, Contrib. (1834) p. 75 ; Trim. Fl. Ceyl. v. 5, p. 20. *Pycreus sanguinolentus,* Nees, in Linnæa, v. 9 (1835) p. 283 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 590 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430 ; Prain, Beng. Pl. p. 1136.

KONKAN : *Law* ! ; Kalyan, *Woodrow*, 11 ! DECCAN : Khandala, *Woodrow*. SIND : *Pinwill* !—DISTRIB. Throughout India ; Ceylon, warm parts of the Old World.

4. **Cyperus hyalinus,** *Vahl, Enum.* v. 2 (1806) p. 329. Annual ; stems tufted, 2—8 in. long. Leaves as long as the stem or longer, $\frac{1}{8}$ in. broad, narrowly linear, acuminate, flat, flaccid, 1-nerved. Umbels simple, with 3—7 rays reaching 2 in. long or sometimes reduced to clusters of sessile few-flowered spikelets ; bracts 3—4, leaf-like, reaching 6 in. long, the largest reaching $\frac{1}{3}$ in. broad. Spikelets $\frac{1}{8}$—$\frac{1}{4}$ by $\frac{1}{10}$—$\frac{1}{8}$ in., yellowish-green, 6—10-flowered, oblong, much compressed ; rhachilla stout, winged. Glumes $\frac{1}{8}$ by $\frac{1}{16}$ in., narrowly ovate-oblong, boat-shaped ; keel herbaceous, brown, 3-nerved, produced into a long slightly recurved cuspidate point

beyond the rounded tip ; the sides hyaline, each with 2 strong nerves. Stamens 2—3. Nut $\frac{1}{12}$ by $\frac{1}{20}$ in., somewhat obliquely oblong-obovate, laterally flattened, truncate or slightly retuse at the apex, brown ; style $\frac{1}{25}$ in. long ; stigmas 2, longer than the style, capillary. Boeck. in Linnæa, v. 35 (1868) p. 482 ; Trim. Fl. Ceyl. v. 5, p. 19. *Cyperus pumilus*, Nees, in Wight, Contrib. (1834) p. 74 (*not* of Linn.). *Pycreus pumilus*, Nees, in Linnæa, v. 9 (1835) p. 283 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 591.—Flowers : Sept.

Rare. Bombay Presidency without locality, *Dr. Leith*, 25! KONKAN : Sion (Bombay), *Woodrow*.—DISTRIB. India (W. Peninsula) ; Ceylon, Timor.

5. **Cyperus pumilus,** *Linn. Sp. Pl.* ed. 2 (1762) p. 69. Annual ; stems tufted, 1—12 in. long, slender. Leaves shorter or longer than the stems, $\frac{1}{20}$—$\frac{1}{8}$ in. broad, linear, 1-nerved, acute. Heads of spikelets $\frac{1}{4}$—$\frac{1}{2}$ in. diam., sometimes broken up into pedunculate spikes or clusters of spikelets, sometimes umbellate, the rays of the umbel 1—6, occasionally though rarely reaching 3 in. long, usually much less ; bracts 3—4, leaf-like, up to 4½ in. long. Spikelets $\frac{1}{8}$—$\frac{3}{8}$ by $\frac{1}{10}$—$\frac{1}{8}$ in., 20—50-flowered, much compressed ; rhachilla stout, not winged. Glumes $\frac{1}{10}$ in. long by about $\frac{1}{25}$ in. broad in the widest place, ovate, boat-shaped, 2-fid at the tip with a narrow herbaceous keel which is cuspidately produced at the apex, with 3—5 conspicuous brown nerves and with rounded hyaline nerveless sides. Stamen usually 1. Nut ellipsoid-oblong or subobovoid, scarcely $\frac{1}{10}$ in. long, very minutely apiculate, biconvex, laterally compressed, brown ; style about equalling the nut, very slender ; stigmas 2, capillary, about equalling the style. Trim. Fl. Ceyl. v. 5, p. 19 ; Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 43. *Cyperus nitens*, Vahl, Enum. v. 2 (1806) p. 331. *Pycreus nitens*, Nees, in Nov. Act. Acad. Cur. v. 19, Suppl. (1843) p. 53 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 591 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430 ; Prain, Beng. Pl. p. 1136.—Flowers : Sept.

KONKAN : *Stocks*!, *Law*! DECCAN : Máwal (Poona districts), *Woodrow* ; Lanoli, *Woodrow*. KANARA : *Woodrow*. SIND : *Pinwill*!—DISTRIB. Throughout India ; Ceylon, Malaya, China, Tropical Africa, Tropical Australia.

6. **Cyperus globosus,** *All. Auct. Fl. Pedem.* (1789) p. 49. A glabrous very variable annual ; root fibrous ; stems tufted, 4—25 in. long, very slender, trigonous. Leaves shorter than the heads, very slender, almost filiform. Umbel simple, with 3—5 rays 1—2 in. long, very slender, terminated by solitary or few spikes of 5 or more spreading spikelets, or the spikes capitate ; bracts 2—3, leaf-like, the longest sometimes reaching 3 in. long, narrow, almost filiform. Spikelets crowded, $\frac{3}{8}$—$\frac{3}{4}$ by $\frac{1}{10}$—$\frac{1}{8}$ in., linear with parallel sides, much compressed, 20—50-flowered, brown or sometimes almost black ; rhachilla stout, tetragonous, not winged, often spotted with red. Glumes $\frac{1}{10}$ by $\frac{1}{25}$ in. long, closely imbricate, ovate-oblong, obtuse ; keel greenish-yellow with brownish-red veins ; the sides brown with hyaline margins. Stamens 2. Nuts $\frac{1}{30}$ in. long, broadly or narrowly obovoid, rounded and apiculate at the apex, laterally compressed, biconvex, dark chestnut-brown, slightly papillose ; style about $\frac{1}{30}$ in. long ; stigmas 2, as long as the style, capillary. Trim.

Fl. Ceyl. v. 5, p. 21. *Cyperus ater,* Dalz. & Gibs. Bo. Fl. (1861) p. 283 (*not* of Vahl). *C. capillaris,* Kœn. ex Roxb. Fl. Ind. v. 1 (1832) p. 194 ; Dalz. & Gibs. p. 283. *Pycreus capillaris,* Nees, in Linnæa, v. 9 (1835) p. 283 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 591 ; Prain, Beng. Pl. p. 1136. *Pycreus capillaris* var. *nilagirica,* C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 592.

KONKAN : *Stocks* !, *Law* ! DECCAN : *Dalzell & Gibson*; Mahableshwar, *Woodrow*; Poona, *Jacquemont,* 409 !, *Cooke* !; Soos, 8 miles north-west of Poona, *Bhiva* !; Hura, *Dalzell* ex *C. B. Clarke.*—DISTRIB. Throughout India; Ceylon, temperate and tropical regions of the Old World.

Mr. Clarke describes a variety of this which he has called var. *nilagirica* and finds it on the width of the spikelets, which are, he says, narrower than in the type. I cannot find that the character is at all a reliable one, and I have carefully examined many specimens, both Indian and European. The color of the spikelets in Peninsular specimens is usually darker than that of the Himalayan and European ones, but Mr. Clarke has very distinctly stated in Dyer's 'Flora of Tropical Africa,' v. 8, p. 300, that he has founded the variety not on the color, which he considers accidental, but on the width of the spikelets.

7. **Cyperus albomarginatus,** *Mart. & Schrad. ex Nees, Fl. Bras.* v. 2, part 1 (1842) p. 9. A glabrous annual ; stem solitary, erect, 1—3 ft. high, triquetrous above. Leaves shorter than the stem, $\frac{1}{3}$ in. broad. Umbel with 4—12 rays reaching sometimes 7 in. long ; secondary umbels with 1—7 rays up to $1\frac{1}{4}$ in. long ; bracts large, the longest sometimes reaching 16 by $\frac{1}{4}$—$\frac{1}{3}$ in., linear, acuminate, striate, leaf-like ; bracteoles of secondary umbels up to $1\frac{3}{4}$ in. long, very slender, almost filiform. Spikes $1\frac{1}{4}$—$2\frac{1}{2}$ in. long. Spikelets 8—20, distant, spreading, acute, $\frac{1}{2}$—$\frac{3}{4}$ by $\frac{1}{10}$—$\frac{1}{8}$ in., pale brown ; rhachilla stout, slightly winged. Glumes $\frac{1}{8}$ by $\frac{1}{16}$ in., elliptic-oblong, rounded and hyaline at the apex, scarcely keeled, compressed, the back 5—7-nerved, the sides yellow or brown with conspicuous white margins chiefly near the apex. Stamens usually 3 ; anthers linear-oblong. Nut $\frac{1}{10}$ in. long, obovoid, apiculate, rounded at the apex, laterally compressed, granulate, black. *Cyperus Hochstetteri,* Nees ex Krauss, in Flora, v. 28 (1845) p. 755 *in note* ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 69. *Pycreus albomarginatus,* Nees, in Mart. Fl. Bras. v. 2, part 1 (1842) p. 9 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 594 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.

KONKAN : *Stocks* !; N. & S. KONKAN, *Law* !; Bombay, ex Herb. Hook. in Herb. Kew. S. M. COUNTRY : Londa, *Woodrow.*—DISTRIB. India (W. Peninsula, Rangoon); Ethiopia, N. Australia.

8. **Cyperus puncticulatus,** *Vahl, Enum.* v. 2 (1806) p. 348. A glabrous annual ; stems robust, subsolitary, 1—2 ft. high, erect from a thickened base, trigonous or triquetrous above, the angles smooth. Leaves as long as the stem or shorter, $\frac{1}{8}$—$\frac{1}{2}$ in. broad, rather thick, 1-nerved, pale beneath ; margins smooth ; sheaths long. Umbel simple or compound, with many slender rays reaching 6 in. or more, terminated by few or many slender spikes of widely spreading pale or dark brown spikelets ; bracts 3—4, the longest sometimes reaching 9 in. or more long and $\frac{1}{8}$—$\frac{1}{6}$ in. broad, leaf-like. Spikelets distant on the slender rhachis, $\frac{1}{4}$—$\frac{3}{4}$ by $\frac{1}{10}$—$\frac{1}{8}$ in., linear or linear-oblong,

compressed, soft, 7—30-flowered ; rhachilla slender, undulate, slightly winged. Glumes closely imbricate, thin, $\frac{1}{8}$ by $\frac{1}{16}$ in., oblong, obtuse, cymbiform ; keel 5-nerved ; sides broadly hyaline. Stamens 3. Nut $\frac{1}{16}$ in. long, obovoid, obcordate at the apex, granulate, apiculate, laterally compressed, dark brown ; style $\frac{1}{30}$—$\frac{1}{20}$ in. long ; stigmas 2, longer than the style, filiform. Dalz. & Gibs. p. 283 ; Trim. Fl. Ceyl. v. 5, p. 21. *Pycreus Baccha,* Nees, in Linnæa, v. 9 (1835) p. 283 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430. *Pycreus puncticulatus,* C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 593.

KONKAN : *Dalzell* ! S. M. COUNTRY : Londa, *Cooke* !—DISTRIB. India (W. Peninsula) ; Ceylon, China.

9. **Cyperus odoratus,** *Linn, Sp. Pl.* (1753) p. 46. Perennial ; stems tufted, 12—30 in. long, slender, trigonous, thickened at the base, sometimes 0. Leaves shorter than the stem, $\frac{1}{16}$—$\frac{1}{8}$ in. broad ; sheath short. Umbel simple, of 2—7 slender rays $\frac{1}{8}$—2 in. long, each terminated by short ternate spikes of 4—8 narrow spikelets ; bracts 3—6, spreading, the longest up to 6 in. long or more, leaf-like. Spikelets $\frac{1}{2}$—$\frac{3}{4}$ by $\frac{1}{16}$—$\frac{1}{10}$ in., linear, acuminate, flat, reddish-brown, 20—50-flowered. Glumes $\frac{1}{16}$—$\frac{1}{8}$ by $\frac{1}{30}$ in., closely imbricate, ovate-lanceolate, mucronulate ; keel straight, obscurely 3-nerved ; the sides yellow streaked with brown with hyaline margins. Stamens usually 2 ; anthers small, oblong. Nut $\frac{1}{20}$ in. long, oblong-ellipsoid, rounded at the apex, apiculate, laterally compressed, biconvex, faintly granulate, brown ; style $\frac{1}{20}$ in. long ; stigmas 2, filiform, as long as the style. *Cyperus polystachyos,* Rottb. Descrip. et. Icon. (1773) p. 39, t. 11, fig. 1 ; Grah. Cat. p. 231 ; Dalz. & Gibs. p. 281 ; Trim. Fl. Ceyl. v. 5, p. 20. *Pycreus polystachyos,* Beauv. Fl. Ow. v. 2, p. 48, t. 86, fig. 2 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 592 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430 ; Prain, Beng. Pl. p. 1136.

The specific name *odoratus,* Linn., has priority over *polystachyos,* Rottb.

KONKAN : Malwán, *Woodrow.* GUJARAT : Surat, *Woodrow.* SIND : *Pinwill* ! —DISTRIB. Throughout India near the coast; Ceylon, all warm countries especially near the sea.

10. **Cyperus pygmæus,** *Rottb. Descrip. et Icon.* (1773) p. 20, t. 14, fig. 5. An annual dwarf herb ; stems 1—10 in. long, densely tufted. Leaves numerous, as long as or shorter than the stem, $\frac{1}{16}$—$\frac{1}{10}$ in. broad, flaccid, green, acuminate. Spikelets very many (often 100), sessile, densely packed in a terminal head $\frac{1}{4}$—$\frac{3}{8}$ in. in diam., ovate, $\frac{1}{8}$ by $\frac{1}{10}$ in., compressed, 8—20-flowered, green or pale brown ; bracts 2—6, dilated at the base, 1—6 in. long, acuminate, leaf-like ; rhachilla slender, not winged, often curved or twisted. Glumes closely imbricate, $\frac{1}{10}$—$\frac{1}{8}$ by $\frac{1}{30}$ in., oblong-lanceolate cuspidate, the back streaked with brown, the sides with broadly hyaline margins. Stamen 1 (rarely 2) ; anthers linear-oblong, muticous. Nut $\frac{1}{25}$ in. long, ellipsoid, plano-convex or trigonous, orange-brown ; style $\frac{1}{30}$ in. long ; stigmas 2, capillary, about as long as the style. Boeck. in Linnæa, v. 35 (1868) p. 493 ; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 81 ; Trim. Fl. Ceyl. v. 5, p. 18. *Cyperus squarrosus,* Roxb. Hort. Beng.

(1814) p. 81 (*not* of Linn.) ; Grah. Cat. p. 231. *Juncellus pygmæus*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 596 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430 ; Prain, Beng. Pl. p. 1138.—Flowers : Oct.

KONKAN : *Law* ! DECCAN : *Poona, Woodrow*. GUJARAT : Surat, *Woodrow*. —DISTRIB. More or less throughout India ; Ceylon, Malaya, N. Trop. Africa, China, Japan, Australia, Europe (Mediterranean regions).

11. **Cyperus lævigatus,** *Linn. Mantiss.* (1771) p. 179. Glabrous ; rhizome creeping horizontally, $\frac{1}{8}$ in. in diam., long and with solitary distant stems, or short and with crowded stems, their bases enclosed by imbricate shining chestnut-red scales ; stems 4—24 in. long, round, somewhat fleshy. Leaves usually short or scarcely any, sometimes as long as the stem, $\frac{1}{12}$—$\frac{1}{8}$ in. broad, the upper part often terete. Spikelets 1—30 in one apparently lateral head, solitary or clustered, straw-colored ; bracts 2, the lower as though a continuation of the stem 1—3 in. long, the other much shorter or wanting. Spikelets $\frac{1}{4}$—$\frac{1}{3}$ by $\frac{1}{8}$ in., ovate, subacute, compressed but thick, straw-colored dotted with brown spots, 12—30-flowered ; rhachilla stout, quadrangular, dotted with brown spots. Glumes $\frac{1}{10}$—$\frac{1}{8}$ by $\frac{1}{20}$—$\frac{1}{16}$ in., ovate or oblong, acute, mucronulate, closely imbricate, dotted with brown spots, the sides with hyaline margins. Stamens 3 ; filaments ligulate, membranous ; anthers linear, $\frac{1}{16}$ in. long, yellow with a reddish-brown acute tip. Nut $\frac{1}{20}$ in. long, obovoid, plano-convex ; style about as long as the nut ; stigmas 2, short. Boeck. in Linnæa, v. 35 (1868) p. 486 ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 77. *Juncellus lævigatus*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 596 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.

Dalzell without locality in Herb. Kew. ! KONKAN : Salt-marshes near Bombay, *Woodrow*. GUJARAT : Kathiawar, *Woodrow*. SIND : *Pinwill*.—DISTRIB. India (Kashmir, Panjáb, W. Peninsula) ; Europe (Mediterranean region), Africa, W. Asia, Australia, S. America.

VAR. *junciformis*, C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 79. Rigid ; spikelets 1—6, rigid, shining, chestnut or black. *Juncellus lævigatus* var. *junciformis*, C. B. Clarke, in Fl. B. I. v. 6, p. 597. *Cyperus junciformis* (sp.), Desfont. Fl. Atlant. v. 1 (1798) p. 42, t. 7, fig. 1.

SIND : *Stocks*, 751 !

12. **Cyperus alopecuroides,** *Rottb. Descrip. et Icon.* (1773) p. 38, t. 8, fig. 2. A large glabrous perennial herb ; root fibrous ; stems 2—3 ft. high, stout, often 1 in. or more in diam. at the base, trigonous above, the angles smooth. Leaves many, as long as the stem or shorter, $\frac{1}{3}$—$\frac{1}{2}$ in. broad, coriaceous, acute. Umbel large, compound, with 4—6 primary rays up to 4 in. long, slender ; secondary rays up to 1 in. long bearing clusters of oblong, sessile and pedunculate spikes $\frac{3}{4}$—$1\frac{1}{4}$ by $\frac{1}{3}$—$\frac{1}{2}$ in., densely covered with small spikelets ; rhachis of spike stout ; bracts reaching 18 in. long by $\frac{1}{2}$ in. broad at the base, leaf-like ; bracteoles 3—4, linear, acute, slender, sometimes wanting. Spikelets $\frac{1}{8}$—$\frac{1}{4}$ by $\frac{1}{16}$ in., elliptic-lanceolate or ovate-oblong, subacute, compressed, straw-colored ; rhachilla stout, subtetragonous, not winged. Stamens 3 ; anthers long, linear,

muticous. Glumes $\frac{1}{16}$ by $\frac{1}{30}$ in., not keeled, obscurely nerved, ovate-oblong, mucronulate, with broad hyaline margins, the sides and back streaked with brown. Nut $\frac{1}{20}$ in. long, ellipsoid, plano-convex or biconvex, sometimes subtrigonous, pale yellow when young, ashy-brown in age. Grah. Cat. p. 232 ; Dalz. & Gibs. p. 282 ; Trim. Fl. Ceyl. v. 5, p. 38 ; Boeck. in Linnæa, v. 36 (1870) p. 321 ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 74. *Juncellus alopecuroides*, C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 595 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.

Dalzell without locality in Herb. Kew.! KONKAN : Bombay, *Jacquemont*, 438! DECCAN : *Woodrow*; between Ellora and Poona, *Jacquemont*, 279! GUJARAT : Panch Mahâls, *Woodrow*. SIND : *Stocks*!—DISTRIB. Throughout India; Ceylon, Africa, Tropical Australia.

13. **Cyperus castaneus,** *Willd. Sp. Pl.* v. 1 (1797) p. 278. A low herb 1—7 in. high ; stems few or many, tufted, slender. Leaves as long as or shorter than the stem, $\frac{1}{16}$—$\frac{1}{12}$ in. broad ; sheaths often purple. Umbel usually simple, consisting of a central sessile head and few or many unequal spreading rays $\frac{1}{4}$—$1\frac{1}{2}$ in. long (rarely again divided, sometimes reduced to a terminal head) ; rays terminated by heads of 3—20 stellately spreading spikelets ; bracts 3—5, the longest sometimes reaching 6 in. long, narrowly linear, leaf-like, dilated at the base, cuspidate at the apex, spreading. Spikelets $\frac{1}{8}$—$\frac{3}{4}$ by $\frac{1}{20}$—$\frac{1}{16}$ in. long, oblong or linear, compressed, usually dark chestnut-brown, many-flowered. Glumes $\frac{1}{16}$—$\frac{1}{12}$ in. long (excluding the mucro) by $\frac{1}{30}$ in. broad ; keel greenish-yellow, produced beyond the rounded tip into a long recurved mucro ; sides usually chestnut-brown, the margins not hyaline ; rhachilla rather stout, scarcely winged. Stamens 1—2 ; anthers small. Nut $\frac{1}{20}$ in. long, oblong, trigonous, shortly apiculate, narrowed at the base, pale brown or yellow, granulate ; style shorter than the nut ; stigmas 3, filiform. Fl. B. I. v. 6, p. 598 ; Boeck. in Linnæa, v. 35 (1868) p. 496 ; Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 87 ; Trim. Fl. Ceyl. v. 5, p. 25 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.—Flowers : Oct.—Dec.

Rare. KONKAN : *Cooke*! ; Bombay, *Woodrow*; Laddapur, *Bhiva*!—DISTRIB. India (Nepal, Sikkim, Pegu, W. Peninsula) ; Ceylon, Tonkin, Central Australia.

14. **Cyperus Teneriffæ,** *Poir. Encyc. Méthod.* v. 7 (1806) p. 245. A low glabrous annual of a reddish-brown color ; root fibrous ; stems 2—8 in. long, tufted. Leaves usually shorter than the stem, $\frac{1}{8}$ in. broad, linear, acute ; sheaths reddish, inflated. Head solitary, of 3—20 sessile spikelets ; bracts 2, the longest $\frac{3}{4}$—$1\frac{1}{2}$ in. long, narrowly linear, acute, leaf-like. Spikelets $\frac{1}{3}$—$\frac{5}{8}$ by $\frac{1}{8}$—$\frac{1}{4}$ in., much compressed, reddish-brown. Glumes $\frac{1}{8}$ in. long (including the mucro) by $\frac{1}{16}$ in. broad, boat-shaped, keeled ; keel produced into a conspicuous recurved mucro ; sides with 4—5 conspicuous ribs on each, the margins hyaline. Stamens 3 ; anthers oblong, muticous. Nut $\frac{1}{20}$ in. long, obovoid, obtuse, shortly apiculate, triquetrous, dark brown ; style longer than the nut ; stigmas 3, shorter than the style. I have not found any of the nuts reticulate black and white as stated in the 'Flora of British India'. Fl. B. I. v. 6, p. 601 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430. *Cyperus Wightii*, Nees, in Wight,

Contrib. (1834) p. 78 ; Boeck. in Linnæa, v. 35 (1868) p. 507. *C. rubicundus,* Kunth, Enum. v. 2 (1837) p. 49 (*not* of Vahl) ; Boeck. in Linnæa, v. 35 (1868) p. 507 ; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 104.—Flowers : Sept.

Rare. DECCAN : Poona, *Woodrow,* 143!—DISTRIB. India (W. Peninsula) ; Teneriffe, Africa.

15. **Cyperus uncinatus,** *Poir. Encyc. Méthod.* v. 7 (1806) p. 247. A glabrous annual ; stems 3—6 in. long, tufted, slender. Leaves as long as or shorter than the stem, filiform, flexuous. Umbel simple, consisting of a central sessile head and few or many filiform spreading unequal rays ¼—1 in. long, each terminated by a head of stellately spreading spikelets ; bracts 3—5, filiform, much longer than the rays, the longest sometimes reaching 3 in. long. Spikelets ⅛—½ by ⅛ in., 5—12 in a cluster, compressed, 12—24-flowered, reddish-brown ; rhachilla scarcely winged, slender. Glumes $\frac{1}{16}$ in. long (not including the mucro, which is nearly as long as the limb), oblong, obtuse, about $\frac{1}{30}$ in. broad ; keel 3-nerved, produced into a long recurved mucro ; sides usually brown, hyaline. Stamens 1—2 ; anthers short, oblong. Nut about $\frac{1}{30}$ in. long, obovoid, trigonous, shortly apiculate, dark brown, faintly granulate ; style shorter than the nut, very slender ; stigmas 3, capillary, about equalling the style. Distinguished from *C. castaneus,* which it much resembles, by the nuts which are obovoid, those of *C. castaneus* being oblong and longer. C. B. Clarke, in Dyer's Fl. Trop. Africa, v. 8 (1902) p. 328. *Cyperus cuspidatus,* H. B. & K. Nov. Gen. & Sp. v. 1 (1815) p. 204 ; Boeck. in Linnæa, v. 35 (1868) p. 496 ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 88 & in Hook. f. Fl. B. I. v. 6, p. 598 ; Trim. Fl. Ceyl. v. 5, p. 26 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430 ; Prain, Beng. Pl. p. 1139.

DECCAN : Lanoli, *Woodrow.* SIND : *Pinwill*!—DISTRIB. Throughout India; Ceylon, Tropical Africa, Java, China, Australia, America.

16. **Cyperus flavidus,** *Retz. Obs.* fasc. 5 (1789) p. 13. Annual ; root fibrous, dark purple (*Dalz. & Gibs.*) ; stems tufted, 6—8 in. high, weak, obtusely trigonous. Leaves shorter or longer than the stem, $\frac{1}{16}$—⅛ in. broad, linear, acute. Umbel compound or decompound, when mature yellow or finally blackening ; rays many, the primary 1—2 in. long, the secondary ½—1 in. long, bearing heads of stellately spreading minute spikelets ; bracts 2—3, the longest reaching 6 in. long ; bracteoles 0. Spikelets ⅛—¼ by $\frac{1}{16}$ in., linear-lanceolate. Glumes $\frac{1}{25}$ in. long, oblong, rounded (not mucronate) at the tip, with a green obscurely 3-nerved back, the sides with hyaline margins. Stamen 1 (rarely 2) ; anthers linear, muticous. Nut $\frac{1}{30}$ in. long, globosely obovoid, trigonous, rounded, shortly and stoutly stipitate, at first pale-yellow, becoming white when quite ripe. Dalzell & Gibson (Bo. Fl. p. 285) say that the plant is easily recognized by its yellow hue. Fl. B. I. v. 6, p. 600 ; Dalz. & Gibs. p. 284 ; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 122 ; Trim. Fl. Ceyl. v. 5, p. 27 ; Prain, Beng. Pl. p. 1139. *Cyperus Haspan* var. α *indicus,* Boeck. in Linnæa, v. 35 (1868) p. 574.

DECCAN: *Dalzell & Gibson.*—DISTRIB. More or less throughout India in rice-fields; Ceylon, warm regions of the Old World.

17. **Cyperus difformis,** *Linn. Cent. Pl. part* 2 (1755), *in Amœn. Acad.* v. 4 (1788) p. 302. A glabrous annual; root fibrous; stems 4—20 in. long, tufted, weak, triquetrous towards the top. Leaves few, usually shorter than the stem, $\frac{1}{8}$—$\frac{1}{6}$ in. broad, linear, acuminate, obscurely nerved, flaccid. Spikes in a simple or compound umbel or contracted into a head; rays of the umbel 3—6, slender, up to $1\frac{1}{2}$ in. long; bracts 2—4, the lowest 2—10 in. long, leaf-like. Spikelets many, in dense heads, dusky or brown, $\frac{1}{8}$—$\frac{1}{5}$ by $\frac{1}{25}$ in., oblong, obtuse, 10—30-flowered; rhachilla slender, not winged. Glumes $\frac{1}{30}$—$\frac{1}{25}$ in. long, closely imbricate, obovate-oblong, obtuse, concave, 3-nerved and rounded on the back; sides broadly hyaline. Stamen 1 (less commonly 2); anthers small, oblong, muticous, yellow. Nut $\frac{1}{30}$ in. long, ellipsoid, obtusely trigonous, rounded and apiculate at the apex, smooth, yellow or brown; style much shorter than the nut; stigmas 3, linear, short. Fl. B. I. v. 6, p. 598; Grah. Cat. p. 232; Dalz. & Gibs. p. 282; Boeck. in Linnæa, v. 35 (1868) p. 586; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 133; Trim. Fl. Ceyl. v. 5, p. 25; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1139.—Flowers: Oct.—Jan.

KONKAN: Matheran, *Woodrow.* DECCAN: Chinchwad, near Poona, *Woodrow;* Khandala, *Woodrow;* between Ellora and Poona, *Jacquemont,* 275!—DISTRIB. More or less throughout India; Ceylon, the Old World generally in warm regions.

18. **Cyperus pulcherrimus,** *Willd. in Kunth, Enum.* v. 2 (1837) p. 35. Rhizome short, creeping; root-fibres slender; stems 12—18 in. long, slender, trigonous. Leaves as long as the stem or longer, narrowly linear, $\frac{1}{12}$—$\frac{1}{8}$ in. broad, weak, 1-nerved. Umbel Compound, contracted; rays very many, reaching $1\frac{1}{2}$ in. long, bearing crowded umbellules whose subglobose heads of innumerable spikelets conceal the secondary rays which are $\frac{1}{4}$—$\frac{3}{8}$ in. long; bracts 3—6, leaf-like, the longest reaching 6 in. long. Spikelets 8—12, small, not reaching $\frac{1}{4}$ in. long, about $\frac{1}{25}$ in. broad, densely crowded, oblong-lanceolate, 12—30-flowered; rhachilla not winged, slender. Glumes ovate-oblong, obtuse, with crisped incurved tips, the sides hyaline with 2 broad reddish-brown bands. Stamens 1—2; anthers linear. Nut minute, half as long as the glume, shortly and stoutly stipitate, globosely trigonous, acute at both ends, granulate; style nearly as long as the nut; stigmas 3, capillary. Fl. B. I. v. 6, p. 600; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 132; Boeck. in Linnæa, v. 35 (1868) p. 573; Trim. Fl. Ceyl. v. 5, p. 27.

SIND: *Pinwill!*—DISTRIB. India (Assam); Ceylon, Penang, Java, Borneo.

19. **Cyperus Haspan,** *Linn. Sp. Pl.* (1753) p. 45. Perennial, glabrous; rhizome creeping, clothed with ovate triangular scales, giving off solitary or tufted stout or slender trigonous or triquetrous often compressed stems 4—24 in. long. Leaves usually shorter (sometimes longer) than the stem, $\frac{1}{8}$—$\frac{1}{6}$ in. broad, acute, erect (occasionally very short and subulate); sheaths inflated. Umbel simple or compound, of 4—12 very unequal rays up to 3 in. long; secondary rays

bearing 3—8 slender stellately spreading spikelets; bracts 2—3, variable, narrow and shorter than the rays, or broader than the leaves and 3 in. long. Spikelets ⅛—⅓ by 1/16—½ in., linear, acute, flat, 10—40-flowered, pale or chestnut-brown; rhachilla narrow, scarcely winged. Glumes 1/16 by 1/10 in., ovate-oblong, rounded on the back, not or obscurely mucronate by the excurrent midrib; sides hyaline, usually brown. Stamens 2 or 3; anthers linear-oblong. Nuts 1/10 in. long, globosely obovoid, rounded and shortly apiculate at the apex, trigonous, on a short thick stipes, yellow or pale-brown; style longer than the nut; stigmas 3, capillary. Fl. B. I. v. 6, p. 600; Grah. Cat. p. 231; Dalz. & Gibs. p. 282; Boeck. in Linnæa, v. 35 (1868) p. 574; Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 119; Trim. Fl. Ceyl. v. 5, p. 26; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1139; Watt, Dict. Econ. Prod. v. 2, p. 684.—Flowers: Oct.—Dec.

KONKAN: Ratnagiri, *Woodrow*. DECCAN: Lanoli, *Woodrow*.—DISTRIB. Throughout India, common in rice-fields; Ceylon, Malaya, Indo-China, Tropical Africa and Australia.

20. **Cyperus niveus,** *Retz. Obs.* fasc. 5 (1789) p. 12. Glabrous, glaucescent; rhizome woody, short, the rootlets wiry; stems 8—16 in. long, nodose at the base, closely 1-seriate. Leaves much shorter than the stem, narrowly linear, setaceo-acuminate, 1/12—⅛ in. broad, weak. Spikelets 3—12 in one head, reaching ¾ by ¼ in., oblong-elliptic, compressed, pale, sometimes almost white, 20—40-flowered; rhachilla not winged; bracts usually 2, the longest reaching 2½ in. long, finely acuminate, not dilated at the base, leaf-like. Glumes ⅛ by 1/16 in., ovate-lanceolate, compressed; keel produced into a very short mucro; sides whitish or whitish-brown, multistriate, with narrow hyaline margins. Stamens 3; filaments long, persistent; anthers linear, muticous, exserted from the glume. Nut 1/12 in. long, obovoid, triquetrous, dark brown; style 1/16 in. long; stigmas 3, rather shorter than the style. Fl. B. I. v. 6, p. 601; Boeck. in Linnæa, v. 35 (1868) p. 530; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 108; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1139; Watt, Dict. Econ. Prod. v. 2, p. 686.—Flowers: Nov.

SIND: *Pinwill;* Hyderabad, *Woodrow*.—DISTRIB. More or less throughout India; Afghanistan, China.

21. **Cyperus leucocephalus,** *Retz. Obs.* fasc. 5 (1789) p. 11. A glabrous herb; rhizome very short, woody, with long fibrous rootlets; stems cæspitose, very slender, nodose at the base, each carrying one head. Leaves shorter than the stem, narrow, 1/20—1/16 in. broad, many-nerved. Heads dense, globose, white, ¼—⅜ in. in diam., containing 8—50 spikelets; bracts 3 (rarely 4), the longest reaching 2½ in. long, narrowly linear, long-acuminate, many-nerved. Spikelets ⅛—⅓ by 1/16—⅛ in., compressed, elliptic, 10—18-flowered. Glumes 1/12 by 1/10 in., oblong-lanceolate, subobtuse, whitish or pale-brown, with hyaline margins. Stamen 1; anthers oblong, muticous. Nut 1/10 in. long, oblong-ellipsoid, trigonous, shortly apiculate, granulate, black; style 1/16 in. long; stigmas 3, as long as the style. Fl. B. I. v. 6,

p. 602 ; Boeck. in Linnæa, v. 35 (1868) p. 590 ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 107 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.

KONKAN : N. & S. Konkan, *Law* !—DISTRIB. Tropics generally.

22. **Cyperus arenarius,** *Retz. Obs.* fasc. 4 (1786) p. 9. Whole plant pale or glaucous-green ; rhizome elongate, creeping, striate, rigid, dichotomously branched, clothed with lanceolate chestnut-brown sheaths ; rootlets thick, glabrous ; stems solitary, 4—12 in. long, distant, stout, rigid, terete, attenuated at the base into the rhizome, clothed below with long withered sheaths. Leaves longer or shorter than the stem, $\frac{1}{12}$—$\frac{1}{8}$ in. broad, linear, spreading and recurved, rigidly coriaceous, terete and grooved above, or broader with complicate sides, not keeled, almost nerveless. Heads solitary on the summit of the stems, globose, $\frac{1}{2}$—$1\frac{1}{2}$ in. in diam., of many sessile radiating spikelets ; bracts 2—3, leaf-like, rigid, the lowest 2—4 in. long, erect, simulating a continuation of the stem, the others much shorter. Spikelets $\frac{3}{8}$—$\frac{1}{2}$ by $\frac{1}{6}$—$\frac{1}{4}$ in., elliptic-lanceolate, straw-colored, becoming ultimately brown, 8—16-flowered ; rhachilla stout, not winged. Glumes $\frac{1}{6}$—$\frac{1}{3}$ by $\frac{1}{10}$ in., ovate-oblong, boat-shaped, obtuse, minutely mucronate, dorsally rounded, streaked with brown, the sides with many strong nerves and hyaline margins. Stamens 3 ; filaments elongate, ligulate, persistent ; anthers narrowly linear, muticous, exserted from the glume. Nut $\frac{1}{10}$ in. long, obovoid, rounded at the apex, trigonous, black ; style $\frac{1}{16}$—$\frac{1}{10}$ in. long ; stigmas 3, capillary, exserted from the glume. Fl. B. I. v. 6, p. 602 ; Dalz. & Gibs. p. 284 ; Boeck. in Linnæa, v. 35 (1868) p. 536 ; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 106 ; Trim. Fl. Ceyl. v. 5, p. 23 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.—Flowers : Oct.—Nov.

KANARA : Karwar, *Talbot*, 553 ! GUJARAT : Domas near Surat on the sea-coast, *Dalzell* ! ; Ahmedabad, *Woodrow*, 21 ! SIND : *Pinwill* !, *Stocks* ! ; Jemadar ka Landa near Karachi, *Stocks* !—DISTRIB. India (sea-coast from Sind to Ceylon and Orissa, Panjáb) ; Ceylon, Persia, Arabia.

23. **Cyperus Atkinsoni,** *C. B. Clarke, in Journ. Linn. Soc.* v. 21 (1884) p. 109. Rhizome short, woody ; roots not woolly ; stems cæspitose, 2—7 in. long, trigonous below, terete above, thickened at the base. Leaves as long as or shorter than the stem, rigid, $\frac{1}{10}$—$\frac{1}{8}$ in. broad at the base, tapering towards the finely cuspidate apex. Umbel simple, often contracted into a head ; rays 3—4, reaching $\frac{3}{8}$—$1\frac{1}{8}$ in. long ; bracts 2—3, the longest 2—3 in. long. Spikelets $\frac{3}{8}$—$\frac{7}{8}$ by $\frac{1}{8}$—$\frac{1}{6}$ in., 20—30-flowered, narrowly linear, subacute ; rhachilla not winged. Glumes oblong-lanceolate, cymbiform, $\frac{1}{8}$—$\frac{1}{6}$ by $\frac{1}{20}$ in., with a strong sharp slightly recurved mucro $\frac{1}{50}$ in. long beyond the subacute tip ; the back pale, the sides pale or cinnamon-colored, multistriate, the margins hyaline. Stamens 3 ; filaments $\frac{1}{8}$ in. long, ligulate, persistent ; anthers $\frac{1}{16}$ in. long, linear, yellow. Nut $\frac{1}{16}$ in. long, obovate, trigonous, yellow ; style $\frac{1}{20}$—$\frac{1}{16}$ in. long ; stigmas 3, much longer than the style, capillary. Fl. B. I. v. 6, p. 603 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.

Dalzell without locality in Herb. Kew.! SIND: *Stocks*!; Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (Kashmir, N. W. Himalaya, W. Peninsula).

24. **Cyperus conglomeratus,** *Rottb. Descrip. et Icon.* (1773) p. 21, t. 15, fig. 7. Glabrous, glaucous-green; rhizome short or long, woody, creeping, ⅛—⅙ in. in diam.; roots of stout woolly fibres; stems stout, 6—20 in. long, terete below, trigonous above, thickened at the base, clothed with brown ovate acuminate scales. Leaves as long as the stem or shorter, 1/10—⅛ in. broad, coriaceous, dorsally rounded (not keeled), shortly cuspidate at the tip, the margins involute when dry; nerves obscure. Umbel simple, often contracted into one head 1—1½ in. diam. of densely crowded spreading spikelets; bracts 3—4, elongate, narrower than the leaves, shortly cuspidate. Spikelets ½—1 by ⅛—⅙ in., oblong-lanceolate, compressed, 10—24-flowered; rhachilla stout, scarred, not winged. Glumes reaching ⅓ by 1/16 in., oblong-lanceolate, cymbiform, with a short stout mucro extending beyond the rounded tip, with many reddish-brown nerves and hyaline margins. Stamens 3; filaments 1/10 in. long, ligulate; anthers yellow, ⅛ in. long, narrowly linear, muticous. Nut (immature) 1/10 in. long, obovoid, compressed, trigonous, yellow; style reaching ⅛ in. long, flattened; stigmas 3, capillary, much longer than the style. Fl. B. I. v. 6, p. 602; Trim. Fl. Ceyl. v. 5, p. 23; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430. *Cyperus pungens,* Boeck. in Linnæa, v. 35 (1868) p. 537; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 113.—Flowers: Nov.—Feb.

GUJARAT: Ahmedabad, *Woodrow*. SIND: *Pinwill*!; Sibi, *Lace,* 3462!—DISTRIB. India (W. Peninsula); Ceylon, Trop. Africa, Mediterranean region.

VAR. *pachyrhizus,* Trimen MSS. ex Hook. f. in Trim. Fl. Ceyl. v. 5 (1900) p. 23. More slender; leaves narrower; heads 2 in. in diam.; spikelets smaller and narrower; glumes muticous. *C. pachyrhizus* (sp.), Nees ex Boeck. in Linnæa, v. 35 (1868) p. 545; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 111 & in Hook. f. Fl. B. I. v. 6, p. 603; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.—Flowers: Nov.—Dec.

KONKAN: *Law*! GUJARAT: (Kathiawar) Verawal, *Woodrow*!; Porbander, *Woodrow*.—DISTRIB. India (W. Peninsula); Ceylon, Laccadive Isles.

25. **Cyperus compressus,** *Linn. Sp. Pl.* (1753) p. 46. A glabrous annual; root fibrous; stems tufted, 4—16 in. long, erect, slender, trigonous, with rounded smooth angles. Leaves shorter or longer than the stem, 1/16—⅛ in. broad, finely acuminate, 1-nerved. Umbel simple, often with a sessile head at the fork or occasionally altogether reduced to a sessile head; rays 3—6, reaching 3 in. long, bearing 4—8 terminal spikelets; bracts 3—5, finely acuminate, leaf-like, the longest reaching 4½ in long. Spikelets ½—1¼ by ⅛—⅕ in., much compressed, yellow when ripe, linear-oblong, 20—40-flowered; rhachilla stout, angular, closely scarred, scarcely winged. Glumes ⅛ in. long (including the mucro), oblong-lanceolate, closely imbricate; keel produced into a slightly recurved, laterally compressed mucro 1/20—1/16 in. long, beyond the obtuse tip; sides membranous, green or yellow, striate, with short hyaline margins. Stamens 3; filaments nearly ¼ in.

long, ligulate ; anthers $\frac{1}{12}$ in. long, yellow, linear, muticous. Nut $\frac{1}{10}$ in. long, broadly obovoid, triquetrous, black ; style $\frac{1}{16}$ in. long ; stigmas 3, as long as the style. Fl. B. I. v. 6, p. 605 ; Grah. Cat. p. 231 ; Dalz. & Gibs. p. 282 ; Boeck. in Linnæa, v. 35 (1868) p. 517 ; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 97 ; Trim. Fl. Ceyl. v. 5, p. 33 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430 ; Prain, Beng. Pl. p. 1140 ; Watt, Dict. Econ. Prod. v. 2, p. 683.

DECCAN : *Dalzell & Gibson;* Poona, *Woodrow.* SIND : *Pinwill* !—DISTRIB. Throughout India; Ceylon, Tropical Africa, Asia, and America.

26. **Cyperus aristatus,** *Rottb. Descrip. et Icon.* (1773) p. 23, t. 6, fig. 1. A small glabrous annual 3—6 in. high ; roots fibrous ; stems tufted, stout or slender, trigonous. Leaves usually shorter than the stem, erect, $\frac{1}{20}$—$\frac{1}{10}$ in. broad, acuminate, flat, 1-nerved, flaccid. Umbel with 2—5 rays, or capitate with numerous spikelets crowded into a globose or oblong head $\frac{1}{4}$—$\frac{1}{2}$ in. long ; bracts 2—5, the longest reaching in well-developed specimens $3\frac{1}{2}$ in. long, broader than the leaves at the base, gradually tapering to a fine point. Spikelets $\frac{1}{3}$—$\frac{1}{2}$ by $\frac{1}{8}$—$\frac{1}{6}$ in., oblong, flat, 6—20-flowered, usually brownish ; rhachilla not winged. Glumes $\frac{1}{8}$ in. long (including the mucro) by $\frac{1}{30}$ in. broad, oblong ; keel strong, produced into a recurved beak as long as the limb ; sides many-nerved up to near the margin, pale or brown. Stamen 1 ; filaments $\frac{1}{12}$ in. long ; anthers small, oblong. Nut $\frac{1}{20}$ in. long, narrowly obovoid, rounded and apiculate at the apex, tapering towards the base, trigonous, reddish-brown ; style $\frac{1}{30}$ in. long ; stigmas 3, about as long as the style, capillary. Fl. B. I. v. 6, p. 606 ; Boeck. in Linnæa, v. 35 (1868) p. 500 ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 91 ; Trim. Fl. Ceyl. v. 5, p. 24 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430 ; Prain, Beng. Pl. p. 1140.—Flowers : Sept.

DECCAN : Poona, *Jacquemont,* 315! *Woodrow.*—DISTRIB. More or less throughout India, Ceylon, Trop. Africa, Australia, America.

27. **Cyperus Iria,** *Linn. Sp. Pl.* (1753) p. 45. A glabrous annual ; root fibrous ; stems tufted, 14—20 in. long, triquetrous, striate. Leaves as long as the stem or shorter, $\frac{1}{8}$—$\frac{1}{4}$ in. broad, multistriate, finely acuminate, flaccid. Umbel decompound, of many primary rays 1—5 in. long, bearing irregularly fascicled umbellules formed of narrow interrupted spikes of 5—20 small few-flowered spikelets ; bracts 3—5, the longest sometimes reaching 8 in. long. Spikelets $\frac{1}{4}$—$\frac{1}{3}$ by $\frac{1}{10}$—$\frac{1}{8}$ in., linear-oblong, obtuse, compressed, 6—20-flowered, yellow or pale brown ; rhachilla not winged. Glumes $\frac{1}{10}$ by $\frac{1}{16}$ in., elliptic-obovate, obtuse, muticous or very minutely apiculate, loosely or scarcely imbricate, 3—5-nerved, with broad hyaline margins. Stamens 2 or 3 ; anthers small, oblong, muticous, yellow. Nut $\frac{1}{12}$ in. long, obovoid, triquetrous, brown or black ; style very short, scarcely $\frac{1}{50}$ in. long ; stigmas 3, very short, slightly exserted from the glume. Fl. B. I. v. 6, p. 606 ; Grah. Cat. p. 232 ; Dalz. & Gibs. p. 282 ; Boeck. in Linnæa, v. 35 (1868) p. 595 ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 137 ; Trim. Fl. Ceyl. v. 5, p. 18 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430 ;

Prain, Beng. Pl. p. 1140 ; Watt, Dict. Econ. Prod. v. 2, p. 685.—Flowers : Dec.

KONKAN : Neral (below Matheran), *Bhiva* ! DECCAN : *Dalzell & Gibson;* Poona, *Jacquemont,* 344 ! ; Matheran, *Woodrow* ; Khandala, *Woodrow.*—DISTRIB. Throughout India in rice-fields ; Ceylon, Indo-China, Australia, Mediterranean region.

VAR. *paniciformis,* C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 607. Spikelets bearing 2—4 nuts ; spikes often drawn out into nearly linear racemes. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430. *Cyperus paniciformis* (sp.), Franck. & Savat. Pl. Japon. v. 2 (1879) p. 103 and p. 537. *C. parviflorus,* Nees, in Wight, Contrib. (1834) p. 87 (exclud. all syn.).—Flowers : Sept.

KONKAN : Neral (below Matheran), *Cooke* !, *Bhiva* ! DECCAN : Khandala, *Woodrow.*—DISTRIB. India (Kashmir, W. Peninsula, Andamans) ; China, Japan, Malaya, Polynesia.

28. **Cyperus procerus,** *Rottb. Descrip. et Icon.* (1773) p. 29, t. 5, fig. 3. Perennial ; rootstock short, stout, stoloniferous, the stolons elongate, clothed with long acuminate scales, bulbilliferous ; stems 2—3 ft. long, acutely triquetrous. Leaves very long, often exceeding the stems, ¼—½ in. broad, acuminate, thickly coriaceous or spongy ; sheaths broad, compressed, membranous. Umbel compound ; primary rays 3—7, stout, 1—4 in. long ; secondary rays bearing loosely corymbose spikes of 5—10 spreading compressed spikelets ; rhachis of spikes rather stout, angular, glabrous ; bracts 2—5, the longest reaching sometimes 15 in. long, divaricate, leaf-like. Spikelets remote, ½—1 by ⅛ in., linear-oblong, 10—50-flowered, straw-colored or red ; rhachilla scarcely winged or winged here and there, tetragonous. Glumes ⅛—⅓ in. long, rather loosely imbricate, cinnamon-red or straw-colored, boat-shaped ; back with 5 or more nerves ; sides and tip with hyaline margins. Stamens 3 ; anthers $\frac{1}{10}$ in. long, oblong, muticous, yellow. Nut $\frac{1}{10}$ in. long, broadly obovoid, trigonous, apiculate, tapering towards the base, yellow ; style $\frac{1}{20}$ in. long ; stigmas 3, longer than the style, capillary. Fl. B. I. v. 6, p. 610 ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 152 ; Trim. Fl. Ceyl. v. 5, p. 34 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1140. *Cyperus Heynei,* Boeck. in Linnæa, v. 35 (1868) p. 600.

Rare. KONKAN : Goa, *Woodrow.*—DISTRIB. More or less throughout India, chiefly near the sea ; Ceylon, Tonkin, Java.

29. **Cyperus nutans,** *Vahl, Enum.* v. 2 (1806) p. 363. A tall perennial ; rhizome tuberous, thicker than the thumb in old plants, creeping ; root-fibres matted ; stems 2—3½ ft. long, stout, trigonous, with smooth angles. Leaves as long as the stem, linear, ¼—½ in. broad, coriaceous in old plants, multistriate. Umbel very large, decompound ; primary rays reaching 10 in. long, slender, trigonous, bearing numerous bracteate umbellules with secondary rays 1—2 in. long, each secondary ray terminated by many unequal simple or paniculate lax spikes 1—1½ in. long, forming tassel-like clusters ; rhachis slender ; bracts 4—8, the longest up to 12 by ½ in. Spikelets erect, ¼—⅓ by $\frac{1}{10}$ in., 6—10-flowered, pale reddish-brown ; rhachilla

slender, scarcely winged, with long internodes between the glumes about ⅓ the length of the glume. Glumes $\frac{1}{12}$ by $\frac{1}{30}$ in., oblong, distant, erect, obtuse, shortly apiculate, rounded on the back, obscurely nerved, with narrow hyaline margins. Stamens 3; anthers linear-oblong. Nut $\frac{1}{16}$ in. long, narrowly obovoid or oblong, tapering towards the base, triquetrous, apiculate, yellow when ripe; style $\frac{1}{30}$ in. long; stigmas 3, longer than the style, capillary. Fl. B. I. v. 6, p. 607; Boeck. in Linnæa, v. 35 (1868) p. 597; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 143 (exclud. syn.); Trim. Fl. Ceyl. v. 5, p. 31; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430; Prain, Beng. Pl. p. 1140. *Cyperus distans*, Grah. Cat. p. 232 (*not* of Linn.); Dalz. & Gibs. p. 283.—Flowers: Sept.

Dalzell without locality in Herb. Kew.! DECCAN: Khandala, *Woodrow*.—DISTRIB. More or less throughout India.

30. **Cyperus eleusinoides,** *Kunth, Enum.* v. 2 (1837) p. 39. Perennial; rootstock woody, with short lateral shoots but no true stolons; stems 1½—4 ft. long, stout, triquetrous, with smooth angles. Leaves usually shorter than the stem, rigid, flat, reaching ⅓ in. broad with a stout midrib. Umbel erect, compound, with 5—8 stout, trigonous rays 4—8 in. long; spikes sessile or pedunculate, ½—1½ by ¼—⅓ in. in diam., green or brown, bracteolate, ascending, never divaricate; bracts 3 or 4, the longest sometimes more than 1 ft. long and ½ in. broad, leaf-like; bracteoles filiform or subulate. Spikelets densely imbricate, ¼—⅓ by $\frac{1}{12}$—⅛ in., linear-oblong, erect, flat, 8—12-flowered; rhachilla slightly winged. Glumes ⅛ by $\frac{1}{30}$ in., oblong, obtuse, apiculate, rounded on the back, about 5-nerved, with hyaline margins. Stamens 3; anthers small, oblong, obtuse. Nut $\frac{1}{16}$ in. long, oblong or obovoid-oblong, trigonous, apiculate, shortly stipitate, yellowish-brown; style scarcely $\frac{1}{30}$ in. long; stigmas, 3 twice as long as the style, capillary. Fl. B. I. v. 6, p. 608; Boeck. in Linnæa, v. 35 (1868) p. 596; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 142; Trim. Fl. Ceyl. v. 5, p. 37; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.—Flowers: Sept.

KONKAN: *Lambert*! DECCAN: Máwal (Poona districts), *Woodrow*. SIND: *Pinwill*!—DISTRIB. India (Kashmir, Moradabad, Darjeeling, Panjáb, W. Peninsula); Ceylon, Tropical Africa, China, Malaya, Queensland.

31. **Cyperus malaccensis,** *Lam. Illustr.* v. 1 (1791) p. 146. Glabrous, green or glaucescent; rhizome creeping, rather thick, clothed with dark brown scales. Stems 1½—3 ft. long, acutely triquetrous, ⅛—⅓ in. in diam., much compressed. Leaves few, the uppermost 2—6 in. long, erect, green, ensiform, shortly caudate; sheaths often enclosing the stem. Umbel 2—6 in. in diam., simple, compound or congested, with 3—12 rays 1—3 in. long, the longer corymbosely branched at the apex; bracts 2—5, divaricate, subequal, spreading, flat, up to 6 by ⅓ in.; umbellules simple; bracteoles small. Spikes of 4—10 spikelets; rhachis glabrous. Spikelets ⅜—⅝ by $\frac{1}{16}$—$\frac{1}{12}$ in., linear, 20—40-flowered. Glumes $\frac{1}{16}$ by $\frac{1}{30}$ in., oblong, obtuse, scarcely keeled, straw-colored or pale brown. Stamens 3; anthers linear-oblong, not crested. Nut $\frac{1}{12}$ in. long, narrowly oblong, obtusely trigonous, tapering at either end, shortly apiculate; style

$\frac{1}{30}$ in. long ; stigmas 3, longer than the style, capillary. Fl. B. I. v. 6, p. 608 ; Boeck. in Linnæa, v. 35 (1868) p. 603 ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 147 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1140 ; Watt, Dict. Econ. Prod. v. 2, p. 685. *Cyperus Pangorii*, Roxb. Hort. Beng. (1814) p. 6 ; Fl. Ind. v. 1 (1832) p. 202 ; Grah. Cat. p. 232.

KONKAN : Goa, *Woodrow;* Kalyan, *Woodrow.* SIND : *Pinwill* !—DISTRIB. India (Bengal, Circars, W. Peninsula) ; Persia, Malyan Peninsula, Japan, China, Borneo, Australia.

32. **Cyperus tegetiformis,** *Roxb. Hort. Beng.* (1814) p. 6. Stolons thick, rather long, round, with ovate dark-colored scales ; stems 1½—5 ft. long, trigonous, often triquetrous near the top. Leaves scarcely any ; sheaths many, up to 6 in. long. Umbel compound or decompound ; rays 10—15, up to 5 in. long, slender ; secondary rays about 8, reaching 2¼ in. long, terminated by spikes or corymbs of 4—16 spikelets ; bracts short (rarely ½ the length of the umbel). Spikelets ½—1 in. long, 10—30-flowered, slightly compressed, pale straw-colored ; rhachilla winged. Glumes $\frac{1}{12}$ in. long, elliptic, obtuse or emarginate ; back rounded, 5—9-nerved ; sides pale, marked with yellow or red. Stamens 3 ; anthers muticous, reddish. Nut $\frac{1}{20}$ in. long, oblong, trigonous, black ; style shorter than the nut ; stigmas 3, much longer than the style. Fl. B. I. v. 6, p. 612 ; C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 157 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1140 ; Watt, Dict. Econ. Prod. v. 2, p. 688.

KONKAN : Kalyan, *Woodrow.*—DISTRIB. India (Bengal, Assam, Bandelkand, W. Peninsula) ; China, Japan.

Woodrow gives Kalyan as the habitat of the plant, but I have seen no specimens from the Bombay Presidency ; there are none in Herb. Kew. It is possible that the plant collected by Woodrow may have been *C. corymbosus,* which is scarcely separable from *C. tegetiformis* and which is also reported from Kalyan.

33. **Cyperus corymbosus,** *Rottb. Descrip. et Icon.* (1773) p. 42, t. 7, fig. 4. A tall glabrous rush-like herb ; rhizome creeping, clothed with dark brown scales ; root-fibres stout ; stems 2—3 ft. long, reaching ⅓ in. in diam., spongy, appearing pseudo-septate and somewhat articulate when dry, terete below, obscurely trigonous above. Leaves 0, or a short blade reaching 5 in. long terminating a long loose membranous sheath. Umbel compound, narrow ; rays 6—8, erect or suberect, very unequal, the longest reaching 4 in. long ; secondary rays terminated by spikes or corymbs of 4—8 very slender spikelets ; bracts 3, rarely as long as the umbel, keeled, green ; bracteoles setaceous. Spikelets variable in length, ¼—1 by $\frac{1}{20}$—$\frac{1}{16}$ in., linear, subterete, rusty-brown ; rhachilla slender, winged. Glumes erect, closely appressed to the rhachilla, ⅛ by $\frac{1}{30}$ in., oblong, obtuse, rounded and 3-nerved on the back ; sides pale, nerveless, scarious. Stamens 3 ; anthers $\frac{1}{20}$ in. long, muticous, brownish-yellow. Nut $\frac{1}{16}$ in. long, narrowly obovoid, tapering towards the base, apiculate, trigonous ; style $\frac{1}{30}$ in. long ; stigmas thrice as long or longer. Fl. B. I. v. 6, p. 612 ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 158 ; Trim. Fl. Ceyl. v. 5, p. 29 ; Woodr. in Journ. Bomb. Nat.

v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1141 ; Watt, Dict. Econ. Prod. v. 2, p. 683. *Cyperus diphyllus*, Retz. Obs. fasc. 5 (1789) p. 11 (*not* of Benth.) ; Boeck. in Linnæa, v. 36 (1870) p. 272.

KONKAN : Kalyan, *Woodrow*.—DISTRIB. More or less throughout India; Ceylon, Tropical Africa, America. Used in S. India and Ceylon for mat-making and occasionally in Ceylon grown for that purpose.

34. **Cyperus tegetum,** *Roxb. Fl. Ind.* v. 1 (1832) p. 208. Glabrous ; rhizome woody, stout, horizontal ; root-fibres wiry, clothed with branched hairs ; stems solitary or approximate, 2—4 ft. high, trigonous or triquetrous. Leaves usually short or 0, but sometimes with long leaves 1 ft. or more long, $\frac{1}{8}$—$\frac{3}{8}$ in. broad, linear, acuminate ; sheaths long, lax. Umbel compound or decompound ; rays many, 1—5 in. long ; secondary rays bearing corymbs or spikes, each with 4—10 slender spikelets ; bracts sometimes reaching 15 in. long by $\frac{1}{8}$ in. broad, erecto-patent, with a strong midrib and scaberulous margins which are usually recurved in dried specimens. Spikelets $\frac{3}{8}$—$\frac{3}{4}$ by $\frac{1}{10}$ in., 10—30-flowered, usually reddish-brown ; rhachilla with large ovate acute dark-brown deciduous wings. Glumes $\frac{1}{8}$ by $\frac{1}{10}$ in., narrowly oblong, obtuse, 3—5-nerved on the back, scarcely keeled ; sides red-brown, nerveless, with narrow scarious margins incurved in dried specimens. Stamens 3 ; anthers $\frac{1}{10}$ in. long, yellowish-brown, muticous or minutely crested. Nut $\frac{1}{16}$ in. long, narrowly obovoid-oblong, tapering towards the base, minutely apiculate, trigonous, yellowish-brown ; style $\frac{1}{25}$ in. long ; stigmas 3, longer than the style, capillary, not or scarcely exserted. Fl. B. I. v. 6, p. 613 ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 160 ; Woodr. in Journ. Bomb. Nat v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1141 ; Watt, Dict. Econ. Prod. v. 2, p. 688. *Cyperus dehiscens,* Nees, in Linnæa, v. 9 (1835) p. 286 (*nomen nudum*) ; Kunth, Enum. v. 2 (1837) p. 56 ; Trim. Fl. Ceyl. v. 5, p. 30. *Papyrus dehiscens,* Nees, in Wight, Contrib. (1834) p. 89.—Flowers : Sept.

KONKAN : *Cooke* ! DECCAN : Lanoli, *Garade* ! SIND : *Pinwill* !—DISTRIB. Throughout India; Ceylon, Tropical Africa ; cultivated in Mauritius.

Much employed in Calcutta for the manufacture of mats, which are sometimes imported into Europe.

35. **Cyperus bulbosus,** *Vahl, Enum.* v. 2 (1806) p. 342. Glabrous, stoloniferous ; stolons $\frac{1}{2}$—$2\frac{1}{2}$ in. long, filiform, with bulbils formed close to the ends of the stolons ; bulbils when ripe ovoid, $\frac{3}{8}$ by $\frac{1}{5}$ in., coated with a thick striate black integument which ultimately splits irregularly into lanceolate segments ; stem 4—12 in. long, slender, trigonous, arising from a bulb, clothed at the base with black coriaceous scales. Leaves coming off at some distance from the base, below the middle of the stem and usually longer than it, reaching $\frac{1}{8}$ in. broad, tapering to a fine point at the apex, spreading and recurved ; sheaths very long, membranous. Inflorescence a head of umbels formed of slender alternate spikes each bearing 3—12 spikelets, the lower distant from the upper ; bracts 3, very unequal, filiform, the longest 3—4 in. long. Spikelets $\frac{3}{8}$—$\frac{5}{8}$ by $\frac{1}{12}$—$\frac{1}{10}$ in., compressed, red, 8—24-flowered ; rhachilla with persistent elliptic wings. Glumes $\frac{1}{8}$ in. long, oblong, slightly mucronulate, cymbiform,

membranous, 7—11-nerved ; the sides bright red with hyaline margins in the lower part. Stamens 3 ; anthers $\frac{1}{16}$ in. long, linear, subacute, yellow. Nut $\frac{1}{16}$ in. long, obovoid, obtuse, triquetrous, black. Fl. B. I. v. 6, p. 611 ; Dalz. & Gibs. p. 284 ; Trim. Fl. Ceyl. v. 5, p. 22 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431. *Cyperus jeminicus,* Retz. Obs. fasc. 4 (1786) p. 11 ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 175 (*not* of Rottb.) ; Watt, Dict. Econ. Prod. v. 2, p. 685.—Flowers : Dec.

Sandy shores near the sea, *Dalzell & Gibson.* SIND : Hyderabad, *Woodrow* ; Jemadar ka Landa near Karachi, *Stocks* !—DISTRIB. India (W. Peninsula) ; Beluchistan, Ceylon, Tropical Africa, and Australia.

The bulbs are used as flour in times of scarcity and eaten roasted or boiled. When roasted they have the flavor of potatoes and would be valuable for food, but that they are so small. See Watt, Dict. Econ. Prod. l. c.

36. **Cyperus rotundus,** *Linn. Sp. Pl.* (1753) p. 45. Glabrous ; stolons elongate, slender, 4—8 in. long, bearing hard ovoid tunicate black fragrant tubers $\frac{1}{3}$—1 in. in diam. ; root-fibres clothed with flexuous hairs ; stems subsolitary, 4—30 in. long, triquetrous at the top, sometimes tuberous at the base. Leaves shorter or longer than the stem, narrowly linear, $\frac{1}{8}$—$\frac{1}{3}$ in. broad, finely acuminate, flat, 1-nerved. Umbel simple or compound ; rays 2—8, the longest reaching 3 in. long, bearing short spikes of 3—10 slender spreading red-brown spiklets [the inflorescence sometimes contracted into a head, occasionally (*fide* C. B. Clarke) of only one spikelet] ; bracts 3, variable in length, the longest reaching 6 in. long, but sometimes abbreviated and much shorter than the head. Spikelets variable in length, $\frac{5}{8}$—$1\frac{1}{2}$ by $\frac{1}{16}$ in., linear, subacute, red-brown, 10—50-flowered, compressed ; rhachilla with hyaline wings. Glumes $\frac{1}{8}$—$\frac{1}{3}$ in. long, oblong, obtuse or slightly apiculate ; back reddish-brown, 3—7-nerved ; sides, margins, and tip hyaline. Stamens 3 ; anthers $\frac{1}{16}$ in. long. Nut $\frac{1}{16}$ in. long, broadly obovoid, trigonous, greyish-black ; style $\frac{1}{16}$ in. long ; stigmas 3, elongate, reaching $\frac{1}{8}$ in. long, much exserted. Fl. B. I. v. 6, p. 614 ; Grah. Cat. p. 231 ; Dalz. & Gibs. p. 283 ; Boeck. in Linnæa, v. 36 (1870) p. 283 ; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 167 ; Trim. Fl. Ceyl. v. 5, p. 35 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1141 ; Watt, Dict. Econ. Prod. v. 2, p. 686.—Flowers : Sept.—Nov. VERN. *Moth ; Motha ; Nagar-motha.*

DECCAN : Poona, *Jacquemont,* 382 !, *Bhagvat* ! ; Lanoli, *Woodrow.* SIND : *Bhola Puran,* 25 ! ; Bhubak, *Woodrow.*—DISTRIB. Throughout India ; Ceylon, most hot countries.

A very troublesome weed of cultivation, eradicated with difficulty owing to the stolons becoming woody. The tubers are roasted and pounded, and are used in native medicine and also for giving an aroma to certain fabrics. The fragrant sticks burnt in Hindu houses contain a portion of the powder.

37. **Cyperus tuberosus,** *Rottb. Descrip. et Icon.* (1773) p. 28, t. 7, fig. 1. Perennial ; rhizome creeping, woody ; stolons elongate, not tuberiferous ; root-fibres filiform, covered with branched hairs ; stems 2—4 ft. long, slender, trigonous with tuberous base. Leaves mostly radical, usually shorter than the stem, up to $\frac{1}{8}$ in. broad, with smooth margins. Umbel compound ; primary rays few or many,

slender, spreading, reaching 6 in. long; secondary rays terminating in 4—8 approximate spreading spikelets; bracts 3—4, the longest 1—2 ft. long with smooth margins. Spikelets $\frac{1}{2}$—$\frac{3}{4}$ in. long, reddish-brown, somewhat turgid along the median line, 16—24-flowered; rhachilla slender, with hyaline wings. Glumes suberect, reaching $\frac{1}{6}$ in. long, oblong-lanceolate, apiculate, keeled; the back reddish-brown, 3—5-nerved, the sides hyaline. Stamens 3; anthers narrow, muticous, yellowish-brown. Nut $\frac{1}{16}$ in. long, broadly obovoid, tapering towards the base, umbonate, granulate, trigonous, grey; style reaching $\frac{1}{16}$ in. long; stigmas 3, capillary, $\frac{1}{8}$—$\frac{1}{6}$ in. long. Not distinguishable from *Cyperus rotundus* by any good characters and it might well be united with it. Fl. B. I. v. 6, p. 616; Boeck. in Linnæa, v. 36 (1870) p. 285 (exclud. Cape plants and description of nut); Trim. Fl. Ceyl. v. 5, p. 33; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1141. *Cyperus tenuiflorus*, Roxb. Fl. Ind. v. 1 (1832) p. 199; Dalz. & Gibs. p. 284. *C. rotundus* var. *procerula*, C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 172.

KONKAN: *Law!*; Matheran, *Woodrow*; Thana, *Woodrow*. DECCAN: Poona; *Woodrow*.—DISTRIB. India (C. Bengal, W. Peninsula); Ceylon, Mauritius, Australia.

38. **Cyperus exaltatus**, *Retz. Obs.* fasc. 5 (1789) p. 11. A large glabrous herb; stolons 0; root-fibres stout; stems 3—6 ft. long, obtusely trigonous. Leaves few, longer or shorter than the stem, linear, $\frac{1}{4}$—$\frac{3}{8}$ in. broad, finely acuminate, 1-nerved, multistriate, with more or less scaberulous margins. Umbel compound; rays 5—10, sometimes reaching 6 in. long, spreading, bearing spikes $\frac{3}{4}$—2 in. long of 20—40 rather distant short spikelets; bracts 3—6, leaf-like, the longest up to 2 ft. long. Spikelets $\frac{1}{6}$—$\frac{1}{4}$ by $\frac{1}{16}$ in., ascending, narrowly elliptic-lanceolate, chestnut-brown, much compressed, 8—16-flowered; rhachilla with narrow persistent wings. Glumes $\frac{1}{12}$ in. long, closely imbricate, ovate-oblong, mucronate; back green, obscurely 3-nerved; sides chestnut-brown, not or scarcely nerved, the margins not or sometimes very narrowly scarious. Stamens 3; anthers $\frac{1}{25}$ in. long, yellow, muticous. Nut $\frac{1}{30}$ in. long, ellipsoid, tapering to both ends, trigonous, brown or yellow; style $\frac{1}{20}$ in. long; stigmas 3, rather shorter than the style, capillary, exserted. Fl. B. I. v. 6, p. 617; Boeck. in Linnæa, v. 36 (1870) p. 319; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 186; Trim. Fl. Ceyl. v. 5, p. 32; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1141; Watt, Dict. Econ. Prod. v. 2, p. 684. *Cyperus umbellatus*, Roxb. Fl. Ind. v. 1 (1832) p. 205; Dalz. & Gibs. p. 284.—Flowers: Sept.

KONKAN: Karjat, *Woodrow*. DECCAN: *Dalzell & Gibson*; Lanoli, *Woodrow*. S. M. COUNTRY: Dambal (Dharwar districts), *Dalzell!*—DISTRIB. India (Panjáb, W. Peninsula); Ceylon, Tropical Africa, Indo-China, Australia.

VAR. *dives*, C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 187. Spikelets more turgid, yellow or golden-yellow, shining, horizontally spreading; glumes with scarious margins. Fl. B. I. v. 6, p. 617. *Cyperus dives* (sp.), Delile, Fl. Egypte (1812) p. 149, t. 4, fig. 3.

SIND : *Pinwill* !—DISTRIB. India (Bengal); Africa.

39. **Cyperus digitatus,** *Roxb. Hort. Beng.* (1814) p. 81. Perennial, glabrous ; rhizome stout, woody, creeping ; stolons 0 ; root-fibres stout. Stems 1—4 ft. long, trigonous or triquetrous above, with smooth angles. Leaves longer or shorter than the stem, ½—⅝ in. broad, flat, coriaceous, multistriate, with scaberulous margins. Umbel very large, broad, up to 12 in. in diam., simple or compound ; rays 4—10, trigonous, 2—6 in. long, terminated by stellately spreading sessile or cylindric spikes of unequal length, loosely set all round with innumerable horizontally spreading spikelets ; bracts 3—6, leaf-like, the longest reaching sometimes 1 ft. long or more ; bracteoles very slender ; spikes 1—1½ by ⅜—½ in., sessile or a few pedicellate. Spikelets ⅛—¼ by $\frac{1}{20}$ in., subterete, acute, 12—20-flowered, spreading horizontally yellowish-brown ; rhachilla with lanceolate acute scarious deciduous wings. Glumes $\frac{1}{16}$ by $\frac{1}{40}$ in., with rounded shortly cuspidate tip ; back chestnut-brown, somewhat obscurely 3-nerved ; sides hyaline. Stamens 3 ; anthers linear-oblong, not crested. Nut $\frac{1}{20}$ in. long, ellipsoid, tapering at both ends, straight or slightly curved, trigonous, yellowish ; style $\frac{1}{30}$ in. long ; stigmas 3, slightly longer than the style, capillary. Fl. B. I. v. 6, p. 618 ; Trim. Fl. Ceyl. v. 5, p. 36 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1141. *Cyperus Neesii,* Boeck. in Linnæa, v. 36 (1870) p. 315. *Cyperus auricomus,* C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 188.—Flowers : Sept.

KONKAN : *Law* ! DECCAN : Lanoli, *Woodrow;* Poona, *Woodrow,* 204 ! S. M. COUNTRY : Londa, *Cooke* !—DISTRIB. India (E. Bengal, Assam, Pegu, Moradabad, Sikkim, W. Peninsula); Ceylon, Ethiopia, China, Malaya, Oceania.

40. **Cyperus Clarkei,** *T. Cooke.* Rootstock tuberous ; stolons elongate, $\frac{1}{25}$ in. in diam., clothed with oblong-lanceolate striate pale-brown scales ; stems 3—8 in. long, thick, trigonous, from a bulbous base. Leaves longer or shorter than the stem, ⅛—¼ in. broad, linear, very acute ; lower sheaths much inflated, striate, brown. Umbel simple, with very short rays, or subcapitate ; spikes 5—8, cylindric, dense, pale, ½—¾ by ¼—⅜ in. ; bracts 5—7, leaf-like, the longest reaching 6 in. long. Spikelets ⅛—⅕ in. long, densely packed, spreading nearly at right angles, bearing 1 nut. Nut-bearing glumes ovate, acute, multistriate, straw-colored. Stamens 3, with long filaments. Nut $\frac{1}{12}$—$\frac{1}{10}$ in. long, ellipsoid, trigonous, brown ; style $\frac{1}{25}$ in. long ; stigmas rather shorter than the style. *Mariscus bulbosus,* C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 620 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431. *Kyllinga bulbosa,* Kœnig, in Vahl, Enum. v. 2 (1806) p. 376 (*in note*).—Flowers : Oct.

S. M. COUNTRY : *Woodrow,* 36 ! ; Badami, *Woodrow;* Dharwar, *Woodrow.* KANARA : N. Kanara, *Young* ex *C. B. Clarke.*—DISTRIB. India (W. Peninsula).

As the name *Cyperus bulbosus* is preoccupied by Vahl's plant [Vahl, Enum. v. 2, (1806) p. 342], I have had to find a new name for this, and, as it was first described by Mr. C. B. Clarke, I have adopted the name *C. Clarkei.*

41. **Cyperus konkanensis,** (*nov. sp.*) *T. Cooke.* Rhizome short ; stolons 0 on the only specimen seen ; root-fibres stout ; stems reaching 30 in. long from a thickened base, stout, trigonous, striate,

smooth, about ½ in. in diam. at the base. Leaves 1½—2 ft. long; sheaths reaching 6—10 in. long, striate. Inflorescence reaching 9 in. long. Umbel compound, with 4—6 long rays up to 7 in. long, and some sessile spikes at its base; secondary umbels with 3—4 sessile spikes of many widely spreading spikelets; bracts of primary umbel ½—2 ft. long, up to ½ in. broad, leaf-like; bracts of secondary umbel ½—1 in. long, filiform; bracteoles ⅛—¼ in. long, lanceolate or aristate from a lanceolate base. Spikelets exceeding ¼ in. long, lanceolate, subterete, $\frac{1}{30}$ in. in diam., somewhat distantly placed along the rhachis, shining, straw-colored. Lowest glume $\frac{1}{10}$ in. long, oblong, obtuse, scarious, with parallel nerves. Upper glumes ¼ in. long, twisted, wrapped round the nut, deeply striate to the margins which are not hyaline. Stamens 3; anthers $\frac{1}{16}$ in. long, narrow, pointed, reddish-brown. Nut ⅛ by $\frac{1}{30}$ in., oblong, trigonous, pale-brown; style $\frac{1}{10}$ in. long; stigmas 3, reaching ¼ in. long, much exserted. *Mariscus Sieberianus*, Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 (*not* of Nees). ? *Mariscus umbellatus*, Dalz. & Gibs. p. 285.

KONKAN: Western Ghâts, *Woodrow*, 34!

There is but one sheet from the Bombay Presidency in Herb. Kew. collected by Woodrow, containing 1 specimen only. Mr. Clarke has labelled the specimen *Mariscus Sieberianus* var. *subcomposita* (forma *gigantea*), and in a pencilled note on the sheet remarks? *Sp. nova*. It is a much larger and coarser plant than the var. *subcomposita* alluded to, the spikelets are not closely packed but rather distant, the glumes are distinctly twisted and conspicuously striate up to the non-hyaline margins.

42. **Cyperus paniceus** (*Mariscus*), *Vahl, Enum.* v. 2 (1806) p. 373. VAR. **Roxburghiana,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 6 (1893) p. 621 (under *Mariscus*). Perennial; rootstock small, horizontal, stoloniferous; stolons slender, rigid; stems up to 2 ft. long, trigonous, smooth. Leaves long, narrow, 1-nerved. Umbel simple; rays reaching sometimes 2 in. long; spikes reaching 1 by ¼—⅓ in., cylindric; the rhachis closely clothed with the persistent lower glumes of the spikelets; bracts 5—7, the longest reaching 10 or 11 in. long, leaf-like. Spikelets ⅛—⅓ in. long, consisting of 4 glumes, the 2 lowest empty, scarious, the third fertile, the fourth empty, lanceolate, with a long subulate tip; rhachilla winged above the articulation. Nut-bearing glume ⅓—½ in. long, lanceolate-subulate, convolute, wrapped round the upper glume and nut; back strongly 3-nerved; sides scarcely striate, often dotted with brown spots, and with narrowly hyaline margins. Stamens 3; anthers long, slender. Nut nearly ⅛ in. long, slightly curved, oblong-ellipsoid, attenuated at each end, trigonous, pale-brown; style $\frac{1}{40}$ in. long; stigmas 3, longer than the style, capillary. *Mariscus cyperinus*, Nees, in Wight, Contrib. (1834) p. 90, var. α (*not* Vahl). *Scirpus echinatus*, Linn. Sp. Pl. (1753) p. 50. *Kyllinga umbellata*, Roxb. Icon. ined. t. 191.

KONKAN: *Law*!—DISTRIB. More or less throughout India; Ceylon, Java.

There is but one sheet in Herb. Kew. from the Bombay Presidency ticketed "Konkan, *Law*," containing two specimens (without leaves) which consist each of a piece of the upper portion of a stem less than 3 in. long, carrying spikes and bracts.

43. **Cyperus pennatus,** *Lam. Illust.* v. 1 (1791) p. 144. Perennial; rootstock tuberous, woody, stoloniferous; root-fibres very stout; stem 2—3 ft. by ⅛ in. or more in diam., stout, trigonous, smooth. Leaves longer than the stem, sometimes reaching 4 ft. long by ⅛ in. broad, coriaceous, sometimes septato-punctate, the margins and keel scaberulous. Umbel compound, 4—8 in. in diam., with 4—8 stout rays 1—3 in. long and short secondary rays with spreading cylindric sessile spikes ½—1 in. long, covered with stout horizontally spreading spikelets; bracts 4—6, leaf-like, up to 16 in. long. Spikelets ¼—5/16 in. long, reddish-brown or straw-colored, oblong-lanceolate, acute, subterete, 3—6-flowered; rhachilla with short winged internodes. Glumes closely imbricate, concave, ovate, subobtuse, the nut-bearing ones reaching ⅛ in. long, dorsally rounded, spotted with brown; nerves many, slender, the margins narrowly hyaline. Stamens 3; anthers small, oblong. Nut 1/16 in. long, ellipsoid, trigonous, black when ripe; style 1/20 in. long; stigmas 3, longer than the style. C. B. Clarke, in Journ. Linn. Soc. v. 21, p. 194. *Cyperus canescens*, Boeck. in Linnæa, v. 36 (1870) p. 340. *Mariscus albescens*, Gaud. in Freyc. Voy. Bot. (1826) p. 415; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 623; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1146.—Flowers: Oct.

KONKAN: *Cooke!*; Máhad, *Woodrow*. DECCAN: Lanoli, *Woodrow*.—DISTRIB. India (Bengal, Birma, W. Peninsula); Ceylon, Ethiopia, China, Malaya, Oceania.

Cyperus stuppeus, Forst. Prodr. (1786) p. 89, should perhaps as the older name have precedence

44. **Cyperus dilutus,** *Vahl, Enum.* v. 2 (1806) p. 357. Perennial, glabrous; rootstock short; stem 1—4 ft. long, obtusely trigonous, smooth. Leaves as long as or longer than the stems, up to ½ in. broad, coriaceous or spongy, septato-punctate, the margins and keel scaberulous. Umbel large, decompound; rays many, trigonous, up to 6 in. long, simple or bearing secondary or tertiary umbellules, the ultimate rays terminated by globose heads (contracted spikes) ¾—1 in. in diam., of innumerable narrow stellately spreading spikelets; bracts many, long and broad in large specimens, few and narrow in small one, leaf-like. Spikelets ⅓—½ in. long, slender, terete, red-brown, shining, bearing 4—14 nuts; rhachilla very slender, with internodes about 1/12 in. long, and oblong persistent wings. Glumes reaching ⅛ by 1/16 in., loosely imbricate, faintly nerved, straight, oblong or oblong-lanceolate, obtuse, dorsally rounded, the margins not hyaline. Stamens 3; anthers 1/20 in. long, reddish-brown, muticous. Nut (not including beak) reaching 1/12 in. long, oblanceolate-oblong, narrow, acutely trigonous, stipitate, distinctly beaked; style shorter than the nut; stigmas 3, exserted. Boeck. in Linnæa, v. 36 (1870) p. 354; C. B. Clarke, in Journ. Linn. Soc. v. 21 (1884) p. 193. *Cyperus spinulosus,* Roxb. Fl. Ind. v. 1 (1832) p. 203. *Mariscus microcephalus,* Presl, Rel. Haenk. (1830) p. 182; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 624.

SIND: *Pinwill!*—DISTRIB. More or less throughout India; Ceylon, Mauritius, China, Malaya.

Excluded Species.

CYPERUS GLABER, Linn. Mantiss. (1771) p. 179. Spikelets tinged with red; glumes muticous or nearly so; nut obovoid, obtuse, minutely conic-apiculate (otherwise as *C. compressus*). C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 606.

There is no specimen of *C. glaber* in the Indian bundles in Herb. Kew.

CYPERUS ESCULENTUS, Linn. Sp. Pl. (1753) p. 45. Stolons long, slender, bearing tubes; spikelets yellow or brownish; glumes plicate-striate over nearly their whole breadth. C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 616; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431.

There is in Herb. Kew. a solitary specimen from *Jacquemont* (No. 277) which, according to the ticket on it, was collected between Ellora and Poona. As Ellora is in the Nizam's dominions, and at least 120 miles from Poona, and as no precise locality has been given, the existence of the plant in the Bombay Presidency is extremely doubtful, especially as no Bombay botanists have apparently met with it.

2. KYLLINGA, Rottb.

Perennial herbs tufted or with a creeping rhizome; stem trigonous, leafy below only, terminated by 1—3 sessile capitate spikes. Leaves narrow. Spikelets minute, green, strongly laterally compressed, 1—2-flowered, densely packed on short sessile oblong or globose involucrate spikes; rhachis short, naked after the fall of the spikelets, or squarrosely covered with the more or less persistent lowest glumes; rhachilla very minute, disarticulating above the two lowest glumes. Glumes 4, distichous, the two lowest hyaline, empty, much shorter than the third and fourth, the third and fourth much the largest, often green and speckled with brown, subequal or the upper longest, unequal-sided, keeled; keel sometimes winged, apiculate or cuspidate. Stamens 1—3; anthers long or short. Ovary suborbicular; style long or short, not swollen at the base; stigmas 2, linear. Fruit a strongly laterally compressed smooth nut, sometimes apiculate by the persistent style-base.—Distrib. All hot and temperate regions except Europe; species 33.

Nut-bearing glume winged in upper half of keel; rhizome creeping, elongate	1. *K. monocephala*
Nut-bearing glume not winged in upper half of keel; rhizome very short	2. *K. triceps.*

1. **Kyllinga monocephala,** *Rottb. Descrip. et Icon.* (1773) p. 13, t. 4, fig. 4. Glabrous or nearly so; rhizome creeping, elongate; stems 3—12 in. high, usually solitary, erect. Leaves shorter than the stem, $\frac{1}{16}$—$\frac{1}{8}$ in. broad, linear, acute with a strong midnerve. Spikes solitary (rarely 2—3), the lateral when present very small, the middle spike $\frac{1}{4}$—$\frac{1}{3}$ in. in diam.; rhachis naked or pitted after the fall of the spikelets, the lowest glumes mostly deciduous; floral bracts 3—4, very long and narrow, similar to the leaves. Spikelets $\frac{1}{16}$ in. long, 1-flowered. Two outer glumes hyaline, the lowest glume narrowly ovate-lanceolate, $\frac{1}{16}$ in. long, the second glume broadly ovate, obtuse; glumes 3 and 4 green, often sparsely speckled with brown, falcately incurved, acuminate, the upper slightly the longer, but no. 3 the broader, the keel dorsally winged about the middle, the wings spinulose, sometimes obscurely developed. Anthers small. Nut obovoid

or oblong, compressed, rather more than half as long as the glume, pale reddish-brown ; style rather more than $\frac{1}{20}$ in. long ; stigmas 2, filiform, as long as the style. Fl. B. I. v. 6, p. 588 ; Grah. Cat. p. 232 ; Dalz. & Gibs. p. 285 ; Trim. Fl. Ceyl. v. 5, p. 44 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430 ; Prain, Beng. Pl. p. 1135.

S. M. COUNTRY : Londa, *Cooke* !—DISTRIB. Throughout India ; Ceylon, hot and warm temperate regions of the Old World except the Mediterranean.

2. **Kyllinga triceps,** *Rottb. Descrip. et Icon.* (1773) p. 14, t. 4, fig. 6. Glabrous ; rhizome very short or 0 ; stems 2—9 in. long, tufted. Leaves as long as (rarely longer) but usually shorter than the stem, $\frac{1}{12}$—$\frac{1}{6}$ in. broad, linear, acute. Spikes ovoid-oblong or subcylindric, usually 3 together (rarely solitary), the middle one the largest, $\frac{1}{8}$—$\frac{1}{4}$ in. in diam. ; rhachis clothed, after the fall of the spikelets, with the persistent lower glumes ; bracts beneath the head 3—4, leaf-like, up to 3 in. long. Two lower glumes hyaline, the lowest lanceolate, acuminate, $\frac{1}{20}$ in. long, the second lanceolate or suborbicular, the third and fourth herbaceous, membranous, green not speckled with brown, ovate-lanceolate, obtusely apiculate, strongly nerved, the uppermost (fourth) rather the longest, $\frac{1}{12}$—$\frac{1}{10}$ in. long. Stamens 2. Nut oblong or ellipsoid-oblong, yellowish-brown, much compressed, $\frac{1}{16}$ in. long ; style with 2 filiform stigmas, together nearly as long as the nut. Fl. B. I. v. 6, p. 587 ; Grah. Cat. p. 232 ; Wight, Contrib. p. 91 ; Trim. Fl. Ceyl. v. 5, p. 45 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 430.—Flowers : Sept.

DECCAN : Poona, *Jacquemont*, 345 !, *Woodrow*. SIND : *Pinwill* !—DISTRIB. India (N.-West, Sind, Bengal, Birma) ; Ceylon, Africa, China, Australia.

3. COURTOISIA, Nees.

Herbs with erect simple stems, leafy only near the base. Leaves grass-like. Spikelets compressed, in globose spikes ; rhachilla disarticulating above the two lowest glumes. Glumes persistent, I and II empty ; 1—3 above them hermaphrodite, nut-bearing, winged on the keel ; uppermost sterile or empty. Stamens 3 ; anthers oblong. Ovary ovoid ; style short, persistent ; stigmas 3, linear, longer than the style. Fruit a trigonous nut with acute apex, continuous with the style.—DISTRIB. India, Africa, Madagascar ; species 2.

1. **Courtoisia cyperoides,** *Nees, in Linnæa*, v. 9 (1835) p. 286. Annual, glabrous, whole plant of a yellowish hue ; root fibrous ; stems 3—16 in. long, cæspitose, slender, trigonous, striate, leafy towards the base. Leaves usually longer than the stems, linear, acute, $\frac{1}{10}$—$\frac{1}{5}$ in. broad. Umbel simple or compound, with 3—10 rays 1—3 in. long ; secondary rays 3—5 up to 1 in. long, bearing dense globose yellowish-brown spikes composed of many short spikelets ; bracts 3—7, leaf-like, 4—15 in. long ; secondary bracts often $\frac{3}{4}$ in. long. Spikelets $\frac{1}{6}$ in. long, many, in globose heads $\frac{1}{4}$—$\frac{1}{2}$ in. in diam. Glumes boat-shaped, flattened, the fertile ones slightly mucronate, the keel with a continuous glistening wing along its whole length ; sides not striate. Stamens 3 ; anthers oblong. Nut rather more than $\frac{1}{8}$ in. long, narrow, trigonous, fusiform, tapering at both ends, almost beaked, chestnut-brown, granulate ; style short, continuous with the

nut ; stigmas 3, filiform. Fl. B. I. v. 6, p. 625 ; Dalz. & Gibs. p. 285 ; Boeck. in Linnæa, v. 35 (1868) p. 434 ; Benth. in Hook. Icon. Pl. (1880) t. 1341 ; Nees, in Wight, Contrib. (1834) p. 92 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1147. *Kyllinga cyperoides*, Roxb. Fl. Ind. v. 1 (1832) p. 182 ; Grah. Cat. p. 232.

KONKAN : *Law* !

There is but one specimen in Herb. Kew. marked as above, and while Woodrow retains the plant in his list he does not indicate any locality where it is to be found.—DISTRIB. India (Sikkim, Assam, Bengal, Pegu, W. Peninsula) ; Tropical Africa, Madagascar.

4. **FIMBRISTYLIS,** Vahl.

Annual or perennial herbs ; roots fibrous or woody ; stolons 0 ; stems tufted. Leaves near the base of the stem, rarely reduced to sheaths, narrowly linear or filiform. Spikelets terete, angular or compressed, many-flowered, in a terminal umbellate or capitate inflorescence. Glumes imbricate spirally round the rhachilla, or the lower glumes distichous, glabrous (very rarely pubescent), deciduous, the lower 1—3 and sometimes the upper empty, the others 2-sexual ; hypogynous bristles 0. Stamens 1—3 ; filaments flat ; anthers linear, obtuse or acute, or subulately tipped. Ovary obovoid, somewhat flattened or trigonous ; style long, base more or less dilated, flattened or slender, glabrous, pubescent or villous, wholly deciduous ; stigmas 2 in the flattened, 3 in the trigonous ovaries, usually filiform and elongate. Fruit an obovoid biconvex or trigonous (very rarely cylindric) nut.—DISTRIB. Nearly all hot and warm regions, especially plentiful in S.E. Asia and N.E. Australia ; species 125.

Stigmas 2.
- Spikelets solitary, terminating the stem (rarely 2 or 3 in *polythricioides*).
  - Leaves 0 or very short (see also *F. ferruginea*) ; nut subcylindric, curved ..... 1. *F. tetragona.*
  - Leaves like the stem; nut turbinate.
    - Nut sessile, yellow dotted with white spots... 2. *F. polythricioides.*
    - Nut stipitate, snow-white with a brown patch on each face ..... 3. *F. schœnoides.*
- Spikelets umbellate or capitate.
  - Annuals (*F. diphylla* sometimes perennial).
    - Spikelets umbellate.
      - Nut with 6—9 broad trabeculate ribs; stamens 1—3 ..... 4. *F. dicholoma.*
      - Nut smooth; stamen 1 ..... 5. *F. æstivalis.*
    - Spikelets capitate ..... 6. *F. argentea.*
  - Perennials (*F. diphylla* sometimes annual).
    - Leaves 0 or very short; stamens 2—3 ..... 7. *F. ferruginea.*
    - Leaves many.
      - Glumes mucronate; stamens 1—3 ..... 8. *F. diphylla.*
      - Glumes with obtuse hyaline tips; stamens usually 2 ..... 9. *F. spathacea.*

Stigmas 3.
- Spikelets terete or polygonal, none of the glumes distichous.
  - Stems 6—24 in. long.
    - Style hairy; glumes acute, mucronate; rhachilla winged ..... 10. *F. quinquangularis.*

Style glabrous; glumes obtuse, not mucronate; rhachilla not winged ..... 11. *F. miliacea.*
Stems less than 6 in. long.
Inflorescence in a terminal head; stamens 3; nut globosely obovoid; style $\frac{1}{10}$ in. long..... 12. *F. digitata.*
Inflorescence umbellate; stamen 1; nut narrowly obovoid; style $\frac{1}{25}$ in. long ..... 13. *F. Woodrowii.*
Spikelets compressed or trigonous; all or the lower glumes only distichous; bracts short in all.
Spikelet 1 (rarely 2) ..... 14. *F. monostachya.*
Spikelets many, umbellate.
Leaves filiform ..... 15. *F. monticola.*
Leaves flat.
Style glabrous ..... 16. *F. complanata.*
Style pubescent ..... 17. *F. junciformis.*

1. **Fimbristylis tetragona,** *R. Br. Prodr.* (1810) p. 226. Perennial, glabrous; root-fibres stout; stems 6—24 in. long, tufted, slender, quadrangular, ribbed. Leaves 0, or the upper sheaths with an erect lanceolate acuminate limb; sheaths usually brown. Spikelet solitary, $\frac{1}{4}$—$\frac{3}{8}$ in. long, erect, ovoid-conic, terete, obtuse; lowest glume sometimes hardly bractiform, at others $\frac{1}{2}$ as long as the spikelet, coriaceous, deciduous; rhachilla thickly studded with deep tetragonal pits with raised edges. Glumes closely imbricate, $\frac{1}{8}$—$\frac{1}{6}$ in. long, broadly oblong or obovate-oblong, rounded at the apex, concave, embracing the nut, scarious, with a broad coriaceous central band. Stamens 2; filaments flattened, dark-brown (nearly black); anthers narrowly linear, muticous. Nut $\frac{1}{12}$ in. long (not including the style-base or the stalk), linear-oblong or subcylindric, narrow, tapering towards the base, slightly curved, with a long slender stalk, trabeculate with slender parallel ribs and minute cross bars, pale straw-colored (nearly white), deciduous with the glume; style villous, flattened, as long as the nut, with a large subpersistent conical compressed base; stigmas 2, short. Fl. B. I. v. 6, p. 631; Trim. Fl. Ceyl. v. 5, p. 48; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1150. *Fimbristylis cylindrocarpa,* Boeck. in Linnæa, v. 37 (1871) p. 7.—Flowers: Oct.

Dalzell without locality in Herb. Kew.! KONKAN: *Stocks*!; Salsette, *Jacquemont,* 747! KANARA: *Law*! DECCAN: Hirdosi, *Woodrow*; Máwal (Poona districts), *Woodrow.*—DISTRIB. Throughout India (except the North-West); Ceylon, E. Asia, Australia.

2. **Fimbristylis polythricioides** (*Scirpus*), *Vahl, Enum.* v. 2 (1806) p. 248. Perennial, glabrous; root-fibres filiform; stems 2—10 in. long, filiform, leafy at the base, trigonous, striate. Leaves $\frac{1}{2}$ as long as the stem or longer, slender, wiry, acute, terete or trigonous, striate; sheaths glabrous or puberulous. Spikelet solitary, $\frac{1}{4}$ in. long, erect, oblong-ellipsoid, many-flowered; rhachilla stout, terete, deeply pitted. Glumes $\frac{1}{8}$ in. long, linear-oblong, cymbiform, subobtuse or acute, minutely apiculate, membranous, with a narrow central band, pale straw-colored or almost white. Stamens 1—3; filaments flattened, membranous, white. Nut $\frac{1}{16}$ in. long, turbinate, sessile, much compressed, subtruncate at the apex, biconvex, with acute margins, yellow, dotted with white spots; style $\frac{1}{20}$ in. long, slightly hairy, scarcely dilated at the base, deciduous; stigmas 2, as long as the

style. Fl. B. I. v. 6, p. 632 ; Trim. Fl. Ceyl. v. 5, p. 49 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1150. *Fimbristylis juncea,* Boeck. in Linnæa, v. 37 (1871) p. 4 (*not* of Rœm. & Schult.).—Flowers : Sept.—Oct.

KONKAN : Sion (Bombay), *Woodrow* !—DISTRIB. India (Bengal, Sundribans, W. Peninsula) ; Ceylon, Malacca.

3. **Fimbristylis schœnoides,** *Vahl, Enum.* v. 2 (1806) p. 286. A glaucous herb ; rhizome 0, or rarely horizontal and very short ; root-fibres slender ; stems 4—18 in. long, tufted, slender (almost filiform), obtusely angled, striate. Leaves usually shorter but hardly broader than the stem, $\frac{1}{20}$ in. broad or less, narrowly linear, very acute, coriaceous, striate above, dotted beneath, with recurved spinulose margins ; sheaths glabrous with membranous margins. Spikelets $\frac{1}{4}$—$\frac{1}{2}$ in. long, solitary or 2—5 in an irregular umbel, sessile or on slender pedicels ; bracts 2, very variable, usually shorter than the spikelets [in one specimen from Khadkala (Deccan) collected by Woodrow there are 2 leaf-like bracts below the umbel which one of them exceeds] ; rhachilla slender. Glumes deciduous, loosely imbricate, $\frac{1}{8}$—$\frac{1}{6}$ in. long and about as broad as long, orbicular, obtuse, shortly apiculate, very concave, membranous, with 5—7 slender central nerves, straw-colored or pale brown. Stamens 3 ; anthers acute. Nut $\frac{1}{16}$—$\frac{1}{12}$ in. long, turbinate, compressed, biconvex, rounded at the apex, smooth, shortly stipitate, snow-white with a brown patch in the centre of each face ; style $\frac{1}{16}$ in. long, the upper half villous, the base enlarged, cylindric or subglobose ; stigmas 2, short. Fl. B. I. v. 6, p. 634 ; Boeck. in Linnæa, v. 37 (1871) p. 5 ; Trim. Fl. Ceyl. v. 5, p. 49 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1150.—Flowers : Sept.

KONKAN : *Woodrow.* DECCAN : Khadkala near Lanoli, *Woodrow* ! SIND : *Pinwill* !—DISTRIB. Throughout India ; Ceylon, China, Malaya, Australia.

4. **Fimbristylis dichotoma,** *Vahl, Enum.* v. 2 (1806) p. 287. Annual ; root-fibres slender ; stems 2—10 in. long, tufted, filiform, striate, smooth. Leaves usually shorter than the stems, very narrow, $\frac{1}{80}$ in. broad, tapering to a fine point, smooth ; sheaths softly villous. Umbel laxly compound or decompound, 1—2 in. in diam. ; rays few or many, up to 1 in. long, suberect ; bracts filiform, shorter or longer than the umbels. Spikelets $\frac{1}{6}$—$\frac{1}{4}$ by $\frac{1}{16}$—$\frac{1}{12}$ in., somewhat angular from the acute keels to the glumes, ellipsoid, many-flowered ; rhachilla stout, angular, with large pits. Glumes loosely imbricate, all, or all but the lowest fertile, $\frac{1}{16}$ by $\frac{1}{30}$ in., ovate, reddish-brown, 1—3-nerved on the back, the midnerve forming a conspicuous acute green keel which is prolonged into a cuspidate point. Stamens 1—3 ; anthers small, obtuse. Nut $\frac{1}{40}$—$\frac{1}{30}$ in. long, broadly turbinate, minutely stipitate, umbonate, compressed, biconvex, with 6—9 broad trabeculate ribs, pale straw-colored or almost white ; style $\frac{1}{20}$ in. long, densely villous in the upper part, or sometimes all over, with a small globose bulbous base ; stigmas 2, recurved. Fl. B. I. v. 6, p. 635 ; Boeck. in Linnæa, v. 37 (1871) p. 12 ; Trim. Fl. Ceyl. v. 5, p. 50 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1151.—Flowers : Oct.—Apr.

KONKAN : *Dalzell, Lambert*!, *Stocks*! DECCAN : Khandala, *Woodrow*. GUJARAT : Bodeli, *Woodrow*. SIND : *Stocks*, 1204!—DISTRIB. Throughout India especially in rice-fields; Ceylon, warm regions of the Old World.

5. **Fimbristylis æstivalis,** *Vahl, Enum.* v. 2 (1806) p. 288. An annual glaucous herb, more or less slightly pubescent ; roots fibrous ; stems 2—8 in. long, erect, trigonous, filiform, striate. Leaves shorter than the stem, very narrow, acute. Umbel compound or subdecompound, lax, with many slender erect rays ; bracts 3—5, the longest usually much exceeding the umbel, narrowly linear, acute, leaf-like, pubescent. Spikelets $\frac{1}{8}$—$\frac{1}{6}$ by $\frac{1}{12}$—$\frac{1}{10}$ in., elliptic-oblong, brown, the two lowest glumes empty, bract-like, $\frac{1}{10}$ in. long, longer than the others, with a hispid keel which is produced into a long recurved mucro, and usually with hyaline margins ; rhachilla prominently scarred. Glumes (fertile) $\frac{1}{16}$ in. long, oblong, puberulous, suberect ; back strongly keeled, the keel produced into a stout mucro about $\frac{1}{40}$ in. long, which is often pubescent ; sides streaked with reddish-brown, the margins not hyaline. Stamen 1. Nut scarcely $\frac{1}{80}$ in. long, orbicularly obovoid, much compressed, biconvex, with an acute margin, narrowed to the base, straw-colored, smooth, slightly umbonate ; style about $\frac{1}{40}$ in. long, slightly pubescent, with a bulbous base ; stigmas 2, recurved, nearly as long as the style. Fl. B. I. v. 6, p. 637 ; Boeck. in Linnæa, v. 37 (1871) p. 11 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1151.—Flowers : Sept.—Dec.

KONKAN : Matheran, *H. M. Birdwood, Woodrow*. DECCAN : Máwal (Poona districts), *Woodrow*; Kanara, *Law*!—DISTRIB. More or less throughout India, S. and E. Asia, Australia. Sir Joseph Hooker (Trim. Fl. Ceyl. v. 5, p. 51) considers the Ceylon plant a distinct species and not conspecific with Vahl's plant, which latter he says has not hitherto been found in Ceylon.

6. **Fimbristylis argentea,** *Vahl, Enum.* v. 2 (1806) p. 294. A densely tufted glaucous glabrous annual ; root-fibres filiform ; stems many, 4—8 in. long, filiform, trigonous, striate. Leaves shorter and often more slender than the stem, flexuous, smooth, canaliculate, acute ; sheaths short, glabrous. Spikelets $\frac{1}{8}$—$\frac{3}{8}$ in. long, 3—20, sessile, forming a terminal globose head, cylindric-oblong, terete, obtuse, many-flowered ; bracts 3—4, much longer than the head, reaching 3 in. long. Glumes $\frac{1}{16}$ in. long, closely imbricate, ovate, obtuse, not cuspidate ; back with a strong green keel, obscurely 3-nerved ; sides brown, with hyaline margins. Stamen 1. Nut $\frac{1}{80}$ in. long, orbicularly obovoid, compressed, biconvex, shortly stipitate, with narrow acute margins, straw-colored, quite smooth, umbonate ; style $\frac{1}{80}$ in. long, minutely hairy in the upper part, with a bulbous base ; stigmas 2, shorter than the style. Fl. B. I. v. 6, p. 640 ; Dalz. & Gibs. p. 287 ; Boeck. in Linnæa, v. 37 (1871) p. 8 ; Prain, Beng. Pl. p. 1151. *Scirpus argenteus*, Rottb. Descrip. et Icon. (1773) p. 51, t. 17, fig. 6 ; Grah. Cat. p. 232.

This is given for the Bombay Presidency on the authority of Dalzell & Gibson (Bo. Fl. l. c.), who assign no locality to the plant. Woodrow does not include it in his list of plants and there are no specimens from the Bombay Presidency in Herb. Kew. The plant seems to be tolerably common in Madras. —DISTRIB. India (Bengal, W. Peninsula); Ceylon, Mauritius.

7. **Fimbristylis ferruginea,** *Vahl, Enum.* v. 2 (1806) p. 291. ? Perennial ; rhizome 0 or scarcely any ; root-fibres stout and slender ; stem 1—2½ ft. long, subtrigonous. Leaves 0 or few, short, very narrow, glabrous or hairy ; sheaths pubescent, thin. Umbels simple or subcompound, of few spikelets ; bracts shorter than the umbel, striate, slender. Spikelets ⅜ by ⅛ in., ellipsoid, pale reddish-brown, pubescent, the lowest spikelets usually bractiform, variable, ⅛—¼ in. long, cuspidate, the mucro varying from 1/20 to ⅛ in. long, pubescent ; rhachilla stout, angular, with large pits. Glumes ⅛ by 1/10 in., erect or slightly recurved, broadly ovate, subacute, concave, shortly mucronate, chartaceous ; the back with a green keel but with no conspicuous nerves. Stamens 2—3. Nut 1/16 in. long, obovoid or suborbicular, narrowly margined all round, compressed, umbonate, with a long stipe, pale straw-colored, not ribbed, obscurely reticulate, smooth ; style 1/10 in. long, flattened, slightly dilated at the base, the margins of the upper part villous ; stigmas 2, short. Fl. B. I. v. 6, p. 638 ; Dalz. & Gibs. p. 287 ; Boeck. in Linnæa, v. 37 (1871) p. 16 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1151.—Flowers : Sept.—Dec.

DECCAN : Poona, *Cooke* !, *Woodrow* ! SIND : *Pinwill* !—DISTRIB. Throughout India ; Ceylon, China, Japan, Malaya, Australia, Polynesia.

8. **Fimbristylis diphylla,** *Vahl, Enum.* v. 2 (1806) p. 289. Rhizome 0 or rarely up to 1 in. long, stout ; root-fibres rather stout ; stolons 0 ; stems 6—24 in. long, tufted, slender, angled, striate, smooth. Leaves usually shorter than the stem, 1/12—⅛ in. broad, linear, coriaceous, rather rigid, often serrulate towards the acute tip, striate above, obscurely 2-nerved beneath, and with scaberulous margins ; sheaths glabrous or pubescent, rather short. Umbel simple or compound (or spikelets in a compact head) ; rays few, very unequal, up to 2 in. long ; bracts filiform, long or short. Spikelets scattered or clustered, ⅛—⅜ in. long, ovoid, acute, terete, the lowest 1—3 glumes empty, smaller than the others, deciduous (rarely elongate and bract-like) ; rhachilla stout, pitted. Glumes ⅛ by 1/10 in., broadly ovate, acute, apiculate, concave, chartaceous, loosely imbricate ; keel obtuse, green, 3-nerved, the midrib reaching the tip ; sides chestnut-brown. Stamens 1—3 ; anthers long with a conical tip. Nut 1/20 in. long, broadly or orbicularly ovoid, compressed, biconvex, shortly stipitate, many-ribbed, trabeculate, umbonate, pale straw-colored or nearly white ; style 1/16 in. long, very broad, villous throughout, base dilated, truncate ; stigmas 2, short. Fl. B. I. v. 6, p. 636 ; Trim. Fl. Ceyl. v. 5, p. 53 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1151. *Fimbristylis polymorpha,* Boeck. in Linnæa, v. 37 (1871) p. 14.—Flowers : Aug.

KONKAN : *Stocks* !, *Woodrow*. KONKAN : *Talbot,* 601, ex *C. B. Clarke,* in Journ. Linn. Soc. v. 34, p. 58. SIND : *Pinwill* !—DISTRIB. Throughout India ; Ceylon, most warm regions.

9. **Fimbristylis spathacea,** *Roth, Nov. Pl. Sp.* (1821) p. 24. Rhizome short or elongate, stout, woody ; root-fibres both stout and slender ; stems densely leafly below, ½—1½ ft. long, stout, obtusely trigonous, striate. Leaves many, densely crowded on the rootstock,

much shorter than the stem, spreading and recurved, narrowly linear, obtuse or acute, up to $\frac{1}{16}$ in. broad, rigidly coriaceous, with recurved scaberulous margins ; sheaths short, open, coriaceous. Umbel simple or compound, open or with the spikelets more or less crowded, sometimes into a globose head, but almost always pedicellate ; bracts short, rigid, erect, leaf-like, with broadly dilated base which often has membranous margins. Spikelets $\frac{1}{8}$—$\frac{1}{5}$ by $\frac{1}{16}$ in., ellipsoid or ovoid, pale brown, subterete ; rhachilla stout, deeply pitted. Glumes rather laxly imbricate, $\frac{1}{16}$ in. long, broadly ovate, concave, obtuse, altogether hyaline except a narrow reddish-brown band at the back, obscurely 3—5-nerved, the keel conspicuous. Stamens usually 2. Nut about $\frac{1}{30}$ in. long, very shortly stipitate, turbinate, compressed, biconvex, rounded at the apex, tapering at the base, at first yellow, afterwards black, microscopically rugose ; style about $\frac{1}{30}$ in. long, glabrous ; stigmas 2, longer than the style. Fl. B. I. v. 6, p. 640 ; Trim. Fl. Ceyl. v. 5, p. 54 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1151. *Fimbristylis glomerata*, Nees, in Linnæa, v. 9 (1835) p. 290 ; Boeck. in Linnæa, v. 37 (1871) p. 47. *F. Wightiana*, Nees, in Wight, Contrib. (1834) p. 99.—Flowers : Dec.

SIND : *Pinwill* ! ; Karachi, *Woodrow*.—DISTRIB. India (Orissa, W. Peninsula) ; Ceylon, Æthiopia, Arabia, China, Malaya.

10. **Fimbristylis quinquangularis,** *Kunth, Enum.* v. 2 (1837) p. 229. Annual, glabrous, leafy ; root-fibres slender ; stems tufted, 6—24 in. long, slender, weak, obtusely angled, deeply striate. Leaves longer or shorter than the stem, very slender, $\frac{1}{16}$ in. broad, linear, finely acuminate, flaccid, with scaberulous margins and keel ; sheaths long, subdistichous, green, coriaceous. Umbel decompound, with many suberect filiform much-branched rays bearing innumerable small pedicellate spikelets (the whole inflorescence appearing like one oblong panicle) ; bracts filiform, acute, usually shorter than the umbel. Spikelets $\frac{1}{8}$ by $\frac{1}{16}$ in., ellipsoid or ovoid, terete, pale brown, 6—14-flowered ; rhachilla winged. Glumes rather laxly imbricate, $\frac{1}{16}$ in. long, broadly ovate, acute, mucronate by the excurrent keel ; back 3-nerved ; sides hyaline. Stamens 3 ; anthers obtuse. Nut shortly stipitate, $\frac{1}{40}$ in. long, obovoid, obtusely trigonous, yellow or pale-brown, tuberculate, transversely lineolate, slightly umbonate ; style as long as the nut, more or less pubescent, the base not or scarcely dilated ; stigmas 3, recurved, longer than the style. Fl. B. I. v. 6, p. 644 ; Dalz. & Gibs. p. 287 ; Boeck. in Linnæa, v. 37 (1871) p. 42 ; Trim. Fl. Ceyl. v. 5, p. 55 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1152.—Flowers : Sept.

KONKAN : *Law* ! GUJARAT : Baroda, *Woodrow*.—DISTRIB. More or less throughout India ; Ceylon, Malaya, China, Australia.

11. **Fimbristylis miliacea,** *Vahl, Enum.* v. 2 (1806) p. 287. A glabrous leafy annual ; root-fibres slender ; stems 6—24 in. long, slender, obtusely angled below, triquetrous above. Leaves shorter than the stem, slender, $\frac{1}{16}$ in. broad or less, tapering to a firm point and with nearly smooth margins ; sheaths subdistichous, striate with scarious margins. Umbel decompound ; rays unequal, suberect or

spreading, filiform, bearing many scattered very small pedicellate spikelets; bracts filiform, shorter than the umbels. Spikelets $\frac{1}{10}$—$\frac{1}{8}$ in. long, subglobose or subcylindric, obtuse, brown; rhachilla stout, pitted, not winged. Glumes $\frac{1}{20}$ in. long, closely imbricate, ovate, obtuse, cymbiform, membranous, obscurely nerved; keel not excurrent into a mucro. Stamens 1—3; anthers obtuse. Nut $\frac{1}{40}$ in. long, obovoid, obtusely trigonous, minutely stipitate, tuberculate, transversely striolate, yellow; style as long as the nut, glabrous; stigmas 3, about as long as the style. Fl. B. I. v. 6, p. 644; Dalz. & Gibs. p. 287; Boeck. in Linnæa, v. 37 (1871) p. 43; Trim. Fl. Ceyl. v. 5, p. 56; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1152. *Scirpus tetragonus,* Poir, Encyc. Méthod. v. 6 (1804) p. 767; Grah. Cat. p. 233. Closely allied to *F. quinquangularis,* but the spikelets are more obtuse, the glumes not mucronate, the rhachilla not winged, and the style glabrous.

KONKAN: *Lambert*!; Kalyan, *Woodrow*. SIND: *Pinwill* ex *C. B. Clarke*. —DISTRIB. More or less throughout India; Ceylon, most warm regions.

12. **Fimbristylis digitata,** *Boeck. in Flora,* v. 61 (1878) p. 35. A low glabrous plant; root-fibres slender; stems 2—5 in. long, cæspitose from a bulbous base, slender, subquadrangular, striate; sheaths short, striate, with obliquely truncate mouth. Leaves radical, few, about $\frac{1}{2}$ as long as the stem, bristle-like, linear, acute. Inflorescence in a terminal head, $\frac{1}{8}$—$\frac{1}{2}$ in. in diam., consisting of 3—5 umbellately arranged sessile spikelets; bracts usually 2, subequal, membranous, $\frac{1}{8}$—$\frac{1}{6}$ in. long, ovate, acute, striate. Spikelets $\frac{1}{8}$—$\frac{1}{2}$ by $\frac{1}{12}$—$\frac{1}{8}$ in., erect, closely approximate, ovoid-oblong, subacute, straw-colored, subterete. Glumes $\frac{1}{10}$—$\frac{1}{8}$ in. long, ovate, cymbiform, the keel produced into a short mucro, all scarious except the 3—5-nerved back; rhachilla winged. Stamens 3; filaments reaching $\frac{1}{8}$ in. long; anthers large, $\frac{1}{30}$ in. long, very shortly pyramidally pointed, yellow. Nut $\frac{1}{30}$ in. long, globosely obovoid, trigonous, with rather acute angles, scarcely stipitate, not umbonate, faintly ribbed and trabeculate between the ribs, yellow; style exceptionally long, reaching $\frac{1}{10}$ in., glabrous, with a small conical base; stigmas 3, shorter than the style, exserted. Fl. B. I. v. 6, p. 648; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432. *Trichelostylis digitata,* Dalz. ex Boeck. in Flora, v. 61 (1878) p. 35.—Flowers: Oct.

KONKAN: *Dalzell*!, *Stocks*, *Law*!; Marmagão, *Talbot*, 2506! DECCAN: Lanoli, *Woodrow*. S. M. COUNTRY: Badami, *Woodrow*, 56! KANARA: *Law*!; Belekerri (N. Kanara), *Talbot*, 491!—DISTRIB. India (W. Peninsula).

13. **Fimbristylis Woodrowii,** *C. B. Clarke, in Journ. Linn. Soc.* v. 34 (1898) p. 68. A low glabrous slender herb; roots fibrous; stems 1½—4½ in. long, cæspitose, 5-angled below the umbel. Leaves usually shorter than but occasionally as long as the stem, $\frac{1}{20}$—$\frac{1}{16}$ in. broad, acute, flat. Umbel subcompound, $\frac{1}{4}$—$\frac{5}{8}$ in. in diam., with 8—18 short rays; bracts 2—3, the longest leaf-like, exceeding the umbel. Spikelets varying in length, often geminate, $\frac{1}{8}$—$\frac{1}{2}$ in. long; rhachilla deeply pitted. Glumes ovate, boat-shaped, spirally arranged, closely imbricate, $\frac{1}{16}$—$\frac{1}{12}$ in. long, rusty-brown, with a green keel which is produced into a mucro. Stamen 1. Nut $\frac{1}{30}$ in. long, narrowly obovoid,

trigonous, straw-colored or white, stipitate, not umbonate, faintly longitudinally ribbed and trabeculate between the ribs ; style $\frac{1}{25}$ in. long with a bulbous base, glabrous ; stigmas 3, about as long as the style. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431.—Flowers : Oct.

KONKAN : Malwán, *Woodrow* ! DECCAN : Khandala, *Woodrow* !—DISTRIB. India (W. Peninsula).

Mr. Clarke originally described the plant from undergrown specimens from Khandala, the spikelets of which did not exceed $\frac{1}{8}$ in. long. Specimens collected more recently at Malwán show that the spikelets reach $\frac{1}{4}$ in. long.

14. **Fimbristylis monostachya,** *Hassk. Pl. Jav. Rar.* (1848) p. 61. Densely tufted and leafy ; root-fibres slender. Steps 6—12 in. long, very slender or filiform, striate. Leaves crowded on the swollen base of the stem, filiform or nearly so, about $\frac{1}{2}$ as long as the stem, acute or acuminate ; sheaths short, with scarious margins. Spikelets solitary (rarely 2) on the stem, variable in size, $\frac{1}{5}$—$\frac{1}{2}$ by $\frac{1}{6}$—$\frac{1}{4}$ in., compressed, ovate, acute, shining, pale straw-colored, the 2 lower glumes empty and longer than the others, cuspidate ; rhachilla slender with persistent wings. Glumes loosely imbricate, subdistichous, much-keeled, ovate, acute, cuspidate, coriaceous. Stamens 3 ; anthers $\frac{1}{16}$ in. long, subacute, yellow. Nut $\frac{1}{10}$ in. long with a long stalk, globosely pyriform, narrowed into the stout stipes, trigonous with rather acute angles, tuberculate on the 3 faces, with a short pyramidal apex, straw-colored, glabrous ; style $\frac{1}{8}$ in. long, stout, pubescent all over and on the conical base ; stigmas 3, much shorter than the style. Fl. B. I. v. 6, p. 649 ; Trim. Fl. Ceyl. v. 5, p. 59 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1150. *Abildgaardia monostachya,* Vahl, Enum. v. 2 (1806) p. 296 ; Dalz. & Gibs. p. 286 ; Boeck. in Linnæa, v. 37 (1871) p. 53.—Flowers : July.

DECCAN : Poona, *Jacquemont,* 411 ! S. M. COUNTRY : Badami, *Woodrow.*—DISTRIB. Throughout the warmer parts of India ; Ceylon, most warm countries.

15. **Fimbristylis monticola,** *Hochst. ex Steud. Syn. Pl. Cyp.* (1855) p. 111. A very slender plant ; root-fibres filiform ; stems 3—12 in. or more long, filiform, obtusely trigonous, striate, flexuous. Leaves many at the base of the stem, shorter than or sometimes nearly equalling the stem, filiform, acute, with distantly scabrid margins ; sheaths short, membranous. Umbel subsimple or subcompound ; rays 2—4 with 1 or 2 spikelets on each, $\frac{1}{4}$—$\frac{1}{2}$ in. long, filiform, spreading or recurved ; bracts very short, setiform. Spikelets $\frac{1}{4}$—$\frac{1}{3}$ in. long, elliptic-oblong, obtuse or acute, compressed, dark-brown ; lowest glumes very small, deciduous ; rhachilla with deep pits with hyaline margins. Glumes laxly subdistichously imbricate, $\frac{1}{8}$ in. long, triangularly ovate, apiculate, concave, coriaceous, with hyaline margins ; back 3-nerved ; keel conspicuous. Stamens 3 ; anthers with an acute tip. Nut stipitate, $\frac{1}{20}$ in. long, globosely obovoid, obtusely trigonous, minutely tuberculate, yellow or brown ; style $\frac{1}{16}$ in. long, with bulbous base, more or less pubescent all over ; stigmas 3, as long as the style. Fl. B. I. v. 6, p. 642 ; Trim. Fl. Ceyl. v. 5, p. 60.; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431.—Flowers : Aug.

KONKAN : Shelarvadi (Bhore Ghát), *Woodrow*, 10!—DISTRIB. India (W. Peninsula) ; Ceylon.

16. **Fimbristylis complanata,** *Link, Hort. Berol.* v. 1 (1827) p. 292. Glabrous ; rhizome very short, hard, creeping ; root-fibres wiry ; stems 8—24 in. long, much flattened near the top, 2-edged, $\frac{1}{8}$ in. broad, deeply grooved and ribbed, quite smooth. Leaves crowded at the base of the stem and shorter than it, 3—8 by $\frac{1}{8}$—$\frac{1}{4}$ in., coriaceous, flat, linear, suddenly narrowed at the tip, obtuse or subacute, with scaberulous margins ; sheaths coriaceous with scarious margins. Umbels decompound, effuse, 1—3 in. broad, with few or many flattened rays, loosely corymbosely branched, the branches bearing small shortly pedicellate brown spikelets ; bracts $\frac{1}{2}$ as long as the umbel, the largest leaf-like, erect, the others subulate. Spikelets $\frac{1}{8}$—$\frac{1}{4}$ by $\frac{1}{20}$—$\frac{1}{10}$ in., ovoid-oblong, few-flowered, brown, with more or less distichously arranged glumes, the lowest glume empty. Glumes $\frac{1}{10}$ in. long, ovate, the keel prolonged into a long mucro ; sides brown, the margins not hyaline ; keel deep, acute. Stamens 3 ; anthers long, obtuse. Nut $\frac{1}{30}$ in. long, obovoid, stipitate, obtusely trigonous, pale straw-colored or nearly white, slightly umbonate, minutely warted ; style longer than the nut with a conical base, slender, glabrous ; stigmas 3, long. Fl. B. I. v. 6, p. 646 ; Trim. Fl. Ceyl. v. 5, p. 63 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1152. *Scirpus complanatus,* Retz. Obs. fasc. 5 (1789) p. 14 ; Grah. Cat. p. 233.

DECCAN : near Chattersinghi (Poona districts), *Ranade*! SIND : *Pinwill*! —DISTRIB. India (Mussooree, Saharanpur, Assam, Birma, W. Peninsula) ; Ceylon, Indo-China, Africa, Oceania.

VAR. *microcarya,* C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 646 (by misprint *microcarpa,* an error which Mr. Clarke has corrected on the sheets in Herb. Kew.). Stems slender, hardly flattened under the umbel. Spikelets more slender. Nut very small, velate (*i.e.,* the outermost cells withering and peeling off). Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431. *Fimbristylis microcarya* (sp.), F. Muell. Fragm. Phyt. Austral. v. 1 (1858—59) p. 200 ; Benth. Fl. Austral. v. 7 (1878) p. 316.

DECCAN : water-holes at Hewra, *Dalzell*! ; Poona, *Woodrow*.

17. **Fimbristylis junciformis,** *Kunth, Enum.* v. 2 (1837) p. 239. Glabrous ; rhizome woody, short or creeping ; root-fibres stout, wiry ; stems 4—18 in. long, tufted, rigid, 4—5-angled or compressed above, deeply striate. Leaves crowded round the base of the stems and very much shorter than them, $\frac{1}{12}$—$\frac{1}{6}$ in. broad, spreading and recurved, flat, coriaceous, with a triangular acute tip and scaberulous margins ; sheaths short, coriaceous. Umbel compound, with few slender rays 1—3 in. long, bearing distant or clustered small chestnut-brown spikelets ; bracts 2—4, much shorter than the umbel, erect, rigid, acute. Spikelets $\frac{1}{8}$—$\frac{1}{3}$ by $\frac{1}{10}$ in., the 2 lowest glumes distichous, the lowest empty ; rhachilla stout, with caducous wings. Glumes $\frac{1}{10}$ in. long, ovate, shortly mucronate, with slender keel and pale hyaline margins. Stamens 3 ; anthers long, acuminate. Nut $\frac{1}{20}$ in. long, very shortly stipitate, obovoid, trigonous, obscurely ribbed and with faint

vein-like markings, pale straw-colored or nearly white, minutely umbonate ; style $\frac{1}{12}$ in. long with conical base, pubescent above ; stigmas 3, about as long as the style. Fl. B. I. v. 6, p. 647 ; Boeck. in Linnæa, v. 37 (1871) p. 49 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1152.—Flowers : Nov.

DECCAN : Karli, *Woodrow*. SIND : *Pinwill* !—DISTRIB. Throughout India ; Ceylon, Madagascar, Philippines.

5. STENOPHYLLUS, Rafin.

Annual herbs ; stems slender, leafy at the base only. Leaves very narrow, filiform or capillary. Spikelets small, crowded in a terminal head or umbellate ; bracts short. Glumes few or many, imbricate all round the rhachilla, 1—2 lowest and often the uppermost empty ; hypogynous bristles 0. Stamens 1—3 ; anthers linear, obtuse or apiculate. Ovary abovoid ; style slender, glabrous ; stigmas 3. Fruit an obovoid obtuse trigonous smooth nut, crowned by the persistent style-base.—DISTRIB. Species about 70, in most warm regions.

The name *Stenophyllus* [Raf. Neog. (1825) p. 4] is prior to the name *Bulbostylis*, Kunth (1837), as pointed out by Dr. N. L. Britton in "The Sedges of Jamaica," published in the 'Bulletin of the Jamaica Department of Agriculture,' v. 5, Suppl. 1, p. 1.

1. **Stenophyllus barbata** (*Scirpus*), *Rottb. Descrip. et Icon.* (1773) p. 52. A slender annual 3—12 in. high ; stems tufted, filiform, glabrous, striate. Leaves about $\frac{1}{2}$ as long as the stem, capillary, acuminate, the margins involute, scaberulous upwards ; sheaths short, membranous, with bearded mouths. Spikelets $\frac{1}{8}$—$\frac{1}{4}$ in. long, few-flowered, oblong-lanceolate, reddish-brown, crowded in a terminal head $\frac{1}{4}$—$\frac{1}{2}$ in. in diam. ; bracts shorter than or rarely exceeding the spikelets ; rhachilla stout. Glumes $\frac{1}{16}$ in. long, ovate, laterally compressed, boat-shaped, loosely imbricate, acute or with the stout acute keel ending in a mucro. Stamen 1 ; anther linear, subacute. Nut $\frac{1}{30}$ in. long, globosely obovoid, trigonous with prominent angles, crowned with the minute base of the style, smooth, pale straw-colored ; style slender ; stigmas 3. *Bulbostylis barbata*, Kunth, Enum. v. 2 (1837) p. 208 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 6, p. 651 ; Trim. Fl. Ceyl. v. 5, p. 66 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1156. *Scirpus barbatus*, Rottb. Descrip. et Icon. (1773) p. 52, t. 17, fig. 4 ; Boeck. in Linnæa, v. 36 (1870) p. 751.—Flowers : July.

S. M. COUNTRY : Badami, *Woodrow*. SIND : *Pinwill* !—DISTRIB. Throughout India ; Ceylon, warm regions.

6. ELEOCHARIS, R. Br.

Glabrous herbs ; stems tufted, simple, erect, embraced by one or more membranous truncate sheaths. Leaves obsolete, or, rarely, a herbaceous or membranous limb on the sheath. Inflorescence a single solitary ovoid or cylindric many-flowered spikelet. Glumes imbricate round the rhachilla, membranous or coriaceous, the lowest

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usually empty, bract-like, but not longer than the spikelet; the uppermost empty, the remainder 2-sexual; hypogynous bristles 8 or fewer, rarely absent, retrorsely scabrous or spinulose. Stamens 3—1; anthers linear or linear-oblong, crested, muticous, or with an aciculär tip. Ovary orbicular-ovoid; style with a swollen base; stigmas 2—3, filiform or flattened. Fruit a plano-convex or trigonous nut, crowned by the persistent and swollen, pyriform conical or depressed style-base.—DISTRIB. Cosmopolitan; species 113.

Glumes subrigid, smooth or striate, but keeled, concolorous; stems usually stout; stigmas 2—3.	
Nut smooth; stems terete, transversely septate when dry	1. *E. plantaginea.*
Nut longitudinally striate; stems subtriquetrous below the spikelet, not septate.	
Spikelets acute; glumes ovate, subacute	2. *E. fistulosa.*
Spikelets obtuse; glumes quadrate, rounded or subtruncate	3. *E. spiralis.*
Glumes membranous, usually 1—3-nerved, with a green keel stems usually slender.	
Stigmas 2; nut compressed.	
Roots fibrous; rhizome short or 0.	
Bristles glistening, white	4. *E. atropurpurea.*
Bristles brown or rusty	5. *E. capitata.*
Rhizome creeping; bristles rusty-brown	6. *E. palustris.*
Stigmas 3; nut obovoid, trigonous	7. *E. Chætaria.*

1. **Eleocharis plantaginea,** *R. Br. Prod.* (1810) p. 224 (*in note*). Stolons long, $\frac{1}{8}$—$\frac{1}{6}$ in. in diam.; stems 1—3 ft. high, $\frac{1}{8}$—$\frac{1}{3}$ in. in diam., densely tufted, appearing transversely septate when dry; sheaths 2—8 in. long, very thin, soon torn, bright red-brown, shining. Spikelets $\frac{3}{4}$—$1\frac{3}{4}$ in. long, straw-colored, rather narrower than the stem; rhachilla stout, angled, with irregular broad concave facets between the insertion of the glumes. Glumes closely imbricate, $\frac{1}{3}$ in. long, subrigid, concolorous, not keeled, broadly ovate, obtuse, rarely truncate, 1-nerved, coriaceous, persistent, the lowest very stout, appearing as a continuation of the stem. Bristles 7, equalling or exceeding the nut, retrorsely scabrid, yellow. Stamens 3; anthers narrowly linear, with a long setaceous tip. Nut $1\frac{1}{2}$ in. long, orbicular-obovoid, compressed, smooth, yellowish; style long, flattened, with a triangular base; stigmas 3. Fl. B. I. v. 6, p. 625; Trim. Fl. Ceyl. v. 5, p. 68; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1148. *Scirpus plantaginus,* Roxb. Fl. Ind. v. 1 (1832) p. 212; Grah. Cat. p. 233. *Scirpus plantaginoides,* Rottb. Descrip. et Icon. (1773) p. 45, t. 15, fig. 2. *Heleocharis plantaginea,* Boeck. in Linnæa, v. 36 (1870) p. 474.—Flowers: Sept.

KONKAN: Bombay without locality or authority in Herb. Kew.! GUJARAT: Baroda, *Woodrow.* SIND: *Pinwill!*—DISTRIB. India (N.-West, Assam, W. Peninsula); Ceylon, Malay Peninsula, Tropics of the Old World.

2. **Eleocharis fistulosa,** *Link, in Spreng. Jahrb. Gewäch.* (1820) Heft 3, p. 78. Stems robust or slender, 1—3 ft. by $\frac{1}{8}$—$\frac{1}{4}$ in., stoloniferous, triquetrous under the spikelet, concave on one face, not transversely septate; sheaths obliquely truncate, thinly membranous, loose, ending in an ovate, acute or lanceolate hyaline limb. Spikelets $\frac{3}{4}$—$1\frac{1}{2}$ in. long, as broad as the stem or broader, greenish; lowest glumes

bractiform, broadly ovate, coriaceous, with narrow membranous margins; rhachilla slender, angular, with broad concave facets between the glumes. Fertile glumes nearly $\frac{1}{8}$ in. long, ovate-oblong or subobovate, multistriate on the back outside, often with minute brown spots inside; bristles longer than the nut, brown, retrorsely scabrid. Nut $\frac{1}{16}$ in. long, obovoid, striate, pale, tipped with the annular somewhat saucer-shaped style-base, which is about three-fourths the width of the nut; stigmas usually 3. Fl. B. I. v. 6, p. 626; Trim. Fl. Ceyl. v. 5, p. 70; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1148. *Heleocharis fistulosa,* Boeck. in Linnæa, v. 36 (1870) p. 472.

KANARA: *Talbot,* 1040, ex *C. B. Clarke,* in Journ. Linn. Soc. v. 34 (1898-1900) p. 48.

I have seen no specimens from the Bombay Presidency; there are none in Herb. Kew.—DISTRIB. India (Nipal, Assam, Birma, W. Peninsula); Tropics generally.

3. **Eleocharis spiralis,** *R. Br. Prod.* (1810) p. 224 (*in note*). Stems densely tufted, stoloniferous, 1—2 ft. by $\frac{1}{8}$—$\frac{1}{6}$ in., trigonous or biconvex below, triquetrous above; upper sheath with a broad ovate-oblong appressed limb sometimes reaching $\frac{1}{4}$ in. long. Spikelets $\frac{1}{2}$—1 in. long, thicker than the stem, cylindric, obtuse, pale; lowest glume like the others but more coriaceous; rhachilla stout, terete, deeply regularly pitted. Glumes very many, closely spirally imbricate, $\frac{1}{8}$ in. long and as broad as long, quadrate, rounded at the apex, with a hyaline border on the sides and on the top; back thick, pale (nearly white) outside, dotted with brown spots inside; bristles much shorter than the nut, scabrid. Stamens $\frac{1}{8}$ in. long; anthers narrow. Nut $\frac{1}{16}$ in. long (not including the conical whitish style-base, which reaches to about $\frac{1}{30}$ in. long and which is as broad as $\frac{2}{3}$ of the nut), ashy brown, globosely obovoid, biconvex, shining, with thickened margins, faintly striate and with minute transverse yellowish streaks; style with the style-base as long as the nut; stigmas 2 or 3. Fl. B. I. v. 6, p. 627; Trim. Fl. Ceyl. v. 5, p. 70; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1148. *Scirpus spiralis,* Rottb. Descrip. et Icon. (1773) p. 45, t. 15, fig. 1.—Flowers: Dec.

KONKAN: Salsette, *Jacquemont,* 725!; Goa, *Lisboa,* 45!—DISTRIB. India (Bengal, Birma, W. Peninsula); Ceylon.

4. **Eleocharis atropurpurea,** *Kunth, Enum.* v. 2 (1837) p. 151. Annual; roots fibrous; stems slender, densely tufted, 2—7 in. long, straight or curved. Leaves 0; sheaths short. Spikelets $\frac{1}{8}$—$\frac{1}{4}$ in. long, ovoid, obtuse or subacute, much broader than the stem, many-flowered; rhachilla pitted. Glumes $\frac{1}{16}$—$\frac{1}{12}$ in. long, broadly ovate-oblong, obtuse, concave, loosely imbricate, easily detached; back green; sides membranous with a chestnut-brown band along each; bristles 4—7, slender, scabrid, as long as the nut, white. Anthers small, apiculate. Nut $\frac{1}{25}$ in. long, obovoid, biconvex, smooth, black, apiculate with the short stout white style-base; stigmas 2. Fl. B. I. v. 6, p. 627; Trim. Fl. Ceyl. v. 5, p. 71; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl p. 1148. *Heleocharis atropurpurea,* Boeck. in Linn. v. 36 (1870) p. 458.—Flowers: Sept.

GUJARAT: Godra, *Woodrow*! SIND: *Pinwill*!—DISTRIB. India (W. Himalaya, Assam, W. Peninsula); Ceylon, Tropics generally.

5. **Eleocharis capitata,** *R. Br. Prod.* (1810) p. 225. Annual; root fibrous; stems densely tufted, numerous, 2—10 in. long, slender, trigonous. Leaves 0; sheaths short, sometimes tinged with purple, the mouth oblique, acute. Spikelets $\frac{1}{10}$—$\frac{1}{8}$ in. in diam., globosely ovoid, rounded at the apex, pale. Lowest glumes bractiform, $\frac{1}{20}$ in. long, ovate-oblong, obtuse; fertile glumes $\frac{1}{16}$ in. long, orbicular-ovate, obtuse, imbricate, easily detached, concave; rhachilla terete, pitted; bristles longer than the nut, 7 or fewer, pale rose-brown when ripe (*Clarke*), retrorsely scabrid. Anthers small, linear, obtuse. Nut $\frac{1}{30}$ in. long, globosely obovoid, brown, smooth, shining, apiculate with the broad style-base; style short; stigmas 2. Fl. B. I. v. 6, p. 627; Dalz. & Gibs. p. 285; Trim. Fl. Ceyl. v. 5, p. 72; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1148. *Heleocharis capitata,* Boeck. in Linnæa, v. 36 (1870) p. 461.—Flowers: Sept.

DECCAN: Poona, *Woodrow.* KANARA: *Thomson.* SIND: *Dalzell*!; Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (Behar, Bengal, W. Peninsula); Ceylon, Singapore, most warm countries.

6. **Eleocharis palustris,** *R. Br. Prod.* (1810) p. 224 (*in note*). A variable plant; rhizome creeping, black or chestnut-brown, rooting from the nodes; stems 4—24 by $\frac{1}{25}$—$\frac{1}{8}$ in.; upper sheath truncate or sometimes produced at one side into a small triangular limb. Spikelets $\frac{1}{4}$—1 by $\frac{1}{8}$—$\frac{1}{5}$ in., ellipsoid or cylindric, chestnut-brown or straw-colored, subacute, the lowest glume bract-like, empty, suborbicular, smaller than the fertile ones, coriaceous, with hyaline margins, about $\frac{1}{2}$-surrounding the stem; bristles usually 4, longer than the nut, scabrid, brown. Fertile glumes $\frac{1}{8}$—$\frac{1}{5}$ in. long, thinly membranous, either hyaline except the back which is narrow and green, ovate-lanceolate, obtuse or subacute; or elliptic, acute, with the back and sides chestnut-brown and with hyaline margins. Stamens 3. Nut $\frac{1}{12}$ in. long (not including the large oblong-conic obtuse subcompressed pale or brown-dotted style-base which reaches sometimes $\frac{1}{16}$ in. long), globosely obovoid, smooth, biconvex, bright yellow or pale brown, the margins scarcely thickened; style above the conical base $\frac{1}{20}$ in. long; stigmas 2 (very rarely 3), about as long as the style. Fl. B. I. v. 6, p. 628; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431; Prain, Beng. Pl. p. 1148. *Heleocharis palustris,* Lindl. Syn. Brit. Fl. (1829) p. 280; Boeck. in Linnæa, v. 36 (1870) p. 466.

SIND: Hyderabad, *Woodrow.*—DISTRIB. Cosmopolitan except Australia.

7. **Eleocharis Chætaria,** *Rœm. & Schult. Syst.* v. 2 (1817) p. 154. Glabrous; roots fibrous, rarely with a white filiform rhizome 1 in. long; stems 1—8 in. long, densely tufted, filiform or capillary, straight or curved; sheaths short, membranous. Spikelets $\frac{1}{8}$—$\frac{1}{5}$ in. long, ovoid, obtuse, usually tinged with red, terete or compressed, with 1—4 nuts, the lowest glume boat-shaped, empty, $\frac{1}{8}$ in. long, with green obscurely 3-nerved back and broad hyaline margins; rhachilla narrowly winged; bristles 6 or fewer, rather longer than the nut, pale-brown, scabrid, sometimes wanting. Glumes 6—8,

subdistichous, loosely imbricate, reaching $\frac{1}{8}$ in. long, boat-shaped, with narrow green backs and chestnut-brown sides and with hyaline margins. Anthers linear, $\frac{1}{10}$ in. long. Nut obovoid, trigonous, $\frac{1}{20}$ in. long (not including the acutely pyramidal style-base, which is less than $\frac{1}{10}$ in. long and nearly as broad as the nut), cancellate, the angles smooth produced into short prominences or shoulders below the convex top, dull pale-straw-colored ; style short ; stigmas 3, very long. Fl. B. I. v. 6, p. 629 ; Trim. Fl. Ceyl. v. 5, p. 71 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 431 ; Prain, Beng. Pl. p. 1148. *Heleocharis Chætaria*, Boeck. in Linnæa, v. 36 (1870) p. 428.

S. M. COUNTRY : Londa, *Woodrow*; Dharwar, *Woodrow*.—DISTRIB. More or less throughout India; Ceylon, Malacca, Tropics generally.

7. **SCIRPUS**, Linn.

Glabrous often tall herbs, leafless or leafy at the base only (very rarely leafy all along the stem) ; stems terete, trigonous or triquetrous. Inflorescence terminal or lateral, of clusters or umbels of oblong or ovoid many-flowered sessile, or pedicellate spikelets. Glumes spirally imbricating round a stout or slender rhachilla, the lowest 2 and a few of the uppermost empty ; hypogynous bristles 0 or 2—7, retrorsely scabrid or rarely (*S. litoralis* and *S. Kysoor*) plumose. Stamens 1—3 ; anthers linear. Ovary obovoid ; style slender, the base dilated ; stigmas 2—3, slender. Nut obovoid, trigonous or biconvex, smooth or nearly so ; the style leaving no button on the nut.—DISTRIB. Species about 136, spread throughout the world.

Large or middle-sized herbs; stems 1—6 ft. or more long, leafy only near the base, rush-like; hypogynous bristles present or not.
- Nut marked with transverse wavy lines; hypogynous bristles 0.
  - Stems flowering nearer to the base than the top, stout, terete, spongy; glumes $\frac{1}{4}$ in. long, with a subcordate base, not inflated in front, hardly keeled ..... 1. *S. articulatus.*
  - Stems flowering nearer to the top than the base, slender, obtusely trigonous; glumes $\frac{1}{10}$ in. long, with tapering (not subcordate) base, not inflated in front, strongly keeled. 2. *S. supinus.*
  - Stems flowering nearer to the top than the base, slender, subcompressed; glumes often 5-ranked, $\frac{1}{8}$ in. long, with tapering (not subcordate) base, inflated in front, keeled... 3. *S. quinquefarius.*
- Nut not marked with transverse wavy lines.
  - Hypogynous bristles 0 ..... 4. *S. corymbosus.*
  - Hypogynous bristles present.
    - Hypogynous bristles retrorsely scrabid (not plumose).
      - Glumes 2-fid at the apex ..... 5. *S. maritimus.*
      - Glumes not 2-fid at the apex ..... 6. *S. grossus.*
    - Hypogynous bristles plumose.
      - Inflorescence lateral; nut plano-convex 7. *S. litoralis.*
      - Inflorescence terminal; not obovoid ..... 8. *S. Kysoor.*

Small tufted herbs with slender stems never reaching 1 ft. long; hypogynous bristles 0.
- Perennial herb ..... 9. *S. Kyllingioides.*

Annual herbs.
Glumes elliptic; mucro ½ the length of the blade; tracts many, reaching 3½ in. long ..... 10. *S. Michelianus.*
Glumes trapeziform; cusp as long as the blade; bracts 1—3, reaching 1 in. long ..... 11. *S. squarrosus.*

1. **Scirpus articulatus,** *Linn. Sp. Pl.* (1753) p. 47. A glabrous perennial (?) herb ; stems 1—3 ft. long, densely tufted, as thick as the little finger, spongy and transversely septate within (visible externally), terete, striate, flowering nearer the base than the top. Leaves 0, or the sheaths with a membranous acute tip sometimes 1 in. long. Spikelets variable in length, ¼—¾ in. long, ovoid-oblong, acute, terete or obscurely angular, rusty-brown, sessile in laterally stellately spreading clusters of 15—60 ; bracts 0. Glumes ⅛ in. long and nearly as broad, broadly ovate, acute, very shortly mucronate, closely imbricate, membranous, concave, persistent, scarcely keeled, with a subcordate base and hyaline margins. Stamens 3, reaching ⅛ in. long ; anthers linear, obtuse, $\frac{1}{30}$ in. long, yellow. Nut $\frac{1}{12}$ in. long, obovoid, sharply triquetrous, black, opaque, shortly pointed, striate with transverse wavy lines ; style $\frac{1}{12}$ in. long ; stigmas 3, nearly as long as the style. Fl. B. I. v. 6, p. 656 ; Grah. Cat. p. 233 ; Boeck. in Linnæa, v. 36 (1870) p. 702 ; Trim. Fl. Ceyl. v. 5, p. 75 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1159. *Isolepis articulata,* Nees, in Wight, Contrib. (1834) p. 108 ; Dalz. & Gibs. p. 286.—Flowers : Oct.—Feb.

KONKAN : *Woodrow.* GUJARAT : Dakor, *Kanitkar*! SIND : *Pinwill*!—DISTRIB. Throughout India; Ceylon, Africa, Philippines, Australia.

2. **Scirpus supinus,** *Linn. Sp. Pl.* (1753) p. 49. A glabrous annual ; roots fibrous ; stems densely tufted, 6—15 in. long, slender, obtusely trigonous, striate, flowering above the middle. Leaves very short or 0 ; sheaths short or long, the mouth oblique, rarely produced into a very short erect acute limb. Spikelets 3—8 in a cluster, coming off from 2 to 6 in. below the top of the stem, ⅛—¼ in. long, ellipsoid or oblong, green, sessile or nearly so, obscurely angular by reason of the sharp keels of the glumes ; rhachilla slender, not winged. Glumes $\frac{1}{10}$ in. long, ovate, acute, membranous, closely imbricate, strongly keeled, the keel produced into a short mucro ; hypogynous bristles 0. Nut $\frac{1}{16}$ in. long, globosely obovoid, rugose with transverse wavy lines, trigonous, umbonate, black ; style $\frac{1}{30}$ in. long ; stigmas 3, nearly as long as the style. Fl. B. I. v. 6, p. 655 ; Boeck. in Linnæa, v. 36 (1870) p. 699 ; Trim. Fl. Ceyl. v. 5, p. 74 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1159.—Flowers : Oct.—Feb.

KONKAN : *Law*! ; Kalyan, *Woodrow* ; Bansda, *Woodrow*. GUJARAT : Dakor, *Kanitkar*! SIND : *Pinwill*!—DISTRIB. More or less throughout India; Ceylon, Old World generally and in America.

VAR. *uninodis,* C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 656. Inflorescence of 1—4 heads in a contracted umbel, the rays rarely reaching 1 in. long. Prain, Beng. Pl. p. 1159. *Isolepis uninodis* (sp.), Delile, Fl. Egypte, p. 8, t. 6, fig. 1. *Scirpus mucronatus,* Roxb. Fl. Ind. v. 1 (1832) p. 216 (*not* of Linn.).

SIND : *Pinwill*!

3. **Scirpus quinquefarius,** *Ham. in Wall. Cat.* (1828) 3465. Root fibrous ; stems 3—25 in. long, slender, terete or slightly compressed, often when dry transversely septate ; sheaths with an obliquely truncate mouth. Leaves almost 0. Spikelets 1—9 in a single lateral dense head, usually nearer to the top than the base of the stem, $\frac{3}{8}$—$\frac{1}{2}$ by $\frac{1}{4}$ in., ovoid-oblong, obtuse, slightly compressed, pale-brown, shining. Glumes inflated in fruit, $\frac{1}{8}$ in. long, usually 5-ranked, elliptic-lanceolate, membranous, multistriate, acutely mucronate, the apex slightly recurved, keeled, tapering (not cordate) at the base ; hypogynous bristles 0. Stamens 3, reaching $\frac{1}{8}$ in. long ; anthers linear, obtuse. Nut $\frac{1}{16}$ in. long, obovoid, acutely trigonous, apiculate, rugose with transverse wavy lines, black ; style $\frac{1}{16}$ in. long ; stigmas 3, shorter than the style. Fl. B. I. v. 6, p. 657 ; Boeck. in Linnæa, v. 36 (1870) p. 701 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1159.—Flowers : Nov.—Dec.

KONKAN : *Dalzell* ! ; Bombay, without authority in Herb. Kew. ! GUJARAT : Umrat, *Woodrow*. SIND : *Pinwill* ! ; Bhubak, *Woodrow*.—DISTRIB. India (North-West, Central India, W. Bengal, W. Peninsula) ; Afghanistan, Beluchistan, Africa.

4. **Scirpus corymbosus,** *Heyne, ex Roth, Nov. Pl. Sp.* (1821) p. 28. Glabrous ; rhizome 2—4 in. long, horizontal ; stems approximate, reaching 3 ft. long, stout, terete, finely striate ; sheaths few, near the base, with an obliquely subacute mouth. Leaves 0. Inflorescence lateral, from near the top of the stem, which is produced bract-like above it into an acute stiff point. Spikelets in pedunculate clusters $\frac{1}{4}$—$\frac{3}{8}$ in. long, ellipsoid, reddish-brown. Glumes $\frac{1}{6}$ in. long, broadly ovate, acute, pale-brown with darker streaks, strongly keeled, the keel produced into a short erect mucro ; hypogynous bristles 0. Stamens 3, reaching $\frac{1}{6}$ in. long ; anthers $\frac{1}{10}$ in. long, linear, obtuse, yellow. Nut $\frac{1}{12}$ in. long, obovoid, trigonous, with a somewhat pyramidal apex, smooth, not rugose with transverse wavy lines, yellow ; style reddish, $\frac{1}{10}$ in. long ; stigmas as long as the style. Fl. B. I. v. 6, p. 657 ; Boeck. in Linnæa, v. 36 (1870) p. 706 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.—Flowers : Dec.

KONKAN : Goa, *Woodrow*. SIND : *Pinwill* !, *Woodrow*.—DISTRIB. India (Bandelkand, W. Peninsula) ; Africa, Madagascar.

5. **Scirpus maritimus,** *Linn. Sp. Pl.* (1753) p. 51. Glabrous ; rhizome creeping, bearing tubers ; stems 1—3 ft. long, stout, triquetrous. Leaves grass-like, harsh, numerous, often as long as the stem, $\frac{1}{4}$—$\frac{1}{3}$ in. broad, keeled ; sheaths long. Inflorescence terminal or subterminal, umbellate with rays of unequal length ; bracts 3—5, leaf-like, the longest much exceeding the inflorescence, keeled, finely pointed. Spikelets 3—8 or solitary on each ray (or umbel rarely reduced to a head of 3—1 spikelets), $\frac{3}{8}$—1 in. long and often $\frac{1}{3}$ in. in diam., ovate-oblong or cylindric, reddish-brown. Glumes $\frac{1}{4}$ in. long, broadly ovate, strongly keeled, membranous, glabrous or puberulous, brown or golden-brown, bifid at the apex and with a long subrecurved mucro about $\frac{1}{20}$ in. long formed by the production of the keel between the apical lobes ; hypogynous bristles 3—6, unequal, $\frac{1}{16}$—$\frac{1}{10}$ in. long, shorter than the nut, slender, retrorsely

scabrid. Stamens 3, reaching ¼ in. long. Nut ⅛ in. long, obovoid, obtusely trigonous, umbonate, quite smooth, pale yellow, nearly white ; style $\frac{1}{10}$—⅛ in. long ; stigmas 3, as long as the style. Fl. B. I. v. 6, p. 658 ; Dalz. & Gibs. p. 288 ; Boeck. in Linnæa, v. 36 (1870) p. 722 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 491. *Scirpus tridentatus,* Roxb. Hort. Beng. (1814) p. 81 ; Fl. Ind. v. 1 (1832) p. 225 ; Grah. Cat. p. 233.—Flowers : Nov.

KONKAN : Bombay, *Woodrow.* DECCAN : Miraj, *Woodrow.* GUJARAT : Umrat, *Woodrow* ! SIND : *Dalzell* !, *Stocks,* 1094 ! ; Karachi, *Woodrow.*—DISTRIB. India (Kashmir, Kashgar, Moradabad, W. Peninsula) ; Old World with vars. in Australia and America.

VAR. *affinis,* C. B. Clarke, in Hook. f. Fl. B. I. v. 6 (1893) p. 659. Spikelets capitate, usually 3—1, large, ovoid-lanceolate ; glumes straw-colored, sparingly hairy ; hypogynous bristles 4, as long as the nut ; nut small ; stigmas 2. Prain, Beng. Pl. p. 1159. *Scirpus affinis* (sp.), Roth, Nov. Pl. Sp. (1821) p. 30 ; Nees, in Wight, Contrib. (1834) p. 111.

KONKAN : Bombay, *Law* ! DECCAN : Nasik, *Cooke* ! SIND : *Dalzell* !

6. **Scirpus grossus,** *Linn. f. Suppl.* (1781) p. 104. Rootstock stout, stoloniferous or not ; root-fibres thick ; stem 6—10 ft. high, as thick as the little finger, triquetrous, spongy, with concave sides and smooth angles. Leaves few, radical, 2—3 ft. by ½ in., much keeled, finely acuminate, coriaceous, with smooth or scaberulous margins ; sheaths long, open. Spikelets subglobosely ovoid, ⅛—⅜ in. long, dark-brown, in large corymbiform decompound terminal open or contracted umbels 3—8 in. in diam., solitary on the top of rigid erect or spreading rays of various lengths ; involucral bracts 3, leaf-like, the longest up to 3 ft. long by ½—¾ in. broad at the base, flat, linear, acuminate ; bracts of the secondary and tertiary umbels lanceolate, acute, scarious, ¼—½ in. long. Glumes rather loosely imbricate, ⅛—⅓ in. long, elliptic, obtuse, mucronate, keeled, membranous ; hypogynous bristles 6, unequal, longer than the nut, retrorsely scabrid (not plumose), brown. Stamens 3, reaching ⅓ in. long ; anthers linear, large. Nut $\frac{1}{12}$ in. long, obovoid, trigonous, with a minute conical tip (*style-base*), ashy-grey or yellowish, smooth ; style $\frac{1}{10}$ in. long, with dilated base ; stigmas 3, as long as the style. Fl. B. I. v. 6, p. 659 ; Boeck. in Linnæa, v. 36 (1870) p. 723 ; Trim. Fl. Ceyl. v. 5, p. 77 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1159.—Flowers : Sept.

KONKAN : Kalyan, *Woodrow.* DECCAN : Poona, *Cooke* ! SIND : *Pinwill* !—DISTRIB. More or less throughout India ; Ceylon, Malaya, Tonkin, Philippines.

7. **Scirpus litoralis,** *Schrad. Fl. Germ.* v. 1 (1806) p. 142, t. 5, fig. 7. Rootstock stout, hard, with matted fibrillose root-fibres ; stem 2—3½ ft. long, as thick as the thumb at the soft base, and as a crow-quill near the top, terete below, trigonous above, spongy, striate, smooth. Leaves 6—24 by $\frac{1}{10}$—¼ in., membranous, grass-like, finely acuminate ; sheaths long, soft, open. Inflorescence near the top of the stem, which is produced 1—6 in. beyond the umbel. Spikelets pale brown, ¼—½ in. long, oblong, obtuse, terete, pedicellate, in lax subcorymbose or paniculate umbels with drooping rays 1—2 in.

long. Glumes $\frac{1}{8}$ in. long, membranous, ovate-oblong, obtuse, notched at the top, mucronate in the notch by the excurrent slender green keel ; hypogynous bristles 2—7, longer than the nut, unequal, linear, plumose with moniliform hairs. Stamens 2 or 3, reaching $\frac{1}{8}$ in. long ; filaments broad ; anthers slender, tipped with a red appendage. Nut $\frac{1}{16}$ in. long and broad, orbicularly obovoid, plano-convex, smooth, with a long apiculation, dull-brown ; style $\frac{1}{16}$ in. long ; stigmas 2, as long as the style. Fl. B. I. v. 6, p. 659 ; Trim. Fl. Ceyl. v. 5, p. 77 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1159. *Scirpus subulatus,* Dalz. & Gibs. Bo. Fl. (1861) p. 288 (*not* of Vahl).

SIND : *Dalzell* ! GUJARAT : Ahmedabad, *Burkhill* ex *Drummond*; Kathiawar, *Mehta* ex *Drummond*; Rajkote, *Cooke* !—DISTRIB. India (Panjáb, Central India, W. Peninsula); Ceylon, Persia, Central Asia, Africa, Mediterranean regions.

Mr. Drummond in a paper in the 'Journal of the Asiatic Society Bengal' (v. 73, part 2 (1904) p. 137) shows that *S. subulatus,* Vahl, which in the 'Flora of British India' (*l. c.*) has been made synonymous with *S. litoralis* should be considered distinct from that species in consequence of its having trifid style.

8. **Scirpus Kysoor,** *Roxb. Hort. Beng.* (1814) p. 6 ; *Fl. Ind.* v. 1 (1832) p. 230. Rootstock stoloniferous, the stolons often producing hard globose tubers $\frac{1}{2}$—$\frac{3}{4}$ in. in diam., densely clothed with matted fibres ; stems straight, erect, 4—6 ft. high, triquetrous, with sharp often retrorsely hispid angles. Leaves several to each stem and about as long as the stem, $\frac{1}{2}$—$\frac{3}{4}$ in. wide, linear, acuminate, the margins and keel somewhat hispid when young. Umbel terminal, supra-decompound, very similar to that of *Scirpus grossus ;* bracts 3, very unequal, the longest often 2 ft. or more long, the shortest 2—3 in., leaf-like. Spikelets $\frac{1}{3}$—$\frac{1}{4}$ in. long, subglobosely ovoid, brown. Glumes $\frac{1}{8}$ in. long, broadly ovate or suborbicular, membranous, reddish-brown, with a strong keel in the upper part produced into a straight or slightly recurved mucro about $\frac{1}{10}$ in. long. Stamens 3, reaching $\frac{1}{8}$ in. long ; hypogynous bristles 5, plumose with many minute multicellular hairs. Nut $\frac{1}{12}$ in. long, obovoid, trigonous, with pyramidal apex, smooth, yellow ; style $\frac{1}{16}$ in. long with dilated red base ; stigmas 3, as long as or longer than the style.

Mr. Clarke, in Hook. f. Fl. B. I. (*l. c.*), gives the number of hypogynous bristles as 6. Roxburgh (*l. c.*) says 5, and I have invariably found 5 in many specimens that I have examined. Graham, Cat. p. 233 ; Dalz. & Gibs. p. 288 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 490. *Scirpus grossus* var. *Kysoor,* C. B. Clarke, in. Hook. f. Fl. B. I. v. 6 (1893) p. 660 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1159.—Flowers : Sept. VERN. *Kachar.*

KONKAN : beds of rivers in both Konkans, *Graham*; Bombay, *Dalzell* !, cultivated, *Woodrow*.—DISTRIB. More or less throughout India, sometimes cultivated.

The tubers are dug up in the cold season, sliced and eaten by the natives in many parts of India. They are sweet and starchy and are considered cooling and highly nutritious (*Watt*).

9. **Scirpus Kyllingioides,** *Boeck. in Linnæa,* v. 36 (1870) p. 733. Perennial, glabrous ; stem 3—6 in. long, slender, with thickened base

and sometimes with long slender stolons. Leaves ½—¾ the length of the stem, $\frac{1}{20}$ in. broad, green, keeled, narrowed above and with very minutely dentate margins. Head terminal, ⅛—¼ in. in diam., of 5—15 spikelets ; bracts 3, leaf-like, spreading or reflexed, 1—3 in. long. Spikelets very small, closely packed, ovoid-lanceolate, many-flowered. Glumes ovate-lanceolate or oblong-lanceolate, subacute, keeled, many-nerved, straw-colored ; hypogynous bristles 0. Stamens 2 or 3 ; filaments scabrous ; anthers small, not crested. Nut obovoid-oblong, minute, scarcely half as long as the glume, equally trigonous or subcompressed, obtuse, shortly apiculate, yellowish-black or reddish, minutely punctulate ; style slender, shorter than the nut ; stigmas 3. Fl. B. I. v. 6, p. 662 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1158.

KANARA : *Young* ex *C. B. Clarke* (Fl. B. I. l. c.).

I have not seen any Bombay specimens ; there are none in Herb. Kew.—DISTRIB. India (N.-West, Bengal, Rajputana, W. Peninsula) ; Tropical Africa.

10. **Scirpus Michelianus,** *Linn. Sp. Pl.* (1753) p. 52. A small glabrous tufted annual ; roots fibrous ; stems 2—5 in. high, triquetrous, leafy towards the base and there brown. Leaves as long as or sometimes longer than the stem, grass-like, narrowly linear, acute. Spikelets numerous, in dense compound terminal heads ¼—¾ in. in diam. (generally 1 head in the middle and 4 or 5 in the circumference) ; bracts many, the longest sometimes reaching 3½ in. long, leaf-like, linear, dilated at the base, acute at the apex. Spikelets ⅛—⅓ in. long, oblong, subterete, straw-colored. Glumes $\frac{1}{12}$ in. long, elliptic, hyaline, with a long mucro about ¼ the length of the blade, 3-nerved on the back. Stamens usually 2. Nut $\frac{1}{25}$ in. long, fusiform, smooth, pale yellow, minutely punctate and with (microscopically) narrow hyaline margins ; style scarcely $\frac{1}{50}$ in. long, reddish-brown ; stigmas 2, as long as or longer than the style, recurved. Fl. B. I. v. 6, p. 662 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1158. *Cyperus diffusus,* Roxb. Fl. Ind. v. 1 (1832) p. 189. *C. pygmæus* var. β, Boeck. in Linnæa, v. 35 (1868) p. 494.—Flowers : Oct.

KONKAN : *Woodrow.* GUJARAT : Pali, *Woodrow.* SIND : Bhubak, *Woodrow.* —DISTRIB. Throughout India ; Europe, Asia, Algeria.

11. **Scirpus squarrosus,** *Linn. Mant.* (1771) p. 181. A slender glabrous tufted annual ; root-fibres capillary ; stems 3—6 in. long, filiform, terete, striate. Leaves shorter than the stem, filiform, acuminate, erect, smooth, with involute margins ; sheaths short, open. Spikelets solitary or 2—4 in a cluster, sessile, ⅛—¼ in. long, globose or oblong, obtuse, green, many-flowered ; rhachilla naked ; bracts 1—3, capillary, finely acuminate, leaf-like, dilated at the base, one or two sometimes 1 in. long. Glumes $\frac{1}{20}$ in. long, closely imbricate, squarrosely spreading and recurved, trapeziform with acutely angled sides, narrowed above into a recurved cusp as long as or longer than the blade with a stout central nerve, very caducous in fruit ; hypogynous bristles 0. Stamens 1 or 2 ; anthers minute, oblong, apiculate, yellow. Nut $\frac{1}{50}$ in. long, obovoid-ellipsoid, trigonous, yellow, brown or ultimately black ; style very short or 0 ; stigmas 3, minute,

recurved. Fl. B. I. v. 6, p. 663 ; Grah. Cat. p. 233 ; Boeck. in Linnæa, v. 36 (1870) p. 734 ; Trim. Fl. Ceyl. v. 5, p. 74 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1158. *Isolepis squarrosa,* Rœm. & Schult. Syst. v. 2 (1817) p. 111 ; Dalz. & Gibs. p. 286.—Flowers : Oct.—Dec.

Widely distributed throughout the Presidency.—DISTRIB. More or less throughout India; Ceylon, Tropical Africa, Java, China.

8. **ERIOPHORUM,** Linn.

Glabrous herbs ; stem leafy only near the base. Leaves many, long, linear. Spikelets with many perfect flowers in compound umbels. Glumes imbricate on all sides ; hypogynous bristles 6, divided nearly to the base into ligulate comose segments. Stamens 3—1 on the anterior side of the ovary. Ovary ovoid ; style slender, glabrous, short or long ; stigmas 3 (casually 2 or 4), long. Fruit a sessile trigonous smooth dusky nut with narrowed apex.—DISTRIB. Species 10, chiefly in Arctic or N. temperate regions.

1. **Eriophorum comosum,** *Wall. Cat.* (1828) 3446. A glabrous herb ; rhizome scarcely any ; stems 6—20 in. long, terete below, trigonous at the top, leafy at the very base. Leaves equalling or exceeding the stem, rigid, linear, narrow, with serrulate margins ; sheaths brown, shining, striate. Umbel supra-decompound, 2—8 in. in diam., with many rays, the spikelets usually solitary on the top of the rays with 1 or 2 sessile ones in the forks ; bracts very long, sometimes reaching 12 in., leaf-like. Spikelets numerous, reaching $\frac{1}{4}$ in. long, elliptic-oblong, obtuse, terete, reddish-brown. Glumes $\frac{1}{8}$ by $\frac{1}{10}$ in., oblong-lanceolate, membranous, 1-nerved, mucronate, reddish-brown. Anthers large, yellow with a long lanceolate pointed bright-red crest. Nuts nearly $\frac{1}{8}$ in. long by about $\frac{1}{10}$ in. wide, linear-oblong or subfusiform, trigonous, acute, shining, greyish-black, with numerous erect white bristles reaching $\frac{1}{3}$ in. long at the base ; style $\frac{1}{16}$—$\frac{1}{12}$ in. long, reddish-brown ; stigmas 3, as long as the style, reddish-brown, much exserted. Fl. B. I. v. 6, p. 664 ; Dalz. & Gibs. p. 289 ; Boeck. in Linnæa, v. 37 (1871) p. 98 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1157 ; Watt, Dict. Econ. Prod. v. 3, p. 266.—Flowers : Oct.

DECCAN : W. Deccan, near Junnar, *Dalzell & Gibson* ; near Junnar, *Bhiva* ! GUJARAT : Champanir, *Woodrow.* SIND : *Pinwill* !—DISTRIB. Throughout India ; Tonkin, China.

The plant is used to make ropes and mixed with *Ischæmum angustifolium* is often exported to the plains from the Himalayas (see Watt, Dict. Econ. Prod. l.c.).

9. **FUIRENA,** Rottb.

Annual or perennial, glabrous or pubescent leafy herbs. Leaves linear-lanceolate ; sheaths entire, with an annular membrane at the mouth. Spikelets many-flowered, in dense axillary pedunculate and terminal clusters. Glumes imbricate all round the rhachilla, orbicular or ovate-oblong, membranous, with a stout 3-nerved keel ending in a cusp or stout scabrid awn ; hypogynous bristles 3, minute, or 0 ;

hypogynous scales (*petals*) 3, enclosing the nut, linear, quadrate or obovate, strongly 3-nerved, glabrous or ciliate. Stamens 2—3. Ovary trigonous; style slender, finally deciduous; stigmas 3. Fruit a trapezoidal trigonous nut, narrowed or stipitate below, with a long or short cusp or beak above, the angles acute, the sides smooth, pale. —DISTRIB. Species 25, scattered through all warm regions.

Hypogynous scales (*petals*) 0	1. *F. Wallichiana.*
Hypogynous scales (*petals*) present, quadrate or obovate.	
Annuals; leaves hairy.	
Spikelets $\frac{1}{6}$—$\frac{1}{3}$ in. long; rhachilla slender; claw of petals as long as the blade	2. *F. glomerata.*
Spikelets $\frac{1}{8}$—$\frac{1}{5}$ in. long; rhachilla obsolete; claw of petals shorter than the blade	3. *F. uncinata.*
Perennial; rhachilla slender; petals sessile or nearly so	4. *F. umbellata.*

1. **Fuirena Wallichiana,** *Kunth, Enum.* v. 2 (1837) p. 182. Rhizome creeping, short or long; stems many, 1—1½ ft. high (rarely higher), triquetrous, more or less pubescent towards the apex. Leaves 2—8 by $\frac{1}{6}$—$\frac{1}{4}$ in., linear-lanceolate, acute, with a strong midnerve and recurved margins; sheaths long, trigonous, striate, with a short ligule. Spikelets in corymbose terminal clusters; bracts small. Spikelets $\frac{1}{4}$—$\frac{1}{3}$ in. long, oblong, terete, many-flowered. Glumes $\frac{1}{8}$ in. long (not including the stout conical slightly hairy mucro, which reaches $\frac{1}{20}$ in. long), broadly oblong, rounded at the apex below the mucro, green with red streaks by transmitted light, pubescent and ciliate; hypogynous bristles shorter than the nut, reddish brown; hypogynous scales (*petals*) 0. Anthers linear-oblong, not crested. Nut $\frac{1}{20}$ in. long, turbinate, with a conical pubescent apex, trigonous, longitudinally ribbed, trabeculate between the ribs, pale yellow; style $\frac{1}{10}$ in. long; stigmas 3, about as long as the style. Fl. B. I. v. 6, p. 665; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432. *Fuirena cuspidata,* Kunth, Enum. v. 2 (1837) p. 187; Dalz. & Gibs. p. 286. *F. pubescens,* Boeck. in Linnæa, v. 37 (1871) p. 104 (*not* of Kunth). —Flowers: Sept.

DECCAN: watery places, *Dalzell!*; Poona, *Woodrow,* 882!, *Jacquemont,* 413!—DISTRIB. India (N.-West, Central India, W. Peninsula).

2. **Fuirena glomerata,** *Lam. Illust.* v. 1 (1791) p. 150. Annual; stems 4—16 in. long, slender, erect, leafy, sparsely hairy above, glabrous or nearly so below. Leaves 2—5 by $\frac{1}{6}$—$\frac{1}{4}$ in., linear-lanceolate, acuminate, 3—5-nerved, hairy; sheaths long, closed, striate. Spikelets clustered, approximate; bracts 0 but the leaf under each cluster of spikelets. Spikelets $\frac{1}{6}$—$\frac{1}{3}$ in., ovoid or oblong, obtuse, brown; lowest glumes longest, empty. Glumes $\frac{1}{8}$ in. long (including the stout hairy awn which sometimes reaches $\frac{1}{20}$ in. long), squarrosely imbricate, at length deciduous, membranous, obovate-oblong, obtuse, the keel ending in a long awn, the tip ciliolate, the back sometimes with a few bristles; hypogynous scales (*petals*) nearly $\frac{1}{20}$ in. long, with a slender stalk about equalling the blade, the blade quadrate, strongly 3-nerved, with 3 acute lobes or teeth at the apex, of which the middle one is the longest, hastate or cordate at the base, brown, membranous. Nut $\frac{1}{30}$ in. long, stipitate, trigonous with acute angles,

subrotund or broadly obovoid, cuspidate, smooth, pale ; style $\frac{1}{50}$ in. long ; stigmas 3, nearly as long as the style. Fl. B. I. v. 6, p. 666 ; Boeck. in Linnæa, v. 37 (1871) p. 107 ; Trim. Fl. Ceyl. v. 5, p. 79 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1157. *Fuirena ciliaris*, Roxb. Hort. Beng. (1814) p. 81 ; Grah. Cat. p. 232.—Flowers : Nov.

KONKAN : *Stocks* !, *Law* ! ; Sávantvadi, *Woodrow*. GUJARAT : Godra, *Woodrow*.—DISTRIB. Throughout the warmer parts of India, common in rice-fields ; Ceylon, Tropical Africa, S.E. Asia, and Australia.

3. **Fuirena uncinata,** *Kunth, Enum.* v. 2 (1837) p. 184. Annual ; stems 4—12 in. long, rather stout, leafy, glabrous below, more or less pubescent above. Leaves 2—6 by $\frac{1}{8}$—$\frac{1}{4}$ in., linear-lanceolate, acuminate, membranous, 3—5-nerved, laxly hairy on both sides ; sheaths long, closed, hairy. Spikelets $\frac{1}{8}$—$\frac{1}{5}$ in. long, densely crowded in capitate axillary, sessile or pedunculate, simple or lobed clusters $\frac{1}{4}$—$\frac{1}{2}$ in. in diam., pale-brown ; lowest glumes longest, empty, with a broad membranous blade and rather longer awn than the others ; rhachilla scarcely any ; bracts at the base of the clusters like large glumes within which are a few very short broad hyaline ciliate scales unlike either the bracts or glumes. Glumes $\frac{1}{8}$ in. long (excluding the recurved stout laxly hairy mucro $\frac{1}{16}$ in. long), obovate, obtuse, cymbiform, pubescent on the back, hispid and hispidly ciliate at the apex, 5-nerved ; hypogynous scales quadrate, shortly clawed, $\frac{1}{25}$ in. long, with a short scabrid awn at the apex and often a minute triangular tooth at each side of the awn. Nut $\frac{1}{50}$ in. long, shortly stalked, obovoid, trigonous, with a curved beak, pale, almost white ; style longer than the nut ; stigmas 3, nearly as long. I have not found the awns of the glumes *hooked* as stated by Mr. Clarke, but merely *recurved*. Fl. B. I. v. 6, p. 666 ; Boeck. in Linnæa, v. 37 (1871) p. 108 ; Trim. Fl. Ceyl. v. 5, p. 79 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.—Flowers : Dec.

KANARA : *Thomson* !—DISTRIB. India (W. Peninsula) ; Ceylon.

4. **Fuirena umbellata,** *Rottb. Descrip. et Icon.* (1773) p. 70, t. 19, fig. 3. Perennial ; rhizome creeping, stout, horizontal, woody, with filiform root-fibres ; stems 1—4 ft. long, stout or slender, striate and ribbed, glabrous or nearly so, with nodes throughout their length. Leaves variable, 6—10 in. long, up to $\frac{2}{3}$ in. broad, linear-lanceolate, acuminate, 3—5-nerved, often ciliate towards the base, the margins smooth or nearly so ; sheaths long, closed at the mouth, with a small brown ligule. Spikelets $\frac{1}{4}$—$\frac{3}{8}$ by $\frac{1}{8}$ in., sessile, oblong, crowded in simple or compound axillary and terminal pedunculate sometimes subpaniculate dark-brown clusters $\frac{1}{2}$—1 in. in diam., with tomentose or villous peduncles ; rhachilla slender ; bracts beneath the clusters short, cuspidate. Glumes closely imbricate, at length deciduous, $\frac{1}{10}$ in. long (not including the mucro), obovate-oblong, rounded or sometimes slightly retuse at the apex, membranous, pubescent on the back and with the upper margins ciliate, strongly 3-nerved, the nerves uniting into a strong, more or less hairy mucro about $\frac{1}{25}$ in. long ; hypogynous scales (*petals*) $\frac{1}{20}$ in. long, nearly

sessile, quadrate-obovate, reddish-brown, 3-nerved, the upper margin thickened, apiculate. Stamens 3. Nut $\frac{1}{20}$—$\frac{1}{16}$ in. long, trapezoidally obovoid, stipitate, trigonous with sharp angles, chestnut-brown, smooth, with a long pale beak ; style $\frac{1}{25}$ in. long ; stigmas 3, as long as the style. Fl. B. I. v. 6, p. 666 ; Boeck. in Linnæa, v. 37 (1871) p. 110 ; Trim. Fl. Ceyl. v. 5, p. 80 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1157.—Flowers : Nov.

DECCAN : Alandi, *Woodrow*. S. M. COUNTRY : Londa, *Woodrow*.—DISTRIB. More or less throughout India; Ceylon, most warm (not too dry) countries.

10. **HYPOLYTRUM,** L. C. Rich.

Stout perennial herbs with a woody rootstock and very stout root-fibres ; stem erect, trigonous, leafy. Leaves long, narrow, linear or ensiform, coriaceous, 3-nerved. Spikelets small, ovoid or subglobose, in broad subumbellate panicles with stout spreading branches, or the panicle contracted into a more or less compact lobed head ; bracts leaf-like. Glumes containing 1 hermaphrodite flower having 2 opposite, lateral, keeled, free or connate hypogynous scales (or bracteoles) containing 2 (rarely 3) stamens and a pistil ; hypogynous bristles 0. Stamens 2 (rarely 3) ; filaments elongate. Ovary terminal, flattened, beaked ; style continuous with the ovary, early deciduous ; stigmas 2—3, filiform, sometimes thickened at the apex. Fruit a rounded or obtusely angled nut with a thick hard endocarp, beaked, often with vein-like sculpturing.—DISTRIB. Tropical regions of both hemispheres ; species 39.

Mr. Clarke regards the whole not as a single flower, but as an inflorescence with the glumes between the stamens and pistil undeveloped.

1. **Hypolytrum Wightianum,** *Boeck. in Linnæa,* v. 37 (1871) p. 130. Glaucescent ; root-fibres stout ; stem slender, 2—3 ft. long, trigonous, scarcely as thick as a goose-quill, quite smooth. Leaves rather rigid, often longer than the stems, linear, acuminate, flat or with the basal portion complicate, 3-nerved, $\frac{1}{2}$—$\frac{5}{8}$ in. broad, the margins and midrib spinulose towards the top. Spikelets in dense compound corymbose depressed panicles ; bracts leaf-like, 2—6 in. long. Spikelets $\frac{1}{6}$—$\frac{1}{3}$ in. long, sessile or shortly pedicellate, subglobose or oblong-cylindric. Glumes $\frac{1}{10}$—$\frac{1}{8}$ in. long, oblong, obtuse, sometimes apiculate, 1-nerved, with scarious margins, brown speckled with minute darker spots ; hypogynous scales (or bracteoles) 2 at the base of the nut, $\frac{1}{10}$ by $\frac{1}{25}$ in., oblong, obtuse, cymbiform, scarious, with a scabrous or hairy keel. Stamens 2 ; filaments long, slender ; anthers linear-oblong. Nut $\frac{1}{8}$—$\frac{1}{6}$ in. long, ovoid-lanceolate, terete or slightly compressed, beaked, veined below with stout obtuse veins, yellow, minutely dotted with darker spots ; style short ; stigmas 2. Fl. B. I. v. 6, p. 678 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.—Flowers : Dec.—Feb.

Stocks without locality in Herb. Kew.! S. M. COUNTRY : Castlerock, *Kanitkar*! KANARA : *Dalzell*! ; Katgal (N. Kanara), *Woodrow*!—DISTRIB. India (W. Peninsula, Nicobars).

11. **RHYNCHOSPORA,** Vahl (*Rynchospora*).

Usually tall herbs ; stems simple, leafy throughout (rarely at the base only), stout or slender. Leaves narrow, often filiform. Spikelets small, ovoid, capitate, corymbose, subumbellate or paniculate, with 1 or 2 bisexual flowers ; bracts various. Glumes imbricate all round the rhachilla, membranous or coriaceous, 1-nerved, the 3 or 4 lower shorter, empty, the next 1 or 2 fertile, the uppermost empty ; hypogynous bristles 0 or 6 (rarely fewer), scabrid with teeth pointing upwards. Stamens 1—3 ; anthers linear. Ovary rounded ; style slender, glabrous, with conical base ; stigmas 2. Nut ovoid or subglobose, turgidly biconvex, smooth or transversely waved, crowned by the conical much enlarged often very long and stout persistent style-base.—DISTRIB. Species, 150, in the warmer regions of the world, numerous in America.

Stem leafy towards the base only; spikelets in a single terminal head.	
Nut biconvex, $\frac{1}{10}$ in. long	1. *R. Wallichiana.*
Nut flattened, $\frac{1}{8}$ in. long	2. *R. Wightiana.*
Stem leafy throughout its entire length; spikelets in paniculately arranged corymbs	3. *R. aurea.*

1. **Rhynchospora Wallichiana,** *Kunth, Enum.* v. 2 (1837) p. 289. Stems 6—24 in. high, leafy at the base only, tufted, slender, striate, trigonous. Leaves shorter than the stem, narrowly linear, up to $\frac{1}{8}$ in. broad, flat or complicate, narrowed from the sheath to the tip, acute. Head of spikelets globose, terminal, brown, shining, $\frac{3}{8}$—$\frac{5}{8}$ in. in diam. ; bracts 3—8, spreading or deflexed, 1—3 in. long, linear-lanceolate, acute. Spikelets $\frac{3}{8}$ in. long, sessile, densely clustered in a terminal head, lanceolate, acute. Glumes glabrous, shining, chestnut-brown, the lowest 3—4 short, ovate-lanceolate, empty, the fertile glumes $\frac{3}{8}$ in. long, ovate-lanceolate, acuminate ; hypogynous bristles if present as long as the nut or shorter, scabrid with teeth pointing upwards. Stamens 2—3 ; anthers with an acute tip. Nut nearly $\frac{1}{10}$ in. long, with a rather long stalk, turgidly biconvex, strongly margined, with a conical beak, nearly black ; style very slender ; stigmas 2, very long. Fl. B. I. v. 6, p. 668 ; Boeck. in Linnæa, v. 37 (1871) p. 542 ; Trim. Fl. Ceyl. v. 5, p. 83 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1134.—Flowers : Aug.

KONKAN : Kalyan, *Woodrow.*—DISTRIB. Throughout India (except the North-West) ; Ceylon, Malaya, Japan, Tropical Africa, and Tropical Australia.

2. **Rhynchospora Wightiana,** *Steud. Cyp.* (1855) p. 148. Stems tufted, 6—16 in. long, slender, trigonous, glabrous ; stolons 0. Leaves many, at the base of the stem only and $\frac{1}{4}$—$\frac{3}{4}$ its length, linear, acuminate, grass-like, $\frac{1}{10}$ in. broad. Spikelets numerous, in reddish-brown heads $\frac{3}{8}$—$\frac{5}{8}$ in. in diam. ; bracts 3—6, unequal, the longest reaching 3 in. long, linear-lanceolate, acuminate, dilated and ciliate at the base. Spikelets $\frac{1}{4}$—$\frac{3}{8}$ in. long, lanceolate, acute, reddish-brown, smooth and shining. Glumes 6—7, elliptic-lanceolate, very acute, $\frac{1}{4}$ in. long, the 3 or 4 lowest empty, the next 2-sexual and larger than the lower ones, the upper male or rudimentary ; hypogynous bristles 6, unequal, $\frac{1}{8}$—$\frac{1}{4}$ in. long, slender, scabrous with

numerous minute teeth pointing upwards, brown. Nut $\frac{1}{8}$ in. long, compressed, rounded at the apex below the beak, oblong, dark brown, with pale papillæ ; beak $\frac{1}{20}$ in. long, compressed-conical, nearly white ; style $\frac{1}{8}$ in. long, very slender, brown ; stigmas 2, very minute. Fl. B. I. v. 6, p. 669 ; Boeck. in Linnæa, v. 37 (1872) p. 544 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.—Flowers : Aug.

KONKAN : *Law* ! ; Bombay without authority in Herb. Kew. ! DECCAN : Khandala, *Jacquemont,* 649 !, *Woodrow* ; Poona, *Woodrow.*—DISTRIB. India (W. Peninsula) ; Cochinchina.

3. **Rhynchospora aurea,** *Vahl, Enum.* v. 2 (1806) p. 229. Root-fibres stout ; stems 2—3 ft. long, leafy throughout, trigonous with smooth angles ; stolons 0. Leaves 1—2 ft. by $\frac{1}{2}$—$\frac{3}{4}$ in., contracted at the sheath, then narrowed to the acute tip, flat, the margins and the slender keel scabrid ; sheaths of the upper leaves closed, those of the lower open. Spikelets clustered or spicate at the ends of the branches of large corymbiform decompound terminal and axillary umbels ; bracts up to 6 in. long. Spikelets $\frac{1}{4}$—$\frac{1}{3}$ in. long, narrowly ovoid, acuminate, reddish-brown. Glumes 6—7, the 3 or 4 lower empty, ovate, mucronate or awned, the next 2-sexual reaching $\frac{1}{4}$ in. long, ovate, mucronate or awned, 1-nerved, keeled, cymbiform, the upper male or empty ; hypogynous bristles 6 or fewer, very slender, scaberulous, shorter than the nut. Nut (including the beak) reaching $\frac{1}{3}$ in. long, brown, often exserted from the glume, the portion below the beak obovoid, compressed, with slightly undulate faces ; beak reaching $\frac{1}{8}$ in. long, conical, hard, acute, as broad as the nut at the base and broadly channelled down the centre ; style long, slender ; stigmas 2, very minute. Fl. B. I. v. 6, p. 670 ; Boeck. in Linnæa, v. 37 (1873) p. 626 ; Trim. Fl. Ceyl. v. 5, p. 83 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1134. *Rhynchospora articulata,* Roem. & Schult. Syst. Mant. v. 2 (1824) p. 49 ; Dalz. & Gibs. p. 288. *Schœnus articulatus,* Roxb. Hort. Beng. (1814) p. 81 ; Grah. Cat. p. 233.

S. M. COUNTRY : *Young* ex *Woodrow.*

This plant is given both by Graham and Dalzell & Gibson, neither of whom has assigned any locality to it. There are no specimens from Bombay in Herb. Kew.—DISTRIB. More or less throughout India ; Ceylon, warm regions of the globe.

12. **REMIREA,** Aublet.

A low creeping branched rigid glabrous perennial, growing on sandy shores of sea-coasts ; rhizome or subterranean stem sometimes several feet long, rooting at the nodes, giving off short, erect, densely leafy flowering branches ; internodes of the rhizome often long, reaching 1—2 in. ; sheaths scarious, acuminate ; flowering branches clothed below with imbricating scarious sheaths. Leaves numerous on the branches, rigid, spreading and recurved, pungent ; sheaths very short, open. Spikelets small, short, 1-flowered, crowded in a terminal ovoid solitary or lobed head. Glumes 4, the 3 lower empty, the second and third larger than the lowest, suborbicular, concave, the upper fertile very thick, corky, 1-flowered ; hypogynous bristles 0.

Stamens 3 ; anthers linear, acute. Nut closely embraced by the 2 upper glumes, linear-oblong, obtusely trigonous, beaked ; style very short, thickened at the base ; stigmas 3, short.—DISTRIB. Sea-coasts in Tropical countries.

1. **Remirea maritima,** *Aubl. Hist. Pl. Guian.* v. 1 (1775) p. 45. Rhizome as thick as a crow-quill, curved, hard, terete, horizontally creeping ; sheaths leafless, as long as or sometimes longer than the internodes, acuminate. Branches erect or ascending, 2—6 in. long, simple, sheathed in the lower part with stout ovate acute finely striate scarious sheaths, densely leafy above often to the apex. Leaves crowded, rigid, recurved, linear, narrowed above, keeled and channelled, with infolded sides, triquetrous and pungent at the apex. Heads of spikelets solitary or 3 or more close together ; bracts 3—4, leaf-like, usually longer (rarely shorter) than the heads. Spikelets sessile or very shortly pedunculate, $\frac{1}{6}$—$\frac{1}{3}$ in. long and broad ; lowest glume small, the next 2 larger, broadly ovate or suborbicular, concave, multistriate, coriaceous, with scarious margins ; flowering glume oblong, cymbiform, nearly as long as the outer glumes, smooth, ultimately corky, pale brown, closely embracing the nut. Stamens 3 ; filaments long, flat. Nut $\frac{1}{8}$ in. long, oblong, tapering at both ends, compressed, minutely punctulate, dark brown or nearly black ; style hardly $\frac{1}{40}$ in. long ; stigmas 3, short, but longer than the style. Fl. B. I. v. 6, p. 677 ; Boeck. in Linnæa, v. 35 (1868) p. 435 ; Trim. Fl. Ceyl. v. 5, p. 87 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.

KANARA : *Thomson* !, *Talbot* ex *C. B. Clarke*.—DISTRIB. Sea-coasts in India; Ceylon, most tropical sea-coasts.

13. SCLERIA, Berg.

Perennial (rarely annual) erect leafy herbs ; stems trigonous or triquetrous. Leaves narrow or broad. Flowers all unisexual. Spikelets dimorphic, androgynous or male, and female, solitary or clustered on the branches of a panicle, mixed with hyaline scales (rarely spicate or capitate) ; bracts often foliaceous ; bracteoles usually filiform. Glumes 1-nerved. MALE or ANDROGYNOUS SPIKELETS narrow. Glumes many, the 5—6 lower distichous, the intermediate convolute, membranous, enclosing many narrowly linear hyaline scales. Stamens 1—3 ; anthers narrowly linear, cuspidate. Ovary sterile or 0. FEMALE SPIKELETS shorter, broader, 1-flowered. Glumes 3 or more, distichous, the lower 2—3 empty, the next above fertile, the upper empty. Disk at the base of the ovary annular (rarely obscure), often enlarged and lobed in fruit. Ovary minute ; style slender ; stigmas 3. Fruit a globose or oblong nut, usually white and polished, smooth or sculptured.—DISTRIB. Most tropical and subtropical regions ; species about 160.

Disk of female flowers 0 ..... 1. *S. lithosperma.*
Disk of female flowers cupular or 3-lobed.
  Disk cupular ..... 2. *S. annularis*
  Disk 3-lobed.
    Leaves $\frac{1}{10}$—$\frac{1}{6}$ in. broad.
      Nut tessellately cancellate ..... 3. *S. tessellata.*

Nut smooth ..... 4. *S. hebecarpa.*
Leaves ¼—⅓ in. broad.
Disk 1-seriate; nut globose, ⅓ in. in diam. ..... 5. *S. biflora.*
Disk 2-seriate; nut ellipsoid, ⅛—⅙ in. long ..... 6. *S. Stocksiana.*

1. **Scleria lithosperma,** *Sw. Prodr.* (1788) p. 18. Rhizome hard, elongate, horizontal, nodose; root-fibres slender, wiry; stems not tufted, 1½—3 ft. long, very slender, trigonous, smooth. Leaves as long as or shorter than the stem, narrowly linear, $\frac{1}{20}$—$\frac{1}{12}$ in. broad, narrowed to the subobtuse tip; sheaths trigonous, closed, glabrous or hairy. Spikelets few, subsolitary, distant on the filiform rhachis and on the few distant branches of slender terminal and axillary subspiciform panicles, dark-brown; bisexual spikelets many; bracts and bracteoles long, slender, almost capillary. Fruiting spikelets $\frac{1}{10}$ in. long. Glumes broadly ovate, cuspidately acuminate. Disk-lobes obsolete. Nut $\frac{1}{10}$ in. long, broadly ellipsoid, obtusely trigonous, smooth, polished, white; style about $\frac{1}{30}$ in. long; stigmas 3, longer than the style. Fl. B. I. v. 6, p. 685; Grah. Cat. p. 233; Dalz. & Gibs. p. 288; Boeck. in Linnæa, v. 38 (1874) p. 451; Trim. Fl. Ceyl. v. 5, p. 96; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432; Prain, Beng. Pl. p. 1132.—Flowers: Dec.

KONKAN: Matheran, *Woodrow.* KANARA: *Talbot,* 562, ex *C. B. Clarke.*—DISTRIB. Throughout India (except the West arid area); Ceylon, most warm regions except Continental Africa.

2. **Scleria annularis,** *Kunth, Enum.* v. 2 (1837) p. 359. Root fibrous; rhizome 0; stem erect, 1—2 ft. high, compressed, triquetrous, slender, scabrous at the apex with spinules pointing downwards. Leaves 6—12 by ⅛ in., linear, subacute, keeled, 3-nerved, the margins and keel scabrous; sheaths 3-winged, hairy or glabrous. Panicles axillary, remote, subspicate, rather dense, oblong, 1—2 in. long; bracteoles conspicuous, linear-lanceolate, acuminate, leaf-like. Spikelets oblong, acute. Glumes ⅛ in. long, reddish-brown, ovate-lanceolate, cuspidate, acutely keeled, the keel spinulose above. Nut $\frac{1}{10}$ in. long, ellipsoid, terete or obscurely trigonous, rounded at the apex, smooth, white. Disk shallowly cup-shaped, small, brown, not lobed, closely appressed to the base of the nut. Fl. B. I. v. 6, p. 687; Boeck. in Linnæa, v. 38 (1874) p. 456; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.

KONKAN: *Stocks!, Law!* KANARA: *Law!*—DISTRIB. India (N.-West, Central India, W. Peninsula); China.

3. **Scleria tessellata,** *Willd. Sp. Pl.* v. 4 (1805) p. 315. Root fibrous, the fibres very dark, nearly black; stems many, tufted, slender, 1—2½ ft. long, triquetrous. Leaves 6—12 by $\frac{1}{10}$ in. or less, linear, subacute or obtusely acuminate, rigid, 3-nerved, with involute scaberulous margins; sheaths trigonous, closed, the mouth truncate. Spikelets solitary or in small clusters on the branches of narrow erect terminal and subterminal sparingly branched panicles 2—3 in. long; bracteoles filiform. Fruiting spikelets $\frac{1}{10}$ in. long. Glumes 3, broadly ovate, acuminate, dark brown. Disk-lobes small, thick, triangular, obtuse, creamy-white. Nut globose, $\frac{1}{10}$ in. in diam., tessellately cancellate in vertical lines, top rounded, not beaked, white, not or rarely puberulous with reddish hairs on the ridges.

Fl. B. I. v. 6, p. 686 ; Boeck. in Linnæa, v. 38 (1874) p. 470 ; Trim. Fl. Ceyl. v. 5, p. 98 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1132.

KONKAN : near Pánvel, *Jacquemont* !—DISTRIB. Throughout India (except the West arid area) ; Ceylon, Malaya, China, Japan, Australia.

4. **Scleria hebecarpa,** *Nees, in Linnæa,* v. 9 (1835) p. 303. Rhizome woody, nodose ; root-fibres stout ; stem 2—3 ft. long or more, triquetrous. Leaves 10—12 by ⅛—⅓ in., narrowed to the obtuse tip, multistriate, flat, 3-nerved, rigid, usually with scabrous margins ; sheaths trigonous, closed, the mouth truncate, with an ovate coriaceous pubescent ligule, the sheaths of the middle stem-leaves winged. Spikelets all unisexual, solitary or in small clusters on the suberect branches of narrow terminal and subterminal sparingly branched panicles 2—3 in. long ; bracts 2—4 in. long, leaf-like ; bracteoles filiform, ½—¾ in. long. Fruiting spikelets ⅛ in. long. Glumes 3, the upper broadly ovate, cuspidate. Disk-lobes triangular-ovate, acute, with a broad sinus, ¼—⅓ the height of the nut. Nut ⅛ in. long, globose or broadly ovoid, obscurely trigonous, apiculate, white, smooth, polished. Fl. B. I. v. 6, p. 689 ; Boeck. in Linnæa, v. 38 (1874) p. 478 ; Trim. Fl. Ceyl. v. 5, p. 99 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.

KONKAN : *Stocks* !, *Law* ! KANARA : N. Kanara, *Talbot* ex *Woodrow.*—DISTRIB. Throughout India (except the N.W. arid region) ; Ceylon, Malaya, China, Japan, Australia, Polynesia.

5. **Scleria biflora,** *Roxb. Fl. Ind.* v. 3 (1832) p. 573. Root fibrous ; stems tufted, 1—2 ft. long, trigonous, slender, leafy. Leaves 6—10 by ¼—⅓ in., ensiform, obtuse or subacute, thin, flat, 3-nerved, the margins smooth or scaberulous ; sheaths loose, closed, trigonous, the mouth truncate. Spikelets solitary or in small clusters on the branches of slender, erect, terminal and subterminal, sparingly branched panicles 2—3 in. long ; bracteoles filiform, ¼—⅝ in. long. Fruiting spikelets 1/10 in. long. Glumes 3, broadly ovate, acuminate. Disk 3-lobed, the lobes ovate, acuminate, large, often half the length of the nut, reddish-brown. Nut globose, 1/12 in. in diam., tessellately cancellate in vertical lines, pubescent on the ridges with reddish-brown hairs, shortly beaked, white. Fl. B. I. v. 6, p. 687 ; Trim. Fl. Ceyl. v. 5, p. 99 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432 ; Prain, Beng. Pl. p. 1132. *Scleria Steudeliana,* Miq. Fl. Ned. Ind. v. 3 (1859) p. 344 ; Boeck. in Linnæa, v. 38 (1874) p. 475.—Flowers : Dec.

Closely allied to *S. tessellata,* from which it differs in the leaves which are broader, in the disk-lobes which are much larger, and in the nut which is beaked.

KONKAN : Matheran, *Woodrow,* 77 !—DISTRIB. India (N. & E. Bengal, Cachar, W. Peninsula) ; Ceylon, Malaya, S. China.

6. **Scleria Stocksiana,** *Boeck. in Linnæa,* v. 38 (1874) p. 474. Root fibrous, small ; stem 6—15 in. long, erect, slender, striate, triquetrous above, scabrous on the margins, the minute spinules on the upper part pointing upwards, those below pointing downwards. Leaves 6—12 in. long, linear, acuminate, ¼ in. broad, multistriate,

with scabrous margins. Panicle elongate, slender, the lower branches remote ; sheaths long, striate, truncate, usually hairy at the mouth ; bracts of variable length, leaf-like, $\frac{1}{12}$—$\frac{1}{6}$ in. broad ; bracteoles narrowly linear, acute, much longer than the spikelets. Spikelets with female and androgynous flowers more or less mixed with males, oblong, obtuse. Glumes ovate-lanceolate. Nut $\frac{1}{8}$—$\frac{1}{6}$ in. long, exceeding the glumes, globosely ellipsoid, truncate at the base, slightly umbonate at the apex, terete or obsoletely trigonous, densely cancellate-reticulate. Disk 2-seriate, the outer with 3 broad rounded spreading lobes, dark-brown with a whitish margin, the 3 inner lobes ovate, acute, closely appressed to the nut, whitish. Fl. B. I. v. 6, p. 687 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 432.

KONKAN : *Stocks*!, *Law*! S. M. COUNTRY : Londa, *Woodrow*! KANARA : *Woodrow*, 76!—DISTRIB. India (W. Peninsula).

14. **CAREX**, Linn.

Perennial, glabrous (rarely pubescent) grassy sedges ; stems leafy, chiefly at the base ; spikelets solitary or few, one terminal, the others lower down (rarely all clustered in terminal or axillary panicles or compound spikes), unisexual or androgynous, the lower spikelets female with a few males at the base or top, very rarely dicœcious, uppermost often wholly male. Glumes many, imbricate all round the rhachilla, persistent or deciduous ; flowers solitary in the glumes. MALE FLOWERS of 2—3 stamens ; anthers linear, obtuse. FEMALE FLOWERS a compressed or triquetrous ovary enclosed in an urceolate usually 2-toothed utricle ; style usually slender ; stigmas 2 or 3, protruding from the utricle.—DISTRIB. Species about 500.

Spikelets short ($\frac{5}{8}$ in. long or less), numerous, arranged in compound panicles.	
Nuts 3—4; beak of utricle $\frac{1}{3}$ the length of the body; style much shorter than the nut; female glumes ovate-lanceolate, shortly apiculate	1. *C. condensata.*
Nuts 6—10; beak of utricle nearly as long as the body; style nearly as long as the nut; female glumes elliptic, conspicuously aristate	2. *C. mercarensis* [var. *major.*
Spikes 1—1½ in. long, few (3 or fewer), very remote, slender, racemosely arranged	3. *C. speciosa.*

1. **Carex condensata,** *Nees, in Wight, Contrib.* (1834) p. 123. Stem 2—3 ft. high, erect, rigid, slender, obtusely triquetrous above, smooth, leafy. Leaves long, linear, acuminate, flat, with minutely scabrous margins, $\frac{1}{4}$—$\frac{3}{8}$ in. broad, the upper exceeding the inflorescence. Panicle axillary, decompound, pale brown, concolorous, 6—8 in. long ; partial panicles 1½—2½ in. long, much-branched, the upper approximate, the lower rather remote, pedunculate ; bracts foliaceous with long sheaths ; bracteoles beneath the spikelets filiform. Spikelets sessile, $\frac{1}{4}$—$\frac{3}{8}$ in. long, with 3—4 nuts, reddish-brown, oblong, terete, with many male flowers. Glumes reaching $\frac{1}{3}$ in. long, ovate-lanceolate, acute, apiculate, membranous, pale brown. Utricle rather more than $\frac{1}{8}$ in. long, yellowish-brown, dotted with ferruginous spots, straight or slightly curved, ovoid-lanceolate, trigonous, irregularly ribbed, scabrous-pilose ; beak $\frac{1}{3}$ the length of the utricle 2-fid.

Nut $\frac{1}{16}$ in. long, ellipsoid, trigonous, very shortly stipitate ; style about $\frac{1}{80}$ in. long ; stigmas very short. Fl. B. I. v. 6, p. 716 ; Boott, Carex, part 2 (1860) p. 86, tt. 247, 248. *Carex indica,* Nees, in Wight, Contrib. (1834) p. 123 (*not* of Linn.) ; Dalz. & Gibs. p. 288 ; Grah. Cat. p. 233. *C. bengalensis,* Roxb. Hort. Beng. (1814) p. 103 ; Boeck. in Linnæa, v. 40 (1876) p. 346.

DECCAN : Mahableshwar, *Dalzell & Gibson.* SIND : *Pinwill.*—DISTRIB. India (Himalaya and Khasia Hills).

2. **Carex mercarensis,** *Hochst. ex Steud. Syn. Pl. Cyp.* (1855) p. 194. VAR. **major** *Steud. l. c.* Rhizome short, hard, subtuberous ; root-fibres long, stout ; stem erect, slender, 1—2 ft. high, firm, triquetrous, smooth. Leaves shorter than the stem, $\frac{1}{8}$—$\frac{3}{8}$ in. broad, linear, acuminate, multistriate and with a strong midrib. Inflorescence elongate ; partial panicles oblong or scarcely pyramidal ; branches erect, spreading ; bracts foliaceous, much longer than the panicles. Spikelets $\frac{3}{8}$—$\frac{5}{8}$ in. long with distant glumes, the female flowers 6—10 in the lower part of the spikelet, the males very few at the apex. Female glumes $\frac{1}{8}$ in. long, elliptic, aristate. Utricle (including beak) $\frac{1}{8}$ in. long, trigonous, straight or slightly curved, scabrous-hairy, with numerous slender nerves ; beak nearly as long as the body, shortly 2-toothed or sometimes entire. Nut $\frac{1}{12}$—$\frac{1}{10}$ in. long, ellipsoid, acutely trigonous, shortly stipitate, pale-yellow ; style as long as the nut ; stigmas rather shorter than the style. Fl. B. I. v. 6, p. 719. *C. mercarensis,* Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.—Flowers : Oct.

DECCAN : Mahableshwar, *Woodrow,* 79! S. M. COUNTRY : Londa, *Woodrow.* KANARA : Hulgi (N. Kanara), *Talbot* ex *Woodrow.*—DISTRIB. India (W. Peninsula).

3. **Carex speciosa,** *Kunth, Enum.* v. 2 (1837) p. 504. Glabrous ; rhizome short or long ; stems cæspitose, 1—1½ ft. long, slender, winged and scaberulous at the apex below the inflorescence. Leaves sub-basal, often exceeding the stem, $\frac{1}{8}$—$\frac{5}{8}$ in. wide, linear, acuminate, multistriate, flat. Peduncles radical, 6—12 in. long, surmounted by narrow oblong spikes 1—1¼ by $\frac{1}{8}$ in. ; male flowers in the upper third of the spike which is attenuated in the male portion ; female flowers at the base of the spike ; bracts foliaceous, shorter or longer than the inflorescence, shortly sheathed. Glumes broadly ovate or suborbicular, obtuse or abruptly apiculate, reaching $\frac{1}{8}$ in. long, multistriate, all green, concolorous. Utricle reaching $\frac{1}{4}$ in. long, acutely trigonous, multistriate, concave on the inner face, rounded on the back, the two interior margins slightly winged and ciliate ; beak $\frac{1}{16}$ in. long, conical, truncate, 2-fid, with ciliate margins. Nut $\frac{1}{8}$ in. long, ellipsoid, trigonous, with prominent angles, stipitate, pale brown with darker markings, finely reticulate ; style persistent, very stout, conical, thickened at the base ; stigmas very short. Fl. B. I. v. 6, p. 729 ; Boott, Carex, part 1 (1858) p. 53 ; Boeck. in Linnæa, v. 40 (1876) p. 388 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1130.—Flowers : Oct.

KANARA : Hulgi (N. Kanara), *Talbot,* 2282!—DISTRIB. Throughout India; Borneo.

ORDER CXLVII. GRAMINEÆ.

Erect decumbent or creeping herbs (rarely suffruticose), or in Tribe *Bambuseæ* shrubs or trees ; stems usually branched at the base, terete or compressed, with hollow or solid internodes. Leaves distichous, simple, usually long and narrow, generally parallel-nerved, with a sheathing base (*sheath*) distinct from the blade and rarely an interposed petiole ; sheath split to the base (very rarely entire), with usually a transverse erect appendage (*ligule*) consisting of a membrane or a fringe of hairs at the union with the blade. Inflorescence terminal (rarely terminal and lateral), composed of variously arranged spikelets, paniculate, racemose, capitate, simply or compoundly spicate (rarely of a single spikelet). Spikelets consisting of an axis (*rhachilla*) and typically of 3 or more alternate distichous more or less heteromorphous bracts (*glumes*), of which the two lowest (*involucral glumes*) form an involucre to the spikelet and are empty, while the following (*floral glumes*) bear in their axils subsessile flowers subtended by a hyaline 2-keeled or 2-nerved dorsal scale (*palea*) ; floral glumes differing usually in structure and size from the involucral glumes, and forming with the palea and the flower proper false flowers (*florets*), which are alike or different in structure and sex. Flowers hermaphrodite or 1-sexual (often with the rudiments of the other sex), consisting of 2 (rarely 3) minute hyaline fleshy scales (*lodicules*) which represent a perianth (sometimes absent), and of stamens or a pistil or both. Stamens usually 3 (rarely 6, 4, 2, or 1, very rarely more), hypogynous ; filaments slender, usually free ; anthers versatile, fugacious, with 2 parallel cells, usually dehiscing by a longitudinal slit. Ovary entire, 1-celled ; ovule erect, anatropous ; styles 2 (rarely 3 or 1), free or connate at the base, usually elongate and exserted from the apex or sides of the spikelet, clothed with simple or branched stigmatic hairs. Fruit a seed-like grain, free within the flowering glume and palea or adnate to either or both ; pericarp very thin (rarely thick and separable from the seed). Seed erect ; albumen copious, floury ; embryo minute, at the base of and outside the albumen ; cotyledon shield-shaped with an erect conical plumule and a descending conical radicle.—DISTRIB. Genera about 325 ; species more than 3000, in all parts of the world.

I have, at Dr. Stapf's suggestion, adopted for the two classes of glumes the terms *involucral* and *floral*. In the clavis I have closely adhered to the Tribes adopted by Dr. Stapf in his 'Flora Capensis' (1898).

In citing Trimen's 'Flora of Ceylon,' the Gramineæ of which have been entirely written by Sir J. D. Hooker, I have, for the sake of brevity, adopted the citation *"Trim. Fl. Ceyl."* except in cases of descriptions of new species.

SERIES I. Mature spikelets articulate on their pedicels (sometimes inarticulate in *Isachne*) or deciduous with them ; spikelets similar or differing in sex and structure, the perfect spikelets with 2 heteromorphous florets, the upper hermaphrodite, the lower male or neuter. Rhachilla not produced beyond the upper floret.

TRIBE 1. **PANICEÆ.** Spikelets in usually continuous spikes, racemes, or panicles ; lower invol.-glume smaller, often minute or suppressed ; lower floral glume generally resembling the invol.-glumes

in structure and nervation ; upper floral glume firmer, at length rigid, often chartaceous to crustaceous.

Shrubs; flowers dicœcious ..... 1. SPINIFEX.
Herbs; flowers not dicœcious.
Spikelets 2-flowered, the upper 2-sexual; lower male or neuter, rarely (*Isachne*) both fertile.
Mature spikelets persistent on their pedicels, surrounded singly or in clusters by an involucel of naked or plumose bristles or spines which fall along with the spikelets.
Involucel of bristles ..... 2. PENNISETUM.
Involucel of spines connate at the base ..... 3. CENCHRUS.
Mature spikelets falling entire and singly from the tips of their pedicels.
Spikelets subtended by an involucel of bristles. 4. SETARIA.
Spikelets not subtended by bristles.
Branches of the panicle produced beyond the uppermost spikelets; lower invol.-glume minute, orbicular, white, hyaline... 5. CHAMÆRAPHIS.
Branches of the panicle not produced beyond the uppermost spikelets.
Glumes 4, all distinct or 3 distinct and 1 obsolete (in *Panicum subeglume* sometimes 2 obsolete).
Invol.-glumes separately deciduous.. 6. ISACHNE.
Invol.-glumes not separately deciduous.
Spikelets awned (except in *Trichoelæna Tenerriffæ*).
Spikelets densely silky ..... 7. TRICHOLÆNA.
Spikelets not silky.
Palea of lower floral glume very short, 2-fid ..... 8. AXONOPUS.
Palea of lower floral glume entire or 0 ..... 9. OPLISMENUS.
Spikelets not awned except in *Panicum stagninum* (mucronate or apiculate in a few species of *Panicum* and in *Eriochloa*).
Lower invol.-glume distinct (except in *Panicum subeglume*); inflorescence paniculate ..... 10. PANICUM.
Lower invol.-glume minute (rarely absent); nerves of lower floral glume 5—7, straight, prominent; inflorescence usually digitate. 11. DIGITARIA.
Lower invol.-glume absent; nerves of lower floral glume 5 or fewer, the side-nerves curved.
Spikelets not thickened at the base ..... 12. PASPALUM.
Spikelets thickened at base ..... 13. ERIOCHLOA.

TRIBE 2. **ANDROPOGONEÆ.** Spikelets usually in pairs, one sessile, the other pedicellate, rarely 3-nate or solitary on the axis of a usually spike-like raceme. Invol.-glumes more or less rigid and firmer than the floral glumes, the lower always longer than the florets ;

floral glumes membranous, often hyaline, that of the upper floret usually awned or reduced to an awn.

Spikelets all similar.
Spikelets solitary, secund on a filiform or flattened inarticulate rhachis ..... 14. DIMERIA.
Spikelets in open or contracted panicles.
Racemes of spikelets in compound panicles.
Rhachis not fragile.
Panicle spiciform silky; spikelets 1-flowered .... 15. IMPERATA.
Rhachis fragile.
Leaves petiolate; spikelets 2-flowered ..... 16. SPODIOPOGON
Leaves not petiolate; spikelets 1-flowered.
Panicle much branched, open, silky.
Spikelets awnless ..... 17. SACCHARUM.
Spikelets awned ..... 18. ERIANTHUS.
Racemes of spikelets 2-nate, digitate or approximate on a short main axis ..... 19. POLLINIA.
Spikelets dissimilar.
Spikelets of each pair differing in sex and structure or (*Ophiurus*) spikelets solitary not secund.
Spikelets sunk in pits of an articulate or fragile rhachis.
Sessile spikelets unaccompanied by an upper spikelet or the pedicel of one ..... 20. OPHIURUS
Sessile spikelets accompanied by a dissimilar pedicellate spikelet.
Lower invol.-glume ovate or oblong, flat, smooth ..... 21. ROTTBOELLIA.
Lower invol.-glume globose, inflated, pitted. 22. MANISURIS.
Spikelets not sunk in nodes of the rhachis.
Spikelets 3 on a very short uninodal inarticulate rhachis, a sessile 2-flowered and 2 pedicellate enclosed in a pedunculate spathe ..... 23. APLUDA.
Spikelets many or few on a plurinodal inarticulate rhachis.
Spikelets many, 2-nate (rarely solitary), in spike-like racemes which are solitary, 2-nate, digitate or approximate on a short main axis; lower floret of the sessile spikelet male.
Margin of lower invol.-glume of sessile spikelet inflexed ..... 24. ISCHÆMUM.
Margin of lower invol.-glume of sessile spikelet not inflexed.
Spikelets 2-awned ..... 25. POGONATHERUM.
Spikelets 1-awned.
Pedicellate spikelets floriferous .... 26. LOPHOPOGON.
Pedicellate spikelets reduced to pedicels often glume-like.
Spikelets 1—2-flowered; lower invol.-glume cuneate-obovate or obcordate, villous; lodicules 0 ..... 27. APOCOPIS.
Spikelets 1-flowered; lower invol.-glume lanceolate, often muriculate; lodicules 2 ..... 28. ARTHRAXON.
Spikelets 2-flowered; lower invol.-glume ovate, beaked, transversely rugose; lodicules 2 ..... 29. THELEPOGON.

Spikelets in compound panicles or spike-like racemes, variously disposed, 2-nate (rarely 3-nate); lower floret of all the spikelets empty; upper usually awned or reduced to an awn.
- Lower invol.-glume furnished with oil-glands or penicillate tubercles close to the keels; spikelets not awned but often beaked ..... 30. ELIONURUS.
- Lower invol.-glume not furnished with oil-glands; spikelets awned.
  - Spikelets in alternate pairs or lower solitary.
    - Inflorescence usually elongate; sessile spikelets many ..... 31. ANDROPOGON.
    - Inflorescence very short; sessile spikelets 2 ..... 32. PSEUDANTHISTIRIA.
  - Spikelets dimorphic, the 4 lower sessile forming an involucre round the upper.
    - Rhachis articulate above the involucral spikelets ..... 33. THEMEDA.
    - Rhachis articulate below the involucral spikelets ..... 34. ISEILEMA.

TRIBE 3. **MAYDEÆ.** Inflorescence monœcious, spicate, the male and female spikelets on the same spike (in which case the females are at the base of the spike) or on different spikes; spikelets never awned, the male and female very dissimilar.

Fruiting spikelet enclosed in a stony polished nut-like bract ..... 35. COIX.
Fruiting spikelet with the lower invol.-glume forming a crustaceous nut-like envelope to the other glumes and grain ..... 36. POLYTOCA.

SERIES II. Mature spikelets breaking up, leaving the persistent or subpersistent glumes on the pedicel, or if falling entire, then not consisting of 2 heteromorphous florets as in Series I.

A. *Leaf-blades rarely* (Centotheca) *transversely veined, not articulate on the sheath.*

TRIBE 4. **ARUNDINELLEÆ.** Florets 2, heteromorphous, the lower awnless, male or neuter. Rhachilla not produced beyond the upper floret. Lower floral glume awnless, rather resembling the invol.-glumes; upper generally awned; awn from the sinus often between 2 bristle-like lateral awns (rarely from the entire obtuse tip), usually geniculate and twisted below the knee.

Spikelets solitary on distinct pedicels, small; flaps of the palea auricled ..... 37. ARUNDINELLA.
Spikelets in clusters of 3, large; flaps of the palea not auricled ..... 38. TRISTACHYA.

TRIBE 5. **ARUNDINEÆ.** Florets 2-many, enveloped in very long hairs springing either from the callus or from the back or margin of the floral glumes. Glumes membranous, often hyaline.

Hairs springing from the margins of the upper floral glume ..... 39. THYSANOLÆNA.
Hairs springing from the callus ..... 40. PHRAGMITES.

TRIBE 6. **STIPEÆ.** Floret 1. Rhachilla not produced beyond the upper floral glume which is 2-sexual, hardened when mature, tightly enveloping the fruit; nerves joining or closely approaching at the tip. Awn terminal (rarely 0).

Awns 3 from the entire tip or 1 simple below, 3-branched above, rarely quite simple ..... 41. ARISTIDA.

TRIBE 7. **AGROSTEÆ.** Floret 1. Rhachilla rarely produced beyond the floret. Upper floral glume membranous, not changed when mature, usually 5-nerved, all the nerves or the outer side-nerves often slightly excurrent, parallel, or at least not anastomosing. Spikelets awned or not.

Spikelets in cylindric spike-like panicles; spikelets not awned ..... 42. HELEOCHLOA.
Spikelets in open or contracted many-flowered panicles; spikelets awned.
  Spikelets subdigitately panicled at the top of a slender peduncle, laterally compressed; stamens 2 ..... 43. WOODROWIA.
  Spikelets terete, in branched panicles; stamens 3... 44. GARNOTIA.

TRIBE 8. **ZOYSIEÆ.** Mature spikelets falling entire and singly or in clusters. Floret 1. Rhachilla not produced beyond the floret. Glumes equal or the lower much smaller or suppressed. Floral glume small, thinly membranous, 1—3-nerved. Spikelets in slender spiciform panicles or racemes.

Spikelets falling in clusters of 2—4.
  Spikelets fascicled.
    Fascicles secund on a broad articulate rhachis; glumes 4; upper invol.-glume not echinate ..... 45. TRACHYS.
    Fascicles all round a slender rhachis; glumes 3; upper invol.-glume echinate ..... 46. TRAGUS.
Spikelets falling singly.
  Lower invol.-glume with pectinate margins; upper invol.-glume spinulosely tuberculate; glumes 3 .... 47. LATIPES.
  Invol.-glumes neither pectinate nor tuberculate.
    Glumes 2; spikelets not awned ..... 48. ZOYSIA.
    Glumes 3; spikelets with a long awn ..... 49. PEROTIS.

TRIBE 9. **SPOROBOLEÆ.** Involucral and floral glumes very similar. Floret 1. Rhachilla not (or rarely) produced beyond the floret. Upper floral glume membranous, acute or obtuse, not changed when ripe, 1- or more or less distinctly 3-nerved, awnless, usually olive-green or grey; side-nerves, if present, delicate, evanescent above. Seed often free in the delicate pericarp.

Spikelets small ..... 50. SPOROBOLUS.

TRIBE 10. **ERAGROSTEÆ.** Spikelets variously panicled, sometimes spicate or subspicate. Florets usually numerous and far-exserted from the glumes. Involucral and floral glumes somewhat similar in general appearance. Floral glumes membranous or chartaceous, entire or 2—3-cleft, 3-nerved, the nerve evanescent above or excurrent into bristles; side-nerves usually submarginal, glabrous or pubescent or finely ciliate below. Paleæ often persistent or subpersistent.

Floral glumes entire.
Upper invol.-glume 3-nerved ..... 51. ERAGROSTIS.
Upper invol.-glume 5-nerved ..... 52. HALOPYRUM.
Floral glumes toothed ..... 53. DIPLACHNE.

TRIBE 11. **CHLORIDEÆ.** Spikelets usually in 2-ranked secund spikes or spike-like racemes, rarely distinctly pedicellate and paniculate. Florets 1 to many. Floral glumes usually membranous, truncate, emarginate or toothed, 3-nerved; nerves distant, subparallel, distinct, percurrent or excurrent, and often ciliate all along, the lateral submarginal (in *Eleusine* there are sometimes additional side-nerves close to the middle nerve of the glume). Awn, if present, straight, usually from a truncate or toothed tip.

Spikelets in deciduous articulate clusters ..... 54. GRACILEA.
Spikelets not clustered.
Spikelets 1-flowered or with one hermaphrodite and 1 or more male or barren florets.
Spikelets 1-flowered, awnless.
Spike solitary, terminal; invol.-glumes longer than the ciliate membranous floral glume ... 55. MICROCHLOA.
Spikes digitate; invol.-glumes shorter than the glabrous subchartaceous floral glume ..... 56. CYNODON.
Spikelets with 1 hermaphrodite flower, the others male or barren, usually awned, in digitate or fascicled spikes ..... 57. CHLORIS.
Hermaphrodite florets 2—many in each spikelet (sometimes reduced to 1 in *Tripogon pauperculus*).
Spikelets crowned on a solitary spike ..... 58. TRIPOGON.
Spikes digitate or whorled ..... 59. ELEUSINE.
Spikes in narrow pyramidal racemes ..... 60. DINEBRA.

TRIBE 12. **PAPPOPHOREÆ.** Floral glumes broad, 5-many-nerved, cleft into 3-many subulate lobes with or without alternating fine straight awns from the sinuses.

Floral glumes 9-cleft ..... 61. ENNEAPOGON.

TRIBE 13. **ORYZEÆ.** Spikelets all alike or more or less heteromorphous and unisexual. Fertile floret 1, awned or not, terminal with 2 minute empty florets (floral glumes) below it or solitary. Invol.-glumes very minute or confluent into an annular rim or suppressed. Palea 3—9-nerved. Stamens usually 6 (rarely more), or 1—3.

A floating glabrous grass; spikelets awned ..... 62. HYGRORHIZA.
Leafy tall grasses, not floating; spikelets usually awnless.
Keels of floral glume and palea pectinately ciliate; spikelets awnless ..... 63. LEERSIA.
Keels of floral glume and palea not pectinately ciliate; spikelets rarely awned ..... 64. ORYZA.

TRIBE 14. **FESTUCEÆ.** Involucral glumes more or less resembling the floral ones in general appearance. Fruiting florets 2 to many (very rarely 1), often much exserted from the glumes. Floral glumes 5- or more-nerved (rarely 1—3-nerved). Awns, if present, terminal or subterminal, never geniculate.

Leaves broad, tessellately nerved; fruiting glumes with reflexed submarginal tubercle-based bristles ..... 65. CENTOTHECA.

Leaves narrow, not tessellately nerved; fruiting glumes without submarginal bristles.
Leaves reaching 12 in. long or more, flaccid; inflorescence in long, often interrupted cylindric spikes ..... 66. ELYTROPHORUS.
Leaves less than 2 in. long, rigid, pungent; inflorescence in short subcapitate spikes ..... 67. ÆLUROPUS.

TRIBE 15. **HORDEÆ.** Spikelets sessile, singly or in clusters, more or less sunk in the hollows of the rhachis of a simple spike. Florets 1 or more.

Spikelets solitary at the nodes of the spike with their plane radial to the rhachis. Florets 1—3 ..... 68. OROPETIUM.

B. *Blades of leaves transversely veined and articulate on the sheath.*

TRIBE 16. **BAMBUSEÆ.** Shrubs or trees. Spikelets all of one kind. Florets few to many (rarely 1). Lower 2 or more glumes empty, gradually increasing in size up to the flowering, with sometimes small terminal imperfect ones. Floral glumes subherbaceous to subcoriaceous, 5-many-nerved, usually awnless. Lodicules usually 3. Stamens 3—6 or more. Styles 2 or 3.

Pericarp thin, adnate to the seed.
Paleæ all 2-keeled; stamens 6; filaments free ..... 69. BAMBUSA.
Paleæ of upper flowers 0 or glume-like, not keeled; filaments connate ..... 70. OXYTENANTHERA.
Pericarp fleshy or crustaceous, not adnate to the seed.
Spikelets 2-many-flowered; palea 2-keeled; stamens 6; pericarp crustaceous ..... 71. DENDROCALAMUS.
Spikelets 1-flowered; palea 0 or glume-like; pericarp fleshy ..... 72. OCHLANDRA.

1. **SPINIFEX,** Linn.

Dicœcious gregarious much-branched rigid littoral bushes; stem and branches woody. Leaves narrow, rigid, involute, spreading and recurved, thickly coriaceous. Inflorescence of large terminal globose bracteate heads, with radiating spike-like racemes, the male with many spikelets on each spike, the female with one only. MALE SPIKELETS 1—2-flowered, distichous, articulate on short pedicels. Glumes 4, chartaceous, acute, strongly nerved; invol.-glumes empty; lower floral glume paleate, empty or 3-androus; upper floral glume paleate, 3-androus, the paleæ of both floral glumes acuminate, as long as the glumes. Anthers linear. FEMALE SPIKELETS narrower than the male, erect, lanceolate, 1-flowered. Glumes acute or acuminate, strongly nerved, the lower invol.-glume the longest; lower floral glume empty; upper floral glume thin, dorsally compressed; palea linear-oblong, acuminate. Lodicules 2, large, connate below, strongly nerved. Styles long, connate below; stigmas long, penicillate, exserted at the top of the glume. Grain clavate, tipped by the long rigid style, free within the hardened glume and palea.—DISTRIB. Species 4, one in India, three in Australia.

1. **Spinifex squarrosus,** *Linn. Mant.* (1771) p. 300. A pale grey or glaucous squarrose shrub, several feet high and broad, forming an impenetrable thicket; stem as thick as the little finger below,

smooth, solid. Leaves 4—6 in. long, spreading and recurved, smooth, tapering from the base to the tip, concavo-convex, base not dilated, margins scaberulous ; sheath ½—1 in. long, smooth, with naked margins ; ligule a ridge of stiff hairs. MALE INFLORESCENCE reaching 6—8 in. in diam. ; bracts shorter than the spikes, lanceolate, aristately pungent, flat, chartaceous, the midrib very prominent beneath ; racemes (male) 1—3 in. long, longer than the stout angular peduncles ; rhachis angular. Spikelets ½ in. long, smooth, straw-colored. Glumes 4 ; lower invol.-glume usually shorter than the upper, ovate, acute, pungent, conspicuously 7—9-nerved ; upper invol.-glume similar but usually longer ; floral glumes longer than the invol.-glumes, subequal, 5—7-nerved. FEMALE INFLORESCENCE reaching 10 in. in diam. ; bracts as in the male but smaller ; peduncle thickened towards the base. Spikelets ½—⅔ in. long, narrowly lanceolate. Glumes 4 ; lower invol.-glume oblong-lanceolate, many-nerved, scaberulous ; upper invol.-glume rather shorter, 7-nerved ; lower floral glume empty, the palea 0 or imperfect ; upper floral glume ovate-lanceolate, 5-nerved ; palea shorter than the glume, acute. Fl. B. I. v. 7, p. 63 ; Grah. Cat. p. 240 ; Trim. Fl. Ceyl. v. 5, p. 174 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1168 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 331.—Flowers : Nov. A valuable sand-binding plant.

KONKAN : *Law* ! ; Shrivardhan, *Woodrow* ; sandy shores near Bandra, close to Bombay, *Graham*. KANARA : *Thomson* ! ; Kumpta, *Woodrow*. GUJARAT : near Domas, *Cooke* !—DISTRIB. Sandy shores of India ; Ceylon, Java, China.

2. **PENNISETUM,** Pers.

Annual or perennial grasses. Leaves narrow. Inflorescence of spike-like racemes of involucellate clusters of shortly pedicellate spikelets articulate on a simple rhachis ; involucels consisting of unequal scabrid or plumose simple or branched bristles. Spikelets 1—6 in each involucel, persistent on their pedicels, 1—2-flowered, obovoid or lanceolate. Glumes 3 or 4 ; lower invol.-glume small or 0 ; upper invol.-glume subequal to the lower floral glume, 5—7-nerved, awned or not, rarely absent ; lower floral glume paleate or not, male or empty ; upper floral glume sessile, coriaceous, 2-sexual or female. Lodicules 2. Stamens 3 ; anthers linear. Styles long, free or connate below. Grain oblong, free within the hardened glume and palea.—DISTRIB. Species about 40, in most warm countries.

Bristles of involucel free to the base, slender, not dilated at the base.
- Inner bristles of involucel scaberulous, not ciliate.
  - Leaves 12—18 in. long ..... 1. *P. Alopecuros.*
  - Leaves 3—6 in. long ..... 2. *P. dichotomum.*
- Inner bristles of involucel ciliate below the middle with long hairs, but naked at the base ; involucel stipitate ..... 3. *P. orientale.*
- Inner bristles of involucel densely villous or ciliate below the middle, not naked at the base ; involucel sessile.
  - Inner bristles of involucel densely villous ..... 4. *P. pedicellatum.*
  - Inner bristles of involucel laxly ciliate with long silky hairs (not villous) ..... 5. *P. setosum.*

Inner bristles of involucel dilated below, their bases confluent in a coriaceous disk ..... 6. *P. cenchroides.*

1. **Pennisetum Alopecuros,** *Nees, ex Steud. Syn. Gram.* (1855) p. 102. Perennial; stems 2—3 ft. high, stout, erect, densely tufted below, subdistichously branched above; branches strict, erect. Leaves 12—18 by $\frac{1}{10}$—$\frac{1}{8}$ in., coriaceous, convolute, glabrous, with usually a tuft of soft hairs at the base; sheaths glabrous or nearly so; ligule a small hairy ring. Racemes spike-like, 5—7 in. long; rhachis flexuous, scaberulous, angular; involucel very shortly pedicellate; bristles very unequal, the longest 2—3 times as long as the spikelet, scaberulous. Spikelets reaching nearly $\frac{3}{8}$ in. long, lanceolate, acute, solitary. Glumes 4; lower invol.-glume $\frac{1}{20}$ in. long, suborbicular, hyaline; upper invol.-glume $\frac{1}{6}$ in. long, lanceolate, acuminate, 3-nerved, hyaline; lower floral glume $\frac{1}{3}$ in. long, lanceolate, acuminate, 7—11-nerved with involute margins; upper floral glume slightly longer than the lower one, lanceolate, acuminate, 5-nerved, with involute margins, 2-sexual; palea lanceolate, as long as the glume. Fl. B. I. v. 7, p. 84; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Watt, Dict. Econ. Prod. v. 6, part 1, p. 127. *Pennisetum aureum,* Dalz. & Gibs. Bo. Fl. (1861) p. 294.—Flowers: Oct. VERN. *Mohl.*

DECCAN: common, *Dalzell & Gibson*; Poona, *Jacquemont,* 407!, *Woodrow, Lisboa*; Lanoli, *Lisboa*; Nasik, *Lisboa.* S. M. COUNTRY: Belgaum, *Woodrow.* SIND: *Dalzell*!—DISTRIB. India (W. Peninsula, Rajputana, Central India). The leaves are used on Mount Abu for making ropes.

2. **Pennisetum dichotomum,** *Delile, Fl. d'Egypte,* p. 159, t. 8, fig. 1. Perennial, quite glabrous, bushy; stem distantly dichotomously branched, the branches often fascicled; internodes long, rigid, smooth and polished. Leaves 3—6 by $\frac{1}{10}$—$\frac{1}{8}$ in., narrowly linear, tapering to a subulate point, rigid. Racemes $2\frac{1}{2}$—5 in. long, cylindric, pale (nearly white); rhachis more or less scaberulous, angular; involucel sessile or nearly so; bristles very numerous, slender, pale, unequal, the longer twice as long as the spikelet, free to the base. Spikelets usually solitary, $\frac{1}{3}$ in. long, lanceolate, acuminate, nearly white. Glumes 4; lower invol.-glume nearly $\frac{1}{4}$ in. long by $\frac{1}{16}$ in. broad at the base, lanceolate, acuminate, 1-nerved, hyaline; upper invol.-glume $\frac{1}{3}$ in. long, lanceolate, acuminate, 5—7-nerved, hyaline; lower floral glume as long as the upper invol.-glume, ovate-lanceolate, cuspidately acuminate, paleate, 5-nerved, the palea nearly as long as the glume, lanceolate, acute; upper floral glume as long as the lower one, ovate-lanceolate, acuminate, cuspidate, 5-nerved; palea $\frac{1}{4}$ in. long, lanceolate, acuminate. Styles much exserted beyond the spikelets, free nearly to the base, densely plumose in the upper part. Fl. B. I. v. 7, p. 85; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435. *Cenchrus ramosissimus,* Poir. Encyc. Méthod. v. 6 (1804) p. 51; Dalz. & Gibs. p. 294.—Flowers: Nov.—Dec.

GUJARAT: in hedges, *Dalzell & Gibson.* SIND: on sand hills, *Stocks*!, *Woodrow*; Hyderabad, *Cooke*!—DISTRIB. India (Panjáb, N.W. Provinces, W. Peninsula); Afghanistan and westwards to N. Africa.

3. **Pennisetum orientale,** *Rich. in Pers. Syn.* v. 1 (1805) p. 72. Perennial, 2—4 ft. high ; stem suberect from a stout rootstock, leafy, clothed below with withered sheaths. Leaves 6—12 by $\frac{1}{8}$—$\frac{3}{8}$ in., narrowly linear, finely acuminate, flat, smooth, the margins scaberulous ciliate close to the obtuse or truncate base ; sheaths glabrous with ciliate margins ; ligule a shortly ciliate line. Racemes reaching as much as 10 in. long ; rhachis subterete, pubescent ; involucel shortly stipitate, the stipe pubescent ; bristles very unequal, the longest about $\frac{3}{4}$ in. long (rarely one may be found 1 in. long), often purplish, scaberulous, the inner ciliate with long hairs below the middle, but naked at the base. Spikelets usually 2—6 (rarely solitary) within the involucel, reaching $\frac{1}{4}$ in. long, on pubescent pedicels. Glumes 4 ; lower invol.-glume $\frac{1}{16}$—$\frac{1}{12}$ in. long, ovate-oblong, obtuse, nerveless, hyaline ; upper invol.-glume $\frac{1}{8}$ in. long, ovate-lanceolate, acuminate ; lower floral glume $\frac{1}{4}$ in. long, ovate-lanceolate, 5-nerved, awned, triandrous, the palea $\frac{1}{8}$ in. long, oblong, obtuse, often 2-fid, hyaline ; upper floral glume $\frac{1}{8}$ in. long, membranous, ovate-lanceolate, 5-nerved, awned ; palea $\frac{1}{16}$ in. long, lanceolate, acuminate, with involute margins, sometimes biaristulate at the tip. Fl. B. I. v. 7, p. 86 ; Trim. Fl. Ceyl. v. 5, p. 171 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435 ; Prain, Beng. Pl. p. 1169.—Flowers : July.

KONKAN : *Stocks* !—DISTRIB. India (W. Himalaya, Panjáb, W. Peninsula) ; N. Africa.

4. **Pennisetum pedicellatum,** *Trin. in Mém. Acad. Pétersb.* sér. 6, v. 3, part 2 (1835) p. 184. Annual ; stems 1—3 ft. long, branched from the base and above, leafy. Leaves 6—10 by $\frac{1}{8}$—$\frac{3}{8}$ in., flat, flaccid, glabrous or sparsely hairy ; sheaths glabrous ; ligule a shortly ciliate membrane. Racemes cylindric, 2—5 in. long, dense-flowered ; rhachis glabrous or nearly so, notched ; involucel sessile ; outer bristles few, slender, short, about $\frac{1}{8}$ in. long ; inner bristles numerous, the longest reaching $\frac{3}{8}$ in. long (or more), densely villous below the middle, unequal, usually pale, free to the base. Spikelets $\frac{1}{8}$ in. long, usually solitary within the involucel, shortly pedicellate. Glumes 4 ; lower invol.-glume very small, woolly ; upper invol.-glume oblong-lanceolate, apiculate, $\frac{1}{8}$ in. long, 7-nerved, hyaline ; lower floral glume $\frac{1}{8}$ in. long, oblong, truncate, 3-toothed, 5-nerved, hyaline ; upper floral glume ovate-oblong, obtuse, with a fimbriately ciliate tip, rather shorter than the lower floral glume, coriaceous, smooth, shining ; palea as long as the glume, lanceolate, toothed. Fl. B. I. v. 7, p. 86 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435 ; Prain, Beng. Pl. p. 1169. *Pennisetum lanuginosum,* Hochst. in Flora, v. 25, part 1 (1842), Beibl. i. p. 133 ; Lisboa, in Journ. Bomb. Nat. v. 5 (1891) p. 339.—Flowers : Oct.

DECCAN : *Lisboa.* GUJARAT : *Lisboa* ; Rajkot (Kathiawar), *Woodrow.*—DISTRIB. India (Behar, Rajputana, W. Peninsula) ; Tropical Africa.

5. **Pennisetum setosum,** *Rich. in Pers. Syn.* v. 1 (1805) p. 72 (*exclud. syn.*). Annual ; stem erect, often fastigiately branched at the nodes, green or purplish. Leaves 6—10 by $\frac{1}{4}$—$\frac{3}{8}$ in., linear, finely acuminate, glabrous or hairy ; sheaths glabrous ; ligule a line fringed with rather long soft hairs. Racemes 2—4 in. long, usually purplish-

brown ; rhachis glabrous, notched ; involucel sessile ; bristles unequal, the outer not ciliate, short, about $\frac{1}{8}$ in. long, the inner longer, ciliate below the middle with long silky hairs (1 of the inner bristles is often much longer than the others, reaching $\frac{1}{2}$ in., the others $\frac{1}{4}$—$\frac{1}{3}$ in. long). Spikelets $\frac{1}{6}$ in. long, solitary within the involucel. Glumes 3 or 4 ; lower invol.-glume minute or wanting ; upper invol.-glume $\frac{1}{8}$ in. long, ovate-oblong, gradually or suddenly cuspidate, 5-nerved, hyaline ; lower floral glume $\frac{1}{8}$ in. long, oblong, obtuse, with 2 subobtuse lateral and an acute median tooth at the apex, 5-nerved, paleate, male, the palea $\frac{1}{10}$ in. long, narrowly oblong, hyaline ; upper floral glume $\frac{1}{10}$ in. long, ovate-oblong, truncate, fimbriately ciliate at the tip, coriaceous, smooth and shining ; palea as long as the glume, oblong, truncate, toothed or ciliate at the tip. Anthers nearly $\frac{1}{12}$ in. long. Styles long, reaching $\frac{1}{8}$ in., much exserted beyond the spikelet. Fl. B. I. v. 7, p. 87 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435 ; Prain, Beng. Pl. p. 1169.—Flowers : Dec.

SIND : Hyderabad, *Woodrow*.—DISTRIB. India (Behar, W. Bengal, Upper Gangetic plain, W. Peninsula) ; Tropical Africa and America.

6. **Pennisetum cenchroides,** *Rich. in Pers. Syn.* v. 1 (1805) p. 72. Perennial ; stems tufted, 6—18 in. long, erect, or decumbent and much-branched from the base, stout or slender, leafy, or ascending from a branched often nodose rootstock. Leaves 4—10 by $\frac{1}{8}$—$\frac{1}{4}$ in., linear, tapering to a fine point, glabrous or hairy. Racemes cylindric, dense, 1—4 by $\frac{1}{3}$—$\frac{1}{2}$ in., pale or purplish ; rhachis finely scaberulous ; involucels subsessile ; outer bristles slender, short, not ciliate ; inner bristles about $\frac{3}{8}$ in. long (1 bristle conspicuously longer and stouter than the others, reaching $\frac{1}{2}$ in. long or more), dilated and connate into a ring at the base. Spikelets $\frac{1}{6}$—$\frac{1}{5}$ in. long, oblong-lanceolate, 3—1 in each involucel. Glumes 4 ; lower invol.-glume $\frac{1}{10}$ in. long, ovate-lanceolate, acute, faintly 1-nerved, hyaline ; upper invol.-glume $\frac{1}{8}$ in. long, ovate, acuminate, 1-nerved, hyaline ; lower floral glume $\frac{1}{6}$—$\frac{1}{5}$ in. long, ovate-lanceolate, cuspidately acuminate, 3—5-nerved, paleate, usually male, the palea narrowly lanceolate, as long as the glume ; upper floral glume as long as the lower one, lanceolate, 3—5-nerved ; palea lanceolate, as long as the glume. Fl. B. I. v. 7, p. 88 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 127.—Flowers : Dec.

DECCAN : *Lisboa*. GUJARAT : *Lisboa* ; Rajkot (Kathiawar), *Woodrow*. SIND : Jemadar ka Landa, near Karachi, *Stocks* !—DISTRIB. India (Kashmir, Upper Gangetic plain, W. Peninsula) ; Sicily, Tropical Africa, and the Canaries.

Pennisetum Typhoideum, Rich. in Pers. Syn. v. 1 (1805) p. 72. An annual plant widely cultivated in India, probably a native of Africa, growing to a height of 5 or 6 ft. with racemes sometimes reaching a foot long.

In the Bombay Presidency more than four millions of acres are annually grown, and in many parts it forms the staple food of the people. It is so well known by its native name *Bajri* that description is unnecessary. Fl. B. I. v. 7, p. 82 ; Woodr. in Journ. Bomb. Nat.

v. 13 (1901) p. 435 ; Prain, Beng. Pl. p. 1169 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 127. *Holcus spicatus,* Linn. Syst. ed. 10, p. 1305 ; Grah. Cat. p. 238 ; Dalz. & Gibs. Suppl. p. 99.

3. CENCHRUS, Linn.

Characters of *Pennisetum,* but involucels composed of subulate hard spines without filiform tips, connate below into a short coriaceous cup which is surrounded by erect or squarrose bristles.—DISTRIB. Species few, tropical and subtropical.

Base of involucel rounded; inner bristles up to ⅛ in. long, erect, not ciliate ..... 1. *C. biflorus.*
Base of involucel turbinate; inner bristles up to ⅜ in. long, usually squarrosely spreading, ciliate at the base. 2. *C. catharticus.*

1. **Cenchrus biflorus,** *Roxb. Fl. Ind.* v. 1 (1832) p. 233. Annual ? ; stem 6—24 in. long, simple. Leaves 3—10 by ⅛—⅜ in., linear-lanceolate, finely acuminate, glabrous or hairy ; sheaths glabrous or nearly so, ciliate near the mouth ; ligule a pubescent ring. Racemes 2—4 in. long, solitary, cylindric ; rhachis angular, smooth ; involucel usually 2-flowered, rounded at the base ; bristles thick, lanceolate-subulate, erect, dorsally flattened, the outer very short, about 1/16—1/10 in. long, glabrous, the inner ⅛ in. long, glabrous or puberulous. Spikelets ⅛ in. long, subglobose. Glumes 4 ; lower invol.-glume 1/10 in. long, ovate, acuminate, very thin, hyaline, 1 (rarely 3)-nerved ; upper invol.-glume ⅛ in. long, ovate, apiculate, 5-nerved, hyaline ; lower floral glume scarcely shorter than the upper invol.-glume, ovate, acute, 5—7-nerved, paleate, the palea ⅛ in. long, oblong, obtuse ; upper floral glume as long as the lower, ovate, obtuse. Anthers 1/10—⅛ in. long. Styles free almost to the base. Grain 1/12 by 1/16 in., orbicular-oblong, compressed, smooth, shining, pale brown. Fl. B. I. v. 7, p. 89 ; Grah. Cat. p. 234 ; Dalz. & Gibs. p. 294 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435.

GUJARAT : Ahmedabad, *Cooke* !; Morvi (Kathiawar), *Beck* ex *Woodrow.* SIND : Karachi, *Woodrow*; Jemadar ka Landa near Karachi, *Stocks* !—DISTRIB. India (Panjáb, Rajputana, W. Peninsula); Beluchistan, Arabia, Africa.

2. **Cenchrus catharticus,** *Delile, Cat. Hort. Monsp.* (1838) ; *Linnæa,* v. 13 (1839), *Litt.* p. 103. Quite glabrous ; stems tufted, geniculately ascending, branched from the base, leafy. Leaves 1—5 by ⅛—¼ in., linear-lanceolate, finely acuminate ; sheaths glabrous ; ligule a hairy ring. Racemes 1—6 in. long, usually more or less enclosed in the upper-most leaf-sheaths ; rhachis angular, glabrous, flexuous ; involucels with a turbinate base ; bristles hard, subulate, sharply pungent, the outermost short, glabrous or nearly so, spreading or reflexed, the inner ciliate at the base, subulate, suberect or squarrosely spreading, dorsally grooved, reaching ⅜ in. long. Spikelets shorter than the inner bristles. Glumes 4 ; lower invol.-glume ovate-lanceolate, acute, hyaline, 1/12 in. long ; upper invol.-glume rather more than ⅛ in. long, 5-nerved, hyaline ; lower floral glume ovate, acuminate, as long as the upper invol.-glume, 5-nerved, paleate, hyaline, the palea ⅛ in. long, narrowly lanceolate, acute, hyaline ;

upper floral glume as long as the lower one, cuspidately acuminate, 5-nerved, membranous; palea ovate, acuminate, membranous, as long as the glume. Grain $\frac{1}{10}$ in. long, ovoid-oblong, compressed, pale, rugulose. Fl. B. I. v. 7, p. 90; Watt, Dict. Econ. Prod. v. 2, p. 246.

GUJARAT: Perim Island, at the mouth of the Narbada river, *Raoji*!—DISTRIB. India (Panjáb, W. Peninsula); Arabia, Tropical Africa.

4. **SETARIA,** Beauv.

Annual (rarely perennial) grasses of various habit; nodes of stem glabrous or hairy; ligules a ridge of hairs. Spikelets subsessile in contracted, cylindric or pyramidal terminal panicles, articulate on a very short pedicel, subtended by 1 to many persistent scabrid or barbed bristles (modified branchlets) which often form a one-sided involucel, but are sometimes present and absent in the same inflorescence. Glumes 4; lower invol.-glume usually much the smallest, 3—5-nerved, membranous; upper invol.-glume 5—7-nerved; lower floral glume more or less exceeding and resembling the upper invol.-glume, usually paleate; upper floral glume coriaceous or crustaceous, 5-nerved, paleate, the palea about equalling the glume. Lodicules 2, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted. Grain tightly enclosed by the hardened glume and palea, oblong or ellipsoid.—DISTRIB. Tropical and temperate; species about 40.

Leaves plicate.	
Perennial; stems reaching 8 ft. long; leaves up to 24 in. long; panicle 1—2 ft. long, with a scabrid rhachis	1. *S. plicata.*
Annual; stem reaching 2 ft. high; leaves up to 8 in. long; panicle 2—6 in. long, with a hairy rhachis	2. *S. rhachitricha.*
Leaves flat not plicate.	
Bristles of involucel with spreading or erect teeth.	
Inflorescence a cylindric spike-like raceme; bristles of involucel 6—12; spikelets $\frac{1}{8}$ in. long	3. *S. glauca.*
Inflorescence a narrowly pyramidal panicle; bristles of involucel 3—6; spikelets $\frac{1}{12}$—$\frac{1}{10}$ in. long	4. *S. intermedia.*
Bristles of involucel with deflexed teeth	5. *S. verticillata.*

1. **Setaria plicata,** *T. Cooke.* Perennial; stem 1—8 ft. long, erect or ascending from a woody branching rootstock, stout, leafy; nodes strigillose; internodes 2—6 in. long. Leaves 6—24 by $\frac{1}{2}$—3 in., linear-lanceolate, finely acuminate, chartaceous, glabrous or sparsely hairy, plicate between the numerous veins, base narrow; sheaths smooth or hispid, the margins naked, or ciliate near the top only; ligule of long hairs. Panicle 1—2 ft. long, contracted, nodding; rhachis stout, angular, scabrid; branches usually alternate, distant (the lower 3—4 in. long), filiform, suberect, bearing short capillary few-flowered branchlets and bristle-like flowerless ones. Spikelets $\frac{1}{8}$ in. long, sessile or shortly pedicellate, ovoid, acute or apiculate, glabrous. Glumes 4; lower invol.-glume broadly ovate, obtuse, 5-nerved, membranous, $\frac{1}{2}$ as long as the spikelet; upper invol.-glume rather more than $\frac{1}{2}$ as long as the upper floral glume, ovate, obtuse,

7-nerved, membranous ; lower floral glume slightly longer than the upper, ovate, shortly apiculate, membranous, empty, paleate or not, 5-nerved, the pales when present small, hyaline, narrowly ovate, acute ; upper floral glume crustaceous, ovate-oblong, acute or shortly apiculate, slightly transversely striate, pale-yellow, with strongly involute margins ; palea ovate, acute, nearly as long as the glume, faintly transversely striate and with incurved membranous margins. *Panicum plicatum,* Lam. Illustr. v. 1 (1791) p. 171 ; Hook. f. Fl. B. I. v. 7, p. 55 ; Trim. Fl. Ceyl. v. 5, p. 157 ; Jacq. Eclog. Gram. v. 1, t. 1 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1176. *P. nepalense,* Spreng. Syst. v. 1 (1825) p. 321 ; Dalz. & Gibs. p. 291.—Flowers : Nov.

KONKAN : western side of the Ghâts, *Dalzell & Gibson* ; Parel (Bombay), *Lisboa.* Sometimes cultivated as an ornamental grass in gardens.—DISTRIB. Throughout the moister hilly parts of India ; Ceylon, Malay Peninsula, China, Malay Islands.

2. **Setaria rhachitricha,** *T. Cooke.* Annual ; stems tufted, erect, 8—24 in. long, glabrous ; nodes softly pubescent. Leaves 3—8 by ½—1 in., oblong-lanceolate, tapering to both ends, finely acuminate, flaccid, glabrous or sparsely hairy, many-veined, plicate between the veins ; sheaths with ciliate margins ; ligule a tuft of hairs. Panicle 2—6 in. long, pyramidal ; rhachis of panicle angular, hairy ; branches 1—1½ in. long, alternate, spreading, with bristle-like flowerless scabrid branchlets at the base of the spikelets, much longer than the spikelets, 1 (rarely 2) to each pedicel ; rhachis of branches angular, sparsely hairy. Spikelets numerous, glabrous, $\frac{1}{10}$ in. long, densely or loosely imbricate, ovate, subacute, dorsally compressed, pale with green nerves, articulated on short scaberulous pedicels. Glumes 4 ; lower invol.-glume orbicular-oblong, $\frac{1}{15}$ in. long, hyaline, obscurely nerved or nerveless ; upper invol.-glume $\frac{1}{10}$ in. long, broadly ovate, subobtuse, 5-nerved, thinly membranous ; lower floral glume about equal to the upper invol.-glume, similar, 5-nerved, epaleate ; upper floral glume elliptic-oblong, subacute, coriaceous, white, transversely striate, $\frac{1}{10}$ in. long, with strongly involute margins ; palea as long as the glume, elliptic, with involute membranous margins. *Panicum rhachitrichum,* Hochst. in Flora, v. 27 (1844) p. 254 ; Hook. f. Fl. B. I. v. 7, p. 56 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1176.—Flowers : Oct.

S. M. COUNTRY : Londa, *Gammie* ex *Woodrow.*—DISTRIB. India (Subtropical Himalaya, W. Peninsula) ; Tropical Africa.

I have not seen any specimens from the Bombay Presidency ; there are none in Herb. Kew.

3. **Setaria glauca,** *Beauv. Agrost.* (1812) p. 51. Stem 1—2 ft. high, erect or ascending, simple or branched ; nodes glabrous, the lower rooting. Leaves 4—12 by ⅜ in., linear, finely acuminate, flat, glabrous or sparsely hairy, with scabrid margins, base usually rounded ; sheaths smooth ; ligule a ridge of hairs. Inflorescence a cylindric densely flowered spike-like raceme 1—5 in. long ; bristles of involucel 6—12, pale or reddish-brown, ⅛—¼ in. long, with very short erect or spreading teeth. Spikelets numerous, closely set along the

rhachis of the spike, ⅛ in. long, ellipsoid, glabrous. Glumes 4 ; lower invol.-glume less than ½ as long as the spikelet, broadly ovate, often shortly apiculate, 3-nerved, hyaline ; upper invol.-glume slightly longer than the lower, broadly ovate or suborbicular, hyaline, 5-nerved ; lower floral glume thinly membranous, as long as the upper one, 5-nerved, paleate, empty or male, the palea hyaline ; upper floral glume coriaceous, broadly elliptic, obtuse, dorsally convex, transversely rugose, pale. Fl. B. I. v. 7, p. 78 ; Dalz. & Gibs. p. 293 ; Trim. Fl. Ceyl. v. 5, p. 162 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435 ; Prain, Beng. Pl. p. 1170 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 546.—Flowers : Oct. VERN. *Kolára.*

KONKAN : *Stocks* ! ; Thána, *Lisboa.* DECCAN : Mahableshwar common, *Daizell & Gibson, Woodrow, Cooke* ! ; Nasik, *Lisboa.* GUJARAT : Baroda, *Cooke* !—DISTRIB. More or less throughout India ; Ceylon, most warm temperate and tropical regions.

4. **Setaria intermedia,** *Roem. & Schult. Syst.* v. 2 (1817) p. 489. Stem 2—3 ft. long, slender, erect or ascending ; nodes glabrous, the lower often rooting. Leaves 2—9 by ⅛—¾ in., linear-lanceolate, finely acuminate, thin, flat, sparsely hairy on both surfaces, with scaberulous margins, base narrow ; sheaths long, smooth, the mouth villous, the margins ciliate especially in the upper part. Panicle 4—6 in. long, narrowly pyramidal ; rhachis glabrous, grooved ; branches short, distant below, rather crowded above, dense-flowered ; bristles of involucel 3—6, about ¼ in. long, very slender, flexuous, studded with minute erect teeth, pale. Spikelets $\frac{1}{12}$—$\frac{1}{10}$ in. long, ovoid, subacute. Glumes 4 ; lower invol.-glume orbicular-oblong or ovate, about ⅓ as long as the spikelet, hyaline, faintly 3-nerved, upper invol.-glume about ½ as long as the spikelet, broadly ovate, subacute, hyaline, 5-nerved ; lower floral glume about equalling the upper, broadly ovate, thinly membranous, 5-nerved, paleate, empty, the palea hyaline ; upper floral glume broadly ovate or suborbicular, acute, coriaceous, very concave, transversely rugulose all over, yellowish-brown ; palea elliptic, subacute. Fl. B. I. v. 7, p. 79 ; Trim. Fl. Ceyl. v. 5, p. 163 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435 ; Prain, Beng. Pl. p. 1170 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 546.—Flowers : Aug.—Oct. VERN. *Pandar.*

Tolerably common throughout the Presidency. KONKAN : *Law* ex *Woodrow.* DECCAN : in cultivated fields about Poona, *Jacquemont,* 355 ! S. M. COUNTRY : Belgaum, *Ritchie,* 839 !—DISTRIB. Throughout India ; Ceylon, temperate and tropical regions.

5. **Setaria verticillata,** *Beauv. Agrost.* (1812) p. 51. Annual ; stems erect or ascending, 1—3 ft. long, stout or slender, leafy, more or less branched, glabrous. Leaves 3—10 by ⅛—¾ in., thin, flat, glabrous or sparsely hairy and scaberulous, linear or linear-lanceolate, tapering to a fine point, base usually narrow ; sheaths smooth, striate ; ligule a fringe of hairs. Panicle 1—5 in. long, erect or curved, spike-like, cylindric or oblong, coarsely bristly ; bristles of the involucel 1 or few, ⅛—⅓ in. long, closely studded with conspicuous downward-pointing teeth. Spikelets $\frac{1}{12}$ in. long, ellipsoid, obtuse, glabrous. Glumes 4 ; lower invol.-glume $\frac{1}{30}$ in. long, ovate, acute, hyaline, fainly 3-nerved ; upper invol.-glume about as long

as the spikelet, ovate, subacute, thinly membranous, 5-nerved; lower floral glume similar to the upper invol.-glume, 5-nerved, empty, paleate or not, the palea when present hyaline, very small; upper floral glume elliptic-oblong, plano-convex, subobtuse, coriaceous, straw-colored, faintly striatulate and with incurved margins; palea as long as the glume, coriaceous, elliptic, faintly striatulate. Fl. B. I. v. 7, p. 80; Dalz. & Gibs. p. 294; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Trim. Fl. Ceyl. v. 5, p. 163; Prain, Beng. Pl. p. 1170; Watt, Dict. Econ. Prod. v. 6, part 2, p. 549.—Flowers: Dec. VERN. *Dangani.*

KONKAN: *Stocks*! GUJARAT: Baroda, *Woodrow*; Morvi (Kathiawar), *Woodrow.* SIND: *Stocks*, 649!—DISTRIB. Throughout India; Ceylon, temperate and tropical regions.

Setaria italica, Beauv. Agrost. (1812) p. 51. Annual; stems 2—5 ft. long, usually branched, tufted, rooting towards the base. Panicle dense, spike-like; bristles few, smooth or barbed. *The Italian Millet,* extensively cultivated as a food-grain throughout India. According to Watt (Dict. Econ. Prod. v. 6, part 2, p. 548), about 330,000 acres were under cultivation in the Bombay Presidency during the year 1886-87. Fl. B. I. v. 7, p. 78; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1170. *Panicum italicum,* Linn. Sp. Pl. (1753) p. 56; Grah. Cat. p. 237; Dalz. & Gibs. Suppl. p. 98.—VERN. *Rála.*

5. CHAMÆRAPHIS, Br.

Glabrous marsh or aquatic grasses. Leaves narrowly linear-lanceolate. Spikelets 1—2-flowered, subsessile and subsecund on the branches of a simple panicle which are produced as awn-like bristles beyond the ultimate spikelet, obscurely articulate but persistent on their short obconic pedicels, narrowly lanceolate, terete, green. Glumes 4; lower invol.-glume very small, suborbicular, hyaline, white, nerveless; upper invol.-glume longer than the lower floral glume, membranous, green, narrowly lanceolate, acuminate or narrowed into a rigid awn, 9—11-nerved; lower floral glume lanceolate, acute or aristately acuminate, paleate, 7-nerved, male, the palea smaller than the glume, hyaline; upper floral glume much smaller than the lower, stipitate, female, oblong or ovate-oblong, acute, flat, thinly coriaceous, nerveless, the palea hyaline, as broad as the glume, acute, nerveless. Lodicules cuneate. Stamens 3; anthers short. Styles free; stigmas laterally exserted. Grain minute, oblong, compressed, free within the subcoriaceous glume and hyaline palea.—DISTRIB. Tropical Asia and Australia; species 5 or 6.

1. **Chamæraphis spinescens,** *Poir. Encyc. Méthod. Suppl.* v. 2 (1811) p. 189. Forming floating much-branched masses with leafy ascending stems 1—3 ft. long. Leaves 1—3 by $\frac{1}{16}$—$\frac{1}{8}$ in., flat, acuminate, narrowly linear-lanceolate, smooth or scabrid, base narrowed; sheaths long, loose, with naked margins; ligule a ridge of

minute hairs. Panicle 2—4 in. long, shortly pedunculate, more or less contracted ; rhachis angular, sulcate ; branches filiform, angular, grooved, flexuous, few- or many-flowered, the lower 1—2 in. long, the awn-like tips $\frac{1}{8}$—$\frac{1}{2}$ in. long. Spikelets (including their awn) $\frac{1}{4}$—$\frac{1}{3}$ in. long, subsessile. Glumes 4 ; lower invol.-glume scarcely $\frac{1}{10}$ in. long, orbicular or subquadrate, usually rounded at the apex, hyaline ; upper invol.-glume $\frac{1}{4}$—$\frac{1}{3}$ in. long (including the awn), lanceolate, setosely scabrid on the sides, membranous, 9—11-nerved, with a long scabrid awn which is sometimes as long as the body of the glume ; lower floral glume shorter than the upper invol.-glume, finely acuminate or awned, 7-nerved, male, paleate, membranous, the palea hyaline, smaller than the glume, linear-oblong, subacute ; upper floral glume about $\frac{1}{12}$ in. long, ovate-lanceolate, acute, female, nerveless, the palea hyaline. Fl. B. I. v. 7, p. 62 ; Trim. Fl. Ceyl. v. 5, p. 165 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1171.—Flowers : Sept.

KONKAN : Wangni, *Woodrow*.—DISTRIB. India (Rajputana, Bengal, W. Peninsula) ; Ceylon, China, Malaya, Australia.

I have seen no specimens from the Bombay Presidency ; there are none from that Presidency in Herb. Kew.

6. ISACHNE, Br.

Perennial grasses. Leaves ovate or linear-lanceolate. Spikelets small or minute, loosely paniculate, not or obscurely articulate with the pedicel, subglobose or obovoid, 1—2-flowered. Glumes 4, the 2 lower often separately deciduous, thinly coriaceous or membranous, strongly nerved ; invol.-glumes subequal, convex, empty ; the 2 floral glumes both paleate, equal and convex, or the lower larger and flatter ; lower floral glume male or neuter ; upper floral glume jointed and often stipitate on the very short rachilla, hemispheric, female or hermaphrodite. Lodicules most minute. Stamens usually 3 (rarely 4 or 6). Styles 2, free ; stigmas short, plumose, exserted at the top of the spikelet. Grain free within the hardened glume and palea.—DISTRIB. Species about 25, tropical and subtropical.

Invol.-glumes longer than the floral glumes ..... 1. *I. Lisboæ.*
Invol.-glumes about equalling the floral glumes.
  Floral glumes equal and similar, both hemispheric and coriaceous ..... 2. *I. elegans.*
  Floral glumes usually unequal, the lower floral glume thin, flat, often longer than the upper.
    Stem reaching 18 in. long ; panicle rather large, ovoid or pyramidal ; spikelets $\frac{1}{12}$ in. long ; leaves 1—2½ in. long ..... 3. *I. australis.*
    Stem rarely reaching 10 in. long ; panicle small, lax-flowered ; spikelets $\frac{1}{10}$—$\frac{1}{16}$ in. long ; leaves 1—1½ in. long ..... 4. *I. miliacea.*

1. **Isachne Lisboæ,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 22. A low plant 6 in. high ; stems creeping, with long wiry roots, then ascending, rather stout, leafy. Leaves 1—2 by $\frac{2}{3}$ in., recurved, thin, oblong-lanceolate, acute, ciliate on the margins with long slender hairs, closely and conspicuously nerved ; sheaths glabrous or sparsely hairy ; ligule 0. Panicles 1—2 in. long ; branches of the panicle (*spikes*)

½—¾ in. long, horizontally spreading. Spikelets 1/10—⅛ in. in diam., secund on the lower side of the branches, hairy with bulbous-based hairs ; pedicels short, triquetrous, hairy. Glumes 4 ; lower and upper invol.-glumes equal, broadly ovate or suborbicular, acuminate, conspicuously 5-nerved, longer than the floral glumes, hairy ; floral glumes orbicular, equal, smaller than the invol.-glumes, concave, glabrous. Palea with incurved flaps. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.—Flowers : Sept.—Oct.

DECCAN : Panchgani, *Raoji*; Mahableshwar, *Cooke* !, *Lisboa*.—DISTRIB. Bombay Presidency, apparently endemic.

2. **Isachne elegans,** *Dalz. in Dalz. & Gibs. Bo. Fl.* (1861) p. 291. A small elegant grass 8—12 in. high ; stems densely tufted, soft, geniculate below, and with slender fibrous roots. Leaves 2—6 by ⅛—¼ in., linear-lanceolate, acute, striate, with thickened and glabrous or minutely serrulate margins ; sheaths bristly at the mouth. Panicle 3—5 in. long, glabrous ; branches slender, alternate, undulating, ½—1 in. long, smooth ; pedicels short, glabrous. Spikelets 1/10—⅛ in. in diam., hispid, with 2 perfect flowers. Glumes 4 ; invol.-glumes equal, similar, inconspicuously many-nerved, broadly ovate or suborbicular, with red margins, hairy ; floral glumes as long as the invol.-glumes, hemispheric, puberulous. Anthers 1/16 in. long, brownish-yellow. Fl. B. I. v. 7, p. 23 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.—Flowers : Sept. VERN. *Dunda.*

KONKAN : Pen, in inundated land, *Dalzell* ! DECCAN : margins of rivulets in the Deccan, *Dalzell & Gibson*; Poona, *Woodrow*; Lanoli, *Woodrow*, 175 !; between Poona and Karli, *Jacquemont*, 556 !—DISTRIB. Bombay Presidency apparently endemic.

3. **Isachne australis,** *R. Br. Prodr.* (1810) p. 196. Stem slender, erect or ascending from a creeping rootstock, 8—18 in. high, leafy, smooth, branched below ; nodes glabrous. Leaves 1—2½ by ⅛—⅓ in., linear-lanceolate, acuminate, flat, multistriate, scaberulous on both surfaces, base rounded ; sheaths ¾—1½ in. long, striate, the margins above the middle densely ciliate ; ligule a tuft of long slender erect white hairs. Panicle 1—4 in. long ; branches alternate, flexuous, erect or spreading, up to 1½ in. long, sometimes divided ; rhachis angular, smooth. Spikelets 1/16—1/12 in. in diam., globose, sessile or pedicellate, green or violet ; pedicels sometimes ¼ in. long, capillary. Glumes 4 ; invol.-glumes similar, broadly ovate or suborbicular, obtuse, concave, membranous, 7-nerved, glabrous or with a few bristles ; floral glumes usually unequal, the lower longer and thinner than the upper, ovate, obtuse, nerveless ; upper floral glume hemispheric, coriaceous, ciliolate. Palea glabrous. Anthers 1/16 in. long, red. Fl. B. I. v. 7, p. 24 ; Trim. Fl. Ceyl. v. 5, p. 128 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1172.—Flowers : Oct. VERN. *Daura.*

DECCAN : Poona, *Lisboa*; Mahableshwar, *Woodrow*; Nasik, *Lisboa*.—GUJARAT : *Lisboa*.—DISTRIB. Throughout India ; Ceylon, Australia, New Zealand.

4. **Isachne miliacea,** *Roth, Nov. Pl. Sp.* (1821) p. 58. A slender plant, variable in size, 6—10 in. high ; stems very slender, prostrate, widely creeping and branched below, then ascending. Leaves small,

rather distant, ½—1½ by ⅛—⅓ in., ovate, acute, glabrous or sparsely hairy, base rounded. Panicle small, lax-flowered. Spikelets $\frac{1}{20}$—$\frac{1}{16}$ in. in diam., globose, few and distant ; pedicels short or long, capillary. Invol.-glumes orbicular-oblong, almost hemispheric, often hispid with long hairs, obscurely 7-nerved ; lower floral glume rather longer than the upper, ovate-oblong, membranous, male ; upper floral glume smaller, hemispheric, coriaceous, female. Palea glabrous. Fl. B. I. v. 7, p. 25 ; Trim. Fl. Ceyl. v. 5, p. 128 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1172.

Seems to be but a small state of *I. australis* with shorter leaves, laxer panicles, and smaller spikelets.

KONKAN : *Woodrow*. DECCAN : Lanoli, *Woodrow* !—DISTRIB. More or less throughout India ; Ceylon, China, Malay and Pacific Islands, S. America.

7. TRICHOLÆNA, Schrad.

Erect tufted perennial (rarely annual) grasses. Leaves narrow ; ligule a fringe of hairs. Spikelets 1—2-flowered, articulate on their pedicels, paniculate, laterally compressed, clothed with long silky hairs. Glumes 3 or 4 ; lower invol.-glume somewhat remote from the upper, often reduced to a minute scale or obsolete ; upper invol.-glume membranous, emarginate or muticous, or finely mucronate or aristate from the sinus, 5-nerved, usually hairy ; lower floral glume like the upper invol.-glume, male or barren, with a hyaline 2-nerved subequal palea ; upper floral glume much smaller than the lower, thinly chartaceous, glabrous, shining, obtuse or emarginate, obscurely 5-nerved, 2-sexual. Lodicules 2, small. Stamens 3. Styles free.—DISTRIB. Species many, chiefly African.

Spikelets up to ⅛ in. long; lower invol.-glume minute or obsolete; lower floral glume apiculate (not awned).	1. *T. Teneriffæ*.
Spikelets reaching ⅜ in. long; lower invol.-glume $\frac{1}{10}$ in. long; lower floral glume awned	2. *T. Wightii*.

1. Tricholæna Teneriffæ, *Parlat. in Webb & Berth. Phyt. Canar.* v. 3, part 2 (1848) p. 425. Perennial ; stems many from a woody rootstock, geniculate below, slender, rigid. Leaves 1¼—3 by $\frac{1}{16}$—⅛ in., narrowly linear-lanceolate, finely acuminate, convolute, rigid, glabrous ; sheaths glabrous ; ligule a narrow softly hairy ridge. Inflorescence of slender erect panicles 2½—4½ in. long ; branchlets and pedicels capillary. Spikelets up to ⅛ in. long, clothed with silky hairs. Glumes 3 (rarely 4); lower invol.-glume minute or obsolete ; upper invol.-glume ⅛ in. long, ovate, acute, densely silky ; lower floral glume ⅛ in. long, ovate, acute, apiculate, paleate, the palea narrowly oblong, subobtuse, hyaline ; upper floral glume $\frac{1}{10}$ in. long, ovate-oblong, obtuse, coriaceous, shining ; palea as long as the glume, oblong-lanceolate, subacute. Anthers $\frac{1}{10}$ in. long, narrowly linear. Stigmas $\frac{1}{10}$ in. long, exserted, sessile or nearly so, plumose. Fl. B. I. v. 7, p. 65 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers : Aug.

SIND : *Stocks*, 639 ! ; Phano-Bullo-Khan, *Woodrow*.—DISTRIB. India (Panjáb, W. Peninsula) ; westward to Sicily and N. Africa.

There is but one specimen (a very poor one) from Sind in Herb. Kew. collected by Stocks !

2. **Tricholæna Wightii,** *Nees, ex Steud. Syn. Gram.* (1855) p. 93. Stems 6—18 in. high, tufted, stout or slender. Leaves 1—6 by $\frac{1}{8}$—$\frac{1}{4}$ in., linear, finely acuminate, flat, glabrous or hairy ; sheaths glabrous or hairy with bulbous-based hairs ; ligule a hairy line. Inflorescence a narrow panicle 2—5 in. long ; branchlets and pedicels capillary, flexuous. Spikelets variable in size, sometimes exceeding $\frac{3}{8}$ in. long (including the awns), silky-hairy. Glumes 4 ; lower invol.-glume $\frac{1}{10}$ in. long, linear, obtuse, distant from the others, strongly bearded at the base ; upper invol.-glume ovate-lanceolate, tumid at the base, obtuse or subacute, silky-hairy, the midnerve produced from the back into a capillary awn nearly $\frac{1}{3}$ in. long ; lower floral glume similar to the upper invol.-glume, with a similar awn, silky-hairy, paleate, male, the palea narrow, hyaline ; upper floral glume $\frac{1}{10}$ in. long, elliptic-oblong, obtuse, concave, smooth, thin, 2-sexual ; palea as long as the glume. Anthers $\frac{1}{10}$ in. long. Stigmas $\frac{1}{10}$ in. long, with distinct styles free to the base or nearly so. Fl. B. I. v. 7, p. 65 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers : Sept. VERN. *Chota-Kagli.*

DECCAN : Malhargad, *Woodrow*; Poona, *Woodrow*; Mahableshwar, *Lisboa*; Panchgani, *Lisboa*. S. M. COUNTRY : Badami, *Woodrow*, 23!—DISTRIB. India (Rajputana, W. Peninsula) ; Arabia, Cape Verd Islands.

8. AXONOPUS, Beauv.

Annual or perennial grasses of various habit. Leaves subradical ; ligules membranous, ciliate or reduced to a ciliate rim. Panicles consisting of digitate or more or less whorled slender or stout often spike-like racemes. Spikelets ovoid or oblong, mucronate or awned, solitary, 2-nate or fasciculate, 2-flowered, articulate on thin pedicels, erect. Glumes 4 ; lower invol.-glume shorter than the spikelet, hyaline, acuminate or aristate, 3-nerved ; upper invol.-glume as long as the upper floral glume, ovate, 5-nerved, the lateral nerves marginal and hairy or villous ; floral glumes subequal ; lower oblong-ovate, 5-nerved, paleate, male, the palea small, 2-partite ; upper floral glume 2-sexual, ovate or oblong, narrowed into a terminal awn, thinly coriaceous ; palea oblong-elliptic. Lodicules flabelliform. Stamens 3 ; anthers linear. Styles free ; stigmas linear, laterally exserted, shortly penicillate. Grain oblong, free within the hardened glume and palea. —DISTRIB. Species 3, one from South Africa and the Mascarene Islands to India and Australia, one in the Indo-Malayan region, the third in Tropical Africa.

1. **Axonopus cimicinus,** *Beauv. Agrost.* (1812) p. 12. A tufted grass ; stems 1—2 ft. long, erect, or decumbent at the base ; nodes hairy. Leaves 1—3 by $\frac{3}{8}$—$\frac{5}{8}$ in., ovate-lanceolate from a broad cordate base, acute, flat, glabrous or hairy, ciliate on the margins with stiff bulbous-based hairs ; sheaths glabrous or hairy ; ligule of short hairs. Inflorescence in spike-like racemes, 3—10 on the top of a slender smooth glabrous peduncle 2—6 in. long, with sometimes a fascicle of 2 or more lower down on the peduncle ; peduncle naked in the lower part ; rhachis of raceme angular, scaberulous, slender. Spikelets (including a slender scaberulous awn about $\frac{1}{3}$ in. long) $\frac{1}{2}$—$\frac{5}{16}$ in.

long, subsecund, solitary or 2- (rarely 3-) nate, erect, readily disarticulating from the pedicel ; pedicels unequal, scaberulous, cupular at the tip. Glumes 4 ; lower invol.-glume rather more than $\frac{1}{10}$ in. long, narrowly ovate-lanceolate, aristately acuminate, hyaline, with 3 slender green nerves, of which the 2 lateral arch to join the midrib below the tip ; upper invol.-glume $\frac{1}{5}$ in. long, broadly ovate, cuspidately acuminate, thinly membranous, 5-nerved, the 3 central nerves slender, green, the 2 lateral nerves marginal, bristly with long coarse purplish hairs which reach $\frac{1}{10}$ in. long ; lower floral glume $\frac{1}{6}$ in. long, ovate-oblong, obtuse, male, paleate, the palea small, 2-partite ; upper floral glume $\frac{1}{4}$ in. long (or more), including the awn, which is nearly as long as the glume, ovate, acute, coriaceous, often faintly ciliolate and with slightly incurved margins ; palea as long as the glume, coriaceous, elliptic-oblong, subobtuse. Fl. B. I. v. 7, p. 64 ; Trim. Fl. Ceyl. v. 5, p. 166 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1173. *Urochloa cimicina*, Kunth, Revis. Gram. (1829) v. 1, p. 31 ; Dalz. & Gibs. p. 289.—Flowers : Oct.

KONKAN : *Stocks* ! S. M. COUNTRY : Dharwar, *Woodrow* ; Badami, *Woodrow* !

9. **OPLISMENUS,** Beauv.

Slender leafy weak grasses ; stems creeping below ; branches ascending. Leaves ovate-lanceolate, acuminate, thin, flat ; margins scaberulous, base narrow, auricled on one side ; ligule a ridge of long hairs. Spikelets solitary or 2-nate, disarticulating at the base, in small clusters or in spike-like more or less secund racemes along a common axis, subterete, awned. Glumes 4 ; invol.-glumes similar, more or less subequal, herbaceous to membranous, 3—7-nerved, both usually with straight awns ; lower floral glume resembling the upper invol.-glume, 5—9-nerved, empty, muticous or very shortly awned, with or without a hyaline 2-nerved or more or less reduced palea ; upper floral glume 2-sexual, as long as or shorter than the lower, chartaceous to coriaceous, 5—7-nerved, muticous ; palea of similar texture, about equal to the glume, 2-nerved. Lodicules 2, minute, cuneate. Stamens 3. Styles distinct, long ; stigmas exserted at the top of the glume. Grain oblong-ellipsoid, free within the hardened glume and palea.—DISTRIB. Species about 8, in the warmer parts of the world.

A tall branching grass; awns stout, smooth, obtuse.....	1. *O. compositus.*
A small diffuse grass; awns capillary, minutely scaberulous	2. *O. Burmanni.*

1. **Oplismenus compositus,** *Beauv. Agrost.* (1812) p. 54. A tall branching grass ; stems 1—3 ft. long, slender, branched, and creeping below ; branches ascending, leafy, rooting from the lower nodes. Leaves variable, 2—6 by $\frac{1}{2}$—$\frac{3}{4}$ in., ovate to ovate-lanceolate, acuminate, thin, flat, glabrous or hairy, base narrow, auricled on one side ; sheaths glabrous or pubescent, with ciliate margins. Panicle 3—10 in. long ; peduncle long or short ; branches of panicle usually distant, 1—3 in. long ; rhachis glabrous or pubescent, angular, grooved.

Spikelets distant, $\frac{1}{6}$ in. long (excluding the awn), lanceolate-ellipsoid, green ; pedicels very short, often with a tuft of hairs at the base. Glumes 4 ; lower invol.-glume ovate-lanceolate, acuminate, $\frac{1}{10}$ in. long (without the awn, which is about $\frac{1}{5}$ in. (or more) long and truncate at the apex, glabrous, often purple), 5-nerved, membranous ; upper invol.-glume $\frac{1}{8}$ in. long (including a short mucro or awn), rather broader than the lower invol.-glume, 5—7-nerved, membranous ; lower floral glume, $\frac{1}{6}$ in. long, membranous, broadly ovate, subacute, the midrib prolonged behind into a very short apiculation, 7—9-nerved with a very narrow palea ; upper floral glume shorter than the lower, ovate-oblong, acute, coriaceous, smooth, shining, with incurved margins ; palea oblong, acute, with strongly involute margins. Fl. B. I. v. 7, p. 66 ; Trim. Fl. Ceyl. v. 5, p. 168 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1173. *Oplismenus lanceolatus,* Kunth, Revis. Gram. (1829) p. 45 ; Dalz. & Gibs. p. 292.—Flowers : Nov.—Dec.

KONKAN : at the foot of the Ghâts under the shade of trees, *Dalzell & Gibson* ; Matheran, *Woodrow* ; Thana, *Lisboa.* DECCAN : Lanoli, *Lisboa.* KANARA : Kadgal (N. Kanara), *Woodrow* !—DISTRIB. Throughout India ; Ceylon, most tropical regions (except Australia).

2. **Oplismenus Burmanni,** *Beauv. Agrost.* (1812) p. 54. A very slender diffusely branched leafy grass ; stems 6—18 in. long ; nodes glabrous or hairy. Leaves $\frac{3}{4}$—2 by $\frac{1}{4}$—$\frac{1}{2}$ in., ovate or ovate-lanceolate, acuminate, sparsely pilose with long slender white hairs ; sheaths glabrous or hairy. Panicle 1—$2\frac{1}{2}$ in. long ; peduncle slender (almost filiform), usually very long ; branches of panicle spike-like, few, distant, subsessile, $\frac{1}{6}$—$\frac{3}{4}$ in. long ; rhachis slender, angular, clothed with long slender white hairs nearly as long as the spikelets. Spikelets $\frac{1}{10}$ in. long (excluding the awns), secund, solitary or 2-nate ; pedicels short, hairy. Glumes 4 ; lower invol.-glume $\frac{1}{16}$ in. long (excluding the acute scaberulous capillary awn which reaches $\frac{1}{8}$ in. long), ovate, obtuse, 3—5-nerved, hyaline, silky-hairy and ciliate ; upper invol.-glume similar and subequal to the lower, 5-nerved, with an awn reaching $\frac{1}{8}$ in. long ; lower floral glume reaching $\frac{1}{10}$ in. long (excluding an awn of about $\frac{1}{20}$ in. long), broadly ovate, subobtuse, concave, hyaline, silky-hairy, and ciliate, 7—9-nerved, empty, epaleate ; upper floral glume as long as the lower, ovate, acute, membranous, with incurved margins ; palea as long as the glume, membranous, ovate-oblong, acute, with strongly involute margins. Fl. B. I. v. 7, p. 68 ; Dalz. & Gibs. p. 291 ; Trim. Fl. Ceyl. v. 5, p. 169 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1173.—Flowers : Sept.—Oct.

Found usually under the shade of trees throughout the Presidency, *Dalzell & Gibson.* KONKAN : Parel (Bombay), *Woodrow.* DECCAN : Panchgani, *Woodrow.* GUJARAT : Domas (near Surat), *Cooke* !—DISTRIB. Throughout India ; Ceylon, Malay Islands, China, Japan, Tropical Africa.

10. **PANICUM,** Linn.

Annual or perennial grasses of various habit. Leaves broad or narrow ; ligules usually reduced to a ciliate rim or a fringe of hairs

(rarely a distinct membrane) or 0. Inflorescence various. Spikelets small, 1—2-flowered, terete or dorsally or laterally compressed, solitary or 2-nate, often secund, ovoid or oblong, articulate at the base and deciduous, rarely awned. Glumes 4 ; invol.-glumes empty ; the lower the smallest (sometimes minute) and fewest-nerved ; upper invol.-glume usually equal or almost equal to the lower floral glume, sometimes cuspidate, 5—13-nerved ; lower floral glume equalling the upper or longer, more or less resembling the upper invol.-glume, usually neuter, paleate or not ; upper floral glume coriaceous to crustaceous, sometimes shortly stipitate, convex, 2-sexual, paleate, the palea usually as long as and of the same texture as the glume. Lodicules 2, cuneate. Stamens 3. Styles distinct ; stigmas laterally exserted near the top of the spikelet. Grain free but tightly enclosed by the hardened glume and palea, oblong, ellipsoid or lanceolate.—DISTRIB. Species 200—250, chiefly in the warm regions of the world.

Spikelets dorsally compressed or subterete.
- Inflorescence racemose, of simple (rarely branched) spikes or racemes bearing secund spikelets.
  - Rhachis of spikes broad, flattened.
    - Spikelets 2-seriate.
      - Spikes shorter than the internodes ..... 1. *P. flavidum.*
      - Spikes longer than the internodes.
        - Upper floral glume granulate ..... 2. *P. punctatum.*
        - Upper floral glume smooth ..... 3. *P. fluitans.*
    - Spikelets 3—5-seriate; lower floral glume cuspidate or awned.
      - Stems stout, reaching 5 ft. long; lower floral glume awned ..... 4. *P. stagninum.*
      - Stems slender, decumbent, 1—2 ft. long; lower floral glume cuspidate, not awned... 5. *P. colonum.*
  - Rhachis of spikes narrow and filiform, terete or angular.
    - Lower invol.-glume minute, not ¼ as long as the upper floral glume, nerveless.
      - Leaf-base rounded; lower invol.-glume triangular ..... 6. *P. Isachne.*
      - Leaf-base cordate-amplexicaul; lower invol.-glume semilunate..... 7. *P. prostratum.*
    - Lower invol.-glume from ⅓—½ as long as the upper floral glume, 3—5-nerved.
      - Upper floral glume apiculate or awned.
        - Upper floral glume only apiculate.
          - Lower invol.-glume ovate, acute, ½ as long as the upper floral glume ..... 8. *P. ramosum.*
          - Lower invol.-glume orbicular, about ½ as long as the upper floral glume. 9. *P. setigerum.*
        - Upper floral glume abruptly awned; lower invol.-glume rather less than ½ the lower floral glume ..... 10. *P. javanicum.*
- Inflorescence of spiciform or effuse panicles.
  - Panicles narrow, spiciform.
    - Lower invol.-glume very minute; spikelets lanceolate ..... 11. *P. interruptum.*
    - Lower invol.-glume ½ as long as the upper; spikelets globosely ovoid ..... 12. *P. myosuroides.*
  - Panicles broad, effuse.
    - Lower invol.-glume as long as the lower floral glume or nearly so ..... 13. *P. turgidum.*

Lower invol.-glume shorter than the lower floral glume.
Annuals.
Leaves $\frac{3}{8}$ in. broad; panicle 15 in. long ..... 14. *P. obscurans.*
Leaves $\frac{1}{8}$—$\frac{1}{4}$ in. broad; panicle 4—10 in. long. 15. *P. trypheron.*
Perennials.
Lower invol.-glumes very minute, 1 or rarely both often obsolete ..... 16. *P. subeglume.*
Lower invol.-glumes distinctly evident.
Spikelets laxly clustered on the branches. 17. *P. antidotale.*
Spikelets solitary (rarely 2-nate).
Lower invol.-glume not $\frac{1}{4}$ the length of the upper, orbicular or reniform ..... 18. *P. proliferum* var. *paludosum.*
Lower invol.-glume $\frac{1}{2}$ the length of the upper, ovate, subacute ..... 19. *P. montanum.*
Spikelets strongly laterally compressed, gibbously ovoid. 20. *P. patens.*

1. **Panicum flavidum,** *Retz. Obs.* fasc. 4 (1786) p. 15. Stems 1—4 ft. long, slender, ascending from a short decumbent base; nodes glabrous. Leaves sub-bifarious, 3—5 by $\frac{1}{8}$—$\frac{1}{4}$ in., narrowly linear, acuminate, thinly coriaceous, glabrous or the margins slightly scaberulous; sheaths compressed, glabrous, the margins not ciliate; ligule a ridge of long hairs. Spikes few or many, distant, erect, $\frac{1}{2}$—1 in. long, shorter than the internodes, secund, sessile; rhachis flattened, glabrous. Spikelets $\frac{1}{10}$ in. long, gibbously globose, sessile or nearly so, 2-seriate, closely imbricate, glabrous. Glumes 4, pale-green or nearly white, the 3 lower with green nerves; lower invol.-glume about $\frac{1}{2}$ as long as the spikelet, orbicular, concave, 3-nerved; upper invol.-glume broadly ovate, concave, shorter than the upper floral glume, 7-nerved; lower floral glume shorter than the upper, orbicular, 5-nerved, paleate, empty; upper floral glume broadly ovate or almost orbicular, often mucronate, very convex, striolate-punctate, white. Palea with the sides infolded nearly to the middle, striolate. Fl. B. I. v. 7, p. 28; Trim. Fl. Ceyl. v. 5, p. 133; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1174; Watt, Dict. Econ. Prod. v. 6, part 1, p. 8. *Panicum brizoides,* Jacq. Eclog. Gram. (1813) p. 2; Dalz. & Gibs. p. 290.—Flowers: Oct.

KONKAN: N. & S. Konkan, *Law!* DECCAN: Khandala, *Woodrow.* GUJARAT: near Surat, *Dalzell & Gibson;* Morvi (Kathiawar), *Woodrow;* Porbander (Kathiawar), *Woodrow.*—DISTRIB. Plains of India; Ceylon, Trop. Asia and Africa.

2. **Panicum punctatum,** *Burm. Fl. Ind.* (1768) p. 26. Perennial, quite glabrous; stem prostrate at the often floating base, 2—4 ft. long, rooting at the lower stout spongy nodes. Leaves 4—8 by $\frac{1}{4}$—$\frac{3}{8}$ in., linear, acute or acuminate, base narrow; lower sheaths inflated; ligule a ridge of hairs. Spikes many, $\frac{1}{2}$—1 in. long, distant, sessile, longer than the internodes, appressed to the glabrous rhachis, very pale. Spikelets $\frac{1}{10}$—$\frac{1}{2}$ in. long, imbricate, sessile, 2-seriate, ovoid-oblong on a flattened undulate rhachis which is produced beyond the spike into an acicular tip which is as long as or longer than the terminal spikelet. Glumes 4; lower invol.-glume small, about $\frac{1}{20}$ in. long, orbicular, rounded or slightly retuse at the apex, thinly membranous; upper invol.-glume about $\frac{1}{2}$ as long as the floral glumes, membranous, 3—5 nerved, orbicular, with truncate or rounded tip;

lower floral glume ovate, acute, 3—5-nerved, membranous, neuter ; upper floral glume about as long as the lower, cuspidately acuminate, thinly coriaceous, granulate, white. Palea coriaceous, with inflexed membranous sides. Anthers $\frac{1}{20}$ in. long. Fl. B. I. v. 7, p. 29 ; Trim. Fl. Ceyl. v. 5, p. 134 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1174. *Panicum fluitans,* Retz. Obs. fasc. 3 (1783) p. 8 (not fasc. 5, p. 18) ; Grah. Cat. p. 237 ; Dalz. & Gibs. p. 290.—Flowers : Nov. VERN. *Petnar.*

DECCAN : Poona, *Woodrow, Lisboa;* Ahmednagar, *Woodrow.*—DISTRIB. Throughout India in marshes; Ceylon, Malaya, Mauritius, Trop. and N. Africa.

3. **Panicum fluitans,** *Retz. Obs.* fasc. 5 (1789) p. 18.—Perennial ; stem 1—4 ft. long from a stout creeping base, often as thick as a swan's quill, smooth, soft, striate ; lower nodes 2—5 in. long, quite glabrous. Leaves 4—8 by $\frac{1}{4}$—$\frac{3}{8}$ in., linear, finely acuminate, glabrous, the margins smooth or nearly so, often incurved, base narrow ; sheaths larger, loose, glabrous, the margins not ciliate ; ligule a ridge of hairs. Panicle 8—12 in. long ; rhachis erect, angular, glabrous or nearly so. Spikes many, $\frac{1}{2}$—$1\frac{1}{2}$ in. long, sessile, longer than the internodes, often appressed to the rhachis ; rhachis of spikes flattened. Spikelets $\frac{1}{10}$—$\frac{1}{8}$ in. long, ovoid, acute, glabrous, 2-seriate, imbricate. Glumes 4 ; lower invol.-glume $\frac{1}{20}$ in. long, broader than long, thinly membranous, without nerves, white ; upper invol.-glume ovate, acute, concave, thinly membranous, with 5—7 green nerves, slightly shorter than the upper floral glume ; lower floral glume subcoriaceous, 5—7-nerved, paleate, empty or male ; upper floral glume broadly ovate, mucronate, thinly coriaceous, smooth or nearly so ; palea with inflexed membranous margins. Trim. Fl. Ceyl. v. 5, p. 135 ; Prain, Beng. Pl. p. 1174. *Panicum paspaloides* (*paspalodes*), Pers. Syn. v. 1 (1805) p. 81 ; Hook. f. Fl. B. I. v. 7, p. 30 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.

Dalzell without locality in Herb. Kew.! SIND : *Stocks*!; Manchar Lake, *Stocks*!, *Woodrow.*—DISTRIB. More or less throughout India; Ceylon, Afghanistan, Arabia, Tropical Africa and America.

4. **Panicum stagninum,** *Retz. Obs.* fasc. 5 (1789) p. 17. Annual or perennial ; root-fibres many, long, wiry, with numerous filiform rootlets ; stem erect from a geniculate or prostrate base, reaching 5 ft. (or more) long, sometimes rooting from the lower nodes. Leaves 6—18 by $\frac{1}{8}$—$\frac{1}{2}$ in., linear, tapering to a fine point ; sheaths striate, smooth, glabrous ; ligule a fringe of stiff hairs. Panicle 4—8 in. long ; rhachis slender, more or less flexuous, angular, grooved, scabrid on the ridges and with scattered bristles ; branches few or many, distant or close, alternate, usually suberect, 1—2 in. long, sessile or nearly so with a tuft of hairs at the base ; rhachis of the branches angular, grooved, clothed sparingly with bulbous-based hairs. Spikelets crowded, ovoid-lanceolate, $\frac{1}{8}$—$\frac{1}{5}$ in. long (excluding the awn), hairy with bulbous-based hairs, pale ; pedicels very short with enlarged tips. Glumes 4 ; lower invol.-glume $\frac{1}{10}$ in. long (half as long as the spikelet), broadly ovate or suborbicular, cuspidate, 3-nerved, hairy and ciliate, thinly membranous ; upper invol.-glume $\frac{1}{5}$ in. long (including the mucro), broadly ovate, concave, hairy and

ciliate with bulbous-based hairs, thinly membranous, 7-nerved in the upper part with green nerves, acuminate or produced into a short compressed scabrid awn ; lower floral glume like the upper invol.-glume with an awn varying from $\frac{1}{6}$—1 in. long, paleate, male, the palea hyaline, as long as the glume ; upper floral glume $\frac{1}{8}$ in. long, ovate-lanceolate, mucronate, straw-colored, shining, faintly striolate, with involute margins, coriaceous ; palea as long as the glume, elliptic-oblong, acute, striolate, with inflexed margins. Roxb. Fl. Ind. v. 1 (1832) p. 295 ; Grah. Cat. p. 237 (misspelt *staginum*) ; Stapf, in Dyer, Fl. Capen. v. 7 (1899) p. 394. *Panicum Crus-galli* var. *stagninum*, Trim. ex Hook. f. in Trim. Fl. Cyel. v. 5, p. 136 ; Prain, Beng. Pl. p. 1174. *P. Crus-galli*, Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 (*not* of Linn.). *Oplismenus stagninus*, Kunth, Rev. Gram. v. 1 (1827) p. 44 ; Dalz. & Gibs. p. 292.—Flowers : Oct.

Throughout the Presidency in wet places, especially in cultivated ground and in ditches.—DISTRIB. More or less throughout India; Ceylon, most warm countries.

I do not believe that the true *P. Crus-galli* of Linnæus occurs anywhere in the Bombay Presidency, *P. stagninum*, which has been restored to specific rank by Stapf (Fl. Capen. l. c.), having been mistaken for it. Dalzell's *Oplismenus Crus-galli*, which has been cited in the 'Flora of British India' (v. 7, p. 31) as a synonym for *P. Crus-galli*, is undoubtedly *Panicum Isachne*. *P. stagninum* is a tall plant which grows in water-holes and places where water has lodged; it has a conspicuous ligule of a fringe of hairs, as noticed by Dr. Stapf in his clavis on p. 384 in the 'Flora Capensis,' while *P. Crus-galli* has no ligule.

VAR. *frumentacea*, Trim. Cat. Ceyl. Pl. (1885) p. 104. Tall, robust ; panicle often nodding ; spikes thickened, often incurved, sometimes branched and corymbosely panicled, lower floral glume cuspidate but not awned. Fl. B. I. v. 7, p. 31 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1174. *Panicum frumentaccum*, Roxb. Fl. Ind. v. 1 (1832) p. 304 ; Grah. Cat. p. 237 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 9. *Oplismenus frumentaceus*, Dalz. & Gibs. Suppl. p. 98.—VERN. *Shamula*.

Cultivated in and near the Ghát districts. The quickest growing of all the millets and in some localities can be harvested within six weeks after being sown (*Watt*).

5. **Panicum colonum**, *Linn. Syst.* ed. 10 (1750) p. 870. Annual ; stem 1—2 ft. long, slender, decumbent or shortly creeping below ; nodes glabrous or puberulous. Leaves 4—8 by $\frac{1}{6}$—$\frac{1}{3}$ in., narrowly lanceolate or linear, acuminate, flat, glabrous, with scaberulous margins ; sheaths up to 6 in. long ; ligule 0. Spikes 8—20, suberect, usually distant, $\frac{1}{2}$—1 in. long ; rhachis stout, angular, scaberulous on the angles. Spikelets $\frac{1}{12}$—$\frac{1}{10}$ in. long, globosely ovoid, acute or subcuspidate, more or less hispidly pubescent, secund, sessile, 3—5-seriate. Glumes 4 ; lower invol.-glume about $\frac{1}{2}$ as long as the lower floral glume, broadly ovate or suborbicular, membranous, 3-nerved, ciliolate ; upper invol.-glume about equal to the lower floral glume, broadly ovate, cuspidate, concave, 5—7-nerved, hairy ; lower floral glume similar, empty, with a hyaline palea ; upper floral glume coriaceous, broadly ovate, turgid, acute, finely striolate, polished, yellowish-white, with a coriaceous palea. Very similar to *P. frumentaceum*,

Roxb., but a more slender plant with smaller spikelets. Fl. B. I. v. 7, p. 32 ; Grah. Cat. p. 237 ; Trim. Fl. Ceyl. v. 5, p. 136 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1174 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 7. *Oplismenus colonus*, H. B. & K. Nov. Gen. & Sp. v. 1 (1815) p. 108 ; Dalz. & Gibs. p. 291.—Flowers : Oct. VERN. *Bovur ; Sáma.*

KONKAN : *Stocks* ! S. M. COUNTRY : Londa, *Woodrow*. GUJARAT : Morvi (Kathiawar), *Woodrow*.—SIND : *Stocks*, 650 !, *Woodrow ;* Shikarpur, *Woodrow*. —DISTRIB. Throughout the plains of India ; Ceylon, most warm countries.

6. Panicum Isachne, *Roth, Nov. Pl. Sp.* (1821) p. 54. Annual ; stems many, 1—2 ft. long, ascending from a decumbent or creeping and rooting base, geniculate, very slender, with villous nodes, otherwise glabrous, much branched below, simple above. Leaves 1—2 by $\frac{1}{12}$—$\frac{1}{8}$ in., linear-lanceolate from a rounded base, acute, subpungent, glabrous or sparsely hairy with scaberulous margins ; sheaths glabrous or hairy, ciliate on the upper part ; ligule a fringe of hairs. Inflorescence 2—3 in. long, erect, consisting of 6—12 secund or subsecund racemosely arranged spikes $\frac{1}{2}$—1 in. long, longer than the internodes, sessile or shortly pedunculate, usually appressed to the triquetrous slender hairy rhachis. Spikelets $\frac{1}{12}$—$\frac{1}{10}$ in. long, secund, closely imbricate in 2 series, oblong, subacute or obtuse, softly hairy ; rhachis of spikes triquetrous, hairy, about $\frac{1}{50}$ in. in diam. ; pedicels very short. Glumes 4 ; lower invol.-glume minute, triangular, membranous, glabrous ; upper invol.-glume membranous, oblong, obtuse, 5-nerved, hispidly pubescent ; lower floral glume narrower, 3-nerved, paleate, neuter or sometimes male, with hyaline palea ; upper floral glume shorter, oblong, obtuse, dorsally flattened, coriaceous, glabrous, shining, 2-sexual, with coriaceous palea. Anthers $\frac{1}{25}$ in. long. Fl. B. I. v. 7, p. 28 ; Trim. Fl. Ceyl. v. 5, p. 133 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1174. *Panicum eruciforme,* Sibth. & Sm. Fl. Græc. Prodr. v. 1 (1806) p. 40 & Fl. Græc. t. 59. *Oplismenus Crus-galli,* Dalz. & Gibs. Bo. Fl. (1861) p. 292 (*not* of Dum.).—Flowers : Sept.—Jan.

Dalzell without locality in Herb. Kew. ! DECCAN : Poona, *Jacquemont*, 452 !, *Woodrow*. GUJARAT : Surat, *Dalzell* !—DISTRIB. Throughout the plains of India in watery places ; Ceylon, westward to Italy, Africa.

7. Panicum prostratum, *Lamk. Illustr.* v. 1 (1791) p. 171. A slender annual grass ; stem 4—18 in. long, ascending from a long creeping base, often branched below ; nodes pubescent ; internodes 1—3 in. long. Leaves 1—2 by $\frac{1}{4}$—$\frac{5}{8}$ in., ovate-lanceolate from a cordate amplexicaul base, acuminate, thin, flat, nearly glabrous or quite glabrous above, often clothed with long hairs beneath, sometimes nearly glabrous ; sheaths slender, with ciliate margins ; ligule a tuft of white hairs or 0. Racemes 5—8, alternate, secund, $\frac{1}{2}$—$1\frac{1}{4}$ in. long, sessile or shortly pedunculate, distichously spreading ; rhachis of racemes slender, angular. Spikelets $\frac{1}{16}$—$\frac{1}{12}$ in. long, solitary or binate, secund, ellipsoid, somewhat turgid, subacute, glabrous or hairy ; pedicels very short, with long slender hairs at the tip below the spikelet. Glumes 4 ; lower invol.-glume minute, semilunate, hyaline, nerveless ; upper invol.-glume about equalling the lower

floral glume, membranous, broadly ovate, acute, pubescent, 7-nerved ; lower floral glume 5-nerved, empty, with hyaline palea ; upper floral glume elliptic, dorsally rounded, thinly coriaceous, finely striolate, nearly white, with subcoriaceous palea. Anthers $\frac{1}{30}$ in. long. Fl. B. I. v. 7, p. 33 ; Dalz. & Gibs. p. 290 ; Trim. Fl. Ceyl. v. 5, p. 138 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1175 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 15.—Flowers : Sept. VERN. *Chimanchara.*

DECCAN : Poona, *Woodrow.* GUJARAT : Surat, *Dalzell & Gibson, Lisboa*; Kathiawar, *Woodrow.* SIND : *Woodrow.*—DISTRIB. Plains of India; Ceylon, Tropics generally.

8. **Panicum ramosum,** *Linn. Mantiss.* (1767) p. 29. Annual ; stem 1—3 ft. long, erect or ascending from a shortly creeping base, slender or rather stout, much branched from the base upwards, usually glabrous, leafy ; nodes pubescent. Leaves 2—5 by $\frac{1}{8}$—$\frac{1}{2}$ in., linear-lanceolate, finely acuminate, thin, flat, smooth, glabrous or pubescent beneath, with scaberulous margins, base rounded ; sheaths glabrous or pubescent, ciliate or not towards the mouth ; ligule a fringe of short hairs. Panicle 2—6 in. long, subpyramidal, with a long peduncle ; rhachis angular ; branches of panicle 5—10, distant, 1—2 in. long, alternate or the lower opposite, erect or spreading, shorter upwards ; rhachis of racemes slender, angular, puberulous. Spikelets alternate, $\frac{1}{10}$—$\frac{1}{8}$ in. long, close or distant, often in pairs (a sessile and a pedicellate one), ovoid, acute, pubescent, turgid, pale green or yellowish ; pedicels with a few long hairs near the tip. Glumes 4 ; lower invol.-glume $\frac{1}{2}$ as long as the lower floral glume, ovate, acute, hyaline ; upper invol.-glume about equalling the lower floral glume, ovate, acute, cuspidate, 5-nerved ; lower floral glume similar but slightly broader, with membranous palea, empty ; upper floral glume coriaceous, ovoid-oblong, acute, rugulose, with coriaceous palea. Fl. B. I. v. 7, p. 36 ; Trim. Fl. Ceyl. v. 5, p. 140 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1175. *Panicum Helopus,* Watt, Dict. Econ. Prod. v. 6, part 1, p. 10 (partly). *P. umbrosum,* Retz. Obs. fasc. 4 (1786) p. 16 ; Roxb. Fl. Ind. v. 1 (1832) p. 297.—Flowers : Aug.—Nov.

DECCAN : Poona, *Woodrow, Lisboa.* S. M. COUNTRY : Badami, *Woodrow.*—DISTRIB. Throughout India; Ceylon, Afghanistan.

9. **Panicum setigerum,** *Retz. Obs.* fasc. 4 (1786) p. 15. Stems 2—3 ft. long, prostrate and widely straggling below, branched, slender, firm ; nodes bearded, the lower rooting ; internodes 1—2 in. long. Leaves 3—5 by $\frac{3}{8}$—$\frac{7}{8}$ in., ovate-lanceolate from a cordate, amplexicaul, more or less ciliate base, finely acuminate, flat, thin, with slender midrib, 5—6 pairs of nerves and scabrid margins ; sheaths glabrous except at the back beneath the leaf-blade, with ciliate margins ; ligule a tuft of long woolly hairs. Inflorescence of 3—10 racemes 1—2 in. long, the lower very distant, alternate ; rhachis of racemes angular, glabrous or pubescent, villous at the base. Spikelets $\frac{1}{10}$—$\frac{1}{8}$ in. long, loosely imbricate, 2-seriate (one often pedicellate, the other sessile), secund, ovoid, acute or acuminate, glabrous or pubescent ; pedicels pubescent and with long spreading slender hairs on or below the

pedicel. Glumes 4 ; lower invol.-glume about ⅓ as long as the upper, orbicular, thinly membranous ; upper invol.-glume broadly ovate, acute or acuminate, 7-nerved, membranous ; lower floral glume about equal to the upper invol.-glume, 5-nerved, paleate, neuter, the palea membranous, as long as the glume, subacute ; upper floral glume elliptic, obtuse, shortly apiculate, coriaceous, granulate, with narrowly incurved margins, the palea coriaceous, elliptic-oblong, obtuse. Fl. B. I. v. 7, p. 36 ; Trim. Fl. Ceyl. v. 5, p. 141 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1175.—Flowers : Sept.—Dec.

DECCAN : Poona, *Woodrow*.—DISTRIB. India (Bengal, W. Peninsula) ; Ceylon.

VAR. *tomentosa*, Hook. f. Fl. B. I. v. 7 (1896) p. 37. Margins of leaves and sheaths with long white hairs ; spikelets larger, ⅛ in. long, tomentose ; awn longer.

GUJARAT : Rajkot (Kathiawar), *Woodrow*, 45!

10. **Panicum javanicum,** *Poir. Encyl. Suppl.* v. 4 (1816) p. 274. Annual ; stem 1—2 ft. long, decumbent and rooting below, geniculately ascending, branching upwards ; nodes pubescent. Leaves 1—5 by ¼—½ in., ovate-lanceolate, from a rounded, cordate, or amplexicaul base, acuminate, softly hairy on both sides, with scaberulous margins ; sheaths loose, softly hairy, the mouth villous ; ligule a beard. Panicle erect ; branches 6—12, rather distant ; rhachis of racemes compressed, glabrous or pubescent. Spikelets ⅛—⅛ in. long, secund, 2-seriate, loosely imbricate, subsessile or very shortly pedicellate, ovoid, acute, pubescent, tomentose, or villous ; pedicels pubescent and with a few long hairs near the tip. Glumes 4 ; lower invol.-glume ovate, acute or obtuse, not ½ as long as the upper invol.-glume, 3-nerved or nerveless ; upper invol.-glume as long as and similar to the lower floral glume, ovate, acute, 7-nerved ; lower floral glume similar, 5-nerved, empty or male, with membranous palea ; upper floral glume crustaceous, broadly ovate-oblong, rugulose, the tip rounded, abruptly cuspidate with a long mucro, concealed by the lower glumes, and with a crustaceous palea. Fl. B. I. v. 7, p. 35 ; Trim. Fl. Ceyl. v. 5, p. 142 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1175. *Panicum Helopus*, Watt, Dict. Econ. Prod. v. 6, part 1, p. 10 (partly). *Urochloa panicoides*, Beauv. Agrost. p. 53 ; Dalz. & Gibs. p. 290.—Flowers : Aug.—Nov. VERN. *Phadya ; Kuri.* Distinguished from *P. ramosum* by the awned upper floral glume.

Dalzell without locality in Herb. Kew.! ; common in cultivated plains, *Lisboa*. DECCAN : N. Khandesh, *Woodrow* ; Poona, *Woodrow, Jacquemont*, 390! ; Dapuri near Poona, *Jacquemont*, 482! S. M. COUNTRY : Badami, *Woodrow*. GUJARAT : Baroda, *Cooke*!—DISTRIB. Plains of India ; Ceylon, Tropics generally. A good fodder grass for horses and cattle.

11. **Panicum interruptum,** *Willd. Sp. Pl.* v. 1 (1797) p. 341. A large perennial grass, quite glabrous ; stem reaching 5—6 ft. long, ascending from a stout creeping and rooting or floating rootstock ; lower nodes emitting fascicles of long stout roots clothed with root-hairs ; upper internodes very long, slender. Leaves 6—12 by ¼—½ in.,

linear, finely acuminate, soft, flat, glabrous, with smooth or scaberulous margins, base rounded or subcordate; sheaths 2—4 in. long, with smooth margins; ligule short, broad, membranous. Inflorescence a spike-like panicle 6—12 by ½—⅔ in., cylindric, interrupted below; rhachis stout, strict, channelled. Spikelets ⅛—⅕ in. long, densely crowded in small fascicles, subsessile or shortly pedicellate, spreading, ovoid-lanceolate, acute, green. Glumes 4; lower invol.-glume scarcely $\frac{1}{16}$ in. long, broadly ovate, obtuse, hyaline, 3—5-nerved; upper invol.-glume ovate, acute, herbaceous, membranous, prominently 9-nerved; lower floral glume about equalling the upper invol.-glume, ovate, acute, 7-nerved, paleate, male or barren, the palea hyaline; upper floral glume shorter than the lower, ovate-oblong, subacute, thinly coriaceous, white, polished, dorsally convex, the palea thinly coriaceous, as large as the glume. Anthers purple, much exserted. Grain obovoid, apiculate. Fl. B. I. v. 7, p. 40; Dalz. & Gibs. p. 316; Trim. Fl. Ceyl. v. 5, p. 147; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1175.—Flowers: Oct.—Feb.

KONKAN: *Stocks*!, *Law*!; Pánvel, *Woodrow;* Vingorla, *Woodrow*; margins of tanks throughout the Konkan, *Dalzell & Gibson*. S. M. COUNTRY: Londa, *Woodrow*! SIND: *Woodrow*.—DISTRIB. Throughout India in swamps; Ceylon, Malaya, Trop. and S. Africa.

12. **Panicum myosuroides,** *R. Br. Prodr.* (1810) p. 189. Stem 2—3 ft. long, erect, or shortly creeping below, rather stout, leafy; internodes 3—5 in. long. Leaves 6—8 by $\frac{1}{10}$—⅛ in., narrowly linear, finely acuminate, margins smooth, base narrow; sheaths 2—4 in. long, with naked margins; ligule 0. Inflorescence a spike-like panicle 1½—8 by ⅛ in., cylindric, erect or curved; rhachis grooved, glabrous. Spikelets innumerable, $\frac{1}{12}$ in. long or less, densely crowded in small fascicles, very shortly pedicellate, globosely ovoid, obtuse, glabrous or pubescent, green or purplish. Glumes 4; lower invol.-glume about ½ as long as the upper, ovate, subacute, 3-nerved; upper invol.-glume ovate, obtuse, conspicuously 5—9-nerved, glabrous or pubescent; lower floral glume about equalling the upper invol.-glume, but broader, ovate, obtuse, very concave, 5—9-nerved, glabrous or pubescent, paleate, empty; upper floral glume much smaller than the lower, ovate-oblong, acute, quite smooth, white, dorsally convex with involute margins, thinly coriaceous; palea as long as the glume. Fl. B. I. v. 7, p. 42; Trim. Fl. Ceyl. v. 5, p. 148; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434; Prain, Beng. Pl. p. 1175.

KONKAN: Sávantvádi, *Woodrow*; Alibag, *Lisboa*.—DISTRIB. Throughout the hotter parts of India; Ceylon, Malay Peninsula, China, Australia, Trop. Africa.

13. **Panicum turgidum,** *Forsk. Fl. Ægypt.-Arab.* (1775) p. 18. Perennial, glabrous, glaucous; rootstock sometimes as thick as the little finger; root-fibres thick, velvety; stem hard (bamboo-like), solid, smooth and polished, $\frac{1}{10}$—⅛ in. in diam. about the middle, emitting from the nodes fascicles of branches in tufts from a swollen base. Leaves few, those at the base of the stem and branches 1—3 in. long, flat, coriaceous, linear-lanceolate, acuminate, smooth, those of the upper nodes often reduced to open chartaceous sheaths with a

setiform blade. Panicle terminal, subpyramidal, 1½—4 in. long; branches at first erect, then more or less spreading, ½—1½ in. long; rhachis angular, grooved, glabrous. Spikelets ⅛—⅛ in. long, solitary, or rarely 2-nate, subsecund, ovoid, turgid, glabrous, white; pedicels short or long, with a cupular tip, scaberulous. Glumes 4, subcoriaceous; lower invol.-glume scarcely shorter than the upper, and about equalling the lower floral glume, broadly ovate, acute, concave, 5—7-nerved; upper invol.-glume broadly ovate, acute, 7-nerved; lower floral glume ovate, acuminate, 9-nerved, paleate, male; upper floral glume much smaller than the lower, ovate-oblong, acute, smooth, polished. Anthers purple. Styles short; stigmas short, pale purple. Fl. B. I. v. 7, p. 44; Delile, Fl. d'Egypte, p. 19, t. 9, fig. 2; Duthie, Fodd. Grass. N. Ind. p. 13; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers: Nov. The plant grows on arid or desert plains.

GUJARAT: Rajkot (Kathiawar), *Woodrow*. SIND: *Duthie*.—DISTRIB. Beluchistan, Egypt, Arabia, Trop. Africa.

14. **Panicum obscurans,** *Woodr. in Journ. Bomb. Nat.* v. 13 (1901) p. 434. Annual; stems tufted, erect or ascending, 1—2 ft. (or more) high (in specimens raised from seed by Woodrow at Poona, in the College of Science Botanical Garden, the stem is simple and about 3 ft. high); nodes glabrous. Leaves 3½—5 by ⅜ in. at the widest part, lanceolate, acute, with a few scattered hairs above, hispid with bulbous-based hairs below; sheaths closely striate, hispid with short bulbous-based hairs, the margins naked; ligule a tuft of hairs. Panicle large, 15 by 12 in., pyramidal, lax; branches of the panicle widely spreading, laxly racemosely or subpaniculately branched, each branchlet 1—3-flowered at the apex, naked below; rhachis angular, grooved, scaberulous on the angles. Spikelets distant, solitary, ⅛—⅛ in. long, pedicellate, narrowly ovoid, acuminate. Glumes 4, the 3 lower strongly nerved with green nerves; lower invol.-glume ⅛ in. long, ovate, acuminate, shorter than the upper, membranous, 5-nerved, the nerves scaberulous; upper invol.-glume ⅛ in. long, ovate, acuminate, 7-nerved; lower floral glume rather less than ⅛ in. long, ovate, acuminate, empty, paleate, the palea ½ as long as the glume, elliptic-oblong, hyaline, shortly 2-dentate; upper floral glume ⅛ in. long, crustaceous, hard, smooth, concave, elliptic, obtuse, with incurved margins, yellowish-white, very faintly 5—7-nerved; the palea crustaceous, elliptic, obtuse, with incurved margins, as long as the glume. *Isachne obscurans,* Woodr. in Gard. Chron. v. 23, ser. 3 (1898) p. 161.—Flowers: Nov.—Dec. VERN. *Tán-sawa.* The whole inflorescence breaks off and is driven about by the wind (*Woodrow*).

DECCAN: Jeur near Sholapur, *Woodrow*! Specimens in Herb. Kew. also grown from seed in the Botanic Garden of the College of Science at Poona.
The grain is used as a fast-day food and cooked like rice (*Woodrow*).

15. **Panicum trypheron,** *Schult. Mantiss.* v. 2 (1824) p. 244. Annual; stems 1—3 ft. high, tufted, erect, or geniculate below, stout or slender, leafy at the base; nodes glabrous; internodes 2—5 in. long. Leaves 3—10 by ⅛—¼ in., usually flat, thin, linear, acuminate, more or less hairy on both surfaces, margins often ciliate, base

narrow ; sheaths long, glabrous or hairy, the margins often ciliate towards the top ; ligule short, fimbriate. Panicle 4—10 in. long, often as broad as long, effuse ; rhachis filiform, slightly scaberulous ; branches up to 4 in. long, capillary. Spikelets $\frac{1}{10}$—$\frac{1}{8}$ in. long, very distant, ovoid, acuminate, sometimes with a purple tinge, glabrous ; pedicels long or short, filiform. Glumes 4 ; lower invol.-glume about $\frac{2}{3}$ as long as the lower floral glume, broadly ovate, acuminate, membranous, 5-nerved ; upper invol.-glume slightly longer than the lower floral glume, ovate, acuminate, 7—9-nerved ; lower floral glume similar but shorter, 7-nerved, empty, paleate, the palea oblong, obtuse, 2-toothed at the apex, smaller than the glume, hyaline ; upper floral glume elliptic, obtuse, dorsally convex, smooth, shining, yellowish-white, coriaceous, faintly 5-nerved, the margin very slightly incurved, the palea elliptic, as long as the glume, coriaceous. Fl. B. I. v. 7, p. 47 ; Trim. Fl. Ceyl. v. 5, p. 152 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1176.—Flowers : Sept. VERN. *Bhatur.*

KONKAN : Malabar Hill (Bombay), *Lisboa.* DECCAN : Poona, *Woodrow;* Jeur (Sholapur districts), *Woodrow*; Malhargad, *Woodrow.*—DISTRIB. India (Bengal, Panjáb, W. Peninsula) ; Ceylon, China, Borneo, Trop. Africa.

16. **Panicum subeglume,** *Trin. in Mém. Acad. Pétersb.* sér. 6, v. 3, part 2 (1835) p. 292. Perennial ; stem slender, 1—2 ft. long, glabrous or nearly so ; nodes glabrous or tomentose. Leaves 3—6 by $\frac{1}{8}$—$\frac{3}{8}$ in., linear, finely acuminate, glabrous or softly hairy ; sheaths glabrous or softly hairy ; ligule short, membranous. Panicle large, effuse, 3—7 in. long, spreading ; rhachis capillary ; branches capillary, reaching 4 in. long, the lower suberect, alternate, often branched from the base ; branchlets filiform. Spikelets pedicellate, $\frac{1}{10}$ in. long, oblong-ellipsoid, tapering to both ends, dorsally compressed, glabrous or silky. Invol.-glumes very minute, hyaline, sometimes one (rarely both) obsolete ; lower floral glume 5—7-nerved, elliptic-oblong, subacute, glabrous or silky ; upper floral glume as long as the lower, elliptic-oblong, acute, with membranous inflexed margins ; palea oblong, subacute, slightly shorter than its glume, with membranous inflexed margins. I have found the two invol.-glumes present (though exceedingly minute) in many specimens that I have examined. Fl. B. I. v. 7, p. 51 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434. *Panicum Torreyanum*, W. & A. ex Steud. Nom. ed. 2, v. 2 (1841) p. 264.—Flowers : Sept.

S. M. COUNTRY : Badami, *Woodrow.*—DISTRIB. India (W. Peninsula).

17. **Panicum antidotale,** *Retz. Obs.* fasc. 4 (1786) p. 17. A tall glabrous perennial grass reaching 5 ft. high ; rootstock creeping, stoloniferous ; stem solid, woody, terete, smooth ; nodes thickened, the lower sometimes rooting. Leaves 6—24 by $\frac{1}{4}$—$\frac{3}{4}$ in., linear, very finely acuminate with capillary tips ; sheaths long, glabrous, striate, with naked margins ; ligule short, membranous, jagged or fimbriate. Panicle 6—9 in. long, effuse, pyramidal ; rhachis very slender, angular, glabrous or slightly scaberulous ; branches usually fascicled (the upper sometimes solitary), 3—4 in. long, filiform, spreading and drooping ; branchlets capillary. Spikelets laxly crowded on the

branchlets, reaching $\frac{1}{8}$ in. long or slightly longer, ovoid, acute, glabrous. Glumes 4 ; lower invol.-glume $\frac{1}{2}$ as long as the upper, broadly ovate, subobtuse, 3-nerved, hyaline ; upper invol.-glume broadly ovate, acuminate, 7—9-nerved, membranous ; lower floral glume equal and similar to the upper invol.-glume, paleate, empty or male, the palea oblong, subacute, hyaline, as long as the glume ; upper floral glume coriaceous, elliptic, obtuse, with incurved margins, dorsally smooth, yellowish-white ; palea thinly coriaceous, ovate, acute, as long as the glume. Anthers linear-oblong. Styles 2, distinct, conspicuous, very plumose. Fl. B. I. v. 7, p. 52 ; Trim. Fl. Ceyl. v. 5, p. 156 ; Duthie, Indig. Fodd. Grass. t. 3 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers : Mar.

S. M. COUNTRY : Londa, *Woodrow*. GUJARAT : Kathiawar, *Woodrow*, 44 ! SIND : *Stocks*, 659 ! ; Sukkur, *Woodrow*.—DISTRIB. India (Panjáb and upper Gangetic plain, W. Peninsula) ; Ceylon, Afghanistan, Trop. Africa and Australia.

18. **Panicum proliferum,** *Lam. Encyc. Méthod.* v. 4 (1797) p. 747. VAR. **paludosum,** *Stapf, in Dyer, Fl. Capen.* v. 7 (1899) p. 407. Perennial ; stem simple or branched, 2—3 ft. high, leafy, ascending from a creeping or floating spongy rootstock which is sometimes as thick as the little finger. Leaves 6—12 by $\frac{1}{4}$—$\frac{3}{8}$ in., linear or ensiform, acute or acuminate, flat, subcoriaceous, glabrous, base broad, subcordate ; sheaths loose, glabrous, the margins naked ; ligule a ridge of fine hairs. Panicle 4—10 in. long, often as broad as long when spreading, sessile at the mouth of the leaf-sheath or very shortly pedunculate ; lower branches whorled and fascicled ; rhachis stout, angular, scaberulous ; branches of panicle strict, naked below, bearing short erect flowering branchlets about the middle. Spikelets $\frac{1}{8}$—$\frac{1}{6}$ in. long, narrowly ovoid-lanceolate, acuminate, greenish, solitary or 2-nate ; pedicels angular, scaberulous. Glumes 4 ; lower invol.-glume not $\frac{1}{4}$ the length of the upper, orbicular or reniform, not nerved, hyaline ; upper invol.-glume ovate, acuminate, 7-nerved, as long as the lower floral glume ; lower floral glume similar, 9-nerved, paleate or not, empty (rarely male) ; upper floral glume shorter than the lower, oblong, acute, yellowish-white, smooth, shining, with incurved margins ; palea as long as the glume, oblong, acute. Dr. Stapf (*l. c.*) states that the typical *P. proliferum* is only to be found in the Atlantic States of North America. *Panicum proliferum,* Hook. f. Fl. B. I. v. 7, p. 50 ; Trim. Fl. Ceyl. v. 5, p. 155 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1176. *Panicum paludosum,* Roxb. Fl. Ind. v. 1 (1832) p. 307. *P. decompositum* var. *paludosum,* Trim. Cat. p. 105.—VERN. *Borati.*

KONKAN : Salsette, *Lisboa*. DECCAN : Poona, *Lisboa;* Lanoli, *Lisboa*.—DISTRIB. Throughout the low countries of India in marshes and still waters; Ceylon, S. Africa, Tropics generally.

19. **Panicum montanum,** *Roxb. Fl. Ind.* v. 1 (1832) p. 313. Perennial ; stem 3—4 ft. high (or more), erect from a woody rootstock, stiff, hard, solid, smooth, sparingly branched ; nodes glabrous, the lower emitting long filiform roots. Leaves 5—7 by $\frac{1}{2}$—1 in., spreading or deflexed from the sheath, linear-oblong, acuminate, flat, smooth, many-veined, glabrous or ciliate near the base only, with

slender midrib and scaberulous margins, base broad, deeply cordate ; sheaths shorter than the internodes, glabrous or pubescent, the margins naked or ciliate near the top ; ligule of soft long hairs. Panicle 8—15 in. long, effuse, copiously branched ; branches suberect or spreading, the lower branches very long ; rhachis of panicle and the branches more or less scaberulous. Spikelets $\frac{1}{10}$—$\frac{1}{8}$ in. long, ellipsoid, obtuse, solitary, distant ; pedicels long, capillary, erect. Glumes 4 ; lower invol.-glume about $\frac{1}{2}$ as long as the spikelet (or more), ovate, subacute, 3—5-nerved, with ciliate margins ; upper invol.-glume broadly ovate, obtuse, 5-nerved, sometimes with ciliolate margins, subcoriaceous ; lower floral glume slightly longer than the upper invol.-glume, broadly ovate, obtuse, 5-nerved, epaleate, subcoriaceous ; upper floral glume elliptic, subacute, faintly striolate, coriaceous or almost crustaceous ; palea nearly as long as the glume, elliptic, subacute, coriaceous, with inflexed membranous margins. Fl. B. I. v. 7, p. 53 ; Trim. Fl. Ceyl. v. 5, p. 155 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1176.—Flowers : Jan. VERN. *Tokarband.*

KONKAN : *Stocks* !, *Law* !; Khardi (Thána districts), *Lisboa.*—DISTRIB. Hotter parts of India; Ceylon, Penang, Malaya, China, Philippines.

20. **Panicum patens,** *Linn. Sp. Pl.* (1753) p. 58. Stem 1—2 feet long, very slender, branched, creeping and rooting below ; nodes glabrous, the lower emitting long, solitary wiry roots. Leaves $\frac{3}{4}$—$3\frac{1}{2}$ by $\frac{1}{4}$—$\frac{1}{2}$ in., ovate-lanceolate or linear-lanceolate, finely acuminate, thin, glabrous or hairy ; sheaths with ciliate margins and mouth ; ligule membranous, rounded. Panicle 2—5 in. long, usually inclined, effuse or contracted ; branches very slender, long, distant, naked below ; branchlets capillary. Spikelets $\frac{1}{16}$ in. long, gibbously obovoid, obtuse, glabrous, laterally compressed, brown ; pedicels long, capillary. Glumes 4 ; lower invol.-glume $\frac{1}{2}$ as long as the spikelet, elliptic-oblong, obtuse, concave, membranous, brown ; upper invol.-glume longer than the lower, but shorter than the floral glumes, gibbous, concave, keeled, membranous, brown ; lower floral glume as long as the upper, elliptic, obtuse, concave, often ciliate at the tip, paleate, membranous, brown, empty, the palea small, hyaline, ovate-lanceolate, acuminate ; upper floral glume glabrous, very gibbous, with a protuberant rounded back, boat-shaped, coriaceous, shortly stipitate, laterally compressed, white, shining ; palea as long as the glume, elliptic with incurved margins. Fl. B. I. v. 7, p. 57 ; Trim. Fl. Ceyl. v. 5, p. 159 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434. *Panicum radicans,* Retz. Obs. fasc. 4 (1786) p. 18.—Flowers : Dec.

KANARA : Kadgal (N. Kanara), *Woodrow,* 32 !—DISTRIB. India (Sikkim, Khasia Hills, W. Peninsula) ; Ceylon, Malay and Pacific Islands.

Panicum maximum, Jacq. Icon. Pl. Rar. v. 1 (1781) p. 2, t. 13. A tall perennial reaching 8—10 ft. high the first year, but after being cut two or three times it does not grow so high but grows thicker. The *Guinea Grass,* a native of Africa, cultivated as a fodder crop

chiefly in Gujarat and Sind. Fl. B. I. v. 7, p. 49 ; Trim. Fl. Ceyl. v. 5, p. 153 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1176. *Panicum altissimum,* Brouss. Elench. Hort. Monsp. (1805) p. 42 ; Dalz. & Gibs. Suppl. p. 98. *P. jumentorum,* Pers. Syn. v. 1 (1805) p. 83 ; Duthie, Fodd. Grass. N. Ind. (1888) p. 9 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 10.

Panicum miliaceum, Linn. Sp. Pl. (1753) p. 58. An annual hairy grass 2—4 ft. high with leafy erect stem and a much-branched panicle, a native of Egypt and Arabia, is cultivated in many places in Gujarat and on the Ghâts for its grain which is eaten and a preparation of which constitutes a favorite food at marriage ceremonies. Fl. B. I. v. 7, p. 45 ; Grah. Cat. p. 237 ; Dalz. & Gibs. Suppl. p. 98 ; Duthie, Fodd. Grass. N. Ind. (1888) p. 9 ; Trim. Fl. Ceyl. v. 5, p. 150 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1176 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 12.—VERN. *Varai ; Ghoti-sáva.*

Panicum miliare, Lamk. Illust. v. 1 (1791) p. 173. Annual ; stems many, 1—3 ft. high, erect, leafy ; leaves smooth, linear, finely acuminate, glabrous or nearly so. Cultivated occasionally but not largely, in Gujarat and other parts of the Bombay Presidency. The grain, which becomes dark brown when ripe, is eaten by the poorer classes. Fl. B. I. v. 7, p. 46 ; Grah. Cat. p. 237 ; Duthie, Fodd. Grass. N. Ind. (1888) p. 10 ; Trim. Fl. Ceyl. v. 5, p. 150 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1176 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 13. *Panicum psilopodium,* Trin. Gram. Pan. Diss. 2 (1826) p. 217 ; Hook. f. Fl. B. I. v. 7, p. 46 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—VERN. *Sáva.*

Panicum muticum, Forsk. Fl. Ægypt.-Arab. (1775) p. 20. A tall grass ; stem 6—8 ft. high with bearded nodes ; leaves 6—10 by ½—⅔ in. with subcordate base ; panicle 3—8 in. long. The *Water-Grass* and *Mauritius Grass* of Ceylon, a native of S. America, has been occasionally cultivated according to Woodrow at Kirkee and Surat. It is a valuable fodder grass and has been largely grown in Ceylon. Fl. B. I. v. 7, p. 34 ; Trim. Fl. Ceyl. v. 5, p. 140 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1175.

EXCLUDED SPECIES.

PANICUM AURITUM, P. INDICUM, P. NODOSUM, and *P. TRIGONUM* are given in Woodrow's list (Journ. Bomb. Nat. v. 13) as occurring in the Bombay Presidency, but no localities have been assigned as their habitat. There are no specimens of these from the Bombay Presidency in Herb. Kew. and there is not at present any evidence to show that they exist in that Presidency.

11. **DIGITARIA,** Rich.

Annual or perennial grasses. Leaves linear or lanceolate. Spikelets usually 2—3-nate, in digitate or racemose spikes, jointed on the pedicel but not thickened at the base ; lower floret barren, reduced

to the floral glume and a very minute palea ; upper floret hermaphrodite. Glumes very dissimilar, normally 4 ; the lower invol.-glume usually hyaline, sometimes absent or present in the same species ; the upper invol.-glume membranous, 1—5-nerved or nerveless ; floral glumes equal or subequal, the lower like the upper invol.-glume, usually 7—9-nerved, the nerves close, parallel, straight, prominent ; upper floral glume chartaceous or subchartaceous, usually 3-nerved. Palea of upper floret subequal to the glume, and of same texture, 2-nerved. Lodicules 2, minute, broadly cuneate. Stamens 3. Styles distinct ; stigmas plumose, laterally exserted near the apex of the floret. Grain oblong, slightly dorsally compressed, free, but tightly enclosed between the hardened glume and the palea.—DISTRIB. Species about 50, mostly in warm parts of the Old World ; 1 species widely spread as a weed all over the globe except the arctic regions.

Spikelets $\frac{1}{10}$ in. long or longer.	
Spikelets with clavate hairs	1. *D. ternata.*
Hairs on the spikelets not clavate.	
Spikelets bearded; spikes few	2. *D. sanguinalis.* var. *ciliaris.*
Spikelets subsilky; spikes many	3. *D. pennata.*
Spikelets less than $\frac{1}{10}$ in. long.	
Rhachis capillary, trigonous	4. *D. pedicellaris.*
Rhachis narrowly winged.	
Spikelets subsilky with slender (not clavellate) hairs	5. *D. longiflora.*
Spikelets with clavellate hairs	6. *D. Royleana.*

1. **Digitaria ternata,** *Stapf, in Dyer, Fl. Capen.* v. 7 (1898) p. 376. Annual ; stems tufted, erect from a geniculate base, slender, 6—18 in. long, glabrous or nearly so. Leaves 2—6 by $\frac{1}{4}$ in., linear-lanceolate, acute, glabrous ; sheaths glabrous, striate, the mouth ciliate ; ligules short, truncate, membranous. Spikes 2—3 (or more), subdigitate, erect or spreading, silvery-white ; rhachis narrowly winged. Spikelets 2—3-nate, $\frac{1}{8}$ in. long, elliptic, subacute, closely appressed to the rhachis, pale ; pedicels unequal, up to $\frac{1}{10}$ in. long, shortly hairy towards the tips. Lower invol.-glume usually obsolete ; upper invol.-glume tender, 3-nerved, the sides villous with clavate hairs ; floral glumes subequal, the lower prominently 5-nerved, densely and appressedly silky-villous with clavate hairs, the upper chartaceous, ovate-oblong, subacute, dark brown (nearly black). *Paspalum ternatum,* Hook. f. Fl. B. I. v. 7 (1896) p. 17 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.

S. M. COUNTRY : Belgaum, *Ritchie* !—DISTRIB. India (Khasia Hills); Abyssinia.

2. **Digitaria sanguinalis,** *Scop. Fl. Carn.* ed. 2, v. 1 (1772) p. 52. VAR. **ciliaris,** *Prain, Beng. Pl.* p. 1181. Annual ; stems tall, reaching 3 ft. long or more, slender, ascending from a geniculate or prostrate branched base, glabrous. Leaves 2—6 by $\frac{1}{8}$—$\frac{1}{3}$ in., linear or linear-lanceolate, acute, flat, with scabrous margins, glabrous or more or less sparsely hairy ; sheaths long, loose, glabrous, or rarely hairy except near the mouth. Spikes few (3—8), 3—6 in. long ; rhachis slender, triquetrous, narrowly winged. Spikelets oblong, acute, $\frac{1}{10}$—$\frac{1}{8}$

in. long, bearded ; pedicels twin, one short, the other much longer, triquetrous with scabrid margins. Glumes 4 ; the lower invol.-glume a minute scale ; the upper invol.-glume about ½ as long as the lower floral glume, membranous ; the lower floral glume ovate-oblong, acute, membranous, 3—5-nerved ; the upper floral glume as long, subchartaceous. *Paspalum sanguinale* var. *ciliaris,* Hook. f. Fl. B. I. v. 7, p. 15. *Paspalum ciliare,* DC. Fl. Fr. ed. 3, v. 6 (1815) p. 250. *Panicum ciliare,* Retz. Obs. fasc. 4 (1786) p. 16 ; Grah. Cat. p. 237. *Panicum sanguinale* var. ciliaris, Watt, Dict. Econ. Prod. v. 6, part 1, p. 15.—Flowers : Oct. VERN. *Roega ; Dinohi.*

Throughout the Presidency, common.—DISTRIB. Most warm countries.

3. **Digitaria pennata,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 16 (*Paspalum*). Stems 2 ft. long, tufted, leafy. Leaves 1—6 by ⅛—¼ in., linear or linear-lanceolate, finely acuminate, glabrous or sparsely hairy, distantly ciliate with long, fine, bulbous-based hairs ; sheaths long, striate, glabrous or with a few scattered hairs ; ligule long, oblong, membranous. Spikes several, radiating, 3—6 in. long ; rhachis very slender, trigonous, with numerous long cilia. Spikelets erect, solitary or 2-nate, ⅛ in. long, narrowly lanceolate, acute, subsilky. Glumes normally 4 ; lower invol.-glume minute, ovate, acute (rarely absent) ; upper invol.-glume lanceolate, acute, membranous ; lower floral glume similar to the upper invol.-glume, 3—5-nerved ; upper floral glume chartaceous, lanceolate, acuminate, nearly equal to the lower. *Paspalum pennatum,* Hook. f. *l. c. ;* Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.—Flowers : Oct.

GUJARAT : Morvi (Kathiawar), *Beck* ex *Woodrow.* SIND : Jemadar ka Landa near Karachi, *Stocks,* 1183 !—DISTRIB. Beluchistan, Abyssinia.

4. **Digitaria pedicellaris,** *Prain, Beng. Pl.* (1903) p. 1181. Stems tufted, 6—18 in. long, leafy. Leaves 2—6 by $\frac{1}{10}$—⅛ in., linear-lanceolate, finely acuminate. Spikes 3—10, alternate, racemosely arranged on a very slender peduncle, suberect or spreading, 1—4 in. long ; rhachis capillary, trigonous ; pedicels $\frac{1}{24}$—⅛ in. long, those of the upper spikelet longer than the spikelet. Spikelets 2—5-nate, $\frac{1}{20}$—$\frac{1}{16}$ in. long, elliptic, acute. Lower invol.-glume obsolete ; upper invol.-glume elliptic, acute, very slightly hairy, 5-nerved, thinly membranous (almost hyaline) ; lower floral glume similar ; upper floral glume elliptic, acuminate, thickly membranous, pale. *Paspalum pedicellare,* Trin. ex Steud. Nom. ed. 2 (1841) p. 272 ; Hook. f. Fl. B. I. v. 7 (1896) p. 19 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.

KONKAN : *Stocks* !—DISTRIB. Throughout India.

5. **Digitaria longiflora,** *Pers. Syn.* v. 1 (1805) p. 85 (*not* of Trin.). Annual or perennial ; stems many, tufted, slender, creeping and rooting, or ascending or suberect, 6—18 in. long, glabrous, with many nodes, often branched, leafy. Leaves ½—4 in. long, linear-lanceolate, acute, spreading, flat, or, in short-leaved states, stiff and pungent, glabrous (rarely hairy) ; sheaths smooth or hairy ; ligule very short, membranous. Spikes 2—5, terminal, very slender, 1—4 in. long, erect or spreading ; rhachis narrowly winged, glabrous ;

pedicels 2 (rarely 3)-nate, unequal, short. Spikelets $\frac{1}{20}$—$\frac{1}{16}$ in. long, appressed to the rhachis, elliptic, obtuse, acute or subacute, pale or purplish, glabrous, or subsilky with wrinkled hairs. Lower invol.-glume 0 or rudimentary ; upper invol.-glume 3—7-nerved ; lower floral glume similar and subequal to the upper invol.-glume, 3—5-nerved ; upper floral glume subchartaceous, ovate-oblong, slightly shorter than the lower, pale brown, smooth ; palea with inflexed (not auricled) flaps. Prain, Beng. Pl. p. 1181. *Digitaria tenuiflora,* Beauv. Agrost. (1812) p. 51. *Paspalum longiflorum,* Retz. Obs. fasc. 4 (1786) p. 15 ; Hook. f. Fl. B. I. v. 7, p. 17 ; Trim. Fl. Ceyl. v. 5, p. 124 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.

Throughout the Presidency, but not common.—DISTRIB. Throughout India ; Ceylon, tropical and subtropical regions of the Old World.

6. **Digitaria Royleana,** *Prain, Beng. Pl.* (1903) p. 1181. Perennial ; stems 1—2 ft. long, tufted, slender, erect, leafy. Leaves 4—9 by $\frac{1}{8}$—$\frac{1}{4}$ in., erect, linear, acuminate, flat, glabrous or sparsely ciliate towards the base ; sheaths glabrous or with a few scattered hairs ; ligule short, rounded, membranous. Spikes 3—15, erect, subdigitate or alternate, 3—6 in. long, on the top of a slender peduncle, very slender ; rhachis filiform, very narrowly winged, glabrous ; pedicels often much longer than the spikelets, usually setulose with long hairs. Spikelets secund, $\frac{1}{20}$—$\frac{1}{16}$ in. long, broadly elliptic, tomentose with minute clavellate hairs. Lower invol.-glume 0 or reduced to a tuft of hairs ; upper invol.-glume usually much smaller than the floral glumes or reduced to hairs ; lower floral glume thinly membranous, broadly elliptic, strongly 5-nerved, as long as and broader than the upper floral glume ; upper floral glume thinly coriaceous, ovate, acute, striolate, polished and shining, dark brown or nearly black ; palea with inflexed flaps. *Paspalum Royleanum,* Nees, ex Thw. Enum. (1864) p. 358 ; Hook. f. Fl. B. I. v. 7, p. 18 ; Trim. Fl. Ceyl. v. 5, p. 125 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.—Flowers : Dec.

Western Ghâts (Suvasni Ghât), *Woodrow* !—DISTRIB. Hilly districts throughout India ; Ceylon, Trop. Africa.

12. **PASPALUM,** Linn.

Annual or perennial grasses. Leaves lanceolate or ovate-lanceolate. Spikelets orbicular to oblong, obtuse, 1-flowered, awnless, falling off entire from the very short or obscure pedicels, secund and generally 2-ranked on the flattened or triquetrous rhachis of spikes, plano-convex ; lower floret barren, reduced to the floral glume ; upper floret hermaphrodite. Glumes 3 ; lower invol.-glume 0 ; upper invol.-glume membranous, as long as the floral glume (rarely shorter or obsolete). Floral glumes equal or subequal ; the lower resembling the upper invol.-glume ; the upper chartaceous to subcoriaceous. Palea subequal to and of the same texture as the upper floral glume. Lodicules 2, connate. Stamens 3. Styles distinct, slender ; stigmas plumose, exserted from near the top of the spikelet. Grain tightly enclosed in the hardened floral glume and palea, dorsally

subcompressed.—DISTRIB. Species about 150, chiefly natives of the New World.

Annual.
Leaves 6—18 by $\frac{1}{12}$—$\frac{1}{3}$ in.; a tall plant 2—3 ft. high. 1. *P. scrobiculatum.*
Leaves 1—3 by $\frac{1}{3}$—$\frac{1}{2}$ in.; plant 6—12 in. high ..... 2. *P. compactum.*
Perennial; leaves 2—4 by $\frac{1}{10}$—$\frac{1}{6}$ in. ..... 3. *P. distichum.*

1. **Paspalum scrobiculatum,** *Linn. Mantiss.* (1767) p. 29. Annual; stems 2—3 ft. long, tufted on a very short rhizome, erect (rarely ascending), leafy from the base upwards, glabrous. Leaves bifarious, erect or suberect, 6—18 by $\frac{1}{12}$—$\frac{1}{3}$ in., finely acuminate, glabrous or sometimes softly hairy; sheaths 4—8 in. long, compressed, loose, the mouth hairy, with very short membranous ligules. Spikes 2—6, sessile, usually distant and spreading, 1—6 in. long; rhachis herbaceous, $\frac{1}{12}$—$\frac{1}{8}$ in. broad with ciliate margins. Spikelets usually 2-ranked, $\frac{1}{12}$—$\frac{1}{8}$ in. in diam., sessile or shortly pedicellate, broadly elliptic or suborbicular, imbricate. Glumes 3; lower invol.-glume 0; the upper convex, 3—7-nerved, membranous; lower floral glume flat, membranous, like the upper invol.-glume; upper floral glume thickly coriaceous, brownish, shining, striolate; palea orbicular, tumid, thickly coriaceous like the upper floral glume, dorsally convex, ventrally strongly inflexed below the middle and forming 2 broad membranous auricles that embrace the grain. Fl. B. I. v. 7, p. 10; Grah. Cat. p. 234; Dalz. & Gibs. Suppl. p. 97; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433; Prain, Beng. Pl. p. 1182; Watt, Dict. Econ. Prod. v. 6, part 1, p. 111. *Paspalum Kora,* Willd. Sp. Pl. v. 1 (1797) p. 332; Grah. Cat. p. 234.—Flowers: Oct. VERN. *Harik.*

Throughout the Presidency, cultivated.—DISTRIB. Tropics of the Old World.
The grain is eaten by the poorer natives, but its use requires care and considerable preparation, as in some cases the grain is poisonous and produces unconsciousness or delirium with violent tremors of the voluntary muscles. See Watt, Dict. Econ. Prod. l. c.

2. **Paspalum compactum,** *Roth, Nov. Pl. Sp.* (1821) p. 36. Plant 6—12 in. high; roots stiff, wiry; stems terete, decumbent and branched below, leafy, hairy. Leaves 1—3 by $\frac{1}{3}$—$\frac{1}{2}$ in., elliptic-lanceolate, acute, sparsely hairy on both sides, ciliate; sheaths densely hairy with fine bulbous-based hairs; ligule very short. Spikes numerous, shorter upwards, spreading (often nearly horizontally), glabrous or nearly so, forming a pyramidal raceme 2—4 in. long; rhachis slender, triquetrous. Spikelets $\frac{1}{20}$—$\frac{1}{16}$ in. in diam., hemispheric, rather turgid, close-set but not imbricate, pendulous by short filiform pedicels. Lower invol.-glume 0; upper invol.-glume broadly elliptic or suborbicular; lower floral glume narrower; upper floral glume subcoriaceous, concave, orbicular, rounded at the tip, white; palea not or obscurely auricled. Fl. B. I. v. 7, p. 12; Steud. Syn. Gram. (1855) p. 31; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433.—Flowers: Sept. VERN. *Kuri.*

KONKAN: *Stocks*! DECCAN: Lanoli, *Lisboa, Woodrow*; Mahableshwar, *Cooke*!, *Woodrow.* KANARA: *Woodrow.*—DISTRIB. India (W. Peninsula).

3. **Paspalum distichum,** *Linn. Amœn. Acad.* v. 5 (1760) p. 391. Perennial; stem many-noded, sheathed throughout, ascending from

a creeping, rooting, often very long and branched base. Leaves numerous, distichous, 2—4 by $\frac{1}{20}$—$\frac{1}{8}$ in., linear-lanceolate, acuminate, involute or flat, spreading, membranous, or, in short-leaved states, stiff and pungent, glabrous or nearly so ; sheaths thin, glabrous except the usually bearded mouth ; ligules very short, truncate. Spikes 2-nate, shortly pedunculate and articulate on the top of the stem ; rhachis herbaceous, $\frac{1}{20}$ in. broad. Spikelets subsessile, solitary or 2-nate, elliptic-oblong, $\frac{1}{12}$—$\frac{1}{8}$ in. long, acute, dorsally flattened, imbricate and appressed to the rhachis, glabrous, pale. Lower invol.-glume 0 ; upper invol.-glume membranous, with a scarcely evident midnerve ; lower floral glume like the upper invol.-glume with a distinct midnerve ; upper floral glume shorter, elliptic, concave, acuminate, subcoriaceous, smooth, nearly white ; palea not or obscurely auricled. Anthers $\frac{1}{20}$—$\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 12 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1182. *Paspalum longiflorum*, Beauv. Fl. d'Owar. v. 2 (1809) p. 46, t. 85 (*not* of Retz.) ; Grah. Cat. p. 234.—Flowers : Oct.

KONKAN : Sea-shore, Bombay, *Woodrow*. Malwán, *Woodrow*.—DISTRIB India (Sundribans, W. Peninsula, Andamans) ; Malacca.

13. **ERIOCHLOA**, H. B. & K.

Annual or perennial grasses. Leaves flat, lanceolate or ovate-lanceolate. Spikelets 1-flowered, aristulate, secund on the spiciform branches of a raceme or panicle, the base thickened and articulate on the thickened apex of the short pedicel. Glumes 3 ; lower invol.-glume (of *Panicum* &c.) absent ; upper invol.-glume subequal to the lower floral glume ; upper floral glume paleate, rather shorter than the lower, apiculate, hardening in fruit. Lodicules truncate. Stamens 3 ; anthers linear. Styles 2, free ; stigmas plumose, subapically exserted. Grain oblong, free between the hardened glume and the palea.—DISTRIB. Species few, tropical.

1. **Eriochloa polystachya,** *H. B. & K. Nov. Gen. & Sp.* v. 1 (1815) p. 95, f. 31. Perennial, densely tufted, 2—5 ft. high ; rootstock short, creeping ; stems leafy, ascending from a creeping base, stout or slender, simple or branched, glabrous except the nodes. Leaves 3—8 by $\frac{1}{8}$—$\frac{1}{3}$ in., linear or linear-lanceolate, acuminate, glabrous ; sheaths glabrous, ligule a villous ridge. Panicles 2—5 in. long ; peduncles long or short ; rhachis slender, angular, smooth ; branches of panicle (spikes) alternate, 1—2 in. long, suberect, angular. Spikelets silvery, $\frac{1}{8}$—$\frac{1}{6}$ in. long, loosely imbricate, shortly pedicellate, distichous, solitary or 2-nate, elliptic-lanceolate, acuminate. Lower invol.-glume 0 ; upper invol.-glume oblong-lanceolate, acuminate, obscurely 3-nerved, silky-hairy, membranous ; lower floral glume similar to the upper invol.-glume ; upper floral glume much shorter than the lower, elliptic-oblong, obtuse, apiculate, thinly coriaceous, pale, shining ; palea oblong with incurved margins. Anthers linear. Grain oblong, free within the hardened glume and palea. Fl. B. I. v. 7, p. 20 ; Trim. Fl. Ceyl. v. 5, p. 126 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 433 ; Prain, Beng. Pl. p. 1183.

Eriochloa annulata, Kunth, Revis. Gram. v. 1 (1829) p. 30 ; Watt, Dict. Econ. Prod. v. 3, p. 257.—Flowers : Oct.

KONKAN : Bombay near Mahim, *Woodrow, Lisboa.* KANARA : N. Kanara, *Lisboa.*—DISTRIB. Throughout India; Ceylon, most hot countries.

14. **DIMERIA**, R. Br.

Erect slender, annual or perennial grasses. Leaves narrow. Inflorescence of solitary or 2-nate or digitate slender racemes bearing many spikelets ; rhachis of racemes inarticulate, terete, angular or flattened. Spikelets 1-flowered, articulate, subsessile or on very short pedicels, laterally much compressed, solitary, secund, bifarious, 2-sexual. Glumes 4 ; invol.-glumes usually divaricate in flower, empty ; lower invol.-glume coriaceous, linear, with complicate sides, dorsally rounded ; upper invol.-glume as long as or longer than the lower one, chartaceous, oblong, with hyaline margins and complicate sides, dorsally keeled, the keel sometimes winged ; lower floral glume shorter than the upper invol.-glume, linear or oblanceolate, empty, epaleate ; upper floral glume hyaline, complicate, oblong, 2-fid, awned in the sinus, the awn capillary with a short column ; palea minute or 0. Lodicules 0 or very minute. Stamens 2 ; anthers long or short. Styles short ; stigmas short, laterally exserted. Grain linear, compressed.—DISTRIB. Tropical Asia and Australia ; species 18.

Racemes 2—3-nate; annuals.	
Rhachis nearly straight; awn long	1. *D. ornithopoda.*
Rhachis circinately curved; awn short	2. *D. Woodrowii.*
Racemes many-nate; a perennial grass	3. *D. gracilis.*

1. **Dimeria ornithopoda,** *Trin. Fund. Agrost.* (1820) p. 167, t. 14. A slender annual tufted leafy grass 6—20 in. high. Leaves 1—3 by $\frac{1}{10}$—$\frac{1}{8}$ in., erect, linear, finely acuminate ; sheaths usually glabrous. Racemes 2 (rarely 3), very slender, 1—2 in. long ; rhachis flexuous, stout, angular. Spikelets about $\frac{1}{10}$ in. long, sessile or subsessile, linear, acuminate ; callus villous with short white hairs. Glumes 4 ; lower invol.-glume slender, linear, acute, $\frac{1}{10}$ in. long, slightly pubescent or nearly glabrous ; upper invol.-glume slightly longer than the lower one, linear, acuminate, with hyaline margins, pubescent on the back ; lower floral glume $\frac{1}{12}$ in. long, linear, acute ; upper floral glume $\frac{1}{16}$ in. long, hyaline ; awn nearly $\frac{1}{3}$ in. long, the column $\frac{1}{8}$ in. long, brown, the upper part white, capillary. Fl. B. I. v. 7, p. 104 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436 ; Prain, Beng. Pl. p. 1187. *Psilostachys filiformis*, Dalz. in Dalz. & Gibs. Bo. Fl. (1861) p. 305.—Flowers : Oct. VERN. *Kháp-kurdi.*

KONKAN : Mahableshwar, *Dalzell & Gibson, Lisboa*; Panchgani, *Woodrow*; Khandala, *Woodrow*; Lanoli, *Lisboa.* KANARA : Jagalbet (N. Kanara), *Talbot*, 1565 !—DISTRIB. Throughout India; Malay Islands, Japan, Tropical Australia.

2. **Dimeria Woodrowii,** *Stapf, in Hook. Icon. Pl.* v. 24 (1895) t. 2312. Annual, 3—6 in. high ; stem slender, leafy, more or less branched ; nodes pubescent ; upper internode (or peduncle) with its leaf abruptly deflexed after flowering. Leaves 1½—3 by $\frac{1}{16}$—$\frac{1}{10}$ in.,

linear, finely acuminate, 3-nerved, with a strong midnerve, glabrous or nearly so ; sheaths glabrous ; ligule very short, hyaline. Racemes ¾—1 in. long, geminate, at first erect, then circinately incurved, glabrous ; rhachis trigonous, subundulate ; internodes shorter than the spikelets ; pedicels distinct, about $\frac{1}{10}$ in. long. Spikelets ⅛ in. long, sublinear, few, rather distant, suberect, diverging as the rhachis incurves ; callus bearded. Glumes 4 ; lower invol.-glume rather more than ⅛ in. long, linear, acute, folded, 1-nerved, glabrous or sparsely hairy ; upper invol.-glume slightly longer than the lower one, broader, acute, narrowly keeled and thickened at the back, the margins hyaline ; lower floral glume narrowly linear, hyaline, sometimes mucronulate ; upper floral glume rather more than $\frac{1}{10}$ in. long, 2-fid, awned at the sinus, hyaline, the awn about ⅛ in. long. Grain linear-lanceolate, compressed. Fl. B. I. v. 7, p. 104 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.—Flowers : Oct.

KONKAN : Ratnagiri, *Woodrow* ! ; Marmagão, *Talbot*, 2557 !—DISTRIB. India (W. Peninsula).

3. **Dimeria gracilis,** *Nees, ex Steud. Syn. Gram.* (1855) p. 413. Perennial ; stems densely tufted, 1—3 ft. high, leafy, stout or slender, rarely branched. Leaves 6—10 by ⅛—⅓ in., erect, rigid, narrowly linear, finely acuminate, glabrous or pilose, base narrowed into the sheath ; sheaths terete, not auricled at the mouth ; ligule short, broad, membranous, ciliolate. Racemes 3—10, very slender, 3—5 in. long, pale brown, lax-flowered, flexuous ; rhachis filiform, obtusely trigonous or subterete, glabrous. Spikelets ⅛—¼ in. long ; pedicels long or short ; callus very short ; densely bearded. Glumes 4 ; lower invol.-glume ⅛ in. long, linear, acute, plicate, more or less scaberulous ; upper invol.-glume ⅛ in. long, linear, acute, aristate, with hyaline ciliolate margins ; lower floral glume obovate-oblong, ciliolate above the middle ; upper floral glume $\frac{1}{10}$ in. long, linear-oblong, acutely 2-fid ; awn ⅜ in. long (or more), the lower third brown, the upper two-thirds white ; palea minute, narrow, ciliate. Lodicules large, broadly cuneate. Fl. B. I. v. 7, p. 105 ; Trim. Fl. Ceyl. v. 5, p. 199 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.—Flowers : Dec.

KONKAN : *Law* !, *Stocks* ! DECCAN : *Woodrow*, 172 ! ; Lanoli, *Woodrow*.—DISTRIB. India (W. Peninsula) ; Ceylon.

15. **IMPERATA,** Cyrill.

Erect perennial grasses ; stem leafy ; internodes solid. Leaves narrow. Spikelets 1-flowered, in spike-like subcylindric silvery-silky panicles, with very short filiform inarticulate branches and rhachises, all alike and 2-sexual, narrow, terete, hidden among very long hairs arising from a small callus and from outer glumes, 2-nate, a sessile and a pedicellate one, articulate at the base, fugacious. Glumes 4 ; invol.-glumes subequal, membranous, dorsally rounded or the upper obscurely keeled, 3—5-nerved at the base ; lower invol.-glume ovate-lanceolate with a hyaline obtuse tip ; upper invol.-glume acuminate ; floral glumes short, often erose ; palea minute, hyaline. Lodicules 0. Stamens 1 or 2. Styles connate below ; stigmas very long, narrow, exserted at the top of the spikelets. Grain small, oblong.—DISTRIB. Species 5, tropical, chiefly American ; 2 Asiatic, one also European.

1. **Imperata arundinacea,** *Cyrill, Pl. Rar. Neap.* fasc. 2 (1792) p. 26, t. 11. Rootstock stoloniferous, often creeping ; stem 1—3 ft. high, stout or slender ; nodes naked or bearded. Leaves 6—18 by $\frac{1}{10}$—$\frac{1}{4}$ in., linear, flat, tapering from the middle to a finely acuminate point, smooth above, scaberulous beneath and on the margins ; sheaths loose, glabrous ; ligule of long soft hairs. Panicle 3—8 in. long, narrow, spike-like, subcylindric, silvery-white ; branches short, crowded, appressed. Spikelets $\frac{1}{8}$ in. long, lanceolate ; pedicels $\frac{1}{12}$—$\frac{1}{8}$ in. long ; hairs of callus twice as long as the spikelet. Glumes 4 ; invol.-glumes ovate-lanceolate, subequal in length, obtuse or sub-obtuse, with ciliate tips, 3—7-nerved ; lower floral glume less than $\frac{1}{2}$ as long as the invol.-glumes, oblong, obtuse, denticulate, ciliate, nerveless ; upper floral glume ovate, glabrous, nerveless or with 1 faint nerve. Anthers $\frac{1}{10}$ in. long, orange. Stigmas $\frac{1}{8}$—$\frac{1}{6}$ in. long, purple. Fl. B. I. v. 7, p. 106 ; Trim. Fl. Ceyl. v. 5, p. 200 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436 ; Prain, Beng. Pl. p. 1188 ; Watt, Dict. Econ. Prod. v. 4, p. 336. *Saccharum cylindricum,* Lam. Encyc. Méthod. v. 1 (1783) p. 594 ; Grah. Cat. p. 239.

KANARA : *Law* ! GUJARAT : *Law* ex *Graham.* SIND : *Stocks* !—DISTRIB. Throughout the hotter parts of India ; Ceylon, most warm countries.

16. SPODIOPOGON, Trin.

Tall grasses. Leaves often with long petioles. Spikelets 1—2-flowered, paniculate, laterally compressed or subterete, 2—3-nate ; lower sessile, male ; upper 2-sexual ; rhachis jointed. Glumes 4 ; invol.-glumes subequal ; lower invol.-glume lanceolate, 5—9-nerved, with an acuminate or toothed tip ; upper invol.-glume membranous, lanceolate, 3—7-nerved ; lower floral glume hyaline, palcate or not, triandrous or empty ; upper floral glume 2-fid or 2-partite, with a very slender exserted awn in the sinus ; palea shorter than the glume. Lodicules cuneate. Anthers linear. Stigmas linear. Grain free, narrowly fusiform.—DISTRIB. Species about 5, Asiatic.

1. **Spodiopogon albidus,** *Benth. in Journ. Linn. Soc.* v. 19 (1881) p. 66. A weak straggling tufted annual grass 2—4 ft. high ; stem slender, much-branched, leafy. Leaves 6—10 by $\frac{1}{4}$—$\frac{3}{4}$ in., oblong-lanceolate, acuminate, 1-nerved, usually suddenly narrowed into a slender petiole 1—3 in. long ; sheaths $\frac{3}{8}$ in. long ; ligule oblong, glabrous. Panicle at first enclosed in a long narrow spathaceous leaf-sheath ; rhachis compressed, ciliate. Spikelets reaching $\frac{1}{4}$ in. long, lanceolate, silky-villous, one pedicellate, the other sessile ; pedicels $\frac{1}{10}$ in. long, spathulate, flattened, ciliate. Glumes 4 ; invol.-glumes equal, ovate-lanceolate, finely mucronate, silky-hairy, 7-nerved ; lower floral glume truncate, with erose tip, hyaline ; upper floral glume $\frac{1}{8}$ in. long, deeply divided at the apex into 2 very acute lobes ; awn reaching $\frac{1}{2}$ in. long, slender. Fl. B. I. v. 7, p. 108 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436. *Andropogon petiolatus,* Dalz. Bo. Fl. (1861) p. 303.—Flowers : Oct.

Dalzell without locality in Herb. Kew. ! KONKAN : W. Ghâts, *Woodrow,* 157 ! ; Matheran, *Cooke* ! ; Salsette, *Jacquemont,* 708 ! DECCAN : Lanoli,

Woodrow; Mahableshwar, *Cooke*! KANARA: N. Kanara, *Talbot*, 279!—DISTRIB. India (Central Provinces, Rajputana, W. Peninsula).

17. SACCHARUM, Linn.

Perennial often very tall grasses. Leaves narrow, flat. Spikelets minute, awnless, 1-flowered, all similar, usually 2-nate (1 sessile, the other pedicellate), 2-sexual, articulate at the base, disposed in large silky much and densely branched panicles with spreading, at length erect, articulate capillary, usually fragile branches; sessile spikelets deciduous with the contiguous joint of the rhachis and pedicel; callus bearded with very long hairs. Glumes 4; lower involucre-glume about equal to the upper, oblong or lanceolate, dorsally flat or convex, with incurved or inflexed margins, 1—2-nerved at each flexure, keels not winged nor scaberulous; upper involucre-glume concave, dorsally rounded or obscurely keeled, 1—5-nerved; lower floral glumes hyaline, oblong; upper floral glume smaller or 0, awnless; palea small, hyaline, nerveless or 0. Lodicules 2, cuneate or irregular. Stamens 3. Stigmas laterally exserted. Grain oblong or subglobose.—DISTRIB. Species about 12, tropical, chiefly Asiatic.

1. **Saccharum spontaneum,** *Linn. Mant.* (1771) p. 183. A tall erect grass reaching sometimes 20 ft. high; stem erect from a stout rootstock, solid, smooth, polished, silky beneath the panicle. Leaves 1—2½ ft. by ⅛—¼ in., narrowly linear, finely acuminate, rigid, coriaceous, usually glabrous, often with convolute margins; sheaths smooth, with fimbriate mouth; ligule ovate, membranous. Panicle 8—24 in. long, lanceolate, silky-hairy; rhachis slender; branches 3—5-nate, 2—4 in. long; rhachis of racemes almost capillary, fragile. Spikelets ⅛ in. long, lanceolate; callus minute, bearded with spreading silky hairs ½ in. long. Glumes 4; lower involucre-glume lanceolate-subulate, acuminate; upper involucre-glume equal to the lower, lanceolate, obscurely keeled, 1-nerved; lower floral glume ovate-lanceolate, subacute, ciliate, hyaline, nerveless; upper floral glume very slender, ciliate; palea minute, ciliate. Fl. B. I. v. 7, p. 118; Dalz. & Gibs. p. 304; Trim. Fl. Ceyl. v. 5, p. 201; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1188; Watt, Dict. Econ. Prod. v. 6, part 2, p. 11.—Flowers: Nov. VERN. *Bagberi; Kamis; Khair.*

KONKAN: *Stocks*!; Karjat, *Woodrow*. DECCAN: Poona (river-bank), *Woodrow*! S. M. COUNTRY: Belgaum, *Ritchie*. GUJARAT: Baroda, *Cooke*!; Domas (near Surat), *Dalzell & Gibson*. SIND: *Stocks*, 545!; Shikarpur, *Woodrow*.—DISTRIB. Throughout India; Ceylon, S. Europe and warm regions of the Old World, East Australia.

Saccharum arundinaceum, Retz. Obs. fasc. 4 (1786) p. 14. A tall strikingly handsome grass reaching, under favorable conditions, nearly 20 ft. high, with leaves 3—5 ft. by 1—3 in. with a conspicuous midrib. Panicle 1—2 ft. long, cream-colored, brown or purplish. Spikelets about 1/10 in. long, clothed with soft creamy or purplish woolly hairs. Fl. B. I. v. 7, p. 119; Trim. Fl. Ceyl. v. 5, p. 202; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl.

p. 1188 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 1. *Saccharum exaltatum,* Roxb. Fl. Ind. v. 1 (1832) p. 245 ; Grah. Cat. p. 239.

I cannot find any evidence that this plant is indigenous in the Bombay Presidency. The only specimens from Bombay in Herb. Kew. were collected by Woodrow from a Bombay garden, and Lisboa (Journ. Bomb. Nat. v. 6 (1891) p. 190) remarks that it has been seen only in cultivation in Bombay gardens, while Woodrow (*l. c.*) gives no habitat, merely noting it as "planted."

Saccharum officinarum, Linn. Sp. Pl. (1753) p. 54. *The Sugar Cane,* extensively cultivated in the Bombay Presidency and throughout the hotter parts of India. For a full account of the cultivation of the plant and the mode of extraction and refining of its sugar, see Watt, Dict. Econ. Prod. v. 6, part 2, pp. 3—380.—VERN. *Us.*

18. **ERIANTHUS,** Michx.

Tall perennial grasses. Leaves flat, narrow. Spikelets all similar, 2-nate (one sessile, the other pedicellate, very rarely both unequally pedicellate), 1-flowered, 2-sexual, on the articulate and usually fragile rhachis of paniculate racemes (the sessile spikelets deciduous with the internode and pedicel) ; callus bearded with long hairs. Glumes 4 ; invol.-glumes subequal ; lower invol.-glume oblong-lanceolate, dorsally flattened, more or less distinctly 2-keeled ; upper invol.-glume 1—3-nerved, keeled ; lower floral glume hyaline, oblong, muticous or mucronate ; upper floral glume shortest, generally awned ; palea small, hyaline, nerveless. Lodicules 2, cuneate. Stamens 2—3. Stigmas usually laterally exserted. Grain oblong or subglobose.—DISTRIB. Species about 20, mainly tropical.

Racemes panicled; leaves 2—3 ft. by 1—1½ in., scaberulous; sheaths hairy; callus with long silky hairs...	1. *E. Ravennæ.*
Racemes subdigitate; leaves 1—2 ft. by ⅛—¼ in., smooth; sheaths glabrous; hairs of callus short	2. *E. fastigiatus.*

1. **Erianthus Ravennæ,** *Beauv. Agrost.* (1812) p. 14. Stem 6—10 ft. high ; nodes glabrous. Leaves 2—3 ft. by 1—1½ in., linear, scaberulous on both surfaces, flat, margins scabrid, midrib broad ; sheaths hairy ; ligule a narrow silky-hairy band. Panicles oblong, 1—3 ft. long, erect or inclined, clothed with silky hairs ; branches many from the rhachis. Spikelets pale, ⅕ in. long (excluding awn), linear-lanceolate ; pedicels with 2 opposite rows of very long silky hairs ; callus short, with long silky hairs which are as long as or longer than the spikelet. Glumes 4 ; lower invol.-glume ⅕ in. long, membranous, lanceolate, aristately acuminate, with slightly scaberulous margins ; upper invol.-glume slightly longer than the lower, lanceolate, aristately acuminate, obscurely 3-nerved ; lower floral glume rather more than ⅛ in. long, narrowly lanceolate, very acute, with incurved margins, hyaline ; upper floral glume $\frac{1}{10}$ in. long, ovate-lanceolate, tapering into a whitish awn of variable length. Fl. B. I. v. 7, p. 121 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436. —Flowers : Dec.

SIND : Larkhana, *Cooke* ! ; Karachi, *Cooke* !, *Woodrow.*—DISTRIB. India (W. Himalaya, Panjáb, Upper Gangetic plain, W. Peninsula) ; westward to the Mediterranean.

2. **Erianthus fastigiatus,** *Nees, ex Steud. Syn. Gram.* (1855) p. 409. Stem 2—8 ft. high, stout or slender, silky-hairy below the panicle. Leaves 1—2 by $\frac{1}{8}$—$\frac{1}{4}$ in., linear from a narrow base, rigid, flat, smooth, with scabrid margins ; sheaths glabrous, with fimbriate mouth ; ligule a narrow membrane. Panicle oblong or fan-shaped ; racemes crowded, subdigitately fascicled ; rhachis angular, silky-hairy. Spikelets $\frac{1}{8}$ in. long, lanceolate, dark brown below, paler above ; callus with white hairs which are much shorter than the spikelet ; pedicels as long as the spikelets, with 2 opposite rows of silky hairs. Glumes 4 ; lower invol.-glume $\frac{1}{8}$ in. long, chartaceous, brown, shining, ovate-lanceolate, acute, the margins near the base clothed with long silky hairs ; upper invol.-glume chartaceous, lanceolate, acuminate, brown below, paler above, equalling the lower invol.-glume ; lower floral glume $\frac{1}{8}$ in. long, narrowly lanceolate, acute, base membranous, colored, the upper part hyaline ; upper floral glume $\frac{1}{10}$ in. long, lanceolate, 2-toothed, hyaline, with a slender awn $\frac{1}{4}$ in. long or longer. Fl. B. I. v. 7, p. 125 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436 ; Prain, Beng. Pl. p. 1189.

S. M. COUNTRY : Belgaum, *Ritchie*, 792 !—DISTRIB. India (Sikkim, Khasia, Assam, Bengal, W. Peninsula).

19. POLLINIA, Trin.

Annual or perennial grasses of various habit. Leaves usually narrow. Spikelets all alike or nearly so, 3-nate (one sessile, the other pedicellate, rarely both pedicellate) on the articulate and usually fragile rhachis of 2-nate, digitate or fascicled spike-like racemes ; callus short, bearded. Glumes 4 ; lower invol.-glume membranous, dorsally flattened or concave, more or less 2-keeled, with inflexed margins ; upper invol.-glume membranous, keeled, 1—3-nerved, with inflexed margins ; lower floral glume hyaline, paleate or not, sometimes suppressed ; upper floral glume short, hyaline, 2-lobed or entire, generally awned ; palea small or 0. Lodicules 2, small, cuneate. Stamens 3 (rarely 2). Styles short ; stigmas linear, laterally exserted. Grain oblong.—DISTRIB. Species about 32, in tropical and subtropical regions of the Old World.

Racemes many, 6—12; perennial	1. *P. argentea.*
Racemes few, 2—4; annual	2. *P. fimbriata.*

1. **Pollinia argentea,** *Trin. in Bull. Sc. Acad. Pétersb.* v. 1 (1836) p. 71. Perennial ; stems tufted, 1½—4 ft. high, stout or slender, erect, simple or branched, smooth, shining, leafy at the base and upwards ; nodes glabrous. Leaves 6—18 by $\frac{1}{20}$—$\frac{1}{8}$ in., erect, narrowly linear, rigid, often filiform, glabrous, striate, tips capillary ; sheaths long, slender, coriaceous, not auricled at the mouth, the sides bearded with long hairs ; ligule a short membrane fringed with long hairs. Racemes 6—12, narrow, 1—6 in. long, lax-flowered ; rhachis firm, flexuous, compressed ; pedicels of spikelets flattened, slightly dilated at the apex, densely silky-villous on the edges. Spikelets $\frac{1}{8}$ in. long (excluding the long awn). Glumes 4 ; lower invol.-glume linear-oblong, crustaceous below, membranous above with a hyaline

tip, silky villous on the back, the margins narrowly incurved, villous with long silky hairs ; upper invol.-glume oblong, 1-nerved, tip erose, margins incurved, ciliate ; lower floral glume $\frac{1}{8}$ in. long, narrowly oblong, hyaline, flat, nerveless ; upper floral glume shorter than the upper invol.-glume, linear-oblong, cleft into 2 subulate lobes ; palea 0 ; awn reaching $\frac{3}{4}$ in. long, not or scarcely ciliate, the lower half brown, twisted, the upper half white, straight. Fl. B. I. v. 7, p. 111 ; Trim. Fl. Ceyl. v. 5, p. 204 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436 ; Prain, Beng. Pl. p. 1190.—Flowers : Oct.—Dec.

KONKAN : Ratnagiri, *Woodrow*. DECCAN : Máwal, *Woodrow*, 11 ; Lanoli, *Woodrow*, *Lisboa*.—DISTRIB. Throughout India ; Ceylon, Malaya, Australia.

2. **Pollinia fimbriata,** *Hack. Monogr. Androp. in DC. Monog. Phan.* v. 6 (1889) p. 164. Annual ; stem 1—2 ft. long ; internodes much longer than the sheaths ; nodes glabrous. Leaves 6—10 by $\frac{1}{8}$ in., flaccid, sparsely hairy above ; sheaths glabrous ; ligule a ciliolate ridge. Racemes 2—4, villous with white hairs, 1—3 in. long, flexuous, pale, with long peduncles ; rhachis slender, silky-hairy ; pedicels of spikelets with 2 opposite rows of dense silky hairs. Spikelets $\frac{1}{8}$ in. long ; callus very short, silky-villous with long white hairs. Glumes 4 ; lower invol.-glume elliptic-lanceolate, with villous keels above, 2-toothed ; upper invol.-glume as long as the lower, elliptic, obtuse, with incurved ciliate margins ; lower floral glume $\frac{1}{8}$ in. long, narrowly oblong, obtuse, hyaline, ciliolate ; upper floral glume $\frac{1}{10}$ in. long, hyaline, deeply 2-fid into 2 acute lobes ; awn $\frac{1}{2}$—$\frac{3}{4}$ in. long, ciliate, the lower half brown, twisted, the upper half white ; palea minute or 0. Fl. B. I. v. 7, p. 112 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.—Flowers : Oct.

KONKAN : *Law* !, *Stocks* ! DECCAN : Lanoli, *Woodrow*, 173 !—DISTRIB. India (W. Himalaya, W. Peninsula, Pegu).

20. OPHIURUS, Gærtn.

Annual or perennial tall grasses ; stems solid, branching upwards, leafy. Leaves linear-lanceolate. Spikes solitary or fasciculate, terete, fragile ; joints excavate, with concave tops. Spikelets 2-flowered, solitary and sessile in the joints, with no trace of an upper spikelet and no awn. Glumes 4 ; lower invol.-glume thickly coriaceous, convex, obtuse ; upper invol.-glume membranous, concave, keeled ; lower floral glume elliptic, obtuse, hyaline, faintly 2-nerved, the margins infolded, paleate, male ; upper floral glume as long as the lower, oblong, obtuse, 2-sexual ; palea narrow. Lodicules 2, cuneate. Stamens 3 ; anthers linear. Styles and stigmas small, not exserted. Grain oblong, free.—DISTRIB. Tropical Asia and Africa ; species 1 or 2.

1. **Ophiurus corymbosus,** *Gærtn. f. Fruct.* v. 3 (1805) p. 4, t. 181, fig. 3*a* (*Ophiuros*). Perennial ; stems erect from a tuberous base, 3—6 ft. high, reed-like, as thick as a goose-quill below, solid, branching upwards, leafy throughout ; nodes glabrous. Leaves 6—24 by $\frac{3}{8}$—1 in., flat (convolute in vernation), linear-lanceolate from a rounded base, finely acuminate, hairy above with bulbous-based

hairs, glabrous beneath, the margins spinulose ; sheaths short, terete, the upper leafless ; ligule very short. Spikes 2—5 by $\frac{1}{12}$ in., corymbosely fasciculate, erect, often in very dense fascicles, frequently tinged with purple ; peduncles short ; joints as long and as broad as the spikelets, the tip obliquely truncate. Spikelets $\frac{1}{8}$ in. long. Glumes 4 ; lower invol.-glume thickly coriaceous or cartilaginous, oblong, obtuse, convex, more or less seriately foveolate on the back, glabrous, at length recurved ; upper invol.-glume membranous, as long as the lower, faintly 3-nerved ; lower floral glume equalling the lower invol.-glume, elliptic, obtuse, hyaline, paleate, male ; upper floral glume as long as the lower, elliptic-oblong, obtuse. Anthers $\frac{1}{12}$ in. long. Fl. B. I. v. 7, p. 160 ; Dalz. & Gibs. p. 300 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437 ; Prain, Beng. Pl. p. 1191. *Rottboellia corymbosa*, Linn. f. Suppl. (1781) p. 114 ; Grah. Cat. p. 233.—Flowers : Dec. VERN. *Hutia.*

DECCAN : pastures, *Dalzell & Gibson*; Poona, *Cooke*!, *Woodrow*; Jeur (Ahmednagar districts), *Woodrow*. S. M. COUNTRY : Belgaum, *Ritchie*, 807! GUJARAT : *Dalzell & Gibson, Woodrow*.—DISTRIB. India (Himalaya and Khasia Hills, N. Bengal, W. Peninsula) ; Tonkin, Australia.

21. **ROTTBOELLIA,** Linn. f.

Annual or perennial grasses of various habit ; stems leafy. Leaves narrow, flat. Racemes solitary or subpaniculate ; rhachis articulate ; internodes terete or compressed, each bearing a pair of usually dissimilar awnless spikelets, the lower 1—2-flowered, usually 2-sexual, the upper pedicellate, male or neuter, sometimes rudimentary, the pedicel free or adnate to the side of the internode. Glumes 4 ; lower invol.-glume coriaceous, dorsally flattened or subconvex, ovate or oblong, usually obtuse ; upper invol.-glume chartaceous to membranous, muticous ; lower floral glume hyaline, paleate or not ; upper floral glume paleate, 2-sexual. Lodicules 2, quadrate or cuneate. Stamens 3. Stigmas generally laterally exserted. Grain broadly oblong.—DISTRIB. Species about 30, temperate and tropical.

Rhachis of raceme not fragile; lower invol.-glume not winged; a perennial grass ..... 1. *R. compressa.*
Rhachis of raceme fragile; lower invol.-glume winged (scarcely winged in *R. exaltata*).
  Annual; stems less than 30 in. long; lower invol.-glume broadly winged.
    Lower invol.-glume 2-aristate ..... 2. *R. divergens.*
    Lower invol.-glume with a simple awn or acuminate.
      Pedicel of upper spikelet adnate to the joint of the rhachis.
        Lower invol.-glume broadly ovate, acuminate (not awned) ..... 3. *R. acuminata.*
        Lower invol.-glume lanceolate with a slender scabrid awn ..... 4. *R. Talboti.*
      Pedicel of upper spikelet wholly free from the joint of the rhachis; lower invol.-glume awnless ..... 5. *R. Clarkei.*
  Perennial; stems 6—10 ft. long; lower invol.-glume scarcely winged ..... 6. *R. exaltata.*

1. **Rottboellia compressa,** *Linn. f. Suppl.* (1781) p. 114. Perennial ; stems erect from a decumbent rooting base, 2—5 ft. long (according to Roxburgh scandent and reaching 20 ft. long), branched, compressed, glabrous, striate, leafy. Leaves 1—5 by $\frac{1}{8}$—$\frac{1}{3}$ in., linear, acuminate, flat, glabrous, base rounded, margins scabrid ; sheaths shorter than the internodes, compressed, loose, glabrous ; ligule short, membranous, ciliate. Racemes few or many, often fascicled, 2—5 in. long, erect, straight or curved, herbaceous, dark green ; rhachis almost inarticulate ; internodes broad, striate, glabrous, nearly as long as the glabrous spikelets. *Sessile spikelets* $\frac{1}{8}$—$\frac{1}{3}$ in. long ; callus small, naked. Glumes 4 ; lower invol.-glume coriaceous, bluntly acuminate, the tip often shortly membranous, 7—9-nerved ; upper invol.-glume as long as the lower, linear-oblong, acutely acuminate, membranous, 3-nerved, adhering to the cavity of the internode ; floral glumes subequal, $\frac{1}{6}$ in. long, lanceolate, acute, nerveless, hyaline ; palea linear, $\frac{1}{10}$ in. long. *Pedicellate spikelets* rather longer and narrower than the sessile ; lower invol.-glume acutely acuminate ; upper invol.-glume chartaceous, 5—7-nerved ; floral glumes as in the sessile spikelets. Fl. B. I. v. 7, p. 153 ; Grah. Cat. p. 233 ; Roxb. Fl. Ind. v. 1, p. 354 ; Trim. Fl. Ceyl. v. 5, p. 206 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437 ; Prain, Beng. Pl. p. 1192.—Flowers : Nov. VERN. *Baika.*

GUJARAT : Godra, *Cooke* ! SIND : *Woodrow* ; Shikarpur, *Woodrow.*—DISTRIB. Throughout the hotter parts of India, generally in wet places ; Ceylon, most warm climates.

2. **Rottboellia divergens,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 292. Annual ; stems 4—9 in. high, erect or ascending, slender ; nodes 2—3, all with usually 2-nate flowering branches. Leaves 2—4 by $\frac{1}{10}$—$\frac{1}{8}$ in., linear, acuminate, complicate, rising without constriction from the sheath, hairy ; sheaths 1—1½ in. long, shorter than the internodes, loose, hairy ; ligule $\frac{1}{12}$ in. long, membranous, rounded. Raceme 1—1½ in. long, pale yellow, simple, solitary ; peduncle filiform, sheathed ; joints of the rhachis shorter than the spikelets, subclavate, excised. *Sessile spikelets* ¼ in. long (excluding the awns), nearly ½ in. long when the awns are included, 2-aristate ; callus short. Glumes 4 ; lower invol.-glume coriaceous, with 5—7 transverse echinulate ridges below the middle, the tips of the echinæ curved upwards, the central portion of the glume above the echinate base ovate-lanceolate, acute, cleft at the apex, with 2 nearly semicircular equal membranous wings with thickened flattened green margins on the inner edge, which margins are prolonged into slender slightly divergent awns ; upper invol.-glume much shorter, about $\frac{1}{8}$ in. long, thinly membranous, oblong, acute, 1-nerved ; lower floral glume about $\frac{1}{10}$ in. long, broadly ovate, nerveless, empty ; upper floral glume slightly shorter than the lower. *Pedicellate spikelets* as long as the sessile ; pedicels about $\frac{1}{10}$ in. long ; lower invol.-glume chartaceous without a muricate base, winged on one side only and with 1 awn from the thickened margin of the wing, about 7-nerved ; upper invol.-glume with a large membranous wing on the back at the apex and an awn about $\frac{1}{12}$ in. long. Fl. B. I. v. 7,

p. 155 ; Lisboa, in Journ. Bomb. Nat. v. 6 (1891) p. 195 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers : Sept. VERN. *Marel.*

DECCAN : Khandala, *Woodrow* ; Sattara, *Lisboa* ! ; Mahableshwar, *Lisboa* ! S. M. COUNTRY : Belgaum, *Ritchie,* 808 ! and 827 !—DISTRIB. India (W. Peninsula).

The specimens from the Bombay Presidency in Herb. Kew. are much larger in all their parts than the specimens collected by Huegel from which Hackel described the species originally, and to which no precise locality has been assigned.

3. **Rottboellia acuminata,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 291. Annual, quite glabrous except the sheaths ; stems 3—12 in. high, erect or ascending, compressed, densely leafy. Leaves flaccid, the lower 2—3 by $\frac{1}{10}$—$\frac{1}{8}$ in., linear-lanceolate, acuminate from a narrow base, the upper shorter, spreading and recurved ; sheaths turgid, compressed, keeled, the mouth hairy ; ligule short, truncate, membranous, glabrous. Racemes 1—2 in. long, sheathed at the base, straight or slightly curved, usually pale brown ; joints subclavate, much shorter than the sessile spikelets, the base not excised. *Sessile spikelets* up to $\frac{1}{3}$ in. long ; callus scarcely distinct. Glumes 4 ; lower invol.-glume $\frac{1}{3}$ in. long, ovate, coriaceous, winged above the middle, with 3—6 dorsal transverse echinulate or warted ridges below the wings, longitudinally striate between the ridges, 5-nerved in the narrow coriaceous part between the wings, with a long ciliate acumen, the cilia pointing upwards ; upper invol.-glume $\frac{1}{3}$ in. long (equalling the lower minus the acumen), elliptic-lanceolate, membranous, subacute, scarcely keeled, 3-nerved ; lower floral glume equalling the upper invol.-glume, elliptic, paleate, male ; upper floral glume less than $\frac{1}{3}$ in. long, oblong, obtuse, nerveless ; palea small, 2-lobed, nerveless. *Pedicellate spikelets* $\frac{1}{3}$ in. long, oblong ; lower invol.-glume lanceolate, 5-nerved, with a membranous ciliolate wing on one side ; upper invol.-glume shortly winged on the back below the apex, elliptic, concave, 3-nerved ; lower floral glume empty ; upper floral glume male ; pedicel $\frac{1}{10}$ in. long, dumbell-shaped, flattened. Fl. B. I. v. 7, p. 155 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers : Oct.

KONKAN : *Stocks* ! ; Malwán, *Woodrow* ; Marmagão, *Talbot,* 1291 ! KANARA : Karwar, *Lisboa* !, *Talbot,* 2539 !—DISTRIB. India (W. Peninsula).

4. **Rottboellia Talboti,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 155. Annual ; stems 6—8 in. high, slender, erect, or geniculate at the base. Leaves 2—3 by $\frac{1}{10}$—$\frac{1}{8}$ in., linear, smooth ; sheaths glabrous ; ligule short, membranous. Raceme $\frac{3}{4}$—$1\frac{1}{4}$ by $\frac{1}{8}$ in., solitary, green ; joints very short, tumid, excavate opposite the spikelet, the top broad, with a very large cavity and thick hispidulous margins. *Sessile spikelets* $\frac{1}{2}$ in. long (or more) including the awn, closely imbricating ; callus annular, ciliolate. Glumes 4 ; lower invol.-glume $\frac{1}{2}$ in. long (not including the awn), coriaceous, lanceolate, narrowed into a slender scabrid awn, with 2—3 transverse ridges at the base, the uppermost ridge extending right across the glume, the others only in its centre, broadly winged at each side above the base ; upper invol.-glume $\frac{1}{3}$ in. long, thinly membranous, ovate-oblong acute,

1-nerved ; lower floral glume broadly oblong, faintly 3-nerved, male ; upper floral glume small, oblong, obtuse, nerveless ; palea as long, nerveless. *Pedicellate spikelets* as long as the sessile ; lower invol.-glume very irregularly winged, dorsally smooth, awnless, as in the sessile ; pedicel wholly adnate to the joint of the rhachis. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers : Oct.

Goa, *Talbot*, 2572 !

There is but one sheet in Herb. Kew., the specimens on which were collected at Goa by Mr. Talbot.

The species is allied to *R. divergens*, from which it differs in the lower invol.-glume of the sessile spikelets, which in that species is 2- in this 1-awned, and in the tumid joints of the rhachis.

5. **Rottboellia Clarkei,** *Hack. in Œstr. Bot. Zeitschr.* v. 41 (1891) p. 8. Annual ; stem 8—24 in. high, erect, striate, compressed ; nodes with a small ring of hairs. Leaves 4—6 by $\frac{1}{3}$—$\frac{1}{2}$ in., linear-lanceolate, acuminate, narrowed to the subcordate base, scabrous and more or less hairy, the hairs with minutely tubercular bases ; midrib prominent ; sheaths compressed, ciliate ; ligule a hairy membrane. Raceme solitary, $\frac{1}{2}$—1 in. long, pale yellow, supported by a spathe ; rhachis very fragile ; joints pyriform, shorter than the spikelets, ciliolate and with a broad cavity at the tip, the sides not hollowed. *Sessile spikelets* $\frac{1}{10}$—$\frac{1}{8}$ in. long, obtuse, closely imbricating ; callus short and broad, cylindric. Glumes 4 ; lower invol.-glume with an ovate coriaceous 3—5-nerved disk and hyaline wings which are ciliate at the tip, dorsally gibbous, scabrid and hairy below the middle ; upper invol.-glume $\frac{1}{10}$ in. long, ovate-oblong, subacute, membranous, 1-nerved, glabrous ; lower floral glume shorter than the upper invol.-glume, ovate-oblong, subobtuse, hyaline, nerveless ; upper floral glume rather smaller than the lower, oblong, obtuse, hyaline, nerveless, the margins incurved ; palea like the glume, nerveless. *Pedicellate spikelets* imperfect, consisting usually of a solitary empty glume about $\frac{1}{20}$ in. long ; pedicel quite free from the rhachis, pyriform, flattened, about $\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 156 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437 ; Prain, Beng. Pl. p. 1192. *Rottboellia gibbosa*, Hack. ex Lisboa, in Journ. Bomb. Nat. v. 6 (1891) p. 195.—Flowers : Nov.

KANARA : Birchi (N. Kanara), *Talbot*, 2072 !, *Lisboa*.—DISTRIB. India (Behar, Chota Nagpur, W. Peninsula).

6. **Rottboellia exaltata,** *Linn. f. Suppl.* (1781) p. 114. Perennial ; stem 6—10 ft. high, erect, leafy, solid, smooth, branching from the base. Leaves 6—24 by $\frac{1}{4}$—1 in., linear-lanceolate, setaceously acuminate, scabrid or hispid and green above, smooth and glaucous beneath, the margins spinulosely scabrid ; midrib stout, prominent beneath ; sheaths loose, glabrous or hispid, the mouth contracted ; ligule short, ciliate. Racemes 3—6 in. long, terete, glabrous, fragile, the upper part of the raceme slender, with imperfect spikelets ; internodes $\frac{1}{6}$—$\frac{1}{5}$ in. long, dorsally rounded, smooth. *Sessile spikelets* about as long as the internodes, $\frac{1}{5}$ in. long. Glumes 4 ; lower invol.-glume $\frac{1}{5}$ in. long, ovate-oblong, obtuse, coriaceous, smooth, with truncate base, many obscure nerves and scaberulous margins ; upper invol.-glume

equalling the lower, chartaceous, broadly ovate, acute, 9—11-nerved, the keel very shortly winged towards the tip ; lower floral glume as long as the lower invol.-glume, broadly ovate, acute, 3-nerved, rigidly membranous, paleate, male, the palea like the glume, with incurved margins ; upper floral glume a little shorter than the lower, ovate from a broad base, acute, 1-nerved ; palea as long as the glume, hyaline, nerveless. *Pedicellate spikelets* more or less imperfect ; lower invol.-glume narrowly winged. Fl. B. I. v. 7, p. 156 ; Grah. Cat. p. 233 ; Trim. Fl. Ceyl. v. 5, p. 207 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437 ; Prain, Beng. Pl. p. 1192.—Flowers : Nov. VERN. *Bursali.*

KONKAN : *Stocks* ! DECCAN : Poona, *Cooke* !, *Woodrow*, 2 !—DISTRIB. Plains and lower hills of India ; Ceylon, China, Malaya, Australia, Africa.

22. **MANISURIS,** Sw.

Annual erect slender leafy grasses. Leaves flat, cordate. Racemes small, terete, axillary and terminal, shortly pedunculate ; rhachis green, ultimately fragile, glabrous, with short broad internodes excavate opposite the sessile spikelets. Spikelets minute, in dissimilar pairs, one globose, sessile, 2-sexual, the other ovate, pedicellate, male or neuter, the pedicel adnate or closely appressed to the joint of the rhachis. *Sessile spikelets* : glumes 4 ; lower invol.-glume hard, globose, foveolate, coriaceous at length crustaceous, with an oblong opening opposite the rhachis ; upper invol.-glume minute, oblong, coriaceous, 1-nerved, closing the orifice of the lower invol.-glume ; lower floral glume very minute, hyaline, orbicular, empty ; upper floral glume and its palea hyaline, broadly oblong. Lodicules 2, subquadrate. Anthers minute. Styles and stigmas short.—DISTRIB. Species 2, tropical.

1. **Manisuris granularis,** *Linn. f. Nov. Gram. Gen.* (1779) p. 40. Stems 4—30 in. high, slender, compressed, softly hairy, leafy ; nodes hairy. Leaves 1½—8 by ¼—½ in., linear-lanceolate, acute or acuminate, flat, hairy on both surfaces or on the lower only with bulbous-based hairs, margins ciliate, base cordate ; sheaths much shorter than the internodes, hispid with bulbous-based hairs ; ligule very short, membranous, densely ciliate. Racemes ¼—1 in. long, resembling a string of minute beads, solitary or seemingly fascicled in the axils of the leaves, but individually from shortened axillary branches. *Sessile spikelets* $\frac{1}{16}$—$\frac{1}{12}$ in. long, subglobose ; callus tumid, glabrous. Glumes 4 ; lower invol.-glume irregularly foveolate on the back ; upper invol.-glume closing the cavity of the lower floral glume, elliptic-oblong, obtuse, 1-nerved ; lower floral glume hyaline, shorter than the upper invol.-glume ; upper floral glume about equalling the lower, broadly ovate, obtuse ; palea similar but a little shorter. *Pedicellate spikelets* equal in length to the sessile or longer, of 2 equal green glumes about $\frac{1}{16}$ in. long ; lower invol.-glume broadly ovate or suborbicular, obtuse or subacute, 5—7-nerved, one margin narrowly folded, the other with a hyaline wing ; upper invol.-glume boat-shaped, laterally compressed, the keel with a dorsal hyaline ciliolate

wing. Fl. B. I. v. 7, p. 159 ; Grah. Cat. p. 234 ; Dalz. & Gibs. p. 300 ; Trim. Fl. Ceyl. v. 5, p. 209 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437 ; Prain, Beng. Pl. p. 1191 ; Watt, Dict. Econ. Prod. v. 5, p. 164.—Flowers : Oct.

Common throughout the Presidency on barren land. DECCAN : Poona, *Cooke* ! ; Khandala, *Woodrow*. S. M. COUNTRY : Dharwar, *Woodrow*.—DISTRIB. Throughout the hotter parts of India ; Ceylon, most tropical countries.

23. APLUDA, Linn.

A tall slender perennial leafy grass ; stems erect or subscandent, branching. Leaves narrow, flat, more or less petiolate. Inflorescence paniculate, leafy, of small spikes each in a spathiform bract. Spikes deformed, base rounded, often utricular, bearing in front a sessile 2-sexual spikelet, prolonged above the base into 2 flat linear truncate parallel arms, one terminated by a solitary minute glume, the other by the upper spikelet. Glumes of both spikelets 4, the invol.-glumes empty, the floral glumes delicately membranous. *Lower spikelets* : lower invol.-glume longest, anticous, linear-oblong, coriaceous, rigid ; upper invol.-glume thinner, tumid, beaked, dorsally gibbous, 7-nerved ; lower floral glume oblong, acute, 3-nerved, triandrous or neuter, with a linear 2-nerved palea ; upper floral glume short, quadrate, deeply 2-fid, awned in the sinus, female or 2-sexual, with a minute ovate palea. Styles short, free ; stigmas short, penicillate. *Upper spikelets* dorsally compressed ; lower invol.-glume oblong, acute, many-nerved, herbaceous, the margins narrowly incurved ; upper invol.-glume chartaceous, ovate-lanceolate, acuminate, 3-nerved ; lower floral glume oblong, 1-nerved, triandrous ; upper floral glume oblong, 1-nerved, female or imperfectly 2-sexual ; paleas of both floral glumes as in the lower spikelets. Lodicules of all flowers 2, cuneate. Anthers linear. Grain oblong, subcompressed.—DISTRIB. India, China, Pacific Islands ; species 1.

1. **Apluda varia,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 196. Stems densely tufted, geniculately ascending, 1—6 ft. high, erect or the branches rambling among bushes, stout or slender, sometimes as thick as a goose-quill below, smooth and polished ; internodes very long, solid. Leaves 4—18 by $\frac{1}{16}$—$\frac{3}{4}$ in., narrowed from the middle to a filiform tip and usually below it into a long or short slender petiole, flat, scaberulous on both surfaces with scabrid margins ; sheaths long, smooth, the mouth not auricled ; ligule chartaceous, oblong, lacerate. Inflorescence very variable, of spikelets clustered on short peduncles, the clusters solitary or few or very numerous and arranged in elongate bracteate very contracted interrupted leafy panicles ; rhachis of inflorescence slender, glabrous or slightly scabrid ; bracts of spikelets $\frac{1}{8}$—$\frac{1}{3}$ in. long, sessile or pedicellate, cymbiform, green, striate, with aristulate tip. Spikes longer or shorter than the bracts, with rounded base. *Sessile spikelets* $\frac{1}{8}$—$\frac{1}{3}$ in. long ; lower invol.-glume spreading, strict or recurved, bicuspidate, with hyaline margins ; upper floral glume 3—5-nerved below the sinus, the lateral nerves arching and meeting the midnerve at the

insertion of the awn. Fl. B. I. v. 7, p. 150 ; Trim. Fl. Ceyl. v. 5, p. 226 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437 ; Prain, Beng. Pl. p. 1194.—Flowers : Oct.—Dec. VERN. *Ghagara.*

KONKAN : *Law* !, *Woodrow.* DECCAN : *Woodrow,* 115 ! S. M. COUNTRY : Belgaum, *Ritchie,* 824 ! GUJARAT : Surat, *Cooke* ! ; Ahmedabad, *Cooke* !— DISTRIB. Throughout India ; Ceylon, E. Trop. Asia, Malaya, Australia, Pacific Islands.

Hackel divides the forms of this variable plant into 2 subspecies—one *mutica,* which is rarely awned ; the other *aristata,* the spikelets of which are always awned. Of *aristata* Hackel has 4 varieties, to the first of which, *aristata proper,* most of the Bombay specimens are referable.

24. **ISCHÆMUM,** Linn.

Annual or perennial grasses. Leaves narrow. Racemes solitary, digitate or fascicled, articulate, fragile ; internodes of rhachis and the pedicels of the upper spikelets trigonous, hollowed ventrally. Spikelets 2-nate, one sessile and one pedicellate, the pedicellate spikelet often dissimilar from the sessile. *Sessile spikelets* : glumes 4 ; invol.-glumes subequal, coriaceous or chartaceous, awnless or the upper sometimes awned ; lower invol.-glume ovate-oblong or oblong-lanceolate, convex, more or less marginally winged above the middle ; upper invol.-glume lanceolate, acuminate, concave ; lower floral glume hyaline, paleate, triandrous, with a narrow lanceolate acuminate 2-nerved palea ; upper floral glume hyaline, usually deeply 2-cleft, awned, the awn geniculate with a brown twisted column. Lodicules cuneate or quadrate. Stamens 3 ; anthers linear. Styles long ; stigmas short. *Pedicellate spikelets* with pedicel half as long as the sessile spikelet or shorter ; upper floral glume rarely awned.—DISTRIB. Species about 40, chiefly tropical.

Racemes 2—3 (rarely more) ; lower invol.-glume dorsally flat, not channelled or depressed along the median line.
- Margins of lower invol.-glume of sessile spikelets narrowly inflexed or incurved from base to apex.
  - Leaves rounded at the base (slightly cordate in *I. molle*), sessile on the sheath.
    - Pedicel of upper spikelet less than ½ the length of the lower spikelet.
      - Lower invol.-glume of sessile spikelets with nodulose margins ..... 1. *I. aristatum.*
      - Lower invol.-glume of sessile spikelets closely transversely ribbed .... 2. *I. rugosum.*
      - Lower invol.-glume of sessile spikelets dorsally villous all over, not transversely ridged nor with nodulose margins ..... 3. *I. molle.*
    - Pedicel of upper spikelet ½ the length of the lower spikelet or more.
      - Stems woolly at the base ..... 4. *I. angustifolium.*
      - Stems not woolly at the base.
        - Upper invol.-glume of sessile spikelets 2-fid, 3-nerved ; lateral nerves pectinately ciliate at the apex... 5. *I. diplopogon.*

Upper invol.-glume of sessile spikelets acuminate, 5-nerved; lateral nerves anastomosing, not pectinately ciliate ..... 6. *I. pilosum.*

Leaves hastate or deeply cordate at the base, petiolate ..... 7. *I. semisagittatum.*

Margins of lower invol.-glume of sessile spikelets broadly incurved below the middle.

Sessile spikelets $\frac{1}{8}$ in. long; callus large, glabrous; awn $\frac{1}{6}$ in. long ..... 8. *I. Lisboæ.*

Sessile spikelets $\frac{1}{5}$ in. long; callus short, bearded; awn $\frac{1}{2}$ in. long ..... 9. *I. ciliare.*

Raceme solitary; lower invol.-glume of sessile spikelets deeply channelled or depressed along the median line.

Racemes enclosed in long narrow spathes ..... 10. *I. spathiflorum.*

Racemes not enclosed in spathes.

Lower invol.-glume of sessile spikelets 6-nerved; upper invol.-glume of pedicellate spikelets shortly awned ..... 11. *I. laxum.*

Lower invol.-glume of sessile spikelets 2-nerved; upper invol.-glume of pedicellate spikelets not awned ..... 12. *I. sulcatum.*

1. **Ischæmum aristatum,** *Linn. Sp. Pl.* (1753) p. 1049. Perennial; stems 1—4 ft. high, stout, erect or decumbent at the base, simple or branched above, leafy, glabrous, thickened at the top below the spikes. Leaves 4—10 by $\frac{1}{4}$—1 in., linear-lanceolate, finely acuminate, glabrous or sparsely hairy, glaucous beneath, narrowed to the acute or subcordate base, with scabrid margins; sheaths loose, glabrous, the mouth naked, auricled; ligule membranous. Racemes 1 or 2, stout or slender, 1—4 in. long. Spikelets reaching $\frac{1}{8}$ in. long, a sessile and a pedicellate closely pressed together; callus of sessile spikelets broad, thick, $\frac{1}{25}$ in. long. *Sessile spikelets*: lower invol.-glume $\frac{1}{3}$ in. long, broadly oblong, cartilaginous and often purplish below the middle, with 2—4 marginal nodules on each edge transversely connected by shallow ridges, thinner above the middle, with green anastomosing veins, tip obtuse or 2-dentate, margins narrowly incurved, ciliolate; upper invol.-glume lanceolate, acuminate, 1-nerved, with smooth rounded keel; lower floral glume ovate-lanceolate, acuminate, 1-nerved, membranous, male or 2-sexual, with an oblong palea; upper floral glume female, cleft to or below the middle into lanceolate acuminate lobes, with a brownish-red awn $\frac{1}{2}$ in. or more long at the sinus, twisted below, straight above; palea linear-oblong. *Pedicellate spikelets* as long as the sessile, inarticulate on the very thick amorphous pedicel, which is densely silky-hairy at the base; lower invol.-glume gibbous or scimitar-shaped, acute, coriaceous, tinged with purple, with a ciliolate semicircular wing; upper invol.-glume and lower floral glume as in the sessile spikelets; upper floral glume hyaline, with a mucro or very short awn. Fl. B. I. v. 7, p. 126; Grah. Cat. p. 239; Dalz. & Gibs. p. 306; Trim. Fl. Ceyl. v. 5, p. 211; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1195.—Flowers: Oct.—Dec. VERN. *Bherda; Guj.*

KONKAN : Matunga near Bombay, *Woodrow*, 4! S. M. COUNTRY : Belgaum, *Ritchie*, 812/2!—DISTRIB. Plains and lower hills of India; Ceylon, China, Malaya.

2. **Ischæmum rugosum,** *Salisb. Ic. Stirp. Rar.* (1791) p. 1, t. 1. Annual ; stems 1—2 ft. long, erect or ascending, slightly thickened beneath the inflorescence, leafy, compressed ; nodes glabrous or bearded. Leaves 4—6 by $\frac{1}{8}$—$\frac{1}{2}$ in., linear-lanceolate, acuminate, flat, glabrous or sparsely hairy, the margins scabrid, the uppermost leaves often reduced to spathiform lanceolate sheaths which partially enclose the racemes ; sheaths compressed, loose, glabrous, the mouth auricled, the auricles membranous, confluent with the truncate ligules. Racemes usually 2, erect, pale yellow, glabrous, 1—3 in. long, fragile ; rhachis trigonous, ciliate on the dorsal angle. Spikelets reaching $\frac{1}{4}$ in. long or more, linear-oblong, the sessile and pedicellate closely pressed together ; pedicel of the latter very short and thick, clavate, angular, confluent with the bristly thick callus of the sessile spikelet. *Sessile spikelets* : lower invol.-glume cartilaginous for $\frac{2}{3}$ of its length from the base, the cartilaginous portion pale yellow, shining, concave, crossed by 3—6 deep smooth ridges, the upper third flattened, thinner, membranous, obtuse, with green veins, the margins narrowly incurved, the outer margin winged ; upper invol.-glume oblong-lanceolate, acuminate, keeled, the keel with a narrow ciliolate wing below the tip ; lower floral glume ovate-lanceolate, acuminate, hyaline, male or empty, paleate, the palea hyaline, narrow ; upper floral glume $\frac{1}{6}$ in. long, deeply cleft into 2 acute lanceolate lobes ; palea linear-lanceolate ; awn reaching $\frac{5}{8}$ in. long or more. *Pedicellate spikelets* variable, rather shorter than the sessile ; lower invol.-glume like that of the sessile or with fewer or sometimes more or less obscure transverse ridges, the upper half of the glume broader and more oblique ; upper invol.-glume not keeled, otherwise as in the sessile spikelet ; lower floral glume as in the sessile ; upper floral glume oblong, obtuse, not awned. Fl. B. I. v. 7, p. 127 ; Grah. Cat. p. 239 ; Dalz. & Gibs. p. 305 ; Trim. Fl. Ceyl. v. 5, p. 212 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436 ; Prain, Beng. Pl. p. 1195 ; Watt, Dict. Econ. Prod. v. 4, p. 531.—Flowers : Oct.

DECCAN : Poona, *Woodrow*.—DISTRIB. Throughout India; Ceylon, China, Malaya.

3. **Ischæmum molle,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 128. Stem 3—4 ft. long, solid, smooth, stout, leafy. Leaves 6—10 by $\frac{1}{4}$—$\frac{1}{3}$ in., linear, finely acuminate, sparsely hairy, base rounded, cordate ; sheaths 4—6 in. long, smooth, glabrous or sparsely hairy above, the mouth villous. Racemes 1—2, axillary and terminal, 3—5 in. long, densely villous with soft white hairs. Spikelets reaching $\frac{1}{3}$ in. long ; callus of sessile spikelets very short and broad. *Sessile spikelets* : lower invol.-glume thinly coriaceous, broadly ovate, obtuse, dorsally villous all over, many-nerved ; upper invol.-glume chartaceous, obtuse, silky, keeled, the keel with a narrow ciliolate wing from the middle upwards ; lower floral glume ovate, obtuse, hyaline, 3-nerved, ciliolate, paleate, the palea as long as the glume, narrow, obtuse ; upper floral glume shorter than the lower one, cleft to the middle into 2

lanceolate acuminate ciliolate lobes; palea small, narrow; awn nearly $\frac{3}{4}$ in. long, the lower half dark brown, the upper half yellowish-white. *Pedicellate spikelets* rather smaller than the sessile, with similar glumes but awnless. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.—Flowers: Oct.—Dec.

DECCAN: Lanoli, *Woodrow*.

There is but one sheet from the Bombay Presidency in Herb. Kew. from Dalzell's Herbarium, but no locality is given for the plant. There is one other small specimen of the plant in the Kew Herbarium, collected in the Chanda district, Central Provinces, by Mr. Duthie.

4. **Ischæmum angustifolium,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 241. Perennial; stems tufted, woolly at the base, 2—3 ft. high, erect, slender, sparingly branched, grooved on one side, glabrous. Leaves 1—2 ft. by $\frac{1}{10}$—$\frac{1}{6}$ in., tapering into a subpungent acumen, concave or convolute, base obtuse, fimbriate, margins scaberulous; sheaths glabrous; ligule a tuft of short hairs. Racemes 2—4, on axillary and terminal filiform peduncles, 1—2 in. long, close or distant, erect, golden or rusty-villous; joints and pedicels $\frac{1}{2}$ as long as the lower spikelet, slender, shortly ciliate, the pedicels bearded at the base. *Sessile spikelets* $\frac{1}{8}$ in. long, lanceolate; callus short, hairy. Glumes 4; lower invol.-glume $\frac{1}{8}$ in. long, elliptic-oblong, chartaceous, 2—3-toothed, 5-nerved, the lower part of the glume ciliate with long rufous hairs and also with a tuft of hairs at the middle of the lower part of the back; upper invol.-glume $\frac{1}{8}$ in. long, membranous, ovate-lanceolate, 2-dentate, often mucronate between the teeth, 3—5-nerved; lower floral glume equalling the lower invol.-glume, oblong, obtuse, irregularly 2-dentate, hyaline, nerveless, paleate, the palea a little shorter than the glume, linear, 2-dentate; upper floral glume $\frac{1}{8}$ in. long, linear, hyaline, usually 2-dentate, but sometimes only acute at the apex; palea shorter than the glume; awn reaching $\frac{3}{8}$ in. long. *Pedicellate spikelets* like the sessile. Fl. B. I. v. 7, p. 129; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1195; Watt, Dict. Econ. Prod. v. 4, p. 526.—Flowers: Dec.—Feb. VERN. *Sabai.*

DECCAN: cultivated at Poona, *Woodrow*. GUJARAT: Rajkot (Kathiawar), *Woodrow*.—DISTRIB. India (Lower Himalaya, Panjáb, Rajputana, Behar, Central India); Afghanistan, China, Philippines

The grass was cultivated at Poona for paper-making by the Deccan Paper Mills. It was found suitable for the lower grades of paper, but for the higher grades was not satisfactory. The nodes are hard, and if boiled long enough to soften them the remaining parts are overboiled and useless.

5. **Ischæmum diplopogon,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 129. Annual; stem 12—20 in. long, branched from the base and upwards; nodes glabrous; internodes long. Leaves 3—6 by $\frac{1}{4}$—$\frac{5}{8}$ in., linear-lanceolate from a narrow base, acuminate, with many slender nerves, dark green and shining above; sheaths glabrous, those of the upper leaves open, spathiform; ligule an oblong glabrous membrane. Peduncles many from the upper spathe-like sheaths, solitary, filiform, the spathes 1—3 in. long, lanceolate. Racemes usually 2, compressed, 1—$1\frac{1}{4}$ in. long; joints and pedicels $\frac{1}{2}$ the length of the lower spikelets or longer, subclavate, dorsally rounded, ventrally concave. *Sessile spikelets*: callus nearly $\frac{1}{20}$ in. long, thick. Spikelets reaching

$\frac{1}{4}$ in. long. Glumes 4 ; lower invol.-glume $\frac{1}{3}$ in. long, oblong, shortly 2-cuspidate, obscurely nerved and with shortly incurved margins ; upper invol.-glume $\frac{1}{3}$ in. long, ovate, subacute, shortly 2-fid, 3-nerved, the lateral nerves pectinately ciliate near the apex with long erect hairs and furnished with a slender whitish awn $\frac{1}{3}$ in. long ; lower floral glume linear-oblong, hyaline, 1-nerved ; upper floral glume $\frac{1}{8}$ in. long, 2-fid at the apex into acute lobes, hyaline ; palea small, oblong ; awn reaching $\frac{5}{8}$ in. long, the lower half brown, the upper yellowish white. *Pedicellate spikelets* often imperfect, not awned. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.

KONKAN : Matheran, *Woodrow*. DECCAN : *Woodrow*, 187! ; Mahableshwar, *Woodrow*, 41 ; Bhorkas near Poona, *Woodrow*, 3!—DISTRIB. India (W. Peninsula).

6. **Ischæmum pilosum,** *Hack. Monog. Andropog. in DC. Mon. Phan.* v. 6 (1889) p. 240. Rhizome giving out densely scaly long stolons stems erect, 2—3 ft. long, slender, terete, glabrous ; nodes glabrous. Leaves 6—12 by $\frac{1}{3}$—$\frac{1}{3}$ in., linear, finely acuminate, glabrous ; sheaths glabrous ; ligule rounded, $\frac{1}{12}$—$\frac{1}{8}$ in. long, membranous, glabrous. Racemes 2—6, fascicled, 1—4 in. long, yellow or brownish, pilose ; rhachis hairy ; joints and pedicels slender, compressed, subclavate, shorter than the sessile spikelets, sparsely ciliate ; pedicel about $\frac{1}{2}$ as long as its spikelet. *Sessile spikelets* narrowly lanceolate, reaching $\frac{1}{4}$ in. long ; callus minute, bearded with long hairs. Glumes 4 ; lower invol.-glume chartaceous, narrowed from the middle upwards, dorsally hairy, the margins incurved throughout their whole length, the nerves anastomosing ; upper invol.-glume rather longer than the lower, chartaceous, ovate-lanceolate, acuminate, laterally compressed, 5-nerved, the lateral nerves anastomosing ; lower floral glume a little shorter than the upper invol.-glume, linear-oblong, obtuse, ciliate above, paleate, male, the palea acute, membranous, nerveless, glabrous ; upper floral glume equalling the lower one, cleft almost to the middle into acute ciliolate lobes ; palea a little shorter, lanceolate-subulate, nerveless ; awn $\frac{1}{4}$—$\frac{3}{8}$ in. long. *Pedicellate spikelets* $\frac{1}{6}$—$\frac{1}{5}$ in. long, like the sessile but usually with a shorter awn, sometimes imperfect or reduced to a single glume. Fl. B. I. v. 7, p. 130 ; Grah. Cat. p. 239 ; Dalz. & Gibs. p. 305 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436 ; Watt, Dict. Econ. Prod. v. 4, p. 531.—Flowers : Oct.—Mar. VERN. *Kunda ; Nuth.*

Very common in black soil, *Dalzell* without locality in Herb. Kew.! DECCAN : *Graham, Dalzell & Gibson, Lisboa* ; Khandesh, *Lisboa* ; Sholapur, *Lisboa* ; Sattara, *Lisboa*.—DISTRIB. India (Rajputana, Central Provinces, W. Peninsula).

7. **Ischæmum semisagittatum,** *Roxb. Hort. Beng.* (1814) p. 8. Annual ; stems 1—2 ft. long, decumbent at the base, then ascending, slender, terete ; nodes glabrous ; internodes long. Leaves 2—3 by $\frac{3}{8}$—$\frac{5}{8}$ in., oblong-lanceolate, acuminate, with capillary tips, base auricled, broadly cordate or sagittate, the lower leaves with a filiform petiole reaching nearly 1 in. long, the upper sessile, glabrous or sparsely hairy, the margins scabrid ; sheaths loose, glabrous, those of the uppermost leaves spathiform ; ligule oblong, $\frac{1}{8}$ in. long, obtuse,

pilose. Racemes 2, more or less softly villous with long white or grey hairs, 1—2½ in. long, fragile; internodes and pedicels much shorter than the spikelets, trigonous. *Sessile spikelets* ⅛—¼ in. long; callus short, bearded with long hairs. Glumes 4; lower invol.-glume ovate, convex, the lower half cartilaginous, with 3—5 obscure or more or less conspicuous ridges ending in marginal nodules, the upper half chartaceous or membranous, with green veins and ciliolate margins; upper invol.-glume equalling the lower, ovate-oblong, obtuse, coriaceous; lower floral glume a little shorter than the lower invol.-glume, ovate, acuminate, 1—3-nerved, paleate, male, the palea linear-oblong, hyaline, 2-nerved; upper floral glume female, cleft to below the middle into acute glabrous lobes; palea linear-oblong; awn ½—⅝ in. long. *Pedicellate spikelets* rather shorter and narrower than the sessile, closely appressed to the sessile, with very broad pedicels ½ in. long; lower invol.-glume narrowly oblong, not ridged; upper invol.- and lower floral glumes as in the sessile spikelets; upper floral glume narrowly oblong, tip 2-toothed with a minute awn. Fl. B. I. v. 7, p. 130; Trim. Fl. Ceyl. v. 5, p. 213; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1195—Flowers: Sept.—Nov.

KONKAN: *Law*!; Parel (Bombay), *Woodrow*; Thána, *Lisboa*. DECCAN: *Woodrow*!; Lanoli, *Woodrow*!; Sattara, *Lisboa*. KANARA: Yellapur, *Talbot*, 738!—DISTRIB. India (Bengal, W. Peninsula); Ceylon.

VAR. *dasyantha*, Hack. Monog. Andropog. in DC. Monog. Phan. v. 6 (1889) p. 209. Lower invol.-glume appressedly villous at least in the upper spikelets; joints scabrous with hairy margins and keel. *Ischæmum conjugatum*, Roxb. Hort. Beng. (1814) p. 8; Hook. f. Fl. B. I. v. 7, p. 131; Grah. Cat. p. 239; Dalz. & Gibs. p. 305; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1195.—Flowers: Dec.

KONKAN: *Stocks*!, *Woodrow*. KANARA: Divimana, *Woodrow*.

8. **Ischæmum Lisboæ,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 133. Stem creeping below, very stout, rooting at the thickened nodes; branches ascending 8—14 in. long, glabrous. Leaves on the creeping stem 1—2 by ¼—⅜ in., oblong, acute, closely imbricating in 2 series, the blades reflexed at right angles to the erect short open sheaths, softly tomentose on both surfaces; lower sheaths ½—1 in. long, villous; ligule short, bearded with very long hairs. Racemes 2, softly tomentose, 2 in. long; joints and pedicels about ½ as long as the spikelets, stout, shortly villous, concavo-convex, truncate. *Sessile spikelets* ⅛ in. long; callus large, glabrous. Glumes 4; lower invol.-glume thickly coriaceous, dorsally convex, 2-fid, ciliate above the middle, margins broadly incurved below the middle, keels with broad auricular ciliate wings; upper invol.-glume ⅛ in. long, rather longer than the lower, rigid, the keel winged above the middle, the back of the glume rounded below the wing, shortly awned; lower floral glume ovate-oblong, obtuse, with ciliate margins, paleate, male, the palea chartaceous, obovate, with broad hyaline wings above the middle; upper floral glume about ½ in. long, 3-nerved below the

middle, obtusely 2-lobed ; palea lanceolate ; awn about $\frac{1}{8}$ in. long. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.

KANARA : North Kanara, *Lisboa*. There is but one sheet in Herb. Kew., the specimens on which were collected in Kanara by Dr. Lisboa. I have seen no others.

9. **Ischæmum ciliare,** *Retz. Obs.* fasc. 6 (1791) p. 36. Stems tufted, up to 2 ft. long, erect or ascending, sometimes decumbent below and rooting at the nodes, slender ; nodes glabrous or bearded. Leaves 2—6 by $\frac{1}{8}$—$\frac{1}{2}$ in., linear or linear-lanceolate, acuminate, flat, sessile, glabrous, pubescent or villous, narrowed towards the acute or rounded base, margins scabrid ; sheaths glabrous or hirsute, compressed, loose, with ciliate rounded auricles ; ligule short, obtuse, membranous, ciliate. Racemes 2, rather short, $1\frac{1}{2}$—2 in. long ; rhachis fragile ; internodes and pedicels of upper spikelets subequal, erect, compressed, trigonous, bearded dorsally and on the angles. *Sessile spikelets* $\frac{1}{8}$—$\frac{1}{4}$ in. long, oblong or ovoid ; callus very short, oblong, bearded. Glumes 4 ; lower invol.-glume 2-cuspidate, coriaceous, convex, smooth or pitted, hirsute below, flatter and veined above the middle, with lateral ciliolate broad or narrow equal wings, the margins narrowly incurved above, broadly so below ; upper invol.-glume as long as or longer than the lower, chartaceous, lanceolate, acuminate or shortly awned, 3—5-nerved, keel narrowly winged towards the tip ; lower floral glume ovate-lanceolate, acuminate, ciliate near the tip, triandrous, paleate, the palea lanceolate, acuminate, opaque, with broad hyaline ciliolate wings ; upper floral glume cleft to the middle into oblong obtuse glabrous or ciliate lobes, female ; palea lanceolate, acuminate, 2-nerved, not ciliolate ; awn $\frac{3}{8}$—$\frac{1}{2}$ in. long. Anthers $\frac{1}{8}$ in. long. Styles and stigmas short. *Pedicellate spikelets* like the sessile, the upper floral glume usually awned. Fl. B. I. v. 7, p. 133 ; Trim. Fl. Ceyl. v. 5, p. 216 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437 ; Prain, Beng. Pl. p. 1195 ; Watt, Dict. Econ. Prod. v. 4, p. 530.—Flowers : Oct. VERN. *Putena.*

KONKAN : Salsette, *Jacquemont*, 710 ! ; Parel (Bombay), *Woodrow*. KANARA : *Dalzell* ! ; Kakti (N. Kanara), *Young* ex *Woodrow*.—DISTRIB. More or less throughout India ; Ceylon, China, Malaya, Australia.

10. **Ischæmum spathiflorum,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 138. A tall grass reaching 3—4 ft. high, much branched above ; branches erect. Stem as thick as a goose-quill below, leafy above ; nodes glabrous. Leaves 1—$1\frac{1}{2}$ ft. by $\frac{3}{4}$ in., linear-lanceolate, finely acuminate, narrowed from the middle, often tinged with purple, almost petiolate, thin, sparsely hairy, margins smooth ; midrib stout, nerves obscure ; sheaths of lower leaves 6 in. long and upwards, terete, quite glabrous, the sheaths of the upper leaves passing into compressed lanceolate flowering spathes 3—4 in. long ; ligule short, scarious. Racemes about 2 in. long, more or less exserted from the spathes, very slender, pale straw-colored ; joints and pedicels more than $\frac{1}{2}$ as long as the sessile spikelets, compressed, one angle ciliate. *Sessile spikelets* $\frac{3}{8}$ in. long, narrowly linear-lanceolate ; callus very short, hairy ; lower invol.-glume $\frac{3}{8}$ in. long, thinly coriaceous, nerveless, white with dense silky hairs to above the middle, dorsal furrow

very deep, causing a thick ridge on the inside of the glume, margins equally incurved, the tip 2-dentate; upper invol.-glume chartaceous, dorsally convex, nerveless, but with a nerve-like fold towards the ciliate margin, keel with long cilia above the middle, scabrid towards the emarginate tip; lower floral glume shorter, hyaline, oblong-lanceolate, obtuse, 3-nerved, paleate, the palea lanceolate, the anthers imperfect; upper floral glume as long as the lower, linear, 3-nerved; palea 0; awn 1½ in. long, the column twisted, brown, the upper portion slender, usually purple. *Pedicellate spikelets* longer than the sessile; lower invol.-glume ½ in. long, dorsally convex, not furrowed lanceolate, narrowed into a bisetose often purplish awn, sparsely silky, 7—9-nerved; upper invol.-glume lanceolate, acute, glabrous; lower floral glume as in the sessile spikelet; upper floral glume awnless. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers: Sept.

KONKAN: Island of Salsette in hilly stony places, *Jacquemont*, 797! DECCAN: Khandala, *Woodrow*!; Palasdari on the Bhore Ghát (G. I. P. Railway), *Woodrow*.—DISTRIB. India (W. Peninsula), apparently endemic.

11. **Ischæmum laxum,** *Br. Prodr.* (1810) p. 205. Perennial; stems 2—3 ft. high, tufted on a short rootstock, simple, slender, erect, glabrous, leafy; nodes glabrous. Leaves 6—12 by $\frac{1}{10}$—$\frac{1}{8}$ in., erect, linear, narrowed to long capillary tips, flat, smooth, striate, glaucous, with minutely scaberulous margins, base not contracted; sheaths shorter than the internodes, glabrous or sparsely hairy, not auricled at the mouth; ligule a tuft of silky hairs. Raceme solitary, 2—4 in. long, suberect, pale, fragile; internodes and pedicels of upper spikelets about ½ as long as the spikelets, concavo-convex, the sides ciliate with long silky hairs. *Sessile spikelets* $\frac{3}{8}$ in. long, linear-oblong, acuminate, pale green; callus short, obtuse, shortly bearded. Glumes 4; lower invol.-glume oblong-lanceolate, acuminate, with a broad depression in the middle instead of a midnerve, the tip 2-dentate, the teeth ending in short capillary awns, margins inflexed, nerves 6, very conspicuous on the back, the 2 lateral nerves very strong, running into the apical teeth, the 4 intermediate nerves diverging from the base in pairs, afterwards more or less converging; upper invol.-glume rather shorter than the lower, membranous, ovate-oblong, acuminate, concave, terminating in a slender awn reaching ½ in. long, the margins ciliate near the apex, nerves 3, very slender; lower floral glume lanceolate, acuminate, hyaline, nerveless, triandrous, paleate, the palea linear-oblong, obtuse; upper floral glume $\frac{1}{5}$ in. long, linear, hyaline, deeply cleft into 2 lanceolate-subulate lobes, female; palea linear-oblong, equalling the glume; awn up to 1¾ in. long, the lower 1 in. brown, the upper ¾ in. white. *Pedicellate spikelets* as long as the sessile; lower invol.-glume $\frac{3}{8}$ in. long, ovate-oblong, bicuspidate, 7-nerved, the nerves very conspicuous on the back; upper invol.-glume 1-nerved, shortly awned; lower floral glume as in the sessile spikelet; upper floral glume triandrous, not awned. Fl. B. I. v. 7, p. 136; Trim. Fl. Ceyl. v. 5, p. 219; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1196; Watt, Dict. Econ. Prod. v. 4, p. 531.—Flowers: Sept. VERN. *Sheda*; *Paunat*.

Common throughout the Presidency. DECCAN: Khandesh (used for thatching), *Lisboa*; Poona, *Woodrow*; Poona to Karli, *Jacquemont*, 530!—DISTRIB. India (Bengal, Behar, Central Provinces, W. Peninsula); Ceylon, Australia, Cape de Verd Islands.

12. **Ischæmum sulcatum,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 248. Stems geniculate, ascending, reaching 20 in. long or more, weak, terete, glabrous, not ribbed, much branched from the base; nodes glabrous. Leaves 4—8 by $\frac{1}{8}$—$\frac{1}{6}$ in., linear or lanceolate, setaceously acuminate, many-nerved, glaucous, glabrous; sheaths lax, glabrous, constricted at the mouth; ligule a narrow ciliate membrane. Raceme solitary, 2—3 in. long; joints and pedicels shorter than the sessile spikelet, slender, ciliate. *Sessile spikelets* $\frac{3}{8}$ in. long; callus about $\frac{1}{16}$ in. long, shortly hairy at the base, cuneate; lower invol.-glume $\frac{3}{8}$ in. long, subchartaceous, bicuspidate, lanceolate, scabro-punctate, the margins incurved in the upper, open in the lower part, with a furrow in the middle in the place of the midnerve and 2 nerves one at each side of and close to the furrow; upper invol.-glume rather shorter than the lower, chartaceous, 3—5-nerved, shortly 2-dentate, ciliate in the upper part and with a capillary awn $\frac{3}{8}$ in. long from the sinus; lower floral glume $\frac{1}{4}$ in. long, linear, subacute, with incurved margins, hyaline, paleate, the palea as long, oblong, slightly emarginate; upper floral glume $\frac{1}{4}$ in. long, divided into 2 acute lobes; palea as long as the glume; awn $\frac{3}{4}$—$1\frac{1}{2}$ in. long, the column brown, twisted, geniculate above the column, the upper part pale, scaberulous. *Pedicellate spikelets* smaller than the sessile, awnless; lower invol.-glume lanceolate, bicuspidate, not furrowed, the margins recurved throughout, 7-nerved, the midrib slender, the lateral nerves green, approximate, close to the margin; upper invol.-glume not awned; lower floral glume as in the sessile spikelets; upper floral glume acute, not awned. Fl. B. I. v. 7, p. 137; Woodrow, in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers: Oct.

DECCAN: Sattara, *Lisboa*; Malsiras (Sholapur taluka), *Lisboa*.—DISTRIB. India (Central Provinces, W. Peninsula).

25. POGONATHERUM, Beauv.

Delicate perennial grasses; stems leafy upwards, branching. Leaves narrow, suberect. Racemes solitary on long flexuous peduncles, plumose from the slender awns; rhachis at length fragile; internodes short. Spikelets very small, subterete, 2-nate, 1—2-flowered, a sessile 2-sexual, and a pedicellate male or neuter (rarely 2-sexual); callus bearded with fine hairs. Glumes 3 or 4, all membranous and hyaline, obscurely nerved or nerveless; lower invol.-glume oblong, truncate, dorsally rounded; upper invol.-glume longer, ovate, keeled, 2-fid and awned in the sinus, the awn much longer than the spikelet, slightly twisted; lower floral glume nearly as long as the upper invol.-glume, not awned, usually absent from the pedicellate spikelet; upper floral glume about $\frac{1}{2}$ as long as the upper invol.-glume, 2-fid and awned in the sinus like the upper invol.-glume; palea broadly oblong, not keeled. Lodicules obsolete. Stamens

1 or 2; anthers long. Ovary narrow; styles short, free; stigmas very long, exserted at the top of the spikelet. Grain narrow, oblong, free.—DISTRIB. India, Afghanistan, China, Malaya, New Hebrides.

1. **Pogonatherum crinitum,** *Kunth, Enum. Pl.* v. 1 (1833) p. 478. Stems 6—12 in. long, densely tufted. Leaves 1—3 by $\frac{1}{10}$—$\frac{1}{8}$ in., linear-lanceolate, acuminate, more or less hairy; sheaths lax, glabrous with a hairy mouth; ligule of long hairs. Racemes terminating the branches of the stem, $\frac{3}{4}$—1 in. long; rhachis slender; internodes short, ciliate; tips thickened, truncate. Spikelets $\frac{1}{12}$—$\frac{1}{10}$ in. long, usually monandrous; hairs of callus longer than the spikelets. Glumes nerveless, hyaline; lower invol.-glume oblong, dorsally rounded, ciliate at the rounded or retuse tip; upper invol.-glume longer than the lower, ovate, keeled, 2-fid, the lobes ciliolate, awned in the sinus with a long capillary awn $\frac{1}{2}$ in. long or more; lower floral glume linear, nearly as long as the upper invol.-glume, not awned, sometimes absent; upper floral glume cleft to the middle into 2 ciliolate lobes; awn straight or recurved, $\frac{3}{4}$ in. long. Fl. B. I. v. 7, p. 141; Trim. Fl. Ceyl. v. 5, p. 222; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1197. *Pogonatherum saccharoideum* var. α. *genuinum,* Hack. Monog. Andropog. in DC. Monog. Phan. v. 6 (1889) p. 193.—Flowers: July.

KANARA: Sampkand (N. Kanara), *Woodrow.*—DISTRIB. More or less throughout India; Afghanistan, China, Malaya, New Hebrides.

Pogonatherum saccharoideum, Beauv. Agrost. (1812), Expl. des Pl. p. 9, t. 11, fig. 7. *The Bamboo Grass* sometimes grown in gardens, scarcely distinct from *P. crinitum,* which Hackel makes a variety of *P. saccharoideum.* Fl. B. I. v. 7, p. 141; Trim. Fl. Ceyl. v. 5, p. 222; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1197.

26. LOPHOPOGON, Hack.

Small perennial densely tufted grasses. Leaves very narrow. Spikes short, solitary, 2-nate or fasciculate at the ends of capillary branches, fragile. Spikelets usually 2-nate at each node of the rhachis; the upper shortly or very shortly pedicellate, 1—2-flowered, aristate from the upper floral glume; the lower spikelet sessile, 2-flowered, not awned from the upper floral glume; lower invol.-glume of both spikelets 3—4-dentate, 5—7-nerved; upper invol.-glume of same 2-dentate, aristate between the teeth; lower floral glume narrow, hyaline, empty or male; upper floral glume hyaline or membranous, that of the upper spikelet with a long awn, that of the lower spikelet awnless. Lodicules 0. Stamens 2. Styles very short; stigmas exserted from the apex of the spikelet.—DISTRIB. India and Australia; species 3.

1. **Lophopogon tridentatus,** *Hack. in Engl. & Prantl, Pflanzenfam.* v. 2, part 2 (1887) p. 26. Perennial; stems tufted, 4—8 in. high, erect, slender, terete, glabrous. Leaves 2—4 by $\frac{1}{25}$—$\frac{1}{16}$ in., linear, acuminate, rigid, erect, green; sheaths close, quite glabrous,

striate, shorter than the internodes, the upper ventricose ; ligule very small, truncate, hyaline, ciliate. Heads of racemes erect ; sheaths ovoid, flattened, membranous, caudate-acuminate. Racemes usually 2, closely appressed together, appearing like one, ½—¾ in. long, erect, pilose with golden or ferruginous hairs, the peduncle shortly exserted or more or less enclosed in the upper sheath ; joints of rhachis very short, slender, glabrous. Spikelets densely imbricate. *Lower spikelets* reaching ⅛ in. long, brown when dry, obovate-oblong ; callus $\frac{1}{30}$ in. long, obtuse, with a small tuft of ferruginous hairs at the very tip. Glumes 4 ; lower invol.-glume chartaceous, cuneate-oblong, truncate, with 2 long lateral teeth and 1 or 2 shorter ones between, glabrous on the back, 5-nerved ; upper invol.-glume ⅛ in. long, membranous, lanceolate, acute, 3-nerved, hirsute near the apex with ferruginous hairs, and sending out an awn as long as the glume ; lower floral glume ⅛ in. long, narrowly linear, subacute, hyaline, nerveless, glabrous, epaleate ; upper floral glume ⅛ in. long, lanceolate, entire or 2-fid, hyaline, not awned. *Upper spikelets* very shortly pedicellate ; lower invol.-glume membranous, 3-toothed, clothed with tufts of long bristles below the middle ; upper floral glume with a long awn ¾ in. long, geniculate about the middle, the column brown, twisted. Fl. B. I. v. 7, p. 149 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers : Oct.—Dec.

Dalzell without locality in Herb. Kew.! KONKAN : *Law*!, *Stocks*! DECCAN : *Woodrow*, 56! ; Poona, *Jacquemont*, 541!, *Woodrow*, *Lisboa*; Sholapur, *Stead* ex *Hackel*, *Lisboa*. S. M. COUNTRY : Belgaum, *Ritchie*, 882!, *Woodrow*.—DISTRIB. India (Central Provinces, W. Peninsula).

27. **APOCOPIS,** Nees.

Annual or perennial grasses ; stems slender. Leaves narrow, flat. Racemes solitary or 2—3-nate, compressed ; rhachis firm, not readily disarticulating ; internodes very short, slender, villous. Spikelets secund closely imbricating in 2 series, solitary, sessile, 1—2-flowered, the lowest 2—4 in each raceme imperfect, neuter ; callus very short, acute, bearing the long capillary ciliate pedicel of an obsolete upper spikelet. Glumes 4 ; lower invol.-glume very large, cuneately obovate or obcordate, chartaceous below, membranous above, more or less villous with pale brown or yellow hairs, 7—9-nerved below the apex, margins incurved at the base only ; upper invol.-glume as long as the lower, much narrower, membranous, oblong-ovate, truncate, 3-nerved, the sides broadly incurved ; lower floral glume and its hyaline palea oblong, the tips broadly truncate and ciliolate, male or empty ; upper floral glume 2-sexual, linear, 2-dentate, 1-nerved, hyaline, paleate, awned ; palea half as long as the glume, quadrately oblong, nerveless, truncate with ciliolate tip ; awn short, very slender, twisted. Lodicules 0. Stamens 2 or 3 ; anthers linear. Ovary narrow ; stigmas slender, exserted at the top of the spikelet. Grain small, narrowly oblong.—DISTRIB. Eastern Asia ; species 3 or 4.

1. **Apocopis vaginatus,** *Hack. in Œstr. Bot. Zeitschr.* v. 41 (1891) p. 8. A low decumbent annual ; stems much branched from

the base, 3—8 in. long. Leaves $\frac{3}{4}$—$1\frac{3}{4}$ by $\frac{1}{12}$—$\frac{1}{8}$ in., linear, acute, shorter upwards, hairy from tubercular bases; sheaths lax, longer than the internodes, hairy at the mouth; ligule a small membrane. Racemes 2-nate, $\frac{3}{4}$—$\frac{7}{8}$ in. long, closely appressed together, partly or almost entirely enclosed during flowering in the sheaths of the upper leaves, supported by a short common peduncle, more or less hairy with yellowish-brown hairs; joints much shorter than the spikelets, ciliate. Spikelets oblong, $\frac{1}{8}$ in. long, brown, nearly uniform in color; callus very short, hairy with long brown hairs. Glumes 4; lower invol.-glume $\frac{1}{8}$ in. long, membranous, obovate, truncate or emarginate at the ciliate hyaline apex, densely brown hairy in the lower half, 7—9-nerved, the nerves abruptly ceasing below the apex; upper invol.-glume as long as the lower, quadrate-oblong, truncate at the hyaline margin, hairy in the lower half, 3-nerved, finely ciliolate at the apex; lower floral glume $\frac{1}{8}$ in. long, hyaline, linear-oblong, obtuse, ciliolate at the apex, nerveless; upper floral glume $\frac{1}{8}$ in. long, conspicuously exceeding the other glumes, linear, membranous, truncate and shortly 2-dentate at the apex, awned; awn perfect, $\frac{7}{8}$—$1\frac{1}{4}$ in. long. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437. *A. Wightii* var. *vaginata*, Hook. f. Fl. B. I. v. 7 (1896) p. 143.

KONKAN: Kalyan, *Woodrow*. KANARA: N. Kanara, *Talbot* ex *Woodrow*.—DISTRIB. India (Hazaribagh (Bengal), *C. B. Clarke*).

I have not seen any specimens from the Bombay Presidency.

28. **ARTHRAXON**, Beauv.

Annual or perennial slender grasses; stems decumbent, creeping and branching below. Leaves short, broad, cordate at the base; sheaths shorter than the internodes. Racemes 2-nate, digitate or fasciculate; rhachis very slender, articulate, fragile. Spikelets 1-flowered, secund, sessile, solitary or with an imperfect pedicellate spikelet, laterally compressed, deciduous at the internodes; callus bearded. Glumes 4; lower invol.-glume lanceolate or linear-lanceolate, acute, thin or subcoriaceous, more or less muriculate or aculeate, margins hardly incurved; upper invol.-glume narrower, lanceolate, acuminate, chartaceous, keeled; lower floral glume hyaline, paleate, empty; upper floral glume hyaline, awned or mucronate, bisexual; palea minute or 0. Lodicules 2, cuneate or quadrate. Stamens 1—3. Styles short; stigmas laterally exserted. Grain linear or narrowly fusiform.—DISTRIB. Tropics of the Old World; species 8.

Awn of spikelets less than 1 in. long; joints of rhachis of racemes rectangularly truncate.
  Stamens 3; anthers nearly as long as the upper floral glume.
    Spikelets all sessile (not pedicellate) ..... 1. *A. inermis*.
    Spikelets sessile and pedicellate.
      Tall, reaching 3 ft. high; joints of rhachis sparsely hairy; lower invol.-glume acuminate ..... 2. *A. lanceolatus*.
      A weak grass reaching 1 ft. high; joints of rhachis densely clothed with silvery hairs; lower invol.-glume 2-fid ..... 3. *A. Meeboldii*.

Stamens 2 or 3; anthers not ½ the length of the upper floral glume.	
Lower invol.-glume 2-fid	4. *A. microphyllus.*
Lower invol.-glume entire	5. *A. ciliaris.*
Awn of spikelets 6 in. or more long; joints of rhachis of racemes obliquely truncate	6. *A. jubatus.*

1. **Arthraxon inermis,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 145. Stems very slender, much geniculately branched, glabrous; nodes pubescent. Leaves 1—1½ by ⅜—⅝ in., ovate, broadly amplexicaul, caudate-acuminate with setaceous tips, glabrous or sparsely hairy on both sides, ciliate near the base. Spikes often 3, short, green; peduncle slender, naked. Spikelets oblong-lanceolate, all sessile (none pedicellate), rather distant. Glumes 3 or 4; lower invol.-glume dorsally convex, obtuse, oblong-lanceolate, strongly 7—9-nerved, the margins not incurved and as well as the nerves scabrid; upper invol.-glume as long as the lower, obovate-oblong (when spread out), obtuse, emarginate, apiculate, 3-nerved, hardly keeled, nearly smooth; lower floral glume 0 (or palea of upper floral glume) shorter than the upper invol.-glume, lanceolate; awn basal, twice as long as the spikelets. Anthers very large. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437. —Flowers: Oct. VERN. *Vanguarin.*

KONKAN: Matheran, *Woodrow.* DECCAN: *Woodrow*, 189!; Mahableshwar, *Woodrow.*—DISTRIB. India (W. Peninsula).

There is a single and not very good specimen in Herb. Kew. collected by Woodrow and ticketed "Deccan." I have seen no other. The grass seems to be procurable at Matheran and Mahableshwar, both places of easy access, and a few specimens would be highly acceptable at Kew.

2. **Arthraxon lanceolatus,** *Hochst. in Flora,* v. 29 (1856) p. 188. A tall much-branched suberect or subscandent grass 1—3 ft. high; stems slender, quite glabrous or scaberulous below the nodes; floriferous branches usually elongate, solitary or twin. Leaves glaucous, very variable, from broadly ovate and ½—3 by ¼—1¼ to narrowly lanceolate and 1—4 by ⅛—½ in., caudate-acuminate, flaccid or rigid, glabrous or hairy, the margins ciliate with stiff hairs, the nerves slender, obscure; sheaths close; ligule 1/20—1/12 in. long, rounded, membranous. Racemes 2—5-nate, 1—2 in. long, pale green or suffused with violet; rhachis sparsely hairy; joints about ½ as long as the spikelets. *Sessile spikelets* ¼ in. long (not including the awn), linear-lanceolate; callus very short, not bearded. Glumes 4; lower invol.-glume ¼ in. long, lanceolate, acuminate, coriaceous, often purplish with a hyaline tip, the keels serrately bristly with strong curved teeth, the back convex, glabrous or muriculate, 5—7-nerved, with incurved margins; upper invol.-glume similar, lanceolate, acuminate or mucronulate, 3-nerved, with incurved margins; lower floral glume ⅛ in. long, acute, glabrous, membranous; upper floral glume hyaline; awn ½—⅝ in. long, basal, the column equalling the subulate portion. Anthers more than ⅛ in. long. *Pedicellate spikelets* ⅕ in. long, linear-lanceolate. Stamens perfect. Fl. B. I. v. 7, p. 143; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437; Prain, Beng. Pl. p. 1198.—Flowers: Oct. VERN. *Harjala; Govinder.*

DECCAN: Lanoli, *Woodrow*. GUJARAT: Morvi (Kathiawar), *Woodrow*. SIND: *Stocks*, 642!—DISTRIB. More or less throughout India, Abyssinia, Tonkin, China.

3. **Arthraxon Meeboldii,** *Stapf, MS.* Annual; stems 2—3 from the base, shortly prostrate, ascending, 6—12 in. long, slender, terete, quite glabrous, often tinged with purple; nodes pubescent. Leaves ¾—2 by ¼—¾ in., ovate lanceolate, finely acuminate, very sparsely hairy with slender bulbous-based hairs, green above, glaucous beneath, ciliate on the margins with bulbous-based hairs, base cordate, amplexicaul; sheaths of the lower leaves loose, the others close or the upper more or less tumid, at first enclosing the panicles, glabrous or with a few scattered hairs and more or less ciliate margins; ligule about $\frac{1}{20}$ in. long, quadrate, hyaline, shortly ciliate at the apex. Inflorescence of paniculate racemes at the apex of the stems; branches 2—4, reaching 2 in. long; joints of the rhachis about ⅛ in. long, densely clothed with long silvery hairs; pedicels ⅛ in. long, broad. *Sessile spikelets* ¼—⅜ in. long, narrowly linear-lanceolate; callus minute, bearded. Glumes 4; lower invol.-glume when young sometimes silky all over with a deciduous tomentum, linear-lanceolate, chartaceous, with a purplish 2-fid acumen with very narrow teeth and with incurved margins, keels serrately muricate from the base up to ¾ of their length, the murications passing into tubercles which, in the upper third of the glume, are ciliate with fine erect silky hairs; upper invol.-glume oblong-lanceolate, setosely acuminate, membranous, equalling the lower one, 3-nerved, with hyaline margins; lower floral glume empty, elliptic-oblong, subobtuse, ⅛ in. long, nerveless; upper floral glume linear-lanceolate, acute, rather more than ⅛ in. long, hyaline, aristate from near the base, the awn ½ in. long or more. *Pedicellate spikelets* closely appressed to the sessile ones, lanceolate, acute, chartaceous, shorter than the sessile spikelets; lower invol.-glume with rigidly ciliate keels, otherwise glabrous, 9-nerved; upper invol.-glume lanceolate, acute, 3-nerved; lower floral glume empty, ovate-oblong, hyaline, ⅛ in. long; upper floral glume ovate, 2-dentate, equalling the lower, mucronulate between the teeth, hyaline, male. Anthers ⅛ in. long, bright yellow. —Flowers: Sept.

The long silky silvery hairs on the racemes are a good distinctive mark of the species.

DECCAN: Khandala, *Meebold*, 9132; Mahableshwar, *Cooke*!—DISTRIB. India (W. Peninsula).

4. **Arthraxon microphyllus,** *Hochst. in Flora*, v. 29 (1856) p. 188. Annual; stem and branches filiform, 6—12 in. long, straggling, glabrous or more or less obscurely pubescent below the spikes. Leaves ¾—1¼ by ⅛—⅓ in., ovate or elliptic, acuminate, membranous, very sparingly hairy or nearly glabrous, base slightly auricled, margins naked or sparsely ciliate especially towards the base; sheaths short, glabrous; ligule small, hyaline. Panicle of 3—5 slender branches; rhachis capillary; internodes shorter than the slender spikelets, usually ciliate with long erect hairs (rarely glabrous). Spikelets solitary (rarely with a pedicellate one), ⅛ in.

long, narrowly lanceolate ; callus nearly glabrous. Glumes 4 ; lower invol.-glume thinly membranous, lanceolate, 2-cuspidate, 5—7-nerved above the middle, the nerves usually scabrid ; upper invol.-glume as long as the lower, narrowly lanceolate, narrowing out into a very fine awn-like point $\frac{1}{60}$—$\frac{1}{30}$ in. long ; lower floral glume much shorter than the upper invol.-glume, lanceolate, acuminate, epaleate ; upper floral glume $\frac{1}{20}$ in. long, ovate-lanceolate, subacute, hyaline, with an awn about $\frac{3}{8}$ in. long from near the base, the column of the awn brown, much shorter than the usually purplish capillary subulate portion. Fl. B. I. v. 7, p. 147 ; Trim. Fl. Ceyl. v. 5, p. 224 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437 ; Prain, Beng. Pl. p. 1199.—Flowers : Sept.

KONKAN : Salsette, *Jacquemont*, 713! ; Parel (Bombay), *Woodrow*. GUJARAT : Surat, *Cooke*!—DISTRIB. More or less throughout India ; Ceylon, Tonkin, Tropical Africa.

5. **Arthraxon ciliaris,** *Beauv. Agros.* (1812) p. 111, t. 11, fig. 6. Stems tall or short, tufted or branched from the base, or with long creeping stems and ascending leafy branches, glabrous. Leaves 1—2½ by $\frac{3}{8}$—$\frac{7}{8}$ in., ovate to lanceolate, glabrous or laxly hairy, the margins ciliate towards the base ; sheaths with ciliate margins. Racemes few or many, on long naked or spathaceously sheathed glabrous peduncles, pale green or purplish. Spikelets $\frac{1}{8}$—$\frac{1}{4}$ in. long, lanceolate or linear-lanceolate ; callus naked or shortly bearded. Glumes 4 ; lower invol.-glume chartaceous, ovate-lanceolate (when spread out), acute, 7—10-nerved, the nerves minutely aculeolate, often punctulate ; upper invol.-glume as long as the lower, linear, acute, 3-nerved ; lower floral glume much shorter than the upper invol.-glume, ovate-oblong, acuminate, nerveless ; upper floral glume about ½ as long as the upper invol.-glume, awned ; awn subbasal, about twice as long as the spikelet. Fl. B. I. v. 7, p. 145 ; Trim. Fl. Ceyl. v. 5, p. 225 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437 ; Prain, Beng. Pl. p. 1199.—Flowers : Oct.

S. M. COUNTRY : Belgaum, *Ritchie*, 796 *a*! GUJARAT : Chamargaon, *Woodrow*.—DISTRIB. Throughout India in hilly districts ; Ceylon.

A very variable species of which Hackel (Monog. Andropog. p. 354) recognizes no less than 12 forms. These, however, for the Indian species Sir Joseph Hooker has reduced to four. There is only one specimen from Bombay in Herb. Kew., obtained by *Ritchie* from Belgaum, and this has been included by Sir J. Hooker in his group *Violaceus*.

6. **Arthraxon jubatus,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 358. Annual ; stems decumbent, then ascending, 4—12 in. long, very slender, terete, quite glabrous, leafy almost to the apex. Leaves $\frac{7}{8}$—1¾ by $\frac{1}{6}$—$\frac{1}{3}$ in., lanceolate, acute, flat, thinly membranous, green, undulate, densely pubescent or almost villous on both surfaces, base subcordate, amplexicaul ; sheaths lax, pubescent, the upper spathiform, leafless ; ligule very short, truncate, hyaline, glabrous. Floral spathes 1½—2 in. long, linear-lanceolate, acuminate, green, with membranous margins, pubescent or villous, enclosing the spikes. Racemes 2-nate, on a common peduncle, a subsessile and a pedicellate one ; the pedicel slender, pubescent, fragile ; joints ½ as long as the spikelets and pedicels of upper spikelet clavate,

compressed, pectinately ciliate. Spikelets 2-nate, a sessile and a pedicellate one at each joint, and a terminal male. *Sessile spikelets* $\frac{3}{8}$ in. long, linear-lanceolate ; callus $\frac{1}{20}$ in. long, bearded with hairs equalling itself. Glumes 4 ; lower invol.-glume membranous, linear, acute, bimucronulate, 2-nerved, the margins hyaline, inflexed ; upper invol.-glume rather shorter than the lower, linear-lanceolate, mucronulate, much compressed, 1-nerved, with hyaline margins ; lower floral glume $\frac{1}{8}$ in. long, narrow, linear, subacute, hyaline, nerveless, glabrous ; upper floral glume $\frac{1}{2}$ as long as the upper invol.-glume, lanceolate, acute, glabrous, with a very long capillary awn reaching 6 in. (or more) long, attached at the base ; palea 0. Anthers $\frac{1}{20}$ in. long. *Pedicellate spikelets* $\frac{1}{5}$ in. long, not awned. Fl. B. I. v. 7, p. 147 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers : Oct.

KONKAN : *Law* !, *Stocks* ! DECCAN : *Woodrow*, from seed sown in the Botanical Garden of the College of Science, Poona, collected at Kori Fort, 12 miles S. of Lanoli.—DISTRIB. India (W. Peninsula).

29. **THELEPOGON,** Roth.

A coarse perennial grass. Leaves lanceolate, cordate, amplexicaul. Racemes few or many, corymbosely fascicled, pedunculate ; rhachis flexuous, fragile, the joints more or less deeply excavated. Spikelets ovoid, acute, solitary at the joints, the upper spikelet reduced to a mere almost glume-like rigid pedicel, the lower sessile, 2-flowered, the lower flower male, the upper 2-sexual. Glumes 4 ; lower invol.-glume coriaceous, transversely rugose, ridged or tuberculate ; upper invol.-glume chartaceous, not keeled, sunk in the cavity of the joint, rigid, sparingly tuberculate ; lower floral glume shorter, paleate, usually male, triandrous, with a similar palea ; upper floral glume hyaline, 2-cleft, with a long twisted awn in the sinus, 3-nerved ; palea narrow, equalling the glume. Lodicules cuneate, truncate. Stamens 3 ; anthers long. Styles free ; stigmas short.—DISTRIB. Species 1, African and East Indian.

1. **Thelepogon elegans,** *Roth, Nov. Pl. Sp.* (1821) p. 62. An annual robust grass ; roots stout, rigid ; stems 1—3½ ft. high, tufted and branching from the base, terete, erect or geniculately ascending, glabrous. Leaves 4—10 by $\frac{3}{8}$—$\frac{3}{4}$ in., linear, acuminate, thin, cordate, amplexicaul, usually hispid with bulbous-based hairs or sometimes only tuberculately scabrid, the margins cartilaginously ciliate ; sheaths loose, hispid above with bulbous-based hairs and with ciliate margins ; ligule narrow, membranous. Racemes 1—2 in. long, corymbose ; peduncles slender, stiff ; joints of the rhachis as long as the spikelets, subclavate, scaberulous, the top orbicular, cupular. Spikelets $\frac{1}{4}$ in. long, yellowish-white, ovate, beaked ; callus small, annular, minutely bearded. Glumes 4 ; lower invol.-glume thickly coriaceous, ovate, acuminate, with a membranous 2-dentate beak, the back convex with transverse much elevated ridges, translucent ; upper invol.-glume slightly longer than the lower, broadly lanceolate, chartaceous, with a long acumen, the back flat or subconvex, with 5—7 short transverse ridges ; lower floral glume $\frac{1}{8}$ in. long, lanceolate,

hyaline, 2-nerved, glabrous, the palea narrow, acute, nerveless; upper floral glume ⅛ in. long, ovate-lanceolate, hyaline, cleft to the middle, glabrous, 3-nerved, the lateral nerves running into the acute lanceolate lobes; awn inserted at the sinus, ¾—1 in. long, the column brown, twisted, equalling the yellow subulate portion; palea equalling the glume, oblong, acuminate. *Pedicel* of the obsolete upper spikelet longer than the sessile spikelet, linear, obtuse, curved, flat, ciliate on one margin. Fl. B. I. v. 7, p. 148; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.—Flowers: Sept.

KONKAN: *Stocks*!, *Law*! DECCAN: Poona. *Woodrow*; Hewra, *Dalzell*!; near Nasik, *Edgeworth*! S. M. COUNTRY: Belgaum, *Ritchie*, 812!—DISTRIB. India (Central India, W. Peninsula); Tropical Africa.

30. **ELIONURUS,** Humb. & Bonpl.

Aromatic cæspitose grasses, usually perennial. Raceme solitary, subsimple, clothed with silky hairs; rhachis fragile, jointed, flattened. Spikelets 2-nate (one sessile, the other pedicellate). *Sessile spikelets* dorsally compressed, 1-flowered. Glumes 4; lower invol.-glume subcoriaceous, often 2-toothed or 2-fid, dorsally flattened, 2-keeled, usually with fine filiform transparent oil-glands close to the ciliate keels; upper invol.-glume membranous, lanceolate, acute, not awned; lower floral glume hyaline, empty, paleate or not; upper floral glume small, hyaline, awnless, paleate or not. Lodicules 2, cuneate. Stamens 3. Stigmas laterally exserted. Grain dorsally compressed, oblong.—DISTRIB. Species about 15, in the tropical and subtropical regions of both hemispheres.

Annual; lower invol.-glume of sessile spikelet with penicillate tubercles on the margin. the floral glumes not paleate	1. *E. Royleanus.*
Perennial; margins of lower invol.-glume of sessile spikelet not tuberculate, the floral glumes paleate...	2. *E. hirsutus.*

1. **Elionurus Royleanus,** *Nees, ex A. Rich. Tent. Fl. Abyss.* v. 2 (1851) p. 471. Annual; stems 3—12 in. high, slender, leafy, geniculate; nodes pubescent. Leaves 1½—4 by $\frac{1}{20}$ in., linear-lanceolate, acute or acuminate, rigid, suberect, at first green then together with the whole plant turning red, glabrous or sparsely hairy, fimbriate at the base; lower sheaths terete, much shorter than the internodes, the upper spathiform; ligule very short, membranous. Racemes 1—2 in. long, erect, yellowish-green or often variegated with purple, each enclosed in a long narrow flattened sheath; joints densely bearded at the apex with long white silky hairs, obliquely disarticulating, shorter than the sessile spikelets. *Sessile spikelets* nearly ½ in. long (including the beak); callus about $\frac{1}{30}$ in. long, densely bearded. Glumes 4; lower invol.-glume coriaceous, nearly ½ in. long (including beak), running out into a usually violet-coloured, 2-fid beak about ¼ in. long, the lobes ciliate, linear, slightly divergent, the margins of the glume below the beak with a row of large violet-colored tubercles each carrying a pencil of whitish glistening hairs; upper invol.-glume as long as the body of the lower, linear-lanceolate, acuminate, finely mucronate, membranous, 1-nerved; lower floral

glume a little shorter than the invol.-glumes, oblong, acute, nerveless, glabrous, epaleate ; upper floral glume much shorter than the lower, oblong, obtuse, nerveless. *Pedicellate spikelets*: pedicels $\frac{1}{8}$ in. long, ciliate on one margin. Spikelets linear-subulate. Lower invol.-glume $\frac{3}{8}$ in. long, narrowed almost from the base into a long narrow linear ciliate beak ; upper invol.-glume $\frac{1}{4}$ in. long, ovate-lanceolate, concave, membranous, narrowed into a short scabrid purplish awn. Fl. B. I. v. 7, p. 161 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437.

GUJARAT : Rajkot (Kathiawar), *Woodrow*. SIND : *Woodrow*.—DISTRIB. India (Upper Gangetic plain, W. Peninsula) ; Arabia, Abyssinia, Cape de Verd Islands.

2. **Elionurus hirsutus,** *Munro, ex Benth. in Journ. Linn. Soc.* v. 19 (1881) p. 68. Perennial ; rootstock woody, branched ; stems 1—2 ft., ascending from a branching base, stout, smooth, rigid, more or less scabrid or pubescent ; nodes pubescent. Leaves 3—6 by $\frac{1}{10}$—$\frac{1}{8}$ in., linear, finely acuminate ; sheaths terete, glabrous or nearly so, the upper sheaths shorter than the internodes, glaucous or nearly white. Raceme solitary, stout, 2—4 in. long, silvery silky all over ; joints shorter than the sessile spikelets, subclavate, densely villous on the back. *Sessile spikelets* at each node of the rhachis, solitary or 2-nate, imbricate, reaching $\frac{3}{8}$ in. long or more (including the beak), pale green. Glumes 4 ; lower invol.-glume $\frac{3}{8}$ in. long (including beak), coriaceous, 7—9-nerved, the beak often as long as the body of the glume, deeply 2—fid, densely silky-villous, the lobes divergent ; upper invol.-glume $\frac{1}{4}$ in. long, ovate, aristately acuminate, chartaceous, 3—5-nerved, the acumen ciliate at the tip ; lower floral glume equalling the upper invol.-glume, hyaline, ovate-oblong, acute, 3-nerved, paleate, the palea lanceolate, acute, as long as the glume ; upper floral glume shorter, ovate, acute, glabrous, with incurved margins. *Pedicellate spikelets* rather shorter than the sessile ones ; pedicels about $\frac{1}{8}$ in. long, shorter than the joints, flattened, subclavate, hairy on the back and with ciliate margins. Fl. B. I. v. 7, p. 162 ; Boiss. Fl. Orient. v. 5, p. 466 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 437 ; Watt, Dict. Econ. Prod. v. 3, p. 242. *Rottboellia hirsuta,* Vahl, Symb. part 1 (1790) p. 11 ; Hack. Monog. Andropog. in DC. Monog. Phan. v. 6 (1889) p. 311.

Dalzell without locality in Herb. Kew.! SIND : *Stocks*, 626!—DISTRIB. India (Panjáb, Rajputana, W. Peninsula) ; westwards to N. Africa.

31. **ANDROPOGON,** Linn.

Perennial or annual grasses of very varied habit. Leaves usually narrow. Spikelets similar or heteromorphous, 2-nate (one sessile, the other pedicellate), on the fragile rhachis of solitary, 2-nate, digitate fasciculate or paniculate racemes. *Sessile spikelets* 1-flowered ; callus long or short. Glumes 3 or 4 ; lower invol.-glume coriaceous or chartaceous, 2-keeled, muticous ; upper invol.-glume usually thinner with a median keel, rarely awned ; lower floral glume hyaline or 0, neuter ; upper floral glume hyaline, usually awned, often reduced to the dilated base of the awn, 2-sexual ; palea various or 0. Lodicules

2, cuneate. Stamens 3—1. Stigmas laterally exserted. Grain various. *Pedicellate spikelets* usually smaller than the sessile.—DISTRIB. Species more than 200, in the warm parts of the world.

Internodes of racemes deeply cupped at the apex.

Subgenus 1. CYMBOPOGON. Racemes 2-nate, terminal on the stems, both together subtended by spathiform sheaths ; spikelets differing in sex and form.

Roots aromatic ..... 1. *A. Iwarancusa.*

Subgenus 2. ARTHROLOPHIS. Racemes 2-nate (1 sessile, the other pedunculate), from spathiform sheaths ; sessile spikelets alike in sex and form ; joints opaque.

Cupular tips of joints toothed ..... 2. *A. pumilus.*

Internodes of racemes truncate but not cupped at the apex.

SECT. A. ISOZYGI. Sessile spikelets of all the pairs alike in sex and form.

Subgenus 3. HYPOGYNIUM. Raceme solitary, pedunculate, in the axil of a spathiform leaf-sheath ; joints and pedicels obliquely truncate at the apex, opaque ; pedicellate spikelets like the sessile.

Lower invol.-glume pitted ..... 3. *A. foveolatus.*

Subgenus 4. AMPHILOPHIS. Racemes 2 or more, fasciculate or paniculate, all pedunculate ; joints of the raceme many to few, like the pedicels, linear, compressed, with a translucent median channel and thickened margins (except *A. concanensis*).

Racemes with many pairs of spikelets.
  Racemes digitate or fasciculate, not panicled, the lower longer than the rhachis of the inflorescence.
    Lower invol.-glume of sessile spikelets villous below the middle.
      Lower invol.-glume not pitted.
        Upper invol.-glume mucronulate ..... 4. *A. compressus.*
        Upper invol.-glume obtuse ..... 5. *A. Woodrowii.*
      Lower invol.-glume pitted ..... 6. *A. pertusus.*
    Lower invol.-glume of sessile spikelets glabrous below the middle (sparsely silky in *A. ensiformis*).
      Nodes of stem densely bearded ..... 7. *A. Kuntzeanus.*
      Nodes of stem glabrous.
        Leaves reaching ½ in. broad ..... 8. *A. ensiformis.*
        Leaves reaching ⅛ in. broad ..... 9. *A. concanensis.*
  Racemes panicled, the lower branches shorter than the rhachis of the inflorescence.
    Non-odorous; sheaths terete ..... 10. *A. intermedius.*
    Aromatic; sheaths compressed ..... 11. *A. odoratus.*
Racemes small, of 1—3 pairs of spikelets, often reduced to 3 spikelets, 1 sessile and 2 pedicellate.
  Stems more or less suffrutescent below, stiff, erect.
    Stems often proliferously branched; nodes of stem glabrous; leaves reaching ½ in. broad; callus shortly bearded ..... 12. *A. assimilis.*
    Stems not proliferously branched; nodes of stem bearded; leaves reaching ½ in. broad; callus densely villous ..... 13. *A. Hugelii.*

Stems decumbent and interlaced, very weak, filiform ..... 14. *A. filiculmis.*

Subgenus 5. SORGHUM. Racemes panicled, all pedunculate; rhachis fragile; joints 1 or few, filiform, truncate, with ciliate margins; sessile spikelets dorsally compressed.

Perennial; stems up to 15 ft. high; leaves 1—2 ft. by ¾—2 in.; joints 3—7 ..... 15. *A. halepensis.*
Annual; stems less than 5 ft. long; leaves 8—10 by ¼—⅓ in.; joints rarely 3 ..... 16. *A. purpureo-sericeus.*

Subgenus 6. CHRYSOPOGON. Raceme solitary, 1-jointed (i.e. reduced to 1 sessile, 2-sexual, and 2 pedicellate male or neuter spikelets), on the bearded tips of the branches of the panicle; sessile spikelets laterally compressed.

Pedicels of the upper spikelets ½ as long as the sessile spikelets or longer.
  Pedicels of upper spikelets glabrous or nearly so.... 17. *A. aciculatus.*
  Pedicels of upper spikelets ciliate with long reddish-brown hairs ..... 18. *A. lancearius.*
Pedicels of upper spikelets not ½ as long as the sessile spikelets.
  Stems reaching 4 ft. high; leaves up to 18 in. long; callus $\frac{1}{30}$ in. long, bearded on one side only ..... 19. *A. Monticola.*
  Stems reaching 18 in. high; leaves up to 4 in. long; callus $\frac{1}{16}$ in. long, villous all over ..... 20. *A. Auchcri.*

SECT. B. HETEROZYGI. Lowest one or more sessile spikelets in all racemes, or at least in one or two, differing from those above it in sex and form.

Subgenus 7. DICHANTHIUM. Racemes digitate (rarely solitary or paniculate); spikelets all alike in form, but differing in sex; lower 1—4 pairs of spikelets usually homogamous.

Raceme solitary, less than 1 in. long ..... 21. *A. Cookei.*
Racemes digitate (sometimes solitary in *A. caricosus*), 1 in. or more long.
  Lower invol.-glumes of the pedicellate spikelets armed with submarginal tubercular-based bristles ¼ in long ..... 22. *A. armatus.*
  Lower invol.-glume not armed with marginal bristles.
    Pedicels ⅓ as long as the sessile spikelets; nodes of stem glabrous; ligule a shortly ciliate small membrane ..... 23. *A. caricosus.*
    Pedicels ½ as long as the sessile spikelets; nodes of stem bearded; ligule large, oblong, obtuse, membranous ..... 24. *A. annulatus.*

Subgenus 8. HETEROPOGON. Raceme solitary, terminal on the stems and branches; lower sessile spikelets very unlike the upper, which are cylindric.

A dwarf erect grass not 1 ft. high ..... 25. *A. polystachyos.*
Tall grasses reaching several feet high.
  Lower invol.-glume dorsally deeply grooved; ligule a rounded membrane ..... 26. *A. triticeus.*
  Lower invol.-glume not dorsally grooved.
    Margins of lower invol.-glume of pedicellate spikelets equally winged, the keels studded with long yellow bristles; ligule of several narrow membranous segments ..... 27. *A. Ritchiei.*

Margins of lower invol.-glume of pedicellate spikelets unequally winged, the keels not studded with bristles; ligule truncate, ciliolate ..... 28. *A. contortus.*

1. **Andropogon Iwarancusa,** *Jones, in Asiatic Research.* v. 4 (1795) p. 109. Whole plant of a pale often glaucous green, perennial; stems up to 6 ft. high, tufted on an annulate creeping rootstock; roots aromatic. Leaves flat or convolute, 6 in. to 2 ft. by $\frac{1}{10}$—$\frac{3}{8}$ in., linear with capillary tips, rigid or flexuous, glabrous or scaberulous, midrib slender; sheaths glabrous, the lower deciduous, splitting into flat often tortuous laminæ; ligule shortly oblong, membranous, ciliolate. Panicle very variable; branches distant or crowded, simple or branched; proper spathes $\frac{1}{3}$—$\frac{2}{3}$ in. long, longer than the peduncles of the racemes, narrowly lanceolate; racemes $\frac{1}{4}$—$\frac{3}{4}$ in. long, unequal; joints of rhachis and pedicels of upper spikelets subclavate, densely villous with long hairs, the hairs more or less concealing the sessile spikelet, the tops cupular, toothed; spikelets 3 or 4 pairs. *Sessile spikelets* reaching $\frac{1}{4}$ in. long, linear-lanceolate, acute; callus acute, densely bearded with long whitish hairs. Glumes 4; lower invol.-glume $\frac{1}{3}$ in. long, linear-lanceolate, thin, flat, glabrous, nerveless, keels scaberulous; upper invol.-glume $\frac{1}{3}$ in. long, ovate, acute, cymbiform, thinly membranous, 3-nerved; lower floral glume $\frac{1}{3}$ in. long, linear-oblong, obtuse, hyaline, 2-nerved; upper floral glume $\frac{1}{20}$ in. long, 2-fid, hyaline, ciliate; awn from the sinus $\frac{1}{3}$ in. long, slender, glabrous. *Pedicellate spikelets* scarcely longer than the sessile, narrowly lanceolate, purplish; pedicels $\frac{1}{10}$ in. long; lower invol.-glume 7—9-nerved, glabrous, with scaberulous keels; upper invol.-glume ovate-oblong, obtuse, 3-nerved, ciliate; lower floral glume oblong, obtuse, hyaline, ciliate. Fl. B. I. v. 7, p. 203; Grah. Cat. p. 238; Dalz. & Gibs. p. 301; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1200. *Andropogon laniger,* Watt, Dict. Econ. Prod. v. 1, p. 244 (partly).—Flowers: Dec.

GUJARAT: Ahmedabad, *Dalzell & Gibson.* SIND: Karachi, *Dalzell & Gibson, Woodrow.*

VAR. *laniger,* Hook. f. Fl. B. I. v. 7 (1896) p. 203. Stem short, subsimple; leaves junciform; lower sheaths hardened, persistent; panicle narrow, subsimple. *Andropogon laniger,* Desf. Fl. Atlant. v. 2 (1800) p. 379.—Flowers: July—Dec.

SIND: widely, *Woodrow, Stocks,* 816!; Jemadar ka Landa near Karachi, *Stocks!*

2. **Andropogon pumilus,** *Roxb. Fl. Ind.* v. 1 (1832) p. 273. Annual; stem 6—18 in. high, slender, suberect or geniculate and decumbent below, quite glabrous; nodes glabrous. Leaves 3—5 by $\frac{1}{10}$—$\frac{1}{6}$ in., linear, finely acuminate, glabrous; sheaths compressed, keeled, quite glabrous; ligule short, truncate, membranous, glabrous. Racemes $\frac{1}{2}$—$\frac{3}{4}$ in. long, in nearly equal pairs on a very slender peduncle which arises from a narrow flattened glabrous spathe $\frac{1}{4}$—$\frac{1}{2}$ in. long; joints $\frac{1}{10}$ in. long, very slightly clavate (almost linear), flattened, glabrous and often red on the back, with densely ciliate margins and a cup-shaped 2—3-toothed apex. *Sessile spikelets* reaching $\frac{1}{3}$ in. long; callus glabrous. Glumes 4; lower invol.-

glume $\frac{1}{8}$ in. long, linear-lanceolate, acuminate, membranous, 2-cuspidate, the keels strong, running into the slender awns about $\frac{1}{30}$ in. long; upper invol.-glume as long as the lower, narrowly lanceolate, mucronate, coriaceous, 1-nerved; lower floral glume hardly $\frac{1}{8}$ in. long, linear-lanceolate, subacute, hyaline; upper floral glume $\frac{1}{10}$ in. long, narrowly linear, hyaline, cleft at the apex into 2 subulate lobes with an awn in the sinus between them; awn reaching $\frac{5}{8}$ in. long, geniculate about the middle; the lower half brown, the upper white. Anthers $\frac{1}{12}$ in. long. *Pedicellate spikelets* not awned; pedicels $\frac{1}{8}$ in. long with ciliate margins. Glumes 3; lower invol.-glume $\frac{1}{8}$ in. long, ovate-lanceolate, acuminate, 5-nerved. Fl. B. I. v. 7, p. 170; Woodr. in Journ. Bomb. Nat v. 13 (1901) p. 438. *Andropogon pachyarthrus*, Hack. Monogr. Andropog. in DC. Monogr. Phan. v. 6 (1889) p. 449.—Flowers: Dec. VERN. *Baerki; Gondval.*

There is an excellent drawing of this grass in *Icones Roxburghianæ* in Herb. Kew. No. 2020.

DECCAN: Khandesh, *Lisboa*. KANARA: Karwar, *Lisboa*. GUJARAT: Surat, *Dalzell!*, *Woodrow*.—DISTRIB. India (Nepal, Rajputana, Central Provinces, W. Peninsula).

3. **Andropogon foveolatus,** *Del. Descrip. de l' Egypte* (1812) p. 160, t. 8, fig. 2. Stems 1—2 ft. long, densely tufted, usually decumbent at the base, then geniculately ascending, very slender, glabrous; nodes bearded. Leaves 3—6 by $\frac{1}{20}$—$\frac{1}{10}$ in., linear, scaberulous beneath; sheaths shorter than the internodes, scabrous or glabrous, the basal sheaths silky-villous; ligule short, truncate, hyaline, ciliate. Racemes 1—1½ in. long, solitary; peduncles capillary, erect, usually far exserted beyond the slender spathe; joints and pedicels slender, ciliate on 2 opposite sides with long silky hairs, shorter than the sessile spikelets. Spikelets $\frac{1}{8}$ in. long (the sessile and pedicellate equal), oblong-lanceolate, glabrous, purplish; callus small, shortly hairy at the base; lower invol.-glume $\frac{1}{8}$ in. long, flat, lanceolate-oblong, subobtuse, with narrowly involute margins, 4-nerved, usually marked with a deep pit above the middle; upper invol.-glume equal to the lower, lanceolate, acute, obscurely 3-nerved; lower floral glume much shorter, oblong-lanceolate, glabrous, nerveless; upper floral glume reduced to an awn ½—$\frac{5}{8}$ in. long, the column about equalling the subulate portion. Anthers $\frac{1}{10}$ in. long. *Pedicellate spikelets*: pedicels $\frac{1}{10}$ in. long. Glumes 2; lower invol.-glume $\frac{1}{8}$ in. long, lanceolate, acute, with slightly incurved margins, the keels above aculeately scabrid, 5-nerved, pitted or not; upper invol.-glume equalling the lower, linear-lanceolate, acute, 3-nerved. Fl. B. I. v. 7, p. 168; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1201.—Flowers: Oct. VERN. *Ghandel.*

DECCAN: Poona, *Cooke!*, *Woodrow*, *Jacquemont*, 454!; Khandesh, *Lisboa*.—DISTRIB. Throughout the drier parts of India; westwards to the Cape Verd Islands.

4. **Andropogon compressus,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 172. A tall grass reaching 3—4 ft. high; stem as thick as a goose-quill at the base, erect, sparingly branched, leafy; nodes glabrous. Leaves 12—18 by ¼—$\frac{3}{8}$ in., linear, finely acuminate, flat,

slightly scaberulous on both surfaces and on the margins, more or less hairy towards the base ; sheaths strongly compressed and acutely keeled ; ligule a glabrous membrane $\frac{1}{10}$ in. long. Panicles 4—5 in. long, of many subcorymbosely arranged pale flexuous silky racemes 1—2 in. long ; joint $\frac{1}{10}$ in. long, slender, with a central translucent line, ciliate on 2 opposite sides with long silky hairs. *Sessile spikelets* $\frac{1}{4}$ in. long, ovate-lanceolate ; callus bearded with long hairs ; lower invol.-glume ovate-lanceolate, $\frac{1}{3}$ in. long, villous on the back below the middle, truncate or notched at the apex, with narrowly incurved margins and a hyaline tip, 5—7-nerved, not pitted ; upper invol.-glume ovate, acute, mucronulate, as long as the lower ; lower floral glume $\frac{1}{3}$ in. long, linear-lanceolate, obtuse, hyaline, nerveless ; upper floral glume represented by an awn reaching $\frac{2}{3}$ in. long, inconspicuously margined for $\frac{1}{10}$ in. at the base. *Pedicellate spikelets* : pedicels $\frac{1}{3}$ in. long, ciliate on 2 opposite sides with long silky hairs, very slender and with a central translucent line ; lower invol.-glume 9—11-nerved ; upper invol.-glume 3-nerved ; lower floral glume oblong, obtuse, ciliolate, hyaline, nerveless. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers : Dec.

DECCAN : *Lisboa*, 6 (*A. odoratus*) ! ; Máwal, *Woodrow* ! ; Poona, *Woodrow*. DISTRIB. India, W. Peninsula, apparently endemic.

5. **Andropogon Woodrowii,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 173 (by misprint *Woodrovii*). A grass with a camphoraceous odor (*Woodrow*) ; rootstock woody ; stems tufted, 3—4 ft. long, erect, compressed, thicker than a goose-quill at the base, obtusely 2-edged, solid, stiff, branched above ; nodes glabrous. Leaves 12—24 by $\frac{1}{3}$—$\frac{1}{2}$ in., rigid, scaberulous on both surfaces and the margins ; sheaths loose, keeled, quite smooth ; ligule $\frac{1}{10}$ in. long, membranous, truncate, ciliate. Racemes 3—5, pale, $\frac{1}{2}$—1 in. long, on slender, stiff, smooth proper peduncles $\frac{1}{3}$—$\frac{1}{2}$ in. long, erect, silky ; joints of the rhachis and the pedicels linear, with silky margins and a translucent centre, the hairs at the top $\frac{1}{2}$ as long as the spikelet. *Sessile spikelets* $\frac{1}{3}$ in. long, oblong-lanceolate ; callus $\frac{1}{10}$ in. long, bearded ; lower invol.-glume coriaceous, not pitted, ovate-oblong, truncate and hyaline-tipped at the apex, many-nerved, margins narrowly incurved, keels ciliolate ; upper invol.-glume chartaceous, 3-nerved, oblong, subobtuse, as long as the lower ; lower floral glume $\frac{1}{3}$ in. long, ovate-oblong, obtuse, hyaline, nerveless ; upper floral glume reduced to an awn $\frac{2}{3}$ in. long with a hyaline flattened base $\frac{1}{10}$ in. long. *Pedicellate spikelets* rather narrower than the sessile ; lower invol.-glume glabrous on the back ; upper invol.-glume narrow, linear, acute ; awn 0. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers : Dec.

DECCAN : Khorbasa (Máwal districts), *Woodrow* ; Paud, 20 miles west of Poona, *Woodrow* !—DISTRIB. India (W. Peninsula), apparently endemic.

6. **Andropogon pertusus,** *Willd. Sp. Pl.* v. 4 (1805) p. 922. Stem 1—2 ft. long, erect or geniculately ascending, leafy upwards, simple or sparingly branched ; nodes bearded with spreading hairs. Leaves up to 1 ft. by $\frac{1}{3}$—$\frac{1}{2}$ in., narrowly linear, acute or acuminate, the lower often short and crowded at the base of the stem, glabrous

or pubescent, or sometimes sparingly pilose, margins scabrid, base narrow, rounded ; sheaths terete or slightly compressed, shorter than the internodes ; ligule $\frac{1}{10}$ in. long, membranous, truncate, ciliate. Racemes 3—8, digitately fasciculate, 1—2 in. long, slender, silky, suberect, flexuous, on short usually glabrous peduncles which are often bearded in the axils ; rhachis very slender ; joints and pedicels $\frac{1}{10}$ in. long, densely ciliate with long silky hairs, the central translucent band very narrow. *Sessile spikelets* $\frac{1}{8}$ in. long, oblong-lanceolate, acuminate by the projection of the point of the upper invol.-glume ; callus bearded ; lower invol.-glume elliptic-oblong, obtuse or truncate, sometimes slightly emarginate, with a deep pit above the middle (sometimes 2 pits when one is above, the other at or about the middle), subchartaceous, more or less hairy below the middle, 5—9-nerved, margins narrowly incurved, spinulosely ciliate ; upper invol.-glume lanceolate, acuminate, finely pointed at the tip, the point slightly projecting beyond the lower glume, 3—5-nerved, membranous, glabrous ; lower floral glume $\frac{1}{10}$ in. long, linear-oblong, obtuse, nerveless, glabrous ; upper floral glume reduced to a slender awn reaching nearly $\frac{3}{4}$ in. long, geniculate about the middle, the lower half brown, the upper yellowish-white, with a narrow linear hyaline flattened base $\frac{1}{12}$ in. long which represents the glume ; palea 0. *Pedicellate spikelets* like the sessile but narrower, not awned ; lower invol.-glume acute, very rarely pitted, 7—13-nerved, ciliate ; upper invol.-glume ovate-lanceolate, acute, 5-nerved, with incurved margins ; lower floral glume linear-oblong, obtuse, hyaline, glabrous. Fl. B. I. v. 7, p. 173 ; Trim. Fl. Ceyl. v. 5, p. 230 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438 ; Prain, Beng. Pl. p. 1201 ; Watt, Dict. Econ. Prod. v. 1, p. 249.—Flowers : Sept. Lisboa (Journ. Bomb. Nat. v. 6 (1901) p. 202) says that the inflorescence of the grass is scented.

DECCAN : Poona, *Cooke* ! ; Lanoli, *Woodrow* ; Sattara, *Lisboa* ; Sholapur, *Lisboa*. KANARA : *Lisboa*.—DISTRIB. More or less throughout India in the drier parts ; Ceylon, Tropical Asia, Africa and Australia, Sicily.

7. **Andropogon Kuntzeanus,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 478. A tall grass 3—5 ft. high ; stems ascending, as thick as a goose-quill below, with 2—3 slender flowering branches above, terete, small ; nodes densely bearded. Leaves narrowly linear, 12 by $\frac{1}{8}$—$\frac{1}{3}$ in., glabrous, glaucous, smooth, with scaberulous margins, the upper cauline leaves short, rigid. Racemes 12—15, corymbosely fasciculate, slender, silky, purplish ; proper peduncles $\frac{1}{4}$—$\frac{1}{3}$ in. long, slender, glabrous ; joints and pedicels $\frac{1}{10}$ in. long, with a translucent centre, slender, densely ciliate with very long erect hairs. *Sessile spikelets* $\frac{1}{5}$ in. long, linear-lanceolate ; callus sparsely bearded at the base with very long hairs ; lower invol.-glume ovate-lanceolate, thin, glabrous, usually pitted, 7—9-nerved, 2-toothed at the apex, the teeth about $\frac{1}{20}$ in. long ; upper invol.-glume as long as the lower, lanceolate, acuminate, mucronate, ciliate ; lower floral glume $\frac{1}{5}$ in. long, linear-lanceolate, glabrous, hyaline ; awn $\frac{5}{8}$ in. long, the basal slightly flattened portion $\frac{1}{10}$ in. long. *Pedicellate spikelets* narrower than the sessile, male ; lower invol.-glume

9—11-nerved, tip entire ; upper invol.-glume 5-nerved, conspicuously ciliate ; lower floral glume linear-oblong, hyaline, ciliate ; upper floral glume small, narrowly linear or 0. Fl. B. I. v. 7, p. 175 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers : Oct.

KONKAN : *Stocks* ! DECCAN : *Woodrow*, 153 ! ; Máwal, *Woodrow*.—DISTRIB. India (Central Provinces, W. Peninsula).

8. **Andropogon ensiformis,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 175. Stems 2 ft. and upwards, densely tufted, stout, compressed, clothed with equitant leaf-sheaths ; nodes glabrous. Leaves 8—10 by ⅛—½ in., erect, strict, rigid, linear-lanceolate, acuminate, strongly nerved, glabrous or sparsely hairy, tips acicular, margins and both surfaces scaberulous ; sheaths smooth, compressed, the lower equitant ; ligule short, scarious. Racemes ½—⅝ in. long, in an erect narrow thyrsus 3 in. long, pale purplish ; proper peduncles ⅛—¼ in. long ; joints and pedicels $\frac{1}{16}$ in. long, very slender, flat, with a translucent channel, ciliate with long erect hairs. *Sessile spikelets* ⅛ in. long, oblong-lanceolate, acute ; callus small, densely bearded with hairs nearly ½ as long as the spikelet ; lower invol.-glume ⅛ in. long, ovate-oblong, flat, truncate, often emarginate, shining, 5—7-nerved, not pitted, very sparsely silky-hairy below the middle, margins very narrowly incurved, keels slender ; upper invol.-glume reaching ⅛ in. long, ovate-oblong, acute, finely mucronate, slightly exceeding the lower, 3-nerved ; lower floral glume less than ⅛ in. long, linear-oblong, acute, hyaline ; upper floral glume reduced to an awn reaching ⅞ in. long, the flattened slightly dilated base $\frac{1}{16}$ in. long representing the glume. *Pedicellate spikelets* as long as the sessile, oblong-lanceolate ; lower invol.-glume many-nerved ; upper invol.-glume 5-nerved ; lower floral glume as long as the sessile ; upper floral glume 0. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers : Sept.

Dalzell without locality in Herb. Kew. ! DECCAN : Lanoli, *Woodrow*.—DISTRIB. India (W. Peninsula), apparently endemic.

9. **Andropogon concanensis,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 174. Perennial ; stems many from a nodose rootstock, 20—24 in. high, firm, smooth, terete, leafy ; nodes glabrous. Leaves 8—10 by $\frac{1}{12}$—⅛ in., linear, finely acuminate, smooth on both surfaces ; sheaths smooth, terete ; ligule short, membranous, truncate, glabrous. Racemes 5—8, loosely fasciculate, 2—2¾ in. long, slender, flexuous, pale ; rhachis and proper peduncles filiform, glabrous, the latter ½—¾ in. long, with slightly bearded axils ; joints and pedicels $\frac{1}{12}$ in. long, compressed, hardly grooved and not translucent in the centre, the sides not thickened, ciliate with long silky hairs. *Sessile spikelets* less than ⅛ in. long, ovate-lanceolate, narrowly truncate ; callus bearded ; lower invol.-glume membranous, with incurved margins, glabrous, not pitted on the back, keels ciliate with short bristles, 7—9-nerved ; upper invol.-glume as long as the lower, lanceolate, acuminate, ending in a fine point which just appears above the tip of the lower glume, faintly 3-nerved ; lower floral glume much shorter than the others, oblong, obtuse, nerveless ; upper floral glume a capillary yellowish awn reaching ¾ in. long with a slightly dilated

base $\frac{1}{10}$ in. long. *Pedicellate spikelets* narrower than the sessile; lower invol.-glume 9-nerved; upper invol.- and lower floral glume as in the sessile spikelets; upper floral glume small, oblong, often unequally 2-fid, ciliate, nerveless. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Oct.

KONKAN: Matheran, *Woodrow*!

10. **Andropogon intermedius,** *Br. Prodr.* (1810) p. 202. Perennial; stem 2—4 ft. high or more, stout, erect or geniculately ascending, slightly flattened on one side, simple or sparingly branched, leafy upwards; nodes usually hairy. Leaves 6—18 by $\frac{1}{8}$—$\frac{1}{3}$ in., narrowly linear, glaucous, finely acuminate with capillary tip, subcoriaceous, glabrous or ciliate towards the base; sheaths terete, glabrous; ligule a narrow truncate membrane $\frac{1}{30}$ in. long, ciliate or not. Panicle 3—6 in. long, erect, pyramidal, thyrsiform or subcorymbose; rhachis glabrous; branches $\frac{1}{2}$—$1\frac{1}{2}$ in. long; racemes slender, fragile, pale-green or purplish, with a capillary rhachis; joints of the rhachis shorter than the spikelets with a translucent centre, ciliate. *Sessile spikelets* $\frac{1}{8}$—$\frac{1}{6}$ in. long; callus very short, bearded; lower invol.-glume thin, oblong, obtuse or truncate, 4—9-nerved, margins narrowly incurved, rigidly ciliate above the middle, not pitted; upper invol.-glume as long as the lower, oblong-lanceolate, acute, faintly 3-nerved, smooth; lower floral glume much shorter, oblong, obtuse, nerveless; upper floral glume represented by the hyaline slightly flattened base of the awn; palea 0; awn reaching $\frac{5}{8}$ in. long. *Pedicellate spikelets* linear-oblong or lanceolate, narrower than the sessile; pedicel $\frac{1}{10}$ in. long with a translucent centre, usually ciliate. Fl. B. I. v. 7, p. 175; Trim. Fl. Ceyl. v. 5, p. 230; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1201.—Flowers: Dec.

DECCAN: Poona, *Woodrow*; Máwal, *Woodrow*.—DISTRIB. More or less throughout India; Ceylon, China, Malaya, Pacific Islands, Africa.

11. **Andropogon odoratus,** *Dna. Lisboa, in Journ. Bomb. Nat.* v. 4 (1889) p. 123. Aromatic; stem erect, 3—4 ft. high, as thick as a swan's quill at the base, sometimes branching below, leafy; nodes bearded. Leaves 12—24 by $\frac{1}{8}$—$\frac{3}{8}$ in., linear-lanceolate, flat, acuminate, scaberulous on both surfaces and on the margins, bright green, with strong nerves; sheaths long, glabrous, smooth, compressed, the upper sheathing the base of the inflorescence; ligule small, membranous, truncate. Racemes numerous, purplish, silky, suberect, slender, flexuous, densely fascicled, pedicellate, crowded at the end of a long peduncle and forming a dense panicle 2—4 in. long; joints and pedicels flattened, with a translucent centre, silky-hairy, the joints $\frac{1}{16}$ in. long, the pedicels rather longer. *Sessile spikelets* purplish, $\frac{1}{8}$ in. long, oblong-lanceolate, acute; callus small, bearded with silky hairs; lower invol.-glume thin, oblong-lanceolate, truncate, 7-nerved, softly hairy below the middle, rarely pitted; upper invol.-glume very little longer than the lower and broader, thinly membranous, keeled; lower floral glume hyaline, oblong-lanceolate, shorter than the upper invol.-glume, nerveless; awn $\frac{1}{2}$—$\frac{5}{8}$ in. long,

slightly dilated towards the base. *Pedicellate spikelets* as long as or slightly longer than the sessile; lower invol.-glume narrow, many-nerved, dorsally glabrous; upper invol.-glume 3-nerved, ciliate; lower floral glume shorter, oblong, obtuse, nerveless. The compressed sheaths, panicled racemes, villous lower invol.-glume of the sessile spikelets, and aroma seem to distinguish this from *Andropogon Kuntzeanus*, which it strongly resembles in a dry state (*Hooker*). Fl. B. I. v. 7, p. 177; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Oct. VERN. *Gavat-vedi.*

KONKAN: Khardi (Thána districts), *Mrs. Lisboa.* DECCAN: Lanoli, *Mrs. Lisboa*; Máwal (Poona districts), *Woodrow*; Khandesh, *Lisboa.*—DISTRIB. India (W. Peninsula), apparently endemic.

12. **Andropogon assimilis,** *Steud. in Zoll. Syst. Verz.* (1854) p. 58; *Syn. Gram.* (1855) p. 397. Suffruticose, fastigiately branched from a decumbent base; stems 1—2 ft. long, hard, smooth and polished, as thick as a goose-quill at the base, often proliferously branched; nodes glabrous or rarely bearded. Leaves 3—8 by $\frac{1}{16}$—$\frac{1}{4}$ in., linear-lanceolate, finely acuminate, glabrous or nearly so, with a strong white midnerve; sheaths usually glabrous, except at the mouth which is sometimes bearded, the upper sheaths appressed, the lower open, often divaricate; ligule short, membranous, ciliate. Inflorescence in lax panicles; branches slender, almost capillary, with long hairs in the axils. Spikelets few, rather distant, pale-green; joints $\frac{1}{16}$ in. long, with a translucent centre, sparsely ciliate. *Sessile spikelets* $\frac{1}{16}$ in. long, ovoid-oblong; callus small, shortly bearded; lower invol.-glume $\frac{1}{16}$ in. long, ovate-oblong, shortly truncate, obscurely 4—6-nerved, ciliate chiefly in the upper half, not pitted; upper invol.-glume as long as the lower, lanceolate, acute; lower floral glume shorter, linear, obtuse; upper floral glume reduced to the scarcely flattened base of the awn; awn $\frac{3}{8}$—$\frac{1}{2}$ in. long, the lower half brown, the upper yellowish-white. *Pedicellate spikelets* $\frac{1}{8}$ in. long, not awned; pedicels $\frac{1}{16}$ in. long, sparsely ciliate; lower invol.-glume lanceolate, acute, the margins incurved and the keels ciliate in the upper part, 5—7-nerved; upper invol.-glume slightly shorter, lanceolate, 3-nerved; lower floral glume obovate-oblong, ciliate at the apex, hyaline; upper floral glume 0. Anthers $\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 179; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438; Prain, Beng. Pl. p. 1201. *Andropogon montanus,* Benth. Fl. Hongk. (1861) p. 423 (*not* of Roxb.); Hack. Monog. Androp. in DC. Monog. Phan. v. 6 (1889) p. 490; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Dec.

DECCAN: Suvasni Ghát, *Woodrow*, 29! S. M. COUNTRY: Belgaum, *Ritchie*!—DISTRIB. India (Temperate Himalaya, Khasia, Behar, N. Bengal, W. Peninsula); Java, China, Japan.

13. **Andropogon Hugelii,** *Hack. Monog. Androp. in DC. Monog. Phan.* v. 6 (1889) p. 492. Stem often suffrutescent below, frequently red, branching from the base, the branches 2½—3½ ft. long; nodes bearded. Leaves 4—8 by $\frac{3}{8}$—½ in., linear-lanceolate, acuminate, flat, flaccid, green, narrowed to the base, the margins scaberulous or sometimes ciliate; sheaths bearded at the mouth, otherwise glabrous;

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ligule membranous, ciliate. Panicle 2—3½ in. long; branches capillary with bearded axils; joints and pedicels ciliate. *Sessile spikelets* ⅛ in. long, pale-green or purplish; callus densely villous; lower invol.-glume chartaceous, ovate, truncate, villous below the middle or glabrous, margins narrowly incurved, the keels ciliate with long hairs; upper invol.-glume as long as the lower, glabrous, narrowly truncate, shortly apiculate; lower floral glume $\frac{1}{16}$ in. long, hyaline, ovate, obtuse, glabrous; upper floral glume represented by the slender white not dilated base of the awn; awn reaching nearly 1 in. long. *Pedicellate spikelets* ⅛ in. long, lanceolate, green or purple; lower invol.-glume subacute, 9—11-nerved, pubescent up the back and with ciliate keels; upper invol.-glume as long as the lower, acuminate, the keels minutely ciliate; lower floral glume oblong, obtuse, hyaline, nearly as long as the upper invol.-glume, nerveless; upper floral glume narrowly linear or 0. Fl. B. I. v. 7, p. 180; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Sept.

DECCAN: Poona, *Woodrow*. S. M. COUNTRY: Belgaum, *Woodrow*.—DISTRIB. India (Central Provinces, Central India, W. Peninsula).

14. **Andropogon filiculmis,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 181. Stems 2—3 ft. long, decumbent and interlaced, copiously geniculately branched, weak, filiform, quite glabrous; internodes long; nodes bearded. Leaves 2—4 by ⅛—$\frac{1}{16}$ in., linear-lanceolate, finely acuminate with a filiform tip, glabrous above, glabrous or sparsely hairy beneath, flaccid, suddenly narrowed at the base, pale green, the midrib and nerves slender; sheaths bearded at the very tip, otherwise glabrous, the lower sheaths open below; ligule membranous, ciliate. Panicles 1—2 in. long; branches few, filiform. Spikelets 2 or 3, pale-green or white; pedicels of upper spikelets ciliate with long hairs. *Sessile spikelets* ⅛ in. long, oblong-lanceolate; callus densely villous; lower invol.-glume oblong-lanceolate, obtuse, membranous, 5—7-nerved, villous below the middle or all over, the keels ciliate; upper invol.-glume thinly membranous, lanceolate, acute, shortly mucronate, 3-nerved, glabrous; lower floral glume small, ovate, obtuse, nerveless, hyaline; upper floral glume represented by an awn ½—⅝ in. long, the lower half dark brown, the upper half yellowish-white, the base not dilated, white for about $\frac{1}{12}$ in. *Pedicellate spikelets* as long as the sessile but narrower; lower invol.-glume ovate-lanceolate, acute, 7—9-nerved, ciliate; upper invol.-glume lanceolate, strongly 5-nerved; lower floral glume broadly oblong, obtuse, hyaline, nerveless, as long as the invol.-glumes; upper floral glume 0. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Nov.—Dec.

DECCAN: Poona, *Jacquemont*, 310!; Dhonshi (Máwal districts), *Woodrow*, 26! and 116! KANARA: Sirsi, *Woodrow*.—DISTRIB. India (W. Peninsula), apparently endemic.

15. **Andropogon halepensis,** *Brot. Fl. Lusit.* v. 1 (1804) p. 89. Perennial; stems erect, tall, up to 15 ft. high, stout, simple or sparingly branched, glabrous, leafy; nodes minutely silky. Leaves 1—2 ft. by ¼—2 in., linear-lanceolate, tapering to a fine point, glabrous, smooth, margins scabridly serrulate, midrib stout, base

narrowed or sometimes rounded ; sheaths glabrous, striate ; ligule short, membranous, ciliate. Panicle 6—18 in. long, decompound ; rhachis nearly smooth ; branches mostly alternate, suberect, filiform, the lower branches up to 8 in. long or more, the axils often bearded ; racemes ½—1 in. long, oblong ; joints 3—7, more than ½ as long as the sessile spikelets, more or less ciliate ; pedicels similar. *Sessile spikelets* ⅛—¼ in. long, ovoid-lanceolate, dorsally compressed, green or purplish ; callus small, shortly bearded. Glumes 4 ; lower invol.-glume subchartaceous, ovate, acute, convex, more or less silky-hairy, 5—13-nerved, with involute margins ; upper invol.-glume as long as the lower, lanceolate, acuminate, chartaceous, shining, 5—7-nerved ; lower floral glume almost as long as the upper invol.-glume, elliptic-oblong, obtuse, hyaline, ciliate ; upper floral glume $\frac{1}{12}$ in. long, oblong, 2-lobed, hyaline, ciliate ; awn ½ in. long, sometimes reduced to a bristle or suppressed. *Pedicellate spikelets* about as long as the sessile but much narrower, not awned, male or barren ; lower invol.-glume herbaceous, 5—9-nerved, glabrous, the keels ciliate ; upper invol.-glume similar, 3—5-nerved ; lower floral glume as in the sessile spikelets ; upper floral glume linear-oblong, hyaline. Fl. B. I. v. 7, p. 182 ; Trim. Fl. Ceyl. v. 5, p. 231 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438 ; Prain, Beng. Pl. p. 1201. *Sorghum halepense*, Pers. Syn. v. 1 (1805) p. 101 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 280.—Flowers : Dec. VERN. *Boru*.

KONKAN : *Woodrow* ; Bassein, *Lisboa*. DECCAN : *Lisboa* ; Poona, *Woodrow* ; Dangs, *Woodrow*. GUJARAT : *Lisboa*.—DISTRIB. Throughout India ; Ceylon, most warm countries.

16. **Andropogon purpureo-sericeus,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* v. 2 (1851) p. 469. Annual, robust ; stem 3—4 ft. high, erect, stout or slender, smooth and polished, glabrous ; nodes villous. Leaves 8—10 by ¼—⅓ in., linear, finely acuminate, sparingly appressedly hairy on both sides, the margins scabrous ; sheaths sub-compressed, glabrous except the villous mouth ; ligule very short, ciliate. Panicle 4—8 in. long, erect ; rhachis glabrous ; branches filiform, subflexuous, ½—1 in. long, often bulbously swollen at their articulation with the rhachis ; racemes 1—1½ in. long, rarely of 3 joints, sometimes of 1 sessile and 2 pedicellate spikelets ; joints about ½ as long as the sessile spikelets. *Sessile spikelets* reaching ¼ in. long, densely villous with red or white hairs ; callus small, densely villous. Glumes 4 ; lower invol.-glume ovate, acuminate, concave, coriaceous or cartilaginous, 7-nerved, with the margins involute from the base to the tip, clothed with long red or white hairs ; upper invol.-glume as long as or rather longer than the lower, oblong-lanceolate, coriaceous, concave, acuminate or aristulate, 5-nerved, the back clothed in the upper part with long hairs, the margins narrowly infolded ; lower floral glume as long, membranous, densely ciliate, oblong-lanceolate, glabrous on the back ; upper floral glume very fragile, $\frac{1}{10}$ in. long, hyaline, 2-lobed, ciliate ; awn reaching 1½ in. long, the column dark brown, twisted, and ciliate with short erect hairs. *Pedicellate spikelets* equalling the sessile but paler and narrower ; lower invol.-glume linear-lanceolate, acute, 5—9-nerved,

shortly silky ; upper invol.- and lower floral glumes as in the sessile spikelets ; upper floral glume a little shorter, lanceolate, acuminate, hyaline, ciliate. Fl. B. I. v. 7, p. 185 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers : Nov.

DECCAN : *Woodrow*, 129! ; *Lisboa* ; Kolhapur, *Woodrow*. S. M. COUNTRY : Belgaum, *Ritchie*, 887! KANARA : N. Kanara, *Woodrow*, 40!—DISTRIB. India (Central Provinces, W. Peninsula) ; Abyssinia.

17. **Andropogon aciculatus,** *Retz. Obs.* fasc. 5 (1789) p. 22. Rootstock woody, creeping ; stems erect or ascending, 1—2 ft. long, slender, leafy chiefly at the base ; lower internodes very short, the upper elongate ; nodes glabrous. Leaves densely tufted, 1—5 by $\frac{1}{8}$—$\frac{1}{5}$ in., linear, obtuse or subacute, flat or with undulate margins, glaucous, usually glabrous, the margins more or less distantly spinulose ; sheaths not auricled, the lower short, the upper elongate with a more or less hairy mouth ; ligule a very short membrane. Panicles 1—3 in. long, narrowly oblong, pale green or purplish ; rhachis strict, filiform ; branches short, spreading, at length erect, capillary, bearing few spikelets. *Sessile spikelets* $\frac{1}{8}$ in. long, dorsally compressed ; callus elongate, decurrent on the peduncle and with it laterally fulvously bearded. Glumes 4 ; lower invol.-glume chartaceous, narrowed from a broad base to the usually bimucronulate tip, dorsally convex, glabrous on the back, the keels ciliate with short stiff erect hairs, obscurely 2—3-nerved ; upper invol.-glume as long, lanceolate, acuminate or aristulate, 1-nerved, the keel setosely ciliate ; lower floral glume shorter, linear-oblong, obtuse, 2-nerved ; upper floral glume narrow, hyaline, ciliate ; awn terminal, about $\frac{1}{5}$ in. long, not twisted. *Pedicellate spikelets* reaching $\frac{1}{5}$ in. long, lanceolate, cuspidately acuminate, purplish ; pedicels nearly as long as the sessile spikelets, flattened, glabrous except for a small tuft of hairs at the base ; lower invol.-glume thin, lanceolate, acuminate, 3-nerved ; upper invol.-glume a little shorter, acuminate, 3-nerved, ciliate ; lower floral glume hyaline, oblong, acuminate, shorter than the invol.-glumes, nerveless ; upper floral glume smaller, broader, 3-nerved, ciliate. Anthers $\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 188 ; Grah. Cat. p. 238 ; Dalz. & Gibs. p. 303 ; Trim. Fl. Ceyl. v. 5, p. 234 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438 ; Prain, Beng. Pl. p. 1202 ; Watt, Dict, Econ. Prod. v. 1, p. 242.—Flowers : Oct.

KANARA : Karwar, *Woodrow*.—DISTRIB. More or less throughout India; Ceylon, Australia, Polynesia, Tropical Asia.

18. **Andropogon lancearius,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 190. Stem 2—3 ft. high or more, leafy upwards ; nodes glabrous. Leaves 12—14 by $\frac{1}{3}$—$\frac{1}{2}$ in., lanceolate, acuminate, narrowed from below the middle to the base, smooth on both surfaces, flat, midrib broad, white above, margins minutely spinulose ; sheaths keeled, quite glabrous ; ligule a row of fine short hairs. Panicle 6 in. long, narrow, of many whorls of simple smooth erect branches bearing solitary erect racemes. *Sessile spikelets* $\frac{1}{4}$ in. long ; callus about $\frac{1}{16}$ in. long, glabrous in front. Glumes 4 ; lower invol.-glume nearly $\frac{1}{4}$ in. long, oblong, chartaceous, truncate or notched, obscurely 5-nerved ; upper invol.-glume $\frac{1}{8}$ in. long, oblong, chartaceous, shortly

ciliate on the keels, otherwise glabrous, cleft at the apex into 2 acute lobes ; lower floral glume $\frac{1}{8}$ in. long, linear-oblong, obtuse, hyaline ; upper floral glume $\frac{1}{10}$ in. long, linear, hyaline ; awn $1\frac{5}{8}$ in. long, the column much twisted and densely hairy with reddish-brown hairs. *Pedicellate spikelets* nearly $\frac{1}{3}$ in. long (not including the awn), lanceolate, acute, awned ; pedicels nearly white, $\frac{1}{8}$ in. long, flattened, ciliate with long reddish-brown hairs. Lower invol.-glume lanceolate, acute, 2-toothed at the tip, with an awn about $\frac{1}{10}$ in. long between the acicular teeth, 7-nerved, membranous, glabrous ; upper invol.-glume as long as the lower, lanceolate, acuminate, membranous, 5-nerved ; lower floral glume shorter, linear-oblong, obtuse, ciliate, hyaline ; upper floral glume hyaline. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438 ; Prain, Beng. Pl. p. 1202.—Flowers : Oct.

S. M. COUNTRY : Castlerock, *Woodrow*.—DISTRIB. India (Sikkim Himalaya, Behar, Chota Nagpur, W. Peninsula).

This is included on the authority of Woodrow. I have seen no specimens from the Bombay Presidency ; there are none in Herb. Kew.

19. **Andropogon Monticola,** *Schult. Mant.* (1824) p. 665. Perennial ; stems densely tufted, 1—4 ft. high, usually slender, erect, simple or branched, leafy chiefly at the base ; nodes glabrous. Leaves 2—18 by $\frac{1}{8}$—$\frac{1}{4}$ in., erect, linear, acute, flat, rigid, glaucous, smooth or scaberulous ; sheaths, the upper terete, the lower compressed ; ligule a very short ciliate membrane. Panicle 2—5 in. long, ovate or oblong ; rhachis slender, smooth or scaberulous ; branches 1—2 in. long, whorled, capillary, spreading, at length erect ; racemes reduced to a single sessile female and 2 pedicellate spikelets. *Sessile spikelets* $\frac{1}{4}$ in. long ; callus about $\frac{1}{30}$ in. long, bearded on one side with rufous hairs. Glumes 4 ; lower invol.-glume $\frac{1}{3}$ in. long, linear, complicate, 2-toothed at the apex, chartaceous, 4-nerved, more or less scaberulous ; upper invol.-glume $\frac{1}{4}$ in. long, ovate-lanceolate, concave, much broader than the lower, ciliate on the keel with rufous hairs, very shortly toothed at the apex, with an awn $\frac{1}{3}$ in. long and with broadly hyaline margins, 3-nerved ; lower floral glume oblong, obtuse, ciliate ; upper floral glume narrowly linear, hyaline ; awn $\frac{3}{4}$ in. long. *Pedicellate spikelets* as long as the sessile ; pedicels $\frac{1}{12}$ in. long, ciliate with rufous hairs, flattened ; lower invol.-glume lanceolate, acute or awned, 7-nerved, scaberulous ; upper invol.-glume lanceolate, acuminate, or very shortly awned ; floral glumes smaller, oblong, hyaline, ciliate. Fl. B. I. v. 7, p. 192 ; Trim. Fl. Ceyl. v. 5, p. 236 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438 ; Prain, Beng. Pl. p. 1202.—Flowers : Oct. VERN. *Agiva.*

Throughout the Presidency, *Lisboa.* DECCAN : Poona, *Woodrow* ; Khandala, *Woodrow* ; Kolhapur, *Woodrow*.—DISTRIB. More or less throughout India ; Ceylon, Afghanistan, S. Africa.

I have not seen any specimens from the Bombay Presidency and am therefore unable to fix definitely the variety to which the Bombay species belong. They will probably belong to VAR. *Trinii,* H. f.

20. **Andropogon Aucheri,** *Boiss. Diag.* ser. 1, fasc. 5 (1844) p. 77. Densely tufted ; stems 6—18 in. long, simple or sparingly branched, base thickened ; nodes glabrous. Leaves 2—4 by $\frac{1}{10}$—$\frac{1}{8}$ in.,

linear, acute or acuminate, more or less pubescent, sometimes undulate, pale green, often ciliate near the base with bulbous-based hairs; sheaths usually glabrous, very pale, with a few hairs at the mouth; ligule a hairy ridge. Panicle 2—3 in. long; branches in whorls of 4—6, spreading, then suberect; racemes usually crowded, rarely 2-nate on a branch. *Sessile spikelets* ¼ in. long; callus $\frac{1}{16}$ in. long, villous all over with long silky hairs; lower invol.-glume ⅓ in. long, linear, with 2 short acicular teeth at the apex, minutely ciliate on the margins, obscurely 5-nerved, chartaceous; upper invol.-glume as long as the lower, oblong, obtuse, 1-nerved, chartaceous, with hyaline margins, the keel ciliate above the middle with long silky hairs, and with a slender awn ½ in. long, the awn ciliate below the middle with long hairs; lower floral glume linear, obtuse, hyaline; upper floral glume represented by the dilated base of the awn; awn ⅞ in. long, base hyaline, dilated. *Pedicellate spikelets* slightly longer than the sessile, linear-lanceolate, acute; pedicels cuneate, silky-villous from base to apex, less than ½ as long as the sessile spikelets; lower invol.-glume lanceolate, acute, ¼ in. long, 7-nerved; upper invol.-glume lanceolate, acuminate, 3-nerved; lower floral glume shorter, hyaline, oblong, acute; upper floral glume lanceolate, acute, 1-nerved, hyaline. Anthers ⅛ in. long. Fl. B. I. v. 7, p. 195; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.

SIND: Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. Afghanistan, N. Africa.

21. **Andropogon Cookei,** *Stapf, ex Woodr. in Journ. Bomb. Nat.* v. 13 (1901) p. 438. A weak straggling much-branched annual; stems reaching 2 ft. long, very slender, smooth, quite glabrous; nodes glabrous. Leaves 3—6 by ⅛—¼ in., flaccid, finely pointed, sparsely clothed with bulbous-based hairs on both sides, scaberulous; sheaths glabrous; ligule hyaline, ovate, ciliolate. Racemes ½—¾ in. long, solitary on the apices of the stems and branches; joints between the 2 or 3 lowest nodes continuous, short, cylindric, glabrous, the others about $\frac{1}{15}$ in. long, disarticulating, subclavate, densely ciliate on one side with long silky hairs which equal or exceed the pedicels; lowest pedicels very short, glabrous, the others $\frac{1}{12}$ in. long, ciliate on one side with long silky hairs, dilated into an oblique sac-like mouth above, and produced into a projecting flat horn. Spikelets closely imbricate, straw-colored, scarious. *Sessile spikelets* 2-sexual (except the lowest which is very often neuter); lower invol.-glume ⅓ in. long, oblong or elliptic-oblong, acute, or shortly bifid, or sub-lacerate at the apex, the margins narrowly infolded, rigid, the keels deeply winged with subequal scarious wings about $\frac{1}{20}$ in. deep and more or less toothed on the margins, 7—9-nerved between the keels, the keel-nerves running into the points of the wings; upper invol.-glume shorter than the lower, oblong-lanceolate, obtuse, apiculate, 3-nerved, chartaceous, margins narrowly incurved, keels glabrous; lower floral glume ⅓ in. long, oblong, obtuse, hyaline, nerveless, glabrous; upper floral glume reduced to the white flattened lanceolate base of the awn; awn ¾ in. long, the column much twisted. *Pedicellate spikelets* longer than the sessile, obliquely lanceolate;

lower invol.-glume nearly ½ in. long, acute, unequally winged, many-nerved ; upper invol.-glume ⅛ by $\frac{1}{12}$ in., lanceolate, acute, 5-nerved, chartaceous ; lower floral glume ⅛ in. long, oblong, obtuse, hyaline ; upper floral glume $\frac{1}{16}$ in. long, oblong, obtuse, hyaline. Anthers $\frac{1}{16}$ in. long. Grain ⅛ in. long, oblong, compressed. The plant does not agree with Hackel's subgenus *Dichanthium* very satisfactorily, but it is the only subgenus into which it will fit at all.

DECCAN : Sakar-pathár hill near Lanoli, *Woodrow* !

22. **Andropogon armatus,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 197. Annual, erect ; stems 12—18 in. long, tufted, slender, simple or branched above, glabrous and shining ; nodes bearded. Leaves 4—6 by ⅛—¼ in., linear, copiously hairy on both surfaces and with long bulbous-based hairs at the base ; sheaths lax, glabrous except on the upper margins where they are more or less ciliate, the upper sheaths pale spathiform ; ligule 0. Racemes ½—1½ in. long, subdigitate, 2—5, flexuous ; lowest pair of spikelets male ; peduncles ⅛—⅓ in. long, capillary, with whorls of long white hairs in their axils ; joints and pedicels slender, not grooved, terete, ciliate with silky hairs. Spikelets 10—20 pairs. *Sessile spikelets* ⅛ in. long ; callus very short, bearded, with silky hairs ; lower invol.-glume thin, pale, nerveless, silky below the middle, often with a deep dorsal pit, margins narrowly incurved, keels ciliate ; upper invol.-glume ovate, acute, nerveless, subchartaceous, silky-villous on the back ; lower floral glume oblong or linear, obtuse, flat, hyaline, nerveless ; upper floral glume represented by a slender awn 1 in. long with an acute base. *Pedicellate spikelets* equalling the sessile but rather narrower ; lower invol.-glume armed with spreading submarginal bulbous-based bristles often ¼ in. long or more, slightly convex, quite smooth between the bristles, many-nerved, keels ciliate ; upper invol.-glume lanceolate, acute, 3-nerved, ciliate ; lower floral glume oblong, obtuse, eciliate ; upper floral glume very narrow. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.

KONKAN : *Stocks* !—DISTRIB. India (W. Peninsula).

23. **Andropogon caricosus,** *Linn. Sp. Pl.* ed. 2 (1763) p. 1480. Stems erect or ascending from a creeping base, forming tufts at the rooting nodes, 1—2 ft. high, stout or slender, grooved on one side, leafy ; nodes usually glabrous, less frequently bearded. Leaves 6—8 by $\frac{1}{16}$—⅛ in., linear, finely acuminate, flat, glabrous, sometimes ciliate at the base, the margins scaberulous ; sheaths glabrous, compressed, the mouth not auricled ; ligule a narrow shortly ciliate membrane. Racemes 1—4 in. long, solitary, 2-nate or subdigitately paniculate, ⅛—¼ in. broad, pale green or silvery, the lower sometimes stipitate ; joints and pedicels about ⅓ as long as the sessile spikelets, ciliate on one margin. *Sessile spikelets* ⅛ in. long ; callus short, bearded ; lower invol.-glume ⅛ in. long, obovate, concave, ciliate at the rounded or truncate apex, 7—9-nerved, subchartaceous ; upper invol.-glume longer than the lower, ovate-lanceolate, acute, often apiculate, subchartaceous, ciliate, 3-nerved ; lower floral glume as long as the lower invol.-glume, ovate-oblong, subacute, hyaline, nerveless,

ciliate ; upper floral glume represented by the hyaline not dilated base of the awn ; awn $\frac{7}{8}$ in. long, the hyaline base about $\frac{1}{8}$ in. long. *Pedicellate spikelets* nearly as long as the sessile ; lower involucre-glume obovate, obtuse, with narrowly incurved margins and ciliate keels, many-nerved ; upper involucre-glume as in the sessile spikelet ; lower floral glume ovate-oblong, subacute, hyaline, ciliate ; upper floral glume nearly as long as the lower, linear-oblong, obtuse, hyaline. Anthers $\frac{1}{10}$ in. long. Fl. B. I. v. 7, p. 196 ; Trim. Fl. Ceyl. v. 5, p. 237 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438 ; Prain, Beng. Pl. p. 1202.—Flowers : Dec.

Dalzell without locality in Herb. Kew. DECCAN : Máwal (Poona districts), *Woodrow*. S. M. COUNTRY : Belgaum, *Ritchie*, 794 !—DISTRIB. India (Bengal, Birma, Central Provinces, W. Peninsula) ; Ceylon, Mauritius, China.

24. **Andropogon annulatus,** *Forsk. Fl. Ægypt.-Arab.* (1775) p. 173. Perennial, densely tufted ; stem erect or ascending, usually simple, 6—36 in. long ; nodes usually bearded. Leaves 3—12 by $\frac{1}{8}$—$\frac{1}{4}$ in., linear, finely acuminate, glaucous, glabrous or more or less sparsely hairy above with small bulbous-based hairs, the margins scabrid ; sheaths bearded at the tip ; ligule nearly $\frac{1}{8}$ in. long, oblong, obtuse, membranous, glabrous. Racemes 1—2½ in. long, subdigitately fascicled, pinkish or nearly white ; peduncles glabrous, $\frac{1}{8}$—$\frac{1}{2}$ in. long ; joints and pedicels $\frac{1}{2}$ as long as the spikelets, sparingly ciliate. *Sessile spikelets* about $\frac{1}{8}$ in. long, but variable in length, elliptic-oblong, closely imbricating ; callus thick, shortly bearded at the base ; lower involucre-glume elliptic-oblong, obtuse, ciliolate at the rounded or truncate apex, thin, margins narrowly incurved, the keels ciliate, the back hairy or glabrous, 5—9-nerved, the nerves not reaching the tip ; upper involucre-glume equalling the lower but narrower, lanceolate, subacute, glabrous or ciliolate, 3-nerved ; lower floral glume as long as the upper involucre-glume, linear-oblong, obtuse, nerveless, glabrous ; upper floral glume represented by the flattened white base of a scabrid slender awn $\frac{3}{4}$ in. long. *Pedicellate spikelets* about equalling the sessile, male or neuter ; lower involucre-glume elliptic-oblong, obtuse, 7—11-nerved, the keels bristly ; upper involucre-glume narrower, 3-nerved ; lower floral glume ciliate ; upper floral glume small or obsolete. Fl. B. I. v. 7, p. 196 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438 ; Prain, Beng. Pl. p. 1202. *Andropogon scandens,* Roxb. Fl. Ind. v. 1 (1832) p. 258 ; Grah. Cat. p. 238 ; Dalz. & Gibs. p. 301.—Flowers : Oct. VERN. *Márvel.*

KONKAN : *Lisboa* ! DECCAN : *Dalzell & Gibson* ; Poona, *Woodrow*, 122 ! SIND : *Stocks*, 646 !—DISTRIB. Throughout India ; Tropical Africa, China, Australia, Pacific Islands.

25. **Andropogon polystachyos,** *Roxb. Fl. Ind.* v. 1 (1832) p. 261. A dwarf erect grass 6—10 in. high ; stems slender, leafy above, corymbosely branched. Leaves 2—4 by $\frac{1}{20}$—$\frac{1}{16}$ in., the lower flat, the upper convolute, erect, hairy on both sides with long slender hairs, the margins thickened ; sheaths hairy ; ligule a short ciliate membrane. Racemes solitary, ½—1 in. long, on very slender peduncles 2—4 in. long, with a very slender sheath and a small leaf about the middle, the 5 or 6 lower pairs of spikelets neuter ; joints

$\frac{1}{12}$ in. long, terete. *Sessile female spikelets* dark brown, $\frac{1}{3}$ in. long; callus bearded on one side with brown hairs; lower involl.-glume oblong when opened out, obtuse, with membranous tip and infolded margins, 7—9-nerved, pubescent on the back; upper involl.-glume linear-oblong with a coriaceous centre and broad hyaline margins; lower floral glume shorter, oblong, ciliate; upper floral glume represented by the acute base of the awn; awn 1½—2 in. long, hairy. *Pedicellate spikelets* $\frac{1}{4}$ in. long; pedicels $\frac{1}{20}$ in. long, glabrous; lower involl.-glume with a coriaceous many-nerved centre and broad hyaline wings; upper involl.-glume lanceolate, ciliate, 5-nerved. *Neuter spikelets*: lower involl.-glume like the pedicellate but broader, 2-toothed at the tip. Fl. B. I. v. 7, p. 202; Dalz. & Gibs. p. 301; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Nov.

DECCAN: Khandala, *Woodrow*; Mahableshwar, western side of the hill, *Dalzell & Gibson*.—DISTRIB. Peninsula of India.

A rare grass; there is but 1 sheet altogether in Herb. Kew. from Wight's Herbarium.

26. **Andropogon triticeus,** *R. Br. Prod.* (1810) p. 201. Perennial; roots of very stout tortuous fibres; stem 4—8 ft. high, as thick as a swan's quill below, hard, smooth, polished, leafy, simple or branched below. Leaves 1—2 ft. by $\frac{1}{4}$—$\frac{3}{4}$ in., narrowly linear, acuminate, glaucous, sparsely hairy, margins scabrous; sheaths compressed, keeled, smooth; ligule a rounded scarcely ciliolate membrane. Racemes 3—6 in. long; rhachis inarticulate except the 4—6 upper nodes, glabrous; spikelets very many, all, except the few terminal, closely imbricating, subsecund, awnless, male or neuter with a short glabrous callus. *Upper sessile spikelets* long-awned, $\frac{1}{3}$ in. long; callus long, acute, densely bearded with dark brown hairs; lower involl.-glume linear-oblong, subterete, rigidly coriaceous, with an obtuse rounded membranous ciliolate tip, dorsally deeply grooved, the margins involute, not winged; upper involl.-glume slightly longer than the lower, linear, subterete, rigidly coriaceous, scaberulous, with pale sigmoidly incurved chartaceous margins, obtuse, with membranous truncate or minutely 3-toothed tip; lower floral glume short, oblong, truncate, hyaline, nerveless; upper floral glume represented by the flattened white base of the awn; awn very stout, hirsute, 2—3 in. long. *Upper pedicellate spikelets* reaching $\frac{3}{4}$ in. long, neuter; pedicels very short, subclavate, glabrous; lower involl.-glume more or less twisted, lanceolate, acuminate, many-nerved; upper involl.-glume rather shorter than the lower, linear-lanceolate, acuminate, ciliate, chartaceous, 3-nerved; lower floral glume shorter than the involl.-glumes, lanceolate, acuminate, ciliate; upper floral glume narrowly oblanceolate, 1-nerved, ciliate near the apex. *Lower spikelets* ½—$\frac{3}{4}$ in. long, neuter or male, like the pedicellate ones. Fl. B. I. v. 7, p. 200; Trim. Fl. Ceyl. v. 5, p. 239; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers: Dec.

KONKAN: *Stocks*! DECCAN: Mawal (Poona districts), *Woodrow*.—DISTRIB. India (Central Provinces, Birma, W. Peninsula); Ceylon, Malaya, Australia.

27. **Andropogon Ritchiei,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 201. Stems stout, erect, rigid, 4 ft. and more high. Leaves 18 by $\frac{3}{8}$ in.,

linear from a narrow base, bluntly acuminate, flat, rigid, shortly hairy on both sides with bulbous-based hairs, the margins spinulosely serrulate ; sheaths glabrous ; ligule ¼ in. long, membranous, divided almost to the base into numerous narrow acute segments. Racemes 1—2 in. long, green, hispid, the lower 1—2 pairs of spikelets homogamous. *Sessile spikelets* rather more than ¼ in. long ; callus nearly $\frac{1}{10}$ in. long, densely bristly with brown hairs ; lower invol.-glume broadly ovate when opened out, bluntly acuminate, truncate, hairy on the back, the margins narrowly incurved, keels bristly, not channelled, dorsally obscurely nerved ; upper invol.-glume linear-oblong with rounded and shortly apiculate apex, 3-nerved, with a coriaceous hispid centre and membranous margins ; lower floral glume ⅛ in. long, narrowly linear, subacute, hyaline, nerveless ; upper floral glume represented by the acute not dilated base of the awn ; awn more than 1½ in. long, tortuous, with a dark brown more or less pubescent column, the upper part very slender. *Pedicellate spikelets* ½ in. long ; pedicels short, glabrous ; lower invol.-glume lanceolate, acute, the margins equally winged and infolded, the keels with a row of long tubercular-based golden-yellow bristles ; upper invol.-glume as long, lanceolate, 3-nerved ; lower floral glume ⅜ in. long, narrowly oblanceolate, hyaline ; upper floral glume shorter, narrowly linear, acute. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438.—Flowers : Oct.—Dec.

DECCAN : hills near Poona, *Woodrow*. S. M. COUNTRY : Belgaum, *Ritchie* ! DISTRIB. India (W. Peninsula).

28. **Andropogon contortus,** *Linn. Sp. Pl.* (1753) p. 1045. Perennial ; stems 1—5 ft. long, densely tufted, erect or decumbent below, slender, leafy chiefly at the base, simple or subfastigiately branched, compressed towards the base. Leaves 6—12 by $\frac{1}{10}$—⅛ in., linear, often shortly and abruptly (rarely long)-acuminate, flat, suberect, rigid, often sparingly ciliate towards the base, sometimes with scattered bulbous-based hairs above, scaberulous below ; sheaths compressed, keeled, glabrous, the mouth shortly auricled ; ligule short, truncate, ciliolate. Racemes 1½—3 in. long ; internodes very short, the lower inarticulate ; spikelets closely imbricating, subsecund, the lower 2—6 or more sessile, awnless, male or neuter, the upper sessile spikelets narrow, long-awned, female. *Sessile* (female) *spikelets* ¼ in. long ; callus long, acute, pungent, bearded with reddish-brown hairs ; lower invol.-glume linear-oblong, truncate, dark brown, many-nerved, hispidulous, margins strongly incurved (not winged), tip membranous ; upper invol.-glume linear, obtuse, concave, rigidly coriaceous, dark brown, hispidulous ; lower floral glume short, oblong, truncate, nerveless ; upper floral glume represented by the subulate white base of a hirsute awn which reaches 3 in. or more long. *Pedicellate spikelets* much longer than the sessile (⅛—½ in. long) ; pedicel very short ; lower invol.-glume lanceolate, usually obliquely twisted, herbaceous, dorsally hispid with long bulbous-based hairs, the margins more or less (often unequally) winged, the wings serrulate ; upper invol.-glume oblong-lanceolate, acuminate, 5-nerved, margins hyaline ; lower floral glume oblong, 1-nerved ; upper floral

glume-obovate-oblong, ciliate, nerveless. *Lower sessile spikelets* like the pedicellate, more or less covered with bulbous-based hairs. Fl. B. I. v. 7, p. 199 ; Grah. Cat. p. 238 ; Dalz. & Gibs. p. 300 ; Trim. Fl. Ceyl. v. 5, p. 238 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438 ; Prain, Beng. Pl. p. 1202 ; Watt, Dict. Econ. Prod. v. 1, p. 244.—Flowers : Nov. VERN. *Kursali.*

Common throughout the Presidency. It is a very troublesome weed, the long awns twisting together like the strands of a rope and the sharp callus of the spikelets sticking into the hides of animals. It is a great annoyance to sportsmen, who come out of a patch of the grass with their lower garments covered with the awns. The grass is known to Anglo-Indians as *Spear Grass.* —DISTRIB. Tropics generally.

Andropogon Sorghum, Brot. Fl. Lusit. v. 1 (1804) p. 88. A tall handsome grass, usually very robust, with a decompound panicle, extensively cultivated throughout India for its grain. Whether originally a native of India is very doubtful ; no Indian writer records having found it wild or naturalized. It is cultivated in the warmer parts of Europe, Asia and Africa, has been introduced into America and Australia, and is known as the *Great Millet.* Fl. B. I. v. 7, p. 183 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438 ; Prain, Beng. Pl. p. 1201. *Sorghum vulgare,* Pers. Syn. v. 1 (1805) p. 101 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 289. *Holcus Sorghum,* Linn. Sp. Pl. (1753) p. 1047 ; Grah. Cat. p. 238 ; Dalz. & Gibs. Suppl. p. 99.—VERN. *Jondla ; Juári.*

Andropogon squarrosus, Linn. f. Suppl. (1781) p. 433. The *Khas-Khas ;* cultivated but not apparently indigenous in Bombay. The roots are made into mats which are known as *tattis* and hung over doors and kept wet to cool the atmosphere during the hot season. The aroma from the wetted roots is very agreeable. Fl. B. I. v. 7, p. 186 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438 ; Prain, Beng. Pl. p. 1201. *Andropogon muricatus,* Retz. Obs. fasc. 3 (1783) p. 43 ; Grah. Cat. p. 238 ; Dalz. & Gibs. p. 302 ; Watt, Dict. Econ. Prod. v. 1, p. 245.

Andropogon Schœnanthus, Linn. Sp. Pl. (1753) p. 1046. The *Lemon-Grass ;* cultivated extensively in the Bombay Presidency for the manufacture of *Lemon-Grass oil,* which is used as an external application in rheumatic affections. The oil is made largely in Khandesh and in the Panch Mahâls and sells at a high price. Fl. B. I. v. 7, p. 204 ; Grah. Cat. p. 238 ; Dalz. & Gibs. Suppl. p. 99 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 438 ; Prain, Beng. Pl. p. 1200 ; Watt, Dict. Econ. Prod. v. 1, p. 249.—VERN. *Surwai.*

32. **PSEUDANTHISTIRIA,** Hook. f.

Annual grasses. Leaves narrow. Panicle leafy ; branches slender, filiform, each bearing a single raceme clothed by a proper spathe, the racemes subumbellate, the umbel subtended by a common spathe. Proper spathes lanceolate or linear-lanceolate, acuminate, keeled. Spikelets within each proper spathe usually consisting of 1 sessile 2-sexual spikelet with 1 pedicellate male and a secund sessile 2-sexual

spikelet with 2 pedicellate males. *Sessile 2-sexual spikelets* with a short callus ; lower invol.-glume chartaceous, truncate, with inflexed margins, 4—7-nerved, the nerves apparent only towards the apex ; upper invol.-glume equalling the lower, linear-lanceolate, glabrous, 3-nerved, membranous ; lower floral glume small, quadrate ; upper floral glume represented by the hyaline base of a long capillary geniculate awn. Lodicules cuneate. *Pedicellate male spikelets* on slender pedicels ; lower invol.-glume thin, about 9-nerved, margins narrowly incurved ; upper invol.-glume 3-nerved ; lower floral glume very small, oblong. Stamens 3 ; anthers linear. Styles short ; stigmas short, exserted. Grain small.—DISTRIB. India ; species 4.

1. **Pseudanthistiria hispida,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 219. Annual ; stem 1—2 ft. high, rather stout, erect, glabrous and polished ; nodes glabrous. Leaves 2—5 by $\frac{1}{8}$—$\frac{1}{4}$ in., linear, finely acuminate, sometimes with a bristle-point, hairy on both surfaces with bulbous-based hairs, more or less subspinulosely ciliate on the margins, strongly nerved ; sheaths hairy on the upper part with bulbous-based hairs, usually glabrous below ; ligule a truncate glabrous membrane much divided to the base into narrow segments, the tips minutely ciliolate. Panicle elongate, simple ; branches very slender, reaching 3 in. long, often in pairs ; fascicles $\frac{3}{4}$ in. broad, copiously hirsute with bulbous-based hairs ; outer spathes $1\frac{1}{2}$ in. long or more ; proper spathes much longer than the racemes, all hirsute on the margins with strong bristles from tubercular bases. *Sessile spikelets* $\frac{1}{8}$ in. long ; callus shortly bearded ; lower invol.-glume $\frac{1}{8}$ in. long, oblong, truncate at the membranous ciliolate apex, with narrowly infolded margins and obscure nerves, glabrous ; upper invol.-glume as long as the lower, oblong, obtuse, 3-nerved with hyaline margins ; lower floral glume small, quadrate ; upper floral glume represented by the very acute base of the awn ; awn 1—$1\frac{1}{4}$ in. long. *Pedicellate spikelets* lanceolate, hairy ; pedicels finely hairy. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers : Oct.—Nov. VERN. *Pokalya.*

Dalzell without locality in Herb. Kew.! KONKAN : *Stocks*! ; Kalyan, *Woodrow.* DECCAN : Panchgani, *Woodrow.* S. M. COUNTRY : Londa, *Woodrow.*—DISTRIB. India (Central Provinces, W. Peninsula).

33. **THEMEDA,** Forsk. (1775).

ANTHISTIRIA, Linn. f. (1779).

Tall annual or perennial grasses. Leaves long, narrow. Spikelets heteromorphous, clustered on the articulate fragile rhachis of short solitary racemes subtended by proper spathes and crowded in paniculate fascicles ; lowest 2 pairs of each raceme closely approximate, male or barren, awnless, sessile or subsessile, usually persistent, forming a spurious tetramerous whorl enveloping the upper 1—3 pairs, each of which consists of a sessile hermaphrodite, and a pedicellate male spikelet, the latter much resembling those of the involucre. Florets 2, the lower reduced to an empty glume, the upper hermaphrodite in the sessile upper spikelets, male in the

involucral and pedicellate spikelets or these more or less reduced or barren. *Bisexual spikelets*: invol.-glumes equal or subequal; lower usually coriaceous, at length hardened and often dark brown to almost black; upper obtusely keeled, coriaceous and channelled along the keel, with membranous margins; lower floral glume hyaline; upper very narrow, passing from a hyaline base into a usually stout awn, very rarely linear and awnless. Palea obsolete or 0. Lodicules 2, cuneate, glabrous. Stamens 3. Stigmas laterally or subterminally exserted. Grain linear-obovoid, biconvex, with 2 grooves on the anterior side. *Involucral and pedicellate spikelets*: invol.-glumes equal or subequal; lower herbaceous, dorsally flattened, 2-keeled, many-nerved; upper membranous, lanceolate, acute, 3-nerved, with ciliate margins; lower floral glume hyaline, 1-nerved or like the upper suppressed.—DISTRIB. Tropical and subtropical regions of the world; species about 10.

Involucral spikelets truly verticillate.
Perennial ..... 1. *T. imberbis.*
Annual ..... 2. *T. ciliata.*
Involucral spikelets in closely superposed pairs.
Inflorescence a decompound thyrsiform panicle; lower invol.-glume of bisexual spikelets not channelled ... 3. *T. cymbaria.*
Inflorescence a racemiform panicle; lower invol.-glume of bisexual spikelets deeply channelled ..... 4. *T. tremula.*

1. **Themeda imberbis,** *T. Cooke.* Perennial, densely tufted; stem 1—3 ft. high, stout or slender, erect, or geniculate and ascending, subsimple or branched, glabrous, polished; nodes glabrous. Leaves 3—8 by $\frac{1}{10}$—$\frac{1}{3}$ in., narrowly linear, finely acuminate, coriaceous, flat, rather rigid, margins scabrid; sheaths compressed, keeled, smooth; ligule a narrow ciliolate membrane. Panicle narrow, racemiform, 3—8 in. long, sparingly branched; branches solitary or the upper 2—3-nate, filiform, bearing capituliform usually dense distant fascicles of racemes; spathes lanceolate, obtusely acuminate, about 1 in. long, usually bearded at the base, glabrous or sparsely hairy, greenish or tinged with red; racemes $\frac{1}{2}$—$\frac{3}{4}$ in. long. *Involucral spikelets* whorled, sessile, persistent, lanceolate, acute or acuminate, $\frac{1}{4}$—$\frac{5}{8}$ in. long, glabrous or with short bulbous-based hairs, male; glumes 3. *Pedicellate spikelets* linear-lanceolate, glabrous, on short glabrous or subglabrous pedicels. *Bisexual spikelet* solitary, $\frac{1}{4}$ in. long; callus reaching $\frac{1}{8}$ in. long, pungent, bearded with colored hairs. Lower invol.-glume obtuse or notched, smooth except the tip, dark brown, not dorsally channelled, obscurely 7—9-nerved; upper invol.-glume glabrous; lower floral glume glabrous, rather shorter than the invol.-glumes; upper floral glume awned; awn $1\frac{1}{2}$—$2\frac{1}{2}$ in. long with a stout hispid column. Anthers $\frac{1}{12}$ in. long. Grain $\frac{1}{10}$ in. long, oblong, grooved ventrally. *Themeda Forskahlii* (*Forskalii*) var. *vulgaris,* Hack. Monog. Andropog. in DC. Monog. Phan. v. 6 (1889) p. 660. *Anthistiria imberbis,* Retz. Obs. fasc. 3 (1783) p. 11; Hook. f. Fl. B. I. v. 7, p. 211; Trim. Fl. Ceyl. v. 5, p. 248; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1207. *A. ciliata,* Retz. Obs. fasc. 3 (1783) p. 11 (*not* of Linn.); Grah. Cat. p. 239; Dalz. & Gibs. p. 304; Watt, Dict. Econ. Prod. v. 1, p. 265.

Common throughout the Presidency, largely used for hay.—DISTRIB. Hotter and drier parts of India; Ceylon, warm regions of the Old World.

2. **Themeda ciliata,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 664. Annual; stems suberect or geniculately ascending and rooting from the lower nodes, very slender, terete, 1—3 ft. high, glabrous, simple or branched. Leaves 6—12 by $\frac{1}{8}$—$\frac{1}{4}$ in., linear, acute, flat, flaccid, glabrous or hairy; sheaths glabrous or the upper with scattered bulbous-based hairs towards the mouth; ligules membranous, rounded, $\frac{1}{12}$ in. long, glabrous. Panicle suberect, occupying $\frac{1}{2}$—$\frac{2}{3}$ of the stem, usually dense; lower branches solitary or 2—3-nate, filiform, glabrous, undivided often to the middle, then bearing at equal distances usually shortly pedunculate dense clusters of racemes; spathes linear to subulate from a broad lanceolate base, $\frac{2}{3}$—1 in. long, glabrous or with scattered bulbous-based bristles; racemes $\frac{1}{3}$—$\frac{1}{2}$ in. long, erect. *Involucral spikelets* whorled, sessile, persistent, linear-lanceolate, acute or acuminate, $\frac{1}{8}$—$\frac{1}{4}$ in. long, reddish, barren or imperfectly male; lower invol.-glume beset along the winged keels with stiff bristles from large tubercular bases, otherwise glabrous. *Pedicellate spikelets* narrow, not winged, glabrous. *Bisexual spikelet* solitary, not exserted from the involucre, $\frac{1}{8}$—$\frac{1}{6}$ in. long, narrow, linear-lanceolate; callus very short, subobtuse, bearded with short reddish hairs; lower invol.-glume obtuse, brown, shining, obscurely 6—7-nerved; upper invol.-glume glabrous; lower floral glume shorter than the invol.-glumes, sometimes 2-toothed; upper floral glume awned; awn 1—1½ in. long, slender. Anthers $\frac{1}{12}$ in. long. *Anthistiria ciliata,* Linn. f. Suppl. (1781) p. 113; Hook. f. Fl. B. I. v. 7, p. 213; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1207.—Flowers: Sept.—Jan.

KONKAN: S. Konkan, *Law*!; Salsette, *Jacquemont*, 717! DECCAN: *Woodrow*! S. M. COUNTRY: Belgaum, *Ritchie*, 886!—DISTRIB. India (North-west, Bengal, Central Provinces, W. Peninsula); S. Africa.

3. **Themeda cymbaria,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 668. Perennial; stems 3—8 ft. high, as thick as a swan's quill below, erect, branched, smooth, clothed at the base with broad strongly compressed equitant leaf-sheaths together 1½—2 in. across; internodes long; nodes glabrous or puberulous. Leaves 2—4 ft. by $\frac{1}{8}$—$\frac{1}{3}$ in., linear, finely pointed, glaucous beneath, green above, glabrous or ciliate at the base, scaberulous above, smooth beneath, margins scabrid; sheaths subcompressed, keeled, smooth, usually bearded at the mouth, the lower $\frac{1}{2}$ in. broad at the base; ligule reddish, membranous, glabrous. Panicle 1—2 ft. long, occupying nearly $\frac{1}{2}$ the stem, supra-decompound; branches loaded with small shortly pedunculate oblong fascicles $\frac{1}{2}$—$\frac{3}{4}$ in. long, of nearly glabrous racemes; proper spathes $\frac{1}{2}$—$\frac{2}{3}$ in. long, linear-lanceolate, boat-shaped, acuminate, finely pointed, glabrous or with hairy margins. *Involucral spikelets* $\frac{1}{8}$—$\frac{1}{4}$ in. long, contiguous in superposed pairs, glabrous. *Pedicellate spikelets* with glabrous pedicels. *Bisexual spikelets* solitary (rarely 2), subsessile; callus short, bearded with white hairs; lower invol.-glume $\frac{1}{4}$ in. long, dorsally convex,

not channelled, smooth, polished, dark brown ; awn ½ in. long, slender, smooth. *Anthistiria Cymbaria,* Roxb. Hort. Beng. (1814) p. 6 ; Grah. Cat. p. 239 ; Dalz. & Gibs. p. 304 ; Hook. f. Fl. B. I. v. 7, p. 215 ; Trim. Fl. Ceyl. v. 5, p. 249.

KONKAN : common.—DISTRIB. India (W. Peninsula) ; Ceylon.

4. **Themeda tremula,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 667. Annual ? ; stems erect or ascending from a creeping rootstock, 1—4 ft. high, stout or slender, leafy, subterete, simple or branched, smooth, polished, brown. Leaves 4—20 by ⅛—⅓ in., finely acuminate with setaceous tips, rigid, suberect, green, glabrous or nearly so, margins scabrid ; sheaths slightly compressed, smooth ; ligule reduced to a very narrow membrane. Panicle 1—2 ft. long, occupying ⅓—½ the stem, racemiform ; fascicles of racemes rather distant, on capillary flexuous peduncles ½—3 in. long, subflabelliform or subglobose, ½—1½ in. broad, sometimes reduced to a few spathes and spikelets ; outer spathes longer than the fascicles, 1—1½ in. long, more or less hairy with simple or bulbous-based hairs ; proper spathes ½—¾ in. long, lanceolate, acute, compressed, glabrous or with some bulbous-based hairs, margins scarious. *Involucral spikelets* in contiguous superposed pairs reaching ⅓ in. long, green tinged with red ; lower invol.-glume linear-lanceolate, acuminate, covered with long often bulbous-based bristles, many-nerved ; upper invol.-glume oblong-lanceolate, acuminate, 1-nerved, ciliate above the middle, margins inflexed ; lower floral glume as long, very narrowly linear, hyaline, 1-nerved. *Lodicules* cuneate. Anthers 1/10 in. long. *Pedicellate spikelets* like the involucral, but nearly glabrous. Glumes 3 ; lower invol.-glume winged on one margin, nerveless, the other two as in the involucral spikelets. *Bisexual spikelets* 2, sessile, ⅛ in. long, linear-oblong, obtuse ; callus small, with a short reddish beard ; lower invol.-glume scabrid, deeply channelled dorsally, nerveless, tip hispid, narrowly truncate ; awn ½—1 in. long. *Anthistiria tremula,* Nees, ex Steud. Syn. Gram. (1855) p. 401 ; Hook. f. Fl. B. I. v. 7, p. 214 ; Trim. Fl. Ceyl. v. 5, p. 249 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers : Oct.

DECCAN : Poona, *Woodrow.*—DISTRIB. India (W. Peninsula) ; Ceylon.

34. ISEILEMA, Hack.

Small annual or perennial grasses ; stems slender, compressed, many-noded. Leaves linear from a usually rounded equilateral base ; sheaths compressed, keeled, shorter than the internodes. Panicle usually occupying ½ the stem ; branches usually fascicled and interspersed with scarious spathe-like bracts ; proper spathes boat-shaped, acute, compressed, more or less herbaceous on the back, many-nerved, with scarious margins ; racemes fasciculiform, solitary at the apex of the stem and branches, articulate with the peduncle below the lowest spikelets, at length all falling away from it. Spikelets dimorphous, the 4 lower whorled, male or neuter, forming an involucre round the inarticulate rhachis. *Involucral spikelets* pedicellate ; pedicels short,

flattened. Glumes 3; lower invol.-glume oblong-lanceolate, 3—5-nerved; upper invol.-glume similar, 3-nerved; floral glume hyaline, 1-nerved. Lodicules cuneate, retuse. Anthers violet. *Pedicellate spikelets* on long slender pedicels, similar to the involucral. *Bisexual spikelets* lanceolate or linear-lanceolate; lower invol.-glume truncate or shortly 2-fid at the tip; upper invol.-glume as long, muticous, hyaline, glabrous; lower floral glume small, sometimes wanting; upper floral glume an awn longer than the spikelet.

As remarked by Hackel (Monog. Andropog. p. 679) the dispersion of the spikelets of *Iseilema* is by the wind carrying away all the spikelets in a body, whereas in *Themeda* the bisexual glumes alone disarticulate and are probably carried away by adhesion to the coats of animals.—DISTRIB. Tropical Asia and Australia; species 5.

Keel and submarginal nerves of the spathes granulate or tuberculate ..... 1. *I. Wightii.*
Keel and submarginal nerves of the spathe smooth..... 2. *I. laxum.*

1. **Iseilema Wightii,** *Anders. in Nov. Act. Soc. Sc. Upsal.* ser. 3, v. 2 (1858) p. 251. Perennial; stems often prostrate and rooting at base, then ascending, 8—36 in. long, rarely as thick at the base as a goose-quill; nodes more or less bearded. Leaves 4—8 by $\frac{1}{12}$—$\frac{1}{8}$ in., linear, acute, glaucescent or sometimes as well as the whole plant reddish, smooth or scaberulous, the floral leaves scabrid with tuberculate margins; sheaths lax, sometimes with bulbous-based hairs; ligule short truncate, membranous, ciliate. Panicle occupying $\frac{1}{2}$ the stem or more, linear-oblong, more or less compound, erect, spreading; rhachis bearded at the nodes; lower branches 2, the upper as many as 5; proper spathes $\frac{1}{3}$—$\frac{1}{2}$ in. long, linear-lanceolate, with scarious margins. *Involucral spikelets* male or neuter, $\frac{1}{8}$ in. long, shortly pedicellate, lanceolate-oblong, green or tinged with violet; lower invol.-glume subacute, with 5 elevated ribs on the back, sulcate between the ribs; upper invol.-glume glabrous with broadly infolded margins, 1-nerved; lower floral glume much shorter, oblong, 2—3-toothed, nerveless, glabrous. Anthers $\frac{1}{16}$ in. long. *Pedicellate spikelets* on very slender pedicels. *Bisexual spikelets* $\frac{1}{16}$—$\frac{1}{8}$ in. long; lower invol.-glume acute (not acuminate nor beaked), obscurely 4-nerved; upper invol.-glume equalling the lower, elliptic-lanceolate, acute or subobtuse, often mucronate, obtusely keeled on the back, 3-nerved, glabrous; upper floral glume an awn $\frac{1}{4}$—$\frac{1}{2}$ in. long, the column exceeding the subulate part. Fl. B. I. v. 7, p. 218; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Watt, Dict. Econ. Prod. v. 4, p. 524.—Flowers: Nov.

DECCAN: Poona, *Woodrow.* S. M. COUNTRY: Belgaum, *Woodrow.* GUJARAT: Morvi (Kathiawar), *Woodrow.*—DISTRIB. Throughout India.

2. **Iseilema laxum,** *Hack. Monog. Andropog. in DC. Monog. Phan.* v. 6 (1889) p. 682. Perennial; stems 6—20 in. long, ascending from a stout hard sometimes shortly creeping rootstock, very slender, simple or sparingly branched; root-fibres wiry. Leaves all cauline or the lower radical with equitant sheaths, 3—6 by $\frac{1}{20}$—$\frac{1}{8}$ in., linear, obtuse or subobtuse, glabrous but often ciliate near the base,

scaberulous above, smooth below, the margins scabrid ; sheaths lax, quite glabrous ; ligule short, truncate, membranous, ciliate. Panicle occupying ⅓—½ the stem, racemiform, long, narrow, of distant axillary pedunculate fascicles ¼—½ in. long ; outer spathes ¼—1 in. long, narrowly lanceolate, glabrous or with a few hairs near the margin ; proper spathes ⅓—½ in. long, elliptic-lanceolate. *Involucral spikelets* truly whorled, ⅛ in. long, pedicellate, oblong-lanceolate, acute ; pedicels short, flattened, bearded at the base ; lower invol.-glume acute, sparsely ciliate, 3—5-nerved ; upper invol.-glume oblong-lanceolate, acuminate, sparsely ciliate, 3-nerved ; lower floral glume linear, glabrous, hyaline. Lodicules cuneate, retuse. Anthers long, narrow. *Pedicellate spikelets* on long ciliate pedicels, lanceolate, glabrous. *Bisexual spikelets* narrowly lanceolate, ¼ in. long, narrowed into a slender stipe, glabrous ; lower invol.-glume chartaceous, 2-fid or truncate at the tip, margins scaberulous in the upper third, thin, faintly 3—5-nerved ; upper invol.-glume lanceolate, acuminate, 1-nerved, tip scaberulous ; upper floral glume a very slender geniculate awn, ⅓—½ in. long, the column equalling the subulate part. Fl. B. I. v. 7, p. 218 ; Trim. Fl. Ceyl. v. 5, p. 251 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439 ; Prain, Beng. Pl. p. 1208 ; Watt, Dict. Econ. Prod. v. 4, p. 524.—Flowers : Nov.—Dec.

KONKAN : *Lambert* ! DECCAN : *Woodrow* ! ; Poona, *Jacquemont*, 439 ! S. M. COUNTRY : Belgaum, *Ritchie*, 799 !—DISTRIB. India (Upper Gangetic plain, W. Peninsula).

35. **COIX**, Linn.

Tall leafy monœcious annual or perennial grasses ; stem branching, spongy within. Leaves long, flat, broad. Racemes many, axillary and terminal ; lower spikelets solitary, female, enclosed in an ultimately hardened, polished, nut-like bract, through the apex of which the male portion of the spike protrudes. MALE SPIKELETS 2—3-nate at each node of the rhachis, 1 sessile and 1 or 2 pedicellate, lanceolate. Glumes 4 ; invol.-glumes subequal, empty, rigid or herbaceous ; lower invol.-glume winged along the inflexed margin ; upper invol.-glume not winged ; floral glumes hyaline, paleate, triandrous or empty. FEMALE SPIKELETS ovoid, acuminate. Glumes 4 ; lower invol.-glume chartaceous, the other 3 glumes becoming successively thinner ; upper floral glume paleate. Lodicules 0. Staminodes minute. Ovary ovoid ; styles 2, free, slender. Grain orbicular, ventrally furrowed, enclosed in the hardened globose ovoid or cylindric involucre.—DISTRIB. Species 3 or 4, in the warmer regions of the globe.

1. **Coix Lachryma-Jobi**, *Linn. Sp. Pl.* (1753) p. 972. Stem 3—5 ft. high or more, stout, rooting at the lower nodes ; internodes smooth, polished. Leaves 4—18 by 1—2 in., narrowed from a broad cordate base to an acuminate tip, smooth on both surfaces, with slender nerves and spinulosely serrate margins ; midrib stout ; sheaths long, smooth ; ligule a very narrow membrane. Racemes 1—2½ in. long, nodding or drooping from long peduncles ; rhachis within the bract slender, above the bract stout, notched at the nodes.

MALE SPIKELETS $\frac{3}{8}$—$\frac{1}{2}$ in. long, subsecund, imbricating. Lower invol.-glume $\frac{3}{8}$ in. long, elliptic-lanceolate, acute, concave, many-nerved, with inflexed margins and with a narrow wing arising from a little above the edge of the margin with many branched green veins ; upper invol.-glume similar to the lower but not winged, 5—9-nerved ; lower floral glume oblong-lanceolate, hyaline, paleate, triandrous, faintly 3—5-nerved ; upper floral glume similar, paleate, triandrous or empty. Anthers $\frac{1}{4}$ in. long, orange. FRUIT from broadly ovoid to globose, bluish-grey, $\frac{1}{4}$—$\frac{3}{8}$ in. long, smooth, polished. Fl. B. I. v. 7, p. 100 ; Trim. Fl. Ceyl. v. 5, p. 192 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436 ; Prain, Beng. Pl. p. 1210. *Coix Lachryma,* Linn. Syst. ed. 10 (1751) p. 1261 ; Grah. Cat. p. 240 ; Dalz. & Gibs. p. 289 ; Watt, Dict. Econ. Prod. v. 2, p. 492.—Flowers : Oct. VERN. *Ránjondhala.*

KONKAN : *Graham.* DECCAN : *Graham* ; Lanoli, *Woodrow* ; Panchgani Ghát, *Cooke* ! GUJARAT : *Graham.*—DISTRIB. Throughout the hotter and damper parts of India, wild or cultivated ; Ceylon, Tropical Asia, cultivated in Africa and America.

36. **POLYTOCA,** Br.

Tall stout erect branching annual or perennial leafy monœcious grasses ; stem spongy within ; nodes bearded ; flowering branches fascicled. Leaves long, flat. Inflorescence of spike-like racemes, terminating the branches, at first enclosed in spathiform bracts ; racemes all male or with one or more female spikelets at the base. MALE SPIKELETS 2-flowered, sometimes imperfect. Glumes 4 (with sometimes a terminal rudimentary one), all subequal in length ; invol.-glumes empty ; lower invol.-glume herbaceous, shallowly concave, many-nerved, with a narrow membranous margin ; upper invol.-glume narrower, ovate, acuminate, 5—9-nerved ; lower floral glume membranous, oblong, acuminate, 3—5-nerved, paleate, triandrous ; upper floral glume very slender, linear, hyaline, paleate, triandrous or empty. Lodicules 2, cuneate. Anthers long. FEMALE SPIKELETS broadly oblong, 1-flowered ; lower invol.-glume thickly coriaceous, closely embracing the rhachis of the spike by its involute margins, with many obscure nerves, the other 3 glumes enclosed in the lower invol.-glume, hyaline ; upper invol.-glume oblong, many-nerved ; lower floral glume narrower, oblong, 3—5-nerved, empty ; upper floral glume very narrow, truncate, 3-nerved, paleate. Styles very long ; stigmas slender. Grain small, fusiform, terete, enclosed in the nut-like polished hardened glume.—DISTRIB. Species 8, tropical Asiatic and Australian.

Leaves 18—24 by 2—3 in. ; lower invol.-glume of female spikelet 3-lobed at the tip	1. *P. Cookei.*
Leaves 6—12 by $\frac{1}{4}$—$\frac{1}{2}$ in. ; lower invol.-glume of female spikelet entire at the tip	2. *P. barbata.*

1. **Polytoca Cookei,** *Stapf, in Hook. Icon. Plant.* v. 24 (1895) t. 2333. Annual ; stem 3 ft. (or more) high, smooth ; nodes bearded. Leaves 18—24 by 2—3 in., linear-lanceolate, acuminate, more or less hispid on both sides with bulbous-based hairs, and with thickened

and ciliate margins ; sheaths rather loose, striate, hairy with bulbous-based hairs ; ligule short, subhyaline, hairy with yellowish hairs. Flowering branches fasciculately crowded in the axils of the upper leaves, each with a linear acuminate pubescent bract at the base. Male panicles reaching 3 in. long. MALE SPIKELETS $\frac{1}{8}$ in. long, geminate, one longer than the other, shortly pedicellate or sessile. Glumes 4 ; lower invol.-glume lanceolate, acuminate, pubescent, many-nerved, with a hyaline more or less inflexed margin ; upper invol.-glume slightly shorter and thinner than the lower one, with slender nerves. Floral glumes slightly shorter than the lower invol.-glume, glabrous, few-nerved, hyaline. Anthers 3, linear. FEMALE SPIKELETS $\frac{1}{3}$ in. long ; lower invol.-glume crustaceous, oblong, the margins connate at the base, closely embracing the upper invol.-glume, the apex with a 3-lobed crest the lateral lobes of which are obliquely truncate, the midlobe emarginate ; upper invol.-glume slightly shorter than the lower, oblong, acuminate ; lower floral glume about equalling the upper invol.-glume, oblong, suddenly apiculate, 13—15-nerved ; upper floral glume shorter than the lower, hyaline, nerveless, sometimes 2-fid. Fl. B. I. v. 7, p. 101 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436.—Flowers : Sept. VERN. *Kurisal.*

KONKAN : *Stocks* !, *Law* !, *Lisboa* ; Bombay, *Dalzell* ! ; Salsette, *Jacquemont*, 706 ! DECCAN : Mahableshwar, *Woodrow* !, *Cooke* ! KANARA : N. Kanara, *Lisboa*.—DISTRIB. India (W. Peninsula).

2. **Polytoca barbata,** *Stapf, in Fl. B. I.* v. 7 (1896) p. 102. Stem 3—6 ft. high, as thick as the little finger below, terete, smooth ; nodes softly bearded. Leaves 6—12 by $\frac{1}{4}$—$\frac{7}{8}$ in., linear, acuminate, scabrid above, with a stout midrib and scabrid margins ; sheaths long, smooth, glabrous or hairy ; ligule a narrow ridge. Racemes paniculate, on slender peduncles ; spathiform sheaths 1 in. long (or more), with a long awn at the tip ; proper sheaths $\frac{1}{2}$ in. long, oblong, awned ; male portion of the raceme appearing as if sessile on the top of the female spikelet, articulate with the internode below it which is embraced by the margins of the outer glume of the female spikelet ; rhachis hardly articulate between the male spikelets. MALE SPIKELETS reaching $\frac{3}{8}$ in. long. Lower invol.-glume $\frac{1}{3}$ by $\frac{1}{6}$ in., ovate, acute, concave, pubescent. FEMALE SPIKELETS $\frac{1}{6}$ in. long, glabrous. Glumes 4 ; lower invol.-glume thickly coriaceous, white, shining, closely wrapped round the rhachis of the spike and the other glumes, obscurely many-nerved ; tip entire. Trim. Fl. Ceyl. v. 5, p. 194 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436 ; Prain, Beng. Pl. p. 1209. *Coix barbata,* Roxb. Fl. Ind. v. 3 (1832) p. 569 ; Dalz. & Gibs. p. 289.—Flowers : Sept. VERN. *Kánta-karvel.*

DECCAN : high hills round Junnar (Poona districts), *Dalzell & Gibson* ; Poona, *Woodrow*.—DISTRIB. More or less throughout India ; Ceylon, Java.

37. ARUNDINELLA, Raddi.

Perennial or annual erect grasses. Leaves narrow. Spikelets paniculate, continuous with or imperfectly jointed on the pedicels ; rhachilla not produced beyond the upper floret. Glumes 4,

membranous, chartaceous or thinly coriaceous ; invol.-glumes acute or acuminate, 3—5-nerved, the upper usually the longer ; lower floral glume, equalling the lower invol.-glume or slightly longer, 3—7-nerved, paleate, male or neuter (rarely 2-sexual) ; upper floral glume much shorter than the lower one, thin, 2-sexual (or sometimes ? female), entire or minutely 2-fid, 3—7-nerved, awnless or 1—3-awned (if 3-awned, the 2 lateral awns bristle-like, straight, the median awn geniculate). Paleæ of floral glumes linear or oblong, 2-keeled ; flaps more or less auricled. Lodicules 2, minute. Stamens 3 ; anthers linear-oblong. Styles 2, distinct ; stigmas short, laterally exserted. Grain oblong to ellipsoid, free within the upper floral glume and palea.—DISTRIB. Species about 25, mainly in Tropical Asia and America.

Upper floral glume with 3 awns.	
Leaves less than 4 in. long; annuals.	
A weak straggling grass; leaves glabrous or sparsely hairy, auricled and pectinately ciliate at the base; lateral awns from a triangular base	1. *A. arenacea.*
An erect grass; leaves hispid with bulbous-based hairs, rounded at the base; lateral awns acicular.	2. *A. tuberculata.*
Leaves 6—12 in. long; a perennial grass	3. *A. setosa.*
Awn of upper floral glume solitary.	
Spikelets $\frac{1}{16}$—$\frac{1}{12}$ in. long (smallest of the genus).....	4. *A. tenella.*
Spikelets $\frac{1}{10}$—$\frac{1}{8}$ in. long.	
Plant scarcely 6 in. high; leaves 1—1½ in. long	5. *A. pygmæa.*
Plants exceeding 6 in. high.	
Annuals.	
Stems reaching 1½ ft. high; leaves 1—4 in. long and as well as the sheaths clothed with long soft hairs.....	6. *A. agrostoides.*
Stems reaching 3 ft. high; leaves 4—6 in. long and as well as the sheaths glabrous or nearly so	7. *A. Metzii.*
Perennial; stem reaching 4 ft. high; leaves 8—12 in. long, sparsely hairy; sheaths glabrous or nearly so, auricled at the mouth.....	8. *A. Lawii.*
Spikelets $\frac{1}{6}$—$\frac{1}{4}$ in. long.	
Panicle branched; leaves 6—12 in. long.	
Rootstock hard, creeping, not tuberous; panicle pyramidal or thyrsiform; rhachis angular, glabrous	9. *A. brasiliensis.*
Rootstock tuberous; panicle oblong; rhachis filiform, scaberulous	10. *A. capillaris.*
Panicle spicate; leaves 1—1½ in. long	11. *A. spicata.*
Upper floral glume awnless; a tall grass 6 ft. high; leaves 12—24 in. long	12. *A. gigantea.*

1. **Arundinella arenacea,** *Munro, ex Thw. Enum. Pl. Zeyl.* (1864) p. 362. An annual weak straggling slender grass ; stems ascending, leafy, 6—12 in. long, rooting at the lower nodes ; nodes glabrous. Leaves ¾—2 by ¼—⅜ in., ovate-lanceolate, acute, flat, glabrous or sparsely hairy, strongly nerved, from an amplexicaul pectinately ciliate 2-auricled base ; sheaths glabrous, the margins naked or ciliolate in the upper part ; ligule linear, small, membranous. Panicle ½—1 in. long, ovoid-oblong, compact ; branches very short. Spikelets ⅛ in. long (excluding the awns). Glumes 4 ; invol.-glumes distant at the base, 3—5-nerved, membranous ; lower invol.-glume

⅛ in. long (including awn), lanceolate, acute, narrowed into a scaberulous awn; upper invol.-glume rather longer, notched at the tip, with a long scaberulous awn in the sinus; lower floral glume shorter than the upper invol.-glume, oblong, obtuse, dorsally mucronate, paleate, neuter or male, the palea oblong-obovate, 2-fid at the apex; upper floral glume 2-sexual or female, shorter than the upper invol.-glume, oblong, membranous, with 2 lateral tufts of white hairs, divided at the apex into 2 triangular lobes from each of which slender capillary awns issue; median awn about ⅜ in. long, the lower half brown, twisted, the upper half geniculate, pale, scabrid, subulate; palea linear-oblong, 2-fid at the apex. Fl. B. I. v. 7, p. 69; Trim. Fl. Ceyl. v. 5, p. 176; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434. *Arundinella Campbelliana*, Lisboa, in Journ. Bomb. Nat. v. 5 (1891) p. 346.—Flowers: Oct.

Dalzell without locality in Herb. Kew. KONKAN: Ratnagiri, *Woodrow*. DECCAN: Mahableshwar, *Lisboa*; Tiger Leap near Lanoli, *Woodrow*! S. M. COUNTRY: Rám Ghát, *Ritchie*, 890!; Castlerock, *Woodrow*.—DISTRIB. India (Khasia, Birma, W. Peninsula); Ceylon.

2. **Arundinella tuberculata,** *Munro, ex Lisboa, in Journ. Bomb. Nat.* v. 5 (1891) p. 344. Annual; stem erect or slightly decumbent at the base, 12—18 in. high, glabrous. Leaves 1—3½ by ⅛—½ in., linear-lanceolate, acute, hispid with white bulbous-based hairs, base rounded; sheaths reaching 2 in. long, hispid with long white bulbous-based hairs; ligule a ridge of hairs. Panicle 3—6 in. long, narrowly oblong; rhachis angular; branches ½—1 in. long, scaberulous. Spikelets ovoid, acute, pedicellate, single or geminate, ⅛ in. long (excluding awns), clothed with long bulbous-based hairs. Glumes 4; lower invol.-glume ⅛ in. long (including an awn of about $\frac{1}{2}\frac{1}{5}$ in. long), 3-nerved, with bulbous-based hairs along the nerves, subcoriaceous; upper invol.-glume ⅛ in. long (excluding the beak), ovate, acute, 5-nerved, with bulbous-based hairs along the nerves, narrowed into a beak as long as the body of the glume, subcoriaceous; lower floral glume rather more than ⅛ in. long, elliptic-oblong, obtuse, 2-fid, glabrous, subcoriaceous, with incurved margins, paleate, male, the palea as long as the glume, oblong-lanceolate acute; upper floral glume rather more than $\frac{1}{10}$ in. long, lanceolate, acute, when ripe subcrustaceous, brown and scabrid; median awn reaching ½ in. long, the lower half brown, twisted or not, the upper half straight, whitish, scaberulous; lateral awns acicular, transparent, $\frac{1}{12}$—$\frac{1}{10}$ in. long. Fl. B. I. v. 7, p. 69; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers: Oct.

Dalzell without locality in Herb. Kew. KONKAN: *Stocks*! DECCAN: Poona, *Woodrow*.—DISTRIB. Central India.

3. **Arundinella setosa,** *Trin. Gram. Panic.* (1826) p. 63. Perennial; stem 1—3 ft. high, erect from a hard rootstock, slender, rigid, subtuberous at the base; nodes glabrous. Leaves 6—12 by ⅛—¼ in., linear, finely acuminate, glabrous, pubescent or sometimes hispidly hairy; sheaths glabrous; ligule very small. Panicle 3—10 in. long, lax; branches 2—5 in. long, distant, suberect, filiform. Spikelets (including the mucro of the upper invol.-glume) reaching ¼ in. long

(or more). Glumes 4 ; lower invol.-glume ¼ in. long, ovate-lanceolate, aristately acuminate, 3-nerved, hairy or almost glabrous ; upper invol.-glume rather more than ½ in. long, oblong-lanceolate, narrowed into a long awn with truncate tip, 5-nerved ; lower floral glume ½ in. long, obtuse, paleate, male, the palea ⅛ in. long, oblong-lanceolate, subacute ; upper floral glume ⅛ in. long, ovate-lanceolate, acuminate, 2-sexual ; palea as long as the glume, narrowly oblong-lanceolate, subacute ; median awn more than ¼ in. long, brown below, pale above ; lateral awns capillary, $\frac{1}{20}$ in. long. Fl. B. I. v. 7, p. 70 ; Trim. Fl. Ceyl. v. 5, p. 177 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1215.

KONKAN : near Bombay, *Ritchie* !—DISTRIB. India (W. Himalaya, Khasia Hills, Central India) ; Ceylon, Tonkin, China, Philippines.

4. **Arundinella tenella,** *Nees & Wight, ex Steud. Nom.* ed. 2, part 1 (1840) p. 143. Annual, nearly glabrous ; stems solitary or tufted, erect, glabrous or with a few scattered hairs. Leaves 1—3 by ¼—¾ in., ovate to linear-lanceolate, acuminate, membranous, many-nerved, sprinkled with a few slender soft hairs, base narrowed ; sheaths usually glabrous with ciliate margins. Panicle 2—10 in. long, effuse, copiously branched ; rhachis slender, strict, erect ; branches alternate or the lower subverticillately fascicled, each with widely spreading capillary branches and branchlets. Spikelets the smallest of the genus, $\frac{1}{16}$—$\frac{1}{12}$ in. long ; pedicels long, slender. Glumes 4 ; lower invol.-glume $\frac{1}{20}$—$\frac{1}{16}$ in. long, ovate-lanceolate, acute, thinly membranous, 3-nerved ; upper invol.-glume longer, $\frac{1}{16}$—$\frac{1}{12}$ in. long, ovate-lanceolate, cuspidately acuminate, 5-nerved ; lower floral glume $\frac{1}{16}$ in. long, ovate, obtuse, paleate ; upper floral glume $\frac{1}{25}$ in. long, lanceolate, scabrid above ; awn solitary, about $\frac{1}{10}$ in. long, the lower part brown, slightly twisted, the upper part pale. Fl. B. I. v. 7, p. 71 ; Dalz. & Gibs. p. 292 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1215. *Arundinella pumila,* Steud. Syn. Pl. Gram. (1855) p. 114 ; Lisboa, in Journ. Bomb. Nat. v. 5 (1891) p. 345.—Flowers : Nov.

Bombay, *Lambert* ! DECCAN : Karli and Khandala, *Jacquemont,* 631 ! ; Lanoli, *Woodrow* ; Mahableshwar, common under the shade of trees, *Dalzell* !, *Cooke* !, *Woodrow, Lisboa.*—DISTRIB. India (W. Himalaya, Behar, Central India, Khasia Hills, W. Peninsula) ; Abyssinia.

5. **Arundinella pygmæa,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 72. A small slender plant scarcely 6 in. high ; stem very slender. Leaves chiefly radical, 1—1½ by $\frac{1}{10}$ in., linear-lanceolate, nerveless except the strong midrib, with a few scattered long hairs and finely serrulate margins ; sheaths glabrous. Panicle erect, effuse ; rhachis filiform ; branches few, capillary. Spikelets ⅛ in. long (including the cuspidation of the upper invol.-glume), ovoid-lanceolate, hispidly hairy ; pedicels very long, capillary. Glumes 4 ; lower invol.-glume $\frac{1}{12}$ in. long, ovate, 3-nerved, hispid with long hairs ; upper invol.-glume ⅛ in. long, ovate-lanceolate, cuspidately acuminate, 5-nerved, hispid with long hairs ; lower floral glume $\frac{1}{12}$ in. long, ovate, obtuse, coriaceous, with incurved margins, obscurely 5-nerved ; upper floral glume about $\frac{1}{25}$ in. long, elliptic-oblong ; awn solitary, ⅛—¼ in. long,

the lower half brown, the upper half pale. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers: Sept.

KONKAN: crest of W. Ghâts, *Woodrow*. KANARA: N. Kanara, *Lisboa*. There is only one half sheet of very poor specimens in Herb. Kew., collected in N. Kanara by Dr. Lisboa.

6. **Arundinella agrostoides,** *Trin. Sp. Gram. Icon.* v. 3 (1836) t. 265. Annual; stem 8—18 in. long, stout or slender. Leaves 1—4 by ¼—½ in., flat, narrowed to the base, clothed with long soft hairs; sheaths softly hairy; ligule a ridge of hairs. Panicle 1—8 in. long, contracted; branches fascicled, suberect. Spikelets $\frac{1}{10}$—⅛ in. long, ovoid-lanceolate, the lower half usually bristly; pedicels reaching ⅛ in. long, slender, glabrous or nearly so. Glumes 4; lower invol.-glume ovate, acuminate, 3-nerved, usually with a few bristles on the lower half; upper invol.-glume ⅛ in. long, ovate, cuspidately acuminate, 5-nerved; lower floral glume rather more than $\frac{1}{10}$ in. long, ovate-lanceolate, coriaceous, paleate, 3-nerved, the palea ovate-lanceolate, acuminate; upper floral glume about $\frac{1}{20}$ in. long, elliptic, obtuse, usually female; palea oblong, obtuse; median awn reaching ⅛ in. long, the lower half twisted, brown, the upper half pale, geniculate above the twisted column; lateral awns 0. Fl. B. I. v. 7, p. 71; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.

KONKAN: *Wight*.

I have seen no specimens from Bombay. Woodrow includes the plant in his list of grasses in the 'Journal of the Bombay Natural History Society', but does not appear to have collected it, as he gives no habitat.

7. **Arundinella Metzii,** *Hochst. in Miq. Anal. Bot. Ind.* part 2 (1851) p. 19. Annual, 1—3 ft. high; stems slender, erect. Leaves 4—6 by ¼—⅛ in., linear, glabrous or sparsely hairy; sheaths glabrous or sparsely hairy. Panicle 1—8 in. long, effuse; rhachis slender, smooth or subscaberulous; branches elongate, alternate or fascicled, 1—4 in. long. Spikelets ⅛ in. long, ovoid-lanceolate. Glumes 4; lower invol.-glume $\frac{1}{10}$ in. long, ovate-lanceolate, with a slender mucro about $\frac{1}{50}$ in. long, strongly 3-nerved; upper invol.-glume ⅛ in. long, similar, with a mucro about $\frac{1}{20}$ in. long, 5-nerved; lower floral glume elliptic, obtuse, $\frac{1}{10}$ in. long, 3-nerved, paleate, empty or male, the palea $\frac{1}{16}$ in. long, oblong-lanceolate, acute, hyaline; upper floral glume $\frac{1}{20}$ in. long, ovate, obtuse; palea as long as the glume, linear-lanceolate, subobtuse; awn solitary, ⅛ in. long, the lower half brown, the upper pale. Fl. B. I. v. 7, p. 72; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434.—Flowers: Oct.

DECCAN: Lanoli, *Woodrow*. KANARA: *Thomson*!—DISTRIB. India (W. Peninsula).

8. **Arundinella Lawii,** *Hook. f. in Trim. Fl. Ceyl.* v. 5 (1900) p. 180. Perennial; stems tufted, erect, 2—4 ft. high, leafy, smooth; nodes hairy. Leaves 8—12 by ¼ in., linear, finely acuminate, flat, sparsely hairy, with nearly smooth margins; sheaths elongate, glabrous or nearly so, auricled and ciliate at the mouth; ligule a tomentose lunate ridge. Panicle 12—20 in. long, pyramidal, decompound, effuse, drooping; rhachis slender, smooth; lower branches reaching 6 in. long, in distant fascicles, filiform, spreading, flexuous;

branchlets capillary. Spikelets numerous, usually hairy, rather more than $\frac{1}{10}$ in. long (excluding the awns); pedicels very long. Glumes 4; lower invol.-glume about $\frac{1}{12}$ in. long (including a short slender awn about $\frac{1}{10}$ in. long), lanceolate, acute, 3-nerved, hairy on the nerves, thinly membranous; upper invol.-glume similar to the lower but longer (nearly $\frac{1}{8}$ in. long, including an awn of nearly $\frac{1}{10}$ in. long), 5-nerved, hairy on the nerves, thinly membranous; lower floral glume rather less than $\frac{1}{10}$ in. long, shorter than the upper invol.-glume, oblong, subobtuse, faintly 5-nerved, not awned, hyaline, paleate, the palea narrowly oblong, subobtuse with a faint median nerve; upper floral glume $\frac{1}{20}$—$\frac{1}{16}$ in. long, elliptic-lanceolate, acute, hyaline, usually 3-nerved, with incurved margins and a long filiform awn reaching $\frac{1}{2}$ in. long, 2-sexual. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435. *Arundinella agrostoides*, Hook. f. Fl. B. I. v. 7 (1896) p. 71 (partly).

KONKAN: *Woodrow*, 35!; N. & S. Konkan, *Law*!—DISTRIB. India (W. Peninsula); Ceylon.

9. **Arundinella brasiliensis,** *Raddi, Agrost. Bras.* (1823) p. 37, t. 1, fig. 3. Perennial; rootstock stout, hard, creeping and sending out stout sheathed branches sometimes as thick as a goose-quill, or tufted and intricately branched; stems 1—5 ft. long, stout or slender, simple or branched, hairy or almost glabrous; nodes glabrous or pubescent. Leaves 6—12 by $\frac{1}{8}$—$\frac{3}{8}$ in., usually ciliate at the narrow base, glabrous or hairy; sheaths usually glabrous; ligule a minute ridge fringed with long hairs. Panicle pyramidal, thyrsiform or subcorymbose, 4—18 in. long; rhachis angular, usually glabrous; branches 1—10 in. long, few or many, fasciculate or subverticillate. Spikelets $\frac{1}{8}$—$\frac{1}{5}$ in. long, subsecund, pedicellate, ovoid-lanceolate, usually glabrous. Glumes 4; lower invol.-glume $\frac{1}{8}$ in. long, ovate-lanceolate, acuminate, subacute, 3-nerved, glabrous or (rarely) sparingly setose; upper invol.-glume $\frac{1}{5}$ in. long, ovate-lanceolate, acuminate, 5-nerved; lower floral glume $\frac{1}{8}$ in. long, elliptic-oblong, obtuse or shortly 2-fid, 3—5-nerved, paleate, empty or male, the palea $\frac{1}{8}$ in. long, lanceolate, hyaline; upper floral glume less than $\frac{1}{8}$ in. long, bearded at the base, narrowly ovate-lanceolate, scaberulous, 2-sexual; awn $\frac{1}{8}$ in. long, straight or slightly twisted, brown below, pale above; palea narrowly lanceolate, acute, as long as the glume. A very variable plant. The measurements have been taken from specimens with full-sized spikelets. *A. Ritchiei*, Munro, has smaller glumes and spikelets. The inflorescence of the Indian plant is generally more lax than that of the Brazilian, and the spikelets somewhat larger. Fl. B. I. v. 7, p. 73; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1215. *Arundinella striata*, Nees, in Kew Journ. Bot. v. 2 (1850) p. 102; Dalz. & Gibs. p. 293. *A. nepalensis*, Trin. Gram. Panic. (1826) p. 62; Lisboa, in Journ. Bomb. Nat. v. 5 (1891) p. 343. *A. Ritchiei*, Munro, ex Lisboa, in Journ. Bomb. Nat. l.c.—Flowers: Oct.

DECCAN: Mahableshwar, *Dalzell & Gibson, Lisboa*; Panchgani, *Woodrow*; Lanoli, *Lisboa*; Khandala, *Lisboa*. KANARA: N. Kanara, *Lisboa*.—DISTRIB. Throughout the hilly parts of India; China, Malaya, Australia, Tropical America.

10. **Arundinella capillaris,** *Hook. f. Fl. B. I.* v. 7 (1896) p. 74. Perennial, very slender ; stem erect from a tuberous rhizome which is clothed with the woolly bases of leaf-sheaths ; nodes glabrous. Leaves 6—12 by $\frac{1}{8}$—$\frac{1}{3}$ in., linear, acuminate, glabrous or hairy ; sheaths glabrous, striate ; ligule a ridge of hairs. Panicle oblong, 5—7 in. long ; rhachis filiform, scaberulous ; branches alternate, slender, 4—6 in. long. Spikelets $\frac{1}{6}$—$\frac{1}{3}$ in. long, glabrous, solitary or geminate ; pedicels long, capillary, angular. Glumes 4 ; lower invol.-glume $\frac{1}{8}$ in. long, ovate, acute, with a long slender mucro, 3-nerved, with a scaberulous keel ; upper invol.-glume reaching $\frac{1}{3}$ in. long, ovate-lanceolate, narrowed into a subcuspidate acuminate tip, 5-nerved ; lower floral glume rather more than $\frac{1}{3}$ in. long, ovate-oblong, subacute, 3-nerved, paleate, the palea $\frac{1}{8}$ in. long, oblong-lanceolate, acute, hyaline ; upper floral glume $\frac{1}{8}$ in. long, lanceolate, acute, slightly scabrid ; palea oblong-lanceolate, acute ; awn nearly $\frac{1}{4}$ in. long, geniculate about the middle, easily breaking off. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435. *Arundinella mutica,* Nees, ex Steud. Syn. Gram. (1855) p. 116.—Flowers : Oct. VERN. *Kotir.*

KONKAN : Parel near Bombay, *Woodrow.* KANARA : Kála naddi, *Woodrow.* DISTRIB. India (W. Peninsula).

11. **Arundinella spicata,** *Dalz. in Dalz. & Gibs. Bo. Fl.* (1861) p. 293. A small grass in appearance resembling a *Setaria ;* stem 6—12 in. high, erect, simple. Leaves 1—1½ by $\frac{1}{4}$ in., linear-lanceolate, acute, densely hispid with long hairs ; sheaths densely hispid ; ligule a minute hairy ring. Inflorescence of cylindric racemes $\frac{3}{4}$—2 in. long. Spikelets $\frac{1}{4}$ in. long to top of upper invol.-glume ; pedicels very short. Glumes 4 ; lower invol.-glume $\frac{1}{16}$—$\frac{1}{12}$ in. long, lanceolate, acuminate, with a few long bulbous-based hairs, 3-nerved ; upper invol.-glume reaching $\frac{1}{4}$ in. long, narrowly lanceolate, attenuated into a long acuminate point, folded round and completely concealing the upper floral glume and its awn, 3-nerved and with a few scattered long hairs ; lower floral glume $\frac{1}{10}$ in. long, lanceolate, acute, thinly membranous, glabrous, paleate, empty or male, the palea $\frac{1}{16}$ in. long, lanceolate, acute ; upper floral glume $\frac{1}{20}$ in. long, oblong, obtuse, female or 2-sexual ; palea lanceolate, acute, hyaline ; awn $\frac{1}{3}$ in. long, the lower half brown, the upper pale, geniculate about the middle. Fl. B. I. v. 7, p. 77 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435.—Flowers : Nov.

DECCAN : common on the Mahableshwar Hills, *Dalzell & Gibson, Woodrow* !, *Cooke* !—DISTRIB. India, Western Peninsula, apparently endemic.

12. **Arundinella gigantea,** *Dalz. in Dalz. & Gibs. Bo. Fl. (1861)* p. 293. A tall grass ; stems erect, smooth, terete, 6 ft. high, as thick as a goose-quill at 18 in. below the panicle ; nodes glabrous. Leaves 1—2 ft. by $\frac{7}{8}$—1¼ in., linear-lanceolate, finely acuminate, glabrous or sparsely hairy, many-nerved, base rounded or cordate ; sheaths striate, sparsely hairy or almost glabrous ; ligule a narrow glabrous membrane. Panicle subcorymbosely thyrsiform, 5—7 by 2—3 in. ; rhachis stout, scabrid, angular, concealed by the numerous erect angular branches which are 2—4 in. long. Spikelets $\frac{1}{10}$—$\frac{1}{8}$ in. long. Glumes 4 ; lower invol.-glume $\frac{1}{12}$ in. long, broadly ovate,

acute, strangly 3-nerved, with a scaberulous keel ; upper invol.-glume $\frac{1}{10}$—$\frac{1}{8}$ in. long, ovate, narrowed into an acuminate point, 5-nerved ; lower floral glume $\frac{1}{12}$—$\frac{1}{10}$ in. long, ovate, subobtuse, 3—5-nerved, paleate, the palea $\frac{1}{16}$ in. long, elliptic, hyaline ; upper floral glume $\frac{1}{16}$ in. long, elliptic, thickly coriaceous, white, without an awn. Fl. B. I. v. 7, p. 76 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435.—Flowers : Oct.

KONKAN : *Stocks* ! ; Kineshvar below the Ghâts, *Dalzell & Gibson*. S. M. COUNTRY : Castlerock, *Woodrow*.—DISTRIB. India (W. Peninsula).

38. **TRISTACHYA,** Nees.

Perennial, usually coarse grasses. Leaves various. Spikelets 2-flowered (lower flower male, the upper 2-sexual), large, lanceolate to linear, sessile or shortly pedicellate, in clusters of 3 at the tips of the branchlets of a raceme or panicle ; rhachilla not produced beyond the upper floret. Glumes 4 ; invol.-glumes more or less unequal, not awned, persistent, 3-nerved, membranous or subcoriaceous ; lower floral glume membranous, 3—7-nerved, not awned ; upper floral glume membranous or ultimately cartilaginous, 2-lobed, with a long twisted awn in the sinus (copiously bearded above the middle in the Indian species) ; palea hyaline, 2-keeled. Lodicules 2, cuneate, fleshy. Stamens 3. Styles slender ; stigmas plumose, laterally exserted. Grain narrow, free.—DISTRIB. Africa, Arabia, India, Beluchistan, Tropical America ; species 11—12.

1. **Tristachya barbata,** *Nees, ex Steud. Syn. Pl. Gram.* (1855) p. 238. Stem 6—18 in., branched and woody at the base, geniculately ascending, the base clothed with tomentose leaf-sheaths ; nodes woolly. Leaves 1—3 by $\frac{1}{10}$—$\frac{1}{8}$ in., linear-lanceolate from a rounded base, finely acuminate, pungent, rigid, glaucous, many-nerved, with a subserrulate thickened margin. Panicle 1—2 in. long and nearly as broad, sparingly branched ; branches solitary and 2-nate, capillary. Spikelets nearly $\frac{1}{2}$ in. long (excluding the awn) ; callus glabrous. Glumes 4 ; lower invol.-glume $\frac{1}{4}$ in. long, ovate-lanceolate, subacute, 3-nerved ; upper invol.-glume $\frac{1}{3}$ in. long, oblong-lanceolate, 3-nerved ; lower floral glume nearly $\frac{1}{2}$ in. long, male, lanceolate, acuminate, interruptedly 7-nerved, with a linear-lanceolate palea $\frac{1}{4}$ in. long ; upper floral glume $\frac{1}{3}$ in. long, 2-sexual, densely hairy on the back above the middle with very slender hairs nearly $\frac{1}{6}$ in. long, 2-lobed, the lobes lanceolate, acute, aristate, each lobe 3-nerved, $\frac{1}{6}$ in. long with an awn $\frac{5}{8}$ in. long from the sinus ; palea lanceolate, acute, $\frac{1}{4}$ in. long. Fl. B. I. v. 7, p. 272 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440. *Tristachya Stocksii,* Boiss. Fl. Orient. v. 5 (1881) p. 552.

SIND : *Stocks,* 1217 ! and 648 !—DISTRIB. Arabia, Nubia.

39. **THYSANOLÆNA,** Nees.

A large glabrous reed-like grass ; stems solid. Leaves broad, flat. Spikelets innumerable, very minute, 1-flowered, jointed on very short pedicels and subsecund on the very numerous crowded, long, filiform, compound, suberect branches and branchlets which

form a very large effuse pyramidal panicle ; rhachilla produced but not beyond the floret. Glumes 4 ; invol.-glumes small, concave, awnless, faintly nerved or nerveless ; lower floral glume rather longer than the upper, empty, acuminate, epaleate ; upper floral glume ovate, acute, ciliate with long erect white hairs ; palea short, truncate. Stamens 2—3 ; anthers short. Styles free. Grain very minute, free within the hardened glumes.—DISTRIB. Tropical Asia ; species 1.

1. **Thysanolæna Agrostis,** *Nees, in Edinb. N. Phil. Journ.* v. 18 (1835) p. 180. A large handsome grass ; stem 4—12 ft. high, reaching sometimes $\frac{3}{8}$ in. in diam., glabrous, polished. Leaves very large, 1—2 ft. by 2—4 in., coriaceous, linear-lanceolate, tapering to a fine point, many-veined, base cordate ; sheaths glabrous, striate, hairy at the mouth ; ligule small, ciliate. Panicle large, 1—2 ft. long, soft, glabrous ; branches very numerous, suberect, filiform, with many short branchlets carrying small spikelets. Spikelets $\frac{1}{20}$—$\frac{1}{16}$ in. long, ovoid-lanceolate, acuminate, pedicellate ; rhachilla produced into a linear-lanceolate point about $\frac{1}{10}$ in. long. Glumes 4 ; invol.-glumes less than $\frac{1}{30}$ in. long, subequal, about $\frac{1}{2}$ as long as the floral glumes, ovate, subacute, hyaline, obscurely 1-nerved ; lower floral glume longer than the upper, lanceolate, acuminate, membranous, glabrous, epaleate, empty, 1-nerved ; upper floral glume ovate-lanceolate, acuminate, ciliate with long white erect hairs. Fl. B. I. v. 7, p. 61 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 434 ; Prain, Beng. Pl. p. 1172. *Thysanolæna acarifera,* Arn. & Nees, in Nov. Act. Cur. v. 19, Suppl. 1 (1843) p. 181 ; Duthie, Fodd. Grass. N. Ind. (1883) p. 21 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 48.—Flowers : Jan. VERN. *Barucha.*

KONKAN : Thána, *Lisboa.* DECCAN : Khandesh, *Lisboa* ; Dangs, *Woodrow* ; Nasik, *Lisboa.* GUJARAT : Bansda (Surat districts), *Woodrow.*—DISTRIB. Throughout India ; Penang, eastwards to New Guinea.

40. PHRAGMITES, Trin. (ex parte).

Tall perennials with a creeping rhizome ; stem stout, hollow, leafy upwards. Leaves long, flat. Panicle lax, usually very large and decompound. Spikelets conspicuously silky from the long hairs on the callus, loosely 3—10-flowered, awnless ; rhachilla disarticulating above the lower and between the following floral glumes, slender, penicillate with long hairs, not produced beyond the flowering glumes. Glumes glabrous ; invol.-glumes unequal, oblong-lanceolate, acute, 3-nerved, membranous, persistent ; floral glumes heteromorphous, the lowest linear-lanceolate, much exceeding the invol.-glumes, the following very thin, more or less caudate-acuminate, hyaline, 3-nerved ; callus long, slender, densely clothed with very long silky hairs. Paleæ linear-oblong, about $\frac{1}{2}$ as long as their glumes, 2-keeled. Lodicules 2 (sometimes 3 in the lower floret). Stamens 3 (sometimes 2 in the lower floret). Styles 2, distinct, rather short ; stigmas laterally exserted, densely plumose. Grain oblong, semiterete.—DISTRIB. Species 2 (perhaps reducible to 1), almost cosmopolitan.

1. **Phragmites karka,** *Trin. ex Steud. Nom.* ed. 2, part 2 (1841) p. 324. Stems reaching 10 ft. high, smooth, simple or branched,

covered with the leaf-sheaths. Leaves close, bifarious, linear, acuminate, reaching 1½ in. broad, coriaceous, smooth, base contracted, margins smooth ; sheaths loose, glabrous, the mouth auricled ; ligule a ciliate line. Panicle 1—2 ft. long, erect, oblong ; branches widely spreading, filiform. Spikelets when fully expanded about ½ in. broad across the glumes ; pedicels capillary, smooth ; callus densely clothed with long silky hairs. Glumes glabrous ; lower involucre-glume ⅛ in. long, oblong-lanceolate, acute, 3-nerved ; upper involucre-glume rather less than ¼ in. long, oblong-lanceolate, acute, 3-nerved ; lower floral glume less than ½ in. long ; upper floral glume rather longer than the lower ; palea $\frac{1}{10}$ in. long, linear-oblong. Anthers $\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 303 ; Trim. Fl. Ceyl. v. 5, p. 287 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440 ; Prain, Beng. Pl. p. 1218. *Phragmites Roxburghii*, Steud. Nom. ed. 2, part 2 (1841) p. 324 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 216.

Not common in the Bombay Presidency. DECCAN : Dhond, *Lisboa* ex *Woodrow*. SIND : *Stocks*, 1211!—DISTRIB. More or less throughout India ; Tropical Asia, Afghanistan, Japan, Africa, Australia.

Woodrow in his list (Journ. Bomb. Nat.) gives *P. communis* as grown in gardens under the name of *Gardener's Garter*, but the *Gardener's Garter* which is commonly grown is *Phalaris arundinacea* var. *variegata*.

41. **ARISTIDA**, Linn.

Annual or perennial tufted grasses. Leaves flat or convolute. Spikelets panicled, 1-flowered, not articulate on their pedicels, laterally compressed ; rhachilla not produced beyond the flowering glume. Glumes 3 ; involucre-glumes very narrow, long, 1-nerved, keeled, persistent, with or without a terminal awn ; floral glume very narrow, cylindric, coriaceous, 3-nerved, tipped by 3 very long capillary awns (the 2 lateral awns occasionally short or obsolete) ; callus long, articulate at the base ; palea minute, convolute round the ovary and grain. Lodicules 2, long, narrow, hyaline. Stamens 3 ; anthers long, narrow. Styles free, short ; stigmas penicillate, laterally exserted. Grain long, narrow, cylindric, free in the convolute closely enveloping glume.—DISTRIB. Species about 100, in warm countries.

Awns not articulate on the floral glume, tripartite from the base without a column.	
Involucre-glumes not awned	1. *A. Adscenscionis.*
Involucre-glumes awned.	
Awns of involucre-glumes ⅛ in. long ; spikelets ⅝ in. long	2. *A. setacea.*
Awns of involucre-glumes $\frac{1}{16}$ in. long ; spikelets ⅜ in. long	3. *A. Hystrix.*
Awns with a twisted column.	
Column of awns articulate on the floral glume.	
Awn plumose	4. *A. hirtigluma.*
Awn not plumose.	
Stems less than 6 in. high ; lower involucre-glume ½ in. long	5. *A. hystricula.*
Stems reaching 2 ft. high ; lower involucre-glume ⅞ in. long	6. *A. funiculata.*
Column of awns not truly articulate on the floral glume, though readily separating ; lower involucre-glume ½ in. long	7. *A. redacta.*

1. **Aristida Adscensionis,** *Linn. Sp. Pl.* (1753) p. 82. Annual or perennial; stems 9—24 in. long, densely tufted, very slender, erect or ascending, simple or branched; branches erect, smooth. Leaves 3—12 by $\frac{1}{28}$—$\frac{1}{12}$ in., convolute, filiform, smooth or scaberulous; sheaths smooth, with rounded auricles; ligule of fine short hairs. Panicle 3—12 in. long, contracted, subsecund; rhachis filiform, smooth; branches short; pedicels short, capillary. Spikelets erect, $\frac{1}{4}$—$\frac{1}{3}$ in. long. Lower invol.-glume $\frac{1}{8}$ in. long, oblong-lanceolate, acute, membranous, often purple, with a scaberulous keel; upper invol.-glume lanceolate, $\frac{1}{4}$ in. long, 2-toothed and apiculate at the tip, the keels smooth; floral glume $\frac{1}{3}$ in. long, 3-nerved, smooth; awns 3, not articulate on the glume, the middle one larger than the lateral, $\frac{3}{8}$—$\frac{3}{4}$ in. long; callus long, pointed, hairy at the base; palea minute, oblong, hyaline, retuse. Fl. B. I. v. 7, p. 224; Trim. Fl. Ceyl. v. 5, p. 252; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1211. *Aristida depressa,* Retz. Obs. fasc. 4 (1786) p. 22; Dalz. & Gibs. p. 295; Watt, Dict. Econ. Prod. v. 1, p. 312.—Flowers: Oct.—May.

On dry hills, *Dalzell & Gibson.* DECCAN: Poona, *Cooke*!, *Woodrow*; Bowdhan hill near Poona, *Woodrow,* 38! GUJARAT: Jetalsar (Kathiawar), *Woodrow,* 43!—DISTRIB. Throughout the plains and low hills of India; Ceylon, most warm countries.

A troublesome grass for those who have to walk through a patch of it; the ripe spikelets, which are easily detached, are like barbed arrows.

2. **Aristida setacea,** *Retz. Obs.* fasc. 4 (1786) p. 22. Perennial; stem 2—3 ft. high, stout, erect or geniculately ascending from a woody base, with stout wiry root-fibres, hard, smooth and polished, simple or subfastigiately branched. Leaves 6—12 by $\frac{1}{12}$—$\frac{1}{8}$ in., usually convolute, coriaceous, smooth; sheaths long, smooth; ligule of short hairs. Panicle various, 6—12 in. long, inclined, sometimes subsecund, open or contracted; rhachis slender, smooth; branches long or short, the lower sometimes reaching 4 in. long, filiform or capillary, usually fascicled and erect. Spikelets $\frac{5}{8}$ in. long (excluding awns), erect; pedicels capillary. Lower invol.-glume awned, $\frac{5}{8}$ in. long (including an awn of $\frac{1}{8}$ in. long), 1-nerved; upper invol.-glume a little longer than the lower (with an awn about $\frac{1}{8}$ in. long), notched at the insertion of the awn, and with hyaline margins, 1-nerved; floral glume $\frac{5}{8}$ in. long, 3-nerved; awns 3, inarticulate at the base, 1—$1\frac{1}{4}$ in. long, subequal or the middle the longest; callus long, bearded with long hairs. Stamens 3; anthers $\frac{1}{8}$ in. long. Fl. B. I. v. 7, p. 225; Grah. Cat. p. 235; Dalz. & Gibs. p. 295; Trim. Fl. Ceyl. v. 5, p. 253; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1211; Watt, Dict. Econ. Prod. v. 1, p. 312.

KONKAN: *Stocks*!; Salsette, *Graham.* DECCAN: Khandala, *Graham.* GUJARAT: Rajkot (Kathiawar), *Woodrow.*—DISTRIB. India (W. Peninsula, Behar); Ceylon, Mascarene Islands.

The grass is largely used for making the screens known as "tatties."

3. **Aristida Hystrix,** *Linn. f. Suppl.* (1781) p. 113. Perennial; stems 6—24 in. long, from a creeping rootstock, diffuse, ascending, sometimes proliferously branched. Leaves rather glaucous, $1\frac{1}{2}$—4 by

$\frac{1}{16}$—$\frac{1}{8}$ in., convolute ; sheaths glabrous, striate ; ligule of soft hairs. Panicle 4—6 in. long and as broad as long, rigid ; rhachis stout, flexuous and angular ; branches and branchlets smooth. Spikelets (excluding awns) $\frac{3}{8}$ in. long, straw-colored. Lower invol.-glume $\frac{3}{8}$ in. long (including awn), lanceolate, acuminate, 1-nerved, with an awn of $\frac{1}{16}$ in. long, chartaceous ; upper invol.-glume more than $\frac{1}{2}$ in. long (including an awn of $\frac{1}{16}$ in. long), lanceolate, acuminate, chartaceous, 1-nerved, quite glabrous, minutely toothed at the tip at the base of the awn ; floral glume $\frac{3}{8}$ in. long ; callus $\frac{1}{16}$ in. long, pointed, shortly villous ; awns 3, not articulate with the glume, subequal or the middle one sometimes the longest, scabrid. Fl. B. I. v. 7, p. 225 ; Grah. Cat. p. 235 ; Dalz. & Gibs. p. 295 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers : Oct.

S. M. COUNTRY : Badami, *Cooke* !, *Woodrow*.—DISTRIB. India (Central Provinces, W. Peninsula).

4. **Aristida hirtigluma,** *Steud. Nom.* ed. 2 (1840) part 1, p. 131, *et Syn. Gram.* (1855) p. 144. Perennial ; stems tufted, 1—2 ft. high, smooth, glabrous, terete, shining ; nodes glabrous. Leaves 2—6 in. long, reaching $\frac{1}{20}$ in. broad when opened out, convolute, filiform with capillary tips ; sheaths quite glabrous except for a few long hairs at the mouth, close ; ligule a very narrow densely ciliate membrane. Panicle slender ; branches short, erect, capillary. Spikelets pale green or straw-colored, linear-lanceolate. Lower invol.-glume $\frac{1}{3}$ in. long, linear-oblong, acute, scarious ; upper invol.-glume a little longer, but similar ; floral glume slightly muricate ; callus about $\frac{1}{10}$ in. long, pointed, shortly villous ; column of awn $\frac{1}{16}$—$\frac{1}{8}$ in. long, plumose with long slender hairs, articulated on the glume ; middle branch $1\frac{1}{2}$ in. long or more, plumose in the lower half with long delicate hairs ; lateral branches very slender, hair-like, about $\frac{1}{2}$ in. long, not plumose. Fl. B. I. v. 7, p. 227 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers : Aug.

SIND : *Dalzell* ! ; hill near Bullo Khan, *Woodrow*, 200 !—DISTRIB. India (Panjáb, Peshawar, Sind) ; Egypt, Abyssinia.

5. **Aristida hystricula,** *Edgew. in Journ. Linn. Soc.* v. 6 (1862) p. 208. Annual, dwarf, slender, about 1—3 in. high, pale ; stems many from the root, $\frac{1}{2}$—1 in. high, densely crowded ; nodes glabrous. Leaves subulate, curved, convolute, acuminate, glabrous, less than 1 in. long ; sheaths glabrous ; ligule a small line of hairs. Panicle without the awns $\frac{1}{2}$—1 in. long, shorter than the awns, narrow, few-flowered ; branches few, short, erect. Spikelets $\frac{3}{8}$ in. long or more. Lower invol.-glume $\frac{1}{8}$—$\frac{1}{5}$ in. long, much shorter than the upper, ovate lanceolate, acute, apiculate, scarious ; upper invol.-glume $\frac{3}{8}$ in. long, linear, running out into a slender awn or often cleft at the tip into 2 subulate lobes $\frac{1}{16}$ in. long ; lower floral glume $\frac{1}{3}$ in. long ; column of awn $\frac{1}{2}$ in. long, twisted, the 3 branches subequal, extremely slender, $\frac{1}{2}$—$\frac{3}{4}$ in. long. Fl. B. I. v. 7, p. 227 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.

SIND : Jemadar ka Landa near Karachi, *Stocks*, 1187 !—DISTRIB. India (Panjáb, Sind) ; Beluchistan.

6. **Aristida funiculata,** *Trin. & Rupr. in Mém. Acad. Pétersb.* sér. 6, v. 7 (1849) p. 159. Annual, very slender ; stems 10—24 in. long, many, geniculately ascending. Leaves 2—6 by $\frac{1}{20}$—$\frac{1}{12}$ in., convolute or flat, ciliate at the base ; sheaths glabrous ; ligule a small ciliate membrane. Panicle 4—10 in. long, lax, narrow ; rhachis angular ; branches short, erect, capillary. Spikelets variable in length, $\frac{1}{2}$—$\frac{7}{8}$ in. long. Lower invol.-glume reaching $\frac{7}{8}$ in. long, linear-lanceolate, acute, 1-nerved, tapering into a slender awn ; upper invol.-glume somewhat shorter than the lower, similar in shape and similarly awned ; floral glume small, smooth, awned ; awn articulate on the glume, the column $\frac{1}{2}$—$\frac{3}{4}$ in. long, twisted, with 3 capillary branches of which the middle is the longest, reaching $1\frac{1}{4}$ in. long. Fl. B. I. v. 7, p. 226 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439. *Aristida Royleana,* Trin. & Rupr. in Mém. Acad. Pétersb. sér. 6, v. 7 (1849) p. 160 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 358.—Flowers : Oct.

DECCAN : Poona, *Lisboa* ; Sattara, *Lisboa* ; Sholapur, *Lisboa* ; Dapuri near Poona, *Jacquemont,* 489 ! S. M. COUNTRY : Belgaum, *Woodrow.* SIND : Jam village, *Woodrow,* 19 !—DISTRIB. India (Panjáb, Raputana, W. Peninsula) ; Beluchistan, Arabia, Tropical Africa.

7. **Aristida redacta,** *Stapf, in Kew Bullet.* (1892) p. 85. Annual or sometimes perennial (and then more robust) ; stems tufted, 6—24 in. high, simple, or proliferously branched in robust specimens ; nodes glabrous. Leaves 4—6 in. long, very slender, convolute, hairy above, smooth below, margins rough ; sheaths glabrous ; ligule narrow, shortly and densely ciliate. Panicle 9—10 in. long by $7\frac{1}{2}$ in. broad ; branches usually twin, remote, at length spreading ; pedicels unequal, shorter than the glumes. Spikelets on long or short capillary pedicels, green or purplish. Lower invol.-glumes subequal, narrowly lanceolate, finely acuminate, shortly aristate, reaching $\frac{1}{2}$ in. long ; floral glume with a hairy callus, usually purplish, armed with an awn $1\frac{1}{4}$ in. long ; column of awn capillary, twisted, easily separating from the glume but not truly articulate ; branches 3 from the top of the column, the lateral much shorter than the middle one, sometimes 0. Fl. B. I. v. 7, p. 227 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439. *Stipa aristoides,* Stapf, ex Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 358 ; Prain, Beng. Pl. p. 1211.—Flowers : Oct.

Lisboa without locality in Herb. Kew, 5 ! ; *Woodrow* without locality, 19 ! DECCAN : *Woodrow,* 124 !, *Lisboa* ; Lanoli, *Woodrow* ; Junnar (Poona districts), *Woodrow.* S. M. COUNTRY : Dharwar, *Talbot,* 2910 ! KANARA : *Law* !—DISTRIB. India (Central India, Nagpur, W. Bengal, W. Peninsula) ; S. Persia.

42. HELEOCHLOA, Host.

Rigid annual or perennial erect or prostrate grasses. Leaves flat or convolute. Spikelets 1-flowered, densely imbricate, in cylindric spike-like panicles laterally compressed ; rhachilla not produced beyond the floral glume. Glumes 3, scarious, the invol.-glumes subequal or the lower shorter, keeled, 1-nerved, persistent ; floral glume

equalling the upper invol.-glume or longer, ovate or oblong, loosely 1-nerved, enwrapping the grain, membranous; palea oblong, obtuse or 2-fid, 2-nerved. Lodicules 2. Stamens 2 or 3. Styles elongate. Grain ovoid or ellipsoid, loose in the glume and palea.—DISTRIB. Species few, Oriental.

Annual; stems prostrate; panicles less than 1 in. long; filaments of anthers not thickened at the base; a herb of dry ground	1. *H. schœnoides.*
Perennial; stems erect or ascending; panicles reaching 3½ in. long; filaments of anthers thickened at the base; a herb of salt-water creeks	2. *H. dura.*

1. **Heleochloa schœnoides,** *Host, Gram.* v. 1 (1801) p. 23, t. 30. Annual; stems prostrate, spreading in a circle round the root, 1—6 in. long, glabrous, smooth, more or less striate, rigid; nodes glabrous. Leaves 1—2 in. long, narrowly lanceolate, acuminate; sheaths more or less inflated, ribbed, hairy at the mouth and with membranous (sometimes ciliate) margins; ligule a dense ring of long slender hairs. Inflorescence a spike-like ovoid-oblong, compressed panicle ½—¾ in. long, sessile on the greatly dilated sheath of the uppermost leaf. Spikelets densely imbricate, ⅛ in. long. Glumes 3; lower invol.-glume 1/10 in. long, linear-lanceolate, folded, glabrous except for the ciliate keel, scarious, 1-nerved; upper invol.-glume a little longer than the lower, ovate-lanceolate, acute, scarious, with ciliate keel, 1-nerved; floral glume nearly ⅛ in. long, broadly ovate, acute, membranous, 1-nerved, the keel nearly glabrous; palea oblong, obtuse. Stamens usually 3; filaments very long, not thickened at the base; anthers small. Grain 1/20 in. long, oblong-ellipsoid, compressed. Fl. B. I. v. 7, p. 235; Duthie, Fodd. Grass. N. Ind. p. 48; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers: Dec.

SIND: Bhubak, *Cooke!*, *Woodrow.*—DISTRIB. India (Panjáb, W. Himalaya, Kashmir, Bandelkand, Sind); westward to the Atlantic.

2. **Heleochloa dura,** *Boiss. Fl. Orient.* v. 5 (1881) p. 477. Perennial, pale, clothed all over with minute velvety pubescence; stems stout, ascending, 6—10 in. long, densely fastigiate from a woody inclined base which is clothed with leaf-sheaths, about 1/10 in. in diam., hard, few-leaved; nodes glabrous. Leaves 3—6 in. long, involute, terete, rigid, pungent; sheaths short, coriaceous, glabrous; ligule a narrow line of hairs. Inflorescence a spike-like panicle reaching 3½ by ⅛ in., solitary at the top of the stem. Spikelets densely imbricate; 1/10 in. long. Glumes 3, all 1-nerved and with ciliate keels; lower invol.-glume 1/16 in. long, linear-oblanceolate, acute, apiculate; upper invol.-glume 1/12 in. long, linear-oblanceolate, apiculate; floral glume 1/10 in. long, elliptic-oblong, obtuse, mucronate; palea 1/12 in. long, 2-fid, with obtuse ciliate lobes, 2-nerved. Stamens usually 2, less commonly 3; filaments very long, thickened at the base; anthers short. Fl. B. I. v. 7, p. 236; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers: Dec.

Dalzell without locality in Herb. Kew.! GUJARAT: Dwarka (Kathiawar), *Woodrow.* SIND: salt-water creeks, *Stocks,* 455!—DISTRIB. Arabia.

43. WOODROWIA, Stapf.

Annual. Leaves narrow, flat. Panicle terminal, contracted, pedunculate ; rhachis short ; branches very slender, simple. Spikelets 2—5, girt at the base with short shining hairs, 1-flowered, arranged along the inarticulate branches of the panicle, articulated with the pedicel which is dilated at the apex, laterally compressed, the flower hermaphrodite. Glumes 3 ; invol.-glumes empty, acute, more or less thickened on the rounded back, obscurely 1-nerved ; lower invol.-glume longer and broader than the upper ; floral glume about as long as the upper invol.-glume, hyaline, 1-nerved, 2-lobed at the apex, with a slender geniculate awn between the lobes ; palea hyaline. Lodicules 2, cuneate, lobulate. Stamens 2. Styles distinct ; stigmas narrowly plumose, laterally exserted. Grain slender, cylindric, free within the glumes.—DISTRIB. W. Peninsula of India ; species 1.

1. **Woodrowia diandra,** *Stapf, in Hook. Icon. Pl.* (1896) t. 2447. An annual grass 1½—2 ft. high. Lower leaves 3—4 by $\frac{1}{12}$—$\frac{1}{8}$ in., narrowly linear, setaceously acuminate ; uppermost leaves reduced or entirely suppressed, hirsute, margins scabrid ; sheaths close, glabrous or hairy at the mouth ; ligule short, truncate, ciliolate. Panicle about 2 in. long ; rhachis slender ; pedicels very short, $\frac{1}{25}$ in. long ; branches of panicle about 4. Spikelets ¼ in. long, rather distant, green or tinged with violet. Glumes 3 ; lower invol.-glume more or less dorsally hairy, with ciliolate margins ; upper invol.-glume with a densely ciliate keel ; floral glume 2-lobed, with a geniculate awn about ½ in. long from the sinus ; column of awn ⅛ in. long, spirally ciliate, brown, the upper part of the awn yellow, longer than the column ; palea obovate-oblong, hyaline, nerveless. Lodicules unequally lobed. Grain yellow, glabrous, ¼—⅓ in. long. Fl. B. I. v. 7, p. 241 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers : Sept.—Oct. VERN. *Kotir.*

DECCAN : Lanoli, *Woodrow*, 241—DISTRIB. India, W. Peninsula.

44. GARNOTIA, Brongn.

Erect, perennial (rarely annual), stout or slender grasses. Leaves flat or convolute. Spikelets paniculate, very small, narrow, terete, 1-flowered, solitary or 2-nate, jointed on their pedicels ; rhachilla not produced beyond the floret. Glumes 3 ; invol.-glumes subequal, lanceolate, acute, acuminate or awned, strongly 3-nerved, empty ; floral glume as long as the invol.-glumes, lanceolate, acuminate or awned, thinly coriaceous or membranous, quite smooth, faintly 1-nerved, paleate, 2-sexual, tip acute or minutely 2-dentate ; awn rarely jointed, sometimes geniculate, slender, scaberulous ; palea as long as the glume, linear, the lobes minutely auricled at the base. Lodicules 2. Stamens 3 ; anthers linear. Styles free ; stigmas with simple hairs, laterally exserted. Grain linear or oblong, dorsally compressed, free within the glume and palea.—DISTRIB. Species about 20, Asiatic and Polynesian.

Leaves 1—2 in. long; a small plant 2—8 in. high growing on trees amongst moss	1. *G. arborum.*
Leaves 3—8 in. long; a terrestrial plant 1—2 ft. high	2. *G. stricta.*

1. **Garnotia arborum,** *Stapf, MS. ex Woodrow, in Journ. Bomb. Nat.* v. 13 (1901) p. 439. A low stiff erect annual grass 2—8 in. high, growing on trees amongst moss ; stems tufted, terete, smooth, shining, glabrous, often tinged with red ; nodes pubescent. Leaves 1—2 by $\frac{1}{16}$—$\frac{1}{8}$ in., linear, acuminate, glabrous ; sheaths glabrous, striate ; ligule a narrow lacerate membrane. Inflorescence paniculate ; branches 2—3, fascicled on the rhachis, the clusters $\frac{1}{4}$—$\frac{3}{4}$ in. apart, angular, stout, truncate. Spikelets 1-flowered, articulate on the ends of the branches, early deciduous. Lower invol.-glume $\frac{1}{10}$—$\frac{1}{8}$ in. long, membranous, 3-nerved, the nerves hispid, the midrib produced into an awn equalling the glume or less ; upper invol.-glume similar ; floral glume nearly equalling the invol.-glumes, but more coriaceous, 2-toothed, with an awn $\frac{3}{4}$ in. long from between the teeth, obscurely nerved ; palea hyaline, slightly smaller than the glume, acute, with large flaps at the base, nerveless. Stamens 3 ; anthers $\frac{1}{10}$ in. long. Grain $\frac{1}{10}$ in. long, ovoid-lanceolate, acute at the apex, rounded at the base.—Flowers : Sept.

DECCAN : on trees at Nandgaon on the crest of the Ghâts 10 miles S. of Lanoli, *Woodrow,* 30!—DISTRIB. India (W. Peninsula).

2. **Garnotia stricta,** *Brongn. in Duperr. Voy. Bot.* (1829) p. 133, t. 21. Annual ? ; stems 1—2 ft. long, tufted, geniculate and often branched at the base, smooth, glabrous. Leaves 3—8 by $\frac{1}{10}$—$\frac{3}{8}$ in., lanceolate or linear-lanceolate, glabrous or hirsute, or scabrous above, the margins flat or hirsute ; sheaths usually glabrous ; ligule a narrow ciliate membrane. Panicle 2—8 in. long, very narrow ; branches in distant fascicles, scaberulous. Spikelets pale, $\frac{1}{10}$—$\frac{1}{8}$ in. long, sparsely hairy at the base. Lower invol.-glume ovate-lanceolate, finely acuminate, 3-nerved, the midnerve sometimes excurrent ; upper invol.-glume similar ; floral glume entire or notched, usually awned, the awn $\frac{1}{2}$ in. long or less. Fl. B. I. v. 7, p. 243 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439 ; Prain, Beng. Pl. p. 1214 ; Watt, Dict. Econ. Prod. v. 3, p. 483.

KONKAN : between Neral and Karjat, *Woodrow*!—DISTRIB. India (Himalayas, Khasia Hills, Behar, W. Peninsula) ; Sandwich Islands.

45. TRACHYS, Pers.

A diffuse softly villous annual grass. Leaves ovate-lanceolate. Inflorescence of 2—3 spikes radiating from the top of a long peduncle ; rhachis broad, herbaceous, jointed, each joint bearing on the under surface at the articulation a solitary globose cluster of 2—3 perfect 1-flowered glabrous spikelets surrounded by many short spinescent glumes of imperfect ones. Glumes 4, very unequal ; lower invol.-glume minute, tooth-like ; upper invol.-glume elongate, linear-lanceolate, very acute, membranous, strongly nerved ; lower floral glume much the largest, obliquely ovate or obovate-oblong, cuspidately acuminate, rigidly coriaceous, 9-many-nerved, paleate, empty,

the palea minute ; upper floral glume much shorter and narrower than the lower one, linear-oblong, acuminate, chartaceous, smooth, dorsally convex, with incurved margins, 2-sexual ; palea as long as the glume, acuminate, hyaline, the margins inflexed below the middle. Lodicules very minute or 0. Stamens 3 ; anthers linear. Styles very long ; stigmas slender, penicillate, exserted at the top of the glume. Grain oblong, compressed, free within the glume and palea.—DISTRIB. India, Ceylon ; species 1.

1. **Trachys mucronata,** *Pers. Syn.* v. 1 (1805) p. 85. Stems 6—18 in. long, ascending or prostrate, leafy, glabrous ; nodes villous. Leaves 1—4 by $\frac{1}{4}$—$\frac{1}{2}$ in., ovate-lanceolate, acuminate, flaccid, softly villous on both surfaces, margins often crisped, base rounded ; sheaths glabrous or hairy ; ligule a thin membrane. Peduncles reaching 8 in. long, slender, shining. Spikes 1—2 by $\frac{1}{10}$—$\frac{1}{8}$ in., stipitate, the stipes $\frac{1}{10}$—$\frac{1}{4}$ in. long, glabrous and more or less angular ; rhachis rigidly herbaceous, with a broad flat midrib and broad closely nerved wings. Clusters of spikelets reaching $\frac{1}{4}$ in. in diam., often partially sunk in a concavity of the rhachis ; perfect spikelets reaching $\frac{1}{4}$ in. long, the imperfect much shorter. Glumes 4 ; lower invol.-glume $\frac{1}{16}$—$\frac{1}{12}$ in. long, lanceolate, acute ; upper invol.-glume $\frac{1}{8}$ by $\frac{1}{16}$ in., linear-lanceolate, very acute, 3-nerved, hyaline ; lower floral glume $\frac{1}{8}$ by $\frac{1}{8}$ in., broadly and obliquely ovate or obovate, cuspidately acuminate, with many green nerves, paleate, the palea $\frac{1}{20}$ in. long, oblong, obtuse, hyaline ; upper floral glume $\frac{1}{8}$ by $\frac{1}{16}$ in., ovate, acute. Fl. B. I. v. 7, p. 96 ; Trim. Fl. Ceyl. v. 5, p. 186 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435. *Panicum squarrosum,* Retz. Obs. fasc. 4 (1786) p. 15 ; Roxb. Cor. Pl. v. 3, t. 206.—Flowers : Aug. VERN. *Devabhata.*

S. M. COUNTRY : Dharwar, *Woodrow* ; Badami, *Cooke* !, *Woodrow* !—DISTRIB. India (W. Peninsula) ; Ceylon.

46. **TRAGUS,** Haller.

Annual or perennial grasses ; stems erect, ascending or decumbent. Leaves linear, rather rigid, with cartilaginous spinulously ciliate margins ; ligule a delicate ciliate rim. Spikelets in deciduous clusters of 2—4, on the filiform continuous axes of cylindric spike-like racemes or panicles. Lower invol.-glume minute, hyaline or suppressed ; upper invol.-glume 5-ribbed or 5-nerved, membranous between the hispid or spinous-hooked ribs or nerves, exceeding the floral glume ; floral glume solitary, lanceolate or oblong-lanceolate, membranous, 3-nerved, 2-sexual ; palea as long as the glume, 2-nerved. Lodicules 2, broad, cuneate, fleshy. Stamens 3. Styles distinct, very slender ; stigmas narrow, plumose, exserted from the top of the glume. Grain oblong to ellipsoid, free within the glume and palea.—DISTRIB. Species 2 ; one in South Africa, the other throughout the warmer parts of both hemispheres.

1. **Tragus racemosus,** *Scop. Introd.* (1777) p. 73. Stems tufted, leafy below, simple or branched, the branches often fasciculate and densely leafy, geniculate, ascending from a decumbent base or wholly

decumbent, from a few inches to 1 ft. long ; nodes glabrous. Leaves variable in length, ¼—1½ by $\frac{1}{10}$—⅛ in., linear-lanceolate, acuminate, flat or undulate, rigid, very glaucous, subpungent, smooth, with pectinately ciliate margins, closely striate ; lowest sheaths short, broad, pale, the intermediate ones more or less herbaceous, the uppermost tumid, usually embracing the base of the panicle ; ligule a slender ciliate rim. Inflorescence a cylindric spike-like panicle ¾—3 in. long ; rhachis slender, straight or slightly undulate, pubescent. Spikelets ⅛ in. long, acute, usually 2 facing each other and appearing like a single spikelet with 2 equal echinate glumes ; pedicels stout, about $\frac{1}{30}$ in. long. Glumes 3 or 2 ; lower invol.-glume very minute, about $\frac{1}{60}$ in. long, hyaline, often suppressed ; upper invol.-glume ⅛ in. long, slightly curved, involute, enveloping the floral glume, strongly 5-ribbed, with rows of stout hooked spines along the ribs, thin between the ribs ; floral glume solitary, $\frac{1}{12}$ in. long, oblong-lanceolate, shortly apiculate. Fl. B. I. v. 7, p. 97 ; All. Fl. Pedem. v. 2 (1785) p. 241 ; Trim. Fl. Ceyl. v. 5, p. 187 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435 ; Prain, Beng. Pl. p. 1186. *Lappago biflora*, Roxb. Fl. Ind. v. 1 (1832) p. 281 ; Grah. Cat. p. 234. *Lappago aliena*, Spreng. Neue Entdeck. v. 3 (1822) p. 15 ; Dalz. & Gibs. p. 295.—Flowers : Sept.

KONKAN : Salsette, *Graham*. DECCAN : Bijapur, *Cooke* !, *Woodrow* ! ; Poona, *Jacquemont*, 386 ! S. M. COUNTRY : Badami, *Woodrow* ! GUJARAT : Domas, near Surat, *Law* ex *Graham* ; Rajkot (Kathiawar), *Woodrow*. SIND : *Stocks* !, *Dalzell & Gibson*.—DISTRIB. More or less throughout the dry plains of India ; Ceylon, all warm countries, Southern Europe.

47. **LATIPES,** Kunth.

A perennial rather rigid grass. Leaves subulate, convolute. Spikelets 1-flowered, in simple spike-like racemes, 2-seriate (1 usually imperfect), persistent on the flattened truncate spreading articulate pedicels ; rhachis flexuous. Glumes 3 ; invol.-glumes thickly coriaceous ; lower invol.-glume usually the longest, narrow, recurved, 3-nerved, with pectinate margins, dorsally smooth ; upper invol.-glume lanceolate, spinulously tuberculate, embracing the floral glume ; floral glume solitary, shorter than the upper invol.-glume, oblong, acute, hyaline ; palea minute, linear-oblong. Lodicules 2, hyaline. Stamens 3 ; anthers oblong. Styles free. Grain free, obliquely ovoid-lanceolate.—DISTRIB. India, Beluchistan, Arabia, Abyssinia, Senegal ; species 1.

1. **Latipes senegalensis,** *Kunth, Revis. Gram.* v. 1 (1829) p. 261, t. 42. Stems 3—12 in. long, wiry, creeping, with many erect or spreading branches, leafy. Leaves 1—3 in. long, subulate, convolute ; sheaths glabrous, the mouth hairy ; ligule 0. Racemes 2—6 in. long ; rhachis glabrous ; pedicels distant, $\frac{1}{10}$ in. long, cuneate, flattened, with winged and ciliate margins, bearing at the broad apex 2 purplish-brown spikelets one perfect, the other not. Glumes 3 ; lower invol.-glume rather more than ⅛ in. long, lanceolate, narrow, recurved, 3-nerved, with pectinate margins, purplish-brown ; upper invol.-glume rather more than $\frac{1}{10}$ in. long, ovate-lanceolate,

purplish-brown, tuberculate on the back ; floral glume solitary, $\frac{1}{16}$ in. long, ovate-oblong, acute, hyaline. Fl. B. I. v. 7, p. 97 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435.—Flowers : Sept.

SIND : Jemadar ka Landa near Karachi, *Stocks*, 1186 ! ; 20 miles N. of Karachi, *Woodrow*.

48. **ZOYSIA,** Willd.

A small rigid glabrous grass, with a long wiry rootstock giving off short erect leafy branches terminating in solitary pedunculate spike-like racemes. Leaves distichous, subulate, concave, pungent. Spikelets ovoid, laterally compressed, 1-flowered, articulate on short or rather long stout angular pedicels appressed to a rigid rhachis. Glumes 2 ; invol.-glume empty, rigidly coriaceous, the margins closely appressed as if connate, with a membranous tip, nerveless ; floral glume much smaller than and completely enclosed in the invol.-glume, ovate-lanceolate, hyaline, 1-nerved ; palea linear-oblong, hyaline. Lodicules 0. Stamens 3 ; anthers long. Styles very long, connate below ; stigmas plumose, exserted at the top of the spikelet. Grain oblong, free within the glume and palea.—DISTRIB. Tropical Asia, Australia, and Mauritius ; species 1.

1. **Zoysia pungens,** *Willd. in Ges. Naturf. Fr. Neue Schrift.* v. 3 (1801) p. 441. Rootstock rigid, wiry, up to 2—3 ft. long, the branches interlaced and rooting, sending up short leafy stems 6—10 in. high. Leaves 1—3 in. long, coriaceous, dorsally rounded, subulate, concave, pungent ; sheaths short ; ligule a narrow ciliolate membrane. Racemes 1—1½ in. long, strict, erect. Spikelets $\frac{1}{8}$ in. long, erect ; pedicels usually short, angular. Invol.-glume biconvex, much compressed at the membranous tip, smooth and shining, thickly coriaceous ; floral glume shorter and much narrower, hyaline ; palea linear-oblong, nerveless. Fl. B. I. v. 7, p. 99 ; Trim. Fl. Ceyl. v. 5, p. 188 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435 ; Prain, Beng. Pl. p. 1186.

GUJARAT : Damaun, *Lisboa*. I have seen no specimens from the Bombay Presidency ; there are none in Herb. Kew.—DISTRIB. of the genus.

49. **PEROTIS,** Ait.

Small annual or subperennial grasses ; stems tufted, leafy. Leaves usually broad, rigid and ciliate ; ligules hyaline or 0. Spikelets very small, linear-lanceolate, sessile or subsessile on the continuous rhachis of a spike or a lax spike-like raceme, articulate on and falling entire from the rhachis or the very short pedicels. Glumes 3 ; invol.-glumes equal, empty, linear-lanceolate, rigidly membranous, with a strong midrib produced into a long capillary awn ; floral glume solitary, lanceolate, acute, hyaline, 1-nerved, 2-sexual ; palea narrow, hyaline, nerveless. Lodicules 2, broad, cuneate. Stamens 3. Styles short ; stigmas plumose, laterally exserted. Grain cylindric, slender, exserted from the unchanged floret and enclosed with it in the invol.-glumes.—DISTRIB. Species 2 or 3, in the Tropics of the Old World and in subtropical Australia.

1. **Perotis latifolia,** *Ait. Hort. Kew.* v. 1 (1789) p. 85. Stems tufted, geniculate, suberect, ascending, 3—15 in. long, glabrous. Leaves ½—1½ by ⅛—⅓ in., ovate or lanceolate, from a broad amplexicaul base, acute or acuminate, flat or somewhat undulate, glaucous, with rigidly ciliate margins; ligule 0. Racemes slender, 2—8 in. long, dense; rhachis subterete, glabrous. Spikelets 1/12 in. long, narrowly linear, subterete, scaberulous. Invol.-glumes equal and similar, often purple, linear-lanceolate, each with a long scaberulous awn reaching sometimes as much as ⅝ in. long, purple or yellow; floral glume solitary, very narrowly linear, rather shorter than the invol.-glumes. Grain 1/16 in. long, almost cylindric. Fl. B. I. v. 7, p. 98; Grah. Cat. p. 237; Dalz. & Gibs. p. 296; Trim. Fl. Ceyl. v. 5, p. 189; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1186.—Flowers: Oct.—Aug. VERN. *Kuras.*

KONKAN: Malwán, *Woodrow.* S. M. COUNTRY: Badami, *Cooke!*, *Woodrow!* GUJARAT: Baroda, *Cooke!*; Surat, *Lisboa*; Domas (near Surat), *Dalzell & Gibson.*—DISTRIB. More or less throughout India; Ceylon, S. Africa.

50. SPOROBOLUS, Br.

Perennial (rarely annual) glabrous grasses, erect or prostrate, or creeping. Leaves narrow, flat or convolute. Spikelets 1-flowered, small or minute, in effuse or contracted panicles, articulate on their pedicels; rhachilla not produced beyond the palea. Glumes 3, usually membranous, 1-nerved or nerveless; invol.-glumes empty, unequal, separately caducous; floral glume not articulate at the base, ovate or oblong, obtuse or acute; callus very short, glabrous; palea as long as the glume and of similar texture, broadly oblong, often dorsally narrowly inflexed along the median line, with a nerve-like ventral ridge along which the palea splits between the two very close often very obscure nerves. Lodicules very minute or 0. Stamens 2—3; anthers short or long. Styles 2, free; stigmas very short. Grain oblong, obovoid or pyriform, free within the glume and palea, with a loose hyaline pericarp.—DISTRIB. Species about 70, in tropical and subtropical regions of both hemispheres.

Invol.-glumes both shorter than the floral glume.	
Stamens 2.	
Stems 1—3 ft. high; panicle reaching 10 in. long; spikelets 1/20—1/16 in. long	1. *S. diander.*
Whole plant scarcely 6 in. high; panicle ¾—1 in. long; spikelets 1/16—1/12 in. long	2. *S. sindicus.*
Stamens 3.	
Panicle narrow, ½—¾ in. broad; spikelets reaching 1/10 in. long	3. *S. indicus.*
Panicle reaching 3 in. broad.	
Panicle 12—18 in. long; spikelets 1/12 in. long	4. *S. multiflorus.*
Panicle 4—6 in. long; spikelets 1/12 in. long	5. *S. ioclados.*
Lower invol.-glume as long as the floral glume or nearly so; panicle interrupted	6. *S. glaucifolius.*
Lower invol.-glume much shorter than either of the two others; upper invol.-glume as long as or longer than the floral glume.	
Panicle contracted.	
Annual; upper invol.-glume longer than the floral glume	7. *S. pilliferus.*

Perennial; upper invol.-glume about equalling the floral glume ..... 8. *S. orientalis.*
Panicle effuse.
Spikelets $\frac{1}{10}$ in. long ..... 9. *S. arabicus.*
Spikelets $\frac{1}{20}$ in. long ..... 10. *S. coromandellianus.*

1. **Sporobolus diander,** *Beauv. Agrost.* (1812) p. 26. Annual or perennial; stems tufted, 1—3 ft. high, slender, smooth; nodes glabrous. Leaves 4—10 by $\frac{1}{25}$—$\frac{1}{16}$ in., with filiform tips, flat or convolute, smooth, strongly nerved; sheaths smooth, ribbed, the lower short, the upper very long; ligule a very narrow ridge of minute hairs. Panicle reaching 10 by 2 in., erect, narrowly pyramidal; rhachis slender, quite smooth; branches capillary, erect or spreading, naked at the base, $\frac{1}{4}$—2 in. long, with numerous very minute spikelets racemosely arranged along the branchlets. Spikelets $\frac{1}{20}$—$\frac{1}{18}$ in. long; pedicels very short. Glumes 3; lower invol.-glume very short, scarcely $\frac{1}{50}$ in. long, broadly oblong, nerveless, hyaline, with erose tip; upper invol.-glume about $\frac{1}{30}$ in. long, broadly elliptic-oblong, hyaline, obscurely 1-nerved; floral glume $\frac{1}{20}$—$\frac{1}{18}$ in. long, broadly ovate-oblong, subacute, 1-nerved; palea plicate in the median line. Stamens 2. Grain obovoid, truncate, obtusely quadrangular, umbonate by the loose pericarp, red-brown, rugulose. Fl. B. I. v. 7, p. 247; Dalz. & Gibs. p. 296; Trim. Fl. Ceyl. v. 5, p. 260; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Prain, Beng. Pl. p. 1213; Watt, Dict. Econ. Prod. v. 6, part 3, p. 341.

DECCAN: Poona, *Jacquemont,* 352!—DISTRIB. Throughout India; Ceylon, Asia, Tropical Australia.

2. **Sporobolus sindicus,** *Stapf, MS. in Herb. Kew.* A low perennial 4—5 in. high; roots stout, wiry; stems densely tufted, the barren ones subwoody, $\frac{1}{12}$ in. in diam., clothed below with numerous withered leaf-sheaths, the flowering stems lateral from the barren ones, slender. Leaves pungent, those of the barren stems crowded, short, ovate-lanceolate to narrowly lanceolate, $\frac{1}{4}$—$\frac{1}{2}$ in. long, with spinous margins, those of the flowering stems narrowly linear, acuminate, distant, often with distantly spinous margins; sheaths closely appressed to the stem, ribbed; ligule a very narrow ciliate membrane. Panicle $\frac{3}{4}$—1 in. long, contracted, often spike-like; branches erect or ascending, filiform, densely clothed with spikelets. Spikelets $\frac{1}{16}$—$\frac{1}{12}$ in. long, ovoid, acute; pedicels short. Glumes 3, hyaline; lower invol.-glume $\frac{1}{25}$ in. long, ovate, acute, nerveless; upper invol.-glume $\frac{1}{20}$ in. long, oblong, obtuse, nerveless; floral glume $\frac{1}{16}$ in. long, ovate, obtuse (acute when folded), 1-nerved; palea shorter than the glume, oblong, truncate. Stamens 2. Grain $\frac{1}{30}$ in. long, broadly obovoid, compressed, reddish-brown.—Flowers: Nov.

SIND: 20 miles from Karachi, *Woodrow*! There is but one sheet of this plant in Herb. Kew., collected by Woodrow.

3. **Sporobolus indicus,** *Br. Prodr.* (1810) p. 170. Perennial; stems 2—3 ft. high, densely tufted, stout; internodes long; nodes glabrous. Leaves mostly crowded near the base, 1—2 ft. long, very slender, wiry, flexuous, convolute (rarely flat), with long filiform tips, quite smooth; sheaths smooth, ribbed; ligule a ridge of minute hairs. Panicles 1—1½ ft. long by ½—¾ in. broad, often interrupted; rhachis

slender, smooth ; branches very short, densely crowded, erect, covered to the base with imbricate green spikelets. Spikelets $\frac{1}{12}$—$\frac{1}{10}$ in. long ; pedicels very short. Glumes 3 ; lower involucre-glume about $\frac{1}{16}$ in. long, broadly oblong, nerveless, hyaline ; upper involucre-glume $\frac{1}{12}$ in. long, broadly oblong, hyaline, nerveless ; floral glume $\frac{1}{12}$—$\frac{1}{10}$ in. long, broadly ovate, 1-nerved ; palea plicate in the median line. Stamens 3. Grain $\frac{1}{20}$ in. long, obovoid, quadrangular, truncate, umbonate by the loose pericarp, red-brown, rugulose. Fl. B. I. v. 7, p. 247 ; Trim. Fl. Ceyl. v. 5, p. 261 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439 ; Prain, Beng. Pl. p. 1213 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 341.—Flowers : Oct.

DECCAN : Kolhapur, *Woodrow*.—DISTRIB. Throughout India ; Ceylon, most warm countries.

4. **Sporobolus minutiflorus,** *Ling, Hort. Reg. Berol.* v. 1 (1827) p. 88. Stem 2—3 ft. high, slender, smooth ; nodes glabrous. Leaves 6—10 by $\frac{1}{12}$—$\frac{1}{8}$ in., flat, finely acuminate, with smooth margins ; sheaths long, ribbed, smooth ; ligule a minute ring. Panicle 12—18 in. long, reaching 3 in. broad, effuse, supra-decompound ; branches capillary. Spikelets $\frac{1}{24}$ in. long, dark-colored. Glumes 3 ; lower involucre-glume about $\frac{1}{60}$ in. long, subquadrate ; upper involucre-glume $\frac{1}{50}$ in. long, broadly ovate, subobtuse, nerveless ; floral glume $\frac{1}{24}$ in. long, ovate-oblong, subobtuse, nerveless ; palea shorter, broad, truncate. Stamens 3, quickly falling with age. Grain $\frac{1}{30}$ in. long, obovoid, compressed. Fl. B. I. v. 7, p. 248 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers : Oct.

KONKAN : Parel (Bombay), *Woodrow* !—DISTRIB. India (W. Peninsula).

5. **Sporobolus ioclados,** *Nees, Fl. Afr. Austr.* (1841) p. 161. An elegant perennial grass ; stems 10—18 in. long, densely tufted, rather stout, erect, smooth, glabrous ; nodes glabrous. Leaves 2—4 by $\frac{1}{10}$—$\frac{1}{8}$ in., flat or convolute, linear, tapering to a fine point ; sheaths ribbed, glabrous, smooth ; ligule a pubescent ridge. Panicle 4—6 by 2—3 in., ovate or subpyramidal, effuse ; branches opposite, or alternate, or the lower whorled, spreading, remotely branched, filiform, smooth. Spikelets $\frac{1}{12}$ in. long, oblong-lanceolate, pale. Glumes 3 ; lower involucre-glume $\frac{1}{30}$ in. long, oblong-lanceolate, hyaline ; upper involucre-glume $\frac{1}{16}$ in. long, ovate, acute, 1-nerved ; floral glume $\frac{1}{12}$ in. long, ovate-lanceolate, acute, 1-nerved ; palea slightly shorter than the glume, oblong, obtuse. Stamens 3, anthers $\frac{1}{30}$ in. long. Grain linear-oblong, $\frac{1}{30}$ in. long. Fl. B. I. v. 7, p. 249 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.

SIND : *Stocks* !—DISTRIB. S. Africa.

6. **Sporobolus glaucifolius,** *Hochst. in Flora,* v. 25, part 1 (1842) *Beibl.* p. 133 (*nomen nudum*), et ex *Steud. Syn. Pl. Gram.* (1855) p. 154 (under *Vilfa*). Perennial ; stems 12—18 in. long, densely tufted, leafy ; nodes glabrous. Leaves 1½—5 by $\frac{1}{10}$—$\frac{1}{8}$ in., narrowed from a subcordate base to an acuminate tip, strict, glaucous, flat or undulate, not pungent ; sheaths ribbed, glabrous ; ligule a line of hairs. Panicle 3—5 in. long, contracted, interrupted, pale yellowish-white ; branches short, erect. Spikelets crowded, $\frac{1}{12}$ in. long ; pedicels

very short. Glumes 3; lower invol.-glume $\frac{1}{16}$ in. long, lanceolate, hyaline, acutely acuminate, 1-nerved; upper invol.-glume $\frac{1}{12}$ in. long, broader than the lower, ovate-lanceolate, acutely acuminate, hyaline, 1-nerved; floral glume $\frac{1}{16}$ in. long, ovate, acute, 1-nerved; palea as long as the glume. Stamens 3; filaments very short; anthers $\frac{1}{30}$ in. long. Fl. B. I. v. 7, p. 250; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.—Flowers: Nov.

Dalzell without locality in Herb. Kew! SIND: *Stocks*, 666!; Karachi, *Woodrow*, 18!—DISTRIB. India (Panjáb, W. Peninsula); Tropical Africa.

7. **Sporobolus piliferus,** *Kunth, Enum. Pl.* v. 1 (1833) p. 211 (var. *a*). Annual; stems 3—12 in. high, tufted, erect; roots fibrous. Leaves 1—4 by $\frac{1}{16}$—$\frac{1}{10}$ in., chiefly radical, narrowed from the base to a fine point, flat or convolute, with scabrid or subserrulate margins; sheaths hairy at the mouth; ligule a minute narrow line. Panicle linear, 1—3 in. long, strict, erect, dense-flowered, often interrupted; branches very short, erect. Spikelets $\frac{1}{16}$—$\frac{1}{12}$ in. long, pale brown; pedicels short. Glumes 3; lower invol.-glume $\frac{1}{20}$ in. long, ovate-lanceolate, hyaline, nerveless; upper invol.-glume $\frac{1}{12}$ in. long, oblong-lanceolate, 1-nerved, slightly longer than the floral glume; floral glume $\frac{1}{16}$ in. long, oblong, obtuse, 1-nerved; palea oblong. Stamens 2. Grain ellipsoid, compressed, with a very loose pericarp, reddish-brown. Fl. B. I. v. 7, p. 251; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439.

S. M. COUNTRY: Belgaum, *Ritchie*, 836!—DISTRIB. India (W. Himalaya, Khasia Hills, Nilghiri Hills, W. Peninsula); Malacca.

8. **Sporobolus orientalis,** *Kunth, Enum. Pl.* v. 1 (1833) p. 211. Stoloniferous, growing on saline soils; stolons stout or slender, rooting at the nodes; stems 6—18 in. high, stout at the base, hard, branching; branches and flowering stems usually geniculate below. Leaves coriaceous, variable, 1—8 by $\frac{1}{10}$—$\frac{1}{8}$ in., usually more or less pungent, tapering to the tip, glabrous or hairy above and with scabrous or subserrulate margins; sheaths close, glabrous; ligule a slender ciliate membrane. Panicle narrow, oblong; branches $\frac{1}{2}$—$\frac{3}{4}$ in. long, suberect. Spikelets $\frac{1}{10}$ in. long. Glumes 3, hyaline; lower invol.-glume $\frac{1}{18}$ in. long, ovate-oblong, obtuse, nerveless; upper invol.-glume $\frac{1}{10}$ in. long, ovate, subobtuse, 1-nerved; floral glume ovate-oblong, obtuse, scarcely longer than the upper invol.-glume, 1-nerved; palea ovate-oblong, obtuse, slightly shorter than the glume. Fl. B. I. v. 7, p. 251; Dalz. & Gibs. p. 295; Trim. Fl. Ceyl. v. 5, p. 263; Duthie, Fodd. Grass. N. Ind. p. 49; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 439; Watt, Dict. Econ. Prod. v. 6, part 3, p. 341.—Flowers: Nov.

GUJARAT: Umrat, on salt land, *Woodrow*.—DISTRIB. India (Panjáb, W. Peninsula); Ceylon.

9. **Sporobolus arabicus,** *Boiss. Diagn.* ser. 1, fasc. 13 (1853) p. 47. Perennial; stems many from a woody stoloniferous base, sometimes as thick as the middle finger, and sending out rigid often geniculate stolons and stout or slender flowering branches 6—24 in. high. Leaves 1—10 by $\frac{1}{8}$—$\frac{1}{6}$ in., rigid, narrowed to the tip from the rounded base, flat or convolute, scaberulous above, with finely ciliate-serrulate

margins ; sheaths glabrous ; ligule a fringe of hairs. Panicle 2—6 in. long, effuse ; branches whorled, capillary, reaching 1½ in. long, naked below, with spikelets spicately arranged on the short branchlets. Spikelets $\frac{1}{10}$ in. long ; pedicels short. Glumes 3 ; lower invol.-glume $\frac{1}{30}$ in. long, ovate, subobtuse, hyaline, nerveless ; upper invol.-glume $\frac{1}{10}$ in. long, oblong, obtuse, 1-nerved ; floral glume as long as the upper invol.-glume, oblong, obtuse, 1-nerved ; palea as long as the glume. Grain subglobose. Fl. B. I. v. 7, p. 252 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440.

SIND : *Stocks*, 667! ; Jemadar ka Landa near Karachi, *Stocks*, 663! ; Karachi, *Woodrow* ; between Karachi and Magar Peer, *Wykeham Perry*!—DISTRIB. India (Panjáb) ; Beluchistan, Arabia.

10. **Sporobolus coromandellianus,** *Link, Hort. Reg. Berol.* v. 1 (1827) p. 89 (*in note*) ; *Kunth, Revis. Gram.* v. 1 (1829) p. 68. Annual, densely tufted ; stems 4—12 in. long, erect, ascending or often spreading from the root, copiously leafy at the base. Leaves 1—3 by $\frac{1}{8}$—$\frac{1}{4}$ in., linear-lanceolate, narrowed from the subcordate base to the acuminate tip, spinulosely toothed especially towards the base ; lower sheaths short, terete or compressed, the upper long, hairy at the mouth ; ligule a narrow membrane fringed with long fine hairs. Panicle 2—4 by 1—2½ in., ovate or pyramidal ; branches capillary in rather distant whorls of 3—6, horizontally spreading, naked below, sparingly shortly divided upwards, bearing short minute red spikelets about $\frac{1}{20}$ in. long on short pedicels. Glumes 3, hyaline ; lower invol.-glume very minute, suborbicular, nerveless ; upper invol.-glume $\frac{1}{20}$ in. long, ovate-oblong, subacute, 1-nerved ; floral glume as long, oblong, obtuse, 1-nerved ; palea as long as the glume. Stamens 3 ; anthers small. Grain broadly ellipsoid, compressed, smooth, enclosed in the loose somewhat fleshy reticulate pericarp, pale reddish-brown. Fl. B. I. v. 7, p. 252 ; Dalz. & Gibs. p. 296 ; Trim. Fl. Ceyl. v. 5, p. 264 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440 ; Prain, Beng. Pl. p. 1213. *Agrostis coromandelliana,* Retz. Obs. fasc. 4 (1786) p. 19 ; Grah. Cat. p. 235.—Flowers : Jan.

KONKAN : Bombay, *Law*! SIND : Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (Panjáb, Orissa, Birma, W. Peninsula) ; Ceylon, Africa, Afghanistan.

51. ERAGROSTIS, Beauv.

Annual usually slender glabrous grasses of various habit ; stems erect or ascending. Leaves narrow ; ligule usually reduced to a line of hairs. Spikelets 2—many-flowered, in open or contracted panicles (rarely spicate), strongly laterally compressed, ovate-oblong or linear, not (or rarely) articulate on their pedicels on a simple terminal rhachis ; rhachilla disarticulating above the invol.-glumes and between the floral ones, or tough and persistent, not produced beyond the upper floret. Glumes many, broad, obtuse, acute or mucronate, never awned, thin, dorsally rounded and keeled ; invol.-glumes much shorter than the spikelet, equal or unequal, empty, persistent or separately deciduous, 1 (rarely 3)-nerved, usually merbranous ; floral

glumes imbricating, at length deciduous from the rhachilla, 3-nerved, all 2-sexual or the upper-most and rarely the lowest imperfect, ovate to lanceolate, membranous to chartaceous, usually glabrous, the lateral nerves short, not reaching the midnerve ; paleæ equal to their glumes or slightly shorter, membranous, 2-keeled, deciduous or persistent on the rhachilla. Lodicules 2, small, cuneate, more or less fleshy. Stamens 3 (rarely 2). Styles distinct ; stigmas plumose, laterally exserted. Grain minute, globose, oblong, ovoid or obovoid, free in the glume and palea.—DISTRIB. In warm countries ; species about 100.

Spikelets panicled.
Rhachilla of spikelets more or less jointed and breaking up from above downwards.
Panicle spiciform, compact, 2—3 by ½ in.; rhachis bearded at the nodes; margins of flowering glumes ciliate ..... 1. *E. ciliata.*
Panicle open or more or less contracted; margins of flowering glumes not ciliate.
Spikelets ½ in. long; panicle large, lax, thyrsiform, 8—20 by 4—6 in. ..... 2. *E. aspera.*
Spikelets $\frac{1}{10}$ in. long; panicle short, compact, cylindric, ½—1½ in. long ..... 3. *E. ciliaris* var. *brachystachya.*
Spikelets $\frac{1}{20}$—⅛ in. long; panicles 2—8 in. long.
Grain ovoid; stamens 3.
Stem and rhachis of panicle not viscid below.
Panicle open; nodes bearded ..... 4. *E. tenella* var. *plumosa.*
Panicle very narrow, contracted; rhachis glabrous ..... var. *riparia.*
Stem and rhachis of panicle viscid below... var. *viscosa.*
Grain obovoid; stamens 2; panicle narrow, often interrupted, 6—18 in. long ..... 5. *E. interrupta* var. *Kœnigii.*

Rhachilla of spikelets tough, persistent; flowering glumes falling away from its base upwards.
Spikelets pedicellate.
Spikelets flat, ovate-elliptic or oblong; lateral nerves of flowering glumes very prominent, straight, almost percurrent; paleæ deciduous with their glumes ..... 6. *E. amabilis.*
Spikelets less compressed, linear or linear-oblong; lateral nerves less prominent; when spikelets compressed or lateral nerves prominent, then with persistent paleæ.
Spikelets more or less fascicled on the primary or secondary branches or shortly pedicellate in narrow racemes.
Leaves glaucous; grain oblong ..... 7. *E. gangetica.*
Leaves not glaucous; grain globose or nearly so ..... 8. *E. stenophylla.*
Spikelets not fascicled; long-pedicellate, more or less divaricate when ripe.
Leaf-margins glandular.
Lower invol.-glume 1—3-nerved; upper invol.-glume 3-nerved ..... 9. *E. major.*
Both invol.-glumes 1-nerved ..... 10. *E. minor.*

Leaf-margins eglandular; invol.-glumes 1-nerved.
Spikelets versatile, 1 in. or more long, narrowly linear; branches of panicle solitary ..... 11. *E. tremula.*
Spikelets small, ¼ in. long or less.
Perennial; mouth of leaf-sheath naked; branches of panicle solitary or 2-nate ..... 12. *E. tenuifolia.*
Annual; mouth of leaf-sheath bearded; branches of panicle usually more or less whorled ..... 13. *E. pilosa.*
Spikelets sessile and jointed on the very short densely crowded branches of a tall narrow raceme-like panicle, deciduous, acute, much compressed, imbricate and secund ..... 14. *E. cynosuroides.*
Spikelets distichously spreading, secund, in a long simple terminal spike; keels of palea winged ..... 15. *E. bifaria.*

1. **Eragrostis ciliata,** *Nees, Agrost. Bras.* (1829) p. 512, Obs. 1 (*nomen nudum*). Perennial; stems 1—2½ ft. long, erect or geniculately ascending, terete. Leaves linear-lanceolate, finely acuminate, spreading, 2—6 by $\frac{1}{10}$—$\frac{1}{8}$ in., flat or convolute, smooth, glabrous; sheaths bearded at the mouth; ligule of a few hairs. Panicle spiciform, 2—3 by ½ in., cylindric, compact; branches much shortened; rhachis finely bearded at the nodes. Spikelets $\frac{1}{10}$—$\frac{1}{8}$ in. long, much compressed, 6—12-flowered. Invol.-glumes ovate, acute, hyaline, ciliate; floral glumes $\frac{1}{10}$—$\frac{1}{8}$ in. long, broadly ovate, cuspidately acuminate, subhyaline, very minutely scaberulous, the margins ciliate and the nerves prominent; palea shorter than its glume with ciliate keels. Grain ovoid to ellipsoid, $\frac{1}{15}$ in. long, terete. Fl. B. I. v. 7, p. 313; Dalz. & Gibs. p. 298; Prain, Beng. Pl. p. 1220. *Poa ciliata,* Roxb. Fl. Ind. ed. Wallich, v. 1 (1820) p. 336.

GUJARAT: Domas near Surat, *Dalzell & Gibson.*

This plant has been included on the authority of Dalzell & Gibson in their 'Bombay Flora'. I have seen no specimens from Bombay, nor does Woodrow include the plant in his list in the 'Bombay Journal of Natural History.' Dalzell's description of the plant is accurate.—DISTRIB. India (Chota Nagpur, W. Peninsula); Cochinchina.

2. **Eragrostis aspera,** *Nees, Fl. Afr. Austr.* (1841) p. 408. Annual; stems 8—20 in. high (excluding the panicle), stout, suberect, usually tufted, smooth and shining; nodes glabrous. Leaves 8—18 by ⅛—¼ in., linear, flat, glabrous; sheaths bearded at the mouth, otherwise glabrous; ligule a fringe of long hairs. Panicle lax, open, thyrsiform, oblong to obovate-oblong, 8—20 by 4—6 in.; rhachis terete, scaberulous, bearded at the nodes; branches solitary or falsely whorled, capillary, loosely and repeatedly divided from near the base; pedicels longer than the spikelets, very slender. Pedicels scattered, linear-oblong, ⅛ by $\frac{1}{12}$ in., erect, 4—16-flowered; rhachilla very slender, breaking up. Invol.-glumes subequal, oblong, obtuse, $\frac{1}{12}$ in. long, 1-nerved; floral glumes about $\frac{1}{16}$ in. long, obliquely ovate-oblong, with prominent nerves; palea obscurely and obtusely 3-lobed, the keels scabrid. Stamens 3; anthers $\frac{1}{15}$ in. long. Grain subglobose, about $\frac{1}{16}$ in. in diam. Fl. B. I. v. 7, p. 314;

Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 386 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441.

KONKAN : *Lisboa* ! KANARA : N. Kanara, *Lisboa* !—DISTRIB. India (S. India, W. Peninsula) ; Ceylon, Tropical and S. Africa, Isle of France.

3. **Eragrostis ciliaris,** *Link, Hort. Reg. Berol.* v. 1 (1827) p. 192. VAR. **brachystachya,** *Boiss. Fl. Orient.* v. 5 (1881) p. 582. Stems 6—10 in. long, tufted, geniculately ascending, glabrous, smooth. Leaves 2—3 by $\frac{1}{20}$—$\frac{1}{12}$ in., linear, tapering to a fine point ; sheaths striate, usually bearded at the mouth with long hairs ; ligule a fringe of short hairs. Panicle short, $\frac{1}{2}$—$1\frac{1}{2}$ in. long, oblong, cylindric, appearing hairy from the long cilia of the paleæ ; branches short, suberect. Spikelets $\frac{1}{10}$ in. long, crowded, 6—12-flowered, strongly compressed ; rhachilla breaking up ; pedicels very short. Invol.-glumes subequal, ovate-lanceolate, acute, reaching $\frac{1}{16}$ in. long ; floral glumes $\frac{1}{20}$ in. long, oblong, subtruncate, mucronulate, spreading ; palcæ equal to their glumes and falling with them, the keels with long rigid cilia. Stamens 3 ; anthers very short. Grain elongate-ovoid, about $\frac{1}{50}$ in. long. Fl. B. I. v. 7, p. 314 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441.—Flowers : Nov.

Dalzell without locality in Herb. Kew. ! GUJARAT : Baroda, *Woodrow.* SIND : *Stocks* ! ; Jemadar ka Landa near Karachi, *Stocks* !—DISTRIB. India (Upper Gangetic plain, W. Peninsula) ; Arabia, Tropical Africa.

4. **Eragrostis tenella,** *Roem. & Schult. Syst.* v. 2 (1817) p. 576. A very variable annual with slender densely tufted stems, of which the following varieties are found or said to be found in the Bombay Presidency.

VAR. 1. *plumosa,* Stapf, in Hook. f. Fl. B. I. v. 7 (1896) p. 315. Stems tufted, sometimes reaching 15 in. high or more, and as well as the panicle eglandular. Panicle delicate, open, often flexuous ; rhachis bearded at the nodes ; pedicels distinct, often long. Spikelets 3—9-flowered, $\frac{1}{20}$—$\frac{1}{8}$ in. long. Invol.-glumes unequal, the lower distinctly shorter than the upper ; floral glumes $\frac{1}{30}$ in. long ; keels of the palea pectinately ciliate with long hairs ; anthers minute. Grain ovoid, about $\frac{1}{40}$ in. long. Trim. Fl. Ceyl. v. 5, p. 291 ; Prain, Beng. Pl. p. 1220. *Eragrostis plumosa* (sp.), Link, Hort. Reg. Berol. v. 1 (1827) p. 192 (*not* of Boiss.) ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 385 ; Watt, Dict. Econ. Prod. v. 3, p. 255. *E. tenella,* Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441.—Flowers : Nov. VERN. *Woya* ; *Bakrálu.*

KONKAN : common, *Lisboa.* DECCAN : Poona, *Cooke* !, *Woodrow.* GUJARAT : Surat, *Woodrow.*—DISTRIB. Throughout India ; Ceylon.

VAR. 2. *riparia,* Stapf, in Hook. f. Fl. B. I. v. 7 (1896) p. 315. Stems and panicle eglandular. Panicle delicate, contracted, very narrow, flaccid, 1—3 by $\frac{1}{6}$—$\frac{1}{3}$ in., subcylindric ; rhachis glabrous ; branches very short, erect, smooth, glabrous. Spikelets crowded. Invol.-glumes unequal, the lower $\frac{1}{3}$ shorter than the upper ; floral glumes $\frac{1}{28}$ in. long. Anthers about $\frac{1}{100}$ in. long. Grain $\frac{1}{60}$ in. long, ovoid. Prain, Beng. Pl. p. 1220. *Eragrostis riparia* (sp.), Steud. Syn. Gram. (1855) p. 265. *Poa tenella,* Roxb. Fl. Ind. v. 1 (1832)

p. 337 ; Grah. Cat. p. 236. This has been included on the authority of Graham (*l. c.*), who, however, gives no habitat. I have seen no specimens from the Bombay Presidency.

VAR. 3. *viscosa,* Stapf, in Hook. f. Fl. B. I. v. 7 (1896) p. 315. Stems and rhachis of the panicle more or less viscid. Panicle stiff, stouter and with firmer and more strongly nerved glumes than in vars. *plumosa* and *riparia,* oblong to linear, 2—3 by ½—1 in. ; branches spreading, filiform, often very short ; rhachis usually glabrous (rarely obscurely bearded at the nodes). Spikelets 5—20-flowered, often purplish. Involucral-glumes nearly equal or the lower very slightly shorter than the upper ; floral glumes ⅛—⅒ in. long. Anthers about $\frac{1}{100}$ in. long. Grain ovoid, $\frac{1}{80}$—$\frac{1}{50}$ in. long. Trim. Fl. Ceyl. v. 5, p. 291 ; Prain, Beng. Pl. p. 1220. *Eragrostis viscosa,* Trin. in Mém. Acad. Pétersb. sér. 6, v. 1 (1831) p. 397 ; Dalz. & Gibs. p. 298 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 386. *Poa viscosa,* Retz. Obs. fasc. 4 (1786) p. 20 ; Roxb. Fl. Ind. v. 1 (1832) p. 336 ; Grah. Cat. p. 236.

KONKAN : Malabar Hill (Bombay), *Graham, Dalzell & Gibson, Lisboa* ; Chowpatti (Bombay), *Lisboa.* The viscid substance on the plant has a balsamic odor (*Dalzell & Gibson*).—DISTRIB. India (southern districts) ; Ceylon, Tropical and S. Africa.

5. **Eragrostis interrupta,** *Beauv. Agrost.* (1812) p. 71 (*not* of Roem. & Schult. nor of Trin.). VAR. **Kœnigii,** *Stapf, in Hook. f. Fl. B. I.* v. 7 (1896) p. 316. A tall glabrous annual or perennial grass ; stem erect, 1—3 ft. high or more, smooth and polished ; nodes glabrous. Leaves 3—10 in. long, narrow, flat ; sheaths glabrous, close ; ligule a fimbriate membrane. Panicle erect, 6—18 in. long, contracted ; branches filiform, often distant, 2 or more proceeding from the same level and giving the panicle a verticillate appearance. Spikelets small, $\frac{1}{12}$—⅛ in. long, usually 6—14-flowered, smooth, often tinged with red, pedicellate ; rhachilla articulate between the flowering glumes, glabrous, disarticulating from above downwards. Involucral-glumes subequal, about $\frac{1}{30}$ in. long, ovate-oblong, obtuse, hyaline, 1-nerved ; floral glumes about $\frac{1}{30}$ in. long, ovate-oblong, obtuse ; palea linear-oblong, with smooth or slightly scaberulous keels. Stamens 2 ; anthers small. Grain obovoid. Trim. Fl. Ceyl. v. 5, p. 292 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 ; Prain, Beng. Pl. p. 1220. *Eragrostis Kœnigii,* Link, Hort. Reg. Bot. Berol. v. 2 (1833) p. 294 in syn. *Eragrostis nutans,* Nees, ex Wight, Cat. (1833) n. 1776, et ex Steud. Nom. ed. 2, part 1 (1840) p. 563 ; Dalz. & Gibs. p. 297 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 381 ; Watt, Dict. Econ. Prod. v. 3, p. 255.—Flowers : Nov. VERN. *Chiksi.*

KONKAN : Bassein, *Lisboa* ; Thána, *Lisboa.* DECCAN : Bhowdan near Poona, *Woodrow.* GUJARAT : in water-holes, *Dalzell & Gibson* ; Surat, *Cooke* !, *Woodrow.*—DISTRIB. Throughout India ; Ceylon, Tropical Asia and Africa.

6. **Eragrostis amabilis,** *Wight & Arn. ex Nees, in Hook. & Arn. Bot. Beech. Voy.* (1841) p. 251 (*not* of Linn.). Annual, glabrous ; stems 6—18 in. long, tufted, slender, erect or geniculately ascending, leafy chiefly at the base ; internodes long. Leaves 3—6 by $\frac{1}{10}$—⅛ in., narrowed from a broad subcordate base to an acute tip,

smooth ; sheaths smooth, glabrous ; ligule 0 or obscure. Panicle oblong or ovoid, 2—4 in. long, sparingly branched ; rhachis and nodes glabrous. Spikelets $\frac{1}{8}$—$\frac{1}{4}$ in. long, compressed, ovoid-elliptic or oblong, 20—50-flowered, shortly pedicellate, often purple ; rhachilla tough, internodes very short. Glumes elegantly distichous, spreading, keeled ; invol.-glumes subequal or the upper slightly longer than the lower, $\frac{1}{25}$—$\frac{1}{16}$ in. long, ovate, acute, 1-nerved ; floral glumes broadly ovate or suborbicular, mucronulate, $\frac{1}{12}$ in. long, punctulate ; plea shorter than its glume and deciduous with it. Stamens 3 ; anthers minute. Grain obovoid or ellipsoid, laterally compressed, about $\frac{1}{30}$ in. long, orange-brown, smooth. Fl. B. I. v. 7, p. 317 ; Trim. Fl. Ceyl. v. 5, p. 293 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 ; Prain, Beng. Pl. p. 1220. *Eragrostis unioloides,* Nees, ex Steud. Syn. Gram. (1855) p. 264 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 383. *Poa unioloides,* Retz. Obs. fasc. 5 (1789) p. 19 ; Roxb. Fl. Ind. v. 1, p. 339 ; Grah. Cat. p. 236. *Uniola indica,* Spreng. Syst. v. 1 (1825) p. 349 ; Dalz. & Gibs. p. 298.—Flowers : Sept.—Nov.

KONKAN : Parel (Bombay) ; Bassein, *Woodrow.* DECCAN : Poona, *Woodrow*, Lanoli, *Woodrow*, 165 ! S. M. COUNTRY : marshes N. of Belgaum, *Ritchie*, 846 !—DISTRIB. Throughout India ; Ceylon, Tropical Asia.

7. **Eragrostis gangetica,** *Steud. Syn. Gram.* (1855) p. 266. Perennial ; stems tufted, 1—3 ft. long, stout, smooth, shining, simple or branched, suberect. Leaves few, 2—8 in. long, very narrow, convolute, rigid, quite smooth, glaucous, linear, tapering to a fine point ; sheaths glabrous except the mouth which is sometimes bearded ; ligule a minutely ciliolate rim. Panicle oblong, 2—6 in. long, nodding ; branches solitary, rather distant, often long, suberect or the lower spreading ; rhachis glabrous ; pedicels of spikelets short. Spikelets $\frac{1}{8}$—$\frac{1}{4}$ in. long, linear to linear-oblong, 10—30-flowered ; rhachilla tough, glabrous, persistent, the internodes short. Lower invol.-glume $\frac{1}{16}$ in. long, ovate-oblong, acute, 1-nerved ; upper slightly larger, 1-nerved ; floral glumes broadly ovate, subacute, reaching to nearly $\frac{1}{10}$ in. long ; palea deciduous, slightly shorter than its glume, with scaberulous keels. Stamens 3 ; anthers about $\frac{1}{25}$ in. long, yellow. Grain oblong, about $\frac{1}{32}$ in. long, brown. Trim. Fl. Ceyl. v. 5, p. 293 ; Stapf, in Dyer, Fl. Capen. v. 7 (1900) p. 617 ; Prain, Beng. Pl. p. 1221. *Eragrostis elegantula,* Stapf, in Hook. f. Fl. B. I. v. 7 (1896) p. 318 (*not* of Nees) ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441. *E. Brownei,* Nees, ex Wight, Cat. n. 1780 ; Watt, Dict. Econ. Prod. v. 3, p. 253.—Flowers : Dec.—Apr.

DECCAN : Borkas, Máwal (Poona districts), *Woodrow.*—DISTRIB. Throughout India ; Ceylon.

8. **Eragrostis stenophylla,** *Hochst. ex Miq. Analect. Bot. Ind.* part 2 (1851) p. 27. Perennial ; stems densely tufted, 12—18 in. high, erect or geniculately ascending, simple or branched ; upper internodes long. Leaves 3—5 in. long, very narrow, strict, rather stiff, usually convolute, smooth, quite flat, glabrous, not glaucous ; sheaths smooth ; ligule a narrow membranous line. Panicle ovate, or oblong,

or sublinear, suberect or nodding ; branches rather distant, alternate, obliquely spreading when ripe, much divided upwards ; rhachis slender, smooth ; pedicels of spikelets filiform. Spikelets $\frac{1}{8}$—$\frac{1}{4}$ in. long, linear-oblong, 20—30-flowered ; rhachila zig-zag. Lower invol.-glume $\frac{1}{30}$ in. long, ovate-oblong, subacute ; upper invol.-glume slightly longer, both hyaline, 1-nerved ; floral glumes broadly ovate, subacute, about $\frac{1}{16}$ in. long, with smooth keels ; palea linear-oblong, caducous with the glumes, the keels scabrid. Stamens 3 ; anthers minute. Grain globose or globosely ellipsoid, $\frac{1}{10}$ in. long, reddish-brown, smooth. Fl. B. I. v. 7, p. 318 ; Trim. Fl. Ceyl. v. 5, p. 294 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 ; Prain, Beng. Pl. p. 1221. *Eragrostis Brownei*, Nees, in Wight, Cat. (1833) n. 1780 (partly) ; Watt, Dict. Econ. Prod. v. 3, p. 253. .

KONKAN : Malwán, *Woodrow*. DECCAN : Borkwas, Máwal (Poona districts), *Woodrow*.—DISTRIB. More or less throughout India ; Ceylon, Tropical Asia and Africa.

9. **Eragrostis major,** *Host, Gram. Austr.* v. 4 (1809) p. 14, t. 24. Annual ; stems 1—3 ft. high, usually stout and branched, leafy, erect or geniculately ascending, smooth, polished. Leaves reaching 8 by $\frac{1}{3}$ in., narrowed to a fine point, flat, smooth, flaccid, glandular along the margins ; sheaths sparingly bearded ; ligule a ciliolate ridge. Panicle 2—8 in. long, erect, oblong or ovate-oblong, open or sometimes contracted, usually stiff ; rhachis strict, rather stout, smooth ; branches spreading or suberect, capillary, stiff or flexuous, again branching from near the base, the branchlets short, capillary. Spikelets longer than their pedicels, usually crowded, ovate and $\frac{1}{8}$—$\frac{1}{4}$ in. long with 6—8 glumes, to linear-oblong rather narrowed upwards, and $\frac{1}{3}$—$\frac{1}{2}$ in. long or more with many (up to 60) glumes, olive-grey or yellowish ; rhachilla tough, zig-zag, the internodes short, smooth. Invol.-glumes ovate, acute, with scabrid keels ; lower smaller than the upper, 1 (sometimes 3)-nerved ; upper slightly larger than the lower, 3-nerved ; floral glumes broadly ovate, acute, sometimes apiculate, $\frac{1}{12}$ in. long, strongly nerved ; palea obovate, much curved, shorter than its glume, with ciliolate keels. Stamens 3 ; anthers $\frac{1}{60}$ in. long. Grain globose, $\frac{1}{40}$ in. in diam., microscopically rugulose, reddish-brown. Fl. B. I. v. 7, p. 320 ; Trim. Fl. Ceyl. v. 5, p. 297 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 ; Prain, Beng. Pl. p. 1221. *Eragrostis megastachya*, Link, Hort. Reg. Berol. v. 1 (1827) p. 187 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 382 ; Watt, Dict. Econ. Prod. v. 3, p. 254.—Flowers : Nov.—Jan.

DECCAN : Poona, *Jacquemont*, 349 !, *Woodrow*. S. M. COUNTRY : Badami, *Woodrow* ! GUJARAT : Morvi (Kathiawar), *Woodrow*. SIND : *Woodrow*.—DISTRIB. More or less throughout India ; Ceylon, westwards to S. Europe, tropical and subtropical Asia.

10. **Eragrostis minor,** *Host, Gram. Austr.* v. 4 (1809) p. 15 (*in note*) et in *Pl. Austriac.* v. 1 (1827) p. 135. Annual ; stems 6—18 in. high, densely tufted, slender. Leaves 1½—6 by $\frac{1}{10}$—$\frac{1}{8}$ in., linear, acute, usually glandular along the margins, flat ; sheaths shortly bearded at the mouth ; ligule a pubescent ridge. Panicle oblong or ovate, rather stiff, 2—6 in. long ; rhachis glabrous ; branches spreading

when mature. Spikelets linear to ovate, ¼ by $\frac{1}{20}$ in., up to 12-flowered, pale green to purplish- or olive-grey ; pedicels shorter than the spikelets, except the terminal ones ; rhachilla tough. Invol.-glumes subequal or the upper slightly larger, about $\frac{1}{20}$ in. long, ovate, acute, 1-nerved ; floral glumes about $\frac{1}{16}$ in. long, ovate, acute, strongly nerved ; palea obovate-oblong, about $\frac{1}{12}$ in. long, shorter than the persistent glumes, the keels scabrid or slightly ciliolate. Stamens 3 ; anthers about $\frac{1}{100}$ in. long. Grain $\frac{1}{50}$ in. long or more, dorsally rounded or slightly flattened. Fl. B. I. v. 7, p. 321 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 ; Prain, Beng. Pl. p. 1221.—Flowers : Nov.

Not very plentiful in the Bombay Presidency. KONKAN : Bombay, *Lambert*! DECCAN : Poona, *Jacquemont*, 350! ; Nasik, *Lisboa*. GUJARAT : Godra, *Woodrow* ; Panch Maháls, *Woodrow*.—DISTRIB. More or less throughout India (plentiful in N. India) ; S. and Central Europe, N. Asia, N. Zealand, Philippines.

11. **Eragrostis tremula,** *Hochst. ex Steud. Syn. Gram.* (1855) p. 269. Annual ; stems densely tufted, suberect, 6—24 in. long. Leaves 2—5 by $\frac{1}{12}$—⅛ in., linear-lanceolate, tapering to a fine point ; sheaths bearded at the mouth ; ligule a minutely hairy line. Panicle large, ovate, very diffuse ; branches solitary, filiform ; pedicels very slender, from ½ the length of the spikelets to longer than them ; rhachis glabrous or bearded at the nodes. Spikelets 1 in. or more long, linear, narrower upwards, from 10—60-flowered. Invol.-glumes subequal, $\frac{1}{20}$—$\frac{1}{16}$ in. long, subobtuse, thin, 1-nerved ; rhachilla tough, glabrous ; floral glumes closely set, broadly ovate, subobtuse, $\frac{1}{16}$—$\frac{1}{12}$ in. long, with strong nerves ; palea obovate-oblong, slightly shorter than its glume, persistent, with scabrid keels. Stamens 3 ; anthers minute. Grain scarcely $\frac{1}{50}$ in. in diam., globose or nearly so. Fl. B. I. v. 7, p. 320 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 382 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 ; Prain, Beng. Pl. p. 1221. *Eragrostis multiflora*, Trin. in Mém. Acad. Pétersb. sér. 6, v. 1 (1831) p. 401 ; Dalz. & Gibs. p. 298. *E. rhachitricha*, Hochst. ex. Miq. Analect. Bot. Ind. part 2 (1851) p. 25 ; Watt, Dict. Econ. Prod. v. 3, p. 256.—Flowers : Nov.

DECCAN : Lanoli, *Lisboa*. GUJARAT : *Woodrow* ; Gogo (Kathiawar), *Dalzell & Gibson*, *Woodrow*.—DISTRIB. India (Panjáb, Bengal, Birma, W. Peninsula) ; Afghanistan, Tropical Africa.

12. **Eragrostis tenuifolia,** *Hochst. in Flora*, v. 24, part 1 (1841), *Intelligenz.* p. 20 (*nomen nudum*). Perennial ; stem 2—3 ft. high, erect, slender, branched. Leaves long, very narrow ; mouth of sheath naked. Panicle 3—6 in. long, oblong to ovate, very open ; rhachis glabrous ; branches solitary or 2-nate, distant. Spikelets ¼ in. long or less, linear, 5—15-flowered. Invol.-glumes very unequal ; lower minute, hyaline ; upper remote from and larger than the lower, about $\frac{1}{30}$ in. long, ovate, subacute, usually nerveless ; floral glumes $\frac{1}{12}$ in. long, ovate, subacute or apiculate ; palea shorter than its glume, strongly curved, persistent, with scabrid keels. Stamens 3 ; anthers $\frac{1}{25}$ in. long. Grain $\frac{1}{12}$ in. long, obovoid-oblong, slightly compressed, dorsally grooved. Fl. B. I. v. 7, p. 322 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 ; Prain, Beng. Pl. p. 1221.

S. M. COUNTRY: Belgaum, *Ritchie*!—DISTRIB. India (W. Peninsula); Tropical Africa.

13. **Eragrostis pilosa,** *Beauv. Agrost.* (1812) p. 71. Annual; stems 6—24 in. high, tufted, erect or geniculately ascending, slender, flaccid. Leaves usually short and narrow (rarely elongate), generally convolute; sheaths appressed, glabrous, bearded at the mouth; ligule a softly hairy ridge. Panicle 2—6 in. long, erect or inclined, oblong to pyramidal, open or contracted; rhachis glabrous or hairy, filiform; branches fascicled or whorled, capillary, much divided. Spikelets scattered (not fascicled), $\frac{1}{8}$—$\frac{1}{3}$ by $\frac{1}{30}$—$\frac{1}{20}$ in., linear, 5—12-flowered, often purplish; pedicels longer or shorter than the spikelets; rhachilla tough, smooth, flexuous. Glumes all hyaline; invol.-glumes very unequal; lower ovate, nerveless; upper much larger, ovate-lanceolate, acuminate, 1-nerved; floral glumes $\frac{1}{16}$—$\frac{1}{10}$ in. long; palea subpersistent, the keels scaberulous or nearly smooth. Grain ellipsoid, $\frac{1}{15}$—$\frac{1}{12}$ in. long, laterally apiculate at the base. Fl. B. I. v. 7, p. 323, Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 381; Trim. Fl. Ceyl. v. 5, p. 296; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1221; Watt, Dict. Econ. Prod. v. 3, p. 255.

DECCAN: Waghoti, *Máwal* (Poona districts), *Woodrow*, 9!; Poona, *Cooke*!; Nasik, *Lisboa*. S. M. COUNTRY: Dharwar, *Woodrow*. SIND: *Woodrow*.—DISTRIB. Throughout India; Ceylon, S. Europe and most warm countries.

14. **Eragrostis cynosuroides,** *Beauv. Agrost.* (1812) p. 71 & p. 162. Perennial, tall, branched from the base; rootstock stout, creeping; stolons very stout, covered with shining sheaths; stems 1—3 ft. high, tufted, smooth, erect, stout. Leaves many, the basal fascicled, reaching sometimes 20 in. long and $\frac{3}{8}$ in. broad at the base, rigid, acuminate, with filiform tips and hispid margins; sheaths glabrous; ligule a hairy line. Panicle 6—18 by $\frac{1}{2}$—$1\frac{1}{2}$ in., strict, erect, narrowly pyramidal or columnar, often interrupted; rhachis puberulous; branches many, short, scarcely reaching 1 in. long, crowded, clothed from the base with sessile imbricating spikelets. Spikelets sessile, secund, 2-seriate and crowded, deflexed, pale brown, rather shining, $\frac{1}{2}$ in. long, up to 30-flowered; rhachilla tough. Invol.-glumes very unequal; lower $\frac{1}{10}$ in. long; upper $\frac{1}{18}$ in. long, obtuse; floral glumes $\frac{1}{16}$—$\frac{1}{12}$ in. long, ovate, acute, coriaceous; palea shorter than its glume, subcoriaceous, with minutely scabrid keels. Stamens 3; anthers $\frac{1}{30}$ in. long. Grain $\frac{1}{30}$—$\frac{1}{40}$ in. long, obliquely ovoid, laterally compressed, obscurely 3-gonous. Fl. B. I. v. 7, p. 324; Dalz. & Gibs. p. 298; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 387; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1221; Watt, Dict. Econ. Prod. v. 3, p. 253. *Poa cynosuroides,* Retz. Obs. fasc. 4 (1786) p. 20; Grah. Cat. p. 236.—Flowers: Dec. VERN. *Darbha; Kusha.*

DECCAN: Nasik, *Lisboa*. GUJARAT: *Lisboa*; Mandvi (Kathiawar), *Woodrow*. SIND: Hyderabad, *Woodrow*.—DISTRIB. Throughout India in hot and dry places; Nubia, Egypt, Syria.

15. **Eragrostis bifaria,** *Wight, ex Steud. Nom.* ed. 2, part 1 (1840) p. 562. Perennial; stems 1—3 ft. high, densely tufted, erect,

simple, subcompressed, glabrous, clothed at the base with the soft fibres of old sheaths. Leaves 2—4 in. long, narrow, linear, acute, rigid, smooth ; sheaths glabrous, keeled ; ligule a pubescent line. Spikelets secund, distichously spreading in a long simple terminal spike 10—12 in. long. Spikelets ovoid to oblong, 15—20-flowered, ¼—⅓ in. long (rarely linear, reaching ⅔ in. long and up to 40-flowered), laterally compressed, olive-grey or -green. Invol.-glumes strongly 1-nerved and keeled ; lower invol.-glume ⅛ in. long, acutely acuminate, with scaberulous keel ; upper invol.-glume $\frac{1}{12}$ in. long, with stout rounded keel ; floral glumes broadly ovate, subacute, ⅛ in. long ; palea slightly shorter than its glume, with winged keels, the wings $\frac{1}{100}$ in. wide, ciliolate. Stamens 3 ; anthers $\frac{1}{25}$ in. long. Fl. B. I. v. 7, p. 325 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 387 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441.—Flowers : Aug.

DECCAN : Khandala, *Woodrow*. S. M. COUNTRY : Belgaum, *Ritchie*.—DISTRIB. India (W. Peninsula) ; Tropical Africa.

52. **HALOPYRUM,** Stapf.

A tall stout perennial glabrous grass with a branching creeping sheathed rootstock. Leaves narrow, rigid, convolute. Spikelets large, many-flowered, sessile or shortly pedicellate on the short alternate branches of an elongate panicle, ovoid, strongly laterally compressed, not jointed on their pedicels, nor are the pedicels jointed on the branches ; rhachilla articulate at the base and between the flowering glumes, silkily hairy. Glumes many, closely distichously imbricate, dorsally rounded, coriaceous, keeled ; invol.-glumes subequal, ovate-lanceolate, acuminate or apiculate ; lower invol.-glume 1—3-nerved ; upper invol.-glume 5-nerved ; floral glumes 6—10, rather shorter than the involucral, mucronulate, 3-nerved ; palea as long as the glume, subacute, 2-keeled. Lodicules 2, obcordate. Stamens 3. Styles short, free ; stigmas elongate. Grain ellipsoid, compressed, deeply hollowed anticously, free.—DISTRIB. Coasts of India and Ceylon, Arabia, Tropical Africa ; species 1.

1. **Halopyrum mucronatum,** *Stapf, in Hook. Icon. Pl.* v. 25, t. 2448 (1896). Rootstock sending up hard woody stems 12—18 in. high and as thick as a crow-quill, smooth, shining, with strict vermiform roots, the branches often fascicled and clothed at the base with pale coriaceous shining mucronate sheaths. Leaves 8—12 by ⅛—⅛ in., convolute (rarely flat), very narrow, glaucous, coriaceous, striate, quite smooth ; sheaths terete, appressed, striate, hard, with villous mouth ; ligule a few hairs. Panicle 12—16 in. long, erect or nodding ; rhachis and branches quite smooth, angular, wiry. Spikelets ½—⅝ in. long, flat, sessile or shortly pedicellate, 10—15-flowered, smooth, white or pale yellowish ; rhachilla very short, the hairs half as long as the glumes. Lower invol.-glume ¼ in. long, scarcely longer than the lowest flowering glume, ovate-lanceolate, apiculate ; upper invol.-glume ⅓ in. long, strongly 5-nerved. Fl. B. I. v. 7, p. 328 ; Trim. Fl. Ceyl. v. 5, p. 299 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441.—Flowers : Nov.

GUJARAT : Porbandar (Kathiawar), *Bhiva* ! SIND : *Stocks* !—DISTRIB. Ceylon, Arabia, East Tropical Africa.

53. **DIPLACHNE,** Beauv.

Tall tufted perennial (?) grasses ; stems erect or ascending, stout or slender, simple or sparingly branched. Leaves flat or convolute, narrow. Spikelets few- or many-flowered, sessile, 1-seriate on the slender spike-like branches of a contracted subsimple erect panicle, not articulate at the base, strongly laterally compressed ; rhachilla articulate between the flowering glumes, not produced beyond the uppermost neuter. Invol.-glumes unequal, membranous, 1-nerved, obtuse, persistent ; floral-glumes rather longer, elliptic-oblong, 1—3-nerved, the tip 2—4-toothed, mucronate or awned ; palea linear. Lodicules 2, broadly cuneate. Stamens 3 ; anthers short. Styles short, distinct, with distant bases and short plumose laterally exserted stigmas. Grain oblong, stipitate, concavo-convex, free in the glumes. —DISTRIB. Species about 20, in warm regions.

1. **Diplachne fusca,** *Beauv. Agrost.* (1812) p. 163. Stems tufted, 2—4 ft. high, stout, erect or geniculately ascending, simple or branched (sometimes proliferously), terete, polished, with long internodes. Leaves 6—10 by $\frac{1}{20}$—$\frac{1}{10}$ in., flat or convolute, strict, erect, smooth, finely acuminate ; sheaths smooth, the mouth truncate (not auricled) ; ligule oblong, membranous, lacerate. Panicle 6—12 in. long, erect, narrowly oblong ; rhachis smooth ; branches spike-like, the lower 1—4 in. long. Spikelets erect, rather distant, $\frac{1}{4}$—$\frac{1}{2}$ in. long, linear-oblong, 4—10-flowered ; rhachilla slender ; pedicels short. Lower invol.-glume $\frac{1}{12}$ in. long, oblong-lanceolate ; upper invol.-glume nearly $\frac{1}{8}$ in. long, ovate-oblong, subacute, broader than the lower ; floral glumes $\frac{1}{8}$ in. long (including mucro), elliptic, thinly coriaceous, 3-nerved, the tip 2-toothed, mucronate by the produced midrib ; palea oblong, obtuse, the keels silkily hairy. Anthers $\frac{1}{20}$ in. long. Fl. B. I. v. 7, p. 329 ; Trim. Fl. Ceyl. v. 5, p. 300 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 ; Prain, Beng. Pl. p. 1225.

KONKAN : Matunga near Bombay in rice-fields, *Woodrow*, 10 !—DISTRIB. India (upper Gangetic plain, Bengal, W. Peninsula) ; Ceylon, Egypt, Tropical Asia, Africa and Australia.

54. **GRACILEA,** Kœn.

Small tufted grasses. Leaves short. Spikelets 2-flowered, collected in turbinate fascicles which are secund, sessile and articulate on a slender spike. Spikelets not articulate at the base ; rhachilla usually produced beyond the upper glume, filiform, scaberulous ; callus 0. Glumes 4 ; invol.-glumes elongate-subulate, rigid, ciliate at the base and ending in rigid scabrid awns, persistent, collateral at base and laterally attached to base of spikelet ; lower without hyaline margins ; the upper with rather wide ones ; lower floral glume 2-sexual, chartaceous, ovate-oblong, cymbiform, shortly awned, 3-nerved, the palea as long as the glume, 2-cuspidate and with scaberulous keels, the lodicules minute, cuneiform, truncate ; upper floral

glume like the lower, but much smaller, bicuspidate, male ; sometimes an imperfect flower of 2 empty glumes at the end of the rhachilla. Stamens 3 ; anthers of 2-sexual flowers large, of male flowers small. Styles free ; stigmas slender, with short simple hairs, laterally exserted. Grain linear-oblong, free within the glumes.—DISTRIB. Species 2, Indian and African.

1. **Gracilea Royleana,** *Hook. f. in Fl. B. I.* v. 7 (1896) p. 284. Annual ; stems 3—8 in. high, densely tufted, very slender. Leaves 1—2 in. long, scarcely reaching $\frac{1}{16}$ in. broad, flat or convolute, linear-lanceolate, acutely pointed, glabrous or nearly so, the margins ciliate ; sheaths with a few long scattered hairs ; ligule a hairy ridge. Spikes filiform, ½—2 in. long, flexuous, often recurved ; rhachis 3-gonous, smooth. Clusters of spikelets ¼—⅓ in. long (including the awns), green or purple ; awns of invol.-glumes longer than the glumes ; awn of floral glumes short. Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440 ; Prain, Beng. Pl. p. 1226. *Melanocenchris Royleana,* Nees, in Proc. Linn. Soc. v. 1 (1841) p. 95 (*nomen nudum*) ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 370. *M. Jacquemontii,* Jaub. & Spach, Illustr. Pl. Or. v. 4 (1850—1853) p. 36, t. 325. *M. Rothiana,* Dalz. & Gibs. Bo. Fl. p. 297 (*not* of Nees).

KONKAN : *Law* !, *Woodrow.* DECCAN : near Poona, *Jacquemont,* 383 ! S. M. COUNTRY : Belgaum, *Stocks* !, *Ritchie,* 831 !—DISTRIB. India (Behar, Rajputana, W. Peninsula) ; Socotra, Nubia.

VAR. *plumosa,* Hook. f. Fl. B. I. (*l. c.*) p. 284. Clusters of spikelets larger, ½ in. long, including the awns. *Melanocenchris plumosa,* Jaub. & Spach, Illustr. Pl. Or. v. 4 (1850—1853) p. 37.

SIND : *Stocks,* 646 ! ; Jemadar ka Landa near Karachi, *Stocks,* 646 !—DISTRIB. India (the Panjáb) ; Arabia, Abyssinia.

55. MICROCHLOA, R. Br.

Slender usually perennial grasses. Leaves narrow, often subsetaceous ; ligule a minutely ciliate rim. Spikelets 1-flowered, small, sessile, unilateral, crowded on the flattened rhachis of a solitary terminal slender curved spike, alternately 2-seriate from near the margins of the rhachis or in a single row ; rhachilla disarticulating above, the invol.-glumes more or less produced. Floret hermaphrodite. Glumes 3 ; invol.-glumes subpersistent, strongly 1-nerved, flattened on the back or keeled, subequal ; floral glume small, oblong, hyaline, awnless ; palea nearly equalling the glume, 2-keeled. Lodicules 2, cuneate, glabrous. Stamens 3 ; anthers linear. Styles distinct ; stigmas plumose, laterally exserted. Grain oblong, glabrous, free within the glumes.—DISTRIB. Species 7, one widely distributed throughout the Tropics, 3 in Africa, 3 in Australia.

1. **Microchloa setacea,** *R. Br. Prodr.* (1810) p. 208. Perennial ; stems tufted, 2—6 (rarely reaching 10) in. high, very slender, branched or almost simple, compressed below, glabrous, smooth. Leaves ½—1½ in. long, crowded at the base, subsetaceous with an acute or callous point, plicate, firm, the lower often curved, usually glabrous. Spike solitary, 1—3 in. (rarely reaching 6 in.) long ; very

slender, usually curved, often purplish ; rhachis minutely ciliate. Spikelets 1-flowered, dorsally compressed, in a single row, $\frac{1}{12}$—$\frac{1}{8}$ in. long, erect glabrous. Invol.-glumes subequal, lanceolate-oblong, acute or acuminate ; floral glume up to $\frac{1}{15}$ in. long, abruptly and shortly acuminate, sometimes mucronulate, hairy along the nerves ; palea ciliate on the nerves. Anthers about $\frac{1}{10}$ in. long. Grain oblong, subfusiform, $\frac{1}{20}$ in. long, smooth. Fl. B. I. v. 7, p. 283 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440 ; Prain, Beng. Pl. p. 1226. *Rottboellia setacea,* Roxb. Fl. Ind. v. 1 (1832) p. 357; Cor. Pl. v. 2, t. 132.—Flowers : Aug.

S. M. COUNTRY : Dharwar, *Woodrow.*

Usually a very small plant growing on old walls. It rarely exceeds 3 inches high, though occasionally, under favorable conditions, it grows higher. DISTRIB. Tropics of the Old ond New World.

56. CYNODON, Pers.

Perennial glabrous grasses ; stems creeping, rooting at the nodes and emitting from them fascicles of barren shoots and flowering stems. Spikes 2—6, in terminal umbels. Spikelets 1-flowered, laterally compressed, sessile, imbricate, alternately 2-seriate and unilateral on a slender keeled rhachis ; rhachilla disarticulating above the invol.-glumes, produced or not beyond the floral glume. Floret hermaphrodite. Invol.-glumes narrow, keeled, acute or subulato-mucronate, the upper usually deciduous with the floral glume, the lower subpersistent ; floral glume exceeding the invol.-glumes, navicular, firmly membranous, 3-nerved, awnless, the keel ciliate ; palea somewhat shorter than the glume, 2-keeled. Lodicules 2, minute, obovate-cuneate, glabrous. Stamens 3. Ovary glabrous ; styles distinct, slightly shorter than the plumose stigmas. Grain oblong, subterete, free within the glumes.—DISTRIB. Species 2, of which 1 occurs in S. Africa, the other almost cosmopolitan.

1. **Cynodon dactylon,** *Pers. Syn.* v. 1 (1805) p. 85. Stem slender, prostrate, widely creeping, forming matted tufts, with slender erect or ascending flowering branches 3—12 in. high. Leaves $\frac{3}{4}$—4 by $\frac{1}{20}$—$\frac{1}{8}$ in., narrowly linear or lanceolate, finely acute to pungent, more or less glaucous, soft, smooth, usually conspicuously distichous in the barren shoots and at the base of the stems ; sheaths tight, glabrous or hairy, sometimes bearded at the mouth ; ligule a very fine ciliate rim. Spikes 2—6, radiating from the top of a slender peduncle, 1—2 in. long, green or purplish ; rhachis slender, compressed or angled, scaberulous. Spikelets $\frac{1}{18}$—$\frac{1}{10}$ in. long ; rhachilla produced, very slender, equalling $\frac{1}{2}$ the length of the spikelet. Invol.-glumes lanceolate, acute to subulato-mucronulate, the lower $\frac{1}{2}$—$\frac{1}{16}$ in. long, the upper slightly longer ; floral glume obliquely oblong to semiovate, about $\frac{1}{12}$ in. long. Anthers oblong, $\frac{1}{25}$ in. long. Grain $\frac{1}{24}$ in. long. Fl. B. I. v. 7, p. 288 ; Dalz. & Gibs. p. 297 ; Trim. Fl. Ceyl. v. 5, p. 274 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 365 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440 ; Prain, Beng. Pl. p. 1227 ; Watt, Dict. Econ. Prod. v. 2, p. 678. *Panicum dactylon,* Linn. Sp. Pl. (1753) p. 58 ; Grah. Cat. p. 236.—VERN. *Hariáli.*

The well-known *Hariáli* grass of the Deccan, extensively used as fodder in the Bombay Presidency.—DISTRIB. Throughout India, Birma, and Ceylon, ascending to 5000 ft. in the Himalayas; most warm countries.

57. CHLORIS, Sw.

Annual or perennial grasses. Leaves flat or convolute. Spikes solitary or several, in terminal umbels or short racemes, erect or stellately spreading. Spikelets of 2—4 florets (1 only or rarely more fertile), sessile, crowded, unilateral, 2-seriate on a slender rhachis; rhachilla disarticulating above the invol.-glumes, more or less produced; lowest floret hermaphrodite, the second male or barren (rarely fertile), the following if present barren, often minute (some occasionally fertile in *C. tenella*). Involucral glumes 2, persistent, narrow, keeled, membranous, 1-nerved, acute, mucronate or the upper awned. HERMAPHRODITE FLORET: floral glume narrow or broad, 3-nerved, acute or obtuse, minutely 2-toothed, usually awned from below the apex, often ciliate; palea almost equalling the glume, 2-keeled. Lodicules 2, minute. Stamens 3. Ovary glabrous; styles distinct, short; stigmas laterally exserted. MALE FLORET: glume and palea as in the hermaphrodite flower but smaller and glabrous. RUDIMENTARY FLORETS glabrous, awned or awnless, small to minute, usually without a trace of a palea.—DISTRIB. Species 40—45, in tropical and subtropical regions of both hemispheres.

Annual; spike solitary; spikelets cuneate, 3-awned; glumes 5—6; glume of hermaphrodite floret cuneate, the upper margin naked	1. *C. tenella.*
Perennial; spikes 1—3; spikelets obconic, 4-awned; glumes 5; glume of hermaphrodite floret broadly ovate, with broad hyaline margins, hirsute all over.	2. *C. villosa.*
Perennial; spikes 4—6, in terminal whorls; spikelets narrowly fusiform; glumes 4, the uppermost minute on the produced rhachilla; glume of hermaphrodite floret oblong-lanceolate	3. *C. incompleta.*
Perennial; spikes 5—20 in a truncate fascicle; spikelets 3-awned; margins of glume of hermaphrodite floret densely bearded above the middle, not hyaline.	4. *C. barbata.*

1. **Chloris tenella,** *Roxb. Fl. Ind.* v. 1 (1832) p. 329. Annual, very slender; stems 10—18 in. long, weak, slender, branched from the base. Leaves 3—8 by ⅛—¼ in., flaccid, linear-lanceolate, finely acuminate, the margins more or less ciliate towards the base; sheaths glabrous; ligule large, membranous, truncate. Spike solitary, 1—2 in. long, erect, flat. Spikelets large, reaching ¼ in. long, cuneate, bifarious, 3-awned. Glumes 5 or 6; lower invol.-glume ⅛ in. long, strongly 1-nerved; upper invol.-glume longer and broader, with a strong mid-nerve which is produced into a short awn; glume of hermaphrodite floret ⅛ in. long, broadly cuneate, the upper margin truncated, naked, and with a scaberulous awn ⅛ in. long from the back below the apex, the palea elliptic with ciliate margins, and the callus densely hairy, the next or second floral glume smaller but similar, with a similar palea, the others still smaller fan-shaped awned. Sometimes one or more of the normally infertile glumes are found to be fertile, at other times all are barren; both forms may

be found among the specimens in Herb. Kew. Fl. B. I. v. 7, p. 290 ; Dalz. & Gibs. p. 296 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 368 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440.

DECCAN : Bijapur, *Woodrow*. GUJARAT : Surat on the city walls, *Dalzell* ! SIND : Jemadar ka Landa near Karachi, *Stocks* !—DISTRIB. India (W. Peninsula) ; Arabia, Abyssinia.

2. **Chloris villosa,** *Pers. Syn.* v. 1 (1805) p. 87. Perennial, stout ; stems 6—10 in. long from a densely tufted stout woody base, clothed with equitant leaf-sheaths. Leaves 1—3 by $\frac{1}{16}$—$\frac{1}{10}$ in., linear, acute, flat, convolute or twisted, rigid ; ligule obscure. Spikes 1—3, erect, pale yellow, $1\frac{1}{2}$—$2\frac{1}{2}$ by $\frac{1}{3}$—$\frac{1}{2}$ in. Spikelets $\frac{1}{8}$ in. long, obconic, with 4 unequal awns. Glumes 5 ; lower invol.-glume $\frac{1}{8}$ in. long (including a short awn), oblong-lanceolate, hyaline ; upper invol.-glume $\frac{1}{8}$ in. long, oblong, hyaline, 2-toothed at the tip and shortly awned ; glume of the hermaphrodite floret $\frac{1}{8}$ in. long, broadly ovate or suborbicular, concave, with an awn $\frac{1}{4}$ in. long or more, and broad hyaline margins bounded by the lateral nerves, hirsute all over with long silky hairs which are much longer than the glume, the palea elliptic-obovate with ciliate margins, hyaline ; the next glume (4th) barren, about $\frac{1}{2}$ as long, also hirsute, the next (5th) small, cuneate, the 6th reduced to an awn. Fl. B. I. v. 7, p. 291 ; Woodr. in Journ. Bomb. Nat v. 13 (1901) p. 440. *Chloris tetrapogon,* Beauv. Agrost. (1812) p. 158. *Tetrapogon villosus,* Desf. Fl. Atlant. v. 2 (1798) p. 389, t. 255.

SIND : *Stocks,* 644 !—DISTRIB. India (Panjáb, Rajputana) ; westward to the Canaries.

3. **Chloris incompleta,** *Roth, Nov. Pl. Sp.* (1821) p. 60. Perennial ; stems procumbent, or erect when growing amongst bushes, reaching a height of 5 ft., ending in a very long naked peduncle. Leaves 6—12 by $\frac{1}{8}$—$\frac{1}{2}$ in., narrowed into a fine point, flat, glabrous or slightly hairy ; sheaths long, smooth, the mouth hairy ; ligule of long hairs. Spikes 4—6, in terminal whorls, 4—9 in. long ; rhachis filiform, scabrid. Spikelets $\frac{1}{5}$ in. long (excluding the awns), narrowly fusiform, imbricating, erect, closely appressed ; rhachilla slender, bearing $\frac{1}{16}$ in. from its base a tuft of hairs, a little above which is a barren glume terminated by a long awn reaching $\frac{1}{3}$ in. long. Glumes 4 ; lower invol. glume $\frac{1}{10}$ in. long, lanceolate, acute ; upper invol.-glume $\frac{1}{5}$ in. long (excluding awn), narrowly lanceolate, membranous, 2-toothed at the apex, with a strong midnerve which is produced into an awn $\frac{1}{20}$ in. long ; floral glume of fertile floret as long as the upper invol.-glume, oblong-lanceolate, 2-toothed at the apex, with an awn $\frac{3}{8}$ in. long ; palea as long as the glume, acuminate ; callus bearded ; fourth glume small, rudimentary. Sir J. Hooker (Fl. Ceyl. v. 5, p. 275) describes the barren 4th glume as a swelling of the rhachilla which it much resembles. Fl. B. I. v. 7, p. 290 ; Trim. Fl. Ceyl. v. 5, p. 275 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440 ; Prain, Beng. Pl. p. 1227. *Chloris digitata,* Steud. Syn. Gram. (1855) p. 207 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 369. *Melica digitata,* Roxb. Fl. Ind. v. 1 (1832) p. 326 ; Grah. Cat. p. 236.—Flowers : Feb.

KONKAN : Thána, *Lisboa*. DECCAN : Nasik, *Lisboa*. KANARA : (N. Kanara), *Woodrow*.—DISTRIB. Throughout the plains of India; Ceylon, Afghanistan, China.

4. **Chloris barbata,** *Sw. Fl. Ind. Occ.* v. 1 (1797) p. 200. Perennial ; stems tufted, with strong root-fibres, rather stout, 2—3 ft. high, geniculately ascending, branching upwards, leafy, quite smooth ; lower internodes 2—3 in. long, as thick as a crow-quill, shining ; upper very long, slender ; nodes often bearing equitant tufts of leaves. Leaves 6—18 in. long, narrowly linear, flat or folded, finely acuminate ; sheaths smooth, the lower open ; ligule a very narrow membrane. Spikes 5—20, digitately arranged in a truncate fascicle, ½—4 in. long, on a slender peduncle, often purplish. Spikelets $\frac{1}{10}$ in. long (excluding the awns), green or purple, 3-awned ; rhachilla produced, but not beyond the fertile glume, bearing 2 small turgid obovate awned barren glumes $\frac{1}{16}$ in. long, the awns ⅛—¼ in. long. Invol.-glumes hyaline, lanceolate, acute (not awned) ; lower $\frac{1}{16}$ in. long ; upper $\frac{1}{10}$ in. long ; floral glume of hermaphrodite floret $\frac{1}{10}$ in. long, broadly elliptic, shortly apiculate, with a slender awn ⅛—¼ in. long and with densely bearded margins above the middle ; palea nearly as long as the glume, oblanceolate. Fl. B. I. v. 7, p. 292 ; Grah. Cat. p. 234 ; Dalz. & Gibs. p. 296 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 367 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440 ; Prain, Beng. Pl. p. 1227 ; Watt, Dict. Econ. Prod. v. 2, p. 269.—Flowers : Nov. VERN. *Gondvel*.

Throughout the Presidency. DECCAN : *Woodrow*. SIND : *Woodrow*.—DISTRIB. Throughout the plains of India; Ceylon, Tropics generally.

58. **TRIPOGON,** Roth.

Slender densely tufted grasses ; stems erect, leafy below. Leaves narrow, rigid, flat or convolute. Spikelets usually many-flowered (all except 1—2 terminal perfect), 2-seriate and unilateral on a very slender terminal spike, not articulate at the base ; rhachilla produced between the glumes but not beyond them, slender, articulate at the base. Glumes many ; invol.-glumes unequal, distantly superposed, membranous, 1-nerved ; lower invol.-glume usually lodged in a furrow of the rhachis, toothed or lobed on one side ; upper invol.-glume entire or notched below the mucronate or apiculate tip ; floral glumes ovate, dorsally convex, 2-fid and awned in the cleft or 4-fid with the outer lobes awned, the inner lobes membranous and rarely awned, awns all straight ; callus short, bearded ; palea broad or narrow, complicate, truncate, with ciliate keels. Lodicules 2, cuneate. Stamens 3 ; anthers long, linear-oblong. Styles short, distant at the base ; stigmas short, plumose. Grain narrow, free in the glumes.—DISTRIB. Tropical and Subtropical Asia and Africa ; species about 12.

Awn as long as its glume or longer; lateral lobes of floral glume awned.
- Under 3 in. high; leaves 1 in. long; ligule membranous, ovate ..... 1. *T. pauperculus.*
- 6—18 in. high; cauline leaves 6—8 in. long; ligule a ridge ..... 2. *T. capillatus.*

Awn shorter than its glume; lateral lobes of floral glume not awned.
Leaves 12—24 in. long; spikelets 5—12-flowered; lower invol.-glume $\frac{1}{12}$ in. long, lanceolate ..... 3. *T. Lisboæ.*
Leaves 2—8 in. long; spikelets 10—20-flowered; lower invol.-glume $\frac{1}{8}$ in. long with a projecting lobe at one side ..... 4. *T. Jacquemontii.*

1. **Tripogon pauperculus** (by misprint *pauperulus*), *Stapf, in Hook. Icon. Pl.* t. 2442 (1896). Dwarf, 2—2½ in. high, annual, glabrous; stems capillary, densely tufted, leafy to the tip. Leaves setaceous, acute, ½—1 in. long, involute; sheaths, the lowest lax, the uppermost close, striate; ligule membranous, ovate, obtuse. Spikelets 2—3, remote (distant more than their own length from each other), or solitary at the apex of the stems, ⅛ in. long (excluding the awns). Lower invol.-glume ⅛ in. long, symmetrical, narrowly lanceolate, 1-nerved, very acute; upper invol.-glume ¼ in. long, lanceolate, cuspidately acuminate; floral glumes 4—1, with one or two empty above them, ⅛—¼ in. long (excluding the awn), linear-oblong, 3-nerved, the lateral lobes with capillary awns; median awn geniculate, twisted below the knee, nearly ½ in. long; palea oblong with ciliolate keels. Anthers 3, minute, subglobose. Grain narrowly linear, cylindric. Fl. B. I. v. 7, p. 285; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440.—Flowers: Sept.

KONKAN: *Stocks*! DECCAN: on the crest of the Western Ghâts (1800 ft.), 8 miles S. of Lanoli, on *Ficus glomerata*, in company with mosses and *Utricularia orbiculata*, *Woodrow*, 25!; on rocks near Karli (Poona districts), *Woodrow*!—DISTRIB. India (W. Peninsula).

2. **Tripogon capillatus,** *Jaub. & Spach, Illustr. Pl. Or.* v. 4 (1850—53) p. 47, t. 332. Whole plant 6—18 in. high; stems densely tufted, erect or geniculately ascending, subfiliform, smooth. Leaves rigid, green, convolute, the radical leaves very short or reduced to sheaths, the cauline erect, elongate, 6—8 by ⅛ in., narrowly linear, finely pointed; sheaths glabrous, striate; ligule reduced to a ridge. Spikes 5—12 in. long, filiform or capillary, flexous. Spikelets 3—4-flowered, distant (⅓ in. apart or more) along the rhachis of the spike, with many slender long awns. Invol.-glumes lanceolate, thinly membranous; lower invol.-glume $\frac{1}{10}$ in. long, cuspidately acuminate; upper invol.-glume ⅕ in. long (including a short awn); floral glume ⅛ in. long, ovate-lanceolate, 2-cleft at the apex, the lobes slender, shortly awned, the median awn reaching ½ in. long or more; palea as long as its glume, narrow, oblanceolate-oblong, hyaline. Anthers $\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 285; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1229.—Flowers: Sept.

KONKAN: *Stocks*!, *Law*!; on trees at Matheran, *Woodrow*, 17!, *Lisboa*. DECCAN: on trees about Poona, *Jacquemont*, 580! S. M. COUNTRY: Belgaum, on trees on Samboti Hill, *Ritchie*, 866!—DISTRIB. India (Behar, W. Peninsula).

3. **Tripogon Lisboæ,** *Stapf, in Kew Bull.* (1892) p. 84. Perennial, 2—3 ft. high; stem stout or slender. Leaves 12—24 by ⅛—⅓ in., rigid, quite smooth, flat or convolute; sheaths glabrous; ligule obsolete. Spikes 6—10 in. long, narrow. Spikelets usually densely crowded, ⅛—½ in. long, 5—12-flowered. Glumes coriaceous; invol.-glumes

very unequal; lower invol.-glume $\frac{1}{12}$ in. long, lanceolate, acute; upper invol.-glume $\frac{1}{8}$ in. long, linear-oblong, with a single tooth or unequally 2-toothed at the apex; floral glumes $\frac{1}{8}$ in. long, ovate, shortly 2-toothed at the apex; the lobes not awned, but with a slender awn about $\frac{1}{10}$ in. long from the sinus; palea oblong, obtuse, shortly 2-fid. Grain narrowly oblong, terete, glabrous. Fl. B. I. v. 7, p. 286; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440.

Lisboa without locality in Herb. Kew.! KONKAN: *Stocks*!, *Law*! DECCAN: Karli between Poona and Lanoli, *Jacquemont*, 581!—DISTRIB. India (Rajputana).

4. **Tripogon Jacquemontii,** *Stapf, in Kew Bull.* (1892) p. 85. Perennial, 1—2 ft. high. Leaves filiform, 2—8 in. long, convolute, glabrous. Spikes 4—8 in. long, narrow. Spikelets $\frac{1}{3}$—$\frac{3}{4}$ in. long, narrow, oblong, 10—20-flowered. Glumes subcoriaceous, the uppermost empty; invol.-glumes very dissimilar; lower invol.-glume $\frac{1}{8}$ in. long, acute, with a large projecting blunt tooth or lobe at one side extending $\frac{1}{2}$ way up; upper invol.-glume $\frac{1}{6}$ in. long, lanceolate-oblong, acute; floral glume $\frac{1}{6}$ in. long, elliptic, shortly 2-fid at the apex, without lateral awns but with a median awn $\frac{1}{20}$ in. long. Grain narrowly oblong, terete, glabrous. Fl. B. I. v. 7, p. 286; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 371; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440.

KONKAN: Bombay districts without precise locality, *Lisboa*!; Matheran, *Woodrow*, 16! DECCAN: *Woodrow*, 79!; Poona, *Jacquemont*, 353!, *Woodrow*!; Sholapur, *Pinwill*!; near Ahmednagar, *Miss Shaluck*!—DISTRIB. India (Bengal, Central India, W. Peninsula).

59. ELEUSINE, Gærtn.

Annual or perennial grasses. Leaves long or short. Spikelets 3—12-flowered (flowers all perfect except the terminal), sessile, 2—3-seriate and secund, forming digitate capitate or whorled spikes laterally compressed not jointed at the base; rhachilla continuous between the flowering glumes. Glumes few or many, keeled; invol.-glumes shorter than the floral ones, subequal or unequal, persistent; lower invol.-glume ovate or lanceolate; upper invol.-glume lanceolate, acute or acuminate, or broadly ovate or didymous, with a short stout recurved awn; floral glumes like the involucral, 3-nerved; palea complicate, strongly 2-keeled. Lodicules 2, cuneate. Stamens 3; anthers short. Styles short, free; stigmas slender, laterally exserted. Grain small, free; pericarp hyaline, loose. Seed rugose. —DISTRIB. Species about 7, in most warm countries.

Spikelets pointing forwards at an acute angle with the rhachis of the spike; upper invol.-glume ovate or lanceolate.
- Annual, erect; leaves 1—2 ft. long ..... 1. *E. indica.*
- Perennial, prostrate; leaves $\frac{1}{2}$—$1\frac{1}{2}$ in. long ..... 2. *E. flagellifera.*

Spikelets spreading, at right angles to the rhachis of the spike; upper invol.-glume orbicular, abruptly awned.
- Annual; grain subglobose ..... 3. *E. ægyptiaca.*
- Perennial; grain ovoid ..... 4. *E. aristata.*

1. **Eleusine indica,** *Gærtn. Fruct.* v. 1 (1788) p. 8. Annual, erect; stem 1—2 ft. high, tufted, slightly compressed, glabrous; roots of strong fibres. Leaves distichous, flat or folded, as long as the stem, $\frac{1}{8}$—$\frac{1}{4}$ in. broad, linear, glabrous or sparsely hairy, with nearly smooth margins; sheaths compressed, the mouth not auricled but often with a few hairs; ligule a thin slightly hairy membrane. Spikes 2—7 or more, 2—5 in. long, with sometimes one or two detached spikes below the umbel, digitate, suberect or slightly recurved, the axils hairy and glandular; rhachis flattened. Spikelets pointing forward at an acute angle with the rhachis of the spike, variable in size, $\frac{1}{10}$—$\frac{1}{6}$ in. long, 3—6-flowered, glabrous. Involucre-glumes unequal, membranous; lower $\frac{1}{16}$ in. long, ovate-oblong, acute, 1-nerved; upper $\frac{1}{10}$ in. long, ovate-oblong, subacute, very shortly apiculate, with 3—7 green nerves; floral glumes gibbously ovate-oblong, obtuse, $\frac{1}{8}$ in. long; palea shorter than the glume, oblong-lanceolate, subacute. Anthers $\frac{1}{30}$ in. long. Grain oblong, obtusely trigonous, obliquely striate, reddish-brown. Fl. B. I. v. 7, p. 293; Grah. Cat. p. 235; Trim. Fl. Ceyl. v. 5, p. 277; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 375; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1229; Watt, Dict. Econ. Prod. v. 3, p. 241.—Flowers: Jan. VERN. *Mahar-náchni.*

Throughout the Presidency, *Lisboa.* DECCAN: Poona, *Woodrow.*—DISTRIB. Throughout the plains of India; Ceylon, Tropics of the Old World.

2. **Eleusine flagellifera,** *Nees, in Linnæa,* v. 16 (1842) p. 220. Perennial, prostrate, proliferously branched, glaucous; stems smooth, stiff, widely spreading, rooting at the distant thickened leafy nodes and sending up slender branches; internodes 4—8 in. long. Leaves $\frac{1}{2}$—$1\frac{1}{2}$ by $\frac{1}{16}$—$\frac{1}{8}$ in., linear-lanceolate, acuminate, rigid, distant, flat or tortuous, recurved, the upper very short; sheaths glabrous; ligule a hairy line. Spikes 3—6, digitate, $\frac{3}{4}$—$1\frac{1}{2}$ by $\frac{1}{8}$—$\frac{1}{3}$ in.; rhachis slender, flexuous, pubescent. Spikelets imbricate, subsessile or very shortly pedicellate, 4—6-flowered, $\frac{1}{8}$—$\frac{1}{3}$ in. long. Lower involucre-glume rather less than $\frac{1}{8}$ in. long, ovate, acute, membranous; upper involucre-glume $\frac{1}{6}$ in. long, lanceolate, aristate, coriaceous, with broad membranous margins; floral glumes $\frac{1}{5}$ in. long, ovate, acute, apiculate, chartaceous, 3-nerved, the midnerve compound, the margins membranous, hairy below; palea oblong with ciliate keels. Anthers $\frac{1}{16}$ in. long. Fl. B. I. v. 7, p. 294; Duthie, Fodd. Grass. N. Ind. p. 57; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 377; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Watt, Dict. Econ. Prod. v. 3, p. 241.

DECCAN: Poona, *Lisboa*; Khandesh, *Lisboa.* SIND: *Dalzell!*, *Stocks*, 765!—DISTRIB. India (Panjáb, W. Peninsula); Afghanistan, N. Africa.

3. **Eleusine ægyptiaca,** *Desf. Fl. Atlant.* v. 1 (1798) p. 85 (*ægyptia*). Annual of variable habit, 1—$1\frac{1}{2}$ ft. high; stems sometimes prostrate, rooting from the proliferously branched nodes, geniculately ascending, compressed, glabrous, smooth. Leaves linear, 1—5 by $\frac{1}{12}$—$\frac{1}{8}$ in., tapering to a fine point, flat, glaucous, glabrous or hairy or hispidly ciliate with bulbous-based hairs; ligule a slightly ciliolate

line. Spikes 2—6, digitately radiating, ½—1½ in. long ; rhachis trigonous or dorsally flattened, rigid, often excurrent into a pungent mucro. Spikelets many, 3—5-flowered, spreading at right angles to the rhachis, up to ⅛ in. long. Glumes divaricate ; lower invol.-glume ovate, acute, $\frac{1}{12}$ in. long ; upper invol.-glume $\frac{1}{12}$ in. long (excluding the awn), suborbicular, the midnerve produced into a usually curved awn often as long as or sometimes longer than the glume ; floral glumes gibbously ovate, up to ⅛ in. long, mucronate or awned ; palea rather shorter than its glume, ovate-oblong, obtuse or 2-fid. Anthers about $\frac{1}{20}$ in. long. Grain subglobose, reddish, very rugose, $\frac{1}{25}$ in. in diam. Fl. B. I. v. 7, p. 295 ; Grah. Cat. p. 235 ; Trim. Fl. Ceyl. v. 5, p. 279 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 374 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440 ; Prain, Beng. Pl. p. 1229 ; Watt, Dict. Econ. Prod. v. 3, p. 236. *Dactyloctenium ægyptiacum,* Willd. Enum. Hort. Berol. (1809) p. 1029 ; Dalz. & Gibs. p. 297.—Flowers : Sept.—Nov.

KONKAN : Ratnagiri, *Woodrow,* 41 ! DECCAN : Poona, *Jacquemont,* 399 ! and 486 ! ; Sharanpur, near Nasik, *Woodrow.* S. M. COUNTRY : Badami, *Woodrow,* 12 ! SIND : *Stocks,* 637 !—DISTRIB. Widely spread throughout tropical and subtropical regions.

4. **Eleusine aristata,** *Ehrenb. ex Boiss. Fl. Orient.* v. 5 (1881) p. 557. Perennial, slender, prostrate, proliferously branched ; stem smooth, stiff, widely spreading, rooting at the distant thickened woody leafy nodes and sending up very slender branches 4—12 in. long ; internodes 2—4 in. long. Leaves 1—4 by $\frac{1}{16}$—$\frac{1}{10}$ in., acuminate or pungent, glaucous, sparsely hairy, and the margins ciliate with bulbous based hairs ; sheaths glabrous or sparsely hairy ; ligule obsolete. Spikes 3 or more, ¼—½ in. long, spreading or decurved, bearded at the base ; rhachis excurrent into a pungent point. Spikelets about $\frac{1}{6}$ in. long (including the awns). Lower invol.-glume $\frac{1}{10}$ in. long, ovate, acute or apiculate, 1-nerved, with ciliate keel ; upper invol.-glume ⅛ in. long (including an awn $\frac{1}{10}$ in. long), suborbicular ; floral glumes nearly $\frac{1}{6}$ in. long, broadly ovate, acute, cuspidate, glabrous, keeled, membranous, with a strong midnerve and weak lateral nerves ; palea broad, the keels scaberulous. Anthers $\frac{1}{20}$—$\frac{1}{12}$ in. long. Grain ovoid, rugose. Fl. B. I. v. 7, p. 296 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440. *Eleusine sindica,* Duthie, Fodd. Grass. N. Ind. (1888) p. 58 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 377. *Dactyloctenium sindicum,* Boiss. Diag. sér. 2, fasc. 4 (1859) p. 131.

KONKAN : Ratnagiri, *Woodrow.* GUJARAT : Ahmedabad, *Woodrow.* SIND : *Stocks,* 637 ! ; Mundgiro, *Stocks,* 637 !—DISTRIB. India (Panjáb, Rajputana, W. Peninsula) ; Beluchistan, Afghanistan, Arabia, Nubia.

Eleusine coracana, Gærtn. Fruct. v. 1 (1788) p. 8, t. 1. Stem 2—5 ft. high, often as thick as the thumb ; leaves broad ; spikes stout, ½ in. broad and reaching 6 in. long ; grain globose. Only known in cultivation ; very like *Eleusine indica,* from which it has probably originated. It is extensively grown in the hilly districts of the Bombay Presidency, and the grain is largely consumed by the

poorer classes. Fl. B. I. v. 7, p. 294 ; Grah. Cat. p. 235 ; Dalz. & Gibs. Suppl. p. 97 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 373 ; Prain, Beng. Pl. p. 1229 ; Watt, Dict. Econ. Prod. v. 3, p. 237.—VERN. *Náchni ; Nágli.*

60. **DINEBRA,** Jacq.

An annual leafy grass. Leaves flat. Spikelets 2—3-flowered, 2-seriate, secund and imbricating on short slender spreading or deflexed spikes collected in narow pyramidal racemes, not jointed at the base ; rhachilla slender, jointed at the base, produced beyond the flowering glumes and bearing an imperfect glume. Glumes 4—5 ; invol.-glumes persistent, much longer than the floral, lanceolate, awned, 1-nerved, keeled ; lower invol.-glume shorter than the upper ; floral glumes small, broadly ovate, subacute, hyaline, 1-nerved ; palea hyaline, shorter than the glume, linear-oblong, obtuse, with finely ciliolate keels. Lodicules 2, minute. Stamens 3 ; anthers minute, didymous. Styles free, short ; stigmas exserted at the apex of the glume, shortly penicillate. Grain narrowly ovoid, obscurely trigonous.—DISTRIB. India, W. Peninsula, Ceylon, Afghanistan, and westward to Senegal.

1. **Dinebra arabica,** *Jacq. Fragm.* (1809) p. 77. Stems 1—3 ft. high, tufted, stout or slender, erect or geniculately ascending, leafy throughout ; nodes glabrous. Leaves 3—8 by $\frac{1}{8}$—$\frac{1}{3}$ in., linear, finely acuminate, flaccid, glabrous or sparsely hairy, contracted at the insertion ; sheaths thin, loose, glabrous ; ligule a narrow lacerate membrane. Spikes $\frac{1}{2}$—$1\frac{1}{2}$ in. long, racemosely arranged along the axis of an inflorescence 4—12 in. long, alternate, single or in fascicles of 2—3 together ; rhachis dorsally flattened, ventrally trigonous. Spikelets $\frac{1}{5}$ in. long (including the awns), alternate, sessile. Invol.-glumes lanceolate, hyaline, keeled, with slightly recurved minutely scaberulous awns, the lower invol.-glume shorter than the upper ; floral glumes reaching $\frac{1}{10}$ in. long, ovate-oblong, subacute, white. Anthers $\frac{1}{40}$ in. long. Grain ellipsoid-oblong, trigonous, $\frac{1}{20}$ in. long, pale brown. Fl. B. I. v. 7, p. 297 ; Trim. Fl. Ceyl. v. 5, p. 280 ; Duthie, Fodd. Grass. N. Ind. p. 55 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 372 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440 ; Prain, Beng. Pl. p. 1230 ; Watt, Dict. Econ. Prod. v. 3, p. 115. *Leptochloa calycina,* Kunth, Revis. Gram. v. 1 (1829) p. 91 ; Dalz. & Gibs. p. 296.—Flowers : Aug.

KONKAN : *Law* !, *Stocks* ! DECCAN : Poona, *Woodrow.* GUJARAT : banks of the Tapti above Surat, *Dalzell & Gibson* ; Surat, *Woodrow ;* Morvi (Kathiawar), *Woodrow.*—DISTRIB. India (W. Peninsula) ; Ceylon, Afghanistan, and westward to Senegal.

61. **ENNEAPOGON,** Desv.

Perennial grasses. Leaves narrow, often convolute ; ligules reduced to a line of hairs. Spikelets 3-flowered, in contracted or spike-like panicles ; rhachilla disarticulating above the glumes ; lowest floret hermaphrodite, the intermediate male or barren, the uppermost

rudimentary. Invol.-glumes persistent, membranous, acute, obtuse or minutely truncate, 3—9-nerved. HERMAPHRODITE FLORET: glume very broad, much shorter (excluding the awns) than the invol.-glumes, 9-nerved, 9-awned, the awns subulate, equal or subequal, plumose, ciliate, or scaberulous; callus minute, short; palea ovate-oblong, 2-keeled. Lodicules 2, minute, cuneate, fleshy. Stamens 3. Ovary glabrous; styles distinct, short; stigmas laterally exserted, plumose. Grain oblong. INTERMEDIATE FLORET like the lower, but the floral glume shorter, glabrous, the ovary rudimentary or suppressed. UPPERMOST FLORET rudimentary or reduced to a tuft of hairs.—DISTRIB. Species about 6, in the dry warm regions of the Old World and in Australia; 1 species in Western N. America.

1. **Enneapogon elegans,** *T. Cooke.* Stem 3—18 in. high, slender, wiry, erect or ascending from a subwoody often thickened base; nodes often tomentose. Leaves ½—5 in. long, usually convolute, pungently pointed, more or less softly pubescent; sheaths puberulous; ligule a line of hairs. Panicle 1—3 in. long; branches very short; rhachis villous. Spikelets with their awns up to ¼ in. long or more, sessile and pedicellate, softly tomentose, nearly white. Lower invol.-glume ⅛ in. long, lanceolate, acute, 5—7-nerved; upper invol.-glume ⅛ in. long, lanceolate, acute, 7-nerved; glume of hermaphrodite floret orbicular below, cleft above into 9 subulate awn-like lobes which are plumose in the lower half; palea ovate, 2-keeled, the keels pubescent. *Pappophorum elegans,* Nees, in Wight, Cat. n. 1771 (1833); Fl. B. I. v. 7, p. 301; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440.

SIND: Karachi district, *Woodrow.*—DISTRIB. India (Peshawar, Birma, W. Peninsula).

62. HYGRORHIZA, Nees.

A floating glabrous grass; stems stoutish, diffusely branched, rooting in dense masses at the nodes; branches short, erect, leafy. Leaves oblong, obtuse. Spikelets few, erect, 1-flowered, articulated on the pedicels, but tardily deciduous, long-awned, lanceolate, on the few widely-spreading branches of a shortly pedunculate panicle. Invol.-glumes 0; floral glume solitary, thinly chartaceous, narrowed to an erect scaberulous awn, strongly 5-nerved, the nerves scabrid and ciliate, the lateral nerves marginal; palea much narrowed, 3-nerved, acuminate, with ciliate keel. Lodicules minute, suborbicular. Stamens 6; anthers long, very slender. Styles 2, free; stigmas plumose, laterally exserted. Grain oblong, narrowed at the base, obtuse, free within the glume and palea.—DISTRIB. India, Ceylon, Tonkin; species 1.

1. **Hygrorhiza aristata,** *Nees, in Edinb. N. Phil. Journ.* v. 15 (1833) p. 3809. A glabrous floating grass; stem 1 ft. (and more) long, spongy, with feathery whorled roots at the nodes; internodes long or short. Leaves 1—3 by ½—¾ in., linear or ovate-oblong, obtuse, more or less scaberulous above, smooth and glaucous beneath, subcoriaceous, with smooth or slightly scaberulous margins, base rounded

or subcordate ; midrib short ; sheaths smooth, inflated, somewhat auricled at the mouth, compressed, with ciliate margins ; ligule a narrow membrane. Panicle about 2 in. long and broad, triangular ; rhachis and branches slender, stiff, smooth, the lower branches sometimes deflexed. Spikelets very narrow, $\frac{3}{4}$ in. long (including the awn), sessile or pedicellate. Floral glume about $\frac{3}{8}$ in. long (excluding the awn), lanceolate, with 5 strong nerves, the lateral nerves forming thickened margins, hairy on the nerves outside, tapering into a long scaberulous awn as long as the body of the glume ; palea as long as the glume. Fl. B. I. v. 7, p. 95 ; Trim. Fl. Ceyl. v. 5, p. 185 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435 ; Prain, Beng. Pl. p. 1185 ; Watt, Dict. Econ. Prod. v. 4, p. 317. *Leersia aristata,* Roxb. Fl. Ind. v. 2 (1832) p. 207 ; Grah. Cat. p. 235. —Flowers : Apr.

GUJARAT : Chikli, *Woodrow.*—DISTRIB. of the genus.

63. **LEERSIA,** Sw.

Tall perennial slender marsh-grasses. Leaves narrow, flat. Spikelets 1-flowered (the florets 2-sexual), in slender contracted usually flaccid panicles with very slender branches, articulate on the pedicels above the rudimentary glumes, strongly laterally compressed. Invol.-glumes reduced to an obscure hyaline entire or 2-lobed rim ; floral glume solitary, oblong, acute, awnless, thinly chartaceous, 3—5-nerved, the lateral nerves forming the thickened margins of the glume, the keel and margins pectinately ciliate ; palea narrow, linear or linear-lanceolate, as long as the glume, rigid, 3-nerved, dorsally ciliate and with hyaline margins. Lodicules 2. Stamens usually 6 (rarely 3 or fewer). Styles short, distinct ; stigmas plumose, laterally exserted from the glume. Grain ovoid or oblong, compressed, free within the glume and palea.—DISTRIB. Species 6 or 7, mostly in the tropical and subtropical regions of both hemispheres.

1. **Leersia hexandra,** *Sw. Prod. Veg. Ind. Occ.* (1797) p. 131. Perennial ; stems rooting in the mud, with floating flexuous branches several feet long, sending up erect or ascending slender leafy branches 2—4 ft. high, usually slender and weak, smooth, striate ; nodes hairy with deflexed hairs. Leaves 3—8 by $\frac{1}{8}$—$\frac{1}{3}$ in., linear, tapering to a fine point, suberect, rather rigid, nearly glabrous, with scaberulous margins, base narrow ; sheaths nearly smooth, glabrous, the margins eciliate ; ligule short, obliquely truncate or 2-lobed, membranous. Panicle 2—4 in. long, pedunculate, oblong, laxly branched, narrow ; rhachis filiform ; branches filiform, flexuous, angular, smooth. Spikelets nearly $\frac{1}{8}$ in. long. Floral glume nearly $\frac{1}{8}$ in. long, ovate-oblong, somewhat boat-shaped, acute, shortly mucronate, strongly keeled, ciliate on the keel and margins, 5-nerved, the lateral nerves forming a thickened margin ; palea as long as the glume, linear-lanceolate, subacute. Fl. B. I. v. 7, p. 94 ; Trim. Fl. Ceyl. v. 5, p. 184 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435 ; Prain, Beng. Pl. p. 1185 ; Watt, Dict. Econ.. Prod. v. 4, p. 619. *Leersia ciliata,* Roxb. Fl. Ind. v. 2 (1832) p. 207.—Flowers : Oct.

S. M. COUNTRY: Londa, *Gammie* ex *Woodrow*.—DISTRIB. More or less throughout India; Ceylon, Africa, America, Australia.

64. **ORYZA,** Linn.

Tall annual or perennial grasses. Leaves long, narrow, flat. Spikelets 1-flowered, loosely arranged on the branches of an elongate panicle, disarticulating above the 2 lowest glumes. Glumes 5; the 2 lower invol.-glumes below the articulation of the spikelet minute, scale-like (rarely absent); the 2 next invol.-glumes above the articulation of the spikelet subulate; floral glume solitary, dimidiate-oblong, coriaceous or chartaceous, 5—9-nerved, awnless or with a short or long straight terminal awn; palea linear or lanceolate, as long as the glume, 3—5-nerved, coriaceous, with membranous margins. Lodicules 2, entire or 2-lobed. Stamens 6; anthers linear. Style short, free; stigmas laterally exserted from the glume. Grain narrowly oblong, compressed, closely covered by or adnate to the glume and the palea.—DISTRIB. Species 5 or 6, tropical.

1. **Oryza coarctata,** *Roxb. Fl. Ind.* v. 2 (1832) p. 206. Stem 4—6 ft. high, erect from a stout creeping rhizome, smooth, hard and polished. Leaves 6—15 by ¼—½ in., coriaceous, linear, caudate-acuminate, with spinulose margins; sheaths glabrous, polished, reticulate like basket-work; ligule very narrow, fringed with short hairs. Panicles 4—8 in. long, spike-like; rhachis and branches trigonous, stiff, smooth. Spikelets reaching ⅝ in. long (including the awn). Glumes 5, the outer (below the articulation of the spikelet) consisting of 2 opposite minute appressed rounded or truncate thick scales, one attached lower than the other; the 2 glumes above the articulation of the spikelet subulate, the lower of the pair $\frac{1}{10}$ in., the upper ⅛ in. long. Floral glume solitary, ⅜ in. long, lanceolate, boat-shaped, rounded and with a large projecting wing on the back, cuspidate with a stout hard glabrous white awn about ⅛ in. long, 7—9-nerved, the lateral nerve forming a thickened margin to the glume. Palea (upper floral glume of some authors) ½ in. long, linear-lanceolate, cuspidately acuminate, with 5 strong nerves and hyaline margins. Lodicules large, membranous, subquadrate or trapeziform. Fl. B. I. v. 7, p. 93; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1184.

SIND: Karachi in Herb. Kew. without collector's name!; Shikarpur, *Dr. King's Collector*!—DISTRIB. India (Sundribans, W. Peninsula).

Oryza sativa, Linn. Sp. Pl. (1753) p. 333. The cultivated rice-plant which is the staple food of millions of the inhabitants of India. The wild form is said to be indigenous in Rajputana, Sikkim, Bengal, the Khasia Hills, Central India, the Circars, and Pegu. Watt, Dict. Econ. Prod. v. 5, pp. 498—654, gives an exhaustive account of the mode of culture and distribution of the rice-plant in India. Fl. B. I. v. 7, p. 92; Grah. Cat. p. 235; Dalz. & Gibs. Suppl. p. 98; Trim. Fl. Ceyl. v. 5, p. 182; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 435; Prain, Beng. Pl. p. 1183.

65. CENTOTHECA, Desv.

Tall leafy perennial grasses. Leaves broadly oblong or lanceolate, with trabeculate veins. Spikelets 1—3-flowered, on the long spike-like branches of a lax subsimple panicle, not articulate at the base, laterally compressed, all perfect or 1 or more upper neuter; rhachilla slender, articulate at the base and between the flowering glumes, not produced beyond the uppermost. Invol.-glumes distant at their insertions, ovate-oblong, persistent, empty, 3—5-nerved; upper invol.-glume larger than the lower; floral glumes broadly ovate, obtuse, apiculate, dorsally rounded, 7-nerved, naked or the upper usually bearing soft erect at length deflexed tubercle-based spines or bristles; palea narrow, with ciliolate keels. Lodicules 0. Stamens 2—3; anthers linear. Styles short, free; stigmas narrow, with short hairs. Grain ovoid, acute, terete, free within the glumes.—DISTRIB. Tropical Asia, Africa, Australia; species doubtfully 3.

1. **Centotheca lappacea,** *Desv. in Nouv. Bull. Soc. Philom.* v. 2 (1810) p. 189, *et in Journ. Bot.* (1813) v. 1, p. 71. A stout erect grass; stem 1—3 ft. high, erect from a woody rootstock with stout root-fibres. Leaves 4—10 by 1—1¼ in., oblong-lanceolate, acute or acuminate, more or less unequal-sided, thin, smooth, glabrous or sparsely hairy, 9—11-nerved, base narrowed; sheaths usually glabrous except at the mouth; ligule a broad sometimes lacerate membrane. Panicle 8—10 in. long and broad, branches slender, suberect. Spikelets ⅓ in. long, oblong-lanceolate, acute. Invol.-glumes distant; lower 1/10—⅛ in. long, ovate, acute, apiculate, 3-nerved; upper ⅛—⅕ in. long, ovate-oblong, acute, apiculate, 3—5-nerved; lower floral glume ⅛—⅕ in. long, broadly ovate-oblong, obtuse, apiculate, 7-nerved; upper floral glume about as long as the lower, oblong, obtuse, 7-nerved, finely apiculate, usually with 2 rows of tubercle-based ultimately deflexed bristles close to each margin in the upper part of the glume, sometimes naked; palea 1/10—⅛ in. long, narrowly lanceolate, acute, with ciliolate keels. Fl. B. I. v. 7, p. 332; Trim. Fl. Ceyl. v. 5, p. 304; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1217. *Melica diandra,* Roxb. Fl. Ind. v. 1 (1832) p. 327; Grah. Cat. p. 236.—Flowers: Oct.

KANARA: Kadgal (N. Kanara).—DISTRIB. India (Himalayas, Khasia Hills, Central India, Birma); Ceylon, Malaya, China, Polynesia, Tropical Africa.

66. ELYTROPHORUS, Beauv.

An annual, erect, glabrous grass. Leaves very narrow, flat. Inflorescence of globose clusters of minute sessile spikelets crowded together in long continuous or interrupted catkin-like spikes (rarely on the short spike-like branches of a very contracted raceme). Spikelets short (many imperfect or reduced to empty glumes), strongly laterally compressed, not articulate at the base, 4—6-flowered; rhachilla very short, articulate at the base and between the flowering glumes, but not beyond the upper. Invol.-glumes subequal, lanceolate, aristately acuminate, hyaline, 1-nerved, glabrous or ciliate, keeled; floral glumes rather longer, with a long awn, 3-nerved, with

ciliate margins, the uppermost neuter ; palea shorter than the glume, very broad, truncately 3-lobed, the lobes ciliate, keels distant, winged, smooth. Lodicules 2, obliquely oblong. Stamens 1—3 ; anthers minute. Styles free, long ; stigmatic hairs very short. Grain minute, fusiform or narrowly oblong ; pericarp loose at both ends.—DISTRIB. Tropical Asia, Africa, and Australia.

1. **Elytrophorus articulatus,** *Beauv. Agrost.* (1812) p. 67. Annual, 6—24 in. high ; stems erect from a densely fibrous root, as thick as a crow-quill or less. Leaves longer or shorter than the stem, linear, acute, $\frac{1}{16}$—$\frac{1}{8}$ in. broad, smooth, flaccid, base narrow ; sheaths membranous, loose ; ligule small, membranous, lacerate. Inflorescence 6—12 in. long, often longer than the rest of the plant. Spikelets $\frac{1}{8}$ in. long (including awns), as broad as long. Lower invol.-glume $\frac{1}{16}$ in. long ; upper invol.-glume $\frac{1}{8}$ in. long ; floral glume (including awn) $\frac{1}{8}$ in. long, ovate-lanceolate ; palea $\frac{1}{16}$ in. long, broadly oblong, truncately 3-lobed. Fl. B. I. v. 7, p. 306 ; Trim. Fl. Ceyl. v. 5, p. 288 ; Duthie, Fodd. Grass. N. India, p. 61 ; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 379 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 ; Prain, Beng. Pl. p. 1218.—Flowers : Nov. —Feb. VERN. *Jangli-rála.*

KONKAN : *Law* ! ; Kalyan, *Woodrow.* S. M. COUNTRY : Londa, *Woodrow.* GUJARAT : Godra, *Woodrow.*—DISTRIB. More or less throughout India ; Ceylon, Tropical Asia, Africa, and Australia.

67. ÆLUROPUS, Trin.

Low much-branched very rigid perennial leafy grasses. Leaves distichous, short, strict, usually convolute, coriaceous, pungent. Spikelets 6—many-flowered, minute, sessile, densely crowded in terminal villous heads, laterally compressed, not articulate at the base ; rhachilla obscurely jointed at the base, not produced beyond the upper glume ; internodes very short. Glumes many, oblong, membranous, apiculate, the margins and tips broadly hyaline. Invol.-glumes unequal, persistent ; lower invol.-glume narrowly oblong, 1—3-nerved ; upper invol.-glume much larger, 5—7-nerved from below the hyaline tip ; floral glumes oblong, apiculate, 7—9-nerved ; palea very large, broadly cuneate, 3-lobed, the lobes erose, flaps broad, keels nearly smooth or ciliolate. Lodicules obliquely truncate. Stamens 3 ; anthers minute. Styles short, free ; stigmas short, plumose. Grain oblong or obovoid, free within the glumes.—DISTRIB. From the Mediterranean and Caspian regions to the Panjáb, Sind, and S. India ; species few.

1. **Æluropus villosus,** *Trin. ex L. Mey. Verz. Pflanz. Cauc.* (1831) p. 18. Perennial, rigid, tufted ; stems 3—8 in. long, crowded on a woody rootstock with stout root-fibres, as thick as a crow-quill, simple or branched, smooth and polished ; branches sometimes elongate, divaricate, 6—10 in. long, resembling stolons, giving off branchlets at the nodes but not rooting ; nodes glabrous ; internodes short or long. Leaves $\frac{1}{8}$—1 in. long, narrowly lanceolate, acuminate, flat or convolute and subulate, erect or spreading, glabrous or sparsely ciliate ; sheaths short, terete or inflated, glabrous or ciliate ; ligule a

shortly hairy ridge. Heads of spikelets shortly pedunculate, subglobose or oblong. Spikelets reaching $\frac{1}{8}$ in. long, 4—8-flowered, crowded, sessile, villous with soft hairs, pale green or white. Lower invol.-glume $\frac{1}{10}$ in. long, ovate-oblong, subacute, hairy and with ciliate margins; upper invol.-glume $\frac{1}{8}$ in. long, similar; floral glumes $\frac{1}{8}$ in. long, ovate, subobtuse, apiculate, many-nerved, hairy and ciliate, the lower 2—4 sometimes neuter; palea broad, 3-lobed. Anthers $\frac{1}{16}$ in. long, oblong. Grain $\frac{1}{10}$ in. long, obovoid-oblong, dorsally compressed. Fl. B. I. v. 7, p. 334; Trim. Fl. Ceyl. v. 5, p. 304; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441. *Æluropus lagopodioides*, Trin. ex Thw. Enum. (1864) p. 374; Lisboa, in Journ. Bomb. Nat. v. 7 (1893) p. 389. *Dactylis lagopoides*, Linn. Mantiss. 1 (1767) p. 33; Grah. Cat. p. 236; Dalz. & Gibs. p. 298 (*lagopodioides*).—Flowers: Nov.—Dec.

KONKAN: *Stocks*!, *Law*!; on the salt ground near the sea, *Graham*, *Lisboa*; Salsette, *Wight*, 531! SIND: *Dalzell*!; near salt creeks in Sind, *Stocks*, 506!; Karachi, *Woodrow*.—DISTRIB. India (Panjáb, W. Peninsula, in salt ground); Ceylon, Mediterranean region, Arabia, Persia, Afghanistan, Caspian regions.

68. **OROPETIUM,** Trin.

Dwarf densely-tufted erect perennial or annual grasses. Leaves short, filiform. Florets 1—3, hermaphrodite or the upper rudimentary, shorter than the upper invol.-glume. Spikelets minute, half immersed in the alternating distichous cavities of a simple slender curved inarticulate spike, sessile, not articulate on the rhachis; rhachilla bearded, articulate at the base, not produced beyond the flowering glume. Lower invol.-glume minute, hyaline, persistent; upper invol.-glume linear-lanceolate, rigid, recurved in fruit, tip subobtuse or emarginate; floral glumes concealed by the upper invol.-glume which closes the cavity in which the floral glume is hidden, sessile, ovate or elliptic, hyaline, 1-nerved; callus very short, bearded with silky hairs; palea as long as the glume; keels smooth. Lodicules very minute, obliquely cuneiform. Stamens 3; anthers oblong. Styles short; stigmas plumose, laterally exserted. Grain oblong, smooth, brown, free in the glume.—DISTRIB. Species 6, in India, Algeria, and S. Africa.

1. **Oropetium Thomæum,** *Trin. Fund. Agrost.* (1820) p. 98. Whole plant 2—3 in. high, forming hard tufts with capillary root-fibres; stems compressed. Leaves shorter or longer than the stems, erect or curved, filiform, acute, coriaceous, striate, sparsely ciliate with long hairs; sheaths membranous, compressed; ligule an erect lacerate membrane. Spikes 1—$1\frac{1}{2}$ by $\frac{1}{30}$ in., erect, straight or slightly curved; rhachis undulating, 4-gonous. Spikelets reaching $\frac{1}{10}$ in. long, acute, 1-flowered. Lower invol.-glume minute, hyaline; upper invol.-glume $\frac{1}{12}$ in. long, linear-lanceolate, rigid, recurved in fruit; floral glume $\frac{1}{16}$ in. long, semicircular in profile, 2-fid, hyaline; callus bearded. Anthers $\frac{1}{60}$ in. long. Grain $\frac{1}{30}$ in. long, somewhat fusiform, reddish-brown. Fl. B. I. v. 7, p. 366; Dalz. & Gibs. p. 300; Trim. Fl. Ceyl. v. 5, p. 271; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain, Beng. Pl. p. 1231.

On old walls, *Dalzell & Gibson.* DECCAN: Poona, *Woodrow*; Junnar near Poona, *Woodrow*.—DISTRIB. Throughout the plains of India; Ceylon.

69. **BAMBUSA,** Schreb.

Shrubs or trees usually large and cæspitose (rarely climbing); stem-sheaths broad, the blade often triangular. Leaves shortly petiolate, not tessellate by nervules but sometimes so by pellucid glands; sheaths variously auricled. Spikelets 1-flowered, usually arranged in a large leafless panicle bearing heads or spiciform branches, or in leafy panicles, or in paniculate spikes. Lower glumes 1—4, empty or bulbiferous; flowering glumes ovate-lanceolate, the uppermost imperfect; palea 2-keeled. Lodicules 2 or 3, membranous, ciliate, rarely obsolete. Stamens 6, free. Ovary oblong or obovoid, with a hairy tip; styles short or long; stigmas 2—3. Grain oblong or linear-oblong, furrowed on one side; pericarp thin, adherent to the seed.—DISTRIB. Species about 50, Eastern Asia, 1 in Australia.

1. **Bambusa arundinacea,** *Willd. Sp. Pl.* v. 2 (1799) p. 245. Thorny; stems many, tufted on a stout rootstock, 80—100 ft. high by 6—7 in. in diam., usually graceful and curving; nodes prominent (the lowest rooting), the lower emitting horizontal, almost naked shoots armed at the nodes with 2—3 stout recurved spines sometimes 1 in. or more long; internodes up to 18 in. long; walls 1—2 in. thick; stem-sheaths coriaceous, variable in shape, up to 12—15 by 9—12 in., striate, with rounded tip and plaited margins, when young orange-yellow streaked with green or red and thickly ciliate with golden hairs, blade up to 4 in. long, triangular, acuminate, glabrous outside, densely hirsute inside, the margins decurrent, thickly ciliate; ligule narrow, entire or fringed with pale hairs. Leaves up to 7—8 by 1 in., linear or linear-lanceolate, tip stiff, glabrous or puberulous beneath, one or more margins scabrous, base rounded, ciliate, midrib narrow, nerves 4—6 with 7—9 intermediate and a few transverse pellucid glands; leaf-sheath ending in a thick callus and shortly bristly auricle; ligule short. Inflorescence an enormous panicle often occupying the whole stem; branchlets bearing loose clusters of pale, suberect, lanceolate, acute, glabrous spikelets ½—1 by ⅛ in. Involucral-glumes 2 or 0, ovate-lanceolate, acute or mucronate, ⅛—¼ in. long, many-nerved, empty; floral glumes 3—7, the uppermost 1—3 male or neuter; palea subacute with 2 ciliate keels. Lodicules 3, ovate or subovate, hyaline, ciliate, 1—3-nerved. Anthers yellow, obtuse. Style short. Grain ⅛—¼ in. long, oblong, beaked by the style-base, grooved on one side. Fl. B. I. v. 7, p. 395; Grah. Cat. p. 239; Dalz. & Gibs. p. 299; Gamble, Bamb. Brit. Ind. (1896) p. 51; Trim. Fl. Ceyl. v. 5, p. 313; Talb. Trees, Bomb. ed. 2, p. 347; Bedd. For. Man. in Fl. Sylvat. p. ccxxxi; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442; Prain, Beng. Pl. p. 1232; Watt, Dict. Econ. Prod. v. 1, p. 390. *Bambusa Arundo,* Klein & Nees, in Linnæa, v. 9 (1834) p. 471; Dalz. & Gibs. p. 299.—VERN. *Kalak.*

KONKAN: Western Ghâts, *Gamble.* GUJARAT: *Gamble*; Dangs, *Woodrow.*—DISTRIB. Throughout India except the Himalayas; Ceylon.

Bambusa vulgaris, Schrad. in Wendl. Collect. v. 2 (1810) p. 26, t. 47. Unarmed ; stems 20—50 ft. high by 2—4 in. in diam., rather distant, green, yellow, or striped ; nodes hardly raised ; internodes 10—18 in. long ; stem-sheaths 6—10 by 7—9 in., the top rounded, retuse. Leaves 6—10 by $\frac{3}{8}$—$1\frac{3}{8}$ in., pale, linear-lanceolate, petiolate, 6—8-nerved ; leaf-sheaths striate, laxly hairy ; ligule short, ciliate. Panicle large, leafy. Spikelets $\frac{5}{8}$—$\frac{7}{8}$ in. long, in bracteate clusters of 3—10. Invol.-glumes 1—2, ovate, acute, empty ; floral glumes 6—10, larger, then 1 imperfect flower above. Cultivated in Bombay, Poona, Sattara, and Kolhapur, but not indigenous. Fl. B. I. v. 7, p. 391 ; Dalz. & Gibs. p. 299 ; Bedd. For. Man. in Flor. Sylvat. p. ccxxxii ; Gamble, Bamb. Brit. Ind. (1896) p. 43 ; Trim. Fl. Ceyl. v. 5, p. 314 ; Talb. Trees, Bomb. ed. 2, p. 347 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442 ; Prain, Beng. Pl. p. 1232 ; Watt, Dict. Econ. Prod. v. 1, p. 394.—VERN. *Udha-báns.*

VAR. *striata,* Gamble, l.c. p. 44. Rather smaller in size, has the stems striped with yellow and green, while the branchlets are yellow and the leaves somewhat smaller and paler. A very handsome variety well deserving of a place in gardens. There is an excellent plate in the Bot. Mag. (6079) which shows the variegated stem well. It is supposed to be a native of China and Japan, and is probably the result of cultivation (*Gamble*). *Bambusa striata* (sp.), Lodd. ex Lindl. in Penny Cyclop. v. 3 (1835) p. 357.

Bambusa nana, Roxb. Hort. Beng. (1814) p. 25. A thickly-growing evergreen cæspitose shrub ; stems 6—10 ft. high, green when young, afterwards yellow. It is a native of China and Japan, and is sometimes grown in gardens. It makes a good hedge. Fl. B. I. v. 7, p. 390 ; Gamble, Bamb. Brit. Ind. (1896) p. 40 ; Trim. Fl. Ceyl. v. 5, p. 315 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442 ; Prain, Beng. Pl. p. 1232 ; Watt, Dict. Econ. Prod. v. 1, p. 392.—VERN. *Bárik ; Bámbu.*

70. **OXYTENANTHERA,** Munro.

Arborescent or scandent bamboos, usually of a medium or small size, unarmed, often gregarious ; rootstock stout, usually creeping and stoloniferous ; stem-sheaths various, usually rather narrow, the imperfect blade also narrow. Leaves variable, shortly petiolate. Inflorescence a large panicle of spicate heads of few or many spikelets. Spikelets narrow, elongate, conical, 1—3-flowered, the uppermost usually fertile. Invol.-glumes 1—3, empty ; floral glumes ovate, elongate, mucronate. Palea of lower florets 2-keeled, of upper florets convolute with obscure or obsolete keel. Lodicules 0. Stamens 6 ; filaments connate in an ultimately elongated membranous tube. Ovary ovoid ; style slender ; stigmas 1—3, more or less plumose. Grain elongate, beaked, grooved, smooth.—DISTRIB. Species 9, of which 8 are found in S. India, Birma, and Malaya, the remaining 1 a native of Tropical Africa.

Spikelets 1-flowered; style glabrous; anthers bristly-apiculate	1. *O. monostigma.*
Spikelets 2-flowered; style hairy; anthers acute, not apiculate	2. *O. Stocksii.*

1. **Oxytenanthera monostigma,** *Bedd. For. Man. in Flor. Sylvat.* (1873) p. ccxxxiii, *et Icon. Pl. Ind. Or.* (1874) p. 56, t. 234. A medium-sized bamboo ; stems 10—15 ft. high by about 1 in. in diam., solid, covered with soft pale yellow velvety tomentum ; nodes not very prominent ; internodes long ; stem-sheaths 6—9 in. long by 3 in. broad at the base, narrowed to the 2-lobed tip ; blade in the sinus imperfect, about 3 in. long, linear-lanceolate, striate ; ligule long, fimbriate. Leaves variable, pale green, 6—8 by 1½ in., linear-lanceolate, acuminate, unequally rounded at the base into a flat petiole, ending above in a setaceous twisted point, glabrous or nearly so above, sparsely hairy and pale beneath ; midrib below yellow, shining ; nerves 7—12 ; leaf-sheaths striate ; ligule often ⅓ in. long, acute or rounded. Panicle large, terminal, of spicate branches bearing dense globular often large heads of spikelets up to 2½ in. in diam. Spikelets ¾—1 in. long, less than 1 in. broad, 1-flowered, with a long spinous apiculation, very numerous, the fertile and sterile about equal in numbers. Invol.-glumes 2—3, mucronate, empty ; floral glume long, narrow, linear-lanceolate, convolute, with a long mucro ; palea shorter than its glume, concave, not keeled, obtuse. Stamens exserted ; anthers long, bristly-apiculate, the bristle somewhat hairy at the tip. Style long, glabrous ; stigma at length curved, thickened. Grain narrow, linear-oblong, grooved, tipped with the conic style-base. Fl. B. I. v. 7, p. 402 ; Gamble, Bamb. Brit. Ind. (1896) p. 74, t. 65 ; Talb. Trees, Bomb. ed. 2, p. 347 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442.—VERN. *Choua.*

KONKAN : Ghâts, *Talbot, Woodrow.* DECCAN : Sâkhar-Pathâr hill near Lanoli, *Woodrow* ; Sattara Ghâts, *Brandis* ; Mahableshwar, *Fagan* ; Poona districts, *Wroughton* ; Ahmednagar, *Wilkins.* S. M. COUNTRY : *Ritchie,* 820. KANARA : N. Kanara, *Woodrow, Talbot.*—DISTRIB. India (W. Peninsula).

2. **Oxytenanthera Stocksii,** *Munro, in Trans. Linn. Soc.* v. 26 (1868) p. 130. A slender bamboo ; stems 30 ft. high by 1—1½ in. in diam., grey-green, covered when young with a white or grey deciduous tomentum ; nodes with a softly pubescent ring ; internodes 6—12 in. long ; stem-sheaths 6—9 in. long by 3—7 in. wide at the base, tapering upwards to a concavely truncate top, appressedly brown-hairy on the back, ciliate on the margins ; blade imperfect, subulate, acuminate, rounded at the base and again expanded into a rounded, waved, long-fringed auricle on the top of the sheath ; ligule ⅓ in. long, deeply fimbriate, conspicuous. Leaves 4—8 by ⅜—¾ in., rounded or attenuate at the base into a very short petiole 1/10 in. long, the top ending in a setaceous point, glabrous or nearly so above, glabrous or hairy below, with scabrous margins ; midrib narrow ; nerves 5—6 ; leaf-sheaths striate, glabrous or at first pubescent ; ligule long, dentate. Panicle large, of spicate heads reaching 1 in. in diam., with many closely packed spinous spikelets, the heads supported by rounded chaffy bracts. Spikelets ⅜—½ in. long, narrow, glabrous, mucronate, many fertile mixed with a few sterile. Invol.-glumes 2, ovate, mucronate, 5—7-nerved, then 2 hermaphrodite florets ; floral glumes ovate, subacute, with a strong mucro from the back ; palea of the lower floret as long as the floret, 5-nerved between

the 2 ciliate keels, obtuse, that of the upper floret concave, convolute, obtuse. Stamens long-exserted ; anthers short, acute. Ovary ovoid, hairy ; style long, hairy ; stigma simple, plumose. Fl. B. I. v. 7, p. 403 ; Bedd. For. Man. in Flor. Sylvat. p. ccxxxiii ; Gamble, Bamb. Brit. Ind. (1896) p. 75, t. 66 ; Talb. Trees, Bomb. ed. 2, p. 348 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442.—Flowers : Nov. VERN. *Chivari* ; *Konda.*

KONKAN : *Stocks.* DECCAN : Panchgani (planted), *Woodrow.* KANARA : Kumpta, *Talbot;* commonly cultivated along the coast; rare in the Ghát forests of N. Kanara, *Talbot.*—DISTRIB. India (W. Peninsula).

71. DENDROCALAMUS, Nees.

Arborescent unarmed bamboos with densely branching root-stocks. Leaves shortly petiolate, the transverse nervules represented by pellucid glands. Spikelets in globose clusters on the long branches of a compound panicle, ovoid, 2—6-flowered. Invol.-glumes 2—3, empty, ovate, acute, many-nerved ; floral glumes like the empty ; palea of lower florets keeled, of the upper dorsally rounded, eciliate. Lodicules rare. Stamens 6 ; filaments free. Ovary hairy above, often depressed ; stigma usually simple. Grain small ; pericarp coriaceous or crustaceous.—DISTRIB. Species 16 ; South-eastern Asia.

1. **Dendrocalamus strictus,** *Nees, in Linnæa,* v. 9 (1834) p. 476. A deciduous densely tufted bamboo with strong stems 20—50 ft. high by 1—3 in. in diam., which are solid or only with a small cavity, glaucous-green when young, dull green or yellowish when old ; nodes swollen, the lower often rooting ; internodes 12—18 in. long ; upper branches decurved ; stem-sheaths variable, the lower 3—12 in. long, covered on the back with golden-brown stiff hairs (or in dry localities sometimes glabrous), striate, rounded on the top, ciliate on the margins, very slightly auricled, the imperfect blade triangular-subulate, hairy on both sides, especially so within ; ligule narrow. Leaves 1—2 in. long in dry localities, up to 10 in. long in moist ones, ¼—1½ in. broad, rounded suddenly at the base into a short petiole, gradually narrowed upwards into an acuminate twisted point, rough and often hairy above, softly hairy beneath, with scabrous margins ; nerves 3—6 pairs, with interposed pellucid glands ; leaf-sheaths striate, hairy, callus prominent, auricle short, ciliate with a few wavy deciduous-hairs ; ligule narrow, serrate. Inflorescence a large branching panicle of dense globular heads about 1 in. in diam, 1½—2 in. apart ; rhachis rounded, smooth. Spikelets usually hairy, spinescent, the fertile intermixed with many sterile smaller ones, ⅓—½ by $\frac{1}{10}$—⅓ in., with 2—3 fertile florets. Invol.-glumes 2 or more, ovate, spinescent, many-nerved ; floral glumes ovate, ending in a sharp spine, surrounded by ciliate tufts of hairs ; palea ovate or obovate, emarginate, the lower ones 2-keeled, the uppermost keelless, 6—8-nerved. Stamens long-exserted ; anthers yellow, shortly apiculate. Ovary stipitate, turbinate ; style long ; stigma simple, plumose. Grain ⅓ in. long, ovoid to subglobose, brown, shining, hairy above, beaked with the persistent style-base. Fl. B. I. v. 7, p. 404 ; Bedd. Flor.

Sylvat. t. 325, et For. Man. p. ccxxxv ; Gamble, Bamb. Brit. Ind. (1896) p. 78, tt. 68, 69 ; Talb. Trees, Bomb. ed. 2, p. 347 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442 ; Prain, Beng. Pl. p. 1234 ; Watt, Dict. Econ. Prod. v. 3, p. 72. *Bambusa stricta,* Roxb. Hort. Beng. (1814) p. 25 ; Dalz. & Gibs. p. 299.—VERN. *Kania báns ; Més.*

Throughout the Presidency in deciduous forests, *Talbot.* KONKAN : planted, *Woodrow.* DECCAN : rocky hills, *Gamble.* GUJARAT : Panch Mahâls, *Woodrow.*—DISTRIB. Throughout India ; Java. This bamboo is known as the "male bamboo."

Dendrocalamus giganteus, Munro, in Trans. Linn. Soc. v. 26 (1868) p. 150. A gigantic bamboo sometimes grown in gardens, a native of the Malay Peninsula and Penang. It is perhaps the largest bamboo known, the stems reaching 100 ft. high with a diameter of 8—10 in. Stem-sheaths very large, 20 in. long and about as broad at the base, the imperfect blade 5—15 in. long and reaching 3½ in. broad. Leaves up to 20 by 4 in., cuspidately acuminate ; ligule broad, fimbriate, sometimes cleft in the middle. Inflorescence a very large panicle with slender curved branches. Spikelets ½—⅝ by ⅓ in., many-flowered, ovate, acute, spiny. Anthers ⅓—⅜ in. long, acuminate at the tip. Fl. B. I. v. 7, p. 406 ; Gamble, Bamb. Brit. Ind. (1896) p. 87, t. 76 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442.—DISTRIB. Malay Peninsula ; Penang.

72. **OCHLANDRA,** Thw.

Shrubby gregarious reed-like bamboos ; stems small, thin-walled, erect ; internodes rather long ; stem-sheaths thin, persistent, auricles small. Leaves small to moderate-sized, linear or oblong-lanceolate, acuminate, shortly petiolate ; leaf-sheaths striate, fringed ; ligule usually short. Inflorescence a terminal spike or spike-like panicle on a leafy branchlet ; spikelets verticillate, partly fertile, partly sterile. Spikelets 1-flowered, often very large. Invol.-glumes 2—6, variable, usually mucronate, empty ; floral glume similar to the last invol.-glume, mucronate. Palea membranous, not keeled. Lodicules 1-several, conspicuous, variable, usually appressed to the filaments. Stamens many, from 6 to 120 ; anthers large, narrow, usually apiculate. Ovary narrow ; style elongate ; stigmas 4—6, plumose or papillose. Grain large or very large, ovoid, long-beaked, supported by the persistent glumes ; pericarp very thick, fleshy.—DISTRIB. India (W. Peninsula), Ceylon, Malay Peninsula ; species 7.

1. **Ochlandra Talboti,** *Brandis, Ind. Trees* (1906) p. 684. Stems numerous in dense clumps, slender, ½—¾ in. in diam., hollow, sometimes scandent ; nodes thickened, shining, glabrous. Leaves glabrous, pale, lanceolate, long-acuminate, 8—12 by 1½—2½ in., on a petiole ¼ in. long ; leaf-sheaths glabrous, the bristles at the mouth early deciduous ; ligule bearded. Spikelets in half whorls on a terminal erect spike 4—8 in. long, glabrous or with a few soft hairs at the tips of the glumes, the fertile spikelets few, 1¼ in. long. Invol.-glumes 3—6, empty. Lodicules 6, linear, nerved. Stamens 25—40 ;

anthers ½ in. long, minutely apiculate; filaments long, slender. Ovary prolonged into a slender style 1½ in. long; stigmas 5, papillose (*Talbot*). Grain ovoid, 2—3 by ⅓ in., narrowed into a long beak, supported by 4 persistent glumes. Flowered in 1896 in N. Kanara and had not been seen in flower for many years till then in that district. *Ochlandra Rheedei* var. *sivagiriana,* Talbot, Trees, Bomb. p. 348 (*not* of Gamble). *O. stridula,* Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442 (*not* of Thwaites).—VERN. *Huda.*

KANARA: Talbot.

This bamboo has been identified with *O. Rheedei* var. *sivagiriana* and with *O. stridula,* both of which plants flower annually, while this flowers at long intervals according to Mr. Talbot.—DISTRIB. India, W. Peninsula.

The following non-indigenous plants not belonging to any of the foregoing genera are grown for ornament or for economic use:—

Zea Mays, Linn. Sp. Pl. (1753) p. 971. The well-known *Maize* or *Indian Corn,* a tall stout annual monœcious grass, a native of America, is cultivated widely to afford a forage for cattle. It is not very largely cultivated for flour in the Bombay Presidency, though on the Panch Mahâls it ranks as a staple. It is grown widely for use as a vegetable, the unripe cobs being boiled or roasted. Fl. B. I. v. 7, p. 102; Grah. Cat. p. 240; Dalz. & Gibs. Suppl. p. 100; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 436; Prain, Beng. Pl. p. 1209; Watt, Dict. Econ. Prod. v. 6, part 4, p. 327.—VERN. *Buta; Maka.*

Avena sativa, Linn. Sp. Pl. (1753) p. 79. The common *Oat,* so well known and largely used as food for horses in Europe, is rarely cultivated in the Bombay Presidency. It has been grown in Hyderabad (Sind), but has not been found as good for horse-feeding as the *Gram* (*Cicer arietinum*). Fl. B. I. v. 7, p. 275; Dalz. & Gibs. Suppl. p. 97; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1217; Watt, Dict. Econ. Prod. v. 1, p. 356.—VERN. *Jai.*

Arundo Donax, Linn. Sp. Pl. (1753) p. 81. A native of the Lower Himalayas, the Panjâb, Naga, Nilgiri and Kurg Hills, extending to Europe and N. Africa, is often grown as an ornamental grass in clumps in large gardens or on lawns. It is a tall grass 6—10 ft. high, with flowers in large erect thyrsiform decompound panicles 1—2 ft. long. A variegated variety is also grown. Fl. B. I. v. 7, p. 302; Woodr. Gard. in Ind. ed. 5 (1889) p. 548; Journ. Bomb. Nat. v. 13 (1901) p. 440; Prain, Beng. Pl. p. 1218; Watt, Dict. Econ. Prod. v. 1, p. 336.

Triticum sativum, Lam. Flor. Fr. ed. 1, v. 3 (1778) p. 625. *Wheat,* widely cultivated, but nowhere found wild. Duthie, Fodd. Grass. N. Ind. (1888) p. 68; Watt, Dict. Econ. Prod. v. 6, part 4, p. 89. *Triticum æstivum,* Linn. Sp. Pl. (1753) p. 85; Roxb. Fl. Ind. v. 1, p. 359; Grah. Cat. p. 234; Dalz. & Gibs. Suppl. p. 97. *T. vulgare,* Villars, Hist. Pl. Dauph. v. 2 (1787) p. 153; Hook. f. Fl. B. I. v. 7, p. 367; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441; Prain,

Beng. Pl. p. 1231.—VERN. *Gahu ; Ghui.* The specific name *sativum* is 9 years prior to that of *vulgare.*

As is not uncommon in the case of plants under cultivation for a long period, under varying conditions of climate and soil, many varieties or forms exist, of which the two following are those chiefly cultivated in the Bombay Presidency :—

VAR. *spelta. Covered-Grain Wheat ; Spelt Wheat.* An inferior hard red wheat, the grain covered with a husk of indurated glumes, cultivated widely in the Bombay Presidency. *Triticum Spelta* (sp.), Linn. Sp. Pl. (1753) p. 86 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 (*Speltum*).—VERN. *Khapala ; Jod-Gahu.*

VAR. *pilosa.* Cultivated widely. The outer glumes are covered with much soft tomentum (*Dalzell & Gibson*). *Triticum pilosum* (sp.), Dalz. & Gibs. Bo. Fl. (1861), Suppl. p. 97 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441.—VERN. *Bakshi ; Kala-Kusali ; Kahno.*

Hordeum vulgare, Linn. Sp. Pl. (1753) p. 84. *Barley.* Annual, 2—3 ft. high, supposed by De Caudolle to have originated in Western temperate Asia. It is extensively cultivated in N. India, less extensively in the Bombay Presidency, where it is grown chiefly in Gujarat and Sind, less commonly in the Deccan. Fl. B. I. v. 7, p. 371 ; Prain, Beng. Pl. p. 1231 ; Watt, Dict. Econ. Prod. v. 4, p. 274. The three following varieties are cultivated :—

VAR. *hexastichon,* Aitch. Cat. Pb. & Sind Pl. (1869) p. 171. The most commonly cultivated kind. Spikelets in 6 rows. Fl. B. I. v. 7, p. 371 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 ; Watt, Dict. Econ. Prod. v. 4, p. 275. *Hordeum hexastichon* (sp.), Linn. Sp. Pl. (1753) p. 85 ; Grah. Cat. p. 234 ; Dalz. & Gibs. Suppl. p. 96.—VERN. *Satu ; Jau.*

VAR. *distichon.* Cultivated in Sind. Spikelets in 2 rows. Fl. B. I. v. 7, p. 371 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 441 ; Watt, Dict. Econ. Prod. v. 4, p. 274. *Hordeum distichon* (sp.), Linn. Sp. Pl. (1753) p. 85.—VERN. *Jau.*

VAR. *nudum,* a beardless variety with spikelets in 2 rows and with the grain free from the palea, known as *"Naked or Loose-grained Barley,"* is cultivated in Gujarat and Sind. Fl. B. I. v. 7, p. 372 ; Woodr. in Journ. Bomb. Nat. v. 13 (1901) p. 442. *Hordeum nudum* (sp.), Arduini, ex Schult. Mantiss. v. 2 (1824) p. 437. *Hordeum gymnodistichon* (var.), Duthie, Fodd. Grass. N. Ind. (1888) p. 70 ; Watt, Dict. Econ. Prod. v. 4 (1890) p. 274.—VERN. *Ua ; Ujan.*

GENERAL INDEX TO ORDERS, GENERA, SPECIES AND SYNONYMS.

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